7037 (143)

Aeronautical Engineering
A Continuing Bibliography with Indexes

NASA SP-7037(143)
January 1982

NEWARK PUBLIC LIBRARY
MAR 1 1 1982
U. S. GOVT. PUBS.
DEPOSITORY

National Aeronautics and
Space Administration

Aeronautical Engineering Aero
ering Aeronautical Engineering
ngineering Aeronautical Engine
cal Engineering Aeronautical E
nautical Engineering Aeronaut
Aeronautical Engineering Aero
ering Aeronautical Engineering
ngineering Aeronautical Engine
cal Engineering Aeronautical E
nautical Engineering Aeronaut
Aeronautical Engineering Aero
ering Aeronautical Engineering

NASA SP-7037(143)

Aeronautical Engineering
A Continuing Bibliography with Indexes

Pages 607-641

January 1982

NAS 1.21:

NASA SP-7037(143)

AERONAUTICAL ENGINEERING

A Continuing Bibliography

Supplement 143

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in December 1981 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB/141/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971. Since that time, monthly supplements have been issued.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 254 reports, journal articles, and other documents originally announced in December 1981 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A81-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $7.00 per document up to a maximum of 40 pages. The charge for each additional page is $0.25. Microfiche(1) of documents announced in *IAA* are available at the rate of $3.00 per microfiche on demand, and at the rate of $1.25 per microfiche for standing orders for all *IAA* microfiche. The price for the *IAA* microfiche by category is available at the rate of $1.50 per microfiche plus a $1.00 service charge per category per issue. Microfiche of all the current AIAA Meeting Papers are available on a standing order basis at the rate of $1.50 per microfiche.

Minimum air-mail postage to foreign countries is $1.00 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N81-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code followed by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page viii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 28:1 reduction).

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

SUBSCRIPTION AVAILABILITY

This publication is available on subscription from the National Technical Information Service (NTIS). The annual subscription rate for the monthly supplements is $55.00 domestic; $110.00 foreign. All questions relating to the subscriptions should be referred to NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield Virginia 22161.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B. W. I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A
STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-- 1/	-- 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more

Schedule E
EXCEPTION PRICE SCHEDULE
Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E99 - Write for quote

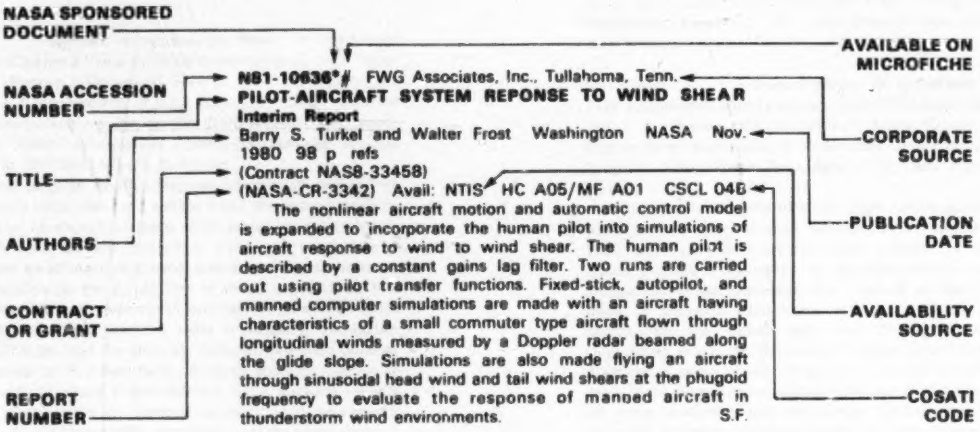
N01	30.00	45.00

TABLE OF CONTENTS

IAA Entries 607
STAR Entries 627

Subject Index A-1
Personal Author Index B-1
Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*

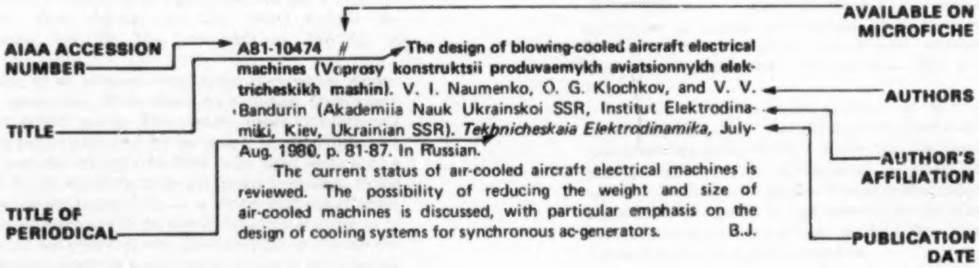


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
CORPORATE SOURCE
TITLE
PUBLICATION DATE
AUTHORS
AVAILABILITY SOURCE
CONTRACT OR GRANT
COSATI CODE
REPORT NUMBER

N81-10636*# FWG Associates, Inc., Tullahoma, Tenn.
PILOT-AIRCRAFT SYSTEM REPONSE TO WIND SHEAR
Interim Report
Barry S. Turkel and Walter Frost Washington NASA Nov. 1980 98 p refs
(Contract NAS8-33458)
(NASA-CR-3342) Avail: NTIS HC A05/MF A01 CSCL 04B

The nonlinear aircraft motion and automatic control model is expanded to incorporate the human pilot into simulations of aircraft response to wind to wind shear. The human pilot is described by a constant gains lag filter. Two runs are carried out using pilot transfer functions. Fixed-stick, autopilot, and manned computer simulations are made with an aircraft having characteristics of a small commuter type aircraft flown through longitudinal winds measured by a Doppler radar beamed along the glide slope. Simulations are also made flying an aircraft through sinusoidal head wind and tail wind shears at the phugoid frequency to evaluate the response of manned aircraft in thunderstorm wind environments. S.F.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AVAILABLE ON MICROFICHE
AIAA ACCESSION NUMBER
AUTHORS
TITLE
AUTHOR'S AFFILIATION
TITLE OF PERIODICAL
PUBLICATION DATE

A81-10474 # **The design of blowing-cooled aircraft electrical machines (Voprosy konstruktsii produvaemykh aviatsionnykh elektricheskikh mashin).** V. I. Naumenko, O. G. Klochkov, and V. V. Bandurin (Akademiia Nauk Ukrainskoi SSR, Institut Elektrodinamiki, Kiev, Ukrainian SSR). *Tekhnicheskaia Elektrodinamika,* July-Aug. 1980, p. 81-87. In Russian.

The current status of air-cooled aircraft electrical machines is reviewed. The possibility of reducing the weight and size of air-cooled machines is discussed, with particular emphasis on the design of cooling systems for synchronous ac-generators. B.J.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 143)

JANUARY 1982

IAA ENTRIES

A81-47142 **Aircraft recognition by means of monostatic radar (Signature d'avions à l'aide du radar monostatique).** J.-Y. Mevel and G. Launay (Rennes I, Université, Rennes, France). *(Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etude sur la Reconnaissance des Formes et Signatures Radar, Paris, France, Jan. 30, 1980.) Annales des Télécommunications,* vol. 36, May-June 1981, p. 347-358. 16 refs. In French.

Consideration is given to the potential for aircraft recognition using a monostatic radar receiving echoes from the aircraft surface. The reconstruction of aircraft attitude with respect to a monostatic radar based on radar-derived trajectory data and wind data is examined and the parameters observable based on the radar echo are considered in relation to the possibility of shape recognition. It is shown that, although the geometrical reconstruction of aircraft shape by the classical monostatic tracking radar is probably impossible, signature identification may be possible through extended observation and comparison with a data bank. A signal analyzer used in an experimental study of aircraft identification by a tracking radar is then described and results of spectral analysis of measurements performed on a variety of propeller and jet aircraft are illustrated. A.L.W.

A81-47143 **An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes (Méthode originale d'analyse du diagramme de diffraction en puissance d'une cible radar en vue de la reconnaissance des formes).** J. Saillard and G. Chassay (Rennes I, Université, Rennes, France). *(Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etude sur la Reconnaissance des Formes et Signatures Radar, Paris, France, Jan. 30, 1980.) Annales des Télécommunications,* vol. 36, May-June 1981, p. 359-368. In French.

The modeling of an airborne radar target is currently accomplished by the replacement of the object by a number of appropriately distributed bright points. The present paper considers the number of bright points necessary for the proper representation of a radar objective and the effective far-field radar cross section of a system modeled by an ensemble of bright points in relation to the problem of target shape recognition. It is shown that the effective cross section may be expressed as the sum of interference patterns of each possible set of two bright points. Consideration of the bipoint interference functions reveals that they can in turn be represented by a combination of Chebyshev polynomials of the first and second kinds, which can be reduced to an amplitude-modulated circular function and used to derive object dimensions by means of Fourier analysis. An example is presented of the analysis of a specific linear isotropic multipoint. A.L.W.

A81-47268 # **A formulation of the shimmy problem for swiveling wheels (Ob odnoi postanovke zadachi o shimmi orientiruiushchikhsia koles).** V. I. Goncharenko, L. G. Lobas, and N. V. Nikitina (Akademiia Nauk Ukrainskoi SSR, Institut Mekhaniki, Kiev, Ukrainian SSR). *Prikladnaia Mekhanika,* vol. 17, Aug. 1981, p. 82-88. 8 refs. In Russian.

Equations of motion are derived for a two-wheel landing gear strut with independently rotating wheels and an oblique alignment axis of the swivel on the basis of an improved version of the formulation proposed by Keldysh (1945). In the present approach, the complex parameter I used in the Keldysh formulation is ignored but, instead, an additional degree of freedom (in the lateral direction) is introduced. Although this results in higher dimensionality of the configuration space and higher order of the system of differential equations, the experimental determinations of the landing gear alignment become unambiguous. V.L.

A81-47425 * **Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981.** N. E. Brown and J. W. Brown (NASA, Johnson Space Center, Houston, TX). *International Astronautical Federation, International Astronautical Congress, 32nd, Rome, Italy, Sept. 6-12, 1981, Paper 81-251.* 22 p. 13 refs.

Reports in the field of space flight safety applicable to current and future operational space activities which appeared between July 1980 and June 1981 are surveyed. Subjects in the area of flight rescue and safety during launch, on-orbit, reentry and landing phases include the major activities and findings of the first Shuttle test flight, a slidewire system for emergency egress from the Space Shuttle on the launch pad, and the testing of the Spacelab engineering model. In the area of human capabilities and crew roles, attention is given to reports of repairs to the Salyut 6 space station made by a Soyuz crew, and an assessment of weightlessness effects on space worker health and safety. Safety requirements for STS payloads including pressure vessels, and the Orbiter window system and for spacecraft testing are also presented, along with those for a television system to aid in monitoring astronaut extravehicular activities. For the operation of large space structures, reports include EVA equipment for satellite servicing and the safety aspects of connectors used in construction. Finally, attention is given to safety-related criteria in a study of Shuttle interactions with the proposed Space Operations Center. A.L.W.

A81-47533 # **Errors of phase VLF navigation systems under conditions of auroral disturbances (Ob oshibkakh sistem fazovoi SDV-navigatsii v usloviiakh avroral'nykh vozmushchenii).** M. I. Beloglazov. *Radiotekhnika,* vol. 36, July 1981, p. 32-34. 5 refs. In Russian.

Experimental data on the operation of VLF navigation systems at high latitudes under conditions of the quiet and disturbed auroral ionosphere are analyzed. It is shown that the mean-square errors of position determination at distances of 6000-7000 km at high latitudes are 5-6 times greater than at midlatitudes. At distances of about 1000 km, errors at high latitudes are twice as great as those at midlatitudes for quiet conditions and four times greater than those at midlatitudes for disturbed conditions. B.J.

A81-47551 # **Development of the carbon fiber-reinforced side rudder for the Airbus (Entwicklung eines kohlefaserverstärkten Seitenruders für den Airbus).** D. Schulz (Messerschmitt-Bölkow-Blohm GmbH, Hamburg, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-055.* 15 p. In German. Research supported by the Bundesministerium für Forschung und Technologie and Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt. (MBB-UT-07-81)

Carbon-fiber-reinforced component parts have been developed to reduce aircraft weight, and thus render the aircraft more fuel efficient. The A310, designed for use by 1983, has spoilers, rudders, nose pieces, and fairings constructed of the carbon-fiber-reinforced material, which makes possible a 20% weight reduction over conventional components of light metals. Side rudders of the A300 and the A310 are compared, and goals such as an 18% weight reduction, acceptable maintenance costs, and similar manufacturing and safety standards are discussed. Construction limitations are considered, and material-specific problems are examined, including electrolytic corrosion, machinability, and the effects of humidity and temperature. Component tests are also conducted. It is found that the use of the carbon-reinforced component parts on aircraft as large as the A310 can lead to a 6000 kg weight reduction, with a yearly savings of 45 million D.M. for a fleet of 30 aircraft. D.L.G.

A81-47552 Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts (Aktive Böen- und Manöverlastregelungs-Konzepte am Beispiel des Airbus A 300. I - Auslegung eines Reglers im Zeitbereich zur Böenlastminderung und Nachprüfung der Wirksamkeit für stochastische Böen). J. Becker, O. Sensburg, and F. Weiss (Messerschmitt-Bölkow-Blohm GmbH, Ottobrunn, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-065A*. 55 p. 12 refs. In German. (MBB-FE-172/S/PUB/39)

An active gust load control concept was designed for an Airbus configuration with 10% span extension. The design was made in the temporal domain on the basis of a quasi-steady representation of the aerodynamics for a rigid-elastic aircraft. Maximum values for wing load reduction were determined for a specific case, taking into account the control of external aileron, spoilers, and the elevator. An inspection of the effectiveness of the designed control concepts was performed in the frequency range for stochastic gusts. Attention is given to results of flutter calculations, the relation between alleviation of gust load and damping of flutter, and the bending moment characteristics. G.R.

A81-47553 Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range (Aktive Böen- und Manöverlastminderungs-Konzepte am Beispiel des Airbus A300. II - Auslegung eines Reglers zur Böen- und Manöverlastminderung im Frequenzbereich). G. Beuck (Messerschmitt-Bölkow-Blohm GmbH, Ottobrunn, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-065B*. 27 p. 7 refs. In German. (MBB-UT-08-81)

A system which reduces surface loading due to vertical gusts and longitudinal maneuvers is considered. The employment of such a system in connection with an aircraft provides an approach for increasing the payload or the range of the aircraft. An investigation is conducted to explore the feasibility of using such an approach in the case of the A300 variant TA9. It is intended to retain the present wing structure of the A300B4 for the new design. Compared to the B4, the new aircraft is to have an extended wing tip and a greater payload. Currently existing A300 control surfaces are to be employed. The design of the controller for implementing the new system is discussed, taking into account an open and a closed loop system. The load reducing potential is determined along with the interior aileron, the three external spoilers, and the exterior aileron. G.R.

A81-47554 # The calculation of transonic blade tip flow at helicopter rotors (Zur Berechnung der transsonischen Blattspitzenumströmung bei Hubschrauberrotoren). H. Stahl and V. Mikulla (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-025*. 26 p. 11 refs. In German. (MBB-UD-320-81-OE)

Differences regarding the flow around the wing for fixed-wing and rotor-wing aircraft are discussed. A description is presented of results which were obtained with the aid of a rotor computational program based on the (two-dimensional) blade-element theory. The particular problem regarding the theoretical treatment of the flow around the blade tip is related to the characteristics of this flow, which is three-dimensional, unsteady, and becomes transonic on the advancing blade in the case of high forward speeds. Theories based on potential theory are discussed, although the assumptions of the theories are not satisfied at the rotating wing. Calculations using such procedures show, however, that the representation of the real flow relations at the blade tip is quite good. The procedures have the disadvantage of very long computation times. Attention is also given to a three-dimensional computational procedure of fixed-wing aerodynamics, which has been modified for a utilization in rotor calculations by introducing a Mach number gradient along the rotor radius. G.R.

A81-47555 # The calculation of separated flow at helicopter bodies (Zur Berechnung der abgelösten Strömung an Hubschrauberrümpfen). G. Polz (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-026*. 26 p. 17 refs. In German. (MBB-UD-321-81-OE)

In the case of helicopters, it is not always possible to avoid flow separation with wake formation at the rear of the fuselage. The wake region makes an analytical computation of the flow with the methods of the potential theory impossible. A survey of existing procedures for separated fuselage flows is provided, and a description is given of a computational model which is based on a combination of panel and boundary-layer computational procedures. The model makes use of a trailing body with uniform circulation distribution to simulate the wake region. The possibilities provided by the procedure are illustrated with the aid of pressure distribution and flowfield calculations. Results obtained in wind tunnel and flight tests are also shown. G.R.

A81-47556 Design and construction of a model which is dynamically similar to the A310 wing (Auslegung und Bau eines dynamisch ähnlichen modells des A 310 Flügels). H. Hönlinger (Messerschmitt-Bölkow-Blohm GmbH, Ottobrunn, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-035*. 31 p. In German. (MBB-FE-17/S/PUB/42)

In investigations conducted to evaluate the flutter characteristics of a wing with supercritical profile, it is necessary to take, for the transonic domain, into consideration also the effect of the steady angle of attack. An experimental verification of this effect requires a wind tunnel study of flutter models with particularly accurate profile geometry. A description is presented of the design and the construction of a flutter model for the A310 wing with supercritical profile. The requirements for the design of the model, in scale of 1:20, included, in addition to a high profile accuracy, also a simple and cost-effective method of construction. In the selected design, the stiffness distribution in the model is simulated by means of a simple steel box. Profile geometry and model mass distribution are imitated with the aid of a foam structure, covered with a glass-fiber laminate. A finite-element model was used for the design of a complex propulsion unit suspension, which was idealized by means of profile beams. G.R.

A81-47557 Surface-oriented coordinates for boundary-layer calculations in the case of general configurations (Oberflächenorientierte Koordinaten für Grenzschichtberechnungen an allgemeinen Konfigurationen). E. H. Hirschel (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-014*. 26 p. 5 refs. In German. (MBB-FE-122/s/PUB/41)

The calculation of three-dimensional boundary layers requires the selection of a suitable coordinate system. A description is presented of an approach for obtaining surface-oriented, curvilinear, nonorthogonal, locally monoclinic coordinates for general wing and body configurations. It is shown that the boundary-layer coordinates for calculations of the first order present a special case of these coordinates. Metric tensor and curvature tensor of the surface are discussed, and relations are given for the transformation of Cartesian components of the frictionless external flow into boundary-layer coordinates. The employed tensorial concepts are used in the formulation of the boundary layer equations, and for the calculation of the streamlines of the frictionless external flow and boundary-wall streamlines. The application of the considered concepts is illustrated with the aid of specific examples of boundary-layer calculations involving aircraft wings and bodies. G.R.

A81-47562 # Estimation of kinetic quantities of flight mechanics with a nonlinear observer (Schätzung flugmechanischer Bewegungsgrössen mit einem nichtlinearen Beobachter). H. Seidel (Messerschmitt-Bölkow-Blohm GmbH, Hamburg, West Germany).

Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-067. 26 p. 18 refs. In German.

Investigations have been conducted regarding the employment of linear observers for a surveillance or a replacement of transducers. The considered study is concerned with an attempt to employ in the observer a nonlinear model in place of the linear one. The motivation for the study is related to the nonlinear characteristics of the mathematical models for the motions of flight mechanics. An adaptation of the model to the current flight conditions, which is necessary in the case of linear models, will not be needed if a nonlinear model is employed. The estimation of the variables of state for the longitudinal motion of the aircraft is discussed. The nonlinear differential equations which describe the symmetrical motion of an aircraft are considered, taking into account the state parameters airspeed, angle of attack, pitch (inclination), and pitch rate. Simulation results are presented, giving attention to steady and unsteady aerodynamic flight characteristics, and disturbances produced by gusts. A test shows that an estimate of the angle of attack with an accuracy of approximately 1 deg is possible. G.R.

A81-47563 # **European transonic wind tunnel ETW - Status of the project at the end of the predesign phase (Europäischer Transsonischer Windkanal ETW - Stand des Projektes am Ende der Vorentwurfsphase).** W. Schröder. *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-027.* 27 p. 24 refs. In German.

The predesign of the Basis ETW with a test cross-section area of 3.2 sq m and a maximum pressure of 4.5 bar was completed in spring 1980. The need for a European transonic wind tunnel for conducting tests at high Reynolds numbers is discussed, taking into account current wind-tunnel developments in Europe and the U.S. The specifications for the ETW are considered. The maximum Reynolds number for the ETW has been raised to a value of 50 million. This was done to enhance the cost effectiveness of testing in the ETW and to reduce development risks. The ETW will, therefore, provide for future European aircraft developments conditions for full-scale testing over a wide flight range. Attention is given to the performance spectrum of the ETW, an evaluation of the predesign, operational aspects of the ETW, the thermal inertia of the model, the pilot wind tunnel, the cryogenic technology program, and the future phases of the ETW program. G.R.

A81-47564 # **Measures for increasing the service life of riveted, aircraft-relevant joints (Massnahmen zur Lebensdauererhöhung flugzeugrelevanter Passnietfügungen).** L. Schwarmann (Vereinigte Flugtechnische Werke GmbH, Bremen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-052.* 16 p. 10 refs. In German.

Proof of the service life of structural components exposed to dynamic stresses is required in connection with the design of supporting structures for an aircraft. It has been found that the service life of such components is often determined by the ability of the riveted joints to withstand the operational stresses. The reported investigation is, therefore, concerned with approaches which make it possible to increase the service life of the riveted joints. Analytical and experimental investigations regarding the feasibility of two approaches for prolonging the service life of riveted joints are discussed, taking into account studies conducted with a test bar which is representative for aircraft-construction applications. One approach makes use of a press fit for rivet and hole. The second approach involves strain hardening of the rivet hole before driving the rivet. G.R.

A81-47565 # **Recognizing defects in carbon-fiber-reinforced plastics (Erkennbarkeit von Fehlern in CFK-Laminaten).** R. Schütze and W. Hillger (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Strukturmechanik, Braunschweig, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-057.* 20 p. In German.

The damage tolerance of structures made of carbon-fiber-reinforced plastic is tested under various loads. Test laminate (73/1/1, 24/9/1, 1465 A) specimens of thickness 1.5-3.2 mm with various defects were subjected to static and dynamic loads. Special attention was given to delamination, and ultrasonic C-scans were made on the specimens. It was shown that cracks from even small defects can be detected with great accuracy. The same probes were also X-rayed; defects that could not be detected under ordinary X-rays were bored and studied under vacuum by a contrast technique. The nondestructive ultrasonic and X-ray tests were controlled by partially destructive tests, and good agreement was observed between the two. J.F.

A81-47580 # **Employment of development simulation for the realization of direct side force control in the case of an attack aircraft (Einsatz der Entwicklungssimulation bei der Realisierung einer direkten Seitenkraftsteuerung an einem Kampfflugzeug).** U. Nortmann and H. J. Munser (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-063.* 50 p. 21 refs. In German.

Direct side force control (DSFC) has been realized in the case of the Alpha Jet. The program used for the implementation of DSFC is discussed, taking into account the program status before the flight test. Attention is given to the Alpha Jet fixed-seat simulator used as flight simulator, the first simulation investigations for DSFC, employment simulations involving the use of DSFC, development simulations for the determination of the required damping systems (DS), simulations for the determination of specification data for DSFC elements and onboard installations, and simulations with DSFC-DC hardware. The application range of simulation methods for the development of modern attack aircraft is examined. G.R.

A81-47585 # **Instrumentation for measurement of flow properties on a swept wing in flight.** A. Bertelrud (Flygtekniska Forsoksanstalten, Bromma, Sweden). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-034.* 31 p. 16 refs.

Flight tests are performed to measure flow properties on a swept wing to improve methods of extrapolating wind tunnel results, and to obtain data supporting the development of computational methods. The approach to the flight test is described with emphasis on the differences in results obtained during wind tunnel testing of fluid flow properties. Problems in flight testing of aerodynamic flow are considered, including flight conditions, unsteadiness, flexibility, heat flux, and nonrepeatability. Experiments using a swept-wing attack aircraft with a 35 deg sweep of the 25% chord line are conducted, indicating static pressure in the leading edge and wing tip regions. The data acquisition system on the laboratory aircraft is described with data from reference and aerodynamic probes. The system is found to allow correlations to be performed with the flight mechanical and structural aspects of the aircraft, and it is shown how the access to a large computer is essential in such testing. D.L.G.

A81-47587 # **The half-model technique in the wind tunnel and its employment in the development of the Airbus family (Die Halbmodelltechnik im Windkanal und ihre Anwendung bei der Entwicklung der Airbus-Familie).** H. P. Franz (Vereinigte Flugtechnische Werke GmbH, Bremen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-118.* 38 p. In German.

The half-model technique for conducting measurements in the wind tunnel is particularly suited for the development of large transport aircraft. The technique is especially useful in connection with the determination and the improvement of the aircraft characteristics related to takeoff and landing operations. Expenses for models are reduced and the obtainable Re-numbers are increased by the factor two. Drawback of the considered technique are also discussed, giving attention to the very exacting requirements for obtaining results having absolute accuracy, and the impossibility to study lateral motions. Details of applications of the half-model technique to Airbus family development projects are examined. G.R.

A81-47595 # **The influence of the airspeed on jet turbulence and the consequences for the jet noise (Einfluss der Fluggeschwindigkeit auf die Turbulenz im Triebwerksstrahl und seine Folgen für den Strahllärm).** U. Michel (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Experimentelle Strömungsmechanik, Berlin, West Germany). *Deutsche Gesellschaft für Luft-*

und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-021. 15 p. 10 refs. In German.

The turbulence in a free jet is the cause of jet noise and consequently a study of the effect of airspeed on jet noise must take into consideration the influence of the airspeed on the turbulence. A model for the description of free jet turbulence is discussed, taking into account investigations reported by Ffowcs Williams (1963) and Michalke (1979). According to Michalke, it is assumed that in a coordinate system at rest relative to the nozzle, there is an extension of the axial coherence distance. Michalke's assumption was utilized in the model which was developed to describe the effect of airspeed on free jet turbulence. The validity of the model could be experimentally confirmed on the basis of measurements of the cross-spectral density of the pressure fluctuations in the free jet. An indirect proof of its validity is provided by the agreement of the corresponding experimental values with the data calculated by means of a relation derived on the basis of the model. The agreement, which is very good, shows that there are no other noise sources in addition to the free jet. The absence of noise sources in the interior of the engine leaves no possibility to achieve a further reduction in aircraft-produced noise. G.R.

A81-47601 # **Investigations of vortex formation on wings with cropped leading edges (Untersuchungen über die Wirbelbildung an Flügeln mit geknickten Vorderkanten).** U. Brennenstuhl and D. Hummel (Braunschweig, Technische Universität, Braunschweig, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-046*. 24 p. In German.

The aerodynamic characteristics of wings with cropped leading edges (double delta wings) are investigated. Measurements are made of the stress distribution and flow. Delta wings are found to produce flow with primary vortex accompanied by secondary separations of flow on each wing half. Streamlines are obtained with a marked secondary separation for wall streamlines on the suction side of the delta wing at an angle of incidence of 20 deg. Flow line development changes very little with inclinations of 20 deg, although a considerable change in flow develops at wing angles of 7.5 deg. At very large angles of incidence the two primary disturbances limit the maximum lift, and are found to originate from the wing tip and the cropping positions in the leading edges. Primary disturbances unite at growing angles of incidence, and produce changes in the stress distribution and aerodynamic parameters in the nonlinear incidence range. The investigation shows good correlation between calculations and measured results, which clarifies and quantifies the effects of turbulence on double delta wings. D.L.G.

A81-47603 # **Damage recognition and localization by means of differential modal analysis (Schadenerkennung und Schadenortung mittels differentieller Modalanalyse).** O. Bschorr and J. Mittmann (Messerschmitt-Bölkow-Blohm GmbH, Ottobrunn, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-056*. 11 p. 7 refs. In German.

The considered procedure for the recognition of defects is based on the measurement of the resonant frequencies and modes. Such measurements can be conducted for a new aircraft. A defect leading to a weakening in strength produces a displacement in the frequency. The theory of differential modal analysis is derived for the general case of an arbitrary structure, taking into account a partition of the investigated structure into finite elements. The vibrational behavior of this model can be described with the aid of the mass matrix and the stiffness matrix. A one-defect procedure is discussed. The accuracy of the localization procedure is investigated by studying four specimens involving aluminum rods of a length of 500 mm. The obtained results could be experimentally confirmed. G.R.

A81-47604 # **Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements (Beitrag zur Ermittlung des Widerstandsbeiwertes luftatmender Flugkoerper aus Windkanalmessungen).** D. Deppe and W. Schamel (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-036*. 19 p. In German.

The considered procedure for the determination of the drag coefficient is illustrated with the aid of two specific flight vehicle projects, involving a typical subsonic flight vehicle with relatively large aspect ratio and a supersonic flight vehicle, using jet propulsion. The objective was in both cases, to provide a reliable prediction of the total drag value and, in addition, of the drag contributed by the individual flight vehicle components, taking into account body, wings, tail unit, and, in particular, the inlets. The principles of model drag evaluation are considered and an evaluation scheme is provided for each of the two flight vehicle projects. Evaluation results obtained for the supersonic flight vehicle are presented, taking into account a standard evaluation and alternative approaches. Attention is also given to the procedures which can be employed to derive the desired data for the flight vehicle itself on the basis of the results obtained with a small-scale model. G.R.

A81-47609 # **Application of reduced natural longitudinal stability in the Airbus program (Anwendung reduzierter natürlicher Längsstabilität im Airbusprogramm).** U. Graeber and B. Fischer (Messerschmitt-Bölkow-Blohm GmbH, Hamburg, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-062*. 18 p. In German.

Advantages of the reduced longitudinal stability for an aircraft are related to drag reduction and performance improvements. The most significant advantage in the case of an airliner is a saving in fuel. The reported investigation shows that the realization of reduced natural longitudinal stability in the case of an aircraft of the type of the Airbus is possible by introducing a tail-unit trimming-tank system. The utilization of such a system makes it possible to affect the location of the center of gravity. The advantages and the limitations of this approach are discussed. The approach is suited for an optimal adaptation of the position of the center of gravity to the requirements of the phase of flight. G.R.

A81-47612 # **Onboard procedure for the measurement of wind shear gradients (Bordgebundenes Verfahren zur Messung von Scherwindgradienten).** G. Neuwerth and R. Hartel (Aachen, Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-060*. 18 p. 7 refs. In German.

The occurrence of wind shears constitutes a considerable risk for an aircraft, particularly during the takeoff and landing phases. The risk factors for the aircraft are connected with changes in lift and disturbances regarding the moments relations. A description is presented of a simple measurement procedure for the determination of the wind shear gradient. The considered onboard procedure can be employed for objectives of flight control and for meteorological measurements. The procedure is based on the measurement of the difference of dynamic pressures at two points of the aircraft. Two pitot tubes with a certain vertical distance from each other are connected by means of a flexible rubber tube. The described procedure was tested with the aid of an aircraft. The measured data showed good agreement with values obtained by means of a measurement device located on the ground. G.R.

A81-47616 # **A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy (Ein fail-op Duplex-Sensorkonzept für Flugregelsysteme auf der Grundlage analytischer Redundanz).** N. Stuckenberg (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugführung, Braunschweig, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-066*. 22 p. 7 refs. In German.

Based on a reliability concept of analytical redundancy, the fail-operational characteristics of a conventional triplex sensor configuration are determined by means of a duplex sensor configuration. Signals of instrument malfunction are generated by deterministic Luenberger observers. The operational efficiency of the reliability concept is determined as a function of the signal character of the instrument malfunction. As an example, the procedure is applied to the autopilot control system for the yawing motion of a HFB 320 commercial aircraft. The usefulness of this concept for a system of closed-loop design is shown to be questionable. Since no assumptions about the failure of the sensors or the signal character of an instrument malfunction can realistically be made, only those malfunctions which had a slight effect on the recognition algorithm and simultaneously a comparatively great effect on the controlled system could be given. The theory of optimal control shows that a deterministic optimal failure signal exists for every system configuration of every sensor. The performance of the concept is then determined by this signal pattern. J.F.

A81-47620 # **Ten years activity in the area of flight control for helicopters at night and in bad weather (Zehn Jahre Aktivität auf dem Gebiet der Flugführung von Hubschraubern bei Nacht und Schlechtwetter).** E. Kohnen (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugführung, Braunschweig, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-064.* 24 p. 5 refs. In German.

Various flight control systems were studied, taking into account simulated and real flight conditions. The subjects investigated are related to aspects of pilot acceptance, obtainable flight control performance, the pilot work load, and the performance provided by various sensors. The employment of visibility aids for the pilot is considered. Systems supplying such aids can enlarge the range of helicopter employment by providing the pilot, in case of insufficient natural visibility, with the possibilities for a flight under quasi-visibility conditions. The effect of a utilization of the novel systems on flight control performance and pilot work load was studied. Attention was given to the design of features of instrument and sensor indication display which are favorable from the viewpoint of human engineering. G.R.

A81-47621 # **Computational fluid mechanics and its impact on the aircraft aerodynamicist.** B. Hunt (British Aerospace Public, Ltd., Co., Aircraft Group, Preston, Lancs., England). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-003.* 45 p.

The capabilities of modern computer-based theoretical methods for predicting the basic types of aerodynamic flow are examined. It is shown that although the methods of computational fluid mechanics can never totally supplant all of the more traditional designer tools, they can offer substantial improvements in the design process, in the quality of the final product, and in the development time and costs. It is also noted that if the capabilities of modern computers are to be realized in the form of user-oriented programs, then careful consideration must be given to the environment for which these programs are to be developed. V.L.

A81-47622 # **Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics.** J. M. Muylaert (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-047.* 35 p. 29 refs. Research supported by the Bundesministerium der Verteidigung.

The influence of compressibility effects on vortex breakdown is investigated for the case of sharp-edged delta wings. Normal force and pitching moment measurements were made at Mach numbers of 0.60-0.85 for delta wing aspect ratios of 1.26, 1.6 and 2.0, with incidence angles varying between near-zero to well above the critical angle at which lee-side vortex breakdown was observed. Detailed study of the lee-side pressure distribution of a wing with an aspect ratio of 2.0 showed that, at the critical angle, the vortex bursting point suddenly jumps from behind the trailing edge to the 50% chord position, giving rise to loss of lift and nose down pitching moment. Schlieren photography and sublimation tests confirm these conclusions, which are visualized by means of water tunnel tests. Attention is given the effect of these phenomena on delta-winged missiles. O.C.

A81-47725 # **Prediction of range and endurance of jet aircraft at constant altitude.** C. W. Bert (Oklahoma, University, Norman, OK). *Journal of Aircraft,* vol. 18, Oct. 1981, p. 890-892. 15 refs.

Jonas (1947) has reported an analysis of range for turbojet-powered aircraft. Ashkenas (1948) has obtained an expression for a jet-aircraft range at altitudes below 35,000 ft and a logarithmic form for the constant-temperature stratosphere. In the current study, it is shown that neither the square-root expression derived by Jonas nor the logarithmic form are appropriate for constant-altitude cruise. The presented analysis removes two deficiencies in the earlier investigations and obtains a simple, closed-form expression which is more appropriate for constant-altitude cruise than either of the standard expressions of Jonas and Ashkenas. The closed-form equation is applied to an example problem. G.R.

A81-47785 **High peak energy shaped-pulse electromagnetic crack detection.** I. G. Hendrickson and K. A. Hansen (Boeing Co., Seattle, WA). In: Eddy-current characterization of materials and structures; Proceedings of the Symposium, Gaithersburg, MD, September 5-7, 1979. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 129-139.

A high peak energy, shaped-pulse, eddy current (SPEC) technique has been developed and investigated with the objective of improving crack detection of thick multiple-layer aircraft structures. The SPEC concept is reviewed, and it involves applying the high current level slow rise time or low-frequency portion of the shaped pulse to obtain the required depth-of-field penetration into the structure. The basic SPEC instrument is described: It is comprised of (1) a pulsar unit to produce the shaped current pulse, (2) a transmit or drive coil to generate the electromagnetic field to be injected into and collapsed out of the structure to be tested, and (3) a receive or pickup coil to detect the produced eddy currents/magnetic fields collapsing from within the structure and modified by cracks in the structure. Investigations include tests of variables, including base-metal conductivity, fastener variability, edge margin, interface gap, fastener height/countersink depth, upper-layer thickness, and probe lift-off. It is shown that crack-inspection capabilities of second-layer structures with 0.635 to 1.27-cm-thick upper layer skin have been improved significantly with the SPEC inspection system. K.S.

A81-47801 **Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979.** Symposium sponsored by the American Society for Testing and Materials. Edited by C. C. Chamis (NASA, Lewis Research Center, Cleveland, OH). Philadelphia, PA, American Society for Testing and Materials (ASTM Special Technical Publication, No. 734), 1981. 442 p. $44.

Papers are presented on special test methods for fibrous composites for quantifying design material properties. Studies are divided into four major areas: (1) new and special test methods, including those for transverse tensile strength, shear modulus, longitudinal compression, and impact resistance; (2) special test methods and analysis, including off-axes and angle-plied tension and compression, fracture and fatigue, and biaxial stress states; (3) design allowables, describing procedures for setting and selecting design allowables in general, and also for composite aircraft structures, graphite/polyimide bolted joints, cost-effective mechanical property characterization, statistical considerations, intraply hybrids, and compression and fatigue; (4) design allowables for special applications, describing procedures for buckling of cylindrical components, proof load of pressure vessels, strength of composite joints, and environmental effects and creep. The papers provide considerable information for test methods and for composite analysis of these methods, as well as tests and procedures for establishing design allowables. K.S.

A81-47811 **Developing design allowables for composite helicopter structures.** M. J. Rich and D. P. Maass (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 181-194. 13 refs.

A procedure is presented for developing static and fatigue design allowables for advanced composite materials used in aircraft structures. The allowables are established at the material lamina level accounting for environmental conditions such as moisture and elevated temperatures. Kevlar/epoxy and graphite/epoxy specimens are tested, and static and fatigue strength and the elastic constants are obtained for basic laminate orientations of a woven fabric and a unidirectional tape. Static test results are presented as a percentage of mean room temperature dry strength. It is shown that the environmental effects are more pronounced for the matrix modes than for the fiber modes of the fracture, and that Kevlar/epoxy is more sensitive to the environmental design conditions than graphite/epoxy. A constant-life diagram, representing fatigue test results as a percentage of room temperature wet static tensile strength, shows that the tension-compression and compression-compression range may be the major aspect of fatigue design. It is also shown that the use of small sample sizes using a simple normal distribution seems to be sufficiently accurate to establish static design allowables. K.S.

A81-47813 **Cost-effective mechanical property characterization.** J. A. Suarez (Grumman Aerospace Corp., Structural Mechanics Section, Bethpage, NY). In: Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 208-228. Contract No. F33615-78-C-5234.

Current cost-effective mechanical property characterization methods are described for advanced composites in automotive and stiffness-critical aircraft secondary structures, using coupon-type specimens tailored to the special application at hand. The automotive application involves the testing of a roof spider and gullwing doors of a brushed stainless steel and reinforced-plastic sports car, while the aerospace application involves the establishment of material and process specifications, selection of a long-term moisture-absorption criterion, and coupon static tests to establish design values with environmental and vacuum-pressure-cure knockdown factors. Data presented include those for test tensile strength and modulus for vacuum-pressure cured graphite/epoxy laminates of various fiber orientations. The design values, given as ratios of dry strength at temperature of autoclave-cured laminates, are established and used in the design of a trailing-edge component. Among the conclusions presented are that abbreviated coupon testing for static design values for secondary structures can be applied to expand utilization of composite structures and rapid processing of composites for high production rates or minimum manufacturing costs can result in a reduction of compression strength. K.S.

A81-47842 **Hyperbolic origins.** C. Powell. *Journal of Navigation*, vol. 34, Sept. 1981, p. 424-436. 26 refs.

An historical account is given of antecedents of modern radio position-fixing systems whose position lines are of hyperbolic form. Consideration is given (1) synchronized sound signals, by which simultaneous transmissions from different points made possible the derivation of a position line by the differential timing of signal reception; (2) sound ranging, in which the position of enemy guns was determined through a comparison of the times at which its report reached a number of listening posts; (3) radio-acoustic trials, in which the acoustic element consisted of sea-bottom hydrophones near shore; (4) comparison of radio signal strength, by which a chain of transmitting stations would enable receiving ships to find their position; (5) ranging and position fixing, where two pairs of receiving stations in a crossed-baseline layout fixed the position of a transmitter-carrying ship; (6) Doppler-effect radio systems; (7) hyperbolic position-fixing for mobile receivers; (8) free-running transmissions; (9) frequency-modulation, for the resolution of hyperbolic pattern ambiguity; and finally (10) the GEE, LORAN and QM systems. O.C.

A81-47843 **The relation between aircraft fuel reserves and navigation.** V. W. Attwooll (Civil Aviation Authority, London, England). *(Royal Institute of Navigation, Meeting, London, England, Jan. 21, 1981.) Journal of Navigation*, vol. 34, Sept. 1981, p. 437-449; Discussion, p. 450, 451.

A rational basis is presented for the determination of fuel uplift quantities in commercial operations, in relation to safety and regularity of services. Numerical models are devised as aids in estimating such factors as the regularity of service to be expected from a given fuel quantity uplifted at take-off, assuming that in-flight decisions about fuel usage are made in a rigid, automatic way. Navigation figures as an important element because all in-flight decisions demand exact knowledge of aircraft position. Attention is given the possible effects on fuel uplift policies of various changes and developments in aircraft equipment and air traffic control (ATC) systems; for instance: (1) the use of blind landing equipment of high reliability can influence a pilot's decision to continue holding or divert to an alternative landing site; and (2) airborne flight management systems are being developed to help the pilot implement fuel conservation through automatic estimates of the best speed and altitude to fly under given conditions, reducing fuel consumption by an estimated 1.6%. O.C.

A81-47844 **A simple radar for navigation accuracy measurements.** S. Nagaoka, E. Yoshioka, and P. T. Muto. *Journal of Navigation*, vol. 34, Sept. 1981, p. 462-469. 6 refs.

In order to survey height-keeping errors, a simple, height-finding radar, or Navigation Accuracy Measurement System (NAMS), has been developed. The radar, which is based on a curve-fitting method, consists of an antenna with fan-beam radiation pattern, a transceiver, a digitizer and a mini-computer; with the antenna rotating about a horizontal axis and scanning aircraft flying overhead. The height of detected aircraft is estimated by processing the data obtained over several scans. The height-measurement accuracy of NAMS depends upon the method of signal processing, the number of radar plots (depending on flight conditions), and the accuracy of input data. Results of a computer simulation of the system for the case of turbojet aircraft flying at altitudes of 30-40,000 feet are presented, in terms of lateral deviation in nm and estimated height measurement error. O.C.

A81-47888 **A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue.** J. R. Gebman (Rand Corp., Engineering and Applied Sciences Dept., Santa Monica, CA) and P. C. Paris (Washington University, St. Louis, MO). In: Fatigue crack growth measurement and data analysis; Proceedings of the Symposium, Pittsburgh, PA, October 29, 30, 1979. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 271-280. 9 refs.

The undetected propagation of a fatigue crack constitutes a significant cause of aircraft and other structural failures. To raise the structural failure load to a relatively high level, the manufacturer can divide the structure into many small elements, which significantly increases the ability of a structure to tolerate an element failure. This paper presents a procedure for calculating the probability that the structure has not failed, as the function of the crack propagation history for an undetected fatigue crack. The form of the procedure is so simple that computations with a desk calculator can yield reasonably accurate results. Moreover, the necessary input data are often readily available. By adopting such a procedure, aircraft manufacturers and operators can better identify those elements that pose the greatest threat to structural integrity. (Author)

A81-47957 # **Damping of turbomachine blade variations by subsonic flow.** G. S. Pisarenko, A. A. Kaminer, V. A. Balalaev, N. Ia. Nastenko, A. L. Stel'makh, and A. V. Dunaev. In: Aeroelasticity in turbomachines; Proceedings of the Second International Symposium, Lausanne, Switzerland, September 8-12, 1980. Zurich, Juris-Verlag, 1981, p. 151-161.

Experimental results are presented concerning aerodynamic damping for compressor blades in nonuniform subsonic flow with vortex wakes. The effects of stator and rotor spacing, maximum additional velocity in the wake, the orientation of the wake in relation to the profile chord, the regime parameters of the flow, and the geometrical parameters of the cascade were investigated. Results show that the nonuniformity of the flow which occurs in turbomachines has no influence on the aerodynamic damping. B.J.

A81-47959 # **Stability and flutter analysis of turbine blades at low speed.** T. J. Akai and H. Atassi (Notre Dame, University, Notre Dame, IN). In: Aeroelasticity in turbomachines; Proceedings of the Second International Symposium, Lausanne, Switzerland, September 8-12, 1980. Zurich, Juris-Verlag, 1981, p. 187-201. 9 refs. Contract No. F49620-76-C-0014.

An aeroelastic analysis for highly loaded turbine blades at low speed is carried out for various vibratory modes. These include pure bending and torsion as well as coupled oscillatory modes. The analysis is based on a complete aerodynamic theory which fully accounts for the blade geometry, flow conditions and cascade parameters. A damping coefficient simulating structural damping is also included. The results clearly show that classical flutter can occur for low speed turbine cascades at typical operating conditions. This is directly attributable to high blade loading and thickness. (Author)

A81-47961 # **Numerical experiments on unsteady flows through vibrating cascades.** M. Pandolfi. In: Aeroelasticity in turbomachines; Proceedings of the Second International Symposium, Lausanne, Switzerland, September 8-12, 1980.
Zurich, Juris-Verlag, 1981, p. 211-228. 8 refs.

A numerical approach is presented for computing the inviscid compressible 2D unsteady flow in a vibrating cascade. The full Euler Equations are considered and no restrictive assumptions are required about geometry of the blading. The analysis is here confined to subsonic flows. The description of the modeling of the boundaries and the numerical methodology is given. Particular attention is paid to the explicit treatment of the wake behind the blade during the unsteady flow. Checks on the accuracy of the computations are done and comments are given on few numerical examples. (Author)

A81-47962 # **Computer-aided investigation of turbomachine aerodynamics and aeroelasticity.** S. M. Belotserkovskii, A. S. Vol'mir, V. V. Kuleshov, M. I. Nisht, G. U. Stepanov, and R. M. Fedorov. In: Aeroelasticity in turbomachines; Proceedings of the Second International Symposium, Lausanne, Switzerland, September 8-12, 1980. Zurich, Juris-Verlag, 1981, p. 229-249. 31 refs.

The paper examines aspects of the computer-aided solution of aeroelasticity problems in turbomachines by the synthesis of numerical methods of unsteady aerodynamics and elasticity. In particular, it is shown that in solving nonlinear aeroelasticity problems it is necessary to perform the step integration of nonlinear equations of aerodynamics and aeroelasticity. Aerodynamic loads and deformations for each step can be corrected by an iteration method. B.J.

A81-47963 # **On the numerical analysis of stall flutter in turbine cascade.** S. Takahara (Mitsubishi Heavy Industries, Ltd., Nagasaki, Japan), T. Adachi, and Y. Kadoya. In: Aeroelasticity in turbomachines; Proceedings of the Second International Symposium, Lausanne, Switzerland, September 8-12, 1980.
Zurich, Juris-Verlag, 1981, p. 251-262. 7 refs.

The modified FLIC method using the triangular finite element mesh pattern was employed to solve the problem of unsteady stalled flow through a turbine cascade; the calculation was performed for the vibration of grouped blades without taking into account the interblade phase angle of vibration. Numerical results for low-pressure end blades of a steam turbine were compared with flutter test data on aerodynamic damping, and satisfactory agreement was obtained. It is concluded that this method is suitable for the prediction of the stall flutter characteristics of blade profiles. B.J.

A81-47966 # **Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans.** R. A. J. Ford (New South Wales, University, Kensington, Australia). In: Aeroelasticity in turbomachines; Proceedings of the Second International Symposium, Lausanne, Switzerland, September 8-12, 1980. Zurich, Juris-Verlag, 1981, p. 297-308.

The twin mode representation of coupled flexion-torsion vibrations in aeroengine fans is essentially a linear feedback system in which flutter is represented by system instability. In earlier papers the model was analysed from direct physical considerations; in this paper the analysis is extended, amplified and unified by applying classical automatic control theory to the twin mode model. The results generally confirm the basic conclusions of the earlier analysis although they have also identified and clarified a number of detail misconceptions which had arisen in the previous work. (Author)

A81-47993 **Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980.** Meeting sponsored by the American Society of Mechanical Engineers. Edited by P. J. Torvik (USAF, Institute of Technology, Wright-Patterson AFB, OH). New York, American Society of Mechanical Engineers (Applied Mechanics Symposia Series. AMD Volume 38), 1980. 163 p. $24.

Papers are presented on viscoelastic materials for damping applications, friction damping, damping applications in aeropropulsion systems, and the treatment of damping in transient computations. Attention is also given to the damping capacity of fiber reinforced composites, to the damping of panels due to ambient air, and to the application of damping for noise control in diesel engine components. C.R.

A81-47999 # **Damping applications in aero-propulsion systems.** J. P. Henderson (USAF, Materials Laboratory, Wright-Patterson AFB, OH). In: Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980. New York, American Society of Mechanical Engineers, 1980, p. 145-158. 21 refs. AF Project 2418.

Several applications of vibration damping technology to high cycle fatigue problems in jet engine components are discussed. It is shown that constrained layer damping treatments, using polymeric materials, have provided cost effective solutions to many difficult high maintenance cost situations. On the other hand, engine experience with vitreous enamel coatings for the damping of hot engine components, although very promising, has pointed the need for further material development for increased durability. (Author)

A81-48003 **Digital simulation for energy conservation in a large wind tunnel plant system.** F. L. Shope (ARO, Inc., Arnold Engineering Development Center, Arnold Air Force Station, TN). In: Annual Simulation Symposium, 13th, Tampa, FL, March 19-21, 1980, Record of Proceedings. Tampa, FL, Annual Simulation Symposium, 1980, p. 73-86. 12 refs.

This paper documents a feasibility study of mathematically modeling the wind tunnel complex and associated plant in the von Karman Gas Dynamics Facility at the Air Force's Arnold Engineering Development Center in Tennessee. The ultimate goal of the modeling effort is to effect energy conservation measures by modifying operational procedures and plant hardware. A general theory is proposed to model the aerodynamics and losses of each plant or tunnel component in terms of a set of 33 equations based on one-dimensional, unsteady, nonisentropic flow and admitting arbitrary interconnections between components. A computer program is currently under development to apply the theoretical model using the IBM Continuous System Modeling Program III. In conjunction with the modeling effort, an assessment was made of the existing experimental data base which could be used to drive the mathematical model. Requirements for experimental data are discussed in general terms. (Author)

A81-48009 **Simulation model to evaluate maintenance strategies for large network of fielded systems.** G. A. Wong (Mitre Corp., McLean, VA). In: Annual Simulation Symposium, 13th, Tampa, FL, March 19-21, 1980, Record of Proceedings. Tampa, FL, Annual Simulation Symposium, 1980, p. 311-326. U.S. Department of Transportation Contract No. FA80WA-4370.

A dynamic simulation model of a field maintenance organization has been developed and validated. The objective of the model is to provide an analytical tool for evaluating the operational feasibility of new maintenance strategies prior to their introduction into the field. This simulation model is an accurate replica of the policies and time critical maintenance activities within a field organization, providing a rendering in detail of each technician and each facility as events take place in time. This paper discusses the structure of the model, the functions simulated, the validation experiment, and an application of the model. (Author)

A81-48062 # **New developments in compact plate-fin heat exchangers.** K. O. Parker and M. G. Coombs (AiResearch Manufacturing Company of California, Torrance, CA). In: Compact heat exchangers - History, technological advancement and mechanical design problems; Proceedings of the Twenty-fourth Annual International Gas Turbine Conference and First Solar Energy Conference, San Diego, CA, March 11-15, 1979. Conferences sponsored by the American Society of Mechanical Engineers. New York, American Society of Mechanical Engineers (Heat Transfer Symposia Series. HTD Volume 10), 1980, p. 171-179.

The extension of compact plate-fin heat exchanger capabilities in order to accommodate the performance requirements of regeneratively cooled hypersonic ramjet engines, laser weapons, aircraft engine infrared suppressors, and large high-efficiency gas turbine cycles is described. Attention is given to cooling fluid flow path geometry and heat exchanger fabrication techniques, such novel materials as alumina and silicon carbide, and space and weight constraints imposed on designs by airborne application. It is shown that operating temperatures, pressures and area densities have been significantly increased. O.C.

A81-48064 **Fly-by-wire Jaguar.** G. Warwick. *Flight International*, vol. 120, Sept. 12, 1981, p. 816-818.

A status report is given for the fly-by-wire Jaguar fighter test bed, which is equipped with a full-time, quadruplex digital flight control system offering a theoretical mean time between catastrophic failures of 250 million hours. General consideration is given the advantages of fly-by-wire and electronic flight control systems (such as relaxed stability and stability simulation, respectively), and parallel developments for the Mirage 2000 and MBB F-104 and Advanced Fighter Technology Integration F-16 research aircraft are cited. Attention is given to the digital management of pilot maneuver demand inputs by the flight computer, the integration of sensor signals, fail-safe reliability of all system elements, pre-flight testing of input tolerances, and software development. Future avenues for design development of such systems and their application to advanced fighters are also discussed. O.C.

A81-48067 **F-100s set to become target drones.** D. M. North. *Aviation Week and Space Technology*, vol. 115, Sept. 28, 1981, p. 69-71.

The Military Aircraft Storage and Disposition Center has undertaken the conversion of about 300 stored F-100s into QF-100 target drones. An account is given of the techniques by which retired military aircraft are conditioned for storage, so that hydraulic, fuel, electrical and electronic systems may be rapidly brought to operating condition and all structures are protected from fatigue and corrosion. It is noted that the facility's location at Tucson, AZ, affords it the low rainfall, 10-20% humidity, and alkaline soil needed to minimize deterioration. Other aircraft in storage, such as A-4s that have been sold to Malaysia for active manned service, are also stored for eventual refurbishment by private companies. Other aircraft similarly processed have been F-102s, A-7s and F-8s. O.C.

A81-48079 **Droplet breakup regimes and criteria for their existence.** A. A. Borisov, B. E. Gel'fand, M. S. Natanzon, and O. M. Kossov (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR). *(Inzhenerno-Fizicheskii Zhurnal*, vol. 40, Jan. 1981, p. 64-70.) *Journal of Engineering Physics*, vol. 40, no. 1, July 1981, p. 44-49. 31 refs. Translation.

Experimental and theoretical work on droplet breakup by a gas flow in shock tubes and nozzles is reviewed. By analyzing experimental results, three droplet breakup regimes are identified: (1) droplet breakup of the parachute type, (2) droplet breakup with tearing off of the surface layer, and (3) explosive breakup of droplets. Conditions for the favored development of one or the other droplet breakup regimes are briefly discussed. V.L.

A81-48097 # **Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method (Raschet na sobstvennye kolebaniia tonkostennykh nereguliarnykh podkreplennykh obolochek tipa fiuzeliazha vertoleta konechno-elementnym metodom sil).** F. F. Baiazitov and Z. I. Burman. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela*, July-Aug. 1981, p. 149-159. 12 refs. In Russian.

An equation describing the natural vibrations of a fuselage is obtained in terms of the work method using a three-dimensional Green's function, and a transformation leading to an equation based on the method of displacements is given. A method is proposed for reducing the order of the dynamic matrix. It is shown that the natural frequencies obtained using a reduced-order matrix are in good agreement with frequencies obtained with a higher-order dynamic matrix. V.L.

A81-48120 **The role of the earth's shape in navigation - An example.** W. Kuebler and S. Sommers (Hydrotronics, Inc., McLean, VA). *Navigation*, vol. 28, Spring 1981, p. 29-33. 7 refs.

The accuracy of navigational fixes obtainable with present day navigation systems is such that the earth's geodesy must be considered, especially in comparing relative fixes. Approximations to the exact transformations between geodetic and geocentric coordinates can be made so as to optimize computer times. This paper presents the results of a systematic error analysis of these approximations to the exact coordinate transformations and the resulting real-time and core requirements on an AN/UYK-20 standard Navy mini-computer. (Author)

A81-48121 **An analytical solution of the two star sight problem of celestial navigation.** J. A. Van Allen. *Navigation*, vol. 28, Spring 1981, p. 40-43. Navy-supported research.

The classical problem of celestial navigation, in its simplest form, is the determination of an observer's longitude and latitude from the altitudes of two identified stars, observed at a known Greenwich Mean Time on a known date. A novel solution of this problem in closed analytical form is given herein. The solution yields the two possible positions of the observer without any prior knowledge of his position, without any dependence on tables of computed altitudes and azimuths for an assumed position, and without any graphical work. The basic two-fold ambiguity is resolved to yield a single, unique position by repeating the calculation using the altitudes of a third star and of one of the two previous stars. The full analytical solution is given as are some artificial numerical examples, readily performed on a hand-held, programmable calculator. (Author)

A81-48142 **Sliding-seal electron beam slot welding of an aircraft wing closure beam.** R. W. Messler, Jr. (Eutectic Corp., Flushing, NY). *Welding Journal*, vol. 60, Sept. 1981, p. 31-39.

A technique was developed for eliminating the seal wear associated with sliding-seal electron beam (EB) welding. This method, referred to as slot welding, involves the use of a cover plate that seals statically to the sliding seal welding head; the cover plate is sealed with an O-ring to a slotted chamber cover plate. By welding through the hole-and-slot arrangement between the sealing plate and a small movable vacuum chamber, the inherent advantages of EB welding can be combined with the rapid pump-down, low capital equipment cost, and the portability of the technique. Five tapered channel Ti-6Al-6V-2Sn wing closure beams for the F-14A were sliding-seal EB welded to demonstrate the system. The first four beams were welded using a partial penetration locking pass, followed by a full penetration locking pass at 30 kV/50 mA, 6.20 A, and 30 ipm; the fifth beam was welded without the partial penetration locking pass. The resulting welds were all uniform and fairly clean, but porosity was reduced in the fifth beam by elimination of the locking pass. The tensile, fracture toughness, and fatigue properties of the welded specimens were compared to those of the base metal and showed good results. J.F.

A81-48196 # **Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft (Analiz rabochego protsessa vozdushnykh turbokholodil'nykh ustanovok /VTKhU/ i ikh primenenie dlia nazemnogo konditsionirovaniia vozdukha na samoletakh).** E. Pasztor (Budapesti Muszaki Egyetem, Budapest, Hungary). *Periodica Polytechnica, Transportation Engineering*, vol. 9, no. 1, 1981, p. 37-47. 7 refs. In Russian.

The theory and operation of turborefrigeration plants which use air as refrigerant are examined. Consideration is given to the effects of losses in the various turborefrigerator components on the specific cooling power. It is shown that there exists an optimum value of the specific cooling power which depends on the pressure ratio. Applications of turborefrigerators are discussed with particular reference to on-the-ground air-conditioning of aircraft. V.L.

A81-48328 **The array processor - A real-time simulator.** M. E. Sturgeon (Floating Point Systems, Inc., Beaverton, OR). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 12-14.

The technique of parallel processing with an array processor is described; overviews are presented of architecture, functional components, software, and simulation applications (sea state simulation, aircraft simulation, and road simulation). The architecture features parallelism and pipelining in both the hardware and software. The floating-point arithmetic hardware provides fast high-precision calculations. The input/output interfaces provide access to the outside world via a variety of peripheral devices. A general-purpose computer with a host with a parallel processor offers an attractive alternative to the large mainframe or wholly analog system. B.J.

A81-48329 **Function generation techniques.** H. R. Justice (Computer Sciences Corp., Defense Systems Div., Huntsville, AL). In: Summer Computer Simulation Conference, Seattle, WA, August

25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 15, 16.

Available methods of function generation in real-time hybrid simulations are reviewed. A particular technique that was used on a real-time hybrid simulation of a Simplified Inertial Guidance-Demonstration (SIG-D) in the Advanced Simulation Center at Redstone, Alabama is presented in detail. It is shown that the Multi-Variable Function Generator (MVFG) developed by Electronic Associates provides an attractive alternative to the other available methods of function generation in a hybrid simulation. Because of the large bandwidth of the MVFG, multiplexing techniques can be used to expand the number of functions obtainable from the available MVFG units. The multiplexing scheme presented herein provides a reliable method of expanding the function generation capecity in any hybrid facility that contains function generators with similar characteristics to the MVFG. B.J.

A81-48333 **A technique for the implementation of nonlinear models as real-time digital simulations.** P. McLaughlin (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 111-115. 12 refs.

This paper presents a technique that can be utilized to perform real-time simulation tasks using digital computers. For certain types of nonlinear models, the computational stability of simulations employing this technique will be more attractive than that obtained from alternative approaches. This, in turn, allows the use of more complex models or, conversely, less expensive computers in these tasks. The technique is based on an implicit method used at the Pratt and Whitney Aircraft Group to simulate the steady-state and transient operation of turbine engines and their components. The manner in which the technique is implemented for a general nonlinear model is described. The stability and accuracy of the technique is compared to other methods used for real-time simulation. A discussion of modifications appropriate to programs employing integer arithmetic is included. (Author)

A81-48351 **Numerical simulation of hydrodynamic ram.** K. D. Kimsey (U.S. Army, Ballistics Research Laboratory, Aberdeen Proving Ground, MD). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 299-301. 8 refs.

The paper presents the results of a numerical simulation of a kinetic energy projectile with an L/D ratio of 3 impacting at normal oliquity a fuel cell simulator. The simulation has been performed using the two-dimensional EPIC-2 (Elastic-Plastic Impact Computation in 2 Dimensions) code. The technique is based on a Lagrangian formulation where the equations of motion are integrated directly, rather than through the traditional stiffness matrix approach. The analysis has confirmed that the entrance panel petaling results from the fluid impulsively accelerating the entrance panel. The hydrostatic pressures generated in the fluid initiate bulging of the exit panel prior to perforation by the penetrator. V.L.

A81-48358 **The evolution of real-time digital simulation of aircraft for training applications.** G. V. Amico and C. E. Lindahl (U.S. Navy, Naval Training Equipment Center, Orlando, FL). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 365-370. 15 refs.

The evolution of real-time digital simulation for flight trainers is reviewed with emphasis on computer system architecture, iteration rates, and programming. With respect to computer architecture, the trend has been one of going from expensive CPU's to the present system architecture of inexpensive and powerful distributed processors based on a functional allocation to the subsystems involved in the flight trainers. Iteration rates are expected to be influenced by on-board computers whose iteration rates may exceed the current 30 Hz standard. Progress is also expected in the use of FORTRAN as more efficient compilers are developed by computer manufacturers for real-time simulation. V.L.

A81-48359 **Probe protection in camera/model visual systems.** P. J. Bellocchio and R. B. Mallinson (Singer Co., Link Flight Simulation Div., Binghamton, NY). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 371-374. Contract No. N61339-76-C-0086.

A system has been developed for protecting the optical probe from collision with the modelboard during low altitude flight simulation in helicopter training simulators. The system uses a solid state infrared laser as a probe height sensor and an auxiliary impact sensor for additional protection around the probe tip. The probe protection software makes use of the probe height sensor output to make a decision as to whether a crash is imminent, and if necessary, issues a command for an emergency retraction of the probe. V.L.

A81-48368 **Simulation of Microwave Landing System.** J. K. Hsiao (U.S. Navy, Naval Research Laboratory, Washington, DC). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 542-546.

The FAA Microwave Landing System (MLS) uses a Time Reference Scanning Beam configuration. The ground installation uses two linear electronically scanned antenna arrays, scanning in azimuth and elevation directions. Radiating signals from the arrays in the 'TO' and 'FRO' directions received by a landing aircraft can be used to determine accurately the aircraft's angular position in both azimuth and elevation. The accuracy of the angle measurement depends on the beam steering algorithm, array component tolerances, multipath effects, failures in the array, and other associated problems. A computer simulation has been developed which represents the performance of the various phased array antenna systems which are being considered for use in the Microwave Landing System. The purpose of this simulation is to assess the angular accuracy of MLS in terms of its design parameters, tolerance effects, component and subsystem failures, multipath, and angle detection algorithm. The entire angle-measurement process used in MLS is modeled, including the phased array antenna, the beam steering algorithm, multipath propagation, and the airborne receiver and angle processor. (Author)

A81-48369 * **Time delays in flight simulator visual displays.** D. F. Crane (NASA, Ames Research Center, Moffett Field, CA). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 552-557. 13 refs.

It is pointed out that the effects of delays of less than 100 msec in visual displays on pilot dynamic response and system performance are of particular interest at this time because improvements in the latest computer-generated imagery (CGI) systems are expected to reduce CGI displays delays to this range. Attention is given to data which quantify the effects of display delays in the range of 0-100 msec on system stability and performance, and pilot dynamic response for a particular choice of aircraft dynamics, display, controller, and task. The conventional control system design methods are reviewed, the pilot response data presented, and data for long delays, all suggest lead filter compensation of display delay. Pilot-aircraft system crossover frequency information guides compensation filter specification. G.R.

A81-48371 **Application of optimal control and estimation to autopilot and autothrottle systems.** P. D. Daniels and D. Gangsaas (Boeing Commercial Airplane Co., Seattle, WA). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 562-565.

Methods for improving autopilot and autothrottle designs are discussed. Particular attention is given to reducing speed and path deviations and control surface activity in the presence of gust wind shear disturbances during the climb, cruise, and descent phases of flight. Linear quadratic regulator synthesis is used for the design of optimal full state feedback controllers. Kalman filters are designed for optimal estimation of airplane and wind states, and computer simulations are used for evaluation of various control designs. V.L.

A81-48373 **Optimization of simulation models for avionics software verification.** S. L. Benning (USAF, Avionics Laboratory, Wright-Patterson AFB, OH) and A. C. Brewer (Systems Consultants, Inc., Dayton, OH). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 570-573. 5 refs. Contract No. F33615-79-C-1739.

Various optimization techniques applied to maintain a cost-effective simulation system are investigated for the reorganization of the DAIS models simulation system. Present model requirements are discussed, and methods of optimizing are presented, including system analysis, priority matrix, SET/USE program, standard comment header, COMMON standard, structured FORTRAN, and word processing. Three phases of testing are used to verify the enhanced performance of the models, including stand-alone testing, integration and functional testing, and system testing. Any anomalies are detected, corrected, and verified to confirm proper operation. Results demonstrate an exceptionally effective methodology with widespread applications, producing faster and better structured models which are more readily maintained and transported. D.L.G.

A81-48376 Development considerations for real-time aircraft/avionic distributed computer control systems. R. D. Hawkins (U.S. Naval Air Systems Command, Washington, DC). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 586-589.

Concepts in real-time aircraft/avionic distributed computer control systems are investigated in an effort to produce a superior avionic product. NATO's efforts to establish an architecture oriented avionics technology are discussed, and the objectives of the Tactical Air Combat Technology Integration and Coordination System (TACTICS) are presented, including a continuity in the design process as a result of close interaction between all major elements of the computer system. The objectives of the systems software simulation laboratory and the real-time simulation laboratory are also presented, including the synthesis and formulation of tactical air combat avionics suites and the physical validation of actual hardware. Needs of the TACTICS facility such as the development of structured methodology to perform the synthesis functions are explained, and the solution is found in the structured design approach which requires the partitioning of the system functions into isolated modules. D.L.G.

A81-48379 Engine requirements for the T-37 trainer aircraft - A simulation study and analysis. T. D. Clark, Jr., L. W. Emmelhainz, and M. A. Martinez (USAF, Institute of Technology, Wright-Patterson AFB, OH). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 660-662.

The Air Force requires an operational inventory of aircraft engines to maintain the flow of T-37 aircraft used in basic pilot-training programs. This paper reports the results of a study of the system for acquiring and managing engines and components to support the flying training program. A network model was constructed and tested, and a number of experiments conducted to address key issues and problems in the system. The model is programmed using the Q-GERT simulation language. It focuses on the engine service required to support given levels of flying activity. Inventory levels at distributed points in the system are investigated and policies for placement recommended. The structure of the repair system is focused upon and various alternatives for its design are investigated. (Author)

A81-48380 Determination of cargo container inventories through logistics simulation. D. H. Cone (Boeing Computer Services Co., Seattle, WA). In: Summer Computer Simulation Conference, Seattle, WA, August 25-27, 1980, Proceedings. Arlington, VA, AFIPS Press, 1980, p. 714-718.

A Container Movement Logistics Model was designed to evaluate the air shipment of cargo containers within a network of airport pairs. The simulation described in the paper was designed to determine the number of cargo containers required for a known level of air shipments, but the technique may be applied to surface transportation modes including rail, truck, and ship. (Author)

A81-48385 Transient vibrations of elastic panels due to the impact of shock waves. J. R. Coleby and J. Mazumdar (Adelaide, University, Adelaide, Australia). *Journal of Sound and Vibration,* vol. 77, Aug. 22, 1981, p. 481-494. 14 refs.

The dynamic response of elastic panels subjected to pressure loadings by shock waves is investigated. Accurate approximate solutions for the time-history response (displacement and strain) of both a completely clamped panel and a simply supported panel are obtained. The transient behavior is discussed by using the isoamplitude contour lines method in conjunction with the normal mode method. The derived analyses are shown to be applicable in estimations of window, wall panel, or flat roof response to sonic boom or explosion blast waves. Illustrative examples are given for the response of an undamped skew panel and for an undamped triangular panel. Results, given in graphic form, are in good agreement with those obtained in previous investigations. J.F.

A81-48390 Finite strip analysis of singly curved skin-stringer structures. M. Petyt and C. C. Fleischer (Southampton, University, Southampton, England). *Journal of Sound and Vibration,* vol. 77, Aug. 22, 1981, p. 561-571. 17 refs. Research supported by the Ministry of Defence (Procurement Executive).

It is shown that the finite strip method can accurately predict the natural frequencies and modes of vibration of singly curved, skin-stringer arrays. The elements analyzed included a rectangular, singly curved, finite strip shell element and a new, compatible thin walled, open section beam element. Convergence studies for freely supported and clamped singly curved, rectangular shells show that only a few strips need to be used to obtain good accuracy. Both five bay and 15 bay skin-stringer structures were analyzed; the five bay structure analysis produced results similar to those of the transfer matrix method; the frequencies and mode shapes obtained in an analysis of the 15 bay structure also agreed closely with experimental measurements. J.F.

A81-48395 * Trailing edge noise prediction from measured surface pressures. T. F. Brooks (NASA, Langley Research Center, Hampton, VA) and T. H. Hodgson (North Carolina State University, Raleigh, NC). *Journal of Sound and Vibration,* vol. 78, Sept. 8, 1981, p. 69-117. 35 refs. Grant No. NsG-1377.

Trailing edge (TE) noise is investigated for the case of a two-dimensional airfoil embedded in a uniform low Mach number flow, and the usefulness of several TE noise theories is examined by applying them to the measured data. The TE noise spectra and directivity are quantitatively determined for the case of a high Reynolds number and a fully turbulent boundary layer. Parameters include angle of attack, flow velocity and TE bluntness. Evanescent wave theories by Chase (1975) and Chandiramani (1974) are compared to the present results and show good agreement. Agreement of the near field pressure scatter phenomenon analysis with measurements implies that the basic assumptions used in the analysis are correct, i.e., the turbulent boundary layer (TBL) flow passes the trailing edge into the wake region. No hydrodynamic wake shedding activity is confirmed for the two-sided TBL flow, and a method incorporating the principles of the coherent output power method is used to determine the sound field. The near field edge scatter model is found to not only establish optimum sizing of edge treatment for noise control, but also to separate and identify the scattered field from the incident hydrodynamic field. D.L.G.

A81-48401 # Operational characteristics comparison /ACV and SES/. F. W. Wilson and P. R. Viars (U.S. Naval Material Command, David W. Taylor Naval Ship Research and Development Center, Bethesda, MD). *American Institute of Aeronautics and Astronautics, Marine Systems Conference, 6th, Seattle, WA, Sept. 14-16, 1981, Paper 81-2064.* 12 p. 8 refs.

The performance of a fully skirted air cushion vehicle (ACV) relative to a sidehull air cushion vehicle or to a surface effect ship is evaluated by comparing the estimated total drag and power of the two vehicle types. The craft are compared on the basis of equivalent displacement, length-to-beam (L/B) ratio, loading, and speed. Drag estimation techniques, developed under the Amphibious Assault Landing Craft project for the ACV predictions and under the Surface Effect Ship project for the SES predictions, are used in the evaluation. The parameter ranges covered in the study were speed (30 to 70 knots), displacement (100 to 10,000 long tons), and loading (1.0 and 3.0 lb/ft). Results indicate that each craft type has distinct operational ranges where it has a powering advantage over the other craft. (Author)

A81-48416 # A new approach to weapon separation aerodynamics. F. A. Tessitore, A. Cenko, R. C. Meyer (Grumman

Aerospace Corp., Bethpage, NY), R. D. Dyer, and J. D. Waskiewicz (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Conference, Dayton, OH, Aug. 11-13, 1981, Paper 81-1654.* 8 p. 8 refs.

An innovative approach has been developed for predicting the aerodynamic forces and moments acting on a store during separation from a parent aircraft. The method utilizes data obtained for one store in the flowfield to predict the forces and moments of another store in the same flowfield by identifying the local angle-of-attack distribution in proximity to the parent aircraft. Extensive comparisons between theory and test are shown for two different parent models, each with two different stores (four stores in all) at supersonic speeds, indicating the excellent correlation achieved. The potential for substantial wind tunnel cost savings is identified. (Author)

A81-48417 # **Determination of thrust and throttle-dependent drag for fighter aircraft.** B. L. Hunt and N. S. Gowadia (Northrop Corp., Aircraft Div., Hawthorne, CA). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Conference, Dayton, OH, Aug. 11-13, 1981, Paper 81-1692.* 15 p. 13 refs.

This paper reviews the problem of determining the thrust and throttle-dependent drag of fighter aircraft. The flight conditions for which throttle-dependent drag is important are identified. Means of determining throttle-dependent drag are discussed with particular emphasis on wind tunnel techniques and the incorporation of the results into the overall drag build-up of the aircraft. Procedures are described for determining thrust and drag from flight test data. Finally, the impact of advanced concepts, such as thrust vectoring, thrust reversing and highly integrated concepts, on propulsion testing is discussed. (Author)

A81-48479 **Measured pressure distributions and shock shapes on a simple delta wing.** L. C. Squire (Cambridge University, Cambridge, England). *Aeronautical Quarterly,* vol. 32, Aug. 1981, p. 188-198.

This note presents the results of an experimental investigation of the flow over a simple delta wing designed for a Mach number of 3.5. Complete pressure distributions were measured for incidences of 0 deg, 10 deg and 20 deg at Mach numbers of 2.5 and 3.5. A number of schlieren photographs of the shock system around the wing were obtained at the same conditions, and surface streamline patterns were studied at M = 3.5. The measurements were made to support numerical calculations which use this wing as a test case. (Author)

A81-48480 **Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions.** D. J. Salmond (Royal Aircraft Establishment, Farnborough, Hants., England). *Aeronautical Quarterly,* vol. 32, Aug. 1981, p. 199-211. 9 refs.

A method is described for calculating numerically the aerodynamic stiffness and damping coefficients and loading distributions for a two-dimensional thin aerofoil oscillating harmonically in subsonic flow, from the Possio Integral Equation by approximating the loading by a finite series of basis functions. Sample loading distributions obtained by using the method are presented for a Mach number of 0.9 and a frequency parameter of 0.4. (Author)

A81-48544 **Adaptive features and measurement requirements for advanced surveillance radars.** B. H. Browne, Jr., L. Ekchian, and L. J. Lawdermilt (Sperry Corp., Clearwater, FL). In: EASCON '80; Electronics and Aerospace Systems Conference, Arlington, VA, September 29-October 1, 1980, Conference Record. New York, Institute of Electrical and Electronics Engineers, 1980, p. 190-194. 10 refs. Contract No. F30602-79-C-0152.

The measurement accuracy requirements for several classes of tactical air control problems are discussed, and adaptive approaches to beam scheduling and tracking are presented that exploit the agile beam capabilities of the radar to jointly meet both search and track requirements over a wide range of tactical situations. It is found that adaptive features are required in future agile-beam surveillance radars, including adaptive beam scheduling, adaptive waveform selection, adaptive tracking filters, and tracking filter selection. It is noted that in future agile-beam surveillance radars it will be expedient to employ algorithms that adaptively select tracking filters matched to the assessed tracking difficulty and available processing power. C.R.

A81-48547 **COMLINK - A communications/EW analytical and modeling tool.** R. K. Keenan (Keenan Corp., Vienna, VA). In: EASCON '80; Electronics and Aerospace Systems Conference, Arlington, VA, September 29-October 1, 1980, Conference Record. New York, Institute of Electrical and Electronics Engineers, 1980, p. 244-252. 10 refs.

COMLINK is defined as a user-interactive microcomputer-based system designed to provide an objective basis for rapid and accurate analyses and modeling of communications scenarios involving three-dimensional dynamic tactical and strategic geometries, with or without jammer. The analytical approach to the conditions of no spectrum spreading, frequency hopping, direct spread spectrum, and hybrid Blue modes (the modulation being QPSK or BPSK or FSK or SQPSK) and follower or barrage or no jammer are discussed. Numerical results are given for an example tactical problem (16 kbit QPSK voice, follower jammer). The purpose is to record the insights of a certain group of engineers on how to deal with the 'dB bookkeeping' problem when the computational tedium index is stressed in the analysis of modern spread-spectrum communications systems. C.R.

A81-48558 # **Availability requirements of the future ATC system.** A. G. Zellweger (FAA, Washington, DC). In: EASCON '80; Electronics and Aerospace Systems Conference, Arlington, VA, September 29-October 1, 1980, Conference Record. New York, Institute of Electrical and Electronics Engineers, 1980, p. 400-405.

The functional evolution of ATC computer availability requirements is reported with emphasis on fault tolerance and system backup to establish the evolving requirements for availability. ATC is characterized in terms of a closed loop theory model consisting of functional elements such as a data managing function and a system function which executes control actions and is subject to disturbances such as weather and equipment outages. The ATC system of the 1980's and beyond the 1990's is discussed, and improvements are proposed, including increasing the number of control processes automatically performed, and entering new and revised data at all operational positions. Present and future fault tolerance requirements are also discussed, and improvements in error detection and isolation are suggested, which require greater software correctness through proofs of critical modules. Safety is the overriding concern, and a quantitative increase in confidence in system safety is sought. D.L.G.

A81-48559 * **Reliability validation of systems for life-critical applications.** K. S. Trivedi (Duke University, Durham, NC), J. W. Gault (North Carolina State University, Raleigh, NC), and J. B. Clary (Research Triangle Institute, Research Triangle Park, NC). In: EASCON '80; Electronics and Aerospace Systems Conference, Arlington, VA, September 29-October 1, 1980, Conference Record. New York, Institute of Electrical and Electronics Engineers, 1980, p. 406-409. 7 refs. Contract No. NAS1-15833.

A framework is proposed which addresses traditional reliability validation approaches consisting of life testing techniques which are inapplicable for digital flight control systems. A specific validation methodology is identified based on logical proofs, analytical modeling, and experimental testing. Research activities required to support continued development of validation technology are identified, and the validation procedure is driven by the reliability model obtained from the system description. The analytical reliability model is shown to be a proper abstraction of the system under consideration, and a proof of correctness of system design and system scheduler performance is proposed. D.L.G.

A81-48566 **Infrared airborne radar.** R. C. Harney (MIT, Lexington, MA). In: EASCON '80; Electronics and Aerospace Systems Conference, Arlington, VA, September 29-October 1, 1980, Conference Record. New York, Institute of Electrical and Electronics Engineers, 1980, p. 462-471. 12 refs. USAF-sponsored research.

A program aimed at developing and demonstrating the technology necessary for the construction of infrared radars for tactical airborne applications is briefly reviewed. Infrared radar and conventional radar are compared, the comparison showing that infrared radar is a direct extension of the conventional radar principles to infrared wavelengths. A testbed radar system for measuring imaging properties, weather penetration, and moving target indication is described, and it is stated that tactical airborne applications will require radar systems much more powerful and complex than the testbed radar. A transportable measurements radar, scaled up to parameter values useful in tactical scenarios, and examples of its initial performance are presented. Component technology unique to infrared radars is emphasized, and component developments pertinent to the transportable system are discussed. K.S.

A81-48602 # **Ray-theory predictions of the sound radiated from realistic engine intakes.** A. J. Kempton and M. G. Smith (Rolls-Royce, Ltd., Derby, England). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1982.* 8 p. 6 refs.

Ray theory is used to calculate the propagation, attenuation, and radiation of broadband fan-noise for realistic engine intake configurations. The theory is compared with the mode theory for an infinite hyperboloidal duct, showing excellent agreement at the given frequencies, except close to the duct wall; this discrepancy is due to the neglect of diffraction in the ray theory approach outside the shadow region in calculating the radiation of high-frequency sound from a smooth engine intake. Bellmouth intakes had a large effect on the directivity of both the radiated sound and the insertion loss. The sound-pressure-level (SPL) insertion loss at one angle in the far field was more dependent on the source type for ducts fitted with bellmouth intakes than for flanged cylindrical ducts. The effect on the radiated sound of complex intake flows was of the order of the flow Mach number if the flow was rotational, but only of the order of the Mach number squared if the flow was irrotational. A new method of choosing intake liners to optimize the EPNL reduction is described; this method is based on the theory that the SPL insertion loss at typical fan-noise frequencies is largaly independent of the source frequency, and depends principally on the liner impedance, liner length, and engine geometry. J.F.

A81-48606 # **An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets.** C. V. Sundaram and J. R. Maus (Tennessee, University, Tullahoma, TN). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2022.* 10 p. 9 refs. Contract No. F40600-77-C-0009.

According to the considered technique, the source for each one third octave frequency is modelled by a combination of uncorrelated elementary sources derived from a multipole expansion. The strengths of the various source components at a particular frequency are determined by a constrained least squares fit to the far field directivity pattern. When the effects of the source motion and axial source distribution with frequency are taken into account, the computed sound field agrees reasonably well with data obtained in the near field. Computations at higher frequencies (roughly, above 1000 Hz) indicated that the dependence of the predicted near sound pressure levels on the order of terms considered from multipole expansion series decreases as the frequency under consideration increases. G.R.

A81-48607 * # **The role of the helical jet mode in aerodynamic noise generation.** J. C. Hardin (NASA, Langley Research Center, Acoustics and Noise Reduction Div., Hampton, VA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1963.* 10 p. 38 refs.

The helical jet mode is modeled by an infinite helical vortex filament, and an exact analytical solution for the induced velocity field interior to the filament is derived. These expressions are then used to model the jet flow field and to analyze the high subsonic and supersonic jet noise generation. It is shown that noise will be generated directly if the helical mode convects or rotates. Reducing this noise by stabilizing the mode is difficult, since the self-induced velocities of the mode itself cause it to convect and rotate; the use of noncircular nozzles is suggested to eliminate the symmetry of the boundary condition. The helical mode can also generate noise indirectly by inducing time-dependent Coriolis accelerations on small-scale turbulence propagating in its induced velocity field. This suggests that any upstream turbulence generation has an enhanced potential for noise propagation when propagating in the presence of the helical mode. J.F.

A81-48608 # **Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission.** J. F. Unruh (Southwest Research Institute, San Antonio, TX). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1970.* 12 p. 10 refs.

A structure-borne interior noise transmission model of a test aircraft was developed, based on analytical models of the simulated engine, vibration isolators, and engine mount structure coupled to an empirical model of the fuselage. Interior sound pressure level transfer function data for isolators with varying mechanical properties were analyzed and compared to predicted transmission levels. The elastomeric isolators did not operate as constant property single degree-of-freedom systems with respect to noise isolation: noise isolation beyond approximately 150 Hz leveled off and decreased somewhat above 600 Hz. The frequency dependence of the isolator material properties was found to play an important role in the transmission of structure-borne noise in the mid- to high-frequency region of the spectrum; isolator stiffness was a strong parameter, while isolator damping was a much weaker parameter. Moderate changes to the lightweight high-strength engine mount structure did not affect the transmission phenomena. J.F.

A81-48610 # **Prediction of flyover jet noise spectra.** U. Michel (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Abteilung Turbulenzforschung, Berlin, West Germany) and A. Michalke (Berlin, Technische Universität, Berlin, West Germany). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2025.* 9 p. 17 refs.

A scaling law is derived for predicting the flyover noise spectra of a single stream shock free circular jet from static experiments. The law is valid for unheated and heated jets, the theory being based on an experimentally supported similarity law for the influence of the flight velocity on the turbulent flow field of a jet. The resulting scaling laws for the difference between third octave spectra and the overall sound pressure are found to compare very well with flyover experiments with a jet engine and wind tunnel experiments with a heated model jet. C.R.

A81-48612 * # **Theoretical and experimental evaluation of transmission loss of cylinders.** Y. S. Wang, M. J. Crocker (Purdue University, West Lafayette, IN), and P. K. Raju. *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1971.* 10 p. 13 refs. NASA-supported research.

A technique is reported which evaluates the transmission loss of a cylinder from measurements of the incident and transmitted intensities. Incident intensity is calculated from the space-averaged measured pressure and the assumption that the source space is reverberant. Transmitted intensity is measured by means of the microphone acoustic intensity technique using a fast Fourier transform analyzer. The first dip at the ring frequency, and the other at the critical coincidence frequency are predicted in the transmission loss curve of a cylindrical shell with a 0.762 m diameter and a 1.67 m length. Results are compared and demonstrate good agreement for frequencies above 500 Hz. It is concluded that the technique combining the measurement of both intensities gives accurate results and is simpler and less expensive than the conventional method. D.L.G.

A81-48613 * # **Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets.** J. A. Gallagher and D. K. McLaughlin (Oklahoma State University, Stillwater, OK). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2041.* 9 p. 10 refs. Grant No. NAG1-10.

A series of experiments were conducted on high-speed model jets to identify and quantify the distortion of radiated noise by nonlinear propagation effects. The jets were operated in a low to moderate Reynolds number range, and the radiated noise was either broadband or discrete in frequency. Three condenser microphones were used to measure the waveforms propagated by the axisymmetric, cold model jets of Mach numbers 2.1 and 2.5. Relatively low Reynolds numbers were obtained by exhausting the jets into a low pressure anechoic test chamber. Nonlinear propagation distortion effects, such as wave steepening, harmonic generation and wave merging, were easily quantified. At a moderate Reynolds number, low frequency production and wave amalgamation, measured by a decrease in the zero crossings per unit time, were quantified in the propagation of sound away from the jet. J.F.

A81-48615 * # **Tip geometry effects on the model helicopter rotor low frequency broadband noise.** N. G. Humbad and W. L. Harris (MIT, Cambridge, MA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2003.* 14 p. 19 refs. Grant No. NsG-1583.

The effect of rotor blade tip shapes and performance parameters on the low frequency broadband noise (LFBN) is investigated experimentally. The experimental results show 2 to 5 dB reductions for swept geometries compared with square tip blades at constant blade loading. A theoretical model is formulated which includes a detailed lift response function. For the square tip blades, theoretical results are found to be in good agreement with the experimental results. While the effects of advance ratio and tip speed on the LFBN are explicable, those of blade loading are not clearly understood. C.R.

A81-48618 * # **Laboratory study of efficient add-on treatments for interior noise control in light aircraft.** J. S. Mixson, L. A. Roussos, C. K. Barton (NASA, Langley Research Center, Hampton, VA), R. Vaicaitist (Columbia University, New York, NY), and M. Slazak. *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1969.* 12 p. 15 refs.

Experimental and theoretical studies of the transmission loss (TL) of 1.15 x 1.46 m flat stiffened-skin aluminum panels are described. Panel configurations included panels with no treatment and eight combinations of treatments consisting of a fiberglass-septum layer, a foam-foil damping material, and a plywood double wall trim panel. Measured TL of the untreated panel and the panel with a damping layer showed characteristics of the double mass law: at low frequencies the TL followed a mass law trend associated with the average mass of both skin and stiffness, while at higher frequencies the TL followed a mass law trend associated with skin mass only. A comparison of TL for panels treated with a damping layer, a fiberglass layer, or a trim panel showed that the effects of damping are frequency dependent with some performing better below 500 Hz and others performing better above 500 Hz. Treatment combinations showed that two treatments with the same mass could have TL values different by about 10 dB, while other combinations having weights different by a factor of two could have TL values within a few dB over most of the frequency range. The highest TL values (50 dB at 1000 Hz) were obtained with a treatment consisting of a fiberglass layer, a trim panel, and damping layers on both the stiffened panel and the trim panel. J.F.

A81-48620 # **Engine noise source breakdown - Theory, simulation and results.** B. J. Tester (Rolls-Royce, Ltd., Derby, England) and M. J. Fisher (Southampton, University, Southampton, England). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2040.* 11 p.

Cross-spectrum measurements in the far-field of an aero-engine are processed to form a source image along the engine axis. The intensity of the intake, bypass, core and mixing noise sources is estimated from the image, provided the sources are well separated on the wavelength scale. The 'best squares' fit procedure is used to automate the source breakdown calculation by eliminating the source-image stage of data analysis, thereby permitting larger volumes of data to be processed. Numerical studies and practical results demonstrate that the method can be used at far lower frequencies than those for which individual source contributions could be discerned from a resolution limited source image. Far less comprehensive microphone arrays are required, since there is no general aliasing problem. Application of this technique to the separate core and jet mixing noise on a Viper engine yields a range of valuable data, previously unavailable; the technique is not restricted to a line array of point sources, but can be extended to an arbitrary array of either compact or noncompact sources. J.F.

A81-48621 * # **Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control.** J. G. McArdle, L. Homyak, and D. D. Chrulski (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2049.* 16 p. 17 refs.

The AiResearch Quiet Clean General Aviation Turbofan engine was tested on a vertical lift fan facility to measure the acoustic performance of two inflow control devices (ICD) of similar design, and three inlet lips of different external shape. Far-field directivity patterns calculated by existing analyses were compared with the measured fan fundamental blade passing frequency (BPF/F/) and broadband data. Installing an ICD on an engine with hardwall ducts reduced the BPF(F) tone everywhere in the far-field. When the ICD was installed on an engine with active acoustic panels, tone reduction in the forward quadrant was comparable to that in the hardwall tests; in the aft quadrant, however, tone noise was attenuated by the large acoustic panels in the bypass duct to such a degree that the ICD had little effect. Tests to compare performance of ICDs with hardwall inlet ducts showed only minor differences in the BPF(F) directivity patterns, while broadband noise was the same for both. Forward-quadrant BPF(F) and broadband directivity patterns were found to be similar for the inlet lips tested with a hardwall inlet duct. At high fan speeds, however, the shape of the analytical multimodal tone pattern from the exhaust nozzle was flatter than the measured patterns. The sources of lobes from several propagating single modes found in the forward-quadrant BPF(F) data were attributed to rotor/strut interaction and the rotor-alone pressure field. J.F.

A81-48625 * # **Contributions to the theory of side edge flap noise.** M. S. Howe (Bolt Beranek and Newman, Inc., Cambridge, MA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2036.* 11 p. 17 refs. NASA-supported research.

High and low frequency asymptotic formulas are derived which express the acoustic frequency spectrum in terms of the wavenumber-frequency spectrum of surface pressure fluctuations on the upper surface of a part span flap, measured in-board of the side edge. Interpolations between the results are used to predict the field shape and its dependence on the subsonic forward flight speed over the whole frequency range. The radiation has the characteristics of a semibaffled dipole at small values of the Strouhal number based on the chord of the flap and the forward flight speed. The degree of Doppler amplification due to forward flight speed of the aircraft is dependent on the Strouhal number: the radiation efficiency of side-edge noise sources is governed by the value of the mean side-edge gap Strouhal number, and is larger when this number is small. Theoretical predictions extrapolated to full scale suggest that the noise generated at a single side edge can exceed that generated along the whole of the trailing edge of the flap by 3 dB. J.F.

A81-48626 * # **Prediction of jet exhaust noise on airframe surfaces during flight.** L. M. Butzel (Boeing Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2035.* 14 p. 16 refs. Research supported by the Boeing Commercial Airplane Co.; Contracts No. F33657-72-C-089; No. F33615-77-C-3035; No. NAS2-9328.

The behavior of pressure fluctuations measured on the airframe of a prototype high lift jet transport (YC-14) is presented. The data are characterized in terms of a particular jet exhaust flow field idealization, jet mixing noise, and exhaust shock noise. Generalized spectrum shapes and scaling relations for peak level and frequency of peak level are developed, and the frequency is found to depend on jet exhaust velocity and aircraft velocity. Comparisons are made with near-field engine exhaust noise of a conventional jet, and results suggest that the same two exhaust noises are important for both aircraft types. Surface fluctuating pressure data are assessed, and results suggest that the jet mixing and exhaust shock noise source characterizations for the YC-14 have useful applicability to conventionally configured jets. D.L.G.

A81-48627 # **The effect of vane-frame design on rotor-stator interaction noise.** P. Y. Ho (General Electric Co., Aircraft Engine Business Group, Evendale, OH). *American Institute of Aeronautics* *and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2034.* 11 p. 20 refs.

Test results of a conventional uniform outlet vane design and an integral vane frame are reported. A turbulence control structure installed over a 20-inch-diameter motor-driven fan inlet is used to determine the difference in overall noise levels. Aerodynamic and acoustic measurements are made for 12 min of recording at a tape speed of 7.5 in./sec, and a method for calculating the steady state potential field noise by struts and pylons is presented. It is found that integral vane-frame design causes blade passing frequency cut-on at low speeds. Rotor-stator spacing is observed as having a severe impact on rearward propagating noise in terms of broadband and tone levels; however, due to large rotor-stator spacing and a smaller rotor incidence angle for the vane-frame design, the overall difference in noise levels between the two configurations is insignificant. It is concluded that in actual engine design practice, an integral vane-frame design is acceptable when sufficient spacing is given between the rotor trailing edge and the vane-frame leading edge. D.L.G.

A81-48628 * # **Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity.** R. P. Woodward and F. W. Glaser (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2032.* 12 p. 30 refs.

A research fan stage is acoustically tested in an anechoic wind tunnel with a 41 m/sec tunnel flow. Two stator vane numbers giving cut-on and cut-off conditions are tested at three rotor stator spacings ranging from 0.5 to 2.0 rotor chords. Hot-film anemometer turbulence measurements are made at the leading edge of the stator for each spacing, and a crossed film anemometer is radially transversed to define streamwise and upwash characteristics of the rotor blade wakes. Trends in the acoustic results are observed in the front and aft quadrants at 80% design fan speed. Aft quadrant results demonstrate a fundamental tone 9 dB lower for the 25 vane stator than for the 11 vane stator, while overtone levels are 3 dB higher. The cut-off criterion strongly controls fundamental tone level at all spacings, and spacing trends of the wake-defect upwash component show good agreement with corresponding cut-on acoustic tone levels. D.L.G.

A81-48629 # **Flight test of the 747-JT9D for airframe and jet-flap interaction noise.** O. Kipersztok and G. Sengupta (Boeing Commercial Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2037.* 10 p. 7 refs.

This paper describes the methodology used to isolate the individual airframe noise components and determine their relative contribution to the total noise radiated by a 747 aircraft with JT9D-7A engines at approach. The individual components are isolated using ensemble averaged flight test data. The spectral data are normalized on the basis of altitude, airspeed, temperature, and relative humidity. The noise radiated at approach is reconstructed from addition of individual components and compares very accurately, in level, spectral shape and directivity pattern, to the actual flyover. A comparison is made between each individual airframe noise component and their logarithmic sum, representing the synthesized total airframe component, and Fink's prediction method. The results of this study show that the landing gear, when isolated from configurations having the flaps retracted, is the major contributor to airframe noise. If the effect of flap deployment is included in the isolation of the landing gear noise component, this result could be altered. No evidence of significant jet-flap interaction noise is found for the 747-JT9D aircraft. (Author)

A81-48634 # **Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale.** W. J. G. Trebble, J. Williams (Royal Aircraft Establishment, Aerodynamics Dept., Farnborough, Hants., England), and R. P. Donnelly (Royal Aircraft Establishment, Aerodynamics Dept., Farnborough, Hants.; Dowty-Rotol, Ltd., Cheltenham, England). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2004.* 15 p. 14 refs.

Experiments are performed on a Dowty-Rotol four-bladed R292 propeller at full scale in a 24 ft anechoic tunnel, and at quarter-scale on a geometrically similar model in a 1.5 m acoustic tunnel. Measurements of power, torque and thrust are simultaneously made with microphone recordings of the propeller noise signal. Third-octave and narrow-band spectra are analyzed in a range of rotational speeds up to a blade-tip Mach number of 0.75 with tunnel airspeeds up to 50 m/s. Variation of propeller nacelle incidence up to 10 deg has little effect on noise level, and the empirical relationship from tunnel full-scale tests correlates with measurements from external fuselage-mounted microphones on a twin propeller Shorts 330 aircraft, although installation effects raise the absolute level by 7 dB. The quarter-scale model has similar acoustic and aerodynamic characteristics to those of the full-scale propeller, and substantially better noise measurements are attainable in the 1.5 m acoustic tunnel than in the 24 ft anechoic tunnel. D.L.G.

A81-48635 * # **Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements.** U. H. von Glahn and D. E. Groesbeck (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2053.* 11 p. 15 refs.

Predicted engine core noise levels for subsonic CTOL aircraft engines are compared with measured total aircraft noise levels and to the spectral envelope, with a peak at 400 Hz which is assumed to be shifted in flight by a Doppler shift in frequency. Preceived noise levels are computed for appropriate engine power settings at desired flight conditions, and reductions in sideline noise levels are made to account for jet and airframe shielding effects. Results indicate that core noise can provide a barrier to the proposed EPA stage 4 and 5 federal noise rules for wide-body aircraft, with the most severe core noise problem occurring at takeoff and sideline measuring stations. D.L.G.

A81-48636 # **Some modal-frequency spectra of fan noise.** T. G. Sofrin. *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1990.* 12 p.

Features of fan-compressor noise are described by means of modal-frequency spectra, which give both modal and frequency distributions of acoustic power. A simple form of spectral function is used, which allows fan noise spectral characteristics to be easily estimated in terms of design and operating characteristics. Examples of modal-frequency spectra are given for rotor-stator interaction, turboprop interactions, a two-stage fan, and inlet distortion interactions. Methods for reducing inflow turbulence present during ground tests are described, and the development of improved quiet fan designs is found to depend on the ability to measure mode structure. Several significant fan noises are illustrated, including examples of discrete frequency, multiple pure tone, and broadband noise. In addition, due to static operation producing strong inflow turbulence interactions, and unacceptably restrictive and expensive flight development testing, more effort is being placed on reducing static environmental effects. D.L.G.

A81-48637 * # **Assessment of inflow control structure effectiveness and design system development.** A. A. Peracchio (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2048.* 12 p. 5 refs. Contract No. NAS1-15085.

Inflow control structures used during static testing of fans are shown to minimize inflow distortions and thus stimulate the inflight flow field and noise generating mechanisms. Acoustic tests are conducted on a Pratt and Whitney aircraft JT9D engine with and without an inflow control structure. Raw data are corrected to 77 deg, and time is averaged over 0.5 second intervals. Use of an inflow control structure is found to significantly reduce blade passage frequency tone, while having little effect on twice blade passage frequency tones, and significantly improves agreement between static data projected to flight and flight data for the blade passage frequency fan tone. A design system is also presented, which prescribes structure shape, size and construction. D.L.G.

A81-48638 * # **Ground effects on aircraft noise for a wide-body commercial airplane.** W. L. Willshire, Jr. (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA,* *Oct. 5-7, 1981, Paper 81-1988.* 8 p. 10 refs.

Ground effects on noise from a high-bypass ratio engined aircraft are investigated. A 747 is flown at altitudes from 30 to 960 m past a 20-microphone array, and ground effects are calculated from noise measurements as a function of elevation angle and slant range. Results are given in terms of EPNL units and are compared with previous results of a turbojet-powered T-38 and SAE-recommended empirical lateral attenuation prediction procedures. Theoretical predictions are made based on a method developed by Pao et al. (1978) and are compared with both 747 and T-38 results, demonstrating good agreement although a consistent underprediction of peak measured attenuation is observed. Measured ground effects are found largest at 200 Hz, and no definite shielding differences are apparent for a directivity angle of 122.5 deg. Less lateral attenuation of effective perceived noise is measured for both aircraft and is attributed to the dominance of low-frequency noise in the source spectrum. D.L.G.

A81-48639 * # **Mixer nozzle aeroacoustic characteristics for the energy efficient engine.** P. R. Gliebe, G. T. Sandusky (General Electric Co., Aircraft Engine Group, Cincinnati, OH), and R. Chamberlin (NASA, Lewis Research Center, Transport Propulsion Office, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1994.* 11 p. NASA-supported research.

Aeroacoustic tests are conducted on scale model mixer nozzle configurations, a separate flow nozzle, and a baseline conical nozzle in an anechoic chamber free-jet facility to investigate exhaust system designs. Far-field acoustic data and exhaust jet plume aerodynamic data are obtained for various combinations of exhaust jet velocity and simulated flight speed, with corrected microphone data at a constant 12.2 m arc distance, and scaled acoustic data at a sideline distance of 457 m. It is found that jet plume aerodynamic and acoustic characteristics of lobed mixer exhaust systems are similar to those of a conical nozzle operating at the same specific thrust, although differences occur at high frequencies, where the sound pressure level of the mixer nozzle is 1-5 dB higher than that of a conical nozzle. In addition, no direct correlation is found between exit plane turbulence levels and plume development or acoustic characteristics for mixer exhaust configurations. D.L.G.

A81-48640 * # **Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation.** K. K. Ahuja, J. Lepicovsky, and R. H. Burrin (Lockheed-Georgia Co., Marietta, GA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2007.* 12 p. 10 refs. Research supported by the Lockheed-Georgia Co.; Contract No. NAS3-21987.

Acoustic as well as turbulence measurements were made of tone-excited jets to obtain an understanding of the broadband noise augmentation mechanism. Results for both heated and unheated jets with and without flight simulation are presented for a range of excitation frequencies and levels, as well as for the zero order and first order spinning modes. It is argued that although the phase-locked large-scale turbulence structure is at the root of the noise amplification process, the actual noise generation mechanism lies in the small-scale turbulence. Results show that (1) the phase velocity of the excited large scale instability waves is subsonic relative to the ambient fluid and (2) broadband jet noise is almost uniform at all frequencies. Moreover, when the large-scale and small-scale structures are plotted against forward velocity (for a given upstream excitation level of 141 dB), the change in large-scale turbulence is negligible with forward velocity, whereas the small-scale turbulence decreases for both excited and unexcited jets. Also, the corresponding difference in far-field noise does not appear to change significantly, indicating that the changes in small-scale turbulence are responsible for jet noise amplification. J.F.

A81-48644 # **Prediction method for aeroacoustic loads on under the wing blown flaps.** D. Lohmann (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Abteilung technische Akustik, Braunschweig, West Germany). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2038.* 11 p. 15 refs.

Regression analyses are performed based on fluctuating surface-pressure data from the McDonnell-Douglas YC-15 STOL prototype aircraft to develop a prediction scheme for aeroacoustic loads on under-the-wing blown flaps. Flight and engine exhaust Mach numbers, flap angle, and flight-altitude are used as primary parametrical variables to calculate third-octave band surface pressure level spectra and overall levels for any chord station on the lower surface of the wing/flap system. Experimental results indicate that the frequency range for 20-2000 Hz is most critical in terms of structural fatigue life, and a marked influence of altitude on overall fluctuating surface-pressure levels appears only in the range from 0 to 10,000 ft, while the difference is less than 2 dB between 10,000 and 30,000 ft. In the case of ground static, the aeroacoustic energy increases with the 3rd and 4th powers of the nozzle exit Mach number, while in the flight case, the energy increases with the 8th to 10th powers of the relative Mach number, which agrees well with predictions. D.L.G.

A81-48647 # **A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies.** T. A. Holbeche and A. F. Hazell (Royal Aircraft Establishment, Aerodynamics Dept., Farnborough, Hants., England). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2028.* 12 p. 9 refs.

Wind-shielding effects for a TriStar airliner are deduced from a comparison of engine noise measured simultaneously above and below the flight path. Noise radiated upward is monitored by flying the aircraft beneath a large instrumented fiberglass sphere suspended from a hovering helicopter, while flyover noise at ground level is recorded conventionally. Predicted acoustic diffraction by the sphere results in good directivity and frequency response characteristics, allowing reliable free-field noise data to be readily derived from the fly-under. Experimental checks on this behavior at model and full-scale are reported, including the results of diffraction studies on a half-scale sphere in an anechoic room. Basic considerations regarding application of the technique to noise-shielding studies in flight are outlined and corrections to free-field conditions are evaluated for a range of typical frequencies and sound incidence angles. Most corrections are -6 dB and independent of the source distance, and efficient shielding by the sphere leads to a substantial reduction in helicopter background noise, which improves reliability of the aircraft noise measurements. D.L.G.

A81-48651 # **Effect of excitation on coaxial jet noise as observed by an elliptic mirror.** H. Y. Lu (Boeing Commercial Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2044.* 3 p. 8 refs.

Coaxial model jets are excited internally by tone and broadband noise under high-bypass-ratio (HBPR) engine exhaust hot gas conditions. The system consists of an internal noise injection section installed 4 ft from the nozzle exit, and 16 Altec horn drivers rated at 50 W per driver. Rotational motion is remotely controlled, and transverse recording is made at 60, 90, 120, and 140 deg. Amplification is found to depend on nozzle configuration, gas conditions, excitation frequencies, and excitation levels and location. HBPR jets without internal acoustic excitation are also examined by using the elliptic mirror, and the secondary ambient premerged jet noise is found to dominate the upstream angles. Acoustic excitation in the secondary duct is most effective due to the sensitivity of the outer shear layer, where jet noise amplification occurs in the subharmonic in a number of cases. In addition, due to increased mixing and higher noise levels of the excited jet, the noise source region is more compact than in unexcited jets, and comparisons of excess jet noise characteristics with HBPR engine noise data indicate that HBPR engines have excess noise. D.L.G.

A81-48653 # **High bypass ratio engine noise component separation by coherence technique.** B. N. Shivashankara (Boeing Commercial Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2054.* 12 p. 13 refs.

Aft fan, core and jet noise components of a large high bypass ratio engine are separated by means of a signal enhancement technique. Simultaneous signals from three or more microphones are used, which are assumed to have a common correlated part and uncorrelated extraneous noise at each location. Advantages include the internal-to-farfield coherence technique used for component separation when the in-duct microphone signal is contaminated by extraneous noise, and the separation of jet noise from core and fan noise using only far-field microphones. The validity of the technique is demonstrated by a scale proof-of-concept experiment, and the technique is applied for use with signals from three microphones external to the engine. Higher-frequency fan tones are well correlated between fan duct and far-field microphones, which indicates that higher-frequency fan noise tones, such as the blade passage frequency tone, are due to distributed and well correlated sources. D.L.G.

A81-48744 # **Choice of optimal parameters of a gyrovertical on the basis of a standard program (Vybor optimal'nykh parametrov girovertikali po tipovoi programme).** M. A. Sergeev, V. A. Iablonskaia, and A. A. Kubenskii (Leningradskii Institut Tochnoi Mekhaniki i Optiki, Leningrad, USSR). *Priborostroenie,* vol. 24, Aug. 1981, p. 78-84. In Russian.

Algorithms are presented for computing the mean-square error of a gyrovertical with a mixed correction characteristic on the basis of a standard program. A method for choosing the optimal parameters of the gyrovertical is described. B.J.

A81-48847 **Unrepresentative temperatures at a first-order meteorological station - Washington National Airport.** J. L. Foster and R. J. Leffler. *American Meteorological Society, Bulletin,* vol. 62, July 1981, p. 1002-1006. 9 refs.

An examination of temperature records from the three major airports in the Washington, DC, area and from a network of volunteer meteorological observers reveals an exceptional warmth at Washington's National Airport and indicates that National Airport does not represent properly temperature conditions normally experienced in the Washington Metropolitan Area. Temperature differences between National Airport and its environs and other meteorological stations in the Middle Atlantic region can be attributed primarily to the location of National Airport within Washington's heat island and to the proximity of its temperature sensors to the modifying effects of the Potomac River. (Author)

A81-49075 **More fight for the Fighting Falcon.** A. T. Lloyd. *Air International,* vol. 21, Oct. 1981, p. 161-170, 202, 203.

A status report is given on technical developments made and operational experience gained in the first five years of F-16 use by U.S., Europan, and Israeli air forces. Attention is given the manufacturer's Multinational Staged Improvement Program (MSIP), whose three stages will cover aircraft produced until 1989, aimed at the gradual introduction of advanced avionics and weapon systems. Consideration is also given the U.S. Air Force's F-16 flight training and maintenance programs, Europan F-16 construction schedules, operation to date by the Belgian, Dutch, Danish and Norwegian air forces, and two advanced development programs: (1) the Supersonic Cruise Aircraft Modification Program, involving a lengthening of the fuselage and incorporation of a large-area cranked arrow wing, while maintaining 93% commonality with the current airframe and (2) the Advanced Fighter Technology Integration demonstrator, employing control-configured vehicle technology and canard control surfaces. O.C.

A81-49076 * # **Structural synthesis - Its genesis and development.** L. A. Schmit (California, University, Los Angeles, CA). *AIAA Journal,* vol. 19, Oct. 1981, p. 1249-1263. 101 refs. NASA-supported research.

An historical account is given of the development, from its conception in 1960, of the structural synthesis method. While synthesis techniques lag behind analytical ones in both sophistication and application, the structural design procedures created by combining finite element analysis and mathematical programming algorithms have progressed to the point of maturity. As in the case of finite element analysis, use and acceptance of structural synthesis methodology depends on the development and distribution of easily used and well-documented, production-quality computer programs. Attention is given such elementary applications of synthesis methods as the three-bar truss, an integrally stiffened waffle plate, a stiffened cylindrical shell, aircraft fuselage window panels, the structural efficiency of graphite-epoxy hat-stiffened panels, and an idealized delta wing. O.C.

A81-49161 # **Propulsion energy for tomorrow's aviation (Antriebsenergie für die Luftfahrt von morgen).** V. M. Akimov (Tsentral'nyi Nauchno-Issledovatel'skii Institut Aviatsionnogo Motorostroeniia, Moscow, USSR). *(Grazhdanskaia Aviatsiia,* no. 2, 1980.) *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 17, no. 2, 1981, p. 68-71. In German. (Translation).

One of the objectives of the Central Institute for the Construction of Aircraft Engines in the USSR involves the study of the characteristics for the aircraft propulsion system to be used at the end of the 20th and the beginning of the 21st century. Conclusions reached in this study are discussed. Further improvements in the efficiency of new propulsion units will be possible on the basis of a high bypass ratio and better operational parameter values. It is pointed out that the design of engines of the new generation will require the solution of complex problems concerning gas dynamics, cooling, and materials. The efficiency of turbine and compressor must be further enhanced and the space remaining between moving and stationary parts in compressor and turbine must be reduced. It is expected that, as a result of these steps, it will be possible to obtain a further reduction in fuel consumption by about 10 to 12%. Attention is also given to approaches for increasing the production of aircraft fuels on a hydrocarbon basis, and possibilities for an employment of hydrogen as aircraft fuel. G.R.

A81-49173 **Combat cockpit design.** *Flight International,* vol. 120, Sept. 26, 1981, p. 939-942.

A status report is presented on attempts to give NATO single-seat fighter pilots, whose aircraft are currently being produced at a rate four times greater than that of two-seat combat aircraft, the greatest range of control capabilities against increasingly sophisticated Soviet antiaircraft systems. After surveying the threat posed by four new Soviet SAM systems, the Ram-J, -K and -L aircraft nearing production and the AWACS/Super Foxbat interception system, recent developments in digital radar mode and weapons control, displays, track-while-scan radar, ECM, and automatic, built-in testing of aircraft systems are described. Attention is given design solutions for the F-16, F-18 and AV-8B aircraft, as well as related developments in the A-10 and F-15. Detailed descriptions are given of the WDNS-141 weapon-delivery and navigation display system and the AV-8B joystick- and throttle-mounted, 'hands on' control devices. O.C.

A81-49209 **A process for protecting gas turbine blade cooling passages against degradation.** J. E. Restall, B. J. Gill (National Gas Turbine Establishment, Farnborough, Hants., England), C. Hayman, and N. J. Archer (Fulmer Research Institute, Ltd., Stoke Poges, Bucks., England). In: Superalloys 1980; Proceedings of the Fourth International Symposium, Champion, PA, September 21-25, 1980. Metals Park, OH, American Society for Metals, 1980, p. 405-411. 5 refs.

A new process for the protection of turbine blades and vanes on both external and internal surfaces has been evolved. The surfaces are metallized by pressure-pulsing the coating gases from a near-conventional cementation pack. Penetration occurs into the internal cooling channels which are inaccessible to most other coating processes. Up to 1000 small turbine blades can now be simultaneously pulse aluminized in an industrial plant. (Author)

A81-49374 # **Performance prediction for light airplanes.** E. V. Laitone (California, University, Berkeley, CA). *Journal of Aircraft,* vol. 18, Nov. 1981, p. 988-991. 6 refs.

Oswald's (1932) method for estimating the performance of aircraft with fixed-pitched propellers is extended to modern aircraft with variable pitch propellers. A parabolic variation of the thrust with the flight velocity makes possible the development of explicit relations for the maximum level flight speed and the maximum rate of climb at any altitude up to the absolute ceiling. It is shown that errors may occur if the limitations of the best-fit parabola are exceeded, and that the performance calculations are greatly simplified by representing the propulsive thrust by a parabola. D.L.G.

A81-49375 * # **Influence of landing gear flexibility on aircraft performance during ground roll.** M. M. Sivaramakrishnan (NASA, Langley Research Center, Hampton, VA; Indian Institute of Technology, Bombay, India). *Journal of Aircraft,* vol. 18, Nov. 1981, p. 991, 992.

An analysis is made of the influence of landing gear deflection characteristics on aircraft performance on the ground up to rotation.

A quasi-steady dynamic equilibrium state is assumed, including other simplifying assumptions such as calm air conditions and normal aircraft lift and drag. Ground incidence is defined as the angle made by the mean aerodynamic chord of the wing with respect to the ground plane, and equations are given for force and balance which determine the quasi-equilibrium conditions for the aircraft during ground roll. Results indicate that the landing gear deflections lead to a substantial increase in the angle of attack, and the variation in the ground incidence due to landing gear flexibility could be as much as + or - 50%, and the reduction in tail load requirements almost 25%. D.L.G.

A81-49378 **Compact and highly sensitive fluorescence lidar for oceanographic measurements.** U. Gehlhaar, K. P. Gunther, and J. Luther (Oldenburg, Universität, Oldenburg, West Germany). *Applied Optics*, vol. 20, Oct. 1, 1981, p. 3318-3320. 12 refs. Research supported by the Deutsche Forschungsgemeinschaft.

A compact and highly sensitive helicopter-borne fluorescence lidar is described. The single channel system is based on a high power, tunable laser. From an altitude of 70 m, selective detection of the tracer dye rhodamine B of less than 10 to the -10th g/cu cm in natural waters is achieved. (Author)

A81-49462 # **Automation of air traffic control processes (Avtomatizatsiia protsessov upravleniia vozdushnym dvizheniem).** Iu. P. Darymov, G. A. Kryzhanovskii, V. A. Solodukhin, V. G. Kiv'ko, and B. A. Kirov. Moscow, Izdatel'stvo Transport, 1981. 400 p. 229 refs. In Russian.

The work presents a systematic exposition of the principles underlying the automation of ATC processes as well as the principles of the technical implementation of automatic ATC systems. Particular consideration is given to the development of mathematical models for ATC processes, the evaluation of the efficiency of automatic ATC systems, and the development of algorithms for the automation of ATC processes. B.J.

A81-49471 # **Stress concentration in elements of aircraft structures (Kontsentratsiia napriazhenii v elementakh aviatsionnykh konstruktsii).** R. R. Mavliutov. Moscow, Izdatel'stvo Nauka, 1981. 144 p. 216 refs. In Russian.

The book deals with methods of calculation and experimental determination of stress concentrations in typical elements of aircraft structures. Emphasis is placed on problems of stress concentration in parts subjected to elastic, plastic, and creep deformation under complex loading conditions. The effect of loading history is evaluated. Computer algorithms and programs for stress calculation are presented together with design optimization guidelines. V.L.

A81-49475 # **Design of production processes for flight-vehicle engines (Proektirovanie tekhnologicheskikh protsessov proizvodstva dvigatelei letatel'nykh apparatov).** I. A. Ivashchenko. Moscow, Izdatel'stvo Mashinostroenie, 1981. 224 p. 22 refs. In Russian.

Principles underlying the design of production processes for aircraft and rocket engines are examined. Particular attention is given to metal-treatment accuracy, the quality of the surface layers of engine parts, tolerances, and improved (particularly automated) methods for the mechanical treatment of engine parts. B.J.

A81-49575 # **Commercial airliners - Design and flight operation (Las aeronaves comerciales - Diseño y operación de vuelo).** M. Cuesta Alvarez. *IAA/Ingeniería Aeronáutica y Astronáutica*, vol. 33, Aug.-Sept. 1981, p. 17-34. In Spanish.

After a brief review of historical trends in jet airliner range and passenger-carrying capacity, consideration is given to a variety of topics in airliner design. These include: (1) sizing, with attention to the market opportunities that will exist until the year 2000 for medium-range aircraft with capacities in the 130-160 and 160-200 seat categories; (2) configurations, with stress on the drag reduction and structural load alleviation that may be derived from supercritical profile wings; (3) structures, with emphasis on the role that may be played by such advanced materials as the 7000 series aluminum alloys and carbon- and boron-reinforced composites; (4) high-bypass turbofan engine design; (5) active control technology for flutter suppression and gust load alleviation; and (6) the determination of flight profiles optimized for maximum range and for minimum direct operating costs. O.C.

A81-49727 # **The effect of flight and the presence of an airframe on engine exhaust noise.** S. Bashforth (Rolls-Royce, Ltd., Derby, England). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2029*. 13 p. 15 refs.

A full-scale static and flight test program using an HS 125 aircraft with an RR Viper 601 turbojet was carried out in order to explain the anomalies found between full-scale in-flight exhaust noise studies and model simulations. Both acoustically lined and unlined engine tailpipes were tested, and extensive installation studies were conducted using a replica tail assembly. Source location techniques were used to determine core noise levels over a wide range of frequencies. It is shown that the discrepancy between the static and flight tests was due to a number of noise-producing and/or affecting features of the aircraft/aero engine combination which were not incorporated into the analyses of the data: static tests conducted at NASA Ames demonstrated the importance of installation effects, and flight tests revealed that airframe self-noise can cause a significant amount of the total noise in small aircraft. J.F.

A81-49728 * # **Flight effects on supersonic convergent-divergent nozzle jet noise.** J. Wat and V. Sarohia (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2027*. 9 p. 12 refs.

The influence of forward flight on the noise generation from convergent-divergent (C-D) nozzle flows was determined experimentally. The experiments were performed in an anechoic chamber using a 2.03 cm diameter C-D nozzle with a design Mach number of 1.4 in a 25 cm diameter free jet flow. Far-field noise measurements and spectral analyses were carried out and visualization of the jet shock structure was made by a spark shadowgraph technique. Jet noise from supersonic C-D nozzle flows under forward flight was found to depend critically on the flight velocity and nozzle pressure ratio. Noise reduction up to 20 dB was observed in the rearward quadrant under flight; excess noise in the forward quadrant under flight resulted from relatively high frequency noise sources in the jet flow field. Screech tones, observed from overexpanded C-D nozzle flows, were suppressed during the simulated flight flow. J.F.

A81-49729 * # **Noise radiated from inverted velocity profile jets under simulated flight.** R. A. Petersen and V. Sarohia (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2026*. 8 p. 13 refs. Contract No. NAS7-100.

Measurements were made of the noise radiated by an inverted profile coannular jet. The measurements were made inside an anechoic chamber and forward flight was simulated with an open jet surrounding a coannular nozzle. The diameters of the center and the annular nozzles were 1.27 cm and 2.03 cm, respectively. The open jet wind tunnel was 17.1 cm in diameter and could be operated at speeds up to 150 m/sec. Noise measurements were made in the acoustic far field at several spherical angles ranging from 20 deg to 120 deg relative to the jet axis. Flow through the center jet decreased the noise radiated by the annular jet. The addition of forward velocity further decreased the noise, and the two noise reductions seem to be additive. Measurements of the mean velocity profile demonstrate that forward flight reduced the growth rate of the high speed annular jet, and that center flow reduced the rate of merging of the annular jet. (Author)

A81-49730 # **Shielding concepts for jet noise.** R. L. M. Wong, W. G. Richarz, and H. S. Ribner (Toronto, University, Toronto, Canada). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2020*. 13 p. 33 refs. Research supported by the Natural Sciences and Engineering Research Council of Canada; Grant No. AF-AFOSR-75-2808B.

Point source shielding is investigated as a function of frequency and source/observer positions for a semiinfinite shield. Several concepts for jet noise shielding are explored, and model experiments center on semiinfinite sugar scoop, and infinite planar shields. Results are synthesized into a predictive algorithm for jet noise shielding, in which the jet is modeled as a line distribution of incoherent sources with narrow-band frequency. Edge noise is minimized by hyperbolic cutouts and hybrid shields, and shielding attenuation increases steadily with frequency following low-frequency enhancement by edge noise. Calculated ground contours of peak flyover perceived noise level (PNdB) show a substantial contraction due to shielding which reaches 66% for one sugar scoop shield for the 90 PNdB contour. Results show good agreement with companion analytical calculations, and the mean of two predictive versions agrees with the experimental results from 1 to 1.5 dB up to moderate frequencies. D.L.G.

A81-49731 * # Noise shielding by a hot subsonic jet. A. Vijayaraghavan and S. P. Parthasarathy (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2018*. 6 p. 5 refs. Contract No. NAS7-100.

An analysis is conducted of the shielding of the noise emitted by a high speed round jet by a hot, subsonic, semicircular jet. A plane wave front in the primary jet is resolved into elementary plane waves which undergo multiple reflections at the jet boundaries of the primary and the shielding jets. The jet boundaries are idealized to be vortex sheets. The far field sound is evaluated asymptotically by a superposition of the waves that penetrate the shielding jet. The angular directivities are plotted for several values of jet temperature and velocity to examine the effectiveness of shielding by the semicircular jet layer. (Author)

A81-49732 # Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers. D. S. JanakiRam (Hughes Helicopters, Inc., Culver City, CA) and B. W. Scruggs (U.S. Army, Applied Technology Laboratories, Fort Eustis, VA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2005*. 15 p. 14 refs.

Several small-scale propeller configurations, applicable to a conceptual remotely piloted vehicle, were tested under static and simulated forward flight conditions in a wind tunnel to determine their performance, acoustic, and detectability characteristics. The propellers tested had tractor, pusher, and ducted configurations, designed to develop 4 thrust horsepower at a cruise speed of 75 knots at 4000 ft altitude and 95 F. The acoustic data were used to determine the slant range and altitude of no detection of each propeller configuration. The acoustic and detectability characteristics of small-scale propellers were found to be significantly different from those of the large-scale propellers; this is explained by low disk loading or the low operating Reynolds numbers of the propellers. An increase in forward velocity caused a significant drop in SPLs at higher harmonics of the blade passage frequency. Tip speed had a strong effect on noise and detectability in forward flight: most of the propellers were detected at either the first or second harmonic of their blade passage frequency. Three-bladed propellers were generally less detectable than two- or four-bladed propellers for most of the forward velocities. Finally, ducted and pusher propeller configurations were more detectable and less efficient than their free and tractor counterparts. J.F.

A81-49736 * # An iterative finite element-integral technique for predicting sound radiation from turbofan inlets. S. J. Horowitz, R. K. Sigman, and B. T. Zinn (Georgia Institute of Technology, Atlanta, GA). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1981*. 10 p. 23 refs. Grant No. NsG-3036.

A new iterative solution technique for predicting the sound field radiated from a turbofan inlet is presented. The sound field is divided into two regions; the sound field within the inlet which is computed using the finite element method and the radiation field outside the inlet which is calculated using an integral solution technique. A 'unified' solution is obtained by matching the finite element and integral solutions at the interface between the interior and exterior regions. The applicability of the iterative technique is demonstrated by considering several simple cases for which exact or 'classical' solutions for the sound field are available. These examples show that the proper solution is obtained within five iterations. The overall accuracy of the method is demonstrated by comparison with experimental data. (Author)

A81-49743 * # An improved prediction method for noise generated by conventional profile coaxial jets. J. R. Stone, D. E. Groesbeck, and C. L. Zola (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-1991*. 33 p. 13 refs.

A semi-empirical model for predicting the noise generated by conventional-velocity-profile jets exhausting from coaxial nozzles is presented and compared with small-scale static and simulated flight data. The present method is an updated version of that part of the original NASA Aircraft Noise Prediction (ANOP) Program (1974) relating to coaxial jet noise. That method has been shown to agree reasonably well with model and full-scale experimental data except at high jet velocities in the region near the jet axis. Improvements to the basic circular jet noise prediction have been developed since that time which improve the accuracy, especially at high jet velocity and near the jet axis, and are incorporated into the coaxial jet procedure in this paper. The new procedure is more theoretically based and has also been improved by some empirical adjustments. (Author)

A81-49877 Aircraft electricity and electronics /3rd edition/. R. D. Bent and J. L. McKinley. New York, McGraw-Hill Book Co., 1981. 365 p. $16.95.

Fundamentals of electricity are considered along with magnetism and electromagnetism, capacitors and inductors, alternating current, and electric measuring instruments. Batteries are examined, taking into account voltaic cells, alkaline cells, nickel-cadmium cells, the theory of the lead-acid cell, aspects of lead-acid battery construction, battery design features, nickel-cadmium storage batteries, and a troubleshooting chart for nickel-cadmium batteries. A description is presented of generator theory, dc generators and controls, electric motors, the installation and maintenance of electrical systems, the principles of electronics, radio transmitters and receivers, electric instruments, and electronic control systems. Other topics considered are related to weather warning systems, communication and navigation systems, and automatic pilots and landing systems. Attention is given to radar, interphone communications, the passenger address and entertainment system, a high-frequency communication system, a Selcal decoder, Federal Communications Commission regulations, automatic direction-finder systems, the instrument-landing system, the microwave landing system, TACAN, long-range navigation systems, and an inertial navigation system. G.R.

A81-49900 # Model following control of gas turbine engines. R. V. Monopoli (Massachusetts, University, Amherst, MA). *ASME, Transactions, Journal of Dynamic Systems, Measurement, and Control*, vol. 103, Sept. 1981, p. 285-289. 18 refs. Research supported by the United Technologies Corp.

A technique, which is based on Liapunov's direct method (Kalman and Bertram, 1960), is described for designing a control system for a nonlinear gas turbine engine. The technique proceeds to the derivation of the control input directly from the nonlinear, time-varying differential equations, rather than from a linearized version of the engine dynamics. The control system resulting from this approach forces certain engine variables to track the corresponding variables of an ideal model of the engine specified by the designer. A brief description of the theory is presented, and the structure of the model is described. Application of the technique to a gas turbine engine is illustrated, using a full nonlinear digital simulation of a representative advanced technology engine. Simulation results are presented and include data indicating the performance achieved when the control algorithm was used. K.S.

A81-49928 # The use of direct lift control of an aircraft in a guided landing run (Ob ispol'zovanii nepostredstvennogo upravleniia pod'emnoi siloi samoleta v rezhime direktornogo zakhoda na posadku). O. Iu. Alasheev, V. D. Osorgin, V. G. Pavlov, L. A. Semakov, and N. L. Sokolov. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 13-18. 7 refs. In Russian.

The paper examines the possibility of using direct lift control to reduce the control time of the guided landing run under the condition that a satisfactory quality of the transient process be maintained. The synthesis of the guided control system is described in detail, and the precision of the technique under consideration is examined. B.J.

A81-49930 # The effect of the skewness of the skin panels on stresses in conical wings (Vliianie nepriamougol'nosti panelei obshivki na napriazheniia v konusnykh kryl'iakh). M. B. Vakhitov and L. M. Koniukhova. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 22-27. 9 refs. In Russian.

A theoretical study is presented of the effect of additional normal stresses, arising in the case of the shear of skewed skin panels, on the stressed state of a conical wing. A discrete-continuum model is used to obtain a system of integrodifferential equations which are solved by the method of integrating matrices. B.J.

A81-49935 # Geometrically nonlinear theory for calculating thin rods of a wing profile (Geometricheski nelineinaia teoriia rascheta tonkikh sterzhnei kryl'evogo profilia). V. A. Pavlov. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 44-50. 11 refs. In Russian.

The paper develops a theory of strength calculations of thin rectilinear rods of a wing profile of invariant cross-section shape; the spatial displacements of these rods are commensurable with their transverse dimensions. Deformations in local axes of rod elements are determined by generalized Kirchhoff-Klebsch relations. B.J.

A81-49937 # Strength calculation of thin-wall rods of significant taper (Raschet na prochnost' tonkostennykh sterzhnei znachitel'nogo suzheniia). V. G. Shataev. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 55-60. 7 refs. In Russian.

The paper examines a thin-wall cantilever beam structure consisting of longitudinal ribs connected by skin panels and transverse diaphragms. General equations are obtained for calculating the strength of this structure, with allowance for nonuniform heating, plastic deformation, and creep in the case of considerable taper. The physically nonlinear problem is reduced to a succession of linear problems by the use of the method of fictitious loads, secants, and tangential moduli. B.J.

A81-49940 # Parametric synthesis of an automatic system for flight-vehicle stabilization (K parametricheskomu sintezu avtomata stabilizatsii letatel'nykh apparatov). A. I. Bogomolov. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 69-72. In Russian.

A81-49943 # Realization of a method of extremal targeting in a problem of aircraft landing control (O realizatsii metoda ekstremal'nogo pritselivaniia v zadache upravleniia samoletom na posadke). V. M. Kein, A. N. Parikov, and M. Iu. Smurov. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 79-82. In Russian.

An algorithm is developed for aircraft terminal guidance which realizes the method of extremal targeting. The proposed algorithm was tested by a simulation of aircraft landing control in the case of extremal disturbances. The algorithm is found to satisfy prescribed speed and memory requirements. B.J.

A81-49946 # Choice of the optimal angular velocity of the twist of a flight vehicle (O vybore optimal'noi uglovoi skorosti zakrutki letatel'nogo apparata). O. A. Privarnikov. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 102-104. In Russian.

During the twist of a flight vehicle, i.e., a rocket, relative to the longitudinal axis at the moment of separation from the booster, the rocket retains its orientation in the extraatmospheric part of the trajectory if the angular velocity of the twist considerably exceeds the transverse components of velocity. This paper considers the selection of the optimal twist velocity on the basis of minimum total deviation in range. B.J.

A81-49948 # Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen (K raschetu nelineinykh aerodinamicheskikh kharakteristik deformiruemogo kryla, dvizhushchegosia vblizi ekrana). L. G. Tsvetkov. *Aviatsionnaia Tekhnika*, no. 2, 1981, p. 107-111. In Russian.

A theoretical study is presented of the motion of a thin wing at low subsonic velocity near a screen for low rates and amplitudes of the change of the kinematic parameters and deformation of the lifting surface. Particular attention is given to the effect of the three-dimensional motion on the formation of a vortex sheet behind the wing. B.J.

A81-49949 # Hydrogen engines (Dvigateli na vodorode). V. P. Barmin (Moskovskoe Vysshee Tekhnicheskoe Uchilishche, Moscow, USSR), I. L. Varshavskii, and V. V. Goncharov (Akademiia Nauk SSSR, Institut Mashinovedeniia, Moscow, USSR). *Priroda*, Sept. 1981, p. 22-29. In Russian.

The development of internal combustion engines fueled by hydrogen or hydrogen mixtures is reviewed. The first systematic investigations in the 1920s of a one-cylinder engine with variable compression ratio, which demonstrated the possibility of qualitatively regulated hydrogen combustion at any range of loading, resulting in a greater engine efficiency, is discussed, and problems of premature ignition encountered due to the use of pure hydrogen fuel are noted along with a possible solution in the use of a special injector for the direct delivery of the hydrogen to the cylinder which, however, leads to strong knocking. Attention is then given to work begun in 1974 on an experimental one-cylinder hydrogen-air engine with various degrees of compression and hydrogen supplied from ferrosilicon and water, the improvement of gasoline engine operating efficiency by 5-10% additions of hydrogen, hydrogen addition to diesel fuels, and hydrogen addition to improve the carbon monoxide, hydrocarbon and NO(x) emissions levels of aircraft gas turbine engines. A.L.W.

A81-49973 Civil head-up displays - Coming up fast. M. Lambert. *Interavia*, vol. 36, Oct. 1981, p. 984, 985.

A survey is made of operational experience to date with partial head-up display (HUD) systems installed in commercial aircraft. Attention is given these systems' certification for Category 3 operation. The systems described are the WGD 1, which is in service aboard A300 and 737-200 aircraft; the visual approach monitor (VAM), allowing ground-roll guidance in visibilities as low as 75 m; and the 193M electromechanical HUD for Mercure aircraft. Emphasis is given a recent HUD design, intended for DC-9 Super 80 airliners, which may be used during landing and take-off ground roll, climb, cruise, descent, instrument landing system approach, visual approach, and go-around. This HUD contains symbols indicating the autopilot's maneuvering capability in relation to the approach path, the phase of the approach, and the autopilot mode state. O.C.

A81-49974 Sukhoi Su-24 Fencer - The Soviet Tornado. G. Lafon. *Interavia*, vol. 36, Oct. 1981, p. 997-999.

Dimensional data and operational capabilities are deduced from photographs of the Soviet Su-24 Fencer interdiction/attack aircraft and from extrapolation of the characteristics of such comparable NATO aircraft as the F-111 and Tornado. After an examination of (1) the design's basic characteristics in light of the aerodynamic principles and structural requirements of low-level, high subsonic speed penetration missions, (2) the aerodynamic advantages and penalties of the large glove-area, variable incidence wing, and (3) the propulsion system difficulties resulting from deep, narrow air intakes intended to minimize radar cross-section, it is concluded that the Fencer is constrained to the interdiction strike mission, with little advantage at the high angles of incidence called for by air-to-air combat. In this, the Fencer compares unfavorably with the more versatile F-111 and Tornado. O.C.

A81-49975 The Lear Fan 2100. J. P. Geddes and D. Wood. *Interavia*, vol. 36, Oct. 1981, p. 1029-1033.

The structural, aerodynamic and propulsion system design features of the Lear Fan 2100 turboprop aircraft are described. The design incorporates two 850 shp turboshaft engines driving a four-bladed pusher propeller through a single transmission. Attention is given the all-graphite/epoxy composite construction of the fuselage and wings, designed for a 15,000-hour service life at high loads and 15,000 cabin pressure cycles, with a safety factor of 2.0 rather than the customary 1.5. Despite the novel materials employed, the structure is of a conventional, semimonocoque design that employs the stringers and frames of aluminum alloy aircraft. Also considered is the joint financing of the aircraft's development program by entrepreneurs and the British government, and the establishment of construction facilities in Northern Ireland. O.C.

A81-49976 # Graphite/polyimide augmentor and nozzle components. T. E. Schmid (United Technologies Corp., Pratt and Whitney Aircraft Group, West Palm Beach, FL). *AIAA, SAE, and*

A81-49979

ASME, Joint Propulsion Conference, 17th, Colorado Springs, CO, July 27-29, 1981, AIAA Paper 81-1358. 13 p. 5 refs.

Two composite applications for the augmentor and nozzle section of advanced military gas turbine engines were designed, fabricated and tested to determine the cost and weight savings potential and to demonstrate the viability of using organic matrix composites as substitues for sheet metal titanium structures. One of these components, the external nozzle flap, is currently undergoing flight service testing and may be considered for incorporation into the engine bill-of-material. Design approaches, configuration constraints, fabrication methods, and component test results are presented. (Author)

A81-49979 # **Comparison of computational and experimental jet effects.** J. L. Jacocks, W. L. Peters, and F. C. Guyton (ARO, Inc., Arnold Air Force Station, TN). *AIAA, SAE, and ASME, Joint Propulsion Conference, 17th, Colorado Springs, CO, July 27-29, 1981, AIAA Paper 81-1492.* 9 p. 11 refs.

Computations were made for transonic flow over a nozzle afterbody with a real plume. The effects of parameters such as nozzle pressure ratio, plume stagnation temperature, and interior nozzle shape on afterbody drag were quantified and compared with available experimental data. Remarkable agreement between the computational and experimental results is demonstrated, including the drag minimum associated with low nozzle pressure ratios and the absolute dependence of drag on temperature. The computer program used for the calculations is an axisymmetric modification of Diewert's planar Navier-Stokes program and utilizes a mixed explicit-implicit MacCormack algorithm with an algebraic turbulence model. (Author)

STAR ENTRIES

N81-32117*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
WIND-TUNNEL STUDIES OF ADVANCED CARGO AIRCRAFT CONCEPTS Final Report, 22 Jun. 1979 - 21 Jun. 1980
D. M. Rao and G. L. Goglia Sep. 1981 17 p refs
(NCC1-9)
(NASA-CR-164833) Avail: NTIS HC A02/MF A01 CSCL 01A

Accomplishments in vortex flap research are summarized. A singular feature of the vortex flap is that, throughout the range of angle of attack range, the flow type remains qualitatively unchanged. Accordingly, no large or sudden change in the aerodynamic characteristics, as happens when forcibly maintained attached flow suddenly reverts to separation, will occur with the vortex flap. Typical wind tunnel test data are presented which show the drag reduction potential of the vortex flap concept applied to a supersonic cruise airplane configuration. The new technology offers a means of aerodynamically augmenting roll-control effectiveness on slender wings at higher angles of attack by manipulating the vortex flow generated from leading edge separation. The proposed manipulator takes the form of a flap hinged at or close to the leading edge, normally retracted flush with the wing upper surface to conform to the airfoil shape. A.R.H.

N81-32118# National Aerospace Lab., Tokyo (Japan).
ON THE SPANWISE UNIFORMITY OF WIND TUNNEL TEST DATA OF TRANSONIC AIRFOILS
Tadashi Ito, Kooichi Suzuki, and Nobuhiko Kamiya 1981 46 p refs In JAPANESE; ENGLISH summary
(NAL-TR-665; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

For flows of free stream Mach numbers below the drag divergence Mach number, the spanwise uniformity of the section drag coefficient is good in the region around the center section. Although the spanwise uniformity is bad for flows of freestream Mach numbers above that, the drag divergence Mach number can be obtained accurately. In order to improve the spanwise uniformity of the section drag coefficient, it would be necessary to survey the wake at a station close to the trailing edge rather than at a station 1-3 chords downstream of the trailing edge, as was done in this experiment. The spanwise uniformity of pressure distribution and of section lift coefficient is fairly good in the region around the center section. The spanwise uniformity is better at Mach numbers below M sub CD than at Mach numbers above M sub CD. T.M.

N81-32119*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF SWEEP AND ASPECT RATIO ON THE LONGITUDINAL AERODYNAMICS OF A SPANLOADER WING IN AND OUT OF GROUND EFFECT
Scott O. Kjelgaard and John W. Paulson, Jr. Jun. 1981 166 p refs Revised
(NASA-TM-80199) Avail: NTIS HC A08/MF A01 CSCL 01A

A wind tunnel investigation was conducted in the Langley 4 by 7 meter tunnel to determine the effects of leading edge sweep, aspect ratio, flap deflection, and elevon deflection on the longitudinal aerodynamic characteristics of a span distributed load advanced cargo aircraft (spanloader). Model configurations consisted of leading edge sweeps of 0, 15, 30 and 45 deg and aspect ratios of approximately 2, 4, 6, and 8. Data were obtained for angles of attack of -8 to 18 deg out of ground effect and at angles of attack of -2, 0, and 2 deg in ground effect at Mach number equal 0.14. Flap and elevon deflections ranged from -20 to 20 deg. The data are represented in tabulated form. M.G.

N81-32121*# George Washington Univ., Washington, D.C. School of Engineering and Applied Sciences.
PROGRAM OF RESEARCH IN LAMINAR FLOW CONTROL IN THE JIAFS AT NASA LANGLEY RESEARCH CENTER Status Report, 1 Jan. - 30 Jun. 1981
W. Pfenninger 30 Jul. 1981 15 p ref
(Grant NsG-1585)
(NASA-CR-164843) Avail: NTIS HC A02/MF A01 CSCL 01C

At high Reynolds numbers, the performance of a low drag suction LFC airplane is essentially controlled by the induced drag and the turbulent friction drag of the nonlaminarized area. The question then arises as to how the airplane cruise lift to drag ratio (L/D) sub cruise) cruise increases with increasing extent of laminar flow 0 sub lam./0 sub total (0 = airplane wetted area). In particular, the question arises as to the airplane performance in the optimum case with all laminar flow over the airplane wetted area. Design approaches of all laminar flow LFC airplanes which optimize the airplane range . R = eta sub ov times (L/D) times H times lambda n(W sub 0/W sub E) are considered. A.R.H.

N81-32124# ARO, Inc., Arnold Air Force Station, Tenn.
STING INTERFERENCE EFFECTS ON THE STATIC DYNAMIC AND BASE PRESSURE MEASUREMENTS OF THE STANDARD DYNAMICS MODEL AIRCRAFT AT MACH NUMBERS 0.3 THROUGH 1.3 Final Report, Jun. - Dec. 1980
Fred B. Cyran AEDC Aug. 1981 66 p refs Sponsored by the AF
(AD-A102612; AEDC-TR-81-3) Avail: NTIS HC A04/MF A01 CSCL 20/4

Wind tunnel tests were conducted in the Arnold Engineering Development Center (AEDC) Propulsion Wind Tunnel Facility (PWT) to provide sting-support interference information for planning and directing wind tunnel tests at subsonic and transonic Mach numbers. Sting length and diameter effects on static and dynamic stability derivatives, static pitching moments, and base pressure of the Standard Dynamics Model (SDM) were investigated at Mach numbers from 0.3 to 1.3. Dynamic stability derivatives were obtained at a nominal frequency of 5.2 Hz, at amplitudes of 1.0, 1.5, and 2.0 deg. Pitch and yaw data were both obtained as a function of angle of attack. Previously unpublished static force and moment data for the SDM are also presented. The results showed that interference related to sting length was most pronounced at Mach number 0.95 for all measurements; the results also showed significant effects at Mach numbers 1.1 and 1.3 for yaw damping. Substantial sting diameter effects were observed at Mach number 0.3 for pitch damping and at Mach number 1.3 for yaw damping. Both sting length and diameter effects were found in base-pressure measurements at most Mach numbers. Author (GRA)

N81-32128# Naval Ship Research and Development Center, Bethesda, Md. Aviation and Surface Effects Dept.
INVESTIGATION OF THE CIRCULATION CONTROL WING/UPPER SURFACE BLOWING HIGH-LIFT SYSTEM ON A LOW ASPECT RATIO SEMISPAN MODEL Final Report, Aug. - Sep. 1980
Michael J. Harris May 1981 85 p refs
(WF41421000)
(AD-A103090; DTNSRDC/ASED-81/10) Avail: NTIS HC A05/MF A01 CSCL 20/4

The results from one in a series of investigations undertaken to develop the Circulation Control Wing/Upper Surface Blowing (CCW/USB) high-lift concept are presented. Included are: isolation of propulsion jet turning, effects of tip devices, and thrust reversing. As evaluated, the concept employs a modified supercritical wing with a 3.6-percent chord circular trailing edge and tangential blowing from a thin, full-span slot over this trailing edge. In addition, turbofans are mounted over the wing so that the exhaust scrubs the upper surface of the wing and is turned by the trailing edge. Unlike other upper surface blowing concepts, thrust deflection is accomplished by entraining the propulsive jet with tangential blowing around the trailing edge. The propulsive-induced lift enhances the proven high lift of the circulation control wing. For a thrust coefficient of 3.76, a tangential blowing coefficient of 0.24, and an angle of attack of 16 deg, the low aspect ratio model produced an untrimmed lift coefficient of 6.5. The system also demonstrated the capability to be used as an effective thrust reverser for deceleration during the landing ground roll. Author (GRA)

N81-32130# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
PROCEDURAL HANDBOOK FOR ESCAPE SYSTEM/ ACCIDENT INVESTIGATION HELMET USAGE ASPECTS, INCLUDING FAILURE ANALYSIS Final Report
Robert Snyder 20 May 1981 21 p
(AD-A102803; NADC-81066-60) Avail: NTIS HC A02/MF A01 CSCL 06/7

Aircrew protective helmets are currently developed to reduce the severity of head impact injuries. Many helmets involved in ejections and land and water crashes may provide clues concerning the sequence of events immediately prior to and/or during the accident. Helmet design may have been a factor in the serious and sometimes fatal injuries sustained during these accidents. This handbook will describe a systematic analysis of aircrewman's helmets involved in accidents or ejections. This analysis may identify and recognize design weaknesses and result in the initiation of appropriate effective remedial action. Author (GRA)

N81-32131# Technische Universitaet, Brunswick (West Germany). Lehrstuhl fuer Flugmechanik.
TAKEOFF AND MISSED APPROACH UNDER THE INFLUENCE OF WIND SHEAR [START UND DURCHSTART UNTER SCHERWINDEINFLUSS]
Reinhard Koenig and Peter Krauspe May 1980 27 p refs In GERMAN
(TUBS/SFB-58-80-05-01) Avail: NTIS HC A03/MF A01

The effect of wind shear on flight performance and flight safety is examined. Loads on aircraft surfaces are quantized. Statutory regulations that concern takeoff and missed approach are considered. The effects of wind shear on takeoff, specifically regarding a missed approach to glide path, are then discussed. Air traffic control measures in consideration of wind shear are proposed. Author (ESA)

N81-32133# Radio Technical Commission for Aeronautics, Washington, D. C.
MINIMUM OPERATIONAL PERFORMANCE STANDARDS FOR MICROWAVE LANDING SYSTEM (MLS) AIRBORNE RECEIVING EQUIPMENT
17 Jul. 1981 118 p
(RTCA/DO-177) Avail: NTIS HC A06/MF A01

Describes characteristics, typical applications, and operational goals envisioned for microwave landing systems are described (MLS). Minimum performance standards for the airborne MLS receiving equipment are given. These standards define the required receiver performance under standard and environmental conditions and detail recommended test procedures to ensure compliance. Tests are included where performance cannot be adequately determined by bench tests. J.M.S.

N81-32136# Fondazione Ugo Bordoni, Rome (Italy).
CHARACTERISTICS OF A DIGITAL FILTER FOR A PRECISION DME SYSTEM IN MICROWAVE LANDING SYSTEMS [CARATTERISTICHE DI UN FILTRO DIGITALE APPLICATO AL SISTEMA DME DI PRECISIONE PER MLS]
Franco Vatalaro Sep. 1980 40 p refs In ITALIAN
(FUB-43-1980) Avail: NTIS HC A03/MF A01

The filter is placed onboard the aircraft as a last processing stage before the data are presented to the pilot. The filter is of the type alpha minus beta, used in radar applications. Errors were analyzed, distinguishing three different regions of the power spectrum: path following error; control motion noise; and high frequency noise. The precision requirements for conventional takeoff and vertical takeoff were examined. The parameters of the proposed filter, bandwidth and frequency response are given. Bendix is also described and comparison shows advantages and disadvantages in both designs. Final specifications by international authorities have been published. Author (ESA)

N81-32137*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A FULL-SCALE WIND TUNNEL INVESTIGATION OF A HELICOPTER BEARINGLESS MAIN ROTOR
William Warmbrodt and John L. McCloud, III Aug. 1981 287 p
(NASA-TM-81321; A-8696) Avail: NTIS HC A13/MF A01 CSCL 01C

A helicopter bearingless main rotor was tested. Areas of investigation included aeroelastic stability, aerodynamic performance, and rotor loads as a function of collective pitch setting, RPM, airspeed and shaft angle. The rotor/support system was tested with the wind tunnel balance dampers installed and, subsequently, removed. Modifications to the rotor hub were tested. These included a reduction in the rotor control system stiffness and increased flexbeam structural damping. The primary objective of the test was to determine aeroelastic stability of the fundamental flexbeam/blade chordwise bending mode. The rotor was stable for all conditions. Damping of the rotor chordwise bending mode increases with increased collective pitch angle at constant operating conditions. No significant decrease in rotor damping occured due to frequency coalescence between the blade chordwise fundamental bending mode and the support system. R.C.T.

N81-32138*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOLAR POWERED AIRCRAFT Patent Application
William H. Phillips, inventor (to NASA) Filed 15 May 1981 12 p
(NASA-Case-LAR-12615-1; US-Patent-Appl-SN-263829) Avail: NTIS HC A02/MF A01 CSCL 01C

A cruciform wing structure for a solar powered aircraft is described. Solar cells are mounted on horizontal wing surfaces. Wing surfaces with spanwise axis perpendicular to the horizontal surfaces maintain these surfaces normal to the Sun line by allowing the aircraft to be flown in a controlled pattern at a large bank angle. The solar airplane may be of conventional design with respect to fuselage, propeller and tail, or may be constructed around a core and driven by propeller mechanisms attached near the tips of the airfoils. NASA

N81-32140# ARO, Inc., Arnold Air Force Station, Tenn. Directorate of Technology.
CAPTIVE AIRCRAFT TESTING AT HIGH ANGLES OF ATTACK Final Report, Oct. 1976 - Sep. 1978
R. W. Butler and J. P. Christopher AEDC Aug. 1981 42 p refs
(AD-A103108; AEDC-TR-80-60) Avail: NTIS HC A03/MF A01 CSCL 20/4

A captive testing technique capable of simulating aircraft maneuvers at high angles of attack has been developed and tested in the Aerodynamic Tunnel 16T of the Arnold Engineering Development Center (AEDC). The captive technique uses a closed loop system between wind tunnel, model, and computer. Use of the wind tunnel as an analog forcing function eliminates the requirement for a conventional static data matrix in motion simulation. Various high angle-of-attack maneuvers (rudder roll, aileron roll, wind-up turn, etc.) were generated with the captive system and show good correlation with flight data.
Author (GRA)

N81-32141# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
TWIN-ROTOR PATROL AIRSHIP FLYING MODEL DESIGN RATIONALE
John A. Eney 1 Jun. 1981 14 p
(AD-A102575; NADC-81165-60) Avail: NTIS HC A02/MF A01 CSCL 01/3

To gain experimental data on the controllability of tilt-rotor airships operating near neutral buoyancy, a 32-foot long 1/10 scale flying model is being developed using two contrarotating tilt-rotor representing those on the NASA/Bell XV-15 research aircraft. It is planned to demonstrate controlled hover and transition in an engine - out condition with one rotor stopped to emphasize the natural attitude stability and damping of such vehicles. Author (GRA)

N81-32142# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
DEVELOPMENT OF AN AIRCRAFT MANEUVER LOAD SPECTRUM BASED ON VGH DATA Final Report
John W. Lincoln Jul. 1980 90 p
(AD-A102750; ASD-TR-80-5037) Avail: NTIS HC A05/MF A01 CSCL 01/3

This report describes a procedure whereby a full scale aircraft maneuver load fatigue spectrum can be developed from recorded VGH data. It is assumed in this development that the internal loads (stresses) at the appropriate control points are available for combinations of velocity, load factor, altitudes and weight so that an interpolation on these points will provide the desired accuracy. The procedure will generate (for a control point) the cumulative probability of exceeding a given stress, exceedances per hour of a given stress level, the probability density function for stress and the stress spectrum. The aircraft spectrum is derived from the assumption that the aircraft test loads derived from a linear combination of balanced loading conditions will provide a good simulation of the stress history at and 'between' the control points. The application of the program to new designs (mission analysis) and to tracking can be made without modification. The computer program for this calculation is included along with a sample problem. As an example of an application of this program, the stress exceedance functions for a control point on the wing of the F-4 are shown that were computed from the VGH data accumulated over a period of one year. Author (GRA)

N81-32143*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
SOFTWARE SURVEY FOR THE AVIONICS TEST BED Interim Report
J. M. Cobb Jul. 1981 113 p
(Contract NAS9-15800)
(NASA-CR-161089; JSC-17490; LEMSCO-16941) Avail: NTIS HC A06/MF A01 CSCL 01D

A survey was conducted to itemize software programs that could possibly be used in the development of an avionics test bed for shuttle attached or autonomous large space structures. The results of this survey are presented. Each program is described on a standard form J.M.S.

N81-32144# Arinc Research Corp., Annapolis, Md.
COST BENEFIT AND FAILURE CRITICALITY ANALYSES OF THE STANDARD AVIONICS INTEGRATED CONTROL SYSTEM (SAICS) CONCEPT
E. Straub, D. Godwin, and A. Savisaar Jun. 1981 129 p
(Contract F04606-79-G-0082; AF Proj. 2257)
(AD-A102197; Rept-2258-02-1-2439) Avail: NTIS HC A07/MF A01 CSCL 09/5

This document reports on the existing individual and integrated avionics cockpit controls of contemporary aircraft. Through failure-criticality and cost-benefit analyses, it examines the potential of a Standard Avionics Integrated Control System (SAICS) as a replacement for existing individual controls. The report provides information on existing individual cockpit avionics control mean times between failures (MTBFs), costs, weights, and sizes. It also provides MTBF, cost, space, and weight estimates for a unique integrated control, a standard avionics integrated control, and a manual back-up control panel for both. The study addresses primarily hardware, not software, and places emphasis on avionics control rather than display. It is assumed that installation of a SAICS would begin in five candidate tactical aircraft some time after 1985. Author (GRA)

N81-32147*# Avco Lycoming Div., Stratford, Conn.
DESIGN AND EVALUATION OF AN INTEGRATED QUIET, CLEAN GENERAL AVIATION TURBOFAN (QCGAT) ENGINE AND AIRCRAFT PROPULSION SYSTEM Contractor Report, Dec. 1976 - Apr. 1980
Jon German, P. Fogel, and C. Wilson Apr. 1980 226 p refs
(Contract NAS3-20584)
(NASA-CR-165185; LYC-80-27) Avail: NTIS HC A11/MF A01 CSCL 21E

The design was based on the LTS-101 engine family for the core engine. A high bypass fan design (BPR = 9.4) was incorporated to provide reduced fuel consumption for the design mission. All acoustic and pollutant emissions goals were achieved. A discussion of the preliminary design of a business jet suitable for the developed propulsion system is included. It is concluded that large engine technology can be successfully applied to small turbofans, and noise or pollutant levels need not be constraints for the design of future small general aviation turbofan engines. T.M.

N81-32150# Tennessee Univ. Space Inst., Tullahoma.
UNSTEADY SWIRLING FLOWS IN GAS TURBINES Annual Technical Report, 1 Apr. 1980 - 30 Jun. 1981
M. Kurosaka Jun. 1981 51 p
(Contract F49620-78-C-0045; AF Proj. 2307)
(AD-A102852; AFOSR-81-0608TR) Avail: NTIS HC A04/MF A01 CSCL 21/5

This annual report covers the second phase of investigations into the unsteady swirling flows. The overall objective of the entire program is to acquire fundamental understanding of a phenomenon characterized by violent fluctuations occurring in swirling flows in gas turbines; this flow instability, dubbed here as 'Vortex Whistle' is known to be capable of causing severe fatigue failure in gas turbine components. Although the phenomena of 'Vortex Whistle' have never remained unrecognized, perhaps for the reason that they appeared in seemingly unrelated incidents under various disguise, no comprehensive investigation appears to have been embarked upon. In addition, in spite of the fact that the vortex whistle is a pure tone noise and distinctly audible, its role as a source of aircraft engine noise has never been recognized. Furthermore, when the vortex whistle becomes intense, it induces a change in the steady flow field, the total temperature being spontaneously separated in the radial direction (the Ranque-Hilsch effect). Not only its implications to the study aero design of turbomachines are of obvious importance, but also this appears to offer an unmistakable clue to the puzzling Ranque-Hilsch effect. GRA

N81-32151*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT EVALUATION OF THE STOL FLARE AND LANDING DURING NIGHT OPERATIONS
James A. Franklin, Robert C. Innis, and Gordon H. Hardy Aug. 1981 46 p refs
(NASA-TM-81312; A-8704) Avail: NTIS HC A03/MF A01 CSCL 01C

Simulated instrument approaches were made to Category 1 minimums followed by a visual landing on a 100 x 1700 ft STOL runway. Data were obtained for variations in the aircraft's flare response characteristics and control techniques and for different combinations of aircraft and runway lighting and a visual approach slope indication. With the complete aircraft and runway lighting and visual guidance no degradation in flying qualities or landing performance was observed compared to daylight operations. elimination of the touchdown zone floodlights or the aircraft landing lights led to somewhat greater pilot workload; however, the landing could still be accomplished successfully. Loss of both touchdown zone and aircraft landing lights led to a high workload situation and only a marginally adequate to inadequate landing capability. T.M.

N81-32152# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
THE CONTROL ANTICIPATION PARAMETER FOR AUGMENTED AIRCRAFT Final Report, 1 Jan. - 15 May 1981
D. E. Bischoff 15 May 1981 40 p refs
(AD-A102626; NADC-81186-60) Avail: NTIS HC A03/MF A01 CSCL 01/3

A longitudinal control anticipation parameter is developed which correlates high order augmented aircraft dynamics with both lower order equivalent system descriptions and pilot opinion ratings. Three extensive in-flight research programs are analyzed via the developed parameter in an effort to define regions of pilot acceptability. Additional effort is recommended to verify the minimum level 1 boundaries and to determine the relationship between the control anticipation parameter and alternate proposed criteria. Author (GRA)

N81-32153*# National Aeronautics and Space Administration, Washington, D. C.
WIND TUNNELS OF NASA
Donald D. Baals and William R. Corliss 1981 162 p Original document contains color illustrations
(NASA-SP-440) Avail: NTIS HC A08/MF A01 CSCL 14B

The contribution of wind tunnels to aerodynamic studies is described. The development of the wind tunnel and the problems of calibration, scaling, and instrumentation are discussed. The NASA wind tunnels form the basis for the book, but Air Force, university, and industrial facilities are also considered. T.M.

N81-32154*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
TWO-DIMENSIONAL DYNAMIC STALL AS SIMULATED IN A VARYING FREESTREAM
G. Alvin Pierce, Donald L. Kunz, and John B. Malone 1978 67 p refs
(Grant NGR-11-002-185)
(NASA-CR-164829) Avail: NTIS HC A04/MF A01 CSCL 14B

A low speed wind tunnel equipped with a axial gust generator to simulate the aerodynamic environment of a helicopter rotor was used to study the dynamic stall of a pitching blade in an effort to ascertain to what extent harmonic velocity perturbations in the freestream affect dynamic stall. The aerodynamic moment on a two dimensional, pitching blade model in both constant and pulsating airstream was measured. An operational analog computer was used to perform on-line data reduction and plots of moment versus angle of attack and work done by the moment were obtained. The data taken in the varying freestream were then compared to constant freestream data and to the results of two analytical methods. These comparisons show that the velocity perturbations have a significant effect on the pitching moment which can not be consistently predicted by the analytical methods, but had no drastic effect on the blade stability. A.R.H.

N81-32155# ARO, Inc., Arnold Air Force Station, Tenn.
SUPPLEMENTAL CALIBRATION OF THE AEDC-PWT 16 FT TRANSONIC TUNNEL AERODYNAMIC TEST SECTION Final Report, Dec. 1979 - Jun. 1980
M. L. Mills AEDC Jul. 1981 109 p refs Sponsored by the AF
(AD-A102384; AEDC-TR-80-32) Avail: NTIS HC A06/MF A01 CSCL 14/2

A test was conducted in the Propulsion Wind Tunnel (16T) to: (1) define the effect of plenum suction utilization on the tunnel calibration and power consumption at free-stream Mach numbers less than 0.75, (2) improve the centerline Mach number calibration at supersonic Mach numbers, (3) correlate the test section centerline Mach number with the tunnel nozzle Mach number, and (4) investigate the effect of tunnel humidity on the calibration. Data were acquired for Mach numbers from 0.6 to 1.6 at total pressures from 400 to 3,200 psfs. The calibration was conducted in the aerodynamic test section using a centerline pipe and wall pressure orifices to define the Mach number distributions. The results of an evaluation of alternate methods of calibration indicated that the current method is the most acceptable. Slightly changing the tunnel nozzle to eliminate the disturbances in the flow at supersonic Mach numbers indicated the need to investigate the entire nozzle system. Comparison of this calibration with previous calibration results indicates that a revision of the current tunnel calibration is not necessary. Author (GRA)

N81-32156# Naval Civil Engineering Lab., Port Hueneme, Calif.
LIME-STABILIZED NATIVE SOIL AS BASE COURSE FOR LIGHT AIRCRAFT PAVEMENT Final Report, Feb. 1978 - Apr. 1981
Robert B. Brownie Apr. 1981 130 p refs
(Contract DOT-FA78WAI-834)
(AD-A102196; FAA-RD-80-112) Avail: NTIS HC A07/MF A01 CSCL 13/2

Present Federal Aviation Administration policy does not recommend the use of lime stabilized soil as base course for airport pavements. The potential savings in cost and materials by using this type of construction for light duty airport pavements (aircraft gross weights less than 30,000 lbs) led to the use of lime stabilized native soil in place of other base course materials at three airports in the Southwestern United States. Those airports are located at Chino, California, Big Bear Lake, California, and Payson, Arizona. The compositions of those base courses were determined by laboratory analyses of core borings and soil samples. Visual condition surveys were performed, and surface deflections under load were measured. Climatological data and aircraft traffic histories were obtained. All of those factors and the performance of the pavements were analyzed, and a suggested specification was prepared for constructing lime stabilized base courses. GRA

N81-32158# Pacer Systems, Inc., Arlington, Va.
DEVELOPMENT OF A HELIPORT CLASSIFICATION METHOD AND AN ANALYSIS OF HELIPORT REAL ESTATE AND AIRSPACE REQUIREMENTS Final Report, Jan. - Jun. 1981
F. D. Smith and A. G. DeLucien Jun. 1981 100 p refs
(Contract DOT-FA01-80-C-10080)
(AD-A102521; PAR-018-81; FAA-RD-81-35) Avail: NTIS HC A05/MF A01 CSCL 01/5

A helicopter performance related heliport classification method is developed which accommodates an applicable range of operating conditions and factors which impact helicopter performance. Dimensional values for use in planning both real estate and airspace surfaces are determined for application to the identified heliport classifications. Those values are incorporated into generalized guidelines for heliport planners to meet site-specific and non-standard operational conditions. Requirements for flight manual performance charts and published heliport information are also identified. Author (GRA)

N81-32164# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
DATA ACQUISITION AND ANALYSIS SYSTEM AS A TRAINING DEVICE FOR SIMULATED CONVENTIONAL WEAPON DELIVERY
C. F. G. M. Hofman and J. Batenburg (Royal Netherlands Air Force) 24 Jun. 1980 13 p refs Presented at AGARD Symp. on Subsystem Testing and Flight Test Instr., Geilo, Norway, 27-30 Oct. 1980 and at 2nd Interserv./Ind. Training Equipment Conf., Salt Lake City, 18-20 Nov. 1980
(NLR-MP-80027-U) Avail: NTIS HC A02/MF A01

The system, based on a photogrammetric method, yields release conditions, the nominal weapon impact position and the weapon time of flight. Simulated attacks on a great variety of realistic targets can be evaluated and validated as there is no need to drop training weapons. No ground-based instrumentation in the target area is needed. The system consisting of an airborne data acquisition system installed in the aircraft and a ground-based processing and analysis system at the airbase allows a debriefing of the pilot within half an hour after completion of the mission. Circular error probable during flight tests with a variety of weapons compared well with predictions. Airworthiness evaluations shows the equipment to be reliable and having no adverse effect on handling. Author (ESA)

N81-32273# Brookhaven National Lab., Upton, N. Y.
WATER-COMPATIBLE POLYMER CONCRETE MATERIALS FOR USE IN RAPID REPAIR SYSTEMS FOR AIRPORT RUNWAYS Final Report
T. Sugama, L. E. Kukacka, and W. Horn Mar. 1981 129 p refs
(Grant AFOSR ISSA 80-00027; AF Proj. 2307)
(AD-A102873; BNL-51390; AFOSR-81-0589TR) Avail: NTIS HC A07/MF A01 CSCL 01/5

Water-compatible polymer concrete (PC) formulations have been developed which appear to have potential for use in all-weather rapid repair procedures for bomb-damaged runways. Formulations consisting of furfuryl alcohol, water-saturated aggregate, dry silica flour, promoters, and catalysts produced composites with properties suitable for repair purposes when mixed and polymerized at temperatures from -20 to 30 C. Calcium-unsaturated polyester complexed PC also produced excellent properties. However, the early strength criteria, (2000 psi (13.78 MPa) at 1 hr) and other requirements such as compatibility of the formulation with water and practical working times could be attained only at temperatures >20 deg C. This system can be polymerized under water. Studies of the polymerization reaction mechanisms, materials properties, costs, and potential placement methods were performed. Author (GRA)

N81-32290# Energy and Minerals Research Co., Exton, Pa.
ULTRASONIC DISPERSION OF PARTICULATE HIGH DENSITY FUELS Final Report, Sep. 1979 - Sep. 1980
Wright-Patterson AFB, Ohio AFWAL May 1981 44 p
(Contract F33615-79-C-2090; AF Proj. 3048)
(AD-A102771; AFWAL-TR-81-2033) Avail: NTIS HC A03/MF A01 CSCL 21/4

The high energy-density slurry fuels being developed to increase missile range may present settling and gelation problems in use. This project was performed to demonstrate ultrasonic dispersion techniques, with the goal of deagglomerating to more uniform, smaller particle-size solids distribution and increased storage stability. Batch and continuous process laboratory-type arrays were used at various power levels (nominal 200 to 1000 watts), on carbon and boron/JP-10 slurries of interest to the Air Force. Analytical techniques, difficult with the particulate sizes involved (down to the 300-millimicron range), showed some measure of ultrasonic deagglomeration, which increased with increasing ultrasonic energy densities, and complete stability of the 60-day-storage activated samples, in contrast to the non-activated control samples. Extended analysis might better quantify ultrasonic effect, but combustion tests could directly identify performance benefits. GRA

N81-32522# Sacramento Air Materiel Area, McClellan AFB, Calif.

THE USE OF ACOUSTIC EMISSION FOR DETECTION OF ACTIVE CORROSION AND DEGRADED ADHESIVE BONDING IN AIRCRAFT STRUCTURE

John Rodgers and Steven Moore Nov. 1975 16 p refs
(AD-A102923; Paper-14) Avail: NTIS HC A02/MF A01 CSCL 01/3

Procedures have been developed by engineers at Sacramento Air Logistics Center to detect active corrosion in aluminum structure and moisture-degraded adhesive bonding in composite honeycomb using acoustic emission monitoring. Simple heating methods employing a hot air gun or heat lamp are used to increase emission from active corrosion sources, and to create the stresses necessary to break moisture-degraded adhesive bonds. Corrosion detection in aluminum skin and honeycomb core has proven very successful. Detection of moisture-degraded bonding between aluminum skin and phenolic core on the F-111 vertical stabilizer leading edge has been substantially improved and simplified. Acoustic emission is replacing X-ray and ultrasonic inspection procedures in these applications, with direct benefits realized in a 75% reduction of inspection time and costs, fewer work flow interruptions, and better defect area definition.
Author (GRA)

N81-32956*# California Univ., Los Angeles. School of Engineering and Applied Science.

FORECAST OF FUTURE AVIATION FUELS: THE MODEL Final Report

M. B Ayati, C. Y. Liu, and J. M. English Sep. 1981 192 p refs
(Contract NsG-3116)
(NASA-CR-165486; UCLA-eng-8037) Avail: NTIS HC A09/MF A01 CSCL 12B

A conceptual models of the commercial air transportation industry is developed which can be used to predict trends in economics, demand, and consumption. The methodology is based on digraph theory, which considers the interaction of variables and propagation of changes. Air transportation economics are treated by examination of major variables, their relationships, historic trends, and calculation of regression coefficients. A description of the modeling technique and a compilation of historic airline industry statistics used to determine interaction coefficients are included. Results of model validations show negligible difference between actual and projected values over the twenty-eight year period of 1959 to 1976. A limited application of the method presents forecasts of air transportation industry demand, growth, revenue, costs, and fuel consumption to 2020 for two scenarios of future economic growth and energy consumption.
Author

N81-32968*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.

USER'S MANUAL FOR A COMPUTER PROGRAM TO CALCULATE DISCRETE FREQUENCY NOISE OF CONVENTIONAL AND ADVANCED PROPELLERS

R. M. Martin and F. Farassat Aug. 1981 90 p refs
(NASA-TM-83135; L-14374) Avail: NTIS HC A05/MF A01 CSCL 20A

A user's manual is presented for a computer program for the calculation of discrete frequency noise of conventional and advanced propellers. The structure of the program and the subroutines describing the input functions are discussed. Input variables and their default values and the variables in the output data sheet are defined. Two versions of the program are available. These differ only in the graphic output capability. One version has only printed output capability. A second version with extensive graphic output capability is available for the computer system at Langley. This Manual includes four detailed examples of both the printed and graphic outputs. These examples may be reproduced by users to check their code on their computer system.
A.R.H

N81-33131# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugmechanik.

DESIGN OF OPTIMAL INPUTS FOR THE IDENTIFICATION OF CHARACTERISTICS OF AIRCRAFT FLIGHTS [ENTWURF VON EINGANGSSSIGNALEN FUER DIE KENNWERTERMITTLUNG BEI FLUGZEUGEN]

E. Plaetschke *In* Hochschule der Bundeswehr Seminar on the Simulation and Optimization of Dyn. Systems Jun. 1981 p 102-120 refs
Avail: NTIS HC A08/MF A01

The design of optimal inputs for identifying stability and control derivatives of the longitudinal and lateral motion of an aircraft are considered. Two different procedures of input design were treated in more detail. Starting with investigations in the frequency domain, the first method yields a multistep input signal, which fulfils specific spectral requirements. Compared with the power spectral densities of the commonly used double and single step input, this multistep input has a larger bandwidth. The second method is based on the optimization of different measures of the Fisher information matrix, such as determinant or trace. Depending on the measure used, the designed signals differ with respect to their spectral composition. The discussed input signals, which were used in a flight test program, are compared with respect to the achieved accuracy of the identified stability and control derivatives.
Author (ESA)

N81-33132# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugmechanik.

SYSTEM IDENTIFICATION FOR CONTROLLED AIRCRAFT [SYSTEMIDENTIFIZIERUNG AM GEREGELTEN FLUGZEUG]

M. Marchand *In* Hochschule der Bundeswehr Seminar on the Simulation and Optimization of Dyn. Systems Jun. 1981 p 121-166 refs In GERMAN

Avail: NTIS HC A08/MF A01

The problems and experiences in applying a maximum likelihood identification method to the flight test data of a controller-supported aircraft are reported. The effect of the controller on the identifiability of the parameters and the validity of the model structure of a so-called equivalent system are treated. The role of the pilot in the control loop, e.g., with respect to stability, and the identification of pilot models is addressed.
Author (ESA)

N81-33133# RAND Corp., Santa Monica, Calif.

ESTIMATING AIRCRAFT DEPOT MAINTENANCE COSTS Interim Report

Kenneth E. Marks and Ronald W. Hess Jul. 1981 214 p
(Contract MDA903-77-C-0107)
(AD-A103623; RAND/R-2731-PA/E) Avail: NTIS HC A10/MF A01 CSCL 05/1

This report describes a series of parametric equations for use in estimating the depot maintenance cost of new Air Force aircraft, particularly for the five major maintenance categories: airframe rework, engine overhaul, airframe component repair, engine component and accessory* repair, and avionics component repair. The equations are intended to provide cost estimates for Defense Systems Acquisitions Review Council Milestone II, at which point some design details of major aircraft subsystems (airframes, engine avionics) are available. The report presents a single set of equations that are the most representative and applicable to the widest range of estimating situations, but presents alternative equations and supporting data and analyses.
Author (GRA)

N81-33134# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

A STUDY OF THE FACTORS AFFECTING PRODUCTIVITY AT THE NAVAL AIR REWORK FACILITIES M.S. Thesis

Janice Allton and Stephen N. Bernard Jun. 1981 83 p refs
(AD-A103783; AFIT-LSSR-10-81) Avail: NTIS HC A05/MF A01 CSCL 05/1

The purpose of this study was to determine the factors affecting productivity at Naval Air Rework Facilities (NARFs). Specific points addressed were number and identity of factors, internal consistency and usefulness in predicting perceived productivity. A seventy-two item questionnaire was administered to a random sample of NARF production-line employees. Five hundred thirty-four cases were factor analyzed. Eleven factors extracted were discussed. Eight of these were used to develop a linear multiple regression model to predict perceived productivity. Approximately twenty percent of the variance in perceived productivity was predicted, with five independent variables (factors) work scheduling supervision, overtime, training quality and equipment. These factors generally substantiated those found in current literature.
Author (GRA)

N81-33135# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A PRESCRIPTIVE MODEL FOR RESOURCE ALLOCATION AT THE INTERMEDIATE LEVEL ENGINE FACILITY M.S. Thesis
Edward Connolly and Charlie D. Johnson Jun. 1981 91 p refs
(AD-A103785; AFIT-LSSR-26-81) Avail: NTIS HC A05/MF A01 CSCL 15/5

Inability to support spare engine requirements has a critical impact on this nation's ability to meet its worldwide commitments during a crisis. This study examined those factors that significantly affect the intermediate level Propulsion Branch's ability to provide a steady supply of spare engines. Through simulation modeling and analysis, four factors were identified as driving the Base Repair Cycle time: spare parts, repair equipment, manpower, and experience level. A decision support system was developed which enables most users to assess the influence on repair cycle time of additional funding levels in specific factor areas. Author (GRA)

N81-33136# Boeing Aerospace Co., Seattle, Wash. Product Support/Experience Analysis Center.
DEVELOPMENT OF MAINTENANCE METRICS TO FORECAST RESOURCE DEMANDS OF WEAPON SYSTEMS Final Report, 1 Mar. 1978 - 1 Oct. 1980
Donald K. Hindes, Gary A. Walker, and David H. Wilson Wright-Patterson AFB, Ohio Air Force Human Resources Lab. Oct. 1980 154 p refs
(Contract F33615-77-C-0075)
(AD-A104089; D194-10089-5) Avail: NTIS HC A08/MF A01 CSCL 05/1

This report describes the methodology and results of a 32 month effort to 'Develop Maintenance Metrics To Forecast Resource Demands of Weapon Systems'. Increased concern with the rising cost to support weapon systems currently in operation, as well as those in development, has created the need for more accurate methods of projecting maintenance requirements. The objective of this subject research was to alleviate the above need by identifying, determining, and integrating those measurable weapon system parameters which are necessary and sufficient to predict and quantify the drivers of maintenance resource demands. Phase 1 investigated and developed new maintenance metrics for aircraft propulsion and avionics. Phase 1 results were then reviewed for overall success and applicability before proceeding with Phase 2 efforts. Initial results were acceptable so Phase 2 of the study was initiated to develop metrics for the rest of the subsystems commonly included in Air Force aircraft. This document is the final report of a series of five technical reports published during the study. It is intended to be a summary overview of the study project and an application guide for potential users of the developed metrics methodology. Study findings include: (1) Review of published literature; (2) Critical equipment selection; (3) Maintenance impact parameter identification; (4) Data base assembly and integration; (5) Maintenance impact estimating relationship detection and analysis; (6) Maintenance metric model development; and (7) Maintenance metrics validation. GRA

N81-33137# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE IMPACT OF MILITARY APPLICATIONS ON ROTORCRAFT AND V/STOL AIRCRAFT DESIGN
Jun. 1981 264 p refs In ENGLISH and FRENCH Conf. held at Paris, 6-9 Apr. 1981
(AGARD-CP-313; ISBN-92-835-0294-9) Avail: NTIS HC A12/MF A01

The technological status of rotorcraft and V/STOL aircraft were reviewed in light of operational possibilities and needs. Topics include operational experiences, present status of technology, future trends, and military mission effectiveness.

N81-33138# French Army, Villacoublay-Air (France).
INCIDENTS OF PROBLEMS IN SETTING TO WORK ON THE CONCEPTUAL DESIGN OF HELICOPTERS [INCIDENCES DES PROBLEMES DE MISE EN OEUVRE SUR LA CONCEPTION DES HELICOPTERES]
M. G. Cannet *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 12 p In FRENCH
Avail: NTIS HC A12/MF A01

The problems focused on concern only the development and design of military helicopters. The general operational requirements of today's military helicopter were reviewed. The immediate problems facing the helicopter industry are discussed. Technological forecasts for the next 20 years are presented with emphasis on the direction that research management will take in helicopter design. T.M.

N81-33139# Martin Marietta Aerospace, Bethesda, Md.
VERTICAL LIFT CAPABILITIES FOR THE 80'S AND 90'S
Norman R. Augustine and James B. Morrison *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 16 p
Avail: NTIS HC A12/MF A01

During the past few years, several things have happened to make vertical lift more attractive. The first is that the technologies in engines, structures, stability and control and avionics have all been improving rapidly, producing great strides in performance, maintainability and potential cost reduction. The second is that the facts of operational life have changed to put additional value on vertical takeoff and landing capability. The status of battlefield vertical lift systems in the United States in reference to the level of technology, mission capabilities and associated development activities is reported. Also, projections in each of these areas are presented, accompanied by a list of recommendations based on the perceived pitfalls in the past and the technological and mission opportunities of the future. T.M.

N81-33140# Marine Corps, Washington, D. C.
TEN YEARS OF US MARINE CORPS HARRIER OPERATIONS
R. A. Gustafson *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 p 10

Avail: NTIS HC A12/MF A01

The VSTOL concept is exceptionally attractive to the Marine Corps because of the significant benefits to expeditionary capability and reduced close air support response times made possible through basing flexibility. The AV-8A was employed world-wide by the Marine Corps aboard ship and ashore. Although the primary purpose of the AV-8A is to provide close air support to the Marine ground combat element, the thrust-vectoring design of the Harrier proved to have significant potential in air combat maneuvering. Operations with the AV-8A highlight areas where future VSTOLs should be improved as well as providing an experience base to support their design. This operational experience proves the VSTOL concept, and the Marine Corps is convinced that significantly increased combat effectiveness is provided. To further expand the VSTOL application, the Marine Corps plans to replace its present eight light attack squadrons with an improved Harrier, the AV-8B. The long term goal is to achieve an all VSTOL aviation force. T.M.

N81-33141# Army Aviation Center, Fort Rucker, Ala.
FIELDING OF AN ADVANCED HELICOPTER. THE UH-60A BLACK HAWK: INITIAL OPERATIONAL EXPERIENCE
Cornelius F. McGillicuddy, Jr. *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 10 p
Avail: NTIS HC A12/MF A01

The Sikorsky UH-60A was developed and designed to replace the UH-1H Iroquois for assault, air cavalry, and aeromedical evacuation missions. The UH-60A carries the infantry squad of 11 men and their equipment as a basic load. Particular emphasis during development was devoted to reducing vulnerability, improving crashworthiness and maintainability. There are eight separate kits for the basic aircraft which increase mission flexibility. The development of the UH-60A was highly successful as have the initial operational experiences. The Black Hawk was issued to operational units and these units deployed and engaged in field exercises both in and outside of the United States. The lessons derived from these operational experiences will assist in improving the UH-60A and defining roles for future utility aircraft. T.M.

N81-33142# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
VIEWS ON V/STOL TACTICAL FIGHTER AIRCRAFT: TECHNOLOGY NEEDS AND RELATIONSHIPS TO THE RUNWAY DENIAL PROBLEMS

John M. Byrnes, G. Keith Richey, and Randall B. Lowry *In* AGARD The Impact of Mil. App. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 13 p refs

Avail: NTIS HC A12/MF A01

On the basis of a number of studies conducted over the past three or four years, the Air Force technology community developed an intense concern over the vulnerability of USAF airbases, particularly those in Central Europe. For this reason, advanced concepts which may help solve the problem in the near and far terms are addressed. A possible airbase survivability plan is presented, and the pros and cons of STOL versus V/STOL aircraft, as a far term solution, are discussed. T.M.

N81-33143*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HISTORICAL OVERVIEW OF V/STOL AIRCRAFT TECHNOLOGY

Seth B. Anderson *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 13 p

Avail: NTIS HC A12/MF A01 CSCL 01B

During the past 25 years over 60 V/STOL types were studied and flown with varying degrees of success. The requirements for satisfactory characteristics in several key technology areas are discussed and a review is made of various V/STOL aircraft for the purpose of assessing the success or failure of each design in meeting design requirements. This survey shows that in spite of many problems revealed, special operating techniques were developed to help circumvent deficiencies. For the most part performance and handling qualities limitations restricted operational evaluations. Flight operations emphasized the need for good STOL performance, good handling qualities, and stability and control augmentation. The majority of aircraft suffered adverse ground effects. T.M.

N81-33144*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

RECENT PROGRESS IN V/STOL AIRCRAFT TECHNOLOGY

L. Roberts, W. Deckert, and D. Hickey *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 10 p refs

Avail: NTIS HC A12/MF A01 CSCL 01B

Recent results from wind-tunnel and flight-tests investigations for V/STOL aircraft were reviewed. Primary emphasis is given to technical results relating to three types of subsonic aircraft: a quiet STOL aircraft; a tilt rotor aircraft, and a turbofan V/STOL aircraft. Comparison and correlation between theoretical and experimental results, and between wind-tunnel and flight-test results, is made. The quiet STOL aircraft technology results are primarily those derived from the NASA/Boeing Quiet Short Haul Aircraft (QSRA) program. The tilt rotor aircraft technology results are those obtained from the NASA/Army/Navy/Bell (XV-15-TRRA) aircraft flight investigations. The turbofan V/STOL aircraft technology results are from static ground facility and wind-tunnel investigations of a NASA/Navy/Grumman full-scale lift/cruise fan aircraft model, which features two tilting nacelles with TF-34 engines. T.M.

N81-33145# Messerschmidt-Boelkow G.m.b.H., Munich (West Germany). Helicopter Div.

CONTROLS AND DISPLAYS FOR ALL-WEATHER OPERATION OF HELICOPTERS

R. D. vonReth *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 15 p refs

Avail: NTIS HC A12/MF A01

Various mission requirements for all weather operations were reviewed. In particular some of the most important features for military applications are outlined. Some of the basic relations between increasing display sophistication and increasing control sophistication are discussed. Also the influence of various functions on the degree of control automation as it seems desirable for future systems under the aspect of man-machine interaction are taken into consideration. In a comparison the controls and displays arrangement of some representative helicopters of presently operational helicopters are described. An outline of the goals and results of some experimental and research programs is given. The characteristics of presently operational helicopters are compared with the technologically feasible solutions taking into account some of the economic constraints as initial cost, operational cost and reliability. Future basic requirements for the controls and the displays operation are established. T.M.

N81-33146# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE ROLE OF THE RESEARCH SIMULATOR IN THE SYSTEMS DEVELOPMENT OF ROTORCRAFT

Irving C. Statler and Arlin Deel *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 21 p refs Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, Calif.

Avail: NTIS HC A12/MF A01 CSCL 14B

Over the last 20 years, flight simulators became widely accepted as training tools. Moreover, research simulators were used extensively by the fixed-wing industry: in the design, testing, and certification of new aircraft. The rotorcraft industry, however, was slow to use man-in-the-loop simulation to solve its design problems, primarily because of the difficulty of modeling complex rotorcraft for realtime simulation and because of the need for a wide-angle visual system for low-level flight. A joint U.S. Army and NASA program was initiated to provide this simulation capability for exploitation by both government and industry. The potential application of the research simulator to future rotorcraft systems design, development, product improvement evaluations, and safety analysis is discussed. T.M.

N81-33147# Societe Nationale Industrielle Aerospatiale, Marignane (France.)

APPLICATIONS OF COMPOSITE MATERIALS FOR THE CONSTRUCTION OF MILITARY HELICOPTERS [APPLICATIONS DES MATERIAUX COMPOSITES POUR LA CONSTRUCTION D'HELICOPTERES MILITAIRES]

A. Sourdon and G. Beziac *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 21 p refs In FRENCH

Avail: NTIS HC A12/MF A01

Production costs and versatility of the construction materials are the guiding factors for aircraft construction techniques. The ever increasing use of composite materials in aircraft construction is a result of these factors. The utilization of composite materials in helicopter construction is discussed. Special emphasis is placed on the advantages and disadvantages of the use of these materials for military helicopters. T.M.

N81-33148# Institut fuer Flugmechanik, Brunswick (West Germany).

THE IMPACT OF HELICOPTER FLIGHT MECHANICS ON MISSION PERFORMANCE

B. L. Gmelin and H.-J. Pausder *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 14 p refs

Avail: NTIS HC A12/MF A01

In comparison to other VTOL aircraft, the helicopter has inherently superior flying characteristics at hover and in the low speed region but it has clear disadvantages by its lower high speed capability. For the completion of today's military helicopter missions near the ground and in all weather flight conditions a careful flight mechanical adaptation of the pilot-helicopter system to the specific task is required. This includes the combined optimization of the basic aircraft, the additional system equipment, and in a certain degree the pilot control behavior. A DFVLR-methodology is presented, having the objective to evaluate the flight mechanical characteristics of the pilot-helicopter system with regard to specific flight tasks. The method leads to taskoriented evaluation diagrams which include scales for the overall system task performance and for the demands on the pilot. Relevant flight test results of the BO 105 helicopter in hover and NOE-flight are presented. Especially the parameters control activity and task performance are discussed. Author

N81-33149# Rolls-Royce Ltd., Bristol (England).

MULTI-MISSION STOVL WITH VECTORED THRUST ENGINES

W. J. Lewis and P. Simplin (Rolls-Royce Ltd., Derby, England) *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 9 p

Avail: NTIS HC A12/MF A01

It is demonstrated how a single vectored thrust engine with plenum chamber burning on the front nozzles can be used in both a subsonic strike and a supersonic air superiority aircraft. The operational capability of the STOVL aircraft was compared with CTOL aircraft powered by an advanced turbofan of similar technology. It is also demonstrated that, when operated on the European environment, the STOVL aircraft when sized and operated in a manner which takes advantage of their specialized capabilities, have higher levels of mission effectiveness compared to the CTOL designs. Author

N81-33150# Textron Bell Helicopter, Fort Worth, Tex. Tilt Rotors.

MISSION POTENTIAL OF DERIVATIVES OF THE XV-15 TILT ROTOR RESEARCH AIRCRAFT

Kenneth G. Wernicke *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 9 p

Avail: NTIS HC A12/MF A01

Outstanding low- and high-speed performance and flight characteristics were demonstrated and measured on the XV-15 tilt rotor research aircraft. Although the XV-15 was designed specifically as a research vehicle, it has the potential, with suitable modifications, to evolve into a productive aircraft for other missions. An increase in blade chord and installation of current state-of-the-art engines increase payload and significantly reduce fuel consumption. A third engine is installed on top of the fuselage to provide good one-engine-inoperative performance. A new fuselage is used for gunship missions. Derivative aircraft and the required changes for commerical and military applications are described. It is shown that the XV-15 derivatives are competitive with existing aircraft. Some of the derivative aircraft can perform missions not possible with airplanes or helicopters by use of the unique high-speed/long-range VTOL capability and the highly-flexible flight envelope of the tilt rotor aircraft. Author

N81-33151# Sikorsky Aircraft, Stratford, Conn.

ADVANCING BLADE CONCEPT HELICOPTER MISSION CAPABILITIES

Robert Zincone and Arthur W. Linden *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 16 p

Avail: NTIS HC A12/MF A01

Today there are several ongoing research programs aimed at combining speed with helicopter attributes in a single vehicle. There is a growing recognition of a need for such aircraft and an active reexamination of the value of speed, the value of helicopter attributes (hover and low speed performance) and the trade-offs between these. Key attributes of interest to military users are: Battlefield survivability - ballistic, acoustic, radar cross section, IR signature; high speed flight while preserving low speed handling qualities equal to those of modern combat helicopters; compact design with low inertia, yielding high angular rates and precise control in all axes; high acceleration and deceleration capability; carrier and small ship compatibility, with good, low speed platform stability; superior one engine inoperative performance and safety; and field level maintainability with rugged reliability and mainteinability attributes owing to simplicity of design. The Advancing Blade Concept helicopter has recently completed a feasibility demonstration phase showing that these attributes can be achieved in future aircraft designs. Author

N81-33152# De Havilland Aircraft Co. of Canada Ltd., Downsview (Ontario).

V/STOL AIRCRAFT TECHNOLOGY IN CANADA

D. C. Whittley *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 9 p refs

Avail: NTIS HC A12/MF A01

Some principles being applied to research in relation to advanced STOL and V/STOL concepts are described. In particular, consideration is given to the supercritical augmentor flap configuration and to a fuselage ejector-lift VTOL concept. L.F.M.

N81-33153# Societe Nationale Industrielle Aerospatiale, Marignane (France.)

THE CONSEQUENCES OF CERTAIN OPERATIONAL REQUIREMENTS ON THE CONCEPTUAL DESIGN OF COMBAT HELICOPTERS [LES CONSEQUENCES DE CERTAINES EXIGENCES OPERATIONNELLES SUR LA CONCEPTION DES HELICOPTERES DE COMBAT]

Jean-Pierre Dubreuil *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 10 p In FRENCH

Avail: NTIS HC A12/MF A01

Three areas of helicopter design were examined: helicopter performance engineering; operational requirements for combat; and instrumentation. Helicopter performance is discussed in terms of controllability and flight speed. Operational characteristics include detectability, vulnerability, and survivability. The avionics are addressed in terms of man machine systems and display devices. T.M.

N81-33154# Costruzioni Aeronautiche Giovanni Agusta S.p.A., Varese (Italy).

DESIGN FOR MAXIMUM EFFECTIVENESS IN THE NAVY ROLE

Paolo Bellavita *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 20 p

Avail: NTIS HC A12/MF A01

The tremendous increase of the submarine threat in terms of speed, depth and weapon systems has forced the navies to review the concepts followed until today for the anti submarine warfare (ASW). Particularly for the peculiar Mediterraneum environment new operational requirements for typical helicopter ASW missions must be developed taking also into account the future availability of low frequency, high range Sonar. To get the maximum profit from this technological improvement, missions should be planned with unusual long time in the search area both in terms of longer hovering and longer Time on Station many miles from the home ship in connection with high air temperature, wind absence, high rotor thrust margin and complete fly away capability in case of engine failure during sonar operation. The optimization of the helicopter design parameters to achieve the maximum effectiveness in the ASW role within the Italian Scenario and the engineering parametric techniques used are described. Author

N81-33155# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

THE IMPACT OF OPERATIONAL REQUIREMENTS ON THE COMPROMISE OF DESIRED FEATURES IN ROTORCRAFT DESIGN

Klaus F. M. Schymanietz *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 17 p refs

Avail: NTIS HC A12/MF A01

The increase of influence for helicopters in military missions can be related to more diversification as well as special designed types. General valid aspects include the all-weather capability, high performance and agility, low vulnerability and detectability and all together high mission effectiveness. The addressed systems can be divided in three areas, the design of the dynamic systems including the rotor- and propulsion-system, the structural design, and the design of the equipment systems. In the first area, the dynamic systems and components, the general, i.e., civil and military, trend is to be seen towards more economy, use of advanced materials, aerodynamic efficiency etc. In the military field in addition high agility, i.e., high maneuverability and high installed power, is required. Derived from the mission task high demands are set in the structural field, esp. the crashworthiness, i.e., high energy absorption by constructional means and specific materials. Dependent on operational requirements as all-weather capability, autonomous navigation, automatic hover the field of equipments of today's and future weapon systems becomes more and more important and complex. Author

N81-33156# National Academy of Sciences - National Research Council, Washington, D. C. Assembly of Engineering.

US MILITARY V/STOL: WHO NEEDS IT? WANTS IT? CAN AFFORD IT?

David C. Hazen *In* AGARD The Impact of Mil. Appl. on Rotorcraft and V/STOL Aircraft Design Jun. 1981 7 p

Avail: NTIS HC A12/MF A01

For a period of thirty years, fixed wing V/STOL technology has been under development. Of all the concepts investigated, only the vectored thrust approach employed in the AV-8A Harrier has found application in the combat forces of the Western World.

This application was itself more the result of a technology push than of any clearly perceived operational pull. Once incorporated in operational units, however, the flexibility of basing displayed by the Harrier led to the evolution of entirely new operation concepts--and the requirement for improved aircraft to meet them. There are clear indications that the vulnerability of aircraft bases both ashore and afloat may make the V/STOL option essential in the future. Constrained by limited budgets and unimpressed by the performance currently available from V/STOL machines, the U.S. Services, other than the Marines, have no plans for introducing V/STOL into their forces, preferring instead to keep the technology on the shelf for future applications. If, however, V/STOL is to be effective in meeting future needs, the operational experience and doctrine to employ it must be developed now to guide the design of the machines that will be required. It is becoming increasingly critical that this Catch 22 be broken--and soon. Author

N81-33158*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ANALYSIS OF THE PERFORMANCE OF THE DRIVE SYSTEM AND DIFFUSER OF THE LANGLEY UNITARY PLAN WIND TUNNEL

Robert L. Stallings and Lowell E. Hasel Oct. 1981 67 p refs
(NASA-TM-83168; L-14543) Avail: NTIS HC A04/MF A01 CSCL 01A

A broad program was initiated at the Langley Research Center in 1973 to reduce the energy consumption of the laboratory. As a part of this program, the performance characteristics of the Unitary Plan Wind Tunnel were reexamined to determine if potential methods for incresing the operating efficiencies of the tunnel could be formulated. The results of that study are summarized. The performance characteristics of the drive system components and the variable-geometry diffuser system of the tunnel are documented and analyzed. Several potential methods for reducing the energy requirements of the facility are discussed. T.M.

N81-33159*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

STABILITY AND CONTROL CHARACTERISTICS OF A THREE-SURFACE ADVANCED FIGHTER CONFIGURATION AT ANGLES OF ATTACK UP TO 45 DEG

William P. Henderson and Laurence D. Leavitt Sep. 1981 47 p refs
(NASA-TM-83171; L-14433) Avail: NTIS HC A03/MF A01 CSCL 01A

The tests were conducted at Mach numbers from 0.40 to 0.90, at angles of attack up to 45 deg for the lower Mach numbers, and at angles of sideslip up to 15 deg. The model variations under study included adding a canard surface and deflecting horizontal tails, ailerons, and rudders. T.M.

N81-33160*# Military Academy, West Point, N. Y.

EXPERIMENTAL AND THEORETICAL STUDY OF THREE INTERACTING, CLOSELY-SPACED, SHARP-EDGED 60 DEG DELTA WINGS AT LOW SPEEDS Final Report

H. F. Faery, Jr., J. K. Strozier, and J. A. Ham Washington NASA Oct. 1981 47 p refs Sponsored by NASA
(NASA-CR-3460) Avail: NTIS HC A03/MF A01 CSCL 01A

Wind tunnel tests were conducted to determine the subsonic longitudinal aerodynamic characteristics of lifting configuration consisting of a 60 deg delta main wing with two smaller 60 deg delta wings (called sub-wings) attached underneath. The test was designed to determine the effects on lift, drag, and pitching moment due to various placement of the subwings in relation to the main wing. Test results indicate the increasing vertical separation between the main wing and the sub-wings produced the most significant results: a 23.1% increase in maximum lift coefficient, a reduction in drag coefficient at high lift coefficients, and an increase in longitudinal stability. Lateral separation of the sub-wings produced no significant changes. Placement of the sub-wings rearward increases the initial lift curve slope and maximum lift coefficient and also increase the longitudinal stability. Results of a computer study using a vortex lattice code supported the experimental conclusions. M.G.

N81-33161# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

INVESTIGATION OF UNSTEADY AIRLOADS ON WINGS WITH OSCILLATING CONTROL FOR ACTIVE CONTROL PURPOSES

W. Geissler (DFVLR, Goettingen, West Germany) Jul. 1981 16 p refs Presented at 52nd Meeting of the AGARD Structures and Mater. Panel, Cesme, Turkey, 5-10 Apr. 1981
(AGARD-R-699; ISBN-92-835-1392-2) Avail: NTIS HC A02/MF A01

Intensive experimental investigations were carried out on a wing section with oscillating control including a streamlined gap between both wing parts. Steady as well as unsteady pressure distributions were measured outside and inside the gap region for various incidences, flap angles, and frequencies. In addition to the experimental investigations, a calculation procedure was developed taking into account the real boundaries of the configuration including the gap region and assuming the fixed wing part and the oscillating control as two lifting systems with two Kutta conditions and correspondingly two wakes behind wing and control. Comparisons between theory and experiment are discussed in detail and the major influences and effects of viscosity are pointed out. The results lead to special conclusions for the applicability of lifting systems for active conrol purposes. J.M.S.

N81-33162*# General Dynamics Corp., Fort Worth, Tex.

EVALUATION OF PRESSURE AND THERMAL DATA FROM A WIND TUNNEL TEST OF A LARGE-SCALE, POWERED, STOL FIGHTER MODEL Final Report, 4 Jun. 1980 - 4 Jun. 1981

G. A. Howell, E. L. Crosthwait, and M. C. Witte Jun. 1981 987 p refs
(Contract NAS2-10649)
(NASA-CR-166170) Avail: NTIS HC A99/MF A01 CSCL 01A

A STOL fighter model employing the vectored-engine-over wing concept was tested at low speeds in the NASA/Ames 40 by 80-foot wind tunnel. The model, approximately 0.75 scale of an operational fighter, was powered by two General Electric J-97 turbojet engines. Limited pressure and thermal instrumentation were provided to measure power effects (chordwise and spanwise blowing) and control-surface-deflection effects. An indepth study of the pressure and temperature data revealed many flow field features - the foremost being wing and canard leading-edge vortices. These vortices delineated regions of attached and separated flow, and their movements were often keys to an understanding of flow field changes caused by power and control-surface variations. Chordwise blowing increased wing lift and caused a modest aft shift in the center of pressure. The induced effects of chordwise blowing extended forward to the canard and significantly increased the canard lift when the surface was stalled. Spanwise blowing effectively enhanced the wing leading-edge vortex, thereby increasing lift and causing a forward shift in the center of pressure. Author

N81-33163# ARO, Inc., Arnold Air Force Station, Tenn.

WIND TUNNEL TESTING OF A WINDSHIELD MATERIAL OR SUPERSONIC AIRCRAFT Final Report

D. W. Stallings (Calspan Field Services, Inc.) and A. S. Hartman (Calspan Field Services, Inc.) AEDC May 1981 45 p refs Sponsored by AF
(AD-A103383; AEDC-TSR-81-V18) Avail: NTIS HC A03/MF A01 CSCL 01/3

Wind tunnel tests of windshield material intended for use on supersonic aircraft were conducted in the von Karman Facility Hypersonic Wind Tunnel B at a free-stream Mach number of 6 and tunnel stilling chamber conditions of 146 psia and 495 F. The wedge technique was used to provide a local Mach number of 2.5 over the windshield specimen. Selected results are presented to illustrate the test techniques and typical data obtained. Author (GRA)

N81-33173# Directorate of Nuclear Safety, Kirtland AFB, N.Mex. Air Force Inspection and Safety Center.

SAFETY STUDY: PRIME NUCLEAR AIRLIFT FORCE (PNAF) MISSIONS INVOLVING THE USE OF C-130 AND C-141 AIRCRAFT Final Report

John G. Dean Jan. 1981 35 p refs
(AD-A103282; AFISC-TR-81-001) Avail: NTIS HC A03/MF A01 CSCL 01/3

This report estimates the accident rate for C-130 and C-141 aircraft while involved in the air transportation of nuclear weapons as cargo. Causes and factors involved in accidents are shown, and beneficial practices are identified. Author (GRA)

N81-33174# Civil Aeromedical Inst., Oklahoma City, Okla.
IMPROVING THE CRASHWORTHINESS OF GENERAL AVIATION AIRCRAFT BY CRASH INJURY INVESTIGATIONS
William R. Kirkham May 1981 17 p refs Sponsored by FAA
(AD-A103316; FAA-AM-81-10) Avail: NTIS HC A02/MF A01 CSCL 01/2

An accident investigative research program has correlated injuries to aircraft occupants with the accident severity and structural changes in the crash. Findings brought to the attention of aircraft manufacturers have led to specific aircraft being made more crashworthy. Following the finding of a failure in a shoulder harness attachment the manufacturer strengthened the attachment brace. The way a shoulder harness was joined to a lapbelt was modified as a followup to failure of the attachment in an accident. Noted fractures of lapbelt and shoulder harness cable tiedowns led to the use of stronger cables and modification of the installation. Other accident findings resulted in a shoulder strap guide being placed on an inertia reel and a side-mounted seat being modified. GRA

N81-33175# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.
EMERGENCY CABIN LIGHTING INSTALLATIONS: AN ANALYSIS OF CEILING- VERSUS LOWER CABIN-MOUNTED LIGHTING DURING EVACUATION TRIALS
Burton P. Chesterfield, Paul G. Rasmussen, and Robert D. Dillon Feb. 1981 46 p refs
(AD-A103191; FAA-AM-81-7) Avail: NTIS HC A03/MF A01 CSCL 01/2

Six series of human subject evacuation tests were conducted to compare the evacuation rates with two different emergency lighting systems in an aircraft cabin filled with nontoxic white smoke. Cabin emergency lighting and exit signs mounted near the ceiling were almost completely obscured by smoke, which layered most heavily in the upper one-half of the cabin. A comparison lighting system mounted below layered smoke in aisle seat armrests, with exit signs mounted at and below the cabin midpoint, provided light directly in the aisle and cross aisle. Results indicated that lights and signs mounted lower in the cabin were more readily visible in smoke and enabled subjects to evacuate from a smoke-filled cabin more rapidly than conventional ceiling-mounted lights and signs. Author (GRA)

N81-33177# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
TEST AND EVALUATION OF AN EXPERIMENTAL FEASIBILITY PROTOTYPE PASSIVE SEAT MOUNTED LIMB RESTRAINT SYSTEM
Marcus Schwartz 20 May 1981 63 p
(AD-A104161; NADC-81065-60) Avail: NTIS HC A04/MF A01 CSCL 13/6

An experimental feasibility prototype of passive seat mounted limb restraint system was tested under various conditions both statically and dynamically on the NAVAIRDEVCEN Ejection Tower and the Dayton T. Brown windblast facility. The Ejection Tower tests resulted in successful and repeatable entrapment of the arm and legs, and good tensioning of the restraint lines through one-way snubbers. The windblast test series also resulted in successful entrapment of the limbs at various pitch and yaw angles up to 600 knots. The results of this T&E study clearly showed the feasibility of the system to provide the necessary protection to the crewmember during the simulated operation environments, and also to meet the passive requirements which results in no additional encumbrances on the crewmember. Author (GRA)

N81-33181# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
MULTISITE TESTING OF THE DISCRETE ADDRESS BEACON SYSTEM (DABS) Interim Report, Mar. - Sep. 1980
J. L. McMillen, J. W. Davis, and R. J. Spadea, Jr. Jul. 1981 61 p refs
(FAA Proj. 034-241-510)
(AD-A103575; FAA-CT-81-9; FAA-RD-81-49) Avail: NTIS HC A04/MF A01 CSCL 17/7

This report contains results of tests performed in an environment of multiple Discrete Address Beacon System (DABS) sensors, one each located at Clementon and Elwood, New Jersey, and the Federal Aviation Administration (FAA) Technical Center, Atlantic City Airport, New Jersey. These DABS sensors were tested in various degrees of intersensor communication that ranged from a full network of connected sensors to a fully nonnetted configuration. The multiple DABS sensors were tested in four major areas: network management, surveillance processing, data link processing, and intersensor communications. It is concluded that the performance of the DABS sensors in multisite configurations meets or exceeds the requirements specified in the DABS engineering requirement (FAA-ER-240-26). Author (GRA)

N81-33182# Federal Aviation Administration, Atlantic City, N.J.
CROSSTALK LEVELS OF SPEECH PLUS DATA IN REMOTE COMMUNICATION AIR-GROUND (RCAG) Final Report, Aug. 1979 - May 1980
Albert J. Rehmann Jun. 1981 61 p refs
(AD-A103351; FAA-CT-80-38) Avail: NTIS HC A04/MF A01 CSCL 17/2

The Federal Aviation Administration (FAA) is proposing the addition of a digital data channel to the existing telephone lines which connect air route traffic control centers (ARTCC's) with Remote Communication Air-Ground (RCAG) sites to economically transfer remote monitoring system (RMS) parameters and control data between the ARTCC's and the sites. FAA Specification FAA-E-2699a establishes the maximum allowable interference level to pilot/controller communications which would be allowed to result from the addition of the data channel. The tests described in this document were designed to verify that the requirements in FAA-E-2699a are sufficient to prevent disturbance to normal air traffic control (ATC) operations. The tests were performed by simulating and existing communications channel using data modems and samples of present-day Voice Frequency Control System (VFCS) equipment. Crosstalk levels of speech and data were measured under actual operating conditions. The test results indicated that the addition of an RMS data channel to existing FAA telephone lines is technically feasible and that the requirement in FAA-E-2699a concerning the data crosstalk in the audio portion of the communication channel is not adequate to prevent disturbance to normal ATC operations. The requirements concerning data crosstalk in the control portion and VFCS crosstalk in the data portion of the channel are sufficient. Author (GRA)

N81-33183# Federal Aviation Administration, Atlantic City, N.J.
EN ROUTE DISCRETE ADDRESS BEACON SYSTEM/AIR TRAFFIC CONTROL (BUILD 1) TECHNICAL TESTING
Robert E. Copes, III and Richard V. Dardano Jul. 1981 35 p
(FAA Proj. 122-115-540)
(AD-A103894; FAA-CT-80-30; FAA-RD-81-31) Avail. NTIS HC A03/MF A01 CSCL 17/7

Tests of the Discrete Address Beacon System (DABS) in an air traffic control (ATC) en route National Airspace System (NAS) environment were conducted at the Federal Aviation Administration (FAA) Technical Center. These tests included: (1) surveillance performance in the areas of track initiation, track continuity, and track swap; and (2) surveillance related communication responses employing the Common International Civil Aviation Organization (ICAO) Data Interchange Network (CIDIN) protocol for Air Traffic Control Radar Beacon System (ATCRBS) identification (ID) requests. Test results indicate that the en route DABS/ATC Build I software successfully processed DABS sensor surveillance information. Although analyzed on a limited basis, the transmission of surveillance related communication messages between the DABS sensor and the en route DABs/ATC Build I system is considered to operate as expected. It is concluded that the DABS/ATC en route Build I system accepts, processes, tracks, and displays DABS and ATCRBS surveillance data from one DABS and multiple ATCRBS sensors with no degradation to the baseline function of the NAS software system A3d2.4. Author (GRA)

N81-33184# Federal Aviation Administration, Washington, D.C. Air Traffic Service.
OPERATION FREE FLIGHT: AN OPERATIONAL EVALUATION OF DIRECT ROUTE FLIGHT PLAN FILING IN TODAY'S NATIONAL AEROSPACE SYSTEM Final Report
Wayne Minnick Jul. 1981 87 p
(AD-A104150; FAA-AT-81-1) Avail: NTIS HC A05/MF A01 CSCL 17/7

This report presents the results of an operational evaluation concerning the feasibility of permitting the filing of direct route flight plans, without route definition, between departure and arrival area fixes serving selected city-pairs. The evaluation was conducted with the voluntary participation of Eastern, United, and Pan American Airlines during the period June 1 through December 31, 1980. Objectives of Operation Free Flight were to obtain factual information about air traffic control (ATC) handling of test aircraft on direct routings, system prohibitions to the concept, general pilot attitude regarding the utility of their RNAV equipment, potential fuel savings, and ATC system impact. The evaluation was conducted throughout the contiguous United States between 27 city-pairs. The primary conclusions were: the operational concept of filing direct, great circle routes between departure and arrival area fixes, at altitudes above Flight Level 290, in a radar environment; incompatibility with traffic arrival flow at destination airports was determined to be the most significant system prohibition; pilot attitude was skewed in a positive direction; potential fuel savings are projected to be in excess of 40,000,000 gallons per year, and, there was no adverse impact to the ATC system. Author (GRA)

N81-33188# Transportation Research Board, Washington, D.C.
COMPUTER GRAPHICS APPLICATIONS
Michael R. Couture, Jerome M. Lutin, Dale Livingston, Edward J. Kobielka, and Neil W. Polhemus 1980 42 p refs
(PB81-215246; TRB/TRR-787; ISBN-0-309-03201-6; LC-81-9570; ISSN-0361-1981) Avail: NTIS HC A03/MF A01 CSCL 17G

Issues in computer graphics application are reported. The following areas are discussed: (1) computer graphics for transit planning, an empirical study, (2) interactive graphics model for testing stochastic traffic assignment algorithms, (3) use of computer graphics to analyze navigational performance and jet route separation, (4) applications of interactive graphics in Michigan's statewide transportation modeling system. GRA

N81-33190*# Beech Aircraft Corp., Wichita, Kans.
APPLICATION OF ADVANCED TECHNOLOGIES TO DERIVATIVES OF CURRENT SMALL TRANSPORT AIRCRAFT Final Report
P. P. Renze and J. E. Terry Jul. 1981 112 p refs
(Contract NAS2-10571)
(NASA-CR-166197) Avail: NTIS HC A06/MF A01 CSCL 01C

Mission requirements of the derivative design were the same as the baseline to readily identify the advanced technology benefits achieved. Advanced technologies investigated were in the areas of propulsion, structures and aerodynamics and a direct operating cost benefit analysis conducted to identify the most promising. Engine improvements appear most promising and combined with propeller, airfoil, surface coating and composite advanced technologies give a 21-25 percent DOC savings. A 17 percent higher acquisition cost is offset by a 34 percent savings in fuel used. T.M.

N81-33191*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
STATISTICS OF SOME ATMOSPHERIC TURBULENCE RECORDS RELEVANT TO AIRCRAFT RESPONSE CALCULATIONS
William D. Mark and Raymond W. Fischer Washington NASA Sep. 1981 238 p refs
(Contract NAS1-14837)
(NASA-CR-3464) Avail: NTIS HC A11/MF A01 CSCL 01C

Methods for characterizing atmospheric turbulence are described. The methods illustrated include maximum likelihood estimation of the integral scale and intensity of records obeying the von Karman transverse power spectral form, constrained least-squares estimation of the parameters of a parametric representation of autocorrelation functions, estimation of the power spectra density of the instantaneous variance of a record with temporally fluctuating variance, and estimation of the probability density functions of various turbulence components. Descriptions of the computer programs used in the computations are given, and a full listing of these programs is included. T.M.

N81-33192# Grumman Aerospace Corp., Bethpage, N.Y. Research Dept.
ANALYSIS AND DESIGN OF SUPERSONIC AIRCRAFT BASED ON INVISCID NONLINEAR EULERIAN EQUATIONS. PART 1: ROTATIONAL EULER SOLUTIONS WITH EXPLICIT SHOCK FITTING Final Report, 1 Oct. 1977 - 1 Apr. 1979
M. J. Siclari and F. Marconi Oct. 1980 118 p refs
(Contract F33615-77-C-3126; AF Proj. 2404)
(AD-A103434; RE-623-Pt-1; AFWAL-TR-80-3110-Pt-1) Avail: NTIS HC A06/MF A01 CSCL 01/3

A computer program has been developed to compute the inviscid supersonic flow over delta wings and smooth wing-body configurations. A second-order accurate predictor-corrector finite-difference scheme is used to integrate the three dimensional Euler equations in regions of continuous flow. Bow shock and crossflow-induced embedded shocks are explicitly computed as discontinuities which simultaneously satisfy the characteristic and the Rankine-Hugoniot conditions. In computing the flow about complex wing cross sections, the use of appropriate conformal mappings was an important factor in developing a computational mesh capable of resolving the large flow gradients that are inevitable in the vicinity of wing leading edges. Geometry programs were developed to supply the appropriate geometric boundary conditions necessary to compute complex wing cross sections. New starting solutions were developed that were more appropriate to thin-wing cross sections. In the initial stage of development, the flow about conical wings was computed for a two-fold purpose. Conical Euler solutions would be used as starting conditions for conical wing-bodies and three dimensional wings and the conical problem would uncover potential problem areas in the computation of these flows without the added complexity of geometrical variations. The conical problem led to the development of special techniques to resolve the vortical layer that inevitably develops on the body surface. Typical results are shown for subsonic and supersonic leading edge delta wings and wing-body combinations. GRA

N81-33194# Naval Ship Research and Development Center, Bethesda, Md. Aviation and Surface Effects Dept.
DESIGN OF A SLOT HEIGHT DISTRIBUTION FOR INCREASED HOVER CONTROL POWER ON A CIRCULATION CONTROL ROTOR Final Report
Daniel W. Poe Dec. 1980 31 p refs
(AD-A103535; DTNSRDC/ASED-80/24) Avail: NTIS HC A03/MF A01 CSCL 01/3

The Circulation Control Rotor Performance Prediction computer program was used with the XH-2/CCR rotor configuration to determine a slot height distribution that would improve control power in hover without causing excessive cyclic pressure requirements for trim in forward flight. Effects of total slot area as well as distribution were considered. The final distribution was constrained by a minimum practical slot height setting of 0.002 in. and a minimum unpressurized blade slot area of 3.0 square inches. Several distributions were evaluated. Noteworthy trends that emerged are: (1) A negatively tapered slot height distribution is favorable to producing hub moments in hover, and (2) a uniform distribution (zero taper) requires the lowest cyclic pressure for trim at 120 knots. The final distribution selection exhibited a 38-percent improvement in predicted hub moment over a slot height distribution previously used on the flight demonstrator. Author (GRA)

N81-33196# Tennessee Univ. Space Inst., Tullahoma.
A FLIGHT TEST EVALUATION OF THE BALL-BARTOE JETWING PROPULSIVE LIFT CONCEPT Progress Report, 18 Apr. 1980 - 17 Apr. 1981
Ralph D. Kimber 1 Jul. 1981 191 p refs
(Contract N00019-80-C-0126)
(AD-A103579; UTSI-81-1) Avail: NTIS HC A09/MF A01 CSCL 01/3

The need for military aircraft that will operate from short unimproved airfields, and the decks of smaller aircraft carriers has increased in recent years due to a changing world situation and the shrinking of the dollar. Such aircraft need to be fuel efficient, quiet, maneuverable, have low infrared signature, and carry a large useful load. The Ball-Bartoe 'Jetwing' is a single engine upper surface blowing concept which offers the possibility of achieving these objectives. The 'Jetwing' concept achieves supercirculation lift and STOL performance by ducting all engine air through the leading edge of the wing and ejecting it over the top surface of the wing through a slot nozzle. This nozzle extends along approximately 70% of the wing span. A Coanda flap is mounted at the trailing edge of the blown portion of the wing. In addition to the main wing, a smaller wing panel is mounted above the slot nozzle. The air passage between the main wing and the smaller upper wing acts as an ejector to reduce installed thrust losses. For high speed applications that concept may be used without this upper wing. A thrust reversing method is also incorporated into the concept. The thrust is reversed by rotating the top of the slot nozzle so as to close the nozzle and open a reverse flow path. This report covers the flight test program of the Jetwing research airplane. GRA

N81-33196# Dayton Univ., Ohio. Research Inst.
ALTERNATE T-38 TRANSPARENCY DEVELOPMENT. PART 1: INITIAL ANALYSIS AND DESIGN Final Report, Jan. 1979 - Sep. 1980
Blaine S. West and Kenneth I. Clayton Wright-Patterson AFB, Ohio AFWAL Nov. 1980 58 p refs 2 Vol.
(Contracts F33615-76-C-3103; F33615-80-C-3401; AF Proj. 2202; AF Proj. 1926)
(AD-A103261; UDR-TR-80-91-Pt-1; AFWAL-TR-80-3132-Pt-1)
Avail: NTIS HC A04/MF A01 CSCL 01/3

T-38 missions at speeds above the existing crew enclosure damage threshold will result in flight safety risk to aircraft and crew. This report documents the design development of alternate T-38 transparencies having the capability of defeating the impact of a four pound bird at aircraft speeds up to 400 knots. To accomplish the desired windshield/canopy redesign, a feasibility study was conducted, damage probability was determined, the birdstrike capability of existing transparencies was experimentally evaluated, edge attachment screening specimens were laboratory tested, and finite element analyses were made. Major findings from each task have been integrated into the detail design of a birdstrike resistant forward windshield panel, recommended for full-scale hardware fabrication, testing, and evaluation. Forward canopy and instructor windshield concepts are also discussed. Author (GRA)

N81-33197# Dayton Univ., Ohio. Research Inst.
ALTERNATE T-38 TRANSPARENCY DEVELOPMENT. PART 2: BASELINE BIRDSTRIKE TESTING Final Report, Jun. 1979 - Oct. 1980
Blaine S. West Wright-Patterson AFB, Ohio AFWAL Dec 1980 92 p 2 Vol.
(Contracts F33615-76-C-3103; F33615-80-C-3401; AF Proj. 2202; AF Proj. 1962)
(AD-A103262; UDR-TR-80-61-Pt-2; AFWAL-TR-80-3132-Pt-2)
Avail: NTIS HC A05/MF A01 CSCL 01/3

T-38 missions at speeds above the existing crew enclosure damage threshold will result in flight safety risk to aircraft. This report documents the results of a full-scale flight hardware test program to establish the bird impact resistance of existing T-38 forward transparencies. The failure threshold for the forward windshield and forward canopy for a four-pound birdstrike at six impact locations was established. Test results are reported and discussed in detail. Author (GRA)

N81-33199# Calspan Corp., Buffalo, N. Y.
AN EXPERIMENTAL INVESTIGATION OF VTOL FLYING QUALITIES REQUIREMENTS OR SHIPBOARD LANDINGS Final Report, Apr. 1978 - Sep. 1980
Robert C. Radford, Dominick Andrisani, II, and John L. Beilman Aug. 1981 262 p refs
(Contract N62269-78-C-0043)
(AD-A104137; CALSPAN-6286-F-1; NADC-77318-60) Avail: NTIS HC A12/MF A01 CSCL 01/2

This fifth simulation experiment, using the U.S. Navy X-22A variable stability V/STOL aircraft, was undertaken to generate data for the development to flying qualities and advanced flight control system design criteria for the visual shipboard landing task. Since a broad range of flying qualities was simulated, actual landings were not performed because of flight safety considerations. Instead, a discrete three dimensional position tracking task, presented to the pilot on a Head-Up-Display (HUD), was devised to evoke pilot control and stabilization activity similar to that in the actual shipboard environment. A microwave landing system with precision ranging capability served as the guidance sensor for both the translational rate flight control system mechanizations and for the HUD tracking information. A total of 3 evaluations were performed of various horizontal and vertical translational rate flight control system dynamics. The primary results of the program defined regions of satisfactory and acceptable flying qualities as functions of velocity command gain and the time constant of velocity response. The limits on command gain and time constant for satisfactory flying qualities indicated by this experiment are considerably smaller than those determined in ground simulator experiments. Author (GRA)

N81-33200# Sandia Labs., Albuquerque, N. Mex. Div. 1556.
ADVANCED COMPOSITE AIRCRAFT ELECTROMAGNETIC DESIGN AND SYNTHESIS
R. F. Wallenberg (Syracuse Research Corp., N.Y.), J. A. Birken (Naval Air System Command, Washington, D.C.), and O. Milton Apr. 1981 9 p refs Presented at the IEEE Intern. Symp. on Electromagnetic Compatability Record, Boulder, Colo., 18-20 Aug. 1981
(Contract DE-AC04-76DP-00789)
(SAND-81-1278C; CONF-810816-1; SRC-TR-81-1170) Avail: NTIS HC A02/MF A01

The ramifications of using advanced composite materials in more upcoming aircraft were investigated. Mission requirements include fly by wire systems surviving increased threats when contained in a composite material fuselage which generally provides poor electromagnetic shielding. The coupling of lightning and a nuclear electromagnetic pulse to aircraft comprised of composite materials are addressed. DOE

N81-33201# Peat, Marwick, Mitchell and Co., San Francisco, Calif.
RESPONSES TO COMMENTS OF AIR TRANSPORT ASSOCIATION OF AMERICA ON AIRCRAFT TOWING FEASIBILITY STUDY
Jun. 1981 112 p refs
(Contract DE-AC01-79CS-50069)
(DE81-029834; DOE/CS-50069/T1) Avail: NTIS HC A06/MF A01

A preliminary assessment of the constraints on and feasibility of extended aircraft towing between airport runways and terminal gate areas with engines shutdown is made. Past aircraft towing experience and the state of the art in towing equipment are reviewed. Safety and operational concerns associated with aircraft towing are identified, and the benefits and costs of implementing aircraft towing at 20 major US airports are analyzed. It was concluded that extended aircraft towing is technically feasible and that substantial reductions in aircraft fuel consumption and air pollutant emissions can be achieved through its implementation. It was also concluded that, although capital and operating costs associated with towing would be increased, net savings could generally be attained at these airports. Because of the lack of past experience and the necessity of proving the cost effectiveness of towing concept, a demonstration of the feasibility of large scale aircraft towing is necessary. DOE

N81-33203*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATOR EVALUATION OF SEPARATION OF DISPLAY PARAMETERS IN PATH-FOLLOWING TASKS
Garimella R. Sarma and James J. Adams Oct. 1981 44 p refs
(NASA-TP-1915; L-14590) Avail: NTIS HC A03/MF A01 CSCL 01D

A five degree of freedom, fixed base simulation changing the location of the displays for bank angle, pitch angle, heading angle, and the vertical and lateral displacement from an instrument landing system path was studied. It is shown that the accuracy of the lateral path following and the pilot aircraft system dynamic characteristics deteriorate when bank angle is displayed separated from the other attitudes. It is found that best results are obtained when bank, heading, and pitch angles are displayed together and vertical and lateral displacements are displayed at another location in the display. E.A.K.

N81-33204# Aircraft Research and Development Unit, Edinburg (Australia).
DEVELOPMENT OF AN INSTRUMENT FOR THE ACCURATE MEASUREMENT OF AIRCRAFT AIRSPEED AND ALTITUDE
G. G. Readett Jul. 1981 28 p refs
(AD-A103421; ARDU-TI-466) Avail: NTIS HC A03/MF A01 CSCL 01/4

Aircraft Research and Development Unit has developed a trailing pitot-static probe suitable for determining pressure error corrections for aircraft airspeed and altitude systems. The instrument is suitable for use with helicopters where both pitot and static pressure measurements on the aircraft could be subject to pressure errors due to rotor downwash. The probe is accurate to better than 1% and was tested and shown to be satisfactory over a speed range of 40 to 120 knots. Author (GRA)

N81-33205*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
DEVELOPMENT OF AN ANALYTICAL TECHNIQUE FOR THE OPTIMIZATION OF JET ENGINE AND DUCT ACOUSTIC LINERS Semiannual Status Report, 3 Jan. - 31 Aug. 1981
Ben T. Zinn and William L. Meyer 1981 30 p refs
(Grant NAG1-133)
(NASA-CR-164872) Avail: NTIS HC A03/MF A01 CSCL 21E

A special integral representation of the external solutions of the Helmholtz equation is described. The analytical technique developed for the generation of the optimum acoustic admittance for an arbitrary axisymmetric body is also presented along with some numerical procedures and some preliminary results for a straight duct. A.R.H.

N81-33206*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMPLIFIED OFF-DESIGN PERFORMANCE MODEL OF A DAY TURBOFAN ENGINE CYCLE
Frederick J. Lallman Sep. 1981 33 p refs
(NASA-TM-83204) Avail: NTIS HC A03/MF A01 CSCL 21E

The specific thrust and fuel-air ratio for a dry turbofan engine cycle were calculated for several power levels over a range of altitudes and Mach numbers. The engine has a design fan pressure ratio of 2.9, compressor pressure ratio of 8.0, and bypass ratio of 0.6. Nominal engine component curves were picked to approximate the calculated data to construct a simplified model of the off-design performance of the engine. The model was then used to construct a simplified design-point engine model for the full-power condition. Author

N81-33210*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROPULSIVE LATERAL CONTROL NOZZLE Patent Application
Paul L. Coe, Jr. and Albert B. Graham, inventors (to NASA) (Old Dominion Univ.) Filed 18 Nov. 1980 9 p
(NASA-Case-LAR-12136-1; US-Patent-Appl-SN-208093) Avail: NTIS HC A02/MF A01 CSCL 01C

The invention relates to a trailing edge flap system useful in increasing low speed lift and low speed roll control in supersonic aircraft. Two trailing edge flaps (upper and lower) extend from the aircraft's engine exhaust nozzle. In the high lift mode of operation, a diverter block pushes the upper flap away from the nozzle, thereby exposing a flow passageway. Exhaust flow through the passageway tends to decrease boundary layer separation. To provide propulsive lateral control, the diverter block of one wing may be selectively closed, thereby reducing the lift on that wing. NASA

N81-33211*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATOR EVALUATION OF THE EFFECTS OF REDUCED SPOILER AND THRUST AUTHORITY ON A DECOUPLED LONGITUDINAL CONTROL SYSTEM DURING LANDINGS IN WIND SHEAR
G. Kimball Miller, Jr. Oct. 1981 51 p refs
(NASA-TM-83188; L-14652) Avail: NTIS HC A04/MF A01 CSCL 01C

The effect of reduced control authority, both in symmetric spoiler travel and thrust level, on the effectiveness of a decoupled longitudinal control system was examined during the approach and landing of the NASA terminal configured vehicle (TCV) aft flight deck simulator in the presence of wind shear. The evaluation was conducted in a fixed-base simulator that represented the TCV aft cockpit. There were no statistically significant effects of reduced spoiler and thrust authority on pilot performance during approach and landing. Increased wind severity degraded approach and landing performance by an amount that was often significant. However, every attempted landing was completed safely regardless of the wind severity. There were statistically significant differences in performance between subjects, but the differences were generally restricted to the control wheel and control-column activity during the approach. M.G.

N81-33214# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Geotechnical Research Branch.
FABRIC INSTALLATION TO MINIMIZE REFLECTION CRACK ON TAXIWAYS AT THULE AIRBASE, GREENLAND
Robert A. Eaton and Randy Godfrey May 1981 35 p refs
(DA Proj. 4K0-78012-AAM-1)
(AD-A103737; CRREL-SR-81-10) Avail: NTIS HC A03/MF A01 CSCL 13/2

In August 1978 two types of fabrics were placed on sections of taxiways 1 and 3 of Thule AB, Greenland, to study the ability of fabrics with an AC 2.5 overlay to minimize reflection cracking in severe climates. Both fabrics should retain durability and mechanical strength under Thule's arctic conditions. Author (GRA)

N81-33216# Mitre Corp., McLean, Va.
UPGRADED FAA AIRFIELD CAPACITY MODEL. VOLUME 1: SUPPLEMENTAL USER'S GUIDE
William J. Swedish Washington FAA Feb. 1981 119 p refs
(Contract DT-FA01-81-C-10001)
(AD-A104154; MTR-81W16-Vol-1; FAA-EM-81-1-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 01/2

Input and output formats for easier usage and for the capability to compute runway capacity for up to eleven different percentages of arrivals in a single run (as opposed to a separate run for each percentage) are presented. Provisions for calculating the capacity of alternating arrivals to a pair of parallel runways are highlighted. Several other runway configurations were added to the model. Other changes made to the internal logic of the model which results in reduced running times and/or improved accuracy. The resulting capacities may, therefore, differ from the results obtained with the previous version. In most cases this will not affect the ranking of the potential airfield changes under evaluation. T.M.

N81-33217# Mitre Corp., McLean, Va.
UPGRADED FAA AIRFIELD CAPACITY MODEL. VOLUME 2: TECHNICAL DESCRIPTION OF REVISIONS
William J. Swedish Washington FAA Feb. 1981 161 p refs
(Contract DT-FA01-81-C-10001)
(AD-A104155; MTR-81W16-Vol-2; FAA-EM-81-1-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 01/2

The FAA Airfield Capacity Model, a computer program designed to quickly calculate the runway capacity of an airport, has recently been upgraded. Several new features have been implemented in the upgraded version. Among these are improved input and output formats for easier usage, the capability to compute runway capacity for up to eleven different percentages of arrivals in a single run (as opposed to a separate run for each percentage), and provisions for calculating the capacity of alternating arrivals to a pair of parallel runways. Several other runway configurations have been added to the model, or improved, as well. Other changes have been made to the internal logic of the model which will result in reduced running times and/or improved accuracy. The resulting capacities may, therefore, differ from the results obtained with the previous version. In most cases this will not affect the ranking of the potential airfield changes under evaluation. This report documents the upgraded FAA Airfield Capacity Model. Volume 2 is a detailed technical description of the revisions to the program, including flow charts of the logic and evaluations of various alternative logics. This volume is intended as a programmer's guide, but it may also be useful for the experienced analyst who desires a fuller understanding of the model. GRA

N81-33238# National Aerospace Lab., Tokyo (Japan). First Airframe Div.
ANTI-SYMMETRIC ELASTIC PROPERTIES OF COMPOSITE PLATES OF SATIN WEAVE CLOTH
Takashi Ishikawa Jan. 1981 18 p refs
(NAL-TR-649T; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Composite plates made of satin weave fabric show macroscopic antisymmetricity and coupling effects. The essential mechanism of such behavior is basically clarified. Closed form solutions of the upper and lower bounds of the stiffness and compliance are obtained by the simplest series model in connection with the uniform stress and strain assumptions. Finite element analyses using 3-D isoparametric elements are also conducted. The solutions fall between both bounds within a certain restriction. The deviation of the actual quasimicromechanical conditions from the simple assumptions can be observed through the FEM results. Rough estimation of thermal warping coefficients is carried out for carbon/epoxy and glass/polyimide 8th harness satin composites by simple measurements. More accurate results are provided by experiments for measuring thermal deflection under a small temperature change. These results confirm the theoretical predictions by both methods. Several comments on ways of preventing such phenomena are made based on the geometry of the fabric structures. Author

N81-33240# SRI International Corp., Menlo Park, Calif.
ENGINEERING EFFECTS OF ADVANCED COMPOSITE MATERIALS ON AVIONICS Final Technical. Report, Sep. 1980 - Jun. 1981
W. Graf, J. Hamm, J. E. Navavicz, and D. E. Tremain Jul. 1981 132 p refs
(Contract DAAK80-80-C-0806)
(AD-A104015; USAAVRADCOM-80-0806-F) Avail: NTIS HC A07/MF A01 CSCL 11/4

This report discusses the effects of advanced composite materials on avionics equipment. Over 80 reports and articles on this subject have been collected; the bibliographic data resides in an on-line computer data base. A summary of previous and ongoing work is included. The impact of composite materials on avionics systems and subsystems is discussed, and the major problem areas identified (viz., lightning, EMP protection, antenna performance, EMI/EMC, and radar cross section reduction). Possible solutions and approaches to these problems are presented and the importance of tradeoff studies at the system level is stressed. Problems peculiar to helicopters are reviewed separately. The relation of this contract to the Advanced Composite Airframe Program (ACAP) is also discussed. Appendices present technical background on interference control and E3 hardening concepts. An extensive bibliography is included. Author (GRA)

N81-33241# General Dynamics/Convair, San Diego, Calif.
DEVELOPMENT OF ADVANCED INTERCEPTOR SUBSTRUCTURAL MATERIAL Final Report, 5 Sep. 1979 - 30 Sep. 1980
Norman R. Adsit and Julius Hertz Jul. 1981 129 p refs
(Contract DAAG46-79-C-0081; DA Proj. 1W1-62113-A-661)
(AD-A103836; AMMRC-TR-81-32) Avail: NTIS HC A07/MF A01 CSCL 11/4

The work reported herein is aimed at the development of ultra-high-modulus graphite/epoxy structures for use in future advanced terminal interceptors (ATI). The work has shown that gore section layup used to fabricate interceptor frusta do not effect the strength or modulus of the frusta. Tests on flat panels representation of full thickness joints substantiated that the end joints will carry ATI loads. Finally, two short but full thickness frusta with antenna window cutouts were fabricated and tested. These frusta met the design goals. Analysis work has been completed and the design and materials are ready for a full-scale demonstration. To accomplish this, the preliminary design was reviewed and has been updated. A full-scale tool was designed and has been procured. Finally, a manufacturing process plan for the full-scale frustum was prepared. GRA

N81-33390# Ball Aerospace Systems Div., Boulder, Colo.
ADVANCED MICROSTRIP ANTENNA DEVELOPMENT. VOLUME 1: TECHNOLOGY STUDIES FOR AIRCRAFT PHASED ARRAYS Final Report, Apr. 1979 - Jun. 1980
Gary G. Sanford Jun. 1981 75 p refs
(Grant DOT-TSC-1397)
(AD-A103837; FAA-EM-80-11-Vol-1; TSC-FAA-80-15-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 09/1

Work has continued on improvement of microstrip phased-array antenna technology since the first microstrip phased-array was flight-tested during the FAA 1974-1975 ATS-6 test program. The present development has extended this earlier work in three areas: the microstrip radiating elements, the array configuration, and the control circuitry. The effort has been successful in developing important new phased-array techniques. These techniques were demonstrated with working hardware, but a complete array was not within the scope of the program. Radiating elements with broad beamwidths were required to permit steering the array to angles near endfire. The most significant improvement was the development of a microstrip crossed-slot element. Dual-band or broad-band elements were developed to permit operation in both the receive and transmit bands. Several approaches were experimented with, the most promising of which was the use of stacked crossed-slot elements. This achieves broad beamwidth and dual-band operation in a compact device. Static arrays for end-fire operation were investigated, and a 4x4 array demonstrated promise for this application. Several phase shifters were developed; the three-bit switched-line phase shifters gave excellent performance. GRA

N81-33392# Network Analysis Corp., Vienna, Va.
COMPUTER B (NAS-NAS) COMMUNICATIONS SUPPORT Final Report
Jul. 1981 171 p refs
(Contract DOT-FA79WA-4335)
(AD-A104145; NAC/FR-303F/01; FAA-RD-81-68) Avail: NTIS HC A08/MF A01 CSCL 17/2

An analysis has been performed to determine the feasibility and desirability of incorporating into NADIN the message traffic currently serviced by the Computer B (NAS-NAS) Network. The use of NADIN to support NAS-NAS communications was found to be feasible and cost-effective. The most attractive approach to such support was found to be the enhancement of the NADIN architecture, using packet-switching technology, to provide virtual circuit and alternate routing capabilities between all NADIN backbone modes. The results of this analysis are to serve as inputs to other tasks under this contract that will investigate a consolidated NADIN enhancement approach for supporting future FAA data communications requirements, including enhancements to support the replacement of FAA's enroute computer system, and the Remote Maintenance Monitoring System. Author (GRA)

N81-33393# Harris Corp., Melbourne, Fla.
TENT SHAPED PHASED ARRAY Interim Report
C. A. Chuang Griffiss AFB, New York RADC Jun. 1981 70 p refs
(Contract F19628-79-C-0173; AF Proj. 4600)
(AD-A103927; RADC-TR-81-116) Avail: NTIS HC A04/MF A01 CSCL 09/5

This interim report presents the study results of a tent shaped phased array SHF aircraft antenna for Satellite Communications. The antenna consists of four planar phased arrays and has a low profile streamlined configuration. The tent array provides electrical scanning over a hemisphere and is capable of high power transmission. The design of the array is a trade-off of the key parameters including antenna coverage, gain, aerodynamic impact, high power transmission, and array packaging. The detailed design considerations of these parameters are presented. A design procedure is given to derive an optimum tent array configuration. The design of a 20 dB gain tent array is discussed. This array consists of square waveguide elements, septum polarizers, ferrite and diode phase shifters, a unique feed network, and a microprocessor for array control. The array depth has a significant impact on the aerodynamic effects and array packaging. The development and design of compact array components to reduce the array depth and to provide high power capability is the key factor to the successful application of the tent array. The extension of the 20 dB gain design to a 30 dB gain array is also included. A breadboard planar array, to test the performance of the array and components, and verify the concept of the tent shaped phased array, is being implemented in this effort.
Author (GRA)

N81-33503# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
MANUAL ON THE FATIGUE OF STRUCTURES. 2: CAUSES AND PREVENTION OF DAMAGE. 7: MECHANICAL SURFACE DAMAGE
W. G. Barrois (l'Armement (Air), Vanves, France) Jun. 1981 140 p refs
(AGARD-MAN-10(ENG); ISBN-92-835-1389-4) Avail: NTIS HC A07/MF A01

Surface damage to aircraft structures is often the origin of fatigue cracks. Damage arising from decarburization and wheel grinding; friction and severe wear; rolling fatigue; contact fatigue; fretting fatigue; and erosion by solid and liquid particles and cavitation is examined. Damage in gears, cams, rails, and bearings are discussed as well as to the surface of metals transparent materials, reinforced plastics, and laminates. A.R.H.

N81-33945*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FLIGHT TEST OF A PURE-TONE ACOUSTIC SOURCE
Arnold W. Mueller and John S. Preisser Oct. 1981 39 p refs
(NASA-TP-1898; L-14600) Avail: NTIS HC A03/MF A01 CSCL 20A

Static and flight testing of a pure-tone acoustic source were conducted in order to: (1) determine if a 4-KHz tone radiated by a source in flight and mixed with broadband aircraft flyover noise could be measured on the ground with a high degree of statistical confidence; (2) determine how well a comparison could be made of flight-to-static tone radiation pattern and a static radiation pattern; and (3) determine if there were any installation effects on the radiation pattern due to the flight vehicle. Narrow-band acoustic data were measured and averaged over eight microphones to obtain a high statistical confidence. The flight data were adjusted to an equivalent static condition by applying corrections for retarded time, spherical spreading, atmospheric absorption, ground impedance, instrumentation constraints, convective amplification, and the Doppler shift. The flight-to-static results are in excellent agreement with the measured static data. No installation effects were observed on the radiation pattern. M.G.

N81-33946*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NOISE SUPPRESSION CHARACTERISTICS OF PERIPHERALLY SEGMENTED DUCT LINERS
Willie R. Watson Sep. 1981 43 p refs
(NASA-TP-1904; L-14521) Avail: NTIS HC A03/MF A01 CSCL 20A

The acoustic fields and transmission losses produced in semi-infinite circular ducts with peripherally segmented liners are analyzed using a series expansion of hard-wall duct modes. The coefficients of the series are computed using Galerkin's method. Unlike finite element approaches, this analysis includes the effects of realistic sources and the number of peripheral strips need not be small. It is shown that peripherally segmented liners redistribute the acoustic energy in waves composed of only a single circumferential mode at the source into other waves which contain a multitude of circumferential modes in the lined section. The accuracy of eigenfunctions computed from the analysis was observed to increase as either the frequency or radial mode order increased. The transmission losses were found to be accurate at frequencies above the cut-on value of the first-order radial mode in a hard-wall duct. The results show that for plane wave sources, peripherally segmented liners may attenuate as much sound as an optimized uniform liner at the optimal point while giving more noise suppression at most other frequencies. M.G.

N81-33947*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPUTER PROGRAM TO PREDICT AIRCRAFT NOISE LEVELS
Bruce J. Clark Sep. 1981 146 p
(NASA-TP-1913; E-733) Avail: NTIS HC A07/MF A01 CSCL 20A

Methods developed at the NASA Lewis Research Center for predicting the noise contributions from various aircraft noise sources were programmed to predict aircraft noise levels either in flight or in ground tests. The noise sources include fan inlet and exhaust, jet, flap (for powered lift), core (combustor), turbine, and airframe. Noise propagation corrections are available for atmospheric attenuation, ground reflections, extra ground attenuation, and shielding. Outputs can include spectra, overall sound pressure level, perceived noise level, tone-weighted perceived noise level, and effective perceived noise level at locations specified by the user. Footprint contour coordinates and approximate footprint areas can also be calculated. Inputs and outputs can be in either System International or U.S. customary units. The subroutines for each noise source and propagation correction are described. A complete listing is given. A.R.H.

N81-33948# Transportation Systems Center, Cambridge, Mass.
HELICOPTER NOISE ANALYSIS: ROUND-ROBIN TEST Final Report, Jan. 1980 - May 1981
Edward J. Rickley Aug. 1981 79 p refs
(AD-A103724; TSC-FAA-81-13; FAA-AEE-81-13) Avail: NTIS HC A05/MF A01 CSCL 20/1

This report documents the results of an international round robin test on the analysis of helicopter noise. Digital spectral noise data of a 3.5 second simulated helicopter flyover and identical analog test tapes containing helicopter noise data, reference signals, test tones and time code signals were sent to 13 participating organizations. The purpose of the test was to evaluate data reduction systems and procedures; to determine the magnitude of the variability between representative systems and organizations; and to identify potential causes and assist in establishing recommended procedures designed to minimize the variablity. Author (GRA)

N81-34108# Department of Transportation, Washington, D. C. Office of Univ. Research.
PUBLISHED RESULTS OF THE PROGRAM OF UNIVERSITY RESEARCH. TRANSPORTATION RESEARCH RESULTS
Helen L. Whitfield and Russell A. Capelle 1980 61 p
(PB81-210130) Avail: NTIS HC A04/MF A01 CSCL 13F

This bibliography contains approximately 400 citations of published reports from transportation related research. Topics covered include automotive technology, energy efficiency and management, transport of hazardous materials, land use/economic impacts of transportation, and rail/guideway development. J.M.S.

N81-34109# Metropolitan Transportation Authority, Inc., New York.
DUAL-POWERED GAS TURBINE/ELECTRIC (GT/E) COMPUTER COMMUTER RAIL CARS: TEST, EVALUATION AND ECONOMICS Final Report
Donald Raskin, Charles Stark, and L. T. Klauder 5 Sep. 1980 52 p refs Sponsored in part by Urban Mass Transportation Administration, New York State Dept. of Transportation and AiResearch Mfg. Co.
(PB81-211757; UMTA-NY-06-0005-80-1) Avail: NTIS HC A04/MF A01 CSCL 13F

Eight prototype gas turbine/electric (GT/E) cars, four from the General Electric Co. (GE) and four from the Garrett Corp. were operated in revenue service on the Long Island Rail Road (LIRR). The design considerations that lead to the configuration of the GT/E cars and a description of the cars as built by GE and Garrett are presented. The costs of using GT/E trains to provide direct service to New York from select nonelectrified lines are compared with costs of extending electrification over those lines and operating conventional MU trains. Three rail lines are examined: the LIRR Port Jefferson and Oyster Bay branches, the Conrail's Upper Hudson to Poughkeepsie. GRA

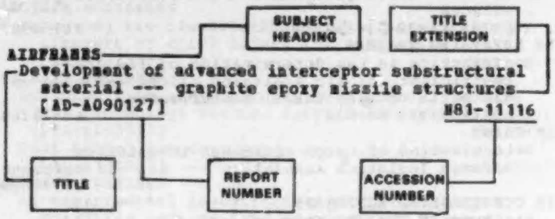
N81-34138*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AMES RESEARCH CENTER PUBLICATIONS: A CONTINUING BIBLIOGRAPHY, 1981
Aug. 1981 261 p
(NASA-TM-81308; A-8655) Avail: NTIS HC A12/MF A01 CSCL 05B

This bibliography lists formal NASA publications, journal articles, books, chapters of books, patents, contractor reports, and computer programs that were issued by Ames Research Center and indexed by Scientific and Technical Aerospace Reports, Limited Scientific and Technical Aerospace Reports, International Aerospace Abstracts, and Computer Program Abstracts in 1980. Citations are arranged by directorate, type of publication, and NASA accession numbers. Subject, personal author, corporate source, contract number, and report/accession number indexes are provided. A.R.H.

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 143)* JANUARY 1982

Typical Subject Index Listing


SUBJECT HEADING
TITLE EXTENSION
AIRFRAMES
Development of advanced interceptor substructural material --- graphite epoxy missile structures
[AD-A090127]
N81-11116
TITLE
REPORT NUMBER
ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ACCIDENT INVESTIGATION
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] N81-32130
ACOUSTIC ATTENUATION
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612
ACOUSTIC DUCTS
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] N81-33205
ACOUSTIC EMISSION
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] N81-32522
ACOUSTIC EXCITATION
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] A81-48640
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] A81-48651
ACOUSTIC MEASUREMENTS
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] A81-48628
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] A81-48634
ACTIVE CONTROL
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] N81-33161
ADAPTIVE CONTROL
Adaptive features and measurement requirements for advanced surveillance radars
A81-48544
ADHESIVE BONDING
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] N81-32522
AERIAL RUDDERS
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] A81-47551
AEROACOUSTICS
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] A81-48606
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] A81-48625
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] A81-48634
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] A81-48639
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] A81-48640
Prediction method for aeroacoustic loads on under the wing blown flaps
[AIAA PAPER 81-2038] A81-48644
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] A81-48647
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] A81-49729
Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730
Unsteady swirling flows in gas turbines --- aircraft engines and aeroacoustics
[AD-A102852] N81-32150
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] N81-32966
AERODYNAMIC CHARACTERISTICS
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] A81-47554
The calculation of separated flow at helicopter bodies
[DGLR PAPER 81-026] A81-47555
The half-model technique in the wind tunnel and its employment in the development of the Airbus family
[DGLR PAPER 81-118] A81-47587
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] A81-47601
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] A81-47609
Computational fluid mechanics and its impact on the aircraft aerodynamicist
[DGLR PAPER 81-003] A81-47621
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] A81-47622
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
A81-49948
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] N81-32118
A full-scale wind tunnel investigation of a helicopter bearingless main rotor --- Ames 40 by 80 Wind Tunnel
[NASA-TM-81321] N81-32137

Twin-rotor patrol airship flying model design rationale
[AD-A102575] N81-32141

The control anticipation parameter for augmented aircraft
[AD-A102626] N81-32152

AERODYNAMIC COEFFICIENTS

Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
A81-48480

Influence of landing gear flexibility on aircraft performance during ground roll
A81-49375

AERODYNAMIC DRAG

Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604

Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] A81-48417

AERODYNAMIC INTERFERENCE

A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] A81-48416

Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] N81-32124

AERODYNAMIC LOADS

Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
A81-48480

Development of an aircraft maneuver load spectrum based on VGH data
[AD-A102750] N81-32142

Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] N81-33161

AERODYNAMIC NOISE

An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] A81-48606

The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] A81-48607

Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] A81-48610

Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] A81-48625

Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] A81-49729

Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730

Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] A81-49731

An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] A81-49743

AERODYNAMIC STABILITY

Stability and flutter analysis of turbine blades at low speed
A81-47959

Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel
[NASA-TM-83171] N81-33159

AERODYNAMIC STALLING

On the numerical analysis of stall flutter in turbine cascade
A81-47963

Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] N81-32154

AERODYNAMICS

Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
A81-47962

Measured pressure distributions and shock shapes on a simple delta wing
A81-48479

Performance prediction for light airplanes
A81-49374

AEROELASTICITY

Stability and flutter analysis of turbine blades at low speed
A81-47959

Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
A81-47962

Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
A81-49948

AFTERBODIES

Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] A81-49979

AIR BREATHING ENGINES

Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604

AIR CARGO

Determination of cargo container inventories through logistics simulation --- for air shipment
A81-48380

AIR CONDITIONING EQUIPMENT

Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
A81-48196

AIR JETS

Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730

AIR NAVIGATION

A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy
[DGLR PAPER 81-066] A81-47616

The relation between aircraft fuel reserves and navigation
A81-47843

AIR TRAFFIC

Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] N81-33216

Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] N81-33217

AIR TRAFFIC CONTROL

A simple radar for navigation accuracy measurements
A81-47844

Availability requirements of the future ATC system
A81-48558

Automation of air traffic control processes --- Russian book
A81-49462

Takeoff and missed approach under the influence of wind shear --- flight safety considerations
[TUBS/SFB-58-80-05-01] N81-32131

Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] N81-33182

En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103094] N81-33183

Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System
[AD-A104150] N81-33184

Computer B (NAS-NAS) communications support
[AD-A104145] N81-33392

AIR TRANSPORTATION

Forecast of future aviation fuels: The model
[NASA-CR-165486] N81-32956

Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] N81-33173

Published results of the program of university research. Transportation research results
[PB81-210130] N81-34108

AIRBORNE EQUIPMENT

Infrared airborne radar
A81-48566

A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] A81-48647

Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49378

Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] N81-32133
AIRBORNE/SPACEBORNE COMPUTERS
Development considerations for real-time aircraft/avionic distributed computer control systems
A81-48376
AIRCRAFT ACCIDENT INVESTIGATION
Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] N81-33174
AIRCRAFT ACCIDENTS
Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] N81-33174
AIRCRAFT ANTENNAS
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] N81-33390
Tent shaped phased array
[AD-A103927] N81-33393
AIRCRAFT CARRIERS
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] N81-33199
AIRCRAFT COMPARTMENTS
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] N81-33175
AIRCRAFT CONFIGURATIONS
Surface-oriented coordinates for boundary-layer calculations in the case of general configurations
[DGLR PAPER 81-014] A81-47557
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel
[NASA-TM-83171] N81-33159
AIRCRAFT CONSTRUCTION MATERIALS
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] A81-47551
Cost-effective mechanical property characterization
A81-47813
The Lear Fan 2100
A81-49975
Applications of composite materials for the construction of military helicopters
N81-33147
AIRCRAFT CONTROL
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] A81-47553
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] A81-47562
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] A81-47580
Fly-by-wire Jaguar
A81-48064
Application of optimal control and estimation to autopilot and autothrottle systems
A81-48371
Development considerations for real-time aircraft/avionic distributed computer control systems
A81-48376
The use of direct lift control of an aircraft in a guided landing run
A81-49928
Parametric synthesis of an automatic system for flight-vehicle stabilization
A81-49940
Realization of a method of extremal targeting in a problem of aircraft landing control
A81-49943
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] N81-32144
System identification for controlled aircraft --- maximum likelihood estimates, parameter identification
N81-33132
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel
[NASA-TM-83171] N81-33159
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] N81-33210
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] N81-33211
AIRCRAFT DESIGN
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] A81-47551
Surface-oriented coordinates for boundary-layer calculations in the case of general configurations
[DGLR PAPER 81-014] A81-47557
The half-model technique in the wind tunnel and its employment in the development of the Airbus family
[DGLR PAPER 81-118] A81-47587
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] A81-47609
Computational fluid mechanics and its impact on the aircraft aerodynamicist
[DGLR PAPER 81-003] A81-47621
Combat cockpit design
A81-49173
Stress concentration in elements of aircraft structures --- Russian book
A81-49471
Commercial airliners - Design and flight operation
A81-49575
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] A81-49732
Sukhoi Su-24 Fencer - The Soviet Tornado
A81-49974
The Lear Fan 2100
A81-49975
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164833] N81-32117
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] N81-32121
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] N81-33137
The role of the research simulator in the systems development of rotorcraft
N81-33146
Multi-mission STOVL with vectored thrust engines
N81-33149
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
N81-33150
V/STOL aircraft technology in Canada
N81-33152
US military V/STOL: Who needs it? Wants it? Can afford it?
N81-33156
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] N81-33192
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] N81-33200

AIRCRAFT DETECTION
Aircraft recognition by means of monostatic radar A81-47142
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers [AIAA PAPER 81-2005] A81-49732
AIRCRAFT ENGINES
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity A81-47962
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans A81-47966
Damping applications in aero-propulsion systems A81-47999
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design A81-48333
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis A81-48379
Engine noise source breakdown - Theory, simulation and results [AIAA PAPER 81-2040] A81-48620
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance [AIAA PAPER 81-2049] A81-48621
The effect of vane-frame design on rotor-stator interaction noise [AIAA PAPER 81-2034] A81-48627
Assessment of inflow control structure effectiveness and design system development [AIAA PAPER 81-2048] A81-48637
Mixer nozzle aeroacoustic characteristics for the energy efficient engine [AIAA PAPER 81-1994] A81-48639
High bypass ratio engine noise component separation by coherence technique [AIAA PAPER 81-2054] A81-48653
Propulsion energy for tomorrow's aviation A81-49161
Design of production processes for flight-vehicle engines --- Russian book A81-49475
The effect of flight and the presence of an airframe on engine exhaust noise [AIAA PAPER 81-2029] A81-49727
The Lear Fan 2100 A81-49975
Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines [AIAA PAPER 81-1358] A81-49976
Unsteady swirling flows in gas turbines --- aircraft engines and aeroacoustics [AD-A102852] N81-32150
Multi-mission STOVL with vectored thrust engines N81-33149
Noise suppression characteristics of peripherally segmented duct liners [NASA-TP-1904] N81-33946
AIRCRAFT EQUIPMENT
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft A81-48196
Aircraft electricity and electronics /3rd edition/ --- Book A81-49877
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept [AD-A102197] N81-32144
Wind tunnel testing of a windshield material or supersonic aircraft [AD-A103383] N81-33163
AIRCRAFT FUEL SYSTEMS
The relation between aircraft fuel reserves and navigation A81-47843
Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks A81-48351
AIRCRAFT FUELS
Propulsion energy for tomorrow's aviation A81-49161
AIRCRAFT GUIDANCE
The use of direct lift control of an aircraft in a guided landing run A81-49928
AIRCRAFT INDUSTRY
Forecast of future aviation fuels: The model [NASA-CR-165486] N81-32956
AIRCRAFT INSTRUMENTS
Instrumentation for measurement of flow properties on a swept wing in flight [DGLR PAPER 81-034] A81-47585
Onboard procedure for the measurement of wind shear gradients [DGLR PAPER 81-060] A81-47612
Civil head-up displays - Coming up fast A81-49973
Simulator evaluation of separation of display parameters in path-following tasks [NASA-TP-1915] N81-33203
AIRCRAFT LANDING
Influence of landing gear flexibility on aircraft performance during ground roll A81-49375
The use of direct lift control of an aircraft in a guided landing run A81-49928
Realization of a method of extremal targeting in a problem of aircraft landing control A81-49943
Flight evaluation of the STOL flare and landing during night operations [NASA-TM-81312] N81-32151
An experimental investigation of VTOL flying qualities requirements or shipboard landings [AD-A104137] N81-33199
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear [NASA-TM-83188] N81-33211
AIRCRAFT MAINTENANCE
Simulation model to evaluate maintenance strategies for large network of fielded systems A81-48009
F-100s set to become target drones A81-48067
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis A81-48379
Estimating aircraft depot maintenance costs [AD-A103623] N81-33133
A study of the factors affecting productivity at the Naval Air Rework Facilities [AD-A103783] N81-33134
A prescriptive model for resource allocation at the intermediate level engine facility [AD-A103785] N81-33135
Development of maintenance metrics to forecast resource demands of weapon systems [AD-A104089] N81-33136
AIRCRAFT MANEUVERS
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts [DGLR PAPER 81-065A] A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range [DGLR PAPER 81-065B] A81-47553
Captive aircraft testing at high angles of attack [AD-A103108] N81-32140
Development of an aircraft maneuver load spectrum based on VGH data [AD-A102750] N81-32142
AIRCRAFT MODELS
Design and construction of a model which is dynamically similar to the A310 wing [DGLR PAPER 81-035] A81-47556
AIRCRAFT NOISE
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission [AIAA PAPER 81-1970] A81-48608
Theoretical and experimental evaluation of transmission loss of cylinders [AIAA PAPER 81-1971] A81-48612

Tip geometry effects on the model helicopter rotor low frequency broadband noise [AIAA PAPER 81-2003] A81-48615

Flight test of the 747-JT9D for airframe and jet-flap interaction noise [AIAA PAPER 81-2037] A81-48629

Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements [AIAA PAPER 81-2053] A81-48635

A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies [AIAA PAPER 81-2028] A81-48647

Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers [AIAA PAPER 81-2005] A81-49732

Flight test of a pure-tone acoustic source --- aircraft noise [NASA-TP-1898] N81-33945

Helicopter noise analysis: Round-robin test [AD-A103724] N81-33948

AIRCRAFT PARTS

The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure [AD-A102923] N81-32522

AIRCRAFT PERFORMANCE

The relation between aircraft fuel reserves and navigation A81-47843

Performance prediction for light airplanes A81-49374

Influence of landing gear flexibility on aircraft performance during ground roll A81-49375

Sukhoi Su-24 Fencer - The Soviet Tornado A81-49974

Design of optimal inputs for the identification of characteristics of aircraft flights --- parameter identification control theory N81-33131

Vertical lift capabilities for the 80's and 90's N81-33139

Ten years of US Marine Corps Harrier operations N81-33140

Historical overview of V/STOL aircraft technology N81-33143

Recent progress in V/STOL aircraft technology N81-33144

Multi-mission STOVL with vectored thrust engines N81-33149

Mission potential of derivatives of the XV-15 tilt rotor research aircraft N81-33150

Statistics of some atmospheric turbulence records relevant to aircraft response calculations [NASA-CR-3464] N81-33191

AIRCRAFT PRODUCTION

Damage recognition and localization by means of differential modal analysis [DGLR PAPER 81-056] A81-47603

Design of production processes for flight-vehicle engines --- Russian book A81-49475

AIRCRAFT SAFETY

Improving the crashworthiness of general aviation aircraft by crash injury investigations [AD-A103316] N81-33174

Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system [AD-A104161] N81-33177

AIRCRAFT STABILITY

Parametric synthesis of an automatic system for flight-vehicle stabilization A81-49940

AIRCRAFT STRUCTURES

A formulation of the shimmy problem for swiveling wheels A81-47268

Measures for increasing the service life of riveted, aircraft-relevant joints [DGLR PAPER 81-052] A81-47564

Recognizing defects in carbon-fiber-reinforced plastics [DGLR PAPER 81-057] A81-47565

High peak energy shaped-pulse electromagnetic crack detection A81-47785

Developing design allowables for composite helicopter structures A81-47811

Cost-effective mechanical property characterization A81-47813

A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue A81-47888

Sliding-seal electron beam slot welding of an aircraft wing closure beam A81-48142

Stress concentration in elements of aircraft structures --- Russian book A81-49471

The effect of the skewness of the skin panels on stresses in conical wings A81-49930

Geometrically nonlinear theory for calculating thin rods of a wing profile A81-49935

Strength calculation of thin-wall rods of significant taper A81-49937

Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures [AGARD-MAN-10(ENG)] N81-33503

AIRCRAFT SURVIVABILITY

Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience N81-33141

Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems N81-33142

The consequences of certain operational requirements on the conceptual design of combat helicopters N81-33153

AIRFOILS

On the spanwise uniformity of wind tunnel test data of transonic airfoils [NAL-TR-665] N81-32118

AIRFRAME MATERIALS

Anti-symmetric elastic properties of composite plates of satin weave cloth [NAL-TR-649T] N81-33238

AIRFRAMES

Prediction of jet exhaust noise on airframe surfaces during flight [AIAA PAPER 81-2035] A81-48626

The effect of flight and the presence of an airframe on engine exhaust noise [AIAA PAPER 81-2029] A81-49727

Engineering effects of advanced composite materials on avionics [AD-A104015] N81-33240

AIRPORT PLANNING

Simulation model to evaluate maintenance strategies for large network of fielded systems A81-48009

Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide [AD-A104154] N81-33216

Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions [AD-A104155] N81-33217

AIRPORTS

Determination of cargo container inventories through logistics simulation --- for air shipment A81-48380

Unrepresentative temperatures at a first-order meteorological station Washington National Airport A81-48847

Water-compatible polymer concrete materials for use in rapid repair systems for airport runways [AD-A102873] N81-32273

AIRSPACE

Development of a heliport classification method and an analysis of heliport real estate and airspace requirements [AD-A102521] N81-32158

AIRSPEED
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] A81-47595
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] N81-33204

ALL-WEATHER AIR NAVIGATION
Ten years activity in the area of flight control for helicopters at night and in bad weather
[DGLR PAPER 81-064] A81-47620
Controls and displays for all-weather operation of helicopters
N81-33145

ALPHA JET AIRCRAFT
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] A81-47580

ALUMINUM COATINGS
A process for protecting gas turbine blade cooling passages against degradation
A81-49209

ANECHOIC CHAMBERS
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] A81-48628

ANGULAR VELOCITY
Choice of the optimal angular velocity of the twist of a flight vehicle
A81-49946

ANTENNA ARRAYS
Hyperbolic origins --- of radio position-fixing systems
A81-47842
Simulation of Microwave Landing System
A81-48368

ANTENNA RADIATION PATTERNS
Hyperbolic origins --- of radio position-fixing systems
A81-47842
A simple radar for navigation accuracy measurements
A81-47844

ANTISUBMARINE WARFARE AIRCRAFT
Design for maximum effectiveness in the Navy role
N81-33154

APPROACH
Takeoff and missed approach under the influence of wind shear --- flight safety considerations
[TUBS/SFB-58-80-05-01] N81-32131

APPROACH CONTROL
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] N81-32151

ARCHITECTURE (COMPUTERS)
The array processor - A real-time simulator
A81-48328

ASPECT RATIO
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] N81-32119

ATMOSPHERIC ENTRY
Choice of the optimal angular velocity of the twist of a flight vehicle
A81-49946

ATMOSPHERIC TEMPERATURE
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
A81-48847

ATMOSPHERIC TURBULENCE
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] N81-33191

ATTACK AIRCRAFT
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] A81-47580
Combat cockpit design
A81-49173
Sukhoi Su-24 Fencer - The Soviet Tornado
A81-49974
Multi-mission STOVL with vectored thrust engines
N81-33149

AURORAL ZONES
Errors of phase VLF-navigation systems under conditions of auroral disturbances
A81-47533

AUTOMATIC CONTROL
Automation of air traffic control processes --- Russian book
A81-49462
Controls and displays for all-weather operation of helicopters
N81-33145

AUTOMATIC FLIGHT CONTROL
Application of optimal control and estimation to autopilot and autothrottle systems
A81-48371
Combat cockpit design
A81-49173
Parametric synthesis of an automatic system for flight-vehicle stabilization
A81-49940

AUTOMATIC PILOTS
Application of optimal control and estimation to autopilot and autothrottle systems
A81-48371

AUTOMATION
Automation of air traffic control processes --- Russian book
A81-49462

AVAILABILITY
Availability requirements of the future ATC system
A81-48558

AVIONICS
Optimization of simulation models for avionics software verification
A81-48373
Development considerations for real-time aircraft/avionic distributed computer control systems
A81-48376
Aircraft electricity and electronics /3rd edition/ --- Book
A81-49877
Software survey for the avionics test bed --- for large space structures
[NASA-CR-161089] N81-32143
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] N81-32144
Engineering effects of advanced composite materials on avionics
[AD-A104015] N81-33240

AXIAL FLOW TURBINES
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] A81-48636

AXISYMMETRIC FLOW
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] A81-48606

B

BASE PRESSURE
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] N81-32124

BEAMS (SUPPORTS)
Sliding-seal electron beam slot welding of an aircraft wing closure beam
A81-48142

BEARINGLESS ROTORS
A full-scale wind tunnel investigation of a helicopter bearingless main rotor --- Ames 40 by 80 Wind Tunnel
[NASA-TM-81321] N81-32137

BIBLIOGRAPHIES
Published results of the program of university research. Transportation research results
[PB81-210130] N81-34108
Ames Research Center publications: A continuing bibliography, 1980
[NASA-TM-81308] N81-34138

BIRD-AIRCRAFT COLLISIONS
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] N81-33197

BLADE TIPS
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] A81-47554
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] A81-48615
BO-105 HELICOPTER
The impact of helicopter flight mechanics on mission performance
N81-33148
BOEING 747 AIRCRAFT
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] A81-48629
Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1588] A81-48638
BOUNDARY LAYER CONTROL
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] N81-32121
BOUNDARY LAYER FLOW
Surface-oriented coordinates for boundary-layer calculations in the case of general configurations
[DGLR PAPER 81-014] A81-47557
Trailing edge noise prediction from measured surface pressures
A81-48395
BOXES (CONTAINERS)
Determination of cargo container inventories through logistics simulation --- for air shipment
A81-48380
BYPASS RATIO
Propulsion energy for tomorrow's aviation
A81-49161

C

C-130 AIRCRAFT
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] N81-33173
C-141 AIRCRAFT
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] N81-33173
CAMERAS
Probe protection in camera/model visual systems --- for helicopter flight simulators
A81-48359
CANADA
V/STOL aircraft technology in Canada
N81-33152
CANOPIES
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] N81-33197
CANTILEVER BEAMS
Strength calculation of thin-wall rods of significant taper
A81-49937
CAPACITY
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] N81-33217
CAPTIVE TESTS
Captive aircraft testing at high angles of attack
[AD-A103108] N81-32140
CARBON FIBER REINFORCED PLASTICS
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] A81-47551
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] A81-47565
CARGO
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] N81-33173
CARGO AIRCRAFT
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164833] N81-32117
CASCADE FLOW
Numerical experiments on unsteady flows through vibrating cascades
A81-47961
On the numerical analysis of stall flutter in turbine cascade
A81-47963
CEILINGS (ARCHITECTURE)
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] N81-33175
CELESTIAL NAVIGATION
An analytical solution of the two star sight problem of celestial navigation
A81-48121
CERTIFICATION
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] A81-48635
CIRCULATION CONTROL AIRFOILS
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] N81-32128
CIVIL AVIATION
The relation between aircraft fuel reserves and navigation
A81-47843
Commercial airliners - Design and flight operation
A81-49575
Civil head-up displays - Coming up fast
A81-49973
Forecast of future aviation fuels: The model
[NASA-CR-165486] N81-32956
CLASSIFICATIONS
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] N81-32158
COAXIAL FLOW
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] A81-49743
COAXIAL NOZZLES
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] A81-48651
COCKPIT SIMULATORS
Probe protection in camera/model visual systems --- for helicopter flight simulators
A81-48359
Time delays in flight simulator visual displays
A81-48369
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83168] N81-33211
COCKPITS
Combat cockpit design
A81-49173
COHERENT ACOUSTIC RADIATION
High bypass ratio engine noise component separation by coherence technique
[AIAA PAPER 81-2054] A81-48653
COHERENT RADAR
Infrared airborne radar
A81-48566
COLLISION AVOIDANCE
A simple radar for navigation accuracy measurements
A81-47844
COMBAT
Ten years of US Marine Corps Harrier operations
N81-33140
The consequences of certain operational requirements on the conceptual design of combat helicopters
N81-33153
COMBUSTION EFFICIENCY
Hydrogen engines
A81-49249

COMMERCIAL AIRCRAFT
- Commercial airliners - Design and flight operation A81-49575
- Responses to comments of Air Transport Association of America on aircraft towing feasibility study [DE81-029834] N81-33201

COMMUNICATION EQUIPMENT
- COMLINK - A communications/EW analytical and modeling tool A81-48547

COMMUNICATION NETWORKS
- Computer B (NAS-NAS) communications support [AD-A104145] N81-33392

COMPLEX SYSTEMS
- A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy [DGLR PAPER 81-066] A81-47616

COMPOSITE MATERIALS
- Water-compatible polymer concrete materials for use in rapid repair systems for airport runways [AD-A102873] N81-32273
- Applications of composite materials for the construction of military helicopters N81-33147
- Advanced composite aircraft electromagnetic design and synthesis [SAND-81-1278C] N81-33200
- Engineering effects of advanced composite materials on avionics [AD-A104015] N81-33240

COMPOSITE STRUCTURES
- The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure [AD-A102923] N81-32522
- Anti-symmetric elastic properties of composite plates of satin weave cloth [NAL-TR-649T] N81-33238
- Engineering effects of advanced composite materials on avionics [AD-A104015] N81-33240
- Development of advanced interceptor substructural material [AD-A103836] N81-33241

COMPRESSIBILITY EFFECTS
- Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics [DGLR PAPER 81-047] A81-47622

COMPRESSOR BLADES
- Damping of turbomachine blade variations by subsonic flow A81-47957

COMPUTATIONAL FLUID DYNAMICS
- Computational fluid mechanics and its impact on the aircraft aerodynamicist [DGLR PAPER 81-003] A81-47621
- Numerical experiments on unsteady flows through vibrating cascades A81-47961
- Digital simulation for energy conservation in a large wind tunnel plant system A81-48003
- Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions A81-48480
- Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen A81-49948
- Comparison of computational and experimental jet effects [AIAA PAPER 81-1492] A81-49979
- Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting [AD-A103434] N81-33192

COMPUTER GRAPHICS
- Computer graphics applications [PB81-215246] N81-33188

COMPUTER NETWORKS
- Availability requirements of the future ATC system A81-48558

COMPUTER PROGRAMS
- Choice of optimal parameters of a gyrovertical on the basis of a standard program A81-48744
- User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers [NASA-TM-83135] N81-32966
- Computer program to predict aircraft noise levels [NASA-TP-1913] N81-33947
- Ames Research Center publications: A continuing bibliography, 1980 [NASA-TM-81308] N81-34138

COMPUTER SYSTEMS DESIGN
- The array processor - A real-time simulator A81-48328
- Development considerations for real-time aircraft/avionic distributed computer control systems A81-48376

COMPUTER TECHNIQUES
- Computational fluid mechanics and its impact on the aircraft aerodynamicist [DGLR PAPER 81-003] A81-47621
- A simple radar for navigation accuracy measurements A81-47844
- Computer-aided investigation of turbomachine aerodynamics and aeroelasticity A81-47962

COMPUTERIZED DESIGN
- Computational fluid mechanics and its impact on the aircraft aerodynamicist [DGLR PAPER 81-003] A81-47621
- A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design A81-48333
- Structural synthesis - Its genesis and development A81-49076
- Development of an aircraft maneuver load spectrum based on VGH data [AD-A102750] N81-32142
- Software survey for the avionics test bed --- for large space structures [NASA-CR-161089] N81-32143

COMPUTERIZED SIMULATION
- Simulation model to evaluate maintenance strategies for large network of fielded systems A81-48009
- The array processor - A real-time simulator A81-48328
- Function generation techniques --- in real time hybrid simulations A81-48329
- Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks A81-48351
- Simulation of Microwave Landing System A81-48368
- Optimization of simulation models for avionics software verification A81-48373
- Engine requirements for the T-37 trainer aircraft - A simulation study and analysis A81-48379
- Determination of cargo container inventories through logistics simulation --- for air shipment A81-48380
- Adaptive features and measurement requirements for advanced surveillance radars A81-48544
- COMLINK - A communications/EW analytical and modeling tool A81-48547

CONCRETES
- Water-compatible polymer concrete materials for use in rapid repair systems for airport runways [AD-A102873] N81-32273

CONFERENCES
- Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979 A81-47801
- Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980 A81-47993
- The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design [AGARD-CP-313] N81-33137

CONICAL BODIES
The effect of the skewness of the skin panels on stresses in conical wings
A81-49930

CONTROL SIMULATION
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] A81-47560
Model following control of gas turbine engines
A81-49900
Realization of a method of extremal targeting in a problem of aircraft landing control
A81-49943

CONTROL SURFACES
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] A81-47553

CONTROL THEORY
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] A81-47562
Application of optimal control and estimation to autopilot and autothrottle systems
A81-48371

CONTROLLABILITY
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] N81-33191

CONVERGENT-DIVERGENT NOZZLES
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] A81-49728

COOLING FINS
New developments in compact plate-fin heat exchangers
A81-48062

COOLING SYSTEMS
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
A81-48196

COORDINATE TRANSFORMATIONS
The role of the earth's shape in navigation - An example
A81-48120

CORROSION
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] N81-32522
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] N81-33503

COST EFFECTIVENESS
Cost-effective mechanical property characterization
A81-47813

COST ESTIMATES
Estimating aircraft depot maintenance costs
[AD-A103623] N81-33133

COUPLED MODES
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
A81-47966

CRACK PROPAGATION
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
A81-47888

CRACKING (FRACTURING)
High peak energy shaped-pulse electromagnetic crack detection
A81-47785
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] N81-33214

CRASH INJURIES
Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] N81-33174

CROSSTALK
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] N81-33182

CRUCIFORM WINGS
Solar powered aircraft
[NASA-CASE-LAR-12615-1] N81-32138

CRUISING FLIGHT
Prediction of range and endurance of jet aircraft at constant altitude
A81-47725

CYLINDRICAL BODIES
Strength calculation of thin-wall rods of significant taper
A81-49937

CYLINDRICAL SHELLS
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612

D

DAMAGE
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] A81-47603
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] N81-33503

DATA ACQUISITION
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] N81-32164

DATA LINKS
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] N81-33182

DATA PROCESSING
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] N81-33183

DATA PROCESSING EQUIPMENT
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] N81-32164

DATA REDUCTION
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] N81-32118

DEFECTS
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] N81-32522

DEGREES OF FREEDOM
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] N81-33203

DELTA WINGS
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] A81-47601
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] A81-47622
Measured pressure distributions and shock shapes on a simple delta wing
A81-48479
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] N81-33160

DH 125 AIRCRAFT
The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] A81-49727

DIFFRACTION PATTERNS
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
A81-47143

DIGITAL FILTERS
Characteristics of a digital filter for a precision DME system in microwave landing systems
[FUB-43-1980] N81-32136
DIGITAL SIMULATION
Digital simulation for energy conservation in a large wind tunnel plant system
A81-48003
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
A81-48333
The evolution of real-time digital simulation of aircraft for training applications
A81-48356
Model following control of gas turbine engines
A81-49900
DIGITAL SYSTEMS
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] N81-33182
DISCRETE ADDRESS BEACON SYSTEM
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] N81-33181
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] N81-33183
DISPLAY DEVICES
Time delays in flight simulator visual displays
A81-48369
Controls and displays for all-weather operation of helicopters
N81-33145
DRAG MEASUREMENT
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604
Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] A81-48417
DRAG REDUCTION
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164833] N81-32117
DUCTED FAN ENGINES
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] A81-48602
DUCTED FANS
The effect of vane-frame design on rotor-stator interaction noise
[AIAA PAPER 81-2034] A81-48627
DUCTS
Noise suppression characteristics of peripherally segmented duct liners
[NASA-TP-1904] N81-33946
DYNAMIC MODELS
Simulation model to evaluate maintenance strategies for large network of fielded systems
A81-48009
DYNAMIC STRUCTURAL ANALYSIS
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980
A81-47993
Finite strip analysis of singly curved skin-stringer structures
A81-48390

E

ECONOMETRICS
Forecast of future aviation fuels: The model
[NASA-CR-165486] N81-32956
EDDY CURRENTS
High peak energy shaped-pulse electromagnetic crack detection
A81-47785
EJECTION SEATS
Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] N81-33177
ELASTIC PLATES
Transient vibrations of elastic panels due to the impact of shock waves
A81-48385
ELASTIC PROPERTIES
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-645T] N81-33238
ELECTRIC HYBRID VEHICLES
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] N81-34109
ELECTRIC PROPULSION
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] N81-34109
ELECTRICAL ENGINEERING
Aircraft electricity and electronics /3rd edition/ --- Book
A81-49877
ELECTRICITY
Aircraft electricity and electronics /3rd edition/ --- Book
A81-49877
ELECTROMAGNETIC PULSES
High peak energy shaped-pulse electromagnetic crack detection
A81-47785
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] N81-33200
ELECTROMAGNETISM
Aircraft electricity and electronics /3rd edition/ --- Book
A81-49877
ELECTRON BEAM WELDING
Sliding-seal electron beam slot welding of an aircraft wing closure beam
A81-48142
ELECTRONIC CONTROL
Fly-by-wire Jaguar
A81-48064
ELECTRONIC EQUIPMENT TESTS
Software survey for the avionics test bed --- for large space structures
[NASA-CR-161089] N81-32143
ELECTRONICS
Aircraft electricity and electronics /3rd edition/ --- Book
A81-49877
EMERGENCIES
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] N81-33175
ENERGY CONSERVATION
Digital simulation for energy conservation in a large wind tunnel plant system
A81-48003
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] N81-33158
Responses to comments of Air Transport Association of America on aircraft towing feasibility study
[DE81-029834] N81-33201
ENERGY REQUIREMENTS
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] N81-33158
ENGINE CONTROL
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] A81-48621
Model following control of gas turbine engines
A81-49900
ENGINE DESIGN
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
A81-48333
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] A81-48637

Propulsion energy for tomorrow's aviation A81-49161
Hydrogen engines A81-49949
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system [NASA-CR-165185] N81-32147
Multi-mission STOVL with vectored thrust engines N81-33149
Simplified off-design performance model of a day turbofan engine cycle [NASA-TM-83204] N81-33206

ENGINE FAILURE
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis A81-48379

ENGINE NOISE
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission [AIAA PAPER 81-1970] A81-48608
Laboratory study of efficient add-on treatments for interior noise control in light aircraft [AIAA PAPER 81-1969] A81-48618
Engine noise source breakdown - Theory, simulation and results [AIAA PAPER 81-2040] A81-48620
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance [AIAA PAPER 81-2049] A81-48621
The effect of vane-frame design on rotor-stator interaction noise [AIAA PAPER 81-2034] A81-48627
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity [AIAA PAPER 81-2032] A81-48628
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale [AIAA PAPER 81-2004] A81-48634
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements [AIAA PAPER 81-2053] A81-48635
Some modal-frequency spectra of fan noise [AIAA PAPER 81-1990] A81-48636
Mixer nozzle aeroacoustic characteristics for the energy efficient engine [AIAA PAPER 81-1994] A81-48639
Effect of excitation on coaxial jet noise as observed by an elliptic mirror [AIAA PAPER 81-2044] A81-48651
High bypass ratio engine noise component separation by coherence technique [AIAA PAPER 81-2054] A81-48653
The effect of flight and the presence of an airframe on engine exhaust noise [AIAA PAPER 81-2029] A81-49727
Noise suppression characteristics of peripherally segmented duct liners [NASA-TP-1904] N81-33946

ENGINE PARTS
Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines [AIAA PAPER 81-1358] A81-49976
A prescriptive model for resource allocation at the intermediate level engine facility [AD-A103785] N81-33135

ENGINE TESTS
The effect of vane-frame design on rotor-stator interaction noise [AIAA PAPER 81-2034] A81-48627

ENVIRONMENT EFFECTS
Unrepresentative temperatures at a first-order meteorological station Washington National Airport A81-48847
Responses to comments of Air Transport Association of America on aircraft towing feasibility study [DE81-029934] N81-33201

ERROR ANALYSIS
The role of the earth's shape in navigation - An example A81-48120
Choice of optimal parameters of a gyrovertical on the basis of a standard program A81-48744
Characteristics of a digital filter for a precision DME system in microwave landing systems [FUB-43-1980] N81-32136

ESCAPE SYSTEMS
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis [AD-A102803] N81-32130

EULER EQUATIONS OF MOTION
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting [AD-A103434] N81-33192

EUROPEAN AIRBUS
Development of the carbon fiber-reinforced side rudder for the Airbus [DGLR PAPER 81-055] A81-47551
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts [DGLR PAPER 81-065A] A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range [DGLR PAPER 81-065B] A81-47553
Design and construction of a model which is dynamically similar to the A310 wing [DGLR PAPER 81-035] A81-47556
The half-model technique in the wind tunnel and its employment in the development of the Airbus family [DGLR PAPER 81-118] A81-47587
Application of reduced natural longitudinal stability in the Airbus program [DGLR PAPER 81-062] A81-47609

EVACUATING (TRANSPORTATION)
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility [AD-A103191] N81-33175

EVALUATION
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system [NASA-CR-165185] N81-32147

EXHAUST FLOW SIMULATION
The effect of flight and the presence of an airframe on engine exhaust noise [AIAA PAPER 81-2029] A81-49727

EXHAUST NOZZLES
Prediction of jet exhaust noise on airframe surfaces during flight [AIAA PAPER 81-2035] A81-48626
Mixer nozzle aeroacoustic characteristics for the energy efficient engine [AIAA PAPER 81-1994] A81-48639
Propulsive lateral control nozzle [NASA-CASE-LAR-12136-1] N81-33210

EXPERIMENTAL DESIGN
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase [DGLR PAPER 81-027] A81-47563

EXTERNAL STORE SEPARATION
A new approach to weapon separation aerodynamics [AIAA PAPER 81-1654] A81-48416

EXTRAVEHICULAR ACTIVITY
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981 [IAF PAPER 81-251] A81-47425

F

F-4 AIRCRAFT
Development of an aircraft maneuver load spectrum based on VGH data [AD-A102750] N81-32142

F-16 AIRCRAFT
More fight for the Fighting Falcon A81-49075

F-100 AIRCRAFT
F-100s set to become target drones A81-48067

FABRICS
- Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland [AD-A103737] N81-33214
- Anti-symmetric elastic properties of composite plates of satin weave cloth [NAL-TR-649T] N81-33238

FAIL-SAFE SYSTEMS
- Fly-by-wire Jaguar A81-48064
- Availability requirements of the future ATC system A81-48558

FAILURE ANALYSIS
- A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue A81-47886
- Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis [AD-A102803] N81-32130

FAR FIELDS
- Flight effects on supersonic convergent-divergent nozzle jet noise [AIAA PAPER 81-2027] A81-49728

FASTENERS
- High peak energy shaped-pulse electromagnetic crack detection A81-47785

FATIGUE (MATERIALS)
- Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures [AGARD-MAN-10(ENG)] N81-33503

FATIGUE LIFE
- Damping applications in aero-propulsion systems A81-47999

FAULT TOLERANCE
- Availability requirements of the future ATC system A81-48558

FEASIBILITY ANALYSIS
- Responses to comments of Air Transport Association of America on aircraft towing feasibility study [DE81-029834] N81-33201

FEEDBACK CONTROL
- Model following control of gas turbine engines A81-49900

FIBER REINFORCED COMPOSITES
- Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979 A81-47801
- Development of advanced interceptor substructural material [AD-A103836] N81-33241

FIGHTER AIRCRAFT
- Optimization of simulation models for avionics software verification A81-48373
- Determination of thrust and throttle-dependent drag for fighter aircraft [AIAA PAPER 81-1692] A81-48417
- Combat cockpit design A81-49173
- Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems N81-33142
- Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel [NASA-TM-83171] N81-33159
- Development of advanced interceptor substructural material [AD-A103836] N81-33241

FINITE ELEMENT METHOD
- Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method A81-48097
- Finite strip analysis of singly curved skin-stringer structures A81-48390
- Structural synthesis - Its genesis and development A81-49076
- An iterative finite element-integral technique for predicting sound radiation from turbofan inlets [AIAA PAPER 81-1581] A81-49736

FLAPS (CONTROL SURFACES)
- Investigation of unsteady airloads on wings with oscillating control for active control purposes [AGARD-R-699] N81-33161

FLEXIBLE BODIES
- Influence of landing gear flexibility on aircraft performance during ground roll A81-49375

FLIGHT ALTITUDE
- Prediction of range and endurance of jet aircraft at constant altitude A81-47725

FLIGHT CHARACTERISTICS
- Captive aircraft testing at high angles of attack [AD-A103108] N81-32140
- Design of optimal inputs for the identification of characteristics of aircraft flights --- parameter identification control theory N81-33131
- The impact of helicopter flight mechanics on mission performance N81-33148

FLIGHT CONTROL
- Onboard procedure for the measurement of wind shear gradients [DGLR PAPER 81-060] A81-47612
- A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy [DGLR PAPER 81-066] A81-47616
- Ten years activity in the area of flight control for helicopters at night and in bad weather [DGLR PAPER 81-064] A81-47620
- The control anticipation parameter for augmented aircraft [AD-A102626] N81-32152
- Investigation of unsteady airloads on wings with oscillating control for active control purposes [AGARD-R-699] N81-33161
- An experimental investigation of VTOL flying qualities requirements or shipboard landings [AD-A104137] N81-33199

FLIGHT HAZARDS
- Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981 [IAF PAPER 81-251] A81-47425

FLIGHT MECHANICS
- Estimation of kinetic quantities of flight mechanics with a nonlinear observer [DGLR PAPER 81-067] A81-47562
- The impact of helicopter flight mechanics on mission performance N81-33148

FLIGHT OPTIMIZATION
- Choice of the optimal angular velocity of the twist of a flight vehicle A81-49946

FLIGHT PATHS
- A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies [AIAA PAPER 81-2028] A81-48647

FLIGHT PLANS
- Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System [AD-A104150] N81-33184

FLIGHT SAFETY
- Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981 [IAF PAPER 81-251] A81-47425
- Availability requirements of the future ATC system A81-48558
- Takeoff and missed approach under the influence of wind shear --- flight safety considerations [TUBS/SFB-58-80-05-01] N81-32131

FLIGHT SIMULATION
- The influence of the airspeed on jet turbulence and the consequences for the jet noise [DGLR PAPER 81-021] A81-47595
- The evolution of real-time digital simulation of aircraft for training applications A81-48358
- Time delays in flight simulator visual displays A81-48369
- Optimization of simulation models for avionics software verification A81-48373

Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation [AIAA PAPER 81-2007] A81-48640

Noise radiated from inverted velocity profile jets under simulated flight [AIAA PAPER 81-2026] A81-49729

Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear [NASA-TM-83188] N81-33211

FLIGHT SIMULATORS

Employment of development simulation for the realization of direct side force control in the case of an attack aircraft [DGLR PAPER 81-063] A81-47580

Probe protection in camera/model visual systems --- for helicopter flight simulators A81-48359

The role of the research simulator in the systems development of rotorcraft N81-33146

FLIGHT TESTS

Instrumentation for measurement of flow properties on a swept wing in flight [DGLR PAPER 81-034] A81-47585

Flight test of the 747-JT9D for airframe and jet-flap interaction noise [AIAA PAPER 81-2037] A81-48629

The effect of flight and the presence of an airframe on engine exhaust noise [AIAA PAPER 81-2029] A81-49727

Recent progress in V/STOL aircraft technology N81-33144

A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept [AD-A103579] N81-33195

Flight test of a pure-tone acoustic source --- aircraft noise [NASA-TP-1890] N81-33945

FLIGHT TIME

Prediction of range and endurance of jet aircraft at constant altitude A81-47725

FLIGHT VEHICLES

Choice of the optimal angular velocity of the twist of a flight vehicle A81-49946

FLOW DISTORTION

Assessment of inflow control structure effectiveness and design system development [AIAA PAPER 81-2048] A81-48637

FLOW DISTRIBUTION

Assessment of inflow control structure effectiveness and design system development [AIAA PAPER 81-2048] A81-48637

Program of research in laminar flow control in the JIAFS at NASA Langley Research Center [NASA-CR-164843] N81-32121

Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model [NASA-CR-166170] N81-33162

FLOW MEASUREMENT

Instrumentation for measurement of flow properties on a swept wing in flight [DGLR PAPER 81-034] A81-47585

Measured pressure distributions and shock shapes on a simple delta wing A81-48479

FLUID FLOW

New developments in compact plate-fin heat exchangers A81-48062

FLUORESCENCE

Compact and highly sensitive fluorescence lidar for oceanographic measurements A81-49378

FLUTTER

Damping applications in aero-propulsion systems A81-47999

Investigation of unsteady airloads on wings with oscillating control for active control purposes [AGARD-R-699] N81-33161

FLUTTER ANALYSIS

Design and construction of a model which is dynamically similar to the A310 wing [DGLR PAPER 81-035] A81-47556

Stability and flutter analysis of turbine blades at low speed A81-47959

On the numerical analysis of stall flutter in turbine cascade A81-47963

Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans A81-47966

FLY BY WIRE CONTROL

Fly-by-wire Jaguar A81-48064

Advanced composite aircraft electromagnetic design and synthesis [SAND-81-1278C] N81-33200

FORCED VIBRATION

Transient vibrations of elastic panels due to the impact of shock waves A81-48385

FRACTURE MECHANICS

Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979 A81-47801

Developing design allowables for composite helicopter structures A81-47811

FREE FLOW

Two-dimensional dynamic stall as simulated in a varying freestream [NASA-CR-164829] N81-32154

FRICTION DRAG

Operational characteristics comparison /ACV and SES/ [AIAA PAPER 81-2064] A81-48401

FUEL COMBUSTION

Droplet breakup regimes and criteria for their existence A81-48079

FUEL CONSUMPTION

Propulsion energy for tomorrow's aviation A81-49161

Forecast of future aviation fuels: The model [NASA-CR-165486] N81-32956

Responses to comments of Air Transport Association of America on aircraft towing feasibility study [DE81-029834] N81-33201

FUEL TANKS

Application of reduced natural longitudinal stability in the Airbus program [DGLR PAPER 81-062] A81-47609

Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks A81-48351

FUNCTION GENERATORS

Function generation techniques --- in real time hybrid simulations A81-48329

FUSELAGES

Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method A81-48097

G

GAS FLOW

Droplet breakup regimes and criteria for their existence A81-48079

Unsteady swirling flows in gas turbines --- aircraft engines and aeroacoustics [AD-A102852] N81-32150

GAS TURBINE ENGINES

Computer-aided investigation of turbomachine aerodynamics and aeroelasticity A81-47962

On the numerical analysis of stall flutter in turbine cascade A81-47963

Model following control of gas turbine engines A81-49900

Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines [AIAA PAPER 81-1358] A81-49976

Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics [PB81-211757] N81-34109

GAS TURBINES
A process for protecting gas turbine blade cooling passages against degradation A81-49209
Unsteady swirling flows in gas turbines --- aircraft engines and aeroacoustics . [AD-A102852] N81-32150
GENERAL AVIATION AIRCRAFT
Improving the crashworthiness of general aviation aircraft by crash injury investigations [AD-A103316] N81-33174
GEOCENTRIC COORDINATES
The role of the earth's shape in navigation - An example A81-48120
GEODESY
The role of the earth's shape in navigation - An example A81-48120
GEOIDS
The role of the earth's shape in navigation - An example A81-48120
GEOMETRICAL OPTICS
Ray-theory predictions of the sound radiated from realistic engine intakes [AIAA PAPER 81-1982] A81-48602
GRAPHITE-EPOXY COMPOSITE MATERIALS
Developing design allowables for composite helicopter structures A81-47811
Cost-effective mechanical property characterization A81-47813
The Lear Fan 2100 A81-49975
GRAPHITE-POLYIMIDE COMPOSITES
Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines [AIAA PAPER 81-1358] A81-49976
GROUND EFFECT (AERODYNAMICS)
Ground effects on aircraft noise for a wide-body commercial airplane [AIAA PAPER 81-1988] A81-48638
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests [NASA-TM-80199] N81-32119
GROUND EFFECT MACHINES
Operational characteristics comparison /ACV and SES/ [AIAA PAPER 81-2064] A81-48401
GROUND SUPPORT EQUIPMENT
Simulation model to evaluate maintenance strategies for large network of fielded systems A81-48009
GUST LOADS
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts [DGLR PAPER 81-065A] A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range [DGLR PAPER 81-065B] A81-47553
GYROSCOPIC PENDULUMS
Choice of optimal parameters of a gyrovertical on the basis of a standard program A81-48744

H

HARRIER AIRCRAFT
Ten years of US Marine Corps Harrier operations N81-33140
HEAD-UP DISPLAYS
Civil head-up displays - Coming up fast A81-49973
HEAT EXCHANGERS
New developments in compact plate-fin heat exchangers A81-48062
HEAT ISLANDS
Unrepresentative temperatures at a first-order meteorological station Washington National Airport A81-48047
HEAT RESISTANT ALLOYS
A process for protecting gas turbine blade cooling passages against degradation A81-49209
HEAT TRANSFER
New developments in compact plate-fin heat exchangers A81-48062
HELICAL FLOW
The role of the helical jet mode in aerodynamic noise generation [AIAA PAPER 81-1963] A81-48607
HELICOPTER CONTROL
Ten years activity in the area of flight control for helicopters at night and in bad weather [DGLR PAPER 81-064] A81-47620
Controls and displays for all-weather operation of helicopters N81-33145
HELICOPTER DESIGN
Developing design allowables for composite helicopter structures A81-47811
Incidents of problems in setting to work on the conceptual design of helicopters N81-33138
The impact of helicopter flight mechanics on mission performance N81-33148
Advancing blade concept helicopter mission capabilities N81-33151
The consequences of certain operational requirements on the conceptual design of combat helicopters N81-33153
Design for maximum effectiveness in the Navy role N81-33154
The impact of operational requirements on the compromise of desired features in rotorcraft design N81-33155
HELICOPTER PERFORMANCE
Probe protection in camera/model visual systems --- for helicopter flight simulators A81-48359
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience N81-33141
The impact of helicopter flight mechanics on mission performance N81-33148
Advancing blade concept helicopter mission capabilities N81-33151
Design for maximum effectiveness in the Navy role N81-33154
The impact of operational requirements on the compromise of desired features in rotorcraft design N81-33155
HELICOPTERS
The calculation of transonic blade tip flow at helicopter rotors [DGLR PAPER 81-025] A81-47554
The calculation of separated flow at helicopter bodies [DGLR PAPER 81-026] A81-47555
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method A81-48097
Tip geometry effects on the model helicopter rotor low frequency broadband noise [AIAA PAPER 81-2003] A81-48615
Two-dimensional dynamic stall as simulated in a varying freestream [NASA-CR-164829] N81-32154
Controls and displays for all-weather operation of helicopters N81-33145
The impact of helicopter flight mechanics on mission performance N81-33148
Mission potential of derivatives of the XV-15 tilt rotor research aircraft N81-33150

Advancing blade concept helicopter mission capabilities
N81-33151
Helicopter noise analysis: Round-robin test
[AD-A103724] N81-33948

HELIPORTS
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] N81-32158

HELMETS
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] N81-32130

HIGH POWER LASERS
Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49378

HIGH RESOLUTION
Infrared airborne radar
A81-48566

HISTORIES
Wind Tunnels of NASA
[NASA-SP-440] N81-32153
Historical overview of V/STOL aircraft technology
N81-33143

HOVERING STABILITY
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] N81-33194

HUMAN FACTORS ENGINEERING
Ames Research Center publications: A continuing bibliography, 1980
[NASA-TM-81308] N81-34138

HYBRID COMPUTERS
Function generation techniques --- in real time hybrid simulations
A81-48329

HYDRODYNAMIC RAM EFFECT
Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks
A81-48351

HYDROGEN ENGINES
Hydrogen engines
A81-49949

HYDROGEN FUELS
Hydrogen engines
A81-49949

HYPERBOLIC NAVIGATION
Hyperbolic origins --- of radio position-fixing systems
A81-47842

I

IGNITION LIMITS
Droplet breakup regimes and criteria for their existence
A81-48079

IN-FLIGHT MONITORING
Instrumentation for measurement of flow properties on a swept wing in flight
[DGLR PAPER 81-034] A81-47585
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] A81-47612

INERTIAL GUIDANCE
Function generation techniques --- in real time hybrid simulations
A81-48329

INFRARED RADAR
Infrared airborne radar
A81-48566

INLET FLOW
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] A81-48621
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] A81-48636
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] A81-48637

INSTRUMENT ERRORS
Simulation of Microwave Landing System
A81-48368

INSTRUMENT LANDING SYSTEMS
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] N81-33203

INTAKE SYSTEMS
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736

INTERACTIVE CONTROL
COMLINK - A communications/EW analytical and modeling tool
A81-48547

INTERNAL COMBUSTION ENGINES
Hydrogen engines
A81-49949

INTERPLANETARY COMMUNICATION
Computer B (NAS-NAS) communications support
[AD-A104145] N81-33392

INVENTORY MANAGEMENT
Determination of cargo container inventories through logistics simulation --- for air shipment
A81-48380

INVISCID FLOW
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] N81-33192

IONOSPHERIC DISTURBANCES
Errors of phase VLF-navigation systems under conditions of auroral disturbances
A81-47533

J

JAGUAR AIRCRAFT
Fly-by-wire Jaguar
A81-48064

JET AIRCRAFT
Prediction of range and endurance of jet aircraft at constant altitude
A81-47725
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579] N81-33195

JET AIRCRAFT NOISE
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] A81-47595
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] A81-48613
Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] A81-48620
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] A81-48626
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] A81-48636
Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] A81-48638
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] A81-48640
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] A81-48651
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] A81-49728
Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730
Computer program to predict aircraft noise levels
[NASA-TP-1913] N81-33947

JET ENGINE FUELS
Ultrasonic dispersion of particulate high density fuels
[AD-A102771] N81-32290

JET ENGINES
Damping applications in aero-propulsion systems
A81-47999
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] N81-33205

JET EXHAUST
Noise shielding by a hot subsonic jet [AIAA PAPER 81-2018] A81-49731
An improved prediction method for noise generated by conventional profile coaxial jets [AIAA PAPER 81-1991] A81-49743

JET FLAPS
Flight test of the 747-JT9D for airframe and jet-flap interaction noise [AIAA PAPER 81-2037] A81-48629

JET FLOW
Prediction of flyover jet noise spectra [AIAA PAPER 81-2025] A81-48610
Noise radiated from inverted velocity profile jets under simulated flight [AIAA PAPER 81-2026] A81-49729

K

KINETIC THEORY
Estimation of kinetic quantities of flight mechanics with a nonlinear observer [DGLR PAPER 81-067] A81-47562

L

LAMINAR BOUNDARY LAYER
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center [NASA-CR-164843] N81-32121

LAMINAR FLOW
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center [NASA-CR-164843] N81-32121

LAMINATES
Recognizing defects in carbon-fiber-reinforced plastics [DGLR PAPER 81-057] A81-47565
Developing design allowables for composite helicopter structures A81-47811

LANDING GEAR
A formulation of the shimmy problem for swiveling wheels A81-47268
Influence of landing gear flexibility on aircraft performance during ground roll A81-49375

LANDING SIMULATION
Simulation of Microwave Landing System A81-48368
Realization of a method of extremal targeting in a problem of aircraft landing control A81-49943

LARGE SPACE STRUCTURES
Software survey for the avionics test bed --- for large space structures [NASA-CR-161089] N81-32143

LATERAL CONTROL
Simulator evaluation of separation of display parameters in path-following tasks [NASA-TP-1915] N81-33203
Propulsive lateral control nozzle [NASA-CASE-LAR-12136-1] N81-33210

LEADING EDGE FLAPS
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction [NASA-CR-164833] N81-32117

LEADING EDGE SWEEP
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests [NASA-TM-80199] N81-32119

LEADING EDGES
Investigations of vortex formation on wings with cropped leading edges [DGLR PAPER 81-046] A81-47601

LIFE SCIENCES
Ames Research Center publications: A continuing bibliography, 1980 [NASA-TM-81308] N81-34138

LIFT
The use of direct lift control of an aircraft in a guided landing run A81-49928

LIFT AUGMENTATION
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model [NASA-CR-166170] N81-33162

LIFT DEVICES
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds [NASA-CR-3460] N81-33160

LIGHT AIRCRAFT
Laboratory study of efficient add-on treatments for interior noise control in light aircraft [AIAA PAPER 81-1969] A81-48618
Performance prediction for light airplanes A81-49374

LIGHTING EQUIPMENT
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility [AD-A103191] N81-33175

LININGS
Development of an analytical technique for the optimization of jet engine and duct acoustic liners [NASA-CR-164872] N81-33205
Noise suppression characteristics of peripherally segmented duct liners [NASA-TP-1904] N81-33946

LIQUID ATOMIZATION
Droplet breakup regimes and criteria for their existence A81-48079

LOAD TESTS
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979 A81-47801
Developing design allowables for composite helicopter structures A81-47811
Cost-effective mechanical property characterization A81-47813

LOGISTICS MANAGEMENT
Determination of cargo container inventories through logistics simulation --- for air shipment A81-46380
A study of the factors affecting productivity at the Naval Air Rework Facilities [AD-A103783] N81-33134
A prescriptive model for resource allocation at the intermediate level engine facility [AD-A103785] N81-33135
Development of maintenance metrics to forecast resource demands of weapon systems [AD-A104089] N81-33136

LONGITUDINAL CONTROL
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear [NASA-TM-83188] N81-33211

LONGITUDINAL STABILITY
Application of reduced natural longitudinal stability in the Airbus program [DGLR PAPER 81-062] A81-47609

LOW SPEED
Stability and flutter analysis of turbine blades at low speed A81-47959

M

MAINTAINABILITY
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience N81-33141

MAN MACHINE SYSTEMS
The control anticipation parameter for augmented aircraft [AD-A102626] N81-32152

MANAGEMENT PLANNING
Development of maintenance metrics to forecast resource demands of weapon systems [AD-A104089] N81-33136

MANNED SPACE FLIGHT
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981 [IAF PAPER 81-251] A81-47425

MARINE PROPULSION
Operational characteristics comparison /ACV and SES/ [AIAA PAPER 81-2064] A81-48401

MARINE TRANSPORTATION
Published results of the program of university research. Transportation research results [PB81-210130] N81-34108

MATHEMATICAL MODELS
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3 [AD-A102612] N81-32124
Simplified off-design performance model of a day turbofan engine cycle [NASA-TM-83204] N81-33206

MATHEMATICAL PROGRAMMING
Structural synthesis - Its genesis and development A81-49076

MAXIMUM LIKELIHOOD ESTIMATES
System identification for controlled aircraft --- maximum likelihood estimates, parameter identification N81-33132

MEAN SQUARE VALUES
Choice of optimal parameters of a gyrovertical on the basis of a standard program A81-48744

MEASURING INSTRUMENTS
Instrumentation for measurement of flow properties on a swept wing in flight [DGLR PAPER 81-034] A81-47585

MECHANICAL PROPERTIES
Cost-effective mechanical property characterization A81-47813

MEDITERRANEAN SEA
Design for maximum effectiveness in the Navy role N81-33154

METALLIZING
A process for protecting gas turbine blade cooling passages against degradation A81-49209

MICROCOMPUTERS
COMLINK - A communications/EW analytical and modeling tool A81-48547

MICROWAVE LANDING SYSTEMS
Simulation of Microwave Landing System A81-48368
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment [RTCA/DO-177] N81-32133
Characteristics of a digital filter for a precision DME system in microwave landing systems [PUB-43-1980] N81-32136

MILITARY AIR FACILITIES
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems N81-33142

MILITARY AIRCRAFT
A new approach to weapon separation aerodynamics [AIAA PAPER 81-1654] A81-48416

MILITARY HELICOPTERS
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design [AGARD-CP-313] N81-33137
Incidents of problems in setting to work on the conceptual design of helicopters N81-33138
Applications of composite materials for the construction of military helicopters N81-33147
Advancing blade concept helicopter mission capabilities N81-33151
The consequences of certain operational requirements on the conceptual design of combat helicopters N81-33153
Design for maximum effectiveness in the Navy role N81-33154
The impact of operational requirements on the compromise of desired features in rotorcraft design N81-33155

MILITARY OPERATIONS
More fight for the Fighting Falcon A81-49075
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design [AGARD-CP-313] N81-33137
Vertical lift capabilities for the 80's and 90's N81-33139
Ten years of US Marine Corps Harrier operations N81-33140
Controls and displays for all-weather operation of helicopters N81-33145

MILITARY TECHNOLOGY
Combat cockpit design A81-49173
US military V/STOL: Who needs it? Wants it? Can afford it? N81-33156

MISSILE CONTROL
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics [DGLR PAPER 81-047] A81-47622

MIXERS
Mixer nozzle aeroacoustic characteristics for the energy efficient engine [AIAA PAPER 81-1994] A81-48639

MODAL RESPONSE
Damage recognition and localization by means of differential modal analysis [DGLR PAPER 81-056] A81-47603

N

NASA PROGRAMS
Ames Research Center publications: A continuing bibliography, 1980 [NASA-TM-81308] N81-34138

NAVIGATION AIDS
Errors of phase VLF-navigation systems under conditions of auroral disturbances A81-47533
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy [DGLR PAPER 81-066] A81-47616
Ten years activity in the area of flight control for helicopters at night and in bad weather [DGLR PAPER 81-064] A81-47620

NAVY
A study of the factors affecting productivity at the Naval Air Rework Facilities [AD-A103783] N81-33134

NEAR FIELDS
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets [AIAA PAPER 81-2022] A81-48606

NIGHT FLIGHTS (AIRCRAFT)
Ten years activity in the area of flight control for helicopters at night and in bad weather [DGLR PAPER 81-064] A81-47620
Flight evaluation of the STOL flare and landing during night operations [NASA-TM-81312] N81-32151

NOISE GENERATORS
The role of the helical jet mode in aerodynamic noise generation [AIAA PAPER 81-1963] A81-48607
Flight test of the 747-JT9D for airframe and jet-flap interaction noise [AIAA PAPER 81-2037] A81-48629

NOISE MEASUREMENT
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation [AIAA PAPER 81-2007] A81-48640
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies [AIAA PAPER 81-2028] A81-48647
Flight effects on supersonic convergent-divergent nozzle jet noise [AIAA PAPER 81-2027] A81-49728
Noise radiated from inverted velocity profile jets under simulated flight [AIAA PAPER 81-2026] A81-49729

Flight test of a pure-tone acoustic source --- aircraft noise
[NASA-TP-1898] N81-33945
Helicopter noise analysis: Round-robin test
[AD-A103724] N81-33948
NOISE PREDICTION (AIRCRAFT)
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] A81-47595
Trailing edge noise prediction from measured surface pressures
A81-48395
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] A81-48602
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] A81-48606
The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] A81-48607
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] A81-48610
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] A81-48618
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] A81-48626
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] A81-48635
Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] A81-48638
Prediction method for aeroacoustic loads on under the wing blown flaps
[AIAA PAPER 81-2038] A81-48644
High bypass ratio engine noise component separation by coherence technique
[AIAA PAPER 81-2054] A81-48653
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1951] A81-49743
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] N81-32966
Computer program to predict aircraft noise levels
[NASA-TP-1913] N81-33987
NOISE PROPAGATION
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] A81-48602
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] A81-48613
Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] A81-48620
Flight test of a pure-tone acoustic source --- aircraft noise
[NASA-TP-1898] N81-33945
NOISE REDUCTION
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] A81-48602
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] A81-48608
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] A81-48615
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] A81-48618
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] A81-48635
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] A81-48639
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] A81-48647
Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] A81-49731
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] N81-32147
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] N81-33205
Noise suppression characteristics of peripherally segmented duct liners
[NASA-TP-1904] N81-33946
NOISE SPECTRA
Trailing edge noise prediction from measured surface pressures
A81-48395
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] A81-48610
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] A81-48625
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] A81-48636
Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] A81-48638
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] A81-48651
NONDESTRUCTIVE TESTS
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] A81-47565
High peak energy shaped-pulse electromagnetic crack detection
A81-47785
NONLINEAR SYSTEMS
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
A81-48333
NONUNIFORM FLOW
Damping of turbomachine blade variations by subsonic flow
A81-47957
NOZZLE DESIGN
Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines
[AIAA PAPER 81-1358] A81-49976
NOZZLE FLOW
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] A81-49979
NOZZLE GEOMETRY
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] A81-48651
NUCLEAR WEAPONS
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] N81-33173
NUMERICAL ANALYSIS
On the numerical analysis of stall flutter in turbine cascade
A81-47963
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] N81-33205
NUMERICAL CONTROL
Development considerations for real-time aircraft/avionic distributed computer control systems
A81-48376

Reliability validation of systems for life-critical applications
A81-48559

NUMERICAL FLOW VISUALIZATION
Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks
A81-48351

O

OBSERVABILITY (SYSTEMS)
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] A81-47562

OCEANOGRAPHY
Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49378

ONBOARD DATA PROCESSING
Characteristics of a digital filter for a precision DME system in microwave landing systems
[FUB-43-1980] N81-32136

ONBOARD EQUIPMENT
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] A81-47612

OPERATING COSTS
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] N81-33190

OPTICAL MEASURING INSTRUMENTS
Probe protection in camera/model visual systems --- for helicopter flight simulators
A81-48359

OPTICAL RADAR
Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49378

OPTIMAL CONTROL
Application of optimal control and estimation to autopilot and autothrottle systems
A81-48371
Model following control of gas turbine engines
A81-49900
Realization of a method of extremal targeting in a problem of aircraft landing control
A81-49943

OPTIMIZATION
Choice of optimal parameters of a gyrovertical on the basis of a standard program
A81-48744
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] N81-33205

OSCILLATING FLOW
Numerical experiments on unsteady flows through vibrating cascades
A81-47961

P

PANELS
Transient vibrations of elastic panels due to the impact of shock waves
A81-48385

PARALLEL PROCESSING (COMPUTERS)
The array processor - A real-time simulator
A81-48328

PARAMETER IDENTIFICATION
Design of optimal inputs for the identification of characteristics of aircraft flights --- parameter identification control theory
N81-33131
System identification for controlled aircraft --- maximum likelihood estimates, parameter identification
N81-33132

PARAMETERIZATION
Parametric synthesis of an automatic system for flight-vehicle stabilization
A81-49940

PARTICLE SIZE DISTRIBUTION
Ultrasonic dispersion of particulate high density fuels
[AD-A102771] N81-32290

PASSENGER AIRCRAFT
Commercial airliners - Design and flight operation
A81-49575

PATTERN METHOD (FORECASTING)
Computer graphics applications
[PB81-215246] N81-33188

PATTERN RECOGNITION
Aircraft recognition by means of monostatic radar
A81-47142
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
A81-47143

PAVEMENTS
Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] N81-32156

PERFORMANCE PREDICTION
Prediction of range and endurance of jet aircraft at constant altitude
A81-47725
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] A81-48401
Performance prediction for light airplanes
A81-49374
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] N81-33191

PERFORMANCE TESTS
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] A81-49732
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] N81-32133

PHASED ARRAYS
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] N81-33390
Tent shaped phased array
[AD-A103927] N81-33393

PILOT TRAINING
The evolution of real-time digital simulation of aircraft for training applications
A81-48358
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] N81-32164

PIPELINING (COMPUTERS)
The array processor - A real-time simulator
A81-48328

PITOT TUBES
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] N81-33204

PLANNING
US military V/STOL: Who needs it? Wants it? Can afford it?
N81-33156

PLUMES
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] A81-49979

POLYMER CHEMISTRY
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] N81-32273

POLYMER MATRIX COMPOSITE MATERIALS
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
A81-47801

POSITION (LOCATION)
Hyperbolic origins --- of radio position-fixing systems
A81-47842
An analytical solution of the two star sight problem of celestial navigation
A81-48121

POSITION ERRORS
Errors of phase VLF-navigation systems under conditions of auroral disturbances
A81-47533

POWERED LIFT AIRCRAFT
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] N81-33162

A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept [AD-A103579] N81-33195

PRECISION
Characteristics of a digital filter for a precision DME system in microwave landing systems [FUB-43-1980] N81-32136

PREDICTION ANALYSIS TECHNIQUES
Prediction method for aeroacoustic loads on under the wing blown flaps [AIAA PAPER 81-2038] A81-48644

PRESSURE DISTRIBUTION
Measured pressure distributions and shock shapes on a simple delta wing A81-48479

PRESSURE MEASUREMENTS
Onboard procedure for the measurement of wind shear gradients [DGLR PAPER 81-063] A81-47612
Trailing edge noise prediction from measured surface pressures A81-48395
Development of an instrument for the accurate measurement of aircraft airspeed and altitude [AD-A103421] N81-33204

PRESSURE OSCILLATIONS
Contributions to the theory of side edge flap noise [AIAA PAPER 81-2036] A81-48625

PROBABILITY THEORY
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue A81-47888
Computer graphics applications [PB81-215246] N81-33188

PRODUCTION ENGINEERING
Design of production processes for flight-vehicle engines --- Russian book A81-49475

PRODUCTIVITY
A study of the factors affecting productivity at the Naval Air Rework Facilities [AD-A103783] N81-33134

PROGRAM VERIFICATION (COMPUTERS)
Optimization of simulation models for avionics software verification A81-48373

PROJECT MANAGEMENT
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase [DGLR PAPER 81-027] A81-47563

PROPELLER BLADES
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers [AIAA PAPER 81-2005] A81-49732
Design of a slot height distribution for increased hover control power on a circulation control rotor [AD-A103535] N81-33194

PROPELLERS
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale [AIAA PAPER 81-2004] A81-48634
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers [NASA-TM-83135] N81-32966

PROPULSION SYSTEM PERFORMANCE
Simplified off-design performance model of a day turbofan engine cycle [NASA-TM-83204] N81-33206

PROPULSIVE EFFICIENCY
Operational characteristics comparison /ACV and SES/ [AIAA PAPER 81-2064] A81-48401
Propulsion energy for tomorrow's aviation A81-49161

PROTECTIVE COATINGS
A process for protecting gas turbine blade cooling passages against degradation A81-49209

Q

QUALITY CONTROL
Damage recognition and localization by means of differential modal analysis [DGLR PAPER 81-056] A81-47603

QUIET ENGINE PROGRAM
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance [AIAA PAPER 81-2049] A81-48621
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system [NASA-CR-165185] N81-32147

R

RADAR CROSS SECTIONS
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes A81-47143

RADAR MEASUREMENT
Adaptive features and measurement requirements for advanced surveillance radars A81-48544

RADAR NAVIGATION
A simple radar for navigation accuracy measurements A81-47844

RADAR TARGETS
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes A81-47143
Adaptive features and measurement requirements for advanced surveillance radars A81-48544

RADAR TRACKING
Aircraft recognition by means of monostatic radar A81-47142

RADIO DIRECTION FINDERS
Hyperbolic origins --- of radio position-fixing systems A81-47842

RADIO NAVIGATION
Errors of phase VLF-navigation systems under conditions of auroral disturbances A81-47533

RAIL TRANSPORTATION
Published results of the program of university research. Transportation research results [PB81-210130] N81-34108
Dual-powered Gas Turbine/Electric (GT/E) commuter rail cars: Test, evaluation and economics [PB81-211757] N81-34109

RANDOM LOADS
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts [DGLR PAPER 81-065A] A81-47552

RANGE (EXTREMES)
Prediction of range and endurance of jet aircraft at constant altitude A81-47725

REAL TIME OPERATION
The array processor - A real-time simulator A81-48328
Function generation techniques --- in real time hybrid simulations A81-48329
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design A81-48333
Development considerations for real-time aircraft/avionic distributed computer control systems A81-48376

RECONNAISSANCE AIRCRAFT
Twin-rotor patrol airship flying model design rationale [AD-A102575] N81-32141

REDUNDANCY
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy [DGLR PAPER 81-066] A81-47616

REFRIGERATING MACHINERY
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
A81-48196

REGENERATORS
New developments in compact plate-fin heat exchangers
A81-48062

REGIONAL PLANNING
Computer graphics applications
[PB81-215246] N81-33188

REINFORCED SHELLS
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method
A81-48097

RELIABILITY ENGINEERING
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] A81-47564
Reliability validation of systems for life-critical applications
A81-48559

REMOTE SENSING
Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49378

REMOTELY PILOTED VEHICLES
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] A81-49732

RESEARCH AND DEVELOPMENT
The role of the research simulator in the systems development of rotorcraft
N81-33146

RESERVES
The relation between aircraft fuel reserves and navigation
A81-47843

RESONANT FREQUENCIES
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] A81-47603

RESONANT VIBRATION
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method
A81-48097
Finite strip analysis of singly curved skin-stringer structures
A81-48390

RESOURCES MANAGEMENT
A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] N81-33135

REYNOLDS NUMBER
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] A81-48613

RIVETED JOINTS
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] A81-47564

ROCKET ENGINES
Design of production processes for flight-vehicle engines --- Russian book
A81-49475

RODS
Geometrically nonlinear theory for calculating thin rods of a wing profile
A81-49935
Strength calculation of thin-wall rods of significant taper
A81-49937

ROTARY WING AIRCRAFT
Twin-rotor patrol airship flying model design rationale
[AD-A102575] N81-32141
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] N81-33137

ROTARY WINGS
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] A81-47554
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] A81-48615
A full-scale wind tunnel investigation of a helicopter bearingless main rotor --- Ames 40 by 80 Wind Tunnel
[NASA-TM-81321] N81-32137
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] N81-32154
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] N81-33194

ROTOR AERODYNAMICS
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] A81-47554
Stability and flutter analysis of turbine blades at low speed
A81-47959
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] N81-32154

ROTOR BLADES (TURBOMACHINERY)
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] A81-48628

ROTOR SPEED
The effect of vane-frame design on rotor-stator interaction noise
[AIAA PAPER 81-2034] A81-48627

ROTORCRAFT AIRCRAFT
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] N81-33137
The role of the research simulator in the systems development of rotorcraft
N81-33146

ROUTES
Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System
[AD-A104150] N81-33184

RUNWAY LIGHTS
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] N81-32151

RUNWAYS
Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] N81-32156
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] N81-32273
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] N81-33214
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] N81-33217

S

SCALE MODELS
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] N81-32124

SCREENS
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
A81-49948

SEAT BELTS
Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] N81-33177

SEMISPAN MODELS
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] N81-32128

SEPARATED FLOW
The calculation of separated flow at helicopter bodies
[DGLR PAPER 81-026] A81-47555
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] A81-47601

SERVICE LIFE
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] A81-47564

SHARP LEADING EDGES
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] N81-33160

SHIELDING
Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] A81-49731

SHOCK TUBES
Droplet breakup regimes and criteria for their existence
A81-48079

SHOCK WAVE INTERACTION
Transient vibrations of elastic panels due to the impact of shock waves
A81-48385

SHOCK WAVE PROFILES
Measured pressure distributions and shock shapes on a simple delta wing
A81-48479

SHOCK WAVES
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] N81-33192

SHORT TAKEOFF AIRCRAFT
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] N81-32151
V/STOL aircraft technology in Canada
N81-33152
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] N81-33162
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579] N81-33195

SIGNAL ANALYSIS
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
A81-47143

SIGNAL PROCESSING
High bypass ratio engine noise component separation by coherence technique
[AIAA PAPER 81-2054] A81-48653
Design of optimal inputs for the identification of characteristics of aircraft flights --- parameter identification control theory
N81-33131

SKEWNESS
The effect of the skewness of the skin panels on stresses in conical wings
A81-49930

SKIN (STRUCTURAL MEMBER)
Finite strip analysis of singly curved skin-stringer structures
A81-48390
The effect of the skewness of the skin panels on stresses in conical wings
A81-49930

SLOTS
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] N81-33194

SLURRY PROPELLANTS
Ultrasonic dispersion of particulate high density fuels
[AD-A102771] N81-32290

SOIL MECHANICS
Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] N81-32156

SOLAR POWERED AIRCRAFT
Solar powered aircraft
[NASA-CASE-LAR-12615-1] N81-32130

SONIC BOOMS
Transient vibrations of elastic panels due to the impact of shock waves
A81-48385

SOUND FIELDS
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736

SOUND INTENSITY
Computer program to predict aircraft noise levels
[NASA-TP-1913] N81-33947

SOUND PRESSURE
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] A81-48608
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] A81-48626

SOUND PROPAGATION
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736

SOUND RANGING
Hyperbolic origins --- of radio position-fixing systems
A81-47842

SOUND TRANSMISSION
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] A81-48608

SOUND WAVES
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] A81-48602

SPACECRAFT COMMUNICATION
Tent shaped phased array
[AD-A103927] N81-33393

SPACECREWS
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] A81-47425

SPANLOADER AIRCRAFT
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] N81-32119

SPANWISE BLOWING
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] N81-33162

SPEED INDICATORS
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] N81-33204

SPHERICAL COORDINATES
An analytical solution of the two star sight problem of celestial navigation
A81-48121

SPOILERS
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] N81-33211

STABILITY DERIVATIVES
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] N81-32124

STANDARDIZATION
Helicopter noise analysis: Round-robin test
[AD-A103724] N81-33948

STANDARDS
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] N81-32133

STAR TRACKERS
An analytical solution of the two star sight problem of celestial navigation
A81-48121

STATIC PRESSURE
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] N81-33204
STATIC TESTS
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] A81-48637
STOCHASTIC PROCESSES
Computer graphics applications
[PB81-215246] N81-33188
STRESS ANALYSIS
Stress concentration in elements of aircraft structures --- Russian book
A81-49471
STRESS CONCENTRATION
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] A81-47601
Stress concentration in elements of aircraft structures --- Russian book
A81-49471
The effect of the skewness of the skin panels on stresses in conical wings
A81-49930
STRESS-STRAIN RELATIONSHIPS
Geometrically nonlinear theory for calculating thin rods of a wing profile
A81-49935
STRINGERS
Finite strip analysis of singly curved skin-stringer structures
A81-48390
STRIP TRANSMISSION LINES
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] N81-33390
STRUCTURAL ANALYSIS
Geometrically nonlinear theory for calculating thin rods of a wing profile
A81-49935
Strength calculation of thin-wall rods of significant taper
A81-49937
Development of an aircraft maneuver load spectrum based on VGH data
[AD-A102750] N81-32142
STRUCTURAL DESIGN
New developments in compact plate-fin heat exchangers
A81-48062
Structural synthesis - Its genesis and development
A81-49076
The Lear Fan 2100
A81-49975
STRUCTURAL DESIGN CRITERIA
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
A81-47801
STRUCTURAL FAILURE
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
A81-47888
STRUCTURAL RELIABILITY
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
A81-47888
STRUCTURAL VIBRATION
A formulation of the shimmy problem for swiveling wheels
A81-47268
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980
A81-47993
STRUTS
A formulation of the shimmy problem for swiveling wheels
A81-47268
SUBSONIC AIRCRAFT
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] A81-48634
SUBSONIC FLOW
Damping of turbomachine blade variations by subsonic flow
A81-47957
Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
A81-48400
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] A81-49731
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
A81-49948
SUBSONIC SPEED
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604
SUCTION
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] N81-32121
SUPERCRITICAL WINGS
Design and construction of a model which is dynamically similar to the A310 wing
[DGLR PAPER 81-035] A81-47556
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] N81-32128
SUPERSONIC AIRCRAFT
Multi-mission STOVL with vectored thrust engines
N81-33149
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] N81-33163
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] N81-33192
SUPERSONIC DIFFUSERS
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] N81-33158
SUPERSONIC FLIGHT
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] A81-49728
SUPERSONIC FLOW
Measured pressure distributions and shock shapes on a simple delta wing
A81-48479
SUPERSONIC JET FLOW
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] A81-48613
SUPERSONIC NOZZLES
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] A81-49728
SUPERSONIC WIND TUNNELS
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] N81-33158
SUPPORTS
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] N81-32124
SURFACE EFFECT SHIPS
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] A81-48401
SURFACE FINISHING
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] N81-33503
SURFACE NAVIGATION
The role of the earth's shape in navigation - An example
A81-48120

SURFACE STABILITY

Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures [AGARD-MAN-10(ENG)] N81-33503

SURVEILLANCE RADAR

Adaptive features and measurement requirements for advanced surveillance radars A81-48544

SWEPT WINGS

Instrumentation for measurement of flow properties on a swept wing in flight [DGLR PAPER 81-034] A81-47585

SWIVELS

A formulation of the shimmy problem for swiveling wheels A81-47268

SYMMETRY

Anti-symmetric elastic properties of composite plates of satin weave cloth [NAL-TR-649T] N81-33238

SYSTEMS ANALYSIS

Multisite testing of the Discrete Address Beacon System (DABS) [AD-A103575] N81-33181

SYSTEMS ENGINEERING

Reliability validation of systems for life-critical applications A81-48559

SYSTEMS SIMULATION

Simulation model to evaluate maintenance strategies for large network of fielded systems A81-48009

Function generation techniques --- in real time hybrid simulations A81-48329

COMLINK - A communications/EW analytical and modeling tool A81-48547

Engine noise source breakdown - Theory, simulation and results [AIAA PAPER 81-2040] A81-48620

T

T-37 AIRCRAFT

Engine requirements for the T-37 trainer aircraft - A simulation study and analysis A81-48379

T-38 AIRCRAFT

Alternate T-38 transparency development. Part 1: Initial analysis and design [AD-A103261] N81-33196

Alternate T-38 transparency development. Part 2: Baseline birdstrike testing [AD-A103262] N81-33197

TABLES (DATA)

Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests [NASA-TM-80199] N81-32119

TAKEOFF

Takeoff and missed approach under the influence of wind shear --- flight safety considerations [TUBS/SFB-58-80-05-01] N81-32131

TARGET DRONE AIRCRAFT

F-100s set to become target drones A81-48067

TARGET RECOGNITION

Aircraft recognition by means of monostatic radar A81-47142

TAXIING

Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland [AD-A103737] N81-33214

TECHNOLOGICAL FORECASTING

Incidents of problems in setting to work on the conceptual design of helicopters N81-33138

TECHNOLOGIES

Design of production processes for flight-vehicle engines --- Russian book A81-49475

TECHNOLOGY ASSESSMENT

More fight for the Fighting Falcon A81-49075

Vertical lift capabilities for the 80's and 90's N81-33139

Historical overview of V/STOL aircraft technology N81-33143

Mission potential of derivatives of the XV-15 tilt rotor research aircraft N81-33150

Advancing blade concept helicopter mission capabilities N81-33151

V/STOL aircraft technology in Canada N81-33152

The impact of operational requirements on the compromise of desired features in rotorcraft design N81-33155

US military V/STOL: Who needs it? Wants it? Can afford it? N81-33156

TECHNOLOGY UTILIZATION

Application of advanced technologies to derivatives of current small transport aircraft [NASA-CR-166197] N81-33190

TELECOMMUNICATION

COMLINK - A communications/EW analytical and modeling tool A81-48547

TENSORS

Surface-oriented coordinates for boundary-layer calculations in the case of general configurations [DGLR PAPER 81-014] A81-47557

TERMINAL GUIDANCE

Realization of a method of extremal targeting in a problem of aircraft landing control A81-49943

THIN AIRFOILS

Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions A81-48480

THIN WALLED SHELLS

Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method A81-48097

THIN WALLS

Geometrically nonlinear theory for calculating thin rods of a wing profile A81-49935

Strength calculation of thin-wall rods of significant taper A81-49937

THIN WINGS

Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen A81-49948

THREE DIMENSIONAL BOUNDARY LAYER

Surface-oriented coordinates for boundary-layer calculations in the case of general configurations [DGLR PAPER 81-014] A81-47557

THRUST AUGMENTATION

Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines [AIAA PAPER 81-1358] A81-49976

THRUST MEASUREMENT

Determination of thrust and throttle-dependent drag for fighter aircraft [AIAA PAPER 81-1692] A81-48417

THRUST VECTOR CONTROL

Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model [AD-A103090] N81-32128

TILT ROTOR AIRCRAFT

Mission potential of derivatives of the XV-15 tilt rotor research aircraft N81-33150

TIME LAG

Time delays in flight simulator visual displays A81-48369

TOWING

Responses to comments of Air Transport Association of America on aircraft towing feasibility study [DE81-029834] N81-33201

TRAILING EDGES

Trailing edge noise prediction from measured surface pressures A81-48395

TRAILING-EDGE FLAPS

Contributions to the theory of side edge flap noise [AIAA PAPER 81-2036] A81-48625

Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] N81-33210

TRAINING SIMULATORS
The evolution of real-time digital simulation of aircraft for training applications
A81-48358

TRANSIENT OSCILLATIONS
Transient vibrations of elastic panels due to the impact of shock waves
A81-48385

TRANSMISSION LOSS
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612

TRANSONIC FLOW
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] A81-47554
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] A81-47622
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] A81-49979
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] N81-32118

TRANSONIC WIND TUNNELS
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase
[DGLR PAPER 81-027] A81-47563
Supplemental calibration of the AEDC-PWT 16 ft transonic tunnel aerodynamic test section
[AD-A102384] N81-32155

TRANSPORT AIRCRAFT
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] N81-33190

TURBINE BLADES
Stability and flutter analysis of turbine blades at low speed
A81-47959
A process for protecting gas turbine blade cooling passages against degradation
A81-49209

TURBINE ENGINES
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
A81-48333

TURBOFAN ENGINES
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
A81-47966
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] A81-48621
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] A81-48628
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] A81-48636
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] N81-32147
Simplified off-design performance model of a day turbofan engine cycle
[NASA-TM-83204] N81-33206

TURBOMACHINERY
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
A81-48196

TURBOPROP AIRCRAFT
The Lear Fan 2100
A81-49975

TURBULENCE EFFECTS
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] A81-47595

TURBULENCE METERS
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] A81-48640

TURBULENT JETS
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] A81-48606
The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] A81-48607

TWISTING
Choice of the optimal angular velocity of the twist of a flight vehicle
A81-49946

TWO DIMENSIONAL FLOW
Numerical experiments on unsteady flows through vibrating cascades
A81-47961

TWO PHASE FLOW
Droplet breakup regimes and criteria for their existence
A81-48079

U

UH-60A HELICOPTER
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
N81-33141

ULTRASONIC FLAW DETECTION
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] A81-47565

UNDER SURFACE BLOWING
Prediction method for aeroacoustic loads on under the wing blown flaps
[AIAA PAPER 81-2038] A81-48644

UNSTEADY FLOW
Numerical experiments on unsteady flows through vibrating cascades
A81-47961
On the numerical analysis of stall flutter in turbine cascade
A81-47963

UPPER SURFACE BLOWING
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] N81-32128
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579] N81-33195

URBAN RESEARCH
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
A81-48847

URBAN TRANSPORTATION
Published results of the program of university research. Transportation research results
[PB81-210130] N81-34108

USER MANUALS (COMPUTER PROGRAMS)
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] N81-32966

USER REQUIREMENTS
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] N81-32158

V

V/STOL AIRCRAFT
Vertical lift capabilities for the 80's and 90's
N81-33139
Ten years of US Marine Corps Harrier operations
N81-33140
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
N81-33142
Historical overview of V/STOL aircraft technology
N81-33143
Recent progress in V/STOL aircraft technology
N81-33144

V/STOL aircraft technology in Canada
N81-33152
US military V/STOL: Who needs it? Wants it? Can afford it?
N81-33156
VANES
The effect of vane-frame design on rotor-stator interaction noise
[AIAA PAPER 81-2034] A81-48627
VARIABLE PITCH PROPELLERS
Performance prediction for light airplanes
A81-49374
VEHICLE WHEELS
A formulation of the shimmy problem for swiveling wheels
A81-47268
VERTICAL LANDING
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] N81-33199
VERTICAL TAKEOFF AIRCRAFT
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] N81-33199
VERY LOW FREQUENCIES
Errors of phase VLF-navigation systems under conditions of auroral disturbances
A81-47533
VIBRATION DAMPING
Damping of turbomachine blade variations by subsonic flow
A81-47957
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980
A81-47993
Damping applications in aero-propulsion systems
A81-47999
VIBRATION ISOLATORS
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] A81-48608
VIBRATION MODE
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] A81-47603
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
A81-47966
Finite strip analysis of singly curved skin-stringer structures
A81-48390
VISIBILITY
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] N81-33175
VOICE COMMUNICATION
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] N81-33182
VORTEX BREAKDOWN
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] A81-47622
VORTEX FLAPS
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164833] N81-32117
VORTEX SHEDDING
The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] A81-48607
VORTICES
Damping of turbomachine blade variations by subsonic flow
A81-47957
VULNERABILITY
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
N81-33141
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
N81-33142

Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] N81-33200

W

WAKES
The calculation of separated flow at helicopter bodies
[DGLR PAPER 81-026] A81-47555
Damping of turbomachine blade variations by subsonic flow
A81-47957
WEAPON SYSTEMS
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] A81-48416
WEAPONS DELIVERY
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] N81-32164
WEATHER STATIONS
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
A81-48847
WEAVING
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] N81-33238
WEIGHT REDUCTION
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] A81-47551
Structural synthesis - Its genesis and development
A81-49076
WELDED STRUCTURES
Sliding-seal electron beam slot welding of an aircraft wing closure beam
A81-48142
WELDING MACHINES
Sliding-seal electron beam slot welding of an aircraft wing closure beam
A81-48142
WIND MEASUREMENT
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] A81-47612
WIND SHEAR
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] A81-47612
Takeoff and missed approach under the influence of wind shear --- flight safety considerations
[TUBS/SFB-58-80-05-01] N81-32131
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83166] N81-33211
WIND TUNNEL APPARATUS
Digital simulation for energy conservation in a large wind tunnel plant system
A81-48003
Wind Tunnels of NASA
[NASA-SP-440] N81-32153
WIND TUNNEL CALIBRATION
Supplemental calibration of the AEDC-PWT 16 ft transonic tunnel aerodynamic test section
[AD-A102384] N81-32155
WIND TUNNEL DRIVES
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] N81-33158
WIND TUNNEL MODELS
The half-model technique in the wind tunnel and its employment in the development of the Airbus family
[DGLR PAPER 81-118] A81-47587
WIND TUNNEL TESTS
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase
[DGLR PAPER 81-027] A81-47563
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] A81-47595
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604

Digital simulation for energy conservation in a
large wind tunnel plant system
A81-48003

Effects of blade-vane ratio and rotor-stator
spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] A81-48628

Comparative acoustic wind-tunnel measurements and
theoretical correlations on subsonic aircraft
propellers at full-scale and model-scale
[AIAA PAPER 81-2004] A81-48634

Comparison of computational and experimental jet
effects
[AIAA PAPER 81-1492] A81-49979

Wind-tunnel studies of advanced cargo aircraft
concepts --- leading edge vortex flaps for drag
reduction
[NASA-CR-164833] N81-32117

On the spanwise uniformity of wind tunnel test
data of transonic airfoils
[NAL-TR-665] N81-32118

Effect of sweep and aspect ratio on the
longitudinal aerodynamics of a spanloader wing
in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] N81-32119

Sting interference effects on the static dynamic
and base pressure measurements of the standard
dynamics model aircraft at Mach numbers 0.3
through 1.3
[AD-A102612] N81-32124

Recent progress in V/STOL aircraft technology
N81-33144

Experimental and theoretical study of three
interacting, closely-spaced, sharp-edged 60 deg
delta wings at low speeds
[NASA-CR-3460] N81-33160

Wind tunnel testing of a windshield material or
supersonic aircraft
[AD-A103383] N81-33163

WIND TUNNELS

Wind Tunnels of NASA
[NASA-SP-440] N81-32153

WINDSHIELDS

Wind tunnel testing of a windshield material or
supersonic aircraft
[AD-A103383] N81-33163

WING FLAPS

Prediction method for aeroacoustic loads on under
the wing blown flaps
[AIAA PAPER 81-2038] A81-48644

WING LOADING

Active gust- and maneuver load control concepts,
taking into account, as example, the Airbus
A300. I - Design of a controller in the temporal
domain for the alleviation of gust loads and the
control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] A81-47552

Active gust- and maneuver load reduction concepts,
taking into account, as an example, the Airbus
A300. II - Design of a controller for gust and
maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] A81-47553

WING OSCILLATIONS

Evaluation of two-dimensional subsonic oscillatory
airforce coefficients and loading distributions
A81-48480

WING PANELS

Sliding-seal electron beam slot welding of an
aircraft wing closure beam
A81-48142

The effect of the skewness of the skin panels on
stresses in conical wings
A81-49930

WING PROFILES

Surface-oriented coordinates for boundary-layer
calculations in the case of general configurations
[DGLR PAPER 81-014] A81-47557

Geometrically nonlinear theory for calculating
thin rods of a wing profile
A81-49935

WING ROOTS

Solar powered aircraft
[NASA-CASE-LAR-12615-1] N81-32138

WING TIP VORTICES

Investigations of vortex formation on wings with
cropped leading edges
[DGLR PAPER 81-046] A81-47601

WINGS

Investigation of unsteady airloads on wings with
oscillating control for active control purposes
[AGARD-R-699] N81-33161

Evaluation of pressure and thermal data from a
wind tunnel test of a large-scale, powered, STOL
fighter model
[NASA-CR-166170] N81-33162

A flight test evaluation of the Ball-Bartoe
jetwing propulsive lift concept
[AD-A103579] N81-33195

Y

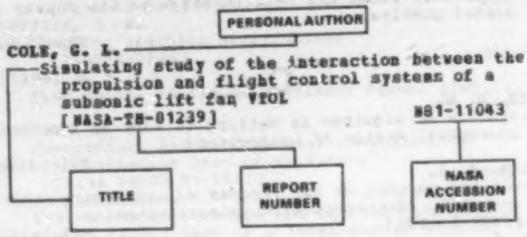
YC-14 AIRCRAFT

Prediction of jet exhaust noise on airframe
surfaces during flight
[AIAA PAPER 81-2035] A81-48626

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 143)* JANUARY 1982

Typical Personal Author Index Listing


PERSONAL AUTHOR
COLE, G. L.
Simulating study of the interaction between the propulsion and flight control systems of a subsonic lift fan VTOL
[NASA-TM-81239]
N81-11043
TITLE
REPORT NUMBER
NASA ACCESSION NUMBER

Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g. N81-11043. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ADACHI, T.
On the numerical analysis of stall flutter in turbine cascade
A81-47963

ADAMS, J. J.
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] N81-33203

ADSIT, N. R.
Development of advanced interceptor substructural material
[AD-A103836] N81-33241

AHUJA, K. K.
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] A81-48640

AKAI, T. J.
Stability and flutter analysis of turbine blades at low speed
A81-47959

AKIMOV, V. N.
Propulsion energy for tomorrow's aviation
A81-49161

ALASHEEV, O. IU.
The use of direct lift control of an aircraft in a guided landing run
A81-49928

ALLTON, J.
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103763] N81-33134

AMICO, G. V.
The evolution of real-time digital simulation of aircraft for training applications
A81-48358

ANDERSON, S. B.
Historical overview of V/STOL aircraft technology
N81-33143

ANDRISANI, D., II
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] N81-33199

ARCHER, N. J.
A process for protecting gas turbine blade cooling passages against degradation
A81-49209

ATASSI, H.
Stability and flutter analysis of turbine blades at low speed
A81-47959

ATTWOOLL, V. W.
The relation between aircraft fuel reserves and navigation
A81-47843

AUGUSTINE, N. R.
Vertical lift capabilities for the 80's and 90's
N81-33139

AYATI, M. B.
Forecast of future aviation fuels: The model
[NASA-CR-165486] N81-32956

B

BAALS, D. D.
Wind Tunnels of NASA
[NASA-SP-440] N81-32153

BAIAZITOV, F. F.
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method
A81-48097

BALALAEV, V. A.
Damping of turbomachine blade variations by subsonic flow
A81-47957

BARMIN, V. P.
Hydrogen engines
A81-49949

BARROIS, W. G.
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage
[AGARD-MAN-10(ENG)] N81-33503

BARTON, C. K.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] A81-48618

BASHFORTH, S.
The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] A81-49727

BATENBURG, J.
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] N81-32164

BECKER, J.
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] A81-47552

BEILMAN, J. L.
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] N81-33199

BELLAVITA, P.
Design for maximum effectiveness in the Navy role
N81-33154

BELLOCCHIO, P. J.
Probe protection in camera/model visual systems
A81-48359

BELOGLAZOV, M. I.
Errors of phase VLF-navigation systems under conditions of auroral disturbances
A81-47533

BELOTSERKOVSKII, S. M.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
A81-47962

BENNING, S. L.
Optimization of simulation models for avionics software verification
A81-48373

BENT, R. D.
Aircraft electricity and electronics /3rd edition/
A81-49877
BERNARD, S. N.
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103783] N81-33134
BERT, C. W.
Prediction of range and endurance of jet aircraft at constant altitude
A81-47725
BERTELRUD, A.
Instrumentation for measurement of flow properties on a swept wing in flight
[DGLR PAPER 81-034] A81-47505
BEUCK, G.
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] A81-47553
BEZIAC, G.
Applications of composite materials for the construction of military helicopters
N81-33147
BIRKEN, J. A.
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] N81-33200
BISCHOFF, D. E.
The control anticipation parameter for augmented aircraft
[AD-A102626] N81-32152
BOGOMOLOV, A. I.
Parametric synthesis of an automatic system for flight-vehicle stabilization
A81-49940
BORISOV, A. A.
Droplet breakup regimes and criteria for their existence
A81-48079
BRENNENSTUHL, U.
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] A81-47601
BREWER, A. C.
Optimization of simulation models for avionics software verification
A81-48373
BROOKS, T. F.
Trailing edge noise prediction from measured surface pressures
A81-48395
BROWN, J. W.
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] A81-47425
BROWN, N. E.
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] A81-47425
BROWNE, D. H., JR.
Adaptive features and measurement requirements for advanced surveillance radars
A81-48544
BROWNIE, R. B.
Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] N81-32156
BSCHORR, O.
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] A81-47603
BURMAN, Z. I.
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method
A81-48097
BURRIN, R. H.
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] A81-48640
BUTLER, R. W.
Captive aircraft testing at high angles of attack
[AD-A103108] N81-32140
BUTZEL, L. M.
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] A81-48626
BYRNES, J. M.
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
N81-33142

C

CANNER, W. G.
Incidents of problems in setting to work on the conceptual design of helicopters
N81-33130
CAPELLE, R. A.
Published results of the program of university research. Transportation research results
[PB81-210130] N81-34108
CENKO, A.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] A81-48416
CHAMBERLIN, R.
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] A81-48639
CHAMIS, C. C.
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
A81-47801
CHASSAY, G.
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
A81-47143
CHESTERFIELD, B. P.
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials
[AD-A103191] N81-33175
CHRISTOPHER, J. P.
Captive aircraft testing at high angles of attack
[AD-A103108] N81-32140
CHUANG, C. A.
Tent shaped phased array
[AD-A103927] N81-33393
CLARK, B. J.
Computer program to predict aircraft noise levels
[NASA-TP-1913] N81-33947
CLARK, T. D., JR.
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
A81-48379
CLARY, J. B.
Reliability validation of systems for life-critical applications
A81-48559
CLAYTON, K. I.
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] N81-33196
CMRULSKI, D. D.
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control
[AIAA PAPER 81-2049] A81-48621
COBB, J. M.
Software survey for the avionics test bed
[NASA-CR-161089] N81-32143
COE, P. L., JR.
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] N81-33210
COLEBY, J. R.
Transient vibrations of elastic panels due to the impact of shock waves
A81-48305
CONE, D. E.
Determination of cargo container inventories through logistics simulation
A81-48380
CONNOLLY, E.
A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] N81-33135
COOMBS, M. G.
New developments in compact plate-fin heat exchangers
A81-48062

COPES, R. E., III
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] N81-33183

CORLISS, W. R.
Wind Tunnels of NASA
[NASA-SP-440] N81-32153

COUTURE, N. R.
Computer graphics applications
[PB81-215246] N81-33188

CRANE, D. F.
Time delays in flight simulator visual displays A81-48369

CROCKER, M. J.
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612

CROSTHWAIT, E. L.
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] N81-33162

CUESTA ALVAREZ, M.
Commercial airliners - Design and flight operation A81-49575

CYRAN, F. B.
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] N81-32124

D

DANIELS, P. D.
Application of optimal control and estimation to autopilot and autothrottle systems A81-48371

DARDANO, R. V.
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] N81-33183

DARYNOV, IU. P.
Automation of air traffic control processes A81-49462

DAVIS, J. W.
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] N81-33181

DEAN, J. G.
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] N81-33173

DECKERT, W.
Recent progress in V/STOL aircraft technology N81-33144

DEEL, A.
The role of the research simulator in the systems development of rotorcraft N81-33146

DELUCIEN, A. G.
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] N81-32158

DEPPE, D.
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604

DILLON, R. D.
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials
[AD-A103191] N81-33175

DONNELLY, R. P.
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] A81-48634

DUBREUIL, J. P.
The consequences of certain operational requirements on the conceptual design of combat helicopters N81-33153

DUNAEV, A. V.
Damping of turbomachine blade variations by subsonic flow A81-47957

DYER, R. D.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] A81-48416

E

EATON, R. A.
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] N81-33214

EKCHIAN, L.
Adaptive features and measurement requirements for advanced surveillance radars A81-48544

EMMELHAINZ, L. W.
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis A81-48379

ENEY, J. A.
Twin-rotor patrol airship flying model design rationale
[AD-A102575] N81-32141

ENGLISH, J. M.
Forecast of future aviation fuels: The model
[NASA-CR-165486] N81-32956

F

FAERY, H. F., JR.
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] N81-33160

FARASSAT, F.
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] N81-32966

FEDOROV, R. M.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity A81-47962

FISCHER, B.
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] A81-47609

FISCHER, R. W.
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] N81-33191

FISHER, M. J.
Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] A81-48620

FLEISCHER, C. C.
Finite strip analysis of singly curved skin-stringer structures A81-48390

FOGEL, P.
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] N81-32147

FORD, R. A. J.
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans A81-47966

FOSTER, J. L.
Unrepresentative temperatures at a first-order meteorological station Washington National Airport A81-48847

FRANKLIN, J. A.
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] N81-32151

FRANZ, H. P.
The half-model technique in the wind tunnel and its employment in the development of the Airbus family
[DGLR PAPER 81-118] A81-47587

G

GALLAGHER, J. A.
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] A81-48613
GANGSAAS, D.
Application of optimal control and estimation to autopilot and autothrottle systems
A81-48371
GAULT, J. W.
Reliability validation of systems for life-critical applications
A81-48559
GERMAN, J. E.
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
A81-47888
GEDDES, J. P.
The Lear Fan 2100
A81-49975
GEHLHAAR, U.
Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49378
GEISSLER, W.
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] N81-33161
GELFAND, B. E.
Droplet breakup regimes and criteria for their existence
A81-48079
GERMAN, J.
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] N81-32147
GILL, B. J.
A process for protecting gas turbine blade cooling passages against degradation
A81-49209
GLASER, F. W.
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] A81-48628
GLIEBE, P. R.
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] A81-48639
GMELIN, B. L.
The impact of helicopter flight mechanics on mission performance
N81-33148
GODFREY, R.
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] N81-33214
GODWIN, D.
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] N81-32144
GOGLIA, G. L.
Wind-tunnel studies of advanced cargo aircraft concepts
[NASA-CR-164833] N81-32117
GONCHARENKO, V. I.
A formulation of the shimmy problem for swiveling wheels
A81-47268
GONCHAROV, V. V.
Hydrogen engines
A81-49949
GOWADIA, N. S.
Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] A81-48417
GRAEBER, U.
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] A81-47609
GRAF, W.
Engineering effects of advanced composite materials on avionics
[AD-A104015] N81-33240
GRAHAM, A. B.
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] N81-33210
GROESBECK, D. E.
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] A81-48635
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] A81-49743
GUNTHER, K. P.
Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49378
GUSTAFSON, R. A.
Ten years of US Marine Corps Harrier operations
N81-33140
GUYTON, F. C.
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] A81-49979

H

HAN, J. A.
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] N81-33160
HAHN, J.
Engineering effects of advanced composite materials on avionics
[AD-A104015] N81-33240
HANSEN, E. A.
High peak energy shaped-pulse electromagnetic crack detection
A81-47785
HARDIN, J. C.
The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] A81-48607
HARDY, G. H.
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] N81-32151
HARNEY, R. C.
Infrared airborne radar
A81-48566
HARRIS, M. J.
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] N81-32128
HARRIS, W. L.
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] A81-48615
HARTEL, R.
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] A81-47612
HARTMAN, A. S.
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] N81-33163
HASEL, L. E.
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] N81-33150
HAWKINS, R. D.
Development considerations for real-time aircraft/avionic distributed computer control systems
A81-48376
HAYMAN, C.
A process for protecting gas turbine blade cooling passages against degradation
A81-49209
HAZELL, A. F.
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] A81-48647
HAZEN, D. C.
US military V/STOL: Who needs it? Wants it? Can afford it?
N81-33156

HENDERSON, J. P.
Damping applications in aero-propulsion systems
A81-47999

HENDERSON, W. P.
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg
[NASA-TM-83171] N81-33159

HENDRICKSON, I. G.
High peak energy shaped-pulse electromagnetic crack detection
A81-47785

HERTZ, J.
Development of advanced interceptor substructural material
[AD-A103836] N81-33241

HESS, R. W.
Estimating aircraft depot maintenance costs
[AD-A103623] N81-33133

HICKEY, D.
Recent progress in V/STOL aircraft technology
N81-33144

HILLGER, W.
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] A81-47565

HINDES, D. E.
Development of maintenance metrics to forecast resource demands of weapon systems
[AD-A104089] N81-33136

HIRSCHEL, E. H.
Surface-oriented coordinates for boundary-layer calculations in the case of general configurations
[DGLR PAPER 81-014] A81-47557

HO, P. Y.
The effect of vane-frame design on rotor-stator interaction noise
[AIAA PAPER 81-2034] A81-48627

HODGSON, T. H.
Trailing edge noise prediction from measured surface pressures
A81-48395

HOENLINGER, H.
Design and construction of a model which is dynamically similar to the A310 wing
[DGLR PAPER 81-035] A81-47556

HOFMAN, C. F. G. M.
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] N81-32164

HOLBECHE, T. A.
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] A81-48647

HOMYAK, L.
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control
[AIAA PAPER 81-2049] A81-48621

HORN, W.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] N81-32273

HOROWITZ, S. J.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736

HOWE, M. S.
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] A81-48625

HOWELL, G. A.
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] N81-33162

HSIAO, J. K.
Simulation of Microwave Landing System
A81-48368

HUMBAD, N. G.
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] A81-48615

HUMMEL, D.
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] A81-47601

HUNT, B.
Computational fluid mechanics and its impact on the aircraft aerodynamicist
[DGLR PAPER 81-003] A81-47621

HUNT, D. L.
Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] A81-48417

I

IABLONSKAIA, V. A.
Choice of optimal parameters of a gyrovertical on the basis of a standard program
A81-48744

INNIS, R. C.
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] N81-32151

ISHIKAWA, T.
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] N81-33238

ITO, T.
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] N81-32118

IVASHCHENKO, I. A.
Design of production processes for flight-vehicle engines
A81-49475

J

JACOCKS, J. L.
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] A81-49979

JANAKIRAM, D. S.
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] A81-49732

JOHNSON, C. D.
A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] N81-33135

JUSTICE, H. B.
Function generation techniques
A81-48329

K

KADOYA, Y.
On the numerical analysis of stall flutter in turbine cascade
A81-47963

KAMINER, A. A.
Damping of turbomachine blade variations by subsonic flow
A81-47957

KAMIYA, N.
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] N81-32118

KEENAN, R. K.
COMLINK - A communications/EW analytical and modeling tool
A81-48547

KEIN, V. M.
Realization of a method of extremal targeting in a problem of aircraft landing control
A81-49943

KEMPTON, A. J.
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] A81-48602

KIMBER, R. D.
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579] N81-33195

KIMSEY, K. D.
Numerical simulation of hydrodynamic ram
A81-48351

KIPERSZTOK, O.
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] A81-48629

KIRKHAM, W. R.
Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] N81-33174
KIROV, B. A.
Automation of air traffic control processes
A81-49462
KIVKO, V. G.
Automation of air traffic control processes
A81-49462
KJELGAARD, S. O.
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect
[NASA-TM-80199] N81-32119
KLAUDER, L. T.
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] N81-34109
KOBIALKA, H. J.
Computer graphics applications
[PB81-215246] N81-33108
KOENIG, R.
Takeoff and missed approach under the influence of wind shear
[TUBS/SFB-58-80-05-01] N81-32131
KOHNEN, E.
Ten years activity in the area of flight control for helicopters at night and in bad weather
[DGLR PAPER 81-064] A81-47620
KONIUKHOVA, L. N.
The effect of the skewness of the skin panels on stresses in conical wings
A81-49930
KOSSOV, O. N.
Droplet breakup regimes and criteria for their existence
A81-48079
KRAUSPE, P.
Takeoff and missed approach under the influence of wind shear
[TUBS/SFB-58-80-05-01] N81-32131
KRYZHANOVSKII, G. A.
Automation of air traffic control processes
A81-49462
KUDERSKII, A. A.
Choice of optimal parameters of a gyrovertical on the basis of a standard program
A81-48744
KUEBLER, W.
The role of the earth's shape in navigation - An example
A81-48120
KUKACKA, L. E.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] N81-32273
KULESHOV, V. V.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
A81-47962
KUNZ, D. L.
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] N81-32154
KUROSAKA, M.
Unsteady swirling flows in gas turbines
[AD-A102852] N81-32150

L

LAFON, G.
Sukhoi Su-24 Fencer - The Soviet Tornado
A81-49974
LAITONE, E. V.
Performance prediction for light airplanes
A81-49374
LALLMAN, F. J.
Simplified off-design performance model of a day turbofan engine cycle
[NASA-TM-83204] N81-33206
LAMBERT, M.
Civil head-up displays - Coming up fast
A81-49973
LAUNAY, G.
Aircraft recognition by means of monostatic radar
A81-47142
LANDERBILT, L. J.
Adaptive features and measurement requirements for advanced surveillance radars
A81-48548
LEAVITT, L. D.
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg
[NASA-TM-83171] N81-33159
LEFFLER, R. J.
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
A81-48847
LEPICOVSKY, J.
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] A81-48640
LEWIS, W. J.
Multi-mission STOVL with vectored thrust engines
N81-33149
LINCOLN, J. W.
Development of an aircraft maneuver load spectrum based on VGH data
[AD-A102750] N81-32142
LINDAHL, C. E.
The evolution of real-time digital simulation of aircraft for training applications
A81-48358
LINDEN, A. W.
Advancing blade concept helicopter mission capabilities
N81-33151
LIU, C. Y.
Forecast of future aviation fuels: The model
[NASA-CR-165486] N81-32956
LIVINGSTON, D.
Computer graphics applications
[PB81-215246] N81-33108
LLOYD, A. T.
More fight for the Fighting Falcon
A81-49075
LOBAS, L. G.
A formulation of the shimmy problem for swiveling wheels
A81-47268
LOHMANN, D.
Prediction method for aeroacoustic loads on under the wing blown flaps
[AIAA PAPER 81-2038] A81-48644
LOWRY, R. B.
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
N81-33142
LU, E. Y.
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] A81-48651
LUTHER, J.
Compact and highly sensitive fluorescence lidar for oceanographic measurements
A81-49376
LUTIN, J. M.
Computer graphics applications
[PB81-215246] N81-33108

M

MAASS, D. P.
Developing design allowables for composite helicopter structures
A81-47811
MALLINSON, R. D.
Probe protection in camera/model visual systems
A81-48359
MALONE, J. B.
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] N81-32154
MARCHAND, M.
System identification for controlled aircraft
N81-33132
MARCONI, F.
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103034] N81-33192

MARK, W. D.
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] N81-33191

MARKS, K. E.
Estimating aircraft depot maintenance costs
[AD-A103623] N81-33133

MARTIN, R. M.
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] N81-32966

MARTINEZ, M. A.
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
A81-48379

MAUS, J. R.
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] A81-48606

MAVLIUTOV, R. R.
Stress concentration in elements of aircraft structures
A81-49471

MAZUMDAR, J.
Transient vibrations of elastic panels due to the impact of shock waves
A81-48305

MCARDLE, J. G.
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control
[AIAA PAPER 81-2049] A81-48621

MCCLOUD, J. L., II
A full-scale wind tunnel investigation of a helicopter bearingless main rotor
[NASA-TM-81321] N81-32137

MCGILLICUDDY, C. F., JR.
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
N81-33141

MCKINLEY, J. L.
Aircraft electricity and electronics /3rd edition/
A81-49877

MCLAUGHLIN, D. K.
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] A81-48613

MCLAUGHLIN, P.
A technique for the implementation of nonlinear models as real-time digital simulations
A81-48333

MCMILLEN, J. L.
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] N81-33181

MESSLER, R. W., JR.
Sliding-seal electron beam slot welding of an aircraft wing closure beam
A81-48142

MEVEL, J.-Y.
Aircraft recognition by means of monostatic radar
A81-47142

MEYER, R. C.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] A81-48416

MEYER, W. L.
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] N81-33205

MICHALKE, A.
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] A81-48610

MICHEL, U.
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] A81-47595
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] A81-48610

MIKULLA, V.
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] A81-47554

MILLER, G. K., JR.
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] N81-33211

MILLS, M. L.
Supplemental calibration of the AEDC-PWT 16 ft transonic tunnel aerodynamic test section
[AD-A102384] N81-32155

MILTON, O.
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] N81-33200

MINNICK, W.
Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System
[AD-A104150] N81-33184

MITTMANN, J.
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] A81-47603

MIXSON, J. S.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] A81-48618

MONOPOLI, R. V.
Model following control of gas turbine engines
A81-49900

MOORE, S.
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] N81-32522

MORRISON, J. D.
Vertical lift capabilities for the 80's and 90's
N81-33139

MUELLER, A. W.
Flight test of a pure-tone acoustic source
[NASA-TP-1898] N81-33945

MUNSER, H. J.
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] A81-47580

MUTO, P. T.
A simple radar for navigation accuracy measurements
A81-47844

MUYLAERT, J. M.
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] A81-47622

N

NAGAOKA, S.
A simple radar for navigation accuracy measurements
A81-47844

NASTENKO, N. IA.
Damping of turbomachine blade variations by subsonic flow
A81-47957

NATANZON, M. S.
Droplet breakup regimes and criteria for their existence
A81-48079

NAVEVICZ, J. E.
Engineering effects of advanced composite materials on avionics
[AD-A104015] N81-33240

NEUWERTH, G.
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] A81-47612

NIKITINA, N. V.
A formulation of the shimmy problem for swiveling wheels
A81-47268

NISHT, M. I.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
A81-47962

NORTH, D. M.
F-100s set to become target drones
A81-48067

NORTMANN, U.
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] A81-47580

O

OSORGIN, V. D.
The use of direct lift control of an aircraft in a guided landing run
A81-49928

P

PANDOLFI, E.
Numerical experiments on unsteady flows through vibrating cascades
A81-47961
PARIKOV, A. N.
Realization of a method of extremal targeting in a problem of aircraft landing control
A81-49943
PARIS, P. C.
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
A81-47888
PARKER, A. O.
New developments in compact plate-fin heat exchangers
A81-48062
PARTHASARATHY, S. P.
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] A81-49731
PASZTOR, E.
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
A81-48196
PAULSON, J. W., JR.
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect
[NASA-TM-80199] N81-32119
PAUSDER, H. J.
The impact of helicopter flight mechanics on mission performance
N81-33148
PAVLOV, V. A.
Geometrically nonlinear theory for calculating thin rods of a wing profile
A81-49935
PAVLOV, V. G.
The use of direct lift control of an aircraft in a guided landing run
A81-49928
PERACCHIO, A. A.
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] A81-48637
PETERS, W. L.
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] A81-49979
PETERSEN, R. A.
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] A81-49729
PETYT, M.
Finite strip analysis of singly curved skin-stringer structures
A81-48390
PFENNINGER, W.
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] N81-32121
PHILLIPS, W. H.
Solar powered aircraft
[NASA-CASE-LAR-12615-1] N81-32138
PIERCE, G. A.
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] N81-32154
PISARENKO, G. S.
Damping of turbomachine blade variations by subsonic flow
A81-47957
PLAETSCHKE, E.
Design of optimal inputs for the identification of characteristics of aircraft flights
N81-33131
POE, D. W.
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] N81-33194
POLHEMUS, N. W.
Computer graphics applications
[PB81-215246] N81-33188
POLZ, G.
The calculation of separated flow at helicopter bodies
[DGLR PAPER 81-026] A81-47555
POWELL, C.
Hyperbolic origins
A81-47842
PREISSER, J. S.
Flight test of a pure-tone acoustic source
[NASA-TP-1898] N81-33945
PRIVARNIKOV, O. A.
Choice of the optimal angular velocity of the twist of a flight vehicle
A81-49946

R

RADFORD, R. C.
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] N81-33199
RAJU, P. K.
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612
RAO, D. M.
Wind-tunnel studies of advanced cargo aircraft concepts
[NASA-CR-164833] N81-32117
RASKIN, D.
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] N81-34109
RASMUSSEN, P. G.
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials
[AD-A103191] N81-33175
READETT, G. G.
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] N81-33204
REHMANN, A. J.
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] N81-33182
RENZE, P. P.
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] N81-33190
RESTALL, J. E.
A process for protecting gas turbine blade cooling passages against degradation
A81-49209
RIBNER, H. S.
Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730
RICH, M. J.
Developing design allowables for composite helicopter structures
A81-47811
RICHARZ, W. G.
Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730
RICHEY, G. K.
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
N81-33142
RICKLEY, E. J.
Helicopter noise analysis: Round-robin test
[AD-A103724] N81-33948
ROBERTS, L.
Recent progress in V/STOL aircraft technology
N81-33144

RODGERS, J.
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] N81-32522

ROUSSOS, L. A.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] A81-48618

S

SAILLARD, J.
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
A81-47143

SALMOND, D. J.
Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
A81-48480

SANDUSKY, G. T.
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] A81-48639

SANFORD, G. G.
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] N81-33390

SARMA, G. R.
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] N81-33203

SAROHIA, V.
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] A81-49728
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] A81-49729

SAVISAAR, A.
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] N81-32144

SCHANEL, W.
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] A81-47604

SCHMID, T. E.
Graphite/polyimide augmentor and nozzle components
[AIAA PAPER 81-1358] A81-49976

SCHMIT, L. A.
Structural synthesis - Its genesis and development
A81-49076

SCHROEDER, W.
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase
[DGLR PAPER 81-027] A81-47563

SCHUETZE, R.
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] A81-47565

SCHULZ, D.
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] A81-47551

SCHWARMANN, L.
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] A81-47564

SCHWARTZ, N.
Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] N81-33177

SCHYMANIETZ, K. F. M.
The impact of operational requirements on the compromise of desired features in rotorcraft design
N81-33155

SCRUGGS, B. W.
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] A81-49732

SEIDEL, R.
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] A81-47562

SEMAKOV, L. A.
The use of direct lift control of an aircraft in a guided landing run
A81-49928

SENGUPTA, G.
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] A81-48629

SENSBURG, O.
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] A81-47552

SERGEEV, M. A.
Choice of optimal parameters of a gyrovertical on the basis of a standard program
A81-48744

SHATAEV, V. G.
Strength calculation of thin-wall rods of significant taper
A81-49937

SHIVASHANKARA, B. N.
High bypass ratio engine noise component separation by coherence technique
[AIAA PAPER 81-2054] A81-48653

SHOPE, F. L.
Digital simulation for energy conservation in a large wind tunnel plant system
A81-48003

SICLARI, M. J.
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] N81-33192

SIGMAN, R. K.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736

SIMPLIN, P.
Multi-mission STOVL with vectored thrust engines
N81-33149

SIVARAMAKRISHNAN, M. M.
Influence of landing gear flexibility on aircraft performance during ground roll
A81-49375

SLAZAK, M.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] A81-48618

SMITH, F. D.
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] N81-32158

SMITH, M. G.
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] A81-48602

SMUROV, M. IU.
Realization of a method of extremal targeting in a problem of aircraft landing control
A81-49943

SNYDER, R.
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] N81-32130

SOFRIN, T. G.
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] A81-48636

SOKOLOV, N. L.
The use of direct lift control of an aircraft in a guided landing run
A81-49928

SOLODUKHIN, V. A.
Automation of air traffic control processes
A81-49462

SOMMERS, S.
The role of the earth's shape in navigation - An example
A81-48120

SOURDON, A.
Applications of composite materials for the construction of military helicopters
N81-33147

SPADEA, R. J., JR.
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] N81-33181

SQUIRE, L. C.
Measured pressure distributions and shock shapes on a simple delta wing
A81-48479

STAHL, W.
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] A81-47554

STALLINGS, D. W.
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] N81-33163

STALLINGS, R. L.
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] N81-33158

STARK, C.
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] N81-34109

STATLER, I. C.
The role of the research simulator in the systems development of rotorcraft
N81-33146

STELMAKH, A. L.
Damping of turbomachine blade variations by subsonic flow
A81-47957

STEPANOV, G. U.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
A81-47962

STONE, J. R.
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] A81-49743

STRAUB, H.
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] N81-32144

STROZIER, J. K.
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] N81-33160

STUCKENBERG, N.
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy
[DGLR PAPER 81-066] A81-47616

STURGEON, W. R.
The array processor - A real-time simulator
A81-48328

SUAREZ, J. A.
Cost-effective mechanical property characterization
A81-47813

SUGAMA, T.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] N81-32273

SUNDARAM, C. V.
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] A81-48606

SUZUKI, K.
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] N81-32118

SWEDISH, W. J.
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] N81-33217

T

TAKAHARA, S.
On the numerical analysis of stall flutter in turbine cascade
A81-47963

TERRY, J. E.
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] N81-33190

TESSITORE, F. A.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] A81-48416

TESTER, B. J.
Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] A81-48620

TORVIK, P. J.
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980
A81-47993

TREBBLE, W. J. G.
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] A81-48634

TREMAIN, D. E.
Engineering effects of advanced composite materials on avionics
[AD-A104015] N81-33240

TRIVEDI, K. S.
Reliability validation of systems for life-critical applications
A81-48559

TSVETKOV, L. G.
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
A81-49940

U

UNRUH, J. F.
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] A81-48608

V

VAICAITIS, R.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] A81-48618

VAKHITOV, M. B.
The effect of the skewness of the skin panels on stresses in conical wings
A81-49930

VAN ALLEN, J. A.
An analytical solution of the two star sight problem of celestial navigation
A81-48121

VARSHAVSKII, I. L.
Hydrogen engines
A81-49949

VATALARO, F.
Characteristics of a digital filter for a precision DME system in microwave landing systems
[PUB-43-1980] N81-32136

VIARS, P. R.
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] A81-48801

VIJAYARAGHAVAN, A.
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] A81-49731

VOLMIR, A. S.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
A81-47962

VON GLAHN, U. H.
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] A81-48635

VONRETH, D. D.
Controls and displays for all-weather operation of helicopters
N81-33145

W

WALKER, G. A.
Development of maintenance metrics to forecast resource demands of weapon systems
[AD-A104089] N81-33136

WALLENBERG, R. P.
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1270C] N81-33200

WANG, T. S.
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] A81-48612

WARMBRODT, W.
A full-scale wind tunnel investigation of a helicopter bearingless main rotor
[NASA-TM-81321] N81-32137

WARWICK, G.
Fly-by-wire Jaguar
A81-48064

WASKIEWICZ, J. D.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] A81-48416

WAT, J.
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] A81-49728

WATSON, W. R.
Noise suppression characteristics of peripherally segmented duct liners
[NASA-TP-1904] N81-33946

WEISS, F.
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] A81-47552

WERNICKE, K. G.
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
N81-33150

WEST, D. S.
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] N81-33197

WHITFIELD, H. L.
Published results of the program of university research. Transportation research results
[PB81-210130] N81-34108

WHITTLEY, D. C.
V/STOL aircraft technology in Canada
N81-33152

WILLIAMS, J.
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] A81-48634

WILLSHIRE, W. L., JR.
Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] A81-48638

WILSON, C.
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] N81-32147

WILSON, D. R.
Development of maintenance metrics to forecast resource demands of weapon systems
[AD-A104089] N81-33136

WILSON, F. W.
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] A81-48401

WITTE, R. C.
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] N81-33162

WONG, G. A.
Simulation model to evaluate maintenance strategies for large network of fielded systems
A81-48009

WONG, R. L. M.
Shielding concepts for jet noise
[AIAA PAPER 81-2020] A81-49730

WOOD, D.
The Lear Fan 2100
A81-49975

WOODWARD, R. P.
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] A81-48628

Y

YOSHIOKA, H.
A simple radar for navigation accuracy measurements
A81-47844

Z

ZELLWEGER, A. G.
Availability requirements of the future ATC system
A81-48558

ZINCONE, R.
Advancing blade concept helicopter mission capabilities
N81-33151

ZINN, B. T.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] A81-49736
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] N81-33205

ZOLA, C. L.
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] A81-49743

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing

NAS1-16000
CONTRACT NUMBER
N81-11013
NASA ACCESSION NUMBER

Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 1926
N81-33196
AF PROJ. 1962
N81-33197
AF PROJ. 2202
N81-33196
N81-33197
AF PROJ. 2257
N81-32144
AF PROJ. 2307
N81-32150
N81-32273
AF PROJ. 2404
N81-33192
AF PROJ. 3048
N81-32290
AF PROJ. 4600
N81-33393
AF PROJECT 2418
A81-47999
AF-AFOSR-75-2808B
A81-49730
AFOSR ISSA 80-00027
N81-32273
DA PROJ. 1W1-62113-A-661
N81-33241
DA PROJ. 4K0-78012-AAN-1
N81-33214
DAAG46-79-C-0081
N81-33241
DAAK80-80-C-0806
N81-33240
DE-AC01-79CS-50069
N81-33201
DE-AC04-76DP-00789
N81-33200
DOT-FA01-80-C-10080
N81-32158
DOT-FA78WAI-034
N81-32156
DOT-FA79WA-4335
N81-33392
DOT-FA80WA-4370
A81-48009
DOT-TSC-1397 N81-33390
DT-FA01-81-C-10001
N81-33216
N81-33217
FAA PROJ. 034-241-510
N81-33181
FAA PROJ. 122-115-540
N81-33183
F04606-79-G-0082
N81-32144
F19628-79-C-0173
N81-33393
F30602-79-C-0152
A81-48544
F33615-76-C-3103
N81-33196
N81-33197
F33615-77-C-0075
N81-33136
F33615-77-C-3035
A81-46626
F33615-77-C-3126
N81-33192
F33615-78-C-5234
A81-47813
F33615-79-C-1739
A81-48373
F33615-79-C-2090
N81-32290
F33615-80-C-3401
N81-33196
N81-33197
F33657-72-C-089
A81-48626
F40600-77-C-0009
A81-48606
F49620-76-C-0014
A81-47959
F49620-78-C-0045
N81-32150
MDA903-77-C-0107
N81-33133
NAG1-10 A81-48613
NAG1-133 N81-33205
NAS1-14837 N81-33191
NAS1-15085 A81-48637
NAS1-15833 A81-48559
NAS2-9328 A81-48626
NAS2-10571 N81-33190
NAS2-10649 N81-33162
NAS3-20584 N81-32147
NAS3-21987 A81-46640
NAS7-100 A81-49729
A81-49731
NAS9-15800 N81-32143
NCC1-9 N81-32117
NGR-11-002-185
N81-32154
NSG-1377 A81-48395
NSG-1583 A81-48615
NSG-1585 N81-32121
NSG-3036 A81-49736
NSG-3116 N81-32956
N00019-80-C-0126
N81-33195
N61339-76-C-0006
A81-48359
N62269-78-C-0043
N81-33199
WF41421000 N81-32128
505-32-02 N81-33947
505-32-03-04 N81-33945
505-32-03-06 N81-33946
505-32-72 N81-32956
505-41-43-01 N81-32966
505-41-73-04 N81-33203
505-43-23-01 N81-33159
505-43-23-02 N81-33158
505-43-23-04 N81-32119

1. Report No. NASA SP-7037(143)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle AERONAUTICAL ENGINEERING A Continuing Bibliography (Supplement 143)		5. Report Date January 1982
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		10. Work Unit No.
		11. Contract or Grant No.
12. Sponsoring Agency Name and Address		13. Type of Report and Period Covered
		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

This Bibliography lists 254 reports, articles, and other documents introduced into the NASA scientific and technical information system in December 1981.

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified - Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 90	22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

READEX FICHE best copy available

All issues available have been filmed.
Unfortunately, any scattered missing issues are no longer available.

NASA SP-7037(144)

A CUMULATIVE INDEX
TO
AERONAUTICAL ENGINEERING
A Continuing Bibliography

This Cumulative index supersedes the indexes contained in supplements [SP-7037(132) through SP-7037(143)] published by NASA during 1981.

Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

SPECIAL NOTICE

The abstract sections of the supplements of *Aeronautical Engineering* can be bound separately. Individual abstracts can be located readily by means of the page numbers given at each entry, e.g., p0630 N81-32290. To assist the user in binding Supplements SP-7037 (132) through SP-7037 (143), a title page is included in the back of this Cumulative Index.

This index is available as NTISUB/141/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $10.00 domestic; $20.00 foreign.

INTRODUCTION

WHAT THIS CUMULATIVE INDEX IS

This publication is a cumulative index to the abstracts contained in NASA SP-7037(132) through NASA SP-7037(143) of *Aeronautical Engineering: A Continuing Bibliography*. NASA SP-7037 and its supplements have been compiled through the cooperative efforts of the American Institute of Aeronautics and Astronautics (AIAA) and the National Aeronautics and Space Administration (NASA). Entries prepared by the two contributing organizations are identified as follows:

1. NASA entries by their *STAR* accession numbers (N81-10000 series).
2. AIAA entries by their *IAA* accession numbers (A81-10000 series).

HOW THIS CUMULATIVE INDEX IS ORGANIZED

This Cumulative Index includes a subject index, a personal author index, a corporate source index, a contract number index, and a report/accession number index.

HOW TO USE THE SUBJECT INDEX

Two types of cross-references appear in the subject index:

1. Use (U) references indicate that the subject term is not "postable," i.e., not a valid term, and the following term or terms are used instead. For example:

   AIRCRAFT PROTUBERANCES
   U PROTUBERANCES
   FLIGHT PERFORMANCE
   U FLIGHT CHARACTERISTICS

2. Narrower Term (NT) references refer the user to more specific headings in the same subject area, under which additional material on the subject may be found. For example:

   FLOW RESISTANCE
   NT AERODYNAMIC DRAG
   NT FRICTION DRAG
   NT SUPERSONIC DRAG

In addition, a searcher may use the title or title and title extension in the index to narrow further his quest for particular items. This is because subject terms readily include more than one class of document. For example:

AIRLINE OPERATIONS
All-weather operations, including pilot role, instrument landing systems and guidance aids.
Airport congestion as constraint on air travel, considering runway capacity and adjusted demand.

illustrates a case where two references on different topics are listed under the same subject term.

HOW TO USE THE PERSONAL AUTHOR INDEX

All personal authors used in the abstract-section citations in the individual Supplements appear in the index. Differences in transliteration schemes may require multiple searching of the index for variants of an author's name. For example:

EMELIANOV, M. D.
and
YEMELYANOV, M. D.

HOW TO USE THE CORPORATE SOURCE INDEX

The corporate source index entries are abridged versions of the corporate sources used in the abstract-section citations in the individual Supplements. The corporate source supplementary (organizational component) does not appear in the index. For example:

BOEING CO., SEATTLE, WASH. MILITARY AIRCRAFT SYSTEMS DIV.
(Source citation entry)
BOEING CO., SEATTLE, WASH.
(Source index entry)

HOW TO USE THE CONTRACT NUMBER INDEX

All contract numbers that are identified in the abstract-section citations in the individual Supplements appear in this index. Changes by agencies in the style in which contract numbers are presented may require multiple searching for variants. For example:

AF 33(615)-71-C-1758
F33615-71-C-1758

HOW TO USE THE REPORT/ACCESSION NUMBER INDEX

All report numbers that have been assigned by the corporate source, monitoring agency or cataloging activity appear in this index. Variations in initial cataloging may result in different report number series. For example:

TP-924
ONERA-TP-924

IDENTIFICATION OF DESIRED SUPPLEMENT

The abstract and descriptive cataloging for any accession number selected from the indexes may be found in the appropriate Supplement. The page-number range of each Supplement appears on the inside front cover of this index. Once the range of page numbers containing the selected accession number is located in the second column, the desired Supplement number will be found in the first column. For example:

Page 281 will be found in Supplement 137.

AVAILABILITY OF DOCUMENTS

Information concerning the availability of documents announced in the *Aeronautical Engineering* supplements is found in the Introduction to the most currently issued supplement.

TABLE OF CONTENTS

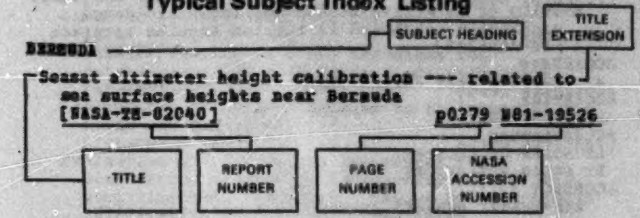
SUBJECT INDEX A-1
PERSONAL AUTHOR INDEX B-1
CORPORATE SOURCE INDEX C-1
CONTRACT NUMBER INDEX D-1
REPORT/ACCESSION NUMBER INDEX E-1

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography* JANUARY 1982

1981 Cumulative Index

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The *STAR* or *IAA* accession number is included in each entry to assist the user in locating the abstract in the abstract section of an individual issue of *Aeronautical Engineering*. If applicable a report number is also included as an aid in identifying the document. The page and accession numbers are located beneath and to the right of the title. Under any one subject heading the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

A-6 AIRCRAFT
Circulation Control Wing /CCW/ flight tests
p0122 A81-19469
A-7 AIRCRAFT
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1331] p0352 A81-31376
A jet engine monitor /JEM/ for the TA-7C
[AIAA PAPER 81-1562] p0507 A81-40947
A-7 composite outer wing service experience
p0530 A81-43617
A synopsis of the Navy A-7 Aircraft Fuel Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949
Abstract interface specifications for the A-7E device interface module
[AD-A092696] p0202 N81-16770
Design, development, and evaluation of lightweight hydraulic system, phase 1 --- A-7 aircraft
[AD-A097505] p0388 N81-23075
A-10 AIRCRAFT
Design and test of a graphite-epoxy composite A-10 slat
p0006 A81-11339
Application of weldbonding to A-10 production aircraft
p0013 A81-11652
VHF-UHF precipitation-static interference effects on aircraft
p0056 A81-14258
Simulated A-10 combat environment
[SAE PAPER 801187] p0401 A81-34199
A-10A Operational Flight Trainer simulator flight control system and aerodynamics
[AIAA 81-0964] p0414 A81-36555
A-10/TF34 Turbine Engine Monitoring System evaluation and implementation
[AIAA PAPER 81-1447] p0505 A81-40880
Advanced flight simulator: Utilization in A-10 conversion and air-to-surface attack training
[AD-A094608] p0254 N81-18066
A-10/TF34 Turbine Engine Monitoring System (TEMS)
p0599 N81-31211
A-300 AIRCRAFT
Development of the A300 fin in modern composite fibre construction
p0013 A81-11653
Airbus Industrie's heavenly twins - A310 and A300-600
p0018 A81-12346
Stress measurements on landing gear for the Airbus A-300 B2
p0119 A81-19299
Airbus Industrie - Past, present and future /26th Mitchell Memorial Lecture/
p0284 A81-27907
Current and future use of an AIDS integrated EMS --- Aircraft Integrated Data System for Engine Monitoring
[SAE PAPER 801219] p0404 A81-34225
The AIRBUS hydraulic systems
[SNIAS-802-111-111] p0427 N81-24055
Protection against wing icing for Airbus A300 and A310
[NASA-TM-76584] p0494 N81-27079
Development of a CFC window frame, using short fiber pressing technology --- jet aircraft cabin windows
[BMFT-FB-W-80-032] p0499 N81-27208
ABLATED NOSETIPS
U PANT PROGRAM
ABLATIVE MATERIALS
Captive carry and free flight rain erosion considerations for reinforced ablative fluorocarbon radome materials
p0103 A81-17453
ABORT APPARATUS
Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033
ABRASION
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27090
ABSORBERS (MATERIALS)
Acoustic structures --- titanium brazing method for producing honeycomb structures for jet engine noise reduction
p0001 A81-10272
ABSORPTION SPECTROSCOPY
The application of UV spectroscopy to the quantitative analysis of nitrogen oxide
p0089 N81-13008
AC (CURRENT)
U ALTERNATING CURRENT
AC GENERATORS
Advanced generating system equipment for aircraft
p0420 A81-37414
Computer analysis of 400 HZ Aircraft electrical generator test data
[AD-A100785] p0552 N81-29354
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362
Solar Brayton engine/alternator set
p0588 N81-30529
ACCELERATED LIFE TESTS
Evaluation of compressor blade endurance limits by an accelerated method
p0177 A81-22182
TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833
The implications of laboratory accelerated conditioning of carbon fibre composites
p0039 N81-11129
Helicopter gearbox testing
p0460 N81-26137
ACCELERATION
Further studies of the influence of thermal effects on the predicted acceleration of gas turbines
[ASME PAPER 81-GT-21] p0311 A81-29938
ACCELERATION (PHYSICS)
NT ANGULAR ACCELERATION
NT DECELERATION
NT HIGH ACCELERATION
NT SPIN REDUCTION

NT TRANSVERSE ACCELERATION
Simulation of apparent acceleration --- on flight test stands
p0223 A81-23405
The behavior of quartz oscillators in the presence of accelerations --- in missile and aircraft time-frequency navigation systems
[ONERA, TP NO. 1981-31] p0351 A81-31285
Effect of acceleration switching during INS in-flight alignment
p0458 A81-39857
Kinematic properties of rotary-wing and fixed-wing aircraft in steady coordinated high-g turns
[AIAA PAPER 81-1855] p0560 A81-44554
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093868] p0204 N81-16996
ACCELERATION STRESSES (PHYSIOLOGY)
NT CENTRIFUGING STRESS
Development of a flight simulation capability in the dynamic environment simulator
[AIAA 81-0976] p0415 A81-36566
Physiological effects of high-G flight - Their impact on flight simulator design
[AIAA 81-0986] p0416 A81-36573
BIOCONAID system (bionic control of acceleration induced dimming)
[AD-A102510] p0601 N81-31234
ACCELERATION TOLERANCE
Escape from military fighters - A modern perspective
p0176 A81-22096
Evaluation of AFIT/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0249 N81-18034
ACCELEROMETERS
Determination of in-flight helicopter loads
p0573 A81-46618
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A095617] p0334 N81-20070
Airplane wing vibrations dre to atmospheric turbulence
[NASA-CR-3431] p0438 N81-24679
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 31 December 1980
[AD-A102495] p0596 N81-31187
ACCEPTABILITY
Noncoherent C-band transponder standards
[AD-A091282] p0095 N81-13251
ACCEPTANCE
U ACCEPTABILITY
ACCIDENT INVESTIGATION
NT AIRCRAFT ACCIDENT INVESTIGATION
Civil aviation safety. IV - Accident severity
p0068 A81-16422
The apparent ignoring of pilot fatigue by the NTSB in airline crashes
p0177 A81-22104
Evaluation of safety programs with respect to the causes of general aviation accidents. Volume 2: Appendices
[AD-A089181] p0023 N81-10023
Annual review of aircraft accident data, U.S. General aviation calendar year 1978
[PB80-201916] p0024 N81-10028
Experiences with flight recorders obtained by analyzing aircraft accidents
p0328 N81-20019
Definition of investigative areas for human-factor aspects of aircraft accidents
[AD-A101601] p0580 N81-30102
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] p0628 N81-32130
ACCIDENT PREVENTION
Wind shear effects on aircraft - Low-level shear and clear-air turbulence as accident causes
p0067 A81-16136
Helicopter alarms - The use of ALAT incident and accident record cards
p0100 A81-16689
Death and injury in aerial spraying - Pre-crash, crash, and post-crash prevention strategies
p0177 A81-22115
Evaluation of safety programs with respect to the causes of general aviation accidents. Volume 2: Appendices
[AD-A089181] p0023 N81-10023
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677
Evaluation of explosafe. Explosion suppression system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17047
Wind shear systems implementation plan, benefit/cost study
[AD-A094168] p0253 N81-18055
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
ACCIDENTS
NT BIRD-AIRCRAFT COLLISIONS
ACCRETION
U DEPOSITION
ACCUMULATORS
NT SOLAR COLLECTORS
NT SOLAR REFLECTORS
ACCURACY
Air-to-air gunnery systems test and evaluation
p0544 N81-29073
Impact of prediction accuracy on costs - noise technology applications in helicopters
[AD-A101768] p0589 N81-30911
ACID RAIN
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222
ACOUSTIC ATTENUATION
NT SHOCK WAVE ATTENUATION
Sandwich structures with high transmission loss
p0151 A81-20069
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
Analysis of pressure spectra measurements in a ducted combustion system
[NASA-TM-81583] p0146 N81-15768
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 2: Computer program
[AD-A093267] p0221 N81-17853
Lateral attenuation of high-by-pass ratio engined aircraft noise
[NASA-TM-81968] p0394 N81-23862
An experimental investigation of a large delta P settling chamber for a supersonic pilot quiet tunnel
[NASA-CR-3436] p0434 N81-24112
Study of noise reduction characteristics of multilayered panels and dual pane windows with Helmholtz resonators
[NASA-CR-164370] p0438 N81-24857
Static tests of excess ground attenuation at Wallops Flight Center
[NASA-CR-3435] p0491 N81-26846
Flying helmet attenuation, and the measurement, with particular reference to the Mk 4 helmet
p0604 N81-31473
ACOUSTIC COMBUSTION
U COMBUSTION STABILITY
ACOUSTIC DUCTS
Acoustic structures --- titanium brazing method for producing honeycomb structures for jet engine noise reduction
p0001 A81-10272
Application of the equivalent surface source method to the acoustics of duct systems with non-uniform wall impedance
p0055 A81-13824
Sound radiation from a finite length unflanged circular duct with uniform axial flow. I - Theoretical analysis. II - Computed radiation characteristics
p0100 A81-16712
A general mapping procedure for variable area duct acoustics
[AIAA PAPER 81-0094] p0160 A81-20597
Numerical techniques in linear duct acoustics - A status report
[ASME PAPER 80-WA/NC-2] p0170 A81-21120
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] p0639 N81-33205
ACOUSTIC EMISSION
Acoustic emission and corrosion
p0153 A81-20211

The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
In-flight fatigue crack monitoring using acoustic emission
p0361 A81-32857
Acoustic emission techniques for in-flight structural monitoring
[SAE PAPER 801211] p0404 A81-34219
Acoustic spectrum analysis for gyro bearings
[AIAA PAPER 81-1616] p0524 A81-43128
Acoustic emission as a NDE technique for determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070
Application of optical methods to the study of jet noise and turbulence
[ISL-CO-201/80] p0147 N81-15819
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 3: Tables of atmospheric absorption losses --- aircraft noise
[AD-A093144] p0221 N81-17848
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522

ACOUSTIC EXCITATION
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] p0621 A81-48640
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] p0621 A81-48651

ACOUSTIC FATIGUE
Acoustic fatigue assessment in the design of aerospace vehicles
p0059 A81-14395
Sonic fatigue design techniques for graphite-epoxy stiffened-skin panels
[AIAA 81-0633] p0305 A81-29488

ACOUSTIC GENERATORS
U SOUND GENERATORS

ACOUSTIC IMPEDANCE
Effect of a semi-annular thermal acoustic shield on jet exhaust noise
[NASA-TM-81615] p0044 N81-11770

ACOUSTIC MEASUREMENTS
NT NOISE MEASUREMENT
Experiments on effective source locations and velocity dependence of the broad band noise from a rotating rod
p0016 A81-11724
Simple method for prediction of aircraft noise contours
p0050 A81-13217
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
Noise reduction test facilities at Douglas Aircraft
p0570 A81-46375
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376
The impact and future direction of aircraft noise certification
p0570 A81-46377
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48629
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634
Improved methods for fan sound field determination
[NASA-CR-165188] p0147 N81-15769
Helicopter noise contour development techniques and directivity analysis
[AD-A093426] p0221 N81-17851
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079
Study of an experimental probe for the measurement of the acoustic pressure inside an air flow
[ESA-TT-633] p0344 N81-21340
Handbook of aircraft noise metrics
[NASA-CR-3406] p0345 N81-21871
Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
[NASA-TM-81739] p0381 N81-22839
Classification of operating conditions of turbomachines from solid borne sound
p0382 N81-23015
Quiet Clean Short-haul Experimental Engine (QCSEE); acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet, test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097
Gun harmonisation using the sector acoustic miss distance indicator
p0544 N81-29074

ACOUSTIC NOZZLES
Flight and tunnel test results of the SDC mechanical jet noise suppressor nozzle
p0245 N81-18000

ACOUSTIC PROPAGATION
Propagation of three-dimensional acoustic perturbations in channels of variable cross-sectional area at frequencies close to cutoff frequency
p0119 A81-19338
The sonic boom from an aircraft flying along an arbitrary path in a stratified atmosphere in the presence of a three-component wind
p0123 A81-19636
Convective amplification of gas turbine engine internal noise sources
p0171 A81-21595
Effect of a semi-annular thermal acoustic shield on jet exhaust noise
p0178 A81-22532
The dominant acoustic radiation surfaces of a helicopter cabin
p0468 A81-40102
Analytical characteristics methods: Applications
[VKI-PREPRINT-1980-10] p0021 N81-10011
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838

ACOUSTIC PROPERTIES
NT ACOUSTIC IMPEDANCE
NT ACOUSTIC SCATTERING
NT ACOUSTIC VELOCITY
NT SOUND INTENSITY
Sound radiation from a finite length unflanged circular duct with uniform axial flow. I - Theoretical analysis. II - Computed radiation characteristics
p0100 A81-16712
Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
Acoustics of rotors utilizing circulation control
[AIAA PAPER 81-0092] p0160 A81-20596
Perspectives on jet noise
[AIAA PAPER 81-0428] p0168 A81-20829
Effect of facility variation on the acoustic characteristics of three single stream nozzles
p0178 A81-22534
Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106

ACOUSTIC RADIATION
U SOUND WAVES

ACOUSTIC SCATTERING
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-28943
A study of the effect of terrain on helicopter noise propagation by acoustical modeling
[AD-A097626] p0394 N81-23864

ACOUSTIC SIMULATION
Acoustic facilities for human factors research at NASA Langley Research Center: Description and operational capabilities
[NASA-TM-81975] p0446 N81-25765

ACOUSTIC STABILITY
U FREQUENCY STABILITY
ACOUSTIC VELOCITY
Two methods for calculating the load on the surface of a slender body executing axisymmetric vibrations in a sonic gas flow
p0004 A81-10920
Calculation of viscous, sonic flow over hemisphere-cylinder at 19 deg incidence - The capturing of nose vortices
[AIAA PAPER 81-0189] p0162 A81-20661
Charts for determining potential minimum sonic-boom overpressures for supersonic cruise aircraft
[NASA-TP-1820] p0337 N81-21016
ACOUSTIC VIBRATIONS
U SOUND WAVES
ACOUSTICS
NT AEROACOUSTICS
NT PSYCHOACOUSTICS
Transonic rotor noise - theoretical and experimental comparisons
[AD-A090806] p0088 N81-12824
The Dalembertometer
[ISL-CO-220/79] p0133 N81-14292
The 1980 Aircraft Safety and Operating Problems, part 2
[NASA-CP-2170-PT-2] p0267 N81-19056
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845
Clear speech: A strategem for improving radio communications and automatic speech recognition in noise
p0603 N81-31453
ACOUSTO-OPTICS
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
ACQUISITION
NT DATA ACQUISITION
NT TARGET ACQUISITION
Airborne Systems Software Acquisition Engineering Guidebook for software cost analysis and estimating
[AD-A100215] p0543 N81-28785
Airborne Systems Software Acquisition Engineering Guidebook for contracting for software acquisition
[AD-A100217] p0543 N81-28786
Airborne Systems software Acquisition Engineering Guidebook for application and use of the guidebooks (series overview)
[AD-A100216] p0543 N81-28787
Airborne Systems Software Acquisition Engineering Guidebook for supportable airborne software
[AD-A100213] p0543 N81-28788
Airborne Systems Software Acquisition Engineering Guidebook for software development and support facilities
[AD-A100214] p0543 N81-28789
ACTINOMETERS
NT INFRARED DETECTORS
NT INFRARED SCANNERS
NT INFRARED SPECTROMETERS
NT MICROWAVE RADIOMETERS
ACTIVE CONTROL
DFVLR-dynamic model testing in wind tunnels for active controls research
p0014 A81-11670
Numerical simulations of a segmented-plenum, perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640
Active controls for civil aircraft
p0228 A81-24070
Transonic maneuver/cruise airfoil design employing active diffusion control
p0239 A81-26511
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control
p0239 A81-26512
Radio Technical Commission for Aeronautics, Technical Symposium and Annual Assembly Meeting, Washington, D.C., November 20, 21, 1980, Proceedings
p0285 A81-28293
Impact of active controls on aircraft design and operations - A helicopter industry perspective
p0285 A81-28294
The impact of active controls on general aviation airplanes of the late 1980s
p0285 A81-28295
A new method of airfoil flutter control
p0367 A81-33844
Generalized active control - Its potential and directions of research
[AAAF PAPER NT 80-29] p0369 A81-33928
Integrated active controls impact on supersonic cruise vehicle structural design
[SAE PAPER 801210] p0404 A81-34218
Is it safe - The safety assessment of aircraft systems. V - Some particular techniques
p0454 A81-38174
Active control of the helicopter rotor for vibration reduction
[AHS 80-68] p0479 A81-40186
An active control system for helicopter vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189
Active elimination of stall conditions --- in helicopters
p0571 A81-46605
A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619
The flying qualities of aircraft with actively augmented pitch and yaw stability
[ARC-R/M-3848] p0082 N81-12113
Transonic wing technology for transport aircraft
p0188 N81-16002
Active controls for flutter suppression and gust alleviation in supersonic aircraft --- YF-17 flutter model
[NASA-CR-163934] p0216 N81-17097
Design for active and passive flutter suppression and gust alleviation
p0253 N81-18063
Advanced aerodynamics and active controls. Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Langley Research Center contributions in advancing active control technology
p0259 N81-19002
Status and future plans of the Drones for Aerodynamic and Structural Testing (DAST) program --- Aeroelastic Research Wing (ARW)
p0259 N81-19003
Ground and flight test experience with a triple redundant digital fly by wire control system --- installed in F-8C aircraft
p0259 N81-19006
Integrated Application of Active Controls (IAAC) technology to an advanced subsonic transport: Project plan
[NASA-CR-3305] p0332 N81-20062
High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400
Generalities on active control. Potentials and research trends
[SNIAS-802-111-112] p0427 N81-24056
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[NASA-TM-83132] p0486 N81-26118
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[NASA-TM-83144] p0491 N81-26496
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118
Some experiences with active control of aeroelastic response
[NASA-TM-83179] p0587 N81-30469
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] p0635 N81-33161
ACTUATOR DISKS
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078
Semi-actuator disk theory for compressor choke flutter
[NASA-CR-3426] p0442 N81-25075

ACTUATORS
Development and application of a moving base visual flight simulator including the design of hydraulic actuators with hydrostatic bearings
p0010 A81-11633
Evaluation of the effect of actuator time lag on the minimum control power of a VTOL aircraft
p0319 A81-30160
The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
[SAE PAPER 801190] p0401 A81-34201
The substantiation of the structural integrity of the YAH-64 control actuators with material variations
[AHS 80-51] p0478 A81-40170
Portable servoactuator test system
[AIAA PAPER 81-1620] p0525 A81-43130
Sensor/actuator failure detection and isolation for airbreathing propulsion systems
p0564 A81-45551
Sensor/actuator failure detection for turbofan engines
p0080 N81-12104
The effects of the direction of control loading on a one-dimensional tracking task
[AD-A092459] p0197 N81-16067
Fault-tolerant actuation concept for a research test aircraft
[AD-A093113] p0216 N81-17100
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096389] p0343 N81-21085
Fiber optics for aircraft engine/inlet control
[NASA-TM-82654] p0597 N81-31190
ACUITY
NT VISUAL ACUITY
ADAPTIVE CONTROL
NT ACTIVE CONTROL
NT SELF ADAPTIVE CONTROL SYSTEMS
A concept for dynamic control of RPV information system parameters
p0049 A81-12796
Adaptive airfoils and wings for efficient transonic flight
p0153 A81-20349
Adaptive control for electronic countermeasures
p0155 A81-20470
Wind tunnel model support, controlled by four microprocessors
[ONERA, TP NO. 1980-149] p0174 A81-21917
On the application of self-adaptive flight control system based on energy balance theory
p0224 A81-23733
Mission Adaptive Wing research programme
p0227 A81-24057
The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400
Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367
The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
[SAE PAPER 801190] p0401 A81-34201
Adaptive multivariable model following --- for aircraft control
p0564 A81-45540
A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619
Adaptive features and measurement requirements for advanced surveillance radars
p0617 A81-48544
Propulsion Controls, 1979 --- air breathing engine control
[NASA-CP-2137] p0078 N81-12090
Road map to adaptive optimal control --- jet engine control
p0079 N81-12098
Engine identification for adaptive control
p0080 N81-12100
Closed loop control systems: Aircraft. Citations from the NTIS data base
[PB80-813710] p0082 N81-12118
Further investigations of adaptive-wall wind tunnels
[AD-A091774] p0131 N81-13977
Model reference adaptive control for multi-input multi-output systems
p0258 N81-18698
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088
F-8C adaptive control law refinement and software development
[NASA-CR-163093] p0377 N81-22059
Automated Plasma Spray (APS) process feasibility study
[NASA-CR-165418] p0597 N81-31193
ADAPTIVE CONTROL SYSTEMS
U ADAPTIVE CONTROL
ADAPTIVE FILTERS
Correction procedures for aircraft noise data. Volume 3: Filter effects
[AD-A091016] p0096 N81-13719
ADDITIVES
NT ANTIICING ADDITIVES
NT ANTIOXIDANTS
NT OIL ADDITIVES
NT PROPELLANT ADDITIVES
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059
The use of Antimisting Kerosene (AMK) in turbojet engines
p0257 N81-19063
Aircraft Research and Technology for Antimisting Kerosene Conference
[AD-A101347] p0580 N81-30103
ADHEROMETERS
U ADHESION TESTS
ADHESION TESTS
Non-destructive testing of adhesive-bonded joints
p0153 A81-20162
Adhesive bonding of avionic structures
p0181 A81-22646
ADHESIVE BONDING
Application of weldbonding to A-10 production aircraft
p0013 A81-11652
Automatization of the adhesion process for supporting airframe parts in light contour systems
p0118 A81-19297
Non-destructive testing of adhesive-bonded joints
p0153 A81-20162
The 1980's - Payoff decade for advanced materials; Proceedings of the Twenty-fifth National Symposium and Exhibition, San Diego, Calif., May 6-8, 1980
p0181 A81-22636
Adhesive bonding of avionic structures
p0181 A81-22646
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
Prospects for bonding primary aircraft structure in the 80's
p0182 A81-22679
Developments in the analysis and repair of cracked and uncracked structures
p0354 A81-31561
Bonded laminated structures in aircraft manufacture --- Russian book
p0366 A81-33700
Adhesive bonding of aircraft primary structures
[SAE PAPER 801209] p0404 A81-34217
Structural aspects in applications of adhesive bonding
[FOK-BO-1238] p0514 A81-42739
Future applications of adhesive bonding in the U.S. Air Force
p0550 A81-44378
Repair of adhesive bonded structure on commercial aircraft
p0559 A81-44394
Developments in aircraft structural materials
[NLR-MP-79042-U] p0077 N81-12081
Aircraft surface coatings study: Energy efficient transport program --- sprayed and adhesive bonded coatings for drag reduction
[NASA-CR-158954] p0004 N81-12225

Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077
Scarf joints in unidirectional carbon fiber
reinforced plastics --- tests of repairs made
using adhesives
[BU-258] p0336 N81-20193
Thirty years experience with primary adhesive
bonded structures --- aircraft construction
[FOK-BO-1240] p0541 N81-28189
Nondestructive testing of adhesive bonded joints
[FOK-BO-1241] p0542 N81-28190
Fatigue properties of adhesive-bonded laminated
sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489
Operational experience with adhesive bonded
structures --- aircraft structures
[FOK-BO-1235] p0582 N81-30124
The use of acoustic emission for detection of
active corrosion and degraded adhesive bonding
in aircraft structure
[AD-A102923] p0631 N81-32522
ADHESIVES
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10080
Evaluation of high-temperature structural
adhesives for extended service
p0247 N81-18010
ADIABATIC FLOW
Adiabatic gas flow. Citations from the NTIS data
base
[PB80-808546] p0026 N81-10048
ADMITTANCE
U ELECTRICAL IMPEDANCE
AERIAL IMAGERY
U AERIAL PHOTOGRAPHY
AERIAL PHOTOGRAPHY
Aerial survey photography
p0018 A81-12350
Aerial surveying of small areas from a small
remotely controlled drone
p0107 A81-17525
Tri-bar reading correction for oblique imagery
p0178 A81-22495
An MTI /moving target indicator/ algorithm for
passive sensors
p0320 A81-30239
Helicopter rotor blade effects on mast-mounted
sensor images
p0350 A81-31114
Charge-coupled device /CCD/ camera/memory
optimization for expendable autonomous vehicles
p0357 A81-32491
Analysis, design and simulation of line scan
aerial surveillance systems
p0357 A81-32492
Comparative efficiency of aircraft and satellites
in the remote sensing of earth resources
p0412 A81-35739
KS-127A long range oblique reconnaissance camera
for RF-4 aircraft
p0462 A81-39419
RF-5E tactical reconnaissance standoff photography
concept
p0462 A81-39421
Big 'R', little 'c', integrated data annotation
and sensor control for long range oblique
photography /LOROP/ --- increased reliability
and reduced complexity
p0462 A81-39435
Image stabilization techniques for long range
reconnaissance camera
p0462 A81-39436
Dynamic simulation of hybrid video compression ---
of airborne reconnaissance systems
p0463 A81-39555
Staring infrared mosaic observation of an F-15
aircraft
p0463 A81-39636
Image processing design for autonomous acquisition
of targets
p0562 A81-44700
AERIAL RECONNAISSANCE
Applications of new technology in the infrared
p0350 A81-31126
The Bundeswehr Drone Program - Where are we today
p0458 A81-38806
Long focal length, high altitude standoff
reconnaissance; Proceedings of the Seminar, San
Diego, CA, July 29, 30, 1980
p0461 A81-39417
KS-127A long range oblique reconnaissance camera
for RF-4 aircraft
p0462 A81-39419
RF-5E tactical reconnaissance standoff photography
concept
p0462 A81-39421
Integrated sensor control system for RF-5E
demonstrator
p0462 A81-39438
Dynamic simulation of hybrid video compression ---
of airborne reconnaissance systems
p0463 A81-39555
Survivors on the RPV front
p0577 A81-46725
Tabulations of ambient ozone data obtained by GASP
airliners, March 1975 to December 1977
[NASA-TM-81528] p0096 N81-13568
AERIAL RUDDERS
Airbus - Rudder unit in carbon fiber technology
p0451 A81-37651
Development of the carbon fiber-reinforced side
rudder for the Airbus
[DGLR PAPER 81-055] p0607 A81-47551
Thrust augmented spin recovery device
[NASA-CASE-LAR-11970-2] p0275 N81-19130
Manufacturing development of DC-10 advanced rudder
[NASA-CR-159060] p0494 N81-27077
AEROACOUSTICS
An experimental investigation of jet screech by
air jet impingement on solid boundaries
p0005 A81-11302
Some thoughts on the effects of flight on jet
noise as observed in actual flight and in wind
tunnels
p0016 A81-11723
Sound generation by vortex shedding from a profile
within a channel
p0054 A81-13570
Influence of boundary-layer suction on the
emission spectrum on a thin plate performing
oscillations under the action of pressure
pulsations --- in aircraft noise reduction
p0054 A81-13573
Application of the equivalent surface source
method to the acoustics of duct systems with
non-uniform wall impedance
p0055 A81-13824
The effects of noise on laminar flow control drag
reduction systems
p0058 A81-14390
Radiation boundary conditions for wave-like
equations --- numerical jet acoustics
experimentation
p0153 A81-20223
Sound sources in aerodynamics - Fact and fiction
[AIAA PAPER 81-0056] p0159 A81-20570
Experiments on the linear and non-linear evolution
of the double helical instability in jets
[AIAA PAPER 81-0415] p0168 A81-20818
Generation of vortex noise in flow past a profile
in a channel
p0238 A81-26134
Influence of boundary-layer suction on the
spectrum of radiation from a thin plate
vibrating under the action of pressure
fluctuations --- in aircraft noise reduction
p0238 A81-26137
Discussion of the pressure-source aerosonic theory
and of Doak's criticism
p0238 A81-26189
The displacement-thickness theory of trailing edge
noise
p0348 A81-30785
Noise characteristics of two parallel jets with
unequal flow
[AIAA PAPER 80-0168] p0354 A81-31601
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
Trailing-edge airframe noise source studies on
aircraft wings
[AIAA PAPER 80-0976] p0411 A81-35634
The dominant acoustic radiation surfaces of a
helicopter cabin
p0468 A81-40102
Acoustic shock waves generated by a transonic
helicopter blade
[AHS 80-63] p0479 A81-40186

Aerodynamic and acoustic behavior of a YF-12 inlet
at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Pressure fluctuations on the surface of a small
passenger aircraft. I - Periodic disturbances
caused by the rotation of the propeller
p0561 A81-44615
Pressure fluctuations on the surface of a small
passenger aircraft. II - The effect of the
turbulent boundary layer
p0562 A81-44618
An acoustic source modelling technique to predict
the near sound field of axisymmetric turbulent
jets
[AIAA PAPER 81-2022] p0618 A81-48606
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] p0619 A81-48625
Comparative acoustic wind-tunnel measurements and
theoretical correlations on subsonic aircraft
propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634
Mixer nozzle aeroacoustic characteristics for the
energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639
Acoustic and turbulence measurements of a
tone-excited jet with and without flight
simulation
[AIAA PAPER 81-2007] p0621 A81-48640
Prediction method for aeroacoustic loads on under
the wing blown flaps
[AIAA PAPER 81-2038] p0621 A81-48644
A novel airborne technique for free-field
measurements of aircraft noise above the flight
path with application to noise-shielding studies
[AIAA PAPER 81-2028] p0621 A81-48647
Noise radiated from inverted velocity profile jets
under simulated flight
[AIAA PAPER 81-2026] p0623 A81-49729
Shielding concepts for jet noise
[AIAA PAPER 81-2020] p0623 A81-49730
Noise and noise abatement in fans and blowers: A
review
[DFVLR-FB-80-16] p0138 N81-14796
Analysis of pressure spectra measurements in a
ducted combustion system
[NASA-TM-81583] p0146 N81-15768
Fluid-dynamic and aeroacoustic investigations of
shrouded jets --- noise prediction (aircraft)
p0256 N81-18318
Coupling of unsteady lift to acoustic duct modes
in an axial flow fan
[AD-A095080] p0274 N81-19124
Airframe noise of a small model transport aircraft
and scaling effects --- Boeing 747
[NASA-TP-1858] p0380 N81-22832
Comparison of NASA and contractor results from
aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81761] p0443 N81-25079
Aeroacoustics of a poroes plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884
Unsteady swirling flows in gas turbines ---
aircraft engines and aeroacoustics
[AD-A102852] p0629 N81-32150
User's manual for a computer program to calculate
discrete frequency noise of conventional and
advanced propellers
[NASA-TM-83135] p0631 N81-32966
AERODYNAMIC AXIS
U AERODYNAMIC BALANCE
AERODYNAMIC BALANCE
Rotor blade aeroelastic stability and response in
forward flight
p0467 A81-40089
Helicopter trim by periodic shooting with
Newton-Raphson iteration
p0573 A81-46621
Some dynamic properties of rigid two-bladed fully
gimballed tip-jet helicopter rotor with
circulation control
[AD-A094031] p0252 N81-18054
Application of superconducting coils to the NASA
prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086
Apparatus for and method of compensating dynamic
unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
AERODYNAMIC BRAKES
NT DRAG CHUTES
NT LEADING EDGE SLATS
NT TRAILING-EDGE FLAPS
NT WING FLAPS
AERODYNAMIC BUZZ
U FLUTTER
AERODYNAMIC CENTER
U AERODYNAMIC BALANCE
AERODYNAMIC CHARACTERISTICS
NT AERODYNAMIC BALANCE
NT AERODYNAMIC DRAG
NT AERODYNAMIC STABILITY
NT INTERFERENCE LIFT
NT JET LIFT
NT LIFT
NT SUPERSONIC DRAG
NT ZERO LIFT
Comparative performance of two centrifugal fan
impellers differing in blade section
p0001 A81-10162
Helicopter tail configurations to survive tail
rotor loss
p0003 A81-10768
The aerodynamic characteristics of some new RAE
blade sections, and their potential influence on
rotor performance
p0004 A81-10769
Numerical optimization - An assessment of its role
in transport aircraft aerodynamic design through
a case study
p0006 A81-11604
Advanced combat aircraft wing design
p0007 A81-11608
A study of the air inlet efficiency of a combat
aircraft concept with dorsal inlet
p0008 A81-11615
Dynamic stability parameters at high angles of
attack
p0009 A81-11624
Identification of longitudinal flying
characteristics of an aeroplane and the effect
of nonstationary aerodynamics
p0010 A81-11627
Low-speed airfoil section research at Delft
University of Technology
p0010 A81-11636
Design and tests of an helicopter rotor blade with
evolutive profile
[ONERA, TP NO. 1980-125] p0011 A81-11638
Study of a variable sweep wing in sub or transonic
flow
[ONERA, TP NO. 1978-106] p0058 A81-14391
Design and analysis of slat systems in transonic
flow
p0058 A81-14392
Influence of a change in power at the propeller on
the properties of the aircraft
p0059 A81-14754
Choking effects in the blade rows of turbomachines
p0061 A81-15269
Research on a high work axial gas generator turbine
[SAE PAPER 800618] p0062 A81-15338
Test results from an analytically designed axial
compressor stage of 1.65:1 pressure ratio
[SAE PAPER 800629] p0063 A81-15344
Calculation of the nonlinear aerodynamic
characteristics of finite-span wing
p0063 A81-15388
The aerodynamics of airfoil boats
p0065 A81-15705
Method for reducing the tangential velocities in
aircraft trailing vortices
p0066 A81-15880
Numerical lifting line theory applied to drooped
leading-edge wings below and above stall
p0066 A81-15881
Aerodynamic effects of body slots on a guided
projectile with cruciform surfaces
[AIAA PAPER 79-1658] p0066 A81-15887
Concorde aerodynamics and associated systems
development --- Book
p0101 A81-16718
The method of superelements in the dynamics of
complex structures
p0101 A81-16969
Optimum selection of main parameters for the
reverse design of a supersonic military aircraft
p0102 A81-17047
Aerodynamic design of a ducted propeller -
Optimization of efficiency
p0102 A81-17146

Variational principles and generalized variational principles for the hybrid aerodynamic problem of airfoil cascades on an arbitrary stream sheet of revolution
p0107 A81-17741

Aerodynamic calculations and design of subcritical aerofoils
p0108 A81-17804

An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805

Characteristics of the velocity field near a wing-body combination located at an angle of attack to an oncoming supersonic flow
p0119 A81-19337

Drag reduction through formation flight
[DGLR PAPER 80-106] p0120 A81-19393

Experimental investigation of a right angle wing with partially separated flow with and without ground effects
[DGLR PAPER 80-111] p0120 A81-19397

Conditions of generation and methods of damping the inlet vortex of a turbojet engine
p0121 A81-19442

Nonlinear aerodynamic characteristics of a thin airfoil of arbitrary plane configuration
p0123 A81-19629

Lifting-line theory of oblique wings - Application of the Galerkin method to the lifting-line equation
p0149 A81-19873

Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack
[AIAA PAPER 81-0007] p0156 A81-20531

Wing-alone aerodynamic characteristics at high angles of attack
[AIAA PAPER 81-0008] p0157 A81-20532

An analytical solution of lift loss for a round planform with a central lifting jet
[AIAA PAPER 81-0011] p0157 A81-20535

Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20540

Aircraft lateral parameter estimation from flight data with unsteady aerodynamic modelling
[AIAA PAPER 81-0221] p0162 A81-20684

Application of aerodynamic jump prediction theory to supersonic, high fineness ratio, cruciform finned bodies
[AIAA PAPER 81-0222] p0162 A81-20685

The aerodynamics of inverted leading edge flaps on delta wings
[AIAA PAPER 81-0356] p0165 A81-20775

An analysis of gap effects on wing-elevon aerodynamic characteristics
[AIAA PAPER 81-0364] p0166 A81-20783

A parametric study of the static longitudinal aerodynamic characteristics of parallel lift delta wing configurations at low Reynolds numbers
[AIAA PAPER 81-0409] p0168 A81-20814

Spanwise distribution of control points in the method of finite elementary solutions
[AIAA PAPER 79-1879] p0169 A81-21011

Effect of rear stagnation point position and trailing edge bluntness on airfoil characteristics
p0170 A81-21013

The influence of a wake splitter plate on the aerodynamic characteristics of a two-dimensional cylinder
p0226 A81-23949

Research on vortex bursting in compressible flow --- Thesis
p0230 A81-24477

Recent developments in integral equation method in transonic flow
p0234 A81-25384

Numerical study of stream surface structure near highly loaded wings
p0235 A81-25682

An analytical study of nonlinear stabilization during ballistic descent
p0237 A81-26028

Some aerodynamic properties of cones in viscous supersonic flow
p0237 A81-26119

Electromagnetic precipitation and ducting of particles in turbulent boundary layers
p0239 A81-26506

Aerodynamic study of flat turbine cascades with additional blades in blade passages
p0281 A81-27373

Aircraft stability at high incidence
p0282 A81-27878

Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results
p0293 A81-29072

Calculation of the aerodynamic characteristics of aircraft with jet mechanization
p0299 A81-29301

A study of the effect of store aerodynamics of wing/store flutter
[AIAA 81-0604] p0304 A81-29467

Development of a large-scale wind tunnel for the simulation of turbomachinery airfoil boundary layers
[ASME PAPER 81-GT-6] p0310 A81-29931

Mathematical model of the linear unsteady aerodynamics of the entire aircraft
p0349 A81-31039

Subsonic and transonic flow on a wing at different sweep angles. I
p0351 A81-31249

Subsonic and transonic flow on a wing at different sweep angles. II
p0351 A81-31250

Effectiveness of leading-edge vortex flaps on 60 and 75 degree delta wings
p0352 A81-31368

Unsteady aerodynamics of an aerofoil at high angle of incidence performing various linear oscillations in a uniform stream
p0357 A81-32017

Comparison of computed and measured unsteady pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541

Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0365 A81-33281

Study of a propulsive system --- aerodynamic characteristics of proposed model
p0366 A81-33673

Vortex-flow aerodynamics - An emerging design capability
p0366 A81-33717

An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168

Preliminary aerodynamic characteristics of several advanced VSTOL fighter/attack aircraft concepts
[SAE PAPER 801178] p0400 A81-34191

Calculation of supersonic flow past interfering wings
p0413 A81-36455

Calculation of the nonlinear aerodynamic characteristics of a wing of finite span
p0417 A81-36738

Design, construction and testing of an improved aircraft propeller
p0449 A81-37635

Integrated wing-engine system for airliners
p0450 A81-37638

Aerodynamic efficiency of the wing of new technology, a comparison of design expectation and flight test result
p0450 A81-37645

Aerodynamic features of designed strake-wing configurations
[AIAA PAPER 81-1214] p0454 A81-38084

Aerodynamic characteristics of two VSTOL fighter configurations
[AIAA PAPER 81-1292] p0454 A81-38119

Tests of air inlets at Reynolds numbers comparable to flight in the ONERA F1 and S1MA wind tunnels
[ONERA, TP NO. 1981-36] p0460 A81-39239

An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240

Aerodynamic characteristics of wings of arbitrary planform
p0461 A81-39267

Aerodynamic design of the Aerospatiale SA 365 N Dauphin 2 helicopter
p0468 A81-40099

U.K. development of a rotor de-icing system
p0469 A81-40103

Aerodynamic design of engine air intakes for
improved performance
p0470 A81-40117
The experimental and analytical definition of
helicopter modeling effects
[AHS 80-4] p0473 A81-40139
Some experimental study on parachute dynamics by
utilizing a deceleration system simulator
p0481 A81-40471
Aerodynamic characteristics of an advanced
technology propeller for commuter aircraft
[AIAA PAPER 81-1565] p0507 A81-40948
NASA VCE test bed engine aerodynamic performance
characteristics and test results
[AIAA PAPER 81-1594] p0508 A81-40969
Helicopter theory --- Book
p0513 A81-41823
Experimental investigation of a high-aspect-ratio
supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42187
Factors influencing the predicted performance of
advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Wind tunnel tests of sailwings for Darrieus rotors
p0518 A81-42670
Status of dynamic flight test technology - Model
identification for flight simulation
[SAE PAPER 810597] p0521 A81-42755
The effect of proplets and bi-blades on the
performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757
Leading edge high lift devices for agricultural
aircraft
[SAE PAPER 810608] p0522 A81-42765
Aerodynamic design data for a cruise-matched high
performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779
Effect of leading-edge vortex flaps on aerodynamic
performance of delta wings
p0559 A81-44424
An ABC status report --- Advancing Blade Concept
for XH-59A rotors
p0572 A81-46610
Local approximation of a vortex layer by a system
of discrete vortices
p0577 A81-46782
The calculation of transonic blade tip flow at
helicopter rotors
[DGLR PAPER 81-025] p0608 A81-47554
The calculation of separated flow at helicopter
bodies
[DGLR PAPER 81-026] p0608 A81-47555
The half-model technique in the wind tunnel and
its employment in the development of the Airbus
family
[DGLR PAPER 81-118] p0609 A81-47587
Investigations of vortex formation on wings with
cropped leading edges
[DGLR PAPER 81-046] p0610 A81-47601
Application of reduced natural longitudinal
stability in the Airbus program
[DGLR PAPER 81-062] p0610 A81-47609
Computational fluid mechanics and its impact on
the aircraft aerodynamicist
[DGLR PAPER 81-003] p0611 A81-47621
Vortex bursting on slender delta wings in
transonic flow and its influence on missile
aerodynamic characteristics
[DGLR PAPER 81-047] p0611 A81-47622
Calculation of the aerodynamic characteristics of
a deformable wing, moving near a screen
p0625 A81-49948
Estimation of wing nonlinear aerodynamic
characteristics at supersonic speeds
[NASA-TP-1718] p0021 N81-10004
Comparison of Unsteady Pressure Fields Computed
and Measured on the ZKP model
[AGARD-R-688] p0033 N81-11019
The turbulent wind and its effect on flight
[UTIAS-REVIEW-44] p0033 N81-11020
Low-speed aerodynamic performance of
50.8-centimeter-diameter noise-suppressing
inlets for the Quiet, Clean, Short-haul
Experimental Engine (QCSEE) --- Lewis 9- by
15-foot low speed wind tunnel tests
[NASA-TP-1178] p0035 N81-11037
A computer program to calculate the longitudinal
aerodynamic characteristics of
upper-surface-blown wing-flap configurations
[NASA-CR-3005] p0071 N81-12014
A mathematical model of the CH-53 helicopter
[NASA-TM-81238] p0075 N81-12068
Some new research approaches to aircraft spin
studies
[AAAF-NT-80-12] p0082 N81-12112
Application of a method for aerodynamic analysis
and design of horizontal axis wind turbines,
part 1
[FFA-TN-AU-1499-PT-1] p0086 N81-12633
Rotary balance data for a single engine general
aviation design having a high aspect-ratio
canard for an angle-of-attack range of 30 deg to
90 deg
[NASA-CR-3170] p0090 N81-13022
Model aerodynamic test results for two variable
cycle engine coannular exhaust systems at
simulated takeoff and cruise conditions ---
Lewis 8 by 6-foot supersonic wind tunnel tests
[NASA-CR-159818] p0093 N81-13057
Pseudosteady-state analysis of nonlinear aircraft
maneuvers
[NASA-TP-1758] p0094 N81-13065
Rotary balance data for a single-engine
agricultural airplane configuration for an
angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3311] p0125 N81-13923
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13978
Experimental aerodynamic characteristics of two
V/STOL fighter/attack aircraft configurations at
Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Curved centerline air intake for a gas turbine
engine
[NASA-CASE-LEW-13201-1] p0143 N81-14999
Effect of wing location and strakes on stability
and control characteristics of a monoplanar
circular missile with low-profile tail fins at
supersonic speeds
[NASA-TM-81878] p0186 N81-15978
Discussion of test results in the design of
laminar airfoils for competition gliders
[NASA-TM-75402] p0186 N81-15984
The tale of two wings
p0188 N81-16004
A wind tunnel investigation of the aerodynamic
characteristics of forward swept wings ---
supersonic cruise aircraft research
p0189 N81-16011
Computer code for the determination of ejection
seat/man aerodynamic parameters
[AD-A092721] p0191 N81-16026
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041
Acoustic and aerodynamic performance investigation
of inverted velocity profile coannular plug
nozzles --- variable cycle engines
[NASA-CR-3149] p0203 N81-16854
Model aerodynamic test results for two variable
cycle engine coannular exhaust systems at
simulated takeoff and cruise conditions.
Comprehensive data report. Volume 1: Design
layouts
[NASA-CR-159819-VOL-1] p0214 N81-17081
Model aerodynamic test results for two variable
cycle engine coannular exhaust systems at
simulated takeoff and cruise conditions.
Comprehensive data report. Volume 2: Tabulated
aeroynamic data book 1
[NASA-CR-159819-VOL-2-BK-1] p0214 N81-17082
Model aerodynamic test results for two variable
cycle engine coannular exhaust systems at
simulated takeoff and cruise conditions.
Comprehensive data report. Volume 2: Tabulated
aerodynamic data book 2
[NASA-CR-159819-VOL-2-BK-2] p0214 N81-17083
Model aerodynamic test results for two variable
cycle engine coannular exhaust systems at
simulated takeoff and cruise conditions.
Comprehensive data report. Volume 2: Tabulated
aerodynamic data book 3
[NASA-CR-159819-VOL-2-BK-3] p0214 N81-17084
Model aerodynamic test results for two variable
cycle engine coannular exhaust systems at
simulated takeoff and cruise conditions.
Comprehensive data report. Volume 3: Graphical
data book 1
[NASA-CR-159819-VOL-3-BK-1] p0214 N81-17085

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 2
[NASA-CR-159819-VOL-3-BK-2] p0214 N81-17086

Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106

Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982

Aerodynamic effects of nearly uniform slipstreams on thin wings in the transonic regime
[NASA-CR-152351] p0249 N81-18027

Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045

Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0255 N81-18257

Flow in bent pipes
[CETIM-14-P-091] p0256 N81-18322

The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19009

Aeropropulsive characteristics of twin nonaxisymmetric vectoring nozzles installed with forward-swept and aft-swept wings --- in the Langley 16 Foot Transonic Tunnel
[NASA-TP-1778] p0261 N81-19019

A theoretical investigation of ground effects on USB configurations
[NASA-CR-159005] p0262 N81-19021

Effect of wing-transition location and slotted and unslotted flaps on aerodynamic characteristics of a fighter model at high subsonic speeds --- conducted in langley 8-foot transonic pressure tunnel
[NASA-TM-X-1849] p0262 N81-19024

Wind-tunnel investigation at Mach numbers from 0.25 to 1.01 of a transport configuration designed to cruise at near-sonic speeds --- conducted in langley 8-foot transonic pressure tunnel
[NASA-TM-X-2622] p0262 N81-19025

NASA progress in aircraft noise prediction
p0269 N81-19074

GASP- General Aviation Synthesis Program. Volume 3: Aerodynamics. Part 1: Theoretical development
[NASA-CR-152303-VOL-3-PT-1] p0270 N81-19090

Analytical study of STOL Aircraft in ground effect. Part 1: Nonplanar, nonlinear wing/jet lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096

Analytical study of STOL Aircraft in ground effect. Part 2: Nonplanar, nonlinear method applicable to three dimensional jets of finite thickness
[NASA-CR-152088-PT-2] p0271 N81-19097

Development of advanced techniques for rotorcraft state estimation and parameter identification
[NASA-CR-159297] p0271 N81-19098

First results obtained by the AMD-BA Company from the rotary assembly of the AMF Lille
[NASA-TM-75887] p0276 N81-19139

Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63 --- Langley unitary plan wind tunnel tests
[NASA-TM-81937] p0329 N81-20025

The elaboration of a new family of helicopter blade profiles
[NASA-TM-75907] p0330 N81-20031

Reasons for low aerodynamic performance of 13.5-centimeter-tip-diameter aircraft engine starter turbine
[NASA-TP-1810] p0334 N81-20076

Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section --- transonic self-streamlining wind tunnel
[NASA-CR-165685] p0343 N81-21087

Sea King mathematical model validation trials. Flight data channel calibration
[AD-A096587] p0374 N81-22043

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 1: Study overview --- aerodynamic characteristics
[NASA-CR-152391-VOL-1] p0384 N81-23030

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 2: Evaluation of prediction methodologies
[NASA-CR-152391-VOL-2] p0384 N81-23031

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 3: Effects of configuration variations from baseline
[NASA-CD-152391-VOL-3] p0384 N81-23032

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 4: RALS E104 aerodynamic characteristics and comparisons with E205 configuration aerodynamic characteristics
[NASA-CR-152391-VOL-4] p0384 N81-23033

Investigation of aerodynamic characteristics of wings having vortex flow using different numerical codes
[NASA-CR-165706] p0384 N81-23034

Two-dimensional aerodynamic characteristics of the NACA 0012 airfoil in the Langley 8 foot transonic pressure tunnel
[NASA-TM-81927] p0385 N81-23036

Full-scale aerodynamic characteristics of a propellar installed on a small twin-engine aircraft wing panel
[NASA-TM-81285] p0385 N81-23039

Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results --- Ames 7- by 10-ft wind tunnel tests
[NASA-TM-81269] p0423 N81-24025

Comparison of selected lift and sideslip characteristics of the Ayres Thrush S2R-800, winglets off and winglets on, to full-scale wind-tunnel data
[NASA-CR-165710] p0423 N81-24026

Surface pressure measurements on a projectile shape at Mach 0.908
[AD-A098589] p0439 N81-25045

Application of the joined wing to cruise missiles
[AD-A096450] p0441 N81-25068

Aerodynamic analysis of a fighter aircraft with a higher order paneling method
[AD-A099404] p0483 N81-26082

An introduction to the aerodynamics of spoilers
[PB81-166183] p0487 N81-26122

Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845

Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081

Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 3: Appendices A and B. Details of program 1
[AD-A099331] p0495 N81-27082

Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 4: Appendices C and D. Details of program 2
[AD-A099332] p0495 N81-27083

Unpowered aerodynamic characteristics of a 15-percent scale model of a twin-engine commuter aircraft
[NASA-TM-81284] p0537 N81-28055

Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0 --- Ames 9 by 7 foot supersonic wind tunnel
[NASA-TM-81286] p0579 N81-30083

Wing-alone aerodynamic characteristics for high angles of attack of supersonic speeds
[NASA-TP-1889] p0579 N81-30087

High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0585 N81-30159

Recent darrieus Vertical-Axis Wind Turbine
aerodynamical experiments at Sandia National
Laboratories
[SAND-81-1100C] p0580 N81-30615
On the spanwise uniformity of wind tunnel test
data of transonic airfoils
[NAL-TR-665] p0627 N81-32118
A full-scale wind tunnel investigation of a
helicopter bearingless main rotor --- Ames 40 by
80 Wind Tunnel
[NASA-TM-81321] p0628 N81-32137
Twin-rotor patrol airship flying model design
rationale
[AD-A102575] p0628 N81-32141
The control anticipation parameter for augmented
aircraft
[AD-A102626] p0629 N81-32152

AERODYNAMIC CHORDS
U AIRFOIL PROFILES

AERODYNAMIC COEFFICIENTS
The influence of a wake splitter plate on the
aerodynamic characteristics of a two-dimensional
cylinder
p0226 A81-23949
Effects of drive slots on parachute performance
p0453 A81-38020
Aerodynamic estimation techniques for aerostats
and airships
[AIAA 81-1339] p0457 A81-38542
Calculation of the coefficients of head and local
drag of bluff bodies
p0466 A81-40023
Determination of model structure and parameters of
an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562
Prediction of dynamic stall and unsteady airloads
for rotor blades
p0571 A81-46604
The aerodynamic influences of rotor blade
airfoils, twist, taper and solidity on hover and
forward flight performance
p0572 A81-46607
Evaluation of two-dimensional subsonic oscillatory
airforce coefficients and loading distributions
p0617 A81-48480
Influence of landing gear flexibility on aircraft
performance during ground roll
p0622 A81-49375
Theoretical determination of subsonic oscillatory
airforce coefficients for fin-tailplane
configurations
[RAE-TR-79125] p0022 N81-10016
Flight evaluation of stabilization and command
augmentation system concepts and cockpit
displays during approach and landing of
powered-lift STOL aircraft
[NASA-TP-1551] p0037 N81-11044
Wind-tunnel test of an articulated helicopter
rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13918
A system for aerodynamic design and analysis of
supersonic aircraft. Part 4: Test cases
[NASA-CR-3354] p0185 N81-15977
A constrained inverse method for the aerodynamic
design of thick wings with given pressure
distribution in subsonic flow
p0188 N81-16006
The prediction of normal force and rolling moment
coefficients for a spinning wing
[NASA-CR-165680] p0333 N81-20068
Flutter analysis fo two-dimensional and
two-degree-of-freedom MBB A-3, CAST 7, an TF-8A
supercritical airfoils in small-disturbance
unsteady transonic flow
[AD-A100334] p0540 N81-28104
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials,
part 1
[NASA-CR-164684] p0583 N81-30134
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials.
Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135

AERODYNAMIC CONFIGURATIONS
NT DROOPED AIRFOILS
NT WING NACELLE CONFIGURATIONS
Longitudinal motion of low-flying vehicles in
nonlinear flowfields
p0009 A81-11626
High lift research and its application to aircraft
design
p0011 A81-11642
High-lift investigations on some small aspect
ratio wings
p0011 A81-11643
Optimizing the fixed leading edge shape of a
transonic wing to suit the landing high-lift
requirements
p0011 A81-11644
Noise control design problems on air cushion
vehicles and surface effect ships
p0017 A81-11818
Determination of the vorticity of a
small-aspect-ratio wing in hypersonic flow
p0054 A81-13544
Variational problems of gas dynamics
p0069 A81-16455
Some aspects of optimizing the aerodynamics of
turbine stages
p0119 A81-19325
Fighters for the 1990s
p0122 A81-19497
Influence of jet location on the efficiency of
spanwise blowing
p0154 A81-20352
Body-fitted 3-D full-potential flow analysis of
complex ducts and inlets
[AIAA PAPER 81-0002] p0156 A81-20527
The numerical solution of incompressible turbulent
flow over airfoils
[AIAA PAPER 81-0047] p0158 A81-20563
Evaluation of methods for prediction and
prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
Finite element methods for transonic
blade-to-blade calculation in turbomachines
[ASME PAPER 81-GT-5] p0310 A81-29930
Application of an aerodynamic configuration
modeling technique to the design and analysis of
X-Wing aircraft configurations
p0356 A81-32013
Determination of the vorticity on a wing of small
aspect ratio in a hypersonic stream
p0411 A81-35668
Aerodynamic features of designed strake-wing
configurations
[AIAA PAPER 81-1214] p0454 A81-38084
Development of a bearingless helicopter tailrotor
p0465 A81-39897
A study of the effect of aft fuselage shape on
helicopter drag
p0470 A81-40116
Wind tunnel experiments on the divergence of swept
wings with composite structures
[AIAA PAPER 81-1670] p0526 A81-43152
Materials and processes for a small remotely
piloted vehicle
p0532 A81-43663
Experimental and analytical development of an
advanced supersonic fighter concept
[AIAA PAPER 81-1659] p0534 A81-43941
Maintenance and repair of advanced composite
structure
p0550 A81-44382
Theoretical determination of subsonic oscillatory
airforce coefficients for fin-tailplane
configurations
[RAE-TR-79125] p0022 N81-10016
Flight evaluation of the effect of winglets on
performance and handling qualities of a
single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
Influence of light aircraft architecture on its
spin characteristics
[AAAF-NT-80-11] p0081 N81-12111
Aerodynamic design of electric and hybrid
vehicles: A guidebook
[NASA-CR-163744] p0088 N81-12943
Rotary balance data for a single engine general
aviation design having a high aspect-ratio
canard for an angle-of-attack range of 30 deg to
90 deg
[NASA-CR-3170] p0090 N81-13022
Optimal bodies for minimum total drag at
supersonic speeds
[AD-A091235] p0091 N81-13036
A system for aerodynamic design and analysis of
supersonic aircraft. Part 2: User's manual

[NASA-CR-3352] p0125 N81-13920
Computational aerodynamic design tools and
techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0128 N81-13950
Laminar-airfoils for transport aircraft
[DFVLR-MITT-80-07] p0129 N81-13952
Low-speed wind-tunnel tests of two weathercocking
sensors
[WSRL-0171-TM] p0136 N81-14575
An investigation into grid patching techniques
p0137 N81-14708
Grid generation for general three-dimensional
configurations
p0137 N81-14714
A system for aerodynamic design and analysis of
supersonic aircraft. Part 1: General
description and theoretical development
[NASA-CR-3351] p0139 N81-14970
A system for aerodynamic design and analysis of
supersonic aircraft. Part 3: Computer program
description
[NASA-CR-3353] p0139 N81-14971
Leading-edge deflection optimization for a highly
swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
Development of finite-volume methods for
three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
A system for aerodynamic design and analysis of
supersonic aircraft. Part 4: Test cases
[NASA-CR-3354] p0165 N81-15977
Study of transonic flow fields about aircraft:
Application to external stores
p0187 N81-15998
Aerodynamic subsonic/transonic aircraft design
studies by numerical methods
p0187 N81-15999
Design of advanced technology transonic airfoils
and wings
p0187 N81-16000
Computer code for the determination of ejection
seat/man aerodynamic parameters
[AD-A092721] p0191 N81-16026
P-3 Orion fuel-saving modification wind tunnel study
[AD-A091906] p0194 N81-16044
Overview of Boeing supersonic transport efforts,
1971 - 1979
p0247 N81-18016
Technology development status at McDonnell Douglas
p0248 N81-18019
KC-135 winglet flight results
p0260 N81-19011
Investigation of impingement region and wall jets
formed by the interaction of high aspect ratio
lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
Experimental and theoretical study of flow fields
and store forces in close proximity to a triple
ejection rack at transonic speeds
[AD-A094751] p0263 N81-19030
NASTRAN level 16 user's manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159824] p0279 N81-19481
A study of high-altitude manned research aircraft
employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067
A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012
Low and high speed propellers for general
aviation: Performance potential and recent wind
tunnel test results
[NASA-TM-81745] p0338 N81-21028
Challenge for operational experience feedback in
aircraft design: An aircraft design example
[AD-A096088] p0341 N81-21067
Method for predicting the jet-induced aerodynamics
of V/STOL configurations in transition
[AD-A097356] p0385 N81-23043
Digital Avionics Information System (DAIS).
Volume 2: Impact of DAIS concept on life cycle
cost. Supplement
[AD-A097438] p0390 N81-23084
Technical evaluation report on the Fluid Dynamic
Panel Symposium on Subsonic/Transonic
Configuration/Aerodynamics
[AGARD-AR-146] p0392 N81-23431
Civil component program Wing Section. The design
of the transonic airfoil Va 2
[BMFT-FB-W-80-023] p0426 N81-24053
Correlation of predicted and flight derived
stability and control derivatives with
particular application to tailless delta wing
configurations --- application to the space
shuttle orbiter
[NASA-TM-81361] p0490 N81-26154
A study in flow control and screening methods for
aircraft laser turrets
[AD-A101723] p0548 N81-29126
Effect of simulated in-flight thrust reversing on
vertical-tail loads of F-18 and F-15 airplane
models --- conducted in the Langley 16-foot
transonic tunnel
[NASA-TP-1890] p0579 N81-30086
Analytical determination of dynamic stability
parameters
p0592 N81-31117
Some applications of aerodynamic formulations to
problems in aircraft dynamics
p0592 N81-31121
Comments on Reynolds number effects and the role
of NTF in the development of air vehicles
p0592 N81-31142
AERODYNAMIC DRAG
NT SUPERSONIC DRAG
Qualitative calculations of transonic drag-rise
characteristics using the equivalence rule
p0058 A81-14393
Calculation of the lift dependent drag polar of
cambered fighter plane configurations with
deflected maneuver flaps in the subsonic region
by means of a modified procedure according to
Lamar
[DGLR PAPER 80-109] p0120 A81-19395
Drag estimations for stream-line and cylindrical
contour distortions on aircraft fuselages and
train cars
[DGLR PAPER 80-116] p0121 A81-19399
The determination of the induced drag on slim
wings with high lift systems in the transonic
region
[MBB-FE122] p0121 A81-19400
Thin minimum-drag airfoils
p0123 A81-19630
Angle of attack - Its measurement and usage. I
p0149 A81-19799
Influence of zero-lift downwash on the relation
between minimum-drag center-of-gravity position
and inherent stability boundary
p0235 A81-25648
Viscous flow drag reduction; Symposium, Dallas,
Tex., November 7, 8, 1979, Technical Papers
p0238 A81-26501
Drag reduction of an oscillating flat plate with
an interface film
p0239 A81-26504
Modification in drag of turbulent boundary layers
resulting from manipulation of large-scale
structures
p0239 A81-26508
Compliant surfaces - Introduction
p0240 A81-26515
Factors affecting afterbody drag
p0292 A81-29069
The art of single-engine aircraft design
[AIAA PAPER 81-0914] p0400 A81-34361
Minimum fuel paths for a subsonic aircraft
p0411 A81-35636
Spanwise lift distribution of forward-and
aft-swept wings in comparison to the optimum
distribution form
p0453 A81-38017
Quasi-hybrid airships
[AIAA 81-1333] p0456 A81-38538
Aerodynamic estimation techniques for aerostats
and airships
[AIAA 81-1339] p0457 A81-38542
Experimental-programme - Transonic wing-TST
p0457 A81-38804
Calculation of the coefficients of head and local
drag of bluff bodies
p0466 A81-40023
A study of the effect of aft fuselage shape on
helicopter drag
p0470 A81-40116

The calculation of lift and drag characteristics
of subsonic wings with winglets
p0480 A81-40442
Improving the economy of subsonic transport
aircraft by means of aerodynamic approaches
p0510 A81-41336
Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740
Analytical studies on the effects of cooling flows
on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741
Investigation of a flight test method for the
measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760
Lift-enhancing surfaces on several advanced V/STOL
fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-43946
Contribution to the determination of the drag
coefficient for air breathing flight vehicles on
the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
Determination of thrust and throttle-dependent
drag for fighter aircraft
[AIAA PAPER 81-1692] p0617 A81-48417
Drag increment due to rear fuselage upsweep
[ESDU-80006] p0021 N81-10001
Induced drag ideal efficiency factor of arbitrary
lateral-vertical wing forms
[NASA-CR-3357] p0072 N81-12022
Aircraft accident report: Allegheny Airlines,
Inc., Nord 262, Mohawk/Frakes 298, N29824,
Benedum Airport, Clarksburg, West Virginia,
February 12, 1979
[NTSB-AAR-79-12] p0073 N81-12044
Transonic wind tunnel development (1940 - 1950)
p0185 N81-15971
An application of wake survey rakes to the
experimental determination of thrust for a
propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
Skin friction measuring device for aircraft
[NASA-CASE-FRC-11029-1] p0210 N81-17057
An investigation of drag associated with the
upswept rear fuselage of a helicopter
[BU-257] p0330 N81-20043
An investigation into the possible reduction of
aerodynamic drag of a fuel economy vehicle ---
wind tunnel tests
[BU-248] p0338 N81-21039
Wind tunnel tests of large- and small-scale rotor
hubs and pylons
[AD-A098510] p0439 N81-25043
Flight test evaluation of predicted light aircraft
drag, performance, and stability
[NASA-CR-159062] p0494 N81-27078
Modification in drag of turbulent boundary layers
resulting from manipulation of large-scale
structures
[NASA-CR-3444] p0587 N81-30392
AERODYNAMIC FORCES
NT AERODYNAMIC DRAG
NT AERODYNAMIC INTERFERENCE
NT AERODYNAMIC LOADS
NT BLAST LOADS
NT GUST LOADS
NT INTERFERENCE LIFT
NT JET LIFT
NT LIFT
NT SUPERSONIC DRAG
NT WING LOADING
NT ZERO LIFT
Investigation of lateral forces and moments in the
case of asymmetric gas flows in nozzles
p0004 A81-10913
Testing stand for the measurement of nonsteady
aerodynamic forces in the transonic wind tunnel
at Goettingen
p0065 A81-15703
A method for calculating the aerodynamic forces
and moments on external stores of aircraft
p0226 A81-24006
Control design for reduction of aerodynamic tail
forces using quadratic synthesis
p0240 A81-26610
Linear/nonlinear behavior in unsteady transonic
aerodynamics
[AIAA 81-0643] p0306 A81-29496
Unsteady aerodynamic propulsion
[AIAA 81-0645] p0307 A81-29498
On the convergence of unsteady generalized
aerodynamic forces
[AIAA 81-0647] p0307 A81-29500
Aerodynamic modeling of an oscillating wing with
external stores
[AIAA 81-0648] p0307 A81-29501
A new frequency parameter for unsteady aerodynamics
[AIAA 81-0649] p0307 A81-29502
A theoretical treatment of lifting surface theory
of an elliptic wing
p0347 A81-30653
Influence of hinge line gap on aerodynamic forces
acting on a harmonically oscillating thin
profile in an incompressible flow. I, II
p0348 A81-30956
Measurement of the aerodynamic forces acting on a
harmonically oscillating wing at high subsonic
speeds
p0349 A81-31042
A half-model free-oscillation rig for
pitch-damping measurements in high speed wind
tunnels
p0461 A81-39263
The influence of leading-edge thrust on twisted
and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146
An analytical technique for approximating unsteady
aerodynamics in the time domain
[NASA-TP-1738] p0043 N81-11022
Supercritical airfoil technology program wake
experiments and modeling for fore and aft loaded
compressor cascades
[AD-A091378] p0091 N81-13034
Clear air turbulence: Historical comments
p0136 N81-14562
A system for aerodynamic design and analysis of
supersonic aircraft. Part 1: General
description and theoretical development
[NASA-CR-3351] p0139 N81-14970
Structural tests on space shuttle thermal
protection system constructed with nondensified
and densified LI 900 and LI 2200 tile
[NASA-TM-81903] p0257 N81-18410
Langley Research Center contributions in advancing
active control technology
p0259 N81-19002
Theoretical analysis of an augmentor wing for a
VTOL fighter
[NASA-CR-152254] p0261 N81-19016
An experimental investigation of the effects of
trailing-edge strips on the unsteady aerodynamic
forces on tabs
[AD-A094989] p0263 N81-19028
VTOL in ground effect flows for closely spaced jets
--- to predict pressure and upwash forces on
aircraft structures
[NASA-CR-152321] p0271 N81-19095
Measurements of aerodynamic damping in the MIT
transonic rotor
[NASA-CR-163988] p0274 N81-19122
Prediction of transonic flutter for a
supercritical wing by modified strip analysis
and comparison with experiment
[NASA-TM-83126] p0445 N81-25432
Strake/delta wing interactions at high angles of
attack
[NASA-CR-166183] p0483 N81-26072
Flap-lag-torsional dynamic modelling of rotor
blades in hover and in forward flight, including
the effect of cubic nonlinearities
[NASA-CR-166194] p0486 N81-26116
Flap-lag-torsional dynamics of extensional and
inextensional rotor blades in hover and in
forward flight
[NASA-CR-164475] p0486 N81-26117
Aeroacoustics of a porous plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884
Statistical review of counting accelerometer data
for Navy and Marine fleet aircraft from 1
January 1962 to 31 December 1980
[AD-A102495] p0596 N81-31187
Transition and conversion trim-maps for the AV-8A
VTOL aircraft
[AD-A102155] p0596 N81-31188
AERODYNAMIC HEAT TRANSFER
Solution of nonautomodeled problems of
boundary-layer theory taking into account
nonstationary conjugate heat exchange and blowing
p0059 A81-14581

Simulation of aeroheating or aerocooling Air Force stores by arrays of impinging jets
[AD-A095464] p0330 N81-20034

AERODYNAMIC HEATING

Tensile stress/strain characterization of non-linear materials
p0348 A81-30915

The use of interactive graphic displays for interpretation of surface design parameters
[NASA-TM-81963] p0581 N81-30110

AERODYNAMIC INTERFERENCE

Wind tunnel wall interference in a test section with ventilated walls
p0015 A81-11673

Lift effect on transonic wind-tunnel blockage
p0066 A81-15883

Separation of laminar boundary layer induced by aerodynamic interference
p0067 A81-15897

A wall interference analysis --- in wind tunnels
p0104 A81-17472

Numerical simulation of wing-fuselage interference
[AIAA PAPER 81-0048] p0158 A81-20564

A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796

An improved potential gradient method to calculate airloads on oscillating supersonic interfering surfaces
[AIAA 81-0646] p0307 A81-29499

Calculation of supersonic flow past interfering wings
p0413 A81-36455

Effect of in-flight thrust reverser deployment on tactical aircraft stability and control
[AIAA PAPER 81-1446] p0504 A81-40879

Propeller performance and design as influenced by the installation
[SAE PAPER 810602] p0521 A81-42759

Helicopter airflow and wake characteristics for low speed and hovering flight from rocket interference investigations
p0572 A81-46608

A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] p0616 A81-48416

Finite element method study of wing-fuselage-nacelle interactions of a Falcon 20 type aircraft at Mach = 0.79
p0187 N81-15994

Prospects for exploiting favourable and minimizing adverse aerodynamic interference in external store installations
p0187 N81-15996

Evaluation of aircraft interference effects on external stores at subsonic and transonic speeds
p0187 N81-15997

Interference aspects of the A310 high speed wing configuration
p0188 N81-16001

Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0188 N81-16009

Experimental study of the interaction between the wing of a subsonic aircraft and a nacelle of a high by-pass ratio engine
p0189 N81-16010

Aerodynamic interaction between a close-coupled canard and a sweptback wing in transonic flow
p0189 N81-16013

Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014

Complex configuration analysis at transonic speeds
p0190 N81-16016

Theoretical and Experimental studies of aerodynamic interference effects --- aerodynamic forces on winglets and on wing nacelle configurations for the YC-14 and KC-135 aircraft
p0190 N81-16017

Data base for the prediction of inlet external drag
p0190 N81-16018

Philosophy and results of steady and unsteady test techniques on a large scale transport aircraft model in the ONERA transonic tunnel S1 MA. Part 1: Philosophy and results of steady tests. Part 2: Interest of large models in unsteady aerodynamics
p0190 N81-16019

Prediction of nacelle aerodynamic interference effects at low supersonic Mach numbers
p0244 N81-17988

Civil component program Wing Section. New calculation methods for subsonic and transonic interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034

Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] p0627 N81-32124

AERODYNAMIC LIFT
U LIFT

AERODYNAMIC LOADS
NT BLAST LOADS
NT GUST LOADS

Two methods for calculating the load on the surface of a slender body executing axisymmetric vibrations in a sonic gas flow
p0004 A81-10920

Structural flight load testing, calibration and analysis
p0013 A81-11656

Procedures to improve flight safety in wind shear conditions
p0014 A81-11666

Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack
[AIAA PAPER 81-0007] p0156 A81-20531

Prediction and experimental verification of transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568

On the derivation of universal indicial functions --- for unsteady transonic flow
[AIAA PAPER 81-0328] p0165 A81-20753

Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208] p0168 A81-20830

Aerodynamic blade excitation in turbocompressors
p0282 A81-27612

Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results
p0293 A81-29072

Use of flight simulators in developing design load spectra for new aircraft
[AIAA 81-0513] p0301 A81-29389

An application of the energy release rate concept to crack growth in attachment lugs
[AIAA 81-0491] p0302 A81-29420

An improved potential gradient method to calculate airloads on oscillating supersonic interfering surfaces
[AIAA 81-0646] p0307 A81-29499

Dynamic stability of a rotor blade using finite element analysis
[AIAA 81-0615] p0309 A81-29513

Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093

RAPIDLOADS - A preliminary design loads prediction technique for aircraft
[SAWE PAPER 1366] p0353 A81-31388

Aerodynamic load distribution along the span of an asymmetric wing
p0413 A81-35915

Experimental substantiation for hovering rotor vertical impedance calculations
p0453 A81-38015

The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-38534

Crack growth model for flight-type loading
p0460 A81-39247

Stability of nonuniform rotor blades in hover using a mixed formulation
p0467 A81-40088

JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1588] p0507 A81-40963

Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953

Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954

Evaluation of two-dimensional subsonic oscillatory
airforce coefficients and loading distributions
p0617 A81-48480
Stability of nonuniform rotor blades in hover
using a mixed formulation
[AD-A090756] p0076 N81-12071
On the use of active higher harmonic blade pitch
control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074
Experimental installation of mast mounted sight on
an OH-58C helicopter
[AD-A091074] p0092 N81-13047
A direct model pitch measurement with a laser
interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
Survey of Workshops on Meteorological and
Environmental Inputs to Aviation Systems
p0135 N81-14556
Transonic wind tunnel tests on an oscillating wing
with external store. Part 4: The wing with
underwing: Store
[AD-A077370] p0139 N81-14969
The velocity induced by the wake of a wind turbine
in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985
A flight investigation of performance and loads
for a helicopter with RC-SC2 main-rotor blade
sections
[NASA-TM-81898] p0186 N81-15982
Mean rotor wake characteristics of an
aerodynamically loaded 0.5 m diameter fan
[NASA-TM-81657] p0195 N81-16053
A method for the prediction of wing response to
nonstationary buffet loads
[AD-A093037] p0208 N81-17043
Comparison of flight load measurements obtained
from calibrated strain gages and pressure
transducers
[AD-A093758] p0208 N81-17044
The influence of the compressibility in simulating
the conduct of exterior loads of a carrier
[MBB-FE-122/S/PUB/17] p0220 N81-17483
Wind loading and response of a high-rise building
[CONF-810104-1] p0256 N81-18259
Wind loads for bar-truss structures
p0259 N81-18997
Status and future plans of the Drones for
Aerodynamic and Structural Testing (DAST) program
--- Aeroelastic Research Wing (ARW)
p0259 N81-19003
Calculation of airloads for a flexible wing via
NASTRAN
[AD-A094770] p0263 N81-19031
A higher-order trapezoidal vector vortex panel for
subsonic flow
[AD-A094775] p0263 N81-19032
Wind tunnel tests to determine the behavior during
ejection of exterior stores at high and low speeds
[DLGR-79-096] p0272 N81-19102
Nastran level 16 theoretical manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
Unsteady airloads on a harmonically pitching wing
with external store
[NLR-MP-80004-U] p0330 N81-20038
Application of linear quadratic control in
reduction of aerodynamic forces on aircraft
p0332 N81-20061
The development of a theoretical and experimental
model for the study of active suppression of
wing flutter
p0376 N81-22058
Some remarks on the unsteady airloads on
oscillating control surfaces in subsonic flow
p0386 N81-23055
Comparison of theoretical predictions of orbiter
airloads with wind tunnel and flight test
results for a Mach number of 0.52
[NASA-TM-81358] p0387 N81-23066
Performance deterioration based on simulated
aerodynamic loads test, JT9D jet engine
diagnostics program
[NASA-CR-165297] p0390 N81-23086
Development of a nonlinear vortex method ---
steady and unsteady aerodynamic loads of highly
sweptback wings
[NASA-CR-164351] p0423 N81-24024
Research related to variable sweep aircraft
development
[NASA-TM-83121] p0441 N81-25067
An aerodynamic analysis of deformed wings in
subsonic and supersonic flow
[AD-A101675] p0500 N81-30091
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 1: Analysis
and simulation --- F-4J and F-14A aircraft
[AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 2: Piloted
simulation assessment of Bihrle departure criteria
[AD-A101647] p0581 N81-30114
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 3: Appendices,
aerodynamic models
[AD-A101648] p0581 N81-30115
User's manual for FSLIP-3, FLEXSTAB loads
integration program
[NASA-TM-81364] p0589 N81-30815
Unsteady airloads on oscillating wings in
post-stall condition
[DFVLR-FB-81-16] p0594 N81-31158
The nature of operating flight loads and their
effect on propulsion system structures
p0599 N81-31207
Development of an aircraft maneuver load spectrum
based on VGH data
[AD-A102750] p0628 N81-32142
Investigation of unsteady airloads on wings with
oscillating control for active control purposes
[AGARD-R-699] p0635 N81-33161
AERODYNAMIC MOMENTS
U STABILITY DERIVATIVES
AERODYNAMIC NOISE
Discrete frequency noise due to irregularity in
blade row of axial fan rotor
p0002 A81-10633
On screeching jets exhausting from an axisymmetric
supersonic nozzle
p0008 A81-11616
Experiments on effective source locations and
velocity dependence of the broad band noise from
a rotating rod
p0016 A81-11724
Noise control design problems on air cushion
vehicles and surface effect ships
p0017 A81-11818
The status of rotor noise technology
p0019 A81-12737
Aerodynamic sound generated by a slotted trailing
edge
p0066 A81-15798
Noise generation mechanism of low pressure
propeller fans
[AIAA PAPER 81-0090] p0160 A81-20594
A lifting surface theory for the sound generated
by the interaction of velocity disturbances with
a leaned vane stator
[AIAA PAPER 81-0091] p0160 A81-20595
Mean rotor wake characteristics of an
aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208] p0168 A81-20830
Sound radiation from vortex systems
p0171 A81-21591
Investigation of transient processes in the
perforated working section of a wind tunnel
p0237 A81-26122
The displacement-thickness theory of trailing edge
noise
p0349 A81-30785
An acoustic source modelling technique to predict
the near sound field of axisymmetric turbulent
jets
[AIAA PAPER 81-2022] p0618 A81-48606
The role of the helical jet mode in aerodynamic
noise generation
[AIAA PAPER 81-1963] p0618 A81-48607
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] p0618 A81-48610
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] p0619 A81-48625
Noise radiated from inverted velocity profile jets
under simulated flight
[AIAA PAPER 81-2026] p0623 A81-49729
Shielding concepts for jet noise
[AIAA PAPER 81-2020] p0623 A81-49730
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] p0624 A81-49731

An improved prediction method for noise generated
by conventional profile coaxial jets
[AIAA PAPER 81-1991] p0624 A81-49743
Weapon bay cavity noise environments, data
correlation and prediction for the B-1 aircraft
[AD-A089770] p0045 N81-11778
Exhaust noise in flight: The role of acoustic
installation effects
[PWR-90029] p0138 N81-14793
Static source locations for four nozzles mounted
on a J-85 engine
[NASA-CR-152401] p0143 N81-14998
Curved centerline air intake for a gas turbine
engine
[NASA-CASE-LEW-13201-1] p0143 N81-14999
Flap noise characteristics measured by pressure
cross correlation techniques
p0259 N81-18808
Aerodynamic and acoustic behavior of a YF-12 inlet
at static conditions
[NASA-CR-163106] p0342 N81-21079

AERODYNAMIC STABILITY

Investigation of high-manoeuvrability flight
vehicle dynamics
p0009 A81-11625
Longitudinal motion of low-flying vehicles in
nonlinear flowfields
p0009 A81-11626
Preliminary consideration of parameter
identification analysis from parachute
aerodynamic flight test data
p0067 A81-16020
The effect of aerodynamic coupling on the dynamics
of aircraft in fast rolling motion
p0104 A81-17471
Practical aerodynamics of the helicopter Mi-6A ---
Russian book
p0116 A81-18600
Delta canard configuration at high angle of attack
p0154 A81-20351
A new concept for dynamic stability testing ---
for aircraft model in orbital path
[AIAA PAPER 81-0158] p0161 A81-20638
Curved-flow, rolling-flow, and oscillatory
pure-yawing wind-tunnel test methods for
determination of dynamic stability derivatives
p0241 A81-26933
The influence of gyroscopic forces on the dynamic
behavior of rotating blades
p0295 A81-29098
The effect of the atmospheric turbulence on the
rotor blade flap-leadlag motion stability in
hovering
[AIAA 81-0610] p0304 A81-29472
Dynamic stability of a rotor blade using finite
element analysis
[AIAA 81-0615] p0309 A81-29513
A new method of airfoil flutter control
p0367 A81-33844
Wind tunnel determination of dynamic
cross-coupling derivatives - A new approach
p0413 A81-35927
Lateral flutter of loads towed beneath helicopters
and its avoidance
p0470 A81-40114
On the use of approximate models in helicopter
flight mechanics
p0471 A81-40122
Parameter identification of a hingeless rotor
helicopter in flight conditions with increased
instability
p0471 A81-40123
Effect of engine noise on aircraft wing laminar
boundary-layer stability
p0510 A81-41255
Effects of yaw on leading edge vortex flap
aerodynamics
[AIAA PAPER 81-1660] p0526 A81-43147
Data analysis for aircraft parameter estimates
[AIAA PAPER 81-1864] p0560 A81-44561
Stability characteristics of a forward swept wing
aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576
Prediction of dynamic stall and unsteady airloads
for rotor blades
p0571 A81-46604
New designs for improved aerodynamic stability on
recent Aerospatiale helicopters
p0574 A81-46625
Stability and flutter analysis of turbine blades
at low speed
p0612 A81-47959
An analytical study of landing flare
[DFVLR-FB-79-40] p0027 N81-10062
Full scale wind tunnel investigation of a
bearingless main helicopter rotor --- Ames 40 by
80 foot wind tunnel test using the BO-105
helicopter
[NASA-CR-152373] p0033 N81-11014
Wind tunnel investigation of the aerodynamic
hysteresis phenomenon on the F-4 aircraft and
its effects on aircraft motion
[AD-A089851] p0033 N81-11016
Flight evaluation of stabilization and command
augmentation system concepts and cockpit
displays during approach and landing of
powered-lift STOL aircraft
[NASA-TP-1551] p0037 N81-11044
Missile motion sensitivity to dynamic stability
derivatives
[AD-A089750] p0038 N81-11093
Report on a cooperative programme on Active
Flutter Suppression
[AGARD-R-689] p0082 N81-12115
Stability of large horizontal-axis axisymmetric
wind turbines
[NASA-TM-81623] p0085 N81-12446
Dynamics of a helicopter-slung load system
p0092 N81-13051
Design of a lateral stability augmentation system
for the F106 to improve lateral handling
qualities during tracking
[AD-A091014] p0094 N81-13067
A contribution to stabilization of flight vehicle
parachute systems
[DFVLR-MITT-80-05] p0126 N81-13926
Active flutter suppression on an F-4F aircraft
with external stores using already existing
control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Aerodynamic stability analysis of NASA
J85-13/planar pressure pulse generator
installation
[NASA-CR-165141] p0143 N81-15004
TF34 engine compression system computer study ---
simulation of flow stability
[NASA-CR-159889] p0143 N81-15005
Some wake-related operational limitations of
rotorcraft
[NASA-TM-81920] p0186 N81-15985
Preliminary airworthiness evaluation AH-1S (PROD)
helicopter equipped with a substitute straight
exhaust pipe
[AD-A092614] p0194 N81-16045
Demonstration of a method for determining critical
store configurations for wing store flutter
[AD-A092257] p0197 N81-16069
Preliminary airworthiness evaluation OH-58C
helicopter configured with a mast mounted sight
[AD-A094172] p025[illegible] N81-18052
The phenomenon of dynamic stall --- vortex
shedding phenomenon on oscillating airfoils
[NASA-TM-81264] p0329 N81-20029
Maximum likelihood identification of aircraft
lateral parameters with unsteady aerodynamic
modelling
p0376 N81-22057
Transonic wind tunnel measurements of tailplane
and elevator effectiveness of the Jindivik 203B
target aircraft
[AD-A098180] p0424 N81-24031
Semi-actuator disk theory for compressor choke
flutter
[NASA-CR-3426] p0442 N81-25075
Phase 2 and 3 wind tunnel tests of the J-97
powered, external augmentor V/STOL model ---
conducted in Ames 40- by 80-foot wind tunnel
[NASA-CR-152380] p0483 N81-26076
Validation study of the V/STOL aerodynamics and
stability and control manual
[AD-A099236] p0486 N81-26119
A study of the effects of store aerodynamic on
wing/store flutter
p0490 N81-26153
A digital program for calculating the interaction
between flexible structures, unsteady
aerodynamics and active controls
[NASA-TM-80040] p0498 N81-27115

An engineering method for estimating the lateral/directicnal characteristics of V/STOL configurations in transition
[AD-A100386] p0540 N81-28103

AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121

Dynamic Stability Parameters --- conferences
[AGARD-LS-114] p0590 N81-31105

Aerodynamic mathematical modeling - basic concepts
p0590 N81-31106

Impact of high-alpha aerodynamics on dynamic stability parameters of aircraft and missiles
p0590 N81-31107

Review of techniques for determination of dynamic stability parameters in wind tunnels
p0590 N81-31108

Direct forced-oscillation techniques for the determination of stability derivatives in wind tunnels
p0590 N81-31109

Wind-tunnel measurement of aerodynamic derivatives using flexible-sting rigs
p0591 N81-31110

Rotary and Magnus balances
p0591 N81-31111

Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0591 N81-31112

Support interference
p0591 N81-31113

Applications of half-model technique in dynamic stability testing
p0591 N81-31114

Transition and conversion trim-maps for the AV-8A VTOL aircraft
[AD-A102155] p0596 N81-31188

Generalized dynamic stability for linearized yawing motion --- The stability of spinning projectiles
[BMCS-80002] p0601 N81-31225

Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12720-1] p0601 N81-31229

Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel
[NASA-TM-83171] p0635 N81-33159

AERODYNAMIC STALLING

Investigation of the stalling characteristics of a general aviation aircraft
p0014 A81-11665

A status report on NASA general aviation stall/spin flight testing
p0122 A81-19471

Model vibrations beyond low-speed stall
[ONERA, TP NO. 1980-154] p0123 A81-19552

Dynamic pressure response with stall on axial flow compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578

Stalling pressure rise capability of axial flow compressor stages
[ASME PAPER 81-GT-3] p0310 A81-29928

Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078

Role of laminar separation bubbles in airfoil leading-edge stalls
p0354 A81-31613

Fluid mechanics mechanisms in the stall process of airfoils for helicopters
p0360 A81-32779

Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations
[AIAA PAPER 81-1239] p0454 A81-38096

Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756

Determination of model structure and parameters of an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562

An investigation of the impact of aerodynamic lags on dynamic flight characteristics
[AIAA PAPER 81-1892] p0561 A81-44581

Prediction of dynamic stall and unsteady airloads for rotor blades
p0571 A81-46604

Active elimination of stall conditions --- in helicopters
p0571 A81-46605

On the numerical analysis of stall flutter in turbine cascade
p0613 A81-47963

An investigation of the dynamic stalling characteristics of rotating axial-flow compressor blades
p0093 N81-13054

Garry casing treatment
[CUED/A-TURBO/TR-101] p0093 N81-13059

Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14968

Supersonic stall flutter of high speed fans --- in turbofan engines
[NASA-TM-81613] p0140 N81-14978

Rotative balance of the I.M.F. Lille and associated experimental techniques
[NASA-TM-75886] p0276 N81-19137

The phenomenon of dynamic stall --- vortex shedding phenomenon on oscillating airfoils
[NASA-TM-81264] p0329 N81-20029

Fluid mechanics mechanisms in the stall process of helicopters
[NASA-TM-81956] p0338 N81-21027

Unsteady pressure measurements during stall and buffeting --- wind tunnel tests
[ESA-TT-641] p0339 N81-21041

On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042

A flight investigation of the ultra-deep-stall descent and spin recovery characteristics of a 1/6 scale radiocontrolled model of the Piper PA38 Tomahawk
[NASA-CR-156871] p0343 N81-21084

A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064

High-response measurements of a turbofan engine during nonrecoverable stall
[NASA-TM-81759] p0443 N81-25084

Model vibrations below low speed stall
p0447 N81-26017

Investigation of aerodynamic stall alleviation on a swept planform wing using leading edge modifications
[AD-A101239] p0548 N81-29122

Unsteady airloads on oscillating wings in post-stall condition
[DFVLR-FB-81-16] p0594 N81-31158

Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] p0629 N81-32154

AERODYNAMIC VEHICLES
U AIRCRAFT

AERODYNAMICS
NT AEROTHERMODYNAMICS
NT ROTOR AERODYNAMICS

The aerodynamics of pure subsonic flow /4th revised edition/ --- German book
p0006 A81-11441

High-lift investigations on some small aspect ratio wings
p0011 A81-11643

Linear vortex theories of a profile and wing with air intake
p0019 A81-12703

Subsonic parachute design, performance, and similarity laws /scale effects/ - A review of the Institute's activities during the last years
p0060 A81-14799

Steady flow past a rectangular wing with circulation that is variable along the span
p0099 A81-16551

Sound sources in aerodynamics - Fact and fiction
[AIAA PAPER 81-0056] p0159 A81-20570

Extraction of wavedrag from airfoil wake measurements
[AIAA PAPER 81-0291] p0164 A81-20732

Three-dimensional wing boundary layer calculated with eight different methods
p0171 A81-21555

Israel Annual Conference on Aviation and Astronautics, 21st, Tel Aviv and Haifa, Israel, February 28-March 1, 1979, Proceedings
p0226 A81-24003

Numerical simulation of supersonic flow around solids of revolution with a leading detachment

zone p0231 A81-24757
Some problems of modeling high-speed aerodynamics --- in wind tunnels and tubes p0237 A81-26118
Historical development of flutter [AIAA 81-0591] p0302 A81-29419
Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis p0309 A81-29867
The challenge of unsteady separating flows p0411 A81-35647
Calculation of supersonic flow around a wing with constant curvature of its leading edges p0413 A81-35916
Calculation of flow past wings with supersonic sharp edges p0418 A81-36944
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed [AIAA 81-1335] p0457 A81-38540
Application of unsteady airfoil theory to rotary wings p0465 A81-39874
Investigation of landing gear alternatives for high performance aircraft [AIAA PAPER 81-1639] p0525 A81-43139
Application of pulse code modulation technology to aircraft dynamics data acquisition [AIAA PAPER 81-1736] p0528 A81-43173
Aerodynamic integration of externally mounted engines on a long-range bomber [AIAA PAPER 81-1693] p0563 A81-44899
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity p0613 A81-47962
Measured pressure distributions and shock shapes on a simple delta wing p0617 A81-48479
Performance prediction for light airplanes p0622 A81-49374
Adiabatic gas flow. Citations from the NTIS data base [PB80-808546] p0026 N81-10048
Pilot-aircraft system response to wind shear [NASA-CR-3342] p0031 N81-10636
The principles and applications of cryogenic wind tunnels p0037 N81-11049
Model design and instrumentation experiences with continuous-flow cryogenic tunnels p0037 N81-11057
The European Transonic Wind tunnel ETW p0038 N81-11064
Characteristics and status of the US National Transonic Facility p0038 N81-11065
Effects of axisymmetric contractions on turbulence of various scales p0093 N81-13055
Evaluation of flow quality in two large NASA wind tunnels at transonic speeds [NASA-TP-1737] p0095 N81-13303
Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers [ONERA-NT-1980-4] p0126 N81-13930
Development of high-temperature turbine subsystem technology to a technology readiness status, phase 2 [FE-1806-72] p0134 N81-14332
Bird flight and airplane flight --- instruments to measure air currents and flight characteristics [NASA-TM-75777] p0138 N81-14962
Bibliography of Supersonic Cruise Research (SCR) program from 1977 to mid-1980 [NASA-RP-1063] p0139 N81-14973
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade [NASA-CR-165166] p0140 N81-14976
The high-speed airfoil program p0185 N81-15970
Transonic wind tunnel development (1940 - 1950) p0185 N81-15971
The high-speed propeller program p0185 N81-15972
High-speed cowlings, air inlets and outlets, and internal-flow systems p0185 N81-15973
A feasibility study for advanced technology integration for general aviation [NASA-CR-159381] p0185 N81-15974
The tale of two wings p0188 N81-16004
Some particular configuration effects on a thin supercritical variable camber wing p0188 N81-16005
A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow p0188 N81-16006
Jet wing interaction to give improved combat performance p0188 N81-16007
Jet wing interference for an overwing engine configuration p0188 N81-16008
Interference effects of concentrated blowing and vortices on a typical fighter configuration p0188 N81-16009
Supersonic Cruise Research 1979, part 1 [NASA-CP-2108-PT-1] p0243 N81-17981
Transonic flow studies [NASA-CR-163965] p0249 N81-18029
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base [AD-A094226] p0252 N81-18050
Numerical computation of flows with rolled-up vortex sheets p0255 N81-18256
An interactive computational aerodynamics analysis program [AD-A094765] p0263 N81-19033
A computer technique for detailed analysis of mission radius and maneuverability characteristics of fighter aircraft [NASA-TP-1837] p0329 N81-20026
A look at NASA's Aircraft Energy Efficiency program [PSAD-80-50] p0334 N81-20077
Aerodynamics of advanced axial-flow turbomachinery [NASA-CR-163995] p0335 N81-20079
Tendencies in the development of subsonic transport-aircraft under special considerations of aerodynamics [DFVLR-MITT-80-15] p0338 N81-21040
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation [NASA-CR-3405] p0372 N81-22015
Analytical study of the cruise performance of a class of remotely piloted, microwave-powered, high-altitude airplane platforms [NASA-TM-81969] p0374 N81-22040
Aircraft modification management evaluation [AD-A096458] p0381 N81-22974
Description of recent changes in the Langley 6- by 28-inch transonic tunnel [NASA-TM-81947] p0391 N81-23096
Measurement of aerodynamic work during fan flutter [NASA-TM-82652] p0443 N81-25080
US and USSR Military Aircraft and Missile Aerodynamics 1970-1980. A selected, annotated bibliography, volume 1 [NASA-TM-81951] p0547 N81-29119

AEROELASTICITY
NT AEROTHERMOELASTICITY
Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream p0060 A81-14959
A frequency-domain technique for aeroelastic mode estimation p0156 A81-20475
On the derivation of universal indicial functions --- for unsteady transonic flow [AIAA PAPER 81-0328] p0165 A81-20753
Damping of aircraft wing vibrations by automatically controlled internal forces p0170 A81-21060
A penalty function method for structural optimum design with aeroelastic constraints p0223 A81-23727
On the use of complex form of the Strouhal number in the study of nonlinear aeroelasticity p0231 A81-24723

Damping in the problem of natural vibrations of an
elastic system with internal resonance
p0236 A81-25656
Aeroelastic stability of aircraft --- Russian book
p0281 A81-27531
Flutter of plates and shells in practice
p0282 A81-27611
Historical development of flutter
[AIAA 81-0591] p0302 A81-29419
Resonance of forwards and backwards vibration mode
of impeller with gyroscopic effect
[AIAA 81-0524] p0303 A81-29445
A study of the effect of store aerodynamics of
wing/store flutter
[AIAA 81-0604] p0304 A81-29467
Evaluation of methods for prediction and
prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
Aeroelastic tailoring of a composite winglet for
KC-135
[AIAA 81-0607] p0304 A81-29470
Prediction of transonic flutter for a
supercritical wing by modified strip analysis
and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Determining the natural frequency of the
combinative system of the helicopter rotor and
elastic fuselage with mechanical impedance
technique
[AIAA 81-0613] p0305 A81-29475
Dynamic analysis of a free-tip rotor
[AIAA 81-0618] p0305 A81-29479
Aeroservoelasticity in the time domain --- for
YF-16 aircraft
[AIAA 81-0635] p0306 A81-29489
A new frequency parameter for unsteady aerodynamics
[AIAA 81-0649] p0307 A81-29502
A hybrid state vector approach to aeroelastic
analysis with application to composite lifting
surfaces
[AIAA 81-0626] p0308 A81-29512
Non-linear oscillator models in bluff body
aeroelasticity
p0348 A81-30786
A Galerkin type finite element method for
rotary-wing aeroelasticity in hover and forward
flight
p0364 A81-33050
A new method of airfoil flutter control
p0367 A81-33844
Application of unsteady airfoil theory to rotary
wings
p0465 A81-39874
Rotor blade aeroelastic stability and response in
forward flight
p0467 A81-40089
Wind tunnel evaluation of aeroelastically
conformable rotors
[AHS 80-23] p0475 A81-40153
Aeroelastic stability analysis of hingeless rotor
helicopters in forward flight using blade and
airframe normal modes
[AHS 80-24] p0475 A81-40154
An experimental investigation of the effects of
aeroelastic couplings on aeromechanical
stability of a hingeless rotor helicopter
[AHS 80-25] p0475 A81-40155
A preliminary divergence and flutter evaluation of
an X-wing aircraft
[AIAA PAPER 81-1671] p0534 A81-43945
Development of airframe structural design loads
prediction techniques for flexible military
aircraft - Theoretical development
[AIAA PAPER 81-1656] p0535 A81-43953
Development of airframe structural design loads
prediction techniques for flexible military
aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954
An analytical pilot rating method for highly
elastic aircraft
[AIAA 81-1772] p0554 A81-44093
Development and hardware verification of an
aeroelastically tailored forward swept composite
wing
p0557 A81-44355
An investigation of the impact of aerodynamic lags
on dynamic flight characteristics
[AIAA PAPER 81-1892] p0561 A81-44581
Design, analyses, and model tests of an
aeroelastically tailored lifting surface
[AIAA PAPER 81-1673] p0566 A81-45974
Full-scale wind-tunnel test of the aeroelastic
stability of a bearingless main rotor
p0573 A81-46620
Automatic damping of vibrations of an airplane
wing by internal control forces
p0577 A81-46783
Stability and flutter analysis of turbine blades
at low speed
p0612 A81-47959
Computer-aided investigation of turbomachine
aerodynamics and aeroelasticity
p0613 A81-47962
Calculation of the aerodynamic characteristics of
a deformable wing, moving near a screen
p0625 A81-49948
Full scale wind tunnel investigation of a
bearingless main helicopter rotor --- Ames 40 by
80 foot wind tunnel test using the BO-105
helicopter
[NASA-CR-152373] p0033 N81-11014
An analytical technique for approximating unsteady
aerodynamics in the time domain
[NASA-TP-1738] p0043 N81-11422
Optimal design studies on composite wings with
static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
Dynamic response of a forward-swept-wing model at
angles of attack up to 15 deg at a Mach number
of 0.8 --- Langley transonic dynamics tunnel tests
[NASA-TM-81863] p0085 N81-12448
Aeroelastic optimization with multiple constraints
[AD-A090775] p0085 N81-12451
Passive control of wing/store flutter
[NASA-TM-81865] p0125 N81-13922
The effects of warhead-induced damage on the
aeroelastic characteristics of lifting surfaces.
Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
A method for the prediction of wing response to
nonstationary buffet loads
[AD-A093037] p0208 N81-17043
Application of the finite element method to rotary
wing aeroelasticity
p0251 N81-18043
Description of the HiMAT Tailored composite
structure and laboratory measured vehicle shape
under load
[NASA-TM-81354] p0251 N81-18047
Design for active and passive flutter suppression
and gust alleviation
p0253 N81-18063
Status and future plans of the Drones for
Aerodynamic and Structural Testing (DAST) program
--- Aeroelastic Research Wing (ARW)
p0259 N81-19003
Nastran level 16 theoretical manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
NASTRAN level 16 user's manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159824] p0279 N81-19481
NASTRAN level 16 programmer's manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
NASTRAN level 16 demonstration manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159826] p0279 N81-19483
The development of a theoretical and experimental
model for the study of active suppression of
wing flutter
p0376 N81-22050
Structures and Materials Panel
[AD-A089019] p0378 N81-22420
Experimental studies of scale effects on
oscillating airfoils at transonic speeds
p0386 N81-23054
Aerodynamics, aeroelasticity, and stability of
hang gliders. Experimental results --- Ames 7-
by 10-ft wind tunnel tests
[NASA-TM-81269] p0423 N81-24925
Overview: NASA/AF/Navy Symposium on
Aeroelasticity of Turbine Engines
[NASA-CR-164419] p0444 N81-25009
Flight test results of an active flutter
suppression system installed on a remotely
piloted research vehicle

[NASA-TM-83132] p0486 N81-26118
Final design and fabrication of an active control
system for flutter suppression on a
supercritical aeroelastic research wing
[NASA-CR-165714] p0498 N81-27114
Aerodynamic and aeroelastic research on tipvane
turbines
[VTH-LR-302] p0540 N81-28100
Some experiences with active control of
aeroelastic response
[NASA-TM-83179] p0587 N81-30469
Aeroelastic flutter and divergence of
graphite/epoxy cantilevered plates with
bending-torsion stiffness coupling
[AD-A101726] p0587 N81-30476
Aeroelasticity, including dynamic effects of
separated flow --- launch vehicle response
p0592 N81-31118
Report of the panel on aeroelasticity and unsteady
aerodynamics
p0593 N81-31149
Aeroelastic buffeting prediction techniques: A
general review
[DFVLR-FB-81-15] p0601 N81-31226
Aeroelastic instability stoppers for wind-tunnel
models
[NASA-CASE-LAR-12720-1] p0601 N81-31229
Aeroelastic instability stoppers for wind-tunnel
models
[NASA-CASE-LAR-12458-1] p0601 N81-31230

AEROMAGNETO FLUTTER
U FLUTTER

AERONAUTICAL ENGINEERING
Aerospace highlights 1980
p0063 A81-15374
A summary of proposals for airflight research by
the BMFT
p0118 A81-19298
An aeronautical structural analysis system for
static analysis /HAJIF-I/
p0224 A81-23728
B. M. Fraeijs de Veubeke memorial volume of
selected papers --- Book
p0232 A81-25174
Engineering aspects of composite structures for
civil aircraft
p0283 A81-27888
Principles of aircraft structural design /2nd
revised and enlarged edition/ --- Russian book
p0355 A81-31800
Aircraft design then and now
[AIAA PAPER 81-0917] p0363 A81-32933
The rise of air and space
p0366 A81-33718
Industrial leadership of an aircraft design class
[AIAA PAPER 81-1723] p0528 A81-43166
On making things the best - Aeronautical uses of
optimization /Wright Bros. lecture/
[AIAA PAPER 81-1738] p0528 A81-43175
Aeronautical engineering - A historical perspective
p0562 A81-44849
New technologies in future commercial aircraft
p0565 A81-45759
Prospects for the employment of dirigibles in the
1980s
p0565 A81-45763
Helicopter External Gondola System
p0576 A81-46642
Fatigue test results of carbon fiber reinforced
plastic F28 aircraft component and its
structural details
p0040 N81-11135
NASA Research in aeropropulsion
[NASA-TM-81633] p0093 N81-13056
A system for aerodynamic design and analysis of
supersonic aircraft. Part 2: User's manual
[NASA-CR-3352] p0125 N81-13920
Computational aerodynamic design tools and
techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0128 N81-13950
Fundamentals of conceptual design optimization of
subsonic transport aircraft
[VTH-LR-292] p0128 N81-13951
A feasibility study for advanced technology
integration for general aviation
[NASA-CR-159381] p0185 N81-15974
Posture hearings (NASA and FAA)
[GPO-65-265] p0203 N81-16952
Aircraft crash survival design guide. Volume 1:
Design criteria and checklists, revision
[AD-A093784] p0204 N81-16997
Technology development status at McDonnell Douglas
p0248 N81-18019
The 1980 Aircraft Safety and Operating Problems,
part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
Scientific and Technical Information Output of the
Langley Research Center, for calendar year 1976
[NASA-TM-82310] p0279 N81-19964
Design considerations for composite fuselage
structure of commercial transport aircraft
[NASA-CR-159296] p0378 N81-22419
Aeronautical systems technology needs: Escape,
rescue and survival and test facilities and test
equipment
[AD-A097827] p0423 N81-24020
NASA's aeronautics program: Systems technology
and experimental program
[NASA-CR-164642] p0543 N81-29034
NASA authorization, 1982, volume 4
[GPO-79-432-VOL-4] p0590 N81-31030

AERONAUTICAL SATELLITES
Aeronautical-Maritime Engineering Satellite /AMES/
program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318

AERONAUTICS
Radio Technical Commission for Aeronautics,
Technical Symposium and Annual Assembly Meeting,
Washington, D.C., November 20, 21, 1980,
Proceedings
p0285 A81-28293
Propeller and wing --- Russian book
p0366 A81-33696
Light aviation in the United States - September 1980
--- French book
p0513 A81-41903
Communications support for National Flight Data
Center information system
[AD-A093095] p0219 N81-17327

AEROSOLS
NT FOG

AEROSPACE ENGINEERING
NT AERONAUTICAL ENGINEERING
Aerospace highlights 1980
p0063 A81-15374
Nederlandse Vereniging voor Luchtvaarttechniek,
Yearbook 1979
p0232 A81-24938
Advanced composites - Evolution of manufacturing
technology
[AIAA PAPER 81-0895] p0362 A81-32920
The rise of air and space
p0366 A81-33718
Forecasting the 80s - An outlook on aerospace
developments of the decade by the Technical
Committees of the AIAA
p0510 A81-41399
Research and technology of the Langley Research
Center
[NASA-TM-81910] p0089 N81-12977
Productivity in aerospace research and development
[NASA-TM-82388] p0097 N81-13804
Design, fabrication and test of graphite/polyimide
composite joints and attachments for advanced
aerospace vehicles
[NASA-CR-159112] p0194 N81-16042
Posture hearings (NASA and FAA)
[GPO-65-265] p0203 N81-16952
Evolution of materials and associated technologies
in the makeup of aerospace materials, part 1
[AAAF-NT-79-22-PT-1] p0209 N81-17050
Evolution of materials and associated technologies
in the makeup of aerospace materials. Part 2:
Examples
[AAAF-NT-79-22-PT-2] p0209 N81-17051
La Recherche Aerospatiale, Bimonthly Bulletin no.
1980-2, March - April 1980
[ESA-TT-652] p0255 N81-18244
Challenge for operational experience feedback in
aircraft design: An aircraft design example
[AD-A096088] p0341 N81-21067
Aerospace in the future
[NASA-TM-82664] p0543 N81-29063
NASA authorization, 1982, volume 4
[GPO-79-432-VOL-4] p0590 N81-31030

AEROSPACE INDUSTRY
NT AIRCRAFT INDUSTRY

New avenues of research in ultrasonic inspection and their applications in the aerospace industry
p0052 A81-13332
NASA's activities in the conservation of strategic aerospace materials
p0179 A81-22535
Advanced composites - Evolution of manufacturing technology
[AIAA PAPER 81-0895] p0362 A81-32920
The titanium industry and the fabrication of semimanufactures for aeronautics
p0416 A81-36651
Forecasting the 80s - An outlook on aerospace developments of the decade by the Technical Committees of the AIAA
p0510 A81-41399
Challenges in alloy design - Titanium for the aerospace industry
p0553 A81-43998
NASA's activities in the conservation of strategic aerospace materials
[NASA-TM-81617] p0550 N81-29205

AEROSPACE MEDICINE
Ergonometric study of ejection through a breakable canopy
p0205 N81-17011

AEROSPACE SCIENCES
Forecasting the 80s - An outlook on aerospace developments of the decade by the Technical Committees of the AIAA
p0510 A81-41399
Evolution of materials and associated technologies in the makeup of aerospace materials. Part 2: Examples
[AAAF-NT-79-22-PT-2] p0209 N81-17051

AEROSPACE SYSTEMS
Aerospace highlights 1980
p0063 A81-15374
Avionics and displays in a future airspace system
p0112 A81-18070
Analysis and synthesis of the digital attitude control system of the aerospace vehicle
p0224 A81-23837
The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475
Application of the parameter space method to aerospace vehicle digital control system design
p0359 A81-32642
Nuclear hardness assurance for aeronautical systems
[SAE PAPER 801227] p0405 A81-34230
The application of interactive graphics to thermal modeling
[AIAA PAPER 81-1109] p0459 A81-39159
Improvement of guidance and handling qualities in the vicinity of airports and on landing --- use of a digital command system
[BMFT-FB-W-79-42] p0425 N81-24045

AEROSPACE TECHNOLOGY TRANSFER
Aeronautics and Space Report of the President, 1979 activities
p0089 N81-12956
Scientific and Technical Information Output of the Langley Research Center, for calendar year 1976
[NASA-TM-82310] p0279 N81-19964

AEROSPACE VEHICLES
Acoustic fatigue assessment in the design of aerospace vehicles
p0059 A81-14395
Damping in the problem of natural vibrations of an elastic system with internal resonance
p0236 A81-25696
High frequency angular vibration measurements in vehicles
[AAS PAPER 81-024] p0361 A81-32886
Maintenance and repair of advanced composite structure
p0550 A81-44382

AEROSTATS
U AIRSHIPS

AEROTHERMODYNAMICS
An implicit finite volume method for elliptical flow computation --- numerical integration, aerothermodynamics
p0255 N81-18248

AEROTHERMOELASTICITY
Aeroelastic and dynamic finite element analyses of a bladder shrouded disk
[NASA-CR-159720] p0278 N81-19479

AEROZINE
NT LIQUID FUELS

AFCS (CONTROL SYSTEM)
U AUTOMATIC FLIGHT CONTROL

AFTERBODIES
Factors affecting afterbody drag
p0292 A81-29069
Wing-body carryover at supersonic speeds with finite afterbodies
p0354 A81-31622
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0365 A81-33281
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-43979
An evaluation of wind tunnel test techniques for aircraft nozzle afterbody testing at transonic Mach numbers
[AD-A091775] p0126 N81-13931
Evaluation of wind tunnel nozzle afterbody test techniques utilizing a modern twin engine fighter geometry at Mach numbers from 0.6 to 1.2 --- YF-17 aircraft
[AD-A091545] p0126 N81-13932
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0255 N81-18257
An investigation of drag associated with the upswept rear fuselage of a helicopter
[BU-257] p0330 N81-20043

AFTERBURNERS
U AFTERBURNING

AFTERBURNING
Application of scaling in afterburner test and development
[ASME PAPER 81-GT-194] p0317 A81-30086
Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996
Small turbine engine augmentor. Phase 1: Preliminary design studies of afterburner and duct-burner configurations
[AD-A101595] p0583 N81-30131

AGGREGATES
Recycling of Portland Cement Concrete airport pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141

AGING (MATERIALS)
Aging study of the Caravelle 38
p0061 A81-15119

AGRICULTURAL AIRCRAFT
Advanced materials for agricultural aircraft
[SAE PAPER 800610] p0062 A81-15333
Death and injury in aerial spraying - Pre-crash, crash, and post-crash prevention strategies
p0177 A81-22115
Design requirements of agricultural aircraft
p0282 A81-27880
Vortex drag reduction by diffusing vanes - Design for the 'Thrush' agricultural aircraft
[SAE PAPER 810605] p0521 A81-42762
Effects of wingtip modifications on handling qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
Leading edge high lift devices for agricultural aircraft
[SAE PAPER 810608] p0522 A81-42765
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019

AH-1G HELICOPTER
Prediction of helicopter rotor noise from measured blade surface pressure
p0577 A81-46649
A flight investigation of performance and loads for a helicopter with RC-SC2 main-rotor blade sections
[NASA-TM-81898] p0166 N81-15982
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23438
Analytical testing
[NASA-CR-3429] p0393 N81-23487

AH-64 HELICOPTER
Advanced Attack Helicopter /YAH-64/ - Status report
p0099 A81-16580

A piloted simulation of the backup control system engagement for the YAH-64
p0576 A81-46646
Application of an in-line contamination monitoring unit to the AHT-64 Hydraulic Test Stand
[AD-A100696] p0550 N81-29140
AILERONS
Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19009
Pressure distributions for the GA(W)-2 airfoil with 20% aileron, 25% slotted flap and 30% Fowler flap
[NASA-CR-2948] p0262 N81-19023
Feasibility study for C-141B reduction of wing loads by uprigging the ailerons
[AD-A094634] p0272 N81-19105
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
AIR
NT COMPRESSED AIR
NT HIGH TEMPERATURE AIR
Investigation of air solubility in jet A fuel at high pressures
[NASA-CR-3422] p0378 N81-22130
AIR BEARINGS
U GAS BEARINGS
AIR BREATHING ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT DUCTED FAN ENGINES
NT GAS TURBINE ENGINES
NT J-65 ENGINE
NT J-79 ENGINE
NT J-85 ENGINE
NT J-97 ENGINE
NT JET ENGINES
NT RAMJET ENGINES
NT SUPERSONIC COMBUSTION RAMJET ENGINES
NT T-56 ENGINE
NT TF-41 ENGINE
NT TURBOFAN ENGINES
NT TURBOJET ENGINES
NT TURBOPROP ENGINES
A survey on airbreathing propulsion education
p0063 A81-15375
A study of air breathing rockets - Subsonic mode combustion
[IAF PAPER 80-F-270] p0115 A81-18371
International Symposium on Air Breathing Engines, 5th, Bangalore, India, February 16-22, 1981, Proceedings
p0290 A81-29051
The future of aeronautical propulsion
p0290 A81-29052
Effectiveness of turbine engine diagnostic systems
p0290 A81-29053
A new breed of an air breathing engine
p0292 A81-29070
Film cooling performance by injection through discrete holes
p0293 A81-29074
Strong pressure waves in air-breathing engines
[AIAA PAPER 81-1475] p0505 A81-40895
Fiber-reinforced composites - The future for aeropropulsion
[AIAA PAPER 81-1713] p0527 A81-43164
Sensor/actuator failure detection and isolation for airbreathing propulsion systems
p0564 A81-45551
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
Propulsion Controls, 1979 --- air breathing engine control
[NASA-CP-2137] p0078 N81-12090
AIR CARGO
Carrier system simplifies freight handling - A new technical concept for Lufthansa's Frankfurt facility
p0056 A81-14241
The future of airfreight - NASA study looks into the next century
p0056 A81-14242
Flatbed - The universal transport airplane
[SAWE PAPER 1343] p0353 A81-31382
'Load snubbing' - A solution to the problem of terrain flying with external cargo
[AHS 80-32] p0476 A81-40162
Determination of cargo container inventories through logistics simulation --- for air shipment
p0616 A81-48380
Air cargo market outlook and impact via the NASA CLASS project --- Cargo/Logistics Airlift Systems Study
[NASA-TM-81886] p0073 N81-12039
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049
AIR CONDITIONING EQUIPMENT
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
p0614 A81-46196
An analysis of thermal balance in the cooled cabin of a Sea King Helicopter
[AD-A097199] p0389 N81-23077
AIR COOLING
The design of blowing-cooled aircraft electrical machines
p0002 A81-10474
Features improved cooling - Turbine blade redesign boosts life
p0227 A81-24046
Transpiration air cooled turbine blade - A technology for future generation aircraft and industrial gas turbine engines using coal or coal derived fuels
p0297 A81-29115
Cooling air flow characteristics in gas turbine components
[ASME PAPER 81-GT-76] p0313 A81-29984
An investigation of a preswirled cooling airflow to a turbine disc by measuring the air temperature in the rotating channels
[ASME PAPER 81-GT-132] p0316 A81-30035
Comparative efficiency of penetrating steam and air cooling of gas turbine blades
p0509 A81-41003
Thermodynamic comparison of the efficiencies of semiclosed- and open-loop air cooling systems of gas turbine engines
p0509 A81-41029
Analytical studies on the effects of cooling flows on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015
Thermal and flow analysis of a convection air-cooled ceramic coated porous metal concept for turbine vanes
[NASA-TM-81749] p0376 N81-22056
Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24068
The packaging of electronic engine control units and related subcomponents
p0497 N81-27105
AIR CURRENTS
NT JET STREAMS (METEOROLOGY)
NT VERTICAL AIR CURRENTS
Bird flight and airplane flight --- instruments to measure air currents and flight characteristics
[NASA-TM-75777] p0138 N81-14962
AIR CUSHION LANDING SYSTEMS
Comparison of model testing with computer simulations of an air landing system
[AIAA PAPER 81-1663] p0534 A81-43942
Soviet military air cushion vehicles - Mechanized amphibious assault
p0577 A81-46714
Studies of some unconventional systems for solving various landing problems --- air cushion landing system
p0268 N81-19067
Calibration of an axial fan at various power settings for use on a quarter scale XC-8A air cushion model
[AD-A097043] p0374 N81-22042
AIR CUSHION VEHICLES
U GROUND EFFECT MACHINES

AIR DEFENSE
Operator training systems/simulators
p0349 A81-31109
The Tactical Air Forces - Outlook for the next decade
[AIAA PAPER 81-0932] p0408 A81-34364
AIR FILTERS
T700 engine integral inlet separator - All weather operational protection
p0469 A81-40108
AIR FLOW
NT AIR CURRENTS
NT JET STREAMS (METEOROLOGY)
NT VERTICAL AIR CURRENTS
Harmonically oscillating airfoil in transonic stream of air
p0054 A81-13753
Considerations of the use of vitiated preheat --- for engine inlets
p0150 A81-20023
Calculation of flow with variable specific heat around a profile
p0235 A81-25689
Light transmission measurements in solid fuel ramjet combustors
p0284 A81-27910
Cooling air flow characteristics in gas turbine components
[ASME PAPER 81-GT-76] p0313 A81-29984
An investigation of a preswirled cooling airflow to a turbine disc by measuring the air temperature in the rotating channels
[ASME PAPER 81-GT-132] p0316 A81-30035
Test stand for the study of flow systems in wind tunnels
p0409 A81-35009
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions
p0417 A81-36737
Improved combustor domes designed for hot streak reduction
[AIAA PAPER 81-1352] p0501 A81-40835
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40887
Analytical studies on the effects of cooling flows on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137
Mixing and combustion in high speed air flows
[AD-A090536] p0083 N81-12192
Dynamic, hot surface ignition of aircraft fuels and hydraulic fluids
[NASA-CR-163979] p0254 N81-18139
Fluid mechanics mechanisms in the stall process of helicopters
[NASA-TM-81956] p0338 N81-21027
Study of an experimental probe for the measurement of the acoustic pressure inside an air flow
[ESA-TT-633] p0344 N81-21340
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320
AIR FREIGHT
U AIR CARGO
AIR INLETS
U AIR INTAKES
AIR INTAKES
NT ENGINE INLETS
NT SUPERSONIC INLETS
Engine air intake design support by use of computational methods and comparison of theoretically derived pressure distributions with experimental data
p0008 A81-11614
A study of the air inlet efficiency of a combat aircraft concept with dorsal inlet
p0008 A81-11615
Linear vortex theories of a profile and wing with air intake
p0019 A81-12703
Flow separation in inlets at incidence angles
p0297 A81-29114
Investigation of instantaneous distortions in air intakes at high angles of attack
[AAAF PAPER NT 80-38] p0369 A81-3394[illegible]
Analysis of total and static pressure fluctuations in an air intake at high incidence
[AAAF PAPER NT 80-61] p0370 A81-33950
An apparatus for the simulation of an air intake at high angle of attack in a compressor test facility
[ONERA, TP NO. 1981-35] p0460 A81-39238
Tests of air inlets at Reynolds numbers comparable to flight in the ONERA F1 and S1MA wind tunnels
[ONERA, TP NO. 1981-36] p0460 A81-39239
An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906
Curved centerline air intake for a gas turbine engine
[NASA-CASE-LEW-13201-1] p0143 N81-14999
AIR JETS
Experimental investigations on shock-associated noise
p0107 A81-17735
Influence of jet location on the efficiency of spanwise blowing
p0154 A81-20352
Streamwise flow and heat transfer distributions for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985
Shielding concepts for jet noise
[AIAA PAPER 81-2020] p0623 A81-49730
The Dalembertometer
[ISL-CO-220/79] p0133 N81-14292
AIR LAUNCHING
High altitude launch of the Cruise Missile
p0179 A81-22608
Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20] p0474 A81-40150
Impact of terrain correlation elevation reference data on Boeing's Air Launched Cruise Missile
p0517 A81-42439
AIR LOCKS
Blade tip ceramic outer air seal for long life turbine engines
[AIAA PAPER 81-1440] p0504 A81-40874
AIR NAVIGATION
NT ALL-WEATHER AIR NAVIGATION
NT AREA NAVIGATION
NT NAP-OF-THE-EARTH NAVIGATION
Computer generated radar images for navigation
p0049 A81-12793
Autonomous navigation using passively sensed terrain images
p0110 A81-17977
RNAV benefits today - Today and future requirements
p0111 A81-18056
Omega - An economic Loran A replacement
p0113 A81-18077
Cruise-missile-carrier navigation requirements
p0116 A81-18576
Radio navigation for aircraft: Handbook --- Russian book
p0116 A81-18599
Map-type displays --- for air navigation
p0121 A81-19443
Improved secondary radar antennas for flight safety installations
p0151 A81-20083
Some implementation considerations for numerically stable flight filters
p0156 A81-20485
The Global Positioning System versus gravity disturbance modeling in an inertial navigation system --- error reduction at aircraft altitude
[AIAA PAPER 81-0087] p0160 A81-20591
Airline navigation planning
p0174 A81-21966
The flight assessment and applications of DME/DME. I, II
p0174 A81-21968
Characterizing cross-track error distributions for continental jet routes
p0174 A81-21969
New navigation systems for helicopters
p0177 A81-22167

Civil aviation applications of Navstar/GPS through differential techniques p0177 A81-22374
The ANK - A four dimensional navigation/flight management system for today p0180 A81-22615
Integrated avionics studies target future technologies p0223 A81-23499
Laser-gyro strapdown inertial navigation p0225 A81-23868
New technology for the NDB system and its reliability. II --- omnidirectional radio beacons p0230 A81-24524
New technology for the NDB system and its reliability. III --- omnidirectional radio beacon p0231 A81-24525
Position-determination accuracies of navigation methods p0233 A81-25374
Aircraft radar equipment and its operation --- Russian book p0289 A81-28759
Program Navigate - A simulation computer program to verify OAS navigation capability --- Offensive Avionics System p0322 A81-30289
Simulation of a third-order vertical channel mechanization --- for airplane inertial navigation p0322 A81-30290
Information requirements for airborne electronic terrain maps p0325 A81-30334
GPS Navstar, the universal positioning system of the future p0349 A81-30975
Control, navigation, and guidance --- of aircraft [AIAA PAPER 81-0859] p0362 A81-32910
Electronic displays and computerized NAV systems for commuters and business aircraft p0407 A81-34330
Integration of navigational information in aircraft p0407 A81-34336
Solo navigation in a light aircraft p0407 A81-34337
SINTAC and its position-finding performance p0409 A81-35021
MLS - An example of microprocessor utilization p0409 A81-35022
The optical-fiber interferometer gyroscope for aviation navigation p0451 A81-37650
Model-based scene matching p0461 A81-39349
Avionics system design requirements for the United States Coast Guard HH-65A Dolphin p0472 A81-40133
Summary of interface testing of the digital AN/ASN-123 tactical navigation avionic system in the SH-3H helicopter [AHS 80-18] p0474 A81-40149
Standard INS program status p0511 A81-41753
Doppler radar systems for helicopters p0512 A81-41758
Helicopter navigation in the 80's p0516 A81-42432
Evaluation of Loran-C for enroute navigation and non-precision approach within the state of Vermont p0516 A81-42433
CAINS II - An application of standard laser gyro inertial and computer technology for existing naval carrier aircraft p0516 A81-42434
Impact of EFIS on navigation --- Electronic Flight Instrument System p0517 A81-42435
Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/ p0517 A81-42437
Status report on Position Location Reporting System /PLRS/ p0517 A81-42440
Doppler aided low accuracy strapdown inertial navigation system [AIAA 81-1798] p0555 A81-44101
The selection of air radio navigation system for the post-1990 period p0556 A81-44322
Automated celestial position determination p0557 A81-44324
The application of computers to navigation - New developments employing microprocessors p0565 A81-45761
Navigation and landing - The prospects of new systems p0566 A81-45766
Origins of inertial navigation p0567 A81-46276
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy [DGLR PAPER 81-066] p0610 A81-47616
The relation between aircraft fuel reserves and navigation p0612 A81-47843
Recommended short-term ATC improvements for helicopters. Volume 3: Operational description of experimental LORAN-C flight following (LOFF) in the Houston area [AD-A089385] p0024 N81-10030
Passive imagery navigation [AD-A096245] p0339 N81-21051
Dead reckoner navigation project p03[illegible] N81-22010
An airborne programmable digital to video converter interface and operation manual [AD-A096422] p0446 N81-25691
Tactical navigation system testing p0544 N81-29066
Flight testing and instrumentation of aircraft navigation systems p0544 N81-29067
Systems integration of automatic flight control, navigational calculations, and visual control (caravelle alis) p0544 N81-29068

AIR POLLUTION
The aircraft in the stratosphere --- effects on ozone layer equilibrium p0002 A81-10499
Aircraft pollution in the vicinity of airports [AIAA PAPER 81-0309] p0164 A81-20743
Gas turbine engine emission abatement - Status and needed advancements p0237 A81-26015
Aircraft and air pollution p0288 A81-28698
Environmental aspects of aircraft emissions - A review and current assessment p0290 A81-29056
Fuel jettisoning by U.S. Air Force aircraft. Volume 1: Summary and analysis [AD-A089010] p0032 N81-10580
Fuel jettisoning by U.S. Air Force aircraft. Volume 2: Fuel dump listings [AD-A089076] p0032 N81-10581
USAF Aircraft Engine emission goals, a critical review [AD-A090282] p0087 N81-12651
The implications of alternative aviation fuels on airbase air quality [AD-A090283] p0087 N81-12652
Studying the exhaust gas from a post combustion turbojet engine p0089 N81-12996
Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair [AD-A091011] p0094 N81-13062
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri [PB80-213119] p0096 N81-13555

AIR QUALITY
The influence of aircraft operations on air quality at airports p0553 A81-44074
The implications of alternative aviation fuels on airbase air quality [AD-A090283] p0087 N81-12652
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD [AD-A091005] p0096 N81-13545

Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962]
p0201 N81-16628

AIR SAMPLING
Tabulations of ambient ozone data obtained by GASP airliners, March 1975 to December 1977
[NASA-TM-81528]
p0096 N81-13560
Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977 --- Global Atmospheric Sampling Program
[NASA-TP-1807]
p0345 N81-21685
CF6-50 engine emissions testing with traverse probe
[AD-A102159]
p0600 N81-31218

AIR TO AIR MISSILES
Fighter fire control requirements for air battles of the future
p0326 A81-30348
Maximum information trajectory for an air to air missile intercept
[AD-A101497]
p0585 N81-30160

AIR TO AIR REFUELING
KC-10A refueling boom control system
p0322 A81-30266
An investigation of safety hazards and reliability problems in aerial refueling stores
[AD-A091788]
p0127 N81-13938
Optimization of strategic airlift in flight refueling
[AD-A101137]
p0539 N81-28090

AIR TO AIR ROCKETS
U AIR TO AIR MISSILES

AIR TO SURFACE MISSILES
Flying-qualities criteria for wings-level-turn maneuvering during an air-to-ground weapon delivery task
[NASA-TM-81266]
p0342 N81-21083

AIR TRAFFIC
Traffic forecasting for the NRIA --- New Riyadh International Airport
p0114 A81-18090
Hourly airport activity profiles: 30 Airports by user, 3 airports by user and equipment type, selected days in June, July and August, 1978
[AD-A089450]
p0024 N81-10031
Airport activity statistics of certificated route air carriers, calendar year 1979
[AD-A089748]
p0034 N81-11023
Airport and airspace delay model description
[AD-A090781]
p0074 N81-12049
Collision avoidance systems. Citations from the NTIS data base
[PB80-815020]
p0193 N81-16038
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980
[NASA-CR-152356]
p0220 N81-17623
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980
[NASA-CR-152357-VOL-2]
p0220 N81-17624
Supersonic market and economic analyses
p0248 N81-18020
Conflict monitoring analysis of parallel route spacing in the high altitude conus airspace, volume 1
[AD-A094071]
p0250 N81-18041
Aircraft operating efficiency on the North Atlantic, a challenge for the 1980's
p0267 N81-19060
Evaluation of the visual acquisition range of en-route air traffic from cockpit observations
[DFVLR-MITT-80-14]
p0332 N81-20058
The FAA plans and programs for the future airport and air traffic control system
[AD-A100370]
p0537 N81-28077
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154]
p0639 N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155]
p0639 N81-33217

AIR TRAFFIC CONTROL
NT RADAR APPROACH CONTROL
The state of German involvement and future possibilities in the development of the DME-based landing system DLS
p0051 A81-13311
Specifications for short instrument and precision approach path trajectories
p0051 A81-13314
General aviation considerations on bad weather approaches at regional airports
p0052 A81-13315
The measurement of the air traffic controller
p0053 A81-13345
Evaluation of the potential format and content of a cockpit display of traffic information
p0053 A81-13419
Air-traffic police steer a new approach
p0061 A81-15167
Improvements required in air traffic control to meet increasing general aviation turbine powered aircraft operations
[SAE PAPER 800614]
p0062 A81-15335
Aircraft collision avoidance and separation assurance
[SAE PAPER 800616]
p0062 A81-15336
Discrete Address Beacon System - The obvious alternative
[SAE PAPER 800625]
p0063 A81-15341
The evolution of operational systems --- approach to National Airspace System automation
p0064 A81-15699
The future ATC system as influenced by advanced avionics
p0100 A81-16586
Airspace analysis in airport system planning
p0111 A81-18052
Canada's national aviation forecasting models
p0112 A81-18072
Increasing capacity with computer-assisted decision making --- airport planning
p0113 A81-18080
Airport visual approach, guidance and landing systems - Airline pilots viewpoint
p0114 A81-18083
Modeling of the terminal area Air Traffic Management and Control
p0114 A81-18085
Airspace simulation in airport system planning
p0114 A81-18086
The role of aircraft separation assurance in the cockpit
p0115 A81-18092
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171]
p0115 A81-18318
Performance evaluation of an interrogation-reply scheduling technique for a discrete address beacon system --- of radar surveillance and aircraft communication in ATC
p0121 A81-19417
New techniques and development trends in the system architecture of EDP systems for radar data processing and airspace control
p0153 A81-20103
Some aspects of advanced flight management systems and their application to modern transport aircraft
p0154 A81-20353
Integration of fuel conservative procedures in the high density terminal area
p0155 A81-20460
Air traffic control problems - A pilot's view
p0169 A81-20914
Bilingual air traffic control in Canada
p0169 A81-20915
Operation and evaluation of the Terminal Configured Vehicle Mission Simulator in an automated terminal area metering and spacing ATC environment
p0171 A81-21709
Air traffic simulation as a validation tool
p0172 A81-21718
Band sharing - A case study
p0173 A81-21869
Air traffic control and position location by satellite constellation in equatorial orbit
p0173 A81-21912
Airline navigation planning
p0174 A81-21966
Standardisation - An alternative approach to ATC automation
p0177 A81-22192
Multipath and interference effects in secondary surveillance radar systems

p0183 A81-23359
Critical analysis and modern approaches to integrated system aircraft

p0227 A81-24059
Radio Technical Commission for Aeronautics, Technical Symposium and Annual Assembly Meeting, Washington, D.C., November 20, 21, 1980, Proceedings

p0285 A81-28293
RTCA looks at DABS avionics

p0286 A81-28301
The automated transport process management system of INTERFLUG /PRIKAS/

p0288 A81-28744
Satellite constellations for three-dimensional coverage of the Atlantic Ocean --- for geosynchronous navigation systems

p0323 A81-30291
Operator training systems/simulators

p0349 A81-31109
Discrete Address Beacon System

p0350 A81-31134
Application of signal detection theory to decision making in supervisory control - The effect of the operator's experience

p0351 A81-31288
SIMCAT - A modular air traffic control simulator

p0364 A81-33149
The use of airspace - One way to save fuel

p0364 A81-33150
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890

Flight test experience using advanced airborne equipment in a time-based metered traffic environment
[SAE PAPER 801207] p0403 A81-34215

AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329

Helicopter navigation in the 80's
p0516 A81-42432

Development of simplified airborne computations for fuel conservative descents in a time-based metered air traffic environment
[SAE PAPER 810642] p0524 A81-42785

Project Prosat --- communication satellite network for land, sea and air traffic control
p0565 A81-45760

The development of secondary radar in air traffic control
p0565 A81-45762

Trends in the future development of air traffic control systems
p0566 A81-45764

A simple radar for navigation accuracy measurements
p0612 A81-47844

Availability requirements of the future ATC system
p0617 A81-48558

Automation of air traffic control processes --- Russian book
p0623 A81-49462

NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021

Recommended short-term ATC improvements for helicopters. Volume 2: Recommended helicopter ATC training material
[AD-A089441] p0024 N81-10029

Recommended short-term ATC improvements for helicopters. Volume 3: Operational description of experimental LORAN-C flight following (LOFF) in the Houston area
[AD-A089385] p0024 N81-10030

Analysis of potentially correctable landing delays at Atlanta
[AD-A089408] p0024 N81-10032

The Discrete Address Beacon System/Air Traffic Control Radar Beacon System/ATCRBS IFF Mark 12 system (DABS/ATCRBS/AIMS) performance prediction model
[AD-A089440] p0024 N81-10034

Proposed ATC system for the Gulf of Mexico: Helicopter operations development program
[AD-A089430] p0025 N81-10036

Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037

Recommendations for short-term simulation of ATC concepts. Helicopter operations development program
[AD-A089435] p0025 N81-10038

Impact of the discrete Address Beacon System (DABS) on Air Traffic Control Radar Beacon System (ATCRBS) performance in selected deployments
[AD-A089611] p0025 N81-10039

Recommended short-term ATC improvements for helicopters. Volume 1: Summary of short term improvements
[AD-A089521] p0025 N81-10041

Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 1
[RAE-TR-79052-VOL-1] p0026 N81-10044

Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 2
[RAE-TR-79052-VOL-2] p0026 N81-10045

Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 3
[RAE-TR-79052-VOL-3] p0026 N81-10046

Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024

New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11025

ATARS implementation tradeoff
[AD-A089977] p0034 N81-11026

Formats for DABS data link applications
[AD-A089963] p0034 N81-11028

Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0042 N81-11290

Aviation safety
[GPO-68-717] p0073 N81-12040

IFR aircraft handled forecast by air route traffic control center, fiscal years 1980-1991
[AD-A090803] p0074 N81-12048

Airport and airspace delay model description
[AD-A090781] p0074 N81-12049

Air traffic controllers and flight service station specialists
[GPO-51-381] p0075 N81-12055

Visual confirmation (VICON) of voice take-off clearance of cost-and-deployment analyses and strategies
[AD-A091007] p0091 N81-13038

Tower Cab Digital Display
[AD-A090616] p0091 N81-13042

Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046

Southern California aviation system study
[PB80-215544] p0125 N81-13916

Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944

Wind shear systems integration plan, VICON (visual confirmation) reliability analysis
[PB80-218233] p0128 N81-13949

Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation systems
[NASA-CP-2139] p0135 N81-14555

Applicated techniques for the control of approach traffic
[DFVLR-MITT-79-20] p0142 N81-14992

Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331] p0142 N81-14994

Consolidated cab display: A summary report of the process and the results of the consolidation of critical and supplementary terminal area air traffic control information for display presentation
[AD-A092450] p0193 N81-16034

Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy
[AD-A093774] p0206 N81-17030

Federal Radionavigation Plan. Volume 2: Requirements
[AD-A093775] p0207 N81-17031

Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics
[AD-A093776] p0207 N81-17032

Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development [AD-A093777] p0207 N81-17033

Detection of military aircraft in an Air Traffic Control Radar Beacon System (ATCRBS) environment [AD-A093427] p0207 N81-17036

Air traffic control simulation models. Citations from the NTIS data base [PB81-800104] p0207 N81-17037

Theoretical study of network design methodologies for the aerial relay system --- energy consumption and air traffic control [NASA-CR-159365] p0249 N81-18033

Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests [AD-A094124] p0250 N81-18037

Conflict monitoring analysis of parallel route spacing in the high altitude airspace, volume 2 [AD-A094152] p0250 N81-18038

Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1 [AD-A094195] p0250 N81-18039

Active Beacon Collision Avoidance System (BCAS) functional overview [AD-A094177] p0250 N81-18040

Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches [AD-A094073] p0251 N81-18042

Test results of flight guidance for fuel conservative descents in a time-based metered air traffic environment --- terminal configured vehicle p0264 N81-19036

A pilot's subjective analysis of a Cockpit Display of Traffic Information (CDTI) --- terminal configured vehicle p0264 N81-19037

Automated pilot advisory system test and evaluation at Manassas Municipal Airport p0264 N81-19040

Active BCAS: Design and validation of the surveillance subsystem [AD-A095049] p0270 N81-19084

Possible online uses of AIDS data in future ATC systems p0328 N81-20018

Initial design and experimental implementation of the traffic advisory service of ATARS [AD-A095462] p0331 N81-20055

The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2 --- air traffic control [NLR-MP-79038-U] p0332 N81-20059

The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format [AD-A096265] p0339 N81-21048

An update of the Discrete Address Beacon System (DABS) alternatives study [AD-A096264] p0340 N81-21052

Laser beacon collision avoidance systems p0372 N81-22009

Candidate CDTI procedures study [NASA-CR-165673] p0373 N81-22032

Potential effects of the introduction of the discrete address beacon system data link on air/ground information transfer problems [NASA-CR-166165] p0373 N81-22037

Summary of transponder data, May 1979 - November 1979 [AD-A097569] p0386 N81-23061

Electronic flight rules: An alternative separation assurance concept [AD-A097570] p0387 N81-23063

Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1 [AD-A097756] p0425 N81-24041

Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual [AD-A098093] p0425 N81-24042

Discrete Address Beacon System (DABS) data link capacity utilization [AD-A098173] p0425 N81-24044

Improvement of guidance and handling qualities in the vicinity of airports and on landing --- use of a digital command system [BMFT-FB-W-79-42] p0425 N81-24045

Definition of a system concept study for future air traffic guidance [BMFT-FB-W-80-008] p0425 N81-24046

A slot allocation model for high-density airports [AD-A098097] p0438 N81-24836

Consolidated Cab Display (CCD) System, Project Planning Document (PPD) [AD-A098651] p0440 N81-25056

Airport Surface Detection Equipment (ASDE)-3 operational evaluation [AD-A098480] p0440 N81-25059

New tower cab mockup for Philadelphia, Pennsylvania [AD-A098520] p0440 N81-25060

Discrete Address Beacon System (DABS) computer performance/test and evaluation [AD-A099326] p0484 N81-26088

Analytical investigation of time correction in alpha-beta tracking filters with application to en route tracking [AD-A099218] p0484 N81-26090

Development and evaluation of a prototype in-flight instrument flight rules (IFR) procedures trainer [NASA-TM-73292] p0490 N81-26156

ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI [NASA-TM-81301] p0492 N81-27061

A study of ASRS reports involving general aviation and weather encounters [NASA-CR-166212] p0493 N81-27063

Aviation forecasting and systems analyses [PB81-174252] p0493 N81-27068

An analysis of the requirements for and the costs and benefits of the National Microwave Landing System (MLS), volume 1 [AD-A099632] p0493 N81-27071

An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS), volume 2 [AD-A100018] p0493 N81-27072

Investigation of Wilcox model 585B very high frequency omnidirectional radio range system, part 2 [AD-A099525] p0494 N81-27073

The FAA plans and programs for the future airport and air traffic control system [AD-A100370] p0537 N81-28077

Applied techniques for the control of approach traffic --- air traffic control [ESA-TT-668] p0538 N81-28079

A method for evaluating radio navigation systems for the terminal maneuvering area --- approach control [DFVLR-MITT-81-02] p0538 N81-28080

Effect of display size on utilization of traffic situation display for self-spacing task --- transport aircraft [NASA-TP-1885] p0546 N81-29109

ATC contingency operations in the en-route flight regime [NASA-CR-166231] p0546 N81-29110

Radar Beacon Transponder (RBX) installation and siting criteria [AD-A100666] p0547 N81-29113

Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information [NASA-TM-81171] p0548 N81-29127

Discrete address beacon system data link capacity requirements [AD-A101731] p0581 N81-30107

Information transfer in the surface component of the system: Coordination problems in air traffic control p0594 N81-31165

Information transfer between air traffic control and aircraft: Communication problems in flight operations p0595 N81-31166

The information transfer problem summary and comments p0595 N81-31169

A flight investigation of simulated data-link communications during single-pilot IFR flight.

Volume 1: Experimental design and initial test
[NASA-CR-3461-VOL-1] p0595 N81-31171
NAS automation equipment operating cost estimates, FY 1978 - 1979
[AD-A102023] p0595 N81-31182
Proceedings of the Public Workshop on Alternative Separation Concepts: Presentations, Discussions and Recommendations
[AD-A102519] p0596 N81-31183
Takeoff and missed approach under the influence of wind shear --- flight safety considerations
[TUBS/SFB-58-80-05-01] p0628 N81-32131
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] p0636 N81-33182
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] p0636 N81-33183
Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System
[AD-A104150] p0636 N81-33184
Computer B (NAS-NAS) communications support
[AD-A104145] p0640 N81-33392

AIR TRAFFIC CONTROLLERS (PERSONNEL)
Human error in ATC system operations
p0052 A81-13414
An information-processing interpretation of air traffic control stress
p0053 A81-13416
Air traffic control using a microwave landing system
p0053 A81-13421
Some aspects of advanced flight management systems and their application to modern transport aircraft
p0154 A81-20353
Integration of fuel conservative procedures in the high density terminal area
p0155 A81-20468
Operator training systems/simulators
p0349 A81-31109
Application of signal detection theory to decision making in supervisory control - The effect of the operator's experience
p0351 A81-31288
SIMCAT - A modular air traffic control simulator
p0364 A81-33149
Air traffic controllers and flight service station specialists
[GPO-51-381] p0075 N81-12055
ATC contingency operations in the en-route flight regime
[NASA-CR-166231] p0546 N81-29110

AIR TRANSPORTATION
Airbus Industrie's heavenly twins - A310 and A300-600
p0018 A81-12348
Fuel conservation in the air transportation industry - General and operational aspects
p0102 A81-17143
International Air Transportation Conference, New Orleans, La., April 30-May 3, 1979, Proceedings. Volumes 1 & 2
p0110 A81-18051
New major U.S. airports - Capacity considerations
p0111 A81-18060
Aviation assumptions in the eighties
p0112 A81-18068
A new perspective in aviation systems planning
p0112 A81-18069
Design for supercommuters
p0227 A81-24048
The maintenance of the Airbus from the user's point of view
p0287 A81-28470
General remarks on helicopter reliability
p0287 A81-28472
Maintenance tomorrow and the day after --- of wide-bodied transport aircraft
p0367 A81-33790
The medical use of the helicopter in the field of air rescue
p0409 A81-34870
The future role of helicopters in public transport
p0466 A81-40078
Airport catchment areas and air passenger demand --- econometric models for air travel
p0571 A81-46575
Airport activity statistics of certificated route air carriers, calendar year 1979
[AD-A089748] p0034 N81-11023
Alternative energy sources for non-highway transportation, appendices
[DOE/CS-05438/T1-VOL-3] p0044 N81-11500
Southern California aviation system study
[PB80-215544] p0125 N81-13916
Long-range airplane study: The consumer looks at SST travel
p0247 N81-18014
Theoretical study of network design methodologies for the aerial relay system --- energy consumption and air traffic control
[NASA-CR-159365] p0249 N81-18033
Application of the epidemiological model in studying human error in aviation
p0265 N81-19046
Investigation of air transportation technology at Massachusetts Institute of Technology, 1980
p0371 N81-22000
MIT Annotated Bibliography
p0371 N81-22001
Investigation of air transportation technology at Ohio University, 1980 --- general aviation aircraft and navigation aids
p0371 N81-22005
Investigation of air transportation technology at Princeton University, 1980
p0371 N81-22008
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A058096] p0424 N81-24038
Aviation safety: Hazardous materials handling
[GPO-69-199] p0439 N81-25049
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
Predicting the impacts of new technology aircraft on international air transportation demand
[NASA-CR-165654] p0594 N81-31160
Airport and airway system development act of 1981
[GPO-75-804] p0601 N81-31231
Airport activity statistics of certificated route air carriers
[AD-A102355] p0602 N81-31236
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] p0635 N81-33173
Published results of the program of university research. Transportation research results
[PB81-210130] p0641 N81-34108

AIRBORNE EQUIPMENT
NT AIRBORNE/SPACEBORNE COMPUTERS
NT LIGHT AIRBORNE MULTIPURPOSE SYSTEM
NT TERCOM
Display motion relationships
p0064 A81-15683
Principle for the design of hybrid control systems for passenger transport systems
p0107 A81-17577
Design and preliminary tests of an IR-airborne LLWS remote sensing system --- Low Level Wind Shear
[AIAA PAPER 81-0239] p0163 A81-20694
An airborne sensor for the avoidance of clear air turbulence
[AIAA PAPER 81-0297] p0164 A81-20735
An airborne integrated communications network utilizing fiber optics
p0173 A81-21880
A distributed airborne surveillance system
p0180 A81-22618
A solid-state airborne sensing system for remote sensing
p0183 A81-23034
Rotating blades radio interference in a helicopter-borne CW Doppler radar
p0224 A81-23813
Helicopter-borne radiosonde system and its experimental uses
p0231 A81-24870
A new airborne nickel cadmium battery concept
p0235 A81-25618
Superconducting generator design for airborne applications
p0241 A81-26862

Airborne emergency hospital
p0299 A81-29207
Advanced techniques for airborne target screener
p0320 A81-30236
Ground moving target radar signal simulation
p0323 A81-30304
Computerized design and optimization of self-contained airborne high power electrical systems
p0323 A81-30310
Information requirements for airborne electronic terrain maps
p0325 A81-30334
Implementation of target orientation angles in improved Kalman filter based short range rador tracking
p0326 A81-30340
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115
Analysis, design and simulation of line scan aerial surveillance systems
p0357 A81-32492
Airborne ground velocity determination by digital processing of electro-optical line sensor signals
p0358 A81-32496
Autonomous target handoff from an airborne sensor to a missile seeker
p0358 A81-32498
High temperature electronic requirements in aeropropulsion systems
p0359 A81-32547
High frequency angular vibration measurements in vehicles
[AAS PAPER 81-024] p0361 A81-32896
The impact of the All Electric Airplane on production engineering
[AIAA PAPER 81-0848] p0362 A81-32909
Technology advances allow multiple role radar design for the F/A-18
[SAE PAPER 801163] p0399 A81-34179
Flight test experience using advanced airborne equipment in a time-based metered traffic environment
[SAE PAPER 801207] p0403 A81-34215
A very complete electronic warfare system
p0412 A81-35674
Development of an astro-inertial hybrid navigation system and a star tracker
p0420 A81-37343
Microprocessor-based airborne spectrometer system
p0453 A81-37744
Design characteristics of Michelson interferometers used on the AFGL NKC-135 infrared flying laboratory
p0463 A81-39505
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
Design considerations for U.S. Coast Guard search and surveillance Forward Looking Infrared /FLIR/ system
p0463 A81-39647
French Army testing of Forward Looking Infra-Red System /FLIR/ on helicopters /November 1976-June 1977/
p0464 A81-39680
Flight evaluation of a helmet mounted LED matrix display in a Lynx helicopter
p0472 A81-40129
Doppler radar systems for helicopters
p0512 A81-41758
Some applications of the turbulence amplifier to airborne systems
p0514 A81-42173
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137
Application of pulse code modulation technology to aircraft dynamics data acquisition
[AIAA PAPER 81-1736] p0528 A81-43173
Clear air turbulence - An airborne alert system
p0562 A81-44648
Infrared airborne radar
p0617 A81-48566
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] p0621 A81-48647
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49378
Observing lightning from ground-based and airborne stations
p0136 N81-14566
An improved flight data transcriber
[AD-A091981] p0201 N81-16430
Generation of optimum vertical profiles for an advanced flight management system
[NASA-CR-165674] p0331 N81-26051
Functional testing airborne navigation equipment
[AD-A097115] p0387 N81-23062
Functional testing airborne radars
[AD-A097562] p0392 N81-23356
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0595 N81-31180
MLS antenna locations for the deHavilland DASH 7 aircraft
[NASA-TM-83195] p0602 N81-31410
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0620 N81-32133

AIRBORNE RADAR APPROACH
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19082
Minimum operational performance standards for airborne radar approach and beacon systems for helicopters
[RTCA/DO-172] p0336 N81-26322

AIRBORNE SURVEILLANCE RADAR
Optimal tracking design and simulation for a monopulse airborne radar system utilizing a predicted dual beam antenna design
p0323 A81-30293
Parameter estimation of an SSR amplitude comparison monopulse extractor --- Secondary Surveillance Radar
p0571 A81-46537

AIRBORNE/SPACEBORNE COMPUTERS
The 767's flight-management system - A new generation of airborne avionics
p0005 A81-11242
Airborne countermeasures system AN/ALQ-161
p0049 A81-12794
Low cost technology for expendable RPV applications
p0049 A81-12795
Standardization in military avionics systems architecture; Proceedings of the Seminar, Dayton, Ohio, November 28, 1979
p0050 A81-13167
Military aircraft avionics in the 1980's
p0056 A81-13169
Avionic standardization from a designer's perspective
p0050 A81-13170
Avionic architectural standardization - Logistic support perspective
p0050 A81-13171
Promoting rational standardization --- for military avionics systems architecture
p0050 A81-13172
An overview - 1980 generation avionic developments
p0111 A81-18061
L-1011 Flight Management System design considerations
p0113 A81-18074
Computer generated displays and pilot effectiveness
p0114 A81-18082
System considerations in the implementation of digital control
[AAS 80-032] p0120 A81-19375
Airline navigation planning
p0174 A81-21966
Flight test evaluation of a digital controller used in a VTOL automatic approach and landing system
p0179 A81-22549
The BQM-74C target as a flying computer - Its language and its peripherals
p0179 A81-22611
Engine performance monitoring systems expansion on Alitalia aircraft
p0290 A81-29054
Using microprocessors in fault monitoring of aircraft electronics
[ASME PAPER 81-GT-138] p0316 A81-30040

Design and development of the control laws for the F-18 primary flight control system
p0320 A81-30245

Digital flight control - The generation of the 80's
p0320 A81-30248

Delco Electronics Flight Management System for Air Force C-141 aircraft
p0321 A81-30249

Dispersed flight control computer systems
p0321 A81-30250

The Z8000 provides the basis for a powerful new airborne computer
p0321 A81-30252

Advanced avionic systems for multi-mission applications
p0321 A81-30258

Offensive avionics system /OAS/ design
p0321 A81-30259

Contention information transfer systems analysis
p0322 A81-30274

Synergistic benefits of fully integrating JTIDS and GPS --- Joint Tactical Information Distribution System and Global Positioning System
p0323 A81-30311

Integrated Flight/Weapon Control system concepts
p0324 A81-30328

Tailoring software logic to the needs of the pilot - A software designer's nightmare
p0325 A81-30335

DAIS controls and displays - A systems approach to avionics subsystem integration
p0325 A81-30336

KC-135 modernization program --- cockpit avionics subsystems integration for pilot workload reduction
p0325 A81-30337

Cybernetic airborne fire control - Issues and potential
p0326 A81-30347

Fighter fire control requirements for air battles of the future
p0326 A81-30348

Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31297

Microprocessor-based digital air data computer for flight test
p0361 A81-32858

Airborne electronic displays
p0364 A81-32999

Flight control systems go digital - More than a binary mechanization of analog predecessors
[SAE PAPER 801166] p0399 A81-34181

An application of redundancy in digital electronic engine control
[SAE PAPER 801200] p0402 A81-34210

Current and future use of an AIDS integrated EMS --- Aircraft Integrated Data System for Engine Monitoring
[SAE PAPER 801219] p0404 A81-34225

Electronic displays and computerized NAV systems for commuters and business aircraft
p0407 A81-34330

Flight-management system - Key to the advanced-technology fighter
p0421 A81-37523

Air data computer for the measurement and evaluation of data of flight physics
p0451 A81-37648

Microprocessor-based airborne spectrometer system
p0453 A81-37744

A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0453 A81-37822

Civil aviation - Onboard electronic equipment and fuel savings
p0464 A81-39699

Integrated multiplex for the Agusta A-129 attack helicopter
p0472 A81-40131

Avionics system design requirements for the United States Coast Guard HH-65A Dolphin
p0472 A81-40133

Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20] p0474 A81-40150

Aiming computation for fighter weapon aiming system
p0480 A81-40448

Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912

Doppler radar systems for helicopters
p0512 A81-41758

Flight control strategies for performance computers
p0512 A81-41759

Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754

The application of computers to navigation - New developments employing microprocessors
p0565 A81-45761

Development considerations for real-time aircraft/avionic distributed computer control systems
p0616 A81-48376

Abstract interface specifications for the A-7E device interface module
[AD-A092696] p0202 N81-16770

Relationships for a flight performance computer
p0382 N81-23014

Navaids calibration evaluation with a computer-controlled avionics data acquisition system
p0383 N81-23020

Demonstration Advanced Avionics System (DAAS) functional description --- Cessna 402B aircraft
[NASA-CR-152405] p0389 N81-23080

Airborne Systems Software Acquisition Engineering Guidebook for software cost analysis and estimating
[AD-A100215] p0543 N81-28785

Airborne Systems Software Acquisition Engineering Guidebook for contracting for software acquisition
[AD-A100217] p0543 N81-28786

Airborne Systems software Acquisition Engineering Guidebook for application and use of the guidebooks (series overview)
[AD-A100216] p0543 N81-28787

Airborne Systems Software Acquisition Engineering Guidebook for supportable airborne software
[AD-A100213] p0543 N81-28788

Airborne Systems Software Acquisition Engineering Guidebook for software development and support facilities
[AD-A100214] p0543 N81-28789

Programmable multipurpose flight test instrumentation system
p0545 N81-29085

Review of AIDS development --- airborne computers for reliability engineering
p0599 N81-31212

AIRBUS

U EUROPEAN AIRBUS

AIRCRAFT

Design concepts for low-cost composite turbofan engine frame
[NASA-CR-165217] p0376 N81-22053

AIRCRAFT ACCIDENT INVESTIGATION

The accident/injury matrix - A tool for aircraft accident investigation
p0018 A81-12241

Midair collisions - The accidents, the systems, and the Realpolitik
p0052 A81-13413

Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison
p0054 A81-13515

Flying safely /Revised and enlarged edition/ --- Book
p0068 A81-16198

Aircraft accident investigation as it relates to life support equipment
p0176 A81-22103

A description of the general aviation fixed wing accident
p0408 A81-34696

Helicopter accidents
[SAE PAPER 810592] p0520 A81-42751

U.S. Army crashworthiness program
[SAE PAPER 810615] p0522 A81-42771

AEROMEXICO DC-10-30, XA-DUH, over Luxembourg, Europe
[NTSB-AAR-80-10] p0073 N81-12042

Aircraft accident report: New York Airways, Inc., Sikorsky S61-L, N618PA Newark, New Jersey, April 18, 1979
[NTSB-AAR-79-14] p0074 N81-12045

Aircraft accident report: Champion Home Builders
company, Gates Learjet 25B, N999HG, Sanford,
North Carolina, September 8, 1977
[NTSB-AAR-79-15] p0074 N81-12046
Testimony of Elwood T. Driver, Vice Chairman,
National Transportation Safety Board,
accompanied by Gerrit J. Walhout, Chief, Human
Factors Division, and Matthew H. McCormick,
Senior Air Safety Investigator, Human Factors
Division
p0126 N81-13934
Aircraft Accident Report: Air Pennsylvania 501,
Piper PA-31-350, N5MS Philadelphia,
Pennsylvania, July 25, 1980
[PB81-910401] p0269 N81-19077
A technique for recovering nonsynchronized data
from a digital flight data recorder
p0328 N81-20020
A review of in-flight emergencies in the ASRS data
base
[NASA-CR-166166] p0372 N81-22031
Trouble shooting in aeronautics and the usefulness
of microscopes
[VTH-LR-305] p0537 N81-28069
Crash survivable flight data recording system study
[AD-A101503] p0583 N81-30127
Improving the crashworthiness of general aviation
aircraft by crash injury investigations
[AD-A103316] p0636 N81-33174
AIRCRAFT ACCIDENTS
NT BIRD-AIRCRAFT COLLISIONS
Helicopter tail configurations to survive tail
rotor loss
p0003 A81-10768
Civil aviation safety. III - Prospects of
improvement
p0017 A81-11900
Medical coordination in airport disasters
p0053 A81-13512
Developing an emergency medical disaster plan for
an airport
p0053 A81-13513
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
Civil aviation safety. IV - Accident severity
p0068 A81-16422
Helicopter alarms - The use of ALAT incident and
accident record cards
p0100 A81-16689
A survey of propulsion systems'
malfunctions/failures resulting in helicopter
mishaps
p0105 A81-17513
Microbursts as an aviation wind shear hazard
[AIAA PAPER 81-0386] p0167 A81-20798
The effect of heavy rain on windshear attributed
accidents
[AIAA PAPER 81-0390] p0167 A81-20800
Air traffic control problems - A pilot's view
p0169 A81-20914
The evaluation of aircraft collision probabilities
at intersecting air routes
p0174 A81-21967
Helicopter emergency underwater escape
p0176 A81-22101
Delayed ejection --- decision factor importance
for pilot safety
p0176 A81-22102
The apparent ignoring of pilot fatigue by the NTSB
in airline crashes
p0177 A81-22104
Death and injury in aerial spraying - Pre-crash,
crash, and post-crash prevention strategies
p0177 A81-22115
Comparison of systems of power generation during
emergencies /aboard aircraft/
p0177 A81-22203
Crashworthiness versus cost based on a study of
severe Army helicopter accidents during 1970 and
1971
p0355 A81-32006
Mission-dedicated vehicle for passenger rescue
from burning aircraft
p0412 A81-35772
Fire-proof fuel
p0480 A81-40458
Determination of crash test pulses and their
application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
Aircraft subfloor response to crash loadings
[SAE PAPER 810614] p0522 A81-42770
Human factors aspects of emergency egress from a
business jet
[SAE PAPER 810617] p0523 A81-42772
Aerial collisions with relief features
p0557 A81-44323
Annual review of aircraft accident data, U.S.
General aviation calendar year 1978
[PB80-201916] p0024 N81-10020
Aircraft accident report: Allegheny Airlines,
Inc., Nord 262, Mohawk/Frakes 298, N29824,
Benedum Airport, Clarksburg, West Virginia,
February 12, 1979
[NTSB-AAR-79-12] p0073 N81-12044
Aircraft accident report: Champion Home Builders
company, Gates Learjet 25B, N999HG, Sanford,
North Carolina, September 8, 1977
[NTSB-AAR-79-15] p0074 N81-12046
Aircraft accident reports. Brief format, US civil
aviation: Issue no. 11, 1979 accidents
[NTSB-BA-80-8] p0075 N81-12053
Status of improved autorotative landing capability
research
[AD-A090431] p0076 N81-12072
Aircraft collision avoidance
[GPO-50-158] p0091 N81-13041
Airport Crash/Fire/Rescue CFR service cost and
benefit analysis. Volume 2: Appendixes
[AD-A091155] p0094 N81-13069
Turbulence: From a pilot's viewpoint
p0136 N81-14561
The microburst: Common factor in recent aircraft
accidents
p0136 N81-14571
Briefs of accidents involving commuter air
carriers and on-demand air taxi operations, U.S.
General Aviation 1978
[PB81-101701] p0141 N81-14987
Briefs of fatal accidents involving weather as a
cause/factor, US General Aviation, 1978
[PB81-110827] p0192 N81-16020
Aircraft crash survival design guide. Volume 1:
Design criteria and checklists, revision
[AD-A093784] p0204 N81-16997
Listing of accidents/incidents by aircraft make
and model, United States Civil Aviation, 1978
[PB81-110280] p0205 N81-16999
Wind shear systems implementation plan,
benefit/cost study
[AD-A094168] p0253 N81-18055
Risk to the public from carbon fibers released in
civil aircraft accidents
[NASA-SP-448] p0254 N81-18096
NASA/FAA general aviation crash dynamics program
p0268 N81-19064
Aircraft Accident Report: Air Pennsylvania 501,
Piper PA-31-350, N5MS Philadelphia,
Pennsylvania, July 25, 1980
[PB81-910401] p0269 N81-19077
Experiences with flight recorders obtained by
analyzing aircraft accidents
p0328 N81-20019
Study of aircraft crashworthiness for fire
protection
[NASA-CR-166159] p0424 N81-24035
Requirements, technology and configuration
evaluation for Crash Survivable Flight Data
Recording (CSFDR) system
[AD-A097863] p0427 N81-24059
Structures and Dynamics Division research and
technology plans, fiscal year, 1981
[NASA-TM-83137] p0491 N81-26497
A study of ASRS reports involving general aviation
and weather encounters
[NASA-CR-166212] p0493 N81-27063
CH-53E emergency flotation system design study
[AD-A101640] p0548 N81-29124
Definition of investigative areas for human-factor
aspects of aircraft accidents
[AD-A101601] p0580 N81-30102
Carbon/graphite composite material study, appendix
A and appendix B
p0585 N81-30190
Improving the crashworthiness of general aviation
aircraft by crash injury investigations
[AD-A103316] p0636 N81-33174
AIRCRAFT ANTENNAS
Antenna-to-antenna coupling in aircraft radio

systems
p0057 A81-14280
In-flight calibration of aircraft antenna radiation patterns
p0173 A81-21625
Flight-vehicle antennas /2nd revised and enlarged edition/ --- Russian book
p0281 A81-27534
An extremely lightweight fuselage-integrated phased array for airborne applications
p0348 A81-30779
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734
Input impedance of a resonator-slot ring antenna on a spherical layer --- for aircraft
p0420 A81-37433
Antennas-avionics systems relationship
[SAE PAPER 810579] p0519 A81-42742
Airborne antenna pattern calculations
p0532 A81-43708
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[DFVLR-FB-80-01] p0132 N81-14195
Airborne antenna pattern code: User's manual
[AD-A092316] p0201 N81-16357
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions
[AD-A095634] p0334 N81-20072
Airborne antenna pattern calculations
[NASA-CR-164350] p0437 N81-24321
VLF P-static noise reduction in aircraft. Volume 1: Current knowledge
[AD-A098451] p0440 N81-25061
VLF P-static noise reduction in aircraft. Volume 2: Recommended action
[AD-A099130] p0491 N81-26394
Multiple arrested synthetic aperture radar
[AD-A101143] p0551 N81-29317
MLS antenna locations for the deHaviland DASH 7 aircraft
[NASA-TM-83195] p0602 N81-31418
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] p0640 N81-33390
Tent shaped phased array
[AD-A103927] p0640 N81-33393

AIRCRAFT APPROACH SPACING
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
Aircraft collision avoidance and separation assurance
[SAE PAPER 800616] p0062 A81-15336
Aircraft collision avoidance
[GPO-50-158] p0091 N81-13041
Effect of display size on utilization of traffic situation display for self-spacing task --- transport aircraft
[NASA-TP-1885] p0546 N81-29109
Evaluation of Microwave Landing System (MLS) effect on the delivery performance of a fixed-path metering and spacing system
[NASA-TP-1844] p0546 N81-29111
Proceedings of the Public Workshop on Alternative Separation Concepts: Presentations, Discussions and Recommendations
[AD-A102519] p0596 N81-31183

AIRCRAFT BASES
U MILITARY AIR FACILITIES

AIRCRAFT BRAKES
NT LEADING EDGE SLATS
NT TRAILING-EDGE FLAPS
NT WING FLAPS
Today and the future in aircraft wheel and brake development
p0102 A81-17046
Real-time microprocessor technology applied to automatic braking systems
[SAE PAPER 801194] p0402 A81-34204
Analytic determination of the kinematic and energy parameters of aircraft braking during the landing run
p0409 A81-35008
Braking of an aircraft tyre
p0412 A81-35892
Review of antiskid and brake dynamics research
p0268 N81-19066
Aircraft brake systems testing handbook
[AD-A101516] p0548 N81-29123
Behavior of aircraft antiskid braking systems on dry and wet runway surfaces: Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112

AIRCRAFT CABINS
U AIRCRAFT COMPARTMENTS

AIRCRAFT CARRIERS
Planning for and evaluating the potential of a land based aircraft for carrier operations
p0122 A81-19470
VTOL control for shipboard landing in high sea states
p0155 A81-20471
Helicopter-ship qualification testing
p0232 A81-24941
F/A-18A Initial Sea Trials
p0458 A81-38857
Runway and deck temperatures in vertical takeoff/landing operations
[AIAA PAPER 81-1623] p0525 A81-43132
Precision flight path control in carrier landing approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43956
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033
System safety program report MK 1 MOD 0 LSO HUD console system
[AD-A095009] p0269 N81-19080
Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea
[NASA-TM-81305] p0579 N81-30080
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] p0638 N81-33199

AIRCRAFT COMMUNICATION
Air-traffic police steer a new approach
p0061 A81-15167
Automating airborne company communications
p0112 A81-16064
Performance evaluation of an interrogation-reply scheduling technique for a discrete address beacon system --- of radar surveillance and aircraft communication in ATC
p0121 A81-19417
Problems of voice communication in helicopters
p0151 A81-20074
A new technique for tracking sequences of digitized images
p0156 A81-20508
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099
LPI, short-range communications between aircraft in rendezvous --- Low Probability of Intercept
p0177 A81-22493
Considerations concerning an 'information bustar' for distributing on-board measurement and control information
p0233 A81-25375
A 7.5-GHz microstrip phased array for aircraft-to-satellite communication
p0347 A81-30776
A multiplexed digital voice intercommunications system for military applications
[SAE PAPER 801144] p0398 A81-34173
SINTAC and its position-finding performance
p0409 A81-35021
Avionics system design requirements for the United States Coast Guard HH-65A Dolphin
p0472 A81-40133
Aircraft radio systems --- Book
p0513 A81-41871
A 7.5 GHz microstrip phased array for aircraft-to-satellite communication
p0562 A81-44623
Fiber optic technology for data transmission in the helicopter environment
p0573 A81-46614
Functional testing communication equipment (avionics)
[AD-A092825] p0201 N81-16375
Radar Beacon Transponder (RBX) functional description
[AD-A100665] p0547 N81-29112

Radar Beacon Transponder (RBX) installation and siting criteria
[AD-A100666] p0547 N81-29113
Impact of low altitude coverage requirements on air-ground communications
[AD-A101642] p0506 N81-30338
Aural communication in aviation
[AGARD-CP-311] p0603 N81-31449
Voice communication research and evaluation system
p0603 N81-31450
Electronic voice communications improvements for Army aircraft
p0603 N81-31454
Second language speech comprehension in noise: A hazard to aviation safety
p0604 N81-31463
An active noise reduction system for aircrew helmets
p0604 N81-31470
A multiplexed digital voice intercommunications system compatible with future voice conversion techniques
p0605 N81-31474
Sidetone-level considerations in aircraft communication systems
p0605 N81-31475

AIRCRAFT COMPARTMENTS
Cabin pressure control systems for general aviation aircraft
[SAE PAPER 800606] p0061 A81-15329
Flight management systems - Central ingredient of the 1980's avionics shipset
[SAE PAPER 800626] p0063 A81-15342
The FFCC cockpit of the A310 is practically defined
p0063 A81-15623
An overview of the research conducted in Aerospatiale on internal noise
p0150 A81-20054
Helicopter internal noise - An overview
p0150 A81-20055
Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20740
Empirical method for the prediction of business executive jet cabin noise levels
p0224 A81-23844
The use of bonded crack-stoppers in pressure cabins
p0233 A81-25378
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442
Bulkheads in airships
[AIAA 81-1328] p0456 A81-38536
Strategies for aircraft interior noise reduction in existing and future propeller aircraft
[SAE PAPER 810560] p0518 A81-42726
Tests on the fire resistance behavior of materials inside civil aircraft
[SNIAS-801-551-101] p0074 N81-12052
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies
[AD-A091051] p0091 N81-13039
Contaminant increase in aircraft liquid oxygen converters: Analysis of data
[AD-A090975] p0092 N81-13049
Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16020
Summary of aviation safety program resumes. Cabin safety
[AD-A091938] p0192 N81-16027
Development of assembly techniques for fire resistant aircraft interior panels
[NASA-CR-152119] p0254 N81-18097
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models
[NASA-CR-159363] p0258 N81-18799
R.A.N. Sea King cabin environment survey. Part 2: Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065
Aircraft transparency optical quality: New methods of measurement
[AD-A096183] p0341 N81-21070
Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977 --- Global Atmospheric Sampling Program
[NASA-TP-1807] p0345 N81-21685
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838
An analysis of thermal balance in the cooled cabin of a Sea King Helicopter
[AD-A097199] p0389 N81-23077
Validation of a bird substitute for development and qualification of aircraft tranparencies
[AD-A097736] p0424 N81-24036
Study of noise reduction characteristics of multilayered panels and dual pane windows with Helmholtz resonators
[NASA-CR-164370] p0430 N81-24857
A study of the performance of an Olson type active noise controller and the possibility of the reduction of cabin noise
[UTIAS-TN-228] p0552 N81-29924
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] p0636 N81-33175

AIRCRAFT CONFIGURATIONS
NT DROOPED AIRFOILS
New concepts for design of fully-optimized configurations for future supersonic aircraft
p0007 A81-11606
Some experiences with numerical optimisation in aircraft specification and preliminary design studies
p0007 A81-11609
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0058 A81-14389
Qualitative calculations of transonic drag-rise characteristics using the equivalence rule
p0058 A81-14393
Finite difference computation of the steady transonic potential flow around airplanes
p0107 A81-17802
Calculation of the lift dependent drag polar of cambered fighter plane configurations with deflected maneuver flaps in the subsonic region by means of a modified procedure according to Lamar
[DGLR PAPER 80-109] p0120 A81-19395
Drag estimations for stream-line and cylindrical contour distortions on aircraft fuselages and train cars
[DGLR PAPER 80-116] p0121 A81-19399
Design requirements of agricultural aircraft
p0282 A81-27880
The next combat aircraft
p0298 A81-29150
Sensitivity of optimum solutions to problem parameters --- in aircraft design
[AIAA 81-0548] p0301 A81-29399
Shape optimization of plate and shell structures
[AIAA 81-0553] p0302 A81-29403
A study of the effect of store aerodynamics on wing/store flutter
[AIAA 81-0604] p0304 A81-29467
A hybrid state vector approach to aeroelastic analysis with application to composite lifting surfaces
[AIAA 81-0626] p0308 A81-29512
The anatomy of the aeroplane --- Book
p0309 A81-29670
Establishing cruise-engine cycle payoffs for a supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007
Flatbed - The universal transport airplane
[SAWE PAPER 1343] p0353 A81-31382
Application of an aerodynamic configuration modeling technique to the design and analysis of X-Wing aircraft configurations
p0356 A81-32013
Feasibility of forward-swept wing technology for V/STOL aircraft
[SAE PAPER 801176] p0400 A81-34189
Preliminary aerodynamic characteristics of several advanced VSTOL fighter/attack aircraft concepts
[SAE PAPER 801176] p0400 A81-34191

The art of single-engine aircraft design
[AIAA PAPER 81-0914] p0408 A81-34361
Aerodynamic characteristics of two VSTOL fighter configurations
[AIAA PAPER 81-1292] p0454 A81-38119
An optimal-surface-transpiration subsonic panel-method for iterative design of complex aircraft configurations
[AIAA PAPER 81-1254] p0458 A81-39012
A survey of heating and turbulent boundary layer characteristics of several hypersonic research aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39134
Westland WG30
p0466 A81-40082
The experimental and analytical definition of helicopter modeling effects
[AHS 80-4] p0473 A81-40139
Preliminary evaluation of RSRA data comparing pure helicopter, auxiliary propulsion and compound helicopter flight characteristics --- Rotor Systems Research Aircraft
[AHS 80-10] p0473 A81-40143
V/STOL technology requirements for future fighter aircraft
[AIAA PAPER 81-1360] p0502 A81-40841
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
A large executive jet design project
p0513 A81-42051
Composite repair concepts for depot level use
p0558 A81-44384
Aerodynamic integration of externally mounted engines on a long-range bomber
[AIAA PAPER 81-1693] p0563 A81-44899
A new aircraft is born - The CN-235
p0565 A81-45756
Prospects for the employment of dirigibles in the 1980s
p0565 A81-45763
An evaluation of advanced rotorcraft configurations for emerging military applications
p0572 A81-46611
Computer aided helicopter design
p0572 A81-46613
Surface-oriented coordinates for boundary-layer calculations in the case of general configurations
[DGLR PAPER 81-014] p0608 A81-47557
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
Bibliography on aerodynamics of airframe/engine integration of high-speed turbine-powered aircraft, volume 1
[NASA-TM-81814] p0035 N81-11032
Component-adaptive grid embedding
p0137 N81-14697
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Computational Fluid Dynamics, volume 2
[VKI-LS-1980-5-VOL-2] p0144 N81-15310
An economic and versatile panel method for aircraft and aircraft/store configurations. An outline of the principal features of the mathematical modeling and numerical implementation of the British Aerospace (Warton) Mk II Panel Method
p0144 N81-15311
Jet wing interaction to give improved combat performance
p0188 N81-16007
Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0188 N81-16009
Complex configuration analysis at transonic speeds
p0190 N81-16016
Demonstration of a method for determining critical store configurations for wing store flutter
[AD-A092257] p0197 N81-16068
Analytic development of improved supersonic cruise aircraft based on wind tunnel data
p0244 N81-17989
La Recherche Aerospatiale, Bimonthly Bulletin no. 1980-2, March - April 1980
[ESA-TT-652] p0255 N81-18244
Wind-tunnel investigation at Mach numbers from 0.25 to 1.01 of a transport configuration designed to cruise at near-sonic speeds --- conducted in Langley 8-foot transonic pressure tunnel
[NASA-TM-X-2622] p0262 N81-19025
GASP- General Aviation Synthesis Program. Volume 2: Geometry. Part 1: Theoretical development
[NASA-CR-152303-VOL-2-PT-1] p0270 N81-19089
Jet-diffuser ejector - attached nozzle design
[NASA-CR-152361] p0278 N81-19412
General aviation airplane fuel economy system model
p0372 N81-22011
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 3: Effects of configuration variations from baseline
[NASA-CR-152391-VOL-3] p0384 N81-23032
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149
Flow control about an airborne laser turret
[AD-A100110] p0537 N81-28060
An engineering method for estimating the lateral/directional characteristics of V/STOL configurations in transition
[AD-A100386] p0540 N81-28103
Configuration aerodynamics
p0593 N81-31148
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel
[NASA-TM-83171] p0635 N81-33159
AIRCRAFT CONSTRUCTION
U AIRCRAFT STRUCTURES
AIRCRAFT CONSTRUCTION MATERIALS
NT AIRFRAME MATERIALS
Acoustic structures --- titanium brazing method for producing honeycomb structures for jet engine noise reduction
p0001 A81-10272
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment
p0013 A81-11659
Electrical bonding in aircraft
p0057 A81-14264
Determination if fiber-optic immunity is adequate for deployment in the V/STOL airframe --- to compensate nonmetallic material LF transparency
p0057 A81-14265
Advanced materials for agricultural aircraft
[SAE PAPER 800610] p0062 A81-15333
Thermal expansion molding process for aircraft composite structures
[SAE PAPER 800612] p0062 A81-15334
The contribution of structural testing to total airworthiness
p0068 A81-16424
Prediction methods for fatigue crack growth in aircraft material
p0118 A81-18777
High-solids coatings for exterior aircraft
p0169 A81-20861
Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3
p0172 A81-21739
Helicopter fatigue qualification
p0180 A81-22623
Progress in P/M superalloy and titanium for aircraft applications
p0181 A81-22641
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
Effects of commercial aircraft operating environment on composite materials
p0182 A81-22681
The quality of nonmetallic materials
p0238 A81-26244
The Windecker Eagle - A new era in general aviation aircraft manufacturing
p0240 A81-26747
Fatigue strength of certain materials used in airframe construction --- glass-plastic reinforced epoxy resin
p0285 A81-28108
Helicopter blade reliability
p0287 A81-28474

The use of carbon-reinforced plastic in the construction of a deflector and a stabilizer
p0299 A81-29310
Material shortages - Effect on the commercial aircraft industry
[AIAA 81-0508] p0300 A81-29386
Material shortages - Effect on the aircraft engine industry
[AIAA 81-0509] p0301 A81-29387
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424
Aircraft applications of titanium - A review of the past and potential for the future
[AIAA PAPER 81-0893] p0362 A81-32918
Advanced composites - Evolution of manufacturing technology
[AIAA PAPER 81-0895] p0362 A81-32920
Past and future trends in structures and dynamics --- of aircraft
[AIAA PAPER 81-0896] p0362 A81-32921
Materials and processes for aircraft environmental controls in the 1990's
[SAE PAPER 801181] p0401 A81-34194
Advanced graphite composites in the 757/767
[SAE PAPER 801212] p0404 A81-34220
Design, fabrication and test of a complex helicopter airframe section
[SAE PAPER 801213] p0404 A81-34221
Relationship between creep characteristics and fracture resistance under the combined effect of fatigue and creep
p0414 A81-36474
The titanium industry and the fabrication of semimanufactures for aeronautics
p0416 A81-36651
Industrial titanium alloys - Use and characteristics
p0416 A81-36653
The state of the technologies involved in the forming of TA6V titanium alloy
p0416 A81-36659
Fabrication problems related to the contamination of titanium alloys
p0417 A81-36664
The present and future applications of titanium alloys - Airframes, helicopters, missiles
p0417 A81-36665
Efficient manufacturing procedures for the production of helicopter rotor blades
[MBB-UD-312-80-OE] p0449 A81-37636
Manufacturing technology for aircraft structural components made of carbon-fiber reinforced plastics
p0449 A81-37637
An investigation of the liquid impact properties of a GFRP radome material
p0457 A81-38571
Kevlar - Thermophysical properties
[AIAA PAPER 81-1104] p0459 A81-39104
Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
Crack growth model for flight-type loading
p0460 A81-39247
Composite flight service evaluation program for helicopters
[AHS 80-46] p0477 A81-40173
Composite helicopter rotor blades - Design, development, and operational performance
p0481 A81-40588
Structural applications for titanium castings
p0510 A81-41637
Development in powder metallurgy /PM/ Ti6Al4V technology for aircraft parts
p0511 A81-41640
From sponge to powder alternatives in titanium processing
p0511 A81-41647
Structural aspects in applications of adhesive bonding
[FOK-BO-1238] p0514 A81-42139
On certification of composite structures for USAF aircraft
[AIAA PAPER 81-1686] p0527 A81-43158
Fiber-reinforced composites - The future for aeropropulsion
[AIAA PAPER 81-1713] p0527 A81-43164
Technology for rustproofing aircraft and helicopters --- Russian book
p0529 A81-43520
Composites - A solution to aluminum honeycomb maintenance costs --- for aircraft structures
p0529 A81-43566
S-3A composite spoilers service experience
p0529 A81-43615
Commercial composite component service experience --- in airplane structural design and manufacturing
p0530 A81-43616
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems
p0530 A81-43624
Development of graphite-epoxy covers for L-1011 advanced composite vertical fin
p0530 A81-43627
Advanced composite applications in McDonnell Douglas commercial transport aircraft
p0530 A81-43628
Graphite thermoplastic YC-14 outboard elevator
p0530 A81-43631
Advanced aluminum metallic materials and processes for application to naval aircraft structures
p0531 A81-43637
A low-cost forward fairing for the Bell Long Ranger Helicopter
p0531 A81-43644
Metallographic analysis techniques used during the Cast Aluminum Structures Technology /CAST/ program --- microstructure of aluminum cast alloy
p0531 A81-43650
High-char-forming composite laminates
p0532 A81-43652
Textile materials for commercial transportation vehicles --- passenger aircraft
p0532 A81-43653
Materials and processes for a small remotely piloted vehicle
p0532 A81-43663
Challenges in alloy design - Titanium for the aerospace industry
p0553 A81-43998
Advanced ultrasonic testing of aerospace structures
p0557 A81-44329
Composite applications on Boeing commercial aircraft
p0557 A81-44341
EF-111A graphite/epoxy Horizontal Stabilizer Trailing Edge
p0557 A81-44342
Future applications of adhesive bonding in the U.S. Air Force
p0558 A81-44378
Review of Navy composite repair program
p0558 A81-44383
Advanced composite repair - Recent developments and some problems
p0558 A81-44385
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44398
Manufacturing methods for a composite main rotor blade for the YAH-64 helicopter
p0575 A81-46629
Development of composite material helicopter structures
p0576 A81-46641
Use of carbon composites in aircraft structures
p0577 A81-46813
Erosion strength of aircraft engine and power plant parts --- Russian book
p0578 A81-46848
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] p0607 A81-47551
Cost-effective mechanical property characterization
p0612 A81-47813
The Lear Fan 2100
p0625 A81-49975
Composite components on commercial aircraft
p0041 N81-11147
Air Force applications and in-service experience with composite structures
p0041 N81-11148
Cost/benefit analysis of advanced materials technology candidates for the 1980's, part 2
[NASA-CR-165176] p0048 N81-11953
The changing scene of structural airworthiness
[AAAF-NT-79-24] p0077 N81-12076

The development of the composite material engine
nacelle
[AAAF-NT-79-38] p0083 N81-12180
Buckling of sandwich panels subjected to axial
compression, shear forces and lateral pressure.
Part 2: Analysis
[SAAB-TN-AE-72-PT-2] p0986 N81-12465
Testimony of James J. Kramer, Associate
Administrator for Aeronautics and Space
Technology, National Aeronautics and Space
Administration, accompanied by John H. Enders,
Project Manager, Aviation Safety Technology
Office, John A. Parker, Chemical Research
Projects Office, NASA-Ames Research Center, and
Demitrius A. Kourtides, Chemical Research
Projects Office, NASA-AMES Research Center
p0127 N81-13935
Testimony of Richard W. Taylor, Vice President and
Special Assistant to the President, and Eugene
A. Dara, Chief Engineer, Payloads Systems,
Boeing Commercial Airplane Company
p0127 N81-13936
Testimony of a panel consisting of: Lloyd E.
Frisbee, Vice President, Engineering and
Operations, Lockheed California Company; Lyle A.
Wright, Director, Powerplant Engineering,
Douglas Aircraft Company, accompanied by Doctor
H. C. Schjeldorup, Chief Technology Engineer,
Materials and Process Engineering, and F. N.
Duskin, Senior Design Engineer, Interiors
Engineering, Douglas Aircraft Company
p0127 N81-13937
Large-scale carbon fiber tests
[NASA-TM-80218] p0196 N81-16137
Current and projected use of carbon composites in
United States aircraft
p0198 N81-16145
The effect of the in-service environment on
composite materials (resume of the April 1980
Athens conference)
p0199 N81-16146
Application of carbon fibre composites to military
aircraft structures
p0199 N81-16147
EMC, lightning and NEMP-protection-new
requirements for approved specifications when
using CFRP
p0199 N81-16152
The electrical effects of joints and bonds in
carbon fiber composites
p0199 N81-16153
Aircraft manufacturers approach to the
E.M.C./Avionics problems associated with the use
of composite materials
p0200 N81-16156
Electromagnetic integration of composite structure
in aircraft
p0200 N81-16159
Electromagnetic coupling to advanced composite
aircraft with application to trade-off and
specification determination
p0200 N81-16166
Composite structural materials --- aircraft
applications
[NASA-CR-163946] p0207 N81-17039
Evolution of materials and associated technologies
in the makeup of aerospace materials, part 1
[AAAF-NT-79-22-PT-1] p0209 N81-17050
Evolution of materials and associated technologies
in the makeup of aerospace materials. Part 2:
Examples
[AAAF-NT-79-22-PT-2] p0209 N81-17051
The impact of materials technology and operational
constraints on the economics of cruise speed
selection
p0248 N81-18021
Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22106
Theoretical and experimental studies of crack
propagation --- aircraft construction materials
[SNIAS-802-111-107] p0437 N81-24482
Fatigue analysis of composite materials using the
fail-safe concept
p0487 N81-26131
An evaluation of fatigue procedures for UK
military helicopters
p0488 N81-26133
Composite structural materials
[NASA-CR-164634] p0541 N81-28176
Cobalt: A vital element in the aircraft engine
industry
[NASA-TM-82662] p0551 N81-29206
Carbon/graphite composite material study
[AE-3] p0585 N81-30188
Carbon/graphite composite material study. 3:
Agency program activities. National Aeronautics
and Space Administration (NASA)
p0585 N81-30189
Conservation of Strategic Aerospace Materials
(COSAM)
p0599 N81-31208
Applications of composite materials for the
construction of military helicopters
p0633 N81-33147
AIRCRAFT CONTROL
NT HELICOPTER CONTROL
The all-electric aircraft
p0008 A81-11617
Improved flight control performance and failure
tolerance using modern control techniques
p0008 A81-11619
DFVLR-dynamic model testing in wind tunnels for
active controls research
p0014 A81-11670
The possibility of improving the
lateral-directional characteristics of a
twin-engine aircraft by spoilers in the case of
sudden engine failure
p0049 A81-12967
Environmental control systems for executive jet
aircraft
[SAE PAPER 800607] p0061 A81-15330
Inverse problems of controlled flight dynamics -
Longitudinal motion
p0101 A81-16968
Principle for the design of hybrid control systems
for passenger transport systems
p0107 A81-17577
Modeling of the terminal area Air Traffic
Management and Control
p0114 A81-18085
Model-following system with assignable error
dynamics and its application to aircraft
p0116 A81-18577
System considerations in the implementation of
digital control
[AAS 80-032] p0120 A81-19375
A correlated random numbers generator and its use
to estimate false alarm rates of airplane sensor
failure detection algorithms
p0154 A81-20448
VTOL control for shipboard landing in high sea
states
p0155 A81-20471
Classical and modern control design of a
speed-hold system for a STOL airplane
[AIAA PAPER 81-0017] p0157 A81-20541
Robustness properties of a new multirate digital
control system
[AIAA PAPER 81-0022] p0158 A81-20545
Aircraft lateral parameter estimation from flight
data with unsteady aerodynamic modelling
[AIAA PAPER 81-0221] p0162 A81-20684
Hinged strakes for enhanced maneuverability at
high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
Bounds for the additional cost of near-optimal
controls
p0170 A81-21075
Airline navigation planning
p0174 A81-21966
A vehicle attitude control system forming the
error signal by way of the optimal rotation axis
p0224 A81-23732
On the application of self-adaptive flight control
system based on energy balance theory
p0224 A81-23733
Critical analysis and modern approaches to
integrated system aircraft
p0227 A81-24059
Active controls for civil aircraft
p0228 A81-24070
Dynamics of longitudinal motion of a
variable-sweepback aeroplane with a deformable
control system
p0231 A81-24722
Control design for reduction of aerodynamic tail
forces using quadratic synthesis

p0240 A81-26610
The role of simulation in automatic flight control
systems research
p0283 A81-27894
Roll stabilization of flight vehicles by means of
rollerons
p0290 A81-29016
Sensitivity reduction in aircraft control systems
by double Perfect Model Following
p0299 A81-29205
Active control of forward swept wings with
divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491
Driving dynamics of a high-speed
positive-displacement pump and gas-turbine drive
during startup --- of flight vehicles
p0319 A81-30155
Avionics computer system support at Ogden ALC
p0320 A81-30243
Design and development of the control laws for the
F-18 primary flight control system
p0320 A81-30245
YC-14 digital flight control experience
p0320 A81-30246
Flight control system design through constrained
output feedback
p0321 A81-30264
DAIS controls and displays - A systems approach to
avionics subsystem integration
p0325 A81-30336
Integrated displays and controls design factors
for the 1990's transport aircraft
p0325 A81-30338
B-52 Offensive Avionics System /OAS/ control and
display design, using a Dynamic Mockup
p0327 A81-30354
F/A-18 Hornet Crew Station
p0327 A81-30355
Control, navigation, and guidance --- of aircraft
[AIAA PAPER 81-0659] p0362 A81-32910
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936] p0363 A81-32937
Generalized active control - Its potential and
directions of research
[AAAF PAPER NT 80-29] p0369 A81-33928
Flight control systems go digital - More than a
binary mechanization of analog predecessors
[SAE PAPER 801166] p0399 A81-34181
Air combat advantages from reaction control systems
[SAE PAPER 801177] p0400 A81-34190
Evolution of an optical control system for
aircraft hydraulics
[SAE PAPER 801195] p0402 A81-34205
Integrated active controls impact on supersonic
cruise vehicle structural design
[SAE PAPER 801210] p0404 A81-34218
Applications of dynamic stability parameters to
problems in aircraft dynamics
p0410 A81-35552
Wake vortex alleviation
[AIAA PAPER 81-0798] p0412 A81-35723
Wind shear detection - Automatic alerting system
for airport applications
p0412 A81-35771
The problem of the minimum-time turn of a
maneuverable aircraft velocity vector to a
specified course angle
p0413 A81-36472
Versatile and economical real-time simulation for
digital flight control systems
[AIAA 81-0974] p0415 A81-36563
Development of a generic airplane response
simulation
[AIAA 81-0980] p0415 A81-36568
Finite-difference gradients versus
error-quadrature gradients in the solution of
parameterized optimal control problems
p0421 A81-37568
Predictive steering control of dirigibles using
the switching curve approach
[AIAA 81-1327] p0456 A81-38535
Quasi-hybrid airships
[AIAA 81-1333] p0456 A81-38538
Dynamics and control of a Heavy Lift Airship in
cross wind hover
[AIAA 81-1334] p0456 A81-38539
Simulation of Heavy Lift Airship dynamics over
large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Pole placement with output feedback
p0458 A81-38999
X-wing stability and control development and wind
tunnel demonstration tests - Helicopter,
conversion, and fixed wing flight
[AHS 80-27] p0475 A81-40157
Effect of in-flight thrust reverser deployment on
tactical aircraft stability and control
[AIAA PAPER 81-1446] p0504 A81-40879
An investigation of the recovery from an engine
failure in a twin engine augmentor wing aircraft
using the NAE Airborne Simulator
p0509 A81-41199
Recommendations for the NASA Avionics program for
the 1980's
p0517 A81-42436
The indication of the characteristics of aircraft
controllability with prediction in dynamic
ergatic systems
p0517 A81-42603
The state of the art of general aviation
autopilots - Now and in the future
[SAE PAPER 810582] p0520 A81-42744
Effects of wingtip modifications on handling
qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
The technical and managerial challenge of
integrated flight/fire control
[AIAA PAPER 81-1706] p0527 A81-43162
AFTI/F-16 advanced multimode control system design
for task-tailored operations
[AIAA PAPER 81-1707] p0535 A81-43955
Precision flight path control in carrier landing
approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43956
Guidance and Control Conference, Albuquerque, NM,
August 19-21, 1981, Collection of Technical Papers
p0553 A81-44076
The improvement of aircraft specific range by
periodic control
[AIAA 81-1748] p0553 A81-44080
Effects of displacement and rate saturation on the
control of statically unstable aircraft
[AIAA 81-1752] p0554 A81-44082
A mode decomposition control logic for system
performance enhancement
[AIAA 81-1753] p0554 A81-44083
Analysis of aircraft longitudinal handling qualities
[AIAA 81-1771] p0554 A81-44092
An analytical pilot rating method for highly
elastic aircraft
[AIAA 81-1772] p0554 A81-44093
Longitudinal equivalent systems analysis of Navy
tactical aircraft
[AIAA 81-1775] p0554 A81-44094
Multiobjective insensitive design of airplane
control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Control characteristics of a Buoyant Quad-Rotor
Research Aircraft
[AIAA 81-1838] p0555 A81-44122
Modern control synthesis applied to the
longitudinal decoupled motion of an aircraft
[AIAA 81-1839] p0555 A81-44123
Closed-loop criteria for assessing
longitudinal-axis handling qualities of
transports in final approach
[AIAA 81-1773] p0556 A81-44133
Low-order approaches to high-order systems -
Problems and promises --- for analysis of
aircraft pitch dynamics
[AIAA 81-1774] p0556 A81-44134
Flight test results for the F-8 digital
fly-by-wire aircraft control sensor analytic
redundancy management technique
[AIAA 81-1796] p0556 A81-44135
Equivalent system analysis of translation rate
command systems for hover and low speed flight
[AIAA PAPER 81-1858] p0560 A81-44557
Data analysis for aircraft parameter estimates
[AIAA PAPER 81-1864] p0560 A81-44561
Determination of model structure and parameters of
an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562
A model-following technique for insensitive
aircraft control systems
[AIAA PAPER 81-1867] p0560 A81-44563
Time-constrained maximum-energy turns --- for
modern fighter aircraft

[AIAA PAPER 81-1886] p0561 A81-44578

Lateral-directional flying qualities of transport aircraft
[AIAA PAPER 81-1887] p0561 A81-44579

A unifying framework for longitudinal flying qualities criteria
[AIAA PAPER 81-1889] p0561 A81-44580

An investigation of the impact of aerodynamic lags on dynamic flight characteristics
[AIAA PAPER 81-1892] p0561 A81-44581

Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem
p0563 A81-45515

Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518

Optimal multirate flight control design
p0563 A81-45922

Adaptive multivariable model following --- for aircraft control
p0564 A81-45540

SR-71 impressive in high-speed regime
p0565 A81-45747

A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619

Inverse problems of guided-flight dynamics - Longitudinal motion
p0577 A81-46749

Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47552

Active gust- and maneuver load reduction concepts; taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] p0608 A81-47553

Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] p0608 A81-47562

Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] p0609 A81-47580

Fly-by-wire Jaguar
p0614 A81-48064

Application of optimal control and estimation to autopilot and autothrottle systems
p0615 A81-48371

Development considerations for real-time aircraft/avionic distributed computer control systems
p0616 A81-48376

The use of direct lift control of an aircraft in a guided landing run
p0624 A81-49928

Parametric synthesis of an automatic system for flight-vehicle stabilization
p0625 A81-49940

Realization of a method of extremal targeting in a problem of aircraft landing control
p0625 A81-49943

System simulation applied to the evaluation of displays for guidance and control
[DFVLR-MITT-79-10] p0028 N81-10064

Propulsion controls
p0079 N81-12095

Should we attempt global (inlet engine airframe) control design?
p0079 N81-12097

Simulation comparison of a decoupled longitudinal control system and a velocity vector control wheel steering system during landings in wind shear
[NASA-TP-1734] p0081 N81-12109

Closed loop control systems: Aircraft. Citations from the NTIS data base
[PB80-813710] p0082 N81-12114

Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969

Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[DFVLR-FB-80-07] p0131 N81-13975

The effects of the direction of control loading on a one-dimensional tracking task
[AD-A092459] p0197 N81-16067

Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061

Preliminary airworthiness evaluation OH-58C helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052

Ground and flight test experience with a triple redundant digital fly by wire control system --- installed in F-8C aircraft
p0259 N81-19006

A brief analysis and its experiment of the hydraulic-electric loading servosystem --- a force simulator
[NASA-TM-76458] p0276 N81-19132

An analytical study of the longitudinal response of airplanes to positive wind shear
[NASA-TP-1765] p0335 N81-20082

SRDS Technical Program document. Fiscal year 1981. Research and Development approved projects
[AD-A096293] p0339 N81-21050

High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400

Comparison of selected lift and sideslip characteristics of the Ayres Thrush S2R-800, winglets off and winglets on, to full-scale wind-tunnel data
[NASA-CR-165710] p0423 N81-24026

Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106

Pitch attitude stabilization system utilizing engine pressure ratio feedback signals
[NASA-CASE-LAR-12562-1] p0490 N81-26152

The 747 primary flight control systems reliability and maintenance study
[NASA-CR-159010] p0498 N81-27116

Development of handling quality criteria for aircraft with independent control of six degrees of freedom
[AD-A100045] p0498 N81-27117

Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118

Handling qualities of large flexible aircraft
p0538 N81-28081

ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783

Control augmentation for lateral control wheel steering
[NASA-CR-164664] p0549 N81-29132

Direct digital design method for reconfigurable multivariable control laws for the A-7D Digital 2 aircraft
[AD-A100794] p0549 N81-29136

Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel
[NASA-CR-165751] p0580 N81-30098

Control derivatives
p0592 N81-31119

A model-following technique for insensitive aircraft control systems
p0600 N81-31223

Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31452

Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] p0629 N81-32144

System identification for controlled aircraft --- maximum likelihood estimates, parameter identification
p0631 N81-33132

Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel
[NASA-TM-83171] p0635 N81-33159

Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] p0639 N81-33210

Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] p0639 N81-33211

AIRCRAFT DESIGN
NT HELICOPTER DESIGN

The aerodynamics of pure subsonic flow /4th revised edition/ --- German book
p0006 A81-11441

How to improve the performance of transport aircraft by variation of wing aspect-ratio and twist /12th Daniel and Florence Guggenheim International Memorial Lecture/
p0006 A81-11602

Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11604

The relevance of the Flex-Hub Prop-Fan for fuel-efficient airliners
p0006 A81-11605

New concepts for design of fully-optimized configurations for future supersonic aircraft
p0007 A81-11606

Advanced combat aircraft wing design
p0007 A81-11608

Some experiences with numerical optimisation in aircraft specification and preliminary design studies
p0007 A81-11609

DRAPO - Computer-assisted design and manufacturing system
p0007 A81-11610

Computer aided compilation of an electrical drawing file
p0007 A81-11611

The all-electric aircraft
p0008 A81-11617

Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621

A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622

The future cockpit of the next generation of civil aircraft
p0010 A81-11630

A theoretical and practical design investigation of the future military cockpit
p0010 A81-11631

Research on transonic wings at the National Aerospace Laboratory, Japan
p0011 A81-11640

High lift research and its application to aircraft design
p0011 A81-11642

Winglets development at Israel Aircraft Industries
p0012 A81-11645

Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646

Structural optimization of advanced aircraft structures
p0013 A81-11651

Optimal flight vehicle design and linear vector spaces
p0014 A81-11668

Hydrogen-fueled aircraft
p0016 A81-11753

A design guide for lightning protection of aircraft
p0056 A81-14259

A case for submicrosecond rise-time lightning current pulses for use in aircraft induced-coupling studies
p0057 A81-14267

The technical contributions of the Wright brothers to aviation
p0058 A81-14388

The effects of noise on laminar flow control drag reduction systems
p0058 A81-14390

Design and analysis of slat systems in transonic flow
p0058 A81-14392

Acoustic fatigue assessment in the design of aerospace vehicles
p0059 A81-14395

Forward swept wings and business airplanes
[SAE PAPER 800605] p0061 A81-15328

Environmental control systems for executive jet aircraft
[SAE PAPER 800607] p0061 A81-15330

Advanced materials for agricultural aircraft
[SAE PAPER 800610] p0062 A81-15333

Future trends in automatic flight control systems
[SAE PAPER 800627] p0063 A81-15343

The FFCC cockpit of the A310 is practically defined
p0063 A81-15623

The aerodynamics of airfoil boats
p0065 A81-15705

Charting a course for V/STOL
p0068 A81-16179

757/767 design considerations for improved productivity
p0100 A81-16504

Development and certification of the Gulfstream III
p0100 A81-16507

A case study in aircraft design: The de Havilland family of STOL commuter aircraft --- Book
p0101 A81-16717

Concorde aerodynamics and associated systems development --- Book
p0101 A81-16718

The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design --- Book
p0101 A81-16720

The Gossamer Condor and Albatross: A case study in aircraft design --- Book
[AV-R-80/540] p0101 A81-16721

Optimum selection of main parameters for the reverse design of a supersonic military aircraft
p0102 A81-17047

Transonic axisymmetric bodies with minimal wave drag
p0102 A81-17048

Application of fracture mechanics in designing lower wing skin of transport aircraft
p0102 A81-17049

Recent selected papers of Northwestern Polytechnical University. Parts 1 & 2 --- Book
p0107 A81-17801

Second order approximation theory of an arbitrary aerofoil in incompressible potential flow
p0108 A81-17803

Aerodynamic calculations and design of subcritical aerofoils
p0108 A81-17804

Structural analysis of fuselages with cutouts by finite element method
p0108 A81-17816

The matrix analysis of wings
p0108 A81-17818

Sukhoi's pivotal interdictor
p0109 A81-17632

Avionics and displays in a future airspace system
p0112 A81-18070

A summary of proposals for airflight research by the BMFT
p0118 A81-19298

Stress measurements on landing gear for the Airbus A-300 B2
p0119 A81-19299

Design to cost and new technologies
p0120 A81-19347

Procedures for optimal drag design of camber and flap deflection in supersonic regions with consideration to geometric limits
[DGLR PAPER 80-110] p0120 A81-19396

Circulation Control Wing /CCW/ flight tests
p0122 A81-19469

Industry proposes supersonic V/STOL
p0122 A81-19490

Fighters for the 1990s
p0122 A81-19497

Adaptive airfoils and wings for efficient transonic flight
p0153 A81-20349

A frequency-domain technique for aeroelastic mode estimation
p0156 A81-20475

Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20580

Experimental development of an advanced circulation control wing system for Navy STOL aircraft

[AIAA PAPER 81-0151] p0161 A81-20632

AV-8B composite fuselage design
[AIAA PAPER 81-0232] p0162 A81-20690

Structural weight comparison of a joined wing and a conventional wing
[AIAA PAPER 81-0366] p0166 A81-20785

A computer graphics display technique for the examination of aircraft design data
[AIAA PAPER 81-0370] p0166 A81-20788

A computer-aided design system geared toward conceptual design in a research environment --- for hypersonic vehicles
[AIAA PAPER 81-0372] p0166 A81-20789

Effect of rear stagnation point position and trailing edge bluntness on airfoil characteristics
p0170 A81-21013

Developments at VFW/Rhein-Flugzeugbau GmbH, Moenchengladbach --- trainer aircraft design
p0171 A81-21574

Flight companies present new aircraft - Boeing 737-200 advanced --- aircraft characteristics and airline selection procedures
p0171 A81-21575

Computer analysis of bird-resistant aircraft transparencies
p0175 A81-22087

High 'Q' ejection protection device
p0175 A81-22093

Escape from military fighters - A modern perspective
p0176 A81-22096

Extension of ejection seat capability for high speed conditions
p0176 A81-22097

Project and experimental fatigue test of the wing of a modern combat aircraft
p0180 A81-22625

Composite fuselage development for Naval aircraft
p0181 A81-22648

Critical field length calculations for preliminary design
p0183 A81-23366

An approximate analytical method for vortex-lift and centre of pressure on the slender wing
p0223 A81-23726

The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835

Israel Annual Conference on Aviation and Astronautics, 21st, Tel Aviv and Haifa, Israel, February 28-March 1, 1979, Proceedings
p0226 A81-24003

Modification of wing sections to optimize transonic performance
p0226 A81-24011

Design for supercommuters
p0227 A81-24048

Mission Adaptive Wing research programme
p0227 A81-24057

Active controls for civil aircraft
p0228 A81-24070

Cygnet - A canard configuration powered ultralight aircraft
p0231 A81-24746

The Coronel Transverse Wing Flight system
p0231 A81-24748

Nederlandse Vereniging voor Luchtvaarttechniek, Yearbook 1979
p0232 A81-24938

Landing gear shock absorber design criteria and the assessment of tire/wheel configurations
p0232 A81-24940

The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475

Wing analysis by the plate analogy using an integral-difference method
p0235 A81-25680

Parametric analysis of multipurpose airplanes based on utilization effectiveness criteria
p0236 A81-25691

Design considerations of advanced supercritical low drag suction airfoils
p0240 A81-26514

Control design for reduction of aerodynamic tail forces using quadratic synthesis
p0240 A81-26610

F-16 improvement program - Making the digits count
p0241 A81-26931

Design requirements of agricultural aircraft
p0282 A81-27880

Back to basics - The philosophy adopted for the flight testing of the Panavia Tornado avionics system in hack aircraft
p0282 A81-27881

Developments in aircraft power flying control hydraulics
p0282 A81-27882

A pursuit of the aerial carriage /25th Henson and Stringfellow Memorial Lecture/
p0284 A81-27901

Combat aircraft development - Looking backward to look forward 1935-1990
p0284 A81-27905

Airbus Industrie - Past, present and future /26th Mitchell Memorial Lecture/
p0284 A81-27907

New directions in cockpit alerting
p0286 A81-28298

Boeing 757 and 767 Flight Management System
p0286 A81-28299

Building the Gossamer Albatross
p0286 A81-28461

Supersonic V/STOL prospects brighten
p0288 A81-28599

Technology pays off on the AV-8B
p0291 A81-29060

A look at comprehensive engine/airframe integration for high performance aircraft
p0298 A81-29118

A method for obtaining shockless transonic flows past two-dimensional airfoils whose profiles are partially modified from a given arbitrary profile
p0298 A81-29201

Calculation of the aerodynamic characteristics of aircraft with jet mechanization
p0299 A81-29301

Use of flight simulators in developing design load spectra for new aircraft
[AIAA 81-0513] p0301 A81-29389

Sensitivity of optimum solutions to problem parameters --- in aircraft design
[AIAA 81-0548] p0301 A81-29399

The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400

Optimality criterion techniques applied to frames having nonlinear cross-sectional properties
[AIAA 81-0552] p0301 A81-29402

Shape optimization of plate and shell structures
[AIAA 81-0553] p0302 A81-29403

Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424

The stretched C-14 - Cost effective application of structural technology
[AIAA 81-0514] p0302 A81-29427

Response of stiffened sandwich panels
[AIAA 81-0557] p0303 A81-29455

Aeroelastic tailoring of a composite winglet for KC-135
[AIAA 81-0607] p0304 A81-29470

The anatomy of the aeroplane --- Book
p0309 A81-29678

An operational tilt-rotor this decade
p0309 A81-29774

Engine cycle selection for advanced technology engine studies
[ASME PAPER 81-GT-191] p0317 A81-30084

On the design of modern airfoil sections by numerical methods
p0347 A81-30705

A computer code for the calculation of aircraft trailing vortices
p0347 A81-30710

The 'light-weight' system - A novel concept for on-board weight and balance measurement using fiber optics
[SAWE PAPER 1336] p0352 A81-31377

Operational responses to aft empty C.G. --- Center of Gravity location in Boeing 727-200 aircraft
[SAWE PAPER 1338] p0352 A81-31378

Test procedures used in determining aircraft suitability for STAN integral weight and balance system
[SAWE PAPER 1339] p0352 A81-31379

Design considerations for future turboprop transports
[SAWE PAPER 1340] p0352 A81-31380

An Interactive Weight Accounting Program /IWAP/
[SAWE PAPER 1345] p0353 A81-31383
Computer aided technology interface with weights engineering --- aircraft design
[SAWE PAPER 1346] p0353 A81-31384
Weights information systems using minicomputers
[SAWE PAPER 1347] p0353 A81-31385
The Modular Life Cycle Cost Model for advanced aircraft systems - An overview
[SAWE PAPER 1351] p0353 A81-31386
The structural weight fraction - Revisited for fighter/attack type aircraft
[SAWE PAPER 1365] p0353 A81-31387
RAPIDLOADS - A preliminary design loads prediction technique for aircraft
[SAWE PAPER 1366] p0353 A81-31388
PARAM - A new weight sizing routine --- cost-effective computerized design for aircraft
[SAWE PAPER 1367] p0353 A81-31389
Design, fabrication, calibration, application, and testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
V/STOL advanced technology rewards and risk --- aircraft design
[SAWE PAPER 1385] p0354 A81-31401
A design analysis technique for evaluating size and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402
Airships - Transport of the future
p0355 A81-31699
Principles of aircraft structural design /2nd revised and enlarged edition/ --- Russian book
p0355 A81-31800
Aircraft assembly --- Russian book
p0355 A81-31872
Past and future trends in structures and dynamics --- of aircraft
[AIAA PAPER 81-0896] p0362 A81-32921
Design of low powered aircraft, a philosophy for future personal sport aircraft
[AIAA PAPER 81-0905] p0362 A81-32926
Jet aircraft design
[AIAA PAPER 81-0912] p0362 A81-32930
Commuter aircraft design
[AIAA PAPER 81-0913] p0363 A81-32931
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
Aircraft design then and now
[AIAA PAPER 81-0917] p0363 A81-32933
European approaches to transport aircraft design
[AIAA PAPER 81-0926] p0363 A81-32934
The art of designing experimental aircraft - An overview
[AIAA PAPER 81-0944] p0363 A81-32939
Airborne electronic displays
p0364 A81-32999
Propeller and wing --- Russian book
p0366 A81-33696
Vortex-flow aerodynamics - An emerging design capability
p0366 A81-33717
Maintenance tomorrow and the day after --- of wide-bodied transport aircraft
p0367 A81-33790
The optimal lift-drag ratio of a civil aircraft
[AAAF PAPER NT 80-35] p0369 A81-33923
Study of the characteristics of a base-vented wing in nonlinear theory
[AAAF PAPER NT 80-40] p0369 A81-33927
Global optimization of a glider
[AAAF PAPER NT 80-36] p0369 A81-33937
The all-electric airplane as an energy efficient transport
[SAE PAPER 801131] p0396 A81-34162
Future challenges in V/STOL flight propulsion control integration
[SAE PAPER 801140] p0397 A81-34170
757/767 flight management system
[SAE PAPER 801169] p0399 A81-34184
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
Feasibility of forward-swept wing technology for V/STOL aircraft
[SAE PAPER 801176] p0400 A81-34189
V/STOL capability by modifying CTOL aircraft
[SAE PAPER 801179] p0400 A81-34192
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193
New hydraulic system technology for future aircraft
[SAE PAPER 801108] p0401 A81-34200
Digital computer simulation of aircraft hydraulic systems
[SAE PAPER 801193] p0402 A81-34203
Small Transport Aircraft Technology /STAT/ Propulsion Study
[SAE PAPER 801198] p0402 A81-34208
The CADAM system for aircraft structural design
[SAE PAPER 801208] p0403 A81-34216
Integrated active controls impact on supersonic cruise vehicle structural design
[SAE PAPER 801210] p0404 A81-34218
Multi service applications for advancing blade concept aircraft
[SAE PAPER 801226] p0405 A81-34229
CAD - The designers' new tool --- in aircraft production
[AIAA PAPER 81-0850] p0407 A81-34352
ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ --- Integrated Computer Aided Manufacturing for aircraft systems
[AIAA PAPER 81-0855] p0408 A81-34353
The art of single-engine aircraft design
[AIAA PAPER 81-0914] p0408 A81-34361
NASA aeronautics R&T - A resource for aircraft design
[AIAA PAPER 81-0925] p0408 A81-34363
Feederjet for the 'eighties
p0410 A81-35024
A new lightweight fighter
p0410 A81-35025
A very complete electronic warfare system
p0412 A81-35674
Dynamics and calculations for an aircraft landing gear pneumatic shock absorber system
p0417 A81-36718
Mirage 2000, a totally multi-purpose aircraft
p0419 A81-37166
Civil aircraft design for fuel reduction
p0420 A81-37415
Coming challenge - Integrating the technologies for forward-swept-wing fighters
p0420 A81-37522
Flight-management system - Key to the advanced-technology fighter
p0421 A81-37523
Future strike aircraft design synthesis
[AIAA PAPER 81-0371] p0421 A81-37571
Integrated flexible sheet-metal components - Manufacturing center
p0449 A81-37633
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
Manufacturing technology for aircraft structural components made of carbon-fiber reinforced plastics
p0449 A81-37637
Integrated wing-engine system for airliners
p0450 A81-37638
Wing of new technology test specimen - Structural design and method of wing construction
p0450 A81-37639
Components in hybrid- and fiber technology for commercial aircraft of the Airbus family /flap support, spoiler, and window frame/
p0450 A81-37644
Aerodynamic efficiency of the wing of new technology, a comparison of design expectation and flight test result
p0450 A81-37645
Computer-aided design and manufacture in aircraft production /CAD/CAM/
p0451 A81-37647
The state-of-the-art in avionics
p0451 A81-37649
Airbus - Rudder unit in carbon fiber technology
p0451 A81-37651
Advanced technology and the commuter aircraft - A look into the next two decades
p0455 A81-38209
Not all student design projects end on paper - Chronology of the Chrysalis --- test procedure of human powered aircraft
p0455 A81-38332
Design and engineering of solar balloons
p0455 A81-38333

Design for safety --- Book
p0455 A81-38499

Coast Guard airship development
[AIAA 81-1311] p0455 A81-38528

Twin-rotor patrol airship flying model
[AIAA 81-1312] p0456 A81-38529

LTA developments in Great Britain
[AIAA 81-1321] p0456 A81-38532

Design and development of a thermal airship
[AIAA 81-1330] p0456 A81-38537

Low cost start-up for rigid-pressure airship
[AIAA 81-1337] p0457 A81-38541

The new utility - Commuter-technology in the sky
p0457 A81-38801

Advanced production methods for the Dornier 228
p0457 A81-38802

Experimental-programme - Transonic wing-TST
p0457 A81-38804

New structural technologies for future fighters
p0458 A81-38805

An optimal-surface-transpiration subsonic panel-method for iterative design of complex aircraft configurations
[AIAA PAPER 81-1254] p0458 A81-39012

Contribution of technological progress to energy savings and conservation to the design of new aircraft
p0464 A81-39695

ATR 42 - A regional transport aircraft designed to save energy
p0464 A81-39696

Development of a comprehensive analysis for rotorcraft. I - Rotor model and wake analysis
p0465 A81-39896

V/STOL combat aircraft progress from the powerplant viewpoint
p0469 A81-40105

X-wing stability and control development and wind tunnel demonstration tests - Helicopter, conversion, and fixed wing flight
[AHS 80-27] p0475 A81-40157

The evolution of a strategic bomber
[AIAA PAPER 81-0919] p0479 A81-40324

The optimum design of non-moment laminated composite plate - According to static failure strength condition
p0480 A81-40449

Boeing plays safe --- Boeing 737-300 design
p0480 A81-40455

The ATR 42 - Progress report on a new aircraft
p0480 A81-40456

Propfan progress
p0480 A81-40459

The survivable, affordable fighter - The Aeritalia-Macchi-Embraer AM-X
p0480 A81-40460

Design and concepts of composite structures
p0481 A81-40503

V/STOL technology requirements for future fighter aircraft
[AIAA PAPER 81-1360] p0502 A81-40841

Advanced nozzle integration for supersonic strike fighter application
[AIAA PAPER 81-1441] p0504 A81-40875

Combat survivability with advanced aircraft propulsion development
[AIAA PAPER 81-1506] p0507 A81-40913

Some propeller developments in the United Kingdom
[AIAA PAPER 81-1566] p0507 A81-40949

Evolution of transport wings - From C-130, C-141, and C-5 to C-XX
p0510 A81-41333

Improving the economy of subsonic transport aircraft by means of aerodynamic approaches
p0510 A81-41336

A large executive jet design project
p0513 A81-42051

New roles for the F-15 eagle
p0518 A81-42629

AMX - Italo-Brazilian bantam battler
p0518 A81-42630

Transonic wing design using potential-flow codes - Successes and failures
[SAE PAPER 810565] p0518 A81-42730

Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740

Analytical studies on the effects of cooling flows on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741

AFCS integration requirements --- Automatic Flight Control System
[SAE PAPER 810580] p0519 A81-42743

General aviation propeller noise reduction - Penalties and potential
[SAE PAPER 810585] p0520 A81-42746

Vortex drag reduction by diffusing vanes - Design for the 'Thrush' agricultural aircraft
[SAE PAPER 810605] p0521 A81-42762

Leading edge high lift devices for agricultural aircraft
[SAE PAPER 810608] p0522 A81-42765

Crashworthy design concepts for airframe structures of light aircraft
[SAE PAPER 810613] p0522 A81-42769

Aerodynamic design data for a cruise-matched high performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779

Summary of high-lift and control surface research on NASA general aviation airfoils
[SAE PAPER 810629] p0524 A81-42781

An assessment of advanced technologies for application to general aviation
[SAE PAPER 810630] p0524 A81-42782

Fibre reinforced composite applications at De Havilland
[SAE PAPER 810640] p0524 A81-42784

Design concepts for minimizing hot-gas ingestion in V/STOL aircraft
[AIAA PAPER 81-1624] p0525 A81-43133

Finite element analysis of a bird-resistant monolithic stretched acrylic canopy design for the F-16A aircraft
[AIAA PAPER 81-1640] p0525 A81-43140

Propulsion system installation design for high-speed prop-fans
[AIAA PAPER 81-1649] p0526 A81-43144

The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146

LQG controls for highly maneuverable aircraft --- Linear quadratic Gaussian
[AIAA PAPER 81-1709] p0527 A81-43163

Industrial leadership of an aircraft design class
[AIAA PAPER 81-1723] p0528 A81-43166

The turboprop aircraft role in the 1980s
[AIAA PAPER 81-1730] p0528 A81-43169

On making things the best - Aeronautical uses of optimization /Wright Bros. lecture/
[AIAA PAPER 81-1738] p0528 A81-43175

Modelling of gusts and wind shear for aircraft assessment and certification
p0528 A81-43376

NASA service experience with composite components --- for aircraft structures
p0529 A81-43607

Commercial composite component service experience --- in airplane structural design and manufacturing
p0530 A81-43616

Composite Wing/Fuselage Program
p0530 A81-43629

From paleoaeronautics to altostratus - A technical history of soaring
[AIAA PAPER 81-1611] p0533 A81-43933

Historical trend in the research and development of aircraft
[AIAA PAPER 81-1613] p0533 A81-43934

Axisymmetric approach and landing thrust reversers
[AIAA PAPER 81-1650] p0533 A81-43936

Some recent applications of high-lift computational methods at Boeing
[AIAA PAPER 81-1657] p0534 A81-43940

Experimental and analytical development of an advanced supersonic fighter concept
[AIAA PAPER 81-1659] p0534 A81-43941

Lift-enhancing surfaces on several advanced V/STOL fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-13946

Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953

Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954

Boeing 767 - The new fuel saver
p0553 A81-44042

Control characteristics of a Buoyant Quad-Rotor Research Aircraft [AIAA 81-1838] p0555 A81-44122

Flying qualities criteria and flight control design [AIAA 81-1823] p0556 A81-44127

Development and hardware verification of an aeroelastically tailored forward swept composite wing p0557 A81-44355

Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for metallic structures p0558 A81-44374

Pressure fluctuations on the surface of a small passenger aircraft. I - Periodic disturbances caused by the rotation of the propeller p0561 A81-44615

Pressure fluctuations on the surface of a small passenger aircraft. II - The effect of the turbulent boundary layer p0562 A81-44618

Aeronautical engineering - A historical perspective p0562 A81-44849

Project Bandit - An economical, high performance business aircraft for the 1990s p0563 A81-44850

Numerical and classical analysis of V/STOL aircraft using selected propulsion systems [AIAA PAPER 81-1676] p0563 A81-44898

Optimal multirate flight control design p0563 A81-45522

A new aircraft is born - The CN-235 p0565 A81-45756

New technologies in future commercial aircraft p0565 A81-45759

Prospects for the employment of dirigibles in the 1980s p0565 A81-45763

Design, analyses, and model tests of an aeroelastically tailored lifting surface [AIAA PAPER 81-1673] p0566 A81-45974

Soviet practice in designing and procuring military aircraft p0567 A81-46340

Aircraft/avionics environmental integration program p0570 A81-46480

Survivors on the RPV front p0577 A81-46725

Development of the carbon fiber-reinforced side rudder for the Airbus [DGLR PAPER 81-055] p0607 A81-47551

Surface-oriented coordinates for boundary-layer calculations in the case of general configurations [DGLR PAPER 81-014] p0608 A81-47557

The half-model technique in the wind tunnel and its employment in the development of the Airbus family [DGLR PAPER 81-118] p0609 A81-47587

Application of reduced natural longitudinal stability in the Airbus program [DGLR PAPER 81-062] p0610 A81-47609

Computational fluid mechanics and its impact on the aircraft aerodynamicist [DGLR PAPER 81-003] p0611 A81-47621

Combat cockpit design p0622 A81-49173

Stress concentration in elements of aircraft structures --- Russian book p0623 A81-49471

Commercial airliners - Design and flight operation p0623 A81-49575

Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers [AIAA PAPER 81-2005] p0624 A81-49732

Sukhoi Su-24 Fencer - The Soviet Tornado p0625 A81-49974

The Lear Fan 2100 p0625 A81-49975

Engineering and development program plan aircraft crashworthiness [AD-A089431] p0023 N81-10022

The XV-15 tilt rotor research aircraft [NASA-TM-81244] p0026 N81-10054

Design options study. Volume 1: Executive summary --- user requirements for the advanced civil military aircraft [AD-A089536] p0027 N81-10056

Design options study. Volume 2: Approach and summary results --- advanced civil military aircraft: cost estimates [AD-A089537] p0027 N81-10057

Design options study. Volume 3: Qualitative assessment --- advanced civil military aircraft [AD-A089538] p0027 N81-10058

Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing [NASA-CR-159361] p0032 N81-11013

Evolution of techniques for LCC analysis p0045 N81-11909

The Hornet program: A design to life cycle cost case study p0046 N81-11910

Design-to-cost and new technologies p0046 N81-11913

Low-speed aerodynamic characteristics of a 13 percent thick medium speed airfoil designed for general aviation applications [NASA-TP-1498] p0071 N81-12015

Should we attempt global (inlet engine airframe) control design? p0079 N81-12097

Influence of light aircraft architecture on its spin characteristics [AAAF-NT-80-11] p0081 N81-12111

Some new research approaches to aircraft spin studies [AAAF-NT-80-12] p0082 N81-12112

Application of fracture mechanics to US Air Force aircraft structural integrity requirements [AAAF-NT-79-25] p0086 N81-12463

Design analysis of wide-body aircraft [GPO-60-652] p0092 N81-13045

A system for aerodynamic design and analysis of supersonic aircraft. Part 2: User's manual [NASA-CR-3352] p0125 N81-13920

Computational aerodynamic design tools and techniques used at fighter development [MBB-FE-122/S/PUB/13] p0128 N81-13950

Fundamentals of conceptual design optimization of subsonic transport aircraft [VTH-LR-292] p0128 N81-13951

Laminar-airfoils for transport aircraft [DFVLR-MITT-80-07] p0129 N81-13952

Technological forecasting--aircraft design. Citations from the International Aerospace data base [NASA-CR-163833] p0129 N81-13957

Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability [NASA-TP-1760] p0130 N81-13960

Bird flight and airplane flight --- instruments to measure air currents and flight characteristics [NASA-TM-75777] p0130 N81-14962

A system for aerodynamic design and analysis of supersonic aircraft. Part 1: General description and theoretical development [NASA-CR-3351] p0139 N81-14970

A system for aerodynamic design and analysis of supersonic aircraft. Part 3: Computer program description [NASA-CR-3353] p0139 N81-14971

Remotely piloted vehicles. Citations from the International Aerospace abstracts data base [NASA-CR-163864] p0142 N81-14996

The high-speed airfoil program p0185 N81-15970

Transonic wind tunnel development (1940 - 1950) p0185 N81-15971

The high-speed propeller program p0185 N81-15972

A feasibility study for advanced technology integration for general aviation [NASA-CR-159381] p0185 N81-15974

A system for aerodynamic design and analysis of supersonic aircraft. Part 4: Test cases [NASA-CR-3354] p0185 N81-15977

Prospects for exploiting favourable and minimizing adverse aerodynamic interference in external store installations p0187 N81-15996

Study of transonic flow fields about aircraft: Application to external stores p0187 N81-15998

Aerodynamic subsonic/transonic aircraft design studies by numerical methods p0187 N81-15999

Design of advanced technology transonic airfoils and wings p0187 N81-16000
Interference aspects of the A310 high speed wing configuration p0188 N81-16001
Transonic wing technology for transport aircraft p0188 N81-16002
Design and experimental verification of a transonic wing for a transonic aircraft p0188 N81-16003
The tale of two wings p0188 N81-16004
Jet wing interference for an overwing engine configuration p0188 N81-16008
Design study for the inner wing of a transonic wing-body combination of aspect ratio 8 p0190 N81-16015
Supersonic Cruise Research 1979, part 1 [NASA-CP-2108-PT-1] p0243 N81-17981
Flying qualities design criteria applicable to supersonic cruise aircraft p0244 N81-17991
Structural concept trends for commercial supersonic cruise aircraft design p0246 N81-18006
Supersonic cruise research aircraft structural studies: Methods and results p0246 N81-18008
Overview of Boeing supersonic transport efforts, 1971 - 1979 p0247 N81-18016
A family of supersonic airplanes: Technical and economic feasibility p0248 N81-18017
Supersonic cruise vehicle research/business jet p0248 N81-18022
Structure and lifetime attestation of TORNADO [MBB-PUB-P-0001] p0251 N81-18048
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base [AD-A094226] p0252 N81-18050
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report [AD-A094225] p0252 N81-18051
Development and evaluation of automatic landing control laws for power lift STOL aircraft [NASA-CR-152399] p0253 N81-18060
The high lift characteristics in the case of the v-wing concept [NASA-TM-75872] p0253 N81-18061
Advanced aerodynamics and active controls. Selected NASA research [NASA-CP-2172] p0259 N81-19001
Langley Research Center contributions in advancing active control technology p0259 N81-19002
Small transport aircraft technology --- STAT p0260 N81-19007
GASP- General Aviation Synthesis Program. Volume 1: Main program. Part 1: Theoretical development [NASA-CR-152303-VOL-1-PT-1] p0270 N81-19088
GASP- General Aviation Synthesis Program. Volume 2: Geometry. Part 1: Theoretical development [NASA-CR-152303-VOL-2-PT-1] p0270 N81-19089
GASP- General Aviation Synthesis Program. Volume 3: Aerodynamics. Part 1: Theoretical development [NASA-CR-152303-VOL-3-PT-1] p0270 N81-19090
GASP- General Aviation Synthesis Program. Volume 4: Propulsion. Part 1: Theoretical development [NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091
GASP- General Aviation Synthesis Program. Volume 5: Weights. Part 1: Theoretical development [NASA-CR-152303-VOL-5-PT-1] p0271 N81-19092
GASP- General Aviation Synthesis Program. Volume 6: Performance. Part 1: Theoretical development [NASA-CR-152303-VOL-6-PT-1] p0271 N81-19093
Historical overview of V/STOL aircraft technology [NASA-TM-81280] p0272 N81-19100
Application of a structural optimization procedure for advanced wings [AGARD-R-691] p0333 N81-20064
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio [NASA-CR-159262] p0333 N81-20067
Integral equation methods for multi-element airfoil analysis and design --- including flap configurations [NLR-MP-79020-U] p0338 N81-21038
Tendencies in the development of subsonic transport-aircraft under special considerations of aerodynamics [DFVLR-MITT-80-15] p0338 N81-21040
Challenge for operational experience feedback in aircraft design: An aircraft design example [AD-A096088] p0341 N81-21067
Design considerations for composite fuselage structure of commercial transport aircraft [NASA-CR-159296] p0378 N81-22419
Aircraft crash dynamics: Some major considerations p0378 N81-22437
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies [NASA-CR-152336-1] p0387 N81-23064
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data [NASA-CR-152336-2] p0387 N81-23065
Technical evaluation report on the Fluid Dynamic Panel Symposium on Subsonic/Transonic Configuration/Aerodynamics [AGARD-AR-146] p0392 N81-23431
Civil component program Wing Section. The design of the transonic airfoil Va 2 [BMFT-FB-W-80-023] p0426 N81-24053
Quality in design --- and production of aircraft [SNIAS-802-111-108] p0427 N81-24054
Generalities on active control. Potentials and research trends [SNIAS-802-111-112] p0427 N81-24056
Aircraft Energy Efficiency program: Laminar flow control technology [NASA-TM-82352] p0437 N81-24389
Theoretical and experimental studies of crack propagation --- aircraft construction materials [SNIAS-802-111-107] p0437 N81-24482
Axisymmetric & non-axisymmetric exhaust jet induced-effects on a V/STOL vehicle design. Part 1: Data presentation --- conducted in Ames 11-foot transonic tunnel [NASA-CR-166146] p0441 N81-25064
Research related to variable sweep aircraft development [NASA-TM-83121] p0441 N81-25067
A procedure for designing forebodies with constraints on cross-section shape and axial area distribution [NASA-TP-1881] p0483 N81-26078
A digital program for calculating the interaction between flexible structures, unsteady aerodynamics and active controls [NASA-TM-80040] p0498 N81-27115
Optimization of fiber reinforced structures to satisfy aeroelastic requirements [NASA-CR-164536] p0499 N81-27200
Adaptive finite element technology in integrated design and analysis --- aircraft structures design [NASA-CR-164560] p0543 N81-28610
US and USSR Military Aircraft and Missile Aerodynamics 1970-1980. A selected, annotated bibliography, volume 1 [NASA-TM-81951] p0547 N81-29119
Control augmentation for lateral control wheel steering [NASA-CR-164664] p0549 N81-29132
The use of interpractive graphic displays for interpretation of surface design parameters [NASA-TM-81963] p0581 N81-30110
Structural optimization of advanced aircraft structures --- computerized design [MBB-S/PUB/32] p0562 N81-30122
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane [NASA-CR-165768] p0596 N81-31184
Vehicle concepts and technology requirements for buoyant heavy-lift systems [NASA-TP-1921] p0596 N81-31185
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag

reduction
[NASA-CR-164833] p0627 N81-32117
Program of research in laminar flow control in the
JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121
The Impact of Military Applications on Rotorcraft
and V/STOL Aircraft Design
[AGARD-CP-313] p0632 N81-33137
The role of the research simulator in the systems
development of rotorcraft
p0633 N81-33146
Multi-mission STOVL with vectored thrust engines
p0633 N81-33149
Mission potential of derivatives of the XV-15 tilt
rotor research aircraft
p0634 N81-33150
V/STOL aircraft technology in Canada
p0634 N81-33152
US military V/STOL: Who needs it? Wants it? Can
afford it?
p0634 N81-33156
Analysis and design of supersonic aircraft based
on inviscid nonlinear Eulerian equations. Part
1: Rotational Euler solutions with explicit
shock fitting
[AD-A103434] p0637 N81-33192
Advanced composite aircraft electromagnetic design
and synthesis
[SAND-81-1278C] p0638 N81-33200
AIRCRAFT DETECTION
Implementation of target orientation angles in
improved Kalman filter based short range radar
tracking
p0326 A81-30340
Aircraft penetration under cloud cover
p0463 A81-39640
Aircraft recognition by means of monostatic radar
p0607 A81-47142
Investigation of performance, noise and
detectability characteristics of small-scale
remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] p0624 A81-49732
Systems analysis of the installation, mounting,
and activation of emergency locator transmitters
in general aviation aircraft
[NASA-CR-160036] p0023 N81-10020
Detection of military aircraft in an Air Traffic
Control Radar Beacon System (ATCRBS) environment
[AD-A093427] p0207 N81-17036
AIRCRAFT ENGINES
NT HELICOPTER ENGINES
NT J-97 ENGINE
NT TF-30 ENGINE
NT TF-34 ENGINE
NT TF-41 ENGINE
NT VARIABLE CYCLE ENGINES
NT VARIABLE STREAM CONTROL ENGINES
Reliability and engineering-economic
characteristics of aircraft engines --- Russian
book
p0001 A81-10045
Impact damage of aircraft gas turbine engines with
axial compressors
p0005 A81-11324
Calculation of the flow field around
engine-wing-configurations
p0007 A81-11613
Hydrogen-fueled aircraft
p0016 A81-11753
Variable geometry, lean, premixed, prevaporized
fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12669
Automation of aircraft gas-turbine power plants
--- Russian book
p0020 A81-12762
The possibility of improving the
lateral-directional characteristics of a
twin-engine aircraft by spoilers in the case of
sudden engine failure
p0049 A81-12967
Influence of a change in power at the propeller on
the properties of the aircraft
p0059 A81-14754
The jet engine - Anniversary of a missed opportunity
p0061 A81-15168
Business aircraft turbofan technology progress in
the 1970's, challenges in the 1980's
[SAE PAPER 800601] p0061 A81-15326
A new high bypass fan for general aviation
[SAE PAPER 800602] p0061 A81-15327
Business aircraft APU's --- Auxiliary Power Units
[SAE PAPER 800608] p0061 A81-15331
Vibration aspects of small turbine engines in
aircraft installations
[SAE PAPER 800617] p0062 A81-15337
Research on a high work axial gas generator turbine
[SAE PAPER 800618] p0062 A81-15338
Fuel economy and extension of the service life of
aircraft gas turbine engines
p0065 A81-15719
Substantiation of oil change periods for ship and
aircraft turbine engines
p0065 A81-15720
The origins of the turbojet revolution --- Book
p0068 A81-16240
Productivity - The challenge of aircraft and
engine maintenance
p0102 A81-17045
Rolls-Royce engines status report
p0102 A81-17166
Coatings in the aero gas turbine
p0103 A81-17167
Turbopropeller engine PZL-10S
p0103 A81-17324
Composition of sludge formed in B-3V oil
p0103 A81-17373
Joint-laboratory qualification testing of oils for
gas turbine engines
p0103 A81-17375
The digital control system as part of an
integrated accessory fit for future engines
p0104 A81-17505
Turbine blade technology - Present and future
[ASME PAPER 80-C2/AERO-10] p0116 A81-18639
Calculated and experimental data for a 118-mm bore
roller bearing to 3 million DN
[ASME PAPER 80-C2/LUB-14] p0117 A81-18668
Aircraft engine programs employing cost objectives
p0119 A81-19346
Calculation of propeller efficiency for an ideal
propeller
p0121 A81-19444
Computer-aided process planning system for
aircraft engine rotating parts
p0149 A81-19836
Scale effects on turbulent boundary layer
development and flow separation around V/STOL
inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Designing the Hornet for improved R and M
[AIAA PAPER 81-0236] p0162 A81-20688
Aircraft pollution in the vicinity of airports
[AIAA PAPER 81-0309] p0164 A81-20743
Prediction method for the overall performance of
turbofan engines
[AIAA PAPER 81-0367] p0166 A81-20786
Developments at VFW/Rhein-Flugzeugbau GmbH,
Moenchengladbach --- trainer aircraft design
p0171 A81-21574
Core noise measurements from a small, general
aviation turbofan engine
p0178 A81-22531
Features improved cooling - Turbine blade redesign
boosts life
p0227 A81-24046
High power silver zinc and thermal batteries for
missiles and aviation applications
p0235 A81-25612
Problems and promises in gas turbine combustor
design development
p0236 A81-26007
Noise from gas turbine combustors
p0236 A81-26008
Basic ignition research related to altitude
relight problems
p0237 A81-26014
Trajectory generation techniques for multivariable
control of aircraft turbine engines
p0240 A81-26609
Investigation of the influence of active particles
on the basic combustion characteristics in
turbulent flow
p0242 A81-26986
Losses of total pressure during mixing of flows in
a step diffuser
p0242 A81-26991

Determination of the thickness of blades of open
wheels of radial-axial turbines
p0242 A81-26994
Flutter of plates and shells in practice
p0282 A81-27611
Some experience with ferrography in monitoring the
condition of aircraft engines
p0285 A81-27943
Calculation of shells in aircraft turbine engines
p0285 A81-28078
Integral methods for solving thermal conductivity
problems and their application to evaluating
heat exchange in certain gas-turbine elements
p0285 A81-28128
Jet engine maintenance and reliability programs -
Objectives and management
p0287 A81-28475
Aircraft and air pollution
p0288 A81-28698
Aircraft thrust augmentors of ejector type ---
Russian book
p0289 A81-28760
Design for economy --- of high-bypass turbofan
engines
p0290 A81-29030
International Symposium on Air Breathing Engines,
5th, Bangalore, India, February 16-22, 1981,
Proceedings
p0290 A81-29051
The future of aeronautical propulsion
p0290 A81-29052
Effectiveness of turbine engine diagnostic systems
p0290 A81-29053
Engine performance monitoring systems expansion on
Alitalia aircraft
p0290 A81-29054
Contribution to the improvement of the classical
method of maintenance of aeroengines
p0290 A81-29055
Analysis of vibration related failures in aero
turbo-shaft engines
p0291 A81-29057
Investigation into the vibration of the starter
gearbox of an aircraft turbine engine
p0291 A81-29059
A new breed of an air breathing engine
p0292 A81-29070
Fresh mixture entrainment in a jet curtain
flameholder
p0294 A81-29084
The effect of oxygen concentration distribution on
altitude relighting performance of a turbo-jet
engine combustor
p0295 A81-29089
The influence of gyroscopic forces on the dynamic
behavior of rotating blades
p0295 A81-29098
Effects of solid particles suspended in fluid flow
through an axial flow compressor stage
p0297 A81-29108
Comparisons of model and flight testing with
respect to hot gas reingestion and debris
ingestion during thrust reversal
p0297 A81-29113
Flow separation in inlets at incidence angles
p0297 A81-29114
Transpiration air cooled turbine blade - A
technology for future generation aircraft and
industrial gas turbine engines using coal or
coal derived fuels
p0297 A81-29115
A look at comprehensive engine/airframe
integration for high performance aircraft
p0298 A81-29118
The engineering basis for the application of life
cycle cost or supportability criteria to gas
turbine engines
p0298 A81-29119
Basic problem of the analytical design of aircraft
gas turbine engines. II
p0299 A81-29305
Material shortages - Effect on the aircraft engine
industry
[AIAA 81-0509] p0301 A81-29387
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442
Transient, nonlinear response analysis of soft
bodied impact on flat plates including
interactive load determination
[AIAA 81-0621] p0305 A81-29482
Gas turbine engineering: Applications, cycles and
characteristics --- Book
p0309 A81-29680
Electronic engine control for commercial aircraft
p0309 A81-29775
The evaluation of fuel property effects on Air
Force gas turbine engines - Program Genesis
[ASME PAPER 81-GT-1] p0310 A81-29926
Pattern factor improvement in the F-100 primary
combustion system
[ASME PAPER 81-GT-25] p0311 A81-29941
Premixing and flash vaporization in a two-stage
combustor
[ASME PAPER 81-GT-41] p0312 A81-29955
Improved jet engine maintenance through automated
vibration diagnostic systems
[ASME PAPER 81-GT-62] p0313 A81-29972
NASA research in aeropropulsion
[ASME PAPER 81-GT-96] p0314 A81-30003
Low NO/X/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
Establishing cruise-engine cycle payoffs for a
supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007
Life cycle cost before, during and after the
design of aircraft propulsion systems
[ASME PAPER 81-GT-111] p0315 A81-30016
Commercial engine logistics cost projections - A
dynamic and flexible approach
[ASME PAPER 81-GT-114] p0315 A81-30018
Design and development of the combustor inlet
diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
Full-authority digital electronic controls for
civil aircraft engines
[ASME PAPER 81-GT-138] p0316 A81-30041
The Navy PATE program --- Propulsion Automatic
Test Equipment
[ASME PAPER 81-GT-189] p0317 A81-30082
Engine cycle selection for advanced technology
engine studies
[ASME PAPER 81-GT-191] p0317 A81-30084
Digital control makes a commercial debut on the
JT9D engine
[ASME PAPER 81-GT-199] p0317 A81-30090
Cooled radial in-flow turbines for advanced gas
turbine engines
[ASME PAPER 81-GT-213] p0318 A81-30102
The role of flight research vehicles in prop-fan
technology development
[ASME PAPER 81-GR-216] p0318 A81-30104
Driving dynamics of a high-speed
positive-displacement pump and gas-turbine drive
during startup --- of flight vehicles
p0319 A81-30155
Principles of aircraft-engine assembly --- Russian
book
p0355 A81-31799
High temperature electronic requirements in
aeropropulsion systems
p0359 A81-32547
Bearing wear detection using radioactive iron-55
tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33868
Prop-Fan technical progress leading to technology
readiness
[AIAA PAPER 81-0810] p0367 A81-33878
Rolls-Royce RB 211-535 power plant
[AIAA PAPER 81-0807] p0368 A81-33886
Investigation of instantaneous distortions in air
intakes at high angles of attack
[AAAF PAPER NT 80-38] p0369 A81-33931
Propellers for economic flight at high speeds
[AAAF PAPER NT 80-34] p0369 A81-33936
Analysis of total and static pressure fluctuations
in an air intake at high incidence
[AAAF PAPER NT 80-61] p0370 A81-33950
The F100 engine
[SAE PAPER 801110] p0395 A81-34151
JT8D performance improvement to offset rising fuel
costs
[SAE PAPER 801117] p0395 A81-34153
Performance deterioration of commercial
high-bypass ratio turbofan engines
[SAE PAPER 801118] p0396 A81-34154
Description of the warm core turbine facility and
the warm annular cascade facility recently
installed at NASA Lewis Research Center

[SAE PAPER 801122] p0396 A81-34158
The all-electric airplane as an energy efficient transport
[SAE PAPER 801131] p0396 A81-34162
An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168
Future challenges in V/STOL flight propulsion control integration
[SAE PAPER 801140] p0397 A81-34170
A comparison of propulsion systems for V/STOL supersonic combat aircraft
[SAE PAPER 801141] p0398 A81-34171
The GTCP331 Auxiliary Power Unit for the next generation commercial transports
[SAE PAPER 801147] p0398 A81-34176
Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177
Fuel efficiency improvements to the T56 turboprop engine
[SAE PAPER 801158] p0399 A81-34178
Secondary power system options for future military aircraft
[SAE PAPER 801192] p0401 A81-34202
Reverse thrust performance of the QCSEE variable pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
Small Transport Aircraft Technology /STAT/ Propulsion Study
[SAE PAPER 801198] p0402 A81-34208
Flight test reliability demonstration of electronic engine controls
[SAE PAPER 801201] p0403 A81-34211
Overview of ARP 1587 aircraft gas turbine Engine Monitoring System guide
[SAE PAPER 801218] p0404 A81-34224
Current and future use of an AIDS integrated EMS --- Aircraft Integrated Data System for Engine Monitoring
[SAE PAPER 801219] p0404 A81-34225
TriStar engine monitoring in British Airways
[SAE PAPER 801224] p0405 A81-34227
Commuter turboprop propulsion technology
[SAE PAPER 801243] p0406 A81-34239
The High Performance Auxiliary Power Unit technology demonstrator program
[SAE PAPER 801148] p0406 A81-34240
Development requirements for integrated aircraft power systems
[SAE PAPER 801149] p0406 A81-34241
The status of the expendable gasifier program --- gas generator for aircraft engine
[SAE PAPER 801151] p0406 A81-34242
Developing a Fighter Engine Derivative of the B-1/F101 engine
[SAE PAPER 801156] p0407 A81-34246
Turbine engine design --- engineering for cost effectiveness and propulsive efficiency
[AIAA PAPER 81-0915] p0408 A81-34362
A new lightweight fighter
p0410 A81-35025
History of the Pegasus vectored thrust engine
p0411 A81-35630
Numerical solution of a supersonic ejector pump
p0413 A81-35939
Microcomputer based engine model used in flight simulation applications
[AIAA 81-0973] p0415 A81-36562
The present and future applications of titanium alloys in engines
p0417 A81-36666
Advanced generating system equipment for aircraft
p0420 A81-37414
Civil aircraft design for fuel reduction
p0420 A81-37415
Pilot installations for deposition techniques in the case of components exposed to heat and for diffusion joining of power plant components
p0449 A81-37634
Integrated wing-engine system for airliners
p0450 A81-37638
New technologies for compressors of aviation engines
p0452 A81-37656
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
U. of Dayton uses X-rays to study impact patterns at ballistic ranges
p0453 A81-37798
Component research for future propulsion systems
p0454 A81-38050
Is it safe - The safety assessment of aircraft systems. V - Some particular techniques
p0454 A81-38178
CFM56 rejuvenates the DC-8
p0455 A81-38196
An apparatus for the simulation of an air intake at high angle of attack in a compressor test facility
[ONERA, TP NO. 1981-35] p0460 A81-39238
Tests of air inlets at Reynolds numbers comparable to flight in the ONERA F1 and S1MA wind tunnels
[ONERA, TP NO. 1981-36] p0460 A81-39239
A theoretical and experimental study of combustion chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242
Wind-tunnel tests of engine-equipped models - Comparison of two jet wash simulation methods
[ONERA, TP NO. 1981-42] p0460 A81-39245
Optimization of aircraft propulsion
p0464 A81-39697
Propellers for economic flight at high speeds
p0464 A81-39698
The requirements for and evolution of a test rig for exhaust gas recirculation studies of V/STOL aircraft
p0469 A81-40106
The development of a twin-turbofan V/STOL aircraft
[AHS 80-8] p0473 A81-40141
Development of small fuel efficient aircraft engines
[AHS 80-38] p0477 A81-40167
Battle of the 15 tonne fans
p0480 A81-40457
Exploratory development program to improve combustor dome operating characteristics
[AIAA PAPER 81-1351] p0501 A81-40834
Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836
Processing for an improved impact resistant composite blade --- for turbofan aircraft engines
[AIAA PAPER 81-1356] p0501 A81-40838
Multi-mission V/STOL with vectored thrust engines
[AIAA PAPER 81-1363] p0502 A81-40843
Recent developments in Naval aircraft jet engine usage
[AIAA PAPER 81-1366] p0502 A81-40846
The influence of blade wakes on the performance of combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856
Fuel character effects on the TF41 engine combustion system
[AIAA PAPER 81-1391] p0503 A81-40858
Selected results from combustion research at the Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859
Use of segmented mold process to produce large superalloy engine castings
[AIAA PAPER 81-1404] p0503 A81-40861
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891
Strong pressure waves in air-breathing engines
[AIAA PAPER 81-1475] p0505 A81-40895
External burning propulsion analysis
[AIAA PAPER 81-1477] p0505 A81-40897
NAPC gyroscopic moment test facility
[AIAA PAPER 81-1480] p0506 A81-40900
Development of exhaust nozzle internal performance prediction techniques for advanced aircraft applications
[AIAA PAPER 81-1490] p0506 A81-40910
Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911
Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1588] p0507 A81-40963
Performance analysis of a family of planar pulse generators
[AIAA PAPER 81-1590] p0507 A81-40965
A compact installation for testing vectored-thrust engines
[AIAA PAPER 81-1592] p0508 A81-40967

A successful step toward an advanced supersonic transport engine - Acoustic and emission results from the Pratt and Whitney Aircraft Variable Cycle Engine Program
[AIAA PAPER 81-1593] p0508 A81-40968

NASA VCE test bed engine aerodynamic performance characteristics and test results
[AIAA PAPER 81-1594] p0508 A81-40969

Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970

Turbine bypass engine - A new supersonic cruise propulsion concept
[AIAA PAPER 81-1596] p0508 A81-40971

The supersonic fan engine - An advanced concept in supersonic cruise propulsion
[AIAA PAPER 81-1599] p0508 A81-40973

Selection of turbine parameters for steam-hydrogen engine schemes
p0509 A81-41028

Thermodynamic comparison of the efficiencies of semiclosed- and open-loop air cooling systems of gas turbine engines
p0509 A81-41029

Excitation of surging type oscillations due to aperiodic external effects --- in multishaft turbojet engines
p0509 A81-41032

An experimental study of heat transfer on turbine rotor blades
p0509 A81-41033

Change of static pressure on the rotating blades of an axial-flow compressor during surging
p0509 A81-41039

Efficiency of cantilever compressor stator blades
p0509 A81-41041

Effect of engine noise on aircraft wing laminar boundary-layer stability
p0510 A81-41255

High pressure fuel pumps - Their design and evolution /The 13th J. D. North Memorial Lecture/
p0513 A81-42052

The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176

F-16 variable-geometry inlet design and performance
[AIAA PAPER 81-1394] p0514 A81-42184

An approach to conformal inlet diffuser design for integrated propulsion systems
[AIAA PAPER 81-1395] p0514 A81-42185

Experimental investigation of a high-aspect-ratio supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42187

The use of engine operating experience in the preliminary design of aircraft gas turbine combustion systems
[AIAA PAPER 81-1399] p0515 A81-42189

Methodology for engine/aircraft selection with life and utilization considerations
[AIAA PAPER 81-1401] p0515 A81-42190

ATES activity and status at Detroit Diesel Allison --- Advanced Technology Engine Studies
[AIAA PAPER 81-1504] p0516 A81-42206

Application of the Semi-Loof thin shell element to the analysis of aircraft engine structures
p0518 A81-42704

Evaluation of multi-viscosity oils designed for aircraft reciprocating engines
[SAE PAPER 810572] p0519 A81-42737

The new aviation multiviscosity oil, SAE 20W-50 for general aviation
[SAE PAPER 810573] p0519 A81-42738

Propeller performance and design as influenced by the installation
[SAE PAPER 810602] p0521 A81-42759

Small turbofan engines - Their impact on general aviation aircraft
[SAE PAPER 810622] p0523 A81-42776

Full-scale study of the cooling system aerodynamics of an operating piston engine installed in a light aircraft wing panel
[SAE PAPER 810623] p0523 A81-42777

An overview of general aviation propulsion research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-42778

Aerodynamic design data for a cruise-matched high performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779

Fiber-reinforced composites - The future for aeropropulsion
[AIAA PAPER 81-1713] p0527 A81-43164

Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165

Turboprop engine propulsion for the 1990's
[AIAA PAPER 81-1648] p0533 A81-43935

Investigation of influences on the definition of engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938

The influence of aircraft operations on air quality at airports
p0553 A81-44074

The new generation of turboshaft and turboprop engines
p0560 A81-44473

Numerical and classical analysis of V/STOL aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898

Aerodynamic integration of externally mounted engines on a long-range bomber
[AIAA PAPER 81-1693] p0563 A81-44899

Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45891

The predictability of turbine vane convection heat transfer
[AIAA PAPER 81-1435] p0566 A81-45892

Design of fault tolerant electronic engine controls
[AIAA PAPER 81-1496] p0566 A81-45894

RB.199 - Compact Tornado power
p0567 A81-46334

Erosion strength of aircraft engine and power plant parts --- Russian book
p0578 A81-46848

Analytical and computer-aided design of automated systems for the testing of aircraft engines --- Russian book
p0578 A81-46850

Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47962

Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
p0613 A81-47966

Damping applications in aero-propulsion systems
p0613 A81-47999

A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
p0615 A81-48333

Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
p0616 A81-48379

Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] p0619 A81-48620

Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] p0619 A81-48621

The effect of vane-frame design on rotor-stator interaction noise
[AIAA PAPER 81-2034] p0619 A81-48627

Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] p0620 A81-48637

Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639

High bypass ratio engine noise component separation by coherence technique
[AIAA PAPER 81-2054] p0621 A81-48653

Propulsion energy for tomorrow's aviation
p0622 A81-49161

Design of production processes for flight-vehicle engines --- Russian book
p0623 A81-49475

The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] p0623 A81-49727

The Lear Fan 2100
p0625 A81-49975

Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines
[AIAA PAPER 81-1358] p0625 A81-49976

Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067

Aircraft engine nacelle fire test simulator.
Volume 1: Technical
[AD-A089629] p0030 N81-10081
Summary of AGARD Lecture Series 107: The
Application of Design to Cost and Life Cycle
Cost to Aircraft Engines
p0047 N81-11926
Cost/benefit analysis of advanced materials
technology candidates for the 1980's, part 2
[NASA-CR-165176] p0048 N81-11953
Synopsis on aircraft integrated data systems and
engine health monitoring and maintenance
[DFVLR-MITT-80-08] p0075 N81-12063
The design development and operation of gas
turbine radio telemetry systems
[EIR-00733] p0077 N81-12082
Propulsion Controls, 1979 --- air breathing engine
control
[NASA-CP-2137] p0078 N81-12090
Should we attempt global (inlet engine airframe)
control design?
p0079 N81-12097
Road map to adaptive optimal control --- jet
engine control
p0079 N81-12098
Propulsion control and control theory: A new
research focus
p0080 N81-12099
Engine identification for adaptive control
p0080 N81-12100
Multivariable synthesis with transfer functions
--- applications to gas turbine engines
p0080 N81-12102
Alternatives for jet engine control
p0080 N81-12103
Metallurgical aspects of materials processing and
manufacturing for aero-engine components --- gas
turbine engines
[PNR-90019] p0084 N81-12209
Advanced industrial gas turbine techclogy
readiness demonstration
[DOE/OR-05035/T1] p0085 N81-12426
An evaluation of wind tunnel test techniques for
aircraft nozzle afterbody testing at transonic
Mach numbers
[AD-A091775] p0126 N81-13931
Advanced Technology Spark-Ignition Aircraft Piston
Engine Design Study
[NASA-CR-165162] p0130 N81-13963
Prevention of spline wear by soft metallic coatings
--- aircraft engines
[AD-A091861] p0132 N81-14064
Compressor configuration and design optimization
for the high reliability gas turbine
[DOE/ET-15425/T1] p0134 N81-14327
The measurement of aero gas turbine noise
[PNR-90032] p0138 N81-14795
Analysis of pressure spectra measurements in a
ducted combustion system
[NASA-TM-81583] p0146 N81-15768
High-speed cowlings, air inlets and outlets, and
internal-flow systems
p0185 N81-15973
An overview of general aviation propulsion
research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16052
Experimental analysis of IMEP in a rotary
combustion engine
[NASA-TM-81662] p0195 N81-16054
Propulsion system mathematical model for a
lift/cruise fan V/STOL aircraft
[NASA-TM-81663] p0195 N81-16055
High temperature electronic requirements in
aeropropulsion systems
[NASA-TM-81682] p0201 N81-16386
Methodology for determining sampling intervals
[AD-A092581] p0202 N81-16825
Turbine engine fault detection and isolation
program, phase 1. Volume 2: Requirements
definition for an integrated engine monitoring
system
[AD-A093226] p0215 N81-17088
Turbine engine fault detection and isolation
program, phase 1. Volume 1: Requirements
definition for an integrated engine monitoring
system
[AD-A093225] p0215 N81-17089
Centrifugal compressors for small aero and
automotive gas turbine engines
p0220 N81-17467
Light aircraft engines, the potential and problems
for use of automotive fuels. Phase 1:
Literature search
[AD-A094154] p0253 N81-18057
Recent developments in aircraft engine noise
reduction technology
p0269 N81-19072
General Aviation Turbine Engine (GATE) study
[NASA-CR-159482] p0274 N81-19117
Evaluation of powder coatings for application to
aircraft component parts
[AD-A094724] p0277 N81-19305
Reasons for low aerodynamic performance of
13.5-centimeter-tip-diameter aircraft engine
starter turbine
[NASA-TP-1810] p0334 N81-20076
An experimental investigation of the aerodynamics
and cooling of a horizontally-opposed air-cooled
aircraft engine installation
[NASA-CR-3405] p0372 N81-22015
Energy efficient engine flight propulsion system:
Aircraft/engine integration evaluation
[NASA-CR-159584] p0375 N81-22051
Quiet Clean General Aviation Turbofan (QCGAT)
technology study, volume 1
[NASA-CR-164222] p0376 N81-22052
NASA's aeronautics research and technology base
[NASA-CR-164195] p0381 N81-22969
An analysis of opportunistic maintenance policy
for the F100PW100 aircraft engine
[AD-A097548] p0384 N81-23025
Application of ion implantation for the
improvement of localized corrosion resistance of
M50 steel bearings
[AD-A097230] p0393 N81-23466
Structures, performance, benefit, cost study ---
gas turbine engines
[NASA-CR-165313] p0428 N81-24067
Turbine Engine Testing
[AGARD-CP-293] p0429 N81-24071
Overview of all civil aviation engine
certification/demonstration requirements and
rationale, i.e., FAA, CAA, etcetera
p0429 N81-24072
Certification procedure for military engines in
Germany
p0429 N81-24074
Boeing Commercial Airplane Company engine
procurement practices
p0429 N81-24076
Propulsion system testing requirements for a
commercial transport
p0430 N81-24077
Development of test requirements for civil engines
p0430 N81-24079
Engine life development --- operating costs and
propulsion system performance
p0430 N81-24081
Development of test requirements for civil and
military auxiliary power units
p0430 N81-24083
Engine in-flight data collection and analysis in
United Kingdom aircraft
p0431 N81-24085
Derivation and correlation of accelerated mission
endurance testing
p0431 N81-24088
Free-jet testing of powerplants for aircraft and
missiles
p0431 N81-24089
Inlet-engine compatability testing techniques in
ground test facilities
p0431 N81-24090
Performance assessment of an advanced reheated
turbo fan engine
p0432 N81-24094
Flight tests of the engines of combat aircraft:
Validation methods used by CEV
p0432 N81-24095
Full annular combustor test facility for high
pressure/high temperature testing
p0432 N81-24097
Low pressure turbine testing
p0432 N81-24098
Rig investigation of a two stage single shaft low
cost turbine
p0432 N81-24099

Prediction of future test needs, test facilities and procedures p0433 N81-24104

Propulsion system study for Small Transport Aircraft Technology (STAT) [NASA-CR-165330] p0442 N81-25078

High performance auxiliary power unit technology demonstrator [AD-A098618] p0444 N81-25085

Reliability advancement for electronic engine controllers, volume 1 [AD-A098623] p0444 N81-25087

A look at NASA's Aircraft Energy Efficiency program [PSAD-80-50] p0490 N81-26149

Microcomputer Applications in Power and Propulsion Systems [AGARD-LS-113] p0497 N81-27103

Fault trees and system reliability analysis with reference to the control of aircraft engines p0498 N81-27109

Prediction of sound radiation from different practical jet engine inlets [NASA-CR-164620] p0500 N81-27886

Aircraft energy efficiency. Overview [NASA-FACTS-96/9-80] p0538 N81-28083

The E3 combustors: Status and challenges --- energy efficient turbofan engines [NASA-TM-82684] p0539 N81-28095

Study of an engine flow diverter system for a large scale ejector powered aircraft model [NASA-CR-166163] p0540 N81-28096

Fuel system testing and test instrumentation --- NHCA aircraft p0544 N81-29076

Turbojet engine blade damping [NASA-CR-165406] p0549 N81-29130

Cobalt: A vital element in the aircraft engine industry [NASA-TM-82662] p0551 N81-29206

Programmes for military engines with cost objectives --- aircraft engines [PNR-90058] p0583 N81-30133

Fiber optics for aircraft engine/inlet control [NASA-TM-82654] p0597 N81-31190

Aircraft Engine Diagnostics [NASA-CP-2190] p0597 N81-31196

CF 6 engine diagnostics p0597 N81-31197

CF6 high pressure compressor and turbine clearance evaluations p0598 N81-31198

JT9D jet engine diagnostics program p0598 N81-31199

JT8D engine performance retention p0598 N81-31200

Performance retention of the RB211 powerplant in service p0598 N81-31201

Performance deterioration: An airline perspective p0598 N81-31202

The nature of operating flight loads and their effect on propulsion system structures p0599 N81-31207

Conservation of Strategic Aerospace Materials (COSAM) p0599 N81-31208

Engine condition monitoring: CF6 family 60's through the 80's p0600 N81-31215

An overview of SAE ARP 1587: Aircraft gas turbine engine monitoring system guide p0600 N81-31217

Unsteady swirling flows in gas turbines --- aircraft engines and aeroacoustics [AD-A102852] p0629 N81-32150

Multi-mission STOVL with vectored thrust engines p0633 N81-33149

Noise suppression characteristics of peripherally segmented duct liners [NASA-TP-1904] p0641 N81-33946

AIRCRAFT EQUIPMENT

NT AIRCRAFT HYDRAULIC SYSTEMS

NT AIRCRAFT TIRES

NT EJECTION SEATS

NT FLYING EJECTION SEATS

NT TERCOM

The design of blowing-cooled aircraft electrical machines p0002 A81-10474

A design guide for lightning protection of aircraft p0056 A81-14259

A fault tolerant multiprocessor system with reconfiguration suitable for multiaxial flight stabilization and trimming p0118 A81-19296

Solid-state power system use expands p0122 A81-19491

Measurement of radar in radio service aircraft p0151 A81-20079

An inflatable seat for aircraft passengers p0175 A81-22091

A versatile miniature solid state television camera /CCD/ p0180 A81-22620

Pulsed laser mapping system for light aircraft p0223 A81-23671

Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft p0281 A81-27364

Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source --- aircraft equipment p0288 A81-28574

Test stand for the experimental study of auxiliary power supplies p0319 A81-30153

Complex computation of flywheel power systems for flight vehicles p0319 A81-30158

Digital computer simulation of generalized fault conditions on aircraft electrical power systems p0322 A81-30285

Computerized design and optimization of self-contained airborne high power electrical systems p0323 A81-30310

The USAF Armament Division Structural Dynamics Lab p0347 A81-30689

Aircraft equipment /2nd revised and enlarged edition/ --- Russian book p0355 A81-31823

Forward-looking infrared /FLIR/ sensor for autonomous vehicles p0357 A81-32490

Dynamics and calculations for an aircraft landing gear pneumatic shock absorber system p0417 A81-36718

Advanced generating system equipment for aircraft p0420 A81-37414

Fiber optic system test results in a tactical military aircraft p0452 A81-37659

A nonlinear propulsion system simulation technique for piloted simulators p0454 A81-38064

Aircraft radio systems --- Book p0513 A81-41871

New roles for the F-15 eagle p0518 A81-42629

Aircraft multi-bus electrical system using a Hall-effect sensing device [SAE PAPER 810569] p0519 A81-42734

Atmospheric electricity hazards protection for advanced technology flight vehicles [AIAA PAPER 81-1642] p0525 A81-43141

Ferranti mission managers p0553 A81-44043

Electric installation work on aircraft --- Russian book p0577 A81-46794

Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft p0614 A81-48196

Aircraft electricity and electronics /3rd edition/ --- Book p0624 A81-49877

Head up displays. Citations from the International Aerospace Abstracts data base [NASA-CR-163656] p0026 N81-10049

Aircraft hydraulic systems dynamic analysis. Volume 6: Steady state flow analysis SSFAB computer program technical description [AD-A089240] p0026 N81-10055

A controlled evaluation of the differences between two approaches to reliability investment screening [AD-A087506] p0031 N81-10446

Detecting the failure of aircraft sensors using analytical redundancy
p0042 N81-11270
Transducer installation for the Sea King MK 50 mathematical model validation flight tests
[AD-A089924] p0043 N81-11365
Balanced design: Minimum cost solution
p0047 N81-11919
Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13958
Flight evaluation of the terminal guidance system
[NASA-CR-163859] p0142 N81-14991
The state of the art of general aviation autopilots
[NASA-CR-159371] p0197 N81-16066
Functional testing communication equipment (avionics)
[AD-A092825] p0201 N81-16375
Airborne lightning warning systems: A survey
[AD-A095354] p0331 N81-20045
Experiences with a Flight Data Recording System (FDRS) in a German Airforce fighter bomber wing after field trials --- digital equipment
p0382 N81-23009
Detection and location of faults in onboard aircraft systems with the aid of the Automatic Fault Identification System (AFIS)
p0383 N81-23022
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692] p0392 N81-23325
Tactical miniature crystal oscillator
[AD-A098490] p0440 N81-25058
Vibration test level criteria for aircraft equipment
[AD-A098675] p0442 N81-25070
Cooling system for high speed aircraft
[NASA-CASE-LAR-12406-1] p0485 N81-26114
Investigation of low level aircraft nonavionic nonlinear interference
[AD-A098784] p0491 N81-26349
Power system control study. Phase 1: Integrated control techniques. Phase 2: Detail design and system modeling
[AD-A099894] p0497 N81-27100
Application of an in-line contamination monitoring unit to the AHT-64 Hydraulic Test Stand
[AD-A100696] p0550 N81-29140
Computer analysis of 400 HZ Aircraft electrical generator test data
[AD-A100785] p0552 N81-29354
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362
High impulse gun airborne demonstration. GAU-13/A weapon, feed system, gun drive and electronic controls
[AD-A101698] p0582 N81-30120
High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] p0629 N81-32148
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] p0635 N81-33163

AIRCRAFT FUEL SYSTEMS
The problem of hoar-frost formation in aircraft fuel tanks
p0319 A81-30159
The F-16 Halon tank inerting system
[AIAA PAPER 81-1636] p0525 A81-43138
The relation between aircraft fuel reserves and navigation
p0612 A81-47843
Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks
p0615 A81-48351
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022
Evaluation of explosafe. Explosion suppression system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17047
Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18018
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0334 N81-20077

Fuel system testing and test instrumentation --- MRCA aircraft
p0544 A81-29076

AIRCRAFT FUELS
NT LIQUID FUELS
Advanced fuel system technology for utilizing broadened property aircraft fuels
p0007 A81-11612
ECS integration for fuel efficient/low life cycle cost design --- Environmental Control Systems in aircraft
p0015 A81-11676
Computerized flight management for fuel saving
p0018 A81-12349
Evolutions in business jet fuel systems as seen in the Falcon Jet series
[SAE PAPER 800621] p0062 A81-15339
Formation of solid phase during the heating of jet fuels
p0103 A81-17372
Fuel consumption aspects of some noise abatement procedures
p0154 A81-20350
Integration of fuel conservative procedures in the high density terminal area
p0155 A81-20460
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923
Design for supercommuters
p0227 A81-24048
Environmental chemistry and management of hydrazine
p0240 A81-26770
Environmental aspects of aircraft emissions - A review and current assessment
p0290 A81-29056
Impacts of broadened-specification fuels on aircraft turbine engine combustors
[ASME PAPER 81-GT-2] p0310 A81-29927
A UK view on future fuels --- for aircraft
[ASME PAPER 81-GT-87] p0314 A81-29994
Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31297
Fuel conservation integrated into airline economics
[AIAA PAPER 81-0831] p0368 A81-33084
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152
Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177
Fuel efficiency improvements to the T56 turboprop engine
[SAE PAPER 801158] p0399 A81-34178
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
Rating hydrogen as a potential aviation fuel
[SAE PAPER 80-1152] p0406 A81-34243
Status of the program to develop LH2 for aircraft
[SAE PAPER 801153] p0407 A81-34244
Civil aircraft design for fuel reduction
p0420 A81-37415
Alternative aircraft fuels - When will the action start
p0465 A81-39981
Fire-proof fuel
p0480 A81-40450
Small gas-turbine combustor study - Fuel injector evaluation
[AIAA PAPER 81-1308] p0502 A81-40857
Degradation and characterization of antimisting kerosene /AMK/
[AIAA PAPER 81-1423] p0503 A81-40867
Acceptability of shale derived fuel for Navy aircraft propulsion systems
[AIAA PAPER 81-1424] p0503 A81-40868
Fundamental studies of antimisting fuels
[AIAA PAPER 81-1422] p0515 A81-42195
Effect of oxygen-containing additives on the antiwear properties of fuels for gas-turbine aircraft engines
p0517 A81-42558
A synopsis of the Navy A-7 Aircraft Fuel Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949
Boeing 767 - The new fuel saver
p0553 A81-44042

Autoignition characteristics of aircraft-type fuels p0562 A81-44666
Propulsion energy for tomorrow's aviation p0622 A81-49161
Experimental study of the stability of aircraft fuels at elevated temperatures [NASA-CR-165165] p0084 N81-12255
The implications of alternative aviation fuels on airbase air quality [AD-A090283] p0087 N81-12652
Testimony of Elwood T. Driver, Vice Chairman, National Transportation Safety Board, accompanied by Gerrit J. Walhout, Chief, Human Factors Division, and Matthew H. McCormick, Senior Air Safety Investigator, Human Factors Division p0126 N81-13934
Effect of refining variables on the properties and composition of JP-5 [AD-A093842] p0219 N81-17281
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base [AD-A094226] p0252 N81-18050
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report [AD-A094225] p0252 N81-18051
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search [AD-A094154] p0253 N81-18057
Dynamic, hot surface ignition of aircraft fuels and hydraulic fluids [NASA-CR-163979] p0254 N81-18139
Minimum ignition energy of F40 aircraft fuel/air mixtures [PHL-1978-22] p0436 N81-24213
Aviation turbine fuel properties and their trends [NASA-TM-82603] p0444 N81-25232
Aviation turbine fuels 1980 [DOE/BETC/PPS-81/2] p0445 N81-25255
Aircraft Research and Technology for Antimisting Kerosene Conference [AD-A101347] p0580 N81-30103
A United Kingdom view on future fuels [PNR-90068] p0602 N81-31398

AIRCRAFT GUIDANCE
Computer generated radar images for navigation p0049 A81-12793
Airport visual approach, guidance and landing systems - Airline pilots viewpoint p0114 A81-18083
A head-up display for low-visibility approach and landing [AIAA PAPER 81-0130] p0161 A81-20623
An airborne sensor for the avoidance of clear air turbulence [AIAA PAPER 81-0297] p0164 A81-20735
Design of guidance and control digital autopilots p0183 A81-22973
INTERSCAN - The development and international acceptance of a new microwave landing system for civil aviation p0418 A81-37114
Model-based scene matching p0461 A81-39349
Pilot guidance and display considerations for energy efficient flight profiles p0513 A81-41924
Boost-glide range-optimal guidance [AIAA 81-1781] p0554 A81-44096
Three edge-point estimation schemes for tracking airborne targets p0562 A81-44681
The use of direct lift control of an aircraft in a guided landing run p0624 A81-49928
Analysis of the function principle and operational assessment of an onboard glidepath guidance system for visual approaches (Visual Approach Monitor (VAM) [DFVLR-FB-79-38] p0025 N81-10043
System simulation applied to the evaluation of displays for guidance and control [DFVLR-MITT-79-10] p0028 N81-10064
Gyrocompasses. Citations from the International Aerospace Abstracts data base [NASA-CR-163675] p0028 N81-10065
LR-80 flight test report --- attitude and heading reference system [AD-A090284] p0075 N81-12058
Flight investigation of a four-dimensional terminal area guidance system for STOL aircraft [NASA-TM-81271] p0260 N81-19014
Guidance and control system research for improved terminal area operations --- terminal controlled vehicle p0264 N81-19038
Operational considerations in utilization of microwave landing system approach and landing guidance --- terminal configured vehicle p0264 N81-19039
Generation of optimum vertical profiles for an advanced flight management system [NASA-CR-165674] p0331 N81-20051
Functional analysis and operational assessment of an onboard glide path guidance system for visual approaches (visual approach monitor VAM) [ESA-TT-655] p0373 N81-22038
Improvement of guidance and handling qualities in the vicinity of airports and on landing --- use of a digital command system [BMFT-FB-W-79-42] p0425 N81-24045
Definition of a system concept study for future air traffic guidance [BMFT-FB-W-80-008] p0425 N81-24046
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros p0484 N81-26092
Proceedings of the Public Workshop on Alternative Separation Concepts: Presentations, Discussions and Recommendations [AD-A102519] p0596 N81-31183

AIRCRAFT HAZARDS
A design guide for lightning protection of aircraft p0056 A81-14259
Aircraft fire and overheat detection and extinguishment [SAE PAPER 800622] p0063 A81-15340
Wind shear effects on aircraft - Low-level shear and clear-air turbulence as accident causes p0067 A81-16136
Aircraft and environmental factors influencing lightning strike [AIAA PAPER 81-0084] p0160 A81-20589
Microbursts as an aviation wind shear hazard [AIAA PAPER 81-0386] p0167 A81-20798
Analysis of wind vector components in the lower troposphere Applications to aircraft operations at terminals [AIAA PAPER 81-0387] p0167 A81-20799
Simulated aircraft takeoff performance with frosted wings [AIAA PAPER 81-0404] p0167 A81-20811
Historical development of flutter [AIAA 81-0591] p0302 A81-29419
Lightning threat definition for aircraft electrical power systems p0322 A81-30284
Techniques for evaluation of aircraft windscreen optical distortion p0358 A81-32507
Is it safe - The safety assessment of aircraft systems. IV - Methods, techniques, and organisation p0366 A81-33789
Wake vortex alleviation [AIAA PAPER 81-0798] p0412 A81-35723
Dielectric electrostatic charge reduction [SAE PAPER 810571] p0519 A81-42736
Atmospheric electricity hazards protection for advanced technology flight vehicles [AIAA PAPER 81-1642] p0525 A81-43141
Clear air turbulence - An airborne alert system p0562 A81-44648
Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs [NASA-CR-152390] p0023 N81-10019
Aircraft engine nacelle fire test simulator. Volume 1: Technical [AD-A089629] p0030 N81-10081
Assessing the behavior of high modulus composite materials in lightning p0040 N81-11141
The potential for damage from the accidental release of conductive carbon fibers from aircraft composites

p0041 N81-11143
AEROMEXICO DC-10-30, XA-DUH, over Luxembourg, Europe
[NTSB-AAR-80-10] p0073 N81-12042
An investigation of safety hazards and reliability problems in aerial refueling stores
[AD-A091788] p0127 N81-13938
Aeronautical concerns and National Aeronautics and Space Administration atmospheric electricity projects
p0136 N81-14567
The microburst: Common factor in recent aircraft accidents
p0136 N81-14571
Doctor Fujita's microburst analysis at Chicago
p0136 N81-14572
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857] p0146 N81-15648
Clean air turbulence. Citations from the International Aerospace Abstracts data base
[NASA-CR-163863] p0146 N81-15649
The evolution of the helicopter seat pan mounted Personal Survival Pack (PSP)
p0205 N81-17016
Static charge in aircraft fuel tanks
[AD-A093552] p0208 N81-17045
In flight direct strike lightning research --- Using an F-106B Aircraft
p0259 N81-19005
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048
In-flight direct-strike lightning research
p0266 N81-19054
Magnitude and frequency of wind speed shears and associated downdrafts
p0267 N81-19055
Airborne lightning warning systems: A survey
[AD-A095354] p0331 N81-20045
Commercial aviation icing research requirements
[NASA-CR-165336] p0387 N81-23069
Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070
Study of aircraft crashworthiness for fire protection
[NASA-CR-166159] p0424 N81-24035
Effect of thermal radiation on the integrity pressurized aircraft evacuation slides and slide materials
[AD-A098179] p0424 N81-24039
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051
Thunderstorm hazards flight research: Storm hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062
Carbon/graphite composite material study
[AR-3] p0585 N81-30188

AIRCRAFT HYDRAULIC SYSTEMS
Development and application of a moving base visual flight simulator including the design of hydraulic actuators with hydrostatic bearings
p0010 A81-11633
Elimination of vibrations in aircraft piping systems --- Russian book
p0116 A81-18457
Developments in aircraft power flying control hydraulics
p0282 A81-27002
Faults of helicopter hydraulic amplifiers related to loading characteristics
p0319 A81-30156
The all-electric airplane as an energy efficient transport
[SAE PAPER 801131] p0396 A81-34162
New hydraulic system technology for future aircraft
[SAE PAPER 801188] p0401 A81-34200
The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
[SAE PAPER 801190] p0401 A81-34201
Digital computer simulation of aircraft hydraulic systems
[SAE PAPER 801193] p0402 A81-34203
Evolution of an optical control system for aircraft hydraulics
[SAE PAPER 801195] p0402 A81-34205
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776
Portable servoactuator test system
[AIAA PAPER 81-1620] p0525 A81-43130
Fault-tolerant actuation concept for a research test aircraft
[AD-A093113] p0216 N81-17100
Design, development, and evaluation of lightweight hydraulic system, phase 1 --- A-7 aircraft
[AD-A097505] p0388 N81-23075
The AIRBUS hydraulic systems
[SNIAS-802-111-111] p0427 N81-24055

AIRCRAFT INDUSTRY
Aviation assumptions in the eighties
p0112 A81-18068
Economics of technological change - A joint model for the aircraft and airline industries
p0169 A81-21010
China aims for modern wings
p0227 A81-24050
Impact of active controls on aircraft design and operations - A helicopter industry perspective
p0285 A81-28294
Material shortages - Effect on the commercial aircraft industry
[AIAA 81-0508] p0300 A81-29306
European approaches to transport aircraft design
[AIAA PAPER 81-0926] p0363 A81-32934
Industrial titanium alloys - Use and characteristics
p0416 A81-36653
Light aviation in the United States - September 1980 --- French book
p0513 A81-41903
Industrial leadership of an aircraft design class
[AIAA PAPER 81-1723] p0528 A81-43166
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for composite structures
p0557 A81-44373
Helicopter manufacturers economic impact assessment of FAA proposed helicopter certification noise rules /NPRM 79-13/
p0576 A81-46647
A review and assessment of system cost reduction activities
p0045 N81-11906
Using cost reduction concepts at Messier-Hispano-Bugatti
p0047 N81-11923
An assessment of General Aviation utilization of advanced avionics technology
[NASA-CR-159328] p0127 N81-13941
Current aircraft survey (approach speeds, gross weights, and Dimensions)
[PB80-225691] p0129 N81-13956
A feasibility study for advanced technology integration for general aviation
[AD-A092437] p0185 N81-15975
Aircraft manufacturers approach to the E.M.C./Avionics problems associated with the use of composite materials
p0200 N81-16156
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0334 N81-20077
Directory of aircraft survivability specialists and their affiliations
[AD-A096259] p0341 N81-21066
Programmes for military engines with cost objectives --- aircraft engines
[PNR-90058] p0583 N81-30133
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956

AIRCRAFT INSTRUMENTS
NT ALTIMETERS
NT ANEMOMETERS
NT APPROACH INDICATORS
NT ATTITUDE INDICATORS
NT AUTOMATIC PILOTS
NT FLIGHT RECORDERS
NT GYRO HORIZONS
NT GYROCOMPASSES
NT PLAN POSITION INDICATORS
NT POSITION INDICATORS
NT RADIO ALTIMETERS
NT RADIO DIRECTION FINDERS

NT SPEED INDICATORS
Head-up displays. III
p0005 A81-11320
Wind shear detection from PCM-recorded MLS-flight data
p0015 A81-11675
Use of similitude in analyzing aircraft windshield anti-icing performance
[AIAA PAPER 79-1822] p0051 A81-13218
An airspeed vector sensor for V/STOL aircraft
[AIAA 80-1938] p0052 A81-13364
The FFCC cockpit of the A310 is practically defined
p0063 A81-15623
Integrated flight displays
p0064 A81-15681
Rate-field displays --- cockpit devices
p0064 A81-15682
Display-control synthesis --- computer flight graphics for aircraft applications
p0064 A81-15684
A new system for the study of visual information presentation in aeronautics - GIBI
p0100 A81-16688
Radio navigation for aircraft: Handbook --- Russian book
p0116 A81-18599
Disturbance estimation for a STOL transport during landing
[AIAA PAPER 81-0018] p0158 A81-20542
Application of CRT displays to new generation aircraft
p0286 A81-28297
Aircraft radar equipment and its operation --- Russian book
p0289 A81-28759
A millimeter wave radar for U.S. Army helicopters in the 80's
p0323 A81-30302
The reconstruction/refiltering approach to Kalman filter evaluation --- in long-range aircraft avionics
p0326 A81-30339
F/A-18 Hornet Crew Station
p0327 A81-30355
The behavior of quartz oscillators in the presence of accelerations --- in missile and aircraft time-frequency navigation systems
[ONERA, TP NO. 1981-31] p0351 A81-31285
Development and testing of a new technology weight and balance indicator
[SAWE PAPER 1341] p0353 A81-31381
Measurement of aircraft speed and altitude --- Book
p0357 A81-32401
Orientation of measurement sensors for optimum end-of-life performance
p0360 A81-32697
Application of CRT displays to the cockpit of tomorrow
[SAE PAPER 801168] p0399 A81-34183
Integrated cockpit information system with color display equipment
p0450 A81-37643
Dynamically tunable, dry gyroscope in aeronautics and astronautics
p0452 A81-37655
Contribution of the DFVLR to the DAS program
p0452 A81-37657
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0453 A81-37822
Boeing plays safe --- Boeing 737-300 design
p0480 A81-40455
The survivable, affordable fighter - The Aeritalia-Macchi-Embraer AM-X
p0480 A81-40460
Aircraft instruments - Principles and applications /2nd edition/ --- Book
p0513 A81-41799
Binocular Camera for cockpit visibility of general aviation aircraft
[SAE PAPER 810628] p0524 A81-42780
Measurement of natural aircraft icing conditions
[AIAA PAPER 81-1646] p0526 A81-43143
Boeing 767 - The new fuel saver
p0553 A81-44082
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110
New visual displays for the next generation of civil aircraft
p0556 A81-44299
Aircraft instruments and measuring systems --- Russian book
p0564 A81-45608
Precision DME for microwave landing system
p0578 A81-47125
Instrumentation for measurement of flow properties on a swept wing in flight
[DGLR PAPER 81-034] p0609 A81-47585
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] p0610 A81-47612
Civil head-up displays - Coming up fast
p0625 A81-49973
Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations
[NASA-TP-1776] p0142 N81-14997
Environmental burn-in effectiveness
[AD-A093307] p0211 N81-17060
Integration of sensors with displays
p0212 N81-17067
Cathode ray tubes and plasma panels as display devices for aircraft displays
p0212 N81-17069
Evolution of tactical and map displays for high performance aircraft
p0212 N81-17072
Display concepts for control configured vehicles
p0213 N81-17076
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048
The 1979 clear air turbulence flight test program --- warning and detection devices
p0266 N81-19050
Flight tests of a clear-air turbulence alerting system --- infrared radiometers
p0266 N81-19052
Clear air turbulence studies with microwave radiometers
p0266 N81-19053
Testing aircraft instruments
[AD-A095680] p0334 N81-20075
Minimum operational performance standards for airborne radar approach and beacon systems for helicopters
[RTCA/DO-172] p0336 N81-20322
Minimum operational performance standards for airborne weather and ground mapping pulsed radars
[RTCA/DO-173] p0336 N81-20323
Laser Doppler airspeed and altitude sensor
[AD-A096980] p0375 N81-22049
Contributions to the 9th Symposium on aircraft integrated data systems --- Conferences
[ESA-TT-532] p0382 N81-23008
Flight evaluation of a simple total energy-rate system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24058
High contrast CRT module
[AD-A097727] p0437 N81-24360
Rapid alignment of aircraft strapdown inertial navigation systems using Navstar Global Positioning System (GPS)
p0485 N81-26107
Flight testing and instrumentation of aircraft navigation systems
p0544 N81-29067
Systems integration of automatic flight control, navigational calculations, and visual control (caravelle alis)
p0544 N81-29068
Programmable multipurpose flight test instrumentation system
p0545 N81-29085
Aircraft sensor quality in SESAME 1979: Results of tower fly-bys and aircraft intercomparison
[PB81-176596] p0552 N81-29722
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] p0638 N81-33203
AIRCRAFT LANDING
NT CRASH LANDING
NT DITCHING (LANDING)

F/A-18's landing, launch and recovery system
p0005 A81-11244
Optimizing the fixed leading edge shape of a
transonic wing to suit the landing high-lift
requirements
p0011 A81-11644
Visual cue augmentation in contact flight simulation
p0064 A81-15696
Research on mechanical flight problems in aircraft
parachute systems
p0065 A81-15706
Micro-wave landing system - An operational point
of view
p0111 A81-18055
Flight instrumentation requirements for
all-weather approach and landing
p0111 A81-18059
Experimental investigation of orographic waves and
vertical motions in the Krasnovodsk airport area
p0121 A81-19441
Runway surface loading during aircraft landings
p0149 A81-19800
Some aspects of advanced flight management systems
and their application to modern transport aircraft
p0154 A81-20353
VTOL control for shipboard landing in high sea
states
p0155 A81-20471
Disturbance estimation for a STOL transport during
landing
[AIAA PAPER 81-0018]
p0158 A81-20542
A head-up display for low-visibility approach and
landing
[AIAA PAPER 81-0130]
p0161 A81-20623
New definition of areas of protection for
instrument landing
p0225 A81-23869
Landings according to CAT II
p0230 A81-24523
Helicopter-ship qualification testing
p0232 A81-24941
Concepts and state of the art of the precision DME
of the microwave landing system
p0233 A81-25376
An observational experiment using a monostatic
sodar at the airport of Fiumicino
p0282 A81-27548
Progress in the use of automatic flight controls
in safety critical applications
p0284 A81-27902
Airport capacity enhancement by innovative use of
runway geometry
[AIAA PAPER 81-0801]
p0368 A81-33891
Analytic determination of the kinematic and energy
parameters of aircraft braking during the
landing run
p0409 A81-35008
Hydroplaning and coefficient of friction in wet
runway testing
p0419 A81-37300
An investigation of the recovery from an engine
failure in a twin engine augmentor wing aircraft
using the NAE Airborne Simulator
p0509 A81-41199
Analysis of helicopter operations and the use of
MLS in the offshore environment
p0512 A81-41764
Axisymmetric approach and landing thrust reversers
[AIAA PAPER 81-1650]
p0533 A81-43936
Precision flight path control in carrier landing
approach - A case for integrated system design
[AIAA PAPER 81-1710]
p0535 A81-43956
Fuel optimal aircraft trajectories with fixed
arrival times
[AIAA 81-1749]
p0554 A81-44081
The influence of structural parameters and
velocity on the shimmy of self-aligned wheels
p0556 A81-44268
Aerial collisions with relief features
p0557 A81-44323
Automatic helical rotorcraft descent and landing
using a Microwave Landing System
[AIAA PAPER 81-1657]
p0560 A81-44556
An aircraft landing system employing observers
p0562 A81-44699
Navigation and landing - The prospects of new
systems
p0566 A81-45766
Influence of landing gear flexibility on aircraft
performance during ground roll
p0622 A81-49375
The use of direct lift control of an aircraft in a
guided landing run
p0624 A81-49928
Realization of a method of extremal targeting in a
problem of aircraft landing control
p0625 A81-49983
An analytical study of landing flare
[DFVLR-FB-79-40]
p0027 N81-10062
Airport activity statistics of certificated route
air carriers, calendar year 1979
[AD-A089748]
p0034 N81-11023
Aircraft towing feasibility study
[DOE/CS-50069/1]
p0074 N81-12051
Pilatus porter: Provision of revised take-off and
landing performance data
[AD-A089964]
p0076 N81-12068
Status of improved autorotative landing capability
research
[AD-A090431]
p0076 N81-12072
Investigation of landing flare in the presence of
wind shear
[ESA-TT-631]
p0077 N81-12080
Simulation comparison of a decoupled longitudinal
control system and a velocity vector control
wheel steering system during landings in wind
shear
[NASA-TP-1734]
p0081 N81-12109
Remote sensing methods for the determination of
slant range visibility
[ESA-TT-627]
p0086 N81-12536
Flight evaluation of the terminal guidance system
[NASA-CR-163859]
p0182 N81-14991
Advanced supersonic transport fixed-base simulator
evaluations at landing approach
p0244 N81-17992
Development of SCR Aircraft takeoff and landing
procedures for community noise abatement and
their impact on flight safety
p0245 N81-17994
A method for determining landing runway length for
a STOL aircraft
p0264 N81-19041
A head-up display format for transport aircraft
approach and landing
p0265 N81-19043
An evaluation of head-up displays in civil
transport operations
p0265 N81-19044
Studies of some unconventional systems for solving
various landing problems --- air cushion landing
system
p0268 N81-19067
Flight-test evaluation of STOL control and flight
director concepts in a powered-lift aircraft
flying curved decelerating approaches
[NASA-TP-1641]
p0275 N81-19131
Recent progress towards predicting aircraft ground
handling performance
[NASA-TM-81952]
p0339 N81-21044
Calibration of an axial fan at various power
settings for use on a quarter scale XC-8A air
cushion model
[AD-A097043]
p0374 N81-22042
Application of variable structure system theory to
aircraft flight control --- AV-8A and the
Augmentor Wing Jet STOL Research Aircraft
[NASA-CR-164321]
p0391 N81-23093
An analysis of the requirements for and the costs
and benefits of the National Microwave Landing
System (MLS), volume 1
[AD-A099632]
p0493 N81-27071
An analysis of the requirements for, and the
benefits and costs of the National Microwave
Landing System (MLS), volume 2
[AD-A100018]
p0493 N81-27072
Results of a feasibility study for determining the
yaw angle of a landing aircraft
[AD-A099765]
p0495 N81-27084
Effect of propagation distance on aircraft flyover
sound duration
[AD-A099694]
p0500 N81-27089
An analysis of the requirements for, and the
benefits and costs of the National Microwave
Landing System (MLS)
[AD-A100136]
p0537 N81-28076

A method for measuring take-off and landing performance of aircraft, using an inertial sensing system p0545 N81-29088

Control augmentation for lateral control wheel steering [NASA-CR-164664] p0549 N81-29132

Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea [NASA-TM-81305] p0579 N81-30060

Simulation study of two VTOL control/display systems in IMC approach and landing [NASA-TM-81295] p0584 N81-30136

Terminal area automatic navigation, guidance, and control 1: Automatic rollout, turnoff, and taxis [NASA-CR-3451] p0600 N81-31224

Structural response methods and evaluation results for helicopter landing decks on 210- and 270-foot USCCG cutters [AD-A102420] p0601 N81-31233

Flight evaluation of the STOL flare and landing during night operations [NASA-TM-81312] p0629 N81-32151

An experimental investigation of VTOL flying qualities requirements or shipboard landings [AD-A104137] p0638 N81-33199

Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear [NASA-TM-83188] p0639 N81-33211

AIRCRAFT LAUNCHING DEVICES

F/A-18's landing, launch and recovery system p0005 A81-11244

F/A-18A Initial Sea Trials p0458 A81-38857

AIRCRAFT MAINTENANCE

Productivity - The challenge of aircraft and engine maintenance p0102 A81-17045

Issues regarding Army turboshaft engines diagnostics and condition monitoring p0105 A81-17514

New NDT techniques used for aircraft maintenance p0153 A81-20168

Designing the Hornet for improved R and M [AIAA PAPER 81-0230] p0162 A81-20688

ORLA - An assessment of risks --- Optimum Repair Level Analysis p0229 A81-24257

Determination of aircraft structural inspection intervals p0230 A81-24285

The maintenance of the Airbus from the user's point of view p0287 A81-28470

Contribution to the improvement of the classical method of maintenance of aeroengines p0290 A81-29055

Improved jet engine maintenance through automated vibration diagnostic systems [ASME PAPER 81-GT-62] p0313 A81-29972

Commercial engine logistics cost projections - A dynamic and flexible approach [ASME PAPER 81-GT-114] p0315 A81-30018

Simulation techniques for new generation aircraft maintenance training devices p0324 A81-30331

Logistics support of avionic software stored or erasable programmable read only memory p0327 A81-30356

Maintenance tomorrow and the day after --- of wide-bodied transport aircraft p0367 A81-33790

Airliner maintenance for fuel efficiency [AIAA PAPER 81-0787] p0367 A81-33877

Maintenance program analysis for aircraft structures of the 80's - MSG-3 [SAE PAPER 801214] p0404 A81-34222

Application of BFRP Crack Patching to Mirage III aircraft p0481 A81-40586

Advanced composite structure repair p0481 A81-40595

Composites - A solution to aluminum honeycomb maintenance costs --- for aircraft structures p0529 A81-43606

S-3A composite spoilers service experience p0529 A81-43615

A-7 composite outer wing service experience p0530 A81-43617

Development of repair procedures for graphite/epoxy structures on commercial transports p0531 A81-43645

Maintenance and repair of advanced composite structure p0558 A81-44382

Review of Navy composite repair program p0558 A81-44383

Composite repair concepts for depot level use p0558 A81-44384

Advanced composite repair - Recent developments and some problems p0558 A81-44385

Advanced structural repair for lower cost p0558 A81-44393

Repair of adhesive bonded structure on commercial aircraft p0559 A81-44394

Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development p0559 A81-44395

Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance p0559 A81-44396

SR-71 imposes burden on maintenance units p0565 A81-45748

The roles of airline engineering and maintenance in 1981 --- summary for 26 January 1981 conference of ATLAS group p0565 A81-45755

HH-65A Dolphin engine condition monitoring system p0575 A81-46636

Reliability and maintainability evaluation of rotor systems p0576 A81-46645

Simulation model to evaluate maintenance strategies for large network of fielded systems p0613 A81-48009

F-100s set to become target drones p0614 A81-48067

Engine requirements for the T-37 trainer aircraft - A simulation study and analysis p0616 A81-48379

Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover [AD-A090049] p0039 N81-11120

Reliability-centered maintenance p0047 N81-11917

Impact of maintainability of life cycle costs p0047 N81-11921

Naval aircraft operating and support cost-estimating model: FY78 revision [AD-A090044] p0071 N81-12013

Aircraft maintenance. Citations from the International Aerospace Abstracts data base [NTIS/PS-79/0859/3] p0125 N81-13917

Feasibility evaluation of advanced multifrequency eddy current technology for use in naval air maintenance environment [AD-A093314] p0220 N81-17476

Application of scheduling heuristics on the aircraft maintenance depot [AD-A094815] p0261 N81-19015

Uses of AIDS data in airlines engine maintenance p0328 N81-20016

Concept definition: Retirement for cause of F-100 rotor components [AD-A095584] p0335 N81-20080

Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A [AD-A096688] p0381 N81-22971

Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A [AD-A096689] p0381 N81-22972

Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A [AD-A096690] p0381 N81-22973

Aircraft modification management evaluation [AD-A096458] p0381 N81-22974

Structural design of BFRP patches for Mirage wing repair [AD-A097195] p0384 N81-23024

An analysis of opportunistic maintenance policy
for the F100PW100 aircraft engine
[AD-A097548]
p0384 N81-23025
F-16 integrated logistics support: Still time to
consider economical alternatives
[PB81-137473]
p0389 N81-23079
Weapons system support resources demand parameters
- logistics
[AD-A097517]
p0394 N81-23937
Helicopter transmission qualification procedures
and tests
p0433 N81-24101
Operational and support costs of the Navy's F/A-18
can be substantially reduced
[PB81-160814]
p0487 N81-26125
PACER LIME: An environmental corrosion severity
classification system, part 1
[AD-A100496]
p0539 N81-26089
Actual versus simulated equipment for aircraft
maintenance training: Cost implications of the
incremental versus the unique device
[AD-A102388]
p0590 N81-31104
Estimating aircraft depot maintenance costs
[AD-A103623]
p0631 N81-33133
A study of the factors affecting productivity at
the Naval Air Rework Facilities
[AD-A103783]
p0631 N81-33134
A prescriptive model for resource allocation at
the intermediate level engine facility
[AD-A103785]
p0632 N81-33135
Development of maintenance metrics to forecast
resource demands of weapon systems
[AD-A104089]
p0632 N81-33136

AIRCRAFT MANEUVERS
Piloted simulation studies of helicopter agility
p0003 A81-10767
Multivariable aircraft control by manoeuvre
commands - An application to air-to-ground gunnery
[ONERA, TP NO. 1980-127]
p0009 A81-11623
Initial experience with methods to evaluate flight
test characteristics with operational flight
maneuvers
p0017 A81-11782
Roll and spin measurements in the low speed wind
tunnel at Braunschweig
p0065 A81-15704
The effect of aerodynamic coupling on the dynamics
of aircraft in fast rolling motion
p0104 A81-17471
Drag reduction through formation flight
[DGLR PAPER 80-106]
p0120 A81-19393
Planning for and evaluating the potential of a
land based aircraft for carrier operations
p0122 A81-19470
New techniques for the monopulse-radar tracking of
high-maneuverability aircraft
p0153 A81-20102
Robust autoregressive models for predicting
aircraft motion from noisy data
p0155 A81-20473
Control strategy for tracking a maneuverable model
[AIAA PAPER 81-0089]
p0160 A81-20593
Bounds for the additional cost of near-optimal
controls
p0170 A81-21075
Transonic maneuver/cruise airfoil design employing
active diffusion control
p0239 A81-26511
Evaluation of the effect of actuator time lag on
the minimum control power of a VTOL aircraft
p0319 A81-30160
Avionics computer system support at Ogden ALC
p0320 A81-30243
RAPIDLOADS - A preliminary design loads prediction
technique for aircraft
[SAWE PAPER 1366]
p0353 A81-31388
HiMAT systems development results and projections
[SAE PAPER 801175]
p0400 A81-34188
Air combat advantages from reaction control systems
[SAE PAPER 801177]
p0400 A81-34190
U.S. Navy/USAF development of Tactical Aircrew
Combat Training System/Air Combat Maneuvering
Instrumentation /TACTS/ACMI/
[SAE PAPER 801183]
p0401 A81-34196
Energy maneuverability displays for air combat
training
[SAE PAPER 801185]
p0401 A81-34198
The problem of the minimum-time turn of a
maneuverable aircraft velocity vector to a
specified course angle
p0413 A81-36472
Effect of acceleration switching during INS
in-flight alignment
p0458 A81-38897
'Load snubbing' - A solution to the problem of
terrain flying with external cargo
[AHS 80-32]
p0476 A81-40162
Aiming computation for fighter weapon aiming system
p0480 A81-40448
TELS - A facility to observe the effect of
simulated flight maneuver loads on turbine engines
[AIAA PAPER 81-1591]
p0508 A81-40966
LQG controls for highly maneuverable aircraft ---
Linear quadratic Gaussian
[AIAA PAPER 81-1709]
p0527 A81-43163
Kinematic properties of rotary-wing and fixed-wing
aircraft in steady coordinated high-g turns
[AIAA PAPER 81-1855]
p0560 A81-44554
Time-constrained maximum-energy turns --- for
modern fighter aircraft
[AIAA PAPER 81-1886]
p0561 A81-44578
Influence of sideslip on the kinematics of the
helicopter in steady coordinated turns
p0576 A81-46644
Active gust- and maneuver load control concepts,
taking into account, as example, the Airbus
A300. I - Design of a controller in the temporal
domain for the alleviation of gust loads and the
control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A]
p0608 A81-47552
Active gust- and maneuver load reduction concepts,
taking into account, as an example, the Airbus
A300. II - Design of a controller for gust and
maneuver load reduction in the frequency range
[DGLR PAPER 81-065B]
p0608 A81-47553
A multivariate approach to handling qualities
rating scale development
[AD-A089825]
p0037 N81-11047
Flight test handbook: Flying qualities theory and
flight test techniques
[AD-A090525]
p0076 N81-12073
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129]
p0092 N81-13050
Pseudosteady-state analysis of nonlinear aircraft
maneuvers
[NASA-TP-1758]
p0094 N81-13065
Maneuvering aircraft: Noise pollution and
control. Citations from the NTIS data base
[PB80-815566]
p0135 N81-14525
Energy maneuverability display for the Air Combat
Maneuvering Range/Tactical Training System
(ACMR/TACTS)
[AD-A092974]
p0208 N81-17041
Evaluation of AFIT/F-16 restraint concepts in the
+ or - 2Gy environment
[AD-A094323]
p0249 N81-18034
Time-constrained maximum-energy turns
[AD-A094733]
p0273 N81-19107
A computer technique for detailed analysis of
mission radius and maneuverability
characteristics of fighter aircraft
[NASA-TP-1837]
p0329 N81-20026
Optimum maneuvers of supersonic aircraft, volumes
1 and 2
p0332 N81-20060
Application of a performance modeling technique to
an airplane with variable sweep wings
[NASA-TP-1855]
p0426 N81-24048
Validation study of the V/STOL aerodynamics and
stability and control manual
[AD-A099236]
p0486 N81-26119
Quantifying reactive maneuvers
[AD-A101136]
p0539 N81-28091
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 1: Analysis
and simulation --- F-4J and F-14A aircraft
[AD-A101646]
p0581 N81-30113
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 2: Piloted
simulation assessment of Bihrle departure criteria
[AD-A101647]
p0581 N81-30114
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 3: Appendixes,
aerodynamic models
[AD-A101648]
p0581 N81-30115
Statistical review of counting accelerometer data
for Navy and Marine fleet aircraft from 1
January 1962 to 31 December 1980

[AD-A102495] p0596 N81-31187

Transition and conversion trim-maps for the AV-8A VTOL aircraft [AD-A102155] p0596 N81-31188

Captive aircraft testing at high angles of attack [AD-A103108] p0628 N81-32140

Development of an aircraft maneuver load spectrum based on VGH data [AD-A102750] p0628 N81-32142

AIRCRAFT MODELS

Model tests for an active rotor isolation system [MBB-278-79-0] p0018 A81-12095

Testing model rotorcraft for overwater operations p0111 A81-18058

High-level languages in affordable aircraft simulators p0154 A81-20418

A new concept for dynamic stability testing --- for aircraft model in orbital path [AIAA PAPER 81-0158] p0161 A81-20638

Aircraft lateral parameter estimation from flight data with unsteady aerodynamic modelling [AIAA PAPER 81-0221] p0162 A81-20684

Response characteristics of a linear rotorcraft vibration model [AIAA 81-0616] p0305 A81-29477

Estimation of dynamic stability parameters from drop model flight tests p0410 A81-35551

Some characteristics of aircraft motion at large angles of attack p0414 A81-36473

Twin-rotor patrol airship flying model [AIAA 81-1312] p0456 A81-38529

Co-axial rotor aerodynamics in hover p0465 A81-39899

On the use of approximate models in helicopter flight mechanics p0471 A81-40122

Identification of a linear model of rotor-fuselage dynamics from nonlinear simulation data p0472 A81-40125

The experimental and analytical definition of helicopter modeling effects [AHS 80-4] p0473 A81-40139

Engine duty cycle estimation for conceptual design aircraft [AIAA PAPER 81-1368] p0514 A81-42179

Analytical techniques for the analysis of stall/spin flight test data [SAE PAPER 810599] p0521 A81-42756

Modelling of gusts and wind shear for aircraft assessment and certification p0528 A81-43376

Airborne antenna pattern calculations p0532 A81-43708

Spin research on a twin-engine aircraft [AIAA PAPER 81-1667] p0534 A81-43943

Determination of model structure and parameters of an airplane from pre- and post-stall flight data [AIAA PAPER 81-1866] p0560 A81-44562

Design and construction of a model which is dynamically similar to the A310 wing [DGLR PAPER 81-035] p0606 A81-47556

Model design and instrumentation for intermittent cryogenic wind tunnels p0037 N81-11056

Rotary balance data for a single engine general aviation design having a high aspect-ratio canard for an angle-of-attack range of 30 deg to 90 deg [NASA-CR-3170] p0090 N81-13022

Laboratory studies of flight mechanics using catapult launched models [AAAF-NT-80-15] p0210 N81-17055

AIRCL: A programmed system for generating NC tapes for airplane models. User's manual [NASA-CR-165687] p0340 N81-21058

Unpowered aerodynamic characteristics of a 15-percent scale model of a twin-engine commuter aircraft [NASA-TM-81284] p0537 N81-28055

AIRCRAFT NOISE

NT JET AIRCRAFT NOISE

NT SONIC BOOMS

Prediction of changes in aircraft noise exposure p0017 A81-11820

Community response to noise from a general aviation airport p0017 A81-11821

The status of rotor noise technology p0019 A81-12737

Simple method for prediction of aircraft noise contours p0050 A81-13217

Influence of boundary-layer suction on the emission spectrum on a thin plate performing oscillations under the action of pressure pulsations --- in aircraft noise reduction p0054 A81-13573

The federal role in airport noise control planning p0113 A81-18073

The sonic boom from an aircraft flying along an arbitrary path in a stratified atmosphere in the presence of a three-component wind p0123 A81-19636

Symposium on Internal Noise in Helicopters, University of Southampton, Southampton, England, July 17-20, 1979, Proceedings p0150 A81-20051

US Army working group on aircraft noise p0150 A81-20053

An overview of the research conducted in Aerospatiale on internal noise p0150 A81-20054

Helicopter internal noise - An overview p0150 A81-20055

Gear unit noise and transmission errors --- helicopter system p0150 A81-20060

Development and application of an analytical method for predicting helicopter transmission noise p0150 A81-20062

Modelling techniques for the reduction of noise and vibration in gearboxes p0151 A81-20063

Sandwich structures with high transmission loss p0151 A81-20069

Gearbox isolation for reducing gear tooth noise in single rotor helicopter p0151 A81-20073

Sound sources in aerodynamics - Fact and fiction [AIAA PAPER 81-0056] p0159 A81-20570

Acoustics of rotors utilizing circulation control [AIAA PAPER 81-0092] p0160 A81-20596

A general mapping procedure for variable area duct acoustics [AIAA PAPER 81-0094] p0160 A81-20597

Convective amplification of gas turbine engine internal noise sources p0171 A81-21595

Noise from gas turbine combustors p0236 A81-26008

Influence of boundary-layer suction on the spectrum of radiation from a thin plate vibrating under the action of pressure fluctuations --- in aircraft noise reduction p0238 A81-26137

Attenuation of propeller related vibration and noise [AIAA 81-0521] p0303 A81-29442

Improvement of the imaging of moving acoustic sources by the knowledge of their motion [ONERA, TP NO. 1981-17] p0359 A81-32534

Federal policies affecting airport noise compatibility programs [AIAA PAPER 81-0829] p0367 A81-33879

Broadband helicopter rotor noise [AAAF PAPER NT 80-58] p0370 A81-33949

Acoustic performance evaluation of an advanced UH-1 helicopter main rotor system [AHS PAPER 81-58] p0370 A81-33952

Trailing-edge airframe noise source studies on aircraft wings [AIAA PAPER 80-0976] p0411 A81-35634

The influence of helicopter operating conditions on rotor noise characteristics and measurement repeatability p0468 A81-40095

Reduction of helicopter noise by use of a quiet tail rotor p0468 A81-40096

The dominant acoustic radiation surfaces of a helicopter cabin p0468 A81-40102

Reducing the cost impact of helicopter internal noise control [AHS 80-59] p0478 A81-40183

A successful step toward an advanced supersonic transport engine - Acoustic and emission results from the Pratt and Whitney Aircraft Variable Cycle Engine Program
[AIAA PAPER 81-1593] p0508 A81-40968
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Strategies for aircraft interior noise reduction in existing and future propeller aircraft
[SAE PAPER 810560] p0518 A81-42726
Summary of typical parameters that affect sound transmission through general aviation aircraft structures
[SAE PAPER 810562] p0518 A81-42728
Noise and performance of general aviation aircraft - A review of the MIT study
[SAE PAPER 810586] p0520 A81-42747
Helicopter noise - Is technology the answer
[SAE PAPER 810591] p0520 A81-42750
The effect of proplets and bi-blades on the performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757
A prediction procedure for propeller aircraft flyover noise based on empirical data
[SAE PAPER 810604] p0521 A81-42761
Avco Lycoming's ALF 502 high bypass fan engine
[SAE PAPER 810618] p0523 A81-42773
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
Aircraft noise control in the 1980's
p0567 A81-46352
EPA proposed national strategy for further reduction of aviation noise
p0567 A81-46353
Airport noise control in the 1980s - FAA's plans and policies
p0568 A81-46355
Remaining problems in the prediction, measurement, evaluation, and control of aircraft noise
p0568 A81-46356
Investigation of the physical working environment for cabin attendants within Scandinavian Airlines System /SAS/ --- noise conditions and aircraft vibration
p0568 A81-46357
Model for airport noise exposure on a national basis - 1960 to 2000
p0568 A81-46363
Plans for control of the noise exposure produced by military aircraft in the 1980's - Aircraft noise
p0568 A81-46364
Noise control at general aviation airports
p0569 A81-46366
Airport noise contour predictions - Improving their accuracy
p0569 A81-46367
Airbase induced community noise - Facilitating the military/civil interface
p0569 A81-46368
Optimizing complex runway use programs for airport noise abatement
p0569 A81-46369
Aircraft noise and land use compatibility tradeoff analyses
p0569 A81-46370
Optimization of takeoff flight paths with respect to FAR Part 36 noise using dynamic programming
p0569 A81-46371
Airport Noise Control and Land Use Compatibility Studies A U.S. case
p0570 A81-46372
A long range research programme of noise abatement at the airport of Beograd and its practical results
p0570 A81-46373
A program to support the full utilization of data from existing social surveys of environmental noise
p0570 A81-46374
Noise reduction test facilities at Douglas Aircraft
p0570 A81-46375
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376
The impact and future direction of aircraft noise certification
p0570 A81-46377
Helicopter manufacturers economic impact assessment of FAA proposed helicopter certification noise rules /NPRM 79-13/
p0576 A81-46647
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] p0618 A81-48608
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] p0619 A81-48615
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] p0620 A81-48629
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] p0620 A81-48635
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] p0621 A81-48647
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] p0624 A81-49732
Survey population response to airplane noise, part 1
[NASA-TM-75790] p0031 N81-10576
Airport noise. Citations from the NTIS data base
[PB80-813231] p0088 N81-12667
Transonic rotor noise - theoretical and experimental comparisons
[AD-A090806] p0088 N81-12824
Spectral analysis of nonstationary random processes. Application to noise of flyover type
[ESA-TT-639] p0088 N81-12826
Noise levels and data correction analysis for seven general aviation propeller aircraft
[AD-A091292] p0096 N81-13717
Correction procedures for aircraft noise data. Volume 3: Filter effects
[AD-A091016] p0096 N81-13719
Correction procedures for aircraft noise data. Volume 5: Propeller aircraft noise
[AD-A091017] p0096 N81-13720
Maneuvering aircraft: Noise pollution and control. Citations from the NTIS data base
[PB80-015566] p0135 N81-14525
Assessment of ground effects on the propagation of aircraft noise: The T-38A flight experiment
[NASA-TP-1747] p0137 N81-14788
The rating of helicopter noise: Development of a proposed impulse correction
[NPL-AC-93] p0138 N81-14792
The annoyance caused by noise around airports
[NASA-TM-75784] p0146 N81-15579
Aircraft annoyance evaluations using field and laboratory simulation techniques
[UTIAS-248] p0146 N81-15580
The need for airport noise monitoring systems. Their uses, and value in promoting civil aviation
[AD-A092240] p0201 N81-16627
A guidance document on airport noise control
[AD-A092228] p0202 N81-16629
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 3: Tables of atmospheric absorption losses --- aircraft noise
[AD-A093144] p0221 N81-17848
NOISECHECK procedures for measuring noise exposure from aircraft operations
[AD-A093940] p0221 N81-17849
Helicopter noise contour development techniques and directivity analysis
[AD-A093426] p0221 N81-17851
Correlation of helicopter noise levels with physical and performance characteristics
[AD-A093428] p0221 N81-17852
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 2: Computer program
[AD-A093267] p0221 N81-17853
NASA progress in aircraft noise prediction
p0269 N81-19078
Study of an experimental probe for the measurement of the acoustic pressure inside an air flow

[ESA-TT-633] p0344 N81-21340
Handbook of aircraft noise metrics
[NASA-CR-3406] p0345 N81-21871
Subjective field study of response to impulsive helicopter noise
[NASA-TP-1833] p0345 N81-21873
Sources, control, and effects of noise from aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904
Annoyance caused by light aircraft noise
[NASA-TM-76533] p0379 N81-22589
The annoyance caused by airplane noise in the vicinity of Orly Airport and the reaction of neighboring residents
[NASA-TM-76575] p0379 N81-22590
The effect of airplane noise on the inhabitants of areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22593
The relationship between noise and annoyance around Orly
[NASA-TM-76573] p0379 N81-22594
Airframe noise of a small model transport aircraft and scaling effects --- Boeing 747
[NASA-TP-1858] p0380 N81-22832
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838
An airport community noise-impact assessment model
[NASA-TM-80198] p0393 N81-23713
Continued research on selected parameters to minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862
Acoustic facilities for human factors research at NASA Langley Research Center: Description and operational capabilities
[NASA-TM-81975] p0446 N81-25765
Engine isolation for structural-borne interior noise reduction in a general aviation aircraft
[NASA-CR-3427] p0446 N81-25766
Additional noise data on the SR-3 propeller
[NASA-TM-81736] p0447 N81-25767
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845
Effect of aircraft noise on the equilibrium of airport residents: Longitudinal study around Roissy, phase 3
[NASA-TM-75906] p0499 N81-27692
Aviation noise overload in the immediate proximity of the Warsaw-Okecie airport
[NASA-TM-75892] p0500 N81-27883
The background and bases for the proposed military standard on acoustical noise limits in helicopters
[AD-A099814] p0500 N81-27890
Nature of the annoyance and noise annoyance relation around airports
[NASA-TM-75873] p0542 N81-28606
Incidences from modifications of the computational methods of the psophic index
[NASA-TM-76577] p0542 N81-28608
Evaluation of the disturbance caused by aircraft noise by opinion surveys
[NASA-TM-76579] p0542 N81-28610
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323
Helicopter noise exposure level data: Variations with test target. Indicated airspeed, distance, main rotor RPM and takeoff power
[AD-A100691] p0552 N81-29661
Community reaction to impulse noise: Initial Army survey
[AD-A101674] p0588 N81-30659
Noise abatement technology options for conventional turboprop airplanes
[AD-A101828] p0589 N81-30910
Impact of prediction accuracy on costs - noise technology applications in helicopters
[AD-A101768] p0589 N81-30911
Minimum noise impact aircraft trajectories
[NASA-CR-164719] p0594 N81-31159
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464
An automated multiple choice intelligibility testing system
p0604 N81-31468
Flying helmet attenuation, and the measurement, with particular reference to the Mk 4 helmet
p0604 N81-31473
Flight test of a pure-tone acoustic source --- aircraft noise
[NASA-TP-1898] p0641 N81-33945
Helicopter noise analysis: Round-robin test
[AD-A103724] p0641 N81-33948

AIRCRAFT NOISE PREDICTION
U NOISE PREDICTION (AIRCRAFT)

AIRCRAFT PARTS
Renewal function for any arbitrary period - A Bayesian way
p0101 A81-16939
The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-16654
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-16672
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0118 A81-16756
The titanium industry and the fabrication of semimanufactures for aeronautics
p0416 A81-36651
Titanium net shapes by a new technology. II - F-18A parts evaluation
p0511 A81-41650
Cost benefits of nonmetallic spline couplings
[SAE PAPER 801101] p0513 A81-41777
Propeller performance and design as influenced by the installation
[SAE PAPER 810602] p0521 A81-42759
Commercial composite component service experience --- in airplane structural design and manufacturing
p0530 A81-43616
Future applications of adhesive bonding in the U.S. Air Force
p0558 A81-44378
Waterjet trimming of cured composites
p0575 A81-46632
Advanced transmission component development
p0575 A81-46634
Structural integration as a means of cost reduction
p0046 N81-11912
Sputtering and ion plating for aerospace applications
[NASA-TM-81726] p0337 N81-20424
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522

AIRCRAFT PERFORMANCE
NT HELICOPTER PERFORMANCE
How to improve the performance of transport aircraft by variation of wing aspect-ratio and twist /12th Daniel and Florence Guggenheim International Memorial Lecture/
p0006 A81-11602
Possibilities for the valuation of different combat aircraft configurations with respect to flight mechanics
p0007 A81-11607
Identification of longitudinal flying characteristics of an aeroplane and the effect of nonstationary aerodynamics
p0010 A81-11627
Aircraft performance optimization by forced singular perturbation
p0014 A81-11667
Optimal flight vehicle design and linear vector spaces
p0014 A81-11668
DFVLR-dynamic model testing in wind tunnels for active controls research
p0014 A81-11670
F/A-18 full scale development test
p0099 A81-16579
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design --- Book

p0101 A81-16720
The Gossamer Condor and Albatross: A case study in
aircraft design --- Book
[AV-A-80/540]
p0101 A81-16721
History of flight testing the L-1011 Tristar jet
transport. I - The L-1011-1

p0110 A81-17976
Application of trajectory optimization principles
to minimize aircraft operating costs

p0155 A81-20066
Simulated aircraft takeoff performance with
frosted wings
[AIAA PAPER 81-0404]
p0167 A81-20811
Escape from military fighters - A modern perspective
p0176 A81-22096
Stochastic modeling of an aircraft traversing a
runway using time series analysis

p0183 A81-23368
A pursuit of the aerial carriage /25th Henson and
Stringfellow Memorial Lecture/

p0284 A81-27901
Combat aircraft development - Looking backward to
look forward 1935-1990

p0284 A81-27905
Building the Gossamer Albatross

p0286 A81-28461
Comparison of two methods for the reduction of
free decaying data in aircraft flutter tests
[NAE-LTR-HA-43]
p0298 A81-29185
Concerning the motion of a piloted aircraft
p0299 A81-29312
The anatomy of the aeroplane --- Book

p0309 A81-29670
An operational tilt-rotor this decade

p0309 A81-29774
Mathematical model of the linear unsteady
aerodynamics of the entire aircraft

p0349 A81-31039
Design, fabrication, calibration, application, and
testing of advanced aircraft weighing systems
[SAWE PAPER 1363]
p0353 A81-31399
A comparison of propulsion systems for V/STOL
supersonic combat aircraft
[SAE PAPER 801141]
p0398 A81-34171
History of SAE Committee S-7, Flight Deck and
Handling Qualities Standards for Transport
Category Aircraft
[SAE PAPER 801165]
p0399 A81-34180
V/STOL capability by modifying CTOL aircraft
[SAE PAPER 801179]
p0400 A81-34192
AV-8B operational features for rapid deployment
[SAE PAPER 801226]
p0405 A81-34231
F-15 nose landing gear shimmy, taxi test and
correlative analyses
[SAE PAPER 801239]
p0406 A81-34237
Supersonic aircraft test experience - Test
techniques and data analysis methods

p0419 A81-37299
STOL performance of the tilt rotor

p0467 A81-40085
Flight control strategies for performance computers
p0512 A81-41759
Engine usage prediction for advanced fighter
aircraft
[AIAA PAPER 81-1367]
p0514 A81-42178
Noise and performance of general aviation aircraft
- A review of the MIT study
[SAE PAPER 810586]
p0520 A81-42747
Development of a simple, self-contained flight
test data acquisition system
[SAE PAPER 810596]
p0520 A81-42754
Aerodynamic design data for a cruise-matched high
performance single-engine airplane
[SAE PAPER 810625]
p0523 A81-42779
An assessment of advanced technologies for
application to general aviation
[SAE PAPER 810630]
p0524 A81-42782
Development of simplified airborne computations
for fuel conservative descents in a time-based
metered air traffic environment
[SAE PAPER 810642]
p0524 A81-42785
Investigation of landing gear alternatives for
high performance aircraft
[AIAA PAPER 81-1639]
p0525 A81-43139
The turboprop aircraft role in the 1980s
[AIAA PAPER 81-1720]
p0529 A81-43169
From paleoaeronautics to altostratus - A technical
history of soaring
[AIAA PAPER 81-1611]
p0533 A81-43933

Historical trend in the research and development
of aircraft
[AIAA PAPER 81-1613]
p0533 A81-43934
Comparison of model testing with computer
simulations of an air landing system
[AIAA PAPER 81-1663]
p0534 A81-43962
Time-constrained maximum-energy turns --- for
modern fighter aircraft
[AIAA PAPER 81-1686]
p0561 A81-44578
Lateral-directional flying qualities of transport
aircraft
[AIAA PAPER 81-1887]
p0561 A81-44579
Project Bandit - An economical, high performance
business aircraft for the 1990s

p0563 A81-44850
General describing function method for systems
with many nonlinearities, with application to
aircraft performance

p0564 A81-45508
SR-71 impressive in high-speed regime

p0565 A81-45747
The relation between aircraft fuel reserves and
navigation

p0612 A81-47843
Performance prediction for light airplanes
p0622 A81-49374
Influence of landing gear flexibility on aircraft
performance during ground roll

p0622 A81-49375
Sukhoi Su-24 Fencer - The Soviet Tornado
p0625 A81-49974
The use of data items on aircraft performance
measurement
[ESDU-80009]
p0026 N81-10053
The XV-15 tilt rotor research aircraft
[NASA-TM-81244]
p0026 N81-10054
Improved aircraft cruise by periodic control
p0034 N81-11030
Flight evaluation of the effect of winglets on
performance and handling qualities of a
single-engine general aviation airplane
[NASA-TM-81892]
p0071 N81-12012
Study of heliport airspace and real estate
requirements
[AD-A091156]
p0095 N81-13072
An airport wind shear detection and warning system
using Doppler radar: A feasibility study
[NASA-CR-3379]
p0202 N81-16681
Correlation of helicopter noise levels with
physical and performance characteristics
[AD-A093428]
p0221 N81-17852
Simulator investigation of arrow-wing low-speed
handling qualities

p0244 N81-17993
Concorde with the airlines --- operating costs and
performance

p0247 N81-18013
Aircraft operating efficiency on the North
Atlantic, a challenge for the 1980's

p0267 N81-19069
Recent progress toward predicting aircraft ground
handling performance

p0268 N81-19088
GASP- General Aviation Synthesis Program. Volume
6: Performance. Part 1: Theoretical development
[NASA-CR-152303-VOL-6-PT-1]
p0271 N81-19093
Investigation of Flight Test Methods for measuring
the performance of general aviation aircraft
[NASA-CR-164057]
p0333 N81-20068
Analytical study of the cruise performance of a
class of remotely piloted, microwave-powered,
high-altitude airplane platforms
[NASA-TM-81969]
p0374 N81-22040
Relationships for a flight performance computer
p0382 N81-23014
The use of aircraft integrated data system at KLM
--- performance monitoring

p0383 N81-23019
Application of a performance modeling technique to
an airplane with variable sweep wings
[NASA-TP-1855]
p0426 N81-24048
System digitization: Its effect in the cockpit
--- on performance
[SNIAS-802-111-115]
p0428 N81-2486
performance control and qualification tests of
civil aviation turbine engines in tests
conducted by airframe manufacturers
p0430 N81-24878

Structures and Dynamics Division research and technology plans, fiscal year, 1981
[NASA-TM-83137] p0491 N81-26497
Pilot-optimal multivariable control synthesis by output feedback
[NASA-CR-163112] p0540 N81-28192
Methods of testing aircraft performance under icing conditions and ice tection systems
p0545 N81-29083
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29088
Conceptual/preliminary design study of subsonic v/stol and stovl aircraft derivatives of the S-3A
[NASA-TM-81310] p0547 N81-29118
US and USSR Military Aircraft and Missile Aerodynamics 1970-1980. A selected, annotated bibliography, volume 1
[NASA-TM-81951] p0547 N81-29119
Applications of dynamic stability parameters to problems in aircraft dynamics
p0592 N81-31122
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-31184
Design of optimal inputs for the identification of characteristics of aircraft flights --- parameter identification control theory
p0631 N81-33131
Vertical lift capabilities for the 80's and 90's
p0632 N81-33139
Ten years of US Marine Corps Harrier operations
p0632 N81-33140
Historical overview of V/STOL aircraft technology
p0633 N81-33143
Recent progress in V/STOL aircraft technology
p0633 N81-33144
Multi-mission STOVL with vectored thrust engines
p0633 N81-33149
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
p0634 N81-33150
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] p0637 N81-33191

AIRCRAFT PILOTS
Flight management systems - Central ingredient of the 1980's avionics shipset
[SAE PAPER 800626] p0063 A81-15342
Primary training of military pilots - Changing theories and new trainers
p0122 A81-19498
Some aspects of advanced flight management systems and their application to modern transport aircraft
p0154 A81-20353
U.S. Navy/USAF development of Tactical Aircrew Combat Training System/Air Combat Maneuvering Instrumentation /TACTS/ACMI/
[SAE PAPER 801183] p0401 A81-34196
Development of an aviator's night vision imaging system /ANVIS/
p0463 A81-39573
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[AHS 80-30] p0476 A81-40160
Light aviation in the United States - September 1980 --- French book
p0513 A81-41903
A piloted simulation of the backup control system engagement for the YAH-64
p0576 A81-46646
Multivariable closed-loop analysis and flight control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11046
Turbulence: From a pilot's viewpoint
p0136 N81-14561
Spin recovery training
[GPO-67-439] p0216 N81-17098
A pilot's subjective analysis of a Cockpit Display of Traffic Information (CDTI) --- terminal configured vehicle
p0264 N81-19037
Operational problems experienced by single pilots in instrument meteorological conditions
[NASA-CR-166236] p0581 N81-30106

AIRCRAFT POWER SOURCES
U AIRCRAFT ENGINES

AIRCRAFT PRODUCTION
DRAPO - Computer-assisted design and manufacturing system
p0007 A81-11610
Application of weldbonding to A-10 production aircraft
p0013 A81-11652
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design --- Book
p0101 A81-16720
Automatization of the adhesion process for supporting airframe parts in light contour systems
p0118 A81-19297
Optimization of finishing conditions --- metal cutting
p0319 A81-30163
Classification of links of assembly units with respect to the character of their connections, and calculation of the accuracy of their execution --- in airframe construction
p0319 A81-30168
Design, fabrication, calibration, application, and testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
Aircraft assembly --- Russian book
p0355 A81-31872
The impact of the All Electric Airplane on production engineering
[AIAA PAPER 81-0848] p0362 A81-32909
Bonded laminated structures in aircraft manufacture --- Russian book
p0366 A81-33700
An aircraft manufacturer's view of airport R&D needs
[AIAA PAPER 81-0793] p0368 A81-33887
The CADAM system for aircraft structural design
[SAE PAPER 801208] p0403 A81-34216
Design, fabrication and test of a complex helicopter airframe section
[SAE PAPER 801213] p0404 A81-34221
Integrated flexible sheet-metal components - Manufacturing center
p0449 A81-37633
Efficient manufacturing procedures for the production of helicopter rotor blades
[MBB-UD-312-80-OE] p0449 A81-37636
Automatic riveting installation for spherical aircraft parts
p0450 A81-37641
Computer-aided design and manufacture in aircraft production /CAD/CAM/
p0451 A81-37647
Advanced production methods for the Dornier 228
p0457 A81-38802
A study of the economic impact of noise limits on new design and current production helicopters
[AHS 80-64] p0479 A81-40187
Fibre reinforced composite applications at De Havilland
[SAE PAPER 810640] p0524 A81-42784
Technology for rustproofing aircraft and helicopters --- Russian book
p0529 A81-43520
Concurrent superplastic forming/diffusion bonding of titanium airframe components
p0531 A81-43638
Flight-vehicle production technology --- Russian book
p0564 A81-45603
Electric installation work on aircraft --- Russian book
p0577 A81-46794
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] p0610 A81-47603
Design of production processes for flight-vehicle engines --- Russian book
p0623 A81-49475
A method for estimating the cost of aircraft structural modification
[AD-A099327] p0483 N81-26035

AIRCRAFT PRODUCTION COSTS
NT AIRPLANE PRODUCTION COSTS
The design-to-cost of aircraft
p0119 A81-19344
Design to cost and new technologies
p0120 A81-19347

Material shortages - Effect on the commercial aircraft industry
[AIAA 81-0508] p0300 A81-29386
Material shortages - Effect on the aircraft engine industry
[AIAA 81-0509] p0301 A81-29387
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424
ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ --- Integrated Computer Aided Manufacturing for aircraft systems
[AIAA PAPER 81-0655] p0408 A81-34353
The ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for Avionics
p0558 A81-44375
Design to Cost and Life Cycle Cost
[AGARD-CP-289] p0045 N81-11902
The Hornet program: A design to life cycle cost case study
p0046 N81-11910
Design to cost and the F-16 multirole fighter
p0046 N81-11911
Structural integration as a means of cost reduction
p0046 N81-11912
Design-to-cost and new technologies
p0046 N81-11913
Organizing a design-to-cost program
p0046 N81-11914
A new method for estimating transport aircraft direct operating costs
p0046 N81-11915
Design-to-cost applied to the AS350 helicopter
p0046 N81-11916
Estimation of relative total cost for aircraft systems
p0047 N81-11922
Using cost reduction concepts at Messier-Hispano-Bugatti
p0047 N81-11923
A cost function for military airframes
[AD-A097538] p0394 N81-23966
A cost function for an airframe production program
[AD-A097540] p0394 N81-23967

AIRCRAFT RELIABILITY
Reliability and engineering-economic characteristics of aircraft engines --- Russian book
p0001 A81-10045
Subsequent proof of damage tolerance for a landing gear component after numerous takeoffs and landings
p0006 A81-11475
Damage tolerance concept for transport aircraft structures
p0050 A81-12970
Inspection methods for various critical steel parts for airframes
p0052 A81-13331
New avenues of research in ultrasonic inspection and their applications in the aerospace industry
p0052 A81-13332
New techniques for the measurement of natural and simulated lightning phenomena
p0057 A81-14268
How do aircraft break down - Some studies of reliability data feedback
p0068 A81-16423
The contribution of structural testing to total airworthiness
p0068 A81-16424
A case study on the F-16 fly-by-wire flight control system --- Book
p0101 A81-16719
The problems of helicopter ditching
p0112 A81-18071
New NDT techniques used for aircraft maintenance
p0153 A81-20160
Designing the Hornet for improved R and M
[AIAA PAPER 81-0230] p0162 A81-20688
Helicopter fatigue qualification
p0180 A81-22623
The new look in reliability - It works --- Operational Mission Environment test program for F/A-18 aircraft
p0229 A81-24268
Development of conceptual Navy aircraft Reliability Prediction Models
p0229 A81-24280
Reliability growth measured by AFM 66-1 data
p0230 A81-24286
Some experience with ferrography in monitoring the condition of aircraft engines
p0285 A81-27943
General considerations on the importance of reliability studies for helicopters
p0287 A81-28471
General remarks on helicopter reliability
p0287 A81-28472
The reliability of helicopter reduction gears
p0287 A81-28473
Helicopter blade reliability
p0287 A81-28474
Statistical crack growth in durability and damage tolerant analyses
[AIAA 81-0492] p0300 A81-29382
Study of the crashworthiness of light aircraft structures
[AIAA 81-0574] p0302 A81-29407
Using microprocessors in fault monitoring of aircraft electronics
[ASME PAPER 81-GT-138] p0316 A81-30046
Heat pipe avionic cooling
p0326 A81-30343
Rapport tactical self protection systems design
p0349 A81-31113
Efficiency of the methods and algorithms used for estimating the reliability in aviation techniques
p0365 A81-33173
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803] p0367 A81-33882
Acoustic emission techniques for in-flight structural monitoring
[SAE PAPER 801211] p0404 A81-34219
Component research for future propulsion systems
p0454 A81-38058
Development of a bearingless helicopter tailrotor
p0465 A81-39897
Reliability of commercial helicopters
p0472 A81-40126
An investigation of the recovery from an engine failure in a twin engine augmentor wing aircraft using the NAE Airborne Simulator
p0509 A81-41199
Advanced structural repair for lower cost
p0558 A81-44393
Philosophy of safety and reliability --- in aviation
p0561 A81-44616
Designing safety into helicopter transmissions
p0575 A81-46630
Reliability and maintainability evaluation of rotor systems
p0576 A81-46645
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0032 N81-11021
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A089971] p0033 N81-11022
Some engineering aspects of life cycle costing
p0047 N81-11918
AEROMEXICO DC-10-30, XA-DUH, over Luxembourg, Europe
[NTSB-AAR-80-10] p0073 N81-12042
The changing scene of structural airworthiness
[AAAF-NT-79-24] p0077 N81-12076
Testing of composite structures
[AAAF-NT-79-41] p0083 N81-12181
Preliminary airworthiness evaluation OH-58C helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052
Improving aircraft safety
[PB81-114806] p0270 N81-19083
The F/A-18 Naval Strike Fighter: Progress has been made but problems and concerns continue
[AD-A095287] p0333 N81-20069
Description of the British Civil Aviation Airworthiness Data Recording Programme (CAADRP) --- analysis of flight recorder data
p0383 N81-23017
Method for computation of structural failure probability for an aircraft
[AD-A098294] p0426 N81-24050

Helicopter transmission qualification procedures and tests
p0433 N81-24101
Helicopter transmission testing
p0433 N81-24102
Prediction of future test needs, test facilities and procedures
p0433 N81-24104
AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121
Factors of safety related to structural integrity. A review of data from military airworthiness authorities
[AGARD-R-677] p0596 N81-31186

AIRCRAFT SAFETY
Ground testing of aircraft antistatic protection
[ONERA, TP NO. 1980-126] p0015 A81-11674
Civil aviation safety. III - Prospects of improvement
p0017 A81-11900
Lightning near fields generated by return stroke current
p0050 A81-14257
Flying safely /Revised and enlarged edition/ --- Book
p0068 A81-16198
Sarsat - A rescue system for ships and aircraft
p0100 A81-16684
Safety considerations for helicopter drive systems of the 1980s
p0105 A81-17510
Helicopter survivability in overwater situations
p0114 A81-18081
Pyrotechnics serving safety --- in aircraft air and ground escape systems
p0120 A81-19348
Design and preliminary tests of an IR-airborne LLWS remote sensing system --- Low Level Wind Shear
[AIAA PAPER 81-0239] p0163 A81-20694
40 years of helicopter ice protection experience at Sikorsky Aircraft
[AIAA PAPER 81-0407] p0168 A81-20813
Bilingual air traffic control in Canada
p0169 A81-20915
Escape systems testing on the Holloman high speed test track
p0175 A81-22088
Progress in the use of automatic flight controls in safety critical applications
p0284 A81-27902
Is it safe - The safety assessment of aircraft systems. III - The use of probability methods
p0290 A81-29029
Is it safe - The safety assessment of aircraft systems. IV - Methods, techniques, and organisation
p0366 A81-33789
Maintenance tomorrow and the day after --- of wide-bodied transport aircraft
p0367 A81-33790
Some design and procedural aspects of in-flight collision avoidance
[AIAA PAPER 81-0805] p0368 A81-33885
Wake vortex alleviation
[AIAA PAPER 81-0798] p0412 A81-35723
Is it safe - The safety assessment of aircraft systems. V - Some particular techniques
p0454 A81-38174
Design for safety --- Book
p0455 A81-38499
Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
Fundamental studies of antimisting fuels
[AIAA PAPER 81-1422] p0515 A81-42195
Helicopter accidents
[SAE PAPER 810592] p0520 A81-42751
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
Simulation of aircraft seat response to a crash environment
[SAE PAPER 810612] p0522 A81-42768
U.S. Army crashworthiness program
[SAE PAPER 810615] p0522 A81-42771
An assessment of advanced technologies for application to general aviation
[SAE PAPER 810630] p0524 A81-42782
The F-16 Halon tank inerting system
[AIAA PAPER 81-1638] p0525 A81-43138
Conditions for safe separation of external stores
p0529 A81-43395
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943
General aviation aircraft rear-seated occupant protection - Shoulder restraints in rear seats
[AIAA PAPER 81-1669] p0534 A81-43944
Aerial collisions with relief features
p0557 A81-44323
Philosophy of safety and reliability --- in aviation
p0561 A81-44616
Limb restraint F-18 style
p0567 A81-46325
Safety - A prime factor in the design of Aerospatiales Super-Puma AS 332
p0572 A81-46609
NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022
Evaluation of safety programs with respect to the causes of general aviation accidents. Volume 2: Appendices
[AD-A089181] p0023 N81-10023
Handbook on bird management and control
[AD-A089009] p0023 N81-10024
Applications of pyrotechniques in aviation
[SNIAS-792-422-103] p0023 N81-10025
Search and rescue methods and equipment. A bibliography with abstracts
[PB80-812837] p0023 N81-10026
Bird strikes and aviation safety. Citations from the NTIS data base
[PB80-812944] p0024 N81-10027
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A089971] p0033 N81-11022
ATARS implementation tradeoff
[AD-A089977] p0034 N81-11026
Aviation safety
[GPO-68-717] p0073 N81-12040
Commuter airport safety
[GPO-60-512] p0073 N81-12041
AEROMEXICO DC-10-30, XA-DUH, over Luxembourg, Europe
[NTSB-AAR-80-10] p0073 N81-12042
Impact of modern materials on the development of rotating airfoil equipment
[AAAF-NT-79-43] p0083 N81-12182
Visual confirmation (VICON) of voice take-off clearance of cost-and-deployment analyses and strategies
[AD-A091007] p0091 N81-13038
Performance verification of the superjet laminar angular rate sensor
[AD-A091089] p0091 N81-13040
Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933
Testimony of James J. Kramer, Associate Administrator for Aeronautics and Space Technology, National Aeronautics and Space Administration, accompanied by John H. Enders, Project Manager, Aviation Safety Technology Office, John A. Parker, Chemical Research Projects Office, NASA-Ames Research Center, and Demitrius A. Kourtides, Chemical Research Projects Office, NASA-AMES Research Center
p0127 N81-13935
Testimony of Richard W. Taylor, Vice President and Special Assistant to the President, and Eugene A. Bara, Chief Engineer, Payloads Systems, Boeing Commercial Airplane Company
p0127 N81-13936
Testimony of a panel consisting of: Lloyd E. Frisbee, Vice President, Engineering and Operations, Lockheed California Company; Lyle A. Wright, Director, Powerplant Engineering, Douglas Aircraft Company, accompanied by Doctor R. C. Schjelderup, Chief Technology Engineer, Materials and Process Engineering, and F. E. Duskin, Senior Design Engineer, Interiors Engineering, Douglas Aircraft Company

p0127 N81-13937
Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation systems
[NASA-CP-2139] p0135 N81-14555
Aviation meteorology research and development: A status report
p0135 N81-14557
Measuring weather for aviation safety in the 1980's
p0136 N81-14568
Commuter airline safety
[PB81-104267] p0141 N81-14988
Aircrew compliance with standard operating procedures as a component of airline safety
[AD-A092443] p0191 N81-16023
Special Aviation Fire and Explosion Reduction (SAFER) advisory committee, volume 1
[AD-A092016] p0191 N81-16024
Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025
Computer code for the determination of ejection seat/man aerodynamic parameters
[AD-A092721] p0191 N81-16026
Summary of aviation safety program resumes. Cabin safety
[AD-A091938] p0192 N81-16027
The 1980 Aircraft Safety and Operating Problems, part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
Evaluation of emergency-locator-transmitter performance in real and simulated crash tests
p0268 N81-19070
System safety program report MK 1 MOD 0 LSO HUD console system
[AD-A095009] p0269 N81-19080
Improving aircraft safety
[PB81-114806] p0270 N81-19083
Study of materials performance model for aircraft interiors
[NASA-CR-152378] p0333 N81-20063
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
A review of in-flight emergencies in the ASRS data base
[NASA-CR-166166] p0372 N81-22031
Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033
Description of the British Civil Aviation Airworthiness Data Recording Programme (CAADRP) --- analysis of flight recorder data
p0383 N81-23017
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A098096] p0424 N81-24038
Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051
Engineering and development program plan propulsion safety
[AD-A098709] p0444 N81-25088
Safety report: The status of general aviation aircraft crashworthiness
[PB81-160798] p0484 N81-26084
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065
Electro-magnetic compatibility: The determination of safety for critical systems
p0545 N81-29079
An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108
Application of damage tolerance concepts for MBB helicopters --- mechanical properties
[MBB-UD-309/80-OE] p0580 N81-30105
The information transfer problem summary and comments
p0595 N81-31169

Factors of safety related to structural integrity. A review of data from military airworthiness authorities
[AGARD-R-677] p0596 N81-31186
Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] p0636 N81-33178
Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] p0636 N81-33177
AIRCRAFT SPECIFICATIONS
Some experiences with numerical optimisation in aircraft specification and preliminary design studies
p0007 A81-11609
Modelling of gusts and wind shear for aircraft assessment and certification
p0528 A81-43376
The 146 emerges from the shadows
p0560 A81-44474
Current aircraft survey (approach speeds, gross weights, and Dimensions)
[PB80-225691] p0129 N81-13956
Airborne-fiber optics manufacturing technology, aircraft installation processes
[AD-A093304] p0221 N81-17902
AIRCRAFT SPIN
A geometrical study of the steady-state spin for a typical low-wing general aviation aircraft
p0454 A81-38023
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943
Spin - Angles and inertial moments
p0567 A81-46023
Influence of light aircraft architecture on its spin characteristics
[AAAF-NT-80-11] p0081 N81-12111
Some new research approaches to aircraft spin studies
[AAAF-NT-80-12] p0082 N81-12112
A flight investigation of the ultra-deep-stall descent and spin recovery characteristics of a 1/6 scale radiocontrolled model of the Piper PA38 Tomahawk
[NASA-CR-156871] p0343 N81-21084
TORNADO: Flight characteristics at high angles of incidence
[MBB-FE-127/S/PUB/23] p0495 N81-27085
AIRCRAFT STABILITY
NT HOVERING STABILITY
A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622
Dynamic stability parameters at high angles of attack
p0009 A81-11624
Model tests for an active rotor isolation system
[MBB-270-79-O] p0018 A81-12095
Active suppression of aircraft flutter
p0059 A81-14397
Gear meshing action as a source of vibratory excitation
p0150 A81-20061
Disturbance estimation for a STOL transport during landing
[AIAA PAPER 81-0018] p0158 A81-20542
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology --- Linear Quadratic Gaussian
[AIAA PAPER 81-0021] p0158 A81-20544
A new concept for dynamic stability testing --- for aircraft model in orbital path
[AIAA PAPER 81-0158] p0161 A81-20638
Damping of aircraft wing vibrations by automatically controlled internal forces
p0170 A81-21060
Active controls for civil aircraft
p0228 A81-24070
Aircraft dynamic stability and response --- Book
p0232 A81-25173
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0241 A81-26933
Aeroelastic stability of aircraft --- Russian book
p0281 A81-27531

Aircraft stability at high incidence
p0282 A81-27870
Roll stabilization of flight vehicles by means of rollerons
p0290 A81-29016
Unsteady aerodynamic propulsion
[AIAA 81-0645] p0307 A81-29498
A wind-tunnel study of the flutter characteristics of a supercritical wing
p0308 A81-29504
CH-53E combat survivability assessment and survivability enhancement program
[SAWE PAPER 1384] p0354 A81-31400
Generalized active control - Its potential and directions of research
[AAAF PAPER NT 80-29] p0369 A81-33928
Estimation of dynamic stability parameters from drop model flight tests
p0410 A81-35551
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
Control system design using graphical decomposition techniques
p0410 A81-35567
Wind tunnel determination of dynamic cross-coupling derivatives - A new approach
p0413 A81-35927
Airship survivability in atmospheric turbulence
[AIAA 81-1323] p0456 A81-38533
Bulkheads in airships
[AIAA 81-1328] p0456 A81-38536
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Identification of a linear model of rotor-fuselage dynamics from nonlinear simulation data
p0472 A81-40125
Aeroelastic stability analysis of hingeless rotor helicopters in forward flight using blade and airframe normal modes
[AHS 80-24] p0475 A81-40154
An experimental investigation of the effects of aeroelastic couplings on aeromechanical stability of a hingeless rotor helicopter
[AHS 80-25] p0475 A81-40155
Effect of in-flight thrust reverser deployment on tactical aircraft stability and control
[AIAA PAPER 81-1446] p0504 A81-40879
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754
Effects of wingtip modifications on handling qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
Control characteristics of a Buoyant Quad-Rotor Research Aircraft
[AIAA 81-1838] p0555 A81-44122
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126
Determination of model structure and parameters of an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562
Stability characteristics of a forward swept wing aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576
Stability of aircraft motion in critical cases
[AIAA PAPER 81-1885] p0561 A81-44577
A flight investigation of static stability, control augmentation, and flight director influences on helicopter IFR handling qualities
p0574 A81-46623
Automatic damping of vibrations of an airplane wing by internal control forces
p0577 A81-46783
Parametric synthesis of an automatic system for flight-vehicle stabilization
p0625 A81-49940
The flying qualities of aircraft with actively augmented pitch and yaw stability
[ARC-R/M-3848] p0082 N81-12113
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046
An analytical study of the longitudinal response of airplanes to positive wind shear
[NASA-TP-1765] p0335 N81-20082
Pitch-flap-phase coupling. A preliminary analysis of an evolving concept of helicopter autostabilization
[BU-242] p0434 N81-24109
Flight test evaluation of predicted light aircraft drag, performance, and stability
[NASA-CR-159062] p0494 N81-27078
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
[MBB-UD-307/80-OE] p0584 N81-30140
Dynamic Stability Parameters --- conferences
[AGARD-LS-114] p0590 N81-31105
Aerodynamic mathematical modeling - basic concepts
p0590 N81-31106
Impact of high-alpha aerodynamics on dynamic stability parameters of aircraft and missiles
p0590 N81-31107
Review of techniques for determination of dynamic stability parameters in wind tunnels
p0590 N81-31108
Wind-tunnel measurement of aerodynamic derivatives using flexible-sting rigs
p0591 N81-31110
Rotary and Magnus balances
p0591 N81-31111
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0591 N81-31112
Applications of half-model technique in dynamic stability testing
p0591 N81-31114
Determination of aircraft dynamic stability and control parameters from flight testing
p0591 N81-31115
Estimation of dynamic stability parameters from drop model flight tests
p0591 N81-31116
Sensitivity of aircraft motion to cross coupling and acceleration derivatives
p0592 N81-31120

AIRCRAFT STRUCTURES
NT AFTERBODIES
NT AIRFRAMES
NT FOREBODIES
NT FUSELAGES
NT PLASTIC AIRCRAFT STRUCTURES
Aspect ratio variability in part-through crack life analysis
p0001 A81-10355
Part-through crack problems in aircraft structures
p0001 A81-10362
Experimental application of a vibration reduction technique
p0004 A81-10770
Design and test of a graphite-epoxy composite A-10 slat
p0006 A81-11339
The analysis of fatigue failures
p0006 A81-11603
Weight optimization of wing structures according to the gradient method
p0012 A81-11650
Structural optimization of advanced aircraft structures
p0013 A81-11651
Development of the A300 fin in modern composite fibre construction
p0013 A81-11653
Nondestructive evaluation of composite structures
p0013 A81-11654
Holographic non-destructive testing of materials using pulsed lasers --- for aircraft structures
p0013 A81-11655
Structural flight load testing, calibration and analysis
p0013 A81-11656
Operational durability of airframe structures
p0014 A81-11662
Ground testing of aircraft antistatic protection
[ONERA, TP NO. 1980-126] p0015 A81-11674
Damage tolerance concept for transport aircraft structures
p0050 A81-12970
Aging study of the Caravelle 38
p0061 A81-15119
Thermal expansion molding process for aircraft composite structures

[SAE PAPER 800612] p0062 A81-15334
Calculation of critical flutter speeds on an aircraft in subsonic flow
p0068 A81-16301
Nonlinear incremental analysis up to failure of aeronautical structures
p0068 A81-16307
The automatic matrix force method and techniques for handling more complex computations with given computer capacity
p0108 A81-17815
Elimination of vibrations in aircraft piping systems --- Russian book
p0116 A81-18497
Automatization of the adhesion process for supporting airframe parts in light contour systems
p0118 A81-19297
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940
Measurements of structural mobility on helicopter structures
p0151 A81-20064
Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110
Evaluation and comparison of nondestructive service inspection methods
p0153 A81-20135
New NDT techniques used for aircraft maintenance
p0153 A81-20168
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
Effect of load spectrum variables on fatigue crack initiation and propagation; Proceedings of the Symposium, San Francisco, Calif., May 21, 1979
p0172 A81-21730
An engineering model for assessing load sequencing effects --- cracks in aircraft structures
p0172 A81-21737
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking
p0173 A81-21742
Fatigue design criteria and fleet fatigue life survey at Aeronautica Macchi
p0180 A81-22624
Project and experimental fatigue test of the wing of a modern combat aircraft
p0180 A81-22625
Definition of loading sequence for full scale fatigue test
p0180 A81-22626
Ductile fracture mechanic assessments of 2219-T851, 2024-T3 and 7075-T6 aluminum alloys
p0180 A81-22628
Crack propagation in lugs
p0180 A81-22629
Crack growth propagation under variable amplitude loading in aerospace structures
p0181 A81-22632
Composite fuselage development for Naval aircraft
p0181 A81-22648
Effect of impact damage on the XFV-12A composite wing box
p0182 A81-22676
Experiences with composite aircraft structures
p0182 A81-22678
Prospects for bonding primary aircraft structure in the 80's
p0182 A81-22679
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
An aeronautical structural analysis system for static analysis /HAJIF-I/
p0224 A81-23728
Supermatrix method for multi-substructure analysis
p0225 A81-23854
Prediction of structural fatigue response under aircraft loads from material stress-strain behavior
p0226 A81-24009
Isothermal rolling of aircraft parts - Versatile process saves costly materials
p0227 A81-24087
Determination of aircraft structural inspection intervals
p0230 A81-24285
The Coromel Transverse Wing Flight system
p0231 A81-24788
Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures
p0232 A81-24942
Application of hybrid schemes in analysis of thin-wall structures by the displacement method
p0235 A81-25681
Iterative method for determining maximum load capacity of aircraft structures
p0235 A81-25683
The joints of aeronautical carbon resin composite structural elements
p0238 A81-26242
The quality of nonmetallic materials
p0238 A81-26244
Failure by fatigue
p0238 A81-26419
Applications of carbon fibre composites to military aircraft structures
p0283 A81-27885
Engineering aspects of composite structures for civil aircraft
p0283 A81-27888
Simple methods of determining stress intensity factors
p0289 A81-28984
Statistical crack growth in durability and damage tolerant analyses
[AIAA 81-0492] p0300 A81-29382
Fatigue sensitivity of composite structure for fighter aircraft
[AIAA 81-0495] p0300 A81-29383
IPAD applications to the design, analysis, and/or machining of aerospace structures --- Integrated Program for Aerospace-vehicle Design
[AIAA 81-0512] p0301 A81-29388
Bolt bearing strengths of graphite/epoxy laminates
[AIAA 81-0544] p0301 A81-29396
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29405
Your next ground vibration test doesn't have to cost a million dollars
[AIAA 81-0529] p0303 A81-29450
Sonic fatigue design techniques for graphite-epoxy stiffened-skin panels
[AIAA 81-0633] p0305 A81-29488
The possibility of single-impact riveting of flat-top countersunk-head rivets --- for aircraft structures
p0319 A81-30164
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1331] p0352 A81-31376
Developments in the analysis and repair of cracked and uncracked structures
p0354 A81-31561
Principles of aircraft structural design /2nd revised and enlarged edition/ --- Russian book
p0355 A81-31800
Aircraft assembly --- Russian book
p0355 A81-31872
Aircraft quality assurance using close-range photogrammetry
p0358 A81-32568
In-flight fatigue crack monitoring using acoustic emission
p0361 A81-32857
Structural optimization - Past, present and future
[AIAA PAPER 81-0897] p0362 A81-32922
A new method for modal identification
p0365 A81-33293
Bonded laminated structures in aircraft manufacture --- Russian book
p0366 A81-33700
Finite element analysis of asymmetric, lateral natural vibrations of a deformable aeroplane
p0366 A81-33736
Global optimization of a glider
[AAAF PAPER NT 80-36] p0368 A81-33837

AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193
Adhesive bonding of aircraft primary structures
[SAE PAPER 801209] p0404 A81-34217
Integrated active controls impact on supersonic cruise vehicle structural design
[SAE PAPER 801210] p0404 A81-34218
Advanced graphite composites in the 757/767
[SAE PAPER 801212] p0404 A81-34220
Maintenance program analysis for aircraft structures of the 80's - MSG-3
[SAE PAPER 801214] p0404 A81-34222
NASA aeronautics R&T - A resource for aircraft design
[AIAA PAPER 81-0925] p0408 A81-34363
Thermomechanical behavior of a mechanically alloyed Al-4.0Mg powder alloy
p0409 A81-34851
The bonding of titanium and its alloys
p0417 A81-36663
The biparametric cycle count method and the principle of simplification --- in determination of aircraft structural fatigue life
p0419 A81-37337
Automatic riveting installation for spherical aircraft parts
p0450 A81-37641
High intensity acoustic testing to determine structural fatigue life and to improve reliability in nuclear reactor and aerospace structures
p0455 A81-38372
Bulkheads in airships
[AIAA 81-1328] p0456 A81-38536
Design and development of a thermal airship
[AIAA 81-1330] p0456 A81-38537
Low cost start-up for rigid-pressure airship
[AIAA 81-1337] p0457 A81-38541
Advanced production methods for the Dornier 228
p0457 A81-38802
Investigation of shot peening as a forming process for aircraft wing skins
p0458 A81-39046
Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
p0467 A81-40087
Model 206L composite vertical fin
[AHS 80-34] p0478 A81-40175
The substantiation of the structural integrity of the YAH-64 control actuators with material variations
[AHS 80-51] p0478 A81-40178
Advanced composite structure repair
p0481 A81-40595
An evaluation of vacuum centrifuged titanium castings for helicopter components
p0510 A81-41516
Titanium net shapes by a new technology. I - F-14A parts evaluation
p0511 A81-41649
Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures --- of Al alloys
p0516 A81-42356
Summary of typical parameters that affect sound transmission through general aviation aircraft structures
[SAE PAPER 810562] p0518 A81-42720
Antennas-avionics systems relationship
[SAE PAPER 810579] p0519 A81-42742
Predicting fatigue crack growth on aircraft structures
[SAE PAPER 810593] p0520 A81-42752
Matrix load analysis method for flexible aircraft structures
[PAPER 810610] p0522 A81-42766
Fibre reinforced composite applications at De Havilland
[SAE PAPER 810640] p0524 A81-42788
Measurement of natural aircraft icing conditions
[AIAA PAPER 81-1646] p0526 A81-43143
On certification of composite structures for USAF aircraft
[AIAA PAPER 81-1686] p0527 A81-43158
Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563
Composites - A solution to aluminum honeycomb maintenance costs --- for aircraft structures
p0529 A81-43606
NASA service experience with composite components --- for aircraft structures
p0529 A81-43607
Electrical/electromagnetic concerns associated with advanced composite materials in aerospace systems
p0530 A81-43630
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636
Development of repair procedures for graphite/epoxy structures on commercial transports
p0531 A81-43645
Manufacturing the F-16 composite horizontal tail
p0531 A81-43646
Advanced ultrasonic testing of aerospace structures
p0557 A81-44329
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for metallic structures
p0558 A81-44374
Maintenance and repair of advanced composite structure
p0558 A81-44382
Composite repair concepts for depot level use
p0558 A81-44384
Advanced composite repair - Recent developments and some problems
p0558 A81-44385
Advanced structural repair for lower cost
p0558 A81-44393
Repair of adhesive bonded structure on commercial aircraft
p0559 A81-44394
Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development
p0559 A81-44395
Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance
p0559 A81-44396
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44398
Flight-vehicle production technology --- Russian book
p0564 A81-45603
SR-71 imposes burden on maintenance units
p0565 A81-45748
New designs for improved aerodynamic stability on recent Aerospatiale helicopters
p0574 A81-46625
Development of composite material helicopter structures
p0576 A81-46641
Helicopter External Gondola System
p0576 A81-46642
Survivors on the RPV front
p0577 A81-46725
Use of carbon composites in aircraft structures
p0577 A81-46813
A formulation of the shimmy problem for swiveling wheels
p0607 A81-47268
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] p0609 A81-47564
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] p0609 A81-47565
High peak energy shaped-pulse electromagnetic crack detection
p0611 A81-47785
Developing design allowables for composite helicopter structures
p0611 A81-47811
Cost-effective mechanical property characterization
p0612 A81-47813
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888
Sliding-seal electron beam slot welding of an aircraft wing closure beam
p0614 A81-48142

Stress concentration in elements of aircraft
structures --- Russian book
p0623 A81-49471
The effect of the skewness of the skin panels on
stresses in conical wings
p0625 A81-49930
Geometrically nonlinear theory for calculating
thin rods of a wing profile
p0625 A81-49935
Strength calculation of thin-wall rods of
significant taper
p0625 A81-49937
Elastomers used in aeronautics industry
[SNIAS-801-551-165] p0031 N81-10168
Evaluation of section properties for hollow
composite beams
[PAPER-NR-35] p0031 N81-10454
Lightning protection considerations for
graphite/epoxy aircraft structure
p0040 N81-11142
Air Force applications and in-service experience
with composite structures
p0041 N81-11148
US Navy service experience with advanced composites
--- in aircraft composite structures
p0041 N81-11149
The effect of thermal stresses on the integrity of
three built-up aircraft structures
[NASA-TM-81352] p0075 N81-12064
The changing scene of structural airworthiness
[AAAF-NT-79-24] p0077 N81-12076
Mirage 2000 and Mirage 4000 fiber structures
[AAAF-NT-79-44] p0083 N81-12183
Aircraft surface coatings study: Energy efficient
transport program --- sprayed and adhesive
bonded coatings for drag reduction
[NASA-CR-158954] p0084 N81-12225
Current developments in aircraft fatigue
evaluation procedures
[AAAF-NT-79-33] p0086 N81-12464
Buckling of sandwich panels subjected to axial
compression, shear forces and lateral pressure.
Part 2: Analysis
[SAAB-TN-AE-72-PT-2] p0086 N81-12465
High-voltage spark carbon-fiber sticky-tape data
analyzer
[NASA-CR-163747] p0087 N81-12646
The effects of warhead-induced damage on the
aeroelastic characteristics of lifting surfaces.
Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
Controls of aeronautical structures under fatigue
testing by holographic pulsed lasers
interferometry
[ISL-CO-218/79] p0133 N81-14300
A French flight test program on the
electromagnetic effects of lightning
p0199 N81-16155
Composite structural materials --- aircraft
applications
[NASA-CR-163946] p0207 N81-17039
A conversational, topological grid method and
optimization of structural calculations
involving finite elements
[AAAF-NT-79-30] p0210 N81-17053
Supersonic Cruise Research 1979, part 2 ---
airframe structures and materials, systems
integration, economic analysis
[NASA-CP-2108-PT-2] p0246 N81-18005
Opportunities for structural improvements for an
advanced supersonic transport vehicle
p0246 N81-18007
Evaluation of high-temperature structural
adhesives for extended service
p0247 N81-18010
Technology development status at McDonnell Douglas
p0248 N81-18019
Description of the HiMAT Tailored composite
structure and laboratory measured vehicle shape
under load
[NASA-TM-81354] p0251 N81-18047
A crack-closure model for predicting fatigue-crack
growth under aircraft spectrum loading
[NASA-TM-81941] p0257 N81-18412
Potential of optical Fourier analysis for
measuring windscreen distortion
[AD-A094127] p0259 N81-18853
VTOL in ground effect flows for closely spaced jets
--- to predict pressure and upwash forces on
aircraft structures
[NASA-CR-152321] p0271 N81-15095
Evaluation of powder coatings for application to
aircraft component parts
[AD-A094724] p0277 N81-19305
Structural flight loads simulation capability,
volume 1
[AD-A096572] p0374 N81-22044
Structural flight loads simulation capability.
Volume 2: Structural analysis computer program
user's manual
[AD-A096594] p0375 N81-22045
Behavior of continuous filament advanced composite
isogrid structure
p0377 N81-22095
Service evaluation of aluminum-brazed titanium
(ABTi) --- aircraft structures
[NASA-CR-3418] p0378 N81-22129
A comparison of laboratory measured temperatures
with predictions for a spar/skin type aircraft
structure
[NASA-TM-81359] p0387 N81-23067
Aircraft wing weight build-up methodology with
modification for materials and construction
techniques
[NASA-CR-166173] p0387 N81-23068
Fatigue life variability in aluminum alloy
aircraft structures
[AD-A097198] p0391 N81-23249
Aircraft canopy lock
[NASA-CASE-FRC-11065-1] p0426 N81-24047
A review of Australian investigations on
aeronautical fatigue
[AD-A098300] p0426 N81-24051
Airplane wing vibrations due to atmospheric
turbulence
[NASA-CR-3431] p0438 N81-24679
The fatigue crack growth under variable amplitude
loading in built-up structures
[AD-A098417] p0446 N81-25037
A method for estimating the cost of aircraft
structural modificction
[AD-A099327] p0483 N81-26035
Synopsis of Specialists' Meeting on Helicopter
Fatigue Methodology
p0487 N81-26129
Helicopter Fatigue: A civil view
p0488 N81-26134
Fatigue tests on the total structure of the
Gazelle SA 341 helicopter
p0488 N81-26136
Energy absorption studied to reduce aircraft crash
forces
[NASA-NEWS-RELEASE-81-96] p0492 N81-27060
Optimization of fiber reinforced structures to
satisfy aeroelastic requirements
[NASA-CR-164536] p0499 N81-27200
Thirty years experience with primary adhesive
bonded structures --- aircraft construction
[FOK-BO-1240] p0541 N81-28189
Nondestructive testing of adhesive bonded joints
[FOK-BO-1241] p0542 N81-28190
Structural optimization of advanced aircraft
structures --- computerized design
[MBB-S/PUB/32] p0582 N81-30122
Operational experience with adhesive bonded
structures --- aircraft structures
[FOK-BO-1235] p0582 N81-30124
Damage tolerance of a landing gear component after
many takeoffs and landings --- nondestructive
tests
[NLR-MP-79039-U] p0596 N81-31189
Manual on the fatigue of structures. 2: Causes
and prevention of damage. 7: Mechanical
surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] p0640 N81-33503

AIRCRAFT SURVIVABILITY
Helicopter tail configurations to survive tail
rotor loss
p0003 A81-10760
The analysis of fatigue failures
p0006 A81-11603
Helicopter survivability in overwater situations
p0114 A81-18081
CH-53E combat survivability assessment and
survivability enhancement program
[SAWE PAPER 1384] p0354 A81-31400
Airship survivability in atmospheric turbulence
[AIAA 81-1323] p0456 A81-38533

Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
The survivable, affordable fighter - The Aeritalia-Macchi-Embraer AM-X
p0480 A81-40460
Combat survivability with advanced aircraft propulsion development
[AIAA PAPER 81-1506] p0507 A81-40913
Crashworthy design concepts for airframe structures of light aircraft
[SAE PAPER 810613] p0522 A81-42769
Failure management techniques for high survivability
p0042 N81-11272
Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933
Aircraft crash survival design guide. Volume 1: Design criteria and checklists, revision
[AD-A093784] p0204 N81-16997
Fireworthiness of transport aircraft interior systems
p0267 N81-19061
Directory of aircraft survivability specialists and their affiliations
[AD-A096259] p0341 N81-21066
ATTACK vs SCAN: A comparison of endgame aircraft survivability computer programs
[AD-A097663] p0388 N81-23076
Safety report: The status of general aviation aircraft crashworthiness
[PB81-160798] p0484 N81-26084
Combat damage assessment
p0488 N81-26132
Survivability study of a FLIR equipment fighter on a night penetration of a Soviet army
[AD-A101186] p0547 N81-29120
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
p0632 N81-33141
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
p0632 N81-33142
The consequences of certain operational requirements on the conceptual design of combat helicopters
p0634 N81-33153

AIRCRAFT TIRES
Today and the future in aircraft wheel and brake development
p0102 A81-17046
Performance of aircraft pneumatic tyres in soft soil
p0226 A81-24000
Landing gear shock absorber design criteria and the assessment of tire/wheel configurations
p0232 A81-24940
Braking of an aircraft tyre
p0412 A81-35892
A dynamic shimmy analysis
[AIAA PAPER 81-1700] p0527 A81-43161
Aircraft ground mobility system for the F-16 aircraft
[AIAA PAPER 81-1735] p0536 A81-43960
Current research in aircraft tire design and performance
p0268 N81-19065
Recent progress towards predicting aircraft ground handling performance
[NASA-TM-81952] p0339 N81-21044
Heat generation in aircraft tires under free rolling conditions
[NASA-CR-164273] p0393 N81-23461
Tire/wheel concept
[NASA-CASE-LAR-11695-2] p0437 N81-24443
Static and yawed-rolling mechanical properties of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24471
Behavior of aircraft antiskid braking systems on dry and wet runway surfaces: Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112

AIRCRAFT WAKES
NT HELICOPTER WAKES
NT PROPELLER SLIPSTREAMS
NT SLIPSTREAMS
Extraction of wavedrag from airfoil wake measurements
[AIAA PAPER 81-0291] p0164 A81-20732
On the unsteady wake-induced lift on a slotted airfoil. II - The influence of displacement thickness fluctuations
p0229 A81-24237
Calculation of the flow pattern behind an aircraft wing
p0349 A81-31041
The effect of the aspect ratio of delta wings on the structure of the near vortex wake
p0413 A81-36467
Development of a comprehensive analysis for rotorcraft. I - Rotor model and wake analysis
p0465 A81-39896
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019
B-52 wake investigation
[LOG-C3932] p0072 N81-12020
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[NASA-TM-81657] p0195 N81-16053
Measurement of canard wakes
[AD-A095063] p0263 N81-19029

AIRCREWS
U FLIGHT CREWS

AIRFIELD SURFACE MOVEMENTS
Non-destructive pavement evaluation
p0111 A81-18062
Airport capacity enhancement by innovative use of runway geometry
[AIAA PAPER 81-0801] p0368 A81-33891
NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021
High speed exit taxiways
[AD-A098178] p0435 N81-24118
Advances in landing gear systems
p0545 N81-29077

AIRFIELDS
U AIRPORTS

AIRFOIL CHARACTERISTICS
U AIRFOILS

AIRFOIL PROFILES
NT WING PROFILES
NT WING SPAN
Design of airfoils in incompressible viscous flows by numerical optimization
p0001 A81-10096
The performance of slotted blades in cascade
p0002 A81-10632
Low-speed airfoil section research at Delft University of Technology
p0010 A81-11636
Design and tests of an helicopter rotor blade with evolutive profile
[ONERA, TP NO. 1980-125] p0011 A81-11638
Calculation of separated viscous flows on wing profiles by a coupling approach
[ONERA, TP NO. 1980-122] p0017 A81-11920
Linear vortex theories of a profile and wing with air intake
p0019 A81-12703
Sound generation by vortex shedding from a profile within a channel
p0054 A81-13570
Design and analysis of slat systems in transonic flow
p0058 A81-14392
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796
Variational principles and generalized variational principles for the hybrid aerodynamic problem of airfoil cascades on an arbitrary stream sheet of revolution
p0107 A81-17741
Second order approximation theory of an arbitrary aerofoil in incompressible potential flow
p0108 A81-17803
Aerodynamic calculations and design of subcritical aerofoils
p0106 A81-17804
Reduction of profile drag by blowing out through peg holes in areas of streamline separation bubbles
[DGLR PAPER 80-103] p0120 A81-19392

Experimental investigation of a right angle wing
with partially separated flow with and without
ground effects
[DGLR PAPER 80-111] p0120 A81-19397
Adaptive airfoils and wings for efficient
transonic flight
p0153 A81-20349
Viscous-inviscid interaction on oscillating
airfoils in subsonic flow
[AIAA PAPER 81-0051] p0159 A81-20567
Prediction and experimental verification of
transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568
Extraction of wavedrag from airfoil wake
measurements
[AIAA PAPER 81-0291] p0164 A81-20732
Computer simulation of airfoil icing without runback
[AIAA PAPER 81-0402] p0167 A81-20809
An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810
Icing tunnel tests of a glycol-exuding porous
leading edge ice protection system on a general
aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20837
A discrete vortex method for the non-steady
separated flow over an airfoil
p0179 A81-22566
Calculation of nonlinear compressibility effects
of airfoils in subcritical conditions
p0225 A81-23853
The problem of the unsteady hypersonic flow past a
plane profile
p0231 A81-24730
Plane transonic solution with shock by direct
iteration
p0231 A81-24814
Recent developments in integral equation method in
transonic flow
p0234 A81-25384
Unsteady Newton-Busemann flow theory. I - Airfoils
p0234 A81-25512
Calculation of flow with variable specific heat
around a profile
p0235 A81-25689
A mathematical computer simulation of stationary
and nonstationary flow of an ideal
incompressible fluid around solid profiles and
arrays
p0237 A81-26045
Generation of vortex noise in flow past a profile
in a channel
p0238 A81-26134
Design considerations of advanced supercritical
low drag suction airfoils
p0240 A81-26514
Coupled bending-torsion vibrations of rotating
blades of asymmetric aerofoil cross section with
allowance for shear deflection and rotary
inertia by use of the Reissner method
p0289 A81-28942
A method for obtaining shockless transonic flows
past two-dimensional airfoils whose profiles are
partially modified from a given arbitrary profile
p0298 A81-29201
Semi-inverse method of computation in inviscid
transonic flows - Application to the design of
turbomachines blades profiles
[ASME PAPER 81-GT-206] p0318 A81-30096
On the design of modern airfoil sections by
numerical methods
p0347 A81-30705
Approximations and short cuts based on generalized
functions
p0347 A81-30730
New interpretations in the theory of viscous
incompressible fluid flow past airfoil profiles
p0349 A81-31044
Concerning Khristianovich's transformation of a
subsonic flow past an airfoil into a low-speed
flow
p0349 A81-31045
Fluid mechanics mechanisms in the stall process of
airfoils for helicopters
p0360 A81-32779
On St. Venant flexure and torsion problem for
symmetrical airfoil sections
p0365 A81-33245
Experimental study of the separation at the
trailing edge of an axisymmetrical contoured
after-body
p0365 A81-33281
A new method of airfoil flutter control
p0367 A81-33844
Inspection of turbine blades using computer aided
laser technology
[SAE PAPER 801173] p0400 A81-34187
The influence of surface roughness on boundary
layer flow and separation at transonic speeds
p0413 A81-36468
A TRANSONIC Navier-Stokes solver --- for two
dimensional flow about arbitrary airfoil sections
[AIAA PAPER 81-1195] p0454 A81-38077
Application of unsteady airfoil theory to rotary
wings
p0465 A81-39874
Propfan progress
p0480 A81-40459
Aerodynamic characteristics of an advanced
technology propeller for commuter aircraft
[AIAA PAPER 81-1565] p0507 A81-40948
Evolution of transport wings - From C-130, C-141,
and C-5 to C-XX
p0510 A81-41333
Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740
Synthesis of test results obtained with Concorde
at high incidences
[AAAF-NT-80-26] p0077 N81-12079
Rotor redesign for a highly loaded 1800 ft/sec tip
speed fan, 2
[NASA-CR-159879] p0078 N81-12087
Wind-tunnel test of an articulated helicopter
rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13918
Experimental study of the separation at the
trailing edge of an axisymmetrical contoured
after-body
p0255 N81-18257
Design of turbine cascades with transitional
profile boundary layers
p0278 N81-19456
Integral equation methods for multi-element
airfoil analysis and design --- including flap
configurations
[NLR-MP-79020-U] p0330 N81-21038
Pressure distribution computation on a nonlifting
symmetrical helicopter blade in forward flight
p0447 N81-26010
Recent darrieus Vertical-Axis Wind Turbine
aerodynamical experiments at Sandia National
Laboratories
[SAND-81-1108C] p0588 N81-30615

AIRFOIL SECTIONS
U AIRFOIL PROFILES
AIRFOIL THICKNESS
U AIRFOIL PROFILES
AIRFOILS
NT AERIAL RUDDERS
NT AILERONS
NT ARROW WINGS
NT BEARINGLESS ROTORS
NT CAMBERED WINGS
NT CIRCULATION CONTROL AIRFOILS
NT CRUCIFORM WINGS
NT DELTA WINGS
NT DROOPED AIRFOILS
NT ELEVATORS (CONTROL SURFACES)
NT ELEVONS
NT EXTERNALLY BLOWN FLAPS
NT FIXED WINGS
NT FLAPS (CONTROL SURFACES)
NT FLEXIBLE WINGS
NT GAW-2 AIRFOIL
NT HORIZONTAL TAIL SURFACES
NT INFINITE SPAN WINGS
NT JET FLAPS
NT LAMINAR FLOW AIRFOILS
NT LEADING EDGE SLATS
NT LIFTING ROTORS
NT LOW ASPECT RATIO WINGS
NT OBLIQUE WINGS
NT PROPELLER BLADES
NT RECTANGULAR WINGS
NT RIGID ROTORS
NT RIGID WINGS
NT ROTARY WINGS
NT SLENDER WINGS
NT SPOILERS

NT SUPERCRITICAL WINGS
NT SUPERSONIC AIRFOILS
NT SWEPT FORWARD WINGS
NT SWEPT WINGS
NT SWEPTBACK WINGS
NT TABS (CONTROL SURFACES)
NT THIN AIRFOILS
NT THIN WINGS
NT TIP DRIVEN ROTORS
NT TRAILING-EDGE FLAPS
NT TRAPEZOIDAL WINGS
NT TWISTED WINGS
NT UPPER SURFACE BLOWN FLAPS
NT VARIABLE SWEEP WINGS
NT WING FLAPS
NT WINGS

The aerodynamic characteristics of some new RAE blade sections, and their potential influence on rotor performance
p0004 A81-10769

Flow computation around multi-element airfoils in viscous transonic flow
p0011 A81-11641

Harmonically oscillating airfoil in transonic stream of air
p0054 A81-13753

Turbine airfoil coating refurbishment
[AIME PAPER P79-10] p0059 A81-14770

A simplified theory of oscillating aerofoils in transonic flow - Review and extension
p0060 A81-14945

The numerical solution of incompressible turbulent flow over airfoils
[AIAA PAPER 81-0047] p0158 A81-20563

Higher-accuracy finite-difference schemes for transonic airfoil flowfield calculations
[AIAA PAPER 81-0381] p0166 A81-20794

The effect of heavy rain on windshear attributed accidents
[AIAA PAPER 81-0390] p0167 A81-20800

Effect of rear stagnation point position and trailing edge bluntness on airfoil characteristics
p0170 A81-21013

New approach to the solution of large, full matrix equations --- Neumann problem for inviscid incompressible flow past airfoils
p0171 A81-21552

Modification of wing sections to optimize transonic performance
p0226 A81-24011

Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0238 A81-26503

Transonic maneuver/cruise airfoil design employing active diffusion control
p0239 A81-26511

Low drag airfoil design utilizing passive laminar flow and coupled diffusion control
p0239 A81-26512

Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
p0354 A81-31612

Role of laminar separation bubbles in airfoil leading-edge stalls
p0354 A81-31613

Measurement of derivatives for an oscillating airfoil with flap
p0411 A81-35635

Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations
[AIAA PAPER 81-1239] p0454 A81-38096

Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel
[AIAA PAPER 81-1062] p0459 A81-39074

General aviation propeller noise reduction - Penalties and potential
[SAE PAPER 810585] p0520 A81-42746

Summary of high-lift and control surface research on NASA general aviation airfoils
[SAE PAPER 810629] p0524 A81-42781

A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017

Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492

The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12038

Numerical study of transonic flutter of a two dimensional airfoil
[NAL-TR-617T] p0090 N81-13023

Results of oscillatory pitch and ramp tests on the NACA 0012 blade section
[ARA-MEMO-220] p0090 N81-13024

Unsteady pressure distributions on airfoils in cascade
[AD-A091173] p0090 N81-13033

A computer program for the design and analysis of low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921

Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077

Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade
[NASA-CR-165166] p0140 N81-14976

A method for obtaining shockless transonic flows past airfoils, partially modified from a given arbitrary airfoil
[NAL-TR-602T] p0141 N81-14983

Effect of wing location and strakes on stability and control characteristics of a monoplanar circular missile with low-profile tail fins at supersonic speeds
[NASA-TM-81878] p0186 N81-15978

Design of advanced technology transonic airfoils and wings
p0187 N81-16000

The tale of two wings
p0188 N81-16004

Jet wing interaction to give improved combat performance
p0188 N81-16007

Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AD-A093970] p0203 N81-16983

Supercritical flow past symmetrical airfoils
[AD-A093300] p0203 N81-16984

An approximate factorization solution of the Navier-Stokes equations for transonic flow using body-fitted coordinates with application to NACA 64A010 airfoils
p0249 N81-18024

Transonic flow studies
[NASA-CR-163965] p0249 N81-18029

Predicted and experimental steady and unsteady transonic flows about a biconvex airfoil
[NASA-TM-81262] p0258 N81-18742

Separation behavior of boundary layers on three-dimensional wings
[NASA-TM-75077] p0262 N81-19027

The phenomenon of dynamic stall --- vortex shedding phenomenon on oscillating airfoils
[NASA-TM-81264] p0329 N81-20029

A panel method to determine loads on oscillating airfoils in transonic flow with embedded shock waves
[NLR-MP-80005-U] p0330 N81-20039

Low and high speed propellers for general aviation: Performance potential and recent wind tunnel test results
[NASA-TM-81745] p0338 N81-21028

On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042

Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section --- transonic self-streamlining wind tunnel
[NASA-CR-165685] p0343 N81-21087

Two-dimensional aerodynamic characteristics of the NACA 0012 airfoil in the Langley 8 foot transonic pressure tunnel
[NASA-TM-81927] p0385 N81-23036

Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053

Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels
p0386 N81-23056

Mean-flow and turbulence measurements in the vicinity of the trailing edge of an NACA (63 sub

1)-012 airfoil
[NASA-TP-1845] p0392 N81-23410
Canadian studies of wind tunnel corrections for
high angle of attack models
p0435 N81-24121
Icing tunnel tests of a glycol-exuding porous
leading edge ice protection system on a general
aviation airfoil
[NASA-CR-164377] p0439 N81-25041
Energy efficient engine, low-pressure turbine
boundary layer program
[NASA-CR-165338] p0442 N81-25077
Turbulent interactions on airfoils at transonic
speeds: Recent developments
p0483 N81-26047
Final design and fabrication of an active control
system for flutter suppression on a
supercritical aeroelastic research wing
[NASA-CR-165714] p0498 N81-27114
Wind-tunnel evaluation of NASA developed control
laws for flutter suppression on a DC-10
derivative wing
[NASA-TM-83143] p0499 N81-27548
Flutter analysis fo two-dimensional and
two-degree-of-freedom MBB A-3, CAST 7, an TF-8A
supercritical airfoils in small-disturbance
unsteady transonic flow
[AD-A100334] p0540 N81-28104
Some applications of aerodynamic formulations to
problems in aircraft dynamics
p0592 N81-31121
High lift technology
p0593 N81-31147
Automated Plasma Spray (APS) process feasibility
study
[NASA-CR-165418] p0597 N81-31193
Improving turbine engine compressor performance
retention through airfoil coatings
p0598 N81-31203
On the spanwise uniformity of wind tunnel test
data of transonic airfoils
[NAL-TR-665] p0627 N81-32118

AIRFRAME MATERIALS

Flight simulation environmental fatigue crack
propagation in 2024-T3 and 7475-T761 aluminium
p0013 A81-11657
Operational durability of airframe structures
p0014 A81-11662
Inspection methods for various critical steel
parts for airframes
p0052 A81-13331
The certification of composite airframe structures
p0283 A81-27887
Fatigue strength of certain materials used in
airframe construction --- glass-plastic
reinforced epoxy resin
p0285 A81-28108
Design, fabrication and test of a complex
helicopter airframe section
[SAE PAPER 801213] p0404 A81-34221
Industrial titanium alloys - Use and characteristics
p0416 A81-36653
The present and future applications of titanium
alloys - Airframes, helicopters, missiles
p0417 A81-36665
New structural technologies for future fighters
p0458 A81-38805
Advanced composite airframe program - Preliminary
design phase
[AHS 80-45] p0477 A81-40172
All composite helicopter airframe roof structure
[AHS 80-47] p0477 A81-40174
Titanium net shapes by a new technology. II -
F-18A parts evaluation
p0511 A81-41650
Late 80's advanced rotary wing aircraft potential
based on ATDE, ACAP, and ITR --- Advanced
Technology Demonstrator Engine, Advanced
Composite Airframe Program and Integrated
Technology Rotor
p0580 A81-46612
Cast Aluminum Structures Technology (CAST).
Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152
Exploratory study of hazard mitigation and
research in the air transport system
[AD-A089204] p0033 N81-11021
Air Force technical objective document FY 1981
[AD-A089709] p0048 N81-12010
Developments in aircraft structural materials
[BLR-BP-79042-U] p0077 N81-12081
Testing of composite structures
[AAAF-NT-79-41] p0083 N81-12181
Environmental exposure effects on composite
materials for commercial aircraft
[NASA-CR-165649] p0198 N81-16139
Supersonic Cruise Research 1979, part 2 ---
airframe structures and materials, systems
integration, economic analysis
[NASA-CP-2108-PT-2] p0246 N81-18005
Structural concept trends for commercial
supersonic cruise aircraft design
p0246 N81-18006
Opportunities for structural improvements for an
advanced supersonic transport vehicle
p0246 N81-18007
An assessment of buffer strips for improving
damage tolerance
p0247 N81-18009
Evaluation of high-temperature structural
adhesives for extended service
p0247 N81-18010
Aircraft wing weight build-up methodology with
modification for materials and construction
techniques
[NASA-CR-166173] p0387 N81-23068
Thirty years experience with primary adhesive
bonded structures --- aircraft construction
[FOK-BO-1240] p0541 N81-28189
Anti-symmetric elastic properties of composite
plates of satin weave cloth
[NAL-TR-649T] p0639 N81-33230

AIRFRAMES

Determination if fiber-optic immunity is adequate
for deployment in the V/STOL airframe --- to
compensate nonmetallic material RF transparency
p0057 A81-14265
Review of engine/airframe/drive train dynamic
interface development problems
p0106 A81-17516
Engine-airframe transient compatibility - Analysis
and test
p0106 A81-17517
Automatization of the adhesion process for
supporting airframe parts in light contour systems
p0118 A81-19297
A look at comprehensive engine/airframe
integration for high performance aircraft
p0298 A81-29118
Optimality criterion techniques applied to frames
having nonlinear cross-sectional properties
[AIAA 81-0552] p0301 A81-29402
Classification of links of assembly units with
respect to the character of their connections,
and calculation of the accuracy of their execution
--- in airframe construction
p0319 A81-30168
The structural weight fraction - Revisited for
fighter/attack type aircraft
[SAWE PAPER 1365] p0353 A81-31387
ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ ---
Integrated Computer Aided Manufacturing for
aircraft systems
[AIAA PAPER 81-0855] p0408 A81-34353
New method for cast superalloy frames - Segmented
mold and HIP utilized
p0408 A81-34693
A new lightweight fighter
p0410 A81-35025
Trailing-edge airframe noise source studies on
aircraft wings
[AIAA PAPER 80-0976] p0411 A81-35634
Effect of post buckling on the fatigue of
composite structures
p0418 A81-37127
Coupled rotor/airframe vibration analysis by a
combined harmonic-balance, impedance-matching
method
[AHS 80-21] p0474 A81-40151
Aeroelastic stability analysis of hingeless rotor
helicopters in forward flight using blade and
airframe normal modes
[AHS 80-24] p0475 A81-40154
AMX - Italo-Brazilian bantam battler
p0518 A81-42830
Determination of crash test pulses and their
application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767

Crashworthy design concepts for airframe structures of light aircraft
[SAE PAPER 810513] p0522 A81-42769
Investigation of landing gear alternatives for high performance aircraft
[AIAA PAPER 81-1639] p0525 A81-43139
Concurrent superplastic forming/diffusion bonding of titanium airframe components
p0531 A81-43630
Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953
Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] p0619 A81-48626
The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] p0623 A81-49727
The use of parametric cost estimating relationships as they pertain to aircraft airframes: A new perspective
[AD-A089525] p0027 N81-10060
Bibliography on aerodynamics of airframe/engine integration of high-speed turbine-powered aircraft, volume 1
[NASA-TM-81814] p0035 N81-11032
Development of advanced interceptor substructural material --- graphite epoxy missile structures
[AD-A090127] p0038 N81-11116
The electrical effects of joints and bonds in carbon fiber composites
p0199 N81-16153
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045
Application of a structural optimization procedure for advanced wings
[AGARD-R-691] p0333 N81-20064
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041
Airframe noise of a small model transport aircraft and scaling effects --- Boeing 747
[NASA-TP-1858] p0380 N81-22832
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
Technical evaluation report on the Fluid Dynamic Panel Symposium on Subsonic/Transonic Configuration/Aerodynamics
[AGARD-AR-146] p0392 N81-23431
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23438
A cost function for military airframes
[AD-A097538] p0394 N81-23966
A cost function for an airframe production program
[AD-A097540] p0394 N81-23967
Cooling system for high speed aircraft
[NASA-CASE-LAR-12406-1] p0485 N81-26114
Combat damage assessment
p0488 N81-26132
Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107
Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240
AIRLINE OPERATIONS
Methods of fuel conservation in civil aviation. I
p0005 A81-11322
Fuel saving methods in civil aviation. II
p0059 A81-14755
The future ATC system as influenced by advanced avionics
p0100 A81-16586
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0101 A81-17044
Productivity - The challenge of aircraft and engine maintenance
p0102 A81-17045
An overview - 1980 generation avionic developments
p0111 A81-18061
Application of trajectory optimization principles to minimize aircraft operating costs
p0155 A81-20466
Analysis of wind vector components in the lower troposphere Applications to aircraft operations at terminals
[AIAA PAPER 81-0307] p0167 A81-20799
Economics of technological change - A joint model for the aircraft and airline industries
p0169 A81-21010
Flight companies present new aircraft - Boeing 737-200 advanced --- aircraft characteristics and airline selection procedures
p0171 A81-21575
Landings according to CAT II
p0230 A81-24523
The automated transport process management system of INTERFLUG /PRIKAS/
p0288 A81-28744
Airliner maintenance for fuel efficiency
[AIAA PAPER 81-0787] p0367 A81-33877
Fuel conservation integrated into airline economics
[AIAA PAPER 81-0831] p0368 A81-33884
The role of the turboprop in the air transportation system for the 1980's and onward
[SAE PAPER 801197] p0402 A81-34207
Rebuild of aircraft ground support equipment
[SAE PAPER 801238] p0406 A81-34236
The domain of the turboprop airplane
[SAE PAPER 801242] p0406 A81-34238
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0420 A81-37416
The 146 emerges from the shadows
p0560 A81-44474
The roles of airline engineering and maintenance in 1981 --- summary for 26 January 1981 conference of ATLAS group
p0565 A81-45755
Airport catchment areas and air passenger demand --- econometric models for air travel
p0571 A81-46575
Hourly airport activity profiles: 30 Airports by user, 3 airports by user and equipment type, selected days in June, July and August, 1978
[AD-A089450] p0024 N81-10031
A new method for estimating transport aircraft direct operating costs
p0046 N81-11915
Aviation safety
[GPO-68-717] p0073 N81-12040
Commuter airport safety
[GPO-60-512] p0073 N81-12041
Aircraft maintenance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0859/3] p0125 N81-13917
Commuter airline safety
[PB81-104267] p0141 N81-14988
Concorde with the airlines --- operating costs and performance
p0247 N81-18013
Supersonic market and economic analyses
p0248 N81-18020
SRDS Technical Program document. Fiscal year 1981. Research and Development approved projects
[AD-A096293] p0339 N81-21050
Investigation of air transportation technology at Massachusetts Institute of Technology, 1980
p0371 N81-22000
Aviation safety: Hazardous materials handling
[GPO-69-199] p0439 N81-25049
Airport activity statistics of certificated route air carriers
[AD-A102355] p0602 N81-31236
AIRPLANE PRODUCTION COSTS
GASP- General Aviation Synthesis Program. Volume 7: Economics. Part 1: Theoretical development
[NASA-CR-152303-VOL-7-PT-1] p0271 N81-19094
AIRPORT BEACONS
NT DISCRETE ADDRESS BEACON SYSTEM
AIRPORT LIGHTS
NT RUNWAY LIGHTS

Energy-saving ramp lighting with high-pressure sodium lamps
p0056 A81-14243
Airport visual approach, guidance and landing systems - Airline pilots viewpoint
p0114 A81-18083
Lighting systems for flight support --- Russian book
p0564 A81-45602

AIRPORT PLANNING

Airfield pavement demonstration-validation study
p0003 A81-10716
Atlanta's new central passenger terminal complex
p0003 A81-10719
Reduction of the take-off ground run distance to a given set of atmospheric condition
p0010 A81-11634
Prediction of changes in aircraft noise exposure
p0017 A81-11820
The outfitting of regional airports in the future with radio assistance for approach and landing, with emphasic on landing site obstacles for general aviation
p0051 A81-13313
Developing an emergency medical disaster plan for an airport
p0053 A81-13513
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison
p0054 A81-13515
Airspace analysis in airport system planning
p0111 A81-18052
Introduction to a rigid pavement design procedure
p0111 A81-18054
Micro-wave landing system - An operational point of view
p0111 A81-18055
The introduction of STOL and RNAV to large commercial operations
p0111 A81-18057
New major U.S. airports - Capacity considerations
p0111 A81-18060
Community participation in airport planning
p0112 A81-18067
A new perspective in aviation systems planning
p0112 A81-18069
Canada's national aviation forecasting models
p0112 A81-18072
The federal role in airport noise control planning
p0113 A81-18073
Fully bonded concrete overlay for an airport runway
p0113 A81-18075
Investment decision-making in international airports
p0113 A81-18079
Increasing capacity with computer-assisted decision making --- airport planning
p0113 A81-18080
Design of the new Tehran International Airport
p0114 A81-18083
Modeling of the terminal area Air Traffic Management and Control
p0114 A81-18085
Airspace simulation in airport system planning
p0114 A81-18086
The importance of 'Interim Standard Microwave Landing System' for small community airports
p0114 A81-18087
Airport/environs plan making - Managing the planning process
p0114 A81-18088
Runway Configuration Management System concepts
p0114 A81-18089
Traffic forecasting for the NRIA --- New Riyadh International Airport
p0114 A81-18090
Environmental aspects of airport planning
p0115 A81-18091
Saudi Arabia's new Gateway Airports
p0115 A81-18093
Air traffic simulation as a validation tool
p0172 A81-21718
Maximizing the capacity of a single-runway airport
p0177 A81-22193
Wire communication systems and equipment at airports --- Russian book
p0289 A81-28745
Application of endfire arrays at contemporary glide-slope problem sites
p0360 A81-32695
An aircraft manufacturer's view of airport R&D needs
[AIAA PAPER 81-0793] p0368 A81-33887
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890
Airport capacity enhancement by innovative use of runway geometry
[AIAA PAPER 81-0801] p0368 A81-33891
Aircraft noise and land use compatibility tradeoff analyses
p0569 A81-46370
Airport Noise Control and Land Use Compatibility Studies A U.S. case
p0570 A81-46372
A long range research programme of noise abatement at the airport of Beograd and its practical results
p0570 A81-46373
Simulation model to evaluate maintenance strategies for large network of fielded systems
p0613 A81-48609
ATARS implementation tradeoff
[AD-A089977] p0038 N81-11026
Southern California aviation system study
[PB80-215544] p0125 N81-13916
A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032
Airport and airway system development act of 1981
[GPO-75-804] p0601 N81-31231
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] p0639 N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] p0639 N81-33217

AIRPORT SURFACE DETECTION EQUIPMENT

A supplementary EMC analysis of the proposed Airport Surface Detection Equipment (ASDE-3) radar
[AD-A092965] p0219 N81-17342
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042
Detection performance evaluation of the ASDE-3 using fixed frequency and frequencyagile operation
[AD-A099513] p0499 N81-27372

AIRPORT TOWERS

New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0038 N81-11025
Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0042 N81-11290
Consolidated car display: A summary report of the process and the results of the consolidation of critical and supplementary terminal area air traffic control information for display presentation
[AD-A092850] p0193 N81-16034
Air traffic control simulation models. Citations from the NTIS data base
[PB81-900104] p0207 N81-17037
Consolidated Cab Display (CCD) System, Project Planning Document (PPD)
[AD-A098651] p0440 N81-25056
New tower cab mockup for Philadelphia, Pennsylvania
[AD-A098528] p0440 N81-25060

AIRPORTS

NT HELIPORTS

Community response to noise from a general aviation airport
p0017 A81-11821
General aviation considerations on bad weather approaches at regional airports
p0052 A81-13315
Medical coordination in airport disasters
p0053 A81-13512
Carrier system simplifies freight handling - A new technical concept for Lufthansa's Frankfurt facility
p0056 A81-14241
International Air Transportation Conference, New Orleans, La., April 30-May 3, 1979, Proceedings. Volumes 1 & 2
p0110 A81-18051
Non-destructive pavement evaluation
p0111 A81-18062

Prestressed concrete airfield pavements
p0112 A81-18063
Runway rehabilitation, Washington National Airport
p0112 A81-18066
UK pavement design and evaluation - A new approach
p0113 A81-18076
Experimental investigation of orographic waves and
vertical motions in the Krasnovodsk airport area
p0121 A81-19441
Aircraft pollution in the vicinity of airports
[AIAA PAPER 81-0309] p0164 A81-20743
New definition of areas of protection for
instrument landing
p0225 A81-23069
An observational experiment using a monostatic
sodar at the airport of Fiumicino
p0282 A81-27548
Federal policies affecting airport noise
compatibility programs
[AIAA PAPER 81-0829] p0367 A81-33879
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
Wind shear detection - Automatic alerting system
for airport applications
p0412 A81-35771
Simulation model validation - Airport applications
p0461 A81-39320
Airports and earthquakes - An important subject
often ignored
p0482 A81-40750
The influence of aircraft operations on air
quality at airports
p0553 A81-44074
Integrated noise model - The Federal Aviation
Administration's computer program for predicting
noise exposure around an airport
p0568 A81-46354
Airport noise control in the 1980s - FAA's plans
and policies
p0568 A81-46355
Model for airport noise exposure on a national
basis - 1960 to 2000
p0568 A81-46363
Noise control at general aviation airports
p0569 A81-46366
Airport noise contour predictions - Improving
their accuracy
p0569 A81-46367
Optimizing complex runway use programs for airport
noise abatement
p0569 A81-46369
The impact and future direction of aircraft noise
certification
p0570 A81-46377
Determination of cargo container inventories
through logistics simulation --- for air shipment
p0616 A81-48380
Unrepresentative temperatures at a first-order
meteorological station Washington National Airport
p0622 A81-48847
NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021
Hourly airport activity profiles: 30 Airports by
user, 3 airports by user and equipment type,
selected days in June, July and August, 1978
[AD-A089450] p0024 N81-10031
Analysis of potentially correctable landing delays
at Atlanta
[AD-A089408] p0024 N81-10032
Airfield pavement evaluation. Citations from the
NTIS data base
[PB80-812869] p0030 N81-10083
Annoyance from light aircraft investigation
carried out around four airports near Paris
[NASA-TM-75823] p0032 N81-10577
Airport activity statistics of certificated route
air carriers, calendar year 1979
[AD-A089748] p0034 N81-11023
Commuter airport safety
[GPO-60-512] p0073 N81-12041
The implications of alternative aviation fuels on
airbase air quality
[AD-A090283] p0067 N81-12652
Airport noise. Citations from the NTIS data base
[PB80-813231] p0088 N81-12667
Airport Crash/Fire/Rescue CFR service cost and
benefit analysis. Volume 2: Appendixes
[AD-A091155] p0094 N81-13069
Impact of aircraft emissions on air quality in the
vicinity of airports. Volume 2: An updated
model assessment of aircraft generated air
pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
Statistical relationship between median visibility
and conditions of worstcase manmade impact on
visibility
[LA-UR-80-2485] p0135 N81-14550
Applicated techniques for the control of approach
traffic
[DFVLR-MITT-79-20] p0142 N81-14992
The annoyance caused by noise around airports
[NASA-TM-75784] p0146 N81-15579
Aircraft annoyance evaluations using field and
laboratory simulation techniques
[UTIAS-248] p0146 N81-15580
The need for airport noise monitoring systems.
Their uses, and value in promoting civil aviation
[AD-A092240] p0201 N81-16627
Impact of aircraft emissions on air quality in the
vicinity of airports. Volume 1: Recent airport
measurement programs, data analyses, and
submodel development
[AD-A089962] p0201 N81-16628
A guidance document on airport noise control
[AD-A092228] p0202 N81-16629
An airport wind shear detection and warning system
using Doppler radar: A feasibility study
[NASA-CR-3379] p0202 N81-16681
Automated pilot advisory system test and
evaluation at Manassas Municipal Airport
p0264 N81-19040
Antenna design and development for the microwave
subsystem experiments for the terminal
configured vehicle project
[NASA-CR-164220] p0378 N81-22282
Annoyance caused by light aircraft noise
[NASA-TM-76533] p0379 N81-22589
The annoyance caused by airplane noise in the
vicinity of Orly Airport and the reaction of
neighboring residents
[NASA-TM-76575] p0379 N81-22590
The effect of airplane noise on the inhabitants of
areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22593
The relationship between noise and annoyance
around Orly
[NASA-TM-76573] p0379 N81-22594
An airport community noise-impact assessment model
[NASA-TM-80198] p0393 N81-23713
Continued research on selected parameters to
minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602
A slot allocation model for high-density airports
[AD-A098097] p0438 N81-24846
Airport noise impact reduction through operations
[NASA-TM-81970] p0438 N81-24855
NOISEMAP: The USAF'S computer program for
predicting noise exposure around an airport
[AD-A094264] p0446 N81-25578
Terminal Forecast Reference Notebook (TFRN) for
George AFB, California
[AD-A098438] p0446 N81-25637
Terminal Forecast Reference Notebook (TFRN) for
Luke AFB, Arizona
[AD-A098445] p0446 N81-25638
Airport activity statistics of certificated route
air carriers
[AD-A102355] p0602 N81-31236
Water-compatible polymer concrete materials for
use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273
AIRSHIPS
NT HEAVY LIFT AIRSHIPS
Airships - Transport of the future
p0355 A81-31699
MATASS/LAMPS MK III --- Moored Airship Towed Array
Sonar System/Light Airborne Multipurpose System
[AIAA 81-1309] p0455 A81-38527
Coast Guard airship development
[AIAA 81-1311] p0455 A81-38528
Twin-rotor patrol airship flying model
[AIAA 81-1312] p0456 A81-38529
LTA developments in Great Britain
[AIAA 81-1321] p0456 A81-38532
Airship survivability in atmospheric turbulence
[AIAA 81-1323] p0456 A81-38533

The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-38534
Predictive steering control of dirigibles using the switching curve approach
[AIAA 81-1327] p0456 A81-38535
Bulkheads in airships
[AIAA 81-1328] p0456 A81-38536
Design and development of a thermal airship
[AIAA 81-1330] p0456 A81-38537
Quasi-hybrid airships
[AIAA 81-1333] p0456 A81-38538
Low cost start-up for rigid-pressure airship
[AIAA 81-1337] p0457 A81-38541
Aerodynamic estimation techniques for aerostats and airships
[AIAA 81-1339] p0457 A81-38542
Prospects for the employment of dirigibles in the 1980s
p0565 A81-45763
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270] p0248 N81-18023
Vehicle concepts and technology requirements for buoyant heavy-lift systems
[NASA-TP-1921] p0596 N81-31185

AIRSPACE
Airspace analysis in airport system planning
p0111 A81-18052
The use of airspace - One way to save fuel
p0364 A81-33150
Study of heliport airspace and real estate requirements
[AD-A091156] p0095 N81-13072
The FAA plans and programs for the future airport and air traffic control system
[AD-A100370] p0537 N81-28077
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] p0630 N81-32158

AIRSPEED
A method of helicopter low airspeed estimation based on measurement of control parameters
[MBB-UD-276-79-O] p0018 A81-12094
An airspeed vector sensor for V/STOL aircraft
[AIAA 80-1938] p0052 A81-13364
Optimization of airplane time to reach a given flight altitude and speed
p0235 A81-25685
Measurement of aircraft speed and altitude --- Book
p0357 A81-32401
The problem of the minimum-time turn of a maneuverable aircraft velocity vector to a specified course angle
p0413 A81-36472
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
p0470 A81-40111
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] p0609 A81-47595
Effects on inlet technology on cruise speed selection
p0245 N81-17998
Wind shear systems implementation plan, benefit/cost study
[AD-A094168] p0253 N81-18055
Low-range airspeed sensors
[AD-A096359] p0342 N81-21076
Dead reckoner navigation project
p0372 N81-22010
Laser Doppler airspeed and altitude sensor
[AD-A096980] p0375 N81-22049
Groundspeed/airspeed differences as a wind shear indicator and flight evaluation of a DME-derived system to determine groundspeed
[AD-A097566] p0393 N81-23768
Subsonic tests of an all-flush-pressure-orifice air data system
[NASA-TP-1871] p0489 N81-26144
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters --- hingeless rotor helicopters
[MBB-UD-306/80-OE] p0584 N81-30139
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] p0630 N81-33204

AIRWORTHINESS
U AIRCRAFT RELIABILITY

AIRWORTHINESS REQUIREMENTS
U AIRCRAFT RELIABILITY

ALARMS
U WARNING SYSTEMS

ALCOHOLS
NT GLYCOLS
Modified Brayton cycles utilizing alcohol fuels
[ASME PAPER 81-GT-103] p0315 A81-30009
Alternative aircraft fuels - When will the action start
p0465 A81-39981

ALGEBRA
NT EIGENVALUES
NT LINEAR EQUATIONS
NT MATRICES (MATHEMATICS)
NT NONLINEAR EQUATIONS
NT POLYNOMIALS
NT STATE VECTORS
NT STIFFNESS MATRIX
NT TENSORS
NT VECTOR SPACES
NT VORTICITY

ALGORITHMS
Radar target detection and map-matching algorithm studies
p0005 A81-11158
Discrete-continuous variable structural synthesis using dual methods
p0066 A81-15894
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0154 A81-20448
Efficiency of the methods and algorithms used for estimating the reliability in aviation techniques
p0365 A81-33173
Performance seeking controls
p0079 N81-12092
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039
Geometric methods in computational fluid dynamics --- turbomachinery
p0256 N81-18331
Model reference adaptive control for multi-input multi-output systems
p0258 N81-18698
Generation of optimum vertical profiles for an advanced flight management system
[NASA-CR-165674] p0331 N81-20051
F-8C adaptive control law refinement and software development
[NASA-CR-163093] p0377 N81-22059
Relationships for a flight performance computer
p0382 N81-23018
PACER LIME: An environmental corrosion severity classification system, part 1
[AD-A100496] p0539 N81-28089
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116

ALIGNMENT
NT SELF ALIGNMENT
Alignment of a navigation and attack system for the alpha jet aircraft
p0544 N81-29070

ALIPHATIC COMPOUNDS
NT GLYCOLS
NT HYDRAZINES
NT METHANE
NT URETHANES

ALKALI METALS
NT SODIUM VAPOR

ALKANES
NT METHANE

ALL-WEATHER AIR NAVIGATION
Problems of flight mechanics involved in all-weather helicopter operation
p0104 A81-17467
Sukhoi's pivotal interdictor
p0109 A81-17832
Helicopters - Help for the all weather terminal
p0112 A81-18065
Critical analysis and modern approaches to integrated system aircraft
p0227 A81-24059

Back to basics - The philosophy adopted for the flight testing of the Panavia Tornado avionics system in back aircraft
p0262 A81-27881

Commercial rotorcraft automatic controls - The next generation
p0470 A81-40113

Ten years activity in the area of flight control for helicopters at night and in bad weather
[DGLR PAPER 81-064] p0611 A81-47620

Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches
[AD-A094073] p0251 N81-18042

Controls and displays for all-weather operation of helicopters
p0633 N81-33145

ALL-WEATHER LANDING SYSTEMS

General aviation considerations on bad weather approaches at regional airports
p0052 A81-13315

Flight instrumentation requirements for all-weather approach and landing
p0111 A81-10059

ALLOYS

NT ALUMINUM ALLOYS
NT BEARING ALLOYS
NT CARBON STEELS
NT CAST ALLOYS
NT CHROMIUM STEELS
NT COBALT ALLOYS
NT HEAT RESISTANT ALLOYS
NT HIGH STRENGTH ALLOYS
NT HIGH STRENGTH STEELS
NT MAGNESIUM ALLOYS
NT MARAGING STEELS
NT NICKEL ALLOYS
NT QUATERNARY ALLOYS
NT RENE 77
NT STEELS
NT TITANIUM ALLOYS
NT VANADIUM ALLOYS

ALMUCANTAR

U ELEVATION ANGLE

ALPHA JET AIRCRAFT

Planning for and evaluating the potential of a land based aircraft for carrier operations
p0122 A81-19470

Experimental-programme - Transonic wing-TST
p0457 A81-38804

New structural technologies for future fighters
p0458 A81-38805

Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] p0609 A81-47580

Alignment of a navigation and attack system for the alpha jet aircraft
p0544 N81-29070

ALTERATION

U REVISIONS

ALTERNATING CURRENT

Brushless cryogenic ac motors
p0002 A81-10468

ALTERNATING CURRENT GENERATORS

U AC GENERATORS

ALTERNATORS (GENERATORS)

U AC GENERATORS

ALTIMETERS

NT LASER ALTIMETERS
NT RADIO ALTIMETERS

Measurement of aircraft speed and altitude --- Book
p0357 A81-32401

How a pilot looks at altitude
p0265 N81-19047

ALTITUDE

NT FLIGHT ALTITUDE
NT HIGH ALTITUDE
NT LOW ALTITUDE

ALTITUDE TESTS

NT HIGH ALTITUDE TESTS

F100 multivariable control synthesis program: A review of full scale engine altitude tests --- F100 engine
p0079 N81-12093

ALUMINIZING

U ALUMINUM COATINGS

ALUMINUM

Cast Aluminum Structures Technology (CAST). Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152

Lightning protection considerations for graphite/epoxy aircraft structure
p0040 N81-11142

ALUMINUM ALLOYS

Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminium
p0013 A81-11657

Prediction methods for fatigue crack growth in aircraft material
p0118 A81-18777

Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3
p0172 A81-21739

Ductile fracture mechanic assessments of 2219-T851, 2024-T3 and 7075-T6 aluminum alloys
p0180 A81-22620

Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures
p0232 A81-24942

Tensile stress/strain characterization of non-linear materials
p0348 A81-30915

Thermomechanical behavior of a mechanically alloyed Al-4.0Mg powder alloy
p0409 A81-34851

Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures --- of Al alloys
p0516 A81-42356

Advanced aluminum metallic materials and processes for application to naval aircraft structures
p0531 A81-43637

Metallographic analysis techniques used during the Cast Aluminum Structures Technology /CAST/ program --- microstructure of aluminum cast alloy
p0531 A81-43650

Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum --- wing panels for transport aircraft
[NLR-MP-80003-U] p0043 N81-11415

Developments in aircraft structural materials
[NLR-MP-79042-U] p0077 N81-12081

Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum
[NLR-MP-80003-U] p0086 N81-12477

Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current
p0200 N81-16150

Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection --- suppressing combustion overpressure
[AD-A093542] p0208 N81-17046

Design and fabrication of a stringer stiffened discrete-tube actively cooled panel for a hypersonic aircraft
[NASA-CR-3403] p0279 N81-19484

Effects of geometric variables on rub characteristics of Ti-6Al-4V
[NASA-TP-1835] p0336 N81-20245

Service evaluation of aluminum-brazed titanium (ABTi) --- aircraft structures
[NASA-CR-3418] p0370 N81-22129

Fatigue life variability in aluminum alloy aircraft structures
[AD-A097198] p0391 N81-23249

Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489

Fatigue crack growth in 7475-T7651 material under flight simulation loading. Information from a Douglas report --- effect of transport/bomber loads spectrum on crack growth
[VTH-M-392] p0542 N81-28493

ALUMINUM BORON COMPOSITES

Boron aluminum blades and vanes
[AIAA PAPER 81-1359] p0502 A81-40840

Fabrication process development of boron/aluminum fan blades for high bypass engines
[NASA-CR-165252] p0442 N81-25076

ALUMINUM COATINGS

Mechanical properties of aluminum coatings on heat-resistant steels
p0355 A81-31668

A process for protecting gas turbine blade cooling passages against degradation
p0622 A81-49209
Aluminized coating study for retrofitting in-service slide materials
[AD-A094170] p0255 N81-18201
ALUMINUM COMPOUNDS
Turbine airfoil coating refurbishment
[AIME PAPER F79-10] p0059 A81-14770
AMBIT
U FIELD THEORY (PHYSICS)
AMMUNITION
High impulse gun airborne demonstration. GAU-13/A weapon, feed system, gun drive and electronic controls
[AD-A101698] p0582 N81-30120
AMPHIBIOUS AIRCRAFT
The aerodynamics of airfoil boats
p0065 A81-15705
AMPHIBIOUS VEHICLES
NT AMPHIBIOUS AIRCRAFT
Soviet military air cushion vehicles - Mechanized amphibious assault
p0577 A81-46714
Heave instabilities of amphibious air cushion suspension systems
[UTIAS-246] p0144 N81-15156
AMPLIFICATION
NT SOUND AMPLIFICATION
AMPLIFIER DESIGN
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122
AMPLIFIERS
NT FLUID AMPLIFIERS
NT MICROWAVE AMPLIFIERS
NT POWER AMPLIFIERS
NT TRANSISTOR AMPLIFIERS
AMPLITUDE MODULATION
Investigation of Wilcox model 585B very high frequency omnidirectional radio range system, part 2
[AD-A099525] p0494 N81-27073
ANALOG COMPUTERS
A digital-analog hybrid system and its application to the automatic flight control system simulation research
[NASA-TM-76457] p0377 N81-22060
ANALOG SIMULATION
From the civil component program 'IFAS': Fundamentals of engine simulation, using turbopowered simulator (TPS) technology in wind tunnel tests
[BMFT-FB-W-80-030] p0541 N81-28111
ANALOG TO DIGITAL CONVERTERS
Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests
[AD-A094124] p0250 N81-18037
ANALYSIS (MATHEMATICS)
NT APPROXIMATION
NT COMPUTATIONAL FLUID DYNAMICS
NT CONFORMAL MAPPING
NT DELTA FUNCTION
NT DIFFERENCE EQUATIONS
NT DIFFERENTIAL EQUATIONS
NT ERROR ANALYSIS
NT EXPONENTIAL FUNCTIONS
NT EXTREMUM VALUES
NT FACTORIALS
NT FINITE DIFFERENCE THEORY
NT FINITE ELEMENT METHOD
NT FOURIER ANALYSIS
NT FOURIER SERIES
NT FOURIER TRANSFORMATION
NT FUNCTIONAL ANALYSIS
NT GREEN FUNCTION
NT HARMONIC ANALYSIS
NT INTEGRAL EQUATIONS
NT KERNEL FUNCTIONS
NT LEAST SQUARES METHOD
NT LINEAR EQUATIONS
NT MEAN SQUARE VALUES
NT MONTE CARLO METHOD
NT NEUMANN PROBLEM
NT NEWTON-RAPHSON METHOD
NT NONHOLONOMIC EQUATIONS
NT NONLINEAR EQUATIONS
NT NUMERICAL ANALYSIS
NT NUMERICAL DIFFERENTIATION
NT NUMERICAL INTEGRATION
NT PADE APPROXIMATION
NT PARABOLIC DIFFERENTIAL EQUATIONS
NT PARTIAL DIFFERENTIAL EQUATIONS
NT SINGULAR INTEGRAL EQUATIONS
NT VECTOR ANALYSIS
NT VORTICITY
NT WEIGHTING FUNCTIONS
Unsteady three-dimensional subsonic flow in a solid propellant rocket motor including the effect of motor rotation
p0095 N81-13085
ANALYZERS
NT ENGINE ANALYZERS
ANATOMY
NT LIMBS (ANATOMY)
ANECHOIC CHAMBERS
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48628
Evaluation of RF anechoic chamber fire protection systems
[AD-A092470] p0197 N81-16070
An experimental investigation of a large delta P settling chamber for a supersonic pilot quiet tunnel
[NASA-CR-3436] p0434 N81-24112
ANEMOMETERS
NT LASER ANEMOMETERS
A low-level wind shear detection system
p0223 A81-23514
ANEMOMETRY
U VELOCITY MEASUREMENT
ANGLE OF ATTACK
Dynamic stability parameters at high angles of attack
p0009 A81-11628
Review of numerical methods for the problem of the supersonic flow around bodies at angle of attack
p0011 A81-11639
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Laminar boundary layer on swept-back wings of infinite span at an angle of attack
p0107 A81-17656
Characteristics of the velocity field near a wing-body combination located at an angle of attack to an oncoming supersonic flow
p0119 A81-19337
Hypersonic gas flow over a delta wing
p0123 A81-19632
Angle of attack - Its measurement and usage. I
p0149 A81-19799
Delta canard configuration at high angle of attack
p0154 A81-20351
Laser measurement of angle of attack on wind-tunnel models
p0154 A81-20419
Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack
[AIAA PAPER 81-0007] p0156 A81-20531
Wing-alone aerodynamic characteristics at high angles of attack
[AIAA PAPER 81-0008] p0157 A81-20532
Hinged strakes for enhanced maneuverability at high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
An approximate analytical method for vortex-lift and centre of pressure on the slender wing
p0223 A81-23726
Slightly blunted cone in a supersonic flow at angle of attack
p0225 A81-23908
Investigation of instantaneous distortions in air intakes at high angles of attack
[AAAF PAPER NT 80-38] p0369 A81-33931
Some characteristics of aircraft motion at large angles of attack
p0418 A81-36473
An apparatus for the simulation of an air intake at high angle of attack in a compressor test facility
[ONERA, TP NO. 1981-35] p0460 A81-39238
Stability characteristics of a forward swept wing aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576

Stability of aircraft motion in critical cases [AIAA PAPER 81-1885] p0561 A81-44577
Influence of sideslip on the kinematics of the helicopter in steady coordinated turns p0576 A81-46644
Low-speed aerodynamic characteristics of a 13 percent thick medium speed airfoil designed for general aviation applications [NASA-TP-1498] p0071 N81-12015
Experimental and theoretical aerodynamic characteristics of two hypersonic cruise aircraft concepts at Mach numbers of 2.96, 3.96, and 4.63 [NASA-TP-1767] p0072 N81-12021
Dynamic response of a forward-swept-wing model at angles of attack up to 15 deg at a Mach number of 0.8 --- Langley transonic dynamics tunnel tests [NASA-TM-81863] p0085 N81-12448
Aerodynamic side-force alleviator means [NASA-CASE-LAR-12326-1] p0139 N81-14968
Effects of angle of attack and ventral fin on transonic flutter characteristics of an arrow-wing configuration [NASA-TM-81914] p0145 N81-15397
Unsteady wakes downstream from a profile oscillating in incidence --- aerodynamic flow tests on helicopter rotor blade profiles [AAAF-NT-80-10] p0204 N81-16989
Calculation of airloads for a flexible wing via NASTRAN [AD-A094770] p0263 N81-19031
Kinematic properties of the helicopter in coordinated turns [NASA-TP-1773] p0374 N81-22039
Wind tunnel corrections for high angle of attack models [AGARD-R-692] p0435 N81-24120
Canadian studies of wind tunnel corrections for high angle of attack models p0435 N81-24121
A review of the wall pressure signature and other tunnel constraint correction methods for high angle-of-attack tests p0435 N81-24122
Expected improvements on high angle of attack model testing p0436 N81-24123
German activities on wind tunnel corrections p0436 N81-24124
A review of research at NLR on wind-tunnel corrections for high angle of attack models p0436 N81-24125
A review of some investigations on wind tunnel wall interference carried out in Sweden in recent years p0436 N81-24126
Wind tunnel corrections for high angles of attack: A brief review of recent UK work p0436 N81-24127
Strake/delta wing interactions at high angles of attack [NASA-CR-166183] p0483 N81-26072
TORNADO: Flight characteristics at high angles of incidence [MBB-FE-127/S/PUB/23] p0495 N81-27085
Wing-alone aerodynamic characteristics for high angles of attack of supersonic speeds [NASA-TP-1889] p0579 N81-30087
Investigation of high-angle-of-attack maneuver-limiting factors. Part 1: Analysis and simulation --- F-4J and F-14A aircraft [AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack maneuver-limiting factors. Part 2: Piloted simulation assessment of Bihrle departure criteria [AD-A101647] p0581 N81-30114
Investigation of high-angle-of-attack maneuver-limiting factors. Part 3: Appendices, aerodynamic models [AD-A101648] p0581 N81-30115
Estimation of dynamic stability parameters from drop model flight tests p0591 N81-31116
Basic studies of body vortices at high angles of attack and supersonic speeds [AD-A102241] p0594 N81-31154

ANGLES (GEOMETRY)
NT ANGLE OF ATTACK
NT ELEVATION ANGLE
NT LEADING EDGE SWEEP
NT SWEEP ANGLE
Comparison of calculated and measured helicopter rotor lateral flapping angles p0357 A81-32018

ANGULAR ACCELERATION
Calculated and experimental data for a 118-mm bore roller bearing to 3 million DN [ASME PAPER 80-C2/LUB-14] p0117 A81-16668
Performance of computer-optimized tapered-roller bearings to 2.4 million DN [ASME PAPER 80-C2/LUB-18] p0117 A81-16672
Phase 2 and 3 wind tunnel tests of the J-97 powered, external augmentor V/STOL model --- conducted in Ames 40- by 80-foot wind tunnel [NASA-CR-152380] p0483 N81-26076

ANGULAR MOTION
U ANGULAR VELOCITY

ANGULAR RESOLUTION
Detection of target multiplicity using monopulse quadrature angle p0360 A81-32696
KS-127A long range oblique reconnaissance camera for RF-4 aircraft p0462 A81-39419

ANGULAR VELOCITY
Choice of the optimal angular velocity of the twist of a flight vehicle p0625 A81-49946
Performance verification of the superjet laminar angular rate sensor [AD-A091089] p0091 N81-13040

ANIMALS
NT BIRDS

ANIMATION
U MOTION

ANIONS
Measurement of canard wakes [AD-A095063] p0263 N81-19029
Pneumatic boot for helicopter rotor deicing p0267 N81-19059

ANISOTROPIC PLATES
The effect of various factors on the vibration characteristics of composite blades of gas turbine engines p0524 A81-42793

ANNULAR FLOW
Analysis of a reverse flow, annular combustion chamber p0294 A81-29081
Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis p0309 A81-29867
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center [SAE PAPER 801122] p0396 A81-34158
External burning propulsion analysis [AIAA PAPER 81-1477] p0505 A81-40897

ANNULAR NOZZLES
Three dimensional flow in annular diffusers with two vortex distributions at entry p0297 A81-29112
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions --- Lewis 8 by 6-foot supersonic wind tunnel tests [NASA-CR-159818] p0093 N81-13057

ANNULI
Shock associated noise reduction from inverted-velocity-profile coannular jets [NASA-CR-3454] p0589 N81-30908

ANTARCTIC ENVIRONMENT
U ICE ENVIRONMENTS

ANTENNA ARRAYS
NT ENDFIRE ARRAYS
Excitation of a circular array of cylinders with longitudinal slits --- in radio antennas p0019 A81-12619
Increased target resolution and minor lobe reduction with active group antennas p0152 A81-20090
A 7.5 GHz microstrip phased array for aircraft-to-satellite communication p0562 A81-44623
Hyperbolic origins --- of radio position-fixing systems p0612 A81-47842

Simulation of Microwave Landing System
p0615 A81-48368
ANTENNA DESIGN
Flight-vehicle antennas /2nd revised and enlarged edition/ --- Russian book
p0281 A81-27534
Optimal tracking design and simulation for a monopulse airborne radar system utilizing a predicted dual beam antenna design
p0323 A81-30293
An extremely lightweight fuselage-integrated phased array for airborne applications
p0348 A81-30779
Input impedance of a resonator-slot ring antenna on a spherical layer --- for aircraft
p0420 A81-37433
Antennas-avionics systems relationship
[SAE PAPER 810579] p0519 A81-42742
Wind loads for bar-truss structures
p0259 N81-18997
ANTENNA FIELDS
U ANTENNA RADIATION PATTERNS
ANTENNA RADIATION PATTERNS
Excitation of a circular array of cylinders with longitudinal slits --- in radio antennas
p0019 A81-12619
Improvement of effective minor lobe behavior of radar antennas through signal processing
p0152 A81-20091
In-flight calibration of aircraft antenna radiation patterns
p0173 A81-21825
Airborne antenna pattern calculations
p0532 A81-43708
Hyperbolic origins --- of radio position-fixing systems
p0612 A81-47842
A simple radar for navigation accuracy measurements
p0612 A81-47844
Airborne antenna pattern code: User's manual
[AD-A092316] p0201 N81-16357
Diversity techniques for omnidirectional telemetry coverage of the HiMAT research vehicle
[NASA-TP-1830] p0334 N81-20074
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059
Airborne antenna pattern calculations
[NASA-CR-164350] p0437 N81-24331
ANTENNAS
NT AIRCRAFT ANTENNAS
NT CYLINDRICAL ANTENNAS
NT OMNIDIRECTIONAL ANTENNAS
NT RADAR ANTENNAS
NT RADIO ANTENNAS
NT SATELLITE ANTENNAS
NT SLOT ANTENNAS
NT SPACECRAFT ANTENNAS
ANTIAIRCRAFT MISSILES
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473
ATTACK vs SCAN: A comparison of endgame aircraft survivability computer programs
[AD-A097663] p0388 N81-23076
ANTIFRICTION BEARINGS
NT BALL BEARINGS
NT ROLLER BEARINGS
ANTIICING ADDITIVES
The problem of hoar-frost formation in aircraft fuel tanks
p0319 A81-30159
JUH-1H ice phobic coating icing tests
[AD-A096361] p0340 N81-21062
ANTIMISTING FUELS
Fundamental studies of antimisting fuels
[AIAA PAPER 81-1422] p0515 A81-42195
ANTIOXIDANTS
Composition of sludge formed in B-3V oil
p0103 A81-17373
ANTISKID DEVICES
Real-time microprocessor technology applied to automatic braking systems
[SAE PAPER 801194] p0402 A81-34204
Review of antiskid and brake dynamics research
p0268 N81-19066
Recent progress towards predicting aircraft ground handling performance
[NASA-TM-81952] p0339 N81-21044
Behavior of aircraft antiskid braking systems on dry and wet runway surfaces: Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112
ANTISUBMARINE WARFARE AIRCRAFT
NT P-3 AIRCRAFT
NT SH-3 HELICOPTER
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115
Design for maximum effectiveness in the Navy role
p0634 N81-33154
ANTITANK MISSILES
NT TOW MISSILES
APPLICATION
U UTILIZATION
APPLICATIONS PROGRAMS (COMPUTERS)
The Navy PATE program --- Propulsion Automatic Test Equipment
[ASME PAPER 81-GT-189] p0317 A81-30082
The Z8000 provides the basis for a powerful new airborne computer
p0321 A81-30252
APPROACH
NT AIRBORNE RADAR APPROACH
NT INSTRUMENT APPROACH
Flight investigation of a four-dimensional terminal area guidance system for STOL aircraft
[NASA-TM-81271] p0260 N81-19014
Automated pilot advisory system test and evaluation at Manassas Municipal Airport
p0264 N81-19040
A head-up display format for transport aircraft approach and landing
p0265 N81-19043
An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108
Minimum fuel horizontal flightpaths in the terminal area
[NASA-TM-81313] p0549 N81-29133
Takeoff and missed approach under the influence of wind shear --- flight safety considerations
[TUBS/SFB-58-80-05-01] p0628 N81-32131
APPROACH AND LANDING TESTS (STS)
Flight evaluation of stabilization and command augmentation system concepts and cockpit displays during approach and landing of powered-lift STOL aircraft
[NASA-TP-1551] p0037 N81-11044
Comparison of theoretical predictions of orbiter airloads with wind tunnel and flight test results for a Mach number of 0.52
[NASA-TM-81350] p0387 N81-23066
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163100] p0490 N81-27113
APPROACH CONTROL
NT RADAR APPROACH CONTROL
The outfitting of regional airports in the future with radio assistance for approach and landing, with emphasis on landing site obstacles for general aviation
p0051 A81-13313
Specifications for short instrument and precision approach path trajectories
p0051 A81-13314
General aviation considerations on bad weather approaches at regional airports
p0052 A81-13315
Flight instrumentation requirements for all-weather approach and landing
p0111 A81-16059
Airport visual approach, guidance and landing systems - Airline pilots viewpoint
p0114 A81-16083
The importance of 'Interim Standard Microwave Landing System' for small community airports
p0114 A81-16087
Flight test evaluation of a digital controller used in a VTOL automatic approach and landing system
p0179 A81-22349
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890
Evaluation of several control/display concepts for V/STOL shipboard landing
[SAE PAPER 801205] p0403 A81-34213
Development of simplified airborne computations for fuel conservative descents in a time-based

metered air traffic environment
[SAE PAPER 810642] p0524 A81-42785
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142
Analysis of the function principle and operational assessment of an onboard glidepath guidance system for visual approaches (Visual Approach Monitor (VAM)
[DFVLR-FB-79-38] p0025 N81-10043
Flight evaluation of the terminal guidance system
[NASA-CR-163859] p0142 N81-14991
Applicated techniques for the control of approach traffic
[DFVLR-MITT-79-20] p0142 N81-14992
Guidance and control system research for improved terminal area operations --- terminal controlled vehicle
p0264 N81-19038
Operational considerations in utilization of microwave landing system approach and landing guidance --- terminal configured vehicle
p0268 N81-19039
Flight-test evaluation of STOL control and flight director concepts in a powered-lift aircraft flying curved decelerating approaches
[NASA-TP-1641] p0275 N81-19131
Operational considerations in utilization of microwave landing system approach and landing guidance
[NASA-TM-81945] p0331 N81-20050
Definition of a system concept study for future air traffic guidance
[BMFT-FB-W-80-008] p0425 N81-24046
Applied techniques for the control of approach traffic --- air traffic control
[ESA-TT-668] p0538 N81-28079
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] p0629 N81-32151

APPROACH INDICATORS
A head-up display for low-visibility approach and landing
[AIAA PAPER 81-0130] p0161 A81-20623
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033
An evaluation of head-up displays in civil transport operations
p0265 N81-19044
Functional analysis and operational assessment of an onboard glide path guidance system for visual approaches (visual approach monitor VAM)
[ESA-TT-655] p0373 N81-22038
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
Feasibility of collision warning, precision approach and landing using GPS, volume 1
[NASA-CR-165675] p0537 N81-28070

APPROPRIATIONS
NASA authorization, 1981
[GPO-71-290] p0203 N81-16953
NASA authorization, 1982, volume 4
[GPO-79-432-VOL-4] p0590 N81-31030
Airport and airway system development act of 1981
[GPO-75-804] p0601 N81-31231

APPROXIMATION
NT FINITE DIFFERENCE THEORY
NT FINITE ELEMENT METHOD
NT LEAST SQUARES METHOD
NT MEAN SQUARE VALUES
NT NEWTON-RAPHSON METHOD
NT NUMERICAL DIFFERENTIATION
NT PADE APPROXIMATION
Second order approximation theory of an arbitrary aerofoil in incompressible potential flow
p0108 A81-17803
Simple methods of determining stress intensity factors
p0289 A81-28984
Approximations and short cuts based on generalized functions
p0347 A81-30730
Dual methods and approximation concepts in structural synthesis
[NASA-CR-3226] p0134 N81-14347
Continued development and correlation of analytically based weight estimation codes for wings and fuselages
[NASA-CR-152331] p0251 N81-18044

APPROXIMATION METHODS
U APPROXIMATION

ARC HEATING
Operating characteristics of the Langley Mach 7 Scramjet Test Facility
[NASA-TM-81929] p0335 N81-20083

ARCHITECTURE
Wind loading and response of a high-rise building
[CONF-810104-1] p0256 N81-18259

ARCHITECTURE (COMPUTERS)
Standardization in military avionics systems architecture; Proceedings of the Seminar, Dayton, Ohio, November 28, 1979
p0050 A81-13167
Standardization in military system architecture
p0050 A81-13168
Military aircraft avionics in the 1980's
p0050 A81-13169
Avionic architectural standardization - Logistic support perspective
p0050 A81-13171
Promoting rational standardization --- for military avionics systems architecture
p0050 A81-13172
New techniques and development trends in the system architecture of EDP systems for radar data processing and airspace control
p0153 A81-20103
Digital flight control - The generation of the 80's
p0320 A81-30248
The Z8000 provides the basis for a powerful new airborne computer
p0321 A81-30252
Offensive avionics system /OAS/ design
p0321 A81-30259
Multisensor track file correlation using attributes and kinematics
p0326 A81-30349
The array processor - A real-time simulator
p0614 A81-48328
Optimized computer systems for avionics applications
[AD-A089570] p0028 N81-10063
Microcomputer array processor system --- design for electronic warfare
p0044 N81-11673

ARCTIC ENVIRONMENTS
U ICE ENVIRONMENTS

AREA NAVIGATION
RNAV benefits today - Today and future requirements
p0111 A81-18056
A comparison of actual and simulated horizontal flight paths - RNAV /Area Navigation/ system
p0562 A81-44741
V/STOL AND digital avionics system for UH-1H
[NASA-CR-152179] p0273 N81-19112
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
Evaluation of Microwave Landing System (MLS) effect on the delivery performance of a fixed-path metering and spacing system
[NASA-TP-1844] p0546 N81-29111

ARIP (IMPACT PREDICTION)
U COMPUTERIZED SIMULATION

ARMED FORCES
NT ARMED FORCES (FOREIGN)
NT ARMED FORCES (UNITED STATES)
NT NAVY

ARMED FORCES (FOREIGN)
French Army testing of Forward Looking Infra-Red System /FLIR/ on helicopters /November 1976-June 1977/
p0464 A81-39680

ARMED FORCES (UNITED STATES)
Army aviation - A perspective into the eighties
[AIAA PAPER 81-0931] p0363 A81-32935

ARRAYS
NT ANTENNA ARRAYS
NT ENDFIRE ARRAYS
NT PHASED ARRAYS
NT SOLAR ARRAYS

ARRESTING GEAR
  F/A-18's landing, launch and recovery system
  p0005 A81-11244
  System safety program report MK 1 MOD 0 LSO HUD console system
  [AD-A095009] p0269 N81-19080
ARROW WINGS
  Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
  [AIAA 81-0654] p0308 A81-29506
  Leading-edge deflection optimization for a highly swept arrow wing configuration
  [NASA-TP-1777] p0139 N81-14974
  Effects of angle of attack and ventral fin on transonic flutter characteristics of an arrow-wing configuration
  [NASA-TM-81914] p0145 N81-15397
  The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
  p0243 N81-17984
  Exploratory subsonic investigation of vortex-flap concept on arrow wing configuration
  p0243 N81-17985
  Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
  p0243 N81-17986
  Simulator investigation of arrow-wing low-speed handling qualities
  p0244 N81-17993
  Supersonic cruise research aircraft structural studies: Methods and results
  p0246 N81-18008
  Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport --- SCAT-15F model test in the Langley Transonic Dynamics Tunnel
  [NASA-TM-81962] p0388 N81-23071
ARSENIC COMPOUNDS
  NT GALLIUM ARSENIDES
ARSENIDES
  NT GALLIUM ARSENIDES
ARTIFICIAL SATELLITES
  NT AERONAUTICAL SATELLITES
  NT COMMUNICATION SATELLITES
  NT MARITIME SATELLITES
  NT NAVIGATION SATELLITES
  NT NAVSTAR SATELLITES
  NT SARSAT
  NT SEASAT-A SATELLITE
  NT SYNCHRONOUS SATELLITES
  NT TRANSIT SATELLITES
ASCENT
  NT CLIMBING FLIGHT
ASDE
  U AIRPORT SURFACE DETECTION EQUIPMENT
ASHES
  Improved particle trajectory calculations through turbomachinery affected by coal ash particles
  [ASME PAPER 81-GT-53] p0312 A81-29965
ASPECT RATIO
  NT HIGH ASPECT RATIO
  NT LOW ASPECT RATIO
  Aspect ratio variability in part-through crack life analysis
  p0001 A81-10355
  How to improve the performance of transport aircraft by variation of wing aspect-ratio and twist /12th Daniel and Florence Guggenheim International Memorial Lecture/
  p0006 A81-11602
  The effect of the aspect ratio of delta wings on the structure of the near vortex wake
  p0413 A81-36467
  Vortex drag reduction by diffusing vanes - Design for the 'Thrush' agricultural aircraft
  [SAE PAPER 810605] p0521 A81-42762
  Design study for the inner wing of a transonic wing-body combination of aspect ratio 8
  p0190 N81-16015
  Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
  [NASA-TM-80199] p0627 N81-32119
ASPHALT
  Polymer research in rapid runway repair materials
  [AD-A089606] p0030 N81-10080
ASSEMBLIES
  NT SUBASSEMBLIES
  NT TAIL ASSEMBLIES
ASSEMBLING
  Classification of links of assembly units with respect to the character of their connections, and calculation of the accuracy of their execution --- in airframe construction
  p0319 A81-30160
  Principles of aircraft-engine assembly --- Russian book
  p0355 A81-31799
  Aircraft assembly --- Russian book
  p0355 A81-31872
  Development of assembly techniques for fire resistant aircraft interior panels
  [NASA-CR-152119] p0254 N81-18097
ASSESSMENTS
  NT DAMAGE ASSESSMENT
  NT TECHNOLOGY ASSESSMENT
  An airport community noise-impact assessment model
  [NASA-TM-80198] p0393 N81-23713
ASTRONAVIGATION
  Development of an astro-inertial hybrid navigation system and a star tracker
  p0420 A81-37343
ASYMPTOTIC METHODS
  Renewal function for any arbitrary period - A Bayesian way
  p0101 A81-16939
  On a generalization of Kaden's problem --- of initially planar semi-infinite vortex sheet rollup
  p0288 A81-28676
  An asymptotic unsteady lifting-line theory with energetics and optimum motion of thrust-producing lifting surfaces
  [NASA-CR-165679] p0385 N81-23035
ASYNCHRONOUS MOTORS
  Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft
  p0281 A81-27364
ATHODYDS
  U RAMJET ENGINES
ATLANTA (GA)
  Atlanta's new central passenger terminal complex
  p0003 A81-10719
ATLANTIC OCEAN
  Satellite constellations for three-dimensional coverage of the Atlantic Ocean --- for geosynchronous navigation systems
  p0323 A81-30291
  Catalog of sea state and wind speed in the South Atlantic Bight
  [NASA-CR-156872] p0137 N81-14601
  Aircraft operating efficiency on the North Atlantic, a challenge for the 1980's
  p0267 N81-19060
ATMOSPHERIC ABSORPTION
  U ATMOSPHERIC ATTENUATION
ATMOSPHERIC ATTENUATION
  Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 3: Tables of atmospheric absorption losses --- aircraft noise
  [AD-A093144] p0221 N81-17848
ATMOSPHERIC BOUNDARY LAYER
  An observational experiment using a monostatic sodar at the airport of Fiumicino
  p0282 A81-27548
ATMOSPHERIC CHEMISTRY
  Thunderstorm hazards flight research: Storm hazards 1980 overview
  [NASA-TM-81974] p0493 N81-27062
ATMOSPHERIC CIRCULATION
  Investigative technical measurements of the planetary boundary layer made onboard an instrumented motorized glider
  [REPT-149] p0379 N81-22666
ATMOSPHERIC COMPOSITION
  NT ATMOSPHERIC MOISTURE
ATMOSPHERIC CONDITIONS
  U METEOROLOGY
ATMOSPHERIC EFFECTS
  The aircraft in the stratosphere --- effects on ozone layer equilibrium
  p0002 A81-10499
  Reduction of the take-off ground run distance to a given set of atmospheric condition
  p0010 A81-11634
  Effects of commercial aircraft operating environment on composite materials

p0182 A81-22681
ATMOSPHERIC ELECTRICITY
Multiple-component lightning high-current testing
p0056 A81-14255
VHF-UHF precipitation-static interference effects on aircraft
p0056 A81-14258
Atmospheric electricity hazards protection for advanced technology flight vehicles
[AIAA PAPER 81-1642] p0525 A81-43141
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126
Observing lightning from ground-based and airborne stations
p0136 N81-14566
Aeronautical concerns and National Aeronautics and Space Administration atmospheric electricity projects
p0136 N81-14567
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857] p0146 N81-15648
Horizontal components of the atmospheric electric field. Studies of the atmospheric electric field in view of electrostatically controlled automatic pilot applications
[BMVG-FBWT-80-7] p0345 N81-21677
ATMOSPHERIC ENTRY
Choice of the optimal angular velocity of the twist of a flight vehicle
p0625 A81-49946
ATMOSPHERIC IMPURITIES
U AIR POLLUTION
ATMOSPHERIC MODELS
NT DYNAMIC MODELS
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook
[AIAA PAPER 81-0302] A81-20739
The turbulent wind and its effect on flight
[UTIAS-REVIEW-44] p0033 N81-11020
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
ATMOSPHERIC MOISTURE
Calculation of the impingement of cloud droplets in a cylinder by the finite-element method
p0533 A81-43890
ATMOSPHERIC PRESSURE
Wind speed measurement for wind turbine testing
p0055 A81-13873
ATMOSPHERIC SHELLS
U ATMOSPHERIC STRATIFICATION
ATMOSPHERIC SOUNDING
Helicopter-borne radiosonde system and its experimental uses
p0231 A81-24870
Diagnosis-prognosis of intense turbulence, causing aircraft buffeting, on the basis of temperature-wind sounding
p0241 A81-26836
ATMOSPHERIC STRATIFICATION
The sonic boom from an aircraft flying along an arbitrary path in a stratified atmosphere in the presence of a three-component wind
p0123 A81-19636
Evaluation of the effect of horizontal and vertical stratification on the stability of air flows
p0241 A81-26839
ATMOSPHERIC TEMPERATURE
Helicopter-borne radiosonde system and its experimental uses
p0231 A81-24870
Evaluation of the effect of horizontal and vertical stratification on the stability of air flows
p0241 A81-26839
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
p0622 A81-48847
Aircraft icing instrumentation: Unfilled needs --- rotary wing aircraft
p0135 N81-14560
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 2: Computer program
[AD-A093267] p0221 N81-17853
ATMOSPHERIC TURBULENCE
NT CLEAR AIR TURBULENCE
NT GUSTS
NT LOW LEVEL TURBULENCE
Operational radar display of the structure of thunderstorm hail clouds
p0069 A81-16474
Disturbance estimation for a STOL transport during landing
[AIAA PAPER 81-0018] p0158 A81-20542
A survey of recent atmospheric turbulence measurements from a subsonic aircraft
[AIAA PAPER 81-0298] p0164 A81-20736
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook
[AIAA PAPER 81-0302] A81-20739
Sources and detection of atmospheric wind shear
[AIAA PAPER 81-0391] p0167 A81-20801
Evaluation of the effect of horizontal and vertical stratification on the stability of air flows
p0241 A81-26839
The effect of the atmospheric turbulence on the rotor blade flap-leading motion stability in hovering
[AIAA 81-0610] p0304 A81-29472
Airship survivability in atmospheric turbulence
[AIAA 81-1323] p0456 A81-38533
The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-38534
Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184
Some applications of the turbulence amplifier to airborne systems
p0514 A81-42173
Survey of Workshops on Meteorological and Environmental Inputs to Aviation Systems
p0135 N81-14556
Turbulence: From a pilot's viewpoint
p0136 N81-14561
Study of oscillatory and flight dynamic behavior of helicopters in atmospheric turbulence
[BMVG-FBWT-80-4] p0342 N81-21074
Airplane wing vibrations due to atmospheric turbulence
[NASA-CR-3431] p0430 N81-24679
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] p0637 N81-33191
ATOMIZATION
U ATOMIZING
ATOMIZERS
The method for calculating the fuel concentration field in the downstream positions of the pressure jet atomizer in the high temperature gas-stream
p0224 A81-23731
ATOMIZING
NT LIQUID ATOMIZATION
An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211
ATTACK AIRCRAFT
NT A-6 AIRCRAFT
NT A-7 AIRCRAFT
NT A-10 AIRCRAFT
NT AH-64 HELICOPTER
NT ALPHA JET AIRCRAFT
NT B-1 AIRCRAFT
NT B-52 AIRCRAFT
NT B-58 AIRCRAFT
NT BOMBER AIRCRAFT
NT F-4 AIRCRAFT
NT F-5 AIRCRAFT
NT F-8 AIRCRAFT
NT F-14 AIRCRAFT
NT F-15 AIRCRAFT
NT F-16 AIRCRAFT
NT F-17 AIRCRAFT
NT F-18 AIRCRAFT
NT F-27 AIRCRAFT
NT F-100 AIRCRAFT
NT F-101 AIRCRAFT
NT F-106 AIRCRAFT
NT F-111 AIRCRAFT
NT FIGHTER AIRCRAFT

NT FV-12A AIRCRAFT
NT JAGUAR AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT SAAB 37 AIRCRAFT
NT YF-12 AIRCRAFT
Sukhoi's pivotal interdictor
p0109 A81-17832
A mobile computer-aided detection and tracking system for low-flying attack aircraft
p0152 A81-20098
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking
p0173 A81-21742
Parametric analysis of multipurpose airplanes based on utilization effectiveness criteria
p0236 A81-25691
The next combat aircraft
p0298 A81-29150
AV-8B operational features for rapid deployment
[SAE PAPER 801228]
p0405 A81-34231
TA-4J spin training through simulation
[AIAA 81-0965]
p0414 A81-36556
Future strike aircraft design synthesis
[AIAA PAPER 81-0371]
p0421 A81-37571
Aircraft penetration under cloud cover
p0463 A81-39640
Weapon system evolution of attack helicopters
p0472 A81-40130
Integrated multiplex for the Agusta A-129 attack helicopter
p0472 A81-40131
Results of a simulator investigation of control system and display variations for an attack helicopter mission
[AHS 80-28]
p0475 A81-40158
A strategy for developing the next generation fighter/attack aircraft engine
[AIAA PAPER 81-1470]
p0505 A81-40890
Advanced technology engine studies /ATES/ - A status report
[AIAA PAPER 81-1502]
p0516 A81-42205
Ferranti mission managers
p0553 A81-44043
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063]
p0609 A81-47580
Combat cockpit design
p0622 A81-49173
Sukhoi Su-24 Fencer - The Soviet Tornado
p0625 A81-49974
Army GPS-doppler hybrid navigation system
[AD-A090394]
p0075 N81-12062
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 0.4 to 1.4
[NASA-TM-81234]
p0140 N81-14901
Demonstration of a method for determining critical store configurations for wing store flutter
[AD-A092257]
p0197 N81-16060
An investigation of the five point restraint system for aviators
[AD-A093065]
p0205 N81-16990
Advanced flight simulator: Utilization in A-10 conversion and air-to-surface attack training
[AD-A094608]
p0254 N81-18066
Analysis of ejection seat stability using easy program, volume 1
[AD-A096597]
p0373 N81-22033
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost
[AD-A097339]
p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement
[AD-A097438]
p0390 N81-23084
The specification of development tests for the engine of a combat aircraft --- engines for the Mirage 2000 and 4000 aircraft
p0430 N81-24082
Flight tests of the engines of combat aircraft: Validation methods used by CEV
p0432 N81-24095
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461]
p0582 N81-30119

Multi-mission STOVL with vectored thrust engines
p0633 N81-33149
ATTENUATION
NT ACOUSTIC ATTENUATION
NT ATMOSPHERIC ATTENUATION
NT SHOCK WAVE ATTENUATION
NT SIDELOBE REDUCTION
Wake vortex attenuation flight tests: A status report
p0267 N81-19057
ATTENUATORS
NT RESISTORS
Main rotor six degree-of-freedom isolation system analysis
[NASA-CR-165665]
p0444 N81-25090
ATTITUDE (INCLINATION)
NT PITCH (INCLINATION)
NT ROLL
NT YAW
ATTITUDE CONTROL
NT DIRECTIONAL CONTROL
NT LATERAL CONTROL
NT LONGITUDINAL CONTROL
NT THRUST VECTOR CONTROL
Computer-aided methods for redesigning the stabilized pitch control system of a semi-active thermal homing missile
p0051 A81-13250
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732
Analysis and synthesis of the digital attitude control system of the aerospace vehicle
p0228 A81-23837
Low-order approaches to high-order systems - Problems and promises --- for analysis of aircraft pitch dynamics
[AIAA 81-1774]
p0556 A81-44134
Flight evaluation of stabilization and command augmentation system concepts and cockpit displays during approach and landing of powered-lift STOL aircraft
[NASA-TP-1551]
p0037 N81-11044
On the use of active higher harmonic blade pitch control for helicopter vibration reduction
[AD-A090398]
p0076 N81-12074
Thrust augmented spin recovery device
[NASA-CASE-LAR-11970-2]
p0275 N81-19130
ATTITUDE GYROS
NT GYRO HORIZONS
ATTITUDE INDICATORS
NT GYRO HORIZONS
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21828
Fitment of TANAS standby attitude indicators to Macchi aircraft
[AD-A089370]
p0035 N81-11036
LR-80 flight test report --- attitude and heading reference system
[AD-A090204]
p0075 N81-12058
Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1]
p0375 N81-22048
Flight evaluation of the concept of the stage A Peripheral Vision Horizon Device (PVHD) using the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870]
p0375 N81-22050
A pilot training manual for the terminal configured vehicle electronic attitude director indicator
[NASA-CR-159195]
p0434 N81-24111
ATTITUDE STABILITY
NT DIRECTIONAL STABILITY
NT GYROSCOPIC STABILITY
NT LATERAL STABILITY
NT LONGITUDINAL STABILITY
AUDIO EQUIPMENT
NT EARPHONES
NT MICROPHONES
Voice communication capability of selected inflight headgear devices
p0604 N81-31867
AUDIO FREQUENCIES
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31852

AUDIO VISUAL EQUIPMENT
U TRAINING DEVICES
U VISUAL AIDS
AUDITORY DEFECTS
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464
AUDITORY PERCEPTION
Temporal integration in low frequency auditory detection
[AD-A098161] p0430 N81-24862
Aural communication in aviation
[AGARD-CP-311] p0603 N81-31449
The background and bases for the proposed military standard on acoustical noise limits in helicopters
p0604 N81-31459
AUDITORY SIGNALS
Aural communication in aviation
[AGARD-CP-311] p0603 N81-31449
The speed of response to synthesized voice messages
p0603 N81-31456
Voice warning systems: Some experimental evidence concerning application
p0603 N81-31458
AUGMENTATION
NT STABILITY AUGMENTATION
NT THRUST AUGMENTATION
AURORAL ZONES
Errors of phase VLF-navigation systems under conditions of auroral disturbances
p0607 A81-47533
AUSTRALIA
Pilatus porter: Provision of revised take-off and landing performance data
[AD-A089964] p0076 N81-12068
AUTOCORRELATION
Simulation model validation - Airport applications
p0461 A81-39320
AUTOGIROS
The stick-fixed lateral dynamic stability of the CSIR SARA II autogyro
[NIAST-80/52] p0434 N81-24107
AUTOMATIC CONTROL
NT ACTIVE CONTROL
NT ADAPTIVE CONTROL
NT AUTOMATIC FLIGHT CONTROL
NT AUTOMATIC LANDING CONTROL
NT CASCADE CONTROL
NT DYNAMIC CONTROL
NT FEEDBACK CONTROL
NT NUMERICAL CONTROL
NT OFF-ON CONTROL
NT OPTIMAL CONTROL
NT SELF ADAPTIVE CONTROL SYSTEMS
NT SELF ALIGNMENT
NT TIME OPTIMAL CONTROL
Automation of aircraft gas-turbine power plants --- Russian book
p0020 A81-12702
Cabin pressure control systems for general aviation aircraft
[SAE PAPER 800606] p0061 A81-15329
Principle for the design of hybrid control systems for passenger transport systems
p0107 A81-17577
Damping of aircraft wing vibrations by automatically controlled internal forces
p0170 A81-21060
Developments in aircraft power flying control hydraulics
p0282 A81-27882
The automated transport process management system of INTERFLUG /PRIKAS/
p0288 A81-28744
Improved jet engine maintenance through automated vibration diagnostic systems
[ASME PAPER 81-GT-62] p0313 A81-29972
Advanced composites - Evolution of manufacturing technology
[AIAA PAPER 81-0895] p0362 A81-32920
Real-time microprocessor technology applied to automatic braking systems
[SAE PAPER 801194] p0402 A81-34208
Automatic riveting installation for spherical aircraft parts
p0450 A81-37641
Forward looking infrared /FLIR/ image enhancement for the automatic target cuer system
p0461 A81-39335
Integrated sensor control system for RF-5E demonstrator
p0462 A81-39438
Automatic damping of vibrations of an airplane wing by internal control forces
p0577 A81-46783
Automation of air traffic control processes --- Russian book
p0623 A81-49462
Improved aircraft cruise by periodic control
p0034 N81-11030
Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing
[AD-A089794] p0035 N81-11034
Gas turbine engines and transmissions for bus demonstration programs
[COO-4867-07] p0134 N81-14329
Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches
[AD-A094073] p0251 N81-18042
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-19116
Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels
[NASA-CR-152145] p0276 N81-19136
The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2 --- air traffic control
[NLR-MP-79038-U] p0332 N81-20059
Consolidated Cab Display (CCD) System, Project Planning Document (PPD)
[AD-A098651] p0440 N81-25056
A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test
[NASA-CR-3461-VOL-1] p0595 N81-31171
Terminal area automatic navigation, guidance, and control 1: Automatic rollout, turnoff, and taxis
[NASA-CR-3451] p0600 N81-31224
Controls and displays for all-weather operation of helicopters
p0633 N81-33145
AUTOMATIC CONTROL VALVES
NT PRESSURE REGULATORS
AUTOMATIC DATA PROCESSING
U DATA PROCESSING
AUTOMATIC FLIGHT CONTROL
NT AUTOMATIC LANDING CONTROL
Future trends in automatic flight control systems
[SAE PAPER 800627] p0063 A81-15343
Inverse problems of controlled flight dynamics - Longitudinal motion
p0101 A81-16968
Operational energy conservation strategies in commercial aviation
p0155 A81-20465
Development and demonstration of an automatic control and recovery system for remotely piloted vehicles
p0156 A81-20476
Airline navigation planning
p0174 A81-21966
The ANK - A four dimensional navigation/flight management system for today
p0180 A81-22615
On the application of self-adaptive flight control system based on energy balance theory
p0224 A81-23733
The role of simulation in automatic flight control systems research
p0283 A81-27894
Progress in the use of automatic flight controls in safety critical applications
p0284 A81-27902
The development of multiple redundant flight control systems for high integrity applications
p0284 A81-27903
Digital flight control - The generation of the 80's
p0320 A81-30248
Flight control system design through constrained output feedback
p0321 A81-30264
Integrated Flight and Weapon Control for improved tactical combat effectiveness

p0324 A81-30329
Integrated flight and fire control development and
demonstration of an F-15B aircraft
p0327 A81-30359
Flight test experience using advanced airborne
equipment in a time-based metered traffic
environment
[SAE PAPER 801207]
p0403 A81-34215
A correlated random numbers generator and its use
to estimate false alarm rates of airplane sensor
failure detection algorithms
p0453 A81-37822
Civil aviation - Onboard electronic equipment and
fuel savings
p0464 A81-39699
Commercial rotorcraft automatic controls - The
next generation
p0470 A81-40113
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115
Integrated multiplex for the Agusta A-129 attack
helicopter
p0472 A81-40131
Avionics system design requirements for the United
States Coast Guard HH-65A Dolphin
p0472 A81-40133
AFCS integration requirements --- Automatic Flight
Control System
[SAE PAPER 810580]
p0519 A81-42743
AFTI/F-16 advanced multimode control system design
for task-tailored operations
[AIAA PAPER 81-1707]
p0535 A81-43955
IFFC flying qualities simulation --- Integrated
Flight/Fire Control
[AIAA 81-1821]
p0555 A81-44111
A comparison of actual and simulated horizontal
flight paths - RNAV /Area Navigation/ system
p0562 A81-44741
Practical solutions to the aircraft minimum fuel,
fixed-range, fixed time-of-arrival trajectory
optimization problem
p0563 A81-45515
Optimal multirate flight control design
p0563 A81-45522
The impact on helicopter cockpits of integrated
advanced flight controls, avionics and optics
p0574 A81-46624
Inverse problems of guided-flight dynamics -
Longitudinal motion
p0577 A81-46749
Application of optimal control and estimation to
autopilot and autothrottle systems
p0615 A81-48371
Combat cockpit design
p0622 A81-49173
Parametric synthesis of an automatic system for
flight-vehicle stabilization
p0625 A81-49940
Failure management for the SAAB Viggen JA37 aircraft
p0042 N81-11273
A mathematical model of the CH-53 helicopter
[NASA-TM-81238]
p0075 N81-12065
Remotely piloted vehicles. Citations from the
International Aerospace abstracts data base
[NASA-CR-163864]
p0142 N81-14596
A study of State Feedback Implicit Model following
control for VSTOL aircraft
[AD-A093253]
p0216 N81-17099
V/STOLAND digital avionics system for XV-15 tilt
rotor
[NASA-CR-152320]
p0375 N81-22047
F-8C adaptive control law refinement and software
development
[NASA-CR-163093]
p0377 N81-22059
A digital-analog hybrid system and its application
to the automatic flight control system
simulation research
[NASA-TM-76457]
p0377 N81-22060
MLS: Airplane system modeling
[NASA-CR-165700]
p0386 N81-23059
Application of variable structure system theory to
aircraft flight control --- AV-8A and the
Augmentor Wing Jet STOL Research Aircraft
[NASA-CR-164321]
p0391 N81-23093
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials,
part 1
[NASA-CR-164684]
p0583 N81-30134
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials.
Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685]
p0584 N81-30135
AUTOMATIC LANDING CONTROL
VTOL control for shipboard landing in high sea
states
p0155 A81-20471
Flight test evaluation of a digital controller
used in a VTOL automatic approach and landing
system
p0179 A81-22549
Automatic helical rotorcraft descent and landing
using a Microwave Landing System
[AIAA PAPER 81-1857]
p0560 A81-44556
An aircraft landing system employing observers
p0562 A81-44699
Development and evaluation of automatic landing
control laws for power lift STOL aircraft
[NASA-CR-152399]
p0253 N81-18060
Operational considerations in utilization of
microwave landing system approach and landing
guidance
[NASA-TM-81945]
p0331 N81-20050
AUTOMATIC PATTERN RECOGNITION
U PATTERN RECOGNITION
AUTOMATIC PILOTS
Future trends in automatic flight control systems
[SAE PAPER 800627]
p0063 A81-15343
Design of guidance and control digital autopilots
p0183 A81-22973
The distributed parameter system theory of the
autopilot design of the slender vehicle
p0224 A81-23835
Control design for reduction of aerodynamic tail
forces using quadratic synthesis
p0240 A81-26610
The state of the art of general aviation
autopilots - Now and in the future
[SAE PAPER 810582]
p0520 A81-42744
Autopilot design via improved discrete modal control
[AIAA 81-1777]
p0554 A81-44095
Application of optimal control and estimation to
autopilot and autothrottle systems
p0615 A81-48371
YF-12 cooperative airframe/propulsion control
system program, volume 1
[NASA-CR-163099]
p0092 N81-13044
Human Factors of Flight-deck Automation:
NASA/Industry Workshop
[NASA-TM-81260]
p0191 N81-16022
The state of the art of general aviation autopilots
[NASA-CR-159371]
p0197 N81-16066
General aviation single pilot IFR autopilot study
p0265 N81-19045
Horizontal components of the atmospheric electric
field. Studies of the atmospheric electric
field in view of electrostatically controlled
automatic pilot applications
[BMVG-FBWT-80-7]
p0345 N81-21677
AUTOMATIC ROCKET IMPACT PREDICTORS
U COMPUTERIZED SIMULATION
AUTOMATIC TEST EQUIPMENT
The Navy PATE program --- Propulsion Automatic
Test Equipment
[ASME PAPER 81-GT-189]
p0317 A81-30082
Air Force Integration Support Facilities - Their
total utility
p0320 A81-30240
Augmenting ATE with dynamic simulation testing
techniques
p0320 A81-30241
A simulator to test compressor research facility
control system software
p0349 A81-31110
Centralized in-place pressure calibration system
for multiple turbine engine aerodynamic pressure
measurement systems
p0360 A81-32047
Analytical and computer-aided design of automated
systems for the testing of aircraft engines ---
Russian book
p0570 A81-46850
Tests of large compressors at CE Pr
p0432 N81-24096
AUTOMATIC TRAFFIC ADVISORY AND RESOLUTION
Discrete Address Beacon System
p0350 A81-31134

Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039
Automated pilot advisory system test and evaluation at Manassas Municipal Airport
p0264 N81-19040
AUTOMATION
Improvements required in air traffic control to meet increasing general aviation turbine powered aircraft operations
[SAE PAPER 800614] p0062 A81-15335
The evolution of operational systems --- approach to National Airspace System automation
p0064 A81-15699
Automating airborne company communications
p0112 A81-18064
Standardisation - An alternative approach to ATC automation
p0177 A81-22192
Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/
p0517 A81-42437
Automation of air traffic control processes --- Russian book
p0623 A81-49462
AUTOMOBILE ENGINES
Centrifugal compressors for small aero and automotive gas turbine engines
p0220 N81-17467
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design
[NASA-TM-81660] p0588 N81-30562
AUTOMOBILE FUELS
NT LIQUID FUELS
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search
[AD-A094154] p0253 N81-18057
AUTOMOBILES
Aerodynamic design of electric and hybrid vehicles: A guidebook
[NASA-CR-163744] p0088 N81-12943
Automotive technology development program
[DOE/CS-0069/1] p0278 N81-19464
AUTOPILOTS
U AUTOMATIC PILOTS
AUTOREGRESSIVE PROCESSES
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473
AUTOROTATION
Status of improved autorotative landing capability research
[AD-A090431] p0076 N81-12072
AUXILIARY POWER SOURCES
NT SNAP
Business aircraft APU's --- Auxiliary Power Units
[SAE PAPER 800608] p0061 A81-15331
Comparison of systems of power generation during emergencies /aboard aircraft/
p0177 A81-22203
A new airborne nickel cadmium battery concept
p0235 A81-25610
Test stand for the experimental study of auxiliary power supplies
p0319 A81-30153
The all-electric airplane as an energy efficient transport
[SAE PAPER 801131] p0396 A81-34162
The GTCP331 Auxiliary Power Unit for the next generation commercial transports
[SAE PAPER 801147] p0398 A81-34176
Secondary power system options for future military aircraft
[SAE PAPER 801192] p0401 A81-34202
Development requirements for integrated aircraft power systems
[SAE PAPER 801149] p0406 A81-34241
Development of test requirements for civil and military auxiliary power units
p0430 N81-24083
High performance auxiliary power unit technology demonstrator
[AD-A098618] p0444 N81-25085
AUXILIARY PROPULSION
The High Performance Auxiliary Power Unit technology demonstrator program
[SAE PAPER 801148] p0406 A81-34240
Preliminary evaluation of RSRA data comparing pure helicopter, auxiliary propulsion and compound helicopter flight characteristics --- Rotor Systems Research Aircraft
[AHS 80-10] p0473 A81-40143
AV-8A AIRCRAFT
U HARRIER AIRCRAFT
AVAILABILITY
Avionics Availability Study
[AIAA PAPER 81-1619] p0525 A81-43129
Availability requirements of the future ATC system
p0617 A81-48550
AVIATION
U AERONAUTICS
AVIATORS
U AIRCRAFT PILOTS
AVIONICS
The design of blowing-cooled aircraft electrical machines
p0002 A81-10474
High-density avionic power supply
p0005 A81-11157
The 767's flight-management system - A new generation of airborne avionics
p0005 A81-11242
The role of flight simulation in the design and development of the Sea Harrier Nav-Attack System
p0010 A81-11635
Airborne countermeasures system AN/ALQ-161
p0049 A81-12794
Low cost technology for expendable RPV applications
p0049 A81-12795
Standardization in military avionics systems architecture; Proceedings of the Seminar, Dayton, Ohio, November 28, 1979
p0050 A81-13167
Standardization in military system architecture
p0050 A81-13168
Military aircraft avionics in the 1980's
p0050 A81-13169
Avionic standardization from a designer's perspective
p0050 A81-13170
Avionic architectural standardization - Logistic support perspective
p0050 A81-13171
Promoting rational standardization --- for military avionics systems architecture
p0050 A81-13172
A lightning protection program for the F-16 fly-by-wire system
p0056 A81-14254
Flight management systems - Central ingredient of the 1980's avionics shipset
[SAE PAPER 800626] p0063 A81-15342
Air traffic management enhancement through new avionics /4-D/
p0099 A81-16583
A cockpit view of advanced airline avionics
p0100 A81-16585
The future ATC system as influenced by advanced avionics
p0100 A81-16586
An overview - 1980 generation avionic developments
p0111 A81-18061
Avionics and displays in a future airspace system
p0112 A81-18070
Cruise-missile-carrier navigation requirements
p0116 A81-18576
System considerations in the implementation of digital control
[AAS 80-032] p0120 A81-19375
Solid-state power system use expands
p0122 A81-19491
Fighters for the 1990s
p0122 A81-19497
Electromagnetic measurement of lightning strikes to aircraft
[AIAA PAPER 81-0083] p0160 A81-20588
Designing the Hornet for improved R and M
[AIAA PAPER 81-0230] p0162 A81-20688
The BQM-74C target as a flying computer - Its language and its peripherals
p0179 A81-22611
Adhesive bonding of avionic structures
p0181 A81-22646
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095

Integrated avionics studies target future technologies
p0223 A81-23499
F-16 improvement program - Making the digits count
p0241 A81-26931
Back to basics - The philosophy adopted for the flight testing of the Panavia Tornado avionics system in back aircraft
p0282 A81-27881
Application of CRT displays to new generation aircraft
p0286 A81-28297
RTCA looks at DABS avionics
p0286 A81-28301
Using microprocessors in fault monitoring of aircraft electronics
[ASME PAPER 81-GT-130]
p0316 A81-30040
Air Force Integration Support Facilities - Their total utility
p0320 A81-30240
Augmenting ATE with dynamic simulation testing techniques
p0320 A81-30241
Avionics computer system support at Ogden ALC
p0320 A81-30243
Delco Electronics Flight Management System for Air Force C-141 aircraft
p0321 A81-30249
Advanced avionic systems for multi-mission applications
p0321 A81-30258
Offensive avionics system /OAS/ design
p0321 A81-30259
Lightning threat definition for aircraft electrical power systems
p0322 A81-30284
Program Navigate - A simulation computer program to verify OAS navigation capability --- Offensive Avionics System
p0322 A81-30289
Simulation of a third-order vertical channel mechanization --- for airplane inertial navigation
p0322 A81-30290
BIT/FIT maturity before first flight --- in B-52 G/H Offensive Avionics System
p0324 A81-30320
A Single Processor Synchronous Executive derived from the DAIS executive --- Digital Avionics Information System
p0324 A81-30326
Information requirements for airborne electronic terrain maps
p0325 A81-30334
Tailoring software logic to the needs of the pilot - A software designer's nightmare
p0325 A81-30335
DAIS controls and displays - A systems approach to avionics subsystem integration
p0325 A81-30336
KC-135 modernization program --- cockpit avionics subsystems integration for pilot workload reduction
p0325 A81-30337
The reconstruction/refiltering approach to Kalman filter evaluation --- in long-range aircraft avionics
p0326 A81-30339
Heat pipe avionic cooling
p0326 A81-30343
B-52 Offensive Avionics System /OAS/ control and display design, using a Dynamic Mockup
p0327 A81-30354
Logistics support of avionic software stored on erasable programmable read only memory
p0327 A81-30356
The RLU - An advanced remote terminal for avionic systems
p0327 A81-30358
Support tactical self protection systems design
p0349 A81-31113
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122
V/STOL advanced technology rewards and risk --- aircraft design
[SAWE PAPER 1385]
p0354 A81-31401
A review of current and future components for electronic warfare receivers
p0357 A81-32252

The impact of the All Electric Airplane on production engineering
[AIAA PAPER 81-0849]
p0362 A81-32909
Airborne electronic displays
p0364 A81-32999
Methods for the verification and validation of digital flight control systems
[SAE PAPER 801134]
p0397 A81-34165
Development and applications of MIL-STD-1553 --- for avionics data buses
[SAE PAPER 801142]
p0398 A81-34172
A multiplexed digital voice intercommunications system for military applications
[SAE PAPER 801144]
p0398 A81-34173
The evolution of fiber optics in avionics
[SAE PAPER 801145]
p0398 A81-34174
Technology advances allow multiple role radar design for the F/A-18
[SAE PAPER 801163]
p0399 A81-34179
Strapdown navigation comes of age
[SAE PAPER 801167]
p0399 A81-34182
757/767 flight management system
[SAE PAPER 801169]
p0399 A81-34184
Flight test experience using advanced airborne equipment in a time-based metered traffic environment
[SAE PAPER 801207]
p0403 A81-34215
ICAS 'Manufacturing Cost/Design Guide' /MC/DG/ --- Integrated Computer Aided Manufacturing for aircraft systems
[AIAA PAPER 81-0855]
p0408 A81-34353
The Northrop F/A-18L Mission Simulator
[AIAA 81-0968]
p0414 A81-36557
A simulation approach to MIL-STD-1553 Multiplex Bus interfacing
[AIAA 81-0971]
p0415 A81-36560
Air data computer for the measurement and evaluation of data of flight physics
p0451 A81-37648
The state-of-the-art in avionics
p0451 A81-37649
Integrated sensor control system for RF-5E demonstrator
p0462 A81-39438
Civil aviation - Onboard electronic equipment and fuel savings
p0464 A81-39699
Weapon system evolution of attack helicopters
p0472 A81-40130
The digital core avionics system
p0472 A81-40132
Avionics system design requirements for the United States Coast Guard HH-65A Dolphin
p0472 A81-40133
Achieving the full benefits of integrated multiplex in the 1980's --- for military helicopter avionics
[AHS 80-15]
p0474 A81-40146
Summary of interface testing of the digital AN/ASN-123 tactical navigation avionic system in the SH-3H helicopter
[AHS 80-18]
p0474 A81-40149
Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499]
p0506 A81-40911
Aircraft radio systems --- Book
p0513 A81-4187
Recommendations for the NASA Avionics program for the 1980's
p0517 A81-42436
Multiplexing in general aviation aircraft
[SAE PAPER 810570]
p0519 A81-42735
Antennas-avionics systems relationship
[SAE PAPER 810572]
p0519 A81-42742
AFCS integration requirements --- Automatic Flight Control System
[SAE PAPER 810580]
p0519 A81-42743
Electronic fuel controls - Who needs them
[SAE PAPER 810619]
p0523 A81-42774
Avionics Availability Study
[AIAA PAPER 81-1619]
p0525 A81-43129
Standard Avionics Testbeds
[AIAA PAPER 81-1734]
p0528 A81-43172
Electrical/electromagnetic concerns associated with advanced composite materials in aerospace systems
p0536 A81-43630
The ICAS 'Manufacturing Cost/Design Guide' /MC/DG/ for Avionics
p0550 A81-44375

Avionics thermal integration for the Boeing 767 airplane
p0570 A81-46478

Aircraft/avionics environmental integration program
p0570 A81-46480

The Hornet's operational mission environment
p0571 A81-46491

Fiber optic technology for data transmission in the helicopter environment
p0573 A81-46614

Electronic Master Monitor and Advisory Display System
p0573 A81-46615

Future challenges in helicopter flight/propulsion control integration
p0575 A81-46633

Optimization of simulation models for avionics software verification
p0615 A81-48373

Development considerations for real-time aircraft/avionic distributed computer control systems
p0616 A81-48376

Aircraft electricity and electronics /3rd edition/ --- Book
p0624 A81-49877

Recommended short-term ATC improvements for helicopters. Volume 2: Recommended helicopter ATC training material
[AD-A089441] p0024 N81-10029

Head up displays. Citations from the NTIS data base
[PB80-809064] p0026 N81-10050

Optimized computer systems for avionics applications
[AD-A089570] p0028 N81-10063

Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A089971] p0033 N81-11022

Failure management techniques for high survivability
p0042 N81-11272

Microcomputer array processor system --- design for electronic warfare
p0044 N81-11673

Estimation of relative total cost for aircraft systems
p0047 N81-11922

Summary of AGARD Lecture Series 100: Methodology for control of life cycle costs for avionics systems
p0047 N81-11924

The role of advanced technology of turbine engine life cycle cost
p0047 N81-11927

Ring laser gyro
[AD-A090643] p0085 N81-12395

An assessment of General Aviation utilization of advanced avionics technology
[NASA-CR-159328] p0127 N81-13941

DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850] p0141 N81-14989

A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993

Validation Methods Research for Fault-Tolerant Avionics and Control Systems Sub-Working Group Meeting. CARE 3 peer review
[NASA-CP-2167] p0146 N81-15702

A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974

Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046

A survey of computer simulations of digital avionics systems
[AD-A091943] p0195 N81-16049

Annual report to the NASA Administrator by the Aerospace Safety Advisory Panel on the space shuttle program. Part 2: Summary of information developed in the panel's fact-finding activities
[NASA-TM-82252] p0198 N81-16114

Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current
p0200 N81-16158

Functional testing communication equipment (avionics)
[AD-A092825] p0201 N81-16375

Operational problems associated with head-up displays during instrument flight
[AD-A092992] p0210 N81-17058

Environmental burn-in effectiveness
[AD-A093307] p0211 N81-17060

Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061

Assessment of risk to Boeing commerical transport aircraft from carbon fibers --- fiber release from graphite/epxoy materials
[NASA-CR-159211] p0218 N81-17171

The 1980 Aircraft Safety and Operating Problems, part 2
[NASA-CP-2170-PT-2] p0267 N81-19056

Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111

V/STOL AND digital avionics system for UH-1H
[NASA-CR-152179] p0273 N81-19112

Integrated strike avionics study, volume 1
[AD-A094705] p0273 N81-19113

General Aviation Avionics Statistics
[AD-A095148] p0273 N81-19114

Estimation and statistical averaging applied to redundant strapped down inertial sensors for navigation and flight control
[AD-A094465] p0276 N81-19133

Initial design and experimental implementation of the traffic advisory service of ATARS
[AD-A095462] p0331 N81-20055

The P/POD project: Programmable/Pilot Oriented Display --- general aviation aircraft
p0371 N81-22004

V/STOLAND digital avionics system for XV-15 tilt rotor
[NASA-CR-152320] p0375 N81-22047

Navaids calibration evaluation with a computer-controlled avionics data acquisition system
p0383 N81-23020

Demonstration Advanced Avionics System (DAAS) functional description --- Cessna 402B aircraft
[NASA-CR-152405] p0389 N81-23080

General Aviation Activity and Avionics Survey
[AD-A097604] p0389 N81-23081

NAVAIR Avionics Master Plan
[AD-A097522] p0389 N81-23082

Groundspeed/airspeed differences as a wind shear indicator and flight evaluation of a DME-derived system to determine groundspeed
[AD-A097566] p0393 N81-23768

Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059

Power system control study. Phase 1: Integrated control techniques. Phase 2: Detail design and system modeling
[AD-A099894] p0497 N81-27100

AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 1: Proceedings
[AD-A100575] p0539 N81-28092

AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093

Onboard and ground test of an autonomous navigation system based on terrain correlation
p0544 N81-29069

The interface arrangement of digibus systems --- Mirage 2000 aircraft
p0545 N81-29084

Development of avionics installation interface standards
[AD-A101423] p0583 N81-30120

Definition, analysis and development of an optical data distribution network for integrated avionics and control systems
[NASA-CR-159370] p0590 N81-30962

High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191

Electronic voice communications improvements for Army aircraft
p0603 N81-31454

Software survey for the avionics test bed --- for large space structures
[NASA-CR-161089] p0629 N81-32143

Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] p0629 N81-32144
Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240
AVOIDANCE
NT BEACON COLLISION AVOIDANCE SYSTEM
NT COLLISION AVOIDANCE
NT VORTEX AVOIDANCE
AXES (COORDINATES)
U COORDINATES
AXIAL COMPRESSORS
U TURBOCOMPRESSORS
AXIAL FLOW
Sound radiation from a finite length unflanged circular duct with uniform axial flow. I - Theoretical analysis. II - Computed radiation characteristics
p0100 A81-16712
New features in the design of axial-flow compressors with tandem blades
[ASME PAPER 81-GT-113] p0315 A81-30017
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-164214] p0380 N81-22033
AXIAL FLOW COMPRESSORS
U TURBOCOMPRESSORS
AXIAL FLOW PUMPS
NT TURBINE PUMPS
AXIAL FLOW TURBINES
Optimum design of axial flow gas turbine stage. I - Formulation and analysis of optimization problem. II - Solution of the optimization problem and numerical results
p0019 A81-12608
Research on a high work axial gas generator turbine
[SAE PAPER 800618] p0062 A81-15338
A one-dimensional analysis and performance prediction of subsonic radial turbines
p0228 A81-24086
Efficiency prediction for axial-flow turbines operating with nonconventional fluids
[ASME PAPER 81-GT-15] p0310 A81-29937
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] p0620 A81-40636
Stability of large horizontal-axis axisymmetric wind turbines
[NASA-TM-81623] p0085 N81-12446
NASA contributions to radial turbine aerodynamic analyses
[NASA-TM-81644] p0090 N81-13019
The velocity induced by the wake of a wind turbine in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985
Turbine modeling technique to generate off-design performance data for both single and multistage axial-flow turbines
[NASA-CR-165244] p0213 N81-17078
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
Coupling of unsteady lift to acoustic duct modes in an axial flow fan
[AD-A095080] p0274 N81-19124
The calculation of quasi-three-dimensional frictionless compressible flow in axial turbomachines --- partial differential equations
[PNR-90047] p0275 N81-19127
Aerodynamics of advanced axial-flow turbomachinery
[NASA-CR-163995] p0335 N81-20079
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27098
Computer evaluation of the on-and-off design of an axial air turbine
[AD-A101102] p0549 N81-29131
Recent darrieus Vertical-Axis Wind Turbine aerodynamical experiments at Sandia National Laboratories
[SAND-81-1108C] p0588 N81-30615
AXISYMMETRIC BODIES
Aerodynamic estimation techniques for aerostats and airships
[AIAA 81-1339] p0457 A81-38542
AXISYMMETRIC FLOW
NT ANNULAR FLOW
Effects of axisymmetric sonic nozzle geometry on Mach disk characteristics
p0110 A81-18022
Non-isoenergetic turbulent jet mixing in a constant area duct --- in turbofan engines
[AIAA PAPER 81-0347] p0165 A81-20768
A computer simulation of turbulent jet flow
p0230 A81-24424
Studies on Thwaites' method for wind tunnel contraction
p0382 A81-27884
Investigation of the influence of the radial nonuniformity of initial temperature and energy losses on flow structure in a highly loaded turbine stage
p0465 A81-40019
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] p0618 A81-43606
Stability of large horizontal-axis axisymmetric wind turbines
[NASA-TM-81623] p0085 N81-12446
Effects of axisymmetric contractions on turbulence of various scales
p0093 N81-13055
AXISYMMETRY
U SYMMETRY
AXLES
U SHAFTS (MACHINE ELEMENTS)
AZIMUTH
The DME-aided Azimuth System - DAS
p0452 A81-37653
A2F AIRCRAFT
U A-6 AIRCRAFT

B

B-A-W DEVICES
U BULK ACOUSTIC WAVE DEVICES
B-1 AIRCRAFT
Airborne countermeasures system AN/ALQ-161
p0049 A81-12798
Developing a Fighter Engine Derivative of the B-1/F101 engine
[SAE PAPER 801156] p0407 A81-34246
The evolution of a strategic bomber
[AIAA PAPER 81-0919] p0479 A81-40324
Aerodynamic integration of externally mounted engines on a long-range bomber
[AIAA PAPER 81-1693] p0563 A81-44899
Weapon bay cavity noise environments, data correlation and prediction for the B-1 aircraft
[AD-A089770] p0045 N81-11778
B-52 AIRCRAFT
BIT/FIT maturity before first flight --- in B-52 G/H Offensive Avionics System
p0324 A81-30320
B-52 Offensive Avionics System /OAS/ control and display design, using a Dynamic Mockup
p0327 A81-30354
B-52 wake investigation
[LOG-C3932] p0072 N81-12020
B-58 AIRCRAFT
Silver recovery from aircraft scrap
[PB81-150021] p0392 N81-23269
BAC AIRCRAFT
The 146 emerges from the shadows
p0560 A81-44474
BACKGROUND NOISE
Second language speech comprehension in noise: A hazard to aviation safety
p0604 N81-31463
BACKINGS
U BACKUPS
BACKUPS
A piloted simulation of the backup control system engagement for the YAH-64
p0576 A81-46646
BACKWARD WAVES
Measurement of aerodynamic work during fan flutter
[NASA-TM-82652] p0443 N81-25080
BACKWASH
Maximum likelihood identification of aircraft lateral parameters with unsteady aerodynamic modelling
p0376 N81-22057
BAFFLES
Low-speed wind-tunnel tests of two weathercocking sensors
[WSRL-0171-TM] p0136 N81-14578

BALANCE
A discussion document on the thermal design of force balances for cryogenic wind tunnels
[OUEL-1321/80] p0435 N81-24119
BALANCE EQUATIONS
U EQUATIONS
BALANCING
The balancing of flexible rotors - Theoretical relation of each balancing method and accuracies
p0228 A81-24086
A unified approach to the mass balancing of rotating flexible shafts
p0095 N81-13355
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A093122] p0215 N81-17092
BALL BEARINGS
Acoustic spectrum analysis for gyro bearings
[AIAA PAPER 81-1616] p0524 A81-43128
BALLISTIC MISSILES
An analytical study of nonlinear stabilization during ballistic descent
p0237 A81-26028
BALLISTIC RANGES
U. of Dayton uses X-rays to study impact patterns at ballistic ranges
p0453 A81-37798
BALLISTICS
NT TERMINAL BALLISTICS
BALLOON FLIGHT
Design and engineering of solar balloons
p0455 A81-38333
BALLOONS
NT TETHERED BALLOONS
BANDPASS FILTERS
NT TRACKING FILTERS
Delta electrical load analysis C-141B JACC/CP Aircraft
[AD-A095659] p0334 N81-20071
BANDWIDTH
NT BROADBAND
BANG-BANG CONTROL
U OFF-ON CONTROL
BANKING FLIGHT
U TURNING FLIGHT
BARDEEN APPROXIMATION
U ELECTRICAL PROPERTIES
U SURFACE PROPERTIES
BAROMETRIC PRESSURE
U ATMOSPHERIC PRESSURE
BARYCENTER
U CENTER OF GRAVITY
BASE PRESSURE
Experimental investigations of the base pressures found on a bluff body in ground effect
p0234 A81-25379
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] p0627 N81-32124
BASES (FOUNDATIONS)
U FOUNDATIONS
BATTERIES
U ELECTRIC BATTERIES
BAYES THEOREM
Renewal function for any arbitrary period - A Bayesian way
p0101 A81-16939
BAYESIAN STATISTICS
U BAYES THEOREM
BAYS (STRUCTURAL UNITS)
Weapon bay cavity noise environments, data correlation and prediction for the B-1 aircraft
[AD-A089770] p0045 N81-11778
BCAS
U BEACON COLLISION AVOIDANCE SYSTEM
BEACON COLLISION AVOIDANCE SYSTEM
Active Beacon Collision Avoidance System (BCAS) functional overview
[AD-A094177] p0250 N81-18040
Arts 2 enhancement design alternative study
[AD-A096276] p0339 N81-21049
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase
[AD-A102163] p0595 N81-31181
BEACONS
NT DISCRETE ADDRESS BEACON SYSTEM
NT OMNIDIRECTIONAL RADIO RANGES
NT RADAR BEACONS
NT RADIO BEACONS
NT RADIO DIRECTION FINDERS
Laser beacon collision avoidance systems
p0372 N81-22009
BEAM WAVEGUIDES
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
BEAMS (RADIATION)
Sidelooking laser altimeter for a flight simulator
[NASA-CASE-ARC-11312-1] p0278 N81-19439
BEAMS (SUPPORTS)
NT BOX BEAMS
NT CANTILEVER BEAMS
Sliding-seal electron beam slot welding of an aircraft wing closure beam
p0614 A81-48142
Evaluation of section properties for hollow composite beams
[PAPER-NR-35] p0031 N81-10454
BEARING ALLOYS
Surface analysis of bearing steels after solvent treatments. II - Lubricant-coated bearing surfaces
[ASLE PREPRINT 80-LC-8A-6] p0118 A81-18748
BEARINGLESS ROTORS
The bearingless main rotor
p0356 A81-32008
Development of a bearingless helicopter tailrotor
p0465 A81-39897
Full scale wind tunnel investigation of a bearingless main helicopter rotor --- Ames 40 by 80 foot wind tunnel test using the BO-105 helicopter
[NASA-CR-152373] p0033 N81-11014
Development of a bearingless helicopter tail rotor --- application of composite materials
[MBB-UD-304/80-OE] p0586 N81-30199
A full-scale wind tunnel investigation of a helicopter bearingless main rotor --- Ames 40 by 80 Wind Tunnel
[NASA-TM-81321] p0628 N81-32137
BEARINGS
NT BALL BEARINGS
NT GAS BEARINGS
NT JOURNAL BEARINGS
NT ROLLER BEARINGS
NT THRUST BEARINGS
The vibration of a multi-bearing rotor
p0015 A81-11722
Experience with advanced high performance gear steel --- for CH-47
[ASME PAPER 80-C2/DET-77] p0117 A81-18648
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0118 A81-18758
Investigation of the squeeze film bearing on two-spool turbo-fan engine
p0295 A81-29093
Service life determination for the UH-60-A (UTTAS) helicopter elastomeric bearings
[AD-A091756] p0134 N81-14324
Improved capabilities to detect incipient bearing failures
[AD-A091687] p0134 N81-14325
BEDS (PROCESS ENGINEERING)
Shielded enclosure test bed requirement
[AD-A092589] p0190 N81-16073
BEHAVIOR
NT HUMAN BEHAVIOR
BELL AIRCRAFT
NT UH-1 HELICOPTER
NT XV-15 AIRCRAFT
Reduction of helicopter vibration through control of hub-impedance
p0356 A81-32009
BENCHES
U SEATS
BENDING
Flow in bent pipes
[CETIM-14-F-091] p0256 N81-18322
BENDING MOMENTS
Photoelastic investigation of stress distribution

around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571]
p0302 A81-29405
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0416 A81-36940
Multicyclic controllable twist rotor data analysis
[NASA-CR-152251]
p0249 N81-18028
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[NASA-TM-83144]
p0491 N81-26496
A structural load alleviation control system for a large transport aircraft
[TT-8002]
p0541 N81-28106
BENDING THEORY
Analysis of the influence of atmospheric turbulence on alternating bending stress level in helicopter main rotor blades
p0236 A81-25690
BENDING VIBRATION
Finite element analysis of natural and forced flexural vibrations of rotor systems
p0017 A81-11956
Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I
p0229 A81-24090
Coupled bending-torsion vibrations of rotating blades of asymmetric aerofoil cross section with allowance for shear deflection and rotary inertia by use of the Reissner method
p0289 A81-28942
Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates
p0348 A81-30914
BERMUDA
Seasat altimeter height calibration --- related to sea surface heights near bermuda
[NASA-TM-82040]
p0279 N81-19526
BIBLIOGRAPHIES
Summary of high-lift and control surface research on NASA general aviation airfoils
[SAE PAPER 810629]
p0524 A81-42701
Search and rescue methods and equipment. A bibliography with abstracts
[PB80-812837]
p0023 N81-10026
Bird strikes and aviation safety. Citations from the NTIS data base
[PB80-812944]
p0024 N81-10027
Adiabatic gas flow. Citations from the NTIS data base
[PB80-808546]
p0026 N81-10048
Head up displays. Citations from the International Aerospace Abstracts data base
[NASA-CR-163656]
p0026 N81-10049
Gyrocompasses. Citations from the International Aerospace Abstracts data base
[NASA-CR-163675]
p0028 N81-10065
Axial flow compressors. Citations from the Engineering Index data base
[PB80-808611]
p0029 N81-10076
Airfield pavement evaluation. Citations from the NTIS data base
[PB80-812860]
p0030 N81-10083
Axial flow compressors. Citations from the NTIS data base
[PB80-808603]
p0031 N81-10441
Bibliography on aerodynamics of airframe/engine integration of high-speed turbine-powered aircraft, volume 1
[NASA-TM-81814]
p0035 N81-11032
Synopsis on aircraft integrated data systems and engine health monitoring and maintenance
[DFVLR-MITT-80-09]
p0075 N81-12063
Closed loop control systems: Aircraft. Citations from the NTIS data base
[PB80-813710]
p0082 N81-12114
Airport noise. Citations from the NTIS data base
[PB80-813231]
p0088 N81-12667
Aircraft maintenance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0859/3]
p0125 N81-13917
Microwave landing systems. Citations from the Engineering Index data base
[PB80-814643]
p0128 N81-13947
Microwave landing systems. Citations from the NTIS data base
[PB80-814635]
p0128 N81-13948
Technological forecasting--aircraft design. Citations from the International Aerospace data base
[NASA-CR-163833]
p0129 N81-13957
Maneuvering aircraft: Noise pollution and control. Citations from the NTIS data base
[PB80-815566]
p0135 N81-14525
Bibliography of Supersonic Cruise Research (SCR) program from 1977 to mid-1980
[NASA-RP-1063]
p0139 N81-14973
Remotely piloted vehicles. Citations from the International Aerospace abstracts data base
[NASA-CR-163864]
p0142 N81-14996
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857]
p0146 N81-15648
Clean air turbulence. Citations from the International Aerospace Abstracts data base
[NASA-CR-163863]
p0146 N81-15649
Collision avoidance systems. Citations from the NTIS data base
[PB80-815020]
p0193 N81-16038
Air traffic control simulation models. Citations from the NTIS data base
[PB81-800104]
p0207 N81-17037
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base
[AD-A094226]
p0252 N81-18050
Scientific and Technical Information Output of the Langley Research Center, for calendar year 1976
[NASA-TM-82310]
p0279 N81-19964
Support interference of wind tunnel models: A selective annotated bibliography
[NASA-TM-81909]
p0335 N81-20084
MIT Annotated Bibliography
p0371 N81-22001
US and USSR Military Aircraft and Missile Aerodynamics 1970-1980. A selected, annotated bibliography, volume 1
[NASA-TM-81951]
p0547 N81-29119
Published results of the program of university research. Transportation research results
[PB81-210130]
p0641 N81-34108
Ames Research Center publications: A continuing bibliography, 1980
[NASA-TM-81308]
p0641 N81-34130
BINARY SYSTEMS (DIGITAL)
U DIGITAL SYSTEMS
BINDERS (ADHESIVES)
U ADHESIVES
BINDING
Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue
[NASA-TM-75733]
p0376 N81-22054
BIOASSAY
A Matrix Approach to Biological Investigation of Synthetic Fuels
[PB81-183477]
p0586 N81-30313
BIOENGINEERING
NT ELECTROMYOGRAPHY
BIOLOGICAL ANALYSIS
U BIOASSAY
BIOLOGICAL EFFECTS
The effect of airplane noise on the inhabitants of areas near Okecie Airport in Warsaw
[NASA-TM-75879]
p0379 N81-22593
BIOLOGICAL MODELS
U BIONICS
BIOMEDICAL DATA
Cabin fire simulator lavatory tests
[NASA-CR-160909]
p0190 N81-16020
BIOMETRICS
NT ELECTROMYOGRAPHY
BIONICS
BIOCONAID system (bionic control of acceleration induced dimming)
[AD-A102510]
p0601 N81-31234
BIOSIMULATION
U BIONICS
BIRD-AIRCRAFT COLLISIONS
Collisions between aircraft and birds
p0122 A81-15865

Computer analysis of bird-resistant aircraft transparencies
p0175 A81-22087
The development of a substitute bird model
[ASME PAPER 81-GT-23] p0311 A81-29939
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
Interactive multi-mode blade impact analysis
[ASME PAPER 81-GT-79] p0314 A81-29987
U. of Dayton uses X-rays to study impact patterns at ballistic ranges
p0453 A81-37798
T700 engine integral inlet separator - All weather operational protection
p0469 A81-40108
Finite element analysis of a bird-resistant monolithic stretched acrylic canopy design for the F-16A aircraft
[AIAA PAPER 81-1640] p0525 A81-43140
Bird strikes and aviation safety. Citations from the NTIS data base
[PB80-812944] p0024 N81-10027
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies
[AD-A091051] p0091 N81-13039
Evaluation of bird load models for dynamic analysis of aircraft transparencies
[AD-A092909] p0204 N81-16995
Validation of a bird substitute for development and qualification of aircraft tranparencies
[AD-A097736] p0424 N81-24036
Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion
[AD-A097731] p0426 N81-24049
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] p0638 N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] p0638 N81-33197
BIRDS
Handbook on bird management and control
[AD-A089009] p0023 N81-10024
Bird flight and airplane flight --- instruments to measure air currents and flight characteristics
[NASA-TM-75777] p0138 N81-14962
BLACKOUT (PROPAGATION)
NT ELECTROMAGNETIC NOISE
BLADE SLAP NOISE
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by tip modification
[AHS 80-62] p0479 A81-40185
BLADE TIPS
The effect of impeller tip design on the performance of a mixed flow turbocharger compressor
[ASME PAPER 81-GT-7] p0310 A81-29932
Rotor-tip leakage. I - Basic methodology
[ASME PAPER 81-GT-71] p0313 A81-29980
Rotor-tip leakage. II - Design optimization through viscous analysis and experiment
[ASME PAPER 81-GT-72] p0313 A81-29981
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by tip modification
[AHS 80-62] p0479 A81-40185
Blade tip ceramic outer air seal for long life turbine engines
[AIAA PAPER 81-1440] p0504 A81-40874
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] p0608 A81-47554
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] p0619 A81-48615
Rotor redesign for a highly loaded 1800 ft/sec tip speed fan, 2
[NASA-CR-159879] p0078 N81-12087
Wind-tunnel test of an articulated helicopter rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13918
Effects of geometric variables on rub characteristics of Ti-6Al-4V
[NASA-TP-1835] p0336 N81-20245
An evaluation of a simplified near field noise model for supersonic helical tip speed propellers
[NASA-TM-81727] p0380 N81-22836
Pressure distribution computation on a nonlifting symmetrical helicopter blade in forward flight
p0447 N81-26010
Aerodynamic and aeroelastic research on tipvane turbines
[VTH-LR-302] p0540 N81-28100
BLADES
Measurements of aerodynamic damping in the MIT transonic rotor
[NASA-CR-163988] p0274 N81-19122
BLAST LOADS
Computational design of large-scale blast simulators
[AIAA PAPER 81-0159] p0162 A81-20639
Nuclear blast response of airbreathing propulsion systems. Laboratory measurements with an operational J-85-5 turbojet engine
[AD-A092229] p0196 N81-16063
BLEED-OFF
U PRESSURE REDUCTION
BLOWDOWN WIND TUNNELS
Test stand for the study of flow systems in wind tunnels
p0409 A81-35009
Calibration of a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11060
The control of pressure, temperature and Mach number in a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11063
Comments on settling chamber design for quiet, blowdown wind tunnels
[NASA-TM-81948] p0335 N81-20085
High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400
BLOWERS
System to measure the pressure distribution on fan aerofoil surfaces during flutter conditions
[PNR-90013] p0072 N81-12029
Noise and noise abatement in fans and blowers: A review
[DFVLR-FB-80-16] p0138 N81-14796
Calibration of an axial fan at various power settings for use on a quarter scale XC-8A air cushion model
[AD-A097043] p0374 N81-22042
BLOWING
Reduction of profile drag by blowing out through peg holes in areas of streamline separation bubbles
[DGLR PAPER 80-103] p0120 A81-19392
Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0188 N81-16009
BLOWN FLAPS
U EXTERNALLY BLOWN FLAPS
BLUFF BODIES
Experimental investigations of the base pressures found on a bluff body in ground effect
p0234 A81-25379
Non-linear oscillator models in bluff body aeroelasticity
p0348 A81-30786
Calculation of the coefficients of head and local drag of bluff bodies
p0466 A81-40023
BLUNT BODIES
Slightly blunted cone in a supersonic flow at angle of attack
p0225 A81-23908
A contribution to the computation of transonic supersonic flows over blunt bodies
p0230 A81-24423
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732
BLUNT TRAILING EDGES
Effect of rear stagnation point position and trailing edge bluntness on airfoil characteristics
p0170 A81-21013
BO-105 HELICOPTER
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
p0467 A81-40087

Full scale wind tunnel investigation of a bearingless main helicopter rotor --- Ames 40 by 80 foot wind tunnel test using the BO-105 helicopter
[NASA-CR-152373] p0033 N81-11014

BK 117: A new helicopter through international cooperation
[MBB-UD-274/79-OE] p0502 N81-30121

The impact of helicopter flight mechanics on mission performance
p0633 N81-33140

BOATTAILS

Surface pressure measurements on a projectile shape at Mach 0.908
[AD-A098589] p0439 N81-25045

BODIES OF REVOLUTION
NT CONICAL BODIES
NT CYLINDRICAL BODIES
NT PARABOLIC BODIES
NT ROTATING CYLINDERS
NT SLENDER CONES

Numerical simulation of supersonic flow around solids of revolution with a leading detachment zone
p0231 A81-24757

BODY TEMPERATURE (NON-BIOLOGICAL)
U TEMPERATURE

BODY-WING AND TAIL CONFIGURATIONS

Possibilities for the valuation of different combat aircraft configurations with respect to flight mechanics
p0007 A81-11607

Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20582

Structural weight comparison of a joined wing and a conventional wing
[AIAA PAPER 81-0366] p0166 A81-20785

Experimental study of the snap-through oscillations of an empennage
p0299 A81-29313

Wing-body carryover at supersonic speeds with finite afterbodies
p0354 A81-31622

BODY-WING CONFIGURATIONS

Characteristics of the velocity field near a wing-body combination located at an angle of attack to an oncoming supersonic flow
p0119 A81-19337

Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367

The Coronal Transverse Wing flight system
p0231 A81-24748

Aerodynamic features of designed strake-wing configurations
[AIAA PAPER 81-1214] p0454 A81-38084

Some recent applications of high-lift computational methods at Boeing
[AIAA PAPER 81-1657] p0534 A81-43940

A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations
[FFA-TN-AU-1418-PT-1] p0022 N81-10013

Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986

Application of transonic potential calculations to aircraft and wind tunnel configurations
p0186 N81-15992

Finite element method study of wing-fuselage-nacelle interactions of a Falcon 20 type aircraft at Mach = 0.79
p0187 N81-15994

Interference aspects of the A310 high speed wing configuration
p0188 N81-16001

A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow
p0188 N81-16006

An investigation of a swept wing-body configuration with drooped leading edge at low and transonic speeds
p0189 N81-16012

Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014

Design study for the inner wing of a transonic wing-body combination of aspect ratio 8
p0190 N81-16015

The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
p0243 N81-17984

A study of wing body blending for an advanced supersonic transport
p0244 N81-17987

Prediction of nacelle aerodynamic interference effects at low supersonic Mach numbers
p0244 N81-17988

Investigation of EMAT base system for the detection of bolt hole type cracks. Part II: Detection of cracks in the inaccessible lower half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419

Overview of advanced wing design --- Ames 12-Foot Pressure Tunnel and 11-Foot Transonic Wind Tunnel
p0260 N81-19012

Computation of pressure distribution on the DFVLR wing-body model by the panel method
[DFVLR-FB-80-02] p0372 N81-22029

Three-dimensional transonic flow analysis
[AD-A101944] p0593 N81-31153

BOEING AIRCRAFT
NT B-52 AIRCRAFT
NT BOEING 727 AIRCRAFT
NT BOEING 737 AIRCRAFT
NT BOEING 747 AIRCRAFT
NT BOEING 757 AIRCRAFT
NT BOEING 767 AIRCRAFT
NT C-135 AIRCRAFT
NT CH-47 HELICOPTER

The development of multiple redundant flight control systems for high integrity applications
p0284 A81-27903

YC-14 digital flight control experience
p0320 A81-30246

Impact of terrain correlation elevation reference data on Boeing's Air Launched Cruise Missile
p0517 A81-42439

Testimony of Richard W. Taylor, Vice President and Special Assistant to the President, and Eugene A. Dare, Chief Engineer, Payloads Systems, Boeing Commercial Airplane Company
p0127 N81-13936

Assessment of risk to Boeing commerical transport aircraft from carbon fibers --- fiber release from graphite/epxoy materials
[NASA-CR-159211] p0218 N81-17171

Boeing Commercial Airplane Company engine procurement practices
p0429 N81-24076

BOEING MILITARY AIRCRAFT
U MILITARY AIRCRAFT

BOEING 727 AIRCRAFT

Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508

Operational responses to aft empty C.G. --- Center of Gravity location in Boeing 727-200 aircraft
[SAWE PAPER 1336] p0352 A81-31378

BOEING 737 AIRCRAFT

Flight companies present new aircraft - Boeing 737-200 advanced --- aircraft characteristics and airline selection procedures
p0171 A81-21575

CFM56-3 high by-pass technology for single aisle twins
[AIAA PAPER 81-0808] p0360 A81-33889

Boeing plays safe --- Boeing 737-300 design
p0480 A81-40855

Operational considerations in utilization of microwave landing system approach and landing guidance
[NASA-TM-81945] p0331 N81-20050

The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-159362] p0383 N81-21131

BOEING 747 AIRCRAFT

Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20740

Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] p0620 A81-48629

Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] p0620 A81-48638
Wake vortex attenuation flight tests: A status report
p0267 N81-19057
Airframe noise of a small model transport aircraft and scaling effects --- Boeing 747
[NASA-TP-1858] p0380 N81-22832
Lateral attenuation of high-by-pass ratio engined aircraft noise
[NASA-TM-81968] p0394 N81-23862
The 747 primary flight control systems reliability and maintenance study
[NASA-CR-159010] p0498 N81-27116
BOEING 757 AIRCRAFT
757/767 design considerations for improved productivity
p0100 A81-16584
Computer generated displays and pilot effectiveness
p0114 A81-18082
Boeing 757 and 767 Flight Management System
p0286 A81-28299
757/767 flight management system
[SAE PAPER 801169] p0399 A81-34184
Advanced graphite composites in the 757/767
[SAE PAPER 801212] p0404 A81-34220
Battle of the 15 tonne fans
p0480 A81-40457
Composite applications on Boeing commercial aircraft
p0557 A81-44341
BOEING 767 AIRCRAFT
The 767's flight-management system - A new generation of airborne avionics
p0005 A81-11242
757/767 design considerations for improved productivity
p0100 A81-16584
Computer generated displays and pilot effectiveness
p0114 A81-18082
Boeing 757 and 767 Flight Management System
p0286 A81-28299
757/767 flight management system
[SAE PAPER 801169] p0399 A81-34184
Advanced graphite composites in the 757/767
[SAE PAPER 801212] p0404 A81-34220
Boeing 767 - The new fuel saver
p0553 A81-44042
Composite applications on Boeing commercial aircraft
p0557 A81-44341
Avionics thermal integration for the Boeing 767 airplane
p0570 A81-46478
BOLKOW AIRCRAFT
NT BO-105 HELICOPTER
BOLTS
Bolt bearing strengths of graphite/epoxy laminates
[AIAA 81-0544] p0301 A81-29396
BOMBER AIRCRAFT
NT A-6 AIRCRAFT
NT B-1 AIRCRAFT
NT B-52 AIRCRAFT
NT B-58 AIRCRAFT
NT F-100 AIRCRAFT
Combat aircraft development - Looking backward to look forward 1935-1990
p0284 A81-27905
The evolution of a strategic bomber
[AIAA PAPER 81-0919] p0479 A81-40324
BOMBS (SAMPLERS)
U SAMPLERS
BONDING
NT ADHESIVE BONDING
NT METAL BONDING
NT METAL-METAL BONDING
NT RESIN BONDING
Electrical bonding in aircraft
p0057 A81-14264
BOOMS (EQUIPMENT)
KC-10A refueling boom control system
p0322 A81-30266
BOOST
U ACCELERATION (PHYSICS)
BOOSTER ROCKET ENGINES
Flutter of plates and shells in practice
p0282 A81-27611
BOOSTERS
The T700 booster engine
p0105 A81-17506
A new approach to turboshaft engine growth
[AHS 80-41] p0477 A81-40169
BOOSTGLIDE VEHICLES
Boost-glide range-optimal guidance
[AIAA 81-1781] p0554 A81-44096
BOREDOM
Human Factors of Flight-deck Automation: NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022
BORES
U CAVITIES
BORON COMPOUNDS
NT BORON-EPOXY COMPOUNDS
BORON REINFORCED MATERIALS
NT BORON-EPOXY COMPOUNDS
Application of BFRP Crack Patching to Mirage III aircraft
p0481 A81-40586
Structural design of BFRP patches for Mirage wing repair
[AD-A097195] p0384 N81-23024
BORON-EPOXY COMPOUNDS
Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development
p0559 A81-44395
Effect of various environmental conditions on polymer matrix composites
p0039 N81-11130
BOUNDARIES
NT FLUID BOUNDARIES
NT GAS-SOLID INTERFACES
NT JET BOUNDARIES
NT LIQUID-SOLID INTERFACES
BOUNDARY LAYER CONTROL
NT POROUS BOUNDARY LAYER CONTROL
The effects of noise on laminar flow control drag reduction systems
p0058 A81-14399
Influence of jet location on the efficiency of spanwise blowing
p0154 A81-20352
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
p0239 A81-26508
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control
p0239 A81-26512
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513
In-flight research - At low cost
p0299 A81-29208
Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
[SAE PAPER 801155] p0407 A81-34245
Core compressor exit stage study. Volume 3: Data and performance report for screening test configurations
[NASA-CR-159499] p0078 N81-12086
Effects of boundary-layer treatment on cryogenic wind-tunnel controls
[NASA-CR-159372] p0083 N81-12120
Effects of axisymmetric contractions on turbulence of various scales
p0093 N81-13055
A computer program for the design and analysis of low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14968
Discussion of test results in the design of laminar airfoils for competition gliders
[NASA-TM-75402] p0186 N81-15984
Aircraft Energy Efficiency program: Laminar flow control technology
[NASA-TM-82352] p0437 N81-24389
An introduction to the aerodynamics of spoilers
[PB81-166183] p0487 N81-26122
Flow control about an airborne laser turret
[AD-A100110] p0537 N81-28060
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures

[NASA-CR-3444] p0587 N81-30392
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121
BOUNDARY LAYER EQUATIONS
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14581
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002
BOUNDARY LAYER FLOW
NT BOUNDARY LAYER SEPARATION
NT REATTACHED FLOW
NT SECONDARY FLOW
NT SEPARATED FLOW
Low-speed airfoil section research at Delft University of Technology
p0010 A81-11636
Attainability of an attached flow in a nozzle with heavily curved walls
p0054 A81-13548
Influence of boundary-layer suction on the emission spectrum on a thin plate performing oscillations under the action of pressure pulsations --- in aircraft noise reduction
p0054 A81-13573
A computational model for low speed flows past airfoils with spoilers
[AIAA PAPER 81-0253] p0163 A81-20702
Influence of boundary-layer suction on the spectrum of radiation from a thin plate vibrating under the action of pressure fluctuations --- in aircraft noise reduction
p0238 A81-26137
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513
Turbine blade cooling research at the von Karman Institute for Fluid Dynamics
p0293 A81-29076
Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434] p0504 A81-40871
Surface-oriented coordinates for boundary-layer calculations in the case of general configurations
[DGLR PAPER 81-014] p0608 A81-47557
Trailing edge noise prediction from measured surface pressures
p0616 A81-48395
Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975
Physical and numerical aspects of shock boundary layer interactions
p0256 N81-18324
Influence of free-stream Mach number on transonic shock-wave boundary-layer interaction
[NLR-MP-78013-U] p0256 N81-18325
Energy efficient engine, low-pressure turbine boundary layer program
[NASA-CR-165338] p0442 N81-25077
The effect of boundary layer growth on the stability of compressible flows
p0587 N81-30389
BOUNDARY LAYER NOISE
U AERODYNAMIC NOISE
U BOUNDARY LAYERS
BOUNDARY LAYER SEPARATION
Separation of laminar boundary layer induced by aerodynamic interference
p0067 A81-15897
Scale effects on turbulent boundary layer development and flow separation around V/STOL inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
An experimental investigation of separating flow on a convex surface
p0230 A81-24488
A numerical study of vortex shedding from one and two circular cylinders
p0233 A81-25355
Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
p0354 A81-31612
Role of laminar separation bubbles in airfoil leading-edge stalls
p0354 A81-31613
The challenge of unsteady separating flows
p0411 A81-35647
The influence of surface roughness on boundary layer flow and separation at transonic speeds
p0413 A81-36468
Development and wind tunnel investigation of three supercritical airfoil profiles for transport aircraft
[NASA-TM-75840] p0249 N81-18030
Study of the vortex conditions of wings with large sweepback by extrapolation of the Jones method
[NASA-TM-75863] p0262 N81-19026
Leading-edge separation from a slender rolling wing-body combination --- vortex sheet model
[RAE-TR-80039] p0330 N81-20040
Experimental investigation of the flow on the suction side of a thin Delta wing
[NASA-TM-75897] p0338 N81-21024
On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042
Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels
p0386 N81-23056
Some qualitative experiments on the local flow about spoilers in unsteady motion at low speeds
[PB81-166159] p0487 N81-26124
BOUNDARY LAYER STABILITY
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840
The linear instability due to the compressible crossflow on a swept wing
p0170 A81-21168
Influence of zero-lift downwash on the relation between minimum-drag center-of-gravity position and inherent stability boundary
p0235 A81-25608
Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0238 A81-26503
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
Compliant surfaces - Introduction
p0240 A81-26515
Experimental investigation into the reaction of a boundary layer to external periodic disturbances
p0309 A81-29866
Effect of engine noise on aircraft wing laminar boundary-layer stability
p0510 A81-41255
BOUNDARY LAYER TRANSITION
Three-dimensional boundary layer transition via the mechanisms of 'attachment line contamination' and 'cross flow instability'
p01[illegible] A81-18122
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities
p0120 A81-19684
Correlation of artificially induced boundary-layer transition data at hypersonic speeds
p0285 A81-27911
Flow transition phenomena and heat transfer over the pressure surfaces of gas turbine blades
[ASME PAPER 81-GT-107] p0315 A81-30012
Effect of engine noise on aircraft wing laminar boundary-layer stability
p0510 A81-41255
Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051
Design of turbine cascades with transitional profile boundary layers
p0278 N81-1945[illegible]
A study of a VTOL thrusting ejector in low speed flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017
A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018

Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3433] p0392 N81-23411
BOUNDARY LAYERS
NT ATMOSPHERIC BOUNDARY LAYER
NT COMPRESSIBLE BOUNDARY LAYER
NT HYPERSONIC BOUNDARY LAYER
NT INCOMPRESSIBLE BOUNDARY LAYER
NT LAMINAR BOUNDARY LAYER
NT PLANETARY BOUNDARY LAYER
NT SUPERSONIC BOUNDARY LAYERS
NT THREE DIMENSIONAL BOUNDARY LAYER
NT TURBULENT BOUNDARY LAYER
NT TWO DIMENSIONAL BOUNDARY LAYER
On the unsteady wake-induced lift on a slotted airfoil. II - The influence of displacement thickness fluctuations
p0229 A81-24237
Natural laminar flow flight experiment --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19010
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
Separation behavior of boundary layers on three-dimensional wings
[NASA-TM-75877] p0262 N81-19027
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088
Expected improvements on high angle of attack model testing
p0436 N81-24123
German activities on wind tunnel corrections
p0436 N81-24124
A review of some investigations on wind tunnel wall interference carried out in Sweden in recent years
p0436 N81-24126
BOUNDARY VALUE PROBLEMS
NT NEUMANN PROBLEM
An experimental and theoretical investigation of pressures in four-lobe bearings
p0004 A81-10840
Component-adaptive grid embedding
p0137 N81-14697
An analytic model of subsonic flow around an airflow with a spoiler
p0138 N81-14966
A method for obtaining shockless transonic flows past airfoils, partially modified from a given arbitrary airfoil
[NAL-TR-602T] p0141 N81-14983
Basic studies of body vortices at high angles of attack and supersonic speeds
[AD-A102241] p0594 N81-31154
BOW SHOCK WAVES
U SHOCK WAVES
BOX BEAMS
A hybrid composite horizontal stabilizer for the XH-2/CCR Flight Demonstrator Aircraft
[AHS 80-35] p0476 A81-40164
BOXES (CONTAINERS)
Determination of cargo container inventories through logistics simulation --- for air shipment
p0616 A81-48380
BRAKES (FOR ARRESTING MOTION)
NT AIRCRAFT BRAKES
NT DRAG CHUTES
NT LEADING EDGE SLATS
NT TRAILING-EDGE FLAPS
NT WING FLAPS
BRAKING
Braking of an aircraft tyre
p0412 A81-35892
BRAYTON CYCLE
Modified Brayton cycles utilizing alcohol fuels
[ASME PAPER 81-GT-103] p0315 A81-30009
Solar Brayton engine/alternator set
p0588 N81-30529
BRAZING
Acoustic structures --- titanium brazing method for producing honeycomb structures for jet engine noise reduction
p0001 A81-10272
Service evaluation of aluminum-brazed titanium (ABTi) --- aircraft structures
[NASA-CR-3418] p0378 N81-22129
BREAKAWAY
U BOUNDARY LAYER SEPARATION
BREATHING APPARATUS
NT OXYGEN MASKS
NT UNDERWATER BREATHING APPARATUS
BRIGHTNESS
Operational problems associated with head-up displays during instrument flight
[AD-A092992] p0210 N81-17058
The presentation of static information on air traffic control displays
p0211 N81-17064
BRISTOL-SIDDELEY BS 53 ENGINE
History of the Pegasus vectored thrust engine
p0411 A81-35630
Bench testing of a vectored thrust engine
p0432 N81-24093
BRITISH AIRCRAFT CORP AIRCRAFT
U BAC AIRCRAFT
BROADBAND
Experiments on effective source locations and velocity dependence of the broad band noise from a rotating rod
p0016 A81-11724
Broadband helicopter rotor noise
[AAAF PAPER NT 80-58] p0370 A81-33949
BRUSHES
NT BRUSHES (ELECTRICAL CONTACTS)
BRUSHES (ELECTRICAL CONTACTS)
Brushless cryogenic ac motors
p0002 A81-10468
BUBBLES
Role of laminar separation bubbles in airfoil leading-edge stalls
p0354 A81-31613
The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12038
On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042
BUCKLING
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29405
Effect of post buckling on the fatigue of composite structures
p0418 A81-37127
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521
Post-buckling and membrane structural capability of composite shell structures
p0482 A81-40602
BUFFETING
A method for the prediction of wing response to nonstationary buffet loads
[AD-A093037] p0208 N81-17043
Unsteady pressure measurements during stall and buffeting --- wind tunnel tests
[ESA-TT-641] p0339 N81-21041
Aeroelastic buffeting prediction techniques: A general review
[DFVLR-FB-81-15] p0601 N81-31226
BUILDING MATERIALS
U CONSTRUCTION MATERIALS
BULK ACOUSTIC WAVE DEVICES
The behavior of quartz oscillators in the presence of accelerations --- in missile and aircraft time-frequency navigation systems
[ONERA, TP NO. 1981-31] p0351 A81-31285
BULKHEADS
Bulkheads in airships
[AIAA 81-1328] p0456 A81-38536
BUOYANCY
Design and development of a thermal airship
[AIAA 81-1330] p0456 A81-38537
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270] p0248 N81-18023
BURNING
U COMBUSTION
BURNING PROCESS
U COMBUSTION
BURNING RATE
External burning propulsion analysis
[AIAA PAPER 81-1477] p0505 A81-40697
BURSTS
State-of-the-art review of flywheel burst containment

[UCRL-15257] p0085 N81-12427

BUS CONDUCTORS

Considerations concerning an 'information busbar' for distributing on-board measurement and control information
p0233 A81-25375

Aircraft multi-bus electrical system using a Hall-effect sensing device
[SAE PAPER 810569] p0519 A81-42730

The interface arrangement of digibus systems --- Mirage 2000 aircraft
p0545 N81-29080

Definition, analysis and development of an optical data distribution network for integrated avionics and control systems
[NASA-CR-159370] p0590 N81-30962

BYPASS RATIO

Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842

Turbine bypass engine - A new supersonic cruise propulsion concept
[AIAA PAPER 81-1596] p0508 A81-40971

Propulsion energy for tomorrow's aviation
p0622 A81-49161

BYPASSES

A new high bypass fan for general aviation
[SAE PAPER 800602] p0061 A81-15327

The optimum design of by-pass engines with jet mixing
[PNR-90017] p0335 N81-20081

C

C BAND

Noncoherent C-band transponder standards
[AD-A091282] p0095 N81-13251

C-15 AIRCRAFT

YC-15 interior noise measurements. Technical discussion
[AD-A098788] p0492 N81-26847

C-130 AIRCRAFT

Airborne emergency hospital
p0299 A81-29207

Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] p0635 N81-33173

C-135 AIRCRAFT

Aeroelastic tailoring of a composite winglet for KC-135
[AIAA 81-0607] p0304 A81-29470

KC-135 modernization program --- cockpit avionics subsystems integration for pilot workload reduction
p0325 A81-30337

Theoretical and Experimental studies of aerodynamic interference effects --- aerodynamic forces on winglets and on wing nacelle configurations for the YC-14 and KC-135 aircraft
p0190 N81-16017

KC-135 winglet flight results
p0260 N81-19011

C-141 AIRCRAFT

The stretched C-141 - Cost effective application of structural technology
[AIAA 81-0514] p0302 A81-29427

Delco Electronics Flight Management System for Air Force C-141 aircraft
p0321 A81-30249

Feasibility study for C-141B reduction of wing loads by uprigging the ailerons
[AD-A094634] p0272 N81-19105

Delta electrical load analysis C-141B JACC/CP Aircraft
[AD-A095659] p0334 N81-20071

Aerodynamic investigation of C-141 leading edge modifications for cruise drag reduction, test 2
[AD-A099662] p0492 N81-27051

PACER LIME: An environmental corrosion severity classification system, part 1
[AD-A100496] p0539 N81-28089

Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] p0635 N81-33173

CABIN ATMOSPHERES

Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20740

Ozone contamination in aircraft cabins: Results from GASP data and analyses
[NASA-TM-81671] p0191 N81-16021

R.A.N. Sea King cabin environment survey. Part 2: Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065

Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977 --- Global Atmospheric Sampling Program
[NASA-TP-1807] p0345 N81-21685

CADMIUM NICKEL BATTERIES
U NICKEL CADMIUM BATTERIES

CAI
U COMPUTER ASSISTED INSTRUCTION

CALCULATION
U COMPUTATION

CALCULUS
NT FOURIER SERIES
NT PADE APPROXIMATION
NT VECTOR ANALYSIS
NT VORTICITY

CALIBRATING
NT WIND TUNNEL CALIBRATION

Structural flight load testing, calibration and analysis
p0013 A81-11656

In-flight calibration of aircraft antenna radiation patterns
p0173 A81-21825

Advancements in dimensional inspection of helicopter gearboxes and transmission cases
[AHS 80-36] p0476 A81-40165

Calibration of a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11060

Seasat altimeter height calibration --- related to sea surface heights near bermuda
[NASA-TM-82040] p0279 N81-19526

Calibration of an axial fan at various power settings for use on a quarter scale XC-8A air cushion model
[AD-A097043] p0374 N81-22042

CALIFORNIA

Southern California aviation system study
[PB80-215544] p0125 N81-13016

CALORIMETRY
U HEAT MEASUREMENT

CAMBER
NT WING CAMBER

Assessment of variable camber for application to transport aircraft
[NASA-CR-158930] p0071 N81-12016

CAMBERED WINGS

The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146

Some particular configuration effects on a thin supercritical variable camber wing
p0188 N81-16005

Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016

CAMERAS
NT TELEVISION CAMERAS

Charge-coupled device /CCD/ camera/memory optimization for expendable autonomous vehicles
p0357 A81-32491

KS-127A long range oblique reconnaissance camera for RF-4 aircraft
p0462 A81-39419

Binocular Camera for cockpit visibility of general aviation aircraft
[SAE PAPER 810628] p0524 A81-42780

Probe protection in camera/model visual systems --- for helicopter flight simulators
p0615 A81-48359

CANADA

Bilingual air traffic control in Canada
p0169 A81-20915

Canadian studies of wind tunnel corrections for high angle of attack models
p0435 N81-24121

V/STOL aircraft technology in Canada
p0634 N81-33152

CANADAIR AIRCRAFT

The 'light-weight' system - A novel concept for

on-board weight and balance measurement using fiber optics
[SAWE PAPER 1336] p0352 A81-31377
CANADAIR CF-104 AIRCRAFT
U CANADAIR AIRCRAFT
CANARD CONFIGURATIONS
Delta canard configuration at high angle of attack
p0154 A81-20351
Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367
Cygnet - A canard configuration powered ultralight aircraft
p0231 A81-24746
Rotary balance data for a single engine general aviation design having a high aspect-ratio canard for an angle-of-attack range of 30 deg to 90 deg
[NASA-CR-3170] p0090 N81-13022
Computational aerodynamic design tools and techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0128 N81-13950
Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0188 N81-16009
Aerodynamic interaction between a close-coupled canard and a sweptback wing in transonic flow
p0189 N81-16013
Description of the HiMAT Tailored composite structure and laboratory measured vehicle shape under load
[NASA-TM-81354] p0251 N81-18047
Measurement of canard wakes
[AD-A095063] p0263 N81-19029
CANNONS
U GUNS (ORDNANCE)
CANOPIES
The measurement of pressure distribution around a parachute canopy
p0067 A81-16019
Finite element analysis of a bird-resistant monolithic stretched acrylic canopy design for the F-16A aircraft
[AIAA PAPER 81-1640] p0525 A81-43140
A contribution to stabilization of flight vehicle parachute systems
[DFVLR-MITT-80-05] p0126 N81-13926
Ergonometric study of ejection through a breakable canopy
p0205 N81-17011
Aircraft transparency optical quality: New methods of measurement
[AD-A096183] p0341 N81-21070
Aircraft canopy lock
[NASA-CASE-FRC-11065-1] p0426 N81-24047
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] p0638 N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] p0638 N81-33197
CANTILEVER BEAMS
Free-vibration analysis of rotating beams by a variable-order finite-element method
[AIAA 81-0614] p0305 A81-29476
On St. Venant flexure and torsion problem for symmetrical airfoil sections
p0365 A81-33245
Strength calculation of thin-wall rods of significant taper
p0625 A81-49937
CANTILEVER MEMBERS
NT CANTILEVER BEAMS
NT CANTILEVER PLATES
Efficiency of cantilever compressor stator blades
p0509 A81-41041
CANTILEVER PLATES
Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates
p0348 A81-30914
CANTILEVER WINGS
U WINGS
CAPACITIVE FUEL GAGES
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059
CAPACITY
Airport capacity enhancement by innovative use of runway geometry
[AIAA PAPER 81-0801] p0368 A81-33891
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] p0639 N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] p0639 N81-33217
CAPTIVE TESTS
NT STATIC FIRING
NT STATIC TESTS
Captive aircraft testing at high angles of attack
[AD-A103108] p0628 N81-32140
CARAVELLE AIRCRAFT
U SE-210 AIRCRAFT
CARBAMATES (TRADENAME)
NT URETHANES
CARBIDES
NT SILICON CARBIDES
CARBON
Compound Cycle Turbofan Engine (CCTE). Task 9: Carbon-Slurry Fuel Combustion Evaluation Program
[AD-A089451] p0029 N81-10072
CARBON COMPOUNDS
NT SILICON CARBIDES
CARBON DIOXIDE
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21078
CARBON DIOXIDE LASERS
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10128
CARBON FIBER REINFORCED PLASTICS
Electrical bonding in aircraft
p0057 A81-14264
The joints of aeronautical carbon resin composite structural elements
p0238 A81-26242
Applications of carbon fibre composites to military aircraft structures
p0283 A81-27885
Engineering aspects of composite structures for civil aircraft
p0283 A81-27888
Building the Gossamer Albatross
p0286 A81-28461
The use of carbon-reinforced plastic in the construction of a deflector and a stabilizer
p0299 A81-29310
Manufacturing technology for aircraft structural components made of carbon-fiber reinforced plastics
p0449 A81-37637
Components in hybrid- and fiber technology for commercial aircraft of the Airbus family /flap support, spoiler, and window frame/
p0450 A81-37644
Airbus - Rudder unit in carbon fiber technology
p0451 A81-37651
New structural technologies for future fighters
p0458 A81-38805
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521
A fatigue study and an investigation on mechanically fastened joints for the development of a flap
p0481 A81-40581
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
Graphite thermoplastic YC-14 outboard elevator
p0530 A81-43631
Use of carbon composites in aircraft structures
p0577 A81-46813
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] p0607 A81-47551
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] p0609 A81-47565
Effect of service environment on composite materials
[AGARD-CP-288] p0039 N81-11128
Constant-amplitude and flight-by-flight tests on CFRP specimens
p0039 N81-11133
Fatigue strength of CFRP under combined flight-by-flight loading and flight-by-flight temperature changes

p0039 N81-11134
Fatigue test results of carbon fiber reinforced plastic F28 aircraft component and its structural details
p0040 N81-11135
The potential for damage from the accidental release of conductive carbon fibers from aircraft composites
p0041 N81-11143
Design-to-cost and new technologies
p0046 N81-11913
Optimal design studies on composite wings with static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
The development of the composite material engine nacelle
[AAAF-NT-79-36] p0083 N81-12180
Current developments in aircraft fatigue evaluation procedures
[AAAF-NT-79-33] p0086 N81-12464
Constant-amplitude and flight-by-flight tests on CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006
EMC, lightning and NEMP-protection-new requirements for approved specifications when using CFRP
p0199 N81-16152
Scarf joints in unidirectional carbon fiber reinforced plastics --- tests of repairs made using adhesives
[BU-258] p0336 N81-20193

CARBON FIBERS
A probabilistic analysis of electrical equipment vulnerability to carbon fibers
[NASA-TM-80217] p0038 N81-11113
Fiber release from impacted graphite reinforced epoxy composites
[NASA-CR-163684] p0038 N81-11117
The implications of laboratory accelerated conditioning of carbon fibre composites
p0039 N81-11129
High-voltage spark carbon-fiber sticky-tape data analyzer
[NASA-CR-163747] p0087 N81-12646
A resin injection technique for the fabrication of aero engine composite components
[PNR-90024] p0131 N81-14004
Large-scale carbon fiber tests
[NASA-TM-80218] p0198 N81-16137
Current and projected use of carbon composites in United States aircraft
p0198 N81-16145
Application of carbon fibre composites to military aircraft structures
p0199 N81-16147
The electrical effects of joints and bonds in carbon fiber composites
p0199 N81-16153
The UK Ministry of Defence programme on the electromagnetic properties of carbon fiber composites
p0199 N81-16154
Aircraft manufacturers approach to the E.M.C./Avionics problems associated with the use of composite materials
p0200 N81-16156
Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current
p0200 N81-16158
Assessment of risk to Boeing commerical transport aircraft from carbon fibers --- fiber release from graphite/epxoy materials
[NASA-CR-159211] p0218 N81-17171
Risk to the public from carbon fibers released in civil aircraft accidents
[NASA-SP-448] p0254 N81-18096
Development of a CFC window frame, using short fiber pressing technology --- jet aircraft cabin windows
[BMFT-FB-W-80-032] p0499 N81-27208
Carbon/graphite composite material study
[AR-3] p0585 N81-30188
Carbon/graphite composite material study. 3: Agency program activities. National Aeronautics and Space Administration (NASA)
p0585 N81-30189
Carbon/graphite composite material study, appendix A and appendix B
p0585 N81-30190

CARBON MONOXIDE
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21078

CARBON STEELS
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796

CARBON-CARBON COMPOSITES
Carbon/carbon components for advanced gas turbine engines
[ASME PAPER 81-GT-35] p0312 A81-29949
Carbon/graphite composite material study
[AR-3] p0585 N81-30188
Carbon/graphite composite material study. 3: Agency program activities. National Aeronautics and Space Administration (NASA)
p0585 N81-30189
Carbon/graphite composite material study, appendix A and appendix B
p0585 N81-30190

CARGO
NT AIR CARGO
Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing
[AD-A089794] p0035 N81-11034
Dynamics of a helicopter-slung load system
p0092 N81-13051
Helicopter external load acquisition technology investigation
[AD-A094672] p0272 N81-19106
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] p0635 N81-33173

CARGO AIRCRAFT
NT C-130 AIRCRAFT
NT C-135 AIRCRAFT
NT C-141 AIRCRAFT
NT DC 3 AIRCRAFT
NT F-27 AIRCRAFT
NT SPANLOADER AIRCRAFT
NT YC-14 AIRCRAFT
The future of airfreight - NASA study looks into the next century
p0056 A81-14282
Flatbed - The universal transport airplane
[SAWE PAPER 1343] p0353 A81-31382
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
Generic multi-body formulation of heavy lift airship equations of motion
p0563 A81-45539
A new aircraft is born - The CN-235
p0565 A81-45756
Design options study. Volume 1: Executive summary --- user requirements for the advanced civil military aircraft
[AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results --- advanced civil military aircraft: cost estimates
[AD-A089537] p0027 N81-10057
Design options study. Volume 3: Qualitative assessment --- advanced civil military aircraft
[AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices --- advanced civil military aircraft
[AD-A089539] p0027 N81-10059
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16081
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047
Airport activity statistics of certificated route air carriers
[AD-A102353] p0602 N81-31236
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164853] p0627 N81-32117

CARRIAGES
An opto-electronic method for wind tunnel model alignment
p0361 A81-32849

CARRIER MODULATION
U MODULATION
CARRIER ROCKETS
U LAUNCH VEHICLES
CARTESIAN COORDINATES
Component-adaptive grid embedding
p0137 N81-14697
CARTOGRAPHY
U MAPPING
CARTRIDGE ACTUATED DEVICES
U ACTUATORS
CASCADE CONTROL
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology --- Linear Quadratic Gaussian
[AIAA PAPER 81-0021] p0156 A81-20544
CASCADE FLOW
The performance of slotted blades in cascade
p0002 A81-10632
Effect of surface roughness over the blade in compressor cascade
p0060 A81-14924
Choking effects in the blade rows of turbomachines
p0061 A81-15269
Variational principles and generalized variational principles for the hybrid aerodynamic problem of airfoil cascades on an arbitrary stream sheet of revolution
p0107 A81-17741
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805
Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197
Eddy viscosity in accelerated and retarded cascade-wake flows
p0233 A81-25267
Subsonic cascade flow analysis by a finite element method
p0233 A81-25311
Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results
p0293 A81-29072
Numerical computation of compressible steady cascade flows
p0296 A81-29100
The axial velocity density ratio and the axial velocity density distribution in axial flow compressors and cascades
p0296 A81-29101
Evaluation of blade element performance of compressor rotor blade cascades in transonic and low supersonic flow range
p0296 A81-29102
The accuracy of mean-stream-line method in subsonic and transonic regions
p0296 A81-29105
Analysis of turbulent boundary layer on cascade and rotor blades of turbomachinery
p0296 A81-29106
Turbine blade construction of multistage axial-flow compressors
p0309 A81-29850
Stalling pressure rise capability of axial flow compressor stages
[ASME PAPER 81-GT-3] p0310 A81-29928
Finite element methods for transonic blade-to-blade calculation in turbomachines
[ASME PAPER 81-GT-5] p0310 A81-29930
Inverse or design calculations for non-potential flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29986
The present role of high speed cascade testing
[ASME PAPER 81-GT-95] p0314 A81-30002
New features in the design of axial-flow compressors with tandem blades
[ASME PAPER 81-GT-113] p0315 A81-30017
New correlations of the two-dimensional turbine cascade aerodynamic performance
[ASME PAPER 81-GT-128] p0316 A81-30032
A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh
p0347 A81-30717
Study of the secondary flow in the downstream of a moving blade row in an axial flow fan
p0355 A81-31767
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center
[SAE PAPER 801122] p0396 A81-34158
Inlet distortion and blade vibration in turbomachines
p0421 A81-37637
Numerical experiments on unsteady flows through vibrating cascades
p0613 A81-47961
On the numerical analysis of stall flutter in turbine cascade
p0613 A81-47963
Force and moment coefficients for high deflection cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade
[NASA-CR-165166] p0140 N81-14976
Supersonic stall flutter of high speed fans --- in turbofan engines
[NASA-TM-81613] p0140 N81-14978
Solution of plane cascade flow using improved surface singularity methods --- application of panel method to internal aerodynamics
[NASA-TM-81589] p0140 N81-14979
Full potential solution of transonic quasi-3-D flow through a cascade using artificial compressability
[NASA-TM-81637] p0140 N81-14980
Prediction of particle paths for flow of a gas/solids suspension through a cascade of flat plates
p0256 N81-18352
Design of turbine cascades with transitional profile boundary layers
p0278 N81-19456
Aerodynamics of advanced axial-flow turbomachinery
[NASA-CR-163995] p0335 N81-20079
Rig investigation of a two stage single shaft low cost turbine
p0432 N81-24099
Cascade design through an inverse method
p0448 N81-26022
CASCADE WIND TUNNELS
Transonic cascade wind tunnel modification and initial tests
[AD-A091080] p0090 N81-13031
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements
[ESA-TT-625] p0197 N81-16069
Evaluation of a subsonic cascade wind tunnel for compressor blade testing
[AD-A093591] p0218 N81-17107
CASCADES (FLUID DYNAMICS)
U FLUID DYNAMICS
CASCODE MOSFET
U FIELD EFFECT TRANSISTORS
CASE HISTORIES
The technical contributions of the Wright brothers to aviation
p0058 A81-14388
A case study on the F-16 fly-by-wire flight control system --- Book
p0101 A81-16719
The high-speed airfoil program
p0185 N81-15970
Transonic wind tunnel development (1940 - 1950)
p0185 N81-15971
The high-speed propeller program
p0185 N81-15972
High-speed cowlings, air inlets and outlets, and internal-flow systems
p0185 N81-15973
CASES (CONTAINERS)
NT ROCKET ENGINE CASES
CAST ALLOYS
New method for cast superalloy frames - Segmented mold and HIP utilized
p0408 A81-34693
Use of segmented mold process to produce large superalloy engine castings
[AIAA PAPER 81-1404] p0503 A81-40861
An evaluation of vacuum centrifuged titanium castings for helicopter components
p0510 A81-41516

Structural applications for titanium castings
p0510 A81-41637
Metallographic analysis techniques used during the Cast Aluminum Structures Technology /CAST/ program --- microstructure of aluminum cast alloy
p0531 A81-43650
Cast Aluminum Structures Technology (CAST). Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152
CASTING
NT CENTRIFUGAL CASTING
NT SLIP CASTING
Metallurgical aspects of materials processing and manufacturing for aero-engine components --- gas turbine engines
[PNR-90019] p0084 N81-12209
CASTINGS
Quality control of precision castings for turbojet engine parts
p0052 A81-13330
CATALYSTS
Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165
CATALYTIC ACTIVITY
Proceedings of the 4th Workshop on Catalytic Combustion
[PB81-176067] p0588 N81-30700
CATAPULTS
F/A-18A Initial Sea Trials
p0458 A81-38857
Laboratory studies of flight mechanics using catapult launched models
[AAAF-NT-80-15] p0210 N81-17055
CATEGORIES
Current aircraft survey (approach speeds, gross weights, and Dimensions)
[PB80-225691] p0129 N81-13956
CATHODE RAY TUBES
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095
Application of CRT displays to new generation aircraft
p0286 A81-28297
F/A-18 horizontal situation display
p0327 A81-30353
Application of CRT displays to the cockpit of tomorrow
[SAE PAPER 801168] p0399 A81-34183
Impact of EFIS on navigation --- Electronic Flight Instrument System
p0517 A81-42435
New visual displays for the next generation of civil aircraft
p0556 A81-44299
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Cathode ray tubes and plasma panels as display devices for aircraft displays
p0212 N81-17069
An advanced electronic cockpit instrumentation system: The coordinated cockpit display
p0213 N81-17074
Development of instrumentation for pilots. CRT screens
[SNIAS-802-111-114] p0426 N81-24061
High contrast CRT module
[AD-A097727] p0437 N81-24360
CAVITATION
U CAVITATION FLOW
CAVITATION FLOW
Reduction of profile drag by blowing out through peg holes in areas of streamline separation bubbles
[DGLR PAPER 80-103] p0120 A81-19392
CAVITIES
Weapon bay cavity noise environments, data correlation and prediction for the B-1 aircraft
[AD-A089770] p0045 N81-11778
CCD
U CHARGE COUPLED DEVICES
CEILINGS (ARCHITECTURE)
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] p0636 N81-33175
CELESTIAL NAVIGATION
NT ASTRONAVIGATION
Automated celestial position determination
p0557 A81-44324
An analytical solution of the two star sight problem of celestial navigation
p0644 A81-48121
CELLULAR MATERIALS (NON BIOLOGICAL)
U FOAMS
CEMENTS
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10090
Shrinkage-compensating cement for airport pavement. Phase 3: Fibrous concretes. Addendum
[AD-A092945] p0219 N81-17290
Porous portland cement concrete: The state of the art
[AD-A098177] p0436 N81-24107
Recycling of Portland Cement Concrete airport pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141
CEMS SYSTEM
U CENTRAL ELECTRONIC MANAGEMENT SYSTEM
CENTER OF GRAVITY
Influence of zero-lift downwash on the relation between minimum-drag center-of-gravity position and inherent stability boundary
p0235 A81-25640
Operational responses to aft empty C.G. --- Center of Gravity location in Boeing 727-200 aircraft
[SAWE PAPER 1330] p0352 A81-31378
A flight test real-time GW-CG computing system
p0361 A81-32660
CENTRAL ELECTRONIC MANAGEMENT SYSTEM
AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329
CENTRAL PROCESSING UNITS
A Single Processor Synchronous Executive derived from the DAIS executive --- Digital Avionics Information System
p0324 A81-30326
An economical approach to automated flight test data reduction
p0576 A81-46603
CENTRIFUGAL CASTING
An evaluation of vacuum centrifuged titanium castings for helicopter components
p0510 A81-41516
CENTRIFUGAL COMPRESSORS
Comparative performance of two centrifugal fan impellers differing in blade section
p0001 A81-10162
Particulate flow in centrifugal compressors used in helicopters
p0297 A81-29109
Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-29110
A method of performance prediction for centrifugal compressors. Part 1: Analysis. Part 2: Comparison with experiment
[ARC-R/M-3843] p0031 N81-10436
Model 250-C30/C28B compressor development
p0219 N81-17466
Centrifugal compressors for small aero and automotive gas turbine engines
p0220 N81-17467
WR34-8 performance improvement program. The WR34-8 gas turbine compressor test
[AD-A098293] p0429 N81-24069
CENTRIFUGAL PUMPS
Inlet flow in centrifugal pumps at partial deliveries
[VKI-PREPRINT-1979-16] p0031 N81-10437
Reverse flow, pre-rotation and unsteady inlet flow in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433
CENTRIFUGES
Development of a flight simulation capability in the dynamic environment simulator
[AIAA 81-0978] p0415 A81-36566
Axial flow compressors. Citations from the Engineering Index data base
[PB80-808611] p0029 N81-10076
CENTRIFUGING STRESS
TELS - A facility to observe the effect of simulated flight maneuver loads on turbine engines
[AIAA PAPER 81-1591] p0508 A81-40956
CERAMAL PROTECTIVE COATINGS
U PROTECTIVE COATINGS

CERAMIC COATINGS

Ceramic applications in turbine engines --- for improved component performance and reduced fuel usage
[NASA-CR-159865] p0274 N81-19118

Thermal and flow analysis of a convection air-cooled ceramic coated porous metal concept for turbine vanes
[NASA-TM-81749] p0376 N81-22056

CERAMIC HONEYCOMBS

Improved ceramic heat exchanger materials
[NASA-CR-159678] p0132 N81-14082

CERAMICS

Analysis and design of a ceramic nozzle insert for the Langley 8-foot high temperature structures tunnel
p0060 A81-14996

Design analysis of high-efficiency low-stress ceramic gas turbines
[ASME PAPER 81-GT-130] p0316 A81-30034

Blade tip ceramic outer air seal for long life turbine engines
[AIAA PAPER 81-1440] p0504 A81-40874

Improved ceramic heat exchanger materials
[NASA-CR-159678] p0132 N81-14082

Ceramic and coating applications in the hostile environment of a high temperature hypersonic wind tunnel --- Langley 8-foot high temperature structures tunnel
[NASA-TM-81931] p0254 N81-18199

Development of gas turbine components, using silicon nitride --- forming techniques
[BMFT-FB-T-79-152] p0275 N81-19129

Structures and Materials Panel
[AD-A089019] p0378 N81-22420

CERTIFICATION

History of flight testing the L-1011 Tristar jet transport. I - The L-1011-1
p0110 A81-17976

Methods for the verification and validation of digital flight control systems
[SAE PAPER 801134] p0397 A81-34165

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
p0454 A81-38062

On certification of composite structures for USAF aircraft
[AIAA PAPER 81-1686] p0527 A81-43158

Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] p0620 A81-48635

Flight termination receiver/decoders design, performance and certification
[AD-A089746] p0037 N81-11045

New materials and helicopter certification --- exigencies of certification regulation
[AAAF-NT-79-26] p0210 N81-17052

Development and evaluation of automatic landing control laws for power lift STOL aircraft
[NASA-CR-152399] p0253 N81-18060

Improving aircraft safety
[PB81-114886] p0270 N81-19083

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
[NASA-TM-81739] p0381 N81-22839

Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070

Overview of all civil aviation engine certification/demonstration requirements and rationale, i.e., FAA, CAA, etcetera
p0429 N81-24072

Certification procedure for military engines in Germany
p0429 N81-24074

Specification and requirements rationale for military and civil helicopter engines
p0429 N81-24075

CESSNA AIRCRAFT

NT CESSNA 402B AIRCRAFT
NT T-37 AIRCRAFT

CESSNA MILITARY AIRCRAFT

U MILITARY AIRCRAFT

CESSNA 402B AIRCRAFT

Demonstration Advanced Avionics System (DAAS) functional description --- Cessna 402B aircraft
[NASA-CR-152405] p0389 N81-23080

CF-104 AIRCRAFT

U CANADAIR AIRCRAFT

CFRP

U CARBON FIBER REINFORCED PLASTICS

CH-53 HELICOPTER

U H-53 HELICOPTER

CH-47 HELICOPTER

Experience with advanced high performance gear steel --- for CH-47
[ASME PAPER 80-C2/DET-77] p0117 A81-18648

Drive system technology advancements --- transmissions for CH-47D helicopter
p0356 A81-32015

Floor and fuel vibration isolation systems for the Boeing Vertol commercial Chinook
p0356 A81-32016

'Load snubbing' - A solution to the problem of terrain flying with external cargo
[AHS 80-32] p0476 A81-40162

Electronic Master Monitor and Advisory Display System
p0573 A81-46615

Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046

CHAIRS

U SEATS

CHALCOGENIDES

NT CARBON DIOXIDE
NT CARBON MONOXIDE
NT NITROGEN OXIDES

CHANCE-VOUGHT MILITARY AIRCRAFT

U MILITARY AIRCRAFT

CHANNEL CAPACITY

IMUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175

Discrete Address Beacon System (DABS) data link capacity utilization
[AD-A098173] p0425 N81-24044

CHANNEL FLOW

Flow past a slender profile in a channel with permeable walls
p0004 A81-10916

Transonic flow past a wing profile in channels with permeable walls
p0054 A81-13533

Sound generation by vortex shedding from a profile within a channel
p0054 A81-13570

Propagation of three-dimensional acoustic perturbations in channels of variable cross-sectional area at frequencies close to cutoff frequency
p0119 A81-19338

Generation of vortex noise in flow past a profile in a channel
p0238 A81-26134

Aerodynamic study of flat turbine cascades with additional blades in blade passages
p0281 A81-27373

An investigation of a preswirled cooling airflow to a turbine disc by measuring the air temperature in the rotating channels
[ASME PAPER 81-GT-132] p0316 A81-30035

Numerical analysis of the flow in the connecting passage between the fan section and high pressure section of a turbojet engine
[AD-A090506] p0081 N81-12107

Experiments with a supersonic multi-channel radial diffuser
[AD-A094192] p0257 N81-18374

CHANNELS (DATA TRANSMISSION)

Considerations concerning an 'information busbar' for distributing on-board measurement and control information
p0233 A81-25375

Contention information transfer systems analysis
p0322 A81-30274

Development and applications of MIL-STD-1553 --- for avionics data buses
[SAE PAPER 801142] p0398 A81-34172

The evolution of fiber optics in avionics
[SAE PAPER 801145] p0398 A81-34174

IMUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175

A simulation approach to MIL-STD-1553 Multiplex Bus interfacing
[AIAA 81-0971] p0415 A81-36560

A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993
High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191
CHAPMAN SHEAR LAYER
U SHEAR LAYERS
CHAPMAN-JOUGUET PLANE
U CHEMICAL EQUILIBRIUM
U FLAME PROPAGATION
CHARACTERISTIC EQUATIONS
U EIGENVALUES
CHARACTERISTIC FUNCTIONS
U EIGENVALUES
CHARACTERISTIC METHOD
U METHOD OF CHARACTERISTICS
CHARACTERIZATION
Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165
CHARACTERS
U SYMBOLS
CHARGE COUPLED DEVICES
A versatile miniature solid state television camera /CCD/
p0180 A81-22620
Charge-coupled device /CCD/ camera/memory optimization for expendable autonomous vehicles
p0357 A81-32491
CHARGE TRANSFER DEVICES
NT CHARGE COUPLED DEVICES
CHARGED PARTICLES
NT ANIONS
NT PLASMAS (PHYSICS)
NT RAREFIED PLASMAS
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
CHARTS
NT FLOW CHARTS
NT GRAPHS (CHARTS)
CHECKOUT EQUIPMENT
U TEST EQUIPMENT
CHEMICAL ANALYSIS
NT GAS ANALYSIS
NT OZONOMETRY
NT QUANTITATIVE ANALYSIS
NT SPECTROSCOPIC ANALYSIS
Trace chemical analysis methodology
[AD-A090762] p0083 N81-12191
Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260
CHEMICAL ATTACK
NT INTERGRANULAR CORROSION
CHEMICAL COMPOSITION
Composition of sludge formed in B-3V oil
p0103 A81-17373
Quality assurance of an epoxy resin prepreg using HPLC
p0531 A81-43642
Effect of refining variables on the properties and composition of JP-5
[AD-A093842] p0219 N81-17281
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19323
Analysis of middle distillate fuels by field ionization mass spectrometry
[AD-A099407] p0491 N81-26209
CHEMICAL ELEMENTS
NT ALUMINUM
NT CARBON
NT COBALT
NT IRON ISOTOPES
NT LIQUID HYDROGEN
NT NITROGEN
NT OXYGEN
NT RADIOACTIVE ISOTOPES
NT SILVER
NT SODIUM VAPOR
NT TITANIUM
NT TUNGSTEN
Environment-load interaction effects on crack growth in landing gear steels
[AD-A093803] p0218 N81-17242
CHEMICAL EQUILIBRIUM
The aircraft in the stratosphere --- affects on ozone layer equilibrium
p0002 A81-10499
CHEMICAL FUELS
NT AIRCRAFT FUELS
NT AUTOMOBILE FUELS
NT DIESEL FUELS
NT HIGH ENERGY FUELS
NT HYDROCARBON FUELS
NT HYDROGEN FUELS
NT JET ENGINE FUELS
NT JP-4 JET FUEL
NT JP-5 JET FUEL
NT JP-8 JET FUEL
NT LIQUID FUELS
NT SLURRY PROPELLANTS
NT SYNTHETIC FUELS
CHEMICAL KINETICS
U REACTION KINETICS
CHEMICAL PROPERTIES
Aviation turbine fuels 1980
[DOE/BETC/PPS-81/2] p0445 N81-25255
CHEMICAL PROPULSION
NT HYBRID PROPULSION
CHEMICAL REACTIONS
NT HYDROGENATION
NT OXIDATION
NT PYROLYSIS
Transonic flows of a multireacting gas mixture through a Laval nozzle
p0225 A81-23909
CHEMICAL SHIFT
U CHEMICAL EQUILIBRIUM
CHEMICAL TESTS
NT CHEMICAL ANALYSIS
NT GAS ANALYSIS
NT OZONOMETRY
NT QUANTITATIVE ANALYSIS
NT SPECTROSCOPIC ANALYSIS
CHILLING
U COOLING
CHIMES
U AUDITORY SIGNALS
CHINA
NT CHINESE PEOPLES REPUBLIC
CHINA (COMMUNIST) MAINLAND
U CHINESE PEOPLES REPUBLIC
CHINESE PEOPLES REPUBLIC
China aims for modern wings
p0227 A81-24050
CHINOOK HELICOPTER
U CH-47 HELICOPTER
CHIPS (ELECTRONICS)
Heat pipe avionic cooling
p0326 A81-30343
Advanced debris monitoring systems for helicopters
p0472 A81-40127
CHIPS (MEMORY DEVICES)
New storage medium - Greater safety. II - Testing, fabrication, implementation --- MNOS block oriented random access memory (BORAM) circuits
p0227 A81-24044
CHOICE
U SELECTION
CHOKES
Semi-actuator disk theory for compressor choke flutter
[NASA-CR-3426] p0442 N81-25075
CHOKES (RESTRICTIONS)
Choking effects in the blade rows of turbomachines
p0061 A81-15269
Computer analysis of flow perturbations generated by placement of choke bumps in a wind tunnel
[NASA-TP-1892] p0579 N81-30088
CHROMATOGRAPHY
NT GAS CHROMATOGRAPHY
NT LIQUID CHROMATOGRAPHY
CHROMIUM ALLOYS
NT CHROMIUM STEELS
NT RENE 77
CHROMIUM STEELS
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17486
CHRONOTRONS
U TIME LAG

CHUGGING
- U COMBUSTION STABILITY

CINEFLUOROGRAPHY
- U RADIOGRAPHY

CINERADIOGRAPHY
- U RADIOGRAPHY

CIRCUIT DIAGRAMS
- Characteristics and status of the US National Transonic Facility p0038 N81-11065
- Low cost airborne microwave landing system receiver, task 3 [NASA-CR-152409] p0075 N81-12054

CIRCUIT PROTECTION
- A lightning protection program for the F-16 fly-by-wire system p0056 A81-14254
- New techniques for the measurement of natural and simulated lightning phenomena p0057 A81-14268
- A case study on the F-16 fly-by-wire flight control system --- Book p0101 A81-16719
- Lightning threat definition for aircraft electrical power systems p0322 A81-30284
- Lightning. Citations from the International Aerospace abstracts data base [NASA-CR-163857] p0146 N81-15648

CIRCUIT RELIABILITY
- Electromagnetic measurement of lightning strikes to aircraft [AIAA PAPER 81-0083] p0160 A81-20588
- The new look in reliability - It works --- Operational Mission Environment test program for F/A-18 aircraft p0229 A81-24268

CIRCUITS
- NT FIRE CONTROL CIRCUITS
- NT FLUIDIC CIRCUITS
- NT INTEGRATED CIRCUITS
- NT LOGIC CIRCUITS
- NT MICROWAVE CIRCUITS
- NT PHASE DETECTORS
- NT POWER SUPPLY CIRCUITS
- NT SWITCHING CIRCUITS

CIRCULAR CYLINDERS
- The influence of a wake splitter plate on the aerodynamic characteristics of a two-dimensional cylinder p0226 A81-23949
- Numerical study on viscous shear flow past a circular cylinder p0228 A81-24077
- The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder p0233 A81-25312
- A numerical study of vortex shedding from one and two circular cylinders p0233 A81-25355
- Wing-body carryover at supersonic speeds with finite afterbodies p0354 A81-31622

CIRCULAR TUBES
- Calculation of the coefficients of head and local drag of bluff bodies p0466 A81-40023

CIRCULATION
- NT ATMOSPHERIC CIRCULATION

CIRCULATION CONTROL AIRFOILS
- Circulation Control Wing /CCW/ flight tests p0122 A81-19469
- Numerical optimization of circulation control airfoils [AIAA PAPER 81-0016] p0157 A81-20540
- Experimental development of an advanced circulation control wing system for Navy STOL aircraft [AIAA PAPER 81-0151] p0161 A81-20632
- Low drag airfoil design utilizing passive laminar flow and coupled diffusion control techniques [AD-A090778] p0072 N81-12024
- Experimental development of an advanced circulation control wing system for Navy STOL aircraft [AD-A101309] p0581 N81-30116
- Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model [AD-A103090] p0627 N81-32128

CIRCULATION CONTROL ROTORS
- Acoustics of rotors utilizing circulation control [AIAA PAPER 81-0092] p0160 A81-20596
- Recent progress in performance prediction of high advance ratio circulation controlled rotors p0468 A81-40100
- Optimization theory applied to higher harmonic control of circulation controlled rotors p0571 A81-46606

CITIES
- NT ATLANTA (GA)

CIVIL AVIATION
- Methods of fuel conservation in civil aviation. I p0005 A81-11322
- OLGA, a gust alleviation system for improvement of passenger comfort of general aviation aircraft p0008 A81-11620
- Civil aviation safety. III - Prospects of improvement p0017 A81-11900
- How will it be possible to pass from ILS to MLS p0059 A81-14473
- Fuel saving methods in civil aviation. II p0059 A81-14755
- The evolution of operational systems --- approach to National Airspace System automation p0064 A81-15699
- Civil aviation safety. IV - Accident severity p0068 A81-16422
- A cockpit view of advanced airline avionics p0100 A81-16585
- The future ATC system as influenced by advanced avionics p0100 A81-16586
- Design of the new Tehran International Airport p0114 A81-18084
- Saudi Arabia's new Gateway Airports p0115 A81-18093
- Pyrotechnics serving safety --- in aircraft air and ground escape systems p0120 A81-19348
- Operational energy conservation strategies in commercial aviation p0155 A81-20465
- Operation and evaluation of the Terminal Configured Vehicle Mission Simulator in an automated terminal area metering and spacing ATC environment p0171 A81-21709
- Civil aviation applications of Navstar/GPS through differential techniques p0177 A81-22374
- Helicopter fatigue qualification p0180 A81-22623
- Active controls for civil aircraft p0228 A81-24070
- Landings according to CAT II p0230 A81-24523
- New technology for th[illegible]DB system and its reliability. III -[illegible]directional radio beacon p0231 A81-24525
- Engineering aspects [illegible] structures for civil aircraft p0283 A81-27888
- Wire communication systems and equipment at airports --- Russian book p0289 A81-28745
- Full-authority digital electronic controls for civil aircraft engines [ASME PAPER 81-GT-138] p0316 A81-30041
- Quiet propulsive-lift technology ready for civil and military applications p0359 A81-32521
- European approaches to transport aircraft design [AIAA PAPER 81-0926] p0363 A81-32934
- The art of designing experimental aircraft - An overview [AIAA PAPER 81-0944] p0363 A81-32939
- An aircraft manufacturer's view of airport R&D needs [AIAA PAPER 81-0793] p0368 A81-33887
- Fog dispersion [SAE PAPER 801133] p0397 A81-34164
- Methods for the verification and validation of digital flight control systems [SAE PAPER 801134] p0397 A81-34165
- Mission-dedicated vehicle for passenger rescue from burning aircraft

p0412 A81-35772
INTERSCAN - The development and international acceptance of a new microwave landing system for civil aviation
p0418 A81-37114
Soviets display heavy-lift helicopter
p0455 A81-38195
Civil aviation - Onboard electronic equipment and fuel savings
p0464 A81-39699
The developing technology and economics of large helicopters
p0466 A81-40079
Flight test investigation of LORAN-C for civil aviation applications
p0512 A81-41762
Evaluation of LORAN-C for non-precision approach applications
p0512 A81-41763
Light aviation in the United States - September 1980 --- French book
p0513 A81-41903
New visual displays for the next generation of civil aircraft
p0556 A81-44299
The selection of air radio navigation system for the post-1990 period
p0556 A81-44322
Aircraft instruments and measuring systems --- Russian book
p0564 A81-45608
Model for airport noise exposure on a national basis - 1960 to 2000
p0568 A81-46363
The relation between aircraft fuel reserves and navigation
p0612 A81-47843
Commercial airliners - Design and flight operation
p0623 A81-49575
Civil head-up displays - Coming up fast
p0625 A81-49973
Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft
[NASA-CR-160036] p0023 N81-10020
NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A089971] p0033 N81-11022
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024
Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
Aviation safety
[GPO-68-717] p0073 N81-12040
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 1: Methods, procedures, results
[EPA-550/9-79-313-1] p0087 N81-12644
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 2: Appendices A through F
[EPA-550/9-70-313-2] p0087 N81-12645
NASA Research in aeropropulsion
p0089 N81-12980
Aircraft maintenance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0859/3] p0125 N81-13917
An assessment of General Aviation utilization of advanced avionics technology
[NASA-CR-159328] p0127 N81-13941
The future of civil turbo-fan engines
[PNR-90034] p0130 N81-13964
Briefs of accidents involving commuter air carriers and on-demand air taxi operations, U.S. General Aviation 1978
[PB81-101701] p0141 N81-14987
Commuter airline safety
[PB81-104267] p0141 N81-14988
A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974
A feasibility study for advanced technology integration for general aviation
[AD-A092437] p0185 N81-15975
Summary of aviation safety program resumes. Cabin safety
[AD-A091938] p0192 N81-16027
Briefs of fatal accidents involving weather as a cause/factor, US General Aviation, 1978
[PB81-110827] p0192 N81-16028
An overview of general aviation propulsion research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16052
The state of the art of general aviation autopilots
[NASA-CR-159377] p0197 N81-16066
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-15994
Listing of accidents/incidents by aircraft make and model, United States Civil Aviation, 1978
[PB81-110280] p0205 N81-16999
Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy
[AD-A093774] p0206 N81-17030
Federal Radionavigation Plan. Volume 2: Requirements
[AD-A093775] p0207 N81-17031
Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics
[AD-A093776] p0207 N81-17032
Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development
[AD-A093777] p0207 N81-17033
Spin recovery training
[GPO-67-439] p0216 N81-17098
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980
[NASA-CR-152356] p0220 N81-17623
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980
[NASA-CR-152357-VOL-2] p0220 N81-17624
A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032
Risk to the public from carbon fibers released in civil aircraft accidents
[NASA-SP-448] p0254 N81-18096
An evaluation of head-up displays in civil transport operations
p0265 N81-19044
General Aviation Turbine Engine (GATE) study
[NASA-CR-159482] p0274 N81-19117
Initial design and experimental implementation of the traffic advisory service of ATARS
[AD-A095462] p0331 N81-20055
Description of the British Civil Aviation Airworthiness Data Recording Programme (CAADRP) --- analysis of flight recorder data
p0383 N81-23017
General Aviation Activity and Avionics Survey
[AD-A097604] p0389 N81-23081
Overview of all civil aviation engine certification/demonstration requirements and rationale, i.e., FAA, CAA, etcetera
p0429 N81-24072
Specification and requirements rationale for military and civil helicopter engines
p0429 N81-24075
Development of test requirements for civil engines
p0430 N81-24079
Development of test requirements for civil and military auxiliary power units
p0430 N81-24083
Engineering and development program plan propulsion safety
[AD-A098709] p0444 N81-25008
Helicopter Fatigue: A civil view
p0468 N81-26134
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
Carbon/graphite composite material study
[AR-3] p0505 N81-30188
Carbon/graphite composite material study. 3: Agency program activities. National Aeronautics and Space Administration (NASA)
p0505 N81-30189

Carbon/graphite composite material study, appendix A and appendix B
p0585 N81-30190
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956

CLARK Y AIRFOIL
U AIRFOIL PROFILES

CLASSIFICATIONS
NT INDEXES (DOCUMENTATION)
Feature extraction from forward looking infrared /FLIR/ imagery
p0461 A81-39338
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] p0630 N81-32158

CLEAN FUELS
NT FUEL OILS

CLEANERS
NT AIR FILTERS

CLEANING
Surface analysis of bearing steels after solvent treatments. II - Lubricant-coated bearing surfaces
[ASLE PREPRINT 80-LC-8A-6] p0118 A81-18748

CLEAR AIR TURBULENCE
Wind shear effects on aircraft - Low-level shear and clear-air turbulence as accident causes
p0067 A81-16136
An airborne sensor for the avoidance of clear air turbulence
[AIAA PAPER 81-0297] p0164 A81-20735
Diagnosis-prognosis of intense turbulence, causing aircraft buffeting, on the basis of temperature-wind sounding
p0241 A81-26836
Clear air turbulence - An airborne alert system
p0562 A81-44648
Clear air turbulence: Historical comments
p0136 N81-14562
Clear air turbulence. Citations from the International Aerospace Abstracts data base
[NASA-CR-163863] p0146 N81-15649
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677
The 1979 clear air turbulence flight test program --- warning and detection devices
p0266 N81-19050
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051
Flight tests of a clear-air turbulence alerting system --- infrared radiometers
p0266 N81-19052
Clear air turbulence studies with microwave radiometers
p0266 N81-19053

CLEARANCES
CF6 high pressure compressor and turbine clearance evaluations
p0598 N81-31198

CLEAVAGE
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17488

CLIMATE
Terminal Forecast Reference Notebook (TFRN) for George AFB, California
[AD-A098438] p0446 N81-25637
Terminal Forecast Reference Notebook (TFRN) for Luke AFB, Arizona
[AD-A098445] p0446 N81-25638

CLIMBING FLIGHT
Optimization of airplane time to reach a given flight altitude and speed
p0235 A81-25685
An empirical prediction method for helicopter performance in low speed level flight and in vertical and forward flight climbs
p0471 A81-40118
Flight control strategies for performance computers
p0512 A81-41759

CLOSED LOOP SYSTEMS
U FEEDBACK CONTROL

CLOTH
U FABRICS

CLOTHING
NT GOGGLES
NT HELMETS

CLOUD COVER
Operational radar display of the structure of thunderstorm hail clouds
p0069 A81-16474
Computer simulation of airfoil icing without runback
[AIAA PAPER 81-0402] p0167 A81-20809
Aircraft penetration under cloud cover
p0463 A81-39640

CLOUD GLACIATION
Survey of aircraft icing simulation test facilities in North America
[NASA-TM-81707] p0269 N81-19078

CLUTTER
Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35891

COAL UTILIZATION
Mechanical property improvement of protective coatings for turbine engines using coal-derived fuels
[DOE/ET-12293/T1] p0094 N81-13064

COATING
NT ELECTROPLATING
NT METALLIZING

COATINGS
NT ALUMINUM COATINGS
NT CERAMIC COATINGS
NT ELECTROPLATING
NT METAL COATINGS
NT METALLIZING
NT PAINTS
NT PRIMERS (COATINGS)
NT PROTECTIVE COATINGS
NT SPRAYED COATINGS
NT THERMAL CONTROL COATINGS
Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover
[AD-A090049] p0039 N81-11120
Sputtering and ion plating for aerospace applications
[NASA-TM-81726] p0337 N81-20424
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27098

COAXIAL FLOW
Computer simulation of unsteady flow past lifting rotors of coaxial configuration
p0230 A81-24389
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] p0624 A81-49743

COAXIAL NOZZLES
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] p0621 A81-48651

COBALT
Cobalt: A vital element in the aircraft engine industry
[NASA-TM-82662] p0551 N81-29206

COBALT ALLOYS
NT RENE 77
NASA's activities in the conservation of strategic aerospace materials
[NASA-TM-81617] , p0550 N81-29205
Conservation of Strategic Aerospace Materials (COSAM)
p0599 N81-31208

COCKPIT SIMULATORS
Piloted simulation studies of helicopter agility
p0003 A81-10767
Evaluation of the potential format and content of a cockpit display of traffic information
p0053 A81-13419
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
Transfer and cost effectiveness of ground-based flight trainers
p0064 A81-15693
A simulation approach to MIL-STD-1553 Multiplex Bus interfacing
[AIAA 81-0971] p0415 A81-36550
Probe protection in camera/model visual systems --- for helicopter flight simulators
p0615 A81-48359
Time delays in flight simulator visual displays
p0615 A81-48369
A survey of new technology for cockpit application to 1990's transport aircraft simulators

[NASA-CR-159330] p0142 N81-14993
Cockpit simulation study of use of flight path angle for instrument approaches
[NASA-CR-165708] p0425 N81-28040
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] p0639 N81-33211

COCKPITS
The future cockpit of the next generation of civil aircraft
p0010 A81-11630
A theoretical and practical design investigation of the future military cockpit
p0010 A81-11631
Flight management systems - Central ingredient of the 1980's avionics shipset
[SAE PAPER 800626] p0063 A81-15342
The FFCC cockpit of the A310 is practically defined
p0063 A81-15623
Rate-field displays --- cockpit devices
p0064 A81-15682
757/767 design considerations for improved productivity
p0100 A81-16584
A cockpit view of advanced airline avionics
p0100 A81-16585
The role of aircraft separation assurance in the cockpit
p0115 A81-18092
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095
New directions in cockpit alerting
p0286 A81-28298
History of SAE Committee S-7, Flight Deck and Handling Qualities Standards for Transport Category Aircraft
[SAE PAPER 801165] p0399 A81-34180
Application of CRT displays to the cockpit of tomorrow
[SAE PAPER 801168] p0399 A81-34183
Integrated cockpit information system with color display equipment
p0450 A81-37643
Multifunctional color displays for cockpits
p0451 A81-37646
Helicopter cockpit design for night goggle compatibility
p0472 A81-40128
Subsystem status monitor --- for military helicopters
[AHS 80-17] p0474 A81-40148
Binocular Camera for cockpit visibility of general aviation aircraft
[SAE PAPER 810628] p0524 A81-42780
The impact on helicopter cockpits of integrated advanced flight controls, avionics and optics
p0574 A81-46624
Combat cockpit design
p0622 A81-49173
Human Factors of Flight-deck Automation: NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022
Test and evaluation of improved aircrew restraint systems for combat helicopers
p0205 N81-17017
An advanced electronic cockpit instrumentation system: The coordinated cockpit display
p0213 N81-17074
The influence of visual requirements on the design of military cockpits
p0213 N81-17075
Evaluation of the visual acquisition range of en-route air traffic from cockpit observations
[DFVLR-MITT-80-14] p0332 N81-20058
Application of computer colour raster displays in the cockpit in research flight simulation
[AD-A096542] p0377 N81-22063
Aircraft canopy lock
[NASA-CASE-FRC-11065-1] p0426 N81-24047
The future cockpit of the next generation of civil aircraft --- Airbus A310 digital displays
[SNIAS-802-111-113] p0427 N81-24057
System digitization: Its effect in the cockpit --- on performance
[SNIAS-802-111-115] p0428 N81-24062
A compendium of aircraft cockpit vision surveys, 1950 through 1980, volume 1
[AD-A101473] p0580 N81-30104
Development of avionics installation interface standards
[AD-A101423] p0583 N81-30128
Information transfer within the cockpit: Problems in intracockpit communications
p0595 N81-31167
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462

CODING
NT REDUNDANCY ENCODING

COEFFICIENT OF FRICTION
Hydroplaning and coefficient of friction in wet runway testing
p0419 A81-37300
Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea
[NASA-TM-81305] p0579 N81-30080

COEFFICIENTS
NT AERODYNAMIC COEFFICIENTS
NT COEFFICIENT OF FRICTION
NT COHERENCE COEFFICIENT
NT DISCHARGE COEFFICIENT
NT HEAT TRANSFER COEFFICIENTS
NT INFLUENCE COEFFICIENT
NT NOZZLE THRUST COEFFICIENTS

COGENERATION
Energy conservation through cogeneration
p0055 A81-14228

COHERENCE COEFFICIENT
Conditioned pressure spectra and coherence measurements in the core of a turbofan engine
[NASA-TM-82608] p0589 N81-30907

COHERENT ACOUSTIC RADIATION
High bypass ratio engine noise component separation by coherence technique
[AIAA PAPER 81-2054] p0621 A81-48653
Improved methods for fan sound field determination
[NASA-CR-165188] p0147 N81-15769

COHERENT RADAR
Coherent signal processing in frequency agile pulse radar units
p0152 A81-20097
Infrared airborne radar
p0617 A81-48566

COHERENT RADIATION
NT COHERENT ACOUSTIC RADIATION

COIN AIRCRAFT
NT F-5 AIRCRAFT

COLD FLOW TESTS
Low pressure turbine testing
p0432 N81-24098

COLD FORMING
U COLD WORKING

COLD WORKING
NT EXPLOSIVE FORMING
Ultrasonic cold forming of aircraft sheet materials
[AD-A096351] p0344 N81-21239
Cold-forming of internal threads
p0551 N81-29294

COLLISION AVOIDANCE
NT BEACON COLLISION AVOIDANCE SYSTEM
Aircraft collision avoidance and separation assurance
[SAE PAPER 800616] p0062 A81-15336
Discrete Address Beacon System - The obvious alternative
[SAE PAPER 800625] p0063 A81-15341
The role of aircraft separation assurance in the cockpit
p0115 A81-18092
Satellites to aid flight safety
[IAF PAPER 80-IAA-17] p0115 A81-18410
Collisions between aircraft and birds
p0122 A81-19445
The evaluation of aircraft collision probabilities at intersecting air routes
p0174 A81-21967
Some design and procedural aspects of in-flight collision avoidance
[AIAA PAPER 81-0805] p0368 A81-33085
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126

Aerial collisions with relief features
p0557 A81-44323
A simple radar for navigation accuracy measurements
p0612 A81-47844
Aircraft collision avoidance
[GPO-50-158] p0091 N81-13041
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944
Collision avoidance systems. Citations from the NTIS data base
[PB80-815020] p0193 N81-16038
Conflict monitoring analysis of parallel route spacing in the high altitude airspace, volume 2
[AD-A094152] p0250 N81-18038
Active BCAS: Design and validation of the surveillance subsystem
[AD-A095049] p0270 N81-19084
Initial design and experimental implementation of the traffic advisory service of ATARS
[AD-A095462] p0331 N81-20055
An update of the Discrete Address Beacon System (DABS) alternatives study
[AD-A096264] p0340 N81-21052
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
Laser beacon collision avoidance systems
p0372 N81-22009
Feasibility of collision warning, precision approach and landing using GPS, volume 1
[NASA-CR-165675] p0537 N81-28070
An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108
Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information
[NASA-TM-81171] p0548 N81-29127
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase
[AD-A102163] p0595 N81-31181

COLLISION WARNING DEVICES
U COLLISION AVOIDANCE
U WARNING SYSTEMS

COLLISIONS
NT BIRD-AIRCRAFT COLLISIONS
NT MIDAIR COLLISIONS
Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs
[NASA-CR-152390] p0023 N81-10019

COLLOIDS
NT FOG

COLOR CODING
Multifunctional color displays for cockpits
p0451 A81-37646
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
[NASA-TM-82656] p0552 N81-29782

COLOR PERCEPTION
U COLOR VISION

COLOR TELEVISION
A modular low-cost raster-scan colour visual system
p0283 A81-27892
Application of computer colour raster displays in the cockpit in research flight simulation
[AD-A096542] p0377 N81-22063

COLOR VISION
Characteristics of flight simulator visual systems
[AGARD-AR-164] p0541 N81-28107

COMBAT
The future of training for aerial combat
p0060 A81-15118
The variable-speed tail-chase aerial combat problem
p0351 A81-31295
Air combat advantages from reaction control systems
[SAE PAPER 801177] p0400 A81-34190
U.S. Navy/USAF development of Tactical Aircrew Combat Training System/Air Combat Maneuvering Instrumentation /TACTS/ACMI/
[SAE PAPER 801183] p0401 A81-34196
Energy maneuverability displays for air combat training
[SAE PAPER 801185] p0401 A81-34198
Simulated A-10 combat environment
[SAE PAPER 801187] p0401 A81-34199
Combat survivability with advanced aircraft propulsion development
[AIAA PAPER 81-1506] p0507 A81-40913
Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS)
[AD-A092974] p0208 N81-17041
Ten years of US Marine Corps Harrier operations
p0632 N81-33140
The consequences of certain operational requirements on the conceptual design of combat helicopters
p0634 N81-33153

COMBINATORIAL ANALYSIS
NT FACTORIALS

COMBUSTIBILITY
U FLAMMABILITY

COMBUSTIBLE FLOW
Three-dimensional model of spray combustion in gas turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
Sudden expansion injection for ram-rockets
p0293 A81-29071
Prediction of swirling reacting flow in ramjet combustors
[AIAA PAPER 81-1485] p0506 A81-40903
An implicit finite volume method for elliptical flow computation --- numerical integration, aerothermodynamics
p0255 N81-18248

COMBUSTION
NT AFTERBURNING
NT FUEL COMBUSTION
NT HYDROCARBON COMBUSTION
NT PROPELLANT COMBUSTION
NT SOLID PROPELLANT COMBUSTION
NT SUPERSONIC COMBUSTION
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19323
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28094

COMBUSTION CHAMBERS
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609
The development of low-toxic combustion chambers of transport gas turbine engines
p0060 A81-14787
A simple combustor system for a small gas turbine engine
p0104 A81-17503
A vaporizing combustor with double combustion spaces
p0109 A81-17827
An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
p0109 A81-17841
Vector and scalar characteristics of opposing jets discharging normally into a cross-stream
p0110 A81-17997
Considerations of the use of vitiated preheat --- for engine inlets
p0150 A81-20023
Problems and promises in gas turbine combustor design development
p0236 A81-26007
Investigation of the influence of active particles on the basic combustion characteristics in turbulent flow
p0242 A81-26986
Flowfield studies of dump combustors
p0292 A81-29064
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067
Sudden expansion injection for ram-rockets
p0293 A81-29071
Film cooling performance of liner cooling devices
p0293 A81-29075
Analysis of a reverse flow, annular combustion chamber
p0294 A81-29081
Cyclone combustors in low emission gas turbine applications
p0294 A81-29082
Factors limiting turbine inlet temperatures
p0294 A81-29083
A comparison of two droplet models for gas-turbine combustion chamber flows

p0294 A81-29086
The combustion modelling of swirling flows for gas
turbine combustors
p0295 A81-29087
The effect of oxygen concentration distribution on
altitude relighting performance of a turbo-jet
engine combustor
p0295 A81-29089
The influence of flames on the formation of
self-excited combustion chamber oscillations
p0298 A81-29197
Impacts of broadened-specification fuels on
aircraft turbine engine combustors
[ASME PAPER 81-GT-2] p0310 A81-29927
Pattern factor improvement in the F-100 primary
combustion system
[ASME PAPER 81-GT-25] p0311 A81-29941
An exploratory study of soot sample integrity and
probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943
Preliminary study on reheat combustor for advanced
gas turbine
[ASME PAPER 81-GT-29] p0311 A81-29944
Development of a low NO/x/ lean premixed annular
combustor
[ASME PAPER 81-GT-40] p0312 A81-29954
Premixing and flash vaporization in a two-stage
combustor
[ASME PAPER 81-GT-41] p0312 A81-29955
Some factors affecting altitude relighting
performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
Design and development of the combustor inlet
diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
Test-stand combustion chamber for the study and
development of forced working processes --- for
jet engines
p0319 A81-30151
A theoretical and experimental study of combustion
chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242
Fluctuation of gas parameters behind the
combustion chamber of gas turbine engines
p0466 A81-40024
TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833
Exploratory development program to improve
combustor dome operating characteristics
[AIAA PAPER 81-1351] p0501 A81-40834
Improved combustor domes designed for hot streak
reduction
[AIAA PAPER 81-1352] p0501 A81-40835
Improved combustor durability - Segmented approach
with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836
The influence of blade wakes on the performance of
combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856
Fuel character effects on the TF41 engine
combustion system
[AIAA PAPER 81-1391] p0503 A81-40858
Interpretation of ramjet combustor test data
[AIAA PAPER 81-1433] p0504 A81-40870
Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434] p0504 A81-40871
Prediction of swirling reacting flow in ramjet
combustors
[AIAA PAPER 81-1485] p0506 A81-40903
The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176
The use of engine operating experience in the
preliminary design of aircraft gas turbine
combustion systems
[AIAA PAPER 81-1399] p0515 A81-42189
Modeling of ramjet combustors using simple reactor
theory
[AIAA PAPER 81-1429] p0515 A81-42196
Fuel character effects on current, high pressure
ratio, can-type turbine combustion systems
[AD-A089182] p0029 N81-10073
Effect of ambient conditions on the emissions from
a gas turbine combustor
[NASA-CR-3355] p0080 N81-12105
Mixing and combustion in high speed air flows
[AD-A090536] p0083 N81-12192
Analysis of pressure spectra measurements in a
ducted combustion system
[NASA-TM-81583] p0146 N81-15760
Two-stage combustion for reducing pollutant
emissions from gas turbine combustors
[NASA-CR-163877] p0196 N81-16056
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
Full annular combustor test facility for high
pressure/high temperature testing
p0432 N81-24097
Selected results from combustion research at the
Lewis Research Center
[NASA-TM-82627] p0443 N81-25083
Small gas-turbine combustor study: Fuel injector
evaluation
[NASA-TM-82641] p0490 N81-26146
The E3 combustors: Status and challenges ---
energy efficient turbofan engines
[NASA-TM-82684] p0539 N81-28095
Proceedings of the 4th Workshop on Catalytic
Combustion
[PB81-176067] p0580 N81-30700
Advanced oxide dispersion strengthened sheet
alloys for improved combustor durability
p0598 N81-31204
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320

COMBUSTION CONTROL
Cyclone combustors in low emission gas turbine
applications
p0294 A81-29082

COMBUSTION EFFICIENCY
Flameholding characteristics of a swept-strut H2
fuel-injector for scramjet applications
p0003 A81-10711
Variable geometry, lean, premixed, prevaporized
fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609
The development of low-toxic combustion chambers
of transport gas turbine engines
p0060 A81-14787
A simple combustor system for a small gas turbine
engine
p0104 A81-17503
Light transmission measurements in solid fuel
ramjet combustors
p0284 A81-27910
Impacts of broadened-specification fuels on
aircraft turbine engine combustors
[ASME PAPER 81-GT-2] p0310 A81-29927
The influence of premixed combustion flame
stabilizer geometry on flame stability and
emissions
[ASME PAPER 81-GT-26] p0311 A81-29942
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
Application of scaling in afterburner test and
development
[ASME PAPER 81-GT-194] p0317 A81-30086
A theoretical and experimental study of combustion
chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242
Selected results from combustion research at the
Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859
Interpretation of ramjet combustor test data
[AIAA PAPER 81-1433] p0504 A81-40870
Critical considerations in the design of
supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1284] p0511 A81-41748
The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176
Hydrogen engines
p0625 A81-49949
An investigation of the reacting and non-reacting
flow characteristics of solid ramjets
[AD-A094567] p0253 N81-18059
Development for new laboratories for future testing
p0433 N81-24105
An investigation of the combustion behavior of
solid fuel ramjets
[AD-A098481] p0445 N81-25240
Small gas-turbine combustor study: Fuel injector
evaluation
[NASA-TM-82641] p0490 N81-26146
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149

Small turbine engine augmentor. Phase 1: Preliminary design studies of afterburner and duct-burner configurations
[AD-A101595] p0583 N81-30131
Proceedings of the 4th Workshop on Catalytic Combustion
[PB81-176067] p0588 N81-30700

COMBUSTION INSTABILITY
U COMBUSTION STABILITY

COMBUSTION PHYSICS
An overview of general aviation propulsion research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16052
Selected results from combustion research at the Lewis Research Center
[NASA-TM-82627] p0443 N81-25083
Computer modeling of internal combustion engines: Combustion and related processes
[HTS/79/3] p0587 N81-30454

COMBUSTION PRODUCTS
Factors limiting turbine inlet temperatures
p0294 A81-29083
Comparisons of model and flight testing with respect to hot gas reingestion and debris ingestion during thrust reversal
p0297 A81-29113
Full-flow debris monitoring in gas turbine engines
[ASME PAPER 81-GT-60] p0313 A81-29970
A mobile emissions laboratory for on-line analysis of combustion products from gas turbine engines
p0361 A81-32872
Determination of coking rate in jet fuel
p0570 A81-46448
Tests on the fire resistance behavior of materials inside civil aircraft
[SNIAS-801-551-101] p0074 N81-12052
Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair
[AD-A091011] p0094 N81-13062
Exhaust emission characteristics and variability for maintained General Electric CF6-50 turbofan engines
[AD-A092291] p0196 N81-16064
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0391 N81-23243
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-28099

COMBUSTION STABILITY
NT FLAME STABILITY
The influence of flames on the formation of self-excited combustion chamber oscillations
p0298 A81-29197
An exploratory study of soot sample integrity and probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943
Application of scaling in afterburner test and development
[ASME PAPER 81-GT-194] p0317 A81-30086
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search
[AD-A094154] p0253 N81-18057

COMBUSTION VIBRATION
The influence of flames on the formation of self-excited combustion chamber oscillations
p0298 A81-29197
Excitation of surging type oscillations due to aperiodic external effects --- in multishaft turbojet engines
p0509 A81-41032

COMBUSTION WAVES
U FLAME PROPAGATION

COMBUSTORS
U COMBUSTION CHAMBERS

COMMAND AND CONTROL
Multivariable aircraft control by manoeuvre commands - An application to air-to-ground gunnery
[ONERA, TP NO. 1980-127] p0009 A81-11623
The development of multiple redundant flight control systems for high integrity applications
p0284 A81-27903
Status report on Position Location Reporting System /PLRS/
p0517 A81-42440
AFTI/F-16 advanced multimode control system design for task-tailored operations
[AIAA PAPER 81-1707] p0535 A81-43955
Modern control synthesis applied to the longitudinal decoupled motion of an aircraft
[AIAA 81-1839] p0555 A81-44123
Equivalent system analysis of translation rate command systems for hover and low speed flight
[AIAA PAPER 81-1858] p0560 A81-44557
The collision course: Conditions, guidance laws and properties
[DFVLR-FB-80-06] p0127 N81-13942
Field evaluation of the LR80 land navigation system
[AD-A091885] p0193 N81-16035
Diversity techniques for omnidirectional telemetry coverage of the HiMAT research vehicle
[NASA-TP-1830] p0334 N81-20074
Guidelines for line-oriented flight training, volume 1
[NASA-CP-2184] p0580 N81-30101

COMMAND GUIDANCE
A low cost multiple drone command and tracking system
p0179 A81-22613

COMMAND SYSTEMS
U COMMAND GUIDANCE

COMMAND-CONTROL
U COMMAND AND CONTROL

COMMERCIAL AIRCRAFT
NT A-300 AIRCRAFT
NT BOEING 727 AIRCRAFT
NT BOEING 737 AIRCRAFT
NT BOEING 747 AIRCRAFT
NT BOEING 757 AIRCRAFT
NT BOEING 767 AIRCRAFT
NT DC 3 AIRCRAFT
NT DC 8 AIRCRAFT
NT DC 9 AIRCRAFT
NT DC 10 AIRCRAFT
NT DH 121 AIRCRAFT
NT EUROPEAN AIRBUS
NT L-1011 AIRCRAFT
NT LEAR JET AIRCRAFT
NT LIGHT TRANSPORT AIRCRAFT
NT SE-210 AIRCRAFT
NT SUPERSONIC COMMERCIAL AIR TRANSPORT
The future cockpit of the next generation of civil aircraft
p0010 A81-11630
Today and the future in aircraft wheel and brake development
p0102 A81-17046
The introduction of STOL and RNAV to large commercial operations
p0111 A81-18057
SNIAS helicopters
p0119 A81-19342
Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110
Operational energy conservation strategies in commercial aviation
p0155 A81-20465
The effect of heavy rain on windshear attributed accidents
[AIAA PAPER 81-0390] p0167 A81-20800
Effects of commercial aircraft operating environment on composite materials
p0182 A81-22681
General considerations on the importance of reliability studies for helicopters
p0287 A81-28471
Engine performance monitoring systems expansion on Alitalia aircraft
p0290 A81-29054
Material shortages - Effect on the commercial aircraft industry
[AIAA 81-0508] p0300 A81-29386
Electronic engine control for commercial aircraft
p0309 A81-23775
Commercial engine logistics cost projections - A dynamic and flexible approach
[ASME PAPER 81-GT-114] p0315 A81-30018
Floor and fuel vibration isolation systems for the Boeing Vertol commercial Chinook
p0356 A81-32016
Concepts for improving the damage tolerance of composite compression panels
p0360 A81-32825
Jet aircraft design
[AIAA PAPER 81-0912] p0362 A81-32930

Commuter aircraft design [AIAA PAPER 81-0913] p0363 A81-32931
The optimal lift-drag ratio of a civil aircraft [AAAF PAPER NT 80-35] p0369 A81-33923
Performance deterioration of commercial high-bypass ratio turbofan engines [SAE PAPER 801116] p0396 A81-34154
The GTCP331 Auxiliary Power Unit for the next generation commercial transports [SAE PAPER 801147] p0398 A81-34176
Civil aircraft design for fuel reduction p0420 A81-37415
Advanced technology and the commuter aircraft - A look into the next two decades p0455 A81-38209
Wind-tunnel tests of engine-equipped models - Comparison of two jet wash simulation methods [ONERA, TP NO. 1981-42] p0460 A81-39245
Contribution of technological progress to energy savings and conservation to the design of new aircraft p0464 A81-39695
Civil aviation - Onboard electronic equipment and fuel savings p0464 A81-39699
The development of the AS 355 Ecureuil 2/Twinstar p0466 A81-40083
Reliability of commercial helicopters p0472 A81-40126
Commercial composite component service experience --- in airplane structural design and manufacturing p0530 A81-43616
A low-cost forward fairing for the Bell Long Ranger Helicopter p0531 A81-43644
Development of repair procedures for graphite/epoxy structures on commercial transports p0531 A81-43645
Repair of adhesive bonded structure on commercial aircraft p0559 A81-44394
New technologies in future commercial aircraft p0565 A81-45759
Commercial airliners - Design and flight operation p0623 A81-49575
Design options study. Volume 1: Executive summary --- user requirements for the advanced civil military aircraft [AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results --- advanced civil military aircraft: cost estimates [AD-A089537] p0027 N81-10057
Design options study. Volume 3: Qualitative assessment --- advanced civil military aircraft [AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices --- advanced civil military aircraft [AD-A089539] p0027 N81-10059
Composite components on commercial aircraft p0041 N81-11147
Commuter airport safety [GPO-60-512] p0073 N81-12041
NASA Research in aeropropulsion p0089 N81-12980
NASA Research in aeropropulsion [NASA-TM-81633] p0093 N81-13056
Tabulations of ambient ozone data obtained by GASP airliners, March 1975 to December 1977 [NASA-TM-81528] p0096 N81-13568
Briefs of accidents involving commuter air carriers and on-demand air taxi operations, U.S. General Aviation 1978 [PB81-101701] p0141 N81-14987
Commuter airline safety [PB81-104267] p0141 N81-14988
Ozone contamination in aircraft cabins: Results from GASP data and analyses [NASA-TM-81671] p0191 N81-16021
Environmental exposure effects on composite materials for commercial aircraft [NASA-CR-165649] p0198 N81-16139
JT8D engine internal exhaust mixer technology program [AD-A093057] p0215 N81-17091
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980 [NASA-CR-152356] p0220 N81-17623
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980 [NASA-CR-152357-VOL-2] p0220 N81-17624
Concorde with the airlines --- operating costs and performance p0247 N81-18013
Small transport aircraft technology --- STAT p0260 N81-19007
Improving aircraft safety [PB81-114886] p0270 N81-19083
Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977 --- Global Atmospheric Sampling Program [NASA-TP-1907] p0345 N81-21685
Commercial aviation icing research requirements [NASA-CR-165336] p0387 N81-23069
Environmental exposure effects on composite materials for commercial aircraft [NASA-CR-165765] p0350 N81-29165
Advanced subsonic transport propulsion [NASA-TM-82696] p0597 N81-31195
Terminal area automatic navigation, guidance, and control 1: Automatic rollout, turnoff, and taxis [NASA-CR-3451] p0600 N81-31224
Responses to comments of Air Transport Association of America on aircraft towing feasibility study [DE81-029834] p0638 N81-33201

COMMERCIAL AVIATION
U CIVIL AVIATION
U COMMERCIAL AIRCRAFT

COMMINUTION
NT CRUSHING

COMMONALITY (EQUIPMENT)
Issues of commonality. Volume 2: Issue analysis [AD-A095418] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary [AD-A095417] p0331 N81-20047

COMMUNICATING
NT AIRCRAFT COMMUNICATION
NT GROUND-AIR-GROUND COMMUNICATIONS
NT VERBAL COMMUNICATION

COMMUNICATION
NT OPTICAL COMMUNICATION
NT VERBAL COMMUNICATION

COMMUNICATION CABLES
NT BEAM WAVEGUIDES
NT WAVEGUIDES
Fiber optics study technology for military aircraft p0178 A81-22503
Considerations concerning an 'information busbar' for distributing on-board measurement and control information p0233 A81-25375

COMMUNICATION EQUIPMENT
NT RADIO RECEIVERS
Automating airborne company communications p0112 A81-18064
Problems of voice communication in helicopters p0151 A81-20074
COMLINK - A communications/EW analytical and modeling tool p0617 A81-48547
Functional testing communication equipment (avionics) [AD-A092825] p0201 N81-16375
Electronic voice communications improvements for Army aircraft p0603 N81-31454
Voice communication capability of selected inflight headgear devices p0604 N81-31467

COMMUNICATION NETWORKS
The use of satellite systems for communication p0051 A81-13310
An airborne integrated communications network utilizing fiber optics p0173 A81-21880
Wire communication systems and equipment at airports --- Russian book p0289 A81-28745
Contention information transfer systems analysis p0322 A81-30274
Communications support for National Flight Data Center information system [AD-A093095] p0219 N81-17327

Transverse Voice Radio Link for Stratospheric Balloons
[INPE-1992-RPE/265] p0586 N81-30331
Voice communication research and evaluation system
p0603 N81-31450
Computer B (NAS-NAS) communications support
[AD-A104145] p0640 N81-33392
COMMUNICATION SATELLITES
NT AERONAUTICAL SATELLITES
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318
Satellites to aid flight safety
[IAF PAPER 80-IAA-17] p0115 A81-18410
Air traffic control and position location by satellite constellation in equatorial orbit
p0173 A81-21912
A 7.5 GHz microstrip phased array for aircraft-to-satellite communication
p0562 A81-44623
Project Prosat --- communication satellite network for land, sea and air traffic control
p0565 A81-45760
COMMUNICATION SYSTEMS
U TELECOMMUNICATION
COMPARISON
Experiences with flight recorders obtained by analyzing aircraft accidents
p0328 N81-20019
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260
COMPARTMENTS
NT AIR LOCKS
NT AIRCRAFT COMPARTMENTS
NT ANECHOIC CHAMBERS
NT PRESSURIZED CABINS
NT TEST CHAMBERS
COMPASSES
NT GYROCOMPASSES
COMPATIBILITY
NT ELECTROMAGNETIC COMPATIBILITY
NT SYSTEMS COMPATIBILITY
Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover
[AD-A090049] p0039 N81-11120
COMPENSATORS
Apparatus for and method of compensating dynamic unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
COMPLEX SYSTEMS
The method of superelements in the dynamics of complex structures
p0101 A81-16969
Is it safe - The safety assessment of aircraft systems. III - The use of probability methods
p0290 A81-29029
General describing function method for systems with many nonlinearities, with application to aircraft performance
p0564 A81-45588
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy
[DGLR PAPER 81-066] p0610 A81-47616
COMPLEX VARIABLES
NT CONFORMAL MAPPING
NT EXPONENTIAL FUNCTIONS
NT NONHOLONOMIC EQUATIONS
COMPONENT RELIABILITY
RF compatibility-environment to component part
p0056 A81-14260
Design for economy --- of high-bypass turbofan engines
p0290 A81-29030
Strapdown navigation comes of age
[SAE PAPER 801167] p0399 A81-34182
Fiber optic system test results in a tactical military aircraft
p0452 A81-37659
Recent developments in Naval aircraft jet engine usage
[AIAA PAPER 81-1366] p0502 A81-40846
Cost benefits of nonmetallic spline couplings
[SAE PAPER 801101] p0513 A81-41777
NASA service experience with composite components --- for aircraft structures
p0529 A81-43607
A controlled evaluation of the differences between two approaches to reliability investment screening
[AD-A087506] p0031 N81-10446
Ceramic applications in turbine engines --- for improved component performance and reduced fuel usage
[NASA-CR-159865] p0274 N81-19118
Location of faults in jet engines by calculation of component characteristics
p0382 N81-23012
Reduction of measured data and possibilities for early detection of sensor break-down
p0383 N81-23016
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23438
Low pressure turbine testing
p0432 N81-24098
The mechanical testing of compressors and turbines for aircraft gas turbine engines
p0433 N81-24100
Helicopter transmission testing
p0433 N81-24102
Prediction of future test needs, test facilities and procedures
p0433 N81-24104
Helicopter Fatigue Life Assessment
[AGARD-CP-297] p0487 N81-26126
State of the art and statistical aspects of helicopter fatigue substantiation procedures
p0487 N81-26127
Fatigue Assessment of UK military aeroplanes
p0487 N81-26128
Synopsis of Specialists' Meeting on Helicopter Fatigue Methodology
p0487 N81-26129
Application of damage tolerance concepts for the helicopters
p0487 N81-26130
An evaluation of fatigue procedures for UK military helicopters
p0488 N81-26133
Helicopter Fatigue: A civil view
p0488 N81-26134
Quantifying reactive maneuvers
[AD-A101136] p0539 N81-28091
COMPOSITE MATERIALS
NT ALUMINUM BORON COMPOSITES
NT BORON REINFORCED MATERIALS
NT BORON-EPOXY COMPOUNDS
NT CARBON FIBER REINFORCED PLASTICS
NT CARBON-CARBON COMPOSITES
NT EPOXY MATRIX COMPOSITE MATERIALS
NT FIBER COMPOSITES
NT FIBER REINFORCED COMPOSITES
NT GLASS FIBER REINFORCED PLASTICS
NT GRAPHITE-EPOXY COMPOSITE MATERIALS
NT GRAPHITE-POLYIMIDE COMPOSITES
NT LAMINATES
NT METAL MATRIX COMPOSITES
NT REINFORCED PLASTICS
NT RESIN MATRIX COMPOSITES
NT SUPERHYBRID MATERIALS
Electrical bonding in aircraft
p0057 A81-14264
The manufacture of composite rotor blades
p0283 A81-27886
Advanced composites - Evolution of manufacturing technology
[AIAA PAPER 81-0895] p0362 A81-32920
Composite flight service evaluation program for helicopters
[AHS 80-46] p0477 A81-40173
Composite helicopter rotor blades - Design, development, and operational performance
p0481 A81-40588
Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839
The effect of various factors on the vibration characteristics of composite blades of gas turbine engines
p0524 A81-42793
Composites - A solution to aluminum honeycomb maintenance costs --- for aircraft structures
p0529 A81-43606
NASA service experience with composite components --- for aircraft structures
p0529 A81-43607

Electrical/electromagnetic concerns associated with advanced composite materials in aerospace systems
p0530 A81-43630

A low-cost forward fairing for the Bell Long Ranger Helicopter
p0531 A81-43644

Advanced composite repair - Recent developments and some problems
p0558 A81-44385

Design, analyses, and model tests of an aeroelastically tailored lifting surface
[AIAA PAPER 81-1673] p0566 A81-45974

Development of composite material helicopter structures
p0576 A81-46541

Evaluation of section properties for hollow composite beams
[PAPER-NR-35] p0031 N81-10454

Effect of service environment on composite materials
[AGARD-CP-288] p0039 N81-11126

The implications of laboratory accelerated conditioning of carbon fibre composites
p0039 N81-11129

Relationships between impact resistance and fracture toughness in advanced composite materials
p0040 N81-11137

Assessing the behavior of high modulus composite materials in lightning
p0040 N81-11141

Composite components on commercial aircraft
p0041 N81-11147

Air Force applications and in-service experience with composite structures
p0041 N81-11148

Acoustic emission as a NDE technique for determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070

Developments in aircraft structural materials
[NLR-MP-79042-U] p0077 N81-12081

Testing of composite structures
[AAAF-NT-79-41] p0083 N81-12181

Impact of modern materials on the development of rotating airfoil equipment
[AAAF-NT-79-43] p0083 N81-12182

Mirage 2000 and Mirage 4000 fiber structures
[AAAF-NT-79-44] p0083 N81-12183

High-voltage spark carbon-fiber sticky-tape data analyzer
[NASA-CR-163747] p0087 N81-12646

Progress in materials and structures at Lewis Research Center
p0089 N81-12982

A resin injection technique for the fabrication of aero engine composite components
[PNR-90024] p0131 N81-14004

Constant-amplitude and flight-by-flight tests on CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006

Cost/benefit analysis of advanced materials technologies for future aircraft turbine engines
[NASA-CR-165225] p0144 N81-15006

Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025

Large-scale carbon fiber tests
[NASA-TM-80218] p0198 N81-16137

Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165649] p0198 N81-16139

Current and projected use of carbon composites in United States aircraft
p0198 N81-16145

The effect of the in-service environment on composite materials (resume of the April 1980 Athens conference)
p0199 N81-16146

Application of carbon fibre composites to military aircraft structures
p0199 N81-16147

The electrical effects of joints and bonds in carbon fiber composites
p0199 N81-16153

The UK Ministry of Defence programme on the electromagnetic properties of carbon fiber composites
p0199 N81-16154

Aircraft manufacturers approach to the E.M.C./Avionics problems associated with the use of composite materials
p0200 N81-16156

Electromagnetic coupling to advanced composite aircraft with application to trade-off and specification determination
p0200 N81-16166

Composite structural materials --- aircraft applications
[NASA-CR-163946] p0207 N81-17039

Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069

Design concepts for low-cost composite turbofan engine frame
[NASA-CR-165217] p0376 N81-22053

Design considerations for composite fuselage structure of commercial transport aircraft
[NASA-CR-159296] p0378 N81-22419

Structures and Materials Panel
[AD-A089019] p0378 N81-22420

Fatigue testing of composite rotor blades
p0489 N81-26140

Analysis of composite laminates and fiber composite repair schemes
[AD-A099629] p0499 N81-27206

Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165765] p0550 N81-29165

Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273

Applications of composite materials for the construction of military helicopters
p0633 N81-33147

Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] p0638 N81-33200

Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240

COMPOSITE STRUCTURES
NT LAMINATES

Design and test of a graphite-epoxy composite A-10 slat
p0006 A81-11339

Structural optimization of advanced aircraft structures
p0013 A81-11651

Development of the A300 fin in modern composite fibre construction
p0013 A81-11653

Nondestructive evaluation of composite structures
p0013 A81-11654

Development of wind tunnel fan blade made of composite materials
[MBB-UD-277-79-0] p0018 A81-12096

Advanced materials for agricultural aircraft
[SAE PAPER 800610] p0062 A81-15333

Hingeless tailrotor in fiber composite construction and vibration-isolation systems /ARIS, ASIS/ for helicopters
[MBB-UD-311-80-0] p0129 A81-19300

Thermal considerations in the patching of metal sheets with composite overlays
p0153 A81-20297

AV-8B composite fuselage design
[AIAA PAPER 81-0232] p0162 A81-20690

Design, durability and low cost processing technology for composite fan exit guide vanes
p0182 A81-22664

Experiences with composite aircraft structures
p0182 A81-22678

The joints of aeronautical carbon resin composite structural elements
p0238 A81-26242

Applications of carbon fibre composites to military aircraft structures
p0283 A81-27885

The certification of composite airframe structures
p0283 A81-27887

Engineering aspects of composite structures for civil aircraft
p0283 A81-27888

Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, Technical Papers. Part 1
p0300 A81-29377

Fatigue sensitivity of composite structure for fighter aircraft

[AIAA 81-0495] p0300 A81-29383
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424
Aeroelastic tailoring of a composite winglet for KC-135
[AIAA 81-0607] p0304 A81-29470
Sonic fatigue design techniques for graphite-epoxy stiffened-skin panels
[AIAA 81-0633] p0305 A81-29488
Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
Effect of post buckling on the fatigue of composite structures
p0418 A81-37127
Advanced composite airframe program - Preliminary design phase
[AHS 80-45] p0477 A81-40172
All composite helicopter airframe roof structure
[AHS 80-47] p0477 A81-40174
Design and concepts of composite structures
p0481 A81-40503
Advanced composite structure repair
p0481 A81-40595
Post-buckling and membrane structural capability of composite shell structures
p0482 A81-40602
Manufacturing technology for low temperature composite engine frames --- for TF-34 engine
[AIAA PAPER 81-1355] p0501 A81-40837
Wind tunnel experiments on the divergence of swept wings with composite structures
[AIAA PAPER 81-1670] p0526 A81-43152
On certification of composite structures for USAF aircraft
[AIAA PAPER 81-1686] p0527 A81-43158
A-7 composite outer wing service experience
p0530 A81-43617
Advanced composite applications in McDonnell Dougals commercial transport aircraft
p0530 A81-43628
Composite Wing/Fuselage Program
p0530 A81-43629
Advanced ultrasonic testing of aerospace structures
p0557 A81-44329
Development and hardware verification of an aeroelastically tailored forward swept composite wing
p0557 A81-44355
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for composite structures
p0557 A81-44373
Review of Navy composite repair program
p0558 A81-44383
Advanced composite repair - Recent developments and some problems
p0558 A81-44385
Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance
p0559 A81-44396
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44398
Late 80's advanced rotary wing aircraft potential based on ATDE, ACAP, and ITR --- Advanced Technology Demonstrator Engine, Advanced Composite Airframe Program and Integrated Technology Rotor
p0580 A81-46612
Factors influencing the selection of tooling and fabrication methods in building a composite fuselage
p0574 A81-46628
Manufacturing methods for a composite main rotor blade for the YAH-64 helicopter
p0575 A81-46629
Waterjet trimming of cured composites
p0575 A81-46632
Some results from a crash energy absorption test for evaluating composite fuselage construction
p0575 A81-46639
Development of advanced interceptor substructural material --- graphite epoxy missile structures
[AD-A090127] p0038 N81-11116
Erosion and impacts on composite helicopter blades
p0040 N81-11138
Fatigue and damage propagation in composite rotor blades
p0041 N81-11145
Composite components on commercial aircraft
p0041 N81-11147
Air Force applications and in-service experience with composite structures
p0041 N81-11148
US Navy service experience with advanced composites --- in aircraft composite structures
p0041 N81-11149
Optimal design studies on composite wings with static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
A French flight test program on the electromagnetic effects of lightning
p0199 N81-16155
Composite structural materials --- aircraft applications
[NASA-CR-163946] p0207 N81-17039
Composite containment systems for jet engine fan blades
[NASA-TM-81675] p0220 N81-17480
Description of the HiMAT Tailored composite structure and laboratory measured vehicle shape under load
[NASA-TM-81354] p0251 N81-18047
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-159362] p0343 N81-21131
Behavior of continuous filament advanced composite isogrid structure
p0377 N81-22095
Design considerations for composite fuselage structure of commercial transport aircraft
[NASA-CR-159296] p0378 N81-22419
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data
[NASA-CR-152336-2] p0387 N81-23065
Structures and Dynamics Division research and technology plans, fiscal year, 1981
[NASA-TM-83137] p0491 N81-26497
Composite structural materials
[NASA-CR-164634] p0541 N81-28176
Development of a bearingless helicopter tail rotor --- application of composite materials
[MBB-UD-304/80-OE] p0586 N81-30199
Fatigue testing of composite rotor blades --- helicopter rotors
[MBB-UD-308/80-OE] p0587 N81-30485
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] p0639 N81-33238
Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240
Development of advanced interceptor substructural material
[AD-A103836] p0640 N81-33241

COMPOSITES
U COMPOSITE MATERIALS

COMPOSITION (PROPERTY)
NT ATMOSPHERIC MOISTURE
NT CHEMICAL COMPOSITION
NT CONCENTRATION (COMPOSITION)
NT GAS COMPOSITION
NT MOISTURE CONTENT

COMPOUND HELICOPTERS
An ABC status report --- Advancing Blade Concept for XH-59A rotors
p0572 A81-46610

COMPRESSED AIR
Development for new laboratories for future testing
p0433 N81-24105

COMPRESSIBILITY
Solution of plane cascade flow using improved surface singularity methods --- application of panel method to internal aerodynamics
[NASA-TM-81589] p0140 N81-14979
COMPRESSIBILITY EFFECTS
Calculation of nonlinear compressibility effects of airfoils in subcritical conditions
p0225 A81-23853
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] p0611 A81-47622
COMPRESSIBLE BOUNDARY LAYER
Laminar boundary layer on swept-back wings of infinite span at an angle of attack
p0107 A81-17656
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840
The linear instability due to the compressible crossflow on a swept wing
p0170 A81-21168
COMPRESSIBLE FLOW
NT TRANSONIC FLOW
Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952
Influence of free-stream turbulence intensity on heat transfer in the two-dimensional turbulent boundary layer of an accelerated compressible flow
p0110 A81-17994
A computerized study of wave characteristics in a time dependent compressible flow
[AIAA PAPER 81-0410] p0169 A81-20838
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002
Research on vortex bursting in compressible flow --- Thesis
p0230 A81-24477
Linearized analysis of the three-dimensional compressible flow through a rotating annular blade row
p0234 A81-25446
On the solution of Navier Stokes equations of the flow in turbomachines
p0296 A81-29099
Numerical computation of compressible steady cascade flows
p0296 A81-29100
Three dimensional flow in annular diffusers with two vortex distributions at entry
p0297 A81-29112
Laminar boundary layer on an oscillating wedge
p0309 A81-29864
The high-speed airfoil program
p0185 N81-15970
Measurement of canard wakes
[AD-A095063] p0263 N81-19029
The calculation of quasi-three-dimensional frictionless compressible flow in axial turbomachines --- partial differential equations
[PNR-90047] p0275 N81-19127
The effect of boundary layer growth on the stability of compressible flows
p0587 N81-30389
COMPRESSION LOADS
NT IMPACT LOADS
Design and fabrication of stabilized organic matrix composites
p0005 A81-11338
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers
p0418 A81-37136
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate
p0418 A81-37137
Heat generation in aircraft tires under free rolling conditions
[NASA-CR-164273] p0393 N81-23461
COMPRESSION RATIO
Development of small fuel efficient aircraft engines
[AHS 80-38] p0477 A81-40167
COMPRESSION TESTERS
U COMPRESSION TESTS
COMPRESSION TESTS
Some results from a crash energy absorption test for evaluating composite fuselage construction
p0575 A81-46639
Buckling of sandwich panels subjected to axial compression, shear forces and lateral pressure. Part 2: Analysis
[SAAB-TN-AE-72-PT-2] p0086 N81-12465
COMPRESSIVE STRENGTH
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521
COMPRESSOR BLADES
Reduction of energy consumption in the vibrational shot peening of axial compressor vanes
p0005 A81-11321
Effect of surface roughness over the blade in compressor cascade
p0060 A81-14924
Recent selected papers of Northwestern Polytechnical University. Parts 1 & 2 --- Book
p0107 A81-17301
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805
Structure and decay characteristics of turbulence in the near- and far-wake of a moderately loaded compressor rotor-blade
[ASME PAPER 80-GT-95] p0109 A81-17954
Evaluation of compressor blade endurance limits by an accelerated method
p0177 A81-22182
The axial velocity density ratio and the axial velocity density distribution in axial flow compressors and cascades
p0296 A81-29101
Evaluation of blade element performance of compressor rotor blade cascades in transonic and low supersonic flow range
p0296 A81-29102
The influence of blade number ratio and blade row spacing on axial-flow compressor stator blade dynamic load and stage sound pressure level
[ASME PAPER 81-GT-165] p0317 A81-30064
Development of a noninterference compressor blade stress measurement system
p0361 A81-32874
The influence of blade wakes on the performance of combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856
Change of static pressure on the rotating blades of an axial-flow compressor during surging
p0509 A81-41039
Possibility of development of an electron-fractographic method for measuring stress level produced by fatigue fracture of the material
p0532 A81-43773
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957
Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901)
[AD-A089524] p0029 N81-10074
Core compressor exit stage study. Volume 3: Data and performance report for screening test configurations
[NASA-CR-159499] p0078 N81-12086
The effects of solidity, interblade phase angle and reduced frequency on the time-variant aerodynamic response of a compressor stator
[AD-A090346] p0081 N81-12108
An investigation of the dynamic stalling characteristics of rotating axial-flow compressor blades
p0093 N81-13054
Gerry casing treatment
[CUED/A-TURBO/TR-101] p0093 N81-13059
Performance evaluation of a prototype noninterference technique for measurement of turbine engines compressor blade stress
[AD-A090566] p0094 N81-13061
Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051
Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
Evaluation of a subsonic cascade wind tunnel for compressor blade testing

[AD-A093591] p0218 N81-17107

Investigation of the use of liquid crystal thermography to study flow over turbomachinery blades
[AD-A097289] p0391 N81-23089

WR34-8 performance improvement program. The WR34-8 gas turbine compressor test
[AD-A098293] p0429 N81-24069

Improving turbine engine compressor performance retention through airfoil coatings
p0598 N81-31203

Determination of aerodynamically adequate fillet geometry in turbocompressor blade rows
[AD-A102170] p0600 N81-31219

COMPRESSOR EFFICIENCY

The T700 booster engine
p0105 A81-17506

Turbo-compressors surge and surge control
[AIAA PAPER 81-0070] p0159 A81-20579

A simulator to test compressor research facility control system software
p0349 A81-31110

Efficiency of cantilever compressor stator blades
p0509 A81-41041

A method of performance prediction for centrifugal compressors. Part 1: Analysis. Part 2: Comparison with experiment
[ARC-R/M-3843] p0031 N81-10436

COMPRESSOR ROTORS

Comparison of experimental and computational shock structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953

Core compressor exit stage study. Volume 3: Data and performance report for screening test configurations
[NASA-CR-159499] p0078 N81-12086

Rotor redesign for a highly loaded 1800 ft/sec tip speed fan, 2
[NASA-CR-159879] p0078 N81-12087

COMPRESSORS

NT CENTRIFUGAL COMPRESSORS
NT SUPERCHARGERS
NT TRANSONIC COMPRESSORS
NT TURBOCOMPRESSORS

Investigation of instantaneous distortions in air intakes at high angles of attack
[AAAF PAPER NT 80-38] p0369 A81-33931

The effects of solidity, interblade phase angle and reduced frequency on the time-variant aerodynamic response of a compressor stator
[AD-A090546] p0081 N81-12108

Effects of downstream distance on turbulence decay for the compressor research facility low conditioning system
[AD-A091543] p0133 N81-14276

Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15425/T1] p0134 N81-14327

Component research for future propulsion systems
[NASA-TM-82613] p0376 N81-22055

Tests of large compressors at CE Pr
p0432 N81-24096

Semi-actuator disk theory for compressor choke flutter
[NASA-CR-3426] p0442 N81-25075

End wall flows in rotors and stators of a single stage compressor
[NASA-CR-164635] p0540 N81-28097

COMPUTATION

Civil component program Wing Section. New calculation methods for subsonic and transonic interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034

COMPUTATIONAL FLUID DYNAMICS

Calculation of the flow field around engine-wing-configurations
p0007 A81-11613

Engine air intake design support by use of computational methods and comparison of theoretically derived pressure distributions with experimental data
p0008 A81-11614

Review of numerical methods for the problem of the supersonic flow around bodies at angle of attack
p0011 A81-11639

Research on transonic wings at the National Aerospace Laboratory, Japan
p0011 A81-11640

Flow computation around multi-element airfoils in viscous transonic flow
p0011 A81-11641

Calculation of plane transonic flows using the integral equation method and shock fitting
p0016 A81-11779

Calculation of separated viscous flows on wing profiles by a coupling approach
[ONERA, TP NO. 1980-122] p0017 A81-11920

A finite-span wing in transonic flow
p0054 A81-13741

Design and analysis of slat systems in transonic flow
p0058 A81-14392

Qualitative calculations of transonic drag-rise characteristics using the equivalence rule
p0058 A81-14393

A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14394

Numerical solutions of transonic flows by parametric differentiation and integral equation techniques
p0067 A81-15896

Thin-layer approximation for three-dimensional supersonic corner flows
p0067 A81-15900

Nonstationary method for the direct statistical modeling of rarefied-gas flows
p0069 A81-16454

Variational problems of gas dynamics
p0069 A81-16455

The method of superelements in the dynamics of complex structures
p0101 A81-16969

Radiation boundary conditions for wave-like equations --- numerical jet acoustics experimentation
p0153 A81-20223

Numerical calculation of jet-induced ground effect in VTOL
[AIAA PAPER 81-0015] p0157 A81-20539

The numerical solution of incompressible turbulent flow over airfoils
[AIAA PAPER 81-0047] p0158 A81-20563

Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659

A computational model for low speed flows past airfoils with spoilers
[AIAA PAPER 81-0253] p0163 A81-20702

Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705

3-D viscous analysis of ducts and flow splitters
[AIAA PAPER 81-0277] p0163 A81-20720

Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840

Spanwise distribution of control points in the method of finite elementary solutions
[AIAA PAPER 79-1879] p0169 A81-21011

Numerical techniques in linear duct acoustics - A status report
[ASME PAPER 80-WA/NC-2] p0170 A81-21120

Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197

Calculation of supersonic gas flows about wings
p0170 A81-21201

New approach to the solution of large, full matrix equations --- Neumann problem for inviscid incompressble flow past airfoils
p0171 A81-21552

Three-dimensional wing boundary layer calculated with eight different methods
p0171 A81-21555

Analysis of a symmetric transonic aerofoil with the finite element method - A new upwinding technique
p0183 A81-22908

Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367

Calculation of nonlinear compressibility effects of airfoils in subcritical conditions
p0225 A81-23853

Slightly blunted cone in a supersonic flow at angle of attack
p0225 A81-23908

A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002

Numerical study on viscous shear flow past a circular cylinder
p0228 A81-24077

Calculation of the boundary of a supersonic inviscid jet flowing into a submerged space or a supersonic wake
p0229 A81-24172

A contribution to the computation of transonic supersonic flows over blunt bodies
p0230 A81-24423

The problem of the unsteady hypersonic flow past a plane profile
p0231 A81-24730

Plane transonic solution with shock by direct iteration
p0231 A81-24814

Transient three-dimensional flow along a porous plate
p0231 A81-24815

Subsonic cascade flow analysis by a finite element method
p0233 A81-25311

Numerical computation of transonic potential flow through nozzles
p0233 A81-25353

A numerical study of vortex shedding from one and two circular cylinders
p0233 A81-25355

Recent developments in integral equation method in transonic flow
p0234 A81-25384

Calculation of flow with variable specific heat around a profile
p0235 A81-25689

A mathematical computer simulation of stationary and nonstationary flow of an ideal incompressible fluid around solid profiles and arrays
p0237 A81-26045

Calculation of circular flow inhomogeneities downstream of the turbine wheel
p0281 A81-27372

Numerical solution of the direct one-dimensional problem of a critical flow in nozzles
p0288 A81-28578

Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results
p0293 A81-29072

The combustion modelling of swirling flows for gas turbine combustors
p0295 A81-29087

Numerical computation of compressible steady cascade flows
p0296 A81-29100

The axial velocity density ratio and the axial velocity density distribution in axial flow compressors and cascades
p0296 A81-29101

Analysis of turbulent boundary layer on cascade and rotor blades of turbomachinery
p0296 A81-29106

Effects of solid particles suspended in fluid flow through an axial flow compressor stage
p0297 A81-29108

Development and validation of computational flow analysis for design of inlets and nozzles
p0298 A81-29117

A method for obtaining shockless transonic flows past two-dimensional airfoils whose profiles are partially modified from a given arbitrary profile
p0298 A81-29201

Calculation of the aerodynamic characteristics of aircraft with jet mechanization
p0299 A81-29301

A diagonal form of an implicit approximate-factorization algorithm
p0300 A81-29363

Finite element methods for transonic blade-to-blade calculation in turbomachines
[ASME PAPER 81-GT-5] p0310 A81-29930

Inverse or design calculations for non-potential flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29986

A model for dynamic loss response in axial-flow compressors
[ASME PAPER 81-GT-154] p0317 A81-30053

Semi-inverse method of computation in inviscid transonic flows - Application to the design of turbomachines blades profiles
[ASME PAPER 81-GT-206] p0318 A81-30096

A theoretical treatment of lifting surface theory of an elliptic wing
p0347 A81-30653

On the design of modern airfoil sections by numerical methods
p0347 A81-30705

A computer code for the calculation of aircraft trailing vortices
p0347 A81-30710

A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh
p0347 A81-30717

Approximations and short cuts based on generalized functions
p0347 A81-30730

Subsonic gas flow past a wing profile
p0349 A81-31034

Calculation of the flow pattern behind an aircraft wing
p0349 A81-31041

Study of the secondary flow in the downstream of a moving blade row in an axial flow fan
p0355 A81-31767

Study of the characteristics of a base-vented wing in nonlinear theory
[AAAF PAPER NT 80-40] p0369 A81-33927

An experimental and theoretical investigation of a twin-entry radial flow turbine under non-steady flow conditions
[SAE PAPER 801136] p0397 A81-34167

Calculation of supersonic flow around a wing with constant curvature of its leading edges
p0413 A81-35916

Calculation of supersonic flow past interfering wings
p0413 A81-36455

Calculation of flow past wings with supersonic sharp edges
p0418 A81-36944

Wing with finite span in a transonic flow
p0420 A81-37400

Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations
[AIAA PAPER 81-1239] p0454 A81-38096

Aerodynamic characteristics of wings of arbitrary planform
p0461 A81-39267

Analysis of steady, two-dimensional, chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique --- for performance prediction of ramjet propulsion system
[AIAA PAPER 81-1432] p0504 A81-40869

Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434] p0504 A81-40871

A parametric study of staged fuel injector configurations for scramjet applications
[AIAA PAPER 81-1468] p0505 A81-40880

Prediction of swirling reacting flow in ramjet combustors
[AIAA PAPER 81-1485] p0506 A81-40903

Transonic swept wings studied by the lifting-line theory
p0509 A81-41090

Calculation of the impingement of cloud droplets in a cylinder by the finite-element method
p0533 A81-43890

Some recent applications of high-lift computational methods at Boeing
[AIAA PAPER 81-1657] p0534 A81-43940

Computational fluid mechanics and its impact on the aircraft aerodynamicist
[DGLR PAPER 81-003] p0611 A81-47621

Numerical experiments on unsteady flows through vibrating cascades
p0613 A81-47961

Digital simulation for energy conservation in a large wind tunnel plant system
p0613 A81-48003

Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
p0617 A81-48480
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
p0625 A81-49948
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-49979
A computer program to calculate the longitudinal aerodynamic characteristics of upper-surface-blown wing-flap configurations
[NASA-CR-3005] p0071 N81-12014
Evaluation of Levinsky's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033
Computational Fluid Dynamics, volume 2
[VKI-LS-1980-5-VOL-2] p0144 N81-15310
An economic and versatile panel method for aircraft and aircraft/store configurations. An outline of the principal features of the mathematical modeling and numerical implementation of the British Aerospace (Warton) Mk II Panel Method
p0144 N81-15311
Vortex methods for two- and three-dimensional flow simulations
p0145 N81-15313
Complex configuration analysis at transonic speeds
p0190 N81-16016
Theoretical and Experimental studies of aerodynamic interference effects --- aerodynamic forces on winglets and on wing nacelle configurations for the YC-14 and KC-135 aircraft
p0190 N81-16017
Data base for the prediction of inlet external drag
p0190 N81-16018
Hyperbolic/parabolic development for the GIM-STAR code --- flow fields in supersonic inlets
[NASA-CR-3369] p0201 N81-16416
The influence of the compressibility in simulating the conduct of exterior loads of a carrier
[MBB-FE-122/S/PUB/17] p0220 N81-17483
Numerical computation of flows with rolled-up vortex sheets
p0255 N81-18256
Geometric methods in computational fluid dynamics --- turbomachinery
p0256 N81-18331
Predicted and experimental steady and unsteady transonic flows about a biconvex airfoil
[NASA-TM-81262] p0258 N81-18742
Unsteady transonic small disturbance theory with strong shock waves
[NASA-CR-166157] p0261 N81-19020
GASP- General Aviation Synthesis Program. Volume 3: Aerodynamics. Part 1: Theoretical development
[NASA-CR-152303-VOL-3-PT-1] p0270 N81-19090
Technical evaluation report on the Fluid Dynamic Panel Symposium on Subsonic/Transonic Configuration/Aerodynamics
[AGARD-AR-146] p0392 N81-23431
Development of a nonlinear vortex method --- steady and unsteady aerodynamic loads of highly sweptback wings
[NASA-CR-164351] p0423 N81-24024
Fundamental heat transfer research for gas turbine engines
[NASA-CP-2178] p0428 N81-24063
Report of the panel on theoretical aerodynamics
p0593 N81-31152
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] p0637 N81-33192

COMPUTER ASSISTED INSTRUCTION
A learning guide for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-83128] p0484 N81-26083
Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel
[NASA-CR-165751] p0580 N81-30098

COMPUTER DESIGN
The Z8000 provides the basis for a powerful new airborne computer
p0321 A81-30252
Microprocessor-based digital air data computer for flight test
p0361 A81-32858
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 1: Proceedings
[AD-A100575] p0539 N81-28092
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093

COMPUTER GRAPHICS
Computer generated radar images for navigation
p0049 A81-12793
Analyst/IAP interface and interactive graphics --- for EMC analysis and display
p0057 A81-14270
Display-control synthesis --- computer flight graphics for aircraft applications
p0064 A81-15684
Computer-aided process planning system for aircraft engine rotating parts
p0149 A81-19836
A computer graphics display technique for the examination of aircraft design data
[AIAA PAPER 81-0370] p0166 A81-20788
Stochastic surfaces for flight simulator displays
p0324 A81-30330
Computer aided technology interface with weights engineering --- aircraft design
[SAWE PAPER 1346] p0353 A81-31384
Vortex-flow aerodynamics - An emerging design capability
p0366 A81-33717
The CADAM system for aircraft structural design
[SAE PAPER 801208] p0403 A81-34216
CAD - The designers' new tool --- in aircraft production
[AIAA PAPER 81-0850] p0407 A81-34352
Design verification by emulation --- computer image generation for aircrew training simulation
[AIAA 81-0975] p0415 A81-36564
The application of interactive graphics to thermal modeling
[AIAA PAPER 81-1180] p0459 A81-39159
The presentation of static information on air traffic control displays
p0211 N81-17064
Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733
Characteristics of flight simulator visual systems
[NASA-TM-81278] p0340 N81-21060
Application of computer colour raster displays in the cockpit in research flight simulation
[AD-A096542] p0377 N81-22063
A study of real-time computer graphic display technology for aeronautical applications
[NASA-CR-164221] p0380 N81-22727
ATTACK vs SCAN: A comparison of endgame aircraft survivability computer programs
[AD-A097663] p0388 N81-23076
Methodological approaches to identifying relevant features for visual flight
[AD-A100199] p0541 N81-28108
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
[NASA-TM-82658] p0552 N81-29782
The use of interpractive graphic displays for interpretation of surface design parameters
[NASA-TM-81963] p0581 N81-30110
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-30143
Computer graphics applications
[PB81-215246] p0637 N81-33188

COMPUTER METHODS
U COMPUTER PROGRAMS

COMPUTER NETWORKS
Weights information systems using minicomputers
[SAWE PAPER 1347] p0353 A81-31385
Availability requirements of the future ATC system
p0617 A81-48558

COMPUTER PROGRAM INTEGRITY
Evaluation of the A-7 requirements document by analysis of change data
[AD-A094888] p0272 N81-19103

COMPUTER PROGRAMMING
NT MICROPROGRAMMING
NT SYMBOLIC PROGRAMMING

A survey of computer simulations of digital
avionics systems
[AD-A091943] p0195 N81-16049
NASTRAN level 16 programmer's manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
A study of real-time computer graphic display
technology for aeronautical applications
[NASA-CR-164221] p0380 N81-22727
Microcomputer Applications in Power and Propulsion
Systems
[AGARD-LS-113] p0497 N81-27103
COMPUTER PROGRAMS
NT COMPUTER SYSTEMS PROGRAMS
NT INPUT/OUTPUT ROUTINES
NT NASTRAN
NT SUBROUTINES
Avionic standardization from a designer's
perspective
p0050 A81-13170
Analyst/IAP interface and interactive graphics ---
for EMC analysis and display
p0057 A81-14270
The matrix analysis of wings
p0108 A81-17818
Fuel consumption aspects of some noise abatement
procedures
p0154 A81-20350
A computerized study of wave characteristics in a
time dependent compressible flow
[AIAA PAPER 81-0410] p0169 A81-20838
An aeronautical structural analysis system for
static analysis /NAJIF-I/
p0224 A81-23728
Studies on Thwaites' method for wind tunnel
contraction
p0282 A81-27884
On the convergence of unsteady generalized
aerodynamic forces
[AIAA 81-0647] p0307 A81-29500
Program Navigate - A simulation computer program
to verify CAS navigation capability ---
Offensive Avionics System
p0322 A81-30289
A Single Processor Synchronous Executive derived
from the DAIS executive --- Digital Avionics
Information System
p0324 A81-30326
IFFC fire control system mechanization - Firefly III
--- for fighter aircraft
p0324 A81-30327
Tailoring software logic to the needs of the pilot
- A software designer's nightmare
p0325 A81-30335
Logistics support of avionic software stored on
erasable programmable read only memory
p0327 A81-30356
A computer code for the calculation of aircraft
trailing vortices
p0347 A81-30710
A simulator to test compressor research facility
control system software
p0349 A81-31110
An Interactive Weight Accounting Program /IWAP/
[SAWE PAPER 1345] p0353 A81-31393
RAPIDLOADS - A preliminary design loads prediction
technique for aircraft
[SAWE PAPER 1366] p0353 A81-31388
Computer calculation of the characteristics of a
hybrid system for the cooling of gas turbine
blades
p0459 A81-39217
Transonic wing design using potential-flow codes -
Successes and failures
[SAE PAPER 810565] p0518 A81-42730
Transonic dip mechanism of flutter of a sweptback
wing. II
p0559 A81-44447
Integrated noise model - The Federal Aviation
Administration's computer program for predicting
noise exposure around an airport
p0568 A81-46354
Optimization theory applied to higher harmonic
control of circulation controlled rotors
p0571 A81-46506
Choice of optimal parameters of a gyrovertical on
the basis of a standard program
p0622 A81-48744
Estimation of wing nonlinear aerodynamic
characteristics at supersonic speeds
[NASA-TP-1718] p0021 N81-10004
Aircraft hydraulic systems dynamic analysis.
Volume 6: Steady state flow analysis SSFAN
computer program technical description
[AD-A089240] p0026 N81-10055
Airport and airspace delay model description
[AD-A090781] p0074 N81-12049
Optimal design studies on composite wings with
static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
Performance seeking controls
p0079 N81-12092
F100 multivariable control synthesis program: A
review of full scale engine altitude tests ---
F100 engine
p0079 N81-12093
Force and moment coefficients for high deflection
cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
Evaluation of the impact computer program as a
linear design tool for bird resistant aircraft
transparencies
[AD-A091051] p0091 N81-13039
Unsteady three-dimensional subsonic flow in a
solid propellant rocket motor including the
effect of motor rotation
p0095 N81-13085
A computer program for the design and analysis of
low-speed airfoils, supplement
[NASA-TM-81062] p0125 N81-13921
Development of a computer program data base of a
navigation aid environment for simulated IFR
flight and landing studies
[NASA-TM-80064] p0129 N81-13959
Prediction of sound radiated from different
practical jet engine inlets
[NASA-CR-163824] p0137 N81-14789
A system for aerodynamic design and analysis of
supersonic aircraft. Part 3: Computer program
description
[NASA-CR-3353] p0139 N81-14971
Airborne antenna pattern code: User's manual
[AD-A092316] p0201 N81-16357
Hyperbolic/parabolic development for the GIM-STAR
code --- flow fields in supersonic inlets
[NASA-CR-3369] p0201 N81-16416
Abstract interface specifications for the A-7E
device interface module
[AD-A092696] p0202 N81-16770
EDRAFT-A graphite code for VTOL aircraft ground
footprint visualization
[AD-A093311] p0208 N81-17042
NOISECHECK procedures for measuring noise exposure
from aircraft operations
[AD-A093948] p0221 N81-17849
Evaluation of alternative procedures for
atmospheric absorption adjustments during noise
certification. Volume 2: Computer program
[AD-A093267] p0221 N81-17853
Continued development and correlation of
analytically based weight estimation codes for
wings and fuselages
[NASA-CR-152331] p0251 N81-18044
Langley Research Center contributions in advancing
active control technology
p0259 N81-19002
GASP- General Aviation Synthesis Program. Volume
1: Main program. Part 1: Theoretical
development
[NASA-CR-152303-VOL-1-PT-1] p0270 N81-19088
GASP- General Aviation Synthesis Program. Volume
2: Geometry. Part 1: Theoretical development
[NASA-CR-152303-VOL-2-PT-1] p0270 N81-19089
GASP- General Aviation Synthesis Program. Volume
4: Propulsion. Part 1: Theoretical development
[NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091
GASP- General Aviation Synthesis Program. Volume
5: Weights. Part 1: Theoretical development
[NASA-CR-152303-VOL-5-PT-1] p0271 N81-19092
GASP- General Aviation Synthesis Program. Volume
6: Performance. Part 1: Theoretical development
[NASA-CR-152303-VOL-6-PT-1] p0271 N81-19093
NASTRAN level 16 demonstration manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159826] p0279 N81-19483
An extension of the local momentum theory to a
distorted wake model of a hovering rotor

[NASA-TM-81258] p0329 N81-20030

Application of a structural optimization procedure for advanced wings
[AGARD-R-691] p0333 N81-20064

Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033

Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22045

DEKFIS user's guide: Discrete Extended Kalman Filter/Smoother program for aircraft and rotorcraft data consistency
[NASA-CR-159081] p0379 N81-22722

SCI Identification (SCIDNT) program user's guide --- maximum likelihood method for linear rotorcraft models
[NASA-CR-159082] p0379 N81-22723

NLSCIDNT user's guide maximum likehood parameter identification computer program with nonlinear rotorcraft model
[NASA-CR-159083] p0380 N81-22724

SCI model structure determination program (CSR) user's guide --- optimal subset regression
[NASA-CR-159084] p0380 N81-22725

INDES User's guide multistep input design with nonlinear rotorcraft modeling
[NASA-CR-159085] p0380 N81-22726

Investigation of aerodynamic characteristics of wings having vortex flow using different numerical codes
[NASA-CR-165706] p0384 N81-23034

MEGA16 - Computer program for analysis and extrapolation of stress-rupture data
[NASA-TP-1809] p0393 N81-23486

Continued research on selected parameters to minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602

Airport noise impact reduction through operations
[NASA-TM-81970] p0438 N81-24855

KONFIG and REKONFIG: Two interactive preprocessing to the Navy/NASA Engine Program (NNEP)
[NASA-TM-82636] p0446 N81-25698

Validation of helicopter noise prediction techniques
[NASA-CR-165715] p0447 N81-25768

Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[NASA-TM-83144] p0491 N81-26496

Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective --- aircraft gas turbine engines
[NASA-CR-165373-VOL-1] p0496 N81-27089

Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27090

Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program
[NASA-CR-165373-VOL-3] p0496 N81-27091

A digital program for calculating the interaction between flexible structures, unsteady aerodynamics and active controls
[NASA-TM-80040] p0498 N81-27115

AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 1: Proceedings
[AD-A100575] p0539 N81-28092

AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093

Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260

Computer analysis of 400 HZ Aircraft electrical generator test data
[AD-A100785] p0552 N81-29354

Computer analysis of flow perturbations generated by placement of choke bumps in a wind tunnel
[NASA-TP-1892] p0579 N81-30088

HADY-1, a FORTRAN program for the compressible stability analysis of three-dimensional boundary layers
p0586 N81-30388

Computer modeling of internal combustion engines: Combustion and related processes
[HTS/79/3] p0587 N81-30454

Determination of aerodynamically adequate fillet geometry in turbocompressor blade rows
[AD-A102170] p0600 N81-31219

User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] p0631 N81-32966

Computer program to predict aircraft noise levels
[NASA-TP-1913] p0641 N81-33947

Ames Research Center publications: A continuing bibliography, 1980
[NASA-TM-81308] p0641 N81-34138

COMPUTER SIMULATION
U COMPUTERIZED SIMULATION

COMPUTER STORAGE DEVICES
NT RANDOM ACCESS MEMORY
NT READ-ONLY MEMORY DEVICES

COMPUTER SYSTEMS DESIGN

DRAPO - Computer-assisted design and manufacturing system
p0007 A81-11610

L-1011 Flight Management System design considerations
p0113 A81-18074

New developments of data processing in computer-controlled manufacturing systems /DNC, FMS/
p0149 A81-19845

Air Force Integration Support Facilities - Their total utility
p0320 A81-30240

Digital flight control - The generation of the 80's
p0320 A81-30248

Dispersed flight control computer systems
p0321 A81-30250

Cybernetic airborne fire control - Issues and potential
p0326 A81-30347

Weights information systems using minicomputers
[SAWE PAPER 1347] p0353 A81-31385

Current and future use of an AIDS integrated EMS --- Aircraft Integrated Data System for Engine Monitoring
[SAE PAPER 801219] p0404 A81-34225

A-10A Operational Flight Trainer simulator flight control system and aerodynamics
[AIAA 81-0964] p0414 A81-36555

Air data computer for the measurement and evaluation of data of flight physics
p0451 A81-37648

Advancements in dimensional inspection of helicopter gearboxes and transmission cases
[AHS 80-36] p0476 A81-40165

An economical approach to automated flight test data reduction
p0576 A81-46643

The array processor - A real-time simulator
p0614 A81-48328

Development considerations for real-time aircraft/avionic distributed computer control systems
p0616 A81-48376

Practical optimal flight control system design for helicopter aircraft. Volume 2: Software user's guide
[NASA-CR-152306] p0081 N81-12110

A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 2: Model equations and base aircraft data
[NASA-CR-166129-VOL-2] p0538 N81-28085

A continuously reconfiguring multi-microprocessor flight control system
[AD-A101412] p0584 N81-30138

COMPUTER SYSTEMS PERFORMANCE

Flight investigation of a four-dimensional terminal area guidance system for STOL aircraft
[NASA-TM-81271] p0260 N81-19014

Airborne Systems Software Acquisition Engineering Guidebook for software development and support facilities
[AD-A100214] p0543 N81-28789

COMPUTER SYSTEMS PROGRAMS
NT INPUT/OUTPUT ROUTINES

Advanced ATC computer system
p0286 A81-28302

Real time analysis for helicopter flight testing
p0470 A81-40112

A system for aerodynamic design and analysis of supersonic aircraft. Part 4: Test cases

[NASA-CR-3354] p0185 N81-15977
Evaluation of the A-7 requirements document by
analysis of change data
[AD-A094888] p0272 N81-19103
Flight data recording and data processing for
light airplanes and gliders
p0328 N81-20008
A quick-look system for the processing of flight
data recordings
p0329 N81-20021
AIRCL: A programmed system for generating NC
tapes for airplane models. User's manual
[NASA-CR-165687] p0340 N81-21058
Airborne antenna pattern calculations
[NASA-CR-164350] p0437 N81-24321
Airborne Systems Software Acquisition Engineering
Guidebook for software cost analysis and
estimating
[AD-A100215] p0543 N81-28785
Airborne Systems Software Acquisition Engineering
Guidebook for contracting for software acquisition
[AD-A100217] p0543 N81-28786
Airborne Systems software Acquisition Engineering
Guidebook for application and use of the
guidebooks (series overview)
[AD-A100216] p0543 N81-28787
Airborne Systems Software Acquisition Engineering
Guidebook for supportable airborne software
[AD-A100213] p0543 N81-28788
Airborne Systems Software Acquisition Engineering
Guidebook for software development and support
facilities
[AD-A100214] p0543 N81-28789
User's manual for FSLIP-3, FLEXSTAB loads
integration program
[NASA-TM-81364] p0589 N81-30815
COMPUTER TECHNIQUES
Computerized flight management for fuel saving
p0018 A81-12349
The state of development and design of target data
processing of the ELRA system
p0152 A81-20089
Evaluation of false alarm information with the ELRA
p0152 A81-20100
Analytical methods for store separation flight test
p0177 A81-22344
Modification of wing sections to optimize
transonic performance
p0226 A81-24011
Adaptive-wall wind-tunnel development for
transonic testing
p0352 A81-31367
Inspection of turbine blades using computer aided
laser technology
[SAE PAPER 801173] p0400 A81-34187
TF41/A7-E engine monitoring system implementation
experience
[SAE PAPER 801222] p0404 A81-34226
A description of the general aviation fixed wing
accident
p0408 A81-34696
Systems costing of hovercraft, hydrofoils and
wing-in-ground effect machines. III
p0412 A81-35724
Computer calculation of the characteristics of a
hybrid system for the cooling of gas turbine
blades
p0459 A81-39217
Computerized gear grinding system development
[AHS 80-48] p0476 A81-40163
Pilot guidance and display considerations for
energy efficient flight profiles
p0513 A81-41924
CAINS II - An application of standard laser gyro
inertial and computer technology for existing
naval carrier aircraft
p0516 A81-42434
Application of the Semi-Loof thi[illegible]ell element to
the analysis of aircraft engine structures
p0518 A81-42704
Development of airframe structural design loads
prediction techniques for flexible military
aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953
Origins of inertial navigation
p0567 A81-46276
Computational fluid mechanics and its impact on
the aircraft aerodynamicist
[DGLR PAPER 81-003] p0611 A81-47621
A simple radar for navigation accuracy measurements
p0612 A81-47844
Computer-aided investigation of turbomachine
aerodynamics and aeroelasticity
p0613 A81-47962
Computer based in-flight monitoring
p0042 N81-11269
A computer-based laser Doppler velocimeter
[DFVLR-MITT-79-14] p0133 N81-14289
An advanced electronic cockpit instrumentation
system: The coordinated cockpit display
p0213 N81-17074
A computer technique for detailed analysis of
mission radius and maneuverability
characteristics of fighter aircraft
[NASA-TP-1837] p0329 N81-20026
Computer techniques for ultrasonic inspection
[AD-A095285] p0337 N81-20447
Microprocessor characteristics and comparative
features
p0497 N81-27104
Microwave system for real time space position
measurement
p0545 N81-29089
COMPUTERIZED CONTROL
U NUMERICAL CONTROL
COMPUTERIZED DESIGN
Numerical optimization - An assessment of its role
in transport aircraft aerodynamic design through
a case study
p0006 A81-11604
DRAPO - Computer-assisted design and manufacturing
system
p0007 A81-11610
Computer aided compilation of an electrical
drawing file
p0007 A81-11611
Engine air intake design support by use of
computational methods and comparison of
theoretically derived pressure distributions
with experimental data
p0008 A81-11614
Optimum design of axial flow gas turbine stage. I
- Formulation and analysis of optimization
problem. II - Solution of the optimization
problem and numerical results
p0019 A81-12608
Computer-aided methods for redesigning the
stabilized pitch control system of a semi-active
thermal homing missile
p0051 A81-13250
Computer-aided roll pass design in rolling of
airfoil shapes
p0065 A81-15796
Discrete-continuous variable structural synthesis
using dual methods
p0066 A81-15894
Optimal design of frames with substructuring
p0068 A81-16276
Aerodynamic design of a ducted propeller -
Optimization of efficiency
p0102 A81-17146
Recent selected papers of Northwestern
Polytechnical University. Parts 1 & 2 --- Book
p0107 A81-17801
Finite difference computation of the steady
transonic potential flow around airplanes
p0107 A81-17802
Aerodynamic calculations and design of subcritical
aerofoils
p0108 A81-17804
An aerodynamic design method for transonic axial
flow compressor stage
p0108 A81-17805
An optimum design procedure of total-temperature
thermocouple probes
p0108 A81-17807
The automatic matrix force method and techniques
for handling more complex computations with
given computer capacity
p0108 A81-17815
Structural analysis of fuselages with cutouts by
finite element method
p0108 A81-17816
The measurement and analysis of station parameters
of a turbojet engine
p0109 A81-17825
Increasing capacity with computer-assisted
decision making --- airport planning

p0113 A81-18080
Airspace simulation in airport system planning
p0114 A81-18066
Frequency-shaped cost functionals - Extension of linear-quadratic-Gaussian design methods
p0116 A81-18578
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672
Computer-aided process planning system for aircraft engine rotating parts
p0149 A81-19836
A computer-aided design system geared toward conceptual design in a research environment --- for hypersonic vehicles
[AIAA PAPER 81-0372] p0166 A81-20789
A penalty function method for structural optimum design with aeroelastic constraints
p0223 A81-23727
Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
p0224 A81-23730
Lifting surface theory and the numerical method of wings with small angles of sideslip at subsonic and supersonic speeds
p0224 A81-23851
Supermatrix method for multi-substructure analysis
p0225 A81-23854
The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856
Landing gear shock absorber design criteria and the assessment of tire/wheel configurations
p0232 A81-24940
The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475
Development and validation of computational flow analysis for design of inlets and nozzles
p0298 A81-29117
IPAD applications to the design, analysis, and/or machining of aerospace structures --- Integrated Program for Aerospace-vehicle Design
[AIAA 81-0512] p0301 A81-29388
Design and development of the control laws for the F-18 primary flight control system
p0320 A81-30245
Computerized design and optimization of self-contained airborne high power electrical systems
p0323 A81-30310
On the design of modern airfoil sections by numerical methods
p0347 A81-30705
An Interactive Weight Accounting Program /IWAP/
[SAWE PAPER 1345] p0353 A81-31383
Computer aided technology interface with weights engineering --- aircraft design
[SAWE PAPER 1346] p0353 A81-31384
PARAM - A new weight sizing routine --- cost-effective computerized design for aircraft
[SAWE PAPER 1367] p0353 A81-31389
Integrated CAD/CAM for the 1980s
[SAE PAPER 801170] p0400 A81-34185
The CADAM system for aircraft structural design
[SAE PAPER 801208] p0403 A81-34216
CAD - The designers' new tool --- in aircraft production
[AIAA PAPER 81-0850] p0407 A81-34352
ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ --- Integrated Computer Aided Manufacturing for aircraft systems
[AIAA PAPER 81-0855] p0408 A81-34353
Computer-aided design and manufacture in aircraft production /CAD/CAM/
p0451 A81-37647
The application of interactive graphics to thermal modeling
[AIAA PAPER 81-1180] p0459 A81-39159
Computerized three-dimensional aerodynamic design of a lifting rotor blade
[AHS 80-2] p0473 A81-40137
Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839
Engine duty cycle estimation for conceptual design aircraft
[AIAA PAPER 81-1368] p0514 A81-42179
An approach to conformal inlet diffuser design for integrated propulsion systems
[AIAA PAPER 81-1395] p0514 A81-42185
Engine life methodologies for conceptual design
[AIAA PAPER 81-1398] p0515 A81-42188
Engine life and usage methodologies for conceptual design
[AIAA PAPER 81-1651] p0533 A81-43937
Multiobjective insensitive design of airplane control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518
Optimal multirate flight control design
p0563 A81-45522
Computer aided helicopter design
p0572 A81-46613
Analytical and computer-aided design of automated systems for the testing of aircraft engines --- Russian book
p0578 A81-46850
Computational fluid mechanics and its impact on the aircraft aerodynamicist
[DGLR PAPER 81-003] p0611 A81-47621
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
p0615 A81-48333
Structural synthesis - Its genesis and development
p0622 A81-49076
Design options study. Volume 4: Detailed analyses supporting appendices --- advanced civil military aircraft
[AD-A089539] p0027 N81-10059
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies
[AD-A091051] p0091 N81-13039
Application of the NNA design method to a nonlinear turbofan engine --- multivariable Nyquist array method
[NASA-CR-163855] p0143 N81-15001
Computer code for the determination of ejection seat/man aerodynamic parameters
[AD-A092721] p0191 N81-16026
A conversational, topological grid method and optimization of structural calculations involving finite elements
[AAAF-NT-79-30] p0210 N81-17053
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
GASP- General Aviation Synthesis Program. Volume 1: Main program. Part 1: Theoretical development
[NASA-CR-152303-VOL-1-PT-1] p0270 N81-19088
GASP- General Aviation Synthesis Program. Volume 2: Geometry. Part 1: Theoretical development
[NASA-CR-152303-VOL-2-PT-1] p0270 N81-19089
GASP- General Aviation Synthesis Program. Volume 3: Aerodynamics. Part 1: Theoretical development
[NASA-CR-152303-VOL-3-PT-1] p0270 N81-19090
GASP- General Aviation Synthesis Program. Volume 4: Propulsion. Part 1: Theoretical development
[NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091
GASP- General Aviation Synthesis Program. Volume 5: Weights. Part 1: Theoretical development
[NASA-CR-152303-VOL-5-PT-1] p0271 N81-19092
GASP- General Aviation Synthesis Program. Volume 6: Performance. Part 1: Theoretical development
[NASA-CR-152303-VOL-6-PT-1] p0271 N81-19093
Design of turbine cascades with transitional profile boundary layers
p0278 N81-19456
Application of a structural optimization procedure for advanced wings
[AGARD-R-691] p0333 N81-20064
Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016
A study of real-time computer graphic display technology for aeronautical applications
[NASA-CR-164221] p0380 N81-22727
Structures and Dynamics Division research and technology plans, fiscal year, 1981
[NASA-TM-83137] p0491 N81-26497

Composite structural materials
[NASA-CR-164634] p0541 N81-28176
Adaptive finite element technology in integrated design and analysis --- aircraft structures design
[NASA-CR-164560] p0543 N81-28810
Conceptual/preliminary design study of subsonic v/stol and stovl aircraft derivatives of the S-3A
[NASA-TM-81310] p0547 N81-29118
Computer evaluation of the on-and-off design of an axial air turbine
[AD-A101102] p0549 N81-29131
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digital 2 aircraft
[AD-A100794] p0549 N81-29136
Structural optimization of advanced aircraft structures --- computerized design
[MBB-S/PUB/32] p0582 N81-30122
Development of an aircraft maneuver load spectrum based on VGH data
[AD-A102750] p0628 N81-32142
Software survey for the avionics test bed --- for large space structures
[NASA-CR-161089] p0629 N81-32143
COMPUTERIZED SIMULATION
NT ANALOG SIMULATION
NT DIGITAL SIMULATION
Prediction of changes in aircraft noise exposure
p0017 A81-11820
Numerical prediction of bypass engine jet noise
[AIAA PAPER 80-1006] p0057 A81-14300
Airspace simulation in airport system planning
p0114 A81-18086
The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-18654
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940
High-level languages in affordable aircraft simulators
p0154 A81-20418
Numerical simulations of a segmented-plenum, perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640
Calculation of viscous, sonic flow over hemisphere-cylinder at 19 deg incidence - The capturing of nose vortices
[AIAA PAPER 81-0189] p0162 A81-20661
A computational model for low speed flows past airfoils with spoilers
[AIAA PAPER 81-0253] p0163 A81-20702
Computer simulation of airfoil icing without runback
[AIAA PAPER 81-0402] p0167 A81-20809
Simulated aircraft takeoff performance with frosted wings
[AIAA PAPER 81-0404] p0167 A81-20811
Air traffic simulation as a validation tool
p0172 A81-21718
A case study - Real time simulation and structured design
p0172 A81-21721
The flight assessment and applications of DME/DME. I, II
p0174 A81-21968
SAFEST computer simulation of ejection seat performance
p0175 A81-22039
Low level, adverse attitude escape using a vertical seeking ejection seat
p0176 A81-22094
Crack propagation in lugs
p0180 A81-22629
Computer simulation of unsteady flow past lifting rotors of coaxial configuration
p0230 A81-24389
A computer simulation of turbulent jet flow
p0230 A81-24424
Numerical simulation of supersonic flow around solids of revolution with a leading detachment zone
p0231 A81-24757
The role of simulation in automatic flight control systems research
p0283 A81-27890
Computation of wind tunnel model deflections --- for transport type solid wing
[AIAA 81-0482] p0300 A81-29381
On the convergence of unsteady generalized aerodynamic forces
[AIAA 81-0647] p0307 A81-29500
Aerodynamic modeling of an oscillating wing with external stores
[AIAA 81-0648] p0307 A81-29501
Interactive multi-mode blade impact analysis
[ASME PAPER 81-GT-79] p0314 A81-29907
Life cycle cost before, during and after the design of aircraft propulsion systems
[ASME PAPER 81-GT-111] p0315 A81-30016
Program Navigate - A simulation computer program to verify OAS navigation capability --- Offensive Avionics System
p0322 A81-30289
Simulation of a third-order vertical channel mechanization --- for airplane inertial navigation
p0322 A81-30290
Optimal tracking design and simulation for a monopulse airborne radar system utilizing a predicted dual beam antenna design
p0323 A81-30293
Ground moving target radar signal simulation
p0323 A81-30304
Simulation techniques for new generation aircraft maintenance training devices
p0324 A81-30331
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
Digital computer simulation of aircraft hydraulic systems
[SAE PAPER 801193] p0402 A81-34203
Flight Simulation Technologies Conference, Long Beach, Calif., June 16-18, 1981, Technical Papers
p0414 A81-36554
A simulation approach to MIL-STD-1553 Multiplex Bus interfacing
[AIAA 81-0971] p0415 A81-36560
Microcomputer based engine model used in flight simulation applications
[AIAA 81-0973] p0415 A81-36562
Versatile and economical real-time simulation for digital flight control systems
[AIAA 81-0974] p0415 A81-36563
Development of a flight simulation capability in the dynamic environment simulator
[AIAA 81-0978] p0415 A81-36566
Theory and application of finite element analysis to structural crash simulation
p0416 A81-36614
Experimental aircraft of the DFVLR for in-flight simulation and flight control technology
p0452 A81-37654
The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-38534
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1218] p0458 A81-39006
Simulation model validation - Airport applications
p0461 A81-39320
An investigation of the recovery from an engine failure in a twin engine augmentor wing aircraft using the NAE Airborne Simulator
p0509 A81-41199
Analytical studies on the effects of cooling flows on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741
Matrix load analysis method for flexible aircraft structures
[PAPER 810610] p0522 A81-42766
Simulation of aircraft seat response to a crash environment
[SAE PAPER 810612] p0522 A81-42768
Comparison of model testing with computer simulations of an air landing system
[AIAA PAPER 81-1663] p0534 A81-43942
A model-following technique for insensitive aircraft control systems
[AIAA PAPER 81-1067] p0560 A81-44563
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44601
Generic multi-body formulation of heavy lift airship equations of motion
p0563 A81-45539
Optimization theory applied to higher harmonic control of circulation controlled rotors
p0571 A81-46606

Simulation model to evaluate maintenance strategies for large network of fielded systems
p0613 A81-48009

The array processor - A real-time simulator
p0614 A81-48328

Function generation techniques --- in real time hybrid simulations
p0614 A81-48329

Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks
p0615 A81-48351

Simulation of Microwave Landing System
p0615 A81-48368

Optimization of simulation models for avionics software verification
p0615 A81-48373

Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
p0616 A81-48379

Determination of cargo container inventories through logistics simulation --- for air shipment
p0616 A81-48380

Adaptive features and measurement requirements for advanced surveillance radars
p0617 A81-48544

COMLINK - A communications/EW analytical and modeling tool
p0617 A81-48547

A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations
[FFA-TN-AU-1418-PT-1] p0022 N81-10013

System simulation applied to the evaluation of displays for guidance and control
[DFVLR-MITT-79-10] p0028 N81-10064

Missile motion sensitivity to dynamic stability derivatives
[AD-A089750] p0038 N81-11093

An automated procedure for developing hybrid computer simulations of turbofan engines
[NASA-TM-81605] p0044 N81-11688

Naval aircraft operating and support cost-estimating model: FY78 revision
[AD-A090044] p0071 N81-12013

Airport and airspace delay model description
[AD-A090781] p0074 N81-12049

An analytic model of subsonic flow around an airflow with a spoiler
p0138 N81-14966

Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331] p0142 N81-14994

Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation
[NASA-CR-165141] p0143 N81-15004

Computer Generated Imagery (CGI) current technology and cost measures feasibility study
[AD-A091636] p0146 N81-15729

A survey of computer simulations of digital avionics systems
[AD-A091943] p0195 N81-16049

Propulsion system mathematical model for a lift/cruise fan V/STOL aircraft
[NASA-TM-81663] p0195 N81-16055

Validation of a two dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A092138] p0196 N81-16060

Airborne antenna pattern code: User's manual
[AD-A092316] p0201 N81-16357

A theoretical method for the simulation of separation behavior of aircraft external stores --- applications to computerized wind tunnel tests
[MBB-FE-122/S/PUB/16] p0203 N81-16987

Air traffic control simulation models. Citations from the NTIS data base
[PB81-800104] p0207 N81-17037

ZDRAFT-A graphite code for VTOL aircraft ground footprint visualization
[AD-A093311] p0208 N81-17042

A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032

Validation of a two-dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A094615] p0254 N81-18067

Nonlinear rotor dynamics analysis --- computerized simulation
p0257 N81-18405

Calculation of airloads for a flexible wing via NASTRAN
[AD-A094770] p0263 N81-19031

An interactive computational aerodynamics analysis program
[AD-A094765] p0263 N81-19033

NASA/FAA general aviation crash dynamics program
p0268 N81-19064

The role of the research simulator in the systems development of rotorcraft
[NASA-TM-81276] p0272 N81-19101

Real-time feasibility for generation of nonlinear textured terrain
[AD-A095070] p0277 N81-19141

Visual system Technology: Status and problems --- training simulators
p0336 N81-20099

An approach to real-time simulation using parallel processing
[NASA-TM-81731] p0345 N81-21603

Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22282

A study of real-time computer graphic display technology for aeronautical applications
[NASA-CR-164221] p0380 N81-22727

User's manual for flight Simulator Display System (FSDS)
[NASA-CR-164295] p0391 N81-23095

Application of a performance modeling technique to an airplane with variable sweep wings
[NASA-TP-1855] p0426 N81-24048

Investigations of free-jet test requirements and techniques with emphasis on the adaptable jet stretcher
[AD-A098710] p0439 N81-25044

KONFIG and REKONFIG: Two interactive preprocessing to the Navy/NASA Engine Program (NNEP)
[NASA-TM-82636] p0446 N81-25698

An investigation of the linear and angular vibration environments of trials aircraft
p0545 N81-29087

Aircraft brake systems testing handbook
[AD-A101516] p0548 N81-29123

Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362

Three-dimensional transonic flow analysis
[AD-A101944] p0593 N81-31153

Transition and conversion trim-maps for the AV-8A VTOL aircraft
[AD-A102155] p0596 N81-31186

COMPUTERS

NT AIRBORNE/SPACEBORNE COMPUTERS
NT ANALOG COMPUTERS
NT DIGITAL COMPUTERS
NT HYBRID COMPUTERS
NT MICROCOMPUTERS
NT MINICOMPUTERS

Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733

NASA's aeronautics research and technology base
[NASA-CR-164195] p0381 N81-22969

AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 1: Proceedings
[AD-A100575] p0539 N81-28092

AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093

CONCENTRATION (COMPOSITION)

NT ATMOSPHERIC MOISTURE
NT MOISTURE CONTENT

CF6-50 engine emissions testing with traverse probe
[AD-A102159] p0600 N81-31218

CONCORDE AIRCRAFT

Concorde aerodynamics and associated systems development --- Book
p0101 A81-16718

An investigation of the liquid impact properties of a GFRP radome material
p0457 A81-38571

Synthesis of test results obtained with Concorde at high incidences
[AAAF-NT-80-26] p0077 N81-12079

Concorde with the airlines --- operating costs and performance

p0247 N81-18013
CONCRETE STRUCTURES
Airfield pavement demonstration-validation study
p0003 A81-10718
CONCRETES
Fully bonded concrete overlay for an airport runway
p0113 A81-18075
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10080
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182
Shrinkage-compensating cement for airport pavement. Phase 3: Fibrous concretes. Addendum
[AD-A092945] p0219 N81-17299
Porous portland cement concrete: The state of the art
[AD-A098177] p0436 N81-24187
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273
CONDITIONS
NT FLIGHT CONDITIONS
NT RUNWAY CONDITIONS
CONDUCTORS
NT BUS CONDUCTORS
NT SUPERCONDUCTORS
CONES
NT CONICAL BODIES
NT SLENDER CONES
CONFERENCES
Standardization in military avionics systems architecture; Proceedings of the Seminar, Dayton, Ohio, November 28, 1975
p0050 A81-13167
Sensor Systems for the 80's Conference, Colorado Springs, Colo., December 2-4, 1980, Technical Papers
p0052 A81-13351
Specialists' Meeting on Helicopter Propulsion Systems, Williamsburg, Va., November 6-8, 1979, Technical Papers
p0104 A81-17501
International Air Transportation Conference, New Orleans, La., April 30-May 3, 1979, Proceedings. Volumes 1 & 2
p0110 A81-18051
Symposium on Internal Noise in Helicopters, University of Southampton, Southampton, England, July 17-20, 1979, Proceedings
p0150 A81-20051
Effect of load spectrum variables on fatigue crack initiation and propagation; Proceedings of the Symposium, San Francisco, Calif., May 21, 1979
p0172 A81-21730
Survival and Flight Equipment Association, Annual Symposium, 17th, Las Vegas, Nev., December 2-6, 1979, Proceedings
p0174 A81-22076
The 1980's - Payoff decade for advanced materials; Proceedings of the Twenty-fifth National Symposium and Exhibition, San Diego, Calif., May 6-8, 1980
p0181 A81-22636
Israel Annual Conference on Aviation and Astronautics, 21st, Tel Aviv and Haifa, Israel, February 28-March 1, 1979, Proceedings
p0226 A81-24003
Viscous flow drag reduction; Symposium, Dallas, Tex., November 7, 8, 1979, Technical Papers
p0230 A81-26501
Practical experiences with flow-induced vibrations; Proceedings of the Symposium, Universitaet Karlsruhe, Karlsruhe, West Germany, September 3-6, 1979
p0282 A81-27610
Radio Technical Commission for Aeronautics, Technical Symposium and Annual Assembly Meeting, Washington, D.C., November 20, 21, 1980, Proceedings
p0285 A81-28293
International Symposium on Air Breathing Engines, 5th, Bangalore, India, February 16-22, 1981, Proceedings
p0290 A81-29051
Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, Technical Papers. Part 1
p0300 A81-29377
Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, and AIAA Dynamics Specialists Conference, Atlanta, Ga., April 9, 10, 1981, Technical Papers. Part 2
p0303 A81-29428
Optics in metrology and quality assurance; Proceedings of the Seminar, Los Angeles, Calif., February 6, 7, 1980
p0358 A81-32504
Flight Simulation Technologies Conference, Long Beach, Calif., June 16-18, 1981, Technical Papers
p0414 A81-36554
Fatigue of fibrous composite materials; Proceedings of the Symposium, San Francisco, Calif., May 22, 23, 1979
p0418 A81-37126
Long focal length, high altitude standoff reconnaissance; Proceedings of the Seminar, San Diego, CA, July 29, 30, 1980
p0461 A81-39417
Guidance and Control Conference, Albuquerque, NM, August 19-21, 1981, Collection of Technical Papers
p0553 A81-44076
The roles of airline engineering and maintenance in 1981 --- summary for 26 January 1981 conference of ATLAS group
p0565 A81-45755
American Helicopter Society, Annual Forum, 37th, New Orleans, LA, May 17-20, 1981, Proceedings
p0571 A81-46603
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
p0611 A81-47801
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980
p0613 A81-47993
Effect of service environment on composite materials
[AGARD-CP-288] p0039 N81-11128
Propulsion Controls, 1979 --- air breathing engine control
[NASA-CP-2137] p0078 N81-12090
Report on a cooperative programme on Active Flutter Suppression
[AGARD-R-689] p0082 N81-12115
Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933
Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation systems
[NASA-CP-2139] p0135 N81-14555
Computational Fluid Dynamics, volume 2
[VKI-LS-1980-5-VOL-2] p0144 N81-15310
The 17th JANNAF combustion meeting, volume 1
[NASA-TM-82238] p0200 N81-16253
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Supersonic Cruise Research 1979, part 1
[NASA-CP-2108-PT-1] p0243 N81-17981
Supersonic Cruise Research 1979, part 2 --- airframe structures and materials, systems integration, economic analysis
[NASA-CP-2108-PT-2] p0246 N81-18005
La Recherche Aerospatiale, Bimonthly Bulletin no. 1980-2, March - April 1980
[ESA-TT-652] p0255 N81-19244
Advanced aerodynamics and active controls. Selected NASA research
[NASA-CP-2172] p0259 N81-19081
The 1980 Aircraft Safety and Operating Problems, part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
The 1980 Aircraft Safety and Operating Problems, part 2
[NASA-CP-2170-PT-2] p0267 N81-19056
Structures and Materials Panel
[AD-A089019] p0378 N81-22420
Contributions to the 5th Symposium on aircraft integrated data systems --- Conferences
[ESA-TT-532] p0382 N81-23008
Fundamental heat transfer research for gas turbine engines
[NASA-CP-2178] p0428 N81-24063
Turbine Engine Testing
[AGARD-CP-293] p0429 N81-24071
Wind tunnel corrections for high angle of attack models

[AGARD-R-692] p0435 N81-24120
Precision Positioning and Inertial Guidance Sensors: Technology and Operational Aspects
[AGARD-CP-298] p0484 N81-26091
Microcomputer Applications in Power and Propulsion Systems
[AGARD-LS-113] p0497 N81-27103
Aircraft Research and Technology for Antimisting Kerosene Conference
[AD-A101347] p0586 N81-30103
Carbon/graphite composite material study
[AR-3] p0585 N81-30188
A Matrix Approach to Biological Investigation of Synthetic Fuels
[PB81-183477] p0586 N81-30313
Parabolic Dish Solar Thermal Power Annual Program Review Proceedings
[NASA-CR-164696] p0587 N81-30525
Dynamic Stability Parameters --- conferences
[AGARD-LS-114] p0590 N81-31105
Aircraft Engine Diagnostics
[NASA-CP-2190] p0597 N81-31196
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] p0632 N81-33137

CONFIGURATION MANAGEMENT
Runway Configuration Management System concepts
p0114 A81-18089
Orientation of measurement sensors for optimum end-of-life performance
p0360 A81-32697
Prediction and evaluation of thrust augmenting ejector performance at the conceptual design stage
[AD-A093953] p0216 N81-17094
Electronic flight rules: An alternative separation assurance concept
[AD-A097570] p0387 N81-23063

CONFIRMATION
U PROVING

CONFLUENCE
U CONVERGENCE

CONFORMAL MAPPING
The performance of slotted blades in cascade
p0002 A81-10632

CONFORMAL TRANSFORMATIONS
U CONFORMAL MAPPING

CONGRESSIONAL REPORTS
Aviation safety and noise abatement
[GPO-50-923] p0032 N81-10578
Aviation safety
[GPO-68-717] p0073 N81-12040
Commuter airport safety
[GPO-60-512] p0073 N81-12041
Air traffic controllers and flight service station specialists
[GPO-51-381] p0075 N81-12055
Aircraft collision avoidance
[GPO-50-158] p0091 N81-13041
Design analysis of wide-body aircraft
[GPO-60-652] p0092 N81-13045
Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933
Testimony of Elwood T. Driver, Vice Chairman, National Transportation Safety Board, accompanied by Gerrit J. Walhout, Chief, Human Factors Division, and Matthew M. McCormick, Senior Air Safety Investigator, Human Factors Division
p0126 N81-13934
Testimony of James J. Kramer, Associate Administrator for Aeronautics and Space Technology, National Aeronautics and Space Administration, accompanied by John H. Enders, Project Manager, Aviation Safety Technology Office, John A. Parker, Chemical Research Projects Office, NASA-Ames Research Center, and Demitrius A. Kourtides, Chemical Research Projects Office, NASA-AMES Research Center
p0127 N81-13935
Testimony of Richard W. Taylor, Vice President and Special Assistant to the President, and Eugene A. Bara, Chief Engineer, Payloads Systems, Boeing Commercial Airplane Company
p0127 N81-13936
Testimony of a panel consisting of: Lloyd E. Frisbee, Vice President, Engineering and Operations, Lockheed California Company; Lyle A. Wright, Director, Powerplant Engineering, Douglas Aircraft Company, accompanied by Doctor H. C. Schjelderup, Chief Technology Engineer, Materials and Process Engineering, and F. E. Duskin, Senior Design Engineer, Interiors Engineering, Douglas Aircraft Company
p0127 N81-13937
Posture hearings (NASA and FAA)
[GPO-65-265] p0203 N81-16952
NASA authorization, 1981
[GPO-71-290] p0203 N81-16953
Spin recovery training
[GPO-67-439] p0216 N81-17098
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0334 N81-20077
Aviation safety: Hazardous materials handling
[GPO-69-199] p0439 N81-25049
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149
Airport and airway system development act of 1981
[GPO-75-804] p0601 N81-31231

CONICAL BODIES
NT SLENDER CONES
Some aerodynamic properties of cones in viscous supersonic flow
p0237 A81-26119
Leading-edge separation from a thick, conical, slender wing at small angles of incidence
p0355 A81-31687
The effect of the skewness of the skin panels on stresses in conical wings
p0625 A81-49930

CONICAL FLOW
Flight experiments with a slender cone at angle of attack
[AIAA PAPER 81-0337] p0165 A81-20761
Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016

CONICAL NOZZLES
Interferometric study of the initial stage of supersonic jets of gases with various specific-heat ratios from conical nozzles
p0068 A81-16231
Effect of facility variation on the acoustic characteristics of three single stream nozzles
p0178 A81-22534
Jet noise suppression for low bypass engines - Have we reached a dead end
p0291 A81-29063
Static source locations for four nozzles mounted on a J-85 engine
[NASA-CR-152401] p0143 N81-14998

CONNECTIONS
U JOINTS (JUNCTIONS)

CONNECTORS
NT ELECTRIC CONNECTORS

CONNECTORS (ELECTRIC)
U ELECTRIC CONNECTORS

CONOIDS
U CONICAL BODIES

CONSERVATION
NT ENERGY CONSERVATION

CONSERVATION EQUATIONS
An implicit finite volume method for elliptical flow computation --- numerical integration, aerothermodynamics
p0255 N81-18248

CONSOLES
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024
New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11025

CONSTANT SPEED PROPELLERS
U VARIABLE PITCH PROPELLERS

CONSTRAINTS
NT METEOROLOGICAL PARAMETERS
Limb restraint F-18 style
p0567 A81-46325
Fundamentals of conceptual design optimization of subsonic transport aircraft
[VTH-LR-292] p0128 N81-13951
Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968

Evaluation of AFIT/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0249 N81-18034
CONSTRUCTION
Prestressed concrete airfield pavements
p0112 A81-18063
CONSTRUCTION MATERIALS
Introduction to a rigid pavement design procedure
p0111 A81-18054
The present and future applications of titanium alloys in engines
p0417 A81-36666
NASA's activities in the conservation of strategic aerospace materials
[NASA-TM-81617] p0550 N81-29205
CONSUMABLES (SPACECRAFT)
NT WORKING FLUIDS
CONSUMPTION
NT ENERGY CONSUMPTION
NT FUEL CONSUMPTION
CONTAINMENT
State-of-the-art review of flywheel burst containment
[UCRL-15257] p0085 N81-12427
Composite containment systems for jet engine fan blades
[NASA-TM-81675] p0220 N81-17480
CONTAMINANTS
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0118 A81-18758
Contaminant increase in aircraft liquid oxygen converters: Analysis of data
[AD-A090975] p0092 N81-13049
PACER LIME: An environmental corrosion severity classification system, part 1
[AD-A100496] p0539 N81-28069
CONTAMINATION
NT FUEL CONTAMINATION
Fabrication problems related to the contamination of titanium alloys
p0417 A81-36664
CONTINENTS
NT AUSTRALIA
NT EUROPE
CONTINUOUS RADIATION
Low-frequency radio navigation system
[NASA-CASE-NPO-15264-1] p0373 N81-22036
CONTINUOUS WAVE RADAR
Rotating blades radio interference in a helicopter-borne CW Doppler radar
p0224 A81-23813
CONTINUOUS WAVES
U CONTINUOUS RADIATION
CONTOURS
Helicopter noise contour development techniques and directivity analysis
[AD-A093426] p0221 N81-17851
CONTRACT NEGOTIATION
Airborne Systems Software Acquisition Engineering Guidebook for contracting for software acquisition
[AD-A100217] p0543 N81-28786
CONTRACTION
Studies on Thwaites' method for wind tunnel contraction
p0282 A81-27084
Effect of contraction on screen-generated turbulence
p0284 A81-27900
Effects of axisymmetric contractions on turbulence of various scales
p0093 N81-13055
CONTRAST
NT IMAGE CONTRAST
CONTROL BOARDS
Display-control synthesis --- computer flight graphics for aircraft applications
p0064 A81-15684
New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11025
A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993
Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel
[NASA-CR-165751] p0580 N81-30098
Development of avionics installation interface standards
[AD-A101423] p0583 N81-30128
Simulation study of two VTOL control/display systems in IMC approach and landing
[NASA-TM-81295] p0584 N81-30136
CONTROL CONFIGURED VEHICLES
Flying qualities criteria for advanced control technology transports
p0008 A81-11618
Multivariable aircraft control by manoeuvre commands - An application to air-to-ground gunnery
[ONERA, TP NO. 1980-127] p0009 A81-11623
Adaptive airfoils and wings for efficient transonic flight
p0153 A81-20349
Display concepts for control configured vehicles
p0213 N81-17076
Integrated Application of Active Controls (IAAC) technology to an advanced subsonic transport: Project plan
[NASA-CR-3305] p0322 N81-20062
Development of handling quality criteria for aircraft with independent control of six degrees of freedom
[AD-A100345] p0498 N81-27117
CONTROL DEVICES
U CONTROL EQUIPMENT
CONTROL EQUIPMENT
NT CONTROL STICKS
NT PRESSURE REGULATORS
Environmental control systems for executive jet aircraft
[SAE PAPER 800607] p0061 A81-15330
Standardisation - An alternative approach to ATC automation
p0177 A81-22192
Considerations concerning an 'information busbar' for distributing on-board measurement and control information
p0233 A81-25375
Analytic design of regulators with limitations
p0235 A81-25680
KC-10A refueling boom control system
p0322 A81-30266
Integrated displays and controls design factors for the 1990's transport aircraft
p0325 A81-30338
B-52 Offensive Avionics System /OAS/ control and display design, using a Dynamic Mockup
p0327 A81-30354
F/A-18 Hornet Crew Station
p0327 A81-30355
Integrated flight and fire control development and demonstration of an F-15B aircraft
p0327 A81-30359
Aircraft equipment /2nd revised and enlarged edition/ --- Russian book
p0355 A81-31823
Flight control and display computation - A 25-year perspective
[AIAA PAPER 81-0865] p0408 A81-34354
Digital controls in a large engine test facility
p0532 A81-43715
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518
Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system
[AD-A093868] p0216 N81-17095
Microcomputer Applications in Power and Propulsion Systems
[AGARD-LS-113] p0497 N81-27103
Control augmentation for lateral control wheel steering
[NASA-CR-164664] p0549 N81-29132
CONTROL PANELS
U CONTROL BOARDS
CONTROL SIMULATION
Modeling of the terminal area Air Traffic Management and Control
p0114 A81-18085
Airspace simulation in airport system planning
p0114 A81-18086
Air traffic simulation as a validation tool
p0172 A81-21710
On the application of self-adaptive flight control system based on energy balance theory
p0224 A81-23733

The role of simulation in automatic flight control systems research
p0283 A81-27894

An objective method of assessing the realism of a simulation of a simple control system
p0284 A81-27898

Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0299 A81-29205

Operator training systems/simulators
p0349 A81-31109

SIMCAT - A modular air traffic control simulator
p0364 A81-33149

The Northrop F/A-18L Mission Simulator
[AIAA 81-0968] p0414 A81-36557

On-line wind shear generation for flight simulator applications
[AIAA 81-0970] p0414 A81-36559

Development of a generic airplane response simulation
[AIAA 81-0980] p0415 A81-36568

Results of a simulator investigation of control system and display variations for an attack helicopter mission
[AHS 80-28] p0475 A81-40158

Status of dynamic flight test technology - Model identification for flight simulation
[SAE PAPER 810597] p0521 A81-42755

An analytical pilot rating method for highly elastic aircraft
[AIAA 81-1772] p0554 A81-44093

Autopilot design via improved discrete modal control
[AIAA 81-1777] p0554 A81-44095

A piloted simulation of the backup control system engagement for the YAH-64
p0576 A81-46646

Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] p0609 A81-47580

Model following control of gas turbine engines
p0624 A81-49900

Realization of a method of extremal targeting in a problem of aircraft landing control
p0625 A81-49943

CONTROL STABILITY

A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622

Computer-aided methods for redesigning the stabilized pitch control system of a semi-active thermal homing missile
p0051 A81-13250

Model-following system with assignable error dynamics and its application to aircraft
p0116 A81-18577

Application of the parameter space method to aerospace vehicle digital control system design
p0359 A81-32642

Control system design using graphical decomposition techniques
p0410 A81-35567

A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[AHS 80-30] p0476 A81-40160

Effects of displacement and rate saturation on the control of statically unstable aircraft
[AIAA 81-1752] p0554 A81-44082

An aircraft landing system employing observers
p0562 A81-44699

Apparatus for sensor failure detection and correction in a gas turbine engine control system
[NASA-CASE-LEW-12907-2] p0273 N81-19115

Design of multivariable feedback control systems via spectral assignment --- as applied to aircraft flight control
[NASA-CR-164189] p0345 N81-21864

Analytical determination of dynamic stability parameters
p0592 N81-31117

CONTROL STICKS

The effects of the direction of control loading on a one-dimensional tracking task
[AD-A092459] p0197 N81-16067

CONTROL SURFACES

NT AERIAL RUDDERS
NT AILERONS
NT ELEVATORS (CONTROL SURFACES)
NT ELEVONS
NT EXTERNALLY BLOWN FLAPS
NT FLAPS (CONTROL SURFACES)
NT GUIDE VANES
NT HORIZONTAL TAIL SURFACES
NT JET FLAPS
NT JET VANES
NT LEADING EDGE FLAPS
NT LEADING EDGE SLATS
NT SPOILERS
NT TABS (CONTROL SURFACES)
NT TRAILING-EDGE FLAPS
NT UPPER SURFACE BLOWN FLAPS
NT WING FLAPS

Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20582

Spanwise distribution of control points in the method of finite elementary solutions
[AIAA PAPER 79-1879] p0169 A81-21011

On the convergence of unsteady generalized aerodynamic forces
[AIAA 81-0647] p0307 A81-29500

Influence of hinge line gap on aerodynamic forces acting on a harmonically oscillating thin profile in an incompressible flow. I, II
p0348 A81-30956

Summary of high-lift and control surface research on NASA general aviation airfoils
[SAE PAPER 810629] p0524 A81-42781

Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47552

Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] p0608 A81-47553

Design of a lateral stability augmentation system for the F106 to improve lateral handling qualities during tracking
[AD-A091014] p0094 N81-13067

Analysis of unsteady pressure measurements on an aerofoil section with an harmonically oscillating, slotted flap
[DFVLR-FB-80-22] p0126 N81-13929

System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
[DFVLR-MITT-79-16] p0130 N81-13971

Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972

Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14960

The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
p0243 N81-17984

Design for active and passive flutter suppression and gust alleviation
p0253 N81-18063

An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989] p0263 N81-19026

A brief analysis and its experiment of the hydraulic-electric loading servosystem --- a force simulator
[NASA-TM-76458] p0276 N81-19132

High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400

Some remarks on the unsteady airloads on oscillating control surfaces in subsonic flow
p0386 N81-23055

Direct digital design method for reconfigurable multivariable control laws for the A-7D Digital 2 aircraft
[AD-A100794] p0549 N81-29136

Experimental development of an advanced circulation control wing system for Navy STOL

aircraft
[AD-A101309] p0581 N81-30116
A program to evaluate a control system based on feedback of aerodynamic pressure differentials, part 1
[NASA-CR-164684] p0583 N81-30134
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
[NASA-CR-3444] p0587 N81-30392
Control derivatives
p0592 N81-31119

CONTROL THEORY
Improved flight control performance and failure tolerance using modern control techniques
p0008 A81-11619
Figure control of flexible structures - Optical surfaces of thin deformable primary mirrors
p0060 A81-14994
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology --- Linear Quadratic Gaussian
[AIAA PAPER 81-0021] p0158 A81-20540
Control strategy for tracking a maneuverable model
[AIAA PAPER 81-0089] p0160 A81-20593
Inverse problems of the dynamics of controlled flight - Lateral motion
p0236 A81-25903
Modern control synthesis applied to the longitudinal decoupled motion of an aircraft
[AIAA 81-1939] p0555 A81-44123
Adaptive multivariable model following --- for aircraft control
p0564 A81-45540
General describing function method for systems with many nonlinearities, with application to aircraft performance
p0564 A81-45588
A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] p0608 A81-47562
Application of optimal control and estimation to autopilot and autothrottle systems
p0615 A81-48371
Propulsion Controls, 1979 --- air breathing engine control
[NASA-CP-2137] p0078 N81-12090
Multivariable identification using centralized fixed modes
p0079 N81-12091
F100 multivariable control synthesis program: A review of full scale engine altitude tests --- F100 engine
p0079 N81-12093
Design of a multivariable integrated control for a supersonic propulsion system --- variable stream control engine
p0079 N81-12094
Should we attempt global (inlet engine airframe) control design?
p0079 N81-12097
Propulsion control and control theory: A new research focus
p0080 N81-12099
Multivarable nyquist array method with application to turbofan engine control
p0080 N81-12101
Multivariable synthesis with transfer functions --- applications to gas turbine engines
p0080 N81-12102
Alternatives for jet engine control
p0080 N81-12103
Practical optimal flight control system design for helicopter aircraft. Volume 2: Software user's guide
[NASA-CR-152306] p0081 N81-12110
Report on a cooperative programme on Active Flutter Suppression
[AGARD-R-689] p0082 N81-12115
Active control of an explosive wing-store flutter case --- Langley Research Center
p0082 N81-12117
Wind tunnel tests on a fighter aircraft wing/store flutter suppression system: The B.Ae control law
p0083 N81-12119
Optimized pitch controller for load alleviation on wind turbines
[FFA-TN-HU-2189-PT-1] p0087 N81-12834
A study of State Feedback Implicit Model following control for VSTOL aircraft
[AD-A093253] p0216 N81-17099
Research in multirate estimation and control
[AD-A096670] p0253 N81-18062
Model reference adaptive control for multi-input multi-output systems
p0258 N81-18698
Design of multivariable feedback control systems via spectral assignment --- as applied to aircraft flight control
[NASA-CR-164189] p0345 N81-21064
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digital 2 aircraft
[AD-A100794] p0549 N81-29136
A method for obtaining reduced-order control laws for high-order systems using optimization techniques
[NASA-TP-1876] p0589 N81-30051

CONTROLLABILITY
Piloted simulation studies of helicopter agility
p0003 A81-10767
New definition of areas of protection for instrument landing
p0225 A81-23869
History of SAE Committee S-7, Flight Deck and Handling Qualities Standards for Transport Category Aircraft
[SAE PAPER 801165] p0399 A81-34180
A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks
p0471 A81-40120
The indication of the characteristics of aircraft controllability with prediction in dynamic ergatic systems
p0517 A81-42603
Effects of wingtip modifications on handling qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
Analysis of aircraft longitudinal handling qualities
[AIAA 81-1771] p0554 A81-44092
An analytical pilot rating method for highly elastic aircraft
[AIAA 81-1772] p0554 A81-44093
Motion-base simulator results of advanced supersonic transport handling qualities with active controls
[AIAA 81-1319] p0555 A81-44109
A unifying framework for longitudinal flying qualities criteria
[AIAA PAPER 81-1889] p0561 A81-44580
Handling qualities of the SH-60B Seahawk
p0574 A81-46627
The control of pressure, temperature and Mach number in a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11063
The tale of two wings
p0188 N81-16004
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046
Multicyclic controllable twist rotor data analysis
[NASA-CR-152251] p0249 N81-18028
In-flight handling qualities investigation of A310 Airbus DLC-configurations on landing approach, using the DFVLR-HFB 320 in-flight simulator (variable stability aircraft) --- instrument flight
[ESA-TT-630] p0276 N81-19135
Recent progress towards predicting aircraft ground handling performance
[NASA-TM-81952] p0339 N81-21044
TORNADO: Flight characteristics at high angles of incidence
[MBB-FE-127/S/PUB/23] p0495 N81-27085
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] p0637 N81-33191

CONTROLLED ATMOSPHERES
NT CABIN ATMOSPHERES
NT INERT ATMOSPHERE

CONTROLLED STABILITY
U STABILITY

CONTROLLERS
NT SERVOMECHANISMS
A versatile microprocessor controller for low cost helicopter applications [ASME PAPER 81-GT-137] p0316 A81-30039
Pole placement with output feedback p0458 A81-38899
Modern control synthesis applied to the longitudinal decoupled motion of an aircraft [AIAA 81-1839] p0555 A81-44123
A study of the performance of an Olson type active noise controller and the possibility of the reduction of cabin noise [UTIAS-TN-228] p0552 N81-29924
CONVAIR MILITARY AIRCRAFT
U GENERAL DYNAMICS AIRCRAFT
U MILITARY AIRCRAFT
CONVECTION CURRENTS
Bird flight and airplane flight --- instruments to measure air currents and flight characteristics [NASA-TM-75777] p0138 N81-14962
CONVECTIVE FLOW
Thermal and flow analysis of a convection air-cooled ceramic coated porous metal concept for turbine vanes [NASA-TM-81749] p0376 N81-22056
CONVECTIVE HEAT TRANSFER
Development of a large-scale wind tunnel for the simulation of turbomachinery airfoil boundary layers [ASME PAPER 81-GT-6] p0310 A81-29931
The predictability of turbine vane convection heat transfer [AIAA PAPER 81-1435] p0566 A81-45892
Improvements in the determination of convective transfers from infrared thermography --- in wind tunnel tests p0255 N81-18258
CONVERGENCE
On the convergence of unsteady generalized aerodynamic forces [AIAA 81-0647] p0307 A81-29500
Topology of three-dimensional separated flows [NASA-TM-81294] p0385 N81-23037
CONVERGENT NOZZLES
New interpretations of shock-associated noise with and without screech p0178 A81-22527
New interpretations of shock-associated noise with and without screech [NASA-TM-81590] p0032 N81-10807
CONVERGENT-DIVERGENT NOZZLES
On screeching jets exhausting from an axisymmetric supersonic nozzle p0008 A81-11616
Calibration of the high speed wind tunnel TVM 150 in the supersonic range p0016 A81-11778
Attainability of an attached flow in a nozzle with heavily curved walls p0054 A81-13548
Transonic flows of a multireacting gas mixture through a Laval nozzle p0225 A81-23909
Some optimization problems of internal aerodynamics p0237 A81-26120
Numerical solution of the direct one-dimensional problem of a critical flow in nozzles p0288 A81-28578
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions p0417 A81-36737
Modeling of 2D-nozzle plume for IR signature prediction under static conditions [AIAA PAPER 81-1108] p0459 A81-39107
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model [AIAA PAPER 81-1445] p0504 A81-40878
Development of exhaust nozzle internal performance prediction techniques for advanced aircraft applications [AIAA PAPER 81-1490] p0506 A81-40908
Flight effects on supersonic convergent-divergent nozzle jet noise [AIAA PAPER 81-2027] p0623 A81-49728
Investigation of convergent-divergent nozzles applicable to reduced-power supersonic cruise aircraft [NASA-TP-1766] p0139 N81-14972
Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles [NASA-TP-1771] p0185 N81-15976
Aeropropulsive characteristics of twin nonaxisymmetric vectoring nozzles installed with forward-swept and aft-swept wings --- in the Langley 16 Foot Transonic Tunnel [NASA-TP-1778] p0261 N81-19019
CONVERTAPLANES
U V/STOL AIRCRAFT
CONVEXITY
An experimental investigation of separating flow on a convex surface p0230 A81-24488
Predicted and experimental steady and unsteady transonic flows about a biconvex airfoil [NASA-TM-81262] p0258 N81-18742
CONVEYORS
System for refurbishing and processing parachutes [NASA-CASE-KSC-11042-1] p0138 N81-14967
COOLANTS
NT ENGINE COOLANTS
COOLING
NT AIR COOLING
NT CRYOGENIC COOLING
NT FILM COOLING
NT GAS COOLING
NT LIQUID COOLING
NT SPACE COOLING (BUILDINGS)
NT SURFACE COOLING
NT SWEAT COOLING
Investigation of the cooling of the turbine rotor blade of a gas-turbine power system p0465 A81-40020
Application of model laws when determining the heat transfer coefficients by experiments on cooled turbine blades p0089 N81-12998
Design and fabrication of a stringer stiffened discrete-tube actively cooled panel for a hypersonic aircraft [NASA-CR-3403] p0279 N81-19484
COOLING FINS
New developments in compact plate-fin heat exchangers p0613 A81-48062
COOLING SYSTEMS
Turbine blade technology - Present and future [ASME PAPER 80-C2/AERO-10] p0116 A81-18639
Film cooling performance of liner cooling devices p0293 A81-29075
Turbine blade cooling research at the von Karman Institute for Fluid Dynamics p0293 A81-29076
An investigation of a preswirled cooling airflow to a turbine disc by measuring the air temperature in the rotating channels [ASME PAPER 81-GT-132] p0316 A81-30035
The problem of hoar-frost formation in aircraft fuel tanks p0319 A81-30159
Computer calculation of the characteristics of a hybrid system for the cooling of gas turbine blades p0459 A81-39217
Improved combustor durability - Segmented approach with advanced cooling techniques [AIAA PAPER 81-1354] p0501 A81-40836
Thermodynamic comparison of the efficiencies of semiclosed- and open-loop air cooling systems of gas turbine engines p0509 A81-41029
Full-scale study of the cooling system aerodynamics of an operating piston engine installed in a light aircraft wing panel [SAE PAPER 810623] p0523 A81-42777
Avionics thermal integration for the Boeing 767 airplane p0570 A81-46478
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft p0614 A81-48196
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation [NASA-CR-3405] p0372 N81-22015

Cooling system for high speed aircraft
[NASA-CASE-LAR-12406-1] p0485 N81-26114
COORDINATE SYSTEMS
U COORDINATES
COORDINATE TRANSFORMATIONS
A new method for torsion of shaft with variable diameter using non-orthogonal curvilinear coordinates and its application
[AIAA 81-0477] p0300 A81-29378
Orthogonal multiblade coordinates
p0453 A81-38021
The role of the earth's shape in navigation - An example
p0614 A81-48120
Geometric methods in computational fluid dynamics --- turbomachinery
p0256 N81-18331
COORDINATES
NT CARTESIAN COORDINATES
NT GEOCENTRIC COORDINATES
NT HYPERBOLIC COORDINATES
NT SPHERICAL COORDINATES
Grid generation for general three-dimensional configurations
p0137 N81-14714
COPILOTS
U AIRCRAFT PILOTS
CORES
NT HONEYCOMB CORES
CORIOLIS EFFECT
Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-29110
Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates
p0348 A81-30914
CORNER FLOW
Thin-layer approximation for three-dimensional supersonic corner flows
p0067 A81-15900
Investigation and improvement of an elbow-type gas outlet of a turboprop engine
p0509 A81-41048
CORRECTION
NT OPTICAL CORRECTION PROCEDURE
Wind tunnel corrections for high angle of attack models
[AGARD-R-692] p0435 N81-24120
A review of the wall pressure signature and other tunnel constraint correction methods for high angle-of-attack tests
p0435 N81-24122
Expected improvements on high angle of attack model testing
p0436 N81-24123
German activities on wind tunnel corrections
p0436 N81-24124
CORRELATION
NT AUTOCORRELATION
NT CROSS CORRELATION
NT DATA CORRELATION
NT SIGNAL ANALYSIS
Semi-empirical correlations for gas turbine emissions, ignition, and flame stabilization
p0171 A81-21505
New correlations of the two-dimensional turbine cascade aerodynamic performance
[ASME PAPER 81-GT-128] p0316 A81-30032
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-28099
Information transfer in the surface component of the system: Coordination problems in air traffic control
p0594 N81-31165
CORRELATION FUNCTIONS
U CORRELATION
CORROSION
NT FUEL CORROSION
NT HOT CORROSION
NT INTERGRANULAR CORROSION
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0391 N81-23243
PACER LIME: An environmental corrosion severity classification system, part 1
[AD-A100496] p0539 N81-28089
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] p0640 N81-33503
CORROSION PREVENTION
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
p0469 A81-40107
Technology for rustproofing aircraft and helicopters --- Russian book
p0529 A81-43520
The resistance of tank protective measures to microorganisms
[SNIAS-801-551-107] p0144 N81-15072
CORROSION RESISTANCE
NT OXIDATION RESISTANCE
Prospects for bonding primary aircraft structure in the 80's
p0182 A81-22679
Erosion strength of aircraft engine and power plant parts --- Russian book
p0578 A81-46848
Development of high-temperature turbine subsystem technology to a technology readiness status, phase 2
[PE-1806-72] p0134 N81-14332
Erosion resistant coatings
[NASA-TM-75870] p0377 N81-22098
Service evaluation of aluminum-brazed titanium (ABTi) --- aircraft structures
[NASA-CR-3418] p0376 N81-22129
Development of a water displacing, touch-up paint
[AD-A097125] p0392 N81-23288
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466
CORROSION TESTS
Aging study of the Caravelle 38
p0061 A81-15119
Acoustic emission and corrosion
p0153 A81-20211
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222
CORSAIR AIRCRAFT
U A-7 AIRCRAFT
COSMIC RADIATION
U COSMIC RAYS
COSMIC RAYS
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476
COST ANALYSIS
The design-to-cost of aircraft
p0119 A81-19344
Aircraft engine programs employing cost objectives
p0119 A81-19346
Design to cost and new technologies
p0120 A81-19347
Your next ground vibration test doesn't have to cost a million dollars
[AIAA 81-0529] p0303 A81-29450
Commercial engine logistics cost projections - A dynamic and flexible approach
[ASME PAPER 81-GT-114] p0315 A81-30010
Systems costing of hovercraft, hydrofoils and wing-in-ground effect machines. III
p0412 A81-35724
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for composite structures
p0557 A81-44373
ATARS implementation tradeoff
[AD-A089977] p0038 N81-11026
Life Cycle Cost Analysis (LCCA) in military aircraft procurement
p0045 N81-11903
Evolution of techniques for LCC analysis
p0045 N81-11909
Cost/benefit analysis of advanced materials technology candidates for the 1980's, part 2
[NASA-CR-165176] p0048 N81-11953

The development of the composite material engine nacelle
[AAAF-NT-79-38] p0083 N81-12180
Microwave landing systems. Citations from the Engineering Index data base
[PB80-814643] p0128 N81-13947
Microwave landing systems. Citations from the NTIS data base
[PB80-814635] p0128 N81-13948
Technological forecasting--aircraft design. Citations from the International Aerospace data base
[NASA-CR-163833] p0129 N81-13957
Cost/benefit analysis of advanced materials technologies for future aircraft turbine engines
[NASA-CR-165225] p0144 N81-15006
Computer Generated Imagery (CGI) current technology and cost measures feasibility study
[AD-A091636] p0146 N81-15729
Use of constrained optimization in the conceptual design of a medium-range subsonic transport
[NASA-TP-1762] p0193 N81-16039
GASP- General Aviation Synthesis Program. Volume 7: Economics. Part 1: Theoretical development
[NASA-CR-152303-VOL-7-PT-1] p0271 N81-19094
The F/A-18 Naval Strike Fighter: Progress has been made but problems and concerns continue
[AD-A095287] p0333 N81-20069
Review of Air Force's next generation trainer aircraft program Department of Defense
[AD-A096238] p0341 N81-21071
A cost function for military airframes
[AD-A097538] p0394 N81-23966
Engine life development --- operating costs and propulsion system performance
p0430 N81-24081
A method for estimating the cost of aircraft structural modification
[AD-A099327] p0483 N81-26035
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS)
[AD-A100136] p0537 N81-28076
Airborne Systems Software Acquisition Engineering Guidebook for software cost analysis and estimating
[AD-A100215] p0543 N81-28785
Programmes for military engines with cost objectives --- aircraft engines
[PNR-90058] p0583 N81-30133
Impact of prediction accuracy on costs - noise technology applications in helicopters
[AD-A101768] p0589 N81-30911
Actual versus simulated equipment for aircraft maintenance training: Cost implications of the incremental versus the unique device
[AD-A102388] p0590 N81-31104
Vehicle concepts and technology requirements for buoyant heavy-lift systems
[NASA-TP-1921] p0596 N81-31185

COST EFFECTIVENESS
Transfer and cost effectiveness of ground-based flight trainers
p0064 A81-15693
Aviation assumptions in the eighties
p0112 A81-16068
Omega - An economic Loran A replacement
p0113 A81-16077
A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796
Integrated avionics studies target future technologies
p0223 A81-23499
ORLA - An assessment of risks --- Optimum Repair Level Analysis
p0229 A81-24257
General remarks on helicopter reliability
p0297 A81-28472
The stretched C-14 - Cost effective application of structural technology
[AIAA 81-0514] p0302 A81-29427
Dispersed flight control computer systems
p0321 A81-30250
Producibility engineering at ASD
p0326 A81-30341
PARAM - A new weight sizing routine --- cost-effective computerized design for aircraft
[SAWE PAPER 1367] p0353 A81-31389
Crashworthiness versus cost based on a study of severe Army helicopter accidents during 1970 and 1971
p0355 A81-32006
A review of the installation, performance and economic aspects of a high altitude facility for small gas turbines
[SAE PAPER 801121] p0396 A81-34157
Strapdown navigation comes of age
[SAE PAPER 801167] p0399 A81-34182
Turbine engine design --- engineering for cost effectiveness and propulsive efficiency
[AIAA PAPER 81-0915] p0408 A81-34362
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Cost benefits of nonmetallic spline couplings
[SAE PAPER 801101] p0513 A81-41777
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems
p0530 A81-43624
Cost-effective mechanical property characterization
p0612 A81-47813
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492
Cost considerations of engine fuel control systems
p0048 N81-11928
Are management problems in the acquisition of aircraft gas turbine engines being corrected
[AD-A090520] p0088 N81-12928
Environmental burn-in effectiveness
[AD-A093307] p0211 N81-17060
Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
Structures, performance, benefit, cost study --- gas turbine engines
[NASA-CR-165313] p0428 N81-24067
A method for evaluating radio navigation systems for the terminal maneuvering area --- approach control
[DFVLR-MITT-81-02] p0538 N81-28080

COST ESTIMATES
Engine maintenance cost calculation method
[ASME PAPER 81-GT-34] p0312 A81-29948
Design options study. Volume 2: Approach and summary results --- advanced civil military aircraft: cost estimates
[AD-A089537] p0027 N81-10057
The use of parametric cost estimating relationships as they pertain to aircraft airframes: A new perspective
[AD-A089525] p0027 N81-10060
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 2: Appendix A. Performance data - GE27/T3 study A1 turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 3: Appendix B. Performance data - TF34/T7 study A1 turboprop
[AD-A089279] p0028 N81-10069
The potential for damage from the accidental release of conductive carbon fibers from aircraft composites
p0041 N81-11143
US Army design-to-cost experience
p0045 N81-11905
A review and assessment of system cost reduction activities
p0045 N81-11906
Design to life cycle cost research
p0045 N81-11907
A new method for estimating transport aircraft direct operating costs
p0046 N81-11915
Naval aircraft operating and support cost-estimating model: FY78 revision
[AD-A090044] p0071 N81-12013
Visual confirmation (VICON) of voice take-off clearance of cost-and-deployment analyses and strategies
[AD-A091007] p0091 N81-13036
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111

Air Force and Navy plans to acquire trainer aircraft
[AD-A096237] p0342 N81-21072
A cost function for military airframes
[AD-A097538] p0394 N81-23966
A cost function for an airframe production program
[AD-A097540] p0394 N81-23967
Airborne Systems Software Acquisition Engineering Guidebook for software cost analysis and estimating
[AD-A100215] p0543 N81-28785
Noise abatement technology options for conventional turboprop airplanes
[AD-A101828] p0589 N81-30910
NAS automation equipment operating cost estimates, FY 1978 - 1979
[AD-A102023] p0595 N81-31182
Estimating aircraft depot maintenance costs
[AD-A103623] p0631 N81-33133

COST REDUCTION
Productivity - The challenge of aircraft and engine maintenance
p0102 A81-17045
Aircraft engine programs employing cost objectives
p0119 A81-19346
Design to cost and new technologies
p0120 A81-19347
Application of trajectory optimization principles to minimize aircraft operating costs
p0155 A81-20466
Design for economy --- of high-bypass turbofan engines
p0290 A81-29030
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1331] p0352 A81-31376
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0420 A81-37416
Reducing the cost impact of helicopter internal noise control
[AHS 80-59] p0478 A81-40183
Design and concepts of composite structures
p0481 A81-40503
Pilot guidance and display considerations for energy efficient flight profiles
p0513 A81-41924
Engineering approaches for cost savings with ILS glide-slope installations
p0516 A81-42431
Standard Avionics Testbeds
[AIAA PAPER 81-1738] p0528 A81-43172
Composites - A solution to aluminum honeycomb maintenance costs --- for aircraft structures
p0529 A81-43606
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636
Fuel optimal aircraft trajectories with fixed arrival times
[AIAA 81-1749] p0554 A81-44081
Advanced structural repair for lower cost
p0558 A81-44393
Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance
p0559 A81-44396
Design to Cost and Life Cycle Cost
[AGARD-CP-289] p0045 N81-11902
The Hornet program: A design to life cycle cost case study
p0046 N81-11910
Design-to-cost and new technologies
p0046 N81-11913
Design-to-cost applied to the AS350 helicopter
p0046 N81-11916
Using cost reduction concepts at Messier-Hispano-Bugatti
p0047 N81-11923
F-16 integrated logistics support: Still time to consider economical alternatives
[PB81-137473] p0389 N81-23079

COSTS
NT AIRCRAFT PRODUCTION COSTS
NT AIRPLANE PRODUCTION COSTS
NT LIFE CYCLE COSTS
NT LOW COST
NT OPERATING COSTS

COUNTERFLOW
Design and fabrication of a stringer stiffened discrete-tube actively cooled panel for a hypersonic aircraft
[NASA-CR-3403] p0279 N81-19404

COUNTERMEASURES
NT ELECTRONIC COUNTERMEASURES
NT JAMMING

COUPLED MODES
The effect of aerodynamic coupling on the dynamics of aircraft in fast rolling motion
p0104 A81-17471
Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I
p0229 A81-24090
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
p0613 A81-47966

COUPLERS
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions
[AD-A095634] p0334 N81-20072

COUPLING
NT CROSS COUPLING
NT GYROSCOPIC COUPLING
NT OPTICAL COUPLING

COVARIANCE
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros
p0484 N81-26092

COWELL METHOD
U NUMERICAL INTEGRATION

COWLINGS
High-speed cowlings, air inlets and outlets, and internal-flow systems
p0185 N81-15973

CRACK FORMATION
U CRACK INITIATION

CRACK INITIATION
Fatigue damage mechanisms in composite materials - A review
p0003 A81-10747
Fabrication problems related to the contamination of titanium alloys
p0417 A81-36664
Crack growth modeling in an advanced powder metallurgy alloy
[AD-A093992] p0218 N81-17235
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 2: Reliability evaluation and system definition for detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18420

CRACK PROPAGATION
Aspect ratio variability in part-through crack life analysis
p0001 A81-10355
Part-through crack problems in aircraft structures
p0001 A81-10362
Fatigue damage mechanisms in composite materials - A review
p0003 A81-10747
On understanding environment-enhanced fatigue crack growth - A fundamental approach
p0003 A81-10749
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminium
p0013 A81-11657
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment
p0013 A81-11659
Crack propagation in panels of pressurised fuselages upon simultaneous action of cyclic loading by pressurization and high-frequency vibrations
p0054 A81-13612
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17480
Prediction methods for fatigue crack growth in aircraft material
p0118 A81-18777
Effect of load spectrum variables on fatigue crack initiation and propagation; Proceedings of the

Symposium, San Francisco, Calif., May 21, 1979
p0172 A81-21730
An engineering model for assessing load sequencing effects --- cracks in aircraft structures
p0172 A81-21737
Effect of transport aircraft wing loads spectrum variation on crack growth
p0172 A81-21738
Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3
p0172 A81-21739
Effects of fighter attack spectrum on crack growth
p0172 A81-21741
Definition of loading sequence for full scale fatigue test
p0180 A81-22626
Ductile fracture mechanic assessments of 2219-T851, 2024-T3 and 7075-T6 aluminum alloys
p0180 A81-22628
Crack propagation in lugs
p0180 A81-22629
Crack growth propagation under variable amplitude loading in aerospace structures
p0181 A81-22632
Study of a crack propagation on the flap rail of a transport aircraft
p0181 A81-22633
Determination of aircraft structural inspection intervals
p0230 A81-24285
Research on fatigue at the Department of Aerospace Engineering of the Delft University
p0232 A81-24939
Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures
p0232 A81-24942
Laws of unstable crack growth under cyclic loading
p0236 A81-25701
Simple methods of determining stress intensity factors
p0289 A81-28984
Statistical crack growth in durability and damage tolerant analyses
[AIAA 81-0492] p0300 A81-29382
An application of the energy release rate concept to crack growth in attachment lugs
[AIAA 81-0491] p0302 A81-29420
Experimental determination of the stress intensity factor for cracks with a curvilinear front in complex parts /gas turbine blades/
p0351 A81-31264
Developments in the analysis and repair of cracked and uncracked structures
p0354 A81-31561
In-flight fatigue crack monitoring using acoustic emission
p0361 A81-32857
Crack growth model for flight-type loading
p0460 A81-39247
Predicting fatigue crack growth on aircraft structures
[SAE PAPER 810593] p0520 A81-42752
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
[AD-A089791] p0036 N81-11041
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum --- wing panels for transport aircraft
[NLR-MP-80003-U] p0043 N81-11415
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum
[NLR-MP-80003-U] p0086 N81-12477
Environment-load interaction effects on crack growth in landing gear steels
[AD-A093803] p0218 N81-17242
A crack-closure model for predicting fatigue-crack growth under aircraft spectrum loading
[NASA-TM-81941] p0257 N81-18412
Method for computation of structural failure probability for an aircraft
[AD-A098294] p0426 N81-24050
Theoretical and experimental studies of crack propagation --- aircraft construction materials
[SNIAS-802-111-107] p0437 N81-24482
The fatigue crack growth under variable amplitude loading in built-up structures
[AD-A098417] p0446 N81-25437
Fatigue analysis of composite materials using the fail-safe concept
p0487 N81-26131
Fatigue crack growth in 7475-T7651 material under flight simulation loading. Information from a Douglas report --- effect of transport/bomber loads spectrum on crack growth
[VTH-M-392] p0542 N81-28493

CRACKING (CHEMICAL ENGINEERING)
NT PYROLYSIS

CRACKING (FRACTURING)
NT STRESS CORROSION CRACKING
The analysis of fatigue failures
p0006 A81-11603
Evaluation and comparison of nondestructive service inspection methods
p0153 A81-20135
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
High peak energy shaped-pulse electromagnetic crack detection
p0611 A81-47785
Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] p0639 N81-33214

CRACKS
NT MICROCRACKS
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182

CRASH INJURIES
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison
p0054 A81-13515
Crashworthiness versus cost based on a study of severe Army helicopter accidents during 1970 and 1971
p0355 A81-32006
Human factors aspects of emergency egress from a business jet
[SAE PAPER 810617] p0523 A81-42772
Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] p0636 N81-33174

CRASH LANDING
NT DITCHING (LANDING)
Fundamental studies of antimisting fuels
[AIAA PAPER 81-1422] p0515 A81-42195
Aircraft subfloor response to crash loadings
[SAE PAPER 810614] p0522 A81-42770
Listing of accidents/incidents by aircraft make and model, United States Civil Aviation, 1978
[PB81-110280] p0205 N81-16999
Evaluation of emergency-locator-transmitter performance in real and simulated crash tests
p0268 N81-19070
Study of aircraft crashworthiness for fire protection
[NASA-CR-166159] p0424 N81-24035
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A098584] p0442 N81-25072

CRASHES
NT CRASH LANDING
NT DITCHING (LANDING)
Theory and application of finite element analysis to structural crash simulation
p0416 A81-36614
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
Simulation of aircraft seat response to a crash environment
[SAE PAPER 810612] p0522 A81-42768
U.S. Army crashworthiness program
[SAE PAPER 810615] p0522 A81-42771
General aviation aircraft rear-seated occupant protection - Shoulder restraints in rear seats

[AIAA PAPER 81-1669] p0534 A81-43944
Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft
[NASA-CR-160036] p0023 N81-10020
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022
Airport Crash/Fire/Rescue CFR service cost and benefit analysis. Volume 2: Appendixes
[AD-A091155] p0094 N81-13069
Summary of aviation safety program resumes. Cabin safety
[AD-A091938] p0192 N81-16027
Briefs of fatal accidents involving weather as a cause/factor, US General Aviation, 1978
[PB81-110827] p0192 N81-16028
Aircraft crash survival design guide. Volume 1: Design criteria and checklists, revision
[AD-A093784] p0204 N81-16997
NASA/FAA general aviation crash dynamics program
p0268 N81-19064
Aircraft Accident Report: Air Pennsylvania 501, Piper PA-31-350, N5MS Philadelphia, Pennsylvania, July 25, 1980
[PB81-910401] p0269 N81-19077
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041
Aircraft crash dynamics: Some major considerations
p0378 N81-22437
Safety report: The status of general aviation aircraft crashworthiness
[PB81-160798] p0484 N81-26084
Energy absorption studied to reduce aircraft crash forces
[NASA-NEWS-RELEASE-81-96] p0492 N81-27060

CREEP PROPERTIES
Relationship between creep characteristics and fracture resistance under the combined effect of fatigue and creep
p0414 A81-36474
Creep properties of single-crystal nickel-based superalloys. II - Creep at medium temperature /760 C/
p0567 A81-46345
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DOE/ER-10570/1] p0135 N81-14363

CREEP RUPTURE STRENGTH
Directionally solidified Soviet superalloy - ZhS6-K
p0532 A81-43770
Low-cost directionally-solidified turbine blades, volume 2 --- TFE731-3 turbofan engine
[NASA-CR-159562] p0078 N81-12088
MEGA16 - Computer program for analysis and extrapolation of stress-rupture data
[NASA-TP-1809] p0393 N81-23486

CREVICES
U CRACKS

CREW STATIONS
F/A-18 Hornet Crew Station
p0327 A81-30355

CREWS
NT FLIGHT CREWS
NT SPACECREWS

CRITERIA
NT STRUCTURAL DESIGN CRITERIA
Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969

CRITICAL FLOW
Numerical solution of the direct one-dimensional problem of a critical flow in nozzles
p0288 A81-28578
Inlet flow in centrifugal pumps at partial deliveries
[VKI-PREPRINT-1979-16] p0031 N81-10437

CRITICAL LOADING
Mathematical aspects of the probabilistic evaluations of structural safety and NDI capabilities
p0181 A81-22635
Iterative method for determining maximum load capacity of aircraft structures
p0235 A81-25683
Kinematic properties of rotary-wing and fixed-wing aircraft in steady coordinated high-g turns
[AIAA PAPER 81-1855] p0560 A81-44554

CRITICAL MACH NUMBER
U CRITICAL VELOCITY
U MACH NUMBER

CRITICAL POINT
Stability of aircraft motion in critical cases
[AIAA PAPER 81-1885] p0561 A81-44577

CRITICAL REYNOLDS NUMBER
U CRITICAL VELOCITY
U REYNOLDS NUMBER

CRITICAL SPEED
U CRITICAL VELOCITY

CRITICAL STRESS
U CRITICAL LOADING

CRITICAL VELOCITY
Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports
p0228 A81-24089
Concerning one self-similarity property in flutter analysis
p0413 A81-36464
The high-speed propeller program
p0105 N81-15972
Cold-air investigation of first stage of 4-1/2-stage, fan drive turbine with average stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050

CROSS CORRELATION
Accuracy of noise-modulated radio altimeter
p0359 A81-32694
Correlation of helicopter noise levels with physical and performance characteristics
[AD-A093428] p0221 N81-17852
Flap noise characteristics measured by pressure cross correlation techniques
p0259 N81-18808

CROSS COUPLING
Antenna-to-antenna coupling in aircraft radio systems
p0057 A81-14280
Wind tunnel determination of dynamic cross-coupling derivatives - A new approach
p0413 A81-35927
A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 A81-46626
Sensitivity of aircraft motion to cross coupling and acceleration derivatives
p0592 N81-31120

CROSS FLOW
Vector and scalar characteristics of opposing jets discharging normally into a cross-stream
p0110 A81-17997
Three-dimensional boundary layer transition via the mechanisms of 'attachment line contamination' and 'cross flow instability'
p0115 A81-18122
The linear instability due to the compressible crossflow on a swept wing
p0170 A81-21168
The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder
p0233 A81-25312
Streamwise flow and heat transfer distributions for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985
Aerodynamic estimation techniques for aerostats and airships
[AIAA 81-1339] p0457 A81-38542
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40807
Vertical momentum of the fountain produced by multijet vertical impingement on a flat ground plane
p0529 A81-43396
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14964
Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14968
Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016

The effect of boundary layer growth on the stability of compressible flows
p0587 N81-30389

CROSSTALK

Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] p0636 N81-33182

CRUCIFORM WINGS

Aerodynamic effects of body slots on a guided projectile with cruciform surfaces
[AIAA PAPER 79-1658] p0066 A81-15887

Solar powered aircraft
[NASA-CASE-LAR-12615-1] p0628 N81-32136

CRUDE OIL

Effect of refining variables on the properties and composition of JP-5
[AD-A093842] p0219 N81-17281

Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18016

CRUISE MISSILES

Cruise-missile-carrier navigation requirements
p0116 A81-18576

High altitude launch of the Cruise Missile
p0179 A81-22608

Firebrand ramjet propulsion system development
[AIAA PAPER 81-1486] p0506 A81-40904

Impact of terrain correlation elevation reference data on Boeing's Air Launched Cruise Missile
p0517 A81-42439

Application of the joined wing to cruise missiles
[AD-A096450] p0441 N81-25068

Cruise missile engine program contract data requirements list sequence number 95. Qualification test report. Volume 39: Vibration and mission simulation testing on engine 828. XF-107-WR-400 cruise missile engine
[AD-A102257] p0600 N81-31220

CRUISING FLIGHT

Transonic maneuver/cruise airfoil design employing active diffusion control
p0239 A81-26511

The supersonic fan engine - An advanced concept in supersonic cruise propulsion
[AIAA PAPER 81-1599] p0508 A81-40973

Aerodynamic design data for a cruise-matched high performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779

The improvement of aircraft specific range by periodic control
[AIAA 81-1748] p0553 A81-44080

Fuel optimal aircraft trajectories with fixed arrival times
[AIAA 81-1749] p0554 A81-44081

Prediction of range and endurance of jet aircraft at constant altitude
p0611 A81-47725

Improved aircraft cruise by periodic control
p0034 N81-11030

The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021

Investigation of powered nacelles on a high aspect ratio NASA supercritical wing, phase 2 --- Langley 8 Foot Transonic Pressure Tunnel
p0260 N81-19008

Application of linear quadratic control in reduction of aerodynamic forces on aircraft
p0332 N81-20061

Aerodynamic investigation of C-141 leading edge modifications for cruise drag reduction, test 2
[AD-A099662] p0492 N81-27051

CRUSADER AIRCRAFT

U F-8 AIRCRAFT

CRUSHING

Theory and application of finite element analysis to structural crash simulation
p0416 A81-36614

CRYOGENIC COOLING

Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
[SAE PAPER 801155] p0407 A81-34245

CRYOGENIC EQUIPMENT

Brushless cryogenic ac motors
p0002 A81-10468

CRYOGENIC FLUIDS

NT LIQUID HYDROGEN

NT LIQUID OXYGEN

CRYOGENIC ROCKET PROPELLANTS

NT LIQUID FUELS

CRYOGENIC WIND TUNNELS

A system for model access in tunnels with an unbreathable test medium
p0015 A81-11672

Developments in the area of cryo-wind tunnel technology by the DFVLR
p0065 A81-15702

Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel
[AIAA PAPER 81-1062] p0459 A81-39074

A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel
[NASA-TP-1752] p0021 N81-10005

The principles and applications of cryogenic wind tunnels
p0037 N81-11049

Model design and instrumentation experiences with continuous-flow cryogenic tunnels
p0037 N81-11057

Model design and instrumentation for intermittent cryogenic wind tunnels
p0037 N81-11058

Calibration of a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11060

The control of pressure, temperature and Mach number in a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11063

Characteristics and status of the US National Transonic Facility
p0038 N81-11065

Effects of boundary-layer treatment on cryogenic wind-tunnel controls
[NASA-CR-159372] p0083 N81-12120

Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061

Estimation of fan pressure ratio requirements and operating performance for the National Transonic Facility
[NASA-TM-81802] p0435 N81-24115

A discussion document on the thermal design of force balances for cryogenic wind tunnels
[OUEL-1321/80] p0435 N81-24119

Aircraft design using the National Transonic Facility
p0593 N81-31143

Proposed aeroelastic and flutter tests for the National Transonic Facility
p0593 N81-31144

Preliminary user planning for the NASA National Transonic Facility
p0593 N81-31145

Report of the panel on fluid dynamics
p0593 N81-31146

High lift technology
p0593 N81-31147

Configuration aerodynamics
p0593 N81-31148

Report of the panel on aeroelasticity and unsteady aerodynamics
p0593 N81-31149

Report of the wind tunnel/flight correlation panel
p0593 N81-31150

High Reynolds number research requirements for space vehicle design
p0593 N81-31151

Report of the panel on theoretical aerodynamics
p0593 N81-31152

CRYOGENICS

Measurements of temperature and pressure fluctuations in the T prime 2 cryogenic wind tunnel
[NASA-TM-75408] p0490 N81-26158

Guide for users of the National Transonic Facility
[NASA-TM-83124] p0550 N81-29139

CRYSTAL DEFECTS

NT CRYSTAL DISLOCATIONS

Low cycle fatigue of Rene 77 at elevated temperatures
p0289 A81-28989

CRYSTAL DISLOCATIONS

Mechanisms of damage accumulation in time-dependent cyclic deformation
[DOE/ER-10570/1] p0135 N81-14363

CRYSTAL GROWTH
NT DIRECTIONAL SOLIDIFICATION (CRYSTALS)
CRYSTAL OSCILLATORS
The behavior of quartz oscillators in the presence of accelerations --- in missile and aircraft time-frequency navigation systems [ONERA, TP NO. 1981-31] p0351 A81-31285
Tactical miniature crystal oscillator [AD-A098490] p0440 N81-25058
CRYSTALLIZATION
NT DIRECTIONAL SOLIDIFICATION (CRYSTALS)
CRYSTALS
NT CRYSTAL OSCILLATORS
NT DENDRITIC CRYSTALS
NT LIQUID CRYSTALS
NT QUARTZ CRYSTALS
NT SINGLE CRYSTALS
CUES
Visual cue augmentation in contact flight simulation p0064 A81-15696
Improved G-Cueing System [AIAA 81-0987] p0416 A81-36572
CUMULATIVE DAMAGE
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment p0013 A81-11659
Statistical crack growth in durability and damage tolerant analyses [AIAA 81-0492] p0300 A81-29382
Limiting application of the concept 'damage tolerance' with regard to fighter aircraft [AAAF-NT-79-32] p0210 N81-17054
Identification of jet engine damages by engine trend analysis LEADS 200 data p0328 N81-20014
Application of damage tolerance concepts for MBB helicopters --- mechanical properties [MBB-UD-309/80-OE] p0580 N81-30105
CURL (VECTORS)
NT VORTICITY
CURRENT REGULATORS
High current power controller [AD-A101643] p0552 N81-29536
CURRENT STABILIZERS
U CURRENT REGULATORS
CURTISS-WRIGHT MILITARY AIRCRAFT
U MILITARY AIRCRAFT
CURVE FITTING
Comparison of two methods for the reduction of free decaying data in aircraft flutter tests [NAE-LTR-UA-43] p0298 A81-29145
CURVED SURFACES
U CONTOURS
U SHAPES
CURVILINEAR COORDINATES
U SPHERICAL COORDINATES
CUSHIONS
Study to develop improved fire resistant aircraft passenger seat materials [NASA-CR-152408] p0306 N81-23056
Testing of aircraft passenger seat cushion material, full scale. Data, volume 2 [NASA-CR-160963] p0440 N81-25050
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1 [NASA-CR-160995-VOL-1] p0440 N81-25051
CUTTING
NT METAL CUTTING
NT SHEARING
Waterjet trimming of cured composites p0575 A81-46632
Applications of pyrotechniques in aviation [SNIAS-792-422-103] p0023 N81-10025
Explosively activated egress area [NASA-CASE-LAR-12624-1] p0546 N81-29107
CW RADAR
U CONTINUOUS WAVE RADAR
CYCLES
NT BRAYTON CYCLE
NT STIRLING CYCLE
NT STRESS CYCLES
NT THERMODYNAMIC CYCLES
CYCLIC LOADS
On understanding environment-enhanced fatigue crack growth - A fundamental approach p0003 A81-10749
Crack propagation in panels of pressurized fuselages upon simultaneous action of cyclic loading by pressurization and high-frequency vibrations p0054 A81-13612
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel p0104 A81-17480
An engineering model for assessing load sequencing effects --- cracks in aircraft structures p0172 A81-21737
Definition of loading sequence for full scale fatigue test p0180 A81-22626
Crack growth propagation under variable amplitude loading in aerospace structures p0181 A81-22632
Prediction of structural fatigue response under aircraft loads from material stress-strain behavior p0226 A81-24009
Laws of unstable crack growth under cyclic loading p0236 A81-25701
A periodic problem in viscoelasticity with variable coefficients p0419 A81-37143
The biparametric cycle count method and the principle of simplification --- in determination of aircraft structural fatigue life p0419 A81-37337
Optimized pitch controller for load alleviation on wind turbines [FFA-TN-HU-2189-PT-1] p0087 N81-12634
The stress behavior of three advanced nickel base superalloys during high temperature low cycle fatigue [AD-A091694] p0131 N81-14061
Mechanisms of damage accumulation in time-dependent cyclic deformation [DOE/ER-10570/1] p0135 N81-14363
Rotor model for verification of computation methods [ISD-262] p0145 N81-15467
Application of damage tolerance concepts for the helicopters p0487 N81-26130
CYCLONES (EQUIPMENT)
U CENTRIFUGES
CYLINDRICAL AFTERBODIES
U AFTERBODIES
U CYLINDRICAL BODIES
CYLINDRICAL ANTENNAS
Excitation of a circular array of cylinders with longitudinal slits --- in radio antennas p0019 A81-12619
CYLINDRICAL BODIES
NT ROTATING CYLINDERS
Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack [AIAA PAPER 81-0007] p0156 A81-20531
Heat transfer from a row of impinging jets to concave cylindrical surfaces p0231 A81-24924
Calculation of the impingement of cloud droplets in a cylinder by the finite-element method p0533 A81-43890
Strength calculation of thin-wall rods of significant taper p0625 A81-49937
Aerodynamic side-force alleviator means [NASA-CASE-LAR-12326-1] p0139 N81-14968
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models [NASA-CR-159363] p0258 N81-18799
CYLINDRICAL CHAMBERS
An experimental investigation of the thrust and discharge characteristics of multinozzle low-head ejectors p0413 A81-35920
CYLINDRICAL SHELLS
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements [AIAA 81-0571] p0302 A81-29405

Some results from a crash energy absorption test for evaluating composite fuselage construction
p0575 A81-46639
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975

CYLINDROIDS
U CYLINDRICAL BODIES

D

DACRON (TRADEMARK)
Air Force Geophysics Laboratory aerodynamically tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023

DAMMO (DATA ANALYSIS)
U DATA PROCESSING
U DATA REDUCTION
U DATA TRANSMISSION

DAMAGE
NT CUMULATIVE DAMAGE
NT EARTHQUAKE DAMAGE
NT FIRE DAMAGE
NT IMPACT DAMAGE
Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development
p0559 A81-44395
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] p0610 A81-47603
The potential for damage from the accidental release of conductive carbon fibers from aircraft composites
p0041 N81-11143
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DOE/ER-10570/1] p0135 N81-14363
Application of damage tolerance concepts for the helicopters
p0487 N81-26130
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] p0640 N81-33503

DAMAGE ASSESSMENT
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment
p0013 A81-11659
Damage tolerance concept for transport aircraft structures
p0050 A81-12970
Maintenance program analysis for aircraft structures of the 80's - MSG-3
[SAE PAPER 801214] p0404 A81-34222
Assessing the behavior of high modulus composite materials in lightning
p0040 N81-11141
Fatigue and damage propagation in composite rotor blades
p0041 N81-11145
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 2: Aerodynamic effects
[AD-A093063] p0209 N81-17048
Assessment of risk to Boeing commerical transport aircraft from carbon fibers --- fiber release from graphite/epxoy materials
[NASA-CR-159211] p0218 N81-17171
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23438
Combat damage assessment
p0488 N81-26132
Application of damage tolerance concepts for MBB helicopters --- mechanical properties
[MBB-UD-309/80-OE] p0580 N81-30105

DAMPING
NT ELASTIC DAMPING
NT VIBRATION DAMPING
NT VISCOELASTIC DAMPING
A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 A81-46626
Measurements of aerodynamic damping in the MIT transonic rotor
[NASA-CR-163988] p0274 N81-19122
Comments on settling chamber design for quiet, blowdown wind tunnels
[NASA-TM-81948] p0335 N81-20085

DAMPING FACTOR
U DAMPING

DAMPING IN PITCH
U DAMPING
U PITCH (INCLINATION)

DAMPING IN ROLL
U DAMPING
U ROLL

DAMPING IN YAW
U DAMPING
U YAW

DAMPING TESTS
Nondestructive dynamic testing
p0124 A81-19657

DAMPNESS
U MOISTURE CONTENT

DANGER
U HAZARDS

DART TURBOPROP ENGINES
U TURBOPROP ENGINES

DASSAULT AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT MYSTERE 20 AIRCRAFT

DASSAULT MIRAGE 3 AIRCRAFT
U MIRAGE 3 AIRCRAFT

DASSAULT MYSTERE 20 AIRCRAFT
U MYSTERE 20 AIRCRAFT

DATA
The use of interpractive graphic displays for interpretation of surface design parameters
[NASA-TM-81963] p0581 N81-30110

DATA ACQUISITION
Wind shear detection from PCM-recorded MLS-flight data
p0015 A81-11675
An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754
A six-channel quick-look unit for the aerodynamics division NKI airborne data acquisition package
[AD-A089975] p0043 N81-11364
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467
Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS)
[AD-A092974] p0208 N81-17041
Evaluation of the A-7 requirements document by analysis of change data
[AD-A094888] p0272 N81-19103
Investigation of Flight Test Methods for measuring the performance of general aviation aircraft
[NASA-CR-164057] p0333 N81-20065
Navaids calibration evaluation with a computer-controlled avionics data acquisition system
p0383 N81-23020
Summary of transponder data, May 1979 - November 1979
[AD-A097569] p0386 N81-23061
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060
Lightning electric field measurements which correlate with strikes to the NASA F-106B aircraft, 22 July 1980
[NASA-TM-82142] p0491 N81-26643
Nature of the annoyance and noise annoyance relation around airports
[NASA-TM-75873] p0542 N81-28606
Evaluation of the disturbance caused by aircraft noise by opinion surveys

[NASA-TM-76579] p0542 N81-28610
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
p0544 N81-29072
Aircraft sensor quality in SESAME 1979: Results of tower fly-bys and aircraft intercomparison
[PB81-176596] p0552 N81-29722
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] p0630 N81-32164
DATA ADAPTIVE EVALUATOR/MONITOR
U DATA PROCESSING
U DATA REDUCTION
U DATA TRANSMISSION
DATA ANALYSIS
U DATA PROCESSING
U DATA REDUCTION
DATA BASES
Are management problems in the acquisition of aircraft gas turbine engines being corrected
[AD-A090520] p0088 N81-12928
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
Development and evaluation of automatic landing control laws for power lift STOL aircraft
[NASA-CR-152399] p0253 N81-18060
Study of materials performance model for aircraft interiors
[NASA-CR-152378] p0333 N81-20063
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-30143
DATA BUSSES
U CHANNELS (DATA TRANSMISSION)
DATA COMPACTION
U DATA COMPRESSION
DATA COMPRESSION
A concept for dynamic control of RPV information system parameters
p0049 A81-12796
Comparison of two methods for the reduction of free decaying data in aircraft flutter tests
[NAE-LTR-HA-43] p0298 A81-29145
Dynamic simulation of hybrid video compression --- of airborne reconnaissance systems
p0463 A81-39555
DATA CONVERSION ROUTINES
NT SUBROUTINES
Processing of AIDS flight recorder data for a quick look with the aid of a hybrid computer system
p0384 N81-23023
DATA CONVERTERS
NT ANALOG TO DIGITAL CONVERTERS
NT DIGITAL TO ANALOG CONVERTERS
DATA CORRELATION
NT SIGNAL ANALYSIS
Weapon bay cavity noise environments, data correlation and prediction for the B-1 aircraft
[AD-A089770] p0045 N81-11778
Correlation of predicted and flight derived stability and control derivatives with particular application to tailless delta wing configurations --- application to the space shuttle orbiter
[NASA-TM-81361] p0490 N81-26154
DATA HANDLING SYSTEMS
U DATA SYSTEMS
DATA LINKS
The RLU - An advanced remote terminal for avionic systems
p0327 A81-30358
Formats for DABS data link applications
[AD-A089963] p0034 N81-11028
Active Beacon Collision Avoidance System (BCAS) functional overview
[AD-A094177] p0250 N81-18040
Potential effects of the introduction of the discrete address beacon system data link on air/ground information transfer problems
[NASA-CR-166165] p0373 N81-22037
Discrete Address Beacon System (DABS) data link capacity utilization
[AD-A098173] p0425 N81-24044
Discrete Address Beacon System (DABS) computer performance/test and evaluation
[AD-A099326] p0484 N81-26088
Discrete address beacon system data link capacity requirements
[AD-A101731] p0581 N81-30107
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] p0636 N81-33182
DATA MANAGEMENT
Flight-management system - Key to the advanced-technology fighter
p0421 A81-37523
Goals of flight management system integration for a forward-swept-wing demonstrator aircraft
p0421 A81-37524
Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061
F-8 digital fly-by-wire aircraft analytic redundancy management flight test experience
p0485 N81-26109
DATA PROCESSING
NT CENTRAL ELECTRONIC MANAGEMENT SYSTEM
NT DATA CORRELATION
NT DATA REDUCTION
NT DATA RETRIEVAL
NT DATA SMOOTHING
NT MULTIPROCESSING (COMPUTERS)
NT PARALLEL PROCESSING (COMPUTERS)
NT PIPELINING (COMPUTERS)
NT SCENE ANALYSIS
NT SIGNAL ANALYSIS
NT SIGNAL PROCESSING
NT VOICE DATA PROCESSING
An information-processing interpretation of air traffic control stress
p0053 A81-13416
Detection of moving objects --- Russian book
p0118 A81-18773
New developments of data processing in computer-controlled manufacturing systems /DNC, FMS/
p0149 A81-19845
The state of development and design of target data processing of the ELRA system
p0152 A81-20089
A computer graphics display technique for the examination of aircraft design data
[AIAA PAPER 81-0370] p0166 A81-20788
Air transport flight parameter measurements program - Concepts and benefits
[SAE PAPER 801132] p0396 A81-34163
The use of data items on aircraft performance measurement
[ESDU-80009] p0026 N81-10053
A direct model pitch measurement with a laser interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility
[LA-UR-80-2485] p0135 N81-14550
Flight data recording and data processing for light airplanes and gliders
p0328 N81-20008
A quick-look system for the processing of flight data recordings
p0329 N81-20021
Flight tests of the microwave landing system multimode digital processor
[AD-A095449] p0332 N81-20056
Contributions to the 9th Symposium on aircraft integrated data systems --- Conferences
[ESA-TT-532] p0382 N81-23008
Description of the British Civil Aviation Airworthiness Data Recording Programme (CAADRP) --- analysis of flight recorder data
p0383 N81-23017
The SYDAS flight data processing system
p0383 N81-23016
Processing of AIDS flight recorder data for a quick look with the aid of a hybrid computer system
p0384 N81-23023
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost
[AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement

[AD-A097438] p0390 N81-23084
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] p0636 N81-33183
DATA PROCESSING EQUIPMENT
NT AIRBORNE/SPACEBORNE COMPUTERS
NT ANALOG COMPUTERS
NT COMPUTERS
NT DATA PROCESSING TERMINALS
NT DIGITAL COMPUTERS
NT HYBRID COMPUTERS
NT MICROCOMPUTERS
NT MICROPROCESSORS
NT MINICOMPUTERS
Sample data effects of high-pass filters
[NASA-TP-1797] p0193 N81-16040
An improved flight data transcriber
[AD-A091981] p0201 N81-16430
NAS automation equipment operating cost estimates, FY 1978 - 1979
[AD-A102023] p0595 N81-31182
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] p0630 N81-32164
DATA PROCESSING TERMINALS
The RLU - An advanced remote terminal for avionic systems
p0327 A81-30358
DATA PROCESSORS
U DATA PROCESSING EQUIPMENT
DATA READOUT SYSTEMS
U DATA SYSTEMS
U DISPLAY DEVICES
DATA RECORDERS
Individual jet engine stress load monitoring with the aid of the flight data recording system LEADS 200
p0328 N81-20013
Identification of jet engine damages by engine trend analysis LEADS 200 data
p0328 N81-20014
Crash survivable flight data recording system study
[AD-A101503] p0583 N81-30127
DATA RECORDING
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23438
DATA REDUCTION
NT DATA SMOOTHING
Analytical methods for store separation flight test
p0177 A81-22344
Analysis of the difficulties in high performance compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107
Application of a flight test and data analysis technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
Wind tunnel determination of dynamic cross-coupling derivatives - A new approach
p0413 A81-35927
Evaluation of flight data from a mosaic sensor
p0452 A81-37681
An economical approach to automated flight test data reduction
p0576 A81-46643
A computer-based laser Doppler velocimeter
[DFVLR-MITT-79-14] p0133 N81-14289
DMAHTC's support to National Ocean Survey LORAN-C-charting
[AD-A093748] p0206 N81-17027
The SYDAS flight data processing system
p0383 N81-23018
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30085
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] p0627 N81-32118
DATA RETRIEVAL
A technique for recovering nonsynchronized data from a digital flight data recorder
p0328 N81-20020
DATA SAMPLING
Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20740
Helicopter gust alleviation - An optimal sampled-data approach
[AHS 80-31] p0476 A81-40161
DATA SMOOTHING
DEKFIS user's guide: Discrete Extended Kalman Filter/Smoother program for aircraft and rotorcraft data consistency
[NASA-CR-159081] p0379 N81-22722
The reconstruction of flight paths from AIDS data with the aid of modern filtering methods --- kalman filters
p0383 N81-23021
DATA SYSTEMS
Big 'R', little 'c', integrated data annotation and sensor control for long range oblique photography /LOROP/ --- increased reliability and reduced complexity
p0462 A81-39435
An integrated performance and air data system for helicopters
p0470 A81-40110
Real time analysis for helicopter flight testing
p0470 A81-40112
Status report on Position Location Reporting System /PLRS/
p0517 A81-42440
An improved flight data transcriber
[AD-A091981] p0201 N81-16430
Uses of AIDS data in airlines engine maintenance
p0328 N81-20016
Possible online uses of AIDS data in future ATC systems
p0328 N81-20018
DATA TRANSMISSION
Dynamic simulation of hybrid video compression --- of airborne reconnaissance systems
p0463 A81-39555
Multiplexing in general aviation aircraft
[SAE PAPER 810570] p0519 A81-42735
Fiber optic technology for data transmission in the helicopter environment
p0573 A81-46614
A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993
Communications support for National Flight Data Center information system
[AD-A093095] p0219 N81-17327
Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests
[AD-A094124] p0250 N81-18037
DC 3 AIRCRAFT
DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850] p0141 N81-14989
DC 8 AIRCRAFT
CFM56 rejuvenates the DC-8
p0455 A81-38196
DC 9 AIRCRAFT
Advanced composite applications in McDonnell Dougals commercial transport aircraft
p0530 A81-43628
DC 10 AIRCRAFT
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[AIAA 81-0567] p0306 A81-29494
Advanced composite applications in McDonnell Dougals commercial transport aircraft
p0530 A81-43628
AEROMEXICO DC-10-30, XA-DUH, over Luxembourg, Europe
[NTSB-AAR-80-10] p0073 N81-12042
Design analysis of wide-body aircraft
[GPO-60-652] p0092 N81-13045
Design and wind tunnel tests of winglets on a DC-10 wing
[NASA-CR-3119] p0492 N81-27086
Manufacturing development of DC-10 advanced rudder
[NASA-CR-159060] p0454 N81-27077
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10

derivative wing
[NASA-TM-83143] p0499 N81-27540
DE HAVILLAND AIRCRAFT
NT DH 121 AIRCRAFT
NT DH 125 AIRCRAFT
A case study in aircraft design: The de Havilland family of STOL commuter aircraft --- Book
p0101 A81-16717
Fibre reinforced composite applications at De Havilland
[SAE PAPER 810640] p0524 A81-42784
DE HAVILLAND DH 121 AIRCRAFT
U DH 121 AIRCRAFT
DE HAVILLAND DH 125 AIRCRAFT
U DH 125 AIRCRAFT
DE LAVAL NOZZLES
U CONVERGENT-DIVERGENT NOZZLES
DEAD RECKONING
Doppler radar systems for helicopters
p0512 A81-41758
Dead reckoner navigation project
p0372 N81-22010
DEADWEIGHT
U STATIC LOADS
DEAFNESS
U AUDITORY DEFECTS
DEBRIS
Comparisons of model and flight testing with respect to hot gas reingestion and debris ingestion during thrust reversal
p0297 A81-29113
Full-flow debris monitoring in gas turbine engines
[ASME PAPER 81-GT-60] p0313 A81-29970
DEBYE TEMPERATURE
U SPECIFIC HEAT
DECAY
NT ACOUSTIC EMISSION
NT ELECTROLUMINESCENCE
NT ELECTRON EMISSION
NT EXHAUST EMISSION
NT FLUORESCENCE
NT X RAY FLUORESCENCE
DECELERATION
NT SPIN REDUCTION
Analytic determination of the kinematic and energy parameters of aircraft braking during the landing run
p0409 A81-35008
Some experimental study on parachute dynamics by utilizing a deceleration system simulator
p0481 A81-40471
DECISION MAKING
Investment decision-making in international airports
p0113 A81-18079
Increasing capacity with computer-assisted decision making --- airport planning
p0113 A81-18080
Airport/environs plan making - Managing the planning process
p0114 A81-18088
Delayed ejection --- decision factor importance for pilot safety
p0176 A81-22102
Application of signal detection theory to decision making in supervisory control - The effect of the operator's experience
p0351 A81-31288
Balanced design: Minimum cost solution
p0047 N81-11919
Design to cost and systems, LCC
p0047 N81-11920
Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061
Investigation of air transportation technology at Massachusetts Institute of Technology, 1980
p0371 N81-22000
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A098096] p0420 N81-24038
DECISION THEORY
NT STATISTICAL DECISION THEORY
Estimation of relative total cost for aircraft systems
p0047 N81-11922
DECKS (FLOORS)
U FLOORS

DECOMPOSITION
NT PROPELLANT DECOMPOSITION
Control system design using graphical decomposition techniques
p0410 A81-35567
DECOMPRESSION
U PRESSURE REDUCTION
DECREMENTING
U REDUCTION
DEFECTS
NT AUDITORY DEFECTS
NT CRYSTAL DEFECTS
NT CRYSTAL DISLOCATIONS
NT SURFACE DEFECTS
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522
DEFENSE INDUSTRY
NT WEAPONS INDUSTRY
Air Force technical objective document FY 1981
[AD-A089709] p0048 N81-12010
DEFENSE PROGRAM
Band sharing - A case study
p0173 A81-21869
DEFLATING
U INFLATABLE STRUCTURES
U PRESSURE REDUCTION
DEFLECTION
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
Force and moment coefficients for high deflection cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
Leading-edge deflection optimization for a highly swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974
Static deflection and eigenfrequency analysis of the Nibe wind turbine rotors. Theoretical background --- structural vibration
[RISOE-M-2199] p0279 N81-19497
Alleviation of helicopter fuselage-induced rotor unsteady loads through deterministic variation of the individual blade pitch
[NASA-CR-166234] p0549 N81-29134
DEFLECTORS
The use of carbon-reinforced plastic in the construction of a deflector and a stabilizer
p0299 A81-29310
Investigation and improvement of an elbow-type gas outlet of a turboprop engine
p0509 A81-41940
DEFORMATION
NT ELASTIC DEFORMATION
NT PLASTIC DEFORMATION
An aerodynamic analysis of deformed wings in subsonic and supersonic flow
[AD-A101675] p0580 N81-30091
DEGRADATION
Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029
DEGREES OF FREEDOM
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] p0638 N81-33203
DEICERS
Artificial and natural icing tests production UH-60A helicopter
[AD-A096239] p0340 N81-21063
Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363] p0441 N81-25065
Protection against wing icing for Airbus A300 and A310
[NASA-TM-76584] p0494 N81-27079
DEICING
U.K. development of a rotor de-icing system
p0469 A81-40103
Helicopter rotor ice accretion and protection research
p0469 A81-40104
Pneumatic boot for helicopter rotor deicing
p0267 N81-19059
Commercial aviation icing research requirements
[NASA-CR-165336] p0387 N81-23069

Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-25041
Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363] p0441 N81-25065

DEICING SYSTEMS
U DEICERS

DELIVERY
NT WEAPONS DELIVERY

DELTA DART AIRCRAFT
U F-106 AIRCRAFT

DELTA FUNCTION
Approximations and short cuts based on generalized functions
p0347 A81-30730

DELTA WINGS
Numerical prediction of vortex cores of the leading and trailing edges of delta wings
p0059 A81-14475
Procedures for optimal drag design of camber and flap deflection in supersonic regions with consideration to geometric limits
[DGLR PAPER 80-110] p0120 A81-19396
The coordinate-deformation method in the problem of a supersonic gas flow over an airfoil --- delta wings
p0123 A81-19631
Hypersonic gas flow over a delta wing
p0123 A81-19632
On a linear theory of a supersonic flow past a delta wing with subsonic leading edges
p0149 A81-19872
Delta canard configuration at high angle of attack
p0154 A81-20351
Numerical simulation of wing-fuselage interference
[AIAA PAPER 81-0048] p0158 A81-20564
The aerodynamics of inverted leading edge flaps on delta wings
[AIAA PAPER 81-0356] p0165 A81-20775
A parametric study of the static longitudinal aerodynamic characteristics of parallel lift delta wing configurations at low Reynolds numbers
[AIAA PAPER 81-0409] p0168 A81-20814
On some methods of supersonic unsteady lifting surface analysis
[AIAA 81-0644] p0307 A81-29497
On the theory of a wing with small aspect ratio in a hypersonic flow
p0309 A81-29860
Effectiveness of leading-edge vortex flaps on 60 and 75 degree delta wings
p0352 A81-31368
Calculation of supersonic flow past interfering wings
p0413 A81-36455
The effect of the aspect ratio of delta wings on the structure of the near vortex wake
p0413 A81-36467
Calculation of flow past wings with supersonic sharp edges
p0418 A81-36944
Effects of yaw on leading edge vortex flap aerodynamics
[AIAA PAPER 81-1660] p0526 A81-43147
Effect of leading-edge vortex flaps on aerodynamic performance of delta wings
p0559 A81-44424
A vortex-lattice method for calculating longitudinal dynamic stability derivatives of oscillating delta wings
[AIAA PAPER 81-1876] p0561 A81-44570
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] p0610 A81-47601
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] p0611 A81-47622
Measured pressure distributions and shock shapes on a simple delta wing
p0617 A81-48479
Experimental study of supersonic viscous leeside flow over a slender delta wing
[NASA-TM-81248] p0133 N81-14265
Experimental investigation of the flow on the suction side of a thin Delta wing
[NASA-TM-75897] p0338 N81-21024
Strake/delta wing interactions at high angles of attack
[NASA-CR-166183] p0483 N81-26072
Correlation of predicted and flight derived stability and control derivatives with particular application to tailless delta wing configurations --- application to the space shuttle orbiter
[NASA-TM-81361] p0490 N81-26154
Subsonic pitch-up alleviation on a 74 deg delta wing
[NASA-CR-165749] p0584 N81-30137
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160

DEMAND (ECONOMICS)
A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032
Predicting the impacts of new technology aircraft on international air transportation demand
[NASA-CR-165654] p0594 N81-31160

DEMONSTRATION
U PROVING

DENDRITIC CRYSTALS
Metallographic analysis techniques used during the Cast Aluminum Structures Technology /CAST/ program --- microstructure of aluminum cast alloy
p0531 A81-43650

DENSIFICATION
Development of high strength silicon carbide materials for gas turbine applications
[BMFT-FB-T-80-025] p0497 N81-27102

DENSITY (NUMBER/VOLUME)
NT PACKING DENSITY
NT PARTICLE DENSITY (CONCENTRATION)

DENSITY DISTRIBUTION
The method for calculating the fuel concentration field in the downstream positions of the pressure jet atomizer in the high temperature gas-stream
p0224 A81-23731

DEPENDENCE
NT TEMPERATURE DEPENDENCE
NT TIME DEPENDENCE

DEPLOYMENT
AV-8B operational features for rapid deployment
[SAE PAPER 801228] p0405 A81-34231

DEPOSITION
NT ELECTROPLATING
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0391 N81-23243

DEPOSITS
Determination of coking rate in jet fuel
p0570 A81-46448

DEPRESSURIZATION
U PRESSURE REDUCTION

DEPTH PERCEPTION
U SPACE PERCEPTION

DESCENT
NT PARACHUTE DESCENT
Development of simplified airborne computations for fuel conservative descents in a time-based metered air traffic environment
[SAE PAPER 810642] p0524 A81-42785
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033
Test results of flight guidance for fuel conservative descents in a time-based metered air traffic environment --- terminal configured vehicle
p0264 N81-19036
A flight investigation of the ultra-deep-stall descent and spin recovery characteristics of a 1/6 scale radiocontrolled model of the Piper PA38 Tomahawk
[NASA-CR-156871] p0343 N81-21084
An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108

DESCENT TRAJECTORIES
Air traffic management enhancement through new avionics /4-D/
p0099 A81-16583
High altitude launch of the Cruise Missile
p0179 A81-22608
Investigation of landing flare in the presence of wind shear

[ESA-TT-631] p0077 N81-12080

DESIGN ANALYSIS

Design of airfoils in incompressible viscous flows by numerical optimization
p0001 A81-10096
Possibilities for the valuation of different combat aircraft configurations with respect to flight mechanics
p0007 A81-11607
Airbus Industrie's heavenly twins - A310 and A300-600
p0018 A81-12348
Improving the mechanical load matching of wind energy converters
p0055 A81-13870
Optimum selection of main parameters for the reverse design of a supersonic military aircraft
p0102 A81-17047
UK pavement design and evaluation - A new approach
p0113 A81-18076
Effects of design variables on spoiler control effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581
A computer-aided design system geared toward conceptual design in a research environment --- for hypersonic vehicles
[AIAA PAPER 81-0372] p0166 A81-20709
The design, testing, certification and production of an emergency parachute for use in light aircraft
[AIAA PAPER 81-0413] p0168 A81-20817
Standardisation - An alternative approach to ATC automation
p0177 A81-22192
Analytic design of regulators with limitations
p0235 A81-25688
Rotor-tip leakage. II - Design optimization through viscous analysis and experiment
[ASME PAPER 81-GT-72] p0313 A81-29981
Inverse or design calculations for non-potential flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29986
Sensitivity of turbine blade temperatures to tolerances of design variables
[ASME PAPER 81-GT-90] p0314 A81-29997
Life cycle cost before, during and after the design of aircraft propulsion systems
[ASME PAPER 81-GT-111] p0315 A81-30016
New features in the design of axial-flow compressors with tandem blades
[ASME PAPER 81-GT-113] p0315 A81-30017
Design analysis of high-efficiency low-stress ceramic gas turbines
[ASME PAPER 81-GT-130] p0316 A81-30034
A versatile microprocessor controller for low cost helicopter applications
[ASME PAPER 81-GT-137] p0316 A81-30039
Flight control system design through constrained output feedback
p0321 A81-30264
A design analysis technique for evaluating size and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402
Application of an aerodynamic configuration modeling technique to the design and analysis of X-Wing aircraft configurations
p0356 A81-32013
The art of designing experimental aircraft - An overview
[AIAA PAPER 81-0944] p0363 A81-32939
SIMCAT - A modular air traffic control simulator
p0364 A81-33149
Digital computer simulation of aircraft hydraulic systems
[SAE PAPER 801193] p0402 A81-34203
Full authority digital electronic control application to a variable cycle engine
[SAE PAPER 801203] p0403 A81-34212
NASA aeronautics R&T - A resource for aircraft design
[AIAA PAPER 81-0925] p0408 A81-34363
Systems costing of hovercraft, hydrofoils and wing-in-ground effect machines. III
p0412 A81-35724
Design characteristics of Michelson interferometers used on the AFGL NKC-135 infrared flying laboratory
p0463 A81-39505
Design considerations for U.S. Coast Guard search and surveillance Forward Looking Infrared /FLIR/ system
p0463 A81-39647
Development of antiresonance force isolators for helicopter vibration reduction
p0467 A81-40091
Boeing plays safe --- Boeing 737-300 design
p0480 A81-40455
Some experimental study on parachute dynamics by utilizing a deceleration system simulator
p0481 A81-40471
The use of engine operating experience in the preliminary design of aircraft gas turbine combustion systems
[AIAA PAPER 81-1399] p0515 A81-42189
Factors influencing the predicted performance of advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Materials and processes for a small remotely piloted vehicle
p0532 A81-43663
Engine life and usage methodologies for conceptual design
[AIAA PAPER 81-1651] p0533 A81-43937
Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954
Project Bandit - An economical, high performance business aircraft for the 1990s
p0563 A81-44850
Output predictive algorithmic control - Precision tracking with application to terrain following
p0564 A81-45573
Design, analyses, and model tests of an aeroelastically tailored lifting surface
[AIAA PAPER 81-1673] p0566 A81-45974
Soviet practice in designing and procuring military aircraft
p0567 A81-46340
Analytical and computer-aided design of automated systems for the testing of aircraft engines --- Russian book
p0578 A81-46850
Evaluation of section properties for hollow composite beams
[PAPER-NR-35] p0031 N81-10454
ATARS implementation tradeoff
[AD-A089977] p0034 N81-11026
The European Transonic Wind tunnel ETW
p0038 N81-11058
The implications of laboratory accelerated conditioning of carbon fibre composites
p0039 N81-11129
Design to Cost and Life Cycle Cost
[AGARD-CP-289] p0045 N81-11902
Reliability-centered maintenance
p0047 N81-11917
Design to cost and systems, LCC
p0047 N81-11920
Summary of AGARD Lecture Series 107: The Application of Design to Cost and Life Cycle Cost to Aircraft Engines
p0047 N81-11926
The changing scene of structural airworthiness
[AAAF-NT-79-24] p0077 N81-12076
The design development and operation of gas turbine radio telemetry systems
[EIR-00733] p0077 N81-12082
Reverse flow, pre-rotation and unsteady inlet flow in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433
Application of a method for aerodynamic analysis and design of horizontal axis wind turbines, part 1
[FFA-TN-AU-1499-PT-1] p0086 N81-12633
Aerodynamic design of electric and hybrid vehicles: A guidebook
[NASA-CR-163744] p0088 N81-12943
NASA contributions to radial turbine aerodynamic analyses
[NASA-TM-81644] p0090 N81-13619
Design analysis of wide-body aircraft
[GPO-60-652] p0092 N81-13085
Fundamentals of conceptual design optimization of subsonic transport aircraft
[VTH-LR-292] p0120 N81-13951

Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968
Full potential solution of transonic quasi-3-D flow through a cascade using artificial compressability
[NASA-TM-81637] p0140 N81-14980
The resonance frequencies of ventilated wind tunnels
[ARC-R/M-3841] p0144 N81-15009
A system for aerodynamic design and analysis of supersonic aircraft. Part 4: Test cases
[NASA-CR-3354] p0185 N81-15977
Design and experimental verification of a transonic wing for a transonic aircraft
p0188 N81-16003
Use of constrained optimization in the conceptual design of a medium-range subsonic transport
[NASA-TP-1762] p0193 N81-16039
Cold-air investigation of first stage of 4-1/2-stage, fan drive turbine with average stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050
Test and evaluation of improved aircrew restraint systems for combat helicopers
p0205 N81-17017
Helmet mounted displays: Design considerations
p0213 N81-17073
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A093122] p0215 N81-17092
Structural concept trends for commercial supersonic cruise aircraft design
p0246 N81-18006
Historical overview of V/STOL aircraft technology
[NASA-TM-81280] p0272 N81-19100
Regenerative engine analysis program
[AD-A095144] p0274 N81-19123
Description of recent changes in the Langley 6- by 28-inch transonic tunnel
[NASA-TM-81947] p0391 N81-23096
Civil component program Wing Section. Transonic wing development --- for the european airbus
[BMFT-FB-W-80-021] p0426 N81-24052
Civil component program Wing Section. The design of the transonic airfoil Va 2
[BMFT-FB-W-80-023] p0426 N81-24053
The AIRBUS hydraulic systems
[SNIAS-802-111-111] p0427 N81-24055
Theoretical and experimental studies of crack propagation --- aircraft construction materials
[SNIAS-802-111-107] p0437 N81-24482
The supercritical profile of the supercritical wing
[NASA-TM-76605] p0494 N81-27075
Final design and fabrication of an active control system for flutter suppression on a supercritical aeroelastic research wing
[NASA-CR-165714] p0498 N81-27114
Adaptive finite element technology in integrated design and analysis --- aircraft structures design
[NASA-CR-164560] p0543 N81-28810

DESIGN OF EXPERIMENTS
U EXPERIMENTAL DESIGN

DESIGN TO COST
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424
The stretched C-14 - Cost effective application of structural technology
[AIAA 81-0514] p0302 A81-29427
ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ --- Integrated Computer Aided Manufacturing for aircraft systems
[AIAA PAPER 81-0855] p0408 A81-34353
Design of rotorcraft powerplants - Use of life cycle costing as an aid to design optimisation
p0469 A81-40109
A study of the economic impact of noise limits on new design and current production helicopters
[AHS 80-64] p0479 A81-40187
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for metallic structures
p0558 A81-44374
The ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for Avionics
p0558 A81-44375
Programmes for military engines with cost objectives --- aircraft engines
[PNR-90058] p0583 N81-30133

DESPINNING
U SPIN REDUCTION

DESTABILIZATION
Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1] p0375 N81-22048

DESTRUCTIVE TESTS
Some results from a crash energy absorption test for evaluating composite fuselage construction
p0575 A81-46639
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12456-1] p0601 N81-31230

DETECTION
NT AIRCRAFT DETECTION
NT RADAR DETECTION
NT REMOTE SENSING
NT SIGNAL DETECTION
NT TARGET RECOGNITION
NT ULTRASONIC FLAW DETECTION
Observing lightning from ground-based and airborne stations
p0136 N81-14566
An assessment of technical factors influencing the potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16047
The 1979 clear air turbulence flight test program --- warning and detection devices
p0266 N81-19050
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862

DEWAR SYSTEMS
U CRYOGENIC EQUIPMENT

DH 121 AIRCRAFT
TriStar engine monitoring in British Airways
[SAE PAPER 801224] p0405 A81-34227

DH 125 AIRCRAFT
The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] p0623 A81-49727

DIAGRAMS
NT CIRCUIT DIAGRAMS
NT NYQUIST DIAGRAM
NT S-N DIAGRAMS
Production of LORAN-C reliability diagrams at the Defense Mapping Agency
[AD-A093749] p0206 N81-17028

DIAMOND WINGS
U LOW ASPECT RATIO WINGS
U SWEPT WINGS

DIELECTRIC MATERIALS
U DIELECTRICS

DIELECTRICS
NT RADOME MATERIALS
Dielectric electrostatic charge reduction
[SAE PAPER 810571] p0519 A81-42736

DIESEL ENGINES
Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067
Automotive technology development program
[DOE/CS-0069/1] p0278 N81-19464

DIESEL FUELS
NT LIQUID FUELS
The 1H and 13C fourier transform NMR characterization of jet fuels derived from alternate energy sources
[AD-A098305] p0437 N81-24284
Behavior of fuels at low temperatures
[AD-A100332] p0542 N81-28276

DIFFERENCE EQUATIONS
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017

DIFFERENTIAL ALGEBRA
U MATRICES (MATHEMATICS)

DIFFERENTIAL ANALYZERS
U ANALOG COMPUTERS

DIFFERENTIAL EQUATIONS
NT PARABOLIC DIFFERENTIAL EQUATIONS
NT PARTIAL DIFFERENTIAL EQUATIONS
NT VORTICITY EQUATIONS
Flap-lag-torsional dynamic modelling of rotor blades in hover and in forward flight, including the effect of cubic nonlinearities

[NASA-CR-166194] p0406 N81-26116
Flag-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-164475] p0406 N81-26117

DIFFERENTIAL GEOMETRY
NT TENSOR ANALYSIS

DIFFERENTIAL OPERATORS
U DIFFERENTIAL EQUATIONS

DIFFRACTION
NT WAVE DIFFRACTION

DIFFRACTION PATHS
Optimization of barriers --- for sceening engine noise, diffraction
[ESA-TT-648] p0500 N81-27893

DIFFRACTION PATTERNS
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
p0607 A81-47143
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[DFVLR-FB-80-01] p0132 N81-14195
Airborne antenna pattern code: User's manual
[AD-A092316] p0201 N81-16357

DIFFUSERS
Vortex drag reduction by aft-mounted diffusing vanes
p0012 A81-11647
Losses of total pressure during mixing of flows in a step diffuser
p0242 A81-26991
Design and development of the combustor inlet diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
The influence of blade wakes on the performance of combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856
An approach to conformal inlet diffuser design for integrated propulsion systems
[AIAA PAPER 81-1395] p0514 A81-42185
Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15425/T1] p0134 N81-14327

DIFFUSION
Transonic maneuver/cruise airfoil design employing active diffusion control
p0239 A81-26511
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control
p0239 A81-26512

DIFFUSION BONDING
U DIFFUSION WELDING

DIFFUSION EFFECT
U DIFFUSION

DIFFUSION WELDING
Concurrent superplastic forming/diffusion bonding of titanium airframe components
p0531 A81-43638
Superplastic formed and diffusion bonded titanium landing gear component feasibility study
[AD-A092788] p0200 N81-16213

DIFLUORO COMPOUNDS
NT POLYTETRAFLUOROETHYLENE

DIGITAL COMMAND SYSTEMS
Experimental aircraft of the DFVLR for in-flight simulation and flight control technology
p0452 A81-37654
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044
Improvement of guidance and handling qualities in the vicinity of airports and on landing --- use of a digital command system
[BMFT-FB-W-79-42] p0425 N81-24045
The interface arrangement of digibus systems --- Mirage 2000 aircraft
p0545 N81-29084

DIGITAL COMMUNICATION
U PULSE COMMUNICATION

DIGITAL COMPUTERS
NT MICROCOMPUTERS
NT MINICOMPUTERS
A mobile computer-aided detection and tracking system for low-flying attack aircraft
p0152 A81-20098
Digital control makes a commercial debut on the JT9D engine
[ASME PAPER 81-GT-199] p0317 A81-30090
Avionics computer system support at Ogden ALC
p0320 A81-30243
A Single Processor Synchronous Executive derived from the DAIS executive --- Digital Avionics Information System
p0324 A81-30326
Microprocessor-based digital air data computer for flight test
p0361 A81-32858
Air data computer for the measurement and evaluation of data of flight physics
p0451 A81-37648
The application of computers to navigation - New developments employing microprocessors
p0565 A81-45761
Failure management for the SAAB Viggen JA37 aircraft
p0042 N81-11273
A digital-analog hybrid system and its application to the automatic flight control system simulation research
[NASA-TM-76457] p0377 N81-22060

DIGITAL DATA
A technique for recovering nonsynchronized data from a digital flight data recorder
p0328 N81-20020

DIGITAL FILTERS
A new technique for tracking sequences of digitized images
p0156 A81-20508
Analytical investigation of time correction in alpha-beta tracking filters with application to en route tracking
[AD-A099218] p0404 N81-26090
Characteristics of a digital filter for a precision DME system in microwave landing systems
[FUB-43-1980] p0628 N81-32136

DIGITAL NAVIGATION
Design of disturbance-rejection controllers for linear multivariable discrete-time systems using entire eigenstructure assignment --- onboard digital flight system of F-4 aircraft
p0155 A81-20454
Flight test evaluation of a digital controller used in a VTOL automatic approach and landing system
p0179 A81-22549
Strapdown navigation comes of age
[SAE PAPER 801167] p0399 A81-34182
Electronic displays and computerized NAV systems for commuters and business aircraft
p0407 A81-34330
Summary of interface testing of the digital AN/ASN-123 tactical navigation avionic system in the SH-3H helicopter
[AHS 80-18] p0474 A81-40149
Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/
p0517 A81-42437
Output predictive algorithmic control - Precision tracking with application to terrain following
p0567 A81-46280
Onboard and ground test of an autonomous navigation system based on terrain correlation
p0544 N81-29069

DIGITAL RADAR SYSTEMS
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
New techniques and development trends in the system architecture of EDP systems for radar data processing and airspace control
p0153 A81-20103
F-16 improvement program - Making the digits count
p0241 A81-26931
A new generation IFF - The AN/APX-100/V/ transponder
p0350 A81-31132
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-30143
Development of a ground signal processor for digital synthetic array radar data
[NASA-CR-161074] p0602 N81-31421

DIGITAL SIMULATION
The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856
Digital computer simulation of generalized fault conditions on aircraft electrical power systems
p0322 A81-30285

Digital computer simulation of aircraft hydraulic systems [SAE PAPER 801193] p0402 A81-34203

A nonlinear propulsion system simulation technique for piloted simulators p0454 A81-38064

Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed [AIAA 81-1335] p0457 A81-38540

Digital simulation for energy conservation in a large wind tunnel plant system p0613 A81-48003

A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design p0615 A81-48333

The evolution of real-time digital simulation of aircraft for training applications p0615 A81-48358

Model following control of gas turbine engines p0624 A81-49900

Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels [NASA-CR-152145] p0276 N81-19136

A nonlinear propulsion system simulation tehnique for piloted simulators [NASA-TM-82600] p0390 N81-23085

A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 1: Model description application [NASA-CR-166129-VOL-1] p0538 N81-28084

A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 2: Model equations and base aircraft data [NASA-CR-166129-VOL-2] p0538 N81-28085

A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 3: User's manual for VATOL simulation program [NASA-CR-166129-VOL-3] p0538 N81-28086

A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test [NASA-CR-3461-VOL-1] p0595 N81-31171

DIGITAL SYSTEMS

NT DIGITAL NAVIGATION

NT DIGITAL RADAR SYSTEMS

Standardization in military system architecture p0050 A81-13168

Avionic architectural standardization - Logistic support perspective p0050 A81-13171

A new system for the study of visual information presentation in aeronautics - GIBI p0100 A81-16688

The digital control system as part of an integrated accessory fit for future engines p0104 A81-17505

System considerations in the implementation of digital control [AAS 80-032] p0120 A81-19375

Robustness properties of a new multirate digital control system [AIAA PAPER 81-0022] p0158 A81-20545

Design of guidance and control digital autopilots p0183 A81-22973

Analysis and synthesis of the digital attitude control system of the aerospace vehicle p0224 A81-23837

YC-14 digital flight control experience p0320 A81-30246

The RLU - An advanced remote terminal for avionic systems p0327 A81-30358

Airborne ground velocity determination by digital processing of electro-optical line sensor signals p0358 A81-32496

Application of the parameter space method to aerospace vehicle digital control system design p0359 A81-32642

Methods for the verification and validation of digital flight control systems [SAE PAPER 801134] p0397 A81-34165

Flight control systems go digital - More than a binary mechanization of analog predecessors [SAE PAPER 801166] p0399 A81-34181

Full Authority Digital Electronic Control turbofan engine demonstration [SAE PAPER 801199] p0402 A81-34209

Full authority digital electronic control application to a variable cycle engine [SAE PAPER 801203] p0403 A81-34212

Versatile and economical real-time simulation for digital flight control systems [AIAA 81-0974] p0415 A81-36563

The digital core avionics system p0472 A81-40132

NDEC - A control concept for helicopter gas turbines --- speed (N) based Digital Electronic Control [AHS 80-44] p0477 A81-40171

Development of an integrated fault tolerant engine control [AIAA PAPER 81-1365] p0502 A81-40845

Propulsion controls p0079 N81-12095

Tower Cab Digital Display [AD-A090616] p0091 N81-13042

A survey of computer simulations of digital avionics systems [AD-A091943] p0195 N81-16049

Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS) [AD-A092974] p0208 N81-17041

Digital Avionics Information System (DAIS): Life Cycle Cost Impact Modeling System (LCCIM). A managerial overview [AD-A093281] p0211 N81-17062

Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system [AD-A093868] p0216 N81-17095

Ground and flight test experience with a triple redundant digital fly by wire control system --- installed in F-8C aircraft p0259 N81-19006

V/STOL AND digital avionics system for UH-1H [NASA-CR-152179] p0273 N81-19112

Experiences with flight recorders obtained by analyzing aircraft accidents p0328 N81-20019

Flight tests of the microwave landing system multimode digital processor [AD-A095449] p0332 N81-20056

V/STOLAND digital avionics system for XV-15 tilt rotor [NASA-CR-152320] p0375 N81-22047

Experiences with a Flight Data Recording System (FDRS) in a German Airforce fighter bomber wing after field trials --- digital equipment p0382 N81-23009

Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost [AD-A097339] p0389 N81-23083

Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement [AD-A097438] p0390 N81-23084

The future cockpit of the next generation of civil aircraft --- Airbus A310 digital displays [SNIAS-802-111-113] p0427 N81-24057

Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system [AD-A097863] p0427 N81-24059

System digitization: Its effect in the cockpit --- on performance [SNIAS-802-111-115] p0428 N81-24062

An airborne programmable digital to video converter interface and operation manual [AD-A096422] p0446 N81-25691

Microprocessor system test and monitoring p0497 N81-27108

Full authority digital electronic control turbofan engine demonstration p0498 N81-27112

High speed multiplex bus protocol study [AD-A102113] p0597 N81-31191

Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG) [AD-A103351] p0636 N81-33182

DIGITAL TECHNIQUES

Side lobe suppression with digital signal processing p0152 A81-20092

Precision correlation tracking via optimal weighting functions p0154 A81-20450

A digital technique for the analysis of the response of compressor/duct systems in unsteady flow
p0294 A81-29078
A flight test real-time GN-CG computing system
p0361 A81-32860
Structural optimization - Past, present and future
[AIAA PAPER 81-0897] p0362 A81-32922
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803] p0367 A81-33882
Application of pulse code modulation technology to aircraft dynamics data acquisition
[AIAA PAPER 81-1736] p0520 A81-43173
Digital controls in a large engine test facility
p0532 A81-43715
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-30143
Digital spectral analysis: A guide based on experience with aircraft vibration
[RAE-TR-81014] p0605 N81-31580

DIGITAL TO ANALOG CONVERTERS
A six-channel quick-look unit for the aerodynamics division NRL airborne data acquisition package
[AD-A089975] p0043 N81-11364

DIGITAL TO VOICE TRANSLATORS
A multiplexed digital voice intercommunications system compatible with future voice conversion techniques
p0605 N81-31474

DIGITIZERS
U ANALOG TO DIGITAL CONVERTERS

DIHEDRAL EFFECT
U LATERAL STABILITY

DIMENSIONAL ANALYSIS
Advancements in dimensional inspection of helicopter gearboxes and transmission cases
[AHS 80-36] p0476 A81-40165

DIMENSIONAL STABILITY
NT SHELL STABILITY
NT STRUCTURAL STABILITY

DIMENSIONLESS NUMBERS
NT MACH NUMBER
NT REYNOLDS NUMBER
NT STROUHAL NUMBER

DIMENSIONS
NT LENGTH

DIMINUTION
U REDUCTION

DIODES
NT LIGHT EMITTING DIODES

DIOXIDES
NT CARBON DIOXIDE

DIRECT LIFT CONTROLS
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[DFVLR-FB-80-07] p0131 N81-13975
In-flight handling qualities investigation of A310 Airbus DLC-configurations on landing approach, using the DFVLR-HFB 320 in-flight simulator (variable stability aircraft) --- instrument flight
[ESA-TT-630] p0276 N81-19135
Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106

DIRECT POWER GENERATORS
NT SOLAR CELLS
NT THERMAL BATTERIES

DIRECTION FINDERS (RADIO)
U RADIO DIRECTION FINDERS

DIRECTIONAL ANTENNAS
NT RADAR ANTENNAS
NT SLOT ANTENNAS

DIRECTIONAL CONTROL
NT THRUST VECTOR CONTROL
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732
Lateral-directional flying qualities of transport aircraft
[AIAA PAPER 81-1887] p0561 A81-44579
The collision course: Conditions, guidance laws and properties
[DFVLR-FB-80-06] p0127 N81-13942

Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106

DIRECTIONAL SOLIDIFICATION (CRYSTALS)
Directionally solidified Soviet superalloy - ZhS6-K
p0532 A81-43770
Low-cost directionally-solidified turbine blades, volume 2 --- TFE731-3 turbofan engine
[NASA-CR-159562] p0070 N81-12088

DIRECTIONAL STABILITY
NT GYROSCOPIC STABILITY
Helicopter tail configurations to survive tail rotor loss
p0003 A81-10768
The possibility of improving the lateral-directional characteristics of a twin-engine aircraft by spoilers in the case of sudden engine failure
p0049 A81-12967
Assessment of propeller influence on lateral-directional stability of multiengine aircraft
p0411 A81-35632
The flying qualities of aircraft with actively augmented pitch and yaw stability
[ARC-R/M-3848] p0002 N81-12113

DIRECTIVITY
Helicopter noise contour development techniques and directivity analysis
[AD-A093426] p0221 N81-17851

DIRECTORIES
U INDEXES (DOCUMENTATION)

DIRIGIBLES
U AIRSHIPS

DISCHARGE COEFFICIENT
Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source --- aircraft equipment
p0288 A81-28574
An experimental investigation of the thrust and discharge characteristics of multinozzle low-head ejectors
p0413 A81-35920

DISCRETE ADDRESS BEACON SYSTEM
Discrete Address Beacon System - The obvious alternative
[SAE PAPER 800625] p0063 A81-[illegible]41
Performance evaluation of an interrogation-reply scheduling technique for a discrete address beacon system --- of radar surveillance and aircraft communication in ATC
p0121 A81-19417
RTCA looks at DABS avionics
p0286 A81-28301
Discrete Address Beacon System
p0350 A81-31134
The Discrete Address Beacon System/Air Traffic Control Radar Beacon System/ATCRBS IFF Mark 12 system (DABS/ATCRBS/AIMS) performance prediction model
[AD-A089440] p0024 N81-10038
Impact of the discrete Address Beacon System (DABS) on Air Traffic Control Radar Beacon System (ATCRBS) performance in selected deployments
[AD-A089611] p0025 N81-10039
Formats for DABS data link applications
[AD-A089963] p0034 N81-11028
Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests
[AD-A094124] p0250 N81-18037
Active BCAS: Design and validation of the surveillance subsystem
[AD-A095049] p0270 N81-19084
Arts 2 enhancement design alternative study
[AD-A096276] p0339 N81-21089
An update of the Discrete Address Beacon System (DABS) alternatives study
[AD-A096264] p0340 N81-21052
Results of a Loran-C flight test using an absolute data reference --- vhf omnirange navigation system and discrete address beacon system
p0371 N81-22006
Potential effects of the introduction of the discrete address beacon system data link on air/ground information transfer problems
[NASA-CR-166165] p0373 N81-22037

Discrete Address Beacon System (DABS) data link capacity utilization
[AD-A098173] p0425 N81-24044
Evaluation of Discrete Address Beacon System (DABS) EMC
[PB81-154387] p0441 N81-25062
Discrete Address Beacon System (DABS) computer performance/test and evaluation
[AD-A099326] p0484 N81-26088
Discrete address beacon system data link capacity requirements
[AD-A101731] p0581 N81-30107
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] p0636 N81-33181
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] p0636 N81-33183

DISCRETE FUNCTIONS
Discrete-continuous variable structural synthesis using dual methods
p0066 A81-15894

DISHES
U PARABOLIC REFLECTORS

DISKS
Concept definition: Retirement for cause of F-100 rotor components
[AD-A095584] p0335 N81-20080

DISKS (SHAPES)
NT ACTUATOR DISKS
NT ROTATING DISKS
Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901)
[AD-A089524] p0029 N81-10074

DISLOCATIONS (MATERIALS)
NT CRYSTAL DISLOCATIONS

DISPERSIONS
NT EMULSIONS
NT FOG
NT NUCLEAR EMULSIONS

DISPLACEMENT MEASUREMENT
Application of hybrid schemes in analysis of thin-wall structures by the displacement method
p0235 A81-25681

DISPLAY DEVICES
NT ANEMOMETERS
NT APPROACH INDICATORS
NT FLOW DIRECTION INDICATORS
NT GYRO HORIZONS
NT HEAD-UP DISPLAYS
NT HELMET MOUNTED DISPLAYS
NT PLAN POSITION INDICATORS
NT POSITION INDICATORS
NT RADARSCOPES
NT RADIO DIRECTION FINDERS
NT SPEED INDICATORS
The future cockpit of the next generation of civil aircraft
p0010 A81-11630
A theoretical and practical design investigation of the future military cockpit
p0010 A81-11631
Evaluation of the potential format and content of a cockpit display of traffic information
p0053 A81-13419
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
Analyst/IAP interface and interactive graphics --- for EMC analysis and display
p0057 A81-14270
Integrated flight displays
p0064 A81-15681
Rate-field displays --- cockpit devices
p0064 A81-15682
Display motion relationships
p0064 A81-15683
Display-control synthesis --- computer flight graphics for aircraft applications
p0064 A81-15684
Time-compressed displays for target detection
p0064 A81-15686
Visual cue requirements in contact flight simulators
p0064 A81-15695
Visual cue augmentation in contact flight simulation
p0064 A81-15696
A new system for the study of visual information presentation in aeronautics - GIRI
p0100 A81-16688
An overview - 1980 generation avionic developments
p0111 A81-18061
Automating airborne company communications
p0112 A81-18064
Avionics and displays in a future airspace system
p0112 A81-18070
Computer generated displays and pilot effectiveness
p0114 A81-18082
The role of aircraft separation assurance in the cockpit
p0115 A81-18092
Map-type displays --- for air navigation
p0121 A81-19443
The flying hologram - Latest in head-up display systems
p0123 A81-19500
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095
A modular low-cost raster-scan colour visual system
p0283 A81-27892
Radio Technical Commission for Aeronautics, Technical Symposium and Annual Assembly Meeting, Washington, D.C., November 20, 21, 1980, Proceedings
p0285 A81-28293
Application of CRT displays to new generation aircraft
p0286 A81-28297
New directions in cockpit alerting
p0286 A81-28298
Stochastic surfaces for flight simulator displays
p0324 A81-30330
Information requirements for airborne electronic terrain maps
p0325 A81-30334
DAIS controls and displays - A systems approach to avionics subsystem integration
p0325 A81-30336
Integrated displays and controls design factors for the 1990's transport aircraft
p0325 A81-30338
Multisensor track file correlation using attributes and kinematics
p0326 A81-30349
Effects of sunlight on display filters
p0326 A81-30352
F/A-18 horizontal situation display
p0327 A81-30353
F/A-18 Hornet Crew Station
p0327 A81-30355
Development and testing of a new technology weight and balance indicator
[SAWE PAPER 1341] p0353 A81-31381
Airborne electronic displays
p0364 A81-32999
Application of CRT displays to the cockpit of tomorrow
[SAE PAPER 801168] p0399 A81-34183
Energy maneuverability displays for air combat training
[SAE PAPER 801185] p0401 A81-34198
Electronic displays and computerized NAV systems for commuters and business aircraft
p0407 A81-34330
Flight control and display computation - A 25-year perspective
[AIAA PAPER 81-0865] p0408 A81-34354
Low-visibility visual simulation with real fog
[AIAA 81-0982] p0415 A81-36569
Integrated cockpit information system with color display equipment
p0450 A81-37643
Multifunctional color displays for cockpits
p0451 A81-37646
French Army testing of Forward Looking Infra-Red System /FLIR/ on helicopters /November 1976-June 1977/
p0464 A81-39680
Flight evaluation of a helmet mounted LED matrix display in a Lynx helicopter
p0472 A81-40129
Impact of EFIS on navigation --- Electronic Flight Instrument System
p0517 A81-42435
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142

Investigation of control, display, and crew-loading requirements for helicopter instrument approach [AIAA 81-1820] p0555 A81-44110
New visual displays for the next generation of civil aircraft p0556 A81-44299
Electronic Master Monitor and Advisory Display System p0573 A81-46615
HH-65A Dolphin engine condition monitoring system p0575 A81-46636
Time delays in flight simulator visual displays p0615 A81-48369
Head up displays. Citations from the International Aerospace Abstracts data base [NASA-CR-163656] p0026 N81-10049
System simulation applied to the evaluation of displays for guidance and control [DFVLR-MITT-79-10] p0028 N81-10064
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex [AD-A089914] p0034 N81-11024
Helicopter electro-optical system display requirements. 1. The effects of CRT display size, system gamma function, and terrain type on pilots required display luminance [AD-A089755] p0035 N81-11035
Tower Cab Digital Display [AD-A090616] p0091 N81-13042
Evaluation of a computer-generated perspective tunnel display for flight path following [NASA-TP-1736] p0129 N81-13958
A survey of new technology for cockpit application to 1990's transport aircraft simulators [NASA-CR-159330] p0142 N81-14993
Consolidated car display: A summary report of the process and the results of the consolidation of critical and supplementary terminal area air traffic control information for display presentation [AD-A092450] p0193 N81-16034
A preliminary human factors flight assessment of a Marconi automatic map [AD-A092585] p0193 N81-16036
Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS) [AD-A092974] p0208 N81-17041
Advancement on visualization techniques [AGARD-AG-255] p0211 N81-17063
The presentation of static information on air traffic control displays p0211 N81-17064
Flat panel display technology review p0211 N81-17065
The electro-optical display/visual system interface: Human factors considerations p0212 N81-17066
Integration of sensors with displays p0212 N81-17067
Liquid crystal displays p0212 N81-17068
Cathode ray tubes and plasma panels as display devices for aircraft displays p0212 N81-17069
Large area gas discharge displays p0212 N81-17070
Optical infinity lens development for flight simulator visual displays p0212 N81-17071
Evolution of tactical and map displays for high performance aircraft p0212 N81-17072
An advanced electronic cockpit instrumentation system: The coordinated cockpit display p0213 N81-17074
The influence of visual requirements on the design of military cockpits p0213 N81-17075
Display concepts for control configured vehicles p0213 N81-17076
Experiments using electronic display information p0213 N81-17077
Evaluation of factors unique to multifunction controls/displays devices [AD-A094227] p0258 N81-18733
A pilot's subjective analysis of a Cockpit Display of Traffic Information (CDTI) --- terminal configured vehicle p0264 N81-19037
A pilot training manual for the terminal configured vehicle electronic horizontal situation indicator [NASA-TM-81959] p0330 N81-20044
Characteristics of flight simulator visual systems [NASA-TM-81278] p0340 N81-21060
Optical Fiber Illumination System for visual flight simulation [NASA-CR-3409] p0343 N81-21086
The P/POD project: Programmable/Pilot Oriented Display --- general aviation aircraft p0371 N81-22004
Candidate CDTI procedures study [NASA-CR-165673] p0373 N81-22032
Application of computer colour raster displays in the cockpit in research flight simulation [AD-A096542] p0377 N81-22063
A microcomputer-based signal data converter for runway visual range measurements [AD-A097568] p0386 N81-23060
Summary of transponder data, May 1979 - November 1979 [AD-A097569] p0386 N81-23061
Demonstration Advanced Avionics System (DAAS) functional description --- Cessna 402B aircraft [NASA-CR-152405] p0389 N81-23080
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost [AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement [AD-A097438] p0390 N81-23084
User's manual for flight Simulator Display System (FSDS) [NASA-CR-164295] p0391 N81-23095
The future cockpit of the next generation of civil aircraft --- Airbus A310 digital displays [SNIAS-802-111-113] p0427 N81-24057
Development of instrumentation for pilots. CRT screens [SNIAS-802-111-114] p0428 N81-24061
High contrast CRT module [AD-A097727] p0437 N81-24360
Consolidated Cab Display (CCD) System, Project Planning Document (PPD) [AD-A098651] p0440 N81-25056
A learning guide for the terminal configured vehicle electronic horizontal situation indicator [NASA-TM-83128] p0484 N81-26083
Effect of display size on utilization of traffic situation display for self-spacing task --- transport aircraft [NASA-TP-1885] p0546 N81-29109
Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information [NASA-TM-81171] p0548 N81-29127
Simulation study of two VTOL control/display systems in IMC approach and landing [NASA-TM-81295] p0584 N81-30136
A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test [NASA-CR-3461-VOL-1] p0595 N81-31171
Flight simulator: Use of spacegraph display in an instructor/operator station [AD-A101951] p0602 N81-31235
Controls and displays for all-weather operation of helicopters p0633 N81-33185
DISPLAY SYSTEMS
U DISPLAY DEVICES
DISSIPATION
NT ENERGY DISSIPATION
DISSOCIATION
NT GAS DISSOCIATION
DISSOLVED GASES
Investigation of air solubility in jet A fuel at high pressures [NASA-CR-3422] p0378 N81-22130
DISTANCE
NT MISS DISTANCE

NT OPTICAL SLANT RANGE
Reduction of the take-off ground run distance to a given set of atmospheric condition
p0010 A81-11634

DISTANCE MEASURING EQUIPMENT
NT ALTIMETERS
NT LASER RANGE FINDERS
NT RADIO ALTIMETERS
The state of German involvement and future possibilities in the development of the DME-based landing system DLS
p0051 A81-13311
The flight assessment and applications of DME/DME. I, II
p0174 A81-21968
Concepts and state of the art of the precision DME of the microwave landing system
p0233 A81-25376
The DME-aided Azimuth System - DAS
p0452 A81-37653
Contribution of the DFVLR to the DAS program
p0452 A81-37657
Navigation and landing - The prospects of new systems
p0566 A81-45766
Precision DME for microwave landing system
p0578 A81-47125
MLS channel assignment model
[AD-A093449] p0206 N81-17026
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21048
Precision Positioning and Inertial Guidance Sensors: Technology and Operational Aspects
[AGARD-CP-298] p0484 N81-26091

DISTANCE PERCEPTION
U SPACE PERCEPTION

DISTORTION
NT FLOW DISTORTION
NT SIGNAL DISTORTION
Techniques for evaluation of aircraft windscreen optical distortion
p0358 A81-32507
An evaluation of statistical methods for the prediction of maximum time-variant inlet total pressure distortion
[AD-A089817] p0036 N81-11040
Potential of optical Fourier analysis for measuring windscreen distortion
[AD-A094127] p0259 N81-18853

DISTRIBUTED PARAMETER SYSTEMS
Figure control of flexible structures - Optical surfaces of thin deformable primary mirrors
p0060 A81-14994
The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835

DISTRIBUTION
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088

DISTRIBUTION (PROPERTY)
NT ANTENNA RADIATION PATTERNS
NT DIFFRACTION PATTERNS
NT ENERGY DISTRIBUTION
NT FLOW DISTRIBUTION
NT FORCE DISTRIBUTION
NT HOLE DISTRIBUTION (ELECTRONICS)
NT INTERFERENCE LIFT
NT LOAD DISTRIBUTION (FORCES)
NT MASS DISTRIBUTION
NT MOMENT DISTRIBUTION
NT PRESSURE DISTRIBUTION
NT RADIATION DISTRIBUTION
NT SPATIAL DISTRIBUTION
NT STRESS CONCENTRATION
NT TEMPERATURE DISTRIBUTION
NT VELOCITY DISTRIBUTION

DISTRIBUTION FUNCTIONS
Efficiency of the methods and algorithms used for estimating the reliability in aviation techniques
p0365 A81-33173
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements
[ESA-TT-625] p0197 N81-16069

DISTRIBUTION MOMENTS
NT ORTHOGONALITY

DISTURBANCE THEORY
U PERTURBATION THEORY

DITCHING (LANDING)
Testing model rotorcraft for overwater operations
p0111 A81-18056
The problems of helicopter ditching
p0112 A81-18071
Helicopter survivability in overwater situations
p0114 A81-18081
Design and testing of float landing gear systems for helicopters
p0356 A81-32007

DIVERGENCE
Wind tunnel experiments on the divergence of swept wings with composite structures
[AIAA PAPER 81-1670] p0526 A81-43152

DIVERTERS
Study of an engine flow diverter system for a large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096

DIVOT (VOICE TRANSLATORS)
U DIGITAL TO VOICE TRANSLATORS

DOCUMENT STORAGE
Computer aided compilation of an electrical drawing file
p0007 A81-11611

DOCUMENTS
NT BIBLIOGRAPHIES
NT ENGINEERING DRAWINGS
NT HANDBOOKS
NT MANUALS
NT PRESIDENTIAL REPORTS
NT PROCEEDINGS
NT USER MANUALS (COMPUTER PROGRAMS)

DOMES (STRUCTURAL FORMS)
NT RADOMES
Improved combustor domes designed for hot streak reduction
[AIAA PAPER 81-1352] p0501 A81-40835

DOMESTIC ENERGY
Hydrogen - Its technology and implications. Volume 4 - Utilization of hydrogen --- Book
p0016 A81-11751

DOPING (ADDITIVES)
U ADDITIVES

DOPPLER EFFECT
Application of Doppler information to automatic target tracking
p0153 A81-20101
Improvement of the imaging of moving acoustic sources by the knowledge of their motion
[ONERA, TP NO. 1981-17] p0359 A81-32534
Doppler aided low accuracy strapdown inertial navigation system
[AIAA 81-1798] p0555 A81-44101

DOPPLER NAVIGATION
New navigation systems for helicopters
p0177 A81-22167
Doppler radar systems for helicopters
p0512 A81-41758
Army GPS-doppler hybrid navigation system
[AD-A090394] p0075 N81-12062
Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN
p0485 N81-26102

DOPPLER RADAR
Rotating blades radio interference in a helicopter-borne CW Doppler radar
p0224 A81-23813
Doppler radar systems for helicopters
p0512 A81-41758
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 1
[RAE-TR-79052-VOL-1] p0026 N81-10044
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 2
[RAE-TR-79052-VOL-2] p0026 N81-10045
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 3
[RAE-TR-79052-VOL-3] p0026 N81-10046
Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0042 N81-11290
An airport wind shear detection and warning system using Doppler radar: A feasibility study

[NASA-CR-3379] p0202 N81-16681
DORNIER AIRCRAFT
The new utility - Commuter-technology in the sky
p0457 A81-38801
Advanced production methods for the Dornier 228
p0457 A81-38802
Experimental-programme - Transonic wing-TST
p0457 A81-38804
DOUGLAS AIRCRAFT
NT DC 3 AIRCRAFT
NT DC 8 AIRCRAFT
NT DC 9 AIRCRAFT
NT DC 10 AIRCRAFT
Weights information systems using minicomputers
[SAWE PAPER 1347] p0353 A81-31385
DOUGLAS DC-3 AIRCRAFT
U DC 3 AIRCRAFT
DOUGLAS DC-8 AIRCRAFT
U DC 8 AIRCRAFT
DOUGLAS DC-9 AIRCRAFT
U DC 9 AIRCRAFT
DOUGLAS MILITARY AIRCRAFT
U DOUGLAS AIRCRAFT
U MILITARY AIRCRAFT
DOVAP
U DOPPLER EFFECT
DOWNTIME
Omega transmitter outages, January to December 1979
[AD-A093425] p0207 N81-17035
DOWNWASH
Influence of zero-lift downwash on the relation between minimum-drag center-of-gravity position and inherent stability boundary
p0235 A81-25648
Downwash calculation at close range behind a trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925
DRAFTING (DRAWING)
Computer aided compilation of an electrical drawing file
p0007 A81-11611
DRAG
NT AERODYNAMIC DRAG
NT FRICTION DRAG
NT PRESSURE DRAG
NT SATELLITE DRAG
NT SUPERSONIC DRAG
NT VISCOUS DRAG
NT WAVE DRAG
Basic research in wake vortex alleviation using a variable twist wing
p0267 N81-19058
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015
Design and experimental results for a natural-laminar-flow airfoil for general aviation applications
[NASA-TP-1861] p0423 N81-24022
DRAG BALANCE
U AERODYNAMIC BALANCE
U LIFT DRAG RATIO
DRAG CHUTES
A contribution to stabilization of flight vehicle parachute systems
[DFVLR-MITT-80-05] p0126 N81-13926
DRAG COEFFICIENT
U AERODYNAMIC COEFFICIENTS
U AERODYNAMIC DRAG
DRAG DEVICES
NT DRAG CHUTES
NT LEADING EDGE SLATS
NT SPOILERS
NT TRAILING-EDGE FLAPS
NT WING FLAPS
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
DRAG EFFECT
U DRAG
DRAG MEASUREMENT
Drag estimations for stream-line and cylindrical contour distortions on aircraft fuselages and train cars
[DGLR PAPER 80-116] p0121 A81-19399
Performance of aircraft pneumatic tyres in soft soil
p0226 A81-24000
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] p0617 A81-48417
Drag increment due to rear fuselage upsweep
[ESDU-80006] p0021 N81-10001
Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975
Skin friction measuring device for aircraft
[NASA-CASE-FRC-11029-1] p0210 N81-17057
DRAG REDUCTION
Vortex drag reduction by aft-mounted diffusing vanes
p0012 A81-11647
Leading-edge 'Vortex Flaps' for enhanced subsonic aerodynamics of slender wings
p0012 A81-11648
The effects of noise on laminar flow control drag reduction systems
p0058 A81-14390
Transonic axisymmetric bodies with minimal wave drag
p0102 A81-17048
Reduction of profile drag by blowing out through peg holes in areas of streamline separation bubbles
[DGLR PAPER 80-103] p0120 A81-19392
Drag reduction through formation flight
[DGLR PAPER 80-106] p0120 A81-19393
Procedures for optimal drag design of camber and flap deflection in supersonic regions with consideration to geometric limits
[DGLR PAPER 80-110] p0120 A81-19396
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923
The influence of a wake splitter plate on the aerodynamic characteristics of a two-dimensional cylinder
p0226 A81-23965
Influence of zero-lift downwash on the relation between minimum-drag center-of-gravity position and inherent stability boundary
p0235 A81-25648
Viscous flow drag reduction; Symposium, Dallas, Tex., November 7, 8, 1979, Technical Papers
p0238 A81-26501
Drag reduction of an oscillating flat plate with an interface film
p0239 A81-26504
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
p0239 A81-26508
Drag characteristics of V-groove and transverse curvature riblets
p0239 A81-26510
Transonic maneuver/cruise airfoil design employing active diffusion control
p0239 A81-26511
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control
p0239 A81-26512
Design considerations of advanced supercritical low drag suction airfoils
p0240 A81-26514
Compliant surfaces - Introduction
p0240 A81-26515
Wing flapping with minimum energy
p0283 A81-27809
The optimal lift-drag ratio of a civil aircraft
[AAAF PAPER NT 80-35] p0369 A81-33923
Improvement of the energy efficiency of helicopters
[AAAF PAPER NT 80-33] p0369 A81-33933
A study of the effect of aft fuselage shape on helicopter drag
p0470 A81-40116
Vortex drag reduction by diffusing vanes - Design for the 'Thrush' agricultural aircraft
[SAE PAPER 810605] p0521 A81-42762
A synopsis of the Navy A-7 Aircraft Fuel Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949

Assessment of variable camber for application to
transport aircraft
[NASA-CR-158930] p0071 N81-12016
Aircraft surface coatings study: Energy efficient
transport program --- sprayed and adhesive
bonded coatings for drag reduction
[NASA-CR-158954] p0084 N81-12225
Aerodynamic design of electric and hybrid
vehicles: A guidebook
[NASA-CR-163744] p0088 N81-12943
Optimal bodies for minimum total drag at
supersonic speeds
[AD-A091235] p0091 N81-13036
Laminar-airfoils for transport aircraft
[DFVLR-MITT-80-07] p0129 N81-13952
Interference aspects of the A310 high speed wing
configuration
p0188 N81-16001
Design and experimental verification of a
transonic wing for a transonic aircraft
p0188 N81-16003
Some particular configuration effects on a thin
supercritical variable camber wing
p0188 N81-16005
Jet wing interaction to give improved combat
performance
p0188 N81-16007
P-3 Orion fuel-saving modification wind tunnel study
[AD-A091906] p0194 N81-16044
Exploratory subsonic investigation of vortex-flap
concept on arrow wing configuration
p0243 N81-17985
Analytic development of improved supersonic cruise
aircraft based on wind tunnel data
p0244 N81-17989
KC-135 winglet flight results
p0260 N81-19011
Leading edge vortex flaps for drag reduction ---
during subsonic flight
[NASA-CASE-LAR-12750-1] p0261 N81-19016
Pneumatic boot for helicopter rotor deicing
p0267 N81-19059
An investigation into the possible reduction of
aerodynamic drag of a fuel economy vehicle ---
wind tunnel tests
[BU-248] p0338 N81-21039
Aerodynamic investigation of C-141 leading edge
modifications for cruise drag reduction, test 2
[AD-A099662] p0492 N81-27051
Wind-tunnel studies of advanced cargo aircraft
concepts --- leading edge vortex flaps for drag
reduction
[NASA-CR-164833] p0627 N81-32117
DRAGULATORS
U DRAG DEVICES
DRAWINGS
NT ENGINEERING DRAWINGS
DROGUE PARACHUTES
U DRAG CHUTES
DROGUES
U TOWED BODIES
DRONE AIRCRAFT
NT JINDIVIK TARGET AIRCRAFT
NT TARGET DRONE AIRCRAFT
Aerial surveying of small areas from a small
remotely controlled drone
p0107 A81-17525
A low cost multiple drone command and tracking
system
p0179 A81-22613
The ANK - A four dimensional navigation/flight
management system for today
p0180 A81-22615
Comparison of analysis and flight test data for a
drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
Application of a flight test and data analysis
technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
The Bundeswehr Drone Program - Where are we today
p0458 A81-38806
Advanced aerodynamics and active controls.
Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Status and future plans of the Drones for
Aerodynamic and Structural Testing (DAST) program
--- Aeroelastic Research Wing (ARW)
p0259 N81-19003
Application of a flight test and data analysis
technique to flutter of a drone aircraft
[NASA-TM-83136] p0441 N81-25066
DRONE HELICOPTERS
U DRONE AIRCRAFT
U HELICOPTERS
DRONE VEHICLES
NT DRONE AIRCRAFT
NT JINDIVIK TARGET AIRCRAFT
NT TARGET DRONE AIRCRAFT
History and prospects for mini-RPVs and drones
p0049 A81-12797
Development tests of an engine with limited life
--- Microturbo TRI 60
p0433 N81-24103
DROOPED AIRFOILS
Numerical lifting line theory applied to drooped
leading-edge wings below and above stall
p0066 A81-15081
An investigation of a swept wing-body
configuration with drooped leading edge at low
and transonic speeds
p0189 N81-16012
DROP SIZE
Evaluation of a pneumatic boot deicing system on a
general aviation wing model
[NASA-TM-82363] p0441 N81-25065
DROP TESTS
Store separation trajectory analysis
p0050 A81-13216
Study of the crashworthiness of light aircraft
structures
[AIAA 81-0574] p0302 A81-29407
Estimation of dynamic stability parameters from
drop model flight tests
p0410 A81-35551
Determination of crash test pulses and their
application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
Evaluation/redesign of the F-105 pitch rate gyro
pack
[AD-A092109] p0194 N81-16048
Estimation of dynamic stability parameters from
drop model flight tests
p0591 N81-31116
DROP WEIGHT TESTS
U DROP TESTS
DROPS (LIQUIDS)
A model for the analysis of
premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
Calculation of the impingement of cloud droplets
in a cylinder by the finite-element method
p0533 A81-43890
Fuel injector characterization studies
[NASA-CR-165200] p0143 N81-15003
DTMB-111 GROUND EFFECT MACHINE
U GROUND EFFECT MACHINES
DTMB-430 GROUND EFFECT MACHINE
U GROUND EFFECT MACHINES
DUAL MODE PROPULSION
U HYBRID PROPULSION
DUCTED FAN ENGINES
Application of the equivalent surface source
method to the acoustics of duct systems with
non-uniform wall impedance
p0055 A81-13024
Ray-theory predictions of the sound radiated from
realistic engine intakes
[AIAA PAPER 81-1982] p0618 A81-48602
DUCTED FANS
The effect of vane-frame design on rotor-stator
interaction noise
[AIAA PAPER 81-2034] p0619 A81-48627
Calibration of an axial fan at various power
settings for use on a quarter scale XC-8A air
cushion model
[AD-A097043] p0374 N81-22042
DUCTED FLOW
Body-fitted 3-D full-potential flow analysis of
complex ducts and inlets
[AIAA PAPER 81-0002] p0156 A81-20527
3-D viscous analysis of ducts and flow splitters
[AIAA PAPER 81-0277] p0163 A81-20720
Non-isoenergetic turbulent jet mixing in a
constant area duct --- in turbofan engines
[AIAA PAPER 81-0347] p0165 A81-20768
Self-excited oscillations of supersonic flow in a
sudden enlargement of a duct

p0228 A81-24081
Linearized analysis of the three-dimensional
compressible flow through a rotating annular
blade row
p0234 A81-25046
A digital technique for the analysis of the
response of compressor/duct systems in unsteady
flow
p0294 A81-29078
NASA contributions to radial turbine aerodynamic
analyses
[NASA-TM-81644] p0090 N81-13019
Analysis of pressure spectra measurements in a
ducted combustion system
[NASA-TM-81583] p0106 N81-15760
DUCTED PROPELLERS
U SHROUDED PROPELLERS
DUCTS
NT ACOUSTIC DUCTS
Development program for a graphite/PMR 15
polyimide duct for the F404 engine
p0181 A81-22647
Small turbine engine augmentor. Phase 1:
Preliminary design studies of afterburner and
duct-burner configurations
[AD-A101595] p0583 N81-30131
Noise suppression characteristics of peripherally
segmented duct liners
[NASA-TP-1904] p0641 N81-33946
DUMMY LOADS
U LOADING
DUNGEYS WIND SHEAR MECHANISM
U WIND SHEAR
DURABILITY
Operational durability of airframe structures
p0014 A81-11662
Effects of commercial aircraft operating
environment on composite materials
p0182 A81-22681
Aircraft turbine engine monitoring experience. An
overview and lessons learned from selected case
studies
[AD-A089752] p0036 N81-11042
Operational experience with adhesive bonded
structures --- aircraft structures
[FOK-BO-1235] p0582 N81-30124
DYNAMIC CHARACTERISTICS
NT AERODYNAMIC DRAG
NT AERODYNAMIC STABILITY
NT AIRCRAFT STABILITY
NT BOUNDARY LAYER STABILITY
NT COMBUSTION STABILITY
NT CONTROL STABILITY
NT DIRECTIONAL STABILITY
NT DRAG
NT DYNAMIC PRESSURE
NT DYNAMIC STABILITY
NT FLAME STABILITY
NT FLOW CHARACTERISTICS
NT FLOW DISTRIBUTION
NT FLOW STABILITY
NT FLOW VELOCITY
NT FREQUENCY STABILITY
NT FRICTION DRAG
NT GYROSCOPIC STABILITY
NT HOVERING STABILITY
NT INTERFERENCE LIFT
NT JET LIFT
NT LATERAL STABILITY
NT LIFT
NT LONGITUDINAL STABILITY
NT LOW SPEED STABILITY
NT PRESSURE DRAG
NT ROTARY STABILITY
NT SATELLITE DRAG
NT SUPERSONIC DRAG
NT TRANSIENT RESPONSE
NT VISCOUS DRAG
NT WAVE DRAG
NT ZERO LIFT
Development and application of a moving base
visual flight simulator including the design of
hydraulic actuators with hydrostatic bearings
p0010 A81-11633
Dynamic characteristics of a high-speed rotor with
radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683
Detection of moving objects --- Russian book
p0118 A81-18773
Gas dynamic characteristics of the nozzle
diaphragms of partial supersonic turbines
p0281 A81-27374
Reduction of helicopter vibration through control
of hub-impedance
p0356 A81-32009
An investigation of the impact of aerodynamic lags
on dynamic flight characteristics
[AIAA PAPER 81-1892] p0561 A81-44581
Flow measurements in the wake of a wing fitted
with a leading-edge root extension (strake)
[RAE-TR-79120] p0022 N81-10015
A contribution to stabilization of flight vehicle
parachute systems
[DFVLR-MITT-80-05] p0126 N81-13926
Apparatus for and method of compensating dynamic
unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
A mathematical model for Vertical Attitude Takeoff
and Landing (VATOL) aircraft simulation. Volume
1: Model description application
[NASA-CR-166129-VOL-1] p0538 N81-28084
A mathematical model for Vertical Attitude Takeoff
and Landing (VATOL) aircraft simulation. Volume
3: User's manual for VATOL simulation program
[NASA-CR-166129-VOL-3] p0538 N81-28086
Support interference
p0591 N81-31113
DYNAMIC CONTROL
A concept for dynamic control of RPV information
system parameters
p0049 A81-12796
Adaptive control for electronic countermeasures
p0155 A81-20470
Inverse problems of the dynamics of controlled
flight - Lateral motion
p0236 A81-25903
Dynamics and control of a Heavy Lift Airship in
cross wind hover
[AIAA 81-1334] p0456 A81-38539
Adaptive multivariable model following --- for
aircraft control
p0564 A81-45540
A digital program for calculating the interaction
between flexible structures, unsteady
aerodynamics and active controls
[NASA-TM-80040] p0498 N81-27115
DYNAMIC LOADS
NT AERODYNAMIC LOADS
NT BLAST LOADS
NT CYCLIC LOADS
NT GUST LOADS
NT IMPACT LOADS
NT LANDING LOADS
NT ROLLING CONTACT LOADS
NT SHOCK LOADS
NT THRUST LOADS
NT WING LOADING
The influence of blade number ratio and blade row
spacing on axial-flow compressor stator blade
dynamic load and stage sound pressure level
[ASME PAPER 81-GT-165] p0317 A81-30064
Modern techniques of conducting a flight loads
survey based on experience gained on the Black
Hawk helicopter
p0356 A81-32014
Theory and application of finite element analysis
to structural crash simulation
p0416 A81-36614
A comparison of methods for calibration and use of
multi-component strain gauge wind tunnel balances
[AD-A090084] p0084 N81-12394
DYNAMIC MODELS
DFVLR-dynamic model testing in wind tunnels for
active controls research
p0014 A81-11670
Inverse problems of controlled flight dynamics -
Longitudinal motion
p0101 A81-16968
Model-following system with assignable error
dynamics and its application to aircraft
p0116 A81-18577
Control strategy for tracking a maneuverable model
[AIAA PAPER 81-0009] p0160 A81-20593
Stability of large horizontal-axis axisymmetric
wind turbines
p0178 A81-22326
Feasibility of a rotor flight-dynamics model with
first-order cyclic inflow and multiblade modes

[AIAA 81-0611] p0304 A81-29473
A model for dynamic loss response in axial-flow
compressors
[ASME PAPER 81-GT-154] p0317 A81-30053
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115
On the use of approximate models in helicopter
flight mechanics
p0471 A81-40122
Inverse problems of guided-flight dynamics -
Longitudinal motion
p0577 A81-46749
Simulation model to evaluate maintenance
strategies for large network of fielded systems
p0613 A81-48009
DYNAMIC PRESSURE
Dynamic pressure response with stall on axial flow
compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578
Advanced ejection seat for high dynamic pressure
escape. Wind tunnel test
[AD-A091810] p0127 N81-13940
DYNAMIC PROGRAMMING
The variable-speed tail-chase aerial combat problem
p0351 A81-31295
DYNAMIC PROPERTIES
U DYNAMIC CHARACTERISTICS
DYNAMIC RESPONSE
NT TRANSIENT RESPONSE
Periodically stiffened fluid-loaded plates. I -
Response to convected harmonic pressure and free
wave propagation. II - Response to line and
point forces
p0102 A81-17067
Dynamic pressure response with stall on axial flow
compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578
Stochastic modeling of an aircraft traversing a
runway using time series analysis
p0183 A81-23368
Aircraft dynamic stability and response --- Book
p0232 A81-25173
A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29982
Failure detection and isolation for tactical
aircraft using the generalized likelihood test
p0321 A81-30261
Dynamic errors of the Kalman filtering of
trajectory parameters --- for radar tracking of
aircraft maneuvers
p0366 A81-33687
Development of a generic airplane response
simulation
[AIAA 81-0980] p0415 A81-36568
The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-38534
Gust response of rotary wing and its alleviation
p0473 A81-40135
Effects of rotor-body coupling in a linear
rotorcraft vibration model
[AHS 80-26] p0475 A81-40156
The indication of the characteristics of aircraft
controllability with prediction in dynamic
ergatic systems
p0517 A81-42603
Simulation of aircraft seat response to a crash
environment
[SAE PAPER 810612] p0522 A81-42768
A dynamic shimmy analysis
[AIAA PAPER 81-1700] p0527 A81-43161
Missile motion sensitivity to dynamic stability
derivatives
[AD-A089750] p0038 N81-11093
Dynamic response of a forward-swept-wing model at
angles of attack up to 15 deg at a Mach number
of 0.8 --- Langley transonic dynamics tunnel tests
[NASA-TM-81863] p0085 N81-12448
Performance verification of the superjet laminar
angular rate sensor
[AD-A091089] p0091 N81-13040
An investigation of the dynamic stalling
characteristics of rotating axial-flow
compressor blades
p0093 N81-13054
The effects of warhead-induced damage on the
aeroelastic characteristics of lifting surfaces.
Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
Experimental analysis and methods to determine the
dynamic behavior of propulsion shafting systems
p0145 N81-15401
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467
Modal analysis for aircraft response to runway
surface roughness
[AD-A092057] p0194 N81-16043
Nuclear blast response of airbreathing propulsion
systems. Laboratory measurements with an
operational J-85-5 turbojet engine
[AD-A092229] p0196 N81-16063
Evaluation of bird load models for dynamic
analysis of aircraft transparencies
[AD-A092909] p0204 N81-16995
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
High bypass turbofan component development,
modification 2
[AD-A093156] p0215 N81-17093
A study of State Feedback Implicit Model following
control for VSTOL aircraft
[AD-A093253] p0216 N81-17099
Wind loading and response of a high-rise building
[CCNP-810104-1] p0256 N81-18259
Review of antiskid and brake dynamics research
p0268 N81-19066
Flying-qualities criteria for wings-level-turn
maneuvering during an air-to-ground weapon
delivery task
[NASA-TM-81266] p0342 N81-21083
Transonic flutter and gust-response tests and
analyses of a wind-tunnel model of a torsion
free wing airplane
[NASA-TM-81961] p0388 N81-23072
Blade loss transient dynamics analysis. Volume 3:
User's manual for TETRA program
[NASA-CR-165373-VOL-3] p0496 N81-27091
Aerodynamic mathematical modeling - basic concepts
p0590 N81-31106
Impact of high-alpha aerodynamics on dynamic
stability parameters of aircraft and missiles
p0590 N81-31107
Aeroelasticity, including dynamic effects of
separated flow --- launch vehicle response
p0592 N81-31118
Control derivatives
p0592 N81-31119
Structural response methods and evaluation results
for helicopter landing decks on 210- and
270-foot USCCG cutters
[AD-A102420] p0601 N81-31233
DYNAMIC STABILITY
NT AERODYNAMIC STABILITY
NT AIRCRAFT STABILITY
NT BOUNDARY LAYER STABILITY
NT COMBUSTION STABILITY
NT CONTROL STABILITY
NT DIRECTIONAL STABILITY
NT FLAME STABILITY
NT FLOW STABILITY
NT FREQUENCY STABILITY
NT GYROSCOPIC STABILITY
NT HOVERING STABILITY
NT LATERAL STABILITY
NT LONGITUDINAL STABILITY
NT LOW SPEED STABILITY
NT ROTARY STABILITY
Dynamic stability parameters at high angles of
attack
p0009 A81-11624
Review of engine/airframe/drive train dynamic
interface development problems
p0106 A81-17516
Engine-airframe transient compatibility - Analysis
and test
p0106 A81-17517
Aircraft dynamic stability and response --- Book
p0232 A81-25173
Unsteady Newton-Busemann flow theory. I - Airfoils
p0234 A81-25512
An analytical study of nonlinear stabilization
during ballistic descent
p0237 A81-26028
Evaluation of the effect of horizontal and
vertical stratification on the stability of air
flows
p0241 A81-26839

Aeroservoelasticity in the time domain --- for YF-16 aircraft [AIAA 81-0635] p0306 A81-29489
Estimation of dynamic stability parameters from drop model flight tests p0410 A81-35551
Assessment of propeller influence on lateral-directional stability of multiengine aircraft p0411 A81-35632
Design and development of the Model 412 helicopter [AHS 80-56] p0478 A81-40181
Stability of aircraft motion in critical cases [AIAA PAPER 81-1685] p0561 A81-44577
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor p0573 A81-46620
Heave instabilities of amphibious air cushion suspension systems [UTIAS-246] p0144 N81-15156
Determination of aircraft dynamic stability and control parameters from flight testing p0591 N81-31115
Estimation of dynamic stability parameters from drop model flight tests p0591 N81-31116
Analytical determination of dynamic stability parameters p0592 N81-31117
Aeroelasticity, including dynamic effects of separated flow --- launch vehicle response p0592 N81-31118
Control derivatives p0592 N81-31119
Sensitivity of aircraft motion to cross coupling and acceleration derivatives p0592 N81-31120
Some applications of aerodynamic formulations to problems in aircraft dynamics p0592 N81-31121
Applications of dynamic stability parameters to problems in aircraft dynamics p0592 N81-31122

DYNAMIC STRUCTURAL ANALYSIS
The vibration of a multi-bearing rotor p0015 A81-11722
Calculation of critical flutter speeds on an aircraft in subsonic flow p0068 A81-16301
Periodically stiffened fluid-loaded plates. I - Response to convected harmonic pressure and free wave propagation. II - Response to line and point forces p0102 A81-17067
On the steady state and dynamic performance characteristics of floating ring bearings [ASME PAPER 80-C2/LUB-17] p0117 A81-18671
Measurements of structural mobility on helicopter structures p0151 A81-20064
Vibrations of multispan stiffened plates via modified Bolotin method p0241 A81-26954
Calculation of shells in aircraft turbine engines p0285 A81-28078
Coupled bending-torsion vibrations of rotating blades of asymmetric aerofoil cross section with allowance for shear deflection and rotary inertia by use of the Reissner method p0289 A81-28942
Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, Technical Papers. Part 1 p0300 A81-29377
Study of the crashworthiness of light aircraft structures [AIAA 81-0574] p0302 A81-29407
Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, and AIAA Dynamics Specialists Conference, Atlanta, Ga., April 9, 10, 1981, Technical Papers. Part 2 p0303 A81-29420
Response of stiffened sandwich panels [AIAA 81-0557] p0303 A81-29455
In-flight structural dynamic characteristics of the XV-15 tilt rotor research aircraft [AIAA 81-0612] p0304 A81-29474
Free-vibration analysis of rotating beams by a variable-order finite-element method [AIAA 81-0614] p0305 A81-29476
Interactive multi-mode blade impact analysis [ASME PAPER 81-GT-79] p0314 A81-29987
The USAF Armament Division Structural Dynamics Lab p0347 A81-30689
Computer aided technology interface with weights engineering --- aircraft design [SAWE PAPER 1346] p0353 A81-31384
Measuring dynamic stresses on helicopter transmission gear teeth utilizing telemetry p0361 A81-32059
Past and future trends in structures and dynamics --- of aircraft [AIAA PAPER 81-0896] p0362 A81-32921
A new method for modal identification p0365 A81-33293
Finite element analysis of asymmetric, lateral natural vibrations of a deformable aeroplane p0366 A81-33736
Investigations of helicopter structural dynamics and a comparison with ground vibration tests p0467 A81-40087
Helicopter vibration reduction through structural manipulation p0467 A81-40090
Coupled rotor/airframe vibration analysis by a combined harmonic-balance, impedance-matching method [AHS 80-21] p0474 A81-40151
Effects of rotor-body coupling in a linear rotorcraft vibration model [AHS 80-26] p0475 A81-40156
Fatigue life evaluation of helicopter rotor heads p0482 A81-40687
Aircraft subfloor response to crash loadings [SAE PAPER 810614] p0522 A81-42770
The influence of structural parameters and velocity on the shimmy of self-aligned wheels p0556 A81-44260
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980 p0613 A81-47993
Finite strip analysis of singly curved skin-stringer structures p0616 A81-48390
Nonlinear rotor dynamics analysis --- computerized simulation p0257 N81-18405
Measurements of aerodynamic damping in the MIT transonic rotor [NASA-CR-163988] p0274 N81-19122
Aircraft crash dynamics: Some major considerations p0378 N81-22437
Analytical testing [NASA-CR-3429] p0393 N81-23487
Structural optimization of advanced aircraft structures --- computerized design [MBB-S/PUB/32] p0582 N81-30122
Development of a bearingless helicopter tail rotor --- application of composite materials [MBB-UD-304/80-OE] p0586 N81-30199
Structural response methods and evaluation results for helicopter landing decks on 210- and 270-foot USCCG cutters [AD-A102420] p0601 N81-31233

DYNAMIC TESTS
Nondestructive dynamic testing p0124 A81-19657
Simulation of apparent acceleration --- on flight test stands p0223 A81-23405
Status of dynamic flight test technology - Model identification for flight simulation [SAE PAPER 810597] p0521 A81-42755
Support interference of wind tunnel models: A selective annotated bibliography [NASA-TM-81909] p0335 N81-20004
Applications of dynamic stability parameters to problems in aircraft dynamics p0592 N81-31122

DYNAMOMETERS
The high-speed propeller program p0105 N81-15972

DYNAMOS
U ROTATING GENERATORS

E

EAR PROTECTORS
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464
EARPHONES
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet --- earphones
[RAE-TR-FS-313] p0084 N81-12320
EARTH ATMOSPHERE
NT OZONOSPHERE
NT STRATOSPHERE
NT TROPOPAUSE
NT TROPOSPHERE
New developments in the field of solar-terrestrial relationships --- Russian book
p0281 A81-27326
EARTH FIGURE
U GEODESY
EARTH OBSERVATIONS (FROM SPACE)
NT PHOTORECONNAISSANCE
NT SATELLITE OBSERVATION
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734
EARTH RESOURCES
NT CRUDE OIL
EARTH SATELLITES
NT AERONAUTICAL SATELLITES
NT COMMUNICATION SATELLITES
NT MARITIME SATELLITES
NT NAVIGATION SATELLITES
NT NAVSTAR SATELLITES
NT SARSAT
NT SEASAT-A SATELLITE
NT SYNCHRONOUS SATELLITES
NT TRANSIT SATELLITES
Estimation of aerodynamic forces acting on Earth satellites, application to an experimental satellite
[INPE-1944-RPE/262] p0585 N81-3[illegible]8
EARTH SHAPE
U GEODESY
EARTH SURFACE
Single-parameter terrain classification for terrain following
p0066 A81-15882
EARTHQUAKE DAMAGE
Airports and earthquakes - An important subject often ignored
p0482 A81-40750
EBF
U EXTERNALLY BLOWN FLAPS
ECHOES
NT CLUTTER
ECONOMETRICS
Airport catchment areas and air passenger demand --- econometric models for air travel
p0571 A81-46575
Air cargo market outlook and impact via the NASA CLASS project --- Cargo/Logistics Airlift Systems Study
[NASA-TM-81886] p0073 N81-12039
Predicting the impacts of new technology aircraft on international air transportation demand
[NASA-CR-165654] p0594 N81-31160
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956
ECONOMIC ANALYSIS
Traffic forecasting for the NRIA --- New Riyadh International Airport
p0114 A81-18090
Economics of heavy fuels in gas turbines and combined cycles
[ASME PAPER 81-GT-45] p0312 A81-29959
The rise of air and space
p0366 A81-33718
Fuel conservation integrated into airline economics
[AIAA PAPER 81-0831] p0368 A81-33884
The developing technology and economics of large helicopters
p0466 A81-40079
Reliability of commercial helicopters
p0472 A81-40126
A study of the economic impact of noise limits on new design and current production helicopters
[AHS 80-64] p0479 A81-40187
Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968
Supersonic Cruise Research 1979, part 2 --- airframe structures and materials, systems integration, economic analysis
[NASA-CP-2108-PT-2] p0246 N81-18005
Supersonic market and economic analyses
p0248 N81-18020
ECONOMIC FACTORS
Reliability and engineering-economic characteristics of aircraft engines --- Russian book
p0001 A81-10045
The next combat aircraft
p0298 A81-29150
Structural optimization - Past, present and future
[AIAA PAPER 81-0897] p0362 A81-32922
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
Rebuild of aircraft ground support equipment
[SAE PAPER 801238] p0406 A81-34236
The domain of the turboprop airplane
[SAE PAPER 801242] p0406 A81-34238
Civil aircraft design for fuel reduction
p0420 A81-37415
Contribution of technological progress to energy savings and conservation to the design of new aircraft
p0464 A81-39695
ATR 42 - A regional transport aircraft designed to save energy
p0464 A81-39696
Optimization of aircraft propulsion
p0464 A81-39697
Propellers for economic flight at high speeds
p0464 A81-39698
Improving the economy of subsonic transport aircraft by means of aerodynamic approaches
p0510 A81-41336
ECONOMIC IMPACT
Aviation assumptions in the eighties
p0112 A81-18068
Helicopter manufacturers economic impact assessment of FAA proposed helicopter certification noise rules /NPRM 79-13/
p0576 A81-46647
Air cargo market outlook and impact via the NASA CLASS project --- Cargo/Logistics Airlift Systems Study
[NASA-TM-81886] p0073 N81-12039
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021
ECONOMICS
NT DEMAND (ECONOMICS)
Economics of technological change - A joint model for the aircraft and airline industries
p0169 A81-21010
ECONOMY
The use of airspace - One way to save fuel
p0364 A81-33150
EDDIES
U VORTICES
EDDY CURRENTS
Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110
High peak energy shaped-pulse electromagnetic crack detection
p0611 A81-47785
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
[AD-A089791] p0036 N81-11041
Feasibility evaluation of advanced multifrequency eddy current technology for use in naval air maintenance environment
[AD-A093314] p0220 N81-17476
EDDY VISCOSITY
Eddy viscosity in accelerated and retarded cascade-wake flows
p0233 A81-25267

Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
EDGES
NT BLUNT TRAILING EDGES
NT LEADING EDGES
NT SHARP LEADING EDGES
NT TRAILING EDGES
EDUCATION
NT FLIGHT TRAINING
NT MAINTENANCE TRAINING
NT PILOT TRAINING
A survey on airbreathing propulsion education
p0063 A81-15375
Flight simulation at Cranfield Institute of Technology
p0283 A81-27893
Industrial leadership of an aircraft design class
[AIAA PAPER 81-1723] p0528 A81-43166
EFFECTIVE PERCEIVED NOISE LEVELS
The rating of helicopter noise: Development of a proposed impulse correction
[NPL-AC-93] p0138 N81-14792
A guidance document on airport noise control
[AD-A092228] p0202 N81-16629
Handbook of aircraft noise metrics
[NASA-CR-3406] p0345 N81-21871
Subjective field study of response to impulsive helicopter noise
[NASA-TP-1833] p0345 N81-21873
Annoyance caused by light aircraft noise
[NASA-TM-76533] p0379 N81-22589
The annoyance caused by airplane noise in the vicinity of Orly Airport and the reaction of neighboring residents
[NASA-TM-76575] p0379 N81-22590
Lateral attenuation of high-by-pass ratio engined aircraft noise
[NASA-TM-81968] p0394 N81-23862
Impact of prediction accuracy on costs - noise technology applications in helicopters
[AD-A101768] p0589 N81-30911
EFFECTIVENESS
NT COST EFFECTIVENESS
NT SYSTEM EFFECTIVENESS
EFFECTORS
U CONTROL EQUIPMENT
EFFICIENCY
NT COMBUSTION EFFICIENCY
NT COMPRESSOR EFFICIENCY
NT ENERGY CONVERSION EFFICIENCY
NT NOZZLE EFFICIENCY
NT POWER EFFICIENCY
NT PROPELLER EFFICIENCY
NT PROPULSIVE EFFICIENCY
NT THERMODYNAMIC EFFICIENCY
NT TRANSMISSION EFFICIENCY
Induced drag ideal efficiency factor of arbitrary lateral-vertical wing forms
[NASA-CR-3357] p0072 N81-12022
EGRESS
Human factors aspects of emergency egress from a business jet
[SAE PAPER 810617] p0523 A81-42772
Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107
EIGENVALUES
Design of disturbance-rejection controllers for linear multivariable discrete-time systems using entire eigenstructure assignment --- onboard digital flight system of F-4 aircraft
p0155 A81-20454
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22526
EJECTION
Delayed ejection --- decision factor importance for pilot safety
p0176 A81-22102
Conditions for safe separation of external stores
p0529 A81-43395
Ergonometric study of ejection through a breakable canopy
p0205 N81-17011
EJECTION INJURIES
Extension of ejection seat capability for high speed conditions
p0176 A81-22097
Neurotraumatological aspects in ejected pilots
p0205 N81-17012
EJECTION SEATS
NT FLYING EJECTION SEATS
Ejection system evolution
p0175 A81-22080
Escape systems testing on the Holloman high speed test track
p0175 A81-22086
SAFEST computer simulation of ejection seat performance
p0175 A81-22089
High 'Q' ejection protection device
p0175 A81-22093
Low level, adverse attitude escape using a vertical seeking ejection seat
p0176 A81-22094
Escape from military fighters - A modern perspective
p0176 A81-22096
Extension of ejection seat capability for high speed conditions
p0176 A81-22097
Ejection experience in F/FB-111 aircraft - 1967-1978
p0176 A81-22098
Limb restraint F-18 style
p0567 A81-46325
Performance verification of the superjet laminar angular rate sensor
[AD-A091089] p0091 N81-13040
Advanced ejection seat for high dynamic pressure escape. Wind tunnel test
[AD-A091810] p0127 N81-13980
Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093088] p0204 N81-16996
Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033
Velocity tolerance of escape systems
[AD-A096081] p0373 N81-22035
MPES negative G restraint strap design options
[AD-A098030] p0424 N81-24037
Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] p0636 N81-33177
EJECTORS
Some optimization problems of internal aerodynamics
p0237 A81-26120
Characteristics of thermal energy separation in a gas ejector
p0281 A81-27371
Aircraft thrust augmentors of ejector type --- Russian book
p0289 A81-28760
Jet noise suppression for low bypass engines - Have we reached a dead end
p0291 A81-29063
An experimental investigation of the thrust and discharge characteristics of multinozzle low-head ejectors
p0413 A81-35920
Numerical solution of a supersonic ejector pump
p0413 A81-35939
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43987
Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025
Prediction and evaluation of thrust augmenting ejector performance at the conceptual design stage
[AD-A093953] p0216 N81-17094
Jet-diffuser ejector - Attached nozzle design
[NASA-CR-152361] p0276 N81-19012
A study of a VTOL thrusting ejector in low speed flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017
A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018
A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24568
Study of an engine flow diverter system for a large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096

ELASTIC CONSTANTS
 U ELASTIC PROPERTIES
ELASTIC DAMPING
 NT VISCOELASTIC DAMPING
 Damping in the problem of natural vibrations of an elastic system with internal resonance
 p0236 A81-25696
ELASTIC DEFORMATION
 Low-speed wind tunnels with deformable walls
 p0299 A81-29304
 On St. Venant flexure and torsion problem for symmetrical airfoil sections
 p0365 A81-33245
 Finite element analysis of asymmetric, lateral natural vibrations of a deformable aeroplane
 p0366 A81-33736
ELASTIC PLATES
 Transient vibrations of elastic panels due to the impact of shock waves
 p0616 A81-48385
ELASTIC PROPERTIES
 NT AEROELASTICITY
 NT AEROTHERMOELASTICITY
 NT VISCOELASTICITY
 Longitudinal instability in braked landing gear
 [ASME PAPER 80-WA/DSC-12] p0170 A81-21083
 Anti-symmetric elastic properties of composite plates of satin weave cloth
 [NAL-TR-649T] p0639 N81-33238
ELASTIC STABILITY
 U DAMPING
ELASTIC WAVES
 NT AERODYNAMIC NOISE
 NT AIRCRAFT NOISE
 NT COHERENT ACOUSTIC RADIATION
 NT ENGINE NOISE
 NT JET AIRCRAFT NOISE
 NT MACH CONES
 NT NOISE (SOUND)
 NT OBLIQUE SHOCK WAVES
 NT SHOCK WAVES
 NT SONIC BOOMS
 NT SOUND WAVES
 Computational design of large-scale blast simulators
 [AIAA PAPER 81-0159] p0162 A81-20639
 Strong pressure waves in air-breathing engines
 [AIAA PAPER 81-1475] p0505 A81-40895
ELASTICITY
 U ELASTIC PROPERTIES
ELASTODYNAMICS
 NT ELASTIC DAMPING
 NT ELASTOHYDRODYNAMICS
ELASTOHYDRODYNAMICS
 Lubrication of rolling element bearings
 p0118 A81-18738
ELASTOMERS
 Elastomers used in aeronautics industry
 [SNIAS-801-551-105] p0031 N81-10168
ELASTOMETERS
 Service life determination for the UH-60-A (UTTAS) helicopter elastomeric bearings
 [AD-A091756] p0134 N81-14324
ELECTRIC APPLIANCES
 U ELECTRIC EQUIPMENT
ELECTRIC BATTERIES
 NT NICKEL CADMIUM BATTERIES
 NT SILVER ZINC BATTERIES
 NT THERMAL BATTERIES
 Comparison of systems of power generation during emergencies /aboard aircraft/
 p0177 A81-22203
ELECTRIC CHARGE
 NT ELECTROSTATIC CHARGE
ELECTRIC COILS
 NT MAGNETIC COILS
ELECTRIC CONNECTORS
 RF compatibility-environment to component part
 p0056 A81-14260
ELECTRIC CONTROL
 The all-electric aircraft
 p0008 A81-11617
 The impact of the All Electric Airplane on production engineering
 [AIAA PAPER 81-0848] p0362 A81-32909
 The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
 [SAE PAPER 801190] p0401 A81-34201
 High current power controller
 [AD-A101643] p0552 N81-29536
ELECTRIC CURRENT
 NT ALTERNATING CURRENT
 NT EDDY CURRENTS
 NT ELECTRIC DISCHARGES
 NT GAS DISCHARGES
 NT LIGHTNING
ELECTRIC DISCHARGES
 NT GAS DISCHARGES
 NT LIGHTNING
 VHF-UHF precipitation-static interference effects on aircraft
 p0056 A81-14258
 Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material
 [NASA-TP-1716] p0078 N81-12089
 VLF P-static noise reduction in aircraft. Volume 1: Current knowledge
 [AD-A098451] p0440 N81-25061
 VLF P-static noise reduction in aircraft. Volume 2: Recommended action
 [AD-A099130] p0491 N81-26394
ELECTRIC ENERGY STORAGE
 Fundamental investigation on jet engine ignition of fuel sprays and its application
 p0420 A81-37341
ELECTRIC EQUIPMENT
 The impact of the All Electric Airplane on production engineering
 [AIAA PAPER 81-0848] p0362 A81-32909
 Electric installation work on aircraft --- Russian book
 p0577 A81-46794
 A probabilistic analysis of electrical equipment vulnerability to carbon fibers
 [NASA-TM-80217] p0038 N81-11113
ELECTRIC EQUIPMENT TESTS
 Aircraft multi-bus electrical system using a Hall-effect sensing device
 [SAE PAPER 810569] p0519 A81-42734
 Computer analysis of 400 HZ Aircraft electrical generator test data
 [AD-A100785] p0552 N81-29354
ELECTRIC FIELD STRENGTH
 A comparison between electric field strengths similarly generated and measured in the open air, in a shielded enclosure and in a large aircraft hangar, over frequency range 10 to 110 MHz
 [RSRE-MEMO-3248] p0004 N81-12353
ELECTRIC FIELDS
 NT EXTERNAL SURFACE CURRENTS
 Lightning electric field measurements which correlate with strikes to the NASA F-106B aircraft, 22 July 1980
 [NASA-TM-82142] p0491 N81-26643
ELECTRIC FILTERS
 NT DIGITAL FILTERS
 NT RADAR FILTERS
 NT TRACKING FILTERS
ELECTRIC GENERATORS
 NT AC GENERATORS
 NT DYNAMOMETERS
 NT ROTATING GENERATORS
 NT SOLAR CELLS
 NT SOLAR GENERATORS
 NT THERMAL BATTERIES
 NT TURBOGENERATORS
 Comparison of systems of power generation during emergencies /aboard aircraft/
 p0177 A81-22203
 Superconducting generator design for airborne applications
 p0241 A81-26862
 MS9001E - A new 100 MW gas turbine
 [ASME PAPER 81-GT-31] p0312 A81-29986
 Samarium cobalt (SMCO) generator/engine integration study
 [AD-AC92904] p0214 N81-17087
ELECTRIC HYBRID VEHICLES
 Aerodynamic design of electric and hybrid vehicles: A guidebook
 [NASA-CR-163744] p0088 N81-12943
 Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
 [PB81-211757] p0641 N81-34109

ELECTRIC IMPULSES
U ELECTRIC PULSES
ELECTRIC MOTOR VEHICLES
The all-electric airplane as an energy efficient transport
[SAE PAPER 801131] p0396 A81-38162
ELECTRIC MOTORS
NT ASYNCHRONOUS MOTORS
Brushless cryogenic ac motors
p0002 A81-10460
The all-electric aircraft
p0008 A81-11617
Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft
p0281 A81-27364
ELECTRIC NETWORKS
Computer aided compilation of an electrical drawing file
p0007 A81-11611
ELECTRIC POTENTIAL
DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850] p0141 N81-14989
ELECTRIC POWER CONVERSION
U ELECTRIC GENERATORS
ELECTRIC POWER PLANTS
Energy conservation through cogeneration
p0055 A81-14220
ELECTRIC POWER SUPPLIES
NT SPACECRAFT POWER SUPPLIES
High-density avionic power supply
p0005 A81-11157
Solid-state power system use expands
p0122 A81-19491
A new airborne nickel cadmium battery concept
p0235 A81-25618
Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft
p0281 A81-27364
Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source --- aircraft equipment
p0288 A81-28574
Test stand for the experimental study of auxiliary power supplies
p0319 A81-30153
Complex computation of flywheel power systems for flight vehicles
p0319 A81-30158
Lightning threat definition for aircraft electrical power systems
p0322 A81-30284
Digital computer simulation of generalized fault conditions on aircraft electrical power systems
p0322 A81-30285
Computerized design and optimization of self-contained airborne high power electrical systems
p0323 A81-30310
Delta electrical load analysis C-141B JACC/CP Aircraft
[AD-A095659] p0334 N81-20071
High current power controller
[AD-A101643] p0552 N81-29536
ELECTRIC PROPULSION
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] p0641 N81-34109
ELECTRIC PULSES
A case for submicrosecond rise-time lightning current pulses for use in aircraft induced-coupling studies
p0057 A81-14267
ELECTRIC WELDING
NT ELECTRON BEAM WELDING
ELECTRIC WIRING
U WIRING
ELECTRICAL BREAKDOWN
U ELECTRICAL FAULTS
ELECTRICAL CONDUCTIVITY
U ELECTRICAL RESISTIVITY
ELECTRICAL ENGINEERING
Aircraft electricity and electronics /3rd edition/ --- Book
p0624 A81-49877
Practical aspects of instrumentation installation in support of subsystem testing
p0546 N81-29090
ELECTRICAL FAULTS
Digital computer simulation of generalized fault conditions on aircraft electrical power systems
p0322 A81-30285
Aircraft multi-bus electrical system using a Hall-effect sensing device
[SAE PAPER 810569] p0519 A81-42734
ELECTRICAL IMPEDANCE
Input impedance of a resonator-slot ring antenna on a spherical layer --- for aircraft
p0420 A81-37433
ELECTRICAL MEASUREMENT
New techniques for the measurement of natural and simulated lightning phenomena
p0057 A81-14268
ELECTRICAL PROPERTIES
NT ELECTRICAL IMPEDANCE
NT ELECTRICAL RESISTIVITY
Electrical bonding in aircraft
p0057 A81-14264
Assessing the behavior of high modulus composite materials in lightning
p0040 N81-11141
The electrical effects of joints and bonds in carbon fiber composites
p0199 N81-16153
ELECTRICAL RESISTIVITY
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059
ELECTRICITY
NT ALTERNATING CURRENT
NT ATMOSPHERIC ELECTRICITY
NT STATIC ELECTRICITY
Aircraft electricity and electronics /3rd edition/ --- Book
p0624 A81-49877
ELECTRO-OPTICAL PHOTOGRAPHY
Analysis, design and simulation of line scan aerial surveillance systems
p0357 A81-32492
ELECTRO-OPTICS
LPI, short-range communications between aircraft in rendezvous --- Low Probability of Intercept
p0177 A81-22493
High temperature electronic requirements in aeropropulsion systems
p0359 A81-32547
Aircraft penetration under cloud cover
p0463 A81-39640
Application of optical methods to the study of jet noise and turbulence
[ISL-CO-201/80] p0187 N81-15819
High temperature electronic requirements in aeropropulsion systems
[NASA-TM-81682] p0201 N81-16388
The electro-optical display/visual system interface: Human factors considerations
p0212 N81-17066
Integration of sensors with displays
p0212 N81-17067
Liquid crystal displays
p0212 N81-17068
ELECTROACOUSTIC TRANSDUCERS
NT MICROPHONES
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 1: Detection of cracks in the inaccessible lower half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 2: Reliability evaluation and system definition for detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18420
ELECTROCHEMICAL CELLS
NT ELECTRIC BATTERIES
NT NICKEL CADMIUM BATTERIES
NT SILVER ZINC BATTERIES
NT THERMAL BATTERIES
ELECTRODEPOSITION
NT ELECTROPLATING
ELECTRODYNAMOMETERS
U DYNAMOMETERS
ELECTROGENERATORS
U ELECTRIC GENERATORS

ELECTROHYDRAULIC CONTROL
U ELECTRIC CONTROL
U HYDRAULIC CONTROL
ELECTROLUMINESCENCE
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Flat panel display technology review
p0211 N81-17065
ELECTROLUMINESCENT LAMPS
U ELECTROLUMINESCENCE
U LUMINAIRES
ELECTROMAGNETIC ABSORPTION
Liquid crystal displays
p0212 N81-17068
ELECTROMAGNETIC COMPATIBILITY
RF compatibility-environment to component part
p0056 A81-14260
The RAE research and development program on EMC for aircraft and flight weapons systems
p0056 A81-14263
Electrical bonding in aircraft
p0057 A81-14264
Analyst/IAP interface and interactive graphics --- for EMC analysis and display
p0057 A81-14270
Noncoherent C-band transponder standards
[AD-A091282] p0095 N81-13251
Aircraft manufacturers approach to the E.M.C./Avionics problems associated with the use of composite materials
p0200 N81-16156
Electromagnetic integration of composite structure in aircraft
p0200 N81-16159
A supplementary EMC analysis of the proposed Airport Surface Detection Equipment (ASDE-3) radar
[AD-A092965] p0219 N81-17342
Evaluation of Discrete Address Beacon System (DABS) EMC
[PB81-154387] p0441 N81-25062
Electro-magnetic compatibility: The determination of safety for critical systems
p0545 N81-29079
ELECTROMAGNETIC DEDUCTION
U MAGNETIC INDUCTION
ELECTROMAGNETIC FIELDS
NT FAR FIELDS
NT NEAR FIELDS
NT SYSTEM GENERATED ELECTROMAGNETIC PULSES
ELECTROMAGNETIC INTERFERENCE
NT CROSSTALK
NT ELECTROMAGNETIC NOISE
NT JAMMING
NT RADIO FREQUENCY INTERFERENCE
VHF-UHF precipitation-static interference effects on aircraft
p0056 A81-14258
A case for submicrosecond rise-time lightning current pulses for use in aircraft induced-coupling studies
p0057 A81-14267
Evaluation of lightning-induced transients in aircraft using high-voltage shock excitation techniques
p0057 A81-14269
Antenna-to-antenna coupling in aircraft radio systems
p0057 A81-14280
Multipath and interference effects in secondary surveillance radar systems
p0183 A81-23359
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115
ELECTROMAGNETIC MEASUREMENT
Electromagnetic measurement of lightning strikes to aircraft
[AIAA PAPER 81-0083] p0160 A81-20588
In-flight calibration of aircraft antenna radiation patterns
p0173 A81-21825
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21828
In flight direct strike lightning research --- Using an F-106B Aircraft
p0259 N81-19005
ELECTROMAGNETIC NOISE
VLF P-static noise reduction in aircraft. Volume 1: Current knowledge
[AD-A098451] p0440 N81-25061
ELECTROMAGNETIC PROPERTIES
NT BRIGHTNESS
NT ELECTRICAL PROPERTIES
NT ELECTROMAGNETIC ABSORPTION
NT OPTICAL PROPERTIES
NT OPTICAL REFLECTION
NT REFLECTANCE
NT TRANSPARENCE
Electrical/electromagnetic concerns associated with advanced composite materials in aerospace systems
p0530 A81-43630
EMC, lightning and NEMP-protection-new requirements for approved specifications when using CFRP
p0199 N81-16152
The UK Ministry of Defence programme on the electromagnetic properties of carbon fiber composites
p0199 N81-16154
ELECTROMAGNETIC PULSES
NT SYSTEM GENERATED ELECTROMAGNETIC PULSES
High peak energy shaped-pulse electromagnetic crack detection
p0611 A81-47785
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1270C] p0638 N81-33200
ELECTROMAGNETIC RADIATION
NT ELECTROMAGNETIC PULSES
NT INFRARED RADIATION
NT MICROWAVES
NT MILLIMETER WAVES
NT RADIO WAVES
NT SUNLIGHT
NT SYSTEM GENERATED ELECTROMAGNETIC PULSES
NT THERMAL RADIATION
A French flight test program on the electromagnetic effects of lightning
p0199 N81-16155
Flight tests for studying radioelectric perturbations of an electrostatic origin
p0200 N81-16160
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
ELECTROMAGNETIC SCATTERING
NT LIGHT SCATTERING
NT RAMAN SPECTRA
NT RAYLEIGH SCATTERING
Electromagnetic scattering by open circular waveguides --- modeling jet engine inlets
[AD-A095554] p0336 N81-20345
ELECTROMAGNETIC SHIELDING
Determination if fiber-optic immunity is adequate for deployment in the V/STOL airframe --- to compensate nonmetallic material LF transparency
p0057 A81-14265
Electromagnetic measurement of lightning strikes to aircraft
[AIAA PAPER 81-0083] p0160 A81-20588
Shielded enclosure test bed requirement
[AD-A092589] p0198 N81-16073
The UK Ministry of Defence programme on the electromagnetic properties of carbon fiber composites
p0199 N81-16154
Electromagnetic coupling to advanced composite aircraft with application to trade-off and specification determination
p0200 N81-16166
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069
ELECTROMAGNETIC SPECTRA
NT INFRARED SPECTRA
NT RAMAN SPECTRA
ELECTROMAGNETIC WAVE FILTERS
NT BANDPASS FILTERS
NT DIGITAL FILTERS
NT RADAR FILTERS
NT TRACKING FILTERS
ELECTROMAGNETIC WAVE TRANSMISSION
NT LIGHT SCATTERING
NT LIGHT TRANSMISSION
NT MULTIPATH TRANSMISSION

NT RADAR TRANSMISSION
NT SHORT WAVE RADIO TRANSMISSION
NT SPREAD SPECTRUM TRANSMISSION
ELECTROMAGNETIC WAVES
U ELECTROMAGNETIC RADIATION
ELECTROMAGNETICS
U ELECTROMAGNETISM
ELECTROMAGNETISM
Aircraft electricity and electronics /3rd edition/ --- Book
p0624 A81-49877
Application of carbon fibre composites to military aircraft structures
p0199 N81-16147
ELECTROMAGNETS
NT SUPERCONDUCTING MAGNETS
ELECTROMECHANICAL DEVICES
A case study on the F-16 fly-by-wire flight control system --- Book
p0101 A81-16719
ELECTROMYOGRAMS
U ELECTROMYOGRAPHY
ELECTROMYOGRAPHS
U ELECTROMYOGRAPHY
ELECTROMYOGRAPHY
BIOCOMAID system (bionic control of acceleration induced dimming)
[AD-A102510] p0601 N81-31234
ELECTRON BEAM WELDING
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636
Sliding-seal electron beam slot welding of an aircraft wing closure beam
p0614 A81-48182
ELECTRON COMPOUNDS
U INTERMETALLICS
ELECTRON EMISSION
Application of exoelectron emission for quality control of gas-turbine engine parts
p0171 A81-21367
ELECTRON IONIZATION
U IONIZATION
ELECTRON MICROSCOPY
Possibility of development of an electron-fractographic method for measuring stress level produced by fatigue fracture of the material
p0532 A81-43773
Trouble shooting in aeronautics and the usefulness of microscopes
[VTH-LR-305] p0537 N81-20069
ELECTRON OPTICS
Head-up displays. III
p0005 A81-11320
ELECTRON TUBES
NT CATHODE RAY TUBES
ELECTRONIC AIRCRAFT
Avionics computer system support at Ogden ALC
p0320 A81-30243
BIT/FIT maturity before first flight --- in B-52 G/H Offensive Avionics System
p0324 A81-30320
A very complete electronic warfare system
p0412 A81-35670
Integrated multiplex for the Agusta A-129 attack helicopter
p0472 A81-40131
EF-111A graphite/epoxy Horizontal Stabilizer Trailing Edge
p0557 A81-44342
SR-71 impressive in high-speed regime
p0565 A81-45747
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
ELECTRONIC CONTROL
A case study - Real time simulation and structured design
p0172 A81-21721
Application of CRT displays to new generation aircraft
p0286 A81-28297
Electronic engine control for commercial aircraft
p0309 A81-29775
Full-authority digital electronic controls for civil aircraft engines
[ASME PAPER 81-GT-138] p0316 A81-30043
Digital control makes a commercial debut on the JT9D engine
[ASME PAPER 81-GT-199] p0317 A81-30090
Offensive avionics system /OAS/ design
p0321 A81-30259
The use of finite-state machines for describing and validating flight control systems
p0322 A81-30265
A microprocessor based land navigator
p0360 A81-32833
Full Authority Digital Electronic Control turbofan engine demonstration
[SAE PAPER 801199] p0402 A81-34209
An application of redundancy in digital electronic engine control
[SAE PAPER 801200] p0402 A81-34210
Flight test reliability demonstration of electronic engine controls
[SAE PAPER 801201] p0403 A81-34211
Microprocessor-based airborne spectrometer system
p0453 A81-37748
Microcomputer system for controlling an infrared scanning camera --- with application to rocket plume radiation measurement
p0453 A81-37749
NDEC - A control concept for helicopter gas turbines --- speed (N) based Digital Electronic Control
[AHS 80-44] p0477 A81-40171
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration
[AIAA PAPER 81-1498] p0506 A81-40910
Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911
Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
Combined environment reliability testing /CERT/ as applied to engine mounted electronic controls
[AIAA PAPER 81-1500] p0516 A81-42204
Electronic fuel controls - Who needs them
[SAE PAPER 810619] p0523 A81-42774
Electronic control system for a modern turboprop engine
[SAE PAPER 810620] p0523 A81-42775
Design of fault tolerant electronic engine controls
[AIAA PAPER 81-1496] p0566 A81-45894
Future challenges in helicopter flight/propulsion control integration
p0575 A81-46633
Fly-by-wire Jaguar
p0614 A81-48064
Power system control study. Phase 1: Integrated control techniques. Phase 2: Detail design and system modeling
[AD-A099894] p0497 N81-27100
The packaging of electronic engine control units and related subcomponents
p0497 N81-27105
Fault trees and system reliability analysis with reference to the control of aircraft engines
p0498 N81-27109
Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112
ELECTRONIC COUNTERMEASURES
Airborne countermeasures system AN/ALQ-161
p0049 A81-12794
Adaptive control for electronic countermeasures
p0155 A81-20470
Support tactical self protection systems design
p0349 A81-31113
A review of current and future components for electronic warfare receivers
p0357 A81-32252
ELECTRONIC EQUIPMENT
NT CHARGE COUPLED DEVICES
NT ELECTRONIC PACKAGING
NT ELECTRONIC RECORDING SYSTEMS
NT ELECTRONIC TRANSDUCERS
NT FIELD EFFECT TRANSISTORS
NT LIGHT EMITTING DIODES
NT METAL OXIDE SEMICONDUCTORS
NT METAL-NITRIDE-OXIDE-SEMICONDUCTORS
NT MINIATURE ELECTRONIC EQUIPMENT
NT RUBY LASERS
NT SEMICONDUCTOR DEVICES
NT SOLID STATE DEVICES
NT SPACECRAFT ELECTRONIC EQUIPMENT
NT TRANSISTOR AMPLIFIERS
High temperature electronic requirements in aeropropulsion systems

p0359 A81-32547
Atmospheric electricity hazards protection for
advanced technology flight vehicles
[AIAA PAPER 81-1642] p0525 A81-43141
The ICAM 'Manufacturing Cost/Design Guide' /MC/DG/
for Avionics
p0558 A81-44375
Reliability advancement for electronic engine
controllers. Volume 2: Guide to development of
high reliability electronic engine controllers
[AD-A098614] p0444 N81-25086
Reliability advancement for electronic engine
controllers, volume 1
[AD-A098623] p0444 N81-25087
Electro-magnetic compatibility: The determination
of safety for critical systems
p0545 N81-29079
ELECTRONIC EQUIPMENT TESTS
New storage medium - Greater safety. II - Testing,
fabrication, implementation --- MNOS block
oriented random access memory (BORAM) circuits
p0227 A81-24044
The new look in reliability - It works ---
Operational Mission Environment test program for
F/A-18 aircraft
p0229 A81-24268
Augmenting ATE with dynamic simulation testing
techniques
p0320 A81-30241
Full authority digital electronic control
application to a variable cycle engine
[SAE PAPER 801203] p0403 A81-34212
The Hornet's operational mission environment
p0571 A81-46491
A comparison between electric field strengths
similarly generated and measured in the open
air, in a shielded enclosure and in a large
aircraft hangar, over frequency range 10 to 110
MHz
[RSRE-MEMO-3248] p0084 N81-12353
Testing aircraft instruments
[AD-A095680] p0334 N81-20075
Software survey for the avionics test bed --- for
large space structures
[NASA-CR-161089] p0629 N81-32143
ELECTRONIC PACKAGING
DC-to-DC power supply for light aircraft flight
testing
[NASA-CR-163850] p0141 N81-14989
The packaging of electronic engine control units
and related subcomponents
p0497 N81-27105
ELECTRONIC PHOTOGRAPHY
U ELECTRO-OPTICAL PHOTOGRAPHY
ELECTRONIC RECORDING SYSTEMS
Requirements, technology and configuration
evaluation for Crash Survivable Flight Data
Recording (CSFDR) system
[AD-A098584] p0442 N81-25072
ELECTRONIC SWITCHES
U SWITCHING CIRCUITS
ELECTRONIC TRANSDUCERS
A study of the performance of an Olson type active
noise controller and the possibility of the
reduction of cabin noise
[UTIAS-TN-228] p0552 N81-29924
ELECTRONICS
Aircraft electricity and electronics /3rd edition/
--- Book
p0624 A81-49877
ELECTROPHYSICS
NT ELECTRO-OPTICS
ELECTROPLATING
Prevention of spline wear by soft metallic coatings
--- aircraft engines
[AD-A091861] p0132 N81-14064
ELECTROREFINING
Silver recovery from aircraft scrap
[PB81-150021] p0392 N81-23269
ELECTROSTATIC CHARGE
Ground testing of aircraft antistatic protection
[ONERA, TP NO. 1980-126] p0015 A81-11674
Dielectric electrostatic charge reduction
[SAE PAPER 810571] p0519 A81-42736
Flight tests for studying radioelectric
perturbations of an electrostatic origin
p0200 N81-16160
Static charge in aircraft fuel tanks
[AD-A093552] p0208 N81-17045
ELECTROSTATIC FIELDS
U ELECTRIC FIELDS
ELECTROSTATIC PLASMA
U PLASMAS (PHYSICS)
ELEVATION ANGLE
Maximum likelihood elevation angle estimates of
radar targets using subapertures
p0359 A81-32691
Helicopter noise contour development techniques
and directivity analysis
[AD-A093426] p0221 N81-17851
Investigation of impingement region and wall jets
formed by the interaction of high aspect ratio
lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
ELEVATORS (CONTROL SURFACES)
Quasi-hybrid airships
[AIAA 81-1333] p0456 A81-38538
Graphite thermoplastic YC-14 outboard elevator
p0530 A81-43631
Transonic wind tunnel measurements of tailplane
and elevator effectiveness of the Jindivik 203B
target aircraft
[AD-A098180] p0424 N81-24031
ELEVONS
An analysis of gap effects on wing-elevon
aerodynamic characteristics
[AIAA PAPER 81-0364] p0166 A81-20783
ELLIPTICITY
A theoretical treatment of lifting surface theory
of an elliptic wing
p0347 A81-30653
An implicit finite volume method for elliptical
flow computation --- numerical integration,
aerothermodynamics
p0255 N81-18248
EMERGENCIES
Developing an emergency medical disaster plan for
an airport
p0053 A81-13513
Airborne emergency hospital
p0299 A81-29207
A study of factors affecting aircrew survivability
following emergency escape over water
p0409 A81-34697
A review of in-flight emergencies in the ASRS data
base
[NASA-CR-166166] p0372 N81-22031
Information transfer during contingency
operations: Emergency air-ground communications
p0595 N81-31168
Emergency cabin lighting installations: An
analysis of ceiling- versus lower cabin-mounted
lighting during evacuation trials --- visibility
[AD-A103191] p0636 N81-33175
EMERGENCY LIFE SUSTAINING SYSTEMS
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
Passenger survival in wide-bodied jet aircraft
accidents vs. other aircraft - A comparison
p0054 A81-13515
Survival and Flight Equipment Association, Annual
Symposium, 17th, Las Vegas, Nev., December 2-6,
1979, Proceedings
p0174 A81-22076
Ejection experience in F/FB-111 aircraft - 1967-1978
p0176 A81-22098
Human factors aspects of emergency egress from a
business jet
[SAE PAPER 810617] p0523 A81-42772
EMERGENCY LOCATOR TRANSMITTERS
Electronic search and rescue aids
p0286 A81-28300
A description of the general aviation fixed wing
accident
p0408 A81-34696
EMISSION
NT ACOUSTIC EMISSION
NT ELECTROLUMINESCENCE
NT ELECTRON EMISSION
NT EXHAUST EMISSION
NT FLUORESCENCE
NT X RAY FLUORESCENCE
EMISSION SPECTRA
Impact of aircraft emissions on air quality in the
vicinity of airports. Volume 2: An updated
model assessment of aircraft generated air
pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545

EMISSOGRAPHS
U RECORDING INSTRUMENTS
EMULSIONS
NT NUCLEAR EMULSIONS
Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277
ENCLOSURE
Gerry casing treatment
[CURD/A-TURBO/TR-101] p0093 N81-13059
ENCLOSURES
Comments on Reynolds number effects and the role of NTF in the development of air vehicles
p0592 N81-31142
ENDFIRE ARRAYS
Application of endfire arrays at contemporary glide-slope problem sites
p0360 A81-32695
ENERGETIC PARTICLES
NT PLASMAS (PHYSICS)
ENERGY ABSORPTION
NT ELECTROMAGNETIC ABSORPTION
Energy absorption studied to reduce aircraft crash forces
[NASA-NEWS-RELEASE-81-96] p0492 N81-27060
ENERGY CONSERVATION
Reduction of energy consumption in the vibratical shot peening of axial compressor vanes
p0005 A81-11321
Methods of fuel conservation in civil aviation. I
p0005 A81-11322
The relevance of the Flex-Hub Prop-Fan for fuel-efficient airliners
p0006 A81-11605
Energy conservation through cogeneration
p0055 A81-14228
Energy-saving ramp lighting with high-pressure sodium lamps
p0056 A81-14243
Fuel saving methods in civil aviation. II
p0059 A81-14755
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0101 A81-17044
Fuel conservation in the air transportation industry - General and operational aspects
p0102 A81-17143
Operational energy conservation strategies in commercial aviation
p0155 A81-20465
Airliner maintenance for fuel efficiency
[AIAA PAPER 81-0787] p0367 A81-33877
Energy modeling for aviation fuel efficiency
[AIAA PAPER 81-0789] p0368 A81-33883
Fuel conservation integrated into airline economics
[AIAA PAPER 81-0831] p0368 A81-33884
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
Wright Field turboprop study
[AIAA PAPER 81-1685] p0526 A81-43157
Digital simulation for energy conservation in a large wind tunnel plant system
p0613 A81-48303
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base
[AD-A094226] p0252 N81-18050
Ceramic applications in turbine engines --- for improved component performance and reduced fuel usage
[NASA-CR-159865] p0274 N81-19118
Integrated Application of Active Controls (IAAC) technology to an advanced subsonic transport: Project plan
[NASA-CR-3305] p0332 N81-20062
Energy efficient engine flight propulsion system: Aircraft/engine integration evaluation
[NASA-CR-159584] p0375 N81-22051
Aircraft Energy Efficiency program: Laminar flow control technology
[NASA-TM-82352] p0437 N81-24389
Aircraft energy efficiency. Overview
[NASA-FACTS-96/9-80] p0538 N81-28083
Minimum fuel horizontal flightpaths in the terminal area
[NASA-TM-81313] p0549 N81-29133
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] p0635 N81-33158
Responses to comments of Air Transport Association of America on aircraft towing feasibility study
[DE81-029834] p0638 N81-33201
ENERGY CONSUMPTION
Characteristics and status of the US National Transonic Facility
p0038 N81-11065
Theoretical study of network design methodologies for the aerial relay system --- energy consumption and air traffic control
[NASA-CR-159365] p0249 N81-18033
ENERGY CONVERSION
NT SOLAR ENERGY CONVERSION
ENERGY CONVERSION EFFICIENCY
New BBC high-efficiency gas turbines
p0017 A81-11797
Improving the mechanical load matching of wind energy converters
p0055 A81-13870
Wing flapping with minimum energy
p0283 A81-27889
The possibilities of improving the efficiency of gas turbines
p0288 A81-28614
Component research for future propulsion systems
p0454 A81-38058
ENERGY DISSIPATION
Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-34166
Investigation of the influence of the radial nonuniformity of initial temperature and energy losses on flow structure in a highly loaded turbine stage
p0465 A81-40019
Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051
ENERGY DISTRIBUTION
Characteristics of thermal energy separation in a gas ejector
p0281 A81-27371
ENERGY LOSSES
U ENERGY DISSIPATION
ENERGY METHODS
NT STRAIN ENERGY METHODS
ENERGY POLICY
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492
Alternative energy sources for non-highway transportation, appendices
[DOE/CS-05438/T1-VOL-3] p0044 N81-11500
Optimized pitch controller for load alleviation on wind turbines
[FFA-TN-HU-2189-PT-1] p0087 N81-12634
ENERGY REQUIREMENTS
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report
[AD-A094225] p0252 N81-18051
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] p0635 N81-33158
ENERGY SOURCES
Wingtip vortex turbine
[NASA-CASE-LAR-12588-1] p0496 N81-27096
ENERGY SPECTRA
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476
ENERGY STORAGE
NT ELECTRIC ENERGY STORAGE
NT HEAT STORAGE
ENERGY TECHNOLOGY
Hydrogen - Its technology and implications. Volume 4 - Utilization of hydrogen --- Book
p0016 A81-11751
ENGINE ANALYZERS
Effect of time-dependent flight loads on turbofan

engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093

Who needs engine monitoring?
p0599 N81-31209

ENGINE CONTROL
NT TURBOJET ENGINE CONTROL

The all-electric aircraft
p0008 A81-11617

Computerized flight management for fuel saving
p0018 A81-12349

Digital control for helicopter powerplants
p0104 A81-17504

The digital control system as part of an integrated accessory fit for future engines
p0104 A81-17505

Failure Indication and Corrective Action for turboshaft engines
p0106 A81-17515

Turbo-compressors surge and surge control
[AIAA PAPER 81-0070] p0159 A81-20579

Trajectory generation techniques for multivariable control of aircraft turbine engines
p0240 A81-26609

Using microprocessors in fault monitoring of aircraft electronics
[ASME PAPER 81-GT-138] p0316 A81-30040

Full-authority digital electronic controls for civil aircraft engines
[ASME PAPER 81-GT-138] p0316 A81-30041

Digital control makes a commercial debut on the JT9D engine
[ASME PAPER 81-GT-199] p0317 A81-30090

Future challenges in V/STOL flight propulsion control integration
[SAE PAPER 801140] p0397 A81-34170

An application of redundancy in digital electronic engine control
[SAE PAPER 801200] p0402 A81-34210

Flight test reliability demonstration of electronic engine controls
[SAE PAPER 801201] p0403 A81-34211

Full authority digital electronic control application to a variable cycle engine
[SAE PAPER 801203] p0403 A81-34212

Current and future use of an AIDS integrated EMS --- Aircraft Integrated Data System for Engine Monitoring
[SAE PAPER 801219] p0404 A81-34225

NDEC - A control concept for helicopter gas turbines --- speed (N) based Digital Electronic Control
[AHS 80-44] p0477 A81-40171

Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911

Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912

Combined environment reliability testing /CERT/ as applied to engine mounted electronic controls
[AIAA PAPER 81-1500] p0516 A81-42204

Real-time estimation in advanced turbofan engines
p0564 A81-45553

Design of fault tolerant electronic engine controls
[AIAA PAPER 81-1496] p0566 A81-45894

Future challenges in helicopter flight/propulsion control integration
p0575 A81-46633

Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] p0619 A81-48621

Model following control of gas turbine engines
p0624 A81-49900

Propulsion Controls, 1579 --- air breathing engine control
[NASA-CP-2137] p0078 N81-12090

Multivariable identification using centralized fixed modes
p0079 N81-12091

Performance seeking controls
p0079 N81-12092

F100 multivariable control synthesis program: A review of full scale engine altitude tests --- F100 engine
p0079 N81-12093

Design of a multivariable integrated control for a supersonic propulsion system --- variable stream control engine
p0079 N81-12094

Propulsion controls
p0079 N81-12095

Should we attempt global (inlet engine airframe) control design?
p0079 N81-12097

Road map to adaptive optimal control --- jet engine control
p0079 N81-12098

Propulsion control and control theory: A new research focus
p0080 N81-12099

Multivariable synthesis with transfer functions --- applications to gas turbine engines
p0080 N81-12102

Alternatives for jet engine control
p0080 N81-12103

Power control for hot gas engines
[NASA-CASE-NPO-14220-1] p0133 N81-14318

Apparatus for sensor failure detection and correction in a gas turbine engine control system
[NASA-CASE-LEW-12907-2] p0273 N81-19115

Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087

Microcomputer Applications in Power and Propulsion Systems
[AGARD-LS-113] p0497 N81-27103

Microprocessor characteristics and comparative features
p0497 N81-27104

The packaging of electronic engine control units and related subcomponents
p0497 N81-27105

Microprocessor system test and monitoring
p0497 N81-27108

Fault trees and system reliability analysis with reference to the control of aircraft engines
p0498 N81-27109

Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112

ENGINE COOLANTS

Heat transfer from a row of impinging jets to concave cylindrical surfaces
p0231 A81-24928

Investigation of the cooling of the turbine rotor blade of a gas-turbine power system
p0465 A81-40020

TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833

ENGINE DESIGN
NT ROCKET ENGINE DESIGN

A numerical study of candidate transverse fuel injector configurations in the Langley scramjet engine
p0003 A81-10709

Engine air intake design support by use of computational methods and comparison of theoretically derived pressure distributions with experimental data
p0008 A81-11619

Hydrogen-fueled aircraft
p0016 A81-11753

Optimum design of axial flow gas turbine stage. I - Formulation and analysis of optimization problem. II - Solution of the optimization problem and numerical results
p0019 A81-12608

Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609

Automation of aircraft gas-turbine power plants --- Russian book
p0020 A81-12782

The development of low-toxic combustion chambers of transport gas turbine engines
p0060 A81-14787

The jet engine - Anniversary of a missed opportunity
p0061 A81-15168

Business aircraft turbofan technology progress in the 1970's, challenges in the 1980's
[SAE PAPER 800601] p0061 A81-15326

A new high bypass fan for general aviation
[SAE PAPER 800602] p0061 A81-15327

Lear fan propulsion system
[SAE PAPER 800609] p0062 A81-15332

Research on a high work axial gas generator turbine
[SAE PAPER 800618] p0062 A81-15338

A survey on airbreathing propulsion education
p0063 A81-15375
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719
Charting a course for V/STOL
p0068 A81-16179
The origins of the turbojet revolution --- Book
p0068 A81-16248
Rolls-Royce engines status report
p0102 A81-17166
Turbopropeller engine PZL-10S
p0103 A81-17324
Specialists' Meeting on Helicopter Propulsion Systems, Williamsburg, Va., November 6-8, 1979, Technical Papers
p0104 A81-17501
The impact of contingency ratings on advanced turboshaft engine design
p0104 A81-17502
The T700 booster engine
p0105 A81-17506
Drive system development for the 1980's --- helicopter transmissions -
p0105 A81-17508
Development of helicopter transmission components for the 1980s
p0105 A81-17509
Helicopter propulsion system development and qualification
p0105 A81-17511
Is the engine helicopter-worthy
p0106 A81-17518
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825
Calculation of propeller efficiency for an ideal propeller
p0121 A81-19444
Designing the Hornet for improved R and M
[AIAA PAPER 81-0230] p0162 A81-20688
Prediction method for the overall performance of turbofan engines
[AIAA PAPER 81-0367] p0166 A81-20786
Developments at VFW/Rhein-Flugzeugbau GmbH, Moenchengladbach --- trainer aircraft design
p0171 A81-21574
Design, durability and low cost processing technology for composite fan exit guide vanes
p0182 A81-22664
Requirements and possibilities - Rotorcraft powerplants /The 15th Halford Memorial Lecture/
p0226 A81-23999
Features improved cooling - Turbine blade redesign boosts life
p0227 A81-24046
Problems and promises in gas turbine combustor design development
p0236 A81-26007
The possibilities of improving the efficiency of gas turbines
p0288 A81-28614
The future of aeronautical propulsion
p0290 A81-29052
A new breed of an air breathing engine
p0292 A81-29070
Discrete hole film cooling of turbine blades
p0293 A81-29073
Film cooling performance by injection through discrete holes
p0293 A81-29074
Cyclone combustors in low emission gas turbine applications
p0294 A81-29082
Transpiration air cooled turbine blade - A technology for future generation aircraft and industrial gas turbine engines using coal or coal derived fuels
p0297 A81-29115
Basic problem of the analytical design of aircraft gas turbine engines. II
p0299 A81-29305
Material shortages - Effect on the aircraft engine industry
[AIAA 81-0509] p0301 A81-29387
Gas turbine engineering: Applications, cycles and characteristics --- Book
p0309 A81-29680
Turbine blade construction of multistage axial-flow compressors
p0309 A81-29850
Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954
Inverse or design calculations for non-potential flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29986
Sensitivity of turbine blade temperatures to tolerances of design variables
[ASME PAPER 81-GT-90] p0314 A81-29997
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
Establishing cruise-engine cycle payoffs for a supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007
Life cycle cost before, during and after the design of aircraft propulsion systems
[ASME PAPER 81-GT-111] p0315 A81-30016
Design and development of the combustor inlet diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
Design analysis of high-efficiency low-stress ceramic gas turbines
[ASME PAPER 81-GT-130] p0316 A81-30034
Engine cycle selection for advanced technology engine studies
[ASME PAPER 81-GT-191] p0317 A81-30084
Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098
Test-stand combustion chamber for the study and development of forced working processes --- for jet engines
p0319 A81-30151
Numerical methods for studying the stress-strain state and service life of aircraft gas-turbine engine disks
p0351 A81-31258
Principles of aircraft-engine assembly --- Russian book
p0355 A81-31799
Rolls-Royce RB 211-535 power plant
[AIAA PAPER 81-0807] p0368 A81-33886
CFM56-3 high by-pass technology for single aisle twins
[AIAA PAPER 81-0808] p0368 A81-33889
Results of thermal tests on the GTA-18 gas turbine unit with the RD-3M-500 jet engine
p0395 A81-34022
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152
JT8D performance improvement to offset rising fuel costs
[SAE PAPER 801117] p0395 A81-34153
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
The GTCP331 Auxiliary Power Unit for the next generation commercial transports
[SAE PAPER 801147] p0398 A81-34176
Fuel efficiency improvements to the T56 turboprop engine
[SAE PAPER 801158] p0399 A81-34178
Commuter turboprop propulsion technology
[SAE PAPER 801283] p0406 A81-34239
The High Performance Auxiliary Power Unit technology demonstrator program
[SAE PAPER 801148] p0406 A81-34240
Developing a Fighter Engine Derivative of the B-1/F101 engine
[SAE PAPER 801156] p0407 A81-34246
Turbine engine design --- engineering for cost effectiveness and propulsive efficiency
[AIAA PAPER 81-0915] p0408 A81-34362
History of the Pegasus vectored thrust engine
p0411 A81-35630
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
New technologies for compressors of aviation engines
p0452 A81-37656
T700 engine integral inlet separator - All weather operational protection
p0469 A81-40108

Design of rotorcraft powerplants - Use of life cycle costing as an aid to design optimization
p0469 A81-40109
Aerodynamic design of engine air intakes for improved performance
p0470 A81-40117
The development of a twin-turbofan V/STOL aircraft
[AHS 80-8] p0473 A81-40141
Development of small fuel efficient aircraft engines
[AHS 80-38] p0477 A81-40167
Regenerative engine for helicopter application
[AHS 80-39] p0477 A81-40168
A new approach to turboshaft engine growth
[AHS 80-41] p0477 A81-40169
Design and development of the Model 412 helicopter
[AHS 80-56] p0478 A81-40181
Battle of the 15 tonne fans
p0480 A81-40457
TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833
Exploratory development program to improve combustor dome operating characteristics
[AIAA PAPER 81-1351] p0501 A81-40834
Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836
Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839
Selected results from combustion research at the Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859
A strategy for developing the next generation fighter/attack aircraft engine
[AIAA PAPER 81-1478] p0505 A81-40898
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Selection of turbine parameters for steam-hydrogen engine schemes
p0509 A81-41028
Thermodynamic comparison of the efficiencies of semiclosed- and open-loop air cooling systems of gas turbine engines
p0509 A81-41029
Critical considerations in the design of supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1284] p0511 A81-41748
High pressure fuel pumps - Their design and evolution /The 13th J. D. North Memorial Lecture/
p0513 A81-42052
The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176
Engine duty cycle estimation for conceptual design aircraft
[AIAA PAPER 81-1368] p0514 A81-42179
F-16 variable-geometry inlet design and performance
[AIAA PAPER 81-1394] p0514 A81-42184
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186
Engine life methodologies for conceptual design
[AIAA PAPER 81-1398] p0515 A81-42188
The use of engine operating experience in the preliminary design of aircraft gas turbine combustion systems
[AIAA PAPER 81-1399] p0515 A81-42189
Modeling of ramjet combustors using simple reactor theory
[AIAA PAPER 81-1429] p0515 A81-42196
ATES activity and status at Detroit Diesel Allison --- Advanced Technology Engine Studies
[AIAA PAPER 81-1504] p0516 A81-42206
Low and high speed propellers for general aviation - Performance potential and recent wind tunnel test results
p0521 A81-42758
Avco Lycoming's ALF 502 high bypass fan engine
[SAE PAPER 810618] p0523 A81-42773
Small turbofan engines - Their impact on general aviation aircraft
[SAE PAPER 810622] p0523 A81-42776
An overview of general aviation propulsion research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-42778
Aerodynamic design data for a cruise-matched high performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779
Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165
The PW100 commuter powerplant
[AIAA PAPER 81-1731] p0528 A81-43170
Turboprop engine propulsion for the 1990's
[AIAA PAPER 81-1648] p0533 A81-43935
Engine life and usage methodologies for conceptual design
[AIAA PAPER 81-1651] p0533 A81-43937
Investigation of influences on the definition of engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938
A synopsis of the Navy A-7 Aircraft Fuel Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949
The new generation of turboshaft and turboprop engines
p0560 A81-44473
Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45891
The design and development of a mixer compound exhaust system for a quiet clean general aviation turbofan
[AIAA PAPER 81-1494] p0566 A81-45893
RB.199 - Compact Tornado power
p0567 A81-46334
Projected power and specific fuel consumption development of the Rolls Royce Gem engine
p0575 A81-46637
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
p0615 A81-48333
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] p0620 A81-48637
Propulsion energy for tomorrow's aviation
p0622 A81-45161
Hydrogen engines
p0625 A81-49949
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 2: Appendix A. Performance data - GE27/T3 study A1 turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 3: Appendix B. Performance data - TF34/T7 study A1 turboprop
[AD-A089279] p0028 N81-10069
Cost/benefit analysis of advanced materials technology candidates for the 1980's, part 2
[NASA-CR-165176] p0048 N81-11953
Road map to adaptive optimal control --- jet engine control
p0079 N81-12098
NASA contributions to radial turbine aerodynamic analyses
[NASA-TM-81644] p0090 N81-13019
Advanced Technology Spark-Ignition Aircraft Piston Engine Design Study
[NASA-CR-165162] p0130 N81-13963
Application of the MNA design method to a nonlinear turbofan engine --- multivariable Nyquist array method
[NASA-CR-163855] p0143 N81-15001
An overview of general aviation propulsion research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16052
Propulsion system mathematical model for a lift/cruise fan V/STOL aircraft
[NASA-TM-81663] p0195 N81-16055
JT8D-15/17 high pressure turbine root discharged blade performance improvement --- engine design
[NASA-CR-165220] p0214 N81-17080
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A093122] p0215 N81-17092
Material and structural problems in aircraft engine technology --- CFM-56 engine
[AAAF-NT-79-23] p0216 N81-17096
Model 250-C30/C28B compressor development
p0219 N81-17466
VCE test bed engine for supersonic cruise research
p0245 N81-17995
Progress with variable cycle engines
p0245 N81-17997
Effects on inlet technology on cruise speed selection

p0245 N81-17990
The RB211 engine and its development --- design
and testing of turbofan engines
[PNR-90043] p0338 N81-21037
Quiet Clean General Aviation Turbofan (QCGAT)
technology study, volume 1
[NASA-CR-164222] p0376 N81-22052
Design concepts for low-cost composite turbofan
engine frame
[NASA-CR-165217] p0376 N81-22053
Structures, performance, benefit, cost study ---
gas turbine engines
[NASA-CR-165313] p0428 N81-24067
The specification of development tests for the
engine of a combat aircraft --- engines for the
Mirage 2000 and 4000 aircraft
p0430 N81-24082
Design development, and certification of a CFM56
engine: Resistance to the ingestion of foreign
bodies
p0431 N81-24087
Simplified design point performance model of a dry
turbofan engine cycle
[NASA-TM-83112] p0490 N81-26148
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149
The packaging of electronic engine control units
and related subcomponents
p0497 N81-27105
Small turbine engine augmentor. Phase 1:
Preliminary design studies of afterburner and
duct-burner configurations
[AD-A101595] p0583 N81-30131
Programmes for military engines with cost objectives
--- aircraft engines
[PNR-90058] p0583 N81-30133
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
CF 6 engine diagnostics
p0597 N81-31197
Performance retention of the RB211 powerplant in
service
p0598 N81-31201
Performance deterioration: An airline perspective
p0598 N81-31202
Advanced oxide dispersion strengthened sheet
alloys for improved combustor durability
p0598 N81-31204
An introduction to NASA's turbine engine hot
section technology (HOST) project
p0599 N81-31206
The nature of operating flight loads and their
effect on propulsion system structures
p0599 N81-31207
Design and evaluation of an integrated Quiet,
Clean General Aviation Turbofan (QCGAT) engine
and aircraft propulsion system
[NASA-CR-165185] p0629 N81-32147
Multi-mission STOVL with vectored thrust engines
p0633 N81-33149
Simplified off-design performance model of a dry
turbofan engine cycle
[NASA-TM-83204] p0639 N81-33206

ENGINE FAILURE

Impact damage of aircraft gas turbine engines with
axial compressors
p0005 A81-11328
The possibility of improving the
lateral-directional characteristics of a
twin-engine aircraft by spoilers in the case of
sudden engine failure
p0049 A81-12967
A survey of propulsion systems'
malfunctions/failures resulting in helicopter
mishaps
p0105 A81-17513
Failure Indication and Corrective Action for
turboshaft engines
p0106 A81-17515
Critical field length calculations for preliminary
design
p0183 A81-23366
Contribution to the improvement of the classical
method of maintenance of aeroengines
p0290 A81-29055
Analysis of vibration related failures in aero
turbo-shaft engines
p0251 A81-29057
The analytical ferrograph - Some factors affecting
deposit formation
p0293 A81-29077
Full-flow debris monitoring in gas turbine engines
[ASME PAPER 81-GT-60] p0313 A81-29970
Principles of the reliability of gas turbine engines
--- Russian book
p0482 A81-40621
An investigation of the recovery from an engine
failure in a twin engine augmentor wing aircraft
using the NAE Airborne Simulator
p0509 A81-41199
Engine usage prediction for advanced fighter
aircraft
[AIAA PAPER 81-1367] p0514 A81-42178
Sensor/actuator failure detection and isolation
for airbreathing propulsion systems
p0564 A81-45551
Engine requirements for the T-37 trainer aircraft
- A simulation study and analysis
p0616 A81-48379
Sensor/actuator failure detection for turbofan
engines
p0080 N81-12104
Engine parameter trend analysis with LEADS 200:
Possibilities and limitations --- using flight
recorder data
p0382 N81-23010
Investigations into local fault detection on
turbojet engines --- monitoring instruments
p0382 N81-23011
Location of faults in jet engines by calculation
of component characteristics
p0382 N81-23012
High-response measurements of a turbofan engine
during nonrecoverable stall
[NASA-TM-81759] p0443 N81-25084

ENGINE INLETS

Engine air intake design support by use of
computational methods and comparison of
theoretically derived pressure distributions
with experimental data
p0008 A81-11614
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Exhaust gas reingestion measurements --- in
helicopters
p0106 A81-17521
A preliminary experimental investigation of the
response of a turbojet engine to inlet pressure
distortion
p0108 A81-17828
Scale effects on turbulent boundary layer
development and flow separation around V/STOL
inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Three-dimensional turbulent boundary layer
development and separation in V/STOL engine
inlets at incidence with small-cross flow and
curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
Development and validation of computational flow
analysis for design of inlets and nozzles
p0298 A81-29117
Design and development of the combustor inlet
diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
Tests for inlet distortion in a two-spool turbojet
engine on the ground test bed
p0419 A81-37340
Aerodynamic design of engine air intakes for
improved performance
p0470 A81-40117
Effect of a part-span variable inlet guide vane on
the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842
F/A-18A inlet/engine compatibility flight test
results
[AIAA PAPER 81-1393] p0503 A81-40860
An experimental study on air intake performance
for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906
A perspective on developing new inlet distortion
measurement and predictive methods
[AIAA PAPER 81-1589] p0507 A81-40964
Aerodynamic and acoustic behavior of a YF-12 inlet
at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972

F-16 variable-geometry inlet design and performance
[AIAA PAPER 81-1394] p0514 A81-42184
An approach to conformal inlet diffuser design for
integrated propulsion systems
[AIAA PAPER 81-1395] p0514 A81-42185
Zero-length inlets for subsonic V/STCL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186
Design concepts for minimizing hot-gas ingestion
in V/STOL aircraft
[AIAA PAPER 81-1624] p0525 A81-43133
Propulsion system installation design for
high-speed prop-fans
[AIAA PAPER 81-1649] p0526 A81-43144
Low-speed aerodynamic performance of
50.8-centimeter-diameter noise-suppressing
inlets for the Quiet, Clean, Short-haul
Experimental Engine (QCSEE) --- Lewis 9- by
15-foot low speed wind tunnel tests
[NASA-TP-1178] p0035 N81-11037
Prediction of sound radiated from different
practical jet engine inlets
[NASA-CR-163824] p0137 N81-14789
High-speed cowlings, air inlets and outlets, and
internal-flow systems
p0185 N81-15973
Effects on inlet technclogy on cruise speed
selection
p0245 N81-17998
Forward velocity effects on fan noise and the
suppression characteristics of advanced inlets
as measured in the NASA Ames 40 by 80 foot wind
tunnel: Acoustic data report
[NASA-CR-152329] p0258 N81-18798
Preliminary wind-tunnel investigation of the
effects of engine nacelles on a transport
configuration with high lift drag ratios to a
Mach number of 1.00
[NASA-TM-82312] p0272 N81-19099
Electromagnetic scattering by open circular
waveguides --- modeling jet engine inlets
[AD-A095554] p0336 N81-20345
Aerodynamic and acoustic behavior of a YF-12 inlet
at static conditions
[NASA-CR-163106] p0342 N81-21079
Top-mounted inlet system feasibility for
transonic-supersonic fighter aircraft --- V/STOL
aircraft
[NASA-TM-81292] p0428 N81-24066
Inlet-engine compatability testing techniques in
ground test facilities
p0431 N81-24090
Additional testing of the inlets designed for a
tandem fan V/STOL nacelle
[NASA-CR-165310] p0483 N81-26075
Prediction of sound radiation from different
practical jet engine inlets
[NASA-CR-164620] p0500 N81-27886
An investigation of engine influence on inlet
performance --- conducted in the Ames 40- by
80-foot wind tunnel
[NASA-CR-166136] p0579 N81-30084
Fiber optics for aircraft engine/inlet control
[NASA-TM-82654] p0597 N81-31190

ENGINE MONITORING INSTRUMENTS
Failure Indication and Corrective Action for
turboshaft engines
p0106 A81-17515
Engine performance monitoring systems expansion on
Alitalia aircraft
p0290 A81-29054
The analytical ferrograph - Some factors affecting
deposit formation
p0293 A81-29077
A digital technique for the analysis of the
response of compressor/duct systems in unsteady
flow
p0294 A81-29078
Full-flow debris monitoring in gas turbine engines
[ASME PAPER 81-GT-60] p0313 A81-29970
Overview of ARP 1587 aircraft gas turbine Engine
Monitoring System guide
[SAE PAPER 801218] p0404 A81-34224
Current and future use of an AIDS integrated EMS
--- Aircraft Integrated Data System for Engine
Monitoring
[SAE PAPER 801219] p0404 A81-34225
TF41/A7-E engine monitoring system implementation
experience
[SAE PAPER 801222] p0404 A81-34226
TriStar engine monitoring in British Airways
[SAE PAPER 801224] p0405 A81-34227
An alternative approach to engine rating
structures using monitoring systems
[SAE PAPER 801225] p0405 A81-34228
Advanced debris monitoring systems for helicopters
p0472 A81-40127
A-10/TF34 Turbine Engine Monitoring System
evaluation and implementation
[AIAA PAPER 81-1447] p0505 A81-40880
A jet engine monitor /JEM/ for the TA-7C
[AIAA PAPER 81-1562] p0507 A81-40947
F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
Sensor/actuator failure detection and isolation
for airbreathing propulsion systems
p0564 A81-45551
HH-65A Dolphin engine condition monitoring system
p0575 A81-46636
Synopsis on aircraft integrated data systems and
engine health monitoring and maintenance
[DFVLR-MITT-80-08] p0075 N81-12063
Engine diagnostics program: CF6-50 engine
performance deterioration
[NASA-CR-159867] p0078 N81-12085
Sensor/actuator failure detection for turbofan
engines
p0080 N81-12104
Individual jet engine stress load monitoring with
the aid of the flight data recording system
LEADS 200
p0328 N81-20013
Identification of jet engine damages by engine
trend analysis LEADS 200 data
p0328 N81-20014
Some effects of compressor fouling on the behavior
of a turbojet engine --- as evidenced by an
engine monitoring system
p0328 N81-20015
Engine parameter trend analysis with LEADS 200:
Possibilities and limitations --- using flight
recorder data
p0382 N81-23010
Investigations into local fault detection on
turbojet engines --- monitoring instruments
p0382 N81-23011
The engine usage monitoring system: An heuristic
approach to cost effective data monitoring and
analysis --- onboard fatigue monitoring
p0382 N81-23013
Classification of operating conditions of
turbomachines from solid borne sound
p0382 N81-23015
Reduction of measured data and possibilities for
early detection of sensor break-down
p0383 N81-23016
Aircraft Engine Diagnostics
[NASA-CP-2190] p0597 N81-31196
Who needs engine monitoring?
p0599 N81-31209
F100 engine diagnostic system status to date
p0599 N81-31210
A-10/TF34 Turbine Engine Monitoring System (TEMS)
p0599 N81-31211
Helicopter propulsion system reliability and
engine monitoring assessments
p0599 N81-31213
Engine health monitoring systems: Tools for
improved maintenance management in the 1980's
p0599 N81-31214
Engine condition monitoring: CF6 family 60's
through the 80's
p0600 N81-31215
An overview of SAE ARP 1587: Aircraft gas turbine
engine monitoring system guide
p0600 N81-31217

ENGINE NOISE
Acoustic structures --- titanium brazing method
for producing honeycomb structures for jet
engine noise reduction
p0001 A81-10272
Numerical prediction of bypass engine jet noise
[AIAA PAPER 80-1006] p0057 A81-14300
Propagation of three-dimensional acoustic
perturbations in channels of variable
cross-sectional area at frequencies close to
cutoff frequency
p0119 A81-19338

Unsteady fan blade pressure and acoustic radiation
from a JT15D-1 turbofan engine at simulated
forward speed
[AIAA PAPER 81-0096] p0161 A81-20598
Convective amplification of gas turbine engine
internal noise sources
p0171 A81-21595
New interpretations of shock-associated noise with
and without screech
p0178 A81-22527
Core noise measurements from a small, general
aviation turbofan engine
p0178 A81-22531
Noise from gas turbine combustors
p0236 A81-26008
Noise attenuation and associated thrust increase
of turbojet engines through hyper-mixing ejector
shrouds
p0291 A81-29062
Installation effects on propeller noise
[AIAA PAPER 80-0993] p0352 A81-31369
Analysis of axial fan noise with the help of the
Lowson formalism
[AAAF PAPER NT 80-54] p0370 A81-33948
Broadband helicopter rotor noise
[AAAF PAPER NT 80-58] p0370 A81-33949
In-flight jet engine noise measurement system
p0410 A81-35553
Comparison of predicted engine core noise with
proposed FAA helicopter noise certification
requirements
p0454 A81-38062
Suppression of jet noise peak by velocity profile
reshaping
p0458 A81-39039
Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184
Aerodynamic and acoustic behavior of a YF-12 inlet
at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Effect of engine noise on aircraft wing laminar
boundary-layer stability
p0510 A81-41255
The design and development of a mixer compound
exhaust system for a quiet clean general
aviation turbofan
[AIAA PAPER 81-1494] p0566 A81-45893
Aircraft noise control in the 1980's
p0567 A81-46352
Procedure for evaluation of engine isolators for
reduced structure-borne interior noise
transmission
[AIAA PAPER 81-1970] p0618 A81-48608
Laboratory study of efficient add-on treatments
for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618
Engine noise source breakdown - Theory, simulation
and results
[AIAA PAPER 81-2040] p0619 A81-48620
Turbomachinery noise studies of the AiResearch
QCGAT engine with inflow control --- acoustic
performance
[AIAA PAPER 81-2049] p0619 A81-48621
The effect of vane-frame design on rotor-stator
interaction noise
[AIAA PAPER 81-2034] p0619 A81-48627
Effects of blade-vane ratio and rotor-stator
spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48628
Comparative acoustic wind-tunnel measurements and
theoretical correlations on subsonic aircraft
propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634
Comparison of predicted engine core noise with
current and proposed aircraft noise
certification requirements
[AIAA PAPER 81-2053] p0620 A81-48635
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] p0620 A81-48636
Mixer nozzle aeroacoustic characteristics for the
energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639
Effect of excitation on coaxial jet noise as
observed by an elliptic mirror
[AIAA PAPER 81-2044] p0621 A81-48651
High bypass ratio engine noise component
separation by coherence technique
[AIAA PAPER 81-2054] p0621 A81-48653
The effect of flight and the presence of an
airframe on engine exhaust noise
[AIAA PAPER 81-2029] p0623 A81-49727
Core noise measurements from a small, general
aviation turbofan engine
[NASA-TM-81610] p0044 N81-11769
Analysis of pressure spectra measurements in a
ducted combustion system
[NASA-TM-81583] p0146 N81-15768
Improved methods for fan sound field determination
[NASA-CR-165186] p0147 N81-15769
Studies on proper simulation during static testing
of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853
Acoustic and aerodynamic performance investigation
of inverted velocity profile coannular plug
nozzles --- variable cycle engines
[NASA-CR-3149] p0203 N81-16854
VCE early acoustic test results of General
Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999
Flight and tunnel test results of the MDC
mechanical jet noise suppressor nozzle
p0245 N81-18000
Forward velocity effects on fan noise and the
suppression characteristics of advanced inlets
as measured in the NASA Ames 40 by 80 foot wind
tunnel: Acoustic data report
[NASA-CR-152329] p0258 N81-18798
Design of an exhaust mixer nozzle for the
Avco-Lycoming Quiet Clean General Aviation
Turbofan (QCGAT)
[NASA-CR-159426] p0274 N81-19120
Coupling of unsteady lift to acoustic duct modes
in an axial flow fan
[AD-A095080] p0274 N81-19124
Comparison of predicted engine core noise with
proposed FAA helicopter noise certification
requirements
[NASA-TM-81739] p0381 N81-22839
Lateral attenuation of high-by-pass ratio engined
aircraft noise
[NASA-TM-81968] p0394 N81-23062
Prediction of sound radiation from different
practical jet engine inlets
[NASA-CR-164620] p0500 N81-27886
Helicopter noise exposure level data: Variations
with test target. Indicated airspeed, distance,
main rotor RPM and takeoff power
[AD-A100691] p0552 N81-29661
Noise suppression characteristics of peripherally
segmented duct liners
[NASA-TP-1904] p0641 N81-33946

ENGINE PARTS
Is the engine helicopter-worthy
p0106 A81-17518
Turbine blade technology - Present and future
[ASME PAPER 80-C2/AERO-10] p0116 A81-18639
Computer-aided process planning system for
aircraft engine rotating parts
p0149 A81-19836
Application of exoelectron emission for quality
control of gas-turbine engine parts
p0171 A81-21367
Development program for a graphite/PMR 15
polyimide duct for the F404 engine
p0181 A81-22647
The M.45SD-02 variable pitch geared fan engine
demonstrator test and evaluation experience
p0283 A81-27897
Some experience with ferrography in monitoring the
condition of aircraft engines
p0285 A81-27943
High temperature metal matrix composites for gas
turbines
p0295 A81-29090
Investigation of the squeeze film bearing on
two-spool turbo-fan engine
p0295 A81-29093
Carbon/carbon components for advanced gas turbine
engines
[ASME PAPER 81-GT-35] p0312 A81-29949
Cooling air flow characteristics in gas turbine
components
[ASME PAPER 81-GT-76] p0313 A81-29984
Commercial engine logistics cost projections - A
dynamic and flexible approach
[ASME PAPER 81-GT-114] p0315 A81-30018

Principles of aircraft-engine assembly --- Russian
book
p0355 A81-31799
JT8D performance improvement to offset rising fuel
costs
[SAE PAPER 801117] p0395 A81-34153
The present and future applications of titanium
alloys in engines
p0417 A81-36666
Pilot installations for deposition techniques in
the case of components exposed to heat and for
diffusion joining of power plant components
p0449 A81-37634
Manufacturing technology for low temperature
composite engine frames --- for TF-34 engine
[AIAA PAPER 81-1355] p0501 A81-40837
Recent developments in Naval aircraft jet engine
usage
[AIAA PAPER 81-1366] p0502 A81-40846
Use of segmented mold process to produce large
superalloy engine castings
[AIAA PAPER 81-1404] p0503 A81-40861
Blade tip ceramic outer air seal for long life
turbine engines
[AIAA PAPER 81-1440] p0504 A81-40874
Critical considerations in the design of
supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1284] p0511 A81-41748
Engine life methodologies for conceptual design
[AIAA PAPER 81-1398] p0515 A81-42188
Impact of advanced propeller technology on
aircraft/mission characteristics of several
general aviation aircraft
[SAE PAPER 810584] p0520 A81-42745
Fiber-reinforced composites - The future for
aeropropulsion
[AIAA PAPER 81-1713] p0527 A81-43164
Graphite/polyimide augmentor and nozzle components
--- of advanced military gas turbine engines
[AIAA PAPER 81-1358] p0625 A81-49976
Metallurgical aspects of materials processing and
manufacturing for aero-engine components --- gas
turbine engines
[PNR-90019] p0084 N81-12209
A resin injection technique for the fabrication of
aero engine composite components
[PNR-90024] p0131 N81-14004
Cost/benefit analysis of advanced materials
technologies for future aircraft turbine engines
[NASA-CR-165225] p0144 N81-15006
Vibrations of turbine engine blades by shell
analysis
p0257 N81-18404
Regenerative engine analysis program
[AD-A095144] p0274 N81-19123
Development and fabrication of refractory silicon
carbide bodies, especially for gas turbine engines
--- by hot pressing
[BMFT-FB-T-79-137] p0275 N81-19128
Development of gas turbine components, using
silicon nitride --- forming techniques
[BMFT-FB-T-79-152] p0275 N81-19129
Concept definition: Retirement for cause of F-100
rotor components
[AD-A095584] p0335 N81-20080
The rejuvenation of properties in turbine engine
hot section components by hot isostatic pressing
[AD-A097551] p0390 N81-23088
Performance retention of the RB211 powerplant in
service
p0598 N81-31201
Performance deterioration: An airline perspective
p0598 N81-31202
A prescriptive model for resource allocation at
the intermediate level engine facility
[AD-A103785] p0632 N81-33135
ENGINE STARTERS
Investigation into the vibration of the starter
gearbox of an aircraft turbine engine
p0291 A81-29059
A generalized mathematical model to estimate gas
turbine starting characteristics
[ASME PAPER 81-GT-202] p0318 A81-30092
Hydrodynamic modelling of the starting process in
liquid-propellant engines
p0351 A81-31287
An experimental evaluation of the performance
deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168
The status of the expendable gasifier program ---
gas generator for aircraft engine
[SAE PAPER 801151] p0406 A81-34282
Samarium cobalt (SMCO) generator/engine
integration study
[AD-A092904] p0214 N81-17087
Reasons for low aerodynamic performance of
13.5-centimeter-tip-diameter aircraft engine
starter turbine
[NASA-TP-1810] p0334 N81-20076
High performance auxiliary power unit technology
demonstrator
[AD-A098618] p0444 N81-25085
ENGINE TESTING LABORATORIES
A mobile emissions laboratory for on-line analysis
of combustion products from gas turbine engines
p0361 A81-32872
O.N.E.R.A. ramjet test facilities
p0365 A81-33285
A forward look at gas turbine testing facilities
[SAE PAPER 801124] p0396 A81-34159
Digital controls in a large engine test facility
p0532 A81-43715
Quantitative thermography in aero-engine research
and development
[PNR-90021] p0029 N81-10075
Free-jet testing of powerplants for aircraft and
missiles
p0431 N81-24089
Inlet-engine compatability testing techniques in
ground test facilities
p0431 N81-24090
Gas turbine engine transient testing
p0431 N81-24091
Experimental verification of turboblading
aeromechanics
p0432 N81-24092
Bench testing of a vectored thrust engine
p0432 N81-24093
Full annular combustor test facility for high
pressure/high temperature testing
p0432 N81-24097
ENGINE TESTS
NT COLD FLOW TESTS
NT STATIC FIRING
Reliability and engineering-economic
characteristics of aircraft engines --- Russian
book
p0001 A81-10045
Forced vibrations of a nonlinear system excited by
a centrifugal oscillator with a sloping engine
characteristic
p0002 A81-10439
Advanced transmission component development and
test program --- for helicopters
p0105 A81-17507
Safety considerations for helicopter drive systems
of the 1980s
p0105 A81-17510
Development and operational flight test of the
model 250-C28B gas turbine engine
p0105 A81-17512
Issues regarding Army turboshaft engines
diagnostics and condition monitoring
p0105 A81-17514
Advanced technology turboshaft IR suppression
p0106 A81-17519
A preliminary experimental investigation of the
response of a turbojet engine to inlet pressure
distortion
p0108 A81-17824
The measurement and analysis of station parameters
of a turbojet engine
p0109 A81-17825
Considerations of the use of vitiated preheat ---
for engine inlets
p0150 A81-20023
Parameter identification and discriminant analysis
for jet engine mechanical state diagnosis
p0156 A81-20474
The M.45SD-02 variable pitch geared fan engine
demonstrator test and evaluation experience
p0283 A81-27897
Effectiveness of turbine engine diagnostic systems
p0290 A81-29053
Investigation of the squeeze film bearing on
two-spool turbo-fan engine
p0295 A81-29093

Reduction of strut induced rotor blade vibration
  with the modified stator setting angles
  p0295 A81-29897
The evaluation of fuel property effects on Air
  Force gas turbine engines - Program Genesis
  [ASME PAPER 81-GT-1] p0310 A81-29926
The development of a substitute bird model
  [ASME PAPER 81-GT-23] p0311 A81-29939
Pattern factor improvement in the F-100 primary
  combustion system
  [ASME PAPER 81-GT-25] p0311 A81-29941
Preliminary study on reheat combustor for advanced
  gas turbine
  [ASME PAPER 81-GT-29] p0311 A81-29944
Improved jet engine maintenance through automated
  vibration diagnostic systems
  [ASME PAPER 81-GT-62] p0313 A81-29972
Application of water cooling for improved gas
  turbine fuel flexibility and availability
  [ASME PAPER 81-GT-68] p0313 A81-29977
The Navy PATE program --- Propulsion Automatic
  Test Equipment
  [ASME PAPER 81-GT-189] p0317 A81-30082
High temperature electronic requirements in
  aeropropulsion systems
  p0359 A81-32547
Centralized in-place pressure calibration system
  for multiple turbine engine aerodynamic pressure
  measurement systems
  p0360 A81-32847
Development of a noninterference compressor blade
  stress measurement system
  p0361 A81-32874
CFM56-3 high by-pass technology for single aisle
  twins
  [AIAA PAPER 81-0808] p0368 A81-33889
Propellers for economic flight at high speeds
  [AAAF PAPER NT 80-34] p0369 A81-33936
Results of thermal tests on the GTA-18 gas turbine
  unit with the RD-3M-500 jet engine
  p0395 A81-34022
The F100 engine
  [SAE PAPER 801110] p0395 A81-34151
A review of the installation, performance and
  economic aspects of a high altitude facility for
  small gas turbines
  [SAE PAPER 801121] p0396 A81-34157
Description of the NASA core turbine facility and
  the warm annular cascade facility recently
  installed at NASA Lewis Research Center
  [SAE PAPER 801122] p0396 A81-34158
Full Authority Digital Electronic Control turbofan
  engine demonstration
  [SAE PAPER 801199] p0402 A81-34209
Tests for inlet distortion in a two-spool turbojet
  engine on the ground test bed
  p0419 A81-37340
Fundamental investigation on jet engine ignition
  of fuel sprays and its application
  p0420 A81-37341
Control of particulate emissions from turbine
  engine test cells by cooling water injection
  p0453 A81-37796
An apparatus for the simulation of an air intake
  at high angle of attack in a compressor test
  facility
  [ONERA, TP NO. 1981-35] p0460 A81-39238
Tests of air inlets at Reynolds numbers comparable
  to flight in the ONERA F1 and S1MA wind tunnels
  [ONERA, TP NO. 1981-36] p0460 A81-39239
Wind-tunnel tests of engine-equipped models -
  Comparison of two jet wash simulation methods
  [ONERA, TP NO. 1981-42] p0460 A81-39245
Investigation of the influence of the radial
  nonuniformity of initial temperature and energy
  losses on flow structure in a highly loaded
  turbine stage
  p0465 A81-40019
Experimental determination of the circumferential
  drift of edge wakes of guide vanes in a turbine
  stage
  p0466 A81-40022
A new approach to turboshaft engine growth
  [AHS 80-41] p0477 A81-40169
TF41/Lamilloy Accelerated Mission Test
  [AIAA PAPER 81-1349] p0501 A81-40833
F/A-18A inlet/engine compatibility flight test
  results
  [AIAA PAPER 81-1393] p0503 A81-40860
Interpretation of ramjet combustor test data
  [AIAA PAPER 81-1433] p0504 A81-40870
Effect of oxygen addition on low pressure ignition
  performance of aero gas turbine engine at
  simulated altitude facility
  [AIAA PAPER 81-1471] p0505 A81-40891
Strong pressure waves in air-breathing engines
  [AIAA PAPER 81-1475] p0505 A81-40895
NAPC gyroscopic moment test facility
  [AIAA PAPER 81-1480] p0506 A81-40900
Full authority digital electronic control /FADEC/
  - Variable cycle engine demonstration
  [AIAA PAPER 81-1498] p0506 A81-40910
JT9D performance deterioration results from a
  simulated aerodynamic load test
  [AIAA PAPER 81-1508] p0507 A81-40963
TELS - A facility to observe the effect of
  simulated flight maneuver loads on turbine engines
  [AIAA PAPER 81-1591] p0508 A81-40966
A compact installation for testing vectored-thrust
  engines
  [AIAA PAPER 81-1592] p0508 A81-40967
A successful step toward an advanced supersonic
  transport engine - Acoustic and emission results
  from the Pratt and Whitney Aircraft Variable
  Cycle Engine Program
  [AIAA PAPER 81-1593] p0508 A81-40968
NASA VCE test bed engine aerodynamic performance
  characteristics and test results
  [AIAA PAPER 81-1594] p0508 A81-40969
Turbine bypass engine - A new supersonic cruise
  propulsion concept
  [AIAA PAPER 81-1596] p0508 A81-40971
Excitation of surging type oscillations due to
  aperiodic external effects --- in multishaft
  turbojet engines
  p0509 A81-41032
Experimental investigation of a high-aspect-ratio
  supersonic inlet
  [AIAA PAPER 81-1397] p0515 A81-42187
Modeling of ramjet combustors using simple reactor
  theory
  [AIAA PAPER 81-1429] p0515 A81-42196
Evaluation of multi-viscosity oils designed for
  aircraft reciprocating engines
  [SAE PAPER 810572] p0519 A81-42737
Avco Lycoming's ALF 502 high bypass fan engine
  [SAE PAPER 810618] p0523 A81-42773
Full-scale study of the cooling system
  aerodynamics of an operating piston engine
  installed in a light aircraft wing panel
  [SAE PAPER 810623] p0523 A81-42777
Erosion strength of aircraft engine and power
  plant parts --- Russian book
  p0570 A81-46840
Analytical and computer-aided design of automated
  systems for the testing of aircraft engines ---
  Russian book
  p0578 A81-46850
The effect of vane-frame design on rotor-stator
  interaction noise
  [AIAA PAPER 81-2034] p0619 A81-48627
Aircraft turbine engine monitoring experience. An
  overview and lessons learned from selected case
  studies
  [AD-A089752] p0036 N81-11042
Experimental analysis of IMEP in a rotary
  combustion engine
  [NASA-TM-81662] p0195 N81-16054
Validation of a two dimensional primitive variable
  computer code for flow fields in jet engine test
  cells
  [AD-A092138] p0196 N81-16060
Multivariable control synthesis program: Control
  aspects of the F100 altitude demonstration of
  the multivariable control system
  [AD-A093868] p0216 N81-17095
VCE test bed engine for supersonic cruise research
  p0245 N81-17995
An investigation of the reacting and non-reacting
  flow characteristics of solid ramjets
  [AD-A098567] p0253 N81-18059
Validation of a two-dimensional primitive variable
  computer code for flow fields in jet engine test
  cells
  [AD-A094615] p0254 N81-18067
Survey of aircraft icing simulation test
  facilities in North America
  [NASA-TM-81707] p0269 N81-19078

Automotive technology development program [DOE/CS-0069/1] p0278 N81-19464
The RB211 engine and its development --- design and testing of turbofan engines [PNR-90043] p0338 N81-21037
Design concepts for low-cost composite turbofan engine frame [NASA-CR-165217] p0376 N81-22053
Turbine Engine Testing [AGARD-CP-293] p0429 N81-24071
Overview of all civil aviation engine certification/demonstration requirements and rationale, i.e., FAA, CAA, etcetera p0429 N81-24072
Specification requirements for fighter engines p0429 N81-24073
Specification and requirements rationale for military and civil helicopter engines p0429 N81-24075
Boeing Commercial Airplane Company engine procurement practices p0429 N81-24076
Propulsion system testing requirements for a commercial transport p0430 N81-24077
performance control and qualification tests of civil aviation turbine engines in tests conducted by airframe manufacturers p0430 N81-24078
Development of test requirements for civil engines p0430 N81-24079
The specification of development tests for the engine of a combat aircraft --- engines for the Mirage 2000 and 4000 aircraft p0430 N81-24082
Turbine engine tests as seen by an aircraft company p0430 N81-24084
Derivation and correlation of accelerated mission endurance testing p0431 N81-24088
Free-jet testing of powerplants for aircraft and missiles p0431 N81-24089
Inlet-engine compatability testing techniques in ground test facilities p0431 N81-24090
Gas turbine engine transient testing p0431 N81-24091
Experimental verification of turboblading aeromechanics p0432 N81-24092
Bench testing of a vectored thrust engine p0432 N81-24093
Performance assessment of an advanced reheated turbo fan engine p0432 N81-24094
Flight tests of the engines of combat aircraft: Validation methods used by CEV p0432 N81-24095
Tests of large compressors at CE Pr p0432 N81-24096
Full annular combustor test facility for high pressure/high temperature testing p0432 N81-24097
Low pressure turbine testing p0432 N81-24098
Rig investigation of a two stage single shaft low cost turbine p0432 N81-24099
The mechanical testing of compressors and turbines for aircraft gas turbine engines p0433 N81-24100
Development tests of an engine with limited life --- Microturbo TRI 60 p0433 N81-24103
Prediction of future test needs, test facilities and procedures p0433 N81-24104
Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine [NASA-TM-81761] p0443 N81-25079
JT9D performance deterioration results from a simulated aerodynamic load test [NASA-TM-82640] p0443 N81-25082
The criticality of engine exhaust simulations on VSTOL model-measured ground effects p0486 N81-26115
Microprocessor system test and monitoring p0497 N81-27108
From the civil component program 'IFAS': Fundamentals of engine simulation, using turbopowered simulator (TPS) technology in wind tunnel tests [BMFT-FB-W-80-030] p0541 N81-28111
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design [NASA-TM-81660] p0588 N81-30562
Aircraft Engine Diagnostics [NASA-CP-2190] p0597 N81-31196
CF6 high pressure compressor and turbine clearance evaluations p0598 N81-31198
JT8D engine performance retention p0598 N81-31200
Cruise missile engine program contract data requirements list sequence number 95. Qualification test report. Volume 35: Vibration and mission simulation testing on engine 828. XF-107-WR-400 cruise missile engine [AD-A102257] p0600 N81-31220

ENGINEERING DEVELOPMENT
U PRODUCT DEVELOPMENT

ENGINEERING DRAWINGS
Low cost airborne microwave landing system receiver, task 3 [NASA-CR-152409] p0075 N81-12058

ENGINES
NT AIR BREATHING ENGINES
NT BOOSTER ROCKET ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT DIESEL ENGINES
NT DUCTED FAN ENGINES
NT GAS TURBINE ENGINES
NT HELICOPTER ENGINES
NT HYDROGEN ENGINES
NT INTERNAL COMBUSTION ENGINES
NT J-65 ENGINE
NT J-79 ENGINE
NT J-85 ENGINE
NT J-97 ENGINE
NT JET ENGINES
NT LIQUID PROPELLANT ROCKET ENGINES
NT PISTON ENGINES
NT RAMJET ENGINES
NT ROCKET ENGINES
NT SOLID PROPELLANT ROCKET ENGINES
NT SUPERSONIC COMBUSTION RAMJET ENGINES
NT T-56 ENGINE
NT TF-30 ENGINE
NT TF-34 ENGINE
NT TF-41 ENGINE
NT TURBINE ENGINES
NT TURBOFAN ENGINES
NT TURBOJET ENGINES
NT TURBOPROP ENGINES
NT VARIABLE CYCLE ENGINES
NT VARIABLE STREAM CONTROL ENGINES

ENTERPRISE (ORBITER)
U SPACE SHUTTLE ORBITER 101

ENVIRONMENT EFFECTS
Environmental chemistry and management of hydrazine p0240 A81-26770
Aircraft and air pollution p0288 A81-28698
Environmental aspects of aircraft emissions - A review and current assessment p0290 A81-29056
Unrepresentative temperatures at a first-order meteorological station Washington National Airport p0622 A81-48047
Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair [AD-A091011] p0094 N81-13062
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD [AD-A091005] p0096 N81-13545
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development [AD-A089962] p0201 N81-16628
Assessment of the impact of advanced air-transport technology p0247 N81-18015

Environmental exposure effects on composite
materials for commercial aircraft
[NASA-CR-165765] p0550 N81-29165
A Matrix Approach to Biological Investigation of
Synthetic Fuels
[PB81-183477] p0586 N81-30313
Responses to comments of Air Transport Association
of America on aircraft towing feasibility study
[DE81-029834] p0638 N81-33201
ENVIRONMENT MANAGEMENT
Environmental aspects of airport planning
p0115 A81-18091
Handbook on bird management and control
[AD-A089009] p0023 N81-10024
ENVIRONMENT POLLUTION
NT AIR POLLUTION
A program to support the full utilization of data
from existing social surveys of environmental
noise
p0570 A81-46374
ENVIRONMENT PROTECTION
Airport/environs plan making - Managing the
planning process
p0114 A81-18088
EPA proposed national strategy for further
reduction of aviation noise
p0567 A81-46353
Advanced technology for controlling pollutant
emissions from supersonic cruise aircraft
p0246 N81-18004
ENVIRONMENT SIMULATION
NT ACOUSTIC SIMULATION
NT SPACE ENVIRONMENT SIMULATION
NT THERMAL SIMULATION
Prediction of changes in aircraft noise exposure
p0017 A81-11820
A case for submicrosecond rise-time lightning
current pulses for use in aircraft
induced-coupling studies
p0057 A81-14267
New techniques for the measurement of natural and
simulated lightning phenomena
p0057 A81-14268
Improving surface current injection techniques via
one- and two-dimensional models
p0149 A81-19940
Computational design of large-scale blast simulators
[AIAA PAPER 81-0159] p0162 A81-20639
Augmenting ATE with dynamic simulation testing
techniques
p0320 A81-30241
The Northrop F/A-18L Mission Simulator
[AIAA 81-0968] p0414 A81-36557
Low-visibility visual simulation with real fog
[AIAA 81-0982] p0415 A81-36569
ENVIRONMENT SIMULATORS
Integration of the F-16 Weapon System Trainer
p0325 A81-30332
Development of a flight simulation capability in
the dynamic environment simulator
[AIAA 81-0978] p0415 A81-36566
ENVIRONMENTAL CHAMBERS
U TEST CHAMBERS
ENVIRONMENTAL CHEMISTRY
NT ATMOSPHERIC CHEMISTRY
Environmental chemistry and management of hydrazine
p0240 A81-26770
ENVIRONMENTAL CONTROL
ECS integration for fuel efficient/low life cycle
cost design --- Environmental Control Systems in
aircraft
p0015 A81-11676
Environmental control systems for executive jet
aircraft
[SAE PAPER 800607] p0061 A81-15330
Materials and processes for aircraft environmental
controls in the 1990's
[SAE PAPER 801181] p0401 A81-34194
Aircraft/avionics environmental integration program
p0570 A81-46480
Development of avionics installation interface
standards
[AD-A101423] p0583 N81-30128
ENVIRONMENTAL ENGINEERING
Combined environment reliability testing /CERT/ as
applied to engine mounted electronic controls
[AIAA PAPER 81-1500] p0516 A81-42204
ENVIRONMENTAL LABORATORIES
Voice communication research and evaluation system
p0603 N81-31450
ENVIRONMENTAL MONITORING
Development of a helicopter water quality
monitoring/sampling system
[PB81-168734] p0499 N81-27714
ENVIRONMENTAL QUALITY
NT AIR QUALITY
NT WATER QUALITY
Airport noise. Citations from the NTIS data base
[PB80-813231] p0088 N81-12667
ENVIRONMENTAL TESTS
NT CORROSION TESTS
NT HIGH TEMPERATURE TESTS
Aircraft and environmental factors influencing
lightning strike
[AIAA PAPER 81-0084] p0160 A81-20509
Adhesive bonding of avionic structures
p0181 A81-22646
Effects of commercial aircraft operating
environment on composite materials
p0182 A81-22681
The new look in reliability - It works ---
Operational Mission Environment test program for
F/A-18 aircraft
p0229 A81-24269
Developing test profiles for multiple mission
situations --- standards for military aircraft
p0570 A81-46483
The Hornet's operational mission environment
p0571 A81-46491
Effect of service environment on composite materials
[AGARD-CP-288] p0039 N81-11128
Effect of various environmental conditions on
polymer matrix composites
p0039 N81-11130
Fatigue strength of CFRP under combined
flight-by-flight loading and flight-by-flight
temperature changes
p0039 N81-11134
Flight simulation environmental fatigue crack
propagation in 2024-T3 and 7475-T761 aluminum
--- wing panels for transport aircraft
[NLR-MP-80003-U] p0043 N81-11415
Vibration test level criteria for aircraft equipment
[AD-A098675] p0442 N81-25070
High performance auxiliary power unit technology
demonstrator
[AD-A098618] p0444 N81-25085
Development for helicopter flight in icing
conditions
p0545 N81-29082
Cruise missile engine program contract data
requirements list sequence number 95.
Qualification test report. Volume 39:
Vibration and mission simulation testing on
engine 828. XF-107-WR-400 cruise missile engine
[AD-A102257] p0600 N81-31220
ENVIRONMENTS
NT HIGH ALTITUDE ENVIRONMENTS
NT HIGH TEMPERATURE ENVIRONMENTS
NT ICE ENVIRONMENTS
NT ROTATING ENVIRONMENTS
Environment-load interaction effects on crack
growth in landing gear steels
[AD-A093803] p0218 N81-17242
EPIDEMIOLOGY
Application of the epidemiological model in
studying human error in aviation
p0265 N81-19046
EPNL
U EFFECTIVE PERCEIVED NOISE LEVELS
EPOXY COMPOUNDS
NT BORON-EPOXY COMPOUNDS
EPOXY MATRIX COMPOSITE MATERIALS
Effects of commercial aircraft operating
environment on composite materials
p0182 A81-22681
The Windecker Eagle - A new era in general
aviation aircraft manufacturing
p0240 A81-26747
Engineering aspects of composite structures for
civil aircraft
p0283 A81-27888
Fatigue strength of certain materials used in
airframe construction --- glass-plastic
reinforced epoxy resin
p0285 A81-28108
A fatigue study and an investigation on
mechanically fastened joints for the development

of a flap p0481 A81-40581
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap p0481 A81-40585
Quality assurance of an epoxy resin prepreg using HPLC p0531 A81-43642
New materials and helicopter certification --- exigencies of certification regulation [AAAF-NT-79-26] p0210 N81-17052

EPOXY RESINS
Adhesive bonding of avionic structures p0181 A81-22646
Microcracking in graphite-epoxy composites [AD-A089894] p0038 N81-11118
A resin injection technique for the fabrication of aero engine composite components [PNR-90024] p0131 N81-14004
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin systems [NASA-CR-152292] p0218 N81-17175

EQUATIONS
Application of transonic potential calculations to aircraft and wind tunnel configurations p0186 N81-15992
Aerodynamic effects of nearly uniform slipstreams on thin wings in the transonic regime [NASA-CR-152351] p0249 N81-18027

EQUATIONS OF MOTION
NT EULER EQUATIONS OF MOTION
NT KINEMATIC EQUATIONS
NT NAVIER-STOKES EQUATION
An exact solution of the problem of the motion of a gyroscope in a Cardan suspension p0019 A81-12704
Exact solutions of the equations of motion of a gyro horizon compass p0290 A81-29001
Concerning the motion of a piloted aircraft p0299 A81-29312
Approximations and short cuts based on generalized functions p0347 A81-30730
Orthogonal multiblade coordinates p0453 A81-38021
Calculation of the impingement of cloud droplets in a cylinder by the finite-element method p0533 A81-43890
Generic multi-body formulation of heavy lift airship equations of motion p0563 A81-45539
Investigation of landing flare in the presence of wind shear [ESA-TT-631] p0077 N81-12080
Dynamics of a helicopter-slung load system p0092 N81-13051
Supercritical flow past symmetrical airfoils [AD-A093300] p0203 N81-16904
Active controls for flutter suppression and gust alleviation in supersonic aircraft --- YF-17 flutter model [NASA-CR-163934] p0216 N81-17097
Advanced supersonic transport fixed-base simulator evaluations at landing approach p0244 N81-17992
Measurements of aerodynamic damping in the MIT transonic rotor [NASA-CR-163988] p0274 N81-19122
The stick-fixed lateral dynamic stability of the CSIR SARA II autogyro [NIAST-80/52] p0434 N81-24107

EQUATIONS OF STATE
Control system design using graphical decomposition techniques p0410 A81-35567

EQUATORIAL ORBITS
Air traffic control and position location by satellite constellation in equatorial orbit p0173 A81-21912

EQUILIBRIUM EQUATIONS
A new method for torsion of shaft with variable diameter using non-orthogonal curvilinear coordinates and its application [AIAA 81-0477] p0300 A81-29378
Application of the finite element method to rotary wing aeroelasticity p0251 N81-18043

EQUIPMENT SPECIFICATIONS
Development of specifications from measured environments p0067 A81-16119
Requirements and possibilities - Rotorcraft powerplants /The 15th Halford Memorial Lecture/ p0226 A81-23999
Development and applications of MIL-STD-1553 --- for avionics data buses [SAE PAPER 801142] p0398 A81-34172
The requirements for efficient small turbine engines taking up the challenge [AHS 80-42] p0477 A81-40170
C-X - A case for scenario-oriented requirements --- new long-range military transport program [AIAA PAPER 81-1690] p0527 A81-43159
Longitudinal equivalent systems analysis of Navy tactical aircraft [AIAA 81-1775] p0554 A81-44094
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment [RTCA/DO-177] p0595 N81-31180

ERECTION
U CONSTRUCTION

ERGONOMICS
U HUMAN FACTORS ENGINEERING

EROSION
NT RAIN EROSION
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion [SAE PAPER 801100] p0512 A81-41776
Erosion strength of aircraft engine and power plant parts --- Russian book p0578 A81-46848
Erosion and impacts on composite helicopter blades p0040 N81-11138
Erosion resistant coatings [NASA-TM-75870] p0377 N81-22098

ERROR ANALYSIS
Human error in ATC system operations p0052 A81-13414
An optimum design procedure of total-temperature thermocouple probes p0108 A81-17807
Geometric dilution of precision in Global Positioning System navigation p0115 A81-18100
Position-determination accuracies of navigation methods p0233 A81-25374
Discussion of the pressure-source aerosonic theory and of Doak's criticism p0238 A81-26189
The accuracy of mean-stream-line method in subsonic and transonic regions p0296 A81-29105
Passive location finding with a multiwavelength two element interferometer p0350 A81-31125
Dynamic errors of the Kalman filtering of trajectory parameters --- for radar tracking of aircraft maneuvers p0366 A81-33687
Precision DME for microwave landing system p0578 A81-47125
The role of the earth's shape in navigation - An example p0614 A81-48120
Choice of optimal parameters of a gyrovertical on the basis of a standard program p0622 A81-48744
Predictability of moisture absorption in graphite/epoxy sandwich panels p0039 N81-11131
An interactive computational aerodynamics analysis program [AD-A094765] p0263 N81-19033
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros p0484 N81-26092
Characteristics of a digital filter for a precision DME system in microwave landing systems [FUB-43-1980] p0628 N81-32136

ERROR BAND
U ACCURACY

ERROR CORRECTING DEVICES
The practical application of the Wake Blocking

Corrections according to Maskell --- for large wind tunnel models
[DGLR PAPER 80-112] p0121 A81-19398
Increased target resolution and minor lobe reduction with active group antennas
p0152 A81-20090
ERROR DETECTION CODES
ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783
ERROR SIGNALS
Model-following system with assignable error dynamics and its application to aircraft
p0116 A81-18577
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732
ERRORS
NT INSTRUMENT ERRORS
NT PILOT ERROR
NT POSITION ERRORS
ESCAPE (ABANDONMENT)
Delayed ejection --- decision factor importance for pilot safety
p0176 A81-22102
Applications of pyrotechniques in aviation
[SNIAS-792-422-103] p0023 N81-10025
ESCAPE SYSTEMS
Pyrotechnics serving safety --- in aircraft air and ground escape systems
p0120 A81-19348
Escape systems testing on the Holloman high speed test track
p0175 A81-22088
High 'Q' ejection protection device
p0175 A81-22093
Low level, adverse attitude escape using a vertical seeking ejection seat
p0176 A81-22094
Escape from military fighters - A modern perspective
p0176 A81-22096
Extension of ejection seat capability for high speed conditions
p0176 A81-22097
Helicopter emergency underwater escape
p0176 A81-22101
A study of factors affecting aircrew survivability following emergency escape over water
p0409 A81-34697
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022
Performance verification of the superjet laminar angular rate sensor
[AD-A091069] p0091 N81-13040
Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033
An investigation of two safe escape from base flight profiles
[AD-A096571] p0373 N81-22034
Velocity tolerance of escape systems
[AD-A096881] p0373 N81-22035
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041
Aeronautical systems technology needs: Escape, rescue and survival and test facilities and test equipment
[AD-A097827] p0423 N81-24020
Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107
CH-53E emergency flotation system design study
[AD-A101640] p0548 N81-29124
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] p0620 N81-32130
ESTERS
NT URETHANES
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776
ESTIMATES
NT COST ESTIMATES
ESTIMATING
NT PARAMETER IDENTIFICATION
EUCLIDEAN GEOMETRY
NT ANGLE OF ATTACK
NT ANGLES (GEOMETRY)
NT CARTESIAN COORDINATES
NT ELEVATION ANGLE
NT LEADING EDGE SWEEP
NT SWEEP ANGLE
EULER EQUATIONS OF MOTION
A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh
p0347 A81-30717
Calculation of supersonic flow past interfering wings
p0413 A81-36455
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] p0637 N81-33192
EUROPE
European cooperation in the tactical transport helicopter
p0466 A81-40081
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980
[NASA-CR-152356] p0220 N81-17623
EUROPEAN AIRBUS
NT A-300 AIRCRAFT
Airbus Industrie's heavenly twins - A310 and A300-600
p0018 A81-12348
The FFCC cockpit of the A310 is practically defined
p0063 A81-15623
Airbus Industrie - Past, present and future /26th Mitchell Memorial Lecture/
p0208 A81-27907
The maintenance of the Airbus from the user's point of view
p0287 A81-28470
Integrated cockpit information system with color display equipment
p0450 A81-37643
Components in hybrid- and fiber technology for commercial aircraft of the Airbus family /flap support, spoiler, and window frame/
p0450 A81-37644
Airbus - Rudder unit in carbon fiber technology
p0451 A81-37651
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] p0607 A81-47551
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] p0608 A81-47553
Design and construction of a model which is dynamically similar to the A310 wing
[DGLR PAPER 81-035] p0608 A81-47556
The half-model technique in the wind tunnel and its employment in the development of the Airbus family
[DGLR PAPER 81-118] p0609 A81-47587
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] p0610 A81-47609
In-flight handling qualities investigation of A310 Airbus DLC-configurations on landing approach, using the DFVLR-HFB 320 in-flight simulator (variable stability aircraft) --- instrument flight
[ESA-TT-630] p0276 N81-19135
Civil component program Wing Section. Transonic wing development --- for the european airbus
[BMFT-FB-W-80-021] p0426 N81-24052
The future cockpit of the next generation of civil aircraft --- Airbus A310 digital displays
[SNIAS-802-111-113] p0427 N81-24057
Protection against wing icing for Airbus A300 and A310
[NASA-TM-76504] p0494 N81-27079
EUTROPHICATION
Development of a helicopter water quality monitoring/sampling system

[PB81-168734] p0499 N81-27714
EVACUATING (TRANSPORTATION)
The medical use of the helicopter in the field of air rescue
p0409 A81-34870
Applications of pyrotechniques in aviation
[SNIAS-792-422-103] p0023 N81-10025
Effect of thermal radiation on the integrity pressurized aircraft evacuation slides and slide materials
[AD-A098179] p0424 N81-24039
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] p0636 N81-33175
EVALUATION
NT TRAINING EVALUATION
Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13958
Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969
Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029
Evaluation of the visual acquisition range of en-route air traffic from cockpit observations
[DFVLR-MITT-80-14] p0332 N81-20058
An investigation of the combustion behavior of solid fuel ramjets
[AD-A098481] p0445 N81-25240
Turbine bypass engine: A new supersonic cruise propulsion concept
[NASA-TM-82608] p0489 N81-26145
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] p0629 N81-32147
EVAPORATION
NT TRANSPIRATION
EVAPORATIVE COOLING
NT FILM COOLING
NT SWEAT COOLING
EVASIVE ACTIONS
Bounds for the additional cost of near-optimal controls
p0170 A81-21075
The variable-speed tail-chase aerial combat problem
p0351 A81-31295
Quantifying reactive maneuvers
[AD-A101136] p0539 N81-28091
EVOLUTION (DEVELOPMENT)
Weapon system evolution of attack helicopters
p0472 A81-40130
EXACTNESS
U PRECISION
EXCITATION
NT ACOUSTIC EXCITATION
NT HARMONIC EXCITATION
NT SELF EXCITATION
EXECUTIVE AIRCRAFT
U GENERAL AVIATION AIRCRAFT
U PASSENGER AIRCRAFT
EXHAUST DIFFUSERS
Noise attenuation and associated thrust increase of turbojet engines through hyper-mixing ejector shrouds
p0291 A81-29062
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43947
Some ejector characteristics
[AIAA PAPER 81-1679] p0534 A81-43948
A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064
EXHAUST EMISSION
The development of low-toxic combustion chambers of transport gas turbine engines
p0066 A81-14787
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741
Aircraft pollution in the vicinity of airports
[AIAA PAPER 81-0309] p0164 A81-20743
Aircraft and air pollution
p0288 A81-28698
Environmental aspects of aircraft emissions - A review and current assessment
p0290 A81-29056
Cyclone combustors in low emission gas turbine applications
p0294 A81-29082
Impacts of broadened-specification fuels on aircraft turbine engine combustors
[ASME PAPER 81-GT-2] p0310 A81-29927
The influence of premixed combustion flame stabilizer geometry on flame stability and emissions
[ASME PAPER 81-GT-26] p0311 A81-29942
Premixing and flash vaporization in a two-stage combustor
[ASME PAPER 81-GT-41] p0312 A81-29955
A mobile emissions laboratory for on-line analysis of combustion products from gas turbine engines
p0361 A81-32872
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
Fuel character effects on the TF41 engine combustion system
[AIAA PAPER 81-1391] p0503 A81-40858
A successful step toward an advanced supersonic transport engine - Acoustic and emission results from the Pratt and Whitney Aircraft Variable Cycle Engine Program
[AIAA PAPER 81-1593] p0508 A81-40968
The influence of aircraft operations on air quality at airports
p0553 A81-44074
USAF Aircraft Engine emission goals, a critical review
[AD-A090282] p0087 N81-12651
Two-stage combustion for reducing pollutant emissions from gas turbine combustors
[NASA-CR-163877] p0196 N81-16056
Exhaust emission characteristics and variability for maintained General Electric CF6-50 turbofan engines
[AD-A092291] p0196 N81-16064
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962] p0201 N81-16628
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21078
Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design
[NASA-TM-81660] p0588 N81-30562
CF6-50 engine emissions testing with traverse probe
[AD-A102159] p0600 N81-31218
EXHAUST FLOW SIMULATION
NT FLIGHT SIMULATION
The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] p0623 A81-49727
Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976
The criticality of engine exhaust simulations on VSTOL model-measured ground effects
p0486 N81-26115
EXHAUST GASES
Advanced technology turboshaft IR suppression
p0106 A81-17519
Exhaust gas reingestion measurements --- in helicopters
p0106 A81-17521
Semi-empirical correlations for gas turbine emissions, ignition, and flame stabilization
p0171 A81-2'505
Gas turbine engine emission abatement - Status and needed advancements
p0237 A81-26015
Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954
The requirements for and evolution of a test rig for exhaust gas recirculation studies of V/STOL aircraft
p0469 A81-40106

Design concepts for minimizing hot-gas ingestion in V/STOL aircraft
[AIAA PAPER 81-1624] p0525 A81-43133

Effect of ambient conditions on the emissions from a gas turbine combustor
[NASA-CR-3355] p0080 N81-12105

Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996

Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair
[AD-A091011] p0094 N81-13062

Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966

Exhaust noise in flight: The role of acoustic installation effects
[PNR-90029] p0138 N81-14793

JT8D engine internal exhaust mixer technology program
[AD-A093057] p0215 N81-1709[illegible]

Advanced technology for controlling pollutant emissions from supersonic cruise aircraft
p0246 N81-18004

Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude
[NASA-TM-82663] p0496 N81-27095

Supercritical fuel injection system
[NASA-CASE-LEW-12990-1] p0549 N81-29129

EXHAUST JETS

U EXHAUST GASES

EXHAUST NOZZLES

NT CONVERGENT-DIVERGENT NOZZLES

NT PLUG NOZZLES

Effect of a semi-annular thermal acoustic shield on jet exhaust noise
p0170 A81-22532

Suppression of jet noise peak by velocity profile reshaping
p0458 A81-39039

Development of exhaust nozzle internal performance prediction techniques for advanced aircraft applications
[AIAA PAPER 81-1490] p0506 A81-40908

Some ejector characteristics
[AIAA PAPER 81-1679] p0534 A81-43948

Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] p0619 A81-48626

Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639

Shear layer instability noise produced by various jet nozzle configurations
[PNR-90018] p0088 N81-12825

An evaluation of wind tunnel test techniques for aircraft nozzle afterbody testing at transonic Mach numbers
[AD-A091775] p0126 N81-13931

Evaluation of wind tunnel nozzle afterbody test techniques utilizing a modern twin engine fighter geometry at Mach numbers from 0.6 to 1.2 --- YF-17 aircraft
[AD-A091545] p0126 N81-13932

Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0105 N81-15976

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 1: Design layouts
[NASA-CR-159819-VOL-1] p0214 N81-17081

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aeroynamic data book 1
[NASA-CR-159819-VOL-2-BK-1] p0214 N81-17082

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 2
[NASA-CR-159819-VOL-2-BK-2] p0214 N81-17083

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 3
[NASA-CR-159819-VOL-2-BK-3] p0214 N81-17084

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 1
[NASA-CR-159819-VOL-3-BK-1] p0214 N81-17085

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 2
[NASA-CR-159819-VOL-3-BK-2] p0214 N81-17086

Aerodynamic/acoustic performance of YJ101/double bypass VCE with coannular plug nozzle
[NASA-CR-159869] p0220 N81-17846

QCGAT mixer compound exhaust system design and static big model test report
[NASA-CR-135386] p0274 N81-19119

Design of an exhaust mixer nozzle for the Avco-Lycoming Quiet Clean General Aviation Turbofan (QCGAT)
[NASA-CR-159426] p0274 N81-19120

Axisymmetric & non-axisymmetric exhaust jet induced-effects on a V/STOL vehicle design. Part 1: Data presentation --- conducted in Ames 11-foot transonic tunnel
[NASA-CR-166146] p0441 N81-25064

Design of a V/STOL propulsion system for a large-scale fighter model
[NASA-CR-166162] p0442 N81-25074

Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude
[NASA-TM-82663] p0496 N81-27095

Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] p0639 N81-33210

EXHAUST SYSTEMS

The design and development of a mixer compound exhaust system for a quiet clean general aviation turbofan
[AIAA PAPER 81-1494] p0566 A81-45893

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions --- Lewis 8 by 6-foot supersonic wind tunnel tests
[NASA-CR-159818] p0093 N81-13057

Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 1: Design layouts
[NASA-CR-159819-VOL-1] p0214 N81-17081

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aeroynamic data book 1
[NASA-CR-159819-VOL-2-BK-1] p0214 N81-17082

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 2
[NASA-CR-159819-VOL-2-BK-2] p0214 N81-17083

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 3
[NASA-CR-159819-VOL-2-BK-3] p0214 N81-17084

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 1
[NASA-CR-159819-VOL-3-BK-1] p0214 N81-17085

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 2
[NASA-CR-159819-VOL-3-BK-2] p0214 N81-17086

EXPANDABLE STRUCTURES
NT INFLATABLE STRUCTURES
NT TETHERED BALLOONS
EXPANSION
NT THERMAL EXPANSION
EXPANSION WAVES
U ELASTIC WAVES
EXPERIMENTAL DESIGN
The art of designing experimental aircraft - An overview
[AIAA PAPER 81-0944] p0363 A81-32939
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase
[DGLR PAPER 81-027] p0609 A81-47563
Shielded enclosure test bed requirement
[AD-A092589] p0198 N81-16073
A rotating, wind tunnel balance and associated experimental techniques
[AAAF-NT-80-13] p0210 N81-17108
Experimental verification of turboblading aeromechanics
p0432 N81-24092
Methodological approaches to identifying relevant features for visual flight
[AD-A100199] p0541 N81-28108
EXPERIMENTATION
Modeling, acquisition and processing during large displacements --- associated with experiments in flight mechanics
[AAAF-NT-80-16] p0210 N81-17056
EXPLORATION
NT OIL EXPLORATION
EXPLOSIONS
Special Aviation Fire and Explosion Reduction (SAFER) advisory committee, volume 1
[AD-A092016] p0191 N81-16024
Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection --- suppressing combustion overpressure
[AD-A093542] p0208 N81-17046
Evaluation of explosafe. Explosion suppression system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17047
EXPLOSIVE FORMING
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174
EXPLOSIVE GASES
U FLAMMABLE GASES
EXPLOSIVES
Active control of an explosive wing-store flutter case --- Langley Research Center
p0082 N81-12117
Tool force evaluation of lathe machined high explosives
[MHSMP-80-20] p0144 N81-15148
EXPONENTIAL FUNCTIONS
Efficiency of the methods and algorithms used for estimating the reliability in aviation techniques
p0365 A81-33173
EXPOSURE
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 1: Methods, procedures, results
[EPA-550/9-79-313-1] p0087 N81-12644
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 2: Appendices A through F
[EPA-550/9-70-313-2] p0087 N81-12645
The effect of the in-service environment on composite materials (resume of the April 1980 Athens conference)
p0199 N81-16146
Test and evaluation of foam-in-place fuel tank container
[AD-A095747] p0334 N81-20073
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-159362] p0343 N81-21131
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165765] p0550 N81-29165
EXTERNAL STORE SEPARATION
Store separation trajectory analysis
p0050 A81-13216
Analytical methods for store separation flight test
p0177 A81-22344
Conditions for safe separation of external stores
p0529 A81-43395
Topside weapons release - An analytical study
[AIAA PAPER 81-1655] p0533 A81-43939
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] p0616 A81-48416
Evaluation of aircraft interference effects on external stores at subsonic and transonic speeds
p0187 N81-15997
A theoretical method for the simulation of separation behavior of aircraft external stores --- applications to computerized wind tunnel tests
[MBB-FE-122/S/PUB/16] p0203 N81-16987
Store separation simulation in subsonic wind tunnels
[MBB-FE-123/S/PUB/20] p0203 N81-16988
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 2: Users manual for the computer program
[AD-A099391] p0494 N81-27080
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 3: Appendices A and B. Details of program 1
[AD-A099331] p0495 N81-27082
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 4: Appendices C and D. Details of program 2
[AD-A099332] p0495 N81-27083
EXTERNAL STORES
Active suppression of aircraft flutter
p0059 A81-14397
A method for calculating the aerodynamic forces and moments on external stores of aircraft
p0226 A81-24006
Aerodynamic modeling of an oscillating wing with external stores
[AIAA 81-0648] p0307 A81-29501
Helicopter External Gondola System
p0576 A81-46642
In-flight measurement of aerodynamic loads on captive stores. Equipment and results
[NLR-MP-79013-U] p0022 N81-10012
Report on a cooperative programme on Active Flutter Suppression
[AGARD-R-689] p0082 N81-12115
Wind tunnel tests on a fighter aircraft wing/store flutter suppression system: The B.Ae control law
p0083 N81-12119
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969
An economic and versatile panel method for aircraft and aircraft/store configurations. An outline of the principal features of the mathematical modeling and numerical implementation of the British Aerospace (Warton) Mk II Panel Method
p0144 N81-15311
Prospects for exploiting favourable and minimizing adverse aerodynamic interference in external store installations
p0187 N81-15996
Study of transonic flow fields about aircraft: Application to external stores
p0187 N81-15998
Demonstration of a method for determining critical store configurations for wing store flutter
[AD-A092257] p0197 N81-16060
Experimental and theoretical study of flow fields and store forces in close proximity to a triple ejection rack at transonic speeds
[AD-A094751] p0263 N81-19030
Unsteady airloads on a harmonically pitching wing with external store

[NLR-MP-80004-U] p0330 N81-23038
Aerodynamic analysis of a fighter aircraft with a higher order paneling method
[AD-A099404] p0483 N81-26082
A study of the effects of store aerodynamic on wing/store flutter
p0490 N81-26153

EXTERNAL SURFACE CURRENTS
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940

EXTERNALLY BLOWN FLAPS
NT UPPER SURFACE BLOWN FLAPS
Flap survey test of a combined surface blowing model: Flow measurements at static flow conditions
[NASA-CR-152124] p0423 N81-24023

EXTRACTION
NT SOLVENT EXTRACTION

EXTRAPOLATION
Examination of the vortex regime for highly swept wings by extrapolation of the Jones method
[AAAF-NT-80-25] p0204 N81-16992
Study of the vortex conditions of wings with large sweepback by extrapolation of the Jones method
[NASA-TM-75863] p0262 N81-19026
MEGA16 - Computer program for analysis and extrapolation of stress-rupture data
[NASA-TP-1809] p0393 N81-23406

EXTRATERRESTRIAL RADIATION
NT SUNLIGHT

EXTRAVEHICULAR ACTIVITY
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] p0607 A81-47425

EXTREMA
U RANGE (EXTREMES)

EXTREMUM VALUES
Bounds for the additional cost of near-optimal controls
p0170 A81-21075

F

F-4 AIRCRAFT
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622
Design of disturbance-rejection controllers for linear multivariable discrete-time systems using entire eigenstructure assignment --- onboard digital flight system of F-4 aircraft
p0155 A81-20454
Use of flight simulators in developing design load spectra for new aircraft
[AIAA 81-0513] p0301 A81-29389
Fiberglass-reinforced rigid polyurethane expedient pavement subject to simulated F-4 aircraft traffic
[AD-A089266] p0030 N81-10079
Wind tunnel investigation of the aerodynamic hysteresis phenomenon on the F-4 aircraft and its effects on aircraft motion
[AD-A089851] p0033 N81-11016
Robust control system design
p0042 N81-11275
Application of vector performance optimization to a robust control loop design for a fighter aircraft
[DFVLR-FB-80-14] p0130 N81-13970
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Investigation of high-angle-of-attack maneuver-limiting factors. Part 1: Analysis and simulation --- F-4J and F-14A aircraft
[AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack maneuver-limiting factors. Part 2: Piloted simulation assessment of Bihrle departure criteria
[AD-A101647] p0581 N81-30114
Investigation of high-angle-of-attack maneuver-limiting factors. Part 3: Appendices, aerodynamic models
[AD-A101648] p0581 N81-30115
Development of an aircraft maneuver load spectrum based on VGH data
[AD-A102750] p0620 N81-32102

F-5 AIRCRAFT
ORLA - An assessment of risks --- Optimum Repair Level Analysis
p0229 A81-24257
Integrated sensor control system for RF-5E demonstrator
p0462 A81-39438
Aerodynamic analysis of a fighter aircraft with a higher order paneling method
[AD-A099404] p0483 N81-26082

F-8 AIRCRAFT
Flight experience with flight control redundancy management
p0042 N81-11278
Ground and flight test experience with a triple redundant digital fly by wire control system --- installed in F-8C aircraft
p0259 N81-19006
F-8 digital fly-by-wire aircraft analytic redundancy management flight test experience
p0485 N81-26109

F-110 AIRCRAFT
U F-4 AIRCRAFT

F-14 AIRCRAFT
Robustness properties of a new multirate digital control system
[AIAA PAPER 81-0022] p0150 A81-20545
Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development
p0559 A81-44395
Investigation of high-angle-of-attack maneuver-limiting factors. Part 1: Analysis and simulation --- F-4J and F-14A aircraft
[AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack maneuver-limiting factors. Part 2: Piloted simulation assessment of Bihrle departure criteria
[AD-A101647] p0581 N81-30114
Investigation of high-angle-of-attack maneuver-limiting factors. Part 3: Appendices, aerodynamic models
[AD-A101648] p0581 N81-30115

F-15 AIRCRAFT
A case study - Real time simulation and structured design
p0172 A81-21721
Reliability growth measured by AFM 66-1 data
p0230 A81-24286
Integrated flight and fire control development and demonstration of an F-15B aircraft
p0327 A81-30359
F-15 nose landing gear shimmy, taxi test and correlative analyses
[SAE PAPER 801239] p0406 A81-34237
Staring infrared mosaic observation of an F-15 aircraft
p0463 A81-39636
Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
New roles for the F-15 eagle
p0510 A81-42629
The technical and managerial challenge of integrated flight/fire control
[AIAA PAPER 81-1706] p0527 A81-43162
An investigation of the impact of aerodynamic lags on dynamic flight characteristics
[AIAA PAPER 81-1892] p0561 A81-44531
Flight evaluation of a simplified gross thrust calculation technique using an F100 turbofan engine in an F-15 airplane
[NASA-TP-1782] p0143 N81-15000
Effect of simulated in-flight thrust reversing on vertical-tail loads of F-18 and F-15 airplane models --- conducted in the Langley 16-foot transonic tunnel
[NASA-TP-1890] p0579 N81-30086
F100 engine diagnostic system status to date
p0599 N81-31210

F-16 AIRCRAFT
A lightning protection program for the F-16 fly-by-wire system
p0056 A81-14254

A case study on the F-16 fly-by-wire flight control system --- Book
p0101 A81-16719
Environmental chemistry and management of hydrazine
p0240 A81-26770
F-16 improvement program - Making the digits count
p0241 A81-26931
Avionics computer system support at Ogden ALC
p0320 A81-30243
Integration of the F-16 Weapon System Trainer
p0325 A81-30332
Rapport tactical self protection systems design
p0349 A81-31113
F-16 variable-geometry inlet design and performance
[AIAA PAPER 81-1394] p0514 A81-42184
The F-16 Halon tank inerting system
[AIAA PAPER 81-1638] p0525 A81-43138
Finite element analysis of a bird-resistant monolithic stretched acrylic canopy design for the F-16A aircraft
[AIAA PAPER 81-1640] p0525 A81-43140
Manufacturing the F-16 composite horizontal tail
p0531 A81-43646
AFTI/F-16 advanced multimode control system design for task-tailored operations
[AIAA PAPER 81-1707] p0535 A81-43955
Aircraft ground mobility system for the F-16 aircraft
[AIAA PAPER 81-1735] p0536 A81-43960
More fight for the Fighting Falcon
p0622 A81-49075
Design to cost and the F-16 multirole fighter
p0046 N81-11911
Evaluation of AFTI/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0245 N81-18034
F-16 integrated logistics support: Still time to consider economical alternatives
[PB81-137473] p0389 N81-23079

F-17 AIRCRAFT
Evaluation of wind tunnel nozzle afterbody test techniques utilizing a modern twin engine fighter geometry at Mach numbers from 0.6 to 1.2 --- YF-17 aircraft
[AD-A091545] p0126 N81-13932
Active control of an explosive wing-store flutter case
[MBB-FE-17/S/PUB/25] p0131 N81-13973
Active controls for flutter suppression and gust alleviation in supersonic aircraft --- YF-17 flutter model
[NASA-CR-163934] p0216 N81-17097

F-18 AIRCRAFT
F/A-18's landing, launch and recovery system
p0005 A81-11244
RF compatibility-environment to component part
p0056 A81-14260
F/A-18 full scale development test
p0099 A81-16579
Designing the Hornet for improved R and M
[AIAA PAPER 81-0230] p0162 A81-20688
The new look in reliability - It works --- Operational Mission Environment test program for F/A-18 aircraft
p0229 A81-24268
Design and development of the control laws for the F-18 primary flight control system
p0320 A81-30245
F/A-18 horizontal situation display
p0327 A81-30353
F/A-18 Hornet Crew Station
p0327 A81-30355
Technology advances allow multiple role radar design for the F/A-18
[SAE PAPER 801163] p0399 A81-34179
The Northrop F/A-18L Mission Simulator
[AIAA 81-0968] p0414 A81-36557
F/A-18A Initial Sea Trials
p0458 A81-38857
F/A-18A inlet/engine compatibility flight test results
[AIAA PAPER 81-1393] p0503 A81-40860
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878
Titanium net shapes by a new technology. II - F-18A parts evaluation
p0511 A81-41650
Limb restraint F-18 style
p0567 A81-46325
The Hornet's operational mission environment
p0571 A81-46491
The F/A-18 Naval Strike Fighter: Progress has been made but problems and concerns continue
[AD-A095287] p0333 N81-20069
Operational and support costs of the Navy's F/A-18 can be substantially reduced
[PB81-160814] p0487 N81-26125
Effect of simulated in-flight thrust reversing on vertical-tail loads of F-18 and F-15 airplane models --- conducted in the Langley 16-foot transonic tunnel
[NASA-TP-1890] p0579 N81-30086

F-27 AIRCRAFT
Lasting friendship. A review of the F-27 fatigue evaluation program carried out by Fokker-VFW --- performance prediction
[NLR-TR-78150-U] p0495 N81-27086

F-100 AIRCRAFT
F-100s set to become target drones
p0614 A81-48067

F-101 AIRCRAFT
Developing a Fighter Engine Derivative of the B-1/F101 engine
[SAE PAPER 801156] p0407 A81-34246

F-106 AIRCRAFT
Electromagnetic measurement of lightning strikes to aircraft
[AIAA PAPER 81-0083] p0160 A81-20588
Design of a lateral stability augmentation system for the F106 to improve lateral handling qualities during tracking
[AD-A091014] p0094 N81-13067
In flight direct strike lightning research --- Using an F-106B Aircraft
p0259 N81-15005

F-111 AIRCRAFT
Ejection experience in F/FB-111 aircraft - 1967-1978
p0176 A81-22098
Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0238 A81-26503
Air Force Integration Support Facilities - Their total utility
p0320 A81-30240
Augmenting ATE with dynamic simulation testing techniques
p0320 A81-30241
Natural laminar flow flight experiment --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19010
Application of a performance modeling technique to an airplane with variable sweep wings
[NASA-TP-1855] p0426 N81-24048

FAB (PROGRAMMING LANGUAGE)
U FORTRAN

FABRICATION
Design and fabrication of stabilized organic matrix composites
p0005 A81-11338
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
A new approach to thick-film resistors
p0232 A81-24968
NASA gas turbine stator vane ring
[ASME PAPER 81-GT-208] p0318 A81-30097
The possibility of single-impact riveting of flat-top countersunk-head rivets --- for aircraft structures
p0319 A81-30164
Classification of links of assembly units with respect to the character of their connections, and calculation of the accuracy of their executio --- in airframe construction
p0319 A81-3016
The titanium industry and the fabrication of semimanufactures for aeronautics
p0416 A81-3665
Fabrication problems related to the contamination of titanium alloys
p0417 A81-3666
Pilot installations for deposition techniques in the case of components exposed to heat and for diffusion joining of power plant components
p0449 A81-3763

A hybrid composite horizontal stabilizer for the XH-2/CCR Flight Demonstrator Aircraft
[AHS 80-35] p0476 A81-40164
Manufacturing technology for low temperature composite engine frames --- for TF-34 engine
[AIAA PAPER 81-1355] p0501 A81-40837
Factors influencing the selection of tooling and fabrication methods in building a composite fuselage
p0574 A81-46628
Waterjet trimming of cured composites
p0575 A81-46632
Development of advanced interceptor substructural material --- graphite epoxy missile structures
[AD-A090127] p0038 N81-11116
Design, fabrication and test of graphite/polyimide composite joints and attachments for advanced aerospace vehicles
[NASA-CR-159112] p0194 N81-16042
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin systems
[NASA-CR-152292] p0218 N81-17175
Fabrication process development of boron/aluminum fan blades for high bypass engines
[NASA-CR-165252] p0442 N81-25076

FABRICS
NT DACRON (TRADEMARK)
NT PARACHUTE FABRICS
Potential use of geotechnical fabric in airfield runway design --- reinforced soil systems
[AD-A092686] p0198 N81-16071
Air Force Geophysics Laboratory aerodynamically tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] p0639 N81-33214
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] p0639 N81-33238

FABRY-PEROT INTERFEROMETERS
Laser scattering applications development test in AEDC tunnel B at Mach number 8
[AD-A093929] p0217 N81-17105

FABRY-PEROT LASERS
U LASERS

FACTORIALS
An approximate factorization solution of the Navier-Stokes equations for transonic flow using body-fitted coordinates with application to NACA 64A010 airfoils
p0249 N81-18024

FADING
NT SIGNAL FADING

FAIL-SAFE SYSTEMS
Improved flight control performance and failure tolerance using modern control techniques
p0008 A81-11619
Failure Indication and Corrective Action for turboshaft engines
p0106 A81-17515
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0453 A81-37822
Fly-by-wire Jaguar
p0618 A81-48064
Availability requirements of the future ATC system
p0617 A81-48558
Apparatus for sensor failure detection and correction in a gas turbine engine control system
[NASA-CASE-LEW-12907-2] p0273 N81-19115

FAILURE
NT ENGINE FAILURE
NT STRUCTURAL FAILURE
NT SYSTEM FAILURES
Detecting the failure of aircraft sensors using analytical redundancy
p0042 N81-11270

FAILURE ANALYSIS
The analysis of fatigue failures
p0006 A81-11603
Nonlinear incremental analysis up to failure of aeronautical structures
p0068 A81-16307
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0154 A81-20448
ORLA - An assessment of risks --- Optimum Repair Level Analysis
p0229 A81-24257
Current and future concepts in FMEA --- Failure Modes and Effects Analysis
p0229 A81-24283
Determination of aircraft structural inspection intervals
p0230 A81-24285
Analysis of vibration related failures in aero turbo-shaft engines
p0291 A81-29057
The analytical ferrograph - Some factors affecting deposit formation
p0293 A81-29077
Failure detection and isolation for tactical aircraft using the generalized likelihood test
p0321 A81-30261
Digital computer simulation of generalized fault conditions on aircraft electrical power systems
p0322 A81-30285
BIT/FIT maturity before first flight --- in B-52 G/H Offensive Avionics System
p0324 A81-30320
Mechanical properties of aluminum coatings on heat-resistant steels
p0355 A81-31668
Orientation of measurement sensors for optimum end-of-life performance
p0360 A81-32697
Is it safe - The safety assessment of aircraft systems. IV - Methods, techniques, and organization
p0366 A81-33789
Fatigue of fibrous composite materials; Proceedings of the Symposium, San Francisco, Calif., May 22, 23, 1979
p0410 A81-37126
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers
p0410 A81-37136
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
p0469 A81-40107
Helicopter accidents
[SAE PAPER 810592] p0520 A81-42751
Sensor/actuator failure detection and isolation for airbreathing propulsion systems
p0564 A81-45551
Real-time estimation in advanced turbofan engines
p0564 A81-45553
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888
Computer based in-flight monitoring
p0042 N81-11269
Failure management techniques for high survivability
p0042 N81-11272
Failure management for the SAAB Viggen JA37 aircraft
p0042 N81-11273
Flight experience with flight control redundancy management
p0042 N81-11274
Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
Some effects of compressor fouling on the behavior of a turbojet engine --- as evidenced by an engine monitoring system
p0328 N81-20015
Investigations into local fault detection on turbojet engines --- monitoring instruments
p0382 N81-23011
Location of faults in jet engines by calculation of component characteristics
p0382 N81-23012
Reduction of measured data and possibilities for early detection of sensor break-down
p0383 N81-23016
MERA16 - Computer program for analysis and extrapolation of stress-rupture data
[NASA-TP-1809] p0393 N81-23486
Method for computation of structural failure probability for an aircraft
[AD-A098294] p0426 N81-24050

Operational experience with adhesive bonded
structures --- aircraft structures
[FOK-BO-1235] p0582 N81-30124
Procedural handbook for escape system/accident
investigation helmet usage aspects, including
failure analysis
[AD-A102803] p0628 N81-32130
FAILURE MODES
Lubrication of rolling element bearings
p0118 A81-18738
Current and future concepts in FMEA --- Failure
Modes and Effects Analysis
p0229 A81-24283
State-of-the-art review of flywheel burst
containment
[UCRL-15257] p0085 N81-12427
A review of in-flight emergencies in the ASRS data
base
[NASA-CR-166166] p0372 N81-22031
Investigation of performance deterioration of the
CF6/JT9D high bypass ratio turbofan engines
p0431 N81-24006
FAIRCHILD MILITARY AIRCRAFT
U MILITARY AIRCRAFT
FAIRINGS
A low-cost forward fairing for the Bell Long
Ranger Helicopter
p0531 A81-43644
FAN BLADES
Discrete frequency noise due to irregularity in
blade row of axial fan rotor
p0002 A81-10633
Development of wind tunnel fan blade made of
composite materials
[MBB-UD-277-79-O] p0018 A81-12096
Unsteady fan blade pressure and acoustic radiation
from a JT15D-1 turbofan engine at simulated
forward speed
[AIAA PAPER 81-0096] p0161 A81-20598
Mean rotor wake characteristics of an
aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208] p0168 A81-20830
Transient, nonlinear response analysis of soft
bodied impact on flat plates including
interactive load determination
[AIAA 81-0621] p0305 A81-29482
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
Interactive multi-mode blade impact analysis
[ASME PAPER 81-GT-79] p0314 A81-29987
Analysis of axial fan noise with the help of the
Lowson formalism
[AAAF PAPER NT 80-54] p0370 A81-33948
Boron aluminum blades and vanes
[AIAA PAPER 81-1359] p0502 A81-40840
Isothermal forging of fan blades
[AIAA PAPER 81-1405] p0503 A81-40862
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42106
Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11412
Rotor redesign for a highly loaded 1800 ft/sec tip
speed fan, 2
[NASA-CR-159879] p0078 N81-12087
Low-cost directionally-solidified turbine blades,
volume 2 --- TFE731-3 turbofan engine
[NASA-CR-159562] p0078 N81-12088
Cold-air investigation of first stage of
4-1/2-stage, fan drive turbine with average
stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050
Composite containment systems for jet engine fan
blades
[NASA-TM-81675] p0220 N81-17480
Fabrication process development of boron/aluminum
fan blades for high bypass engines
[NASA-CR-165252] p0442 N81-25076
FANLIFT DEVICES
U LIFT FANS
FAR FIELDS
Flight effects on supersonic convergent-divergent
nozzle jet noise
[AIAA PAPER 81-2027] p0623 A81-49728
Prediction of sound radiated from different
practical jet engine inlets
[NASA-CR-163824] p0137 N81-14789
Flap noise characteristics measured by pressure
cross correlation techniques
p0259 N81-18808
FASTENERS
NT BOLTS
NT LOCKS (FASTENERS)
A fatigue study and an investigation on
mechanically fastened joints for the development
of a flap
p0481 A81-40581
High peak energy shaped-pulse electromagnetic
crack detection
p0611 A81-47785
Investigation of EMAT base system for the
detection of bolt hole type cracks. Part 1:
Detection of cracks in the inaccessible lower
half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419
Investigation of EMAT base system for the
detection of bolt hole type cracks. Part 2:
Reliability evaluation and system definition for
detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18420
FATIGUE (BIOLOGY)
NT FLIGHT FATIGUE
Vibration in a Helmet Mounted Sight (HMS) using
mechanical linkage
[AD-A098533] p0442 N81-25071
FATIGUE (MATERIALS)
NT METAL FATIGUE
NT STRUCTURAL STRAIN
NT THERMAL FATIGUE
The use of acoustic emission for detecting and
evaluating of fatigue cracks severity during
static and cyclic loading of structure elements
p0153 A81-20214
Prediction of structural fatigue response under
aircraft loads from material stress-strain
behavior
p0226 A81-24009
Fatigue of fibrous composite materials;
Proceedings of the Symposium, San Francisco,
Calif., May 22, 23, 1979
p0410 A81-37126
Effect of post buckling on the fatigue of
composite structures
p0410 A81-37127
Prevention of corrosion and fatigue failure of
helicopter gas turbine compressors
p0469 A81-40107
Development in powder metallurgy /PM/ Ti6Al4V
technology for aircraft parts
p0511 A81-41640
Composite repair concepts for depot level use
p0558 A81-44384
Cast Aluminum Structures Technology (CAST).
Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152
Fatigue and damage propagation in composite rotor
blades
p0041 N81-11145
Flight simulation environmental fatigue crack
propagation in 2024-T3 and 7475-T761 aluminum
[NLR-MP-80003-U] p0086 N81-12477
Constant-amplitude and flight-by-flight tests on
CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006
Compressor blade monitoring system for a VA1310
(Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
Crack growth modeling in an advanced powder
metallurgy alloy
[AD-A093992] p0218 N81-17235
An assessment of buffer strips for improving
damage tolerance
p0247 N81-18009
A crack-closure model for predicting fatigue-crack
growth under aircraft spectrum loading
[NASA-TM-81941] p0257 N81-18412
Investigation of EMAT base system for the
detection of bolt hole type cracks. Part 1:
Detection of cracks in the inaccessible lower
half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419
Investigation of EMAT base system for the
detection of bolt hole type cracks. Part 2:
Reliability evaluation and system definition for
detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18420
The engine usage monitoring system: An heuristic
approach to cost effective data monitoring and
analysis --- onboard fatigue monitoring

p0382 N81-23013
A review of Australian investigations on
aeronautical fatigue
[AD-A098300]
p0426 N81-24051
The fatigue crack growth under variable amplitude
loading in built-up structures
[AD-A098417]
p0486 N81-25837
Trouble shooting in aeronautics and the usefulness
of microscopes
[VTH-LR-305]
p0537 N81-28069
Manual on the fatigue of structures. 2: Causes
and prevention of damage. 7: Mechanical
surface damage --- aircraft structures
[AGARD-MAN-10(ENG)]
p0640 N81-33503

FATIGUE DIAGRAMS
U S-N DIAGRAMS

FATIGUE LIFE
Aspect ratio variability in part-through crack
life analysis
p0001 A81-10355
Fatigue damage mechanisms in composite materials -
A review
p0003 A81-10747
The analysis of fatigue failures
p0006 A81-11603
Acoustic fatigue assessment in the design of
aerospace vehicles
p0059 A81-14395
Evaluating spectrum effects in U.S. Air Force
attack/fighter/trainer individual aircraft
tracking
p0173 A81-21742
Fatigue design criteria and fleet fatigue life
survey at Aeronautica Macchi
p0180 A81-22624
Definition of loading sequence for full scale
fatigue test
p0180 A81-22626
Fatigue life evaluation of a helicopter main rotor
hub
p0180 A81-22631
Crack growth propagation under variable amplitude
loading in aerospace structures
p0181 A81-22632
The use of bonded crack-stoppers in pressure cabins
p0233 A81-25378
Failure by fatigue
p0238 A81-26419
The certification of composite airframe structures
p0283 A81-27887
Fatigue strength of certain materials used in
airframe construction --- glass-plastic
reinforced epoxy resin
p0285 A81-28108
Increased fatigue resistance for blades of
stationary gas-turbine engines by ultrasonic
hardening with spherical particles
p0285 A81-28134
Helicopter transmission fatigue life
p0291 A81-29058
Fatigue sensitivity of composite structure for
fighter aircraft
[AIAA 81-0495]
p0300 A81-29383
Fatigue strength of gas turbine engine rotor
blades in connection with structural changes in
service
p0355 A81-31673
Maintenance program analysis for aircraft
structures of the 80's - MSG-3
[SAE PAPER 801214]
p0404 A81-34222
Estimated service life of gas turbine engine
compressor blades
p0417 A81-36680
Fatigue of fibrous composite materials;
Proceedings of the Symposium, San Francisco,
Calif., May 22, 23, 1979
p0418 A81-37126
Effects of truncation of a predominantly
compression load spectrum on the life of a
notched graphite/epoxy laminate
p0418 A81-37137
The biparametric cycle count method and the
principle of simplification --- in determination
of aircraft structural fatigue life
p0419 A81-37337
High intensity acoustic testing to determine
structural fatigue life and to improve
reliability in nuclear reactor and aerospace
structures
p0455 A81-38372
Investigation of shot peening as a forming process
for aircraft wing skins
p0458 A81-39046
Fatigue life evaluation of helicopter rotor heads
p0482 A81-40687
Structural applications for titanium castings
p0510 A81-41637
Determination of fatigue life by testing materials
for thermal fatigue
p0532 A81-43774
Damping applications in aero-propulsion systems
p0613 A81-47999
Disk residual life studies. Part 2: TF30
10th-stage compressor disk (INCOLOY 901)
[AD-A089524]
p0029 N81-10074
Airfield pavement evaluation. Citations from the
NTIS data base
[PB80-812860]
p0030 N81-10083
Disk residual life studies. Part 1: F100
1st-stage turbine disk (IN100)
[AD-A089791]
p0036 N81-11041
Constant-amplitude and flight-by-flight tests on
CFRP specimens
p0039 N81-11133
Application of fracture mechanics to US Air Force
aircraft structural integrity requirements
[AAAF-NT-79-25]
p0086 N81-12463
Current developments in aircraft fatigue
evaluation procedures
[AAAF-NT-79-33]
p0086 N81-12464
Environmental exposure effects on composite
materials for commercial aircraft
[NASA-CR-165649]
p0198 N81-16139
Statistical review of counting accelerometer data
for Navy and Marine fleet aircraft
[AD-A095617]
p0334 N81-20070
Concept definition: Retirement for cause of F-100
rotor components
[AD-A095584]
p0335 N81-20080
Structures and Materials Panel
[AD-A089019]
p0378 N81-22420
Fatigue life variability in aluminum alloy
aircraft structures
[AD-A097198]
p0391 N81-23209
Structural Integrity Recording System (SIR) for
U.S. Army AH-1S Helicopters
[AD-A097283]
p0393 N81-23438
Helicopter Fatigue Life Assessment
[AGARD-CP-297]
p0487 N81-26126
State of the art and statistical aspects of
helicopter fatigue substantiation procedures
p0487 N81-26127
Fatigue analysis of composite materials using the
fail-safe concept
p0487 N81-26131
Helicopter Fatigue: A civil view
p0488 N81-26134
Helicopter component fatigue life determination
p0488 N81-26135
Fatigue test program and test results
p0489 N81-26142
Fatigue behavior of helicopter dynamic components
under constant amplitude and spectrum loading
p0489 N81-26143
Lasting friendship. A review of the F-27 fatigue
evaluation program carried out by Fokker-VFW ---
performance prediction
[NLR-TR-78150-U]
p0495 N81-27086
State of the art and statistical aspects of
helicopter fatigue substantiation procedures
[NLR-MP-80025-U]
p0496 N81-27087
Damage tolerance of a landing gear component after
many takeoffs and landings --- nondestructive
tests
[NLR-MP-79039-U]
p0596 N81-31189
Advanced oxide dispersion strengthened sheet
alloys for improved combustor durability
p0598 N81-31204

FATIGUE TESTING MACHINES
Controls of aeronautical structures under fatigue
testing by holographic pulsed lasers
interferometry
[ISL-CO-218/79]
p0133 N81-14300

FATIGUE TESTS
Flight simulation environmental fatigue crack
propagation in 2024-T3 and 7475-T761 aluminium
p0013 A81-11657

Aging study of the Caravelle 30 p0061 A81-15119
Ferrography as a health monitor and a design aid for the development of helicopter gearboxes p0118 A81-18759
Acoustic fatigue strength of fiber-reinforced plastic panels p0169 A81-20873
Application of exoelectron emission for quality control of gas-turbine engine parts p0171 A81-21367
Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3 p0172 A81-21739
Helicopter fatigue qualification p0180 A81-22623
Project and experimental fatigue test of the wing of a modern combat aircraft p0180 A81-22625
Definition of loading sequence for full scale fatigue test p0180 A81-22626
Study of a crack propagation on the flap rail of a transport aircraft p0181 A81-22633
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry p0182 A81-22692
Determination of aircraft structural inspection intervals p0230 A81-24285
Research on fatigue at the Department of Aerospace Engineering of the Delft University p0232 A81-24939
Fatigue strength of certain materials used in airframe construction --- glass-plastic reinforced epoxy resin p0285 A81-28108
Low cycle fatigue of Rene 77 at elevated temperatures p0289 A81-28989
Helicopter transmission fatigue life p0291 A81-29058
In-flight fatigue crack monitoring using acoustic emission p0361 A81-32857
Adhesive bonding of aircraft primary structures [SAE PAPER 801209] p0404 A81-34217
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers p0418 A81-37136
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate p0418 A81-37137
A fatigue study and an investigation on mechanically fastened joints for the development of a flap p0481 A81-40581
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap p0481 A81-40585
Possibility of development of an electron-fractographic method for measuring stress level produced by fatigue fracture of the material p0532 A81-43773
Determination of fatigue life by testing materials for thermal fatigue p0532 A81-43774
Fatigue strength of CFRP under combined flight-by-flight loading and flight-by-flight temperature changes p0039 N81-11134
Fatigue test results of carbon fiber reinforced plastic F28 aircraft component and its structural details p0040 N81-11135
Current developments in aircraft fatigue evaluation procedures [AAAF-NT-79-33] p0086 N81-12464
Constant-amplitude and flight-by-flight tests on CFRP specimens [MBB-FE-2/S/PUB/26] p0131 N81-14006
The stress behavior of three advanced nickel base superalloys during high temperature low cycle fatigue [AD-A091694] p0131 N81-14061
Additional information about Fighter Aircraft Loading Standard for Fatigue Evaluation (FALSTAFF) [NLR-TR-79056-U] p0344 N81-21391
The mechanical testing of compressors and turbines for aircraft gas turbine engines p0433 N81-24100
Helicopter Fatigue Life Assessment [AGARD-CP-297] p0487 N81-26126
State of the art and statistical aspects of helicopter fatigue substantiation procedures p0487 N81-26127
Fatigue Assessment of UK military aeroplanes p0487 N81-26128
Synopsis of Specialists' Meeting on Helicopter Fatigue Methodology p0487 N81-26129
Application of damage tolerance concepts for the helicopters p0487 N81-26130
An evaluation of fatigue procedures for UK military helicopters p0488 N81-26133
Helicopter component fatigue life determination p0488 N81-26135
Fatigue tests on the total structure of the Gazelle SA 341 helicopter p0488 N81-26136
Helicopter gearbox testing p0488 N81-26137
Fatigue testing of helicopter gearboxes p0488 N81-26138
The methodology of fatigue analysis and testing: Main rotor blades and hub, Hughes YAH-64 advanced attack helicopter p0488 N81-26139
Fatigue testing of composite rotor blades p0489 N81-26140
Development of standardised fatigue test load histories for helicopter rotors: Basic consideration and definition of Helix and Felix p0489 N81-26141
Fatigue test program and test results p0489 N81-26142
Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading p0489 N81-26143
Lasting friendship. A review of the F-27 fatigue evaluation program carried out by Fokker-VFW --- performance prediction [NLR-TR-78150-U] p0495 N81-27006
Fatigue testing of composite rotor blades --- helicopter rotors [MBB-UD-308/80-OE] p0587 N81-30485

FAULT MECHANICS
U FRACTURE MECHANICS

FAULT TOLERANCE
A fault tolerant multiprocessor system with reconfiguration suitable for multiaxial flight stabilization and trimming p0118 A81-19296
Statistical crack growth in durability and damage tolerant analyses [AIAA 81-0492] p0300 A81-29382
AN/TPX-54 interrogator p0350 A81-31131
An application of redundancy in digital electronic engine control [SAE PAPER 801206] p0402 A81-34210
Development of an integrated fault tolerant engine control [AIAA PAPER 81-1365] p0502 A81-40885
Aircraft multi-bus electrical system using a Hall-effect sensing device [SAE PAPER 810569] p0519 A81-42734
Design of fault tolerant electronic engine controls [AIAA PAPER 81-1496] p0566 A81-45896
Availability requirements of the future ATC system p0617 A81-48550
Computer based in-flight monitoring p0042 N81-11269
Failure management techniques for high survivability p0042 N81-11272
Flight experience with flight control redundancy management p0042 N81-11274
Robust control system design p0042 N81-11275
Validation Methods Research for Fault-Tolerant Avionics and Control Systems Sub-Working Group

Meeting. CARE 3 peer review
[NASA-CP-2167] p0146 N81-15702
Fault-tolerant actuation concept for a research test aircraft
[AD-A093113] p0216 N81-17100
An interactive computational aerodynamics analysis program
[AD-A094765] p0263 N81-19033
Precision Positioning and Inertial Guidance Sensors: Technology and Operational Aspects
[AGARD-CP-298] p0484 N81-26081
Full authority digital electronic control turbofan engine demonstration
p0490 N81-27112
FAULT TREES
Fault trees and system reliability analysis with reference to the control of aircraft engines
p0498 N81-27109
FEASIBILITY ANALYSIS
Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370
Feasibility of forward-swept wing technology for V/STOL aircraft
[SAE PAPER 801176] p0400 A81-34189
Aircraft towing feasibility study
[DOE/CS-50069/1] p0074 N81-12051
Microwave landing systems. Citations from the Engineering Index data base
[PB80-814643] p0120 N81-13947
Microwave landing systems. Citations from the NTIS data base
[PB80-814635] p0120 N81-13948
Laser-Raman/Rayleigh flow diagnostic techniques applied to subsonic flow
[AD-A091695] p0133 N81-14275
A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974
A feasibility study for advanced technology integration for general aviation
[AD-A092437] p0185 N81-15975
An airport wind shear detection and warning system using Doppler radar: A feasibility study
[NASA-CR-3379] p0202 N81-16681
Feasibility study for C-141B reduction of wing loads by uprigging the ailerons
[AD-A094634] p0272 N81-19105
Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels
[NASA-CR-152145] p0276 N81-19136
Real-time feasibility for generation of nonlinear textured terrain
[AD-A095070] p0277 N81-19141
Possible online uses of AIDS data in future ATC systems
p0328 N81-20018
Responses to comments of Air Transport Association of America on aircraft towing feasibility study
[DE81-029834] p0638 N81-33201
FEDERAL BUDGETS
Posture hearings (NASA and FAA)
[GPO-65-265] p0203 N81-16952
NASA authorization, 1981
[GPO-71-290] p0203 N81-16953
NASA authorization, 1982, volume 4
[GPO-79-432-VOL-4] p0590 N81-31030
FEDERAL REPUBLIC OF GERMANY
U GERMANY
FEED SYSTEMS
High impulse gun airborne demonstration. GAU-13/A weapon, feed system, gun drive and electronic controls
[AD-A101698] p0582 N81-30120
FEEDBACK
NT SENSORY FEEDBACK
Challenge for operational experience feedback in aircraft design: An aircraft design example
[AD-A096088] p0341 N81-21067
FEEDBACK CONTROL
NT CASCADE CONTROL
Model-following system with assignable error dynamics and its application to aircraft
p0116 A81-18577
Frequency-shaped cost functionals - Extension of linear-quadratic-Gaussian design methods
p0116 A81-18578
System considerations in the implementation of digital control
[AAS 80-032] p0120 A81-18375
Robustness properties of a new multirate digital control system
[AIAA PAPER 81-0322] p0150 A81-20545
On the application of self-adaptive flight control system based on energy balance theory
p0224 A81-23733
The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0296 A81-29205
Control settings for a trimmed, stalled rotor by an automatic feedback system
[AIAA 81-0617] p0305 A81-29478
Active control of forward swept wings with divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
Flight control system design through constrained output feedback
p0321 A81-30264
Application of the parameter space method to aerospace vehicle digital control system design
p0359 A81-32642
Control system design using graphical decomposition techniques
p0410 A81-35567
Pole placement with output feedback
p0450 A81-38899
Gust response of rotary wing aircraft and its alleviation
p0465 A81-39900
Optimal processing of GPS signals
p0512 A81-41761
LQG controls for highly manoeuverable aircraft --- Linear quadratic Gaussian
[AIAA PAPER 81-1709] p0527 A81-43163
Effects of displacement and rate saturation on the control of statically unstable aircraft
[AIAA 81-1752] p0554 A81-44082
Autopilot design via improved discrete modal control
[AIAA 81-1777] p0554 A81-44095
Closed-loop criteria for assessing longitudinal-axis handling qualities of transports in final approach
[AIAA 81-1773] p0556 A81-44133
Low-order approaches to high-order systems - Problems and promises --- for analysis of aircraft pitch dynamics
[AIAA 81-1774] p0556 A81-44134
Optimal multirate flight control design
p0563 A81-45522
Model following control of gas turbine engines
p0624 A81-49900
Multivariable closed-loop analysis and flight control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11086
Closed loop control systems: Aircraft. Citations from the NTIS data base
[PB80-813710] p0082 N81-12114
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
A study of State Feedback Implicit Model following control for VSTOL aircraft
[AD-A093253] p0216 N81-17099
Research in multirate estimation and control
[AD-A094070] p0253 N81-18062
Design of multivariable feedback control systems via spectral assignment --- as applied to aircraft flight control
[NASA-CR-164189] p0345 N81-21864
F-8C adaptive control law refinement and software development
[NASA-CR-163093] p0377 N81-22089

Pilot-optimal multivariable control synthesis by
output feedback
[NASA-CR-163112] p0540 N81-28102
A study of the performance of an Olson type active
noise controller and the possibility of the
reduction of cabin noise
[UTIAS-TN-228] p0552 N81-29924
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials,
part 1
[NASA-CR-164684] p0583 N81-30134
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials.
Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135
A method for obtaining reduced-order control laws
for high-order systems using optimization
techniques
[NASA-TP-1876] p0589 N81-30851
A model-following technique for insensitive
aircraft control systems
p0600 N81-31223

FEEL
U SENSORY FEEDBACK
FET (TRANSISTORS)
U FIELD EFFECT TRANSISTORS
FIBER COMPOSITES
NT CARBON FIBER REINFORCED PLASTICS
NT GLASS FIBER REINFORCED PLASTICS
Hingeless tailrotor in fiber composite
construction and vibration-isolation systems
/ARIS, ASIS/ for helicopters
[MBB-UD-311-80-0] p0119 A81-19300
Effect of post buckling on the fatigue of
composite structures
p0418 A81-37127
Fatigue and damage propagation in composite rotor
blades
p0041 N81-11145
Analysis of composite laminates and fiber
composite repair schemes
[AD-A099629] p0499 N81-27206
Development of a CFC window frame, using short
fiber pressing technology --- jet aircraft cabin
windows
[BMFT-FB-W-80-032] p0499 N81-27208
FIBER OPTICS
Determination if fiber-optic immunity is adequate
for deployment in the V/STOL airframe --- to
compensate nonmetallic material LF transparency
p0057 A81-14265
An airborne integrated communications network
utilizing fiber optics
p0173 A81-21880
Fiber optics study technology for military aircraft
p0178 A81-22503
The 'light-weight' system - A novel concept for
on-board weight and balance measurement using
fiber optics
[SAWE PAPER 1336] p0352 A81-31377
An opto-electronic method for wind tunnel model
alignment
p0361 A81-32849
The evolution of fiber optics in avionics
[SAE PAPER 801145] p0398 A81-34174
Evolution of an optical control system for
aircraft hydraulics
[SAE PAPER 801195] p0402 A81-34205
The optical-fiber interferometer gyroscope for
aviation navigation
p0451 A81-37650
Fiber optic system test results in a tactical
military aircraft
p0452 A81-37659
Fiber optic technology for data transmission in
the helicopter environment
p0573 A81-46614
Airborne-fiber optics manufacturing technology,
aircraft installation processes
[AD-A093304] p0221 N81-17902
Optical Fiber Illumination System for visual
flight simulation
[NASA-CR-3409] p0343 N81-21086
Definition, analysis and development of an optical
data distribution network for integrated
avionics and control systems
[NASA-CR-159370] p0590 N81-30962
Fiber optics for aircraft engine/inlet control
[NASA-TM-82654] p0597 N81-31190

FIBER ORIENTATION
Wind tunnel experiments on the divergence of swept
wings with composite structures
[AIAA PAPER 81-1670] p0526 A81-43152
Scarf joints in unidirectional carbon fiber
reinforced plastics --- tests of repairs made
using adhesives
[BU-258] p0336 N81-20193
FIBER REINFORCED COMPOSITES
Thermal expansion molding process for aircraft
composite structures
[SAE PAPER 800612] p0062 A81-15334
Composite fuselage development for Naval aircraft
p0181 A81-22608
Fatigue of fibrous composite materials;
Proceedings of the Symposium, San Francisco,
Calif., May 22, 23, 1979
p0418 A81-37126
Advanced composite structure repair
p0481 A81-40595
Processing for an improved impact resistant
composite blade --- for turbofan aircraft engines
[AIAA PAPER 81-1356] p0501 A81-40830
Fibre reinforced composite applications at De
Havilland
[SAE PAPER 810640] p0524 A81-42704
Fiber-reinforced composites - The future for
aeropropulsion
[AIAA PAPER 81-1713] p0527 A81-43164
Test methods and design allowables for fibrous
composites; Proceedings of the Symposium,
Dearborn, MI, October 2, 3, 1979
p0611 A81-47801
Helicopter external cargo sling apex fitting:
Development and testing
[AD-A093515] p0252 N81-18049
Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22106
Structural design of BFRP patches for Mirage wing
repair
[AD-A097195] p0384 N81-23024
Development and design of a large wind-turbine blade
--- fiber reinforced composites
[MBB-UD-301/80-OE] p0586 N81-30198
Development of advanced interceptor substructural
material
[AD-A103836] p0640 N81-33241
FIBER RELEASE
A probabilistic analysis of electrical equipment
vulnerability to carbon fibers
[NASA-TM-80217] p0038 N81-11113
Fiber release from impacted graphite reinforced
epoxy composites
[NASA-CR-163684] p0038 N81-11117
The potential for damage from the accidental
release of conductive carbon fibers from
aircraft composites
p0041 N81-11143
Assessment of risk to Boeing commerical transport
aircraft from carbon fibers --- fiber release
from graphite/epxoy materials
[NASA-CR-159211] p0218 N81-17171
Carbon/graphite composite material study
[AR-3] p0585 N81-30188
Carbon/graphite composite material study. 3:
Agency program activities. National Aeronautics
and Space Administration (NASA)
p0585 N81-30189
Carbon/graphite composite material study, appendix
A and appendix B
p0585 N81-30190

FIBERGLASS
U GLASS FIBERS
FIBERS
NT CARBON FIBERS
NT DACRON (TRADEMARK)
NT GLASS FIBERS
NT HAIR
NT REINFORCING FIBERS
FIDELITY
U ACCURACY
FIELD EFFECT TRANSISTORS
A simple model of the threshold voltage of short
and narrow channel MOSFETs
p0051 A81-13285
An X-band power GaAs FET amplifier for military
avionics radar applications
p0350 A81-31122

FIELD OF VIEW
Head up displays
p0266 A81-28296
FIELD STRENGTH
NT ELECTRIC FIELD STRENGTH
FIELD THEORY (PHYSICS)
Analysis of calculated three-dimensional inviscid flow fields with embedded shock waves (presentation of a field solution), part 1
[ESA-TT-558] p0022 N81-10017
FIGHTER AIRCRAFT
NT ALPHA JET AIRCRAFT
NT F-4 AIRCRAFT
NT F-5 AIRCRAFT
NT F-8 AIRCRAFT
NT F-14 AIRCRAFT
NT F-15 AIRCRAFT
NT F-16 AIRCRAFT
NT F-17 AIRCRAFT
NT F-18 AIRCRAFT
NT F-27 AIRCRAFT
NT F-100 AIRCRAFT
NT F-101 AIRCRAFT
NT F-106 AIRCRAFT
NT F-111 AIRCRAFT
NT FV-12A AIRCRAFT
NT HARRIER AIRCRAFT
NT JAGUAR AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT SAAB 37 AIRCRAFT
NT YF-12 AIRCRAFT
NASA presses fighter gains --- long-range supersonic cruise aircraft
p0002 A81-10575
Possibilities for the valuation of different combat aircraft configurations with respect to flight mechanics
p0007 A81-11607
Advanced combat aircraft wing design
p0007 A81-11608
A study of the air inlet efficiency of a combat aircraft concept with dorsal inlet
p0008 A81-11615
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment
p0013 A81-11659
Qualitative calculations of transonic drag-rise characteristics using the equivalence rule
p0058 A81-14393
The future of training for aerial combat
p0060 A81-15110
Charting a course for V/STOL
p0068 A81-16179
Calculation of the lift dependent drag polar of cambered fighter plane configurations with deflected maneuver flaps in the subsonic region by means of a modified procedure according to Lamar
[DGLR PAPER 80-109] p0120 A81-19395
Procedures for optimal drag design of camber and flap deflection in supersonic regions with consideration to geometric limits
[DGLR PAPER 80-110] p0120 A81-19396
Industry proposes supersonic V/STOL
p0122 A81-19490
Fighters for the 1990s
p0122 A81-19497
A computer graphics display technique for the examination of aircraft design data
[AIAA PAPER 81-0370] p0166 A81-20788
Effects of fighter attack spectrum on crack growth
p0172 A81-21741
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking
p0173 A81-21742
Escape from military fighters - A modern perspective
p0176 A81-22096
Project and experimental fatigue test of the wing of a modern combat aircraft
p0180 A81-22625
The Coronel Transverse Wing Flight system
p0231 A81-24748
Combat aircraft development - Looking backward to look forward 1935-1990
p0284 A81-27905
Supersonic V/STOL prospects brighten
p0288 A81-28599
The next combat aircraft
p0298 A81-29150
Fatigue sensitivity of composite structure for fighter aircraft
[AIAA 81-0495] p0300 A81-29383
Use of flight simulators in developing design load spectra for new aircraft
[AIAA 81-0513] p0301 A81-29389
An improved potential gradient method to calculate airloads on oscillating supersonic interfering surfaces
[AIAA 81-0646] p0307 A81-29499
Aerodynamic modeling of an oscillating wing with external stores
[AIAA 81-0648] p0307 A81-29501
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
Digital flight control - The generation of the 80's
p0320 A81-30248
IFFC fire control system mechanization - Firefly III --- for fighter aircraft
p0324 A81-30327
Integrated Flight/Weapon Control system concepts
p0324 A81-30328
Integrated Flight and Weapon Control for improved tactical combat effectiveness
p0324 A81-30329
Fighter fire control requirements for air battles of the future
p0326 A81-30348
Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370
The structural weight fraction - Revisited for fighter/attack type aircraft
[SAWE PAPER 1365] p0353 A81-31307
RAPIDLOADS - A preliminary design loads prediction technique for aircraft
[SAWE PAPER 1366] p0353 A81-31308
Aircraft design then and now
[AIAA PAPER 81-0917] p0363 A81-32933
Aerodynamic trials with the linear motor-driven platform at the Toulouse Aeronautic Testing Center --- for aircraft acceleration and deceleration tests
[AAAF PAPER NT 80-41] p0369 A81-33963
A comparison of propulsion systems for V/STOL supersonic combat aircraft
[SAE PAPER 801141] p0398 A81-34171
Feasibility of forward-swept wing technology for V/STOL aircraft
[SAE PAPER 801176] p0400 A81-34189
Preliminary aerodynamic characteristics of several advanced VSTOL fighter/attack aircraft concepts
[SAE PAPER 801178] p0400 A81-34191
Energy maneuverability displays for air combat training
[SAE PAPER 801185] p0401 A81-34198
Full Authority Digital Electronic Control turbofan engine demonstration
[SAE PAPER 801199] p0402 A81-34209
A new lightweight fighter
p0410 A81-35025
Estimation of dynamic stability parameters from drop model flight tests
p0410 A81-35551
Mirage 2000, a totally multi-purpose aircraft
p0419 A81-37166
Supersonic aircraft test experience - Test techniques and data analysis methods
p0419 A81-37299
The biparametric cycle count method and the principle of simplification --- in determination of aircraft structural fatigue life
p0419 A81-37337
Coming challenge - Integrating the technologies for forward-swept-wing fighters
p0420 A81-37522
Flight-management system - Key to the advanced-technology fighter
p0421 A81-37523
Goals of flight management system integration for a forward-swept-wing demonstrator aircraft
p0421 A81-37524

Future strike aircraft design synthesis
[AIAA PAPER 81-0371] p0421 A81-37571

Fiber optic system test results in a tactical military aircraft
p0452 A81-37659

Aerodynamic characteristics of two VSTOL fighter configurations
[AIAA PAPER 81-1292] p0454 A81-38119

An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240

V/STOL combat aircraft progress from the powerplant viewpoint
p0469 A81-40105

Aiming computation for fighter weapon aiming system
p0480 A81-40448

The survivable, affordable fighter - The Aeritalia-Macchi-Embraer AM-X
p0480 A81-40460

V/STOL technology requirements for future fighter aircraft
[AIAA PAPER 81-1360] p0502 A81-40841

Advanced nozzle integration for supersonic strike fighter application
[AIAA PAPER 81-1441] p0504 A81-40875

A strategy for developing the next generation fighter/attack aircraft engine
[AIAA PAPER 81-1478] p0505 A81-40898

Engine usage prediction for advanced fighter aircraft
[AIAA PAPER 81-1367] p0514 A81-42178

Engine duty cycle estimation for conceptual design aircraft
[AIAA PAPER 81-1368] p0514 A81-42179

AMX - Italo-Brazilian bantam battler
p0518 A81-42630

Composite Wing/Fuselage Program
p0530 A81-43629

Axisymmetric approach and landing thrust reversers
[AIAA PAPER 81-1650] p0533 A81-43936

Topside weapons release - An analytical study
[AIAA PAPER 81-1655] p0533 A81-43939

Experimental and analytical development of an advanced supersonic fighter concept
[AIAA PAPER 81-1659] p0534 A81-43941

Lift-enhancing surfaces on several advanced V/STOL fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-43946

Development and hardware verification of an aeroelastically tailored forward swept composite wing
p0557 A81-44355

Review of Navy composite repair program
p0558 A81-44383

Stability characteristics of a forward swept wing aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576

Time-constrained maximum-energy turns --- for modern fighter aircraft
[AIAA PAPER 81-1886] p0561 A81-44578

Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518

Optimization of simulation models for avionics software verification
p0615 A81-48373

Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] p0617 A81-48417

Combat cockpit design
p0622 A81-49173

Constant-amplitude and flight-by-flight tests on CFRP specimens
p0039 N81-11133

Fatigue strength of CFRP under combined flight-by-flight loading and flight-by-flight temperature changes
p0039 N81-11134

Fatigue test results of carbon fiber reinforced plastic F28 aircraft component and its structural details
p0040 N81-11135

Report on a cooperative programme on Active Flutter Suppression
[AGARD-R-689] p0082 N81-12115

Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116

Test and analyses of an active flutter suppression system on an FFDL model of YF17
p0082 N81-12118

Wind tunnel tests on a fighter aircraft wing/store flutter suppression system: The B.Ae control law
p0083 N81-12119

Are management problems in the acquisition of aircraft gas turbine engines being corrected
[AD-A090520] p0088 N81-12928

Computational aerodynamic design tools and techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0128 N81-13950

Constant-amplitude and flight-by-flight tests on CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006

Evaluation of aircraft interference effects on external stores at subsonic and transonic speeds
p0187 N81-15997

Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0188 N81-16009

Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014

Seat pack for fighter aircraft operating on the NATO Northern Flank
p0205 N81-17010

The influence of visual requirements on the design of military cockpits
p0213 N81-17075

Structure and lifetime attestation of TORNADO
[MBB-PUB-P-0001] p0251 N81-18048

Additional information about Fighter Aircraft Loading Standard for Fatigue Evaluation (FALSTAFF)
[NLR-TR-79056-U] p0344 N81-21391

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 1: Study overview --- aerodynamic characteristics
[NASA-CR-152391-VOL-1] p0384 N81-23030

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 2: Evaluation of prediction methodologies
[NASA-CR-152391-VOL-2] p0384 N81-23031

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 3: Effects of configuration variations from baseline
[NASA-CR-152391-VOL-3] p0384 N81-23032

Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 4: RALS R104 aerodynamic characteristics and comparisons with R205 configuration aerodynamic characteristics
[NASA-CR-152391-VOL-4] p0384 N81-23033

Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion free wing airplane
[NASA-TM-81961] p0388 N81-23072

Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft --- V/STOL aircraft
[NASA-TM-81292] p0428 N81-24066

Specification requirements for fighter engines
p0429 N81-24073

Survivability study of a FLIR equipment fighter on a night penetration of a Soviet army
[AD-A101186] p0547 N81-29120

Optimal nuclear radiation criteria for aeronautical systems
[AD-A101651] p0548 N81-29125

Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0 --- Ames 9 by 7 foot supersonic wind tunnel
[NASA-TM-81286] p0579 N81-30083

Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
p0632 N81-33142

Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg --- conducted in the Langley 16-foot transonic tunnel
[NASA-TM-83171] p0635 N81-33159

Development of advanced interceptor substructural material

[AD-A103835] p0640 N81-33241

FILAMENT WINDING
  Manufacturing methods for a composite main rotor blade for the YAH-64 helicopter
  p0575 A81-46629

FILAMENT WOUND CONSTRUCTION
  U FILAMENT WINDING

FILAMENTS
  Behavior of continuous filament advanced composite isogrid structure
  p0377 N81-22095

FILE MAINTENANCE (COMPUTERS)
  Computer aided compilation of an electrical drawing file
  p0007 A81-11611

FILLETS
  Determination of aerodynamically adequate fillet geometry in turbocompressor blade rows
  [AD-A102170] p0600 N81-31219

FILM COOLING
  Discrete hole film cooling of turbine blades
  p0293 A81-29073
  Film cooling performance by injection through discrete holes
  p0293 A81-29074
  Film cooling performance of liner cooling devices
  p0293 A81-29075
  Turbine blade cooling research at the von Karman Institute for Fluid Dynamics
  p0293 A81-29076
  Factors limiting turbine inlet temperatures
  p0294 A81-29083
  Computation of wall temperature and heat flux distributions of the film cooled walls
  p0348 A81-30802

FILTRATION
  NT SPATIAL FILTERING

FINANCIAL MANAGEMENT
  Evolution of techniques for LCC analysis
  p0045 N81-11909

FINITE DIFFERENCE THEORY
  Review of numerical methods for the problem of the supersonic flow around bodies at angle of attack
  p0011 A81-11639
  Finite difference computation of the steady transonic potential flow around airplanes
  p0107 A81-17802
  A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
  [AIAA PAPER 81-0050] p0158 A81-20566
  Higher-accuracy finite-difference schemes for transonic airfoil flowfield calculations
  [AIAA PAPER 81-0381] p0166 A81-20794
  A cost-effective method for shock-free supercritical wing design
  [AIAA PAPER 81-0383] p0166 A81-20796
  Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
  p0224 A81-23730
  A contribution to the computation of transonic supersonic flows over blunt bodies
  p0230 A81-24423
  Wing analysis by the plate analogy using an integral-difference method
  p0235 A81-25680
  On the solution of Navier Stokes equations of the flow in turbomachines
  p0296 A81-29099
  Three dimensional flow in annular diffusers with two vortex distributions at entry
  p0297 A81-29112
  A diagonal form of an implicit approximate-factorization algorithm
  p0300 A81-29363
  Linear/nonlinear behavior in unsteady transonic aerodynamics
  [AIAA 81-0643] p0306 A81-29496
  Semi-inverse method of computation in inviscid transonic flows - Application to the design of turbomachines blades profiles
  [ASME PAPER 81-GT-206] p0318 A81-30096
  Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
  p0354 A81-31612
  Factors which influence the behavior of turbofan forced mixer nozzles
  [AIAA PAPER 81-0274] p0359 A81-32549
  Finite-difference gradients versus error-quadrature gradients in the solution of parameterized optimal control problems
  p0421 A81-37560
  A PANSONIC Navier-Stokes solver --- for two dimensional flow about arbitrary airfoil sections
  [AIAA PAPER 81-1195] p0434 A81-38777
  Transonic dip mechanism of flutter of a sweptback wing. II
  p0559 A81-44447
  Numerical study of transonic flutter of a two dimensional airfoil
  [NAL-TR-617T] p0090 N81-13023

FINITE ELEMENT METHOD
  Flow computation around multi-element airfoils in viscous transonic flow
  p0011 A81-11641
  Finite element analysis of natural and forced flexural vibrations of rotor systems
  p0017 A81-11956
  Calculation of critical flutter speeds on an aircraft in subsonic flow
  p0068 A81-16301
  Nonlinear incremental analysis up to failure of aeronautical structures
  p0068 A81-16307
  The method of superelements in the dynamics of complex structures
  p0101 A81-16969
  Variational principles and generalized variational principles for the hybrid aerodynamic problem of airfoil cascades on an arbitrary stream sheet of revolution
  p0107 A81-17741
  Structural analysis of fuselages with cutouts by finite element method
  p0108 A81-17816
  Spanwise distribution of control points in the method of finite elementary solutions
  [AIAA PAPER 79-1879] p0169 A81-21011
  Fatigue life evaluation of a helicopter main rotor hub
  p0180 A81-22631
  Analysis of a symmetric transonic aerofoil with the finite element method - A new upwinding technique
  p0183 A81-22984
  An aeronautical structural analysis system for static analysis /HAJIF-I/
  p0224 A81-23720
  Calculation of nonlinear compressibility effects of airfoils in subcritical conditions
  p0225 A81-23853
  Conforming element with out-element nodes
  p0225 A81-23855
  Prediction of structural fatigue response under aircraft loads from material stress-strain behavior
  p0226 A81-24009
  Subsonic cascade flow analysis by a finite element method
  p0233 A81-25311
  Finite element calculation of thin-wall reinforced shells of the fuselage type with account for physical nonlinearity and loss of stability of certain elements
  p0235 A81-25679
  Use of optimization in helicopter vibration control by structural modification
  p0241 A81-26945
  The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
  p0291 A81-29061
  An application of the energy release rate concept to crack growth in attachment lugs
  [AIAA 81-0491] p0302 A81-29420
  Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, and AIAA Dynamics Specialists Conference, Atlanta, Ga., April 9, 10, 1981, Technical Papers. Part 2
  p0393 A81-29420
  Free-vibration analysis of rotating beams by a variable-order finite-element method
  [AIAA 81-0614] p0305 A81-29476
  Transient, nonlinear response analysis of soft bodied impact on flat plates including interactive load determination

[AIAA 81-0621] p0305 A81-29482
On some methods of supersonic unsteady lifting surface analysis [AIAA 81-0644] p0307 A81-29497
Dynamic stability of a rotor blade using finite element analysis [AIAA 81-0615] p0309 A81-29513
Finite element methods for transonic blade-to-blade calculation in turbomachines [ASME PAPER 81-GT-5] p0310 A81-29930
A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh p0347 A81-30717
Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates p0348 A81-30914
Numerical methods for studying the stress-strain state and service life of aircraft gas-turbine engine disks p0351 A81-31258
Developments in the analysis and repair of cracked and uncracked structures p0354 A81-31561
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight p0364 A81-33050
Finite element analysis of asymmetric, lateral natural vibrations of a deformable aeroplane p0366 A81-33736
Finite element analysis of self-excited vibrations of helicopter rotor blades p0395 A81-34120
The CADAM system for aircraft structural design [SAE PAPER 801208] p0403 A81-34216
Theory and application of finite element analysis to structural crash simulation p0416 A81-36614
A periodic problem in viscoelasticity with variable coefficients p0419 A81-37143
The calculation of lift and drag characteristics of subsonic wings with winglets p0480 A81-40442
Stress analysis of first turbine vane using a 3-dimensional model with non linear material behavior subjected to transient temperatures [AIAA PAPER 81-1437] p0504 A81-40873
Application of the Semi-Loof thin shell element to the analysis of aircraft engine structures p0518 A81-42704
Aircraft subfloor response to crash loadings [SAE PAPER 810614] p0522 A81-42770
Finite element analysis of a bird-resistant monolithic stretched acrylic canopy design for the F-16A aircraft [AIAA PAPER 81-1640] p0525 A81-43140
Calculation of the impingement of cloud droplets in a cylinder by the finite-element method p0533 A81-43890
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method p0614 A81-48097
Finite strip analysis of singly curved skin-stringer structures p0616 A81-48390
Structural synthesis - Its genesis and development p0622 A81-49076
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets [AIAA PAPER 81-1981] p0624 A81-49736
Stability of nonuniform rotor blades in hover using a mixed formulation [AD-A090756] p0076 N81-12071
Finite element analysis of inviscid subsonic boattail flow [NASA-TM-81650] p0140 N81-14977
Finite element method study of wing-fuselage-nacelle interactions of a Falcon 20 type aircraft at Mach = 0.79 p0187 N81-15994
Nonlinear analysis of squeeze film dampers applied to gas turbine helicopter engines [AD-A091905] p0196 N81-16062
A conversational, topological grid method and optimization of structural calculations involving finite elements [AAAF-NT-79-30] p0210 N81-17053
Application of the finite element method to rotary wing aeroelasticity p0251 N81-18043
Aeroelastic and dynamic finite element analyses of a bladder shrouded disk [NASA-CR-159728] p0278 N81-19479
Analysis of composite laminates and fiber composite repair schemes [AD-A099629] p0499 N81-27206
Adaptive finite element technology in integrated design and analysis --- aircraft structures design [NASA-CR-164560] p0543 N81-28810

FINITE VOLUME METHOD
An implicit finite volume method for elliptical flow computation --- numerical integration, aerothermodynamics p0255 N81-18248

FINITE-STATE MACHINES
U TURING MACHINES

FINNED BODIES
Application of aerodynamic jump prediction theory to supersonic, high fineness ratio, cruciform finned bodies [AIAA PAPER 81-0222] p0162 A81-20685
Aerodynamic estimation techniques for aerostats and airships [AIAA 81-1339] p0457 A81-38542
Theoretical determination of subsonic oscillatory airforce coefficients for fin-tailplane configurations [RAE-TR-79125] p0022 N81-10016

FINS
NT COOLING FINS
Development of the A300 fin in modern composite fibre construction p0013 A81-11653
Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control [AIAA PAPER 81-0074] p0159 A81-20582
Analytically determined fin-tip heat transfer coefficients p0234 A81-25585
Model 206L composite vertical fin [AHS 80-34] p0478 A81-40175
Development of graphite-epoxy covers for L-1011 advanced composite vertical fin p0530 A81-43627

FIRE CONTROL
Multivariable aircraft control by manoeuvre commands - An application to air-to-ground gunnery [ONERA, TP NO. 1980-127] p0009 A81-11623
IFFC fire control system mechanization - Firefly III --- for fighter aircraft p0324 A81-30327
Integrated Flight/Weapon Control system concepts p0324 A81-30328
Implementation of target orientation angles in improved Kalman filter based short range radar tracking p0326 A81-30340
Cybernetic airborne fire control - Issues and potential p0326 A81-30347
Fighter fire control requirements for air battles of the future p0326 A81-30348
Integrated flight and fire control development and demonstration of an F-15B aircraft p0327 A81-30359
Operator training systems/simulators p0349 A81-31109
Aiming computation for fighter weapon aiming system p0480 A81-40440
The technical and managerial challenge of integrated flight/fire control [AIAA PAPER 81-1706] p0527 A81-43162
IFFC flying qualities simulation --- Integrated Flight/Fire Control [AIAA 81-1821] p0555 A81-44111
Origins of inertial navigation p0567 A81-46276
Automatic handoff of multiple targets [AD-A093483] p0217 N81-17101
Integrated strike avionics study, volume 1 [AD-A094705] p0273 N81-19113
Air-to-air gunnery systems test and evaluation p0544 N81-29073

Gun harmonisation using the sector acoustic miss distance indicator
p0544 N81-29074

FIRE CONTROL CIRCUITS
Integrated Flight and Weapon Control for improved tactical combat effectiveness
p0324 A81-30329

FIRE DAMAGE
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16020

FIRE FIGHTING
Aircraft fire and overheat detection and extinguishment
[SAE PAPER 800622] p0063 A81-15340
Mission-dedicated vehicle for passenger rescue from burning aircraft
p0412 A81-35772
Airport Crash/Fire/Rescue CFR service cost and benefit analysis. Volume 2: Appendixes
[AD-A091155] p0094 N81-13069

FIRE PREVENTION
Aircraft fire and overheat detection and extinguishment
[SAE PAPER 800622] p0063 A81-15340
Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
Fire-proof fuel
p0480 A81-40458
Fundamental studies of antimisting fuels
[AIAA PAPER 81-1422] p0515 A81-42195
Aircraft engine nacelle fire test simulator. Volume 1: Technical
[AD-A089629] p0030 N81-10081
Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933
Testimony of Elwood T. Driver, Vice Chairman, National Transportation Safety Board, accompanied by Gerrit J. Walhout, Chief, Human Factors Division, and Matthew M. McCormick, Senior Air Safety Investigator, Human Factors Division
p0126 N81-13934
Testimony of a panel consisting of: Lloyd E. Frisbee, Vice President, Engineering and Operations, Lockheed California Company; Lyle A. Wright, Director, Powerplant Engineering, Douglas Aircraft Company, accompanied by Doctor H. C. Schjelderup, Chief Technology Engineer, Materials and Process Engineering, and F. E. Duskin, Senior Design Engineer, Interiors Engineering, Douglas Aircraft Company
p0127 N81-13937
Special Aviation Fire and Explosion Reduction (SAFER) advisory committee, volume 1
[AD-A092016] p0191 N81-16024
Evaluation of EF anechoic chamber fire protection systems
[AD-A092478] p0197 N81-16070
Fireworthiness of transport aircraft interior systems
p0267 N81-19061
Study of materials performance model for aircraft interiors
[NASA-CR-152378] p0333 N81-20063
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041
Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23058
Effect of thermal radiation on the integrity pressurized aircraft evacuation slides and slide materials
[AD-A098179] p0424 N81-24039
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065

FIREPROOFING
Textile materials for commercial transportation vehicles --- passenger aircraft
p0532 A81-43653
Development of assembly techniques for fire resistant aircraft interior panels
[NASA-CR-152119] p0254 N81-18097
Wing spillage tests using antimisting fuel
[AD-A096326] p0344 N81-21215
Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050

FIRES
Large-scale carbon fiber tests
[NASA-TM-80218] p0196 N81-16137
Study of aircraft crashworthiness for fire protection
[NASA-CR-166159] p0424 N81-24035

FIREWORKS
U PYROTECHNICS

FIRING (IGNITING)
NT STATIC FIRING
NT TEST FIRING

FISHTAILING
U YAW

FITTINGS
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049

FIXED WINGS
A hybrid state vector approach to aeroelastic analysis with application to composite lifting surfaces
[AIAA 81-0626] p0300 A81-29512
A description of the general aviation fixed wing accident
p0408 A81-34696
X-wing stability and control development and wind tunnel demonstration tests - Helicopter, conversion, and fixed wing flight
[AHS 80-27] p0475 A81-40157
Kinematic properties of rotary-wing and fixed-wing aircraft in steady coordinated high-g turns
[AIAA PAPER 81-1855] p0560 A81-44554
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022
DEKFIS user's guide: Discrete Extended Kalman Filter/Smoother program for aircraft and rotorcraft data consistency
[NASA-CR-159081] p0379 N81-22722
Determination of aircraft dynamic stability and control parameters from flight testing
p0591 N81-31115
National icing facilities requirements investigation
[AD-A102520] p0602 N81-31230

FIXED-WING AIRCRAFT
U AIRCRAFT CONFIGURATIONS
U FIXED WINGS

FLAME FRONTS
U FLAME PROPAGATION

FLAME HOLDERS
Flameholding characteristics of a swept-strut H2 fuel-injector for scramjet applications
p0003 A81-10711
Fresh mixture entrainment in a jet curtain flameholder
p0294 A81-29084

FLAME INTERACTION
U CHEMICAL REACTIONS
U FLAME PROPAGATION

FLAME PROPAGATION
Investigation of the influence of active particles on the basic combustion characteristics in turbulent flow
p0242 A81-26986
Tests on the fire resistance behavior of materials inside civil aircraft
[SNIAS-801-551-101] p0074 N81-12052

FLAME RETARDANTS
Textile materials for commercial transportation vehicles --- passenger aircraft
p0532 A81-43653

FLAME STABILITY
Numerical investigation of a model of turbulent combustion of hydrocarbons
[AIAA PAPER 81-0039] p0158 A81-20589
Semi-empirical correlations for gas turbine emissions, ignition, and flame stabilization
p0171 A81-21505
Fresh mixture entrainment in a jet curtain flameholder
p0294 A81-29084

The combustion modelling of swirling flows for gas turbine combustors
p0295 A81-29087
The influence of flames on the formation of self-excited combustion chamber oscillations
p0298 A81-29197
The influence of premixed combustion flame stabilizer geometry on flame stability and emissions
[ASME PAPER 81-GT-26] p0311 A81-29942
Interpretation of ramjet combustor test data
[AIAA PAPER 81-1433] p0504 A81-40870
FLAMES
NT PREMIXED FLAMES
FLAMMABILITY
High-char-forming composite laminates
p0532 A81-43652
Tests on the fire resistance behavior of materials inside civil aircraft
[SNIAS-801-551-101] p0074 N81-12052
Dynamic, hot surface ignition of aircraft fuels and hydraulic fluids
[NASA-CR-163979] p0254 N81-18139
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28094
FLAMMABLE GASES
Aircraft Research and Technology for Antimisting Kerosene Conference
[AD-A101347] p0580 N81-30103
FLAP CONTROL
U AIRCRAFT CONTROL
U FLAPS (CONTROL SURFACES)
FLAPPING
Wing flapping with minimum energy
p0283 A81-27889
Use of multiblade sensors for on-line rotor tip-path plane estimation
p0356 A81-32010
Comparison of calculated and measured helicopter rotor lateral flapping angles
p0357 A81-32018
FLAPPING HINGES
Alleviation of helicopter fuselage-induced rotor unsteady loads through deterministic variation of the individual blade pitch
[NASA-CR-166234] p0549 N81-29134
FLAPS (CONTROL SURFACES)
NT EXTERNALLY BLOWN FLAPS
NT JET FLAPS
NT LEADING EDGE FLAPS
NT LEADING EDGE SLATS
NT TRAILING-EDGE FLAPS
NT UPPER SURFACE BLOWN FLAPS
NT VORTEX FLAPS
NT WING FLAPS
Study of a crack propagation on the flap rail of a transport aircraft
p0181 A81-22633
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
Measurement of derivatives for an oscillating airfoil with flap
p0411 A81-35635
A fatigue study and an investigation on mechanically fastened joints for the development of a flap
p0481 A81-40581
Flap noise characteristics measured by pressure cross correlation techniques
p0259 N81-18008
Pressure distributions for the GA(W)-2 airfoil with 20% aileron, 25% slotted flap and 30% Fowler flap
[NASA-CR-2948] p0262 N81-19023
Pitch-flap-phase coupling. A preliminary analysis of an evolving concept of helicopter autostabilization
[BU-242] p0434 N81-24109
A program to evaluate a control system based on feedback of aerodynamic pressure differentials. Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] p0635 N81-33161
FLASHBACK
Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465
FLAT COAXIAL TRANSMISSION LINES
U MICROSTRIP TRANSMISSION LINES
FLAT PLATES
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002
Drag reduction of an oscillating flat plate with an interface film
p0239 A81-26504
Film cooling performance by injection through discrete holes
p0293 A81-29074
Turbine blade cooling research at the von Karman Institute for Fluid Dynamics
p0293 A81-29076
Transient, nonlinear response analysis of soft bodied impact on flat plates including interactive load determination
[AIAA 81-0621] p0305 A81-29482
Study of noise reduction characteristics of multilayered panels and dual pane windows with Helmholtz resonators
[NASA-CR-164370] p0438 N81-24857
Aeroelastic flutter and divergence of graphite/epoxy cantilevered plates with bending-torsion stiffness coupling
[AD-A101726] p0587 N81-30476
FLAW DETECTION
U NONDESTRUCTIVE TESTS
FLAWS
U DEFECTS
FLEXIBILITY
Matrix load analysis method for flexible aircraft structures
[PAPER 810610] p0522 A81-42766
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A093122] p0215 N81-17092
FLEXIBLE BODIES
Figure control of flexible structures - Optical surfaces of thin deformable primary mirrors
p0060 A81-14994
The balancing of flexible rotors - Theoretical relation of each balancing method and accuracies
p0228 A81-24088
Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports
p0228 A81-24089
LTA developments in Great Britain
[AIAA 81-1321] p0456 A81-38532
Influence of landing gear flexibility on aircraft performance during ground roll
p0622 A81-45375
Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section --- transonic self-streamlining wind tunnel
[NASA-CR-165685] p0343 N81-21087
A digital program for calculating the interaction between flexible structures, unsteady aerodynamics and active controls
[NASA-TM-80040] p0498 N81-27115
Handling qualities of large flexible aircraft
p0538 N81-28001
FLEXIBLE WINGS
Calculation of airloads for a flexible wing via NASTRAN
[AD-A094770] p0263 N81-19031
Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope --- wind tunnel tests for flight characteristics
[ESA-TT-634] p0339 N81-21046
FLEXING
Finite element analysis of natural and forced flexural vibrations of rotor systems
p0017 A81-11956
FLEXURE
U FLEXING
FLIGHT ALTITUDE
The effect of oxygen concentration distribution on altitude relighting performance of a turbo-jet

engine combustor
p0295 A81-29089
Measurement of aircraft speed and altitude --- Book
p0357 A81-32401
Prediction of range and endurance of jet aircraft
at constant altitude
p0611 A81-47725
The NASA digital VGH program, early results ---
structural design criteria
p0268 N81-19069
Sidelooking laser altimeter for a flight simulator
[NASA-CASE-ARC-11312-1] p0278 N81-19439
Laser Doppler airspeed and altitude sensor
[AD-A096980] p0375 N81-22049
An investigation of reports of Controlled Flight
Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108
FLIGHT CHARACTERISTICS
Identification of longitudinal flying
characteristics of an aeroplane and the effect
of nonstationary aerodynamics
p0010 A81-11627
Development and application of a moving base
visual flight simulator including the design of
hydraulic actuators with hydrostatic bearings
p0010 A81-11633
Helicopter flight characteristics improvement
through swept-tip rotor blades
[MBB-UD-275-79-0] p0018 A81-12097
Influence of a change in power at the propeller on
the properties of the aircraft
p0059 A81-14754
Shipboard trials of the Quiet Short-Haul Research
Aircraft /QSRA/
p0099 A81-16581
History of flight testing the L-1011 Tristar jet
transport. I - The L-1011-1
p0110 A81-17976
Practical aerodynamics of the helicopter Mi-6A ---
Russian book
p0116 A81-18600
Aircraft lateral parameter estimation from flight
data with unsteady aerodynamic modelling
[AIAA PAPER 81-0221] p0162 A81-20684
Dynamics of longitudinal motion of a
variable-sweepback aeroplane with a deformable
control system
p0231 A81-24722
On the inter-relationship of the basic parameters
and characteristics of various flight vehicles
p0236 A81-25694
Some characteristics of aircraft motion at large
angles of attack
p0414 A81-36473
Development of a generic airplane response
simulation
[AIAA 81-0980] p0415 A81-36568
Air data computer for the measurement and
evaluation of data of flight physics
p0451 A81-37648
Effects of drive slots on parachute performance
p0453 A81-38020
Rotor blade aeroelastic stability and response in
forward flight
p0467 A81-40089
Flight tests and statistical data analysis for
flying qualities investigations
p0471 A81-40121
Preliminary evaluation of RSRA data comparing pure
helicopter, auxiliary propulsion and compound
helicopter flight characteristics --- Rotor
Systems Research Aircraft
[AHS 80-10] p0473 A81-40143
Flight test results for task oriented flying
qualities evaluation
[AHS 80-29] p0476 A81-40159
Evolution of transport wings - From C-130, C-141,
and C-5 to C-XX
p0510 A81-41333
The indication of the characteristics of aircraft
controllability with prediction in dynamic
ergatic systems
p0517 A81-42603
Longitudinal equivalent systems analysis of Navy
tactical aircraft
[AIAA 81-1775] p0554 A81-44094
IFFC flying qualities simulation --- Integrated
Flight/Fire Control
[AIAA 81-1821] p0555 A81-44111
Flying qualities criteria and flight control design
[AIAA 81-1823] p0556 A81-44127
Closed-loop criteria for assessing
longitudinal-axis handling qualities of
transports in final approach
[AIAA 81-1773] p0556 A81-44133
Low-order approaches to high-order systems -
Problems and promises --- for analysis of
aircraft pitch dynamics
[AIAA 81-1774] p0556 A81-44130
Lateral-directional flying qualities of transport
aircraft
[AIAA PAPER 81-1887] p0561 A81-44579
A unifying framework for longitudinal flying
qualities criteria
[AIAA PAPER 81-1889] p0561 A81-44580
An investigation of the impact of aerodynamic lags
on dynamic flight characteristics
[AIAA PAPER 81-1892] p0561 A81-44581
SR-71 impressive in high-speed regime
p0565 A81-45747
The aerodynamic influences of rotor blade
airfoils, twist, taper and solidity on hover and
forward flight performance
p0572 A81-46607
Helicopter trim by periodic shooting with
Newton-Raphson iteration
p0573 A81-46621
Handling qualities of the SH-60B Seahawk
p0574 A81-46627
Improved aircraft cruise by periodic control
p0034 N81-11030
A multivariate approach to handling qualities
rating scale development
[AD-A089825] p0037 N81-11047
Synthesis of test results obtained with Concorde
at high incidences
[AAAF-NT-80-26] p0077 N81-12079
The flying qualities of aircraft with actively
augmented pitch and yaw stability
[ARC-R/M-3840] p0082 N81-12113
Pseudosteady-state analysis of nonlinear aircraft
maneuvers
[NASA-TP-1758] p0094 N81-13065
The collision course: Conditions, guidance laws
and properties
[DFVLR-FB-80-06] p0127 N81-13982
A flight investigation of performance and loads
for a helicopter with NC-SC2 main-rotor blade
sections
[NASA-TM-81898] p0186 N81-15982
On the flight mechanics of remotely piloted vehicles
[BMVG-FBWT-79-28] p0209 N81-17049
First results obtained with a rotating construction
--- used in measuring flying qualities of wind
tunnel aircraft models
[AAAF-NT-80-14] p0218 N81-17109
Flying qualities design criteria applicable to
supersonic cruise aircraft
p0244 N81-17991
Advanced aerodynamics and active controls.
Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Flight safety of Rogallo hang gliders.
Theoretical and experimental study of the flight
envelope --- wind tunnel tests for flight
characteristics
[ESA-TT-634] p0339 N81-21046
Flying-qualities criteria for wings-level-turn
maneuvering during an air-to-ground weapon
delivery task
[NASA-TM-81266] p0342 N81-21083
Fatigue tests on the total structure of the
Gazelle SA 341 helicopter
p0488 N81-26136
Flight control system analysis and design for a
remotely piloted vehicle with thrust vectoring
unit
[AD-A100805] p0540 N81-28105
An investigation of the linear and angular
vibration environments of trials aircraft
p0545 N81-29087
Applications of dynamic stability parameters to
problems in aircraft dynamics
p0592 N81-31122
Captive aircraft testing at high angles of attack
[AD-A103108] p0628 N81-32140
Design of optimal inputs for the identification of
characteristics of aircraft flights ---

parameter identification control theory
p0631 N81-33131
The impact of helicopter flight mechanics on mission performance
p0633 N81-33148
FLIGHT COMPUTERS
U AIRBORNE/SPACEBORNE COMPUTERS
FLIGHT CONDITIONS
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook
[AIAA PAPER 81-0302] A81-20739
Landings according to CAT II
p0230 A81-24523
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093
Solo navigation in a light aircraft
p0407 A81-34337
The influence of helicopter operating conditions on rotor noise characteristics and measurement repeatability
p0468 A81-40095
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
p0471 A81-40123
Active control of the helicopter rotor for vibration reduction
[AHS 80-68] p0479 A81-40188
Lighting systems for flight support --- Russian book
p0564 A81-45602
The microburst: Common factor in recent aircraft accidents
p0136 N81-14571
Doctor Fujita's microburst analysis at Chicago
p0136 N81-14572
Wallops severe storms measurement capability
p0266 N81-19049
The 1979 clear air turbulence flight test program --- warning and detection devices
p0266 N81-19050
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051
Flight tests of a clear-air turbulence alerting system --- infrared radiometers
p0266 N81-19052
In-flight direct-strike lightning research
p0266 N81-19054
Magnitude and frequency of wind speed shears and associated downdrafts
p0267 N81-19055
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163108] p0498 N81-27113
Development for helicopter flight in icing conditions
p0545 N81-29082
Operational problems experienced by single pilots in instrument meteorological conditions
[NASA-CR-166236] p0581 N81-30106
FLIGHT CONTROL
NT AUTOMATIC FLIGHT CONTROL
NT AUTOMATIC LANDING CONTROL
NT FLY BY WIRE CONTROL
NT THRUST VECTOR CONTROL
The 767's flight-management system - A new generation of airborne avionics
p0005 A81-11242
Flying qualities criteria for advanced control technology transports
p0008 A81-11618
Improved flight control performance and failure tolerance using modern control techniques
p0008 A81-11619
Multivariable aircraft control by manoeuvre commands - An application to air-to-ground gunnery
[ONERA, TP NO. 1980-127] p0009 A81-11623
DFVLR-dynamic model testing in wind tunnels for active controls research
p0014 A81-11670
A method of helicopter low airspeed estimation based on measurement of control parameters
[MBB-UD-276-79-0] p0018 A81-12094
Computerized flight management for fuel saving
p0018 A81-12349
Flight management systems - Central ingredient of the 1980's avionics shipset
[SAE PAPER 800626] p0063 A81-15342
Display-control synthesis --- computer flight graphics for aircraft applications
p0064 A81-15684
The implications of current flight control research and development
p0099 A81-16578
A fault tolerant multiprocessor system with reconfiguration suitable for multiaxial flight stabilization and trimming
p0118 A81-19296
System considerations in the implementation of digital control
[AAS 80-032] p0120 A81-19375
Angle of attack - Its measurement and usage. I
p0149 A81-19799
Design of disturbance-rejection controllers for linear multivariable discrete-time systems using entire eigenstructure assignment --- onboard digital flight system of F-4 aircraft
p0155 A81-20454
Application of singular perturbation theory to onboard aircraft trajectory optimization --- for commercial jet transport aircraft
[AIAA PAPER 81-0019] p0158 A81-20543
Robustness properties of a new multirate digital control system
[AIAA PAPER 81-0022] p0158 A81-20545
Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20582
A head-up display for low-visibility approach and landing
[AIAA PAPER 81-0130] p0161 A81-20623
Piloting techniques on the backside - Flight path angle control
p0171 A81-21673
Inverse problems of the dynamics of controlled flight - Lateral motion
p0236 A81-25903
The S3 transition --- flight control logic circuit analysis
p0240 A81-26617
Developments in aircraft power flying control hydraulics
p0282 A81-27882
An objective method of assessing the realism of a simulation of a simple control system
p0284 A81-27898
The impact of active controls on general aviation airplanes of the late 1980s
p0285 A81-28295
Boeing 757 and 767 Flight Management System
p0286 A81-28299
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0299 A81-29205
Design and development of the control laws for the F-18 primary flight control system
p0320 A81-30245
YC-14 digital flight control experience
p0320 A81-30246
Dispersed flight control computer systems
p0321 A81-30250
Failure detection and isolation for tactical aircraft using the generalized likelihood test
p0321 A81-30261
The use of finite-state machines for describing and validating flight control systems
p0322 A81-30265
Integrated Flight/Weapon Control system concepts
p0324 A81-30328
Methods for the verification and validation of digital flight control systems
[SAE PAPER 301134] p0397 A81-34165
Flight control systems go digital - More than a binary mechanization of analog predecessors
[SAE PAPER 801166] p0399 A81-34181
757/767 flight management system
[SAE PAPER 801169] p0399 A81-34184
The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
[SAE PAPER 801190] p0401 A81-34201
Evolution of an optical control system for aircraft hydraulics

[SAE PAPER 801195] p0402 A81-34205
Evaluation of several control/display concepts for V/STOL shipboard landing
[SAE PAPER 801205] p0403 A81-34213
Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
[SAE PAPER 801206] p0403 A81-34214
AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329
Electronic displays and computerized NAV systems for commuters and business aircraft
p0407 A81-34330
Flight control and display computation - A 25-year perspective
[AIAA PAPER 81-0865] p0408 A81-34354
A-10A Operational Flight Trainer simulator flight control system and aerodynamics
[AIAA 81-0964] p0414 A81-36555
Flight-management system - Key to the advanced-technology fighter
p0421 A81-37523
Goals of flight management system integration for a forward-swept-wing demonstrator aircraft
p0421 A81-37524
Experimental aircraft of the DFVLR for in-flight simulation and flight control technology
p0452 A81-37654
The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-38534
A half-model free-oscillation rig for pitch-damping measurements in high speed wind tunnels
p0461 A81-39263
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
p0470 A81-40111
A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks
p0471 A81-40120
Flight control strategies for performance computers
p0512 A81-41759
Impact of EFIS on navigation --- Electronic Flight Instrument System
p0517 A81-42435
The technical and managerial challenge of integrated flight/fire control
[AIAA PAPER 81-1706] p0527 A81-43162
Modern control synthesis applied to the longitudinal decoupled motion of an aircraft
[AIAA 81-1839] p0555 A81-44123
Flying qualities criteria and flight control design
[AIAA 81-1823] p0556 A81-44127
A flight investigation of static stability, control augmentation, and flight director influences on helicopter IFR handling qualities
p0574 A81-46623
Future challenges in helicopter flight/propulsion control integration
p0575 A81-46633
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] p0610 A81-47612
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy
[DGLR PAPER 81-066] p0610 A81-47616
Ten years activity in the area of flight control for helicopters at night and in bad weather
[DGLR PAPER 81-064] p0611 A81-47620
Recommended short-term ATC improvements for helicopters. Volume 3: Operational description of experimental LORAN-C flight following (LOFF) in the Houston area
[AD-A089385] p0024 N81-10030
Fitment of TAMAN standby attitude indicators to Macchi aircraft
[AD-A089378] p0035 N81-11036
Simulating study of the interaction between the propulsion and flight control systems of a subsonic lift fan VTOL
[NASA-TM-81239] p0036 N81-11043
Flight termination receiver/decoders design, performance and certification
[AD-A089746] p0037 N81-11045
Multivariable closed-loop analysis and flight control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11046
Computer based in-flight monitoring
p0042 N81-11269
Detecting the failure of aircraft sensors using analytical redundancy
p0042 N81-11270
Robust control system design
p0042 N81-11275
Practical optimal flight control system design for helicopter aircraft. Volume 2: Software user's guide
[NASA-CR-152306] p0081 N81-12110
Closed loop control systems: Aircraft. Citations from the NTIS data base
[PB80-813710] p0082 N81-12114
Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13958
Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969
Validation Methods Research for Fault-Tolerant Avionics and Control Systems Sub-Working Group Meeting. CARE 3 peer review
[NASA-CP-2167] p0146 N81-15702
The effects of the direction of control loading on a one-dimensional tracking task
[AD-A092459] p0197 N81-16067
Display concepts for control configured vehicles
p0213 N81-17076
Research in multirate estimation and control
[AD-A094070] p0253 N81-18062
Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733
The 1980 Aircraft Safety and Operating Problems, part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
Guidance and control system research for improved terminal area operations --- terminal controlled vehicle
p0264 N81-19038
An analytical study of the longitudinal response of airplanes to positive wind shear
[NASA-TP-1765] p0335 N81-20082
Flying-qualities criteria for wings-level-turn maneuvering during an air-to-ground weapon delivery task
[NASA-TM-81266] p0342 N81-21083
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085
Design of multivariable feedback control systems via spectral assignment --- as applied to aircraft flight control
[NASA-CR-164189] p0345 N81-21864
Investigation of air transportation technology at Princeton University, 1980
p0371 N81-22008
Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1] p0375 N81-22048
Flight evaluation of the concept of the stage A Peripheral Vision Horizon Device (PVHD) using the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870] p0375 N81-22050
Total energy and flight control --- energy vectors as part of piloting schemes
[SEIAS-802-111-102] p0430 N81-24110
A pilot training manual for the terminal configured vehicle electronic attitude director indicator
[NASA-CR-159195] p0434 N81-24111
New Navy programs for development of integrated inertial sensors
p0485 N81-26108
Validation study of the V/STOL aerodynamics and stability and control manual
[AD-A099236] p0486 N81-26119
Correlation of predicted and flight derived stability and control derivatives with particular application to tailless delta wing configurations --- application to the space shuttle orbiter
[NASA-TM-81361] p0490 N81-26154
The 747 primary flight control systems reliability and maintenance study
[NASA-CR-159010] p0490 N81-27116
Development of handling quality criteria for aircraft with independent control of six degrees

of freedom
[AD-A100085] p0498 N81-27117

AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100986] p0548 N81-29121

Direct digital design method for reconfigurable multivariable control laws for the A-7D Digital 2 aircraft
[AD-A100794] p0549 N81-29136

A continuously reconfiguring multi-microprocessor flight control system
[AD-A101412] p0584 N81-30138

Definition, analysis and development of an optical data distribution network for integrated avionics and control systems
[NASA-CR-159270] p0590 N81-30962

Transition and conversion trim-maps for the AV-8A VTOL aircraft
[AD-A102155] p0596 N81-31188

A model-following technique for insensitive aircraft control systems
p0600 N81-31223

The control anticipation parameter for augmented aircraft
[AD-A102626] p0629 N81-32152

Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] p0635 N81-33161

An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] p0638 N81-33199

FLIGHT CREWS

NT SPACECREWS

The influence of beards on the efficiency of aviators' oxygen masks
p0176 A81-22100

A study of factors affecting aircrew survivability following emergency escape over water
p0409 A81-34697

Investigation of the physical working environment for cabin attendants within Scandinavian Airlines System /SAS/ --- noise conditions and aircraft vibration
p0568 A81-46357

Aircrew compliance with standard operating procedures as a component of airline safety
[AD-A092443] p0191 N81-16023

An investigation of the five point restraint system for aviators
[AD-A093065] p0205 N81-16998

Test and evaluation of improved aircrew restraint systems for combat helicopers
p0205 N81-17017

Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064

Information transfer within the cockpit: Problems in intracockpit communications
p0595 N81-31167

An active noise reduction system for aircrew helmets
p0604 N81-31470

FLIGHT FATIGUE

The apparent ignoring of pilot fatigue by the NTSB in airline crashes
p0177 A81-22104

Plans for control of the noise exposure produced by military aircraft in the 1980's - Aircraft noise
p0568 A81-46364

FLIGHT HAZARDS

Collisions between aircraft and birds
p0122 A81-19445

Pulsed Doppler radar detects weather hazards to aviation
[AIAA PAPER 81-0235] p0163 A81-20691

Microbursts as an aviation wind shear hazard
[AIAA PAPER 81-0386] p0167 A81-20798

Sources and detection of atmospheric wind shear
[AIAA PAPER 81-0391] p0167 A81-20801

An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810

Diagnosis-prognosis of intense turbulence, causing aircraft buffeting, on the basis of temperature-wind sounding
p0241 A81-26836

A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119

Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] p0607 A81-47425

Bird strikes and aviation safety. Citations from the NTIS data base
[PB80-812944] p0024 N81-10027

Aviation safety
[GPO-68-717] p0073 N81-12040

Aircraft accident report: Allegheny Airlines, Inc., Nord 262, Mohawk/Frakes 298, n29824, Benedum Airport, Clarksburg, West Virginia, February 12, 1979
[NTSB-AAR-79-12] p0073 N81-12044

Aeronautical concerns and National Aeronautics and Space Administration atmospheric electricity projects
p0136 N81-14567

Summary of aviation safety program resumes. Cabin safety
[AD-A091938] p0192 N81-16027

Briefs of fatal accidents involving weather as a cause/factor, US General Aviation, 1978
[PB81-110827] p0192 N81-16028

CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677

Application of the epidemiological model in studying human error in aviation
p0265 N81-19046

Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048

Wallops severe storms measurement capability
p0266 N81-19049

The 1979 clear air turbulence flight test program --- warning and detection devices
p0266 N81-19050

Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051

Flight tests of a clear-air turbulence alerting system --- infrared radiometers
p0266 N81-19052

Clear air turbulence studies with microwave radiometers
p0266 N81-19053

In-flight direct-strike lightning research
p0266 N81-19054

Magnitude and frequency of wind speed shears and associated downdrafts
p0267 N81-19055

Helicopter external load acquisition technology investigation
[AD-A094672] p0272 N81-19106

Airborne lightning warning systems: A survey
[AD-A095354] p0331 N81-20045

An analytical study of the longitudinal response of airplanes to positive wind shear
[NASA-TP-1765] p0335 N81-20082

An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108

FLIGHT INSTRUMENTS

NT APPROACH INDICATORS
NT ATTITUDE INDICATORS
NT AUTOMATIC PILOTS
NT FLIGHT TEST INSTRUMENTS
NT GYRO HORIZONS
NT RADIO ALTIMETERS

Flight instrumentation requirements for all-weather approach and landing
p0111 A81-16059

Some implementation considerations for numerically stable flight filters
p0156 A81-20485

Application of CRT displays to the cockpit of tomorrow
[SAE PAPER 801168] p0399 A81-[illegible]4183

In-flight jet engine noise measurement system
p0410 A81-35553

Contribution of the DFVLR to the DAS program
p0452 A81-37657

Evaluation of flight data from a mosaic sensor
p0452 A81-37681

Aircraft radio systems --- Book
p0513 A81-41871

Impact of EFIS on navigation --- Electronic Flight Instrument System
p0517 A81-42435

Head up displays. Citations from the NTIS data base
[PB80-809064] p0026 N81-10050
Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053
Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331] p0142 N81-14994
Operational problems associated with head-up displays during instrument flight
[AD-A092992] p0210 N81-17050
Evolution of tactical and map displays for high performance aircraft
p0212 N81-17072
Helmet mounted displays: Design considerations
p0213 N81-17073
An advanced electronic cockpit instrumentation system: The coordinated cockpit display
p0213 N81-17074
Experiments using electronic display information
p0213 N81-17077
Testing aircraft instruments
[AD-A095680] p0334 N81-20075
Development of instrumentation for pilots. CRT screens
[SNIAS-802-111-114] p0428 N81-24061
Engine in-flight data collection and analysis in United Kingdom aircraft
p0431 N81-24085
Review of AIDS development --- airborne computers for reliability engineering
p0599 N81-31212

FLIGHT LOAD RECORDERS
Design, fabrication, calibration, application, and testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
Air transport flight parameter measurements program - Concepts and benefits
[SAE PAPER 801132] p0396 A81-34163
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A095617] p0334 N81-20070
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 31 December 1980
[AD-A102495] p0596 N81-31187

FLIGHT MECHANICS
The aerodynamics of pure subsonic flow /4th revised edition/ --- German book
p0006 A81-11441
Possibilities for the valuation of different combat aircraft configurations with respect to flight mechanics
p0007 A81-11607
Aircraft performance optimization by forced singular perturbation
p0014 A81-11667
Inverse problems of controlled flight dynamics - Longitudinal motion
p0101 A81-16968
Concerning the motion of a piloted aircraft
p0299 A81-29312
On the use of approximate models in helicopter flight mechanics
p0471 A81-40122
Helicopter theory --- Book
p0513 A81-41823
From paleoaeronautics to altostratus - A technical history of soaring
[AIAA PAPER 81-1611] p0533 A81-43933
Inverse problems of guided-flight dynamics - Longitudinal motion
p0577 A81-46749
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] p0608 A81-47562
Laboratory studies of flight mechanics using catapult launched models
[AAAF-NT-80-15] p0210 N81-17055
Modeling, acquisition and processing during large displacements --- associated with experiments in flight mechanics
[AAAF-NT-80-16] p0210 N81-17056
The impact of helicopter flight mechanics on mission performance
p0633 N81-33148

FLIGHT OPERATIONS
Problems of flight mechanics involved in all-weather helicopter operation
p0104 A81-17467
Micro-wave landing system - An operational point of view
p0111 A81-18055
RNAV benefits today - Today and future requirements
p0111 A81-18056
The introduction of STOL and RNAV to large commercial operations
p0111 A81-18057
The problems of helicopter ditching
p0112 A81-18071
Human Factors of Flight-deck Automation: NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022
Information transfer between air traffic control and aircraft: Communication problems in flight operations
p0595 N81-31166
Information transfer during contingency operations: Emergency air-ground communications
p0595 N81-31160

FLIGHT OPTIMIZATION
L-1011 Flight Management System design considerations
p0113 A81-18074
Drag reduction through formation flight
[DGLR PAPER 80-106] p0120 A81-19393
Delco Electronics Flight Management System for Air Force C-141 aircraft
p0321 A81-30249
Fuel conservation integrated into airline economics
[AIAA PAPER 81-0831] p0368 A81-33884
Minimum fuel paths for a subsonic aircraft
p0411 A81-35636
Flight-management system - Key to the advanced-technology fighter
p0421 A81-37523
Goals of flight management system integration for a forward-swept-wing demonstrator aircraft
p0421 A81-37524
Pilot guidance and display considerations for energy efficient flight profiles
p0513 A81-41924
Optimizing complex runway use programs for airport noise abatement
p0569 A81-46369
Optimization of takeoff flight paths with respect to FAR Part 36 noise using dynamic programming
p0569 A81-46371
Choice of the optimal angular velocity of the twist of a flight vehicle
p0625 A81-49946
Generation of optimum vertical profiles for an advanced flight management system
[NASA-CR-165674] p0331 N81-20051

FLIGHT PATHS
NT GLIDE PATHS
Simple method for prediction of aircraft noise contours
p0050 A81-13217
Specifications for short instrument and precision approach path trajectories
p0051 A81-13314
Piloting techniques on the backside - Flight path angle control
p0171 A81-21673
The evaluation of aircraft collision probabilities at intersecting air routes
p0174 A81-21967
Optimization of airplane time to reach a given flight altitude and speed
p0235 A81-25605
Energy modeling for aviation fuel efficiency
[AIAA PAPER 81-0789] p0368 A81-33683
Minimum fuel paths for a subsonic aircraft
p0411 A81-35636
Precision flight path control in carrier landing approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43856
Boost-glide range-optimal guidance
[AIAA 81-1781] p0554 A81-44096
A comparison of actual and simulated horizontal flight paths - RNAV /Area Navigation/ system
p0562 A81-44741
Optimization of takeoff flight paths with respect to FAR Part 36 noise using dynamic programming

p0569 A81-46371

A novel airborne technique for free-field
measurements of aircraft noise above the flight
path with application to noise-shielding studies
[AIAA PAPER 81-2028] p0621 A81-48647

Recommended short-term ATC improvements for
helicopters. Volume 3: Operational description
of experimental LORAN-C flight following (LOFF)
in the Houston area
[AD-A089385] p0024 N81-10030

Synthesis of test results obtained with Concorde
at high incidences
[AAAF-NT-80-26] p0077 N81-12079

Investigation of landing flare in the presence of
wind shear
[ESA-TT-631] p0077 N81-12080

Midair and near midair collisions on two- and
three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944

Flight evaluation of the terminal guidance system
[NASA-CR-163859] p0142 N81-14991

Conflict monitoring analysis of parallel route
spacing in the high altitude airspace, volume 2
[AD-A094152] p0250 N81-18038

Conflict monitoring analysis of parallel route
spacing in the high altitude conus airspace,
volume 1
[AD-A094071] p0250 N81-18041

Development and evaluation of automatic landing
control laws for power lift STOL aircraft
[NASA-CR-152399] p0253 N81-18060

Test results of flight guidance for fuel
conservative descents in a time-based metered
air traffic environment --- terminal configured
vehicle
p0264 N81-19036

Operational considerations in utilization of
microwave landing system approach and landing
guidance --- terminal configured vehicle
p0264 N81-19039

Generation of optimum vertical profiles for an
advanced flight management system
[NASA-CR-165674] p0331 N81-20051

Evaluation of the visual acquisition range of
en-route air traffic from cockpit observations
[DFVLR-MITT-80-14] p0332 N81-20058

An investigation of two safe escape from base
flight profiles
[AD-A096571] p0373 N81-22034

The reconstruction of flight paths from AIDS data
with the aid of modern filtering methods ---
kalman filters
p0383 N81-23021

Cockpit simulation study of use of flight path
angle for instrument approaches
[NASA-CR-165708] p0425 N81-24040

The FAA plans and programs for the future airport
and air traffic control system
[AD-A100370] p0537 N81-28077

Minimum fuel horizontal flightpaths in the
terminal area
[NASA-TM-81313] p0549 N81-29133

Minimum noise impact aircraft trajectories
[NASA-CR-164719] p0594 N81-31159

FLIGHT PERFORMANCE
U FLIGHT CHARACTERISTICS

FLIGHT PLANS

Airline navigation planning
p0174 A81-21966

Solo navigation in a light aircraft
p0407 A81-34337

IFR aircraft handled forecast by air route traffic
control center, fiscal years 1980-1991
[AD-A090803] p0074 N81-12048

Operation free flight: An operational evaluation
of direct route flight plan filing in today's
National Aerospace System
[AD-A104150] p0636 N81-33184

FLIGHT RECORDERS

A six-channel quick-look unit for the aerodynamics
division MKI airborne data acquisition package
[AD-A089975] p0043 N81-11364

Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050

An improved flight data transcriber
[AD-A091981] p0201 N81-16430

flight data recording and data processing for
light airplanes and gliders
p0328 N81-20008

Experiences with flight recorders obtained by
analyzing aircraft accidents
p0328 N81-20019

A technique for recovering nonsynchronized data
from a digital flight data recorder
p0328 N81-20020

A quick-look system for the processing of flight
data recordings
p0329 N81-20021

Contributions to the 9th Symposium on aircraft
integrated data systems --- Conferences
[ESA-TT-532] p0382 N81-23008

Experiences with a Flight Data Recording System
(FDRS) in a German Airforce fighter bomber wing
after field trials --- digital equipment
p0382 N81-23009

Engine parameter trend analysis with LEADS 200:
Possibilities and limitations --- using flight
recorder data
p0382 N81-23010

The engine usage monitoring system: An heuristic
approach to cost effective data monitoring and
analysis --- onboard fatigue monitoring
p0382 N81-23013

Description of the British Civil Aviation
Airworthiness Data Recording Programme (CAADRP)
--- analysis of flight recorder data
p0383 N81-23017

The SYDAS flight data processing system
p0383 N81-23018

The use of aircraft integrated data system at KLM
--- performance monitoring
p0383 N81-23019

Detection and location of faults in onboard
aircraft systems with the aid of the Automatic
Fault Identification System (AFIS)
p0383 N81-23022

Processing of AIDS flight recorder data for a
quick look with the aid of a hybrid computer
system
p0384 N81-23023

Requirements, technology and configuration
evaluation for Crash Survivable Flight Data
Recording (CSFDR) system
[AD-A097863] p0427 N81-24059

Requirements, technology and configuration
evaluation for Crash Survivable Flight Data
Recording (CSFDR) system
[AD-A098584] p0442 N81-25072

Crash survivable flight data recording system study
[AD-A101503] p0583 N81-30127

FLIGHT RULES
NT INSTRUMENT FLIGHT RULES
NT VISUAL FLIGHT RULES

Summary of Federal Aviation Administration
responses to National Transportation Safety
Board safety recommendations
[AD-A089971] p0033 N81-11022

FLIGHT SAFETY

Procedures to improve flight safety in wind shear
conditions
p0014 A81-11666

Ground testing of aircraft antistatic protection
[ONERA, TP NO. 1980-126] p0015 A81-11674

Civil aviation safety. III - Prospects of
improvement
p0017 A81-11900

Damage tolerance concept for transport aircraft
structures
p0050 A81-12970

Aircraft collision avoidance and separation
assurance
[SAE PAPER 800616] p0062 A81-15336

Flight management systems - Central ingredient of
the 1980's avionics shipset
[SAE PAPER 800626] p0063 A81-15342

Flying safely /Revised and enlarged edition/ ---
Book
p0068 A81-16198

Civil aviation safety. IV - Accident severity
p0068 A81-16422

Operational radar display of the structure of
thunderstorm hail clouds
p0069 A81-16474

Micro-wave landing system - An operational point
of view
p0111 A81-18055

RNAV benefits today - Today and future requirements
p0111 A81-18056

Satellites to aid flight safety
[IAF PAPER 80-IAA-17] p0115 A81-18410
Pyrotechnics serving safety --- in aircraft air and ground escape systems
p0120 A81-19348
Improved secondary radar antennas for flight safety installations
p0151 A81-20083
Survival and Flight Equipment Association, Annual Symposium, 17th, Las Vegas, Nev., December 2-6, 1979, Proceedings
p0174 A81-22076
Computer analysis of bird-resistant aircraft transparencies
p0175 A81-22087
Atmospheric electricity hazards protection for advanced technology flight vehicles
[AIAA PAPER 81-1642] p0525 A81-43141
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] p0607 A81-47425
Availability requirements of the future ATC system
p0617 A81-48558
NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021
Aviation safety and noise abatement
[GPO-50-923] p0032 N81-10578
Failure management for the SAAB Viggen JA37 aircraft
p0042 N81-11273
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944
Measuring weather for aviation safety in the 1980's
p0136 N81-14568
Commuter airline safety
[PB81-104267] p0141 N81-14988
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857] p0146 N81-15648
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16020
Annual report to the NASA Administrator by the Aerospace Safety Advisory Panel on the space shuttle program. Part 2: Summary of information developed in the panel's fact-finding activities
[NASA-TM-82252] p0198 N81-16114
Test and evaluation of improved aircrew restraint systems for combat helicopers
p0205 N81-17017
Spin recovery training
[GPO-67-439] p0216 N81-17098
Application of the epidemiological model in studying human error in aviation
p0265 N81-19046
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048
Wallops severe storms measurement capability
p0266 N81-19049
Initial design and experimental implementation of the traffic advisory service of ATARS
[AD-A095462] p0331 N81-20055
Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope --- wind tunnel tests for flight characteristics
[ESA-TT-634] p0339 N81-21046
An update of the Discrete Address Beacon System (DABS) alternatives study
[AD-A096264] p0340 N81-21052
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085
An investigation of two safe escape from base flight profiles
[AD-A096571] p0373 N81-22034
Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23058
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065
A compendium of aircraft cockpit vision surveys, 1950 through 1980, volume 1
[AD-A101473] p0580 N81-30104
Second language speech comprehension in noise: A hazard to aviation safety
p0604 N81-31463
Takeoff and missed approach under the influence of wind shear --- flight safety considerations
[TUBS/SFB-58-80-05-01] p0628 N81-32131

FLIGHT SIMULATION
Piloted simulation studies of helicopter agility
p0003 A81-10767
Identification of longitudinal flying characteristics of an aeroplane and the effect of nonstationary aerodynamics
p0010 A81-11627
The role of flight simulation in the design and development of the Sea Harrier Nav-Attack System
p0010 A81-11635
Visual cue augmentation in contact flight simulation
p0064 A81-15696
Prediction methods for fatigue crack growth in aircraft material
p0118 A81-18777
A new concept for dynamic stability testing --- for aircraft model in orbital path
[AIAA PAPER 81-0158] p0161 A81-20638
Operation and evaluation of the Terminal Configured Vehicle Mission Simulator in an automated terminal area metering and spacing ATC environment
p0171 A81-21709
Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3
p0172 A81-21739
The flight assessment and applications of DMI/DMI. I, II
p0174 A81-21968
Qualification of HiMAT flight systems
p0179 A81-22603
Simulation of apparent acceleration --- on flight test stands
p0223 A81-23405
Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures
p0232 A81-24942
A modular low-cost raster-scan colour visual system
p0283 A81-27892
Flight simulation at Cranfield Institute of Technology
p0283 A81-27893
The role of simulation in automatic flight control systems research
p0283 A81-27894
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-28943
An approach to ramjet trajectory simulation test
p0292 A81-29065
Aeroservoelasticity in the time domain --- for YF-16 aircraft
[AIAA 81-0635] p0306 A81-29409
B-52 Offensive Avionics System /OAS/ control and display design, using a Dynamic Mockup
p0327 A81-30354
Mathematical model of the linear unsteady aerodynamics of the entire aircraft
p0349 A81-31039
Flight Simulation Technologies Conference, Long Beach, Calif., June 16-18, 1981, Technical Papers
p0414 A81-36554
Microcomputer based engine model used in flight simulation applications
[AIAA 81-0973] p0415 A81-36562
Versatile and economical real-time simulation for digital flight control systems
[AIAA 81-0974] p0415 A81-36563
Design verification by emulation --- computer image generation for aircrew training simulation
[AIAA 81-0975] p0415 A81-36564
Development of a flight simulation capability in the dynamic environment simulator
[AIAA 81-0978] p0415 A81-36566
Development of a generic airplane response simulation

[AIAA 81-0980] p0415 A81-36568
Low-visibility visual simulation with real fog
[AIAA 81-0982] p0415 A81-36569
Improved G-Cueing System
[AIAA 81-0987] p0416 A81-36572
Experimental aircraft of the DFVLR for in-flight simulation and flight control technology
p0452 A81-37654
On the use of approximate models in helicopter flight mechanics
p0471 A81-40122
JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1588] p0507 A81-40963
TELS - A facility to observe the effect of simulated flight maneuver loads on turbine engines
[AIAA PAPER 81-1591] p0508 A81-40966
Engine duty cycle estimation for conceptual design aircraft
[AIAA PAPER 81-1368] p0514 A81-42179
Status of dynamic flight test technology - Model identification for flight simulation
[SAE PAPER 810597] p0521 A81-42755
Motion-base simulator results of advanced supersonic transport handling qualities with active controls
[AIAA 81-1819] p0555 A81-44109
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110
IFFC flying qualities simulation --- Integrated Flight/Fire Control
[AIAA 81-1821] p0555 A81-44111
Equivalent system analysis of translation rate command systems for hover and low speed flight
[AIAA PAPER 81-1858] p0560 A81-44557
A comparison of actual and simulated horizontal flight paths - RNAV /Area Navigation/ system
p0562 A81-44741
CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617
A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 A81-46626
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] p0609 A81-47595
The evolution of real-time digital simulation of aircraft for training applications
p0615 A81-48358
Time delays in flight simulator visual displays
p0615 A81-48369
Optimization of simulation models for avionics software verification
p0615 A81-48373
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] p0621 A81-48640
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] p0623 A81-49729
Recommendations for short-term simulation of ATC concepts. Helicopter operations development program
[AD-A089435] p0025 N81-10038
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
Pilot-aircraft system reponse to wind shear
[NASA-CR-3342] p0031 N81-10636
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum --- wing panels for transport aircraft
[NLR-MP-80003-U] p0043 N81-11415
A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise
[NASA-TP-1742] p0073 N81-12043
A mathematical model of the CH-53 helicopter
[NASA-TM-81238] p0075 N81-12065
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum
[NLR-MP-80003-U] p0086 N81-12477
Design of a lateral stability augmentation system for the F106 to improve lateral handling qualities during tracking
[AD-A091014] p0094 N81-13067
Evaluation of wind tunnel nozzle afterbody test techniques utilizing a modern twin engine fighter geometry at Mach numbers from 0.6 to 1.2 --- YF-17 aircraft
[AD-A091545] p0126 N81-13932
Development of a computer program data base of a navigation aid environment for simulated IFR flight and landing studies
[NASA-TM-80064] p0129 N81-13959
Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations
[NASA-TP-1776] p0142 N81-14997
Computer Generated Imagery (CGI) current technology and cost measures feasibility study
[AD-A091636] p0146 N81-15729
Simulator investigation of arrow-wing low-speed handling qualities
p0244 N81-17993
Helicopter icing review
[AD-A094175] p0252 N81-18053
The role of the research simulator in the systems development of rotorcraft
[NASA-TM-81276] p0272 N81-19101
Wind tunnel tests to determine the behavior during ejection of exterior stores at high and low speeds
[DLGH-79-096] p0272 N81-19102
Real-time feasibility for generation of nonlinear textured terrain
[AD-A095070] p0277 N81-19141
Study of oscillatory and flight dynamic behavior of helicopters in atmospheric turbulence
[BMVG-FBWT-80-4] p0342 N81-21074
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21078
Training effectiveness of platform motion: Review of motion research involving the advanced simulator for pilot training and the simulator for air-to-air combat
[AD-A095930] p0343 N81-21089
Performance deterioration based on simulated aerodynamic loads test, JT9D jet engine diagnostics program
[NASA-CR-165297] p0390 N81-23086
User's manual for flight Simulator Display System (FSDS)
[NASA-CR-164295] p0391 N81-23095
Airplane wing vibrations due to atmospheric turbulence
[NASA-CR-3431] p0438 N81-24679
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
Characteristics of flight simulator visual systems
[AGARD-AR-164] p0541 N81-28107
Methodological approaches to identifying relevant features for visual flight
[AD-A100199] p0541 N81-28108
Fatigue crack growth in 7475-T7651 material under flight simulation loading. Information from a Douglas report --- effect of transport/bomber loads spectrum on crack growth
[VTH-M-392] p0542 N81-28493
Guidelines for line-oriented flight training, volume 1
[NASA-CP-2184] p0580 N81-30101
Investigation of high-angle-of-attack maneuver-limiting factors. Part 2: Piloted simulation assessment of Bihrle departure criteria
[AD-A101647] p0581 N81-30114
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-31143
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] p0639 N81-33211
FLIGHT SIMULATORS
NT COCKPIT SIMULATORS
Development and application of a moving base visual flight simulator including the design of hydraulic actuators with hydrostatic bearings

p0010 A81-11633
Visual cue requirements in contact flight simulators
p0064 A81-15695
Visual systems at Lufthansa's simulator centre
p0122 A81-19499
High-level languages in affordable aircraft
  simulators
p0154 A81-20418
An objective method of assessing the realism of a
  simulation of a simple control system
p0284 A81-27898
Use of flight simulators in developing design load
  spectra for new aircraft
  [AIAA 81-0513] p0301 A81-29389
Stochastic surfaces for flight simulator displays
p0324 A81-30330
Flight Simulation Technologies Conference, Long
  Beach, Calif., June 16-18, 1981, Technical Papers
p0414 A81-36554
A-10A Operational Flight Trainer simulator flight
  control system and aerodynamics
  [AIAA 81-0964] p0414 A81-36555
The Northrop F/A-18L Mission Simulator
  [AIAA 81-0968] p0414 A81-36557
On-line wind shear generation for flight simulator
  applications
  [AIAA 81-0970] p0414 A81-36559
Physiological effects of high-G flight - Their
  impact on flight simulator design
  [AIAA 81-0986] p0416 A81-36573
A nonlinear propulsion system simulation technique
  for piloted simulators
p0454 A81-38064
Results of a simulator investigation of control
  system and display variations for an attack
  helicopter mission
  [AHS 80-28] p0475 A81-40158
A piloted simulator investigation of static
  stability and stability/control augmentation
  effects on helicopter handling qualities for
  instrument approach
  [AHS 80-30] p0476 A81-40160
Some experimental study on parachute dynamics by
  utilizing a deceleration system simulator
p0481 A81-40471
Employment of development simulation for the
  realization of direct side force control in the
  case of an attack aircraft
  [DGLR PAPER 81-063] p0609 A81-47580
Probe protection in camera/model visual systems
  --- for helicopter flight simulators
p0615 A81-48359
The turbulent wind and its effect on flight
  [UTIAS-REVIEW-44] p0033 N81-11020
Microprocessor software applications for flight
  training simulators
p0044 N81-11658
An equipment for testing and measuring a Helmet
  Mounted Sight and Display system with a coupled
  TV-camera in the flight simulator for research
  of the DFVLR
  [DFVLR-MITT-80-04] p0092 N81-13052
Equipment for testing and measuring a "helmet
  mounted sight and display" system with a coupled
  movable television camera in the
  flight-simulator for research of the DFVLR
  [DFVLR-MITT-80-04] p0129 N81-13960
Critical research issues and visual system
  requirements for a V/STOL training research
  simulator
  [AD-A092561] p0198 N81-16072
The use of total simulator training in
  transitioning air-carrier pilots: A field
  evaluation
  [NASA-TM-81250] p0204 N81-16994
Optical infinity lens development for flight
  simulator visual displays
p0212 N81-17071
Advanced flight simulator: Utilization in A-10
  conversion and air-to-surface attack training
  [AD-A094608] p0254 N81-18066
The role of the research simulator in the systems
  development of rotorcraft
  [NASA-TM-81276] p0272 N81-19101
Sidelooking laser altimeter for a flight simulator
  [NASA-CASE-ARC-11312-1] p0278 N81-19439
Characteristics of flight simulator visual systems
  [NASA-TM-81278] p0340 N81-21060
Optical Fiber Illumination System for visual
  flight simulation
  [NASA-CR-3409] p0343 N81-21086
Training effectiveness of platform motion: Review
  of motion research involving the advanced
  simulator for pilot training and the simulator
  for air-to-air combat
  [AD-A095930] p0343 N81-21089
Application of computer colour raster displays in
  the cockpit in research flight simulation
  [AD-A096542] p0377 N81-22063
A nonlinear propulsion system simulation tehnique
  for piloted simulators
  [NASA-TM-82600] p0390 N81-23085
Development and evaluation of a prototype
  in-flight instrument flight rules (IFR)
  procedures trainer
  [NASA-TM-73292] p0490 N81-26156
Assessment of scene complexity and cue validity in
  visual flight simulation
  [AD-A100200] p0541 N81-28109
The effects of various fidelity factors on
  simulated helicopter hover
  [AD-A102028] p0601 N81-31232
BIOCONAID system (bionic control of acceleration
  induced dimming)
  [AD-A102510] p0601 N81-31234
Flight simulator: Use of spacegraph display in an
  instructor/operator station
  [AD-A101951] p0602 N81-31235
The role of the research simulator in the systems
  development of rotorcraft
p0633 N81-33146
FLIGHT STABILITY TESTS
  Missile motion sensitivity to dynamic stability
    derivatives
    [AD-A089750] p0038 N81-11093
  Influence of light aircraft architecture on its
    spin characteristics
    [AAAF-NT-80-11] p0081 N81-12111
  Some new research approaches to aircraft spin
    studies
    [AAAF-NT-80-12] p0082 N81-12112
  In-flight handling qualities investigation of A310
    Airbus DLC-configurations on landing approach,
    using the DFVLR-HFB 320 in-flight simulator
    (variable stability aircraft) --- instrument
    flight
    [ESA-TT-630] p0276 N81-19135
  Maximum likelihood identification of aircraft
    lateral parameters with unsteady aerodynamic
    modelling
  p0376 N81-22057
  Analytical testing
    [NASA-CR-3429] p0393 N81-23487
  Dynamic Stability Parameters --- conferences
    [AGARD-LS-114] p0590 N81-31105
FLIGHT STRESS
  Flight simulation environmental fatigue crack
    propagation in 2024-T3 and 7475-T761 aluminium
  p0013 A81-11657
  Effects of fighter attack spectrum on crack growth
  p0172 A81-21741
FLIGHT TECHNICAL ERROR
 U PILOT ERROR
FLIGHT TEST INSTRUMENTS
  A mobile emissions laboratory for on-line analysis
    of combustion products from gas turbine engines
  p0361 A81-32872
FLIGHT TEST VEHICLES
  AD-1 oblique wing aircraft program
    [SAE PAPER 801180] p0400 A81-34193
  A single gimbal/strapdown inertial navigation
    system for use on spin stabilized flight test
    vehicles
    [SAND-80-2479C] p0193 N81-16037
FLIGHT TESTS
 RT FLIGHT STABILITY TESTS
 RT SPACE TRANSPORTATION SYSTEM 1 FLIGHT
  Active flutter suppression design and test - A
    joint U.S.-F.R.G. program
  p0009 A81-11621
  Reduction of the take-off ground run distance to a
    given set of atmospheric condition
  p0010 A81-11634
  Design and tests of an helicopter rotor blade with
    evolutive profile
    [ONERA, TP NO. 1980-125] p0011 A81-11638

Structural flight load testing, calibration and analysis
p0013 A81-11656
Investigation of the stalling characteristics of a general aviation aircraft
p0014 A81-11665
Initial experience with methods to evaluate flight test characteristics with operational flight maneuvers
p0017 A81-11782
Helicopter flight characteristics improvement through swept-tip rotor blades
[MBB-UD-275-79-0] p0018 A81-12097
Store separation trajectory analysis
p0050 A81-13216
The technical contributions of the Wright brothers to aviation
p0058 A81-14388
Active suppression of aircraft flutter
p0059 A81-14397
Research on mechanical flight problems in aircraft parachute systems
p0065 A81-15706
F/A-18 full scale development test
p0099 A81-16579
Head-Up-Display flight tests
p0099 A81-16582
The PZL-Sokol - New Polish helicopter
p0103 A81-17325
Development and operational flight test of the model 250-C28B gas turbine engine
p0105 A81-17512
Engine-airframe transient compatibility - Analysis and test
p0106 A81-17517
Exhaust gas reingestion measurements --- in helicopters
p0106 A81-17521
History of flight testing the L-1011 Tristar jet transport. I - The L-1011-1
p0110 A81-17976
Testing model rotorcraft for overwater operations
p0111 A81-18058
Circulation Control Wing /CCW/ flight tests
p0122 A81-19469
A status report on NASA general aviation stall/spin flight testing
p0122 A81-19471
Development and demonstration of an automatic control and recovery system for remotely piloted vehicles
p0156 A81-20476
The XV-15 - An initial Navy look
[AIAA PAPER 81-0155] p0161 A81-20635
Flight experiments with a slender cone at angle of [illegible]
[illegible]APER 81-0337] p0165 A81-20761
[illegible], adverse attitude escape using a [illegible]cal seeking ejection seat
p0176 A81-22094
Analytical methods for store separation flight test
p0177 A81-22344
Flight test evaluation of a digital controller used in a VTOL automatic approach and landing system
p0179 A81-22549
Pulsed laser mapping system for light aircraft
p0223 A81-23671
On the application of self-adaptive flight control system based on energy balance theory
p0224 A81-23733
Helicopter-ship qualification testing
p0232 A81-24941
Back to basics - The philosophy adopted for the flight testing of the Panavia Tornado avionics system in hack aircraft
p0282 A81-27881
Building the Gossamer Albatross
p0286 A81-28461
In-flight structural dynamic characteristics of the XV-15 tilt rotor research aircraft
[AIAA 81-0612] p0304 A81-29474
Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[AIAA 81-0655] p0308 A81-29507
Application of a flight test and data analysis technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
BIT/FIT maturity before first flight --- in B-52 G/H Offensive Avionics System
p0324 A81-30320
The reconstruction/refiltering approach to Kalman filter evaluation --- in long-range aircraft avionics
p0326 A81-30339
Integrated flight and fire control development and demonstration of an F-15B aircraft
p0327 A81-30359
Design and testing of float landing gear systems for helicopters
p0356 A81-32007
Modern techniques of conducting a flight loads survey based on experience gained on the Black Hawk helicopter
p0356 A81-32014
Microprocessor-based digital air data computer for flight test
p0361 A81-32858
A flight test real-time GW-CG computing system
p0361 A81-32860
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
A review of the installation, performance and economic aspects of a high altitude facility for small gas turbines
[SAE PAPER 801121] p0396 A81-34157
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
Flight test reliability demonstration of electronic engine controls
[SAE PAPER 801201] p0403 A81-34211
Flight test experience using advanced airborne equipment in a time-based metered traffic environment
[SAE PAPER 801207] p0403 A81-34215
Multi service applications for advancing blade concept aircraft
[SAE PAPER 801226] p0405 A81-34229
Estimation of dynamic stability parameters from drop model flight tests
p0410 A81-35551
Wake vortex alleviation
[AIAA PAPER 81-0796] p0412 A81-35723
Supersonic aircraft test experience - Test techniques and data analysis methods
p0419 A81-37299
The biparametric cycle count method and the principle of simplification --- in determination of aircraft structural fatigue life
p0419 A81-37337
Wing of new technology test specimen - Structural design and method of wing construction
p0450 A81-37639
Aerodynamic efficiency of the wing of new technology, a comparison of design expectation and flight test result
p0450 A81-37645
Fiber optic system test results in a tactical military aircraft
p0452 A81-37659
Not all student design projects end on paper - Chronology of the Chrysalis --- test procedure of human powered aircraft
p0455 A81-38332
Design and engineering of solar balloons
p0455 A81-38333
Effect of acceleration switching during INS in-flight alignment
p0458 A81-38897
ABC aircraft development status
p0467 A81-40084
Analysis and application of compliant rotor technology
p0467 A81-40086
Aerodynamic design of the Aerospatiale SA 365 N Dauphin 2 helicopter
p0468 A81-40099
The dominant acoustic radiation surfaces of a helicopter cabin
p0468 A81-40102
U.K. development of a rotor de-icing system
p0469 A81-40103
Real time analysis for helicopter flight testing
p0470 A81-40112

A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119
Flight tests and statistical data analysis for flying qualities investigations
p0471 A81-40121
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
p0471 A81-40123
Research into a helicopter rotor's speed and load factor limits
p0471 A81-40124
Flight evaluation of a helmet mounted LED matrix display in a Lynx helicopter
p0472 A81-40129
ABC development status and design considerations for several military applications --- Advancing Blade Concept for helicopter
[AHS 80-12] p0474 A81-40145
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
Flight test results for task oriented flying qualities evaluation
[AHS 80-29] p0476 A81-40159
Composite flight service evaluation program for helicopters
[AHS 80-46] p0477 A81-40173
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
Advancing blade concept /ABC/ high speed development
p0478 A81-40182
F/A-18A inlet/engine compatibility flight test results
[AIAA PAPER 81-1393] p0503 A81-40860
Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
Flight test investigation of LORAN-C for civil aviation applications
p0512 A81-41762
Evaluation of LORAN-C for non-precision approach applications
p0512 A81-41763
F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
Evaluation of Loran-C for enroute navigation and non-precision approach within the state of Vermont
p0516 A81-42433
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754
Status of dynamic flight test technology - Model identification for flight simulation
[SAE PAPER 810597] p0521 A81-42755
Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756
Investigation of a flight test method for the measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760
Vortex drag reduction by diffusing vanes - Design for the 'Thrush' agricultural aircraft
[SAE PAPER 810605] p0521 A81-42762
Avco Lycoming's ALF 502 high bypass fan engine
[SAE PAPER 810618] p0523 A81-42773
Development of simplified airborne computations for fuel conservative descents in a time-based metered air traffic environment
[SAE PAPER 810642] p0524 A81-42785
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142
Standard Avionics Testbeds
[AIAA PAPER 81-1734] p0528 A81-43172
Application of pulse code modulation technology to aircraft dynamics data acquisition
[AIAA PAPER 81-1736] p0528 A81-43173
NASA service experience with composite components --- for aircraft structures
p0529 A81-43607
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135
An economical approach to automated flight test data reduction
p0576 A81-46643
Instrumentation for measurement of flow properties on a swept wing in flight
[DGLR PAPER 81-034] p0609 A81-47505
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] p0620 A81-48629
The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] p0623 A81-49727
In-flight measurement of aerodynamic loads on captive stores. Equipment and results
[NLR-MP-79013-U] p0022 N81-10012
The use of data items on aircraft performance measurement
[ESDU-80009] p0026 N81-10053
Flight test results of the HFB 320 model following control system for the in-flight simulation of Airbus A 130
[DFVLR-MITT-79-13] p0030 N81-10078
Aircraft turbine engine monitoring experience. An overview and lessons learned from selected case studies
[AD-A089752] p0036 N81-11042
Constant-amplitude and flight-by-flight tests on CFRP specimens
p0039 N81-11133
Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
Pilatus porter: Provision of revised take-off and landing performance data
[AD-A089964] p0076 N81-12068
Flight test handbook: Flying qualities theory and flight test techniques
[AD-A090525] p0076 N81-12073
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
Flight test investigation of LORAN-C for en route navigation in the Gulf of Mexico
[AD-A091637] p0128 N81-13945
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Constant-amplitude and flight-by-flight tests on CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006
Assessment of ground effects on the propagation of aircraft noise: The T-38A flight experiment
[NASA-TP-1747] p0137 N81-14788
DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850] p0141 N81-14989
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046
A French flight test program on the electromagnetic effects of lightning
p0199 N81-16155
Flight tests for studying radioelectric perturbations of an electrostatic origin
p0200 N81-16160
Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853
Microwave Landing System (MLS) clearance format assessment tests
[AD-A093553] p0206 N81-17024
The DAST-1 remotely piloted research vehicle development and initial flight testing
[NASA-CR-163105] p0207 N81-17030
Flight and tunnel test results of the MDC mechanical jet noise suppressor nozzle
p0245 N81-18000
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS)

[AD-A094169] p0250 N81-18036
An application of wake survey rakes to the
experimental determination of thrust for a
propeller driven aircraft
[NASA-CR-163967] p0251 N81-18046
Preliminary airworthiness evaluation OH-58C
helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052
Advanced aerodynamics and active controls.
Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Status and future plans of the Drones for
Aerodynamic and Structural Testing (DAST) program
--- Aeroelastic Research Wing (ARW)
p0259 N81-19003
In flight direct strike lightning research ---
Using an F-106B Aircraft
p0259 N81-19005
Ground and flight test experience with a triple
redundant digital fly by wire control system ---
installed in F-8C aircraft
p0259 N81-19006
KC-135 winglet flight results
p0260 N81-19011
Test results of flight guidance for fuel
conservative descents in a time-based metered
air traffic environment --- terminal configured
vehicle
p0264 N81-19036
Flight tests of IFR landing approach systems for
helicopters
p0265 N81-19042
The 1980 Aircraft Safety and Operating Problems,
part 2
[NASA-CP-2170-PT-2] p0267 N81-19056
Wade vortex attenuation flight tests: A status
report
p0267 N81-19057
Flight-test evaluation of STOL control and flight
director concepts in a powered-lift aircraft
flying curved decelerating approaches
[NASA-TP-1641] p0275 N81-19131
First results obtained by the AMD-BA Company from
the rotary assembly of the AMF Lille
[NASA-TM-75887] p0276 N81-19139
Flight tests of the microwave landing system
multimode digital processor
[AD-A095449] p0332 N81-20056
Investigation of Flight Test Methods for measuring
the performance of general aviation aircraft
[NASA-CR-164057] p0333 N81-20065
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Results of a Loran-C flight test using an absolute
data reference --- vhf omnirange navigation
system and discrete address beacon system
p0371 N81-22006
Flight evaluation of the concept of the stage A
Peripheral Vision Horizon Device (PVHD) using
the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870] p0375 N81-22050
Groundspeed/airspeed differences as a wind shear
indicator and flight evaluation of a DME-derived
system to determine groundspeed
[AD-A097566] p0393 N81-23768
Flight tests of the engines of combat aircraft:
Validation methods used by CEV
p0432 N81-24095
Helicopter transmission qualification procedures
and tests
p0433 N81-24101
Prediction of future test needs, test facilities
and procedures
p0433 N81-24104
Application of a flight test and data analysis
technique to flutter of a drone aircraft
[NASA-TM-83136] p0441 N81-25066
Flight test results of an advanced development
model Ring Laser Gyro Navigator (RLGN)
p0485 N81-26103
F-8 digital fly-by-wire aircraft analytic
redundancy management flight test experience
p0485 N81-26109
Flight test results of an active flutter
suppression system installed on a remotely
piloted research vehicle
[NASA-TM-83132] p0486 N81-26118
Flight test evaluation of a nonlinear hub spring
on a UH-1H helicopter
[AD-A098794] p0486 N81-26121
Subsonic tests of an all-flush-pressure-orifice
air data system
[NASA-TP-1871] p0489 N81-26144
Development and evaluation of a prototype
in-flight instrument flight rules (IFR)
procedures trainer
[NASA-TM-73292] p0490 N81-26156
Thunderstorm hazards flight research: Storm
hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062
Flight test evaluation of predicted light aircraft
drag, performance, and stability
[NASA-CR-159062] p0494 N81-27078
Development of handling quality criteria for
aircraft with independent control of six degrees
of freedom
[AD-A100045] p0498 N81-27117
Flight testing and instrumentation of aircraft
navigation systems
p0544 N81-29067
Systems integration of automatic flight control,
navigational calculations, and visual control
(caravelle alis)
p0544 N81-29068
Onboard and ground test of an autonomous
navigation system based on terrain correlation
p0544 N81-29069
Alignment of a navigation and attack system for
the alpha jet aircraft
p0544 N81-29070
Air-to-air gunnery systems test and evaluation
p0544 N81-29073
Methods of testing aircraft performance under
icing conditions and ice tection systems
p0545 N81-29083
Programmable multipurpose flight test
instrumentation system
p0545 N81-29085
A method for measuring take-off and landing
performance of aircraft, using an inertial
sensing system
p0545 N81-29088
Some experiences with active control of
aeroelastic response
[NASA-TM-83179] p0587 N81-30469
Recent progress in V/STOL aircraft technology
p0633 N81-33144
A flight test evaluation of the Ball-Bartoe
jetwing propulsive lift concept
[AD-A103579] p0637 N81-33195
Flight test of a pure-tone acoustic source ---
aircraft noise
[NASA-TP-1898] p0641 N81-33945

FLIGHT TIME
Prediction of range and endurance of jet aircraft
at constant altitude
p0611 A81-47725
Method for computation of structural failure
probability for an aircraft
[AD-AC98294] p0426 N81-24050

FLIGHT TRAINING
Transfer and cost effectiveness of ground-based
flight trainers
p0064 A81-15693
Recommended short-term ATC improvements for
helicopters. Volume 2: Recommended helicopter
ATC training material
[AD-A089441] p0024 N81-10029
Fitment of TAMAM standby attitude indicators to
Macchi aircraft
[AD-A089378] p0035 N81-11036
Flight test handbook: Flying qualities theory and
flight test techniques
[AD-A090525] p0076 N81-12073
Advanced flight simulator: Utilization in A-10
conversion and air-to-surface attack training
[AD-A094608] p0254 N81-18066
Air Force and Navy plans to acquire trainer aircraft
[AD-A096237] p0342 N81-21072

FLIGHT VEHICLES
Investigation of high-manoeuvrability flight
vehicle dynamics
p0009 A81-11625
Optimal flight vehicle design and linear vector
spaces
p0014 A81-11668
Gyrostabilizers for inertial control systems ---
Russian book

p0017 A81-12024
Roll stabilization of flight vehicles by means of rollerons
p0290 A81-29016
Complex computation of flywheel power systems for flight vehicles
p0319 A81-30158
Flight-vehicle production technology --- Russian book
p0564 A81-45603
Choice of the optimal angular velocity of the twist of a flight vehicle
p0625 A81-49946
FLIR DETECTORS
Forward-looking infrared /FLIR/ sensor for autonomous vehicles
p0357 A81-32490
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
Forward looking infrared /FLIR/ image enhancement for the automatic target cuer system
p0461 A81-39335
Feature extraction from forward locking infrared /FLIR/ imagery
p0461 A81-39338
Design considerations for U.S. Coast Guard search and surveillance Forward Looking Infrared /FLIR/ system
p0463 A81-39647
French Army testing of Forward Looking Infra-Red System /FLIR/ on helicopters /November 1976-June 1977/
p0464 A81-39680
An assessment of technical factors influencing the potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16047
Survivability study of a FLIR equipment fighter on a night penetration of a Soviet army
[AD-A101186] p0547 N81-29120
FLOATS
Development of retardation and automatic flotation system (R.A.F.T.)
[AD-A096828] p0439 N81-25047
CH-53E emergency flotation system design study
[AD-A101640] p0548 N81-29124
FLOORS
Floor and fuel vibration isolation systems for the Boeing Vertol commercial Chinook
p0356 A81-32016
Energy absorption studied to reduce aircraft crash forces
[NASA-NEWS-RELEASE-81-96] p0492 N81-27060
FLOTATION
Testing model rotorcraft for overwater operations
p0111 A81-18058
The problems of helicopter ditching
p0112 A81-18071
Design and testing of float landing gear systems for helicopters
p0356 A81-32007
FLOTATION SYSTEMS
U FLOATS
FLOW
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088
FLOW CHARACTERISTICS
NT BOUNDARY LAYER STABILITY
NT FLAME STABILITY
NT FLOW DISTRIBUTION
NT FLOW STABILITY
NT FLOW VELOCITY
Transonic flow past a wing profile in channels with permeable walls
p0054 A81-13533
Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732
Calculation of circular flow inhomogeneities downstream of the turbine wheel
p0281 A81-27372
Flowfield studies of dump combustors
p0292 A81-29064
Cooling air flow characteristics in gas turbine components
[ASME PAPER 81-GT-76] p0313 A81-29984
An experimental and theoretical investigation of a twin-entry radial flow turbine under non-steady flow conditions
[SAE PAPER 801136] p0397 A81-34167
Strong pressure waves in air-breathing engines
[AIAA PAPER 81-1475] p0505 A81-40895
Some ejector characteristics
[AIAA PAPER 81-1679] p0534 A81-43948
Analytical estimation on nonlinear longitudinal characteristics of wings with small and moderate aspect ratio by the vortex lattice method in incompressible flow
[ESA-TT-585] p0022 N81-10018
The European Transonic Wind tunnel ETW
p0038 N81-11064
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14964
An investigation of the reacting and non-reacting flow characteristics of solid ramjets
[AD-A094567] p0253 N81-18059
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor --- heated intake air
[PNR-90022] p0275 N81-19126
Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061
Some remarks on the unsteady airloads on oscillating control surfaces in subsonic flow
p0386 N81-23055
Aeroacoustics of a porous plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884
FLOW CHARTS
A survey of computer simulations of digital avionics systems
[AD-A091943] p0195 N81-16049
FLOW COEFFICIENTS
NT DISCHARGE COEFFICIENT
FLOW DEFLECTION
Effects of design variables on spoiler control effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581
FLOW DIRECTION INDICATORS
Experimental investigations on the V/STOL tunnel at NASA/Langley Research Center
[NASA-CR-165655] p0329 N81-20028
FLOW DISTORTION
Flow past a slender profile in a channel with permeable walls
p0004 A81-10916
Lift effect on transonic wind-tunnel blockage
p0066 A81-15083
Steady flow past a rectangular wing with circulation that is variable along the span
p0099 A81-16551
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952
Characteristics of the velocity field near a wing-body combination located at an angle of attack to an oncoming supersonic flow
p0119 A81-19337
The practical application of the Wake Blocking Corrections according to Maskell --- for large wind tunnel models
[DGLR PAPER 80-112] p0121 A81-19398
The numerical solution of incompressible turbulent flow over airfoils
[AIAA PAPER 81-0047] p0158 A81-20563
Dynamic pressure response with stall on axial flow compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732
Effect of contraction on screen-generated turbulence
p0284 A81-27900
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307

Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis
p0309 A81-29867
Subsonic gas flow past a wing profile
p0349 A81-31034
Investigation of instantaneous distortions in air intakes at high angles of attack
[AAAF PAPER NT 80-36] p0369 A81-33931
Tests for inlet distortion in a two-spool turbojet engine on the ground test bed
p0419 A81-37340
Inlet distortion and blade vibration in turbomachines
p0421 A81-37631
A perspective on developing new inlet distortion measurement and predictive methods
[AIAA PAPER 81-1589] p0507 A81-40964
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] p0620 A81-48637
Discussion of test results in the design of laminar airfoils for competition gliders
[NASA-TM-75402] p0186 N81-15984
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor --- heated intake air
[PNR-90022] p0275 N81-19126
Computer analysis of flow perturbations generated by placement of choke bumps in a wind tunnel
[NASA-TP-1892] p0579 N81-30088

FLOW DISTRIBUTION
Calculation of the flow field around engine-wing-configurations
p0007 A81-11613
Experimental investigations to fully map the flow field around a wind tunnel model of a transport airplane
[SAE PAPER 800630] p0063 A81-15345
The supercritical profile of the supercritical wing
p0107 A81-17522
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825
The coordinate-deformation method in the problem of a supersonic gas flow over an airfoil --- delta wings
p0123 A81-19631
Particle dynamics of inlet flow fields with swirling vanes
[AIAA PAPER 81-0001] p0156 A81-20526
Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659
Higher-accuracy finite-difference schemes for transonic airfoil flowfield calculations
[AIAA PAPER 81-0381] p0166 A81-20794
Flow visualization through the use of the smoke-wire technique
[AIAA PAPER 81-0412] p0168 A81-20816
A discrete vortex method for the non-steady separated flow over an airfoil
p0179 A81-22568
Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367
Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
p0224 A81-23730
A contribution to the computation of transonic supersonic flows over blunt bodies
p0230 A81-24423
The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder
p0233 A81-25312
Linearized analysis of the three-dimensional compressible flow through a rotating annular blade row
p0234 A81-25446
Partially confined multiple jet mixing
p0234 A81-25513
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061
Flowfield studies of dump combustors
p0292 A81-29064
Three dimensional flow in annular diffusers with two vortex distributions at entry
p0297 A81-29112
Flow separation in inlets at incidence angles
p0297 A81-29114
A diagonal form of an implicit approximate-factorization algorithm
p0300 A81-29363
Experimental investigation into the reaction of a boundary layer to external periodic disturbances
p0309 A81-29866
Improved particle trajectory calculations through turbomachinery affected by coal ash particles
[ASME PAPER 81-GT-53] p0312 A81-29965
Rotor-tip leakage. I - Basic methodology
[ASME PAPER 81-GT-71] p0313 A81-29980
A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29982
Streamwise flow and heat transfer distributions for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985
The present role of high speed cascade testing
[ASME PAPER 81-GT-95] p0314 A81-30002
Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098
Calculation of the flow pattern behind an aircraft wing
p0349 A81-31041
Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations
[AIAA PAPER 81-1239] p0454 A81-38096
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1218] p0458 A81-39006
Improved combustor domes designed for hot streak reduction
[AIAA PAPER 81-1352] p0501 A81-40835
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] p0620 A81-48637
Analysis of calculated three-dimensional inviscid flow fields with embedded shock waves (presentation of a field solution), part 1
[ESA-TT-558] p0022 N81-10017
Effects of boundary-layer treatment on cryogenic wind-tunnel controls
[NASA-CR-159372] p0083 N81-12120
An investigation into grid patching techniques
p0137 N81-14708
Study of transonic flow fields about aircraft: Application to external stores
p0187 N81-15998
Aerodynamic subsonic/transonic aircraft design studies by numerical methods
p0187 N81-15999
Aerodynamic interaction between a close-coupled canard and a sweptback wing in transonic flow
p0189 N81-16013
Validation of a two dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A092138] p0196 N81-16060
Three dimensional internal flows in turbomachinery, volume 1
[AD-A092737] p0197 N81-16065
ZDRAPT-A graphite code for VTOL aircraft ground footprint visualization
[AD-A093311] p0208 N81-17082
Laser scattering applications development test in AEDC tunnel B at Mach number 8
[AD-A093929] p0217 N81-17105
The influence of the compressibility in simulating the conduct of exterior loads of a carrier
[MBB-FE-122/S/PUB/17] p0220 N81-17483
Prediction of particle paths for flow of a gas/solids suspension through a cascade of flat plates
p0256 N81-18352
Investigation of impingement region and wall jets formed by the interaction of high aspect ratio lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
Measurement of canard wakes
[AD-A095063] p0263 N81-19029
Experimental and theoretical study of flow fields and store forces in close proximity to a triple ejection rack at transonic speeds
[AD-A094751] p0263 N81-19030

An interactive computational aerodynamics analysis
program
[AD-A094765] p0263 N81-19033
Experimental investigation of the flow on the
suction side of a thin Delta wing
[NASA-TM-75897] p0330 N81-21024
Application of holography to the study of
helicopter rotor flow fields
[NASA-CR-164293] p0392 N81-23433
An experimental investigation of a large delta P
settling chamber for a supersonic pilot quiet
tunnel
[NASA-CR-3436] p0434 N81-24112
A review of the wall pressure signature and other
tunnel constraint correction methods for high
angle-of-attack tests
p0435 N81-24122
An engineering method for estimating the induced
lift on V/STOL aircraft hovering in and out of
ground effect
[AD-A098509] p0441 N81-25069
The criticality of engine exhaust simulations on
VSTOL model-measured ground effects
p0486 N81-26115
Some qualitative experiments on the local flow
about spoilers in unsteady motion at low speeds
[PB81-166159] p0487 N81-26124
The supercritical profile of the supercritical wing
[NASA-TM-76605] p0494 N81-27075
Unpowered aerodynamic characteristics of a
15-percent scale model of a twin-engine commuter
aircraft
[NASA-TM-81284] p0537 N81-28055
Study of an engine flow diverter system for a
large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096
End wall flows in rotors and stators of a single
stage compressor
[NASA-CR-164635] p0540 N81-28097
An investigation of engine influence on inlet
performance --- conducted in the Ames 40- by
80-foot wind tunnel
[NASA-CR-166136] p0579 N81-30084
Three-dimensional transonic flow analysis
[AD-A101944] p0593 N81-31153
Basic studies of body vortices at high angles of
attack and supersonic speeds
[AD-A102241] p0594 N81-31154
Program of research in laminar flow control in the
JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121
Evaluation of pressure and thermal data from a
wind tunnel test of a large-scale, powered, STOL
fighter model
[NASA-CR-166170] p0635 N81-33162
FLOW EQUATIONS
NT VORTICITY EQUATIONS
Numerical solutions of transonic flows by
parametric differentiation and integral equation
techniques
p0067 A81-15896
Body-fitted 3-D full-potential flow analysis of
complex ducts and inlets
[AIAA PAPER 81-0002] p0156 A81-20527
New approach to the solution of large, full matrix
equations --- Neumann problem for inviscid
incompressible flow past airfoils
p0171 A81-21552
Numerical solution of the direct one-dimensional
problem of a critical flow in nozzles
p0280 A81-28578
An investigation into grid patching techniques
p0137 N81-14708
FLOW FIELDS
U FLOW DISTRIBUTION
FLOW GEOMETRY
Asymmetric flow of subsonic and sonic jets over an
infinite wedge
p0004 A81-10919
An example of the transonic flow past a body with
a discontinuity in the contour curvature
p0019 A81-12367
Attainability of an attached flow in a nozzle with
heavily curved walls
p0054 A81-13548
Sound generation by vortex shedding from a profile
within a channel
p0054 A81-13570
A numerical simulation of hypersonic viscous flow
over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566
Generation of vortex noise in flow past a profile
in a channel
p0238 A81-26134
Curved-flow, rolling-flow, and oscillatory
pure-yawing wind-tunnel test methods for
determination of dynamic stability derivatives
p0241 A81-26933
On a generalization of Kaden's problem --- of
initially planar semi-infinite vortex sheet rollup
p0288 A81-28676
Sudden expansion injection for ram-rockets
p0293 A81-29071
A geometrical study of the steady-state spin for a
typical low-wing general aviation aircraft
p0454 A81-38023
Development of finite-volume methods for
three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
Turbine modeling technique to generate off-design
performance data for both single and multistage
axial-flow turbines
[NASA-CR-165244] p0213 N81-17078
A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012
FLOW MEASUREMENT
High-lift investigations on some small aspect
ratio wings
p0011 A81-11643
Instantaneous velocity measurements in a
periodically pulsed plane turbulent jet
p0066 A81-15895
Vector and scalar characteristics of opposing jets
discharging normally into a cross-stream
p0110 A81-17997
Measurements of flow quality in the Ames 2 x 2ft
transonic wind tunnel
[AIAA PAPER 81-0156] p0161 A81-20636
A survey of recent atmospheric turbulence
measurements from a subsonic aircraft
[AIAA PAPER 81-0298] p0164 A81-20736
The static pressure in a vortex core
p0228 A81-24072
Miniature pressure probe for measuring the
surface-shear-stress vector in turbulent flow
p0233 A81-25354
Device for lubricant flow measurement and
conservation
p0288 A81-28743
Analysis of the difficulties in high performance
compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107
Experimental investigation of oscillating subsonic
jets
p0360 A81-32777
An acquisition and analysis system for the dynamic
testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240
Instrumentation for measurement of flow properties
on a swept wing in flight
[DGLR PAPER 81-034] p0609 A81-47585
Measured pressure distributions and shock shapes
on a simple delta wing
p0617 A81-48479
Experimental investigations on the V/STOL tunnel
at NASA/Langley Research Center
[NASA-CR-165655] p0329 N81-20028
The role of coherent structures in the generation
of noise for subsonic jets
[NASA-CR-164214] p0380 N81-22833
Flap survey test of a combined surface blowing
model: Flow measurements at static flow
conditions
[NASA-CR-152124] p0423 N81-24023
Aeroelastic instability stoppers for wind-tunnel
models
[NASA-CASE-LAR-12720-1] p0601 N81-31229
FLOW PATTERNS
U FLOW DISTRIBUTION
FLOW RATE
U FLOW VELOCITY
FLOW RESISTANCE
NT AERODYNAMIC DRAG
NT FRICTION DRAG
NT SUPERSONIC DRAG
NT VISCOUS DRAG

FLOW SEPARATION
U BOUNDARY LAYER SEPARATION
U SEPARATED FLOW
FLOW STABILITY
NT BOUNDARY LAYER STABILITY
NT PLANE STABILITY
One-dimensional considerations concerning the stability behavior of inlet diffusers for supersonic aircraft --- German thesis p0107 A81-17548
Dialogue on bridging some gaps in stability and transition research --- in external, internal and free-shear layer through-flow systems p0115 A81-18105
The influence of flow disturbances on the laminar-turbulent transition in a supersonic boundary layer p0124 A81-19643
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities p0124 A81-19644
Experiments on the linear and non-linear evolution of the double helical instability in jets [AIAA PAPER 81-0415] p0168 A81-20818
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control p0239 A81-26512
The effect of impeller tip design on the performance of a mixed flow turbocharger compressor [ASME PAPER 81-GT-7] p0310 A81-29932
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control techniques [AD-A090778] p0072 N81-12024
Shear layer instability noise produced by various jet nozzle configurations [PNR-90018] p0088 N81-12825
Static source locations for four nozzles mounted on a J-85 engine [NASA-CR-152401] p0143 N81-14998
TF34 engine compression system computer study --- simulation of flow stability [NASA-CR-155889] p0143 N81-15005
Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels p0386 N81-23056
Aeroelastic instability stoppers for wind-tunnel models [NASA-CASE-LAR-12720-1] p0601 N81-31229
FLOW THEORY
A simplified theory of oscillating aerofoils in transonic flow - Review and extension p0060 A81-14945
Non-isoenergetic turbulent jet mixing in a constant area duct --- in turbofan engines [AIAA PAPER 81-0347] p0165 A81-20768
Unsteady Newton-Busemann flow theory. I - Airfoils p0234 A81-25512
Discussion of the pressure-source aerosonic theory and of Doak's criticism p0238 A81-26189
New interpretations in the theory of viscous incompressible fluid flow past airfoil profiles p0349 A81-31044
Accuracy and application of a second-order theory for three-dimensional supersonic and low hypersonic unsteady flows aroung a thin wing p0419 A81-37335
The high-speed airfoil program p0185 N81-15970
FLOW VELOCITY
Calculation of the flow field around engine-wing-configurations p0007 A81-11613
Method for reducing the tangential velocities in aircraft trailing vortices p0066 A81-15880
Instantaneous velocity measurements in a periodically pulsed plane turbulent jet p0066 A81-15895
Vector and scalar characteristics of opposing jets discharging normally into a cross-stream p0110 A81-17997
A computational model for low speed flows past airfoils with spoilers [AIAA PAPER 81-0253] p0163 A81-20702
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate p0228 A81-24079
A computer simulation of turbulent jet flow p0230 A81-24424
Partially confined multiple jet mixing p0234 A81-25513
A method for measuring the velocity field in a stalled flow p0287 A81-28523
A simple model for compressor stall cell propagation [ASME PAPER 81-GT-73] p0313 A81-29982
Concerning Khristianovich's transformation of a subsonic flow past an airfoil into a low-speed flow p0349 A81-31045
Local approximation of a vortex layer by a system of discrete vortices p0577 A81-46782
Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material [NASA-TP-1716] p0078 N81-12089
Dynamics of a helicopter-slung load system p0092 N81-13051
Evaluation of flow quality in two large NASA wind tunnels at transonic speeds [NASA-TP-1737] p0095 N81-13303
Analysis of unsteady pressure measurements on an aerofoil section with an harmonically oscillating, slotted flap [DFVLR-FB-80-22] p0126 N81-13929
Computer evaluation of the on-and-off design of an axial air turbine [AD-A101102] p0549 N81-29131
FLOW VISUALIZATION
NT NUMERICAL FLOW VISUALIZATION
Add fluorescent minitufts to the aerodynamicist's bag of tricks p0005 A81-11245
High-lift investigations on some small aspect ratio wings p0011 A81-11643
A simple laser interferometer for wind tunnel flow visualisation p0018 A81-12078
Harmonically oscillating airfoil in transonic stream of air p0054 A81-13753
Experimental investigations to fully map the flow field around a wind tunnel model of a transport airplane [SAE PAPER 800630] p0063 A81-15345
A parametric study of the static longitudinal aerodynamic characteristics of parallel lift delta wing configurations at low Reynolds numbers [AIAA PAPER 81-0409] p0168 A81-20814
Flow visualization through the use of the smoke-wire technique [AIAA PAPER 81-0412] p0168 A81-20816
Investigation of transient processes in the perforated working section of a wind tunnel p0237 A81-26122
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures p0239 A81-26508
Holographic investigation of slender body vortex wakes [AD-A089496] p0021 N81-10008
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft [NASA-CR-159382] p0071 N81-12019
Measured pressure distributions and shock shapes on a Butler wing [CUED/A-AERO/TR-9] p0090 N81-13026
Application of optical methods to the study of jet noise and turbulence [ISL-CO-201/80] p0147 N81-15019
Flow phenomena along fuselages and wing-fuselage systems of gliders [NASA-TM-75401] p0186 N81-15983
Some aerodynamic interference effects that influence the transonic performance of combat aircraft p0189 N81-16014
Structures of flow separations over swept wings p0255 N81-18246

Flow in heat pipes
[CETIM-14-F-091] p0256 N81-18322
Investigation of the use of liquid crystal thermography to study flow over turbomachinery blades
[AD-A097289] p0391 N81-23089
Energy efficient engine, high-pressure turbine cooling model technology report
[NASA-CR-165374] p0496 N81-27093
FLOWMETERS
NT HOT-WIRE FLOWMETERS
FLUID AMPLIFICATION
U FLUID AMPLIFIERS
FLUID AMPLIFIERS
Faults of helicopter hydraulic amplifiers related to loading characteristics
p0319 A81-30156
Some applications of the turbulence amplifier to airborne systems
p0514 A81-42173
FLUID BOUNDARIES
NT GAS-SOLID INTERFACES
NT JET BOUNDARIES
NT LIQUID-SOLID INTERFACES
An experimental investigation of jet screech by air jet impingement on solid boundaries
p0005 A81-11302
Calculation of the boundary of a supersonic inviscid jet flowing into a submerged space or a supersonic wake
p0229 A81-24172
FLUID DYNAMICS
NT AERODYNAMICS
NT AEROTHERMODYNAMICS
NT COMPUTATIONAL FLUID DYNAMICS
NT ELASTOHYDRODYNAMICS
NT GAS DYNAMICS
NT HYDRODYNAMICS
NT MAGNETOHYDRODYNAMICS
NT RAREFIED GAS DYNAMICS
NT ROTOR AERODYNAMICS
NT VORTEX SHEDDING
Practical experiences with flow-induced vibrations; Proceedings of the Symposium, Universitaet Karlsruhe, Karlsruhe, West Germany, September 3-6, 1979
p0282 A81-27610
Transonic cascade wind tunnel modification and initial tests
[AD-A091080] p0090 N81-13031
Unsteady pressure distributions on airfoils in cascade
[AD-A091173] p0090 N81-13033
Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-13034
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
Fluid-dynamic and aeroacoustic investigations of shrouded jets --- noise prediction (aircraft)
p0256 N81-18318
NASA's aeronautics research and technology base
[NASA-CR-164195] p0381 N81-22969
Report of the panel on fluid dynamics
p0593 N81-31146
FLUID FILMS
NT SQUEEZE FILMS
On the steady state and dynamic performance characteristics of floating ring bearings
[ASME PAPER 80-C2/LUB-17] p0117 A81-18671
Surface analysis of bearing steels after solvent treatments. II - Lubricant-coated bearing surfaces
[ASLE PREPRINT 80-LC-8A-6] p0118 A81-18748
FLUID FILTERS
NT AIR FILTERS
FLUID FLOW
NT ADIABATIC FLOW
NT AIR CURRENTS
NT AIR FLOW
NT AIR JETS
NT ANNULAR FLOW
NT AXIAL FLOW
NT AXISYMMETRIC FLOW
NT BOUNDARY LAYER FLOW
NT BOUNDARY LAYER SEPARATION
NT CASCADE FLOW
NT CAVITATION FLOW
NT CHANNEL FLOW
NT COAXIAL FLOW
NT COMBUSTIBLE FLOW
NT COMPRESSIBLE FLOW
NT CONICAL FLOW
NT CONVECTIVE FLOW
NT CORNER FLOW
NT COUNTERFLOW
NT CRITICAL FLOW
NT CROSS FLOW
NT DUCTED FLOW
NT FREE FLOW
NT FUEL FLOW
NT GAS FLOW
NT HELICAL FLOW
NT HYPERSONIC FLOW
NT INCOMPRESSIBLE FLOW
NT INLET FLOW
NT INVISCID FLOW
NT JET FLOW
NT JET MIXING FLOW
NT JET STREAMS (METEOROLOGY)
NT LAMINAR FLOW
NT MAGNETOHYDRODYNAMIC FLOW
NT MASS FLOW
NT MULTIPHASE FLOW
NT NONEQUILIBRIUM FLOW
NT NONUNIFORM FLOW
NT NOZZLE FLOW
NT ONE DIMENSIONAL FLOW
NT ORIFICE FLOW
NT OSCILLATING FLOW
NT OUTLET FLOW
NT PARALLEL FLOW
NT PERIPHERAL JET FLOW
NT PIPE FLOW
NT POTENTIAL FLOW
NT RADIAL FLOW
NT REATTACHED FLOW
NT RECIRCULATIVE FLUID FLOW
NT REVERSED FLOW
NT SECONDARY FLOW
NT SEPARATED FLOW
NT SHEAR FLOW
NT SMALL PERTURBATION FLOW
NT STEADY FLOW
NT SUBCRITICAL FLOW
NT SUBSONIC FLOW
NT SUPERCAVITATING FLOW
NT SUPERCRITICAL FLOW
NT SUPERSONIC FLOW
NT SUPERSONIC JET FLOW
NT THREE DIMENSIONAL FLOW
NT TRANSITION FLOW
NT TRANSONIC FLOW
NT TURBULENT FLOW
NT TWO DIMENSIONAL FLOW
NT TWO PHASE FLOW
NT UNIFORM FLOW
NT UNSTEADY FLOW
NT VERTICAL AIR CURRENTS
NT VISCOUS FLOW
NT WALL FLOW
NT WEDGE FLOW
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20037
Effects of solid particles suspended in fluid flow through an axial flow compressor stage
p0297 A81-29108
New developments in compact plate-fin heat exchangers
p0613 A81-48062
Vortex methods for two- and three-dimensional flow simulations
p0145 N81-15313
Fundamental heat transfer research for gas turbine engines
[NASA-CP-2178] p0428 N81-24063
FLUID INJECTION
NT GAS INJECTION
FLUID JET AMPLIFIERS
U FLUID AMPLIFIERS
FLUID JETS
NT AIR JETS
NT FREE JETS
NT GAS JETS
NT HYDRAULIC JETS

FLUID MECHANICS
NT AERODYNAMICS
NT AEROTHERMODYNAMICS
NT COMPUTATIONAL FLUID DYNAMICS
NT ELASTOHYDRODYNAMICS
NT FLUID DYNAMICS
NT GAS DYNAMICS
NT HYDRODYNAMICS
NT HYDROMECHANICS
NT MAGNETOHYDRODYNAMICS
NT RAREFIED GAS DYNAMICS
NT ROTOR AERODYNAMICS
NT VORTEX SHEDDING

FLUID PRESSURE
Periodically stiffened fluid-loaded plates. I - Response to convected harmonic pressure and free wave propagation. II - Response to line and point forces
p0102 A81-17067

FLUID TRANSPIRATION
U TRANSPIRATION

FLUIDIC CIRCUITS
Some applications of the turbulence amplifier to airborne systems
p0514 A81-42173

FLUIDICS
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093888] p0204 N81-16996
Dead reckoner navigation project
p0372 N81-22010

FLUORESCENCE
NT X RAY FLUORESCENCE
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49378

FLUORESCENT EMISSION
U FLUORESCENCE

FLUORIDES
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099

FLUORINE COMPOUNDS
NT FLUORIDES
NT FLUOROCARBONS
NT POLYTETRAFLUOROETHYLENE

FLUORINE ORGANIC COMPOUNDS
NT FLUOROCARBONS

FLUORO COMPOUNDS
NT FLUOROCARBONS
NT POLYTETRAFLUOROETHYLENE

FLUOROCARBONS
Captive carry and free flight rain erosion considerations for reinforced ablative fluorocarbon radome materials
p0103 A81-17453

FLUOROPOLYMERS
NT POLYTETRAFLUOROETHYLENE

FLUOROSCOPY
Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563

FLUTTER
NT PANEL FLUTTER
NT SUBSONIC FLUTTER
NT SUPERSONIC FLUTTER
NT TRANSONIC FLUTTER
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology --- Linear Quadratic Gaussian
[AIAA PAPER 81-0021] p0158 A81-20544
Historical development of flutter
[AIAA 81-0591] p0302 A81-29419
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
p0467 A81-40087
Development of antiresonance force isolators for helicopter vibration reduction
p0467 A81-40091
Lateral flutter of loads towed beneath helicopters and its avoidance
p0470 A81-40114
Damping applications in aero-propulsion systems
p0613 A81-47999
Force and moment coefficients for high deflection cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
Passive control of wing/store flutter
[NASA-TM-81865] p0125 N81-13922
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Active control of an explosive wing-store flutter case
[MBB-FE-17/S/PUB/25] p0131 N81-13973
Demonstration of a method for determining critical store configurations for wing store flutter
[AD-A092257] p0197 N81-16068
Design for active and passive flutter suppression and gust alleviation
p0253 N81-18063
An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989] p0263 N81-19028
NASTRAN level 16 user's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159824] p0279 N81-19481
The development of a theoretical and experimental model for the study of active suppression of wing flutter
p0376 N81-22058
Application of a flight test and data analysis technique to flutter of a drone aircraft
[NASA-TM-83136] p0441 N81-25066
Semi-actuator disk theory for compressor choke flutter
[NASA-CR-3426] p0442 N81-25075
Measurement of aerodynamic work during fan flutter
[NASA-TM-82652] p0443 N81-25080
Overview: NASA/AF/Navy Symposium on Aeroelasticity of Turbine Engines
[NASA-CR-164419] p0444 N81-25089
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[NASA-TM-83132] p0486 N81-26118
A study of the effects of store aerodynamic on wing/store flutter
p0490 N81-26153
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[NASA-TM-83144] p0491 N81-26496
Final design and fabrication of an active control system for flutter suppression on a supercritical aeroelastic research wing
[NASA-CR-165714] p0498 N81-27114
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[NASA-TM-83143] p0499 N81-27548
Aeroelastic flutter and divergence of graphite/epoxy cantilevered plates with bending-torsion stiffness coupling
[AD-A101726] p0587 N81-30476
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] p0635 N81-33161

FLUTTER ANALYSIS
Influence of boundary-layer suction on the emission spectrum on a thin plate performing oscillations under the action of pressure pulsations --- in aircraft noise reduction
p0054 A81-13573
Active suppression of aircraft flutter
p0059 A81-14397
Calculation of critical flutter speeds on an aircraft in subsonic flow
p0068 A81-16301
A frequency-domain technique for aeroelastic mode estimation
p0156 A81-20475
Initial development for a flutter analysis of damaged T-38 horizontal stabilators using NASTRAN
[AIAA PAPER 81-0365] p0166 A81-20784
Influence of boundary-layer suction on the spectrum of radiation from a thin plate vibrating under the action of pressure fluctuations --- in aircraft noise reduction
p0238 A81-26137
Aeroelastic stability of aircraft --- Russian book
p0281 A81-27531

Practical experiences with flow-induced vibrations; Proceedings of the Symposium, Universitaet Karlsruhe, Karlsruhe, West Germany, September 3-6, 1979
p0282 A81-27610
Flutter of plates and shells in practice
p0282 A81-27611
Experimental verification of unsteady aerodynamic models of supersonic unstalled flutter
p0295 A81-29094
Comparison of two methods for the reduction of free decaying data in aircraft flutter tests
[NAE-LTR-UA-43] p0298 A81-29145
Experimental study of the snap-through oscillations of an empennage
p0299 A81-29313
Your next ground vibration test doesn't have to cost a million dollars
[AIAA 81-0529] p0303 A81-29450
A study of the effect of store aerodynamics of wing/store flutter
[AIAA 81-0604] p0304 A81-29467
Evaluation of methods for prediction and prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Dynamic analysis of a free-tip rotor
[AIAA 81-0618] p0305 A81-29479
Active control of forward swept wings with divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[AIAA 81-0567] p0306 A81-29494
Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
A new frequency parameter for unsteady aerodynamics
[AIAA 81-0649] p0307 A81-29502
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
A wind-tunnel study of the flutter characteristics of a supercritical wing
p0308 A81-29504
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[AIAA 81-0655] p0308 A81-29507
Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
Application of a flight test and data analysis technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
Non-linear oscillator models in bluff body aeroelasticity
p0348 A81-30766
Influence of hinge line gap on aerodynamic forces acting on a harmonically oscillating thin profile in an incompressible flow. I, II
p0348 A81-30956
A new method of airfoil flutter control
p0367 A81-33844
Finite element analysis of self-excited vibrations of helicopter rotor blades
p0395 A81-34120
Three-dimensional oscillatory piecewise continuous-kernel function method. I - Basic problems. II - Geometrically continuous wings. III - Wings with geometrical discontinuities
p0411 A81-35631
Measurement of derivatives for an oscillating airfoil with flap
p0411 A81-35635
Concerning one self-similarity property in flutter analysis
p0413 A81-36464
Aeroelastic stability analysis of hingeless rotor helicopters in forward flight using blade and airframe normal modes
[AHS 80-24] p0475 A81-40154
Vibrations in technical equipment. Volume 3 - Oscillations of machines, structures, and their components --- Russian book
p0511 A81-41725
A preliminary divergence and flutter evaluation of an X-wing aircraft
[AIAA PAPER 81-1671] p0534 A81-43945
Transonic dip mechanism of flutter of a sweptback wing. II
p0559 A81-44447
Design and construction of a model which is dynamically similar to the A310 wing
[DGLR PAPER 81-035] p0600 A81-47556
Stability and flutter analysis of turbine blades at low speed
p0612 A81-47959
On the numerical analysis of stall flutter in turbine cascade
p0613 A81-47963
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
p0613 A81-47966
Report on a cooperative programme on Active Flutter Suppression
[AGARD-R-689] p0082 N81-12115
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116
Test and analyses of an active flutter suppression system on an FFDL model of YF17
p0082 N81-12118
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974
Active controls for flutter suppression and gust alleviation in supersonic aircraft --- YF-17 flutter model
[NASA-CR-163934] p0216 N81-17097
Investigation of an improved flutter speed prediction technique for damaged T-38 horizontal stabilators using NASTRAN
[AD-A094769] p0273 N81-18109
Nastran level 16 theoretical manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
NASTRAN level 16 programmer's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport --- SCAT-15F model test in the Langley Transonic Dynamics Tunnel
[NASA-TM-81962] p0388 N81-23071
Flutter analysis fo two-dimensional and two-degree-of-freedom MBB A-3, CAST 7, an TF-8A supercritical airfoils in small-disturbance unsteady transonic flow
[AD-A100334] p0540 N81-28104
FLUX (RATE)
NT HEAT FLUX
FLUX DENSITY
NT SOUND INTENSITY
FLUX MAPPING
U MAPPING
FLUXMETERS
U MEASURING INSTRUMENTS
FLY BY WIRE CONTROL
Improved flight control performance and failure tolerance using modern control techniques
p0008 A81-11619
A lightning protection program for the F-16 fly-by-wire system
p0056 A81-14254
A case study on the F-16 fly-by-wire flight control system --- Book
p0101 A81-16719
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135
Fly-by-wire Jaguar
p0614 A81-48064
Flight experience with flight control redundancy management

p0042 N81-11274
Fault-tolerant actuation concept for a research test aircraft
[AD-A093113] p0216 N81-17100
Advanced aerodynamics and active controls. Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Ground and flight test experience with a triple redundant digital fly by wire control system --- installed in F-8C aircraft
p0259 N81-19006
A pilot's subjective analysis of a Cockpit Display of Traffic Information (CDTI) --- terminal configured vehicle
p0264 N81-19037
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data
[NASA-CR-152336-2] p0387 N81-23065
Advanced Scout Helicopter (ASH) fly-by-wire control system preliminary design. Volume 1: System design and analysis
[AD-A098155] p0434 N81-24108
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] p0638 N81-33200

FLYING BEDSTEAD AIRCRAFT
U FLYING PLATFORMS

FLYING EJECTION SEATS
Computer code for the determination of ejection seat/man aerodynamic parameters
[AD-A092721] p0191 N81-16026

FLYING PERSONNEL
NT AIRCRAFT PILOTS
NT FLIGHT CREWS
NT SPACECREWS

FLYING PLATFORM STABILITY
U AERODYNAMIC STABILITY
U FLYING PLATFORMS

FLYING PLATFORMS
Analytical study of the cruise performance of a class of remotely piloted, microwave-powered, high-altitude airplane platforms
[NASA-TM-81969] p0374 N81-22040

FLYING QUALITIES
U FLIGHT CHARACTERISTICS

FLYWHEELS
Complex computation of flywheel power systems for flight vehicles
p0319 A81-30158
State-of-the-art review of flywheel burst containment
[UCRL-15257] p0085 N81-12427

FOAMS
Test and evaluation of foam-in-place fuel tank container
[AD-A095747] p0334 N81-20073

FOG
Low-visibility visual simulation with real fog
[AIAA 81-0982] p0415 A81-36569

FOG DISPERSAL
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164

FOILS (MATERIALS)
Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection --- suppressing combustion overpressure
[AD-A093542] p0208 N81-17046

FOKKER AIRCRAFT
NT F-27 AIRCRAFT
Lasting friendship. A review of the F-27 fatigue evaluation program carried out by Fokker-VFW --- performance prediction
[NLR-TR-78150-U] p0495 N81-27086

FOKKER BOND TESTERS
U ADHESION TESTS

FOKKER F 27 AIRCRAFT
U F-27 AIRCRAFT

FOKKER FRIENDSHIP AIRCRAFT
U F-27 AIRCRAFT

FOLDING STRUCTURES
NT SAILWINGS
Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope --- wind tunnel tests for flight characteristics
[ESA-TT-634] p0339 N81-21046

FORCE DISTRIBUTION
Wing flapping with minimum energy
p0283 A81-27889
Spanwise lift distribution of forward-and aft-swept wings in comparison to the optimum distribution form
p0453 A81-38017
Evaluation of Levinsky's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033
Force and moment coefficients for high deflection cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
The velocity induced by the wake of a wind turbine in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985
Tool force evaluation of lathe machined high explosives
[MHSMP-80-20] p0144 N81-15148
The prediction of normal force and rolling moment coefficients for a spinning wing
[NASA-CR-165680] p0333 N81-20068
Total energy and flight control --- energy vectors as part of piloting schemes
[SNIAS-802-111-102] p0434 N81-24110
Evaluation of Ting's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-80078-U] p0594 N81-31157

FORCE FIELDS
U FIELD THEORY (PHYSICS)

FORCED OSCILLATION
U FORCED VIBRATION

FORCED VIBRATION
Forced vibrations of a nonlinear system excited by a centrifugal oscillator with a sloping engine characteristic
p0002 A81-10439
The vibration of a multi-bearing rotor
p0015 A81-11722
Finite element analysis of natural and forced flexural vibrations of rotor systems
p0017 A81-11956
Use of optimization in helicopter vibration control by structural modification
p0241 A81-26945
The influence of gyroscopic forces on the dynamic behavior of rotating blades
p0295 A81-29098
Transient vibrations of elastic panels due to the impact of shock waves
p0616 A81-48385
Direct forced-oscillation techniques for the determination of stability derivatives in wind tunnels
p0590 N81-31109

FORCED VIBRATORY MOTION EQUATIONS
U EQUATIONS
U FORCED VIBRATION

FOREBODIES
Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14968
A procedure for designing forebodies with constraints on cross-section shape and axial area distribution
[NASA-TP-1881] p0483 N81-26078

FORECASTING
NT PATTERN METHOD (FORECASTING)
NT PERFORMANCE PREDICTION
NT PREDICTION ANALYSIS TECHNIQUES
NT TECHNOLOGICAL FORECASTING
NT WEATHER FORECASTING
Canada's national aviation forecasting models
p0112 A81-18072
Traffic forecasting for the NRIA --- New Riyadh International Airport
p0114 A81-18090
IFR aircraft handled forecast by air route traffic control center, fiscal years 1980-1991
[AD-A090803] p0074 N81-12048

Definition of a system concept study for future air traffic guidance
[BMFT-FB-W-80-008] p0425 N81-24046
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
FORECASTS
U FORECASTING
FOREIGN POLICY
NT INTERNATIONAL COOPERATION
FORGING
Isothermal rolling of aircraft parts - Versatile process saves costly materials
p0227 A81-24047
Titanium forging - Stamping /stamp, screw-press/, circular rolling and isothermal forging
p0416 A81-36657
Isothermal forging of fan blades
[AIAA PAPER 81-1405] p0503 A81-40862
FORM
U SHAPES
FORM PERCEPTION
U SPACE PERCEPTION
FORMAT
Formats for DABS data link applications
[AD-A089963] p0034 N81-11028
FORMING TECHNIQUES
NT CASTING
NT CENTRIFUGAL CASTING
NT COLD WORKING
NT EXPLOSIVE FORMING
NT FORGING
NT HOT WORKING
NT INJECTION MOLDING
NT METAL SPINNING
NT PRESSING (FORMING)
NT ROLL FORMING
NT SLIP CASTING
NT STAMPING
Concurrent superplastic forming/diffusion bonding of titanium airframe components
p0531 A81-43638
MM&T: Low cost production/installation of urethane leading edge guards on rotor blades
[AD-A101603] p0582 N81-30117
FORTRAN
KONFIG and REKONFIG: Two interactive preprocessing to the Navy/NASA Engine Program (NNEP)
[NASA-TM-82636] p0446 N81-25698
FORWARD LOOKING INFRARED DETECTORS
U FLIR DETECTORS
FOSSIL FUELS
NT CRUDE OIL
FOULING
Some effects of compressor fouling on the behavior of a turbojet engine --- as evidenced by an engine monitoring system
p0328 N81-20015
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0391 N81-23243
FOUNDATIONS
Probabilistic analysis of foundation forces for a class of unbalanced rotating machines
p0145 N81-15362
FOURIER ANALYSIS
NT FOURIER SERIES
Application of a Fourier analyzer to the analysis of shimmy test data
[AIAA 81-0533] p0303 A81-29453
Potential of optical Fourier analysis for measuring windscreen distortion
[AD-A094127] p0259 N81-18853
FOURIER SERIES
A pure direct force/moment control for coaxial counterrotating rotors
p0144 N81-15007
FOURIER TRANSFORMATION
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 1: Detection of cracks in the inaccessible lower half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 2: Reliability evaluation and system definition for detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18420
The 1H and 13C fourier transform NMR characterization of jet fuels derived from alternate energy sources
[AD-A098305] p0437 N81-24284
FRACTOGRAPHY
Possibility of development of an electron-fractographic method for measuring stress level produced by fatigue fracture of the material
p0532 A81-43773
FRACTURE MECHANICS
Fatigue damage mechanisms in composite materials - A review
p0003 A81-10747
On understanding environment-enhanced fatigue crack growth - A fundamental approach
p0003 A81-10749
Application of fracture mechanics in designing lower wing skin of transport aircraft
p0102 A81-17049
Effect of load spectrum variables on fatigue crack initiation and propagation; Proceedings of the Symposium, San Francisco, Calif., May 21, 1979
p0172 A81-21730
An engineering model for assessing load sequencing effects --- cracks in aircraft structures
p0172 A81-21737
Ductile fracture mechanic assessments of 2219-T851, 2024-T3 and 7075-T6 aluminum alloys
p0180 A81-22628
Laws of unstable crack growth under cyclic loading
p0236 A81-25701
Simple methods of determining stress intensity factors
p0289 A81-28984
Estimated service life of gas turbine engine compressor blades
p0417 A81-36680
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
p0611 A81-47801
Developing design allowables for composite helicopter structures
p0611 A81-47811
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
[AD-A089791] p0036 N81-11041
Application of fracture mechanics to US Air Force aircraft structural integrity requirements
[AAAF-NT-79-25] p0086 N81-12463
Application of fracture mechanics to built-up structures --- aircraft handbooks
[NLR-MP-79044-U] p0086 N81-12475
Structures and Materials Panel
[AD-A089019] p0378 N81-22420
FRACTURE RESISTANCE
U FRACTURE STRENGTH
FRACTURE STRENGTH
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17488
Bolt bearing strengths of graphite/epoxy laminates
[AIAA 81-0544] p0301 A81-29396
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174
Relationship between creep characteristics and fracture resistance under the combined effect of fatigue and creep
p0414 A81-36474
Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures --- of Al alloys
p0516 A81-42356
Relationships between impact resistance and fracture toughness in advanced composite materials
p0040 N81-11137
An assessment of buffer strips for improving damage tolerance
p0247 N81-18009
Helicopter Fatigue Life Assessment
[AGARD-CP-297] p0487 N81-26126
Application of damage tolerance concepts for the helicopters
p0487 N81-26130

FRACTURE TOUGHNESS
U FRACTURE STRENGTH
FRAGMENTATION
Is it safe - The safety assessment of aircraft systems. V - Some particular techniques
p0454 A81-38174

FRAMES
NT AIRFRAMES
Optimal design of frames with substructuring
p0068 A81-16276
Manufacturing technology for low temperature composite engine frames --- for TF-34 engine
[AIAA PAPER 81-1355] p0501 A81-40837
Development of a CFC window frame, using short fiber pressing technology --- jet aircraft cabin windows
[BMFT-FB-W-80-032] p0499 N81-27208
FRANCE
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890
Annoyance from light aircraft investigation carried out around four airports near Paris
[NASA-TM-75823] p0032 N81-10577
The relationship between noise and annoyance around Orly
[NASA-TM-76573] p0379 N81-22594
FRAUNHOFER REGION
U FAR FIELDS
FREE FLIGHT
Investigation of high-manoeuvrability flight vehicle dynamics
p0009 A81-11625
Captive carry and free flight rain erosion considerations for reinforced ablative fluorocarbon radome materials
p0103 A81-17453
FREE FLIGHT TEST APPARATUS
In-flight research - At low cost
p0299 A81-29208
Study of the crashworthiness of light aircraft structures
[AIAA 81-0574] p0302 A81-29407
Free flight research at Lockheed-Georgia
[SAE PAPER 810567] p0518 A81-42732
Wall interference effects: Status review
p0592 N81-31141
FREE FLOW
Effect of contraction on screen-generated turbulence
p0284 A81-27900
Development of a large-scale wind tunnel for the simulation of turbomachinery airfoil boundary layers
[ASME PAPER 81-GT-6] p0310 A81-29931
Evaluation of flow quality in two large NASA wind tunnels at transonic speeds
[NASA-TP-1737] p0095 N81-13303
Jet wing interference for an overwing engine configuration
p0188 N81-16008
Laser scattering applications development test in AEDC tunnel B at Mach number 8
[AD-A093929] p0217 N81-17105
Influence of free-stream Mach number on transonic shock-wave boundary-layer interaction
[NLR-MP-78013-U] p0256 N81-18325
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] p0629 N81-32154
FREE JETS
Effects of axisymmetric sonic nozzle geometry on Mach disk characteristics
p0110 A81-18022
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-28943
Free-jet testing of powerplants for aircraft and missiles
p0431 N81-24089
FREE OSCILLATIONS
U FREE VIBRATION
FREE STREAM EFFECTS
U FREE FLOW
FREE STREAMS
U FREE FLOW
FREE VIBRATION
The vibration of a multi-bearing rotor
p0015 A81-11722
Finite element analysis of natural and forced flexural vibrations of rotor systems
p0017 A81-11956
Free-vibration analysis of rotating beams by a variable-order finite-element method
[AIAA 81-0614] p0305 A81-29476
Finite element analysis of asymmetric, lateral natural vibrations of a deformable aeroplane
p0366 A81-33736
A half-model free-oscillation rig for pitch-damping measurements in high speed wind tunnels
p0461 A81-39263
FREEDOM FIGHTER AIRCRAFT
U F-5 AIRCRAFT
FREIGHT
U CARGO
FREQUENCIES
NT AUDIO FREQUENCIES
NT BROADBAND
NT C BAND
NT HIGH FREQUENCIES
NT LOW FREQUENCIES
NT LOW FREQUENCY BANDS
NT RESONANT FREQUENCIES
NT SUPERHIGH FREQUENCIES
NT VERY HIGH FREQUENCIES
NT VERY LOW FREQUENCIES
FREQUENCY ASSIGNMENT
Band sharing - A case study
p0173 A81-21869
FREQUENCY MEASUREMENT
A frequency-domain technique for aeroelastic mode estimation
p0156 A81-20475
FREQUENCY RESPONSE
Frequency-shaped cost functionals - Extension of linear-quadratic-Gaussian design methods
p0116 A81-18578
Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
A new frequency parameter for unsteady aerodynamics
[AIAA 81-0649] p0307 A81-29502
Detection performance evaluation of the ASDE-3 using fixed frequency and frequencyagile operation
[AD-A099513] p0499 N81-27372
FREQUENCY STABILITY
Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft
p0281 A81-27364
FRESNEL LENSES
System safety program report MK 1 MOD 0 LSO HUD console system
[AD-A095009] p0269 N81-19080
FRICTION
NT AERODYNAMIC DRAG
NT FRICTION DRAG
NT SKIN FRICTION
NT SUPERSONIC DRAG
NT VISCOUS DRAG
Longitudinal instability in braked landing gear
[ASME PAPER 80-WA/DSC-12] p0170 A81-21083
The response of turbine engine rotors to interference rubs
[AD-A090408] p0093 N81-13060
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974
National runway friction measurement program
[AD-A097334] p0391 N81-23097
FRICTION COEFFICIENT
U COEFFICIENT OF FRICTION
FRICTION DRAG
NT AERODYNAMIC DRAG
NT SUPERSONIC DRAG
NT VISCOUS DRAG
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401
FRICTION FACTOR
Braking of an aircraft tyre
p0412 A81-35892
The calculation of quasi-three-dimensional frictionless compressible flow in axial turbomachines --- partial differential equations
[PNR-90047] p0275 N81-19127

FRICTION LOSS COEFFICIENT
U FRICTION FACTOR
FRICTION PRESSURE DROP
U SKIN FRICTION
FRINGE PATTERNS
U DIFFRACTION PATTERNS
FROST
The problem of hoar-frost formation in aircraft fuel tanks
p0319 A81-30159
FUEL COMBUSTION
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
Basic ignition research related to altitude relight problems
p0237 A81-26014
Fire-proof fuel
p0480 A81-40456
Fuel character effects on the TF41 engine combustion system
[AIAA PAPER 81-1391] p0503 A81-40856
Determination of coking rate in jet fuel
p0570 A81-46448
Droplet breakup regimes and criteria for their existence
p0614 A81-48079
Compound Cycle Turbofan Engine (CCTE). Task 9: Carbon-Slurry Fuel Combustion Evaluation Program
[AD-A089451] p0029 N81-10072
Alternative energy sources for non-highway transportation, volume 1
[DOE/CS-05438/T1-VOL-1] p0044 N81-11513
An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211
Selected results from combustion research at the Lewis Research Center
[NASA-TM-82627] p0443 N81-25083
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149
Aircraft Research and Technology for Antimisting Kerosene Conference
[AD-A101347] p0580 N81-30103
FUEL CONSUMPTION
Methods of fuel conservation in civil aviation. I
p0005 A81-11322
The relevance of the Flex-Hub Prop-Fan for fuel-efficient airliners
p0006 A81-11605
Advanced fuel system technology for utilizing broadened property aircraft fuels
p0007 A81-11612
ECS integration for fuel efficient/low life cycle cost design --- Environmental Control Systems in aircraft
p0015 A81-11676
Computerized flight management for fuel saving
p0018 A81-12349
Fuel saving methods in civil aviation. II
p0059 A81-14755
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0101 A81-17044
Fuel conservation in the air transportation industry - General and operational aspects
p0102 A81-17143
Rolls-Royce engines status report
p0102 A81-17166
L-1011 Flight Management System design considerations
p0113 A81-18074
Fuel consumption aspects of some noise abatement procedures
p0154 A81-20350
Operational energy conservation strategies in commercial aviation
p0155 A81-20465
Integration of fuel conservative procedures in the high density terminal area
p0155 A81-20468
Measurements of flow quality in the Ames 2 x 2ft transonic wind tunnel
[AIAA PAPER 81-0156] p0161 A81-20636
Design for economy --- of high-bypass turbofan engines
p0290 A81-29030
A UK view on future fuels --- for aircraft
[ASME PAPER 81-GT-87] p0314 A81-29994
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0316 A81-30093
Delco Electronics Flight Management System for Air Force C-141 aircraft
p0321 A81-30249
Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31297
The impact of the All Electric Airplane on production engineering
[AIAA PAPER 81-0848] p0362 A81-32909
The use of airspace - One way to save fuel
p0364 A81-33150
Airliner maintenance for fuel efficiency
[AIAA PAPER 81-0787] p0367 A81-33877
Energy modeling for aviation fuel efficiency
[AIAA PAPER 81-0789] p0368 A81-33883
Rolls-Royce RB 211-535 power plant
[AIAA PAPER 81-0807] p0368 A81-33886
Propellers for economic flight at high speeds
[AAAF PAPER NT 80-34] p0369 A81-33936
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152
JT8D performance improvement to offset rising fuel costs
[SAE PAPER 801117] p0395 A81-34153
Performance deterioration of commercial high-bypass ratio turbofan engines
[SAE PAPER 801118] p0396 A81-34154
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
Fuel efficiency improvements to the T56 turboprop engine
[SAE PAPER 801158] p0399 A81-34178
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
The domain of the turboprop airplane
[SAE PAPER 801242] p0406 A81-34238
Commuter turboprop propulsion technology
[SAE PAPER 801243] p0406 A81-34239
Status of the program to develop LH2 for aircraft
[SAE PAPER 801153] p0407 A81-34244
Minimum fuel paths for a subsonic aircraft
p0411 A81-35636
Civil aircraft design for fuel reduction
p0420 A81-37415
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0420 A81-37416
CFM56 rejuvenates the DC-8
p0455 A81-38196
Contribution of technological progress to energy savings and conservation to the design of new aircraft
p0464 A81-39695
ATR 42 - A regional transport aircraft designed to save energy
p0464 A81-39696
Optimization of aircraft propulsion
p0464 A81-39697
Civil aviation - Onboard electronic equipment and fuel savings
p0464 A81-39699
Aerodynamic design of engine air intakes for improved performance
p0470 A81-40117
Development of small fuel efficient aircraft engines
[AHS 80-38] p0477 A81-40167
Improving the economy of subsonic transport aircraft by means of aerodynamic approaches
p0510 A81-41336
Flight control strategies for performance computers
p0512 A81-41759
Pilot guidance and display considerations for energy efficient flight profiles
p0513 A81-41924
Development of simplified airborne computations for fuel conservative descents in a time-based metered air traffic environment
[SAE PAPER 810642] p0524 A81-42785

Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
Wright Field turboprop study
[AIAA PAPER 81-1685] p0526 A81-43157
Turboprop engine propulsion for the 1990's
[AIAA PAPER 81-1648] p0533 A81-43935
A synopsis of the Navy A-7 Aircraft Fuel Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949
Boeing 767 - The new fuel saver
p0553 A81-44042
The improvement of aircraft specific range by periodic control
[AIAA 81-1748] p0553 A81-44080
Fuel optimal aircraft trajectories with fixed arrival times
[AIAA 81-1749] p0554 A81-44081
Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem
p0563 A81-45515
Projected power and specific fuel consumption development of the Rolls Royce Gem engine
p0575 A81-46637
Propulsion energy for tomorrow's aviation
p0622 A81-49161
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 2: Appendix A. Performance data - GE27/T3 study a1 turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 3: Appendix B. Performance data - TF34/T7 study A1 turboprop
[AD-A089279] p0028 N81-10069
Aircraft towing feasibility study
[DOE/CS-50069/1] p0074 N81-12051
Technological forecasting--aircraft design. Citations from the International Aerospace data base
[NASA-CR-163833] p0129 N81-13957
The future of civil turbo-fan engines
[PNR-90034] p0130 N81-13964
A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974
P-3 Orion fuel-saving modification wind tunnel study
[AD-A091906] p0194 N81-16044
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report
[AD-A094225] p0252 N81-18051
Test results of flight guidance for fuel conservative descents in a time-based metered air traffic environment --- terminal configured vehicle
p0264 N81-19036
Ceramic applications in turbine engines --- for improved component performance and reduced fuel usage
[NASA-CR-159865] p0274 N81-19118
Generation of optimum vertical profiles for an advanced flight management system
[NASA-CR-165674] p0331 N81-20051
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0334 N81-20077
An investigation into the possible reduction of aerodynamic drag of a fuel economy vehicle --- wind tunnel tests
[BU-248] p0338 N81-21039
General aviation airplane fuel economy system model
p0372 N81-22011
Energy efficient engine flight propulsion system: Aircraft/engine integration evaluation
[NASA-CR-159584] p0375 N81-22051
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149
The E3 combustors: Status and challenges --- energy efficient turbofan engines
[NASA-TM-82684] p0539 N81-28095
Minimum fuel horizontal flightpaths in the terminal area
[NASA-TM-81313] p0549 N81-29133
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design
[NASA-TM-81660] p0588 N81-30562
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-31184
CF 6 engine diagnostics
p0597 N81-31197
JT8D engine performance retention
p0598 N81-31200
Performance deterioration: An airline perspective
p0598 N81-31202
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956
Responses to comments of Air Transport Association of America on aircraft towing feasibility study
[DE81-029834] p0638 N81-33201

FUEL CONTAMINATION
The resistance of tank protective measures to microorganisms
[SNIAS-801-551-107] p0144 N81-15072

FUEL CONTROL
ECS integration for fuel efficient/low life cycle cost design --- Environmental Control Systems in aircraft
p0015 A81-11676
A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
A versatile microprocessor controller for low cost helicopter applications
[ASME PAPER 81-GT-137] p0316 A81-30039
Selected results from combustion research at the Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859
Electronic fuel controls - Who needs them
[SAE PAPER 810619] p0523 A81-42774
Electronic control system for a modern turboprop engine
[SAE PAPER 810620] p0523 A81-42775
Cost considerations of engine fuel control systems
p0048 N81-11928

FUEL CORROSION
Formation of solid phase during the heating of jet fuels
p0103 A81-17372
Economics of heavy fuels in gas turbines and combined cycles
[ASME PAPER 81-GT-45] p0312 A81-29959

FUEL FLOW
Three-dimensional model of spray combustion in gas turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
A comparison of two droplet models for gas-turbine combustion chamber flows
p0294 A81-29086
The combustion modelling of swirling flows for gas turbine combustors
p0295 A81-29087
Small gas-turbine combustor study: Fuel injector evaluation
[NASA-TM-82641] p0490 N81-26146

FUEL GAGES
NT CAPACITIVE FUEL GAGES

FUEL INJECTION
A numerical study of candidate transverse fuel injector configurations in the Langley scramjet engine
p0003 A81-10709
Flameholding characteristics of a swept-strut H2 fuel-injector for scramjet applications
p0003 A81-10711
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
A simple combustor system for a small gas turbine engine
p0104 A81-17503
A vaporizing combustor with double combustion spaces
p0109 A81-17827
A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
Small gas-turbine combustor study - Fuel injector evaluation
[AIAA PAPER 81-1388] p0502 A81-40857
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40887
A parametric study of staged fuel injector configurations for scramjet applications
[AIAA PAPER 81-1468] p0505 A81-40888

External burning propulsion analysis
[AIAA PAPER 81-1477] p0505 A81-40897
Autoignition characteristics of aircraft-type fuels
p0562 A81-44666
Fuel injector characterization studies
[NASA-CR-165200] p0143 N81-15003
An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211
Small gas-turbine combustor study: Fuel injector evaluation
[NASA-TM-82641] p0490 N81-26146
Supercritical fuel injection system
[NASA-CASE-LEW-12990-1] p0549 N81-29129

FUEL OILS
NT LIQUID FUELS
Economics of heavy fuels in gas turbines and combined cycles
[ASME PAPER 81-GT-45] p0312 A81-29959
Full-flow debris monitoring in gas turbine engines
[ASME PAPER 81-GT-60] p0313 A81-29970
Experimental study of the stability of aircraft fuels at elevated temperatures
[NASA-CR-165165] p0084 N81-12255

FUEL PRODUCTION
NT LIQUID FUELS
Future U.S. jet fuels - A refiner's viewpoint
[AIAA PAPER 81-0770] p0367 A81-33876
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
Effect of refining variables on the properties and composition of JP-5
[AD-A093842] p0219 N81-17281
Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates
[NASA-TP-1768] p0436 N81-24283

FUEL PUMPS
Numerical solution of a supersonic ejector pump
p0413 A81-35939
High pressure fuel pumps - Their design and evolution /The 13th J. D. North Memorial Lecture/
p0513 A81-42052

FUEL SPRAYS
The method for calculating the fuel concentration field in the downstream positions of the pressure jet atomizer in the high temperature gas-stream
p0224 A81-23731
A comparison of two droplet models for gas-turbine combustion chamber flows
p0294 A81-29086
Some factors affecting altitude relighting performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962
Fundamental investigation on jet engine ignition of fuel sprays and its application
p0420 A81-37341
Degradation and characterization of antimisting kerosene /AMK/
[AIAA PAPER 81-1423] p0503 A81-40867
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40887
Autoignition characteristics of aircraft-type fuels
p0562 A81-44666

FUEL SYSTEMS
NT AIRCRAFT FUEL SYSTEMS
Advanced fuel system technology for utilizing broadened property aircraft fuels
p0007 A81-11612
Evolutions in business jet fuel systems as seen in the Falcon Jet series
[SAE PAPER 800621] p0062 A81-15339
An approach to ramjet trajectory simulation test
p0292 A81-29065
Rating hydrogen as a potential aviation fuel
[SAE PAPER 80-1152] p0406 A81-34243
Electronic control system for a modern turboprop engine
[SAE PAPER 810620] p0523 A81-42775
Supercritical fuel injection system
[NASA-CASE-LEW-12990-1] p0549 N81-29129

FUEL TANKS
NT WING TANKS
The problem of hoar-frost formation in aircraft fuel tanks
p0319 A81-30159
Floor and fuel vibration isolation systems for the Boeing Vertol commercial Chinook
p0356 A81-32016
The F-16 Halon tank inerting system
[AIAA PAPER 81-1630] p0525 A81-43138
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] p0610 A81-47609
Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks
p0615 A81-48351
The resistance of tank protective measures to microorganisms
[SNIAS-801-551-107] p0144 N81-15072
Static charge in aircraft fuel tanks
[AD-A093552] p0208 N81-17045
Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection --- suppressing combustion overpressure
[AD-A093542] p0208 N81-17046
Evaluation of explosafe. Explosion suppression system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17047
Test and evaluation of foam-in-place fuel tank container
[AD-A095747] p0334 N81-20073

FUEL TESTS
Advanced fuel system technology for utilizing broadened property aircraft fuels
p0007 A81-11612
Comparative evaluation of the quality of jet fuels
p0103 A81-17371
Application of water cooling for improved gas turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977
Experimental study of the stability of aircraft fuels at elevated temperatures
[NASA-CR-165165] p0084 N81-12255
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19323
Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates
[NASA-TP-1768] p0436 N81-24283
Aviation turbine fuels 1980
[DOE/BETC/PPS-81/2] p0445 N81-25255
Behavior of fuels at low temperatures
[AD-A100332] p0542 N81-28276

FUEL-AIR RATIO
A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
Fresh mixture entrainment in a jet curtain flameholder
p0294 A81-29084
Some factors affecting altitude relighting performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962
Improved combustor domes designed for hot streak reduction
[AIAA PAPER 81-1352] p0501 A81-40835
Autoignition characteristics of aircraft-type fuels
p0562 A81-44666
Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465
Fuel injector characterization studies
[NASA-CR-165200] p0143 N81-15003
An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211
Minimum ignition energy of F40 aircraft fuel/air mixtures
[PML-1978-22] p0436 N81-24213
Simplified design point performance model of a dry turbofan engine cycle
[NASA-TM-83112] p0490 N81-26148

FUELING
U REFUELING

FUELS
NT AIRCRAFT FUELS
NT AUTOMOBILE FUELS
NT DIESEL FUELS
NT FUEL OILS
NT HIGH ENERGY FUELS
NT HYDROCARBON FUELS

NT HYDROGEN FUELS
NT JET ENGINE FUELS
NT JP-4 JET FUEL
NT JP-5 JET FUEL
NT JP-8 JET FUEL
NT KEROSENE
NT LIQUID FUELS
NT METAL PROPELLANTS
NT SLURRY PROPELLANTS
NT SOLID ROCKET PROPELLANTS
NT SYNTHETIC FUELS
NASA's aeronautics research and technology base [NASA-CR-164195] p0361 N81-22969
An investigation of the combustion behavior of solid fuel ramjets [AD-A098481] p0445 N81-25240

FULL SCALE TESTS
F/A-18 full scale development test p0099 A81-16579
QF-100 Full-Scale Aerial Target program p0179 A81-22612
Definition of loading sequence for full scale fatigue test p0180 A81-22626
Equilibrium spinning of a typical single-engine low-wing light aircraft p0354 A81-31598
Full-scale study of the cooling system aerodynamics of an operating piston engine installed in a light aircraft wing panel [SAE PAPER 810623] p0523 A81-42777
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor p0573 A81-46620
Validation of a two dimensional primitive variable computer code for flow fields in jet engine test cells [AD-A092138] p0196 N81-16060
NASA/FAA general aviation crash dynamics program p0268 N81-19064
The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2 --- air traffic control [NLR-MP-79038-U] p0332 N81-20059
Full-scale aerodynamic characteristics of a propellar installed on a small twin-engine aircraft wing panel [NASA-TM-81285] p0385 N81-23039
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1 [NASA-CR-160995-VOL-1] p0440 N81-25051

FUNCTION GENERATORS
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms p0453 A81-37822
Function generation techniques --- in real time hybrid simulations p0614 A81-48329

FUNCTIONAL ANALYSIS
NT FOURIER TRANSFORMATION
NT HARMONIC ANALYSIS
NT INTEGRAL EQUATIONS
NT SINGULAR INTEGRAL EQUATIONS
Frequency-shaped cost functionals - Extension of linear-quadratic-Gaussian design methods p0116 A81-18578

FUNCTIONAL DESIGN SPECIFICATIONS
Flight companies present new aircraft - Boeing 737-200 advanced --- aircraft characteristics and airline selection procedures p0171 A81-21575
Design options study. Volume 3: Qualitative assessment --- advanced civil military aircraft [AD-A089538] p0027 N81-10058
Auto-adaptive piloting --- of missiles [GA-380] p0217 N81-17102
Challenge for operational experience feedback in aircraft design: An aircraft design example [AD-A096088] p0341 N81-21067
Demonstration Advanced Avionics System (DAAS) functional description --- Cessna 402B aircraft [NASA-CR-152405] p0389 N81-23080

FUNCTIONS (MATHEMATICS)
NT CONFORMAL MAPPING
NT COORDINATE TRANSFORMATIONS
NT DELTA FUNCTION
NT DISCRETE FUNCTIONS
NT DISTRIBUTION FUNCTIONS
NT EXPONENTIAL FUNCTIONS
NT FOURIER TRANSFORMATION
NT GREEN FUNCTION
NT KERNEL FUNCTIONS
NT NORMAL DENSITY FUNCTIONS
NT PENALTY FUNCTION
NT PROBABILITY DISTRIBUTION FUNCTIONS
NT RAMP FUNCTIONS
NT TRANSFER FUNCTIONS
NT WEIGHTING FUNCTIONS
Dual methods and approximation concepts in structural synthesis [NASA-CR-3226] p0134 N81-14347

FURAN RESINS
NT KEVLAR (TRADEMARK)

FUSELAGE MOUNTING
U AIRCRAFT PRODUCTION

FUSELAGES
Crack propagation in panels of pressurized fuselages upon simultaneous action of cyclic loading by pressurization and high-frequency vibrations p0054 A81-13612
Structural analysis of fuselages with cutouts by finite element method p0108 A81-17816
Reduction of profile drag by blowing out through peg holes in areas of streamline separation bubbles [DGLR PAPER 80-103] p0120 A81-19392
Drag estimations for stream-line and cylindrical contour distortions on aircraft fuselages and train cars [DGLR PAPER 80-116] p0121 A81-19399
Numerical simulation of wing-fuselage interference [AIAA PAPER 81-0048] p0158 A81-20564
AV-8B composite fuselage design [AIAA PAPER 81-0232] p0162 A81-20690
Composite fuselage development for Naval aircraft p0181 A81-22648
Finite element calculation of thin-wall reinforced shells of the fuselage type with account for physical nonlinearity and loss of stability of certain elements p0235 A81-25679
Study of the crashworthiness of light aircraft structures [AIAA 81-0574] p0302 A81-29407
An extremely lightweight fuselage-integrated phased array for airborne applications p0348 A81-30779
A study of the effect of aft fuselage shape on helicopter drag p0470 A81-40116
Identification of a linear model of rotor-fuselage dynamics from nonlinear simulation data p0472 A81-40125
Composite Wing/Fuselage Program p0530 A81-43629
Airborne antenna pattern calculations p0532 A81-43708
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for composite structures p0557 A81-44373
Factors influencing the selection of tooling and fabrication methods in building a composite fuselage p0574 A81-46628
Some results from a crash energy absorption test for evaluating composite fuselage construction p0575 A81-46639
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method p0614 A81-48097
Drag increment due to rear fuselage upsweep [ESDU-80006] p0021 N81-10001
Flow phenomena along fuselages and wing-fuselage systems of gliders [NASA-TM-75401] p0186 N81-15983
Design and experimental verification of a transonic wing for a transonic aircraft p0188 N81-16003
Continued development and correlation of analytically based weight estimation codes for wings and fuselages [NASA-CR-152331] p0251 N81-18044

Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models
[NASA-CR-159363] p0250 N81-18799
An investigation of drag associated with the upswept rear fuselage of a helicopter
[BU-257] p0330 N81-20043
Design considerations for composite fuselage structure of commercial transport aircraft
[NASA-CR-159296] p0378 N81-22419
Phase 2 and 3 wind tunnel tests of the J-97 powered, external augmentor V/STOL model --- conducted in Ames 40- by 80-foot wind tunnel
[NASA-CR-152380] p0483 N81-26076
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081

FUSION WELDING
NT BRAZING
NT ELECTRON BEAM WELDING

FV-12A AIRCRAFT
Effect of impact damage on the XFV-12A composite wing box
p0182 A81-22676

F4H AIRCRAFT
U F-4 AIRCRAFT

F8U AIRCRAFT
U F-8 AIRCRAFT

G

G FORCE
U ACCELERATION (PHYSICS)

GAGES
U MEASURING INSTRUMENTS

GALERKIN METHOD
Lifting-line theory of oblique wings - Application of the Galerkin method to the lifting-line equation
p0149 A81-19873
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight
p0364 A81-33050
Application of the finite element method to rotary wing aeroelasticity
p0251 N81-18043

GALLIUM ARSENIDES
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122

GALLIUM COMPOUNDS
NT GALLIUM ARSENIDES

GAME THEORY
The variable-speed tail-chase aerial combat problem
p0351 A81-31295

GAPS
An analysis of gap effects on wing-elevon aerodynamic characteristics
[AIAA PAPER 81-0364] p0166 A81-20783

GARP
U GLOBAL ATMOSPHERIC RESEARCH PROGRAM

GAS ANALYSIS
NT OZONOMETRY
Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16920
Exhaust emission characteristics and variability for maintained General Electric CF6-50 turbofan engines
[AD-A092291] p01[illegible] N81-16064

GAS BEARINGS
Rotor-bearing dynamics technology design guide. Part 6: Status of gas bearing technology applicable to aero propulsion machinery
[AD-A094167] p0257 N81-18394

GAS CHROMATOGRAPHY
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966

GAS COMPOSITION
The application of UV spectroscopy to the quantitative analysis of nitrogen oxide
p0089 N81-13008

GAS COOLING
Effect of temperature dependent mechanical properties on thermal stress in cooled turbine blades
[ASME PAPER 81-GT-105] p0315 A81-30010

GAS DISCHARGES
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Large area gas discharge displays
p0212 N81-17070

GAS DISSOCIATION
Factors limiting turbine inlet temperatures
p0294 A81-29083

GAS DYNAMICS
NT AERODYNAMICS
NT AEROTHERMODYNAMICS
NT RAREFIED GAS DYNAMICS
NT ROTOR AERODYNAMICS
Variational problems of gas dynamics
p0069 A81-16455
Calculation of supersonic gas flows about wings
p0170 A81-21201
Transonic flows of a multireacting gas mixture through a Laval nozzle
p0225 A81-23909
Gas dynamic characteristics of the nozzle diaphragms of partial supersonic turbines
p0281 A81-27374
On the theory of a wing with small aspect ratio in a hypersonic flow
p0309 A81-29860
Adiabatic gas flow. Citations from the NTIS data base
[PB80-808546] p0026 N81-10048

GAS FLOW
NT AIR CURRENTS
NT AIR FLOW
NT JET STREAMS (METEOROLOGY)
NT NONEQUILIBRIUM FLOW
NT PIPE FLOW
NT TRANSITION FLOW
NT VERTICAL AIR CURRENTS
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles
p0004 A81-10913
Stationary displacement of a body by a shock wave
p0107 A81-17622
Propagation of three-dimensional acoustic perturbations in channels of variable cross-sectional area at frequencies close to cutoff frequency
p0119 A81-19338
Plane vortex gas flows --- emphasizing supersonic case
p0123 A81-19634
The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856
The accuracy of mean-stream-line method in subsonic and transonic regions
p0296 A81-29105
Subsonic gas flow past a wing profile
p0349 A81-31034
Droplet breakup regimes and criteria for their existence
p0614 A81-48079
Investigation of plume induced separation on a full-size missile at supersonic velocities
[AD-A094742] p0277 N81-19212
Unsteady swirling flows in gas turbines --- aircraft engines and aeroacoustics
[AD-A102052] p0629 N81-32150

GAS GENERATOR ENGINES
U GAS GENERATORS

GAS GENERATORS
The status of the expendable gasifier program --- gas generator for aircraft engine
[SAE PAPER 801151] p0466 A81-34242
A new approach to turboshaft engine growth
[AHS 80-41] p0477 A81-40169
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842

GAS HEATING
Considerations of the use of vitiated preheat --- for engine inlets
p0150 A81-20023

GAS INJECTION
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061
Sudden expansion injection for ram-rockets
p0293 A81-29071
Film cooling performance by injection through discrete holes
p0293 A81-29074

GAS IONIZATION
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732

GAS JETS
Interferometric study of the initial stage of supersonic jets of gases with various specific-heat ratios from conical nozzles
p0068 A81-16231
Characteristics of thermal energy separation in a gas ejector
p0281 A81-27371
Interaction of a gas jet from a jet engine with the destroyed surface of a multiphase disperse medium
p0319 A81-30152
External burning propulsion analysis
[AIAA PAPER 81-1477] p0505 A81-40897
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14964

GAS LASERS
NT CARBON DIOXIDE LASERS
NT HELIUM-NEON LASERS

GAS LUBRICANTS
Rotor-bearing dynamics technology design guide. Part 6: Status of gas bearing technology applicable to aero propulsion machinery
[AD-A094167] p0257 N81-18394

GAS LUBRICATED BEARINGS
U GAS BEARINGS

GAS MIXTURES
NT AIR
NT COMPRESSED AIR
Transonic flows of a multireacting gas mixture through a Laval nozzle
p0225 A81-23909
Losses of total pressure during mixing of flows in a step diffuser
p0242 A81-26991

GAS PRESSURE
Measurement of heat flux and pressure in a turbine stage
[ASME PAPER 81-GT-88] p0314 A81-29995
Fluctuation of gas parameters behind the combustion chamber of gas turbine engines
p0466 A81-40024

GAS STREAMS
Two methods for calculating the load on the surface of a slender body executing axisymmetric vibrations in a sonic gas flow
p0004 A81-10920
A vaporizing combustor with double combustion spaces
p0109 A81-17827
The method for calculating the fuel concentration field in the downstream positions of the pressure jet atomizer in the high temperature gas-stream
p0224 A81-23731
Effect of a semi-annular thermal acoustic shield on jet exhaust noise
[NASA-TM-81615] p0044 N81-11770

GAS TEMPERATURE
Investigation of the influence of the radial nonuniformity of initial temperature and energy losses on flow structure in a highly loaded turbine stage
p0465 A81-40019

GAS TURBINE ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT DUCTED FAN ENGINES
NT HYDROGEN ENGINES
NT J-65 ENGINE
NT J-79 ENGINE
NT J-85 ENGINE
NT J-97 ENGINE
NT JET ENGINES
NT RAMJET ENGINES
NT SUPERSONIC COMBUSTION RAMJET ENGINES
NT T-56 ENGINE
NT TF-30 ENGINE
NT TF-41 ENGINE
NT TURBOFAN ENGINES
NT TURBOJET ENGINES
NT TURBOPROP ENGINES
Impact damage of aircraft gas turbine engines with axial compressors
p0005 A81-11324
Optimum design of axial flow gas turbine stage. I - Formulation and analysis of optimization problem. II - Solution of the optimization problem and numerical results
p0019 A81-12608
Automation of aircraft gas-turbine power plants --- Russian book
p0020 A81-12782
On the utilization of hydrogen as a fuel for gas turbine. I - On the utilization of low temperature exergy of liquid hydrogen
p0055 A81-14075
Energy conservation through cogeneration
p0055 A81-14228
The development of low-toxic combustion chambers of transport gas turbine engines
p0060 A81-14787
Business aircraft APU's --- Auxiliary Power Units
[SAE PAPER 800608] p0061 A81-15331
Vibration aspects of small turbine engines in aircraft installations
[SAE PAPER 800617] p0062 A81-15337
Research on a high work axial gas generator turbine
[SAE PAPER 800618] p0062 A81-15338
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719
Coatings in the aero gas turbine
p0103 A81-17167
Joint-laboratory qualification testing of oils for gas turbine engines
p0103 A81-17375
A simple combustor system for a small gas turbine engine
p0104 A81-17503
The digital control system as part of an integrated accessory fit for future engines
p0104 A81-17505
Development and operational flight test of the model 250-C28B gas turbine engine
p0105 A81-17512
Failure Indication and Corrective Action for turboshaft engines
p0106 A81-17515
Advanced technology turboshaft IR suppression
p0106 A81-17519
An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
p0109 A81-17841
Turbine blade technology - Present and future
[ASME PAPER 80-C2/AERO-10] p0116 A81-18639
Calculated and experimental data for a 118-mm bore roller bearing to 3 million DN
[ASME PAPER 80-C2/LUB-14] p0117 A81-18668
Considerations of the use of vitiated preheat --- for engine inlets
p0150 A81-20023
3-D viscous analysis of ducts and flow splitters
[AIAA PAPER 81-0277] p0163 A81-20720
Three-dimensional model of spray combustion in gas turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
Use of speckle-holographic interferometry to study the strain-strain state of a gas-turbine engine disk close to the blade root fixing
p0170 A81-21366
Application of exoelectron emission for quality control of gas-turbine engine parts
p0171 A81-21367
Convective amplification of gas turbine engine internal noise sources
p0171 A81-21595
New interpretations of shock-associated noise with and without screech
p0178 A81-22527
Progress in P/M superalloy and titanium for aircraft applications
p0181 A81-22641

Development program for a graphite/PMR 15
  polyimide duct for the F404 engine
p0181 A81-22647

Problems and promises in gas turbine combustor
  design development
p0236 A81-26007

Noise from gas turbine combustors
p0236 A81-26008

Basic ignition research related to altitude
  relight problems
p0237 A81-26014

Gas turbine engine emission abatement - Status and
  needed advancements
p0237 A81-26015

Trajectory generation techniques for multivariable
  control of aircraft turbine engines
p0240 A81-26609

Determination of the thickness of blades of open
  wheels of radial-axial turbines
p0242 A81-26994

Calculation of shells in aircraft turbine engines
p0285 A81-28078

Integral methods for solving thermal conductivity
  problems and their application to evaluating
  heat exchange in certain gas-turbine elements
p0285 A81-28128

Increased fatigue resistance for blades of
  stationary gas-turbine engines by ultrasonic
  hardening with spherical particles
p0285 A81-28134

The possibilities of improving the efficiency of
  gas turbines
p0288 A81-28614

Analysis of vibration related failures in aero
  turbo-shaft engines
p0291 A81-29057

Investigation into the vibration of the starter
  gearbox of an aircraft turbine engine
p0291 A81-29059

A new breed of an air breathing engine
p0292 A81-29070

Analysis of a reverse flow, annular combustion
  chamber
p0294 A81-29081

Cyclone combustors in low emission gas turbine
  applications
p0294 A81-29082

Factors limiting turbine inlet temperatures
p0294 A81-29083

A comparison of two droplet models for gas-turbine
  combustion chamber flows
p0294 A81-29086

The combustion modelling of swirling flows for gas
  turbine combustors
p0295 A81-29087

High temperature metal matrix composites for gas
  turbines
p0295 A81-29090

Particulate flow in centrifugal compressors used
  in helicopters
p0297 A81-29109

Transpiration air cooled turbine blade - A
  technology for future generation aircraft and
  industrial gas turbine engines using coal or
  coal derived fuels
p0297 A91-29115

The engineering basis for the application of life
  cycle cost or supportability criteria to gas
  turbine engines
p0298 A81-29119

Basic problem of the analytical design of aircraft
  gas turbine engines. II
p0299 A81-29305

A new method for torsion of shaft with variable
  diameter using non-orthogonal curvilinear
  coordinates and its application
  [AIAA 81-0477]
p0300 A81-29378

Material shortages - Effect on the aircraft engine
  industry
  [AIAA 81-0509]
p0301 A81-29387

Gas turbine engineering: Applications, cycles and
  characteristics --- Book
p0309 A81-29680

The evaluation of fuel property effects on Air
  Force gas turbine engines - Program Genesis
  [ASME PAPER 81-GT-1]
p0310 A81-29926

An exploratory study of soot sample integrity and
  probe perturbation in a swirl-stabilized combustor
  [ASME PAPER 81-GT-27]
p0311 A81-29943

Preliminary study on reheat combustor for advanced
  gas turbine
  [ASME PAPER 81-GT-29]
p0311 A81-29944

Carbon/carbon components for advanced gas turbine
  engines
  [ASME PAPER 81-GT-35]
p0312 A81-29949

Economics of heavy fuels in gas turbines and
  combined cycles
  [ASME PAPER 81-GT-45]
p0312 A81-29959

Full-flow debris monitoring in gas turbine engines
  [ASME PAPER 81-GT-60]
p0313 A81-29970

Application of water cooling for improved gas
  turbine fuel flexibility and availability
  [ASME PAPER 81-GT-68]
p0313 A81-29977

Cooling air flow characteristics in gas turbine
  components
  [ASME PAPER 81-GT-76]
p0313 A81-29984

Measurement of heat flux and pressure in a turbine
  stage
  [ASME PAPER 81-GT-88]
p0314 A81-29995

Sensitivity of turbine blade temperatures to
  tolerances of design variables
  [ASME PAPER 81-GT-90]
p0314 A81-29997

Low NO/x/ and fuel flexible gas turbine combustors
  [ASME PAPER 81-GT-99]
p0315 A81-30006

Modified Brayton cycles utilizing alcohol fuels
  [ASME PAPER 81-GT-103]
p0315 A81-30009

Flow transition phenomena and heat transfer over
  the pressure surfaces of gas turbine blades
  [ASME PAPER 81-GT-107]
p0315 A81-30012

Design analysis of high-efficiency low-stress
  ceramic gas turbines
  [ASME PAPER 81-GT-130]
p0316 A81-30034

An investigation of a preswirled cooling airflow
  to a turbine disc by measuring the air
  temperature in the rotating channels
  [ASME PAPER 81-GT-132]
p0316 A81-30035

A versatile microprocessor controller for low cost
  helicopter applications
  [ASME PAPER 81-GT-137]
p0316 A81-30039

The Navy PATE program --- Propulsion Automatic
  Test Equipment
  [ASME PAPER 81-GT-189]
p0317 A81-30082

A generalized mathematical model to estimate gas
  turbine starting characteristics
  [ASME PAPER 81-GT-202]
p0318 A81-30092

NASA gas turbine stator vane ring
  [ASME PAPER 81-GT-208]
p0318 A81-30097

Cooled radial in-flow turbines for advanced gas
  turbine engines
  [ASME PAPER 81-GT-213]
p0318 A81-30102

Driving dynamics of a high-speed
  positive-displacement pump and gas-turbine drive
  during startup --- of flight vehicles
p0319 A81-30155

Computation of wall temperature and heat flux
  distributions of the film cooled walls
p0348 A81-30802

Numerical methods for studying the stress-strain
  state and service life of aircraft gas-turbine
  engine disks
p0351 A81-31258

Experimental determination of the stress intensity
  factor for cracks with a curvilinear front in
  complex parts /gas turbine blades/
p0351 A81-31264

Mechanical properties of aluminum coatings on
  heat-resistant steels
p0355 A81-31668

Fatigue strength of gas turbine engine rotor
  blades in connection with structural changes in
  service
p0355 A81-31673

Centralized in-place pressure calibration system
  for multiple turbine engine aerodynamic pressure
  measurement systems
p0360 A81-32847

A mobile emissions laboratory for on-line analysis
  of combustion products from gas turbine engines
p0361 A81-32872

Thermoplastic strengthening of a gas-turbine
  engine disk lock joint - Determination of the
  residual stresses
p0365 A81-33169

Bearing wear detection using radioactive iron-55
  tagging
  [ASLE PREPRINT 81-AM-6A-3]
p0367 A81-33868

Results of thermal tests on the GTA-18 gas turbine
  unit with the RD-ZM-500 jet engine

p0395 A81-34022

A review of the installation, performance and economic aspects of a high altitude facility for small gas turbines
[SAE PAPER 801121] p0396 A81-34157

A forward look at gas turbine testing facilities
[SAE PAPER 801124] p0396 A81-34159

Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-34166

An experimental and theoretical investigation of a twin-entry radial flow turbine under non-steady flow conditions
[SAE PAPER 801136] p0397 A81-34167

Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169

Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177

Overview of ARP 1587 aircraft gas turbine Engine Monitoring System guide
[SAE PAPER 801218] p0404 A81-34224

The High Performance Auxiliary Power Unit technology demonstrator program
[SAE PAPER 801148] p0406 A81-34240

The status of the expendable gasifier program --- gas generator for aircraft engine
[SAE PAPER 801151] p0406 A81-34242

Turbine engine design --- engineering for cost effectiveness and propulsive efficiency
[AIAA PAPER 81-0915] p0408 A81-34362

Estimated service life of gas turbine engine compressor blades
p0417 A81-36680

New technologies for compressors of aviation engines
p0452 A81-37656

Computer calculation of the characteristics of a hybrid system for the cooling of gas turbine blades
p0459 A81-39217

Investigation of the influence of the radial nonuniformity of initial temperature and energy losses on flow structure in a highly loaded turbine stage
p0465 A81-40019

Investigation of the cooling of the turbine rotor blade of a gas-turbine power system
p0465 A81-40020

Fluctuation of gas parameters behind the combustion chamber of gas turbine engines
p0466 A81-40024

Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
p0469 A81-40107

Regenerative engine for helicopter application
[AHS 80-39] p0477 A81-40168

The requirements for efficient small turbine engines taking up the challenge
[AHS 80-42] p0477 A81-40170

NDEC - A control concept for helicopter gas turbines --- speed (N) based Digital Electronic Control
[AHS 80-44] p0477 A81-40171

High-temperature strength of alloys for gas turbine engines --- Russian book
p0482 A81-40616

Principles of the reliability of gas turbine engines --- Russian book
p0482 A81-40621

Exploratory development program to improve combustor dome operating characteristics
[AIAA PAPER 81-1351] p0501 A81-40834

Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836

Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839

The influence of blade wakes on the performance of combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856

Small gas-turbine combustor study - Fuel injector evaluation
[AIAA PAPER 81-1388] p0502 A81-40857

Selected results from combustion research at the Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859

Use of segmented mold process to produce large superalloy engine castings
[AIAA PAPER 81-1404] p0503 A81-40861

Stress analysis of first turbine vane using a 3-dimensional model with non linear material behavior subjected to transient temperatures
[AIAA PAPER 81-1437] p0504 A81-40873

Effect of oxygen addition on low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891

Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911

Performance analysis of a family of planar pulse generators
[AIAA PAPER 81-1590] p0507 A81-40965

Selection of turbine parameters for steam-hydrogen engine schemes
p0509 A81-41028

Thermodynamic comparison of the efficiencies of semiclosed- and open-loop air cooling systems of gas turbine engines
p0509 A81-41029

Efficiency of cantilever compressor stator blades
p0509 A81-41041

An experimental study of heat transfer in rotating slots and bends --- in gas turbine engines
p0509 A81-41049

From sponge to powder alternatives in titanium processing
p0511 A81-41647

Engine life methodologies for conceptual design
[AIAA PAPER 81-1398] p0515 A81-42188

The use of engine operating experience in the preliminary design of aircraft gas turbine combustion systems
[AIAA PAPER 81-1399] p0515 A81-42189

Methodology for engine/aircraft selection with life and utilization considerations
[AIAA PAPER 81-1401] p0515 A81-42190

Effect of oxygen-containing additives on the antiwear properties of fuels for gas-turbine aircraft engines
p0517 A81-42558

Application of the Semi-Loof thin shell element to the analysis of aircraft engine structures
p0518 A81-42704

The effect of various factors on the vibration characteristics of composite blades of gas turbine engines
p0524 A81-42793

Possibility of development of an electron-fractographic method for measuring stress level produced by fatigue fracture of the material
p0532 A81-43773

Engine life and usage methodologies for conceptual design
[AIAA PAPER 81-1651] p0533 A81-43937

Autoignition characteristics of aircraft-type fuels
p0562 A81-44666

The predictability of turbine vane convection heat transfer
[AIAA PAPER 81-1435] p0566 A81-45892

Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47962

On the numerical analysis of stall flutter in turbine cascade
p0613 A81-47963

Model following control of gas turbine engines
p0624 A81-49900

Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines
[AIAA PAPER 81-1358] p0625 A81-49976

Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067

An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS)
[AD-A089365] p0028 N81-10070

Engine diagnostics program: CF6-50 engine performance deterioration
[NASA-CR-159867] p0078 N81-12085

Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material
[NASA-TP-1716] p0078 N81-12089

Effect of ambient conditions on the emissions from
  a gas turbine combustor
  [NASA-CR-3355]   p0080 N81-12105
Metallurgical aspects of materials processing and
  manufacturing for aero-engine components --- gas
  turbine engines
  [PNR-90019]   p0084 N81-12209
An automatic isokinetic sampler for particulate
  emissions from aircraft gas turbine engines
  [AD-A090280]   p0088 N81-12653
A comparison of the three methods used to obtain
  acoustic measurements for the NASA Flight
  Effects Program
  [NASA-TM-81906]   p0088 N81-12822
Progress in materials and structures at Lewis
  Research Center
                p0089 N81-12982
Power control for hot gas engines
  [NASA-CASE-NPO-14220-1]   p0133 N81-14318
Improved capabilities to detect incipient bearing
  failures
  [AD-A091687]   p0134 N81-14325
Compressor configuration and design optimization
  for the high reliability gas turbine
  [DOE/ET-15425/T1]   p0134 N81-14327
Gas turbine engines and transmissions for bus
  demonstration programs
  [COO-4867-07]   p0134 N81-14329
The measurement of aero gas turbine noise
  [PNR-90032]   p0138 N81-14795
Curved centerline air intake for a gas turbine
  engine
  [NASA-CASE-LEW-13201-1]   p0143 N81-14999
Cost/benefit analysis of advanced materials
  technologies for future aircraft turbine engines
  [NASA-CR-165225]   p0144 N81-15006
Compressor configuration and design optimization
  for the high reliability gas turbine
  [DOE/ET-15332/T1]   p0145 N81-15414
Nonlinear analysis of squeeze film dampers applied
  to gas turbine helicopter engines
  [AD-A091905]   p0196 N81-16062
Centrifugal compressors for small aero and
  automotive gas turbine engines
                p0220 N81-17467
Apparatus for sensor failure detection and
  correction in a gas turbine engine control system
  [NASA-CASE-LEW-12907-2]   p0273 N81-19115
Development and fabrication of refractory silicon
  carbide bodies, especially for gas turbine engines
  --- by hot pressing
  [BMFT-FB-T-79-137]   p0275 N81-19128
Development of gas turbine components, using
  silicon nitride --- forming techniques
  [BMFT-FB-T-79-152]   p0275 N81-19129
Automotive technology development program
  [DOE/CS-0069/1]   p0278 N81-19464
The rejuvenation of properties in turbine engine
  hot section components by hot isostatic pressing
  [AD-A097551]   p0390 N81-23088
Fundamental heat transfer research for gas turbine
  engines
  [NASA-CP-2178]   p0428 N81-24063
Structures, performance, benefit, cost study ---
  gas turbine engines
  [NASA-CR-165313]   p0428 N81-24067
Internal coating of air-cooled gas turbine blades
  [NASA-CR-165337]   p0429 N81-24068
Experimental verification of turboblading
  aeromechanics
                p0432 N81-24092
Full annular combustor test facility for high
  pressure/high temperature testing
                p0432 N81-24097
The mechanical testing of compressors and turbines
  for aircraft gas turbine engines
                p0433 N81-24100
Prediction of future test needs, test facilities
  and procedures
                p0433 N81-24104
Reliability advancement for electronic engine
  controllers, volume 1
  [AD-A098623]   p0443 N81-25087
Overview: NASA/AF/Navy Symposium on
  Aeroelasticity of Turbine Engines
  [NASA-CR-164413]   p0444 N81-25089
Blade loss transient dynamics analysis, volume 1.
  Task 1: Survey and perspective --- aircraft gas
  turbine engines
  [NASA-CR-165373-VOL-1]   p0496 N81-27089
Coating for prevention of titanium combustion
  [NASA-CR-165360]   p0539 N81-28094
High temperature strain gage system for
  application to turbine engine components
  [AD-A101713]   p0583 N81-30132
Solar Brayton engine/alternator set
                p0588 N81-30529
First phase testing of solar thermal engine at
  United Stirling
                p0588 N81-30530
Non-heat pipe receiver/p-40 Stirling engine
                p0588 N81-30531
Heat pipe solar receiver with thermal energy storage
                p0588 N81-30532
Test results of the Chrysler upgraded automotive
  gas turbine engine: Initial design
  [NASA-TM-81660]   p0588 N81-30562
An introduction to NASA's turbine engine hot
  section technology (HOST) project
                p0599 N81-31206
Dual-powered Gas Turbine/Electric (GT/E) computer
  commuter rail cars: Test, evaluation and
  economics
  [PB81-211757]   p0641 N81-34109
GAS TURBINES
  New BBC high-efficiency gas turbines
                p0017 A81-11797
  Vector and scalar characteristics of opposing jets
    discharging normally into a cross-stream
                p0110 A81-17997
  Semi-empirical correlations for gas turbine
    emissions, ignition, and flame stabilization
                p0171 A81-21505
  Photoelastic investigation of stress distribution
    around inclined cut-outs in gas-turbine
    components subjected to in-plane and bending loads
                p0295 A81-29091
  Further studies of the influence of thermal
    effects on the predicted acceleration of gas
    turbines
    [ASME PAPER 81-GT-21]   p0311 A81-29938
  The influence of premixed combustion flame
    stabilizer geometry on flame stability and
    emissions
    [ASME PAPER 81-GT-26]   p0311 A81-29942
  MS9001E - A new 100 MW gas turbine
    [ASME PAPER 81-GT-31]   p0312 A81-29946
  Improved particle trajectory calculations through
    turbomachinery affected by coal ash particles
    [ASME PAPER 81-GT-53]   p0312 A81-29965
  New correlations of the two-dimensional turbine
    cascade aerodynamic performance
    [ASME PAPER 81-GT-128]   p0316 A81-30032
  Method for evaluating the resistance of
    gas-turbine installation disks to thermal cycling
                p0364 A81-33168
  Comparative efficiency of penetrating steam and
    air cooling of gas turbine blades
                p0509 A81-41003
  A process for protecting gas turbine blade cooling
    passages against degradation
                p0622 A81-49209
  Axial flow compressors. Citations from the
    Engineering Index data base
    [PB80-808611]   p0029 N81-10076
  Axial flow compressors. Citations from the NTIS
    data base
    [PB80-808603]   p0031 N81-10441
  The design development and operation of gas
    turbine radio telemetry systems
    [EIR-00733]   p0077 N81-12082
  Advanced industrial gas turbine techology
    readiness demonstration
    [DOE/OR-05035/T1]   p0085 N81-12426
  The response of turbine engine rotors to
    interference rubs
    [AD-A090408]   p0093 N81-13060
  Effects of downstream distance on turbulence decay
    for the compressor research facility low
    conditioning system
    [AD-A091543]   p0133 N81-14276
  Development of high-temperature turbine subsystem
    technology to a technology readiness status,
    phase 2
    [FE-1806-72]   p0134 N81-14332
  Two-stage combustion for reducing pollutant
    emissions from gas turbine combustors
    [NASA-CR-163877]   p0196 N81-16056

Samarium cobalt (SMCO) generator/engine integration study [AD-A092904] p0214 N81-17087

Turbine engine fault detection and isolation program, phase 1. Volume 2: Requirements definition for an integrated engine monitoring system [AD-A093226] p0215 N81-17088

Turbine engine fault detection and isolation program, phase 1. Volume 1: Requirements definition for an integrated engine monitoring system [AD-A093225] p0215 N81-17089

Prediction and evaluation of thrust augmenting ejector performance at the conceptual design stage [AD-A093953] p0216 N81-17094

WR34-8 performance improvement program. The WR34-8 gas turbine compressor test [AD-A098293] p0429 N81-24069

Tests of large compressors at CE Pr p0432 N81-24096

High-response measurements of a turbofan engine during nonrecoverable stall [NASA-TM-81759] p0443 N81-25084

Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers [AD-A098614] p0444 N81-25086

Small gas-turbine combustor study: Fuel injector evaluation [NASA-TM-82641] p0490 N81-26146

Energy efficient engine, high-pressure turbine cooling model technology report [NASA-CR-165374] p0496 N81-27093

Development of high strength silicon carbide materials for gas turbine applications [BMFT-FB-T-80-025] p0497 N81-27102

An overview of SAE ARP 1587: Aircraft gas turbine engine monitoring system guide p0600 N81-31217

Unsteady swirling flows in gas turbines --- aircraft engines and aeroacoustics [AD-A102852] p0629 N81-32150

GAS WELDING

NT BRAZING

GAS-SOLID INTERACTIONS

Prediction of particle paths for flow of a gas/solids suspension through a cascade of flat plates p0256 N81-18352

GAS-SOLID INTERFACES

Stationary displacement of a body by a shock wave p0107 A81-17622

Interaction of a gas jet from a jet engine with the destroyed surface of a multiphase disperse medium p0319 A81-30152

GASEOUS CAVITATION

U CAVITATION FLOW

U GAS FLOW

GASEOUS FUELS

NT LIQUID FUELS

GASEOUS ROCKET PROPELLANTS

A study of air breathing rockets - Subsonic mode combustion [IAF PAPER 80-F-270] p0115 A81-18371

GASES

NT AIR

NT CARBON DIOXIDE

NT CARBON MONOXIDE

NT CHARGED PARTICLES

NT COMPRESSED AIR

NT DISSOLVED GASES

NT EXHAUST GASES

NT FLAMMABLE GASES

NT GAS MIXTURES

NT GAS STREAMS

NT HIGH TEMPERATURE AIR

NT HIGH TEMPERATURE GASES

NT IDEAL GAS

NT LIQUID HYDROGEN

NT LIQUID OXYGEN

NT NITROGEN

NT OXYGEN

NT OZONE

NT RAREFIED PLASMAS

GASOLINE

NT LIQUID FUELS

GASP

U GLOBAL AIR SAMPLING PROGRAM

GAUSSIAN DISTRIBUTIONS

U NORMAL DENSITY FUNCTIONS

GAUSSIAN NOISE

U RANDOM NOISE

GAW-2 AIRFOIL

Pressure distributions for the GA(W)-2 airfoil with 20% aileron, 25% slotted flap and 30% Fowler flap [NASA-CR-2948] p0262 N81-19023

GC-130 AIRCRAFT

U C-130 AIRCRAFT

GEAR TEETH

Gear meshing action as a source of vibratory excitation p0150 A81-20061

Gearbox isolation for reducing gear tooth noise in single rotor helicopter p0151 A81-20073

Measuring dynamic stresses on helicopter transmission gear teeth utilizing telemetry p0361 A81-32659

Advancements in dimensional inspection of helicopter gearboxes and transmission cases [AHS 80-36] p0476 A81-40165

GEARS

An analytical method to calculate misalignment in the journal bearing of a planetary gear system p0004 A81-10839

Water content of helicopter gear oils [ASME PAPER 80-C2/DET-12] p0116 A81-18640

A low height 2300 kW helicopter transmission with an enclosed planetary gear [ASME PAPER 80-C2/DET-17] p0116 A81-18642

Approximation of gear transmission error by standard gear errors [ASME PAPER 80-C2/DET-71] p0117 A81-18646

Experience with advanced high performance gear steel --- for CH-47 [ASME PAPER 80-C2/DET-77] p0117 A81-18648

The rigidity and performance of a simple spiral bevel helicopter gearbox [ASME PAPER 80-C2/DET-103] p0117 A81-18654

Ferrography as a health monitor and a design aid for the development of helicopter gearboxes p0118 A81-18759

Gear unit noise and transmission errors --- helicopter system p0150 A81-20060

Modelling techniques for the reduction of noise and vibration in gearboxes p0151 A81-20063

Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I p0229 A81-24090

Investigation into the vibration of the starter gearbox of an aircraft turbine engine p0291 A81-29059

Computerized gear grinding system development [AHS 80-48] p0476 A81-40163

Advanced transmission component development p0575 A81-46634

Designing safety into helicopter transmissions p0575 A81-46638

Power control for hot gas engines [NASA-CASE-NPO-14220-1] p0133 N81-14318

Helicopter gearbox testing p0488 N81-26137

Fatigue testing of helicopter gearboxes p0488 N81-26138

GELATINS

The development of a substitute bird model [ASME PAPER 81-GT-23] p0311 A81-29939

GELLED ROCKET PROPELLANTS

NT LIQUID FUELS

GENERAL AVIATION AIRCRAFT

NT AGRICULTURAL AIRCRAFT

NT CESSNA 402B AIRCRAFT

NT DH 125 AIRCRAFT

OLGA, a gust alleviation system for improvement of passenger comfort of general aviation aircraft p0008 A81-11620

Investigation of the stalling characteristics of a general aviation aircraft p0014 A81-11665

General aviation considerations on bad weather approaches at regional airports p0052 A81-13315

Business aircraft turbofan technology progress in
 the 1970's, challenges in the 1980's
 [SAE PAPER 800601] p0061 A81-15326
A new high bypass fan for general aviation
 [SAE PAPER 800602] p0061 A81-15327
Forward swept wings and business airplanes
 [SAE PAPER 800605] p0061 A81-15328
Cabin pressure control systems for general
 aviation aircraft
 [SAE PAPER 800606] p0061 A81-15329
Business aircraft APU's --- Auxiliary Power Units
 [SAE PAPER 800608] p0061 A81-15331
Improvements required in air traffic control to
 meet increasing general aviation turbine powered
 aircraft operations
 [SAE PAPER 800614] p0062 A81-15335
Evolutions in business jet fuel systems as seen in
 the Falcon Jet series
 [SAE PAPER 800621] p0062 A81-15339
Future trends in automatic flight control systems
 [SAE PAPER 800627] p0063 A81-15343
Development and certification of the Gulfstream III
 p0100 A81-16587
The Grumman Aerospace and Gulfstream American
 Gulfstream III case study in aircraft design ---
 Book
 p0101 A81-16720
A status report on NASA general aviation
 stall/spin flight testing
 p0122 A81-19471
An analytical approach to airfoil icing
 [AIAA PAPER 81-0403] p0167 A81-20810
Icing tunnel tests of a glycol-exuding porous
 leading edge ice protection system on a general
 aviation airfoil
 [AIAA PAPER 81-0405] p0168 A81-20837
Core noise measurements from a small, general
 aviation turbofan engine
 p0178 A81-22531
Empirical method for the prediction of business
 executive jet cabin noise levels
 p0224 A81-23844
Design for supercommuters
 p0227 A81-24048
The Windecker Eagle - A new era in general
 aviation aircraft manufacturing
 p0240 A81-26747
The impact of active controls on general aviation
 airplanes of the late 1980s
 p0285 A81-28295
Electronic search and rescue aids
 p0286 A81-28300
NASA research in aeropropulsion
 [ASME PAPER 81-GT-96] p0314 A81-30003
Jet aircraft design
 [AIAA PAPER 81-0912] p0362 A81-32930
The rise of air and space
 p0366 A81-33718
Designing for aircraft structural crashworthiness
 [AIAA PAPER 81-0803] p0367 A81-33882
Electronic displays and computerized NAV systems
 for commuters and business aircraft
 p0407 A81-34330
The art of single-engine aircraft design
 [AIAA PAPER 81-0914] p0408 A81-34361
A description of the general aviation fixed wing
 accident
 p0408 A81-34696
Applications of dynamic stability parameters to
 problems in aircraft dynamics
 p0410 A81-35552
A geometrical study of the steady-state spin for a
 typical low-wing general aviation aircraft
 p0454 A81-38023
Light aviation in the United States - September 1980
 --- French book
 p0513 A81-41903
Strategies for aircraft interior noise reduction
 in existing and future propeller aircraft
 [SAE PAPER 810560] p0518 A81-42726
Summary of typical parameters that affect sound
 transmission through general aviation aircraft
 structures
 [SAE PAPER 810562] p0518 A81-42728
Multiplexing in general aviation aircraft
 [SAE PAPER 810570] p0519 A81-42735
The new aviation multiviscosity oil, SAE 20W-50
 for general aviation
 [SAE PAPER 810573] p0519 A81-42736
The state of the art of general aviation
 autopilots - Now and in the future
 [SAE PAPER 810582] p0520 A81-42744
Impact of advanced propeller technology on
 aircraft/mission characteristics of several
 general aviation aircraft
 [SAE PAPER 810584] p0520 A81-42745
General aviation propeller noise reduction -
 Penalties and potential
 [SAE PAPER 810585] p0520 A81-42746
Noise and performance of general aviation aircraft
 - A review of the MIT study
 [SAE PAPER 810586] p0520 A81-42747
Development of a simple, self-contained flight
 test data acquisition system
 [SAE PAPER 810596] p0520 A81-42754
Analytical techniques for the analysis of
 stall/spin flight test data
 [SAE PAPER 810599] p0521 A81-42756
The effect of proplets and bi-blades on the
 performance and noise of propellers
 [SAE PAPER 810600] p0521 A81-42757
Low and high speed propellers for general aviation
 - Performance potential and recent wind tunnel
 test results
 p0521 A81-42758
Propeller performance and design as influenced by
 the installation
 [SAE PAPER 810602] p0521 A81-42759
Investigation of a flight test method for the
 measurement of propeller thrust
 [SAE PAPER 810603] p0521 A81-42760
Crashworthy design concepts for airframe
 structures of light aircraft
 [SAE PAPER 810613] p0522 A81-42769
Aircraft subfloor response to crash loadings
 [SAE PAPER 810614] p0522 A81-42770
Human factors aspects of emergency egress from a
 business jet
 [SAE PAPER 810617] p0523 A81-42772
Electronic fuel controls - Who needs them
 [SAE PAPER 810619] p0523 A81-42774
Small turbofan engines - Their impact on general
 aviation aircraft
 [SAE PAPER 810622] p0523 A81-42776
An overview of general aviation propulsion
 research programs at NASA-Lewis Research Center
 [SAE PAPER 810624] p0523 A81-42778
Binocular Camera for cockpit visibility of general
 aviation aircraft
 [SAE PAPER 810628] p0524 A81-42780
Summary of high-lift and control surface research
 on NASA general aviation airfoils
 [SAE PAPER 810629] p0524 A81-42781
An assessment of advanced technologies for
 application to general aviation
 [SAE PAPER 810630] p0524 A81-42782
Flight test evaluation of advanced symbology for
 general aviation approach to landing displays
 [AIAA PAPER 81-1643] p0526 A81-43142
General aviation aircraft rear-seated occupant
 protection - Shoulder restraints in rear seats
 [AIAA PAPER 81-1669] p0534 A81-43944
Data analysis for aircraft parameter estimates
 [AIAA PAPER 81-1864] p0560 A81-44561
Project Bandit - An economical, high performance
 business aircraft for the 1990s
 p0563 A81-44850
The design and development of a mixer compound
 exhaust system for a quiet clean general
 aviation turbofan
 [AIAA PAPER 81-1494] p0566 A81-45893
Noise control at general aviation airports
 p0569 A81-46366
Annual review of aircraft accident data, U.S.
 General aviation calendar year 1978
 [PB80-201916] p0028 N81-10028
Low-speed aerodynamic characteristics of a 13
 percent thick medium speed airfoil designed for
 general aviation applications
 [NASA-TP-1498] p0071 N81-12015
Noise exposure of civil aircarrier airplanes
 through the year 2000. Volume 1: Methods,
 procedures, results
 [EPA-550/9-79-313-1] p0087 N81-12644
Noise exposure of civil aircarrier airplanes
 through the year 2000. Volume 2: Appendices A
 through F
 [EPA-550/9-70-313-2] p0087 N81-12645

Noise levels and data correction analysis for seven general aviation propeller aircraft
[AD-A091292] p0096 N81-13717

An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986

General aviation single pilot IFR autopilot study
p0265 N81-19045

Light transport and general aviation aircraft icing research requirements
[NASA-CR-165290] p0269 N81-19079

GASP- General Aviation Synthesis Program. Volume 1: Main program. Part 1: Theoretical development
[NASA-CR-152303-VOL-1-PT-1] p0270 N81-19088

GASP- General Aviation Synthesis Program. Volume 2: Geometry. Part 1: Theoretical development
[NASA-CR-152303-VOL-2-PT-1] p0270 N81-19089

GASP- General Aviation Synthesis Program. Volume 3: Aerodynamics. Part 1: Theoretical development
[NASA-CR-152303-VOL-3-PT-1] p0270 N81-19090

GASP- General Aviation Synthesis Program. Volume 4: Propulsion. Part 1: Theoretical development
[NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091

GASP- General Aviation Synthesis Program. Volume 5: Weights. Part 1: Theoretical development
[NASA-CR-152303-VOL-5-PT-1] p0271 N81-19092

GASP- General Aviation Synthesis Program. Volume 6: Performance. Part 1: Theoretical development
[NASA-CR-152303-VOL-6-PT-1] p0271 N81-19093

GASP- General Aviation Synthesis Program. Volume 7: Economics. Part 1: Theoretical development
[NASA-CR-152303-VOL-7-PT-1] p0271 N81-19094

Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111

General Aviation Avionics Statistics
[AD-A095148] p0273 N81-19114

General Aviation Turbine Engine (GATE) study
[NASA-CR-159482] p0274 N81-19117

Investigation of Flight Test Methods for measuring the performance of general aviation aircraft
[NASA-CR-164057] p0333 N81-20065

A flight investigation of the ultra-deep-stall descent and spin recovery characteristics of a 1/6 scale radiocontrolled model of the Piper PA38 Tomahawk
[NASA-CR-156871] p0343 N81-21084

MIT Annotated Bibliography
p0371 N81-22001

Use of Loran-C for general aviation aircraft navigation
p0371 N81-22002

The P/POD project: Programmable/Pilot Oriented Display --- general aviation aircraft
p0371 N81-22004

Investigation of air transportation technology at Ohio University, 1980 --- general aviation aircraft and navigation aids
p0371 N81-22005

General aviation airplane fuel economy system model
p0372 N81-22011

An investigation of two safe escape from base flight profiles
[AD-A096571] p0373 N81-22034

Quiet Clean General Aviation Turbofan (QCGAT) technology study, volume 1
[NASA-CR-164222] p0376 N81-22052

General Aviation Activity and Avionics Survey
[AD-A097604] p0389 N81-23081

Engine isolation for structural-borne interior noise reduction in a general aviation aircraft
[NASA-CR-3427] p0446 N81-25766

Safety report: The status of general aviation aircraft crashworthiness
[PB81-160798] p0484 N81-26084

Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107

Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] p0636 N81-33174

GENERAL AVIATION WHITCOMB AIRFOIL
U GAW-2 AIRFOIL

GENERAL DYNAMICS AIRCRAFT
NT B-58 AIRCRAFT
NT CANADAIR AIRCRAFT
NT F-106 AIRCRAFT
NT F-111 AIRCRAFT

Aircraft quality assurance using close-range photogrammetry
p0358 A81-32508

A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064

GENERAL DYNAMICS MILITARY AIRCRAFT
U GENERAL DYNAMICS AIRCRAFT
U MILITARY AIRCRAFT

GENERATORS
Recent improvements on generating voltmeters
[DOE/ER-01388/463] p0257 N81-18359

GEOCENTRIC COORDINATES
The role of the earth's shape in navigation - An example
p0614 A81-48120

GEODESY
The role of the earth's shape in navigation - An example
p0614 A81-48120

Seasat altimeter height calibration --- related to sea surface heights near bermuda
[NASA-TM-82040] p0279 N81-19526

GEOGRAPHY
NT OROGRAPHY

GEOIDS
The role of the earth's shape in navigation - An example
p0614 A81-48120

GEOLOGY
NT OROGRAPHY

GEOMETRICAL HYDROMAGNETICS
U MAGNETOHYDRODYNAMICS

GEOMETRICAL OPTICS
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] p0618 A81-48602

GEOMETRY
NT ANGLE OF ATTACK
NT ANGLES (GEOMETRY)
NT CARTESIAN COORDINATES
NT ELEVATION ANGLE
NT FLOW GEOMETRY
NT LEADING EDGE SWEEP
NT NOZZLE GEOMETRY
NT SWEEP ANGLE
NT TENSOR ANALYSIS
NT TOPOLOGY
NT VECTOR ANALYSIS
NT VORTICITY

GEOSTATIONARY SATELLITES
U SYNCHRONOUS SATELLITES

GERDIEN ARC HEATERS
U ARC HEATING

GERMANY
Certification procedure for military engines in Germany
p0429 N81-24074

GIMBALS
A single gimbal/strapdown inertial navigation system for use on spin stabilized flight test vehicles
[SAND-80-2479C] p0193 N81-16037

Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1] p0375 N81-22048

GLASS
NT GLASS FIBERS

GLASS FIBER REINFORCED PLASTICS
Fatigue damage mechanisms in composite materials - A review
p0003 A81-10747

Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873

The Windecker Eagle - A new era in general aviation aircraft manufacturing
p0240 A81-26747

Fatigue strength of certain materials used in airframe construction --- glass-plastic reinforced epoxy resin
p0285 A81-28109

Manufacturing technology for aircraft structural components made of carbon-fiber reinforced plastics
p0449 A81-37637

An investigation of the liquid impact properties of a GFRP radome material
p0457 A81-38571

Quality assurance of an epoxy resin prepreg using
HPLC
p0531 A81-43642
Composite applications on Boeing commercial aircraft
p0557 A81-44341
Fiberglass-reinforced rigid polyurethane expedient
pavement subject to simulated F-4 aircraft traffic
[AD-A089266] p0030 N81-10079
Use of composite materials for helicopter rotor
blades --- glass fiber reinforced epoxy
[CSIR-ME-1674] p0550 N81-29167
GLASS FIBERS
Vanadium trineodecanoate promoter for
fiberglass-polyester soil surfacings
[AD-A091785] p0132 N81-14084
GLAUERT COEFFICIENT
U AERODYNAMIC FORCES
U MACH NUMBER
GLIDE ANGLES
U GLIDE PATHS
GLIDE LANDINGS
Application of endfire arrays at contemporary
glide-slope problem sites
p0360 A81-32695
GLIDE PATHS
NASA/FAA flight-test investigation of helicopter
microwave landing system approaches
[AHS 80-55] p0478 A81-40180
Engineering approaches for cost savings with ILS
glide-slope installations
p0516 A81-42431
An analytical study of landing flare
[DFVLR-FB-79-40] p0027 N81-10062
Glideslope descent-rate cuing to aid carrier
landings
[AD-A092193] p0192 N81-16033
Functional analysis and operational assessment of
an onboard glide path guidance system for visual
approaches (visual approach monitor VAM)
[ESA-TT-655] p0373 N81-22038
Application of variable structure system theory to
aircraft flight control --- AV-8A and the
Augmentor Wing Jet STOL Research Aircraft
[NASA-CR-164321] p0391 N81-23093
GLIDE SLOPES
U GLIDE PATHS
GLIDERS
NT BOOSTGLIDE VEHICLES
NT HANG GLIDERS
The technical contributions of the Wright brothers
to aviation
p0058 A81-14388
In-flight research - At low cost
p0299 A81-29208
Global optimization of a glider
[AAAF PAPER NT 80-36] p0369 A81-33937
Free flight research at Lockheed-Georgia
[SAE PAPER 810567] p0518 A81-42732
From paleoaeronautics to altostratus - A technical
history of soaring
[AIAA PAPER 81-1611] p0533 A81-43933
Bird flight and airplane flight --- instruments to
measure air currents and flight characteristics
[NASA-TM-75777] p0138 N81-14562
Flow phenomena along fuselages and wing-fuselage
systems of gliders
[NASA-TM-75401] p0186 N81-15983
flight data recording and data processing for
light airplanes and gliders
p0328 N81-20008
Analytical study of the cruise performance of a
class of remotely piloted, microwave-powered,
high-altitude airplane platforms
[NASA-TM-81969] p0374 N81-22040
Investigative technical measurements of the
planetary boundary layer made onboard an
instrumented motorized glider
[REPT-149] p0379 N81-22666
Composite structural materials
[NASA-CR-164634] p0541 N81-28176
GLOBAL AIR SAMPLING PROGRAM
Ozone contamination in aircraft cabins - Results
from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20740
Tabulations of ambient ozone data obtained by GASP
airliners, March 1975 to December 1977
[NASA-TM-81528] p0096 N81-13568
Analysis of atmospheric ozone levels at commercial
airplane cruise altitudes in winter and spring,
1976 - 1977 --- Global Atmospheric Sampling
Program
[NASA-TP-1807] p0345 N81-21685
GLOBAL ATMOSPHERIC RESEARCH PROGRAM
Ozone contamination in aircraft cabins: Results
from GASP data and analyses
[NASA-TM-81671] p0191 N81-16021
GLOBAL POSITIONING SYSTEM
The use of satellite systems for communication
p0051 A81-13310
Geometric dilution of precision in Global
Positioning System navigation
p0115 A81-18100
Characteristics of NAVSTAR user stations
p0121 A81-19425
The Global Positioning System versus gravity
disturbance modeling in an inertial navigation
system --- error reduction at aircraft altitude
[AIAA PAPER 81-0087] p0160 A81-20591
Air traffic control and position location by
satellite constellation in equatorial orbit
p0173 A81-21912
GPS receiver simulation
p0173 A81-21913
Civil aviation applications of Navstar/GPS through
differential techniques
p0177 A81-22374
Synergistic benefits of fully integrating JTIDS
and GPS --- Joint Tactical Information
Distribution System and Global Positioning System
p0323 A81-30311
GPS Navstar, the universal positioning system of
the future
p0349 A81-30975
Perspectives on the civil utilization of the
Navstar/GPS
p0409 A81-35023
Status report - Global Positioning System
p0511 A81-41752
Optimal processing of GPS signals
p0512 A81-41761
Navstar field test results
p0404 N81-26100
Rapid alignment of aircraft strapdown inertial
navigation systems using Navstar Global
Positioning System (GPS)
p0405 N81-26107
Navstar GPS receiver for satellite applications
p0405 N81-26111
Feasibility of collision warning, precision
approach and landing using GPS, volume 1
[NASA-CR-165675] p0537 N81-28070
GLYCOLS
Icing tunnel tests of a glycol-exuding porous
leading edge ice protection system on a general
aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20837
Icing tunnel tests of a glycol-exuding porous
leading edge ice protection system on a general
aviation airfoil
[NASA-CR-164377] p0439 N81-25041
GOGGLES
Helicopter cockpit design for night goggle
compatibility
p0472 A81-40120
GONDOLAS
Helicopter External Gondola System
p0576 A81-46642
GOVERNMENT PROCUREMENT
C-X - A case for scenario-oriented requirements
--- new long-range military transport program
[AIAA PAPER 81-1690] p0527 A81-43159
GOVERNMENT/INDUSTRY RELATIONS
The federal role in airport noise control planning
p0113 A81-18073
Federal policies affecting airport noise
compatibility programs
[AIAA PAPER 81-0829] p0367 A81-33079
Perspectives on the civil utilization of the
Navstar/GPS
p0409 A81-35023
EPA proposed national strategy for further
reduction of aviation noise
p0567 A81-46353
Airport noise control in the 1980s - FAA's plans
and policies
p0568 A81-46355
An assessment of General Aviation utilization of
advanced avionics technology

[NASA-CR-159328] p0127 N81-13941
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 U81-20046
Aerospace in the future
[NASA-TM-82664] p0543 N81-29063
GRADIENTS
NT PRESSURE GRADIENTS
NT TEMPERATURE GRADIENTS
An improved potential gradient method to calculate airloads on oscillating supersonic interfering surfaces
[AIAA 81-0646] p0307 A81-29499
Finite-difference gradients versus error-quadrature gradients in the solution of parameterized optimal control problems
p0421 A81-37568
GRADUATION
U CALIBRATING
GRAPH THEORY
Control system design using graphical decomposition techniques
p0410 A81-35567
GRAPHITE
Graphite thermoplastic YC-14 outboard elevator
p0530 A81-43631
Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22106
GRAPHITE-EPOXY COMPOSITE MATERIALS
Design and fabrication of stabilized organic matrix composites
p0005 A81-11338
Design and test of a graphite-epoxy composite A-10 slat
p0006 A81-11339
AV-8B composite fuselage design
[AIAA PAPER 81-0232] p0162 A81-20690
Effect of impact damage on the XFV-12A composite wing box
p0182 A81-22676
Bolt bearing strengths of graphite/epoxy laminates
[AIAA 81-0544] p0301 A81-29396
Sonic fatigue design techniques for graphite-epoxy stiffened-skin panels
[AIAA 81-0633] p0305 A81-29488
Concepts for improving the damage tolerance of composite compression panels
p0360 A81-32825
Advanced graphite composites in the 757/767
[SAE PAPER 801212] p0404 A81-34220
Design, fabrication and test of a complex helicopter airframe section
[SAE PAPER 801213] p0404 A81-34221
Fatigue of fibrous composite materials; Proceedings of the Symposium, San Francisco, Calif., May 22, 23, 1979
p0418 A81-37126
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers
p0418 A81-37136
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate
p0418 A81-37137
A hybrid composite horizontal stabilizer for the XH-2/CCR Flight Demonstrator Aircraft
[AHS 80-35] p0476 A81-40164
Model 206L composite vertical fin
[AHS 80-34] p0478 A81-40175
On certification of composite structures for USAF aircraft
[AIAA PAPER 81-1686] p0527 A81-43158
S-3A composite spoilers service experience
p0529 A81-43615
Development of graphite-epoxy covers for L-1011 advanced composite vertical fin
p0530 A81-43627
Advanced composite applications in McDonnell Dougals commercial transport aircraft
p0530 A81-43628
Development of repair procedures for graphite/epoxy structures on commercial transports
p0531 A81-43645
Manufacturing the F-16 composite horizontal tail
p0531 A81-43646
Composite applications on Boeing commercial aircraft
p0557 A81-44341
EF-111A graphite/epoxy Horizontal Stabilizer Trailing Edge
p0557 A81-44342
Maintenance and repair of advanced composite structure
p0558 A81-44382
Composite repair concepts for depot level use
p0558 A81-44384
Developing design allowables for composite helicopter structures
p0611 A81-47811
Cost-effective mechanical property characterization
p0612 A81-47813
The Lear Fan 2100
p0625 A81-49975
Development of advanced interceptor substructural material --- graphite epoxy missile structures
[AD-A090127] p0038 N81-11116
Fiber release from impacted graphite reinforced epoxy composites
[NASA-CR-163684] p0038 N81-11117
Microcracking in graphite-epoxy composites
[AD-A089894] p0038 N81-11118
Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover
[AD-A090049] p0039 N81-11120
Effect of service environment on composite materials
[AGARD-CP-288] p0039 N81-11128
Effect of various environmental conditions on polymer matrix composites
p0039 N81-11130
Predictability of moisture absorption in graphite/epoxy sandwich panels
p0039 N81-11131
Graphite-epoxy panel compression strength reduction due to local impact
p0040 N81-11139
Lightning protection considerations for graphite/epoxy aircraft structure
p0040 N81-11142
US Navy service experience with advanced composites --- in aircraft composite structures
p0041 N81-11149
Electromagnetic integration of composite structure in aircraft
p0200 N81-16159
Assessment of risk to Boeing commerical transport aircraft from carbon fibers --- fiber release from graphite/epxoy materials
[NASA-CR-159211] p0218 N81-17171
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin systems
[NASA-CR-152292] p0218 N81-17175
An assessment of buffer strips for improving damage tolerance
p0247 N81-18009
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-159362] p0343 N81-21131
Manufacturing development of DC-10 advanced rudder
[NASA-CR-159060] p0494 N81-27077
Aeroelastic flutter and divergence of graphite/epoxy cantilevered plates with bending-torsion stiffness coupling
[AD-A101726] p0587 N81-30476
GRAPHITE-POLYIMIDE COMPOSITES
Development program for a graphite/PMR 15 polyimide duct for the F404 engine
p0181 A81-22647
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines
[AIAA PAPER 81-1358] p0625 A81-49976
Design, fabrication and test of graphite/polyimide composite joints and attachments for advanced aerospace vehicles
[NASA-CR-159112] p0194 N81-16042
GRAPHS (CHARTS)
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Charts for determining potential minimum sonic-boom overpressures for supersonic cruise

aircraft
[NASA-TP-1820] p0337 N81-21016

GRASSMANN ALGEBRA
U VECTOR SPACES

GRAVIMETRY
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements
[ESA-TT-625] p0197 N81-16069

GRAVITATION
The NASA digital VGH program, early results --- structural design criteria
p0268 N81-19069

GRAVITATIONAL EFFECTS
The Global Positioning System versus gravity disturbance modeling in an inertial navigation system --- error reduction at aircraft altitude
[AIAA PAPER 81-0087] p0160 A81-20591
Physiological effects of high-G flight - Their impact on flight simulator design
[AIAA 81-0986] p0416 A81-36573

GRAVITY
U GRAVITATION

GREAT LAKES (NORTH AMERICA)
NT LAKE ERIE

GREEN FUNCTION
A wall interference analysis --- in wind tunnels
p0104 A81-17472

GREEN THEOREM
U GREEN FUNCTION

GRIDS
Conforming element with out-element nodes
p0225 A81-23855
An investigation into grid patching techniques
p0137 N81-14708

GRINDING MACHINES
Computerized gear grinding system development
[AHS 80-48] p0476 A81-40163

GROOVES
NT V GROOVES

GROUND BASED CONTROL
NT AIR TRAFFIC CONTROL
NT RADAR APPROACH CONTROL
The role of aircraft separation assurance in the cockpit
p0115 A81-18092
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882
An integrated Omega/satellite radio navigation system
p0566 A81-45767
A supplementary EMC analysis of the proposed Airport Surface Detection Equipment (ASDE-3) radar
[AD-A092965] p0219 N81-17342
A flight investigation of the ultra-deep-stall descent and spin recovery characteristics of a 1/6 scale radiocontrolled model of the Piper PA38 Tomahawk
[NASA-CR-156871] p0343 N81-21084
Results of a feasibility study for determining the yaw angle of a landing aircraft
[AD-A099765] p0495 N81-27084

GROUND EFFECT
Assessment of ground effects on the propagation of aircraft noise: The T-38A flight experiment
[NASA-TP-1747] p0137 N81-14708
The velocity induced by the wake of a wind turbine in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985
Some wake-related operational limitations of rotorcraft
[NASA-TM-81920] p0186 N81-15985
An engineering method for estimating the induced lift on V/STOL aircraft hovering in and out of ground effect
[AD-A098509] p0441 N81-25069
The criticality of engine exhaust simulations on VSTOL model-measured ground effects
p0486 N81-26115

GROUND EFFECT (AERODYNAMICS)
Longitudinal motion of low-flying vehicles in nonlinear flowfields
p0009 A81-11626
Experiments on the validity of ground effect predictions for static noise testing of propeller aircraft
p0054 A81-13811
Determination of the effect of transverse cutouts on the hydrodynamic characteristics of a finite-span wing in the case of steady and unsteady motion near a wall
p0119 A81-19335
Experimental investigation of a right angle wing with partially separated flow with and without ground effects
[DGLR PAPER 80-111] p0120 A81-19397
Numerical calculation of jet-induced ground effect in VTOL
[AIAA PAPER 81-0015] p0157 A81-20539
Unsteady subsonic motion of a wing near a screen
p0225 A81-23889
Experimental investigations of the base pressures found on a bluff body in ground effect
p0234 A81-25379
Steady flow and static stability of airfoils in extreme ground effect
p0355 A81-31686
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
p0470 A81-40111
Vertical momentum of the fountain produced by multijet vertical impingement on a flat ground plane
p0529 A81-43396
Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] p0620 A81-48630
Investigation of impingement region and wall jets formed by the interaction of high aspect ratio lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
A theoretical investigation of ground effects on USB configurations
[NASA-CR-159005] p0262 N81-19021
Analytical study of STOL Aircraft in ground effect. Part 1: Nonplanar, nonlinear wing/jet lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096
Analytical study of STOL Aircraft in ground effect. Part 2: Nonplanar, nonlinear method applicable to three dimensional jets of finite thickness
[NASA-CR-152088-PT-2] p0271 N81-19097
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] p0627 N81-32119

GROUND EFFECT (COMMUNICATIONS)
Application of endfire arrays at contemporary glide-slope problem sites
p0360 A81-32695

GROUND EFFECT MACHINES
Noise control design problems on air cushion vehicles and surface effect ships
p0017 A81-11818
On the inter-relationship of the basic parameters and characteristics of various flight vehicles
p0236 A81-25694
Systems costing of hovercraft, hydrofoils and wing-in-ground effect machines. III
p0412 A81-35724
Soviet military air cushion vehicles - Mechanized amphibious assault
p0577 A81-46714
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401
Heave instabilities of amphibious air cushion suspension systems
[UTIAS-246] p0144 N81-15156

GROUND HANDLING
Carrier system simplifies freight handling - A new technical concept for Lufthansa's Frankfurt facility
p0056 A81-14241
Recent progress toward predicting aircraft ground handling performance
p0268 N81-19068

GROUND SPEED
Longitudinal instability in braked landing gear
[ASME PAPER 80-WA/DSC-12] p0170 A81-21083
Airborne ground velocity determination by digital processing of electro-optical line sensor signals
p0358 A81-32496
Groundspeed/airspeed differences as a wind shear indicator and flight evaluation of a DME-derived

system to determine groundspeed
[AD-A097566] p0393 N81-23768
GROUND STATIONS
Omega station 10.2 kHz signal coverage prediction diagrams
p0512 A81-41760
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams
[AD-A092742] p0192 N81-16031
GROUND SUPPORT EQUIPMENT
Characteristics of NAVSTAR user stations
p0121 A81-19425
Rebuild of aircraft ground support equipment
[SAE PAPER 801238] p0406 A81-34236
Aircraft ground mobility system for the F-16 aircraft
[AIAA PAPER 81-1735] p0536 A81-43960
Simulation model to evaluate maintenance strategies for large network of fielded systems
p0613 A81-48009
Airport Crash/Fire/Rescue CFR service cost and benefit analysis. Volume 2: Appendixes
[AD-A091155] p0094 N81-13069
Observing lightning from ground-based and airborne stations
p0136 N81-14566
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048
Wallops severe storms measurement capability
p0266 N81-19049
GROUND SUPPORT SYSTEMS
Air Force Integration Support Facilities - Their total utility
p0320 A81-30240
GROUND TESTS
NT COLD FLOW TESTS
NT STATIC FIRING
Ground testing of aircraft antistatic protection
[ONERA, TP NO. 1980-126] p0015 A81-11674
SAFEST computer simulation of ejection seat performance
p0175 A81-22089
An approach to ramjet trajectory simulation test
p0292 A81-29065
Your next ground vibration test doesn't have to cost a million dollars
[AIAA 81-0529] p0303 A81-29450
The USAF Armament Division Structural Dynamics Lab
p0347 A81-30689
Aerodynamic trials with the linear motor-driven platform at the Toulouse Aeronautic Testing Center --- for aircraft acceleration and deceleration tests
[AAAF PAPER NT 80-41] p0369 A81-33943
Tests for inlet distortion in a two-spool turbojet engine on the ground test bed
p0419 A81-37340
Image stabilization techniques for long range reconnaissance camera
p0462 A81-39436
Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39898
A compact installation for testing vectored-thrust engines
[AIAA PAPER 81-1592] p0508 A81-40967
In flight direct strike lightning research --- Using an F-106B Aircraft
p0259 N81-19005
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079
Onboard and ground test of an autonomous navigation system based on terrain correlation
p0544 N81-29069
Methods of testing aircraft performance under icing conditions and ice tection systems
p0545 N81-29083
GROUND WIND
Wind shear systems implementation plan, benefit/cost study
[AD-A094168] p0253 N81-18055
GROUND-AIR-GROUND COMMUNICATIONS
Automating airborne company communications
p0112 A81-18064
Problems of voice communication in helicopters
p0151 A81-20074
Bilingual air traffic control in Canada
p0169 A81-20915
Potential effects of the introduction of the discrete address beacon system data link on air/ground information transfer problems
[NASA-CR-166165] p0373 N81-22037
Impact of low altitude coverage requirements on air-ground communications
[AD-A101642] p0586 N81-30338
Information transfer problems in the aviation system
[NASA-TP-1875] p0594 N81-31162
Dimensions of the information transfer problem --- human performance
p0594 N81-31163
Information transfer in the surface component of the system: Coordination problems in air traffic control
p0594 N81-31165
Information transfer between air traffic control and aircraft: Communication problems in flight operations
p0595 N81-31166
Information transfer during contingency operations: Emergency air-ground communications
p0595 N81-31168
The information transfer problem summary and comments
p0595 N81-31169
GROWTH
NT DIRECTIONAL SOLIDIFICATION (CRYSTALS)
GRUMMAN AIRCRAFT
NT A-6 AIRCRAFT
NT F-14 AIRCRAFT
NT F-111 AIRCRAFT
Development and certification of the Gulfstream III
p0100 A81-16587
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design --- Book
p0101 A81-16720
GUIDANCE (MOTION)
NT AIRCRAFT GUIDANCE
NT COMMAND GUIDANCE
NT INERTIAL GUIDANCE
NT MAP MATCHING GUIDANCE
NT STRAPDOWN INERTIAL GUIDANCE
NT TERMINAL GUIDANCE
Aerodynamic effects of body slots on a guided projectile with cruciform surfaces
[AIAA PAPER 79-1658] p0066 A81-15887
Control, navigation, and guidance --- of aircraft
[AIAA PAPER 81-0859] p0362 A81-32910
GUIDANCE SENSORS
Simulation of a third-order vertical channel mechanization --- for airplane inertial navigation
p0322 A81-30290
Orientation of measurement sensors for optimum end-of-life performance
p0360 A81-32697
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135
Low-speed wind-tunnel tests of two weathercocking sensors
[WSRL-0171-TM] p0136 N81-14575
Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1] p0375 N81-22048
GUIDE VANES
NT JET VANES
Particle dynamics of inlet flow fields with swirling vanes
[AIAA PAPER 81-0001] p0156 A81-20526
Design, durability and low cost processing technology for composite fan exit guide vanes
p0182 A81-22664
Experimental determination of the circumferential drift of edge wakes of guide vanes in a turbine stage
p0466 A81-40022
Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906

GULF OF MEXICO
Proposed ATC system for the Gulf of Mexico: Helicopter operations development program [AD-A089430] p0025 N81-10036
Production of LORAN-C reliability diagrams at the Defense Mapping Agency [AD-A093749] p0206 N81-17028
GULFS
NT GULF OF MEXICO
GUMBEL THEORY
U RANGE (EXTREMES)
GUN LAUNCHERS
High impulse gun airborne demonstration. GAU-13/A weapon, feed system, gun drive and electronic controls [AD-A101698] p0582 N81-30120
GUN TURRETS
A study in flow control and screening methods for aircraft laser turrets [AD-A101723] p0548 N81-29120
GUNS (ORDNANCE)
Origins of inertial navigation p0567 A81-46276
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage [AD-A098533] p0442 N81-25071
Air-to-air gunnery systems test and evaluation p0544 N81-29073
Gun harmonisation using the sector acoustic miss distance indicator p0544 N81-29074
High impulse gun airborne demonstration. GAU-13/A weapon, feed system, gun drive and electronic controls [AD-A101698] p0582 N81-30120
GUST ALLEVIATORS
OLGA, a gust alleviation system for improvement of passenger comfort of general aviation aircraft p0008 A81-11620
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology --- Linear Quadratic Gaussian [AIAA PAPER 81-0021] p0158 A81-20544
Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3 p0172 A81-21739
Active controls for civil aircraft p0228 A81-24070
Gust response of rotary wing aircraft and its alleviation p0465 A81-39900
Gust response of rotary wing and its alleviation p0473 A81-40135
Helicopter gust alleviation - An optimal sampled-data approach [AHS 80-31] p0476 A81-40161
Active controls for flutter suppression and gust alleviation in supersonic aircraft --- YF-17 flutter model [NASA-CR-163934] p0216 N81-17097
Design for active and passive flutter suppression and gust alleviation p0253 N81-18063
Some experiences with active control of aeroelastic response [NASA-TM-83179] p0587 N81-30469
GUST LOADS
Wind shear detection from PCM-recorded MLS-flight data p0015 A81-11675
Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures p0232 A81-24942
Analysis of the influence of atmospheric turbulence on alternating bending stress level in helicopter main rotor blades p0236 A81-25690
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane [AIAA 81-0650] p0307 A81-29503
Gust response of rotary wing aircraft and its alleviation p0465 A81-39900
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts [DGLR PAPER 81-065A] p0608 A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range [DGLR PAPER 81-065B] p0608 A81-47553
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum [NLR-MP-80003-U] p0086 N81-12477
Aviation meteorology research and development: A status report p0135 N81-14557
The NASA digital VGH program, early results --- structural design criteria p0268 N81-19069
Experimental and analytical study on the flutter and gust response characteristics of a torsion-free-wing airplane model --- in the Langley transonic dynamics tunnel [NASA-CR-159283] p0340 N81-21059
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion free wing airplane [NASA-TM-81961] p0388 N81-23072
GUSTS
Modelling of gusts and wind shear for aircraft assessment and certification p0528 A81-43376
The turbulent wind and its effect on flight [UTIAS-REVIEW-44] p0033 N81-11020
Clear air turbulence: Historical comments p0136 N81-14562
GYRATION
NT AUTOROTATION
NT ROTATION
GYRO HORIZONS
Exact solutions of the equations of motion of a gyro horizon compass p0290 A81-29001
GYROCOMPASSES
Exact solutions of the equations of motion of a gyro horizon compass p0290 A81-29001
Gyrocompasses. Citations from the International Aerospace Abstracts data base [NASA-CR-163675] p0028 N81-10065
GYROPLANES
U HELICOPTERS
GYROS
U GYROSCOPES
GYROSCOPES
NT GYRO HORIZONS
NT GYROCOMPASSES
NT GYROSCOPIC PENDULUMS
NT GYROSTABILIZERS
NT LASER GYROSCOPES
NT OPTICAL GYROSCOPES
NT ROTARY GYROSCOPES
Dynamically tunable, dry gyroscope in aeronautics and astronautics p0452 A81-37655
Acoustic spectrum analysis for gyro bearings [AIAA PAPER 81-1616] p0524 A81-43128
Origins of inertial navigation p0567 A81-46276
Ring laser gyro [AD-A090643] p0085 N81-12395
Evaluation/redesign of the F-105 pitch rate gyro pack [AD-A092109] p0194 N81-16048
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros p0484 N81-26092
Flight test results of an advanced development model Ring Laser Gyro Navigator (RLGN) p0485 N81-26103
GYROSCOPIC COUPLING
Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports p0228 A81-24089
GYROSCOPIC DRIFT
U GYROSCOPES
U GYROSCOPIC STABILITY
GYROSCOPIC PENDULUMS
Choice of optimal parameters of a gyrovertical on the basis of a standard program p0622 A81-48744

GYROSCOPIC STABILITY
Roll stabilization of flight vehicles by means of rollerons p0290 A81-29016
NAPC gyroscopic moment test facility [AIAA PAPER 81-1480] p0506 A81-40900
GYROSTABILIZERS
Gyrostabilizers for inertial control systems --- Russian book p0017 A81-12024
Synthesis of gyrostabilizer state evaluation system under unknown perturbations p0299 A81-29311
Aircraft body-axis rotation measurement system [NASA-CASE-FRC-11043-1] p0375 N81-22048
GYROSTATS
U GYROSCOPES

H

H-53 HELICOPTER
CH-53E combat survivability assessment and survivability enhancement program [SAWE PAPER 1384] p0354 A81-31400
CH-53 Helicopter Night Vision System simulation experiments p0573 A81-46617
A mathematical model of the CH-53 helicopter [NASA-TM-81238] p0075 N81-12065
CH-53E emergency flotation system design study [AD-A101640] p0548 N81-29124
HAIL
Operational radar display of the structure of thunderstorm hail clouds p0069 A81-16474
HAILSTONES
U HAIL
HAIR
The influence of beards on the efficiency of aviators' oxygen masks p0176 A81-22100
HALIDES
NT FLUORIDES
HALL COEFFICIENT
U HALL EFFECT
HALL CURRENTS
U HALL EFFECT
HALL EFFECT
Aircraft multi-bus electrical system using a Hall-effect sensing device [SAE PAPER 810569] p0519 A81-42734
HALOCARBONS
NT FLUOROCARBONS
HALOGEN COMPOUNDS
NT FLUORIDES
NT FLUOROCARBONS
NT POLYTETRAFLUOROETHYLENE
HAMBURGER AIRCRAFT
NT HFB-320 AIRCRAFT
HAMBURGER HFB-320 AIRCRAFT
U HFB-320 AIRCRAFT
HANDBOOKS
NT USER MANUALS (COMPUTER PROGRAMS)
Airborne Systems Software Acquisition Engineering Guidebook for application and use of the guidebooks (series overview) [AD-A100216] p0543 N81-28787
Digital spectral analysis: A guide based on experience with aircraft vibration [RAE-TR-81014] p0605 N81-31588
HANDLING EQUIPMENT
Carrier system simplifies freight handling - A new technical concept for Lufthansa's Frankfurt facility p0056 A81-14241
The future of airfreight - NASA study looks into the next century p0056 A81-14242
HANDLING QUALITIES
U CONTROLLABILITY
HANG GLIDERS
Cygnet - A canard configuration powered ultralight aircraft p0231 A81-24746
Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope --- wind tunnel tests for flight characteristics [ESA-TT-634] p0339 N81-21046
The development of the secondary wing structure for a rigid wing hang glider --- sandwich structure techniques [BU-251] p0375 N81-22046
Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results --- Ames 7- by 10-ft wind tunnel tests [NASA-TM-81269] p0423 N81-24025
HANGARS
A comparison between electric field strengths similarly generated and measured in the open air, in a shielded enclosure and in a large aircraft hangar, over frequency range 10 to 110 MHz [RSRE-MEMO-3248] p0084 N81-12353
HARDENING (MATERIALS)
NT HOT PRESSING
NT SHOT PEENING
NT STRAIN HARDENING
NT WORK HARDENING
HARDNESS
Superhard transparent coating optimization program [AD-A091083] p0092 N81-13048
HARDWARE
The necessity of 'testing-in' hardware reliability p0229 A81-24277
HARMONIC ANALYSIS
Coupled rotor/airframe vibration analysis by a combined harmonic-balance, impedance-matching method [AHS 80-21] p0474 A81-40151
A pure direct force/moment control for coaxial counterrotating rotors p0144 N81-15007
HARMONIC EXCITATION
Periodically stiffened fluid-loaded plates. I - Response to convected harmonic pressure and free wave propagation. II - Response to line and point forces p0102 A81-17067
HARMONIC MOTION
Unsteady airloads on a harmonically pitching wing with external store [NLR-MP-80004-U] p0330 N81-20038
HARMONIC OSCILLATION
Harmonically oscillating airfoil in transonic stream of air p0054 A81-13753
Experimental investigations on a harmonically swinging trail edge flap with a space [DGLR PAPER 80-029] p0055 A81-13925
Influence of hinge line gap on aerodynamic forces acting on a harmonically oscillating thin profile in an incompressible flow. I, II p0348 A81-30956
Measurement of the aerodynamic forces acting on a harmonically oscillating wing at high subsonic speeds p0349 A81-31042
Oscillating airfoils in shock-free transonic flows p0410 A81-35026
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade [NASA-CR-165166] p0140 N81-14976
HARMONICS
NT HARMONIC EXCITATION
NT HARMONIC OSCILLATION
Optimal higher harmonic blade pitch control for minimum vibration of a hinged rotor p0473 A81-40134
HARNESSES
General aviation aircraft rear-seated occupant protection - Shoulder restraints in rear seats [AIAA PAPER 81-1669] p0534 A81-43944
Airborne-fiber optics manufacturing technology, aircraft installation processes [AD-A093304] p0221 N81-17902
Evaluation of AFTI/F-16 restraint concepts in the + or - 2Gy environment [AD-A094323] p0249 N81-18034
HARRIER AIRCRAFT
The role of flight simulation in the design and development of the Sea Harrier Nav-Attack System p0010 A81-11635
Industry proposes supersonic V/STOL p0122 A81-15490
AV-8B composite fuselage design [AIAA PAPER 81-0232] p0162 A81-20690

Technology pays off on the AV-8B p0291 A81-29060
AV-8B operational features for rapid deployment [SAE PAPER 801228] p0405 A81-34231
History of the Pegasus vectored thrust engine p0411 A81-35630
Application of variable structure system theory to aircraft flight control --- AV-8A and the Augmentor Wing Jet STOL Research Aircraft [NASA-CR-164321] p0391 N81-23093
Transition and conversion trim-maps for the AV-8A VTOL aircraft [AD-A102155] p0596 N81-31188
Ten years of US Marine Corps Harrier operations p0632 N81-33140
HAWKER SIDDELEY AIRCRAFT
NT DH 121 AIRCRAFT
NT DH 125 AIRCRAFT
NT HARRIER AIRCRAFT
HAZARDS
NT AIRCRAFT HAZARDS
NT FLIGHT HAZARDS
NT OPERATIONAL HAZARDS
NT TOXIC HAZARDS
A probabilistic analysis of electrical equipment vulnerability to carbon fibers [NASA-TM-80217] p0038 N81-11113
High-voltage spark carbon-fiber sticky-tape data analyzer [NASA-CR-163747] p0087 N81-12646
HC-1 HELICOPTER
U CH-47 HELICOPTER
HEAD-UP DISPLAYS
Head-up displays. III p0005 A81-11320
Head-Up-Display flight tests p0099 A81-16582
The flying hologram - Latest in head-up display systems p0123 A81-19500
A head-up display for low-visibility approach and landing [AIAA PAPER 81-0130] p0161 A81-20623
Head up displays p0286 A81-28296
Evaluation of several control/display concepts for V/STOL shipboard landing [SAE PAPER 801205] p0403 A81-34213
Aiming computation for fighter weapon aiming system p0480 A81-40448
Civil head-up displays - Coming up fast p0625 A81-49973
Head up displays. Citations from the NTIS data base [PB80-809064] p0026 N81-10050
Operational problems associated with head-up displays during instrument flight [AD-A092992] p0210 N81-17058
A head-up display format for transport aircraft approach and landing p0265 N81-19043
An evaluation of head-up displays in civil transport operations p0265 N81-19044
System safety program report MK 1 MOD 0 LSO HUD console system [AD-A095009] p0269 N81-19080
Functional analysis and operational assessment of an onboard glide path guidance system for visual approaches (visual approach monitor VAM) [ESA-TT-655] p0373 N81-22038
The effects of various fidelity factors on simulated helicopter hover [AD-A102028] p0601 N81-31232
HEADSETS
U EARPHONES
HEALTH
NT MENTAL HEALTH
HEARING
NT ACOUSTIC FATIGUE
The background and bases for the proposed military standard on acoustical noise limits in helicopters [AD-A099814] p0500 N81-27890
HEARING LOSS
U AUDITORY DEFECTS
HEAT BALANCE
An analysis of thermal balance in the cooled cabin of a Sea King Helicopter [AD-A097199] p0389 N81-23077
HEAT CAPACITY
U SPECIFIC HEAT
HEAT DISSIPATION
U COOLING
HEAT DISSIPATION CHILLING
U COOLING
HEAT EFFECTS
U TEMPERATURE EFFECTS
HEAT EQUATIONS
U THERMODYNAMICS
HEAT EXCHANGERS
New developments in compact plate-fin heat exchangers p0613 A81-48062
Improved ceramic heat exchanger materials [NASA-CR-159678] p0132 N81-14082
HEAT FLUX
Measurement of heat flux and pressure in a turbine stage [ASME PAPER 81-GT-88] p0314 A81-29995
Computation of wall temperature and heat flux distributions of the film cooled walls p0340 A81-30802
HEAT GAIN
U HEATING
HEAT GENERATION
Heat generation in aircraft tires under free rolling conditions [NASA-CR-164273] p0393 N81-23461
HEAT ISLANDS
Unrepresentative temperatures at a first-order meteorological station Washington National Airport p0622 A81-46047
HEAT MEASUREMENT
Measurement of heat flux and pressure in a turbine stage [ASME PAPER 81-GT-88] p0314 A81-29995
HEAT PIPES
Heat pipe avionic cooling p0326 A81-30343
Heat pipe solar receiver with thermal energy storage p0583 N81-30532
HEAT PUMPS
Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft p0281 A81-27364
Cooling system for high speed aircraft [NASA-CASE-LAR-12406-1] p0485 N81-26114
HEAT REGULATION
U TEMPERATURE CONTROL
HEAT RESISTANCE
U THERMAL RESISTANCE
HEAT RESISTANT ALLOYS
NT RENE 77
Recent selected papers of Northwestern Polytechnical University. Parts 1 & 2 --- Book p0107 A81-17801
Progress in P/M superalloy and titanium for aircraft applications p0181 A81-22641
Low cycle fatigue of Rene 77 at elevated temperatures p0289 A81-28989
High temperature metal matrix composites for gas turbines p0295 A81-29090
Mechanical properties of aluminum coatings on heat-resistant steels p0355 A81-31668
New method for cast superalloy frames - Segmented mold and HIP utilized p0408 A81-34693
High-temperature strength of alloys for gas turbine engines --- Russian book p0482 A81-40616
Use of segmented mold process to produce large superalloy engine castings [AIAA PAPER 81-1404] p0503 A81-40861
Directionally solidified Soviet superalloy - ZhS6-K p0532 A81-43770
Determination of fatigue life by testing materials for thermal fatigue p0532 A81-43774
Creep properties of single-crystal nickel-based superalloys. II - Creep at medium temperature /760 C/ p0567 A81-46345
A process for protecting gas turbine blade cooling passages against degradation

p0622 A81-49209
Metallurgical aspects of materials processing and
manufacturing for aero-engine components --- gas
turbine engines
[PNR-90019] p0084 N81-12209
The stress behavior of three advanced nickel base
superalloys during high temperature low cycle
fatigue
[AD-A091694] p0131 N81-14061
NASA's activities in the conservation of strategic
aerospace materials
[NASA-TM-81617] p0550 N81-29205
Cobalt: A vital element in the aircraft engine
industry
[NASA-TM-82662] p0551 N81-29206
Advanced oxide dispersion strengthened sheet
alloys for improved combustor durability
p0598 N81-31204
An introduction to NASA's turbine engine hot
section technology (HOST) project
p0599 N81-31206
Conservation of Strategic Aerospace Materials
(COSAM)
p0599 N81-31208

HEAT SHIELDING
Effect of a semi-annular thermal acoustic shield
on jet exhaust noise
p0178 A81-22532

HEAT STORAGE
Heat pipe solar receiver with thermal energy storage
p0588 N81-30532

HEAT TESTS
U HIGH TEMPERATURE TESTS
HEAT TRANSFER
NT AERODYNAMIC HEAT TRANSFER
NT CONVECTIVE HEAT TRANSFER
NT LAMINAR HEAT TRANSFER
NT RADIATIVE HEAT TRANSFER
NT TURBULENT HEAT TRANSFER
Heat transfer from a row of impinging jets to
concave cylindrical surfaces
p0231 A81-24924
Composite wall concept for high-temperature
turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
Effectiveness of a gas curtain in Laval nozzles
under nonrated flow conditions
p0417 A81-36737
A survey of heating and turbulent boundary layer
characteristics of several hypersonic research
aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39134
Comparative efficiency of penetrating steam and
air cooling of gas turbine blades
p0509 A81-41003
An experimental study of heat transfer on turbine
rotor blades
p0509 A81-41033
An experimental study of heat transfer in rotating
slots and bends --- in gas turbine engines
p0509 A81-41049
New developments in compact plate-fin heat
exchangers
p0613 A81-48062
Adiabatic gas flow. Citations from the NTIS data
base
[PB80-808546] p0026 N81-10048
Wind-tunnel measurements and comparison with
flight of the boundary layer and heat transfer
on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975
Thermal and flow analysis of a convection
air-cooled ceramic coated porous metal concept
for turbine vanes
[NASA-TM-81749] p0376 N81-22056
A comparison of laboratory measured temperatures
with predictions for a spar/skin type aircraft
structure
[NASA-TM-81359] p0387 N81-23067
Fundamental heat transfer research for gas turbine
engines
[NASA-CP-2178] p0428 N81-24063
HEAT TRANSFER COEFFICIENTS
Analytically determined fin-tip heat transfer
coefficients
p0234 A81-25585
Discrete hole film cooling of turbine blades
p0293 A81-29073
Turbine blade cooling research at the von Karman
Institute for Fluid Dynamics
p0293 A81-29076
Streamwise flow and heat transfer distributions
for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985
Computation of wall temperature and heat flux
distributions of the film cooled walls
p0348 A81-30802
Application of model laws when determining the
heat transfer coefficients by experiments on
cooled turbine blades
p0089 N81-12998

HEAT TRANSMISSION
NT AERODYNAMIC HEAT TRANSFER
NT CONVECTIVE HEAT TRANSFER
NT HEAT TRANSFER
NT LAMINAR HEAT TRANSFER
NT RADIATIVE HEAT TRANSFER
NT TURBULENT HEAT TRANSFER
HEAT TREATMENT
Creep properties of single-crystal nickel-based
superalloys. II - Creep at medium temperature
/760 C/
p0567 A81-46345

HEATING
NT AERODYNAMIC HEATING
NT ARC HEATING
NT GAS HEATING
NT RADIANT HEATING
NT SOLAR HEATING
NT SPACE HEATING (BUILDINGS)
NT TRANSIENT HEATING
Preliminary study on reheat combustor for advanced
gas turbine
[ASME PAPER 81-GT-29] p0311 A81-29944
HEAVING
Heave instabilities of amphibious air cushion
suspension systems
[UTIAS-246] p0144 N81-15156
HEAVY LIFT AIRSHIPS
Dynamics and control of a Heavy Lift Airship in
cross wind hover
[AIAA 81-1334] p0456 A81-38539
Simulation of Heavy Lift Airship dynamics over
large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Generic multi-body formulation of heavy lift
airship equations of motion
p0563 A81-45539

HEAVY LIFT HELICOPTERS
Soviets display heavy-lift helicopter
p0455 A81-38195
Mi-26 - The first true heavy lift helicopter
p0559 A81-44471
Container Life Adapter-Helicopter (CLAH)
operational prototype (preproduction)
militarized units for flight evaluation and
operational testing
[AD-A089794] p0035 N81-11034
Preliminary design of a tip-jet-driven heavy lift
helicopter incorporating circulation control
[AD-A099192] p0486 N81-26120
Lift-propulsion system weight variation for very
heavy lift helicopters
[AD-A099169] p0490 N81-26151
Vehicle concepts and technology requirements for
buoyant heavy-lift systems
[NASA-TP-1921] p0596 N81-31185
HEF (HIGH ENERGY FUELS)
U HIGH ENERGY FUELS
HELICAL FLOW
Experiments on the linear and non-linear evolution
of the double helical instability in jets
[AIAA PAPER 81-0415] p0168 A81-20818
The role of the helical jet mode in aerodynamic
noise generation
[AIAA PAPER 81-1963] p0618 A81-48607
Rotary balance data for a single-engine
agricultural airplane configuration for an
angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3311] p0125 N81-13923
HELICOPTER ATTITUDE INDICATORS
U ATTITUDE INDICATORS
U HELICOPTERS
HELICOPTER CONTROL
A method of helicopter low airspeed estimation
based on measurement of control parameters
[NRB-UD-276-79-0] p0018 A81-12054

The problems of helicopter ditching p0112 A81-10071

Acoustics of rotors utilizing circulation control [AIAA PAPER 81-0092] p0160 A81-20596

Impact of active controls on aircraft design and operations - A helicopter industry perspective p0285 A81-28294

Control settings for a trimmed, stalled rotor by an automatic feedback system [AIAA 81-0617] p0305 A81-29478

Faults of helicopter hydraulic amplifiers related to loading characteristics p0319 A81-30156

Use of multiblade sensors for on-line rotor tip-path plane estimation p0356 A81-32010

Gust response of rotary wing aircraft and its alleviation p0465 A81-39900

U.K. development of a rotor de-icing system p0469 A81-40103

Commercial rotorcraft automatic controls - The next generation p0470 A81-40113

Lateral flutter of loads towed beneath helicopters and its avoidance p0470 A81-40114

ASW helicopter/sonar dynamics mathematical model p0470 A81-40115

A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks p0471 A81-40120

Flight tests and statistical data analysis for flying qualities investigations p0471 A81-40121

On the use of approximate models in helicopter flight mechanics p0471 A81-40122

Integrated multiplex for the Agusta A-129 attack helicopter p0472 A81-40131

The digital core avionics system p0472 A81-40132

Optimal higher harmonic blade pitch control for minimum vibration of a hinged rotor p0473 A81-40134

Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs [AHS 80-16] p0474 A81-40147

X-wing stability and control development and wind tunnel demonstration tests - Helicopter, conversion, and fixed wing flight [AHS 80-27] p0475 A81-40157

Results of a simulator investigation of control system and display variations for an attack helicopter mission [AHS 80-28] p0475 A81-40158

A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach [AHS 80-30] p0476 A81-40160

Helicopter gust alleviation - An optimal sampled-data approach [AHS 80-31] p0476 A81-40161

The substantiation of the structural integrity of the YAH-64 control actuators with material variations [AHS 80-51] p0478 A81-40178

NASA/FAA flight-test investigation of helicopter microwave landing system approaches [AHS 80-55] p0478 A81-40180

Advancing blade concept /ABC/ high speed development p0478 A81-40182

An active control system for helicopter vibration reduction by higher harmonic pitch [AHS 80-71] p0479 A81-40189

Night flight of helicopters p0510 A81-41335

Investigation of control, display, and crew-loading requirements for helicopter instrument approach [AIAA 81-1820] p0555 A81-43110

Active elimination of stall conditions --- in helicopters p0571 A81-46605

Helicopter trim by periodic shooting with Newton-Raphson iteration p0573 A81-46621

A flight investigation of static stability, control augmentation, and flight director influences on helicopter IFR handling qualities p0574 A81-46623

Future challenges in helicopter flight/propulsion control integration p0575 A81-46633

A piloted simulation of the backup control system engagement for the YAH-64 p0576 A81-46646

Ten years activity in the area of flight control for helicopters at night and in bad weather [DGLR PAPER 81-064] p0611 A81-47620

Recommended short-term ATC improvements for helicopters. Volume 3: Operational description of experimental LORAN-C flight following (LOFF) in the Houston area [AD-A089385] p0024 N81-10030

Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing [AD-A089794] p0035 N81-11034

LR-80 flight test report --- attitude and heading reference system [AD-A090284] p0075 N81-12058

Practical optimal flight control system design for helicopter aircraft. Volume 2: Software user's guide [NASA-CR-152306] p0081 N81-12110

Dynamics of a helicopter-slung load system p0092 N81-13051

A pure direct force/moment control for coaxial counterrotating rotors p0144 N81-15007

V/STOL AND digital avionics system for UH-1H [NASA-CR-152179] p0273 N81-19112

Study of oscillatory and flight dynamic behavior of helicopters in atmospheric turbulence [BMVG-FBWT-80-4] p0342 N81-21074

Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN p0485 N81-26102

Research on the functional limits of a helicopter rotor: Speed and load factor p0545 N81-29078

Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters --- hingeless rotor helicopters [MBB-UD-306/80-OE] p0584 N81-30139

Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability [MBB-UD-307/80-OE] p0584 N81-30140

The effects of various fidelity factors on simulated helicopter hover [AD-A102028] p0601 N81-31232

Controls and displays for all-weather operation of helicopters p0633 N81-33145

HELICOPTER DESIGN

Design and tests of an helicopter rotor blade with evolutive profile [ONERA, TP NO. 1980-125] p0011 A81-11638

Model tests for an active rotor isolation system [MBB-278-79-O] p0018 A81-12095

Helicopter flight characteristics improvement through swept-tip rotor blades [MBB-UD-275-79-O] p0018 A81-12097

Advanced Attack Helicopter /YAH-64/ - Status report p0099 A81-16500

The PZL-Sokol - New Polish helicopter p0103 A81-17325

SNIAS helicopters p0119 A81-19342

US Army working group on aircraft noise p0150 A81-20053

An overview of the research conducted in Aerospatiale on internal noise p0150 A81-20054

Measurements of structural mobility on helicopter structures p0151 A81-20064

Sandwich structures with high transmission loss p0151 A81-20069

Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
40 years of helicopter ice protection experience at Sikorsky Aircraft
[AIAA PAPER 81-0407] p0168 A81-20813
New navigation systems for helicopters
p0177 A81-22167
Use of optimization in helicopter vibration control by structural modification
p0241 A81-26945
The manufacture of composite rotor blades
p0283 A81-27886
Impact of active controls on aircraft design and operations - A helicopter industry perspective
p0285 A81-28294
Dynamic stability of a rotor blade using finite element analysis
[AIAA 81-0615] p0309 A81-29513
Helicopter rotor blade effects on mast-mounted sensor images
p0350 A81-31114
CH-53E combat survivability assessment and survivability enhancement program
[SAWE PAPER 1384] p0354 A81-31400
Design and testing of float landing gear systems for helicopters
p0356 A81-32007
The bearingless main rotor
p0356 A81-32008
Reduction of helicopter vibration through control of hub-impedance
p0356 A81-32009
Drive system technology advancements --- transmissions for CH-47D helicopter
p0356 A81-32015
Helicopter vibration control - A survey
p0364 A81-33047
Improvement of the energy efficiency of helicopters
[AAAF PAPER NT 80-33] p0369 A81-33933
Design, fabrication and test of a complex helicopter airframe section
[SAE PAPER 801213] p0404 A81-34221
Multi service applications for advancing blade concept aircraft
[SAE PAPER 801226] p0405 A81-34229
Component research for future propulsion systems
p0454 A81-38058
Soviets display heavy-lift helicopter
p0455 A81-38195
Development of a bearingless helicopter tailrotor
p0465 A81-39897
Co-axial rotor aerodynamics in hover
p0465 A81-39899
Westland WG30
p0466 A81-40082
The development of the AS 355 Ecureuil 2/Twinstar
p0466 A81-40083
ABC aircraft development status
p0467 A81-40084
Helicopter vibration reduction through structural manipulation
p0467 A81-40090
Development of antiresonance force isolators for helicopter vibration reduction
p0467 A81-40091
Reduction of helicopter noise by use of a quiet tail rotor
p0468 A81-40096
Aerodynamic design of the Aerospatiale SA 365 N Dauphin 2 helicopter
p0468 A81-40099
Design of rotorcraft powerplants - Use of life cycle costing as an aid to design optimisation
p0469 A81-40109
Reliability of commercial helicopters
p0472 A81-40126
Helicopter cockpit design for night goggle compatibility
p0472 A81-40128
Avionics system design requirements for the United States Coast Guard HH-65A Dolphin
p0472 A81-40133
Computerized three-dimensional aerodynamic design of a lifting rotor blade
[AHS 80-2] p0473 A81-40137
The experimental and analytical definition of helicopter modeling effects
[AHS 80-4] p0473 A81-40139
Preliminary evaluation of RSRA data comparing pure helicopter, auxiliary propulsion and compound helicopter flight characteristics --- Rotor Systems Research Aircraft
[AHS 80-10] p0473 A81-40143
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
[AHS 80-11] p0474 A81-40144
ABC development status and design considerations for several military applications --- Advancing Blade Concept for helicopter
[AHS 80-12] p0474 A81-40145
Achieving the full benefits of integrated multiplex in the 1980's --- for military helicopter avionics
[AHS 80-15] p0474 A81-40146
Subsystem status monitor --- for military helicopters
[AHS 80-17] p0474 A81-40148
Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20] p0474 A81-40150
Coupled rotor/airframe vibration analysis by a combined harmonic-balance, impedance-matching method
[AHS 80-21] p0474 A81-40151
LIVE - Liquid inertia vibration eliminator
[AHS 80-22] p0475 A81-40152
An experimental investigation of the effects of aeroelastic couplings on aeromechanical stability of a hingeless rotor helicopter
[AHS 80-25] p0475 A81-40155
Computerized gear grinding system development
[AHS 80-48] p0476 A81-40163
A hybrid composite horizontal stabilizer for the XH-2/CCR Flight Demonstrator Aircraft
[AHS 80-35] p0476 A81-40164
The requirements for efficient small turbine engines taking up the challenge
[AHS 80-42] p0477 A81-40170
Advanced composite airframe program - Preliminary design phase
[AHS 80-45] p0477 A81-40172
Composite flight service evaluation program for helicopters
[AHS 80-46] p0477 A81-40173
All composite helicopter airframe roof structure
[AHS 80-47] p0477 A81-40174
Model 206L composite vertical fin
[AHS 80-34] p0478 A81-40175
Design and development of the Model 412 helicopter
[AHS 80-56] p0478 A81-40181
Reducing the cost impact of helicopter internal noise control
[AHS 80-59] p0478 A81-40183
A study of the economic impact of noise limits on new design and current production helicopters
[AHS 80-64] p0479 A81-40187
Active control of the helicopter rotor for vibration reduction
[AHS 80-68] p0479 A81-40188
Composite helicopter rotor blades - Design, development, and operational performance
p0481 A81-40588
An evaluation of vacuum centrifuged titanium castings for helicopter components
p0510 A81-41516
Helicopter theory --- Book
p0513 A81-41823
Helicopter noise - Is technology the answer
[SAE PAPER 810591] p0520 A81-42750
U.S. Army crashworthiness program
[SAE PAPER 810615] p0522 A81-42771
A low-cost forward fairing for the Bell Long Ranger Helicopter
p0531 A81-43644
Mi-26 - The first true heavy lift helicopter
p0559 A81-44471
American Helicopter Society, Annual Forum, 37th, New Orleans, LA, May 17-20, 1981, Proceedings
p0571 A81-46603
The aerodynamic influences of rotor blade airfoils, twist, taper and solidity on hover and forward flight performance
p0572 A81-46607
Safety - A prime factor in the design of Aerospatiales Super-Puma AS 332
p0572 A81-46609

An ABC status report --- Advancing Blade Concept for XH-59A rotors
p0572 A81-46610

An evaluation of advanced rotorcraft configurations for emerging military applications
p0572 A81-46611

Late 80's advanced rotary wing aircraft potential based on ATDE, ACAP, and ITR --- Advanced Technology Demonstrator Engine, Advanced Composite Airframe Program and Integrated Technology Rotor
p0580 A81-46612

Computer aided helicopter design
p0572 A81-46613

Fiber optic technology for data transmission in the helicopter environment
p0573 A81-46614

Electronic Master Monitor and Advisory Display System
p0573 A81-46615

CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617

A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619

Nonlinear dynamic characteristics of the rotor bifilar absorber
p0574 A81-46622

The impact on helicopter cockpits of integrated advanced flight controls, avionics and optics
p0574 A81-46624

New designs for improved aerodynamic stability on recent Aerospatiale helicopters
p0574 A81-46625

Handling qualities of the SH-60B Seahawk
p0574 A81-46627

Factors influencing the selection of tooling and fabrication methods in building a composite fuselage
p0574 A81-46628

Manufacturing methods for a composite main rotor blade for the YAH-64 helicopter
p0575 A81-46629

Designing safety into helicopter transmissions
p0575 A81-46638

Development of composite material helicopter structures
p0576 A81-46641

Helicopter External Gondola System
p0576 A81-46642

Developing design allowables for composite helicopter structures
p0611 A81-47811

Design-to-cost applied to the AS350 helicopter
p0046 N81-11916

Impact of modern materials on the development of rotating airfoil equipment
[AAAF-NT-79-43] p0083 N81-12182

New materials and helicopter certification --- exigencies of certification regulation
[AAAF-NT-79-26] p0210 N81-17052

The role of the research simulator in the systems development of rotorcraft
[NASA-TM-81276] p0272 N81-19101

Helicopter transmission testing
p0433 N81-24102

Preliminary design of a tip-jet-driven heavy lift helicopter incorporating circulation control
[AD-A099192] p0486 N81-26120

Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143

Testing and evaluation of a stall-flutter-suppression system for helicopter rotors using individual-blade-control
[NASA-CR-166233] p0549 N81-29135

BK 117: A new helicopter through international cooperation
[MBB-UD-274/79-OE] p0582 N81-30121

The background and bases for the proposed military standard on acoustical noise limits in helicopters
p0604 N81-31459

Incidents of problems in setting to work on the conceptual design of helicopters
p0632 N81-33138

The impact of helicopter flight mechanics on mission performance
p0633 N81-33148

Advancing blade concept helicopter mission capabilities
p0634 N81-33151

The consequences of certain operational requirements on the conceptual design of combat helicopters
p0634 N81-33153

Design for maximum effectiveness in the Navy role
p0634 N81-33154

The impact of operational requirements on the compromise of desired features in rotorcraft design
p0634 N81-33155

HELICOPTER ENGINES

Specialists' Meeting on Helicopter Propulsion Systems, Williamsburg, Va., November 6-8, 1979, Technical Papers
p0104 A81-17501

The impact of contingency ratings on advanced turboshaft engine design
p0104 A81-17502

A simple combustor system for a small gas turbine engine
p0104 A81-17503

Digital control for helicopter powerplants
p0104 A81-17504

The T700 booster engine
p0105 A81-17506

Advanced transmission component development and test program --- for helicopters
p0105 A81-17507

Development of helicopter transmission components for the 1980s
p0105 A81-17509

Helicopter propulsion system development and qualification
p0105 A81-17511

Development and operational flight test of the model 250-C28B gas turbine engine
p0105 A81-17512

A survey of propulsion systems' malfunctions/failures resulting in helicopter mishaps
p0105 A81-17513

Failure Indication and Corrective Action for turboshaft engines
p0106 A81-17515

Review of engine/airframe/drive train dynamic interface development problems
p0106 A81-17516

Engine-airframe transient compatibility - Analysis and test
p0106 A81-17517

Is the engine helicopter-worthy
p0106 A81-17518

Particle dynamics of inlet flow fields with swirling vanes
[AIAA PAPER 81-0001] p0156 A81-20526

Requirements and possibilities - Rotorcraft powerplants /The 15th Halford Memorial Lecture/
p0226 A81-23999

Particulate flow in centrifugal compressors used in helicopters
p0297 A81-29109

A versatile microprocessor controller for low cost helicopter applications
[ASME PAPER 81-GT-137] p0316 A81-30039

Broadband helicopter rotor noise
[AAAF PAPER NT 80-58] p0370 A81-33949

An alternative approach to engine rating structures using monitoring systems
[SAE PAPER 801225] p0405 A81-34228

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
p0454 A81-38062

Soviets display heavy-lift helicopter
p0455 A81-38195

The development of the AS 355 Ecureuil 2/Twinstar
p0466 A81-40083

Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
p0469 A81-40107

T700 engine integral inlet separator - All weather operational protection
p0469 A81-40108

Design of rotorcraft powerplants - Use of life cycle costing as an aid to design optimisation

p0469 A81-40109

Aerodynamic design of engine air intakes for improved performance
p0470 A81-40117

Advanced debris monitoring systems for helicopters
p0472 A81-40127

Regenerative engine for helicopter application
[AHS 80-39] p0477 A81-40168

The requirements for efficient small turbine engines taking up the challenge
[AHS 80-42] p0477 A81-40170

NDEC - A control concept for helicopter gas turbines --- speed (N) based Digital Electronic Control
[AHS 80-44] p0477 A81-40171

Design and development of the Model 412 helicopter
[AHS 80-56] p0478 A81-40181

Late 80's advanced rotary wing aircraft potential based on ATDE, ACAP, and ITR --- Advanced Technology Demonstrator Engine, Advanced Composite Airframe Program and Integrated Technology Rotor
p0580 A81-46612

Future challenges in helicopter flight/propulsion control integration
p0575 A81-46633

AH-65A Dolphin engine condition monitoring system
p0575 A81-46636

Projected power and specific fuel consumption development of the Rolls Royce Gem engine
p0575 A81-46637

Reliability and maintainability evaluation of rotor systems
p0576 A81-46645

Preliminary airworthiness evaluation AH-1S (PRCD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045

Nonlinear analysis of squeeze film dampers applied to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062

Model 250-C30/C28B compressor development
p0219 N81-17466

Regenerative engine analysis program
[AD-A095144] p0274 N81-19123

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
[NASA-TM-81739] p0381 N81-22839

Specification and requirements rationale for military and civil helicopter engines
p0429 N81-24075

Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222

HELICOPTER PERFORMANCE

Piloted simulation studies of helicopter agility
p0003 A81-10767

Helicopter flight characteristics improvement through swept-tip rotor blades
[MBB-UD-275-79-O] p0018 A81-12097

The XV-15 tilt rotor research aircraft
p0100 A81-16588

The PZL-Sokol - New Polish helicopter
p0103 A81-17325

Problems of flight mechanics involved in all-weather helicopter operation
p0104 A81-17467

General Electric infrared suppressors for the Black Hawk helicopter
p0106 A81-17520

Testing model rotorcraft for overwater operations
p0111 A81-18058

Helicopter survivability in overwater situations
p0114 A81-18081

Practical aerodynamics of the helicopter Mi-6A --- Russian book
p0116 A81-18600

The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-18654

Ferrography as a health monitor and a design aid for the development of helicopter gearboxes
p0118 A81-18759

SNIAS helicopters
p0119 A81-19342

Symposium on Internal Noise in Helicopters, University of Southampton, Southampton, England, July 17-20, 1979, Proceedings
p0150 A81-20051

Helicopter fatigue qualification
p0180 A81-22623

Helicopter-ship qualification testing
p0232 A81-24941

General considerations on the importance of reliability studies for helicopters
p0287 A81-28471

General remarks on helicopter reliability
p0287 A81-28472

The reliability of helicopter reduction gears
p0287 A81-28473

Crashworthiness versus cost based on a study of severe Army helicopter accidents during 1970 and 1971
p0355 A81-32006

The bearingless main rotor
p0356 A81-32008

Fluid mechanics mechanisms in the stall process of airfoils for helicopters
p0360 A81-32779

Acoustic performance evaluation of an advanced UH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33952

Finite element analysis of self-excited vibrations of helicopter rotor blades
p0395 A81-34120

The development of the AS 355 Ecureuil 2/Twinstar
p0466 A81-40083

Analysis and application of compliant rotor technology
p0467 A81-40086

Experimental and analytical studies of a model helicopter rotor in hover
p0468 A81-40097

Aerodynamic study of a hovering rotor
p0468 A81-40098

Aerodynamic design of the Aerospatiale SA 365 N Dauphin 2 helicopter
p0468 A81-40099

Helicopter rotor ice accretion and protection research
p0469 A81-40104

An integrated performance and air data system for helicopters
p0470 A81-40110

Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
p0470 A81-40111

Real time analysis for helicopter flight testing
p0470 A81-40112

A study of the effect of aft fuselage shape on helicopter drag
p0470 A81-40116

An empirical prediction method for helicopter performance in low speed level flight and in vertical and forward flight climbs
p0471 A81-40118

A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119

Flight tests and statistical data analysis for flying qualities investigations
p0471 A81-40121

On the use of approximate models in helicopter flight mechanics
p0471 A81-40122

Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
p0471 A81-40123

Research into a helicopter rotor's speed and load factor limits
p0471 A81-40124

Hover performance methodology at Bell Helicopter Textron
[AHS 80-3] p0473 A81-40130

Flight test results for task oriented flying qualities evaluation
[AHS 80-29] p0476 A81-40159

Advancing blade concept /ABC/ high speed development
p0478 A81-40182

Helicopter theory --- Book
p0513 A81-41023

Advanced technology engine studies /ATES/ - A status report
[AIAA PAPER 81-1502] p0516 A81-42205

Helicopter navigation in the 80's
p0516 A81-42432

Mi-26 - The first true heavy lift helicopter
p0559 A81-44471

Prediction of dynamic stall and unsteady airloads for rotor blades
p0571 A81-46604

Computer aided helicopter design
p0572 A81-46613

Determination of in-flight helicopter loads
p0573 A81-46618

A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 A81-46626

Influence of sideslip on the kinematics of the helicopter in steady coordinated turns
p0576 A81-46644

Probe protection in camera/model visual systems --- for helicopter flight simulators
p0615 A81-48359

Experimental and analytical studies of a model helicopter rotor in hover
[AD-A089780] p0035 N81-11033

Aircraft accident report: New York Airways, Inc., Sikorsky S61-L, N618PA Newark, New Jersey, April 18, 1979
[NTSB-AAR-79-14] p0074 N81-12045

Stability of nonuniform rotor blades in hover using a mixed formulation
[AD-A090756] p0076 N81-12071

Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046

Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050

A flight investigation of performance and loads for a helicopter with RC-SC2 main-rotor blade sections
[NASA-TM-81898] p0186 N81-15982

Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046

Sea King mathematical model validation trials. Flight data channel calibration
[AD-A096587] p0374 N81-22043

Helicopter transmission testing
p0433 N81-24102

Advancing Blade Concept (ABC) technology demonstrator
[AD-A100181] p0538 N81-28087

Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
p0632 N81-33141

The impact of helicopter flight mechanics on mission performance
p0633 N81-33148

Advancing blade concept helicopter mission capabilities
p0634 N81-33151

Design for maximum effectiveness in the Navy role
p0634 N81-33154

The impact of operational requirements on the compromise of desired features in rotorcraft design
p0634 N81-33155

HELICOPTER PROPELLER DRIVE

Drive system development for the 1980's --- helicopter transmissions
p0105 A81-17508

Development of helicopter transmission components for the 1980s
p0105 A81-17509

Safety considerations for helicopter drive systems of the 1980s
p0105 A81-17510

Review of engine/airframe/drive train dynamic interface development problems
p0106 A81-17516

Water content of helicopter gear oils
[ASME PAPER 80-C2/DET-12] p0116 A81-18640

A low height 2300 kW helicopter transmission with an enclosed planetary gear
[ASME PAPER 80-C2/DET-17] p0116 A81-18642

Experience with advanced high performance gear steel --- for CH-47
[ASME PAPER 80-C2/DET-77] p0117 A81-18648

Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672

Gear unit noise and transmission errors --- helicopter system
p0150 A81-20060

Gear meshing action as a source of vibratory excitation
p0150 A81-20061

Development and application of an analytical method for predicting helicopter transmission noise
p0150 A81-20062

Modelling techniques for the reduction of noise and vibration in gearboxes
p0151 A81-20063

The reliability of helicopter reduction gears
p0287 A81-28473

Helicopter transmission fatigue life
p0291 A81-29058

Drive system technology advancements --- transmissions for CH-47D helicopter
p0356 A81-32015

Measuring dynamic stresses on helicopter transmission gear teeth utilizing telemetry
p0361 A81-32859

Advanced debris monitoring systems for helicopters
p0472 A81-40127

Advancements in dimensional inspection of helicopter gearboxes and transmission cases
[AHS 80-36] p0476 A81-40165

Advanced transmission component development
p0575 A81-46634

Helicopter transmission qualification procedures and tests
p0433 N81-24101

Helicopter transmission testing
p0433 N81-24102

Helicopter gearbox testing
p0488 N81-26137

Fatigue testing of helicopter gearboxes
p0488 N81-26138

Lift-propulsion system weight variation for very heavy lift helicopters
[AD-A099169] p0490 N81-26151

HELICOPTER ROTORS

U ROTARY WINGS

HELICOPTER TAIL ROTORS

Helicopter tail configurations to survive tail rotor loss
p0003 A81-10760

Hingeless tailrotor in fiber composite construction and vibration-isolation systems /ARIS, ASIS/ for helicopters
[MBB-UD-311-80-0] p0119 A81-19300

Development of a bearingless helicopter tailrotor
p0465 A81-39897

Reduction of helicopter noise by use of a quiet tail rotor
p0468 A81-40096

Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143

Lift-propulsion system weight variation for very heavy lift helicopters
[AD-A099169] p0490 N81-26151

HELICOPTER WAKES

Aerodynamic study of a hovering rotor
p0468 A81-40098

New designs for improved aerodynamic stability on recent Aerospatiale helicopters
p0574 A81-46625

Recommended short-term ATC improvements for helicopters. Volume 2: Recommended helicopter ATC training material
[AD-A089441] p0024 N81-10029

Some wake-related operational limitations of rotorcraft
[NASA-TM-81920] p0186 N81-15985

Fluid mechanics mechanisms in the stall process of helicopters
[NASA-TM-81956] p0338 N81-21027

HELICOPTERS

NT AH-1G HELICOPTER
NT AH-64 HELICOPTER
NT BO-105 HELICOPTER
NT CH-47 HELICOPTER
NT COMPOUND HELICOPTERS
NT H-53 HELICOPTER
NT HEAVY LIFT HELICOPTERS
NT MILITARY HELICOPTERS
NT P-531 HELICOPTER

NT RIGID ROTOR HELICOPTERS
NT S-61 HELICOPTER
NT SH-3 HELICOPTER
NT TANDEM ROTOR HELICOPTERS
NT UH-1 HELICOPTER
NT UH-60A HELICOPTER

The aerodynamic characteristics of some new RAE blade sections, and their potential influence on rotor performance
p0004 A81-10769

Experimental application of a vibration reduction technique
p0004 A81-10770

The status of rotor noise technology
p0019 A81-12737

Helicopter alarms - The use of AIAT incident and accident record cards
p0100 A81-16689

Exhaust gas reingestion measurements --- in helicopters
p0106 A81-17521

Helicopters - Help for the all weather terminal
p0112 A81-18065

Helicopter internal noise - An overview
p0150 A81-20055

Gearbox isolation for reducing gear tooth noise in single rotor helicopter
p0151 A81-20073

Problems of voice communication in helicopters
p0151 A81-20074

Helicopter emergency underwater escape
p0176 A81-22101

Analysis of the influence of atmospheric turbulence on alternating bending stress level in helicopter main rotor blades
p0236 A81-25690

Response characteristics of a linear rotorcraft vibration model
[AIAA 81-0616] p0305 A81-29477

Pressure distribution computation on a non-lifting symmetrical helicopter blade in forward flight
p0365 A81-33291

Propeller and wing --- Russian book
p0366 A81-33696

The medical use of the helicopter in the field of air rescue
p0409 A81-34870

The present and future applications of titanium alloys - Airframes, helicopters, missiles
p0417 A81-36665

Efficient manufacturing procedures for the production of helicopter rotor blades
[MBB-UD-312-80-OE] p0449 A81-37636

Design considerations for U.S. Coast Guard search and surveillance Forward Looking Infrared /FLIR/ system
p0463 A81-39647

Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39898

The future role of helicopters in public transport
p0466 A81-40078

A review of some topics of UK research on helicopters
p0466 A81-40080

The influence of helicopter operating conditions on rotor noise characteristics and measurement repeatability
p0468 A81-40095

The dominant acoustic radiation surfaces of a helicopter cabin
p0468 A81-40102

Aeroelastic stability analysis of hingeless rotor helicopters in forward flight using blade and airframe normal modes
[AHS 80-24] p0475 A81-40154

Effects of rotor-body coupling in a linear rotorcraft vibration model
[AHS 80-26] p0475 A81-40156

Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184

Helicopter model scale results of blade-vortex interaction impulsive noise as affected by tip modification
[AHS 80-62] p0479 A81-40185

Fatigue life evaluation of helicopter rotor heads
p0482 A81-40687

Flight test investigation of LORAN-C for civil aviation applications
p0512 A81-41762

Analysis of helicopter operations and the use of MLS in the offshore environment
p0512 A81-41764

Technology for rustproofing aircraft and helicopters --- Russian book
p0529 A81-43520

A preliminary divergence and flutter evaluation of an X-wing aircraft
[AIAA PAPER 81-1671] p0534 A81-43945

Aircraft instruments and measuring systems --- Russian book
p0564 A81-45608

Waterjet trimming of cured composites
p0575 A81-46632

Helicopter manufacturers economic impact assessment of FAA proposed helicopter certification noise rules /NPRM 79-13/
p0576 A81-46647

The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] p0608 A81-47554

The calculation of separated flow at helicopter bodies
[DGLR PAPER 81-026] p0608 A81-47555

Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method
p0614 A81-48097

Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] p0619 A81-48615

Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs
[NASA-CR-152390] p0023 N81-10019

Recommended short-term ATC improvements for helicopters. Volume 2: Recommended helicopter ATC training material
[AD-A089441] p0024 N81-10029

Proposed ATC system for the Gulf of Mexico: Helicopter operations development program
[AD-A089430] p0025 N81-10036

Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037

Recommendations for short-term simulation of ATC concepts. Helicopter operations development program
[AD-A089435] p0025 N81-10038

Recommended short-term ATC improvements for helicopters. Volume 1: Summary of short term improvements
[AD-A089521] p0025 N81-10041

Helicopter electro-optical system display requirements. 1. The effects of CRT display size, system gamma function, and terrain type on pilots required display luminance
[AD-A089755] p0035 N81-11035

Erosion and impacts on composite helicopter blades
p0040 N81-11138

Transducer installation for the Sea King MK 50 mathematical model validation flight tests
[AD-A089924] p0043 N81-11365

Army GPS-doppler hybrid navigation system
[AD-A090394] p0075 N81-12062

Status of improved autorotative landing capability research
[AD-A090431] p0076 N81-12072

On the use of active higher harmonic blade pitch control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074

Advanced transmission components investigation program: Bearing and seal development
[AD-A090675] p0076 N81-12075

Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047

The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555

The rating of helicopter noise: Development of a proposed impulse correction
[NPL-AC-93] p0138 N81-14792

Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045

An investigation of the five point restraint system for aviators
[AD-A093065] p0205 N81-16998
The evolution of the helicopter seat pan mounted Personal Survival Pack (PSP)
p0205 N81-17016
Helicopter noise contour development techniques and directivity analysis
[AD-A093426] p0221 N81-17851
Correlation of helicopter noise levels with physical and performance characteristics
[AD-A093428] p0221 N81-17852
Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches
[AD-A094073] p0251 N81-18042
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049
Preliminary airworthiness evaluation OH-58C helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052
Helicopter icing review
[AD-A094175] p0252 N81-18053
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042
Pneumatic boot for helicopter rotor deicing
p0267 N81-19059
Helicopter external load acquisition technology investigation
[AD-A094672] p0272 N81-19106
An investigation of drag associated with the upswept rear fuselage of a helicopter
[BU-257] p0330 N81-20043
Minimum operational performance standards for airborne radar approach and beacon systems for helicopters
[RTCA/DO-172] p0336 N81-20322
Fluid mechanics mechanisms in the stall process of helicopters
[NASA-TM-81956] p0338 N81-21027
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068
Low-range airspeed sensors
[AD-A096359] p0342 N81-21076
Subjective field study of response to impulsive helicopter noise
[NASA-TP-1833] p0345 N81-21873
Kinematic properties of the helicopter in coordinated turns
[NASA-TP-1773] p0374 N81-22039
Component research for future propulsion systems
[NASA-TM-82613] p0376 N81-22055
Structures and Materials Panel
[AD-A089019] p0378 N81-22420
An analysis of thermal balance in the cooled cabin of a Sea King Helicopter
[AD-A097199] p0389 N81-23077
A study of the effect of terrain on helicopter noise propagation by acoustical modeling
[AD-A097626] p0394 N81-23864
Helicopter transmission qualification procedures and tests
p0433 N81-24101
Advanced Scout Helicopter (ASH) fly-by-wire control system preliminary design. Volume 1: System design and analysis
[AD-A098155] p0434 N81-24108
Pitch-flap-phase coupling. A preliminary analysis of an evolving concept of helicopter autostabilization
[BU-242] p0434 N81-24109
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25071
Validation of helicopter noise prediction techniques
[NASA-CR-165715] p0447 N81-25768
Helicopter Fatigue Life Assessment
[AGARD-CP-297] p0487 N81-26126
State of the art and statistical aspects of helicopter fatigue substantiation procedures
p0487 N81-26127
Synopsis of Specialists' Meeting on Helicopter Fatigue Methodology
p0487 N81-26129
Application of damage tolerance concepts for the helicopters
p0487 N81-26130
Fatigue analysis of composite materials using the fail-safe concept
p0487 N81-26131
Helicopter Fatigue: A civil view
p0488 N81-26134
Helicopter component fatigue life determination
p0488 N81-26135
Fatigue tests on the total structure of the Gazelle SA 341 helicopter
p0488 N81-26136
Helicopter gearbox testing
p0488 N81-26137
Fatigue testing of helicopter gearboxes
p0488 N81-26138
Fatigue testing of composite rotor blades
p0489 N81-26140
Development of standardised fatigue test load histories for helicopter rotors: Basic consideration and definition of Helix and Felix
p0489 N81-26141
Fatigue test program and test results
p0489 N81-26142
Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
State of the art and statistical aspects of helicopter fatigue substantiation procedures
[NLR-MP-80025-U] p0496 N81-27087
The background and bases for the proposed military standard on acoustical noise limits in helicopters
[AD-A099814] p0500 N81-27890
Development for helicopter flight in icing conditions
p0545 N81-29062
AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121
Testing and evaluation of a stall-flutter-suppression system for helicopter rotors using individual-blade-control
[NASA-CR-166233] p0549 N81-29135
Helicopter noise exposure level data: Variations with test target. Indicated airspeed, distance, main rotor RPM and takeoff power
[AD-A100691] p0552 N81-29661
Application of damage tolerance concepts for MBB helicopters --- mechanical properties
[MBB-UD-309/80-OE] p0580 N81-30105
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461] p0582 N81-30119
Developement of antiresonance force isolators for helicopter vibration reduction
[MBB-UD-305/80-OE] p0582 N81-30123
Helicopter technologies of the future --- weight reduction
[MBB-UD-314/80-OE] p0583 N81-30125
Helicopter propulsion system reliability and engine monitoring assessments
p0599 N81-31213
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] p0629 N81-32159
Controls and displays for all-weather operation of helicopters
p0633 N81-33145
The impact of helicopter flight mechanics on mission performance
p0633 N81-33148
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
p0634 N81-33150
Advancing blade concept helicopter mission capabilities
p0634 N81-33151
Helicopter noise analysis: Round-robin test
[AD-A103724] p0641 N81-33948
HELIPORTS
Study of heliport airspace and real estate requirements

[AD-A091156] p0095 N81-13072
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] p0630 N81-32158

HELIUM-NEON LASERS
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
The Dalembertometer
[ISL-CO-220/79] p0133 N81-14292

HELMET MOUNTED DISPLAYS
Flight evaluation of a helmet mounted LED matrix display in a Lynx helicopter
p0472 A81-40129
An equipment for testing and measuring a Helmet Mounted Sight and Display system with a coupled TV-camera in the flight simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0092 N81-13052
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960
Helmet mounted displays: Design considerations
p0213 N81-17073

HELMETS
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet --- earphones
[RAE-TM-FS-313] p0084 N81-12320
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25071
An active noise reduction system for aircrew helmets
p0604 N81-31470
Flying helmet attenuation, and the measurement, with particular reference to the Mk 4 helmet
p0604 N81-31473
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] p0628 N81-32130

HEMISPHERE CYLINDER BODIES
Calculation of viscous, sonic flow over hemisphere-cylinder at 19 deg incidence - The capturing of nose vortices
[AIAA PAPER 81-0189] p0162 A81-20661

HERCULES AIRCRAFT
U C-130 AIRCRAFT

HEURISTIC METHODS
Application of scheduling heuristics on the aircraft maintenance depot
[AD-A094815] p0261 N81-19015

HFB-320 AIRCRAFT
System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
[DFVLR-MITT-79-16] p0130 N81-13971

HHX HELICOPTER
U H-53 HELICOPTER

HIGH ACCELERATION
Physiological effects of high-G flight - Their impact on flight simulator design
[AIAA 81-0986] p0416 A81-36573

HIGH ALTITUDE
Conflict monitoring analysis of parallel route spacing in the high altitude airspace, volume 2
[AD-A094152] p0250 N81-18038
Conflict monitoring analysis of parallel route spacing in the high altitude conus airspace, volume 1
[AD-A094071] p0250 N81-18041
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067

HIGH ALTITUDE ENVIRONMENTS
Characterizing cross-track error distributions for continental jet routes
p0174 A81-21969

HIGH ALTITUDE FLIGHT
U HIGH ALTITUDE

HIGH ALTITUDE PRESSURE
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891

HIGH ALTITUDE TESTS
A review of the installation, performance and economic aspects of a high altitude facility for small gas turbines
[SAE PAPER 801121] p0396 A81-34157

HIGH ASPECT RATIO
Experimental investigation of a high-aspect-ratio supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42187
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
Rotary balance data for a single engine general aviation design having a high aspect-ratio canard for an angle-of-attack range of 30 deg to 90 deg
[NASA-CR-3170] p0090 N81-13022
Investigation of powered nacelles on a high aspect ratio NASA supercritical wing, phase 2 --- Langley 8 Foot Transonic Pressure Tunnel
p0260 N81-19008
The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19009
Investigation of impingement region and wall jets formed by the interaction of high aspect ratio lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067

HIGH ASPECT RATIO WINGS
U SLENDER WINGS

HIGH ENERGY FUELS
Proceedings of the 4th Workshop on Catalytic Combustion
[PB81-176067] p0588 N81-30700

HIGH ENERGY INTERACTIONS
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476

HIGH FREQUENCIES
High frequency angular vibration measurements in vehicles
[AAS PAPER 81-024] p0361 A81-32886
Radio direction finding on high frequency short duration signals
[AD-A092136] p0192 N81-16029

HIGH INTENSITY LASERS
U HIGH POWER LASERS

HIGH LEVEL LANGUAGES
High-level languages in affordable aircraft simulators
p0154 A81-20418
The BQM-74C target as a flying computer - Its language and its peripherals
p0179 A81-22611

HIGH MELTING COMPOUNDS
U REFRACTORY MATERIALS

HIGH PASS FILTERS
Sample data effects of high-pass filters
[NASA-TP-1797] p0193 N81-16040

HIGH POLYMERS
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923

HIGH POWER LASERS
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49370

HIGH PRESSURE
High pressure fuel pumps - Their design and evolution /The 13th J. D. North Memorial Lecture/
p0513 A81-42052
JT8D-15/17 high pressure turbine root discharged blade performance improvement --- engine design
[NASA-CR-165220] p0214 N81-17080
Investigation of air solubility in jet A fuel at high pressures
[NASA-CR-3422] p0378 N81-22130
Energy efficient engine, high-pressure turbine cooling model technology report
[NASA-CR-165374] p0456 N81-27093

HIGH RESOLUTION
Infrared airborne radar
p0617 A81-48566

HIGH SPEED
Extension of ejection seat capability for high speed conditions
p0176 A81-22097
Some problems of modeling high-speed aerodynamics --- in wind tunnels and tubes
p0237 A81-26118
Advancing blade concept /ABC/ high speed development
p0478 A81-40182
High speed exit taxiways
[AD-A098178] p0435 N81-24118
High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191
HIGH SPEED FLIGHT
U HIGH SPEED
HIGH STRENGTH ALLOYS
NT HIGH STRENGTH STEELS
NT MARAGING STEELS
Material shortages - Effect on the commercial aircraft industry
[AIAA 81-0508] p0300 A81-29386
Thermomechanical behavior of a mechanically alloyed Al-4.0Mg powder alloy
p0409 A81-34851
HIGH STRENGTH STEELS
NT MARAGING STEELS
Recent selected papers of Northwestern Polytechnical University. Parts 1 & 2 --- Book
p0107 A81-17801
HIGH TEMPERATURE
Ceramic and coating applications in the hostile environment of a high temperature hypersonic wind tunnel --- Langley 8-foot high temperature structures tunnel
[NASA-TM-81931] p0254 N81-18199
Structural tests on space shuttle thermal protection system constructed with nondensified and densified Li 900 and LI 2200 tile
[NASA-TM-81903] p0257 N81-18410
HIGH TEMPERATURE AIR
Design and development of a thermal airship
[AIAA 81-1330] p0456 A81-38537
HIGH TEMPERATURE ALLOYS
U HEAT RESISTANT ALLOYS
HIGH TEMPERATURE ENVIRONMENTS
High temperature electronic requirements in aeropropulsion systems
p0359 A81-32547
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center
[SAE PAPER 801122] p0396 A81-34158
High temperature electronic requirements in aeropropulsion systems
[NASA-TM-81682] p0201 N81-16388
Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue
[NASA-TM-75733] p0376 N81-22054
HIGH TEMPERATURE FLUIDS
NT HIGH TEMPERATURE AIR
NT HIGH TEMPERATURE GASES
HIGH TEMPERATURE GASES
NT HIGH TEMPERATURE AIR
A vaporizing combustor with double combustion spaces
p0109 A81-17827
The method for calculating the fuel concentration field in the downstream positions of the pressure jet atomizer in the high temperature gas-stream
p0224 A81-23731
Comparisons of model and flight testing with respect to hot gas reingestion and debris ingestion during thrust reversal
p0297 A81-29113
Measurement of heat flux and pressure in a turbine stage
[ASME PAPER 81-GT-88] p0314 A81-29995
Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
Improved combustor domes designed for hot streak reduction
[AIAA PAPER 81-1352] p0501 A81-40835
Design concepts for minimizing hot-gas ingestion in V/STOL aircraft
[AIAA PAPER 81-1624] p0525 A81-43133
Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996
Development of high-temperature turbine subsystem technology to a technology readiness status, phase 2
[FE-1806-72] p0136 N81-16332
HIGH TEMPERATURE MATERIALS
U REFRACTORY MATERIALS
HIGH TEMPERATURE RESEARCH
Evaluation of high-temperature structural adhesives for extended service
p0247 N81-14010
HIGH TEMPERATURE TESTS
Low cycle fatigue of Rene 77 at elevated temperatures
p0289 A81-28989
Development of the self-temperature compensated resistance strain gage used up to 700 C
[ASME PAPER 81-GT-118] p0316 A81-30022
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022
High-temperature strength of alloys for gas turbine engines --- Russian book
p0402 A81-40616
Stress analysis of first turbine vane using a 3-dimensional model with non linear material behavior subjected to transient temperatures
[AIAA PAPER 81-1437] p0504 A81-40873
The Hornet's operational mission environment
p0571 A81-46491
Experimental study of the stability of aircraft fuels at elevated temperatures
[NASA-CR-165165] p0084 N81-12255
The stress behavior of three advanced nickel base superalloys during high temperature low cycle fatigue
[AD-A091694] p0131 N81-14061
HIGH VOLTAGES
Evaluation of lightning-induced transients in aircraft using high-voltage shock excitation techniques
p0057 A81-14269
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
High current power controller
[AD-A101643] p0552 N81-29536
HILLER MILITARY AIRCRAFT
U MILITARY AIRCRAFT
HINDRANCE
U CONSTRAINTS
HINGE MOMENTS
U TORQUE
HINGED ROTOR BLADES
U HINGES
U ROTARY WINGS
HINGELESS ROTORS
U RIGID ROTORS
HINGES
NT FLAPPING HINGES
Hinged strakes for enhanced maneuverability at high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
Optimal higher harmonic blade pitch control for minimum vibration of a hinged rotor
p0473 A81-40134
HISTOGRAMS
Catalog of sea state and wind speed in the South Atlantic Bight
[NASA-CR-156872] p0137 N81-18601
HISTORIES
NT CASE HISTORIES
The jet engine - Anniversary of a missed opportunity
p0061 A81-15168
Historical development of flutter
[AIAA 81-0591] p0302 A81-29419
European approaches to transport aircraft design
[AIAA PAPER 81-0926] p0363 A81-32934
The art of designing experimental aircraft - An overview
[AIAA PAPER 81-0944] p0363 A81-32939
The rise of air and space
p0366 A81-33718
Historical trend in the research and development of aircraft
[AIAA PAPER 81-1613] p0533 A81-43934
Wind Tunnels of NASA
[NASA-SP-440] p0629 N81-32153
Historical overview of V/STOL aircraft technology
p0633 N81-33103

HOLDERS
NT FLAME HOLDERS
HOLE DISTRIBUTION (ELECTRONICS)
Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material
[NASA-TP-1716] p0078 N81-12089
HOLOGRAPHIC INTERFEROMETRY
Holographic non-destructive testing of materials using pulsed lasers --- for aircraft structures
p0013 A81-11655
Use of speckle-holographic interferometry to study the strain-strain state of a gas-turbine engine disk close to the blade root fixing
p0170 A81-21366
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
Holographic investigation of slender body vortex wakes
[AD-A089496] p0021 N81-[illegible]008
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300
Application of holography to the study of helicopter rotor flow fields
[NASA-CR-164293] p0392 N81-23433
HOLOGRAPHY
The flying hologram - Latest in head-up display systems
p0123 A81-19500
HOMING
The collision course: Conditions, guidance laws and properties
[DFVLR-FB-80-06] p0127 N81-13942
HOMING DEVICES
Computer-aided methods for redesigning the stabilized pitch control system of a semi-active thermal homing missile
p0051 A81-13250
Autonomous target handoff from an airborne sensor to a missile seeker
p0358 A81-32498
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0585 N81-30159
HOMOSPHERE
NT STRATOSPHERE
HONEYCOMB CORES
Graphite polyimide fabrication research for supersonic cruise aircraft
p0162 A81-22665
Manufacturing the F-16 composite horizontal tail
p0531 A81-43646
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44398
HONEYCOMB STRUCTURES
NT HONEYCOMB CORES
Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563
Composites - A solution to aluminum honeycomb maintenance costs --- for aircraft structures
p0529 A81-43606
Buckling of sandwich panels subjected to axial compression, shear forces and lateral pressure. Part 2: Analysis
[SAAB-TN-AE-72-PT-2] p0086 N81-12465
Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025
Development of assembly techniques for fire resistant aircraft interior panels
[NASA-CR-152119] p0254 N81-18097
HORIZONTAL FLIGHT
F/A-18 horizontal situation display
p0327 A81-30353
A comparison of actual and simulated horizontal flight paths - RNAV /Area Navigation/ system
p0562 A81-44741
Pressure distribution computation on a nonlifting symmetrical helicopter blade in forward flight
p0447 N81-26010
Minimum fuel horizontal flightpaths in the terminal area
[NASA-TM-81313] p0549 N81-29133
HORIZONTAL ORIENTATION
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22526
The velocity induced by the wake of a wind turbine in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985
Horizontal components of the atmospheric electric field. Studies of the atmospheric electric field in view of electrostatically controlled automatic pilot applications
[BMVG-FBWT-80-7] p0345 N81-21677
HORIZONTAL STABILIZERS
U STABILIZERS (FLUID DYNAMICS)
HORIZONTAL TAIL SURFACES
A hybrid composite horizontal stabilizer for the XH-2/CCR Flight Demonstrator Aircraft
[AHS 80-35] p0476 A81-40164
Manufacturing the F-16 composite horizontal tail
p0531 A81-43646
The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19009
HOSPITALS
Airborne emergency hospital
p0299 A81-29207
HOT AIR
U HIGH TEMPERATURE AIR
HOT CORROSION
NT TEMPERATURE DEPENDENCE
Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24068
HOT CYCLE PROPULSION SYSTEM
U TIP DRIVEN ROTORS
HOT FORMING
U HOT WORKING
HOT GAS SYSTEMS
U HIGH TEMPERATURE GASES
HOT GASES
U HIGH TEMPERATURE GASES
HOT JET EXHAUST
U HIGH TEMPERATURE GASES
U JET EXHAUST
HOT JETS
U JET FLOW
HOT PRESSING
New method for cast superalloy frames - Segmented mold and HIP utilized
p0408 A81-34693
Development in powder metallurgy /PM/ Ti6Al4V technology for aircraft parts
p0511 A81-41640
Titanium net shapes by a new technology. I - F-14A parts evaluation
p0511 A81-41649
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines --- by hot pressing
[BMFT-FB-T-79-137] p0275 N81-19128
The rejuvenation of properties in turbine engine hot section components by hot isostatic pressing
[AD-A097551] p0390 N81-23088
HOT WORKING
The state of the technologies involved in the forming of TA6V titanium alloy
p0416 A81-36659
HOT-WIRE FLOWMETERS
Considerations for the installation of honeycomb and screens to reduce wind-tunnel turbulence
[NASA-TM-81868] p0550 N81-29137
HOT-WIRE TURBULENCE METERS
U HOT-WIRE FLOWMETERS
U TURBULENCE METERS
HOUSINGS
NT COWLINGS
NT RADOMES
HOVERCRAFT
U GROUND EFFECT MACHINES
HOVERING
Dynamic analysis of a free-tip rotor
[AIAA 81-0618] p0305 A81-29479
Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
[SAE PAPER 801206] p0403 A81-34214

Dynamics and control of a Heavy Lift Airship in
cross wind hover
[AIAA 81-1334]
p0456 A81-38539
Experimental and analytical studies of a model
helicopter rotor in hover
p0468 A81-40097
Hover performance methodology at Bell Helicopter
Textron
[AHS 80-3]
p0473 A81-40136
The aerodynamic influences of rotor blade
airfoils, twist, taper and solidity on hover and
forward flight performance
p0572 A81-46607
Experimental and analytical studies of a model
helicopter rotor in hover
[AD-A089780]
p0035 N81-11033
Heave instabilities of amphibious air cushion
suspension systems
[UTIAS-246]
p0144 N81-15156
An extension of the local momentum theory to a
distorted wake model of a hovering rotor
[NASA-TM-81258]
p0329 N81-20030
Application of variable structure system theory to
aircraft flight control --- AV-8A and the
Augmentor Wing Jet STOL Research Aircraft
[NASA-CR-164321]
p0391 N81-23093
Fountain-jet turbulence
[AD-A098098]
p0423 N81-24028
An engineering method for estimating the induced
lift on V/STOL aircraft hovering in and out of
ground effect
[AD-A098509]
p0441 N81-25069
Validation study of the V/STOL aerodynamics and
stability and control manual
[AD-A099236]
p0486 N81-26119
The effects of various fidelity factors on
simulated helicopter hover
[AD-A102028]
p0601 N81-31232
HOVERING STABILITY
Prediction of tilt rotor outwash
[AIAA PAPER 81-0013]
p0157 A81-20537
The effect of the atmospheric turbulence on the
rotor blade flap-leadlag motion stability in
hovering
[AIAA 81-0610]
p0304 A81-29472
Experimental and analytical studies of a model
helicopter rotor in hover
p0465 A81-39898
Co-axial rotor aerodynamics in hover
p0465 A81-39899
Stability of nonuniform rotor blades in hover
using a mixed formulation
p0467 A81-40088
Aerodynamic study of a hovering rotor
p0468 A81-40098
An empirical prediction method for helicopter
performance in low speed level flight and in
vertical and forward flight climbs
p0471 A81-40118
Flight tests and statistical data analysis for
flying qualities investigations
p0471 A81-40121
Trailing edge noise from hovering rotors
[AHS 80-60]
p0479 A81-40184
Equivalent system analysis of translation rate
command systems for hover and low speed flight
[AIAA PAPER 81-1858]
p0560 A81-44557
Stability of nonuniform rotor blades in hover
using a mixed formulation
[AD-A090756]
p0076 N81-12071
A pure direct force/moment control for coaxial
counterrotating rotors
p0144 N81-15007
Parameter identification of a hingeless rotor
helicopter in flight conditions with increased
instability
[MBB-UD-307/80-OE]
p0584 N81-30140
Design of a slot height distribution for increased
hover control power on a circulation control rotor
[AD-A103535]
p0637 N81-33194
HS-125 AIRCRAFT
U DH 125 AIRCRAFT
HSS-2 HELICOPTER
U SH-3 HELICOPTER
HU-1 HELICOPTER
U UH-1 HELICOPTER
HUBS
Fatigue life evaluation of a helicopter main rotor
hub
p0180 A81-22631
Reduction of helicopter vibration through control
of hub-impedance
p0356 A81-32009
Fatigue life evaluation of helicopter rotor heads
p0482 A81-40687
Preliminary design study of advanced composite
blade and hub and nonmechanical control system
for the tilt-rotor aircraft. Volume 1:
Engineering studies
[NASA-CR-152336-1]
p0387 N81-23064
Preliminary design study of advanced composite
blade and hub and nonmechanical control system
for the tilt-rotor aircraft. Volume 2: Project
planning data
[NASA-CR-152336-2]
p0387 N81-23065
Wind tunnel tests of large- and small-scale rotor
hubs and pylons
[AD-A098510]
p0439 N81-25043
Flight test evaluation of a nonlinear hub spring
on a UH-1H helicopter
[AD-A098794]
p0486 N81-26121
HUGHES AIRCRAFT
NT AH-64 HELICOPTER
HUGHES MILITARY AIRCRAFT
U MILITARY AIRCRAFT
HULLS (STRUCTURES)
Aerodynamic estimation techniques for aerostats
and airships
[AIAA 81-1339]
p0457 A81-38542
Air Force Geophysics Laboratory aerodynamically
tethered balloon, 45,000 cubic feet
[AD-A096758]
p0372 N81-22023
HUMAN BEHAVIOR
Nature of the annoyance and noise annoyance
relation around airports
[NASA-TM-75873]
p0542 N81-28606
Evaluation of the disturbance caused by aircraft
noise by opinion surveys
[NASA-TM-76579]
p0542 N81-28610
HUMAN ENGINEERING
U HUMAN FACTORS ENGINEERING
HUMAN FACTORS ENGINEERING
A theoretical and practical design investigation
of the future military cockpit
p0010 A81-11631
Midair collisions - The accidents, the systems,
and the Realpolitik
p0052 A81-13413
Human error in ATC system operations
p0052 A81-13414
The measurement of the air traffic controller
p0053 A81-13415
Evaluation of the potential format and content of
a cockpit display of traffic information
p0053 A81-13419
757/767 design considerations for improved
productivity
p0100 A81-16584
Air traffic control problems - A pilot's view
p0169 A81-20914
High 'Q' ejection protection device
p0175 A81-22093
Tailoring software logic to the needs of the pilot
- A software designer's nightmare
p0325 A81-30335
KC-135 modernization program --- cockpit avionics
subsystems integration for pilot workload
reduction
p0325 A81-30337
Integration of navigational information in aircraft
p0407 A81-34336
Physiological effects of high-G flight - Their
impact on flight simulator design
[AIAA 81-0986]
p0416 A81-36573
Multifunctional color displays for cockpits
p0451 A81-37646
Recommendations for the NASA Avionics program for
the 1980's
p0517 A81-42436
Human factors aspects of emergency egress from a
business jet
[SAE PAPER 810617]
p0523 A81-42772
Motion-base simulator results of advanced
supersonic transport handling qualities with
active controls
[AIAA 81-1819]
p0555 A81-44109
IFFC flying qualities simulation --- Integrated
Flight/Fire Control

[AIAA 81-1821] p0555 A81-44111
Investigation of the physical working environment
for cabin attendants within Scandinavian
Airlines System /SAS/ --- noise conditions and
aircraft vibration
p0568 A81-46357
Electronic Master Monitor and Advisory Display
System
p0573 A81-46615
The impact on helicopter cockpits of integrated
advanced flight controls, avionics and optics
p0574 A81-46624
Human Factors of Flight-deck Automation:
NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022
Summary of aviation safety program resumes. Cabin
safety
[AD-A091938] p0192 N81-16027
A preliminary human factors flight assessment of a
Marconi automatic map
[AD-A092585] p0193 N81-16036
The effects of the direction of control loading on
a one-dimensional tracking task
[AD-A092459] p0197 N81-16067
An investigation of the five point restraint
system for aviators
[AD-A093065] p0205 N81-16998
Ergonometric study of ejection through a breakable
canopy
p0205 N81-17011
Operational problems associated with head-up
displays during instrument flight
[AD-A092992] p0210 N81-17058
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
The electro-optical display/visual system
interface: Human factors considerations
p0212 N81-17066
The influence of visual requirements on the design
of military cockpits
p0213 N81-17075
Evaluation of AFTI/F-16 restraint concepts in the
+ or - 2Gy environment
[AD-A094323] p0249 N81-18034
Evaluation of factors unique to multifunction
controls/displays devices
[AD-A094227] p0258 N81-18733
A head-up display format for transport aircraft
approach and landing
p0265 N81-19043
How a pilot looks at altitude
p0265 N81-19047
The 1980 Aircraft Safety and Operating Problems,
part 2
[NASA-CP-2170-PT-2] p0267 N81-19056
Flight evaluation of the concept of the stage A
Peripheral Vision Horizon Device (PVHD) using
the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870] p0375 N81-22050
MPES negative G restraint strap design options
[AD-A098030] p0424 N81-24037
Continued research on selected parameters to
minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602
Acoustic facilities for human factors research at
NASA Langley Research Center: Description and
operational capabilities
[NASA-TM-81975] p0446 N81-25765
Special Aviation Fire and Explosion Reduction
(SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction
(SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065
The background and bases for the proposed military
standard on acoustical noise limits in helicopters
[AD-A099814] p0500 N81-27890
Definition of investigative areas for human-factor
aspects of aircraft accidents
[AD-A101601] p0580 N81-30102
Predicting the impacts of new technology aircraft
on international air transportation demand
[NASA-CR-165654] p0594 N81-31160
Ames Research Center publications: A continuing
bibliography, 1980
[NASA-TM-81308] p0641 N81-34138
HUMAN FACTORS LABORATORIES
Voice communication research and evaluation system
p0603 N81-31450

HUMAN PERFORMANCE
NT OPERATOR PERFORMANCE
NT PILOT PERFORMANCE
Advanced flight simulator: Utilization in A-10
conversion and air-to-surface attack training
[AD-A094608] p0254 N81-18066
ATC contingency operations in the en-route flight
regime
[NASA-CR-166231] p0546 N81-29110
Information transfer problems in the aviation system
[NASA-TP-1875] p0594 N81-31162
Dimensions of the information transfer problem ---
human performance
p0594 N81-31163
HUMAN REACTIONS
Community response to noise from a general
aviation airport
p0017 A81-11021
A program to support the full utilization of data
from existing social surveys of environmental
noise
p0570 A81-46374
Survey population response to airplane noise, part 1
[NASA-TM-75790] p0031 N81-10576
A guidance document on airport noise control
[AD-A092228] p0202 N81-16629
The annoyance caused by airplane noise in the
vicinity of Orly Airport and the reaction of
neighboring residents
[NASA-TM-76575] p0379 N81-22590
An airport community noise-impact assessment model
[NASA-TM-80198] p0393 N81-23713
The speed of response to synthesized voice messages
p0603 N81-31456
Voice warning systems: Some experimental evidence
concerning application
p0603 N81-31458
HUMAN TOLERANCES
Aircraft annoyance evaluations using field and
laboratory simulation techniques
[UTIAS-248] p0146 N81-15580
Airport noise impact reduction through operations
[NASA-TM-81970] p0438 N81-24655
Effect of aircraft noise on the equilibrium of
airport residents: Longitudinal study around
Roissy, phase 3
[NASA-TM-75906] p0499 N81-27692
HUMIDITY
R.A.N. Sea King cabin environment survey. Part 2:
Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065
HUSTLER AIRCRAFT
U B-58 AIRCRAFT
HYBRID COMPUTERS
Function generation techniques --- in real time
hybrid simulations
p0614 A81-48329
An automated procedure for developing hybrid
computer simulations of turbofan engines
[NASA-TM-81605] p0044 N81-11688
A digital-analog hybrid system and its application
to the automatic flight control system
simulation research
[NASA-TM-76457] p0377 N81-22060
Processing of AIDS flight recorder data for a
quick look with the aid of a hybrid computer
system
p0384 N81-23023
HYBRID NAVIGATION SYSTEMS
Principle for the design of hybrid control systems
for passenger transport systems
p0107 A81-17577
Development of an astro-inertial hybrid navigation
system and a star tracker
p0420 A81-37343
Evaluation of a hybrid navigation system with
laser gyroscopes: SEXTAN
p0485 N81-26102
HYBRID PROPULSION
Hydrogen fueled catalytic combustion for low
thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165
HYBRID STRUCTURES
Quasi-hybrid airships
[AIAA 81-1333] p0456 A81-38538
Low cost start-up for rigid-pressure airship
[AIAA 81-1337] p0457 A81-38541
Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11412

HYDRAULIC ACTUATORS
 U ACTUATORS
 U HYDRAULIC EQUIPMENT
HYDRAULIC CONTROL
 The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
 [SAE PAPER 801190] p0401 A81-34201
 Evolution of an optical control system for aircraft hydraulics
 [SAE PAPER 801195] p0402 A81-34205
HYDRAULIC EQUIPMENT
 NT AIRCRAFT HYDRAULIC SYSTEMS
 Elimination of vibrations in aircraft piping systems --- Russian book
 p0116 A81-18497
 Practical experiences with flow-induced vibrations; Proceedings of the Symposium, Universitaet Karlsruhe, Karlsruhe, West Germany, September 3-6, 1979
 p0282 A81-27610
 Driving dynamics of a high-speed positive-displacement pump and gas-turbine drive during startup --- of flight vehicles
 p0319 A81-30155
 Faults of helicopter hydraulic amplifiers related to loading characteristics
 p0319 A81-30156
 Aircraft hydraulic systems dynamic analysis. Volume 6: Steady state flow analysis SSFAN computer program technical description
 [AD-A089240] p0026 N81-10055
HYDRAULIC FLUIDS
 LIVE - Liquid inertia vibration eliminator
 [AHS 80-22] p0475 A81-40152
 Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
 [SAE PAPER 801100] p0512 A81-41776
 Dynamic, hot surface ignition of aircraft fuels and hydraulic fluids
 [NASA-CR-163979] p0254 N81-18139
 Application of an in-line contamination monitoring unit to the AHT-64 Hydraulic Test Stand
 [AD-A100696] p0550 N81-29140
HYDRAULIC HEATING SOURCES
 U HYDRAULIC EQUIPMENT
HYDRAULIC JETS
 An investigation of the liquid impact properties of a GFRP radome material
 p0457 A81-38571
HYDRAULIC PUMPS
 U HYDRAULIC EQUIPMENT
HYDRAULIC SYSTEMS
 U HYDRAULIC EQUIPMENT
HYDRAULIC TEST TUNNELS
 Structures of flow separations over swept wings
 p0255 N81-18246
HYDRAULIC VALVES
 U HYDRAULIC EQUIPMENT
 U VALVES
HYDRAZINES
 Environmental chemistry and management of hydrazine
 p0240 A81-26770
HYDROAEROMECHANICS
 U AERODYNAMICS
HYDROCARBON COMBUSTION
 Numerical investigation of a model of turbulent combustion of hydrocarbons
 [AIAA PAPER 81-0039] p0158 A81-20559
 USAF Aircraft Engine emission goals, a critical review
 [AD-A090282] p0087 N81-12651
HYDROCARBON FUELS
 NT DIESEL FUELS
 NT JET ENGINE FUELS
 NT JP-4 JET FUEL
 NT JP-5 JET FUEL
 NT JP-8 JET FUEL
 NT LIQUID FUELS
 The evaluation of fuel property effects on Air Force gas turbine engines - Program Genesis
 [ASME PAPER 81-GT-1] p0310 A81-29926
 Determination of coking rate in jet fuel
 p0570 A81-46448
 The implications of alternative aviation fuels on airbase air quality
 [AD-A090283] p0087 N81-12652
 An assessment of the use of antimisting fuel in turbofan engines
 [NASA-CR-165258] p0277 N81-19316
 Chromatographic separation of conventional and experimental fuels
 [AD-A101673] p0586 N81-30282
HYDROCARBONS
 NT METHANE
 Toxicity of synthetic high density and conventional hydrocarbon jet fuels to a soil bacterium
 [AD-A089527] p0041 N81-11233
 Trace chemical analysis methodology
 [AD-A090762] p0083 N81-12191
HYDRODYNAMIC COEFFICIENTS
 Determination of the effect of transverse cutouts on the hydrodynamic characteristics of a finite-span wing in the case of steady and unsteady motion near a wall
 p0119 A81-19335
HYDRODYNAMIC RAM EFFECT
 Numerical simulation of hydrodynamic ram --- for aircraft fuel tanks
 p0615 A81-48351
HYDRODYNAMIC STABILITY
 U FLOW STABILITY
HYDRODYNAMICS
 NT ELASTOHYDRODYNAMICS
 NT MAGNETOHYDRODYNAMICS
 Hydrodynamic modelling of the starting process in liquid-propellant engines
 p0351 A81-31287
HYDROFOILS
 Systems costing of hovercraft, hydrofoils and wing-in-ground effect machines. III
 p0412 A81-35724
HYDROGEN
 NT LIQUID HYDROGEN
HYDROGEN ENGINES
 On the utilization of hydrogen as a fuel for gas turbine. I - On the utilization of low temperature exergy of liquid hydrogen
 p0055 A81-14075
 An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
 p0109 A81-17641
 Selection of turbine parameters for steam-hydrogen engine schemes
 p0509 A81-41028
 Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
 [AIAA PAPER 81-1715] p0527 A81-43165
 Hydrogen engines
 p0625 A81-49949
HYDROGEN FUELS
 NT LIQUID FUELS
 A numerical study of candidate transverse fuel injector configurations in the Langley scramjet engine
 p0003 A81-10709
 Flameholding characteristics of a swept-strut H2 fuel-injector for scramjet applications
 p0003 A81-10711
 Hydrogen - Its technology and implications. Volume 4 - Utilization of hydrogen --- Book
 p0016 A81-11751
 Hydrogen-fueled aircraft
 p0016 A81-11753
 On the utilization of hydrogen as a fuel for gas turbine. I - On the utilization of low temperature exergy of liquid hydrogen
 p0055 A81-14075
 Rating hydrogen as a potential aviation fuel
 [SAE PAPER 80-1152] p0406 A81-34243
 Status of the program to develop LH2 for aircraft
 [SAE PAPER 801153] p0407 A81-34244
 Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
 [SAE PAPER 801155] p0407 A81-34245
 Hydrogen engines
 p0625 A81-49949
HYDROGEN-BASED ENERGY
 Hydrogen - Its technology and implications. Volume 4 - Utilization of hydrogen --- Book
 p0016 A81-11751
HYDROGENATION
 Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates
 [NASA-TP-1768] p0436 N81-24283

HYDROGRAPHY
Hydrographic applications of the global
positioning system
[AD-A093750] p0206 N81-17029
HYDROKINETICS
U HYDROMECHANICS
HYDROMAGNETIC FLOW
U MAGNETOHYDRODYNAMIC FLOW
HYDROMAGNETICS
U MAGNETOHYDRODYNAMICS
HYDROMAGNETISM
U MAGNETOHYDRODYNAMICS
HYDROMECHANICS
NT ELASTOHYDRODYNAMICS
NT HYDRODYNAMICS
NT MAGNETOHYDRODYNAMICS
Advanced generating system equipment for aircraft
p0420 A81-37414
Cost considerations of engine fuel control systems
p0048 N81-11928

HYDROPLANING
Hydroplaning and coefficient of friction in wet
runway testing
p0419 A81-37300

HYDROXYL COMPOUNDS
NT ALCOHOLS
NT GLYCOLS
HYPERBOLIC COORDINATES
Hyperbolic/parabolic development for the GIM-STAR
code --- flow fields in supersonic inlets
[NASA-CR-3369] p0201 N81-16416
HYPERBOLIC NAVIGATION
NT LORAN
NT LORAN C
Hyperbolic origins --- of radio position-fixing
systems
p0612 A81-47842
Production of LORAN-C reliability diagrams at the
Defense Mapping Agency
[AD-A093749] p0206 N81-17028
HYPERBOLIC SPACE
U HYPERBOLIC COORDINATES
HYPERGOLIC ROCKET PROPELLANTS
NT LIQUID FUELS
HYPERSONIC AIRCRAFT
A survey of heating and turbulent boundary layer
characteristics of several hypersonic research
aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39134
Design and fabrication of a stringer stiffened
discrete-tube actively cooled panel for a
hypersonic aircraft
[NASA-CR-3403] p0279 N81-19484
Aerodynamic characteristics of a hypersonic cruise
aircraft concept with wing-mounted propulsion
systems at Mach numbers of 2.96, 3.96 and 4.63
--- Langley unitary plan wind tunnel tests
[NASA-TM-81937] p0329 N81-20025
HYPERSONIC BOUNDARY LAYER
Hypersonic gas flow over a delta wing
p0123 A81-19632
Correlation of artificially induced boundary-layer
transition data at hypersonic speeds
p0285 A81-27911

HYPERSONIC FLOW
Determination of the vorticity of a
small-aspect-ratio wing in hypersonic flow
p0054 A81-13544
A numerical simulation of hypersonic viscous flow
over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566
The problem of the unsteady hypersonic flow past a
plane profile
p0231 A81-24730
Characteristics of nonequilibrium flow with
ionization in a region perturbed by a thin blunt
body
p0231 A81-24732
Some aerodynamic properties of cones in viscous
supersonic flow
p0237 A81-26119
On the theory of a wing with small aspect ratio in
a hypersonic flow
p0309 A81-29860
Determination of the vorticity on a wing of small
aspect ratio in a hypersonic stream
p0411 A81-35668
Accuracy and application of a second-order theory
for three-dimensional supersonic and low
hypersonic unsteady flows aroung a thin wing
p0419 A81-37335
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
HYPERSONIC SHOCK
Analysis of calculated three-dimensional inviscid
flow fields with embedded shock waves
(presentation of a field solution), part 1
[ESA-TT-558] p0022 N81-10017
HYPERSONIC VEHICLES
NT HYPERSONIC AIRCRAFT
A computer-aided design system geared toward
conceptual design in a research environment ---
for hypersonic vehicles
[AIAA PAPER 81-0372] p0166 A81-20789
A comparison of laboratory measured temperatures
with predictions for a spar/skin type aircraft
structure
[NASA-TM-81359] p0387 N81-23067
HYPERSONIC WIND TUNNELS
NT CASCADE WIND TUNNELS
Analysis and design of a ceramic nozzle insert for
the Langley 8-foot high temperature structures
tunnel
p0060 A81-14996
Some problems of modeling high-speed aerodynamics
--- in wind tunnels and tubes
p0237 A81-26118
Ceramic and coating applications in the hostile
environment of a high temperature hypersonic
wind tunnel --- Langley 8-foot high temperature
structures tunnel
[NASA-TM-81931] p0254 N81-18199
A rectangular rod-wall sound shield
[NASA-CASE-LAR-12883-1] p0550 N81-29138
HYPERVELOCITY WIND TUNNELS
NT CASCADE WIND TUNNELS
HYSTERESIS
Wind tunnel investigation of the aerodynamic
hysteresis phenomenon on the F-4 aircraft and
its effects on aircraft motion
[AD-A089851] p0033 N81-11016

I

ICE ENVIRONMENTS
Seat pack for fighter aircraft operating on the
NATO Northern Flank
p0205 N81-17010

ICE FORMATION
NT CLOUD GLACIATION
An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810
Simulated aircraft takeoff performance with
frosted wings
[AIAA PAPER 81-0404] p0167 A81-20811
United States Army helicopter icing qualification
1980
[AIAA PAPER 81-0406] p0167 A81-20812
The problem of hoar-frost formation in aircraft
fuel tanks
p0319 A81-30159
Measurement of natural aircraft icing conditions
[AIAA PAPER 81-1646] p0526 A81-43143
Aircraft icing instrumentation: Unfilled needs
--- rotary wing aircraft
p0135 N81-14560
Helicopter icing review
[AD-A094175] p0252 N81-18053
Survey of aircraft icing simulation test
facilities in North America
[NASA-TM-81707] p0269 N81-19078
Light transport and general aviation aircraft
icing research requirements
[NASA-CR-165290] p0269 N81-19079
Rotorcraft aviation icing research requirements:
Research review and recommendations
[NASA-CR-165344] p0308 N81-23070
Icing tunnel tests of a glycol-exuding porous
leading edge ice protection system on a general
aviation airfoil
[NASA-CR-164377] p0439 N81-25041
Development for helicopter flight in icing
conditions
p0545 N81-29082
Methods of testing aircraft performance under
icing conditions and ice tection systems
p0545 N81-29083

National icing facilities requirements investigation
[AD-A102520] p0602 N81-31238
ICE PREVENTION
Use of similitude in analyzing aircraft windshield anti-icing performance
[AIAA PAPER 79-1822] p0051 A81-13218
Computer simulation of airfoil icing without runback
[AIAA PAPER 81-0402] p0167 A81-20809
40 years of helicopter ice protection experience at Sikorsky Aircraft
[AIAA PAPER 81-0407] p0168 A81-20813
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20837
Helicopter rotor ice accretion and protection research
p0469 A81-40104
Helicopter icing review
[AD-A094175] p0252 N81-18053
Survey of aircraft icing simulation test facilities in North America
[NASA-TM-81707] p0269 N81-19078
JUH-1H ice phobic coating icing tests
[AD-A096361] p0340 N81-21062
Artificial and natural icing tests production UH-60A helicopter
[AD-A096239] p0340 N81-21063
Commercial aviation icing research requirements
[NASA-CR-165336] p0387 N81-23069
Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-25041
Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363] p0441 N81-25065
Protection against wing icing for Airbus A300 and A310
[NASA-TM-76584] p0494 N81-27079
Methods of testing aircraft performance under icing conditions and ice tection systems
p0545 N81-29083
ICING
U ICE FORMATION
IDEAL FLUIDS
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002
Numerical study of stream surface structure near highly loaded wings
p0235 A81-25682
IDEAL GAS
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14581
Laminar boundary layer on an oscillating wedge
p0309 A81-29864
IDENTIFY FRIEND OR FOE
U IFF SYSTEMS (IDENTIFICATION)
IDENTIFYING
NT IFF SYSTEMS (IDENTIFICATION)
NT PARAMETER IDENTIFICATION
IFF SYSTEMS (IDENTIFICATION)
A new generation IFF - The AN/APX-100/V/ transponder
p0350 A81-31132
New technology applied to an IFF diversity transponder
p0350 A81-31133
IFR (RULES)
U INSTRUMENT FLIGHT RULES
IGNITION
NT SPARK IGNITION
Some factors affecting altitude relighting performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10128
Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465
Dynamic, hot surface ignition of aircraft fuels and hydraulic fluids
[NASA-CR-163979] p0254 N81-18139
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28094
IGNITION LIMITS
The effect of oxygen concentration distribution on altitude relighting performance of a turbo-jet engine combustor
p0295 A81-29069
Fluctuation of gas parameters behind the combustion chamber of gas turbine engines
p0466 A81-40024
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891
Autoignition characteristics of aircraft-type fuels
p0562 A81-44666
Droplet breakup regimes and criteria for their existence
p0614 A81-48079
Minimum ignition energy of F40 aircraft fuel/air mixtures
[PML-1978-22] p0436 N81-24213
ILLUMINATORS
Optical Fiber Illumination System for visual flight simulation
[NASA-CR-3409] p0343 N81-21086
ILS (LANDING SYSTEMS)
U INSTRUMENT LANDING SYSTEMS
IMAGE CONTRAST
Effects of sunlight on display filters
p0326 A81-30352
IMAGE CONVERTERS
NT IMAGE TUBES
An airborne programmable digital to video converter interface and operation manual
[AD-A096422] p0446 N81-25621
IMAGE ENHANCEMENT
Time-compressed displays for target detection
p0064 A81-15686
Effects of sunlight on display filters
p0326 A81-30352
Forward looking infrared /FLIR/ image enhancement for the automatic target cuer system
p0461 A81-39335
Evaluation of image processing for man-in-loop target acquisition
p0461 A81-39337
Night flight of helicopters
p0510 A81-41335
F-111 windscreen machining
[Y-2232] p0142 N81-14995
IMAGE FILTERS
Effects of sunlight on display filters
p0326 A81-30352
IMAGE INTENSIFIERS
Development of an aviator's night vision imaging system /ANVIS/
p0463 A81-39573
IMAGE MOTION COMPENSATION
An MTI /moving target indicator/ algorithm for passive sensors
p0320 A81-30239
Moving target identification /MTI/ algorithm for passive sensors
p0358 A81-32502
Image stabilization techniques for long range reconnaissance camera
p0462 A81-39436
IMAGE PROCESSING
Radar target detection and map-matching algorithm studies
p0005 A81-11158
Computer generated radar images for navigation
p0049 A81-12793
A concept for dynamic control of RPV information system parameters
p0049 A81-12796
Autonomous navigation using passively sensed terrain images
p0110 A81-17977
A new technique for tracking sequences of digitized images
p0156 A81-20500
A solid-state airborne sensing system for remote sensing
p0183 A81-23034
Advanced techniques for airborne target screener
p0320 A81-30238

An MTI /moving target indicator/ algorithm for passive sensors p0320 A81-30239
Charge-coupled device /CCD/ camera/memory optimization for expendable autonomous vehicles p0357 A81-32491
Analysis, design and simulation of line scan aerial surveillance systems p0357 A81-32492
Autonomous target handoff from an airborne sensor to a missile seeker p0358 A81-32498
Advanced target tracking by dynamic scene analysis p0358 A81-32499
Moving target identification /MTI/ algorithms for passive sensors p0358 A81-32502
Evaluation of flight data from a mosaic sensor p0452 A81-37681
Evaluation of image processing for man-in-loop target acquisition p0461 A81-39337
Feature extraction from forward looking infrared /FLIR/ imagery p0461 A81-39338
Staring infrared mosaic observation of an F-15 aircraft p0463 A81-39636
Image processing design for autonomous acquisition of targets p0562 A81-44700
Optimized computer systems for avionics applications [AD-A089570] p0028 N81-10063

IMAGE RECONSTRUCTION
The reconstruction/refiltering approach to Kalman filter evaluation --- in long-range aircraft avionics p0326 A81-30339

IMAGE RESOLUTION
Tri-bar reading correction for oblique imagery p0178 A81-22495
Characteristics of flight simulator visual systems [AGARD-AR-164] p0541 N81-28107

IMAGE TUBES
A new system for the study of visual information presentation in aeronautics - GIBI p0100 A81-16688
Head up displays. Citations from the NTIS data base [PB80-809064] p0026 N81-10050

IMAGERY
NT AERIAL PHOTOGRAPHY
NT ELECTRO-OPTICAL PHOTOGRAPHY
NT HOLOGRAPHY
NT INFRARED IMAGERY
NT PHOTORECONNAISSANCE
NT RADAR IMAGERY
NT RADIOGRAPHY
NT SATELLITE-BORNE PHOTOGRAPHY
NT SCHLIEREN PHOTOGRAPHY
NT STEREOPHOTOGRAPHY
Computer Generated Imagery (CGI) current technology and cost measures feasibility study [AD-A091636] p0146 N81-15729
Characteristics of flight simulator visual systems [AGARD-AR-164] p0541 N81-28107

IMAGES
Assessment of scene complexity and cue validity in visual flight simulation [AD-A100200] p0541 N81-28109

IMAGING TECHNIQUES
NT IMAGE ENHANCEMENT
NT RADAR IMAGERY
Precision correlation tracking via optimal weighting functions p0154 A81-20450
A new technique for tracking sequences of digitized images p0156 A81-20508
Improvement of the imaging of moving acoustic sources by the knowledge of their motion [ONERA, TP NO. 1981-17] p0359 A81-32534
Model-based scene matching p0461 A81-39349
Image stabilization techniques for long range reconnaissance camera p0462 A81-39436
Development of an aviator's night vision imaging system /ANVIS/ p0463 A81-39573
Application of optical methods to the study of jet noise and turbulence [ISL-CO-201/80] p0147 N81-15819
Characteristics of flight simulator visual systems [NASA-TM-81278] p0340 N81-21060

IMMISCIBILITY
U SOLUBILITY

IMMITTANCE
U ELECTRICAL IMPEDANCE

IMPACT
NT ECONOMIC IMPACT

IMPACT DAMAGE
Impact damage of aircraft gas turbine engines with axial compressors p0005 A81-11324
Effect of impact damage on the XFV-12A composite wing box p0182 A81-22676
Concepts for improving the damage tolerance of composite compression panels p0360 A81-32825
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers p0416 A81-37136
U. of Dayton uses X-rays to study impact patterns at ballistic ranges p0453 A81-37798
An investigation of the liquid impact properties of a GFRP radome material p0457 A81-38571
Relationships between impact resistance and fracture toughness in advanced composite materials p0040 N81-11137
Graphite-epoxy panel compression strength reduction due to local impact p0040 N81-11139
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 1: Aeroelastic effects [AD-A091674] p0129 N81-13955
Combat damage assessment p0488 N81-26132

IMPACT DECELERATION
U DECELERATION

IMPACT LOADS
Unsteady Newton-Busemann flow theory. I - Airfoils p0234 A81-25512
Transient, nonlinear response analysis of soft bodied impact on flat plates including interactive load determination [AIAA 81-0621] p0305 A81-29482
Aircraft subfloor response to crash loadings [SAE PAPER 810614] p0522 A81-42770

IMPACT PRESSURES
U IMPACT LOADS

IMPACT RESISTANCE
Concepts for improving the damage tolerance of composite compression panels p0360 A81-32825
Automatic riveting installation for spherical aircraft parts p0450 A81-37641
Processing for an improved impact resistant composite blade --- for turbofan aircraft engines [AIAA PAPER 81-1356] p0501 A81-40838
Relationships between impact resistance and fracture toughness in advanced composite materials p0040 N81-11137
Erosion and impacts on composite helicopter blades p0040 N81-11138
Superhybrid composite blade impact studies [NASA-TM-81597] p0043 N81-11412

IMPACT SENSITIVITY
U IMPACT RESISTANCE

IMPACT STRENGTH
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies [AD-A091051] p0091 N81-13039
Superhard transparent coating optimization program [AD-A091083] p0092 N81-13040

IMPACT TESTING MACHINES
Designing for aircraft structural crashworthiness [AIAA PAPER 81-0803] p0367 A81-33882

IMPACT TESTS
Study of the crashworthiness of light aircraft structures [AIAA 81-0574] p0302 A81-29407

The development of a substitute bird model
[ASME PAPER 81-GT-23] p0311 A81-29939
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
Concepts for improving the damage tolerance of
composite compression panels
p0360 A81-32825
U. of Dayton uses X-rays to study impact patterns
at ballistic ranges
p0453 A81-37798
Boron aluminum blades and vanes
[AIAA PAPER 81-1359] p0502 A81-40840
Fiber release from impacted graphite reinforced
epoxy composites
[NASA-CR-163684] p0030 N81-11117
Graphite-epoxy panel compression strength
reduction due to local impact
p0040 N81-11139
Evaluation/redesign of the F-105 pitch rate gyro
pack
[AD-A092109] p0194 N81-16048
IMPACT TOLERANCES
Validation of a bird substitute for development
and qualification of aircraft tranparencies
[AD-A097736] p0424 N81-24036
Fatigue Assessment of UK military aeroplanes
p0487 N81-26128
IMPEDANCE
NT ACOUSTIC IMPEDANCE
NT ELECTRICAL IMPEDANCE
NT MECHANICAL IMPEDANCE
IMPEDANCE MATCHING
Coupled rotor/airframe vibration analysis by a
combined harmonic-balance, impedance-matching
method
[AHS 80-21] p0474 A81-40151
IMPEDANCE MEASUREMENTS
Experimental substantiation for hovering rotor
vertical impedance calculations
p0453 A81-38015
IMPELLER BLADES
U ROTOR BLADES (TURBOMACHINERY)
IMPELLERS
NT PUMP IMPELLERS
Comparative performance of two centrifugal fan
impellers differing in blade section
p0001 A81-10162
Effects of Coriolis on the turbulent field inside
centrifugal impellers
p0297 A81-29110
The effect of impeller tip design on the
performance of a mixed flow turbocharger
compressor
[ASME PAPER 81-GT-7] p0310 A81-29932
IMPERFECTIONS
U DEFECTS
IMPINGEMENT
NT JET IMPINGEMENT
Calculation of the impingement of cloud droplets
in a cylinder by the finite-element method
p0533 A81-43890
IMPULSE GENERATORS
Community reaction to impulse noise: Initial Army
survey
[AD-A101674] p0588 N81-30659
IN-FLIGHT MONITORING
In-flight calibration of aircraft antenna
radiation patterns
p0173 A81-21825
In-flight structural dynamic characteristics of
the XV-15 tilt rotor research aircraft
[AIAA 81-0612] p0304 A81-29474
Using microprocessors in fault monitoring of
aircraft electronics
[ASME PAPER 81-GT-138] p0316 A81-30040
Modern techniques of conducting a flight loads
survey based on experience gained on the Black
Hawk helicopter
p0356 A81-32014
In-flight fatigue crack monitoring using acoustic
emission
p0361 A81-32857
Some design and procedural aspects of in-flight
collision avoidance
[AIAA PAPER 81-0005] p0368 A81-33805
Air transport flight parameter measurements
program - Concepts and benefits
[SAE PAPER 801132] p0396 A81-34163
Flight control systems go digital - More than a
binary mechanization of analog predecessors
[SAE PAPER 801166] p0399 A81-34181
Acoustic emission techniques for in-flight
structural monitoring
[SAE PAPER 801211] p0404 A81-34219
TF41/A7-E engine monitoring system implementation
experience
[SAE PAPER 801222] p0404 A81-34226
An alternative approach to engine rating
structures using monitoring systems
[SAE PAPER 801225] p0405 A81-34228
In-flight jet engine noise measurement system
p0410 A81-35553
Research into a helicopter rotor's speed and load
factor limits
p0471 A81-40124
Portable servoactuator test system
[AIAA PAPER 81-1620] p0525 A81-43130
Aircraft noise identification system - Application
for inflight position detector
p0570 A81-46376
Determination of in-flight helicopter loads
p0573 A81-46618
Instrumentation for measurement of flow properties
on a swept wing in flight
[DGLR PAPER 81-034] p0609 A81-47585
Onboard procedure for the measurement of wind
shear gradients
[DGLR PAPER 81-060] p0610 A81-47612
In-flight measurement of aerodynamic loads on
captive stores. Equipment and results
[NLR-MP-79013-U] p0022 N81-10012
Flight test results of the HFB 320 model following
control system for the in-flight simulation of
Airbus A 130
[DFVLR-MITT-79-13] p0030 N81-10078
Aircraft turbine engine monitoring experience. An
overview and lessons learned from selected case
studies
[AD-A089752] p0036 N81-11042
Synopsis on aircraft integrated data systems and
engine health monitoring and maintenance
[DFVLR-MITT-80-08] p0075 N81-12063
Flight evaluation of a simplified gross thrust
calculation technique using an F100 turbofan
engine in an F-15 airplane
[NASA-TP-1782] p0143 N81-15000
A French flight test program on the
electromagnetic effects of lightning
p0199 N81-16155
Flight tests for studying radioelectric
perturbations of an electrostatic origin
p0200 N81-16160
Energy maneuverability display for the Air Combat
Maneuvering Range/Tactical Training System
(ACMR/TACTS)
[AD-A092974] p0208 N81-17041
Individual jet engine stress load monitoring with
the aid of the flight data recording system
LEADS 200
p0328 N81-20013
Uses of AIDS data in airlines engine maintenance
p0328 N81-20016
Possible online uses of AIDS data in future ATC
systems
p0328 N81-20018
Sea King mathematical model validation trials.
Flight data channel calibration
[AD-A096587] p0374 N81-22043
Contributions to the 9th Symposium on aircraft
integrated data systems --- Conferences
[ESA-TT-532] p0382 N81-23000
Experiences with a Flight Data Recording System
(FDRS) in a German Airforce fighter bomber wing
after field trials --- digital equipment
p0382 N81-23009
Engine parameter trend analysis with LEADS 200:
Possibilities and limitations --- using flight
recorder data
p0382 N81-23010
Investigations into local fault detection on
turbojet engines --- monitoring instruments
p0382 N81-23011
The engine usage monitoring system: An heuristic
approach to cost effective data monitoring and
analysis --- onboard fatigue monitoring
p0382 N81-23013

Relationships for a flight performance computer p0382 N81-23014
Classification of operating conditions of turbomachines from solid borne sound p0382 N81-23015
The SYDAS flight data processing system p0383 N81-23018
The use of aircraft integrated data system at KLM --- performance monitoring p0383 N81-23019
Detection and location of faults in onboard aircraft systems with the aid of the Automatic Fault Identification System (AFIS) p0383 N81-23022
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters [AD-A097283] p0393 N81-23438
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters [AD-A098236] p0427 N81-24060
performance control and qualification tests of civil aviation turbine engines in tests conducted by airframe manufacturers p0430 N81-24078
Turbine engine tests as seen by an aircraft company p0430 N81-24084
Who needs engine monitoring? p0599 N81-31209
F100 engine diagnostic system status to date p0599 N81-31210

INCIDENCE
Analysis of total and static pressure fluctuations in an air intake at high incidence [AAAF PAPER NT 80-61] p0370 A81-33950
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed [AIAA 81-1335] p0457 A81-38540

INCOMPRESSIBLE BOUNDARY LAYER
An experimental investigation of separating flow on a convex surface p0230 A81-24488
Hybrid suction surface for turbulent boundary layer flow p0240 A81-26513

INCOMPRESSIBLE FLOW
Design of airfoils in incompressible viscous flows by numerical optimization p0001 A81-10096
Flow past a slender profile in a channel with permeable walls p0004 A81-10916
Flow computation around multi-element airfoils in viscous transonic flow p0011 A81-11641
Second order approximation theory of an arbitrary aerofoil in incompressible potential flow p0108 A81-17803
Nonlinear aerodynamic characteristics of a thin airfoil of arbitrary plane configuration p0123 A81-19629
The numerical solution of incompressible turbulent flow over airfoils [AIAA PAPER 81-0047] p0158 A81-20563
Computer simulation of airfoil icing without runback [AIAA PAPER 81-0402] p0167 A81-20809
New approach to the solution of large, full matrix equations --- Neumann problem for inviscid incompressble flow past airfoils p0171 A81-21552
A method for calculating the aerodynamic forces and moments on external stores of aircraft p0226 A81-24006
Influence of hinge line gap on aerodynamic forces acting on a harmonically oscillating thin profile in an incompressible flow. I, II p0348 A81-30956
New interpretations in the theory of viscous incompressible fluid flow past airfoil profiles p0349 A81-31044
Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations [AIAA PAPER 81-1239] p0454 A81-38096
Measurement of canard wakes [AD-A095063] p0263 N81-19029
Mean-flow and turbulence measurements in the vicinity of the trailing edge of an NACA (63 sub 1)-012 airfoil [NASA-TP-1845] p0392 N81-23410

INCOMPRESSIBLE FLUIDS
Computer simulation of unsteady flow past lifting rotors of coaxial configuration p0230 A81-24389
Calculation of the aerodynamic characteristics of aircraft with jet mechanization p0299 A81-29301

INDEXES (DOCUMENTATION)
NASA authorization, 1981 [GPO-71-290] p0203 N81-16953
Directory of aircraft survivability specialists and their affiliations [AD-A096259] p0341 N81-21066

INDICATING INSTRUMENTS
NT ANEMOMETERS
NT APPROACH INDICATORS
NT ATTITUDE INDICATORS
NT FLOW DIRECTION INDICATORS
NT GYRO HORIZONS
NT GYROCOMPASSES
NT LASER ANEMOMETERS
NT PLAN POSITION INDICATORS
NT POSITION INDICATORS
NT RADIO DIRECTION FINDERS
NT SPEED INDICATORS
NT STRAIN GAGE BALANCES
NT WEIGHT INDICATORS
Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft [NASA-CR-160036] p0023 N81-10020
Helmet mounted displays: Design considerations p0213 N81-17073
Experiments using electronic display information p0213 N81-17077

INDUCED FLUID FLOW
U FLUID FLOW

INDUCTION SYSTEMS
U INTAKE SYSTEMS

INDUSTRIAL ENERGY
Hydrogen - Its technology and implications. Volume 4 - Utilization of hydrogen --- Book p0016 A81-11751
Energy conservation through cogeneration p0055 A81-14228

INDUSTRIAL MANAGEMENT
NT INVENTORY CONTROLS
NT INVENTORY MANAGEMENT
NT PERSONNEL MANAGEMENT

INDUSTRIES
NT AEROSPACE INDUSTRY
NT AIRCRAFT INDUSTRY
NT DEFENSE INDUSTRY
NT WEAPONS INDUSTRY

INELASTIC BODIES
U RIGID STRUCTURES

INERT ATMOSPHERE
The F-16 Halon tank inerting system [AIAA PAPER 81-1638] p0525 A81-43138

INERTIA
NT INERTIA PRINCIPLE

INERTIA MOMENTS
U MOMENTS OF INERTIA

INERTIA PRINCIPLE
An exact solution of the problem of the motion of a gyroscope in a Cardan suspension p0019 A81-12704

INERTIAL GUIDANCE
NT STRAPDOWN INERTIAL GUIDANCE
Guidance and Control Conference, Albuquerque, NM, August 19-21, 1981, Collection of Technical Papers p0553 A81-44076
Function generation techniques --- in real time hybrid simulations p0614 A81-48329
Ring laser gyro [AD-A090643] p0085 N81-12395
Precision Positioning and Inertial Guidance Sensors: Technology and Operational Aspects [AGARD-CP-298] p0484 N81-26091

INERTIAL NAVIGATION
Gyrostabilizers for inertial control systems --- Russian book p0017 A81-12024
Cruise-missile-carrier navigation requirements p0116 A81-18576
Some implementation considerations for numerically stable flight filters p0156 A81-20485

The Global Positioning System versus gravity
disturbance modeling in an inertial navigation
system --- error reduction at aircraft altitude
[AIAA PAPER 81-0087]
p0160 A81-20591
Laser-gyro strapdown inertial navigation
p0225 A81-23868
Synthesis of gyrostabilizer state evaluation
system under unknown perturbations
p0299 A81-29311
Simulation of a third-order vertical channel
mechanization --- for airplane inertial navigation
p0322 A81-30290
The reconstruction/refiltering approach to Kalman
filter evaluation --- in long-range aircraft
avionics
p0326 A81-30339
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936]
p0363 A81-32937
Development of an astro-inertial hybrid navigation
system and a star tracker
p0420 A81-37343
Effect of acceleration switching during INS
in-flight alignment
p0458 A81-38897
Standard INS program status
p0511 A81-41753
Optimal processing of GPS signals
p0512 A81-41761
CAINS II - An application of standard laser gyro
inertial and computer technology for existing
naval carrier aircraft
p0516 A81-42434
Ferranti mission managers
p0553 A81-44043
Doppler aided low accuracy strapdown inertial
navigation system
[AIAA 81-1798]
p0555 A81-44101
Aircraft instruments and measuring systems ---
Russian book
p0564 A81-45608
Origins of inertial navigation
p0567 A81-46276
Gyrocompasses. Citations from the International
Aerospace Abstracts data base
[NASA-CR-163675]
p0028 N81-10065
Flight test investigation of LORAN-C for en route
navigation in the Gulf of Mexico
[AD-A091637]
p0128 N81-13945
A single gimbal/strapdown inertial navigation
system for use on spin stabilized flight test
vehicles
[SAND-80-2479C]
p0193 N81-16037
Estimation and statistical averaging applied to
redundant strapped down inertial sensors for
navigation and flight control
[AD-A094465]
p0276 N81-19133
Flight test results of an advanced development
model Ring Laser Gyro Navigator (RLGN)
p0485 N81-26103
New Navy programs for development of integrated
inertial sensors
p0485 N81-26108

INERTIAL REFERENCE SYSTEMS
Failure detection and isolation for tactical
aircraft using the generalized likelihood test
p0321 A81-30261

INFINITE SPAN WINGS
Laminar boundary layer on swept-back wings of
infinite span at an angle of attack
p0107 A81-17656

INFLATABLE DEVICES
U INFLATABLE STRUCTURES

INFLATABLE STRUCTURES
NT TETHERED BALLOONS
An inflatable seat for aircraft passengers
p0175 A81-22091
Effect of thermal radiation on the integrity
pressurized aircraft evacuation slides and slide
materials
[AD-A098179]
p0424 N81-24039
Development of retardation and automatic flotation
system (R.A.F.T.)
[AD-A096828]
p0439 N81-25047

INFLUENCE COEFFICIENT
The balancing of flexible rotors - Theoretical
relation of each balancing method and accuracies
p0228 A81-24088

INFORMATION FLOW
Dimensions of the information transfer problem ---
human performance
p0594 N81-31163

INFORMATION MANAGEMENT
Integration of navigational information in aircraft
p0407 A81-34336

INFORMATION RETRIEVAL
Arts 2 enhancement design alternative study
[AD-A096276]
p0339 N81-21049

INFORMATION SYSTEMS
NT MANAGEMENT INFORMATION SYSTEMS
A concept for dynamic control of RPV information
system parameters
p0049 A81-12796
Advanced avionic systems for multi-mission
applications
p0321 A81-30258
Contention information transfer systems analysis
p0322 A81-30274
Synergistic benefits of fully integrating JTIDS
and GPS --- Joint Tactical Information
Distribution System and Global Positioning System
p0323 A81-30311
A Single Processor Synchronous Executive derived
from the DAIS executive --- Digital Avionics
Information System
p0324 A81-30326
The RLU - An advanced remote terminal for avionic
systems
p0327 A81-30358
Weights information systems using minicomputers
[SAWE PAPER 1347]
p0353 A81-31385
Communications support for National Flight Data
Center information system
[AD-A093095]
p0219 N81-17327

INFORMATION TRANSMISSION
U DATA TRANSMISSION

INFRARED DETECTORS
NT FLIR DETECTORS
Staring infrared mosaic observation of an F-15
aircraft
p0463 A81-39636

INFRARED HORIZON SCANNERS
U INFRARED SCANNERS

INFRARED IMAGERY
The flying hologram - Latest in head-up display
systems
p0123 A81-19500
An MTI /moving target indicator/ algorithm for
passive sensors
p0320 A81-30239
Helicopter rotor blade effects on mast-mounted
sensor images
p0350 A81-31114
Moving target identification /MTI/ algorithm for
passive sensors
p0358 A81-32502
Microcomputer system for controlling an infrared
scanning camera --- with application to rocket
plume radiation measurement
p0453 A81-37749
Forward looking infrared /FLIR/ image enhancement
for the automatic target cuer system
p0461 A81-39335
Feature extraction from forward looking infrared
/FLIR/ imagery
p0461 A81-39338
Test facility for the measurement of infrared
radiation from jet engine exhaust systems
p0462 A81-39503
Design considerations for U.S. Coast Guard search
and surveillance Forward Looking Infrared /FLIR/
system
p0463 A81-39647
Night flight of helicopters
p0510 A81-41335
Image processing design for autonomous acquisition
of targets
p0562 A81-44700
Improvements in the determination of convective
transfers from infrared thermography --- in wind
tunnel tests
p0255 N81-18258

INFRARED INSTRUMENTS
NT FLIR DETECTORS
NT INFRARED DETECTORS
NT INFRARED SCANNERS
NT INFRARED SPECTROMETERS
Design and preliminary tests of an IR-airborne
LLWS remote sensing system --- Low Level Wind

Shear
[AIAA PAPER 81-0239] p0163 A81-20694

INFRARED RADAR
Infrared airborne radar p0617 A81-48566

INFRARED RADIATION
Advanced technology turboshaft IR suppression p0106 A81-17519

Test facility for the measurement of infrared radiation from jet engine exhaust systems p0462 A81-39503

Design characteristics of Michelson interferometers used on the AFGL NKC-135 infrared flying laboratory p0463 A81-39505

INFRARED RADIOMETERS
Evaluation of flight data from a mosaic sensor p0452 A81-37681

Staring infrared mosaic observation of an F-15 aircraft p0463 A81-39636

Clear air turbulence - An airborne alert system p0562 A81-44648

Flight tests of a clear-air turbulence alerting system --- infrared radiometers p0266 N81-19052

INFRARED SCANNERS
Applications of new technology in the infrared p0350 A81-31126

Forward-looking infrared /FLIR/ sensor for autonomous vehicles p0357 A81-32490

Microcomputer system for controlling an infrared scanning camera --- with application to rocket plume radiation measurement p0453 A81-37749

INFRARED SPECTRA
Modeling of 2D-nozzle plume for IR signature prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107

INFRARED SPECTROMETERS
Microprocessor-based airborne spectrometer system p0453 A81-37744

INFRARED SUPPRESSION
Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045

INFRARED TRACKING
General Electric infrared suppressors for the Black Hawk helicopter p0106 A81-17520

Image processing design for autonomous acquisition of targets p0562 A81-44700

INGESTION (ENGINES)
Exhaust gas reingestion measurements --- in helicopters p0106 A81-17521

Model for axial compressors operating with water ingestion p0297 A81-29111

Comparisons of model and flight testing with respect to hot gas reingestion and debris ingestion during thrust reversal p0297 A81-29113

The development of a substitute bird model
[ASME PAPER 81-GT-23] p0311 A81-29939

Design development, and certification of a CFM56 engine: Resistance to the ingestion of foreign bodies p0431 N81-24087

INHIBITORS
NT WEAR INHIBITORS
INITIAL VALUE PROBLEMS
U BOUNDARY VALUE PROBLEMS
INJECTION
NT FUEL INJECTION
NT GAS INJECTION
INJECTION CARBURETORS
U FUEL INJECTION
INJECTION MOLDING
Fabrication of injection molded sintered alpha SiC turbine components
[ASME PAPER 81-GT-161] p0317 A81-30060

INJECTORS
Small gas-turbine combustor study - Fuel injector evaluation
[AIAA PAPER 81-1388] p0502 A81-40857

A parametric study of staged fuel injector configurations for scramjet applications
[AIAA PAPER 81-1468] p0505 A81-40888

INJURIES
NT CRASH INJURIES
NT EJECTION INJURIES
The accident/injury matrix - A tool for aircraft accident investigation p0018 A81-12241

Aircraft accident reports. Brief format, US civil aviation: Issue no. 11, 1979 accidents
[NTSB-BA-80-8] p0075 N81-12053

Briefs of accidents involving commuter air carriers and on-demand air taxi operations, U.S. General Aviation 1978
[PB81-101701] p0141 N81-14987

INLET FLOW
A study of the air inlet efficiency of a combat aircraft concept with dorsal inlet p0008 A81-11615

One-dimensional considerations concerning the stability behavior of inlet diffusers for supersonic aircraft --- German thesis p0107 A81-17548

Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952

Conditions of generation and methods of damping the inlet vortex of a turbojet engine p0121 A81-19442

Particle dynamics of inlet flow fields with swirling vanes
[AIAA PAPER 81-0001] p0156 A81-20526

Body-fitted 3-D full-potential flow analysis of complex ducts and inlets
[AIAA PAPER 81-0002] p0156 A81-20527

An approach to ramjet trajectory simulation test p0292 A81-29065

Evaluation of blade element performance of compressor rotor blade cascades in transonic and low supersonic flow range p0296 A81-29102

Three dimensional flow in annular diffusers with two vortex distributions at entry p0297 A81-29112

Flow separation in inlets at incidence angles p0297 A81-29114

Development and validation of computational flow analysis for design of inlets and nozzles p0298 A81-29117

Feasibility of a rotor flight-dynamics model with first-order cyclic inflow and multiblade modes
[AIAA 81-0611] p0304 A81-29473

Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098

Cooled radial in-flow turbines for advanced gas turbine engines
[ASME PAPER 81-GT-213] p0318 A81-30102

Tests for inlet distortion in a two-spool turbojet engine on the ground test bed p0419 A81-37340

Inlet distortion and blade vibration in turbomachines p0421 A81-37631

A perspective on developing new inlet distortion measurement and predictive methods
[AIAA PAPER 81-1589] p0507 A81-40960

Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] p0619 A81-40621

Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] p0620 A81-40636

Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] p0620 A81-40637

Hyperbolic/parabolic development for the GIN-STAR code --- flow fields in supersonic inlets
[NASA-CR-3369] p0201 N81-16416

An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211

Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft --- V/STOL aircraft
[NASA-TM-81292] p0428 N81-24064

An investigation of engine influence on inlet performance --- conducted in the Ames 40- by 80-foot wind tunnel

[NASA-CR-166136] p0579 N81-30084
INLET NOZZLES
Jet-diffuser ejector - Attached nozzle design
[NASA-CR-152361] p0278 N81-19412
INLET PRESSURE
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
An evaluation of statistical methods for the prediction of maximum time-variant inlet total pressure distortion
[AD-A089817] p0036 N81-11040
INLET TEMPERATURE
Considerations of the use of vitiated preheat --- for engine inlets
p0150 A81-20023
Factors limiting turbine inlet temperatures
p0294 A81-29083
Cooled radial in-flow turbines for advanced gas turbine engines
[ASME PAPER 81-GT-213] p0318 A81-30102
INLETS (DEVICES)
U INTAKE SYSTEMS
INORGANIC COATINGS
NT CERAMIC COATINGS
INPUT
INDES User's guide multistep input design with nonlinear rotorcraft modeling
[NASA-CR-159085] p0380 N81-22726
INPUT/OUTPUT ROUTINES
Arts 2 enhancement design alternative study
[AD-A096276] p0339 N81-21049
INSECTICIDES
NT URETHANES
INSENSITIVITY
U SENSITIVITY
INSERTS
NT NOZZLE INSERTS
INSPECTION
NT X RAY INSPECTION
Inspection methods for various critical steel parts for airframes
p0052 A81-13331
Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110
Contribution to the improvement of the classical method of maintenance of aeroengines
p0290 A81-29055
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187
Maintenance program analysis for aircraft structures of the 80's - MSG-3
[SAE PAPER 801214] p0404 A81-34222
System for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] p0138 N81-14967
INSTABILITY
U STABILITY
INSTALLATION
U INSTALLING
INSTALLING
Practical aspects of instrumentation installation in support of subsystem testing
p0546 N81-29090
INSTRUCTIONS
U EDUCATION
INSTRUMENT APPROACH
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[AHS 80-30] p0476 A81-40160
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
Evaluation of LORAN-C for non-precision approach applications
p0512 A81-41763
Evaluation of Loran-C for enroute navigation and non-precision approach within the state of Vermont
p0516 A81-42433
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110
Automatic helical rotorcraft descent and landing using a Microwave Landing System
[AIAA PAPER 81-1857] p0560 A81-44556
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches
[AD-A094073] p0251 N81-18042
In-flight handling qualities investigation of A310 Airbus DLC-configurations on landing approach, using the DFVLR-HFB 320 in-flight simulator (variable stability aircraft) --- instrument flight
[ESA-TT-630] p0276 N81-19135
Cockpit simulation study of use of flight path angle for instrument approaches
[NASA-CR-165708] p0425 N81-24040
INSTRUMENT COMPENSATION
NT TEMPERATURE COMPENSATION
INSTRUMENT ERRORS
An optimum design procedure of total-temperature thermocouple probes
p0108 A81-17807
Approximation of gear transmission error by standard gear errors
[ASME PAPER 80-C2/DET-71] p0117 A81-16646
Evaluation of false alarm information with the ELRA
p0152 A81-20100
Measurement of aircraft speed and altitude --- Book
p0357 A81-32401
Accuracy of noise-modulated radio altimeter
p0359 A81-32694
Orientation of measurement sensors for optimum end-of-life performance
p0360 A81-32697
A microprocessor based land navigator
p0360 A81-32833
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
Simulation of Microwave Landing System
p0615 A81-48368
INSTRUMENT FLIGHT RULES
Commercial rotorcraft automatic controls - The next generation
p0470 A81-40113
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
Night flight of helicopters
p0510 A81-41335
A flight investigation of static stability, control augmentation, and flight director influences on helicopter IFR handling qualities
p0574 A81-46623
IFR aircraft handled forecast by air route traffic control center, fiscal years 1980-1991
[AD-A090803] p0074 N81-12048
Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046
Development of a computer program data base of a navigation aid environment for simulated IFR flight and landing studies
[NASA-TM-80064] p0129 N81-13959
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042
General aviation single pilot IFR autopilot study
p0265 N81-19045
Development and evaluation of a prototype in-flight instrument flight rules (IFR) procedures trainer
[NASA-TM-73292] p0490 N81-26156
Operational problems experienced by single pilots in instrument meteorological conditions
[NASA-CR-166236] p0581 N81-30106
INSTRUMENT LANDING SYSTEMS
NT ALL-WEATHER LANDING SYSTEMS
NT AUTOMATIC LANDING CONTROL
Specifications for short instrument and precision approach path trajectories

p0051 A81-13314
How will it be possible to pass from ILS to MLS
p0059 A81-14473
New definition of areas of protection for instrument landing
p0225 A81-23869
Application of endfire arrays at contemporary glide-slope problem sites
p0360 A81-32695
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890
On-line wind shear generation for flight simulator applications
[AIAA 81-0970] p0414 A81-36559
INTERSCAN - The development and international acceptance of a new microwave landing system for civil aviation
p0418 A81-37114
Engineering approaches for cost savings with ILS glide-slope installations
p0516 A81-42431
Navigation and landing - The prospects of new systems
p0566 A81-45766
Math model study, runway 16R instrument landing system localizer at Seattle-Tacoma Airport, Washington
[AD-A095076] p0270 N81-19085
Flight-test evaluation of STOL control and flight director concepts in a powered-lift aircraft flying curved decelerating approaches
[NASA-TP-1641] p0275 N81-19131
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] p0638 N81-33203

INSTRUMENT ORIENTATION
Alignment of a navigation and attack system for the alpha jet aircraft
p0544 N81-29070

INSTRUMENTAL ANALYSIS
U AUTOMATION

INSTRUMENTATION
U INSTRUMENTS

INSTRUMENTS
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116

INSULATION
NT THERMAL INSULATION

INTAKE SYSTEMS
NT AIR INTAKES
NT ENGINE INLETS
NT INTERNAL COMPRESSION INLETS
NT NOSE INLETS
NT SUPERSONIC INLETS
T700 engine integral inlet separator - All weather operational protection
p0469 A81-40108
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] p0624 A81-49736
Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465
Effects of downstream distance on turbulence decay for the compressor research facility low conditioning system
[AD-A091543] p0133 N81-14276
Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853
Quiet Clean Short-haul Experimental Engine (QCSEE); acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet, test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097

INTEGRAL EQUATIONS
NT SINGULAR INTEGRAL EQUATIONS
Calculation of plane transonic flows using the integral equation method and shock fitting
p0016 A81-11779
Numerical solutions of transonic flows by parametric differentiation and integral equation techniques
p0067 A81-15896
On the derivation of universal indicial functions --- for unsteady transonic flow
[AIAA PAPER 81-0328] p0165 A81-20753
Recent developments in integral equation method in transonic flow
p0234 A81-25384
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022
Integral equation methods for multi-element airfoil analysis and design --- including flap configurations
[NLR-MP-79020-U] p0338 N81-21038

INTEGRAL TRANSFORMATIONS
NT FOURIER TRANSFORMATION

INTEGRATED CIRCUITS
NT LARGE SCALE INTEGRATION
High-density avionic power supply
p0005 A81-11157
New storage medium - Greater safety. II - Testing, fabrication, implementation --- MNOS block oriented random access memory (BORAM) circuits
p0227 A81-24044
Integrated Flight and Weapon Control for improved tactical combat effectiveness
p0324 A81-30329
Integrated displays and controls design factors for the 1990's transport aircraft
p0325 A81-30338
Multisensor track file correlation using attributes and kinematics
p0326 A81-30349
DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850] p0141 N81-14989

INTEGRITY
NT COMPUTER PROGRAM INTEGRITY

INTEGRODIFFERENTIAL EQUATIONS
U DIFFERENTIAL EQUATIONS
U INTEGRAL EQUATIONS

INTELLIGIBILITY
NT SPEECH RECOGNITION
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet --- earphones
[RAE-TM-FS-313] p0084 N81-12320
Aural communication in aviation
[AGARD-CP-311] p0603 N81-31449
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
Second language speech comprehension in noise: A hazard to aviation safety
p0604 N81-31463
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464
Voice communication capability of selected inflight headgear devices
p0604 N81-31467
An automated multiple choice intelligibility testing system
p0604 N81-31468
An active noise reduction system for aircrew helmets
p0604 N81-31470

INTENSIFIER TUBES
U IMAGE INTENSIFIERS

INTENSIFIERS
NT IMAGE INTENSIFIERS

INTERACTIVE CONTROL
An objective method of assessing the realism of a simulation of a simple control system
p0284 A81-27898
The application of interactive graphics to thermal modeling
[AIAA PAPER 81-1180] p0459 A81-39159
Big 'R', little 'c', integrated data annotation and sensor control for long range oblique photography /LOROP/ --- increased reliability and reduced complexity
p0462 A81-39435
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration
[AIAA PAPER 81-1498] p0506 A81-40910
COMLINK - A communications/EW analytical and modeling tool
p0617 A81-48547

INTERACTIVE GRAPHICS
U COMPUTER GRAPHICS

INTERCEPTION
LPI, short-range communications between aircraft

in rendezvous --- Low Probability of Intercept
p0177 A81-22493
INTERCEPTOR AIRCRAFT
U FIGHTER AIRCRAFT
INTERCEPTORS
Autopilot design via improved discrete modal control
[AIAA 81-1777] p0554 A81-44095
INTERCONNECTION
U JOINING
INTERFACES
NT FLUID BOUNDARIES
NT GAS-SOLID INTERFACES
NT JET BOUNDARIES
NT LIQUID-SOLID INTERFACES
Abstract interface specifications for the A-7E
device interface module
[AD-A092696] p0202 N81-16770
The interface arrangement of digital systems ---
Mirage 2000 aircraft
p0545 N81-29084
INTERFERENCE
Analytic determination of interference thresholds
for microwave landing system equipment and
TACAN/DME equipment
[AD-A093448] p0206 N81-17025
INTERFERENCE LIFT
Wind tunnel corrections for high angle of attack
models
[AGARD-R-692] p0435 N81-24120
German activities on wind tunnel corrections
p0436 N81-24124
A review of research at NLR on wind-tunnel
corrections for high angle of attack models
p0436 N81-24125
A review of some investigations on wind tunnel
wall interference carried out in Sweden in
recent years
p0436 N81-24126
Wind tunnel corrections for high angles of attack:
A brief review of recent UK work
p0436 N81-24127
INTERFEROGRAMS
U INTERFEROMETRY
INTERFEROMETERS
NT FABRY-PEROT INTERFEROMETERS
NT MACH-ZEHNDER INTERFEROMETERS
NT MICHELSON INTERFEROMETERS
NT RADIO INTERFEROMETERS
A simple laser interferometer for wind tunnel flow
visualisation
p0018 A81-12078
The optical-fiber interferometer gyroscope for
aviation navigation
p0451 A81-37650
A direct model pitch measurement with a laser
interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
INTERFEROMETRY
NT HOLOGRAPHIC INTERFEROMETRY
NT LASER INTERFEROMETRY
Interferometric study of the initial stage of
supersonic jets of gases with various
specific-heat ratios from conical nozzles
p0068 A81-16231
INTERGRANULAR CORROSION
On understanding environment-enhanced fatigue
crack growth - A fundamental approach
p0003 A81-10749
INTERLAYERS
An assessment of buffer strips for improving
damage tolerance
p0247 N81-18009
INTERMETALLICS
NASA's activities in the conservation of strategic
aerospace materials
[NASA-TM-81617] p0550 N81-29205
Conservation of Strategic Aerospace Materials
(COSAM)
p0599 N81-31208
INTERNAL COMBUSTION ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT DIESEL ENGINES
NT DUCTED FAN ENGINES
NT GAS TURBINE ENGINES
NT HELICOPTER ENGINES
NT HYDROGEN ENGINES
NT J-65 ENGINE
NT J-79 ENGINE
NT J-85 ENGINE
NT J-97 ENGINE
NT JET ENGINES
NT RAMJET ENGINES
NT SUPERSONIC COMBUSTION RAMJET ENGINES
NT T-56 ENGINE
NT TF-30 ENGINE
NT TF-41 ENGINE
NT TURBOFAN ENGINES
NT TURBOJET ENGINES
NT TURBOPROP ENGINES
Hydrogen engines
p0625 A81-49949
Supercritical fuel injection system
[NASA-CASE-LEW-12990-1] p0549 N81-29129
Computer modeling of internal combustion engines:
Combustion and related processes
[NTS/79/3] p0587 N81-30454
INTERNAL COMPRESSION INLETS
High-speed cowlings, air inlets and outlets, and
internal-flow systems
p0185 N81-15973
INTERNAL STRESS
U RESIDUAL STRESS
INTERNATIONAL COOPERATION
INTERSCAN - The development and international
acceptance of a new microwave landing system for
civil aviation
p0418 A81-37114
European cooperation in the tactical transport
helicopter
p0466 A81-40081
The roles of airline engineering and maintenance
in 1981 --- summary for 26 January 1981
conference of ATLAS group
p0565 A81-45755
BK 117: A new helicopter through international
cooperation
[MBB-UD-274/79-OE] p0582 N81-30121
INTERNATIONAL RELATIONS
NT INTERNATIONAL COOPERATION
INTERPLANETARY COMMUNICATION
Computer B (NAS-NAS) communications support
[AD-A104145] p0640 N81-33392
INTERPLANETARY MAGNETIC FIELDS
New developments in the field of solar-terrestrial
relationships --- Russian book
p0281 A81-27326
INTERPLANETARY PROPULSION
U ROCKET ENGINES
INTERROGATION
Performance evaluation of an interrogation-reply
scheduling technique for a discrete address
beacon system --- of radar surveillance and
aircraft communication in ATC
p0121 A81-19417
AN/TPX-54 interrogator
p0350 A81-31131
INTRUDER AIRCRAFT
U A-6 AIRCRAFT
INVENTORY CONTROLS
Renewal function for any arbitrary period - A
Bayesian way
p0101 A81-16939
INVENTORY MANAGEMENT
NT INVENTORY CONTROLS
Determination of cargo container inventories
through logistics simulation --- for air shipment
p0616 A81-48380
Aircraft modification management evaluation
[AD-A096458] p0381 N81-22974
INVERSIONS
NT CENTRIFUGING STRESS
INVESTIGATION
NT ACCIDENT INVESTIGATION
NT AIRCRAFT ACCIDENT INVESTIGATION
INVESTMENTS
Investment decision-making in international airports
p0113 A81-18079
A controlled evaluation of the differences between
two approaches to reliability investment screening
[AD-A087506] p0031 N81-10446
INVISCID FLOW
Nonlinear aerodynamic characteristics of a thin
airfoil of arbitrary plane configuration
p0123 A81-19629
Viscous-inviscid interaction on oscillating
airfoils in subsonic flow
[AIAA PAPER 81-0051] p0159 A81-20567

New approach to the solution of large, full matrix equations --- Neumann problem for inviscid incompressible flow past airfoils
p0171 A81-21552
Three-dimensional wing boundary layer calculated with eight different methods
p0171 A81-21555
Sound radiation from vortex systems
p0171 A81-21591
Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0228 A81-24078
Calculation of the boundary of a supersonic inviscid jet flowing into a submerged space or a supersonic wake
p0229 A81-24172
A contribution to the computation of transonic supersonic flows over blunt bodies
p0230 A81-24423
Subsonic cascade flow analysis by a finite element method
p0233 A81-25311
On a generalization of Kaden's problem --- of initially planar semi-infinite vortex sheet rollup
p0288 A81-28676
Calculation of supersonic flow around a wing with constant curvature of its leading edges
p0413 A81-35916
Aerodynamic characteristics of wings of arbitrary planform
p0461 A81-39267
Modeling of ramjet combustors using simple reactor theory
[AIAA PAPER 81-1429] p0515 A81-42196
Analysis of calculated three-dimensional inviscid flow fields with embedded shock waves (presentation of a field solution), part 1
[ESA-TT-558] p0022 N81-10017
Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-13034
An investigation into grid patching techniques
p0137 N81-14708
Finite element analysis of inviscid subsonic boattail flow
[NASA-TM-81650] p0140 N81-14977
Application of transonic potential calculations to aircraft and wind tunnel configurations
p0186 N81-15992
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AD-A093970] p0203 N81-16983
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] p0637 N81-33192
INVISIBILITY
U VISIBILITY
ION PLATING
Sputtering and ion plating for aerospace applications
[NASA-TM-81726] p0337 N81-20429
IONIZATION
NT GAS IONIZATION
Analysis of middle distillate fuels by field ionization mass spectrometry
[AD-A099407] p0491 N81-26209
IONIZED GASES
NT CHARGED PARTICLES
NT PLASMA JETS
NT PLASMAS (PHYSICS)
NT RAREFIED PLASMAS
IONIZED PLASMAS
U PLASMAS (PHYSICS)
IONIZING RADIATION
NT COSMIC RAYS
IONOSPHERIC ABSORPTION
U ELECTROMAGNETIC ABSORPTION
IONOSPHERIC DISTURBANCES
Errors of phase VLF-navigation systems under conditions of auroral disturbances
p0607 A81-47533
IONS
NT ANIONS
IP (IMPACT PREDICTION)
U COMPUTERIZED SIMULATION
IRAN
Design of the new Tehran International Airport
p0114 A81-18084
IRON
NT IRON ISOTOPES
IRON ALLOYS
NT CARBON STEELS
NT CHROMIUM STEELS
NT HIGH STRENGTH STEELS
NT MARAGING STEELS
NT STEELS
IRON COMPOUNDS
Methodology for determining sampling intervals
[AD-A092591] p0202 N81-16825
IRON ISOTOPES
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33068
IROQUOIS HELICOPTER
U UH-1 HELICOPTER
IRRITATION
NT TOXICITY AND SAFETY HAZARD
IRROTATIONAL FLOW
U POTENTIAL FLOW
ISING MODEL
U MATHEMATICAL MODELS
ISLANDS
NT BERMUDA
NT PACIFIC ISLANDS
ISOBARS (PRESSURE)
Experimental investigations to fully map the flow field around a wind tunnel model of a transport airplane
[SAE PAPER 800630] p0063 A81-15385
ISOLATION
Total main rotor isolation system analysis
[NASA-CR-165667] p0494 N81-27076
ISOLATORS
NT VIBRATION ISOLATORS
Main rotor six degree-of-freedom isolation system analysis
[NASA-CR-165665] p0444 N81-25090
ISOSTATIC PRESSURE
New method for cast superalloy frames - Segmented mold and HIP utilized
p0408 A81-34693
Titanium net shapes by a new technology. I - F-14A parts evaluation
p0511 A81-41649
The rejuvenation of properties in turbine engine hot section components by hot isostatic pressing
[AD-A097551] p0390 N81-23088
ISOTHERMAL PROCESSES
Isothermal rolling of aircraft parts - Versatile process saves costly materials
p0227 A81-24087
Titanium forging - Stamping /stamp, screw-press/, circular rolling and isothermal forging
p0416 A81-36657
Isothermal forging of fan blades
[AIAA PAPER 81-1405] p0503 A81-40862
ISOTOPES
NT IRON ISOTOPES
NT RADIOACTIVE ISOTOPES
ISOTOPIC LABELING
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33068
ITERATION
NT ITERATIVE SOLUTION
ITERATIVE SOLUTION
Plane transonic solution with shock by direct iteration
p0231 A81-24814
Iterative method for determining maximum load capacity of aircraft structures
p0235 A81-25603
IZSAK ELLIPSOID
U GEODESY

J

J-65 ENGINE
Location of faults in jet engines by calculation of component characteristics
p0302 N81-23012
J-79 ENGINE
Evaluation of fuel character effects J79 smokeless combustor

[AD-A095057] p0278 N81-19323

J-85 ENGINE
Organic compounds in the exhaust of a J85-5 turbine engine [AD-A091712] p0130 N81-13966
Static source locations for four nozzles mounted on a J-85 engine [NASA-CR-152401] p0143 N81-14998
Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation [NASA-CR-165141] p0143 N81-15004
Gas turbine engine transient testing p0431 N81-24091

J-97 ENGINE
Static tests of the J97 powered, external augmentor V/STOL wind tunnel model [NASA-CR-152403] p0337 N81-21010
Design of a V/STOL propulsion system for a large-scale fighter model [NASA-CR-166162] p0442 N81-25074

JACKS (ELECTRICAL)
U ELECTRIC CONNECTORS

JAGUAR AIRCRAFT
Fly-by-wire Jaguar p0614 A81-48064

JAMMING
Airborne countermeasures system AN/ALQ-161 p0049 A81-12794

JARRING
U MECHANICAL SHOCK

JC-130 AIRCRAFT
U C-130 AIRCRAFT

JEEPS
U AUTOMOBILES

JET AIRCRAFT
NT A-6 AIRCRAFT
NT A-7 AIRCRAFT
NT A-300 AIRCRAFT
NT ALPHA JET AIRCRAFT
NT B-52 AIRCRAFT
NT B-58 AIRCRAFT
NT BOEING 727 AIRCRAFT
NT BOEING 737 AIRCRAFT
NT BOEING 747 AIRCRAFT
NT BOEING 757 AIRCRAFT
NT BOEING 767 AIRCRAFT
NT C-135 AIRCRAFT
NT C-141 AIRCRAFT
NT CONCORDE AIRCRAFT
NT DC 8 AIRCRAFT
NT DC 9 AIRCRAFT
NT DC 10 AIRCRAFT
NT DH 121 AIRCRAFT
NT DH 125 AIRCRAFT
NT EUROPEAN AIRBUS
NT F-4 AIRCRAFT
NT F-5 AIRCRAFT
NT F-8 AIRCRAFT
NT F-14 AIRCRAFT
NT F-15 AIRCRAFT
NT F-16 AIRCRAFT
NT F-17 AIRCRAFT
NT F-18 AIRCRAFT
NT F-27 AIRCRAFT
NT F-100 AIRCRAFT
NT F-101 AIRCRAFT
NT F-106 AIRCRAFT
NT F-111 AIRCRAFT
NT HFB-320 AIRCRAFT
NT JINDIVIK TARGET AIRCRAFT
NT L-1011 AIRCRAFT
NT LEAR JET AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT MYSTERE 20 AIRCRAFT
NT P-3 AIRCRAFT
NT PHANTOM AIRCRAFT
NT SAAB 37 AIRCRAFT
NT SE-210 AIRCRAFT
NT T-37 AIRCRAFT
NT T-38 AIRCRAFT
NT TURBOFAN AIRCRAFT
NT TURBOPROP AIRCRAFT
Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison p0054 A81-13515
Environmental control systems for executive jet aircraft [SAE PAPER 800607] p0061 A81-15330
Future trends in automatic flight control systems [SAE PAPER 800627] p0063 A81-15343
Development and certification of the Gulfstream III p0100 A81-16587
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design --- Book p0101 A81-16720
Characterizing cross-track error distributions for continental jet routes p0174 A81-21969
Critical field length calculations for preliminary design p0183 A81-23366
Calculation of the aerodynamic characteristics of aircraft with jet mechanization p0299 A81-29301
Jet aircraft design [AIAA PAPER 81-0912] p0362 A81-32930
Energy modeling for aviation fuel efficiency [AIAA PAPER 81-0789] p0368 A81-33083
The GTCP331 Auxiliary Power Unit for the next generation commercial transports [SAE PAPER 801147] p0398 A81-34176
Feederjet for the 'eighties p0410 A81-35024
Effect of in-flight thrust reverser deployment on tactical aircraft stability and control [AIAA PAPER 81-1446] p0504 A81-40879
A large executive jet design project p0513 A81-42051
The improvement of aircraft specific range by periodic control [AIAA 81-1748] p0553 A81-44080
A mode decomposition control logic for system performance enhancement [AIAA 81-1753] p0554 A81-44083
The 146 emerges from the shadows p0560 A81-44874
Prediction of range and endurance of jet aircraft at constant altitude p0611 A81-47725
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing [NASA-CR-159361] p0032 N81-11013
Fitment of TANAN standby attitude indicators to Macchi aircraft [AD-A089378] p0035 N81-11036
Flight test handbook: Flying qualities theory and flight test techniques [AD-A090525] p0076 N81-12073
Long-range airplane study: The consumer looks at SST travel p0247 N81-18014
Delta electrical load analysis C-141B JACC/CP Aircraft [AD-A095659] p0334 N81-20071
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions [AD-A095634] p0334 N81-20072
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept [AD-A103579] p0637 N81-33195

JET AIRCRAFT NOISE
An experimental investigation of jet screech by air jet impingement on solid boundaries p0005 A81-11302
Some thoughts on the effects of flight on jet noise as observed in actual flight and in wind tunnels p0016 A81-11723
Status of knowledge of sonic booms p0017 A81-11822
Numerical prediction of bypass engine jet noise [AIAA PAPER 80-1006] p0057 A81-14300
Sound radiation from a finite length unflanged circular duct with uniform axial flow. I - Theoretical analysis. II - Computed radiation characteristics p0100 A81-16712
Experimental investigations on shock-associated noise p0107 A81-17735
A study of multiple jets p0110 A81-18024

Propagation of three-dimensional acoustic perturbations in channels of variable cross-sectional area at frequencies close to cutoff frequency p0119 A81-19338

Fuel consumption aspects of some noise abatement procedures p0154 A81-20350

Numerical techniques in linear duct acoustics - A status report [ASME PAPER 80-WA/NC-2] p0170 A81-21120

The spectral analysis of nonstationary random processes - Applications to aircraft overflight-type noises --- French thesis p0174 A81-21922

Effect of a semi-annular thermal acoustic shield on jet exhaust noise p0178 A81-22532

Effect of facility variation on the acoustic characteristics of three single stream nozzles p0178 A81-22534

Empirical method for the prediction of business executive jet cabin noise levels p0224 A81-23844

Noise attenuation and associated thrust increase of turbojet engines through hyper-mixing ejector shrouds p0291 A81-29062

Jet noise suppression for low bypass engines - Have we reached a dead end p0291 A81-29063

Installation effects on propeller noise [AIAA PAPER 80-0993] p0352 A81-31369

Noise characteristics of two parallel jets with unequal flow [AIAA PAPER 80-0168] p0354 A81-31601

Contribution to the study of non stationary signals emitted by moving jet engine - Application to special analysis and imaging. I. p0365 A81-33288

Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II p0366 A81-33294

In-flight jet engine noise measurement system p0410 A81-35553

Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost p0420 A81-37416

Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield [AIAA PAPER 81-1218] p0458 A81-39006

Suppression of jet noise peak by velocity profile reshaping p0458 A81-39039

Aircraft noise control in the 1980's p0567 A81-46352

The influence of the airspeed on jet turbulence and the consequences for the jet noise [DGLR PAPER 81-021] p0609 A81-47595

Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets [AIAA PAPER 81-2041] p0618 A81-48613

Engine noise source breakdown - Theory, simulation and results [AIAA PAPER 81-2040] p0619 A81-48620

Prediction of jet exhaust noise on airframe surfaces during flight [AIAA PAPER 81-2035] p0619 A81-48626

Some modal-frequency spectra of fan noise [AIAA PAPER 81-1990] p0620 A81-48636

Ground effects on aircraft noise for a wide-body commercial airplane [AIAA PAPER 81-1988] p0620 A81-48638

Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation [AIAA PAPER 81-2007] p0621 A81-48640

Effect of excitation on coaxial jet noise as observed by an elliptic mirror [AIAA PAPER 81-2044] p0621 A81-48651

Flight effects on supersonic convergent-divergent nozzle jet noise [AIAA PAPER 81-2027] p0623 A81-49728

Shielding concepts for jet noise [AIAA PAPER 81-2020] p0623 A81-49730

Aviation safety and noise abatement [GPO-50-923] p0032 N81-10578

New interpretations of shock-associated noise with and without screech [NASA-TM-81590] p0032 N81-10807

Core noise measurements from a small, general aviation turbofan engine [NASA-TM-81610] p0044 N81-11769

Effect of a semi-annular thermal acoustic shield on jet exhaust noise [NASA-TM-81615] p0044 N81-11770

Cooperative investigation of the noise producing region of an axisymmetric jet [AD-A089692] p0045 N81-11774

A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise [NASA-TP-1742] p0073 N81-12043

Noise exposure of civil aircarrier airplanes through the year 2000. Volume 1: Methods, procedures, results [EPA-550/9-79-313-1] p0087 N81-12644

Noise exposure of civil aircarrier airplanes through the year 2000. Volume 2: Appendices A through F [EPA-550/9-70-313-2] p0087 N81-12645

Effects of axisymmetric contractions on turbulence of various scales p0093 N81-13055

Exhaust noise in flight: The role of acoustic installation effects [FNR-90029] p0138 N81-14793

The measurement of aero gas turbine noise [FNR-90032] p0138 N81-14795

JT8D engine internal exhaust mixer technology program [AD-A093057] p0215 N81-17091

Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980 [NASA-CR-152356] p0220 N81-17623

Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980 [NASA-CR-152357-VOL-2] p0220 N81-17624

Aerodynamic/acoustic performance of YJ101/double bypass VCE with coannular plug nozzle [NASA-CR-159869] p0220 N81-17846

Development of SCR Aircraft takeoff and landing procedures for community noise abatement and their impact on flight safety p0245 N81-17994

Flight and tunnel test results of the MDC mechanical jet noise suppressor nozzle p0245 N81-18000

Effects of nozzle design on the noise from supersonic jets p0246 N81-18001

Status of noise technology for advanced supersonic cruise aircraft p0246 N81-18002

Coupling of unsteady lift to acoustic duct modes in an axial flow fan [AD-A095080] p0274 N81-19124

Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions [NASA-CR-163106] p0342 N81-21079

The role of coherent structures in the generation of noise for subsonic jets [NASA-CR-164214] p0380 N81-22833

Diagnostic experiments on supersonic jet noise [NASA-CR-164348] p0438 N81-24856

Contribution to the study of nonstationary signals emitted by moving jet engines: Application to special analysis and imaging. Part 1 p0447 N81-26006

Contribution to the study of nonstationary signals emitted by moving jet engines: Application to spectral analysis and imaging. Part 2 p0447 N81-26013

YC-15 interior noise measurements. Technical discussion [AD-A098788] p0492 N81-26847

YC-14 interior noise measurements program [NASA-CR-164523] p0492 N81-26849

Effect of propagation distance on aircraft flyover sound duration [AD-A099694] p0500 N81-27889

Optimization of barriers --- for screening engine noise, diffraction
[ESA-TT-648] p0500 N81-27893
Shock associated noise reduction from inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30908
An active noise reduction system for aircrew helmets
p0604 N81-31470
Computer program to predict aircraft noise levels
[NASA-TP-1913] p0641 N81-33947
JET AIRSTREAMS
U JET STREAMS (METEOROLOGY)
JET AUGMENTED WING FLAPS
U JET FLAPS
U WING FLAPS
JET BOUNDARIES
Radiation boundary conditions for wave-like equations --- numerical jet acoustics experimentation
p0153 A81-20223
JET DAMPING
U DAMPING
U SPIN REDUCTION
JET DRAGON AIRCRAFT
U DH 125 AIRCRAFT
JET DRIVE
U JET PROPULSION
JET ENGINE FUELS
NT JP-4 JET FUEL
NT JP-5 JET FUEL
NT JP-8 JET FUEL
NT LIQUID FUELS
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
Evolutions in business jet fuel systems as seen in the Falcon Jet series
[SAE PAPER 800621] p0062 A81-15339
Comparative evaluation of the quality of jet fuels
p0103 A81-17371
Formation of solid phase during the heating of jet fuels
p0103 A81-17372
The evaluation of fuel property effects on Air Force gas turbine engines - Program Genesis
[ASME PAPER 81-GT-1] p0310 A81-29926
Impacts of broadened-specification fuels on aircraft turbine engine combustors
[ASME PAPER 81-GT-2] p0310 A81-29927
A UK view on future fuels --- for aircraft
[ASME PAPER 81-GT-67] p0314 A81-29994
Future U.S. jet fuels - A refiner's viewpoint
[AIAA PAPER 81-0770] p0367 A81-33876
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
Status of the program to develop LH2 for aircraft
[SAE PAPER 801153] p0407 A81-34244
Alternative aircraft fuels - When will the action start
p0465 A81-39981
Determination of coking rate in jet fuel
p0570 A81-46448
Fuel character effects on current, high pressure ratio, can-type turbine combustion systems
[AD-A089182] p0029 N81-10073
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10128
Fuel jettisoning by U.S. Air Force aircraft. Volume 1: Summary and analysis
[AD-A089010] p0032 N81-10580
Fuel jettisoning by U.S. Air Force aircraft. Volume 2: Fuel dump listings
[AD-A089076] p0032 N81-10581
Toxicity of synthetic high density and conventional hydrocarbon jet fuels to a soil bacterium
[AD-A089527] p0041 N81-11233
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936
Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18018
The use of Antimisting Kerosene (AMK) in turbojet engines
p0267 N81-19063
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19323
An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211
Wing spillage tests using antimisting fuel
[AD-A096326] p0344 N81-21215
Investigation of air solubility in jet A fuel at high pressures
[NASA-CR-3422] p0378 N81-22130
Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates
[NASA-TP-1768] p0436 N81-24283
The 1H and 13C fourier transform NMR characterization of jet fuels derived from alternate energy sources
[AD-A098305] p0437 N81-24284
Aviation turbine fuels 1980
[DOE/BETC/PPS-81/2] p0445 N81-25255
Behavior of fuels at low temperatures
[AD-A100332] p0542 N81-28276
Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277
Application of General Technology Applications, Incorporated (GTA) blending process to antimisting fuel additives
[AD-A100692] p0551 N81-29247
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260
Ultrasonic dispersion of particulate high density fuels
[AD-A102771] p0630 N81-32290
JET ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT DUCTED FAN ENGINES
NT J-65 ENGINE
NT J-79 ENGINE
NT J-85 ENGINE
NT J-97 ENGINE
NT RAMJET ENGINES
NT SUPERSONIC COMBUSTION RAMJET ENGINES
NT T-56 ENGINE
NT TF-30 ENGINE
NT TF-41 ENGINE
NT TURBOFAN ENGINES
NT TURBOJET ENGINES
NT TURBOPROP ENGINES
The jet engine - Anniversary of a missed opportunity
p0061 A81-15168
Parameter identification and discriminant analysis for jet engine mechanical state diagnosis
p0156 A81-20474
A computerized study of wave characteristics in a time dependent compressible flow
[AIAA PAPER 81-0410] p0169 A81-20838
Jet engine maintenance and reliability programs - Objectives and management
p0287 A81-28475
Fresh mixture entrainment in a jet curtain flameholder
p0294 A81-29004
Improved jet engine maintenance through automated vibration diagnostic systems
[ASME PAPER 81-GT-62] p0313 A81-29972
Application of scaling in afterburner test and development
[ASME PAPER 81-GT-194] p0317 A81-30086
Test-stand combustion chamber for the study and development of forced working processes --- for jet engines
p0319 A81-30151
Interaction of a gas jet from a jet engine with the destroyed surface of a multiphase disperse medium
p0319 A81-30152
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022
Fundamental investigation on jet engine ignition of fuel sprays and its application
p0420 A81-37341
Tests of air inlets at Reynolds numbers comparable to flight in the ONERA F1 and S1MA wind tunnels
[ONERA, TP NO. 1981-36] p0460 A81-39239
An acquisition and analysis system for the dynamic testing of air intakes

[ONERA, TP NO. 1981-37] p0460 A81-39240
Test facility for the measurement of infrared
radiation from jet engine exhaust systems
p0462 A81-39503
Boron aluminum blades and vanes
[AIAA PAPER 81-1359] p0502 A81-40840
Recent developments in Naval aircraft jet engine
usage
[AIAA PAPER 81-1366] p0502 A81-40846
Combined environment reliability testing /CERT/ as
applied to engine mounted electronic controls
[AIAA PAPER 81-1500] p0516 A81-42204
ATES activity and status at Detroit Diesel Allison
--- Advanced Technology Engine Studies
[AIAA PAPER 81-1504] p0516 A81-42206
Digital controls in a large engine test facility
p0532 A81-43715
Damping applications in aero-propulsion systems
p0613 A81-47999
Quantitative thermography in aero-engine research
and development
[PNR-90021] p0029 N81-10075
Axial flow compressors. Citations from the
Engineering Index data base
[PB80-808611] p0029 N81-10076
Axial flow compressors. Citations from the NTIS
data base
[PB80-808603] p0031 N81-10441
Alternatives for jet engine control
p0080 N81-12103
USAF Aircraft Engine emission goals, a critical
review
[AD-A090282] p0087 N81-12651
Shear layer instability noise produced by various
jet nozzle configurations
[PNR-90018] p0088 N81-12825
Are management problems in the acquisition of
aircraft gas turbine engines being corrected
[AD-A090520] p0088 N81-12928
An evaluation of wind tunnel test techniques for
aircraft nozzle afterbody testing at transonic
Mach numbers
[AD-A091775] p0126 N81-13931
Prediction of sound radiated from different
practical jet engine inlets
[NASA-CR-163824] p0137 N81-14789
Validation of a two dimensional primitive variable
computer code for flow fields in jet engine test
cells
[AD-A092138] p0196 N81-16060
Composite containment systems for jet engine fan
blades
[NASA-TM-81675] p0220 N81-17480
Validation of a two-dimensional primitive variable
computer code for flow fields in jet engine test
cells
[AD-A094615] p0254 N81-18067
On the influence of steady state temperature and
pressure distortion on the flow characteristics
in an installed multistage jet engine compressor
--- heated intake air
[PNR-90022] p0275 N81-19126
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047
The optimum design of by-pass engines with jet
mixing
[PNR-90017] p0335 N81-20081
Electromagnetic scattering by open circular
waveguides --- modeling jet engine inlets
[AD-A095554] p0336 N81-20345
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
Investigations of free-jet test requirements and
techniques with emphasis on the adaptable jet
stretcher
[AD-A098710] p0439 N81-25044
JT9D performance deterioration results from a
simulated aerodynamic load test
[NASA-TM-82640] p0443 N81-25082
Selected results from combustion research at the
Lewis Research Center
[NASA-TM-82627] p0443 N81-25083
Contribution to the study of nonstationary signals
emitted by moving jet engines: Application to
spectral analysis and imaging. Part 2
p0447 N81-26013
Prediction of sound radiation from different
practical jet engine inlets
[NASA-CR-164620] p0500 N81-27886
From the civil component program 'IFAS':
Fundamentals of engine simulation, using
turbopowered simulator (TPS) technology in wind
tunnel tests
[BMFT-FB-W-80-030] p0541 N81-28111
CF 6 engine diagnostics
p0597 N81-31197
CF6 high pressure compressor and turbine clearance
evaluations
p0598 N81-31198
JT9D jet engine diagnostics program
p0598 N81-31199
Development of an analytical technique for the
optimization of jet engine and duct acoustic
liners
[NASA-CR-164872] p0639 N81-33205

JET EXHAUST
On screeching jets exhausting from an axisymmetric
supersonic nozzle
p0008 A81-11616
Vector and scalar characteristics of opposing jets
discharging normally into a cross-stream
p0110 A81-17997
Solutions for slightly over- or under-expanded hot
supersonic jets exhausting into cold subsonic
mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705
Aircraft NO/X/ emissions and stratospheric ozone
reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741
Test facility for the measurement of infrared
radiation from jet engine exhaust systems
p0462 A81-39503
Runway and deck temperatures in vertical
takeoff/landing operations
[AIAA PAPER 81-1623] p0525 A81-43132
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] p0624 A81-49731
An improved prediction method for noise generated
by conventional profile coaxial jets
[AIAA PAPER 81-1991] p0624 A81-49743
Trace chemical analysis methodology
[AD-A090762] p0083 N81-12191
Impact of aircraft emissions on air quality in the
vicinity of airports. Volume 2: An updated
model assessment of aircraft generated air
pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
Organic compounds in the exhaust of a J85-5
turbine engine
[AD-A091712] p0130 N81-13966
Effects of sidewall geometry on the installed
performance of nonaxisymmetric
convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976
Impact of aircraft emissions on air quality in the
vicinity of airports. Volume 1: Recent airport
measurement programs, data analyses, and
submodel development
[AD-A089962] p0201 N81-16628
Advanced technology for controlling pollutant
emissions from supersonic cruise aircraft
p0246 N81-18004
Flap survey test of a combined surface blowing
model: Flow measurements at static flow
conditions
[NASA-CR-152124] p0423 N81-24023
Axisymmetric & non-axisymmetric exhaust jet
induced-effects on a V/STOL vehicle design.
Part 1: Data presentation --- conducted in Ames
11-foot transonic tunnel
[NASA-CR-166146] p0441 N81-25064

JET FLAMES
U JET FLOW

JET FLAPS
Flight test of the 747-JT9D for airframe and
jet-flap interaction noise
[AIAA PAPER 81-2037] p0620 A81-48629
Analytical study of STOL Aircraft in ground
effect. Part 1: Nonplanar, nonlinear wing/jet
lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096
A study of a VTOL thrusting ejector in low speed
flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017

A study of a VTOL thrusting ejector in low speed
flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018
JET FLIGHT
U JET AIRCRAFT
JET FLOW
NT AIR JETS
NT PERIPHERAL JET FLOW
NT SUPERSONIC JET FLOW
Instantaneous velocity measurements in a
periodically pulsed plane turbulent jet
p0066 A81-15895
Numerical calculation of jet-induced ground effect
in VTOL
[AIAA PAPER 81-0015] p0157 A81-20539
Experiments on the linear and non-linear evolution
of the double helical instability in jets
[AIAA PAPER 81-0415] p0168 A81-20818
Perspectives on jet noise
[AIAA PAPER 81-0426] p0168 A81-20829
Drag reduction - Jet breakup correlation with
kerosene-based additives
p0225 A81-23923
A computer simulation of turbulent jet flow
p0230 A81-24424
The effect of jet non-uniformity on the lift of an
augmentor wing
p0298 A81-29144
Roll length of an annular underexpanded jet formed
by a sonic nozzle with cylindrical rod on its axis
p0309 A81-29867
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] p0618 A81-48610
Noise radiated from inverted velocity profile jets
under simulated flight
[AIAA PAPER 81-2026] p0623 A81-49729
Effect of a semi-annular thermal acoustic shield
on jet exhaust noise
[NASA-TM-81615] p0044 N81-11770
Static source locations for four nozzles mounted
on a J-85 engine
[NASA-CR-152401] p0143 N81-14998
Jet wing interaction to give improved combat
performance
p0188 N81-16007
Jet wing interference for an overwing engine
configuration
p0188 N81-16008
Method for predicting the jet-induced aerodynamics
of V/STOL configurations in transition
[AD-A097356] p0385 N81-23043
Fountain-jet turbulence
[AD-A098098] p0423 N81-24028
An engineering method for estimating the induced
lift on V/STOL aircraft hovering in and out of
ground effect
[AD-A098509] p0441 N81-25069
Evaluation of Ting's method for the calculation of
the lift distribution on a wing in propulsive jets
[NLR-TR-80078-U] p0594 N81-31157
JET FUELS
U JET ENGINE FUELS
JET IMPINGEMENT
An experimental investigation of jet screech by
air jet impingement on solid boundaries
p0005 A81-11302
Numerical calculation of jet-induced ground effect
in VTOL
[AIAA PAPER 81-0015] p0157 A81-20539
Heat transfer from a row of impinging jets to
concave cylindrical surfaces
p0231 A81-24924
Streamwise flow and heat transfer distributions
for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985
Interaction of a gas jet from a jet engine with
the destroyed surface of a multiphase disperse
medium
p0319 A81-30152
Wind-tunnel tests of engine-equipped models -
Comparison of two jet wash simulation methods
[ONERA, TP NO. 1981-42] p0460 A81-39245
Vertical momentum of the fountain produced by
multijet vertical impingement on a flat ground
plane
p0529 A81-43396
Investigation of impingement region and wall jets
formed by the interaction of high aspect ratio
lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
Simulation of aeroheating or aerocooling Air Force
stores by arrays of impinging jets
[AD-A095464] p0330 N81-20036
JET LIFT
Vertical momentum of the fountain produced by
multijet vertical impingement on a flat ground
plane
p0529 A81-43396
JET MIXING FLOW
Solutions for slightly over- or under-expanded hot
supersonic jets exhausting into cold subsonic
mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705
Non-isoenergetic turbulent jet mixing in a
constant area duct --- in turbofan engines
[AIAA PAPER 81-0347] p0165 A81-20768
Partially confined multiple jet mixing
p0234 A81-25513
Cooperative investigation of the noise producing
region of an axisymmetric jet
[AD-A089692] p0045 N81-11774
Turbulence modeling for application to V/STOL
propulsion induced effects: Two dimensional
formulation
[AD-A090331] p0072 N81-12026
The optimum design of by-pass engines with jet
mixing
[PNR-90017] p0335 N81-20081
JET NOISE
U JET AIRCRAFT NOISE
JET NOZZLES
On screeching jets exhausting from an axisymmetric
supersonic nozzle
p0008 A81-11616
Effect of a semi-annular thermal acoustic shield
on jet exhaust noise
p0178 A81-22532
The method for calculating the fuel concentration
field in the downstream positions of the
pressure jet atomizer in the high temperature
gas-stream
p0224 A81-23731
Noise characteristics of two parallel jets with
unequal flow
[AIAA PAPER 80-0168] p0354 A81-31601
Jet-diffuser ejector - Attached nozzle design
[NASA-CR-152361] p0278 N81-19412
JET PILOTS
U AIRCRAFT PILOTS
JET PROPULSION
Quiet propulsive-lift technology ready for civil
and military applications
p0359 A81-32521
Simulating study of the interaction between the
propulsion and flight control systems of a
subsonic lift fan VTOL
[NASA-TM-81239] p0036 N81-11043
Evaluation of Levinsky's method for the
calculation of the lift distribution on a wing
in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
JET STREAMS (METEOROLOGY)
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677
JET THRUST
Experimental development of an advanced
circulation control wing system for Navy STOL
aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
Jet noise suppression for low bypass engines -
Have we reached a dead end
p0291 A81-29063
Experimental investigation of oscillating subsonic
jets
p0360 A81-32777
Prediction of swirling reacting flow in ramjet
combustors
[AIAA PAPER 81-1485] p0506 A81-40903
Flight evaluation of a simplified gross thrust
calculation technique using an F100 turbofan
engine in an F-15 airplane
[NASA-TP-1782] p0143 N81-15000
Comparison of three thrust calculation methods
using in-flight thrust data
[NASA-TM-81360] p0581 N81-30111

JET VANES
Boron aluminum blades and vanes
[AIAA PAPER 81-1359] p0502 A81-40840
JETAVATORS
U GUIDE VANES
JETTISON SYSTEMS
Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20] p0474 A81-40150
Ergonometric study of ejection through a breakable canopy
p0205 N81-17011
Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461] p0582 N81-30119
JETTISONING
Fuel jettisoning by U.S. Air Force aircraft. Volume 1: Summary and analysis
[AD-A089010] p0032 N81-10580
Fuel jettisoning by U.S. Air Force aircraft. Volume 2: Fuel dump listings
[AD-A089076] p0032 N81-10581
JF 101 AIRCRAFT
U F-101 AIRCRAFT
JINDIVIK TARGET AIRCRAFT
Transonic wind tunnel measurements of tailplane and elevator effectiveness of the Jindivik 203B target aircraft
[AD-A098180] p0424 N81-24031
JITTER
U VIBRATION
JOINING
Classification of links of assembly units with respect to the character of their connections, and calculation of the accuracy of their execution --- in airframe construction
p0319 A81-30168
JOINTS (JUNCTIONS)
NT METAL JOINTS
NT RIVETED JOINTS
Non-destructive testing of adhesive-bonded joints
p0153 A81-20162
The joints of aeronautical carbon resin composite structural elements
p0238 A81-26242
Bolt bearing strengths of graphite/epoxy laminates
[AIAA 81-0544] p0301 A81-29396
A fatigue study and an investigation on mechanically fastened joints for the development of a flap
p0481 A81-40581
Elastomers used in aeronautics industry
[SNIAS-801-551-105] p0031 N81-10168
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182
Design, fabrication and test of graphite/polyimide composite joints and attachments for advanced aerospace vehicles
[NASA-CR-159112] p0194 N81-16042
Scarf joints in unidirectional carbon fiber reinforced plastics --- tests of repairs made using adhesives
[BU-258] p0336 N81-20193
Thirty years experience with primary adhesive bonded structures --- aircraft construction
[FOK-BO-1240] p0541 N81-28189
Nondestructive testing of adhesive bonded joints
[FOK-BO-1241] p0542 N81-28190
Operational experience with adhesive bonded structures --- aircraft structures
[FOK-BO-1235] p0582 N81-30124
JOURNAL BEARINGS
An analytical method to calculate misalignment in the journal bearing of a planetary gear system
p0004 A81-10839
An experimental and theoretical investigation of pressures in four-lobe bearings
p0004 A81-10840
On the steady state and dynamic performance characteristics of floating ring bearings
[ASME PAPER 80-C2/LUB-17] p0117 A81-18671
Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683
Nonlinear analysis of squeeze film dampers applied to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062
JOURNALS (SHAFTS)
U SHAFTS (MACHINE ELEMENTS)
JP-4 JET FUEL
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
JP-5 JET FUEL
Acceptability of shale derived fuel for Navy aircraft propulsion systems
[AIAA PAPER 81-1424] p0503 A81-40868
Two-stage combustion for reducing pollutant emissions from gas turbine combustors
[NASA-CR-163877] p0196 N81-16056
Effect of refining variables on the properties and composition of JP-5
[AD-A093842] p0219 N81-17281
JP-8 JET FUEL
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073

K

KALMAN FILTERS
Some implementation considerations for numerically stable flight filters
p0156 A81-20485
The reconstruction/refiltering approach to Kalman filter evaluation --- in long-range aircraft avionics
p0326 A81-30339
Implementation of target orientation angles in improved Kalman filter based short range radar tracking
p0326 A81-30340
Dynamic errors of the Kalman filtering of trajectory parameters --- for radar tracking of aircraft maneuvers
p0366 A81-33687
Optimal processing of GPS signals
p0512 A81-41761
DEKFIS user's guide: Discrete Extended Kalman Filter/Smoother program for aircraft and rotorcraft data consistency
[NASA-CR-159081] p0379 N81-22722
The reconstruction of flight paths from AIDS data with the aid of modern filtering methods --- kalman filters
p0383 N81-23021
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116
KARMAN VORTEX STREET
An example of the transonic flow past a body with a discontinuity in the contour curvature
p0019 A81-12367
KC-130 AIRCRAFT
U C-130 AIRCRAFT
KC-135 AIRCRAFT
U C-135 AIRCRAFT
KERNEL FUNCTIONS
Three-dimensional oscillatory piecewise continuous-kernel function method. I - Basic problems. II - Geometrically continuous wings. III - Wings with geometrical discontinuities
p0411 A81-35631
KEROGEN
NT LIQUID FUELS
KEROSENE
NT LIQUID FUELS
An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
p0109 A81-17041
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923
Future U.S. jet fuels - A refiner's viewpoint
[AIAA PAPER 81-0770] p0367 A81-33076
Degradation and characterization of antimisting kerosene /AMK/
[AIAA PAPER 81-1423] p0503 A81-40867
The use of AntiMisting Kerosene (AMK) in turbojet engines
p0267 N81-19063
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] p0277 N81-19316
Aircraft Research and Technology for Antimisting Kerosene Conference
[AD-A101347] p0580 N81-30103

KEVLAR (TRADEMARK)
Advanced graphite composites in the 757/767
[SAE PAPER 801212] p0404 A81-34220
Kevlar - Thermophysical properties
[AIAA PAPER 81-1104] p0459 A81-39104
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049
Air Force Geophysics Laboratory aerodynamically tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023
KINEMATIC EQUATIONS
A geometrical study of the steady-state spin for a typical low-wing general aviation aircraft
p0454 A81-38023
Kinematic properties of the helicopter in coordinated turns
[NASA-TP-1773] p0374 N81-22039
KINEMATICS
Analytic determination of the kinematic and energy parameters of aircraft braking during the landing run
p0409 A81-35008
Kinematic properties of rotary-wing and fixed-wing aircraft in steady coordinated high-g turns
[AIAA PAPER 81-1855] p0560 A81-44554
Influence of sideslip on the kinematics of the helicopter in steady coordinated turns
p0576 A81-46644
KINETIC ENERGY
Wind tunnel tests to determine the behavior during ejection of exterior stores at high and low speeds
[DLGB-79-096] p0272 N81-19102
Flight evaluation of a simple total energy-rate system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24058
KINETIC EQUATIONS
NT KINEMATIC EQUATIONS
KINETIC HEATING
NT AERODYNAMIC HEATING
KINETIC THEORY
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] p0608 A81-47562
KINETICS
NT KINETIC ENERGY
NT REACTION KINETICS
KIRCHHOFF-HELMHOLTZ FLOW
U PIPE FLOW
KIRCHHOFF-HUYGENS PRINCIPLE
U WAVE PROPAGATION
KITE BALLOONS
U TETHERED BALLOONS
KNIGHT SHIFT
U NUCLEAR MAGNETIC RESONANCE
KRONECKER PRODUCT
U ORTHOGONALITY
KU BAND
U SUPERHIGH FREQUENCIES
KUIPER AIRBORNE OBSERVATORY
U C-141 AIRCRAFT

L

L-1011 AIRCRAFT
Air traffic management enhancement through new avionics /4-D/
p0099 A81-16583
History of flight testing the L-1011 Tristar jet transport. I - The L-1011-1
p0110 A81-17976
L-1011 Flight Management System design considerations
p0113 A81-18074
Development of graphite-epoxy covers for L-1011 advanced composite vertical fin
p0530 A81-43627
Wade vortex attenuation flight tests: A status report
p0267 N81-19057
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
Propulsion system testing requirements for a commercial transport
p0430 N81-24077

LABORATORIES
NT ENGINE TESTING LABORATORIES
NT ENVIRONMENTAL LABORATORIES
NT HUMAN FACTORS LABORATORIES
Design verification by emulation --- computer image generation for aircrew training simulation
[AIAA 81-0975] p0415 A81-36564
LABORATORY EQUIPMENT
Laboratory studies of flight mechanics using catapult launched models
[AAAF-NT-80-15] p0210 N81-17055
LAG (DELAY)
U TIME LAG
LAKE ERIE
Determination of wind stress from water level fluctuations
N81-30774
LAKES
NT LAKE ERIE
LAMINAR BOUNDARY LAYER
Effect of surface roughness over the blade in compressor cascade
p0060 A81-14924
Laminar boundary layer on swept-back wings of infinite span at an angle of attack
p0107 A81-17656
The influence of flow disturbances on the laminar-turbulent transition in a supersonic boundary layer
p0124 A81-19643
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840
In-flight research - At low cost
p0299 A81-29208
Laminar boundary layer on an oscillating wedge
p0309 A81-29864
Effect of engine noise on aircraft wing laminar boundary-layer stability
p0510 A81-41255
Boundary layer measurements on a two-dimensional wing with flap
[NLR-TR-79009-U] p0022 N81-10014
The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12038
On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042
Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels
p0386 N81-23056
Aircraft Energy Efficiency program: Laminar flow control technology
[NASA-TM-82352] p0437 N81-24309
HADY-1, a FORTRAN program for the compressible stability analysis of three-dimensional boundary layers
p0586 N81-30388
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121
LAMINAR BOUNDARY LAYER SEPARATION
U LAMINAR BOUNDARY LAYER
LAMINAR FLAMES
U LAMINAR FLOW
LAMINAR FLOW
The effects of noise on laminar flow control drag reduction systems
p0058 A81-14390
Separation of laminar boundary layer induced by aerodynamic interference
p0067 A81-15857
Dialogue on bridging some gaps in stability and transition research --- in external, internal and free-shear layer through-flow systems
p0115 A81-18105
Analytically determined fin-tip heat transfer coefficients
p0234 A81-25585
Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0238 A81-26503
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control
p0239 A81-26512

Low-speed wind tunnels with deformable walls
p0299 A81-29304
Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
p0354 A81-31612
Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
[SAE PAPER 801155] p0407 A81-34245
Laminar-airfoils for transport aircraft
[DFVLR-MITT-80-07] p0129 N81-13352
Three-dimensional internal flows in turbomachinery, volume 2
[AD-A093130] p0215 N81-17090
Physical and numerical aspects of shock boundary layer interactions
p0256 N81-18324
Natural laminar flow flight experiment --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19010
Topology of three-dimensional separated flows
[NASA-TM-81294] p0385 N81-23037
Evaluation of turbulence reduction devices for the Langley 8-foot Transonic Pressure Tunnel
[NASA-TM-81792] p0434 N81-24114
Aircraft Energy Efficiency program: Laminar flow control technology
[NASA-TM-82352] p0437 N81-24389
Analysis of laminar and turbulent symmetric blunt trailing-edge flows
[AD-A098703] p0439 N81-25046
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121

LAMINAR FLOW AIRFOILS
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control techniques
[AD-A090778] p0072 N81-12024
Discussion of test results in the design of laminar airfoils for competition gliders
[NASA-TM-75402] p0186 N81-15984
Design and experimental results for a natural-laminar-flow airfoil for general aviation applications
[NASA-TP-1861] p0423 N81-24022

LAMINAR FLOW CONTROL
U BOUNDARY LAYER CONTROL
U LAMINAR BOUNDARY LAYER

LAMINAR HEAT TRANSFER
Flow transition phenomena and heat transfer over the pressure surfaces of gas turbine blades
[ASME PAPER 81-GT-107] p0315 A81-30012

LAMINAR JETS
U JET FLOW
U LAMINAR FLOW

LAMINATED MATERIALS
U LAMINATES

LAMINATES
The matrix analysis of wings
p0108 A81-17818
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
Research on fatigue at the Department of Aerospace Engineering of the Delft University
p0232 A81-24939
Bolt bearing strengths of graphite/epoxy laminates
[AIAA 81-0544] p0301 A81-29396
Bonded laminated structures in aircraft manufacture --- Russian book
p0366 A81-33700
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate
p0418 A81-37137
The optimum design of non-moment laminated composite plate - According to static failure strength condition
p0480 A81-40449
High-char-forming composite laminates
p0532 A81-43652
Use of carbon composites in aircraft structures
p0577 A81-46813
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] p0609 A81-47565
Developing design allowables for composite helicopter structures
p0611 A81-47811
Predictability of moisture absorption in graphite/epoxy sandwich panels
p0039 N81-11131
Relationships between impact resistance and fracture toughness in advanced composite materials
p0040 N81-11137
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489

LAMINATIONS
U LAMINATES

LAMPS
U LUMINAIRES

LAMPS PROGRAM
U LIGHT AIRBORNE MULTIPURPOSE SYSTEM

LAND USE
Investment decision-making in international airports
p0113 A81-18079
Airbase induced community noise - Facilitating the military/civil interface
p0569 A81-46368
Aircraft noise and land use compatibility tradeoff analyses
p0569 A81-46370
Airport Noise Control and Land Use Compatibility Studies A U.S. case
p0570 A81-46372

LANDFORMS
NT BERMUDA
NT PACIFIC ISLANDS

LANDING
NT AIRCRAFT LANDING
NT CRASH LANDING
NT DITCHING (LANDING)
NT GLIDE LANDINGS
NT VERTICAL LANDING
NT WATER LANDING
A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise
[NASA-TP-1742] p0073 N81-12043
In-flight handling qualities investigation of A310 Airbus DLC-configurations on landing approach, using the DFVLR-HFB 320 in-flight simulator (variable stability aircraft) --- instrument flight
[ESA-TT-630] p0276 N81-19135

LANDING AIDS
NT AIRPORT LIGHTS
NT ALL-WEATHER LANDING SYSTEMS
NT APPROACH INDICATORS
NT ARRESTING GEAR
NT AUTOMATIC LANDING CONTROL
NT DISCRETE ADDRESS BEACON SYSTEM
NT INSTRUMENT LANDING SYSTEMS
NT LANDING INSTRUMENTS
NT LANDING RADAR
NT MICROWAVE LANDING SYSTEMS
NT RUNWAY LIGHTS
Procedures to improve flight safety in wind shear conditions
p0014 A81-11666
The state of German involvement and future possibilities in the development of the DME-based landing system DLS
p0051 A81-13311
The present state of the MLS --- Microwave Landing System standardization
p0051 A81-13312
The outfitting of regional airports in the future with radio assistance for approach and landing, with emphasis on landing site obstacles for general aviation
p0051 A81-13313
Research on mechanical flight problems in aircraft parachute systems
p0065 A81-15706
Airport visual approach, guidance and landing systems - Airline pilots viewpoint
p0114 A81-18083
Landings according to CAT II
p0230 A81-24523
Concepts and state of the art of the precision DME of the microwave landing system
p0233 A81-25376
Progress in the use of automatic flight controls in safety critical applications
p0284 A81-27902

Evaluation of several control/display concepts for V/STOL shipboard landing
[SAE PAPER 801205] p0403 A81-34213
Precision flight path control in carrier landing approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43956
Analysis of the function principle and operational assessment of an onboard glidepath guidance system for visual approaches (Visual Approach Monitor (VAM)
[DFVLR-FB-79-38] p0025 N81-10043
Microwave Landing System (MLS) clearance format assessment tests
[AD-A093553] p0206 N81-17024
MLS channel assignment model
[AD-A093449] p0206 N81-17026
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS)
[AD-A094169] p0250 N81-18036
A head-up display format for transport aircraft approach and landing
p0265 N81-19043
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22282
Feasibility of collision warning, precision approach and landing using GPS, volume 1
[NASA-CR-165675] p0537 N81-28070

LANDING GEAR
Subsequent proof of damage tolerance for a landing gear component after numerous takeoffs and landings
p0006 A81-11475
Today and the future in aircraft wheel and brake development
p0102 A81-17046
Stress measurements on landing gear for the Airbus A-300 B2
p0119 A81-19299
Longitudinal instability in braked landing gear
[ASME PAPER 80-WA/DSC-12] p0170 A81-21083
Landing gear shock absorber design criteria and the assessment of tire/wheel configurations
p0232 A81-24940
Application of a Fourier analyzer to the analysis of shimmy test data
[AIAA 81-0533] p0303 A81-29453
Test procedures used in determining aircraft suitability for STAN integral weight and balance system
[SAWE PAPER 1339] p0352 A81-31379
Design and testing of float landing gear systems for helicopters
p0356 A81-32007
F-15 nose landing gear shimmy, taxi test and correlative analyses
[SAE PAPER 801239] p0406 A81-34237
Braking of an aircraft tyre
p0412 A81-35892
Dynamics and calculations for an aircraft landing gear pneumatic shock absorber system
p0417 A81-36718
Investigation of landing gear alternatives for high performance aircraft
[AIAA PAPER 81-1639] p0525 A81-43139
A dynamic shimmy analysis
[AIAA PAPER 81-1700] p0527 A81-43161
Aircraft ground mobility system for the F-16 aircraft
[AIAA PAPER 81-1735] p0536 A81-43960
The influence of structural parameters and velocity on the shimmy of self-aligned wheels
p0556 A81-44268
Self-oscillations of a self-aligned landing gear strut in the case of classical nonholonomic rolling constraints
p0563 A81-45315
Self-oscillations of a wheel on a self-aligning landing gear strut with a nonlinear damper
A81-46847
A formulation of the shimmy problem for swiveling wheels
p0607 A81-47268
Influence of landing gear flexibility on aircraft performance during ground roll
p0622 A81-49375
Superplastic formed and diffusion bonded titanium landing gear component feasibility study
[AD-A092788] p0206 N81-16213
Environment-load interaction effects on crack growth in landing gear steels
[AD-A093803] p0218 N81-17242
Current research in aircraft tire design and performance
p0268 N81-19065
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041
Tire/wheel concept
[NASA-CASE-LAR-11695-2] p0437 N81-24443
Advances in landing gear systems
p0545 N81-29077
Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea
[NASA-TM-81305] p0579 N81-30080
Damage tolerance of a landing gear component after many takeoffs and landings --- nondestructive tests
[NLR-MP-79039-U] p0596 N81-31189

LANDING INSTRUMENTS
NT APPROACH INDICATORS
New definition of areas of protection for instrument landing
p0225 A81-23869
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142

LANDING LOADS
Runway surface loading during aircraft landings
p0149 A81-19800
Operational responses to aft empty C.G. --- Center of Gravity location in Boeing 727-200 aircraft
[SAWE PAPER 1338] p0352 A81-31378

LANDING MATS
Fiberglass-reinforced rigid polyurethane expedient pavement subject to simulated F-4 aircraft traffic
[AD-A089266] p0030 N81-10079

LANDING RADAR
Results of a feasibility study for determining the yaw angle of a landing aircraft
[AD-A099765] p0495 N81-27084

LANDING SIMULATION
Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
[SAE PAPER 801206] p0403 A81-34214
On-line wind shear generation for flight simulator applications
[AIAA 81-0970] p0414 A81-36559
Simulation of Microwave Landing System
p0615 A81-48368
Realization of a method of extremal targeting in a problem of aircraft landing control
p0625 A81-49943
Analysis of the function principle and operational assessment of an onboard glidepath guidance system for visual approaches (Visual Approach Monitor (VAM)
[DFVLR-FB-79-38] p0025 N81-10043
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-16994
Advanced supersonic transport fixed-base simulator evaluations at landing approach
p0244 N81-17992
Recent progress towards predicting aircraft ground handling performance
[NASA-TM-81952] p0339 N81-21044

LANDING SITES
Application of endfire arrays at contemporary glide-slope problem sites
p0360 A81-32695
Engineering approaches for cost savings with ILS glide-slope installations
p0516 A81-42431

LANDING SPEED
Analytic determination of the kinematic and energy parameters of aircraft braking during the landing run

p0409 A81-35008
LANDING SYSTEMS
U LANDING AIDS
LANDMARKS
Passive imagery navigation
[AD-A096245] p0339 N81-21051
LANDSCAPE
U TERRAIN
LANGUAGES
NT FORTRAN
NT HIGH LEVEL LANGUAGES
Bilingual air traffic control in Canada
p0169 A81-20915
Second language speech comprehension in noise: A hazard to aviation safety
p0604 N81-31463
LARGE SCALE INTEGRATION
The Z8000 provides the basis for a powerful new airborne computer
p0321 A81-30252
A review of current and future components for electronic warfare receivers
p0357 A81-32252
LARGE SPACE STRUCTURES
Software survey for the avionics test bed --- for large space structures
[NASA-CR-161089] p0629 N81-32143
LASER ALTIMETERS
Sidelooking laser altimeter for a flight simulator
[NASA-CASE-ARC-11312-1] p0278 N81-19439
LASER ANEMOMETERS
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements
[ESA-TT-625] p0197 N81-16069
LASER APPLICATIONS
A simple laser interferometer for wind tunnel flow visualisation
p0018 A81-12078
Laser measurement of angle of attack on wind-tunnel models
p0154 A81-20419
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187
Laser scattering applications development test in AEDC tunnel B at Mach number 8
[AD-A093929] p0217 N81-17105
Laser beacon collision avoidance systems
p0372 N81-22009
LASER COMMUNICATION
U OPTICAL COMMUNICATION
LASER DOPPLER VELOCIMETERS
Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367
A computer-based laser Doppler velocimeter
[DFVLR-MITT-79-14] p0133 N81-14289
Laser Doppler airspeed and altitude sensor
[AD-A096980] p0375 N81-22049
LASER GYROSCOPES
Laser-gyro strapdown inertial navigation
p0225 A81-23868
The optical-fiber interferometer gyroscope for aviation navigation
p0451 A81-37650
CAINS II - An application of standard laser gyro inertial and computer technology for existing naval carrier aircraft
p0516 A81-42434
Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN
p0485 N81-26102
LASER INTERFEROMETRY
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0418 A81-36940
A direct model pitch measurement with a laser interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300
LASER RADAR
U OPTICAL RADAR
LASER RANGE FINDERS
Ferranti mission managers
p0553 A81-44043
LASER RANGER/TRACKER
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
LASER TARGET DESIGNATORS
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047
LASER WEAPONS
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137
B-52 wake investigation
[LOG-C3932] p0072 N81-12020
LASER WELDING
NT BRAZING
LASERS
NT CARBON DIOXIDE LASERS
NT HELIUM-NEON LASERS
NT HIGH POWER LASERS
NT PULSED LASERS
NT RING LASERS
NT RUBY LASERS
Flow control about an airborne laser turret
[AD-A100110] p0537 N81-28060
LASV
U F-111 AIRCRAFT
LATERAL CONTROL
Aircraft lateral parameter estimation from flight data with unsteady aerodynamic modelling
[AIAA PAPER 81-0221] p0162 A81-20684
Inverse problems of the dynamics of controlled flight - Lateral motion
p0236 A81-25903
The problem of the minimum-time turn of a maneuverable aircraft velocity vector to a specified course angle
p0413 A81-36472
Lateral-directional flying qualities of transport aircraft
[AIAA PAPER 81-1887] p0561 A81-44579
Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations
[NASA-TP-1776] p0142 N81-14997
The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19009
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] p0638 N81-33203
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] p0639 N81-33210
LATERAL STABILITY
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles
p0004 A81-10913
The possibility of improving the lateral-directional characteristics of a twin-engine aircraft by spoilers in the case of sudden engine failure
p0049 A81-12967
Aircraft stability at high incidence
p0282 A81-27878
Roll stabilization of flight vehicles by means of rollerons
p0290 A81-29016
Assessment of propeller influence on lateral-directional stability of multiengine aircraft
p0411 A81-35632
Lateral flutter of loads towed beneath helicopters and its avoidance
p0470 A81-40114
Data analysis for aircraft parameter estimates
[AIAA PAPER 81-1864] p0560 A81-44561
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518
A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 A81-46626

Design of a lateral stability augmentation system for the F106 to improve lateral handling qualities during tracking
[AD-A091014] p0094 N81-13067
Leading-edge deflection optimization for a highly swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974
Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results --- Ames 7- by 10-ft wind tunnel tests
[NASA-TM-81269] p0423 N81-24025
The stick-fixed lateral dynamic stability of the CSIR SARA II autogyro
[NIAST-80/52] p0434 N81-24107
LATERALITY
U LATERAL STABILITY
LATERALIZATION
U LATERAL CONTROL
LATHES
Tool force evaluation of lathe machined high explosives
[MHSMP-80-20] p0148 N81-15140
LATTICE IMPERFECTIONS
U CRYSTAL DEFECTS
LATTICES (MATHEMATICS)
Analytical estimation on nonlinear longitudinal characteristics of wings with small and moderate aspect ratio by the vortex lattice method in incompressible flow
[ESA-TT-585] p0022 N81-10018
Application of vortex lattice methods to calculate Lv (rolling moment due to sideslip)
[PB81-166167] p0487 N81-26123
LAUNCH VEHICLE CONFIGURATIONS
Aeroelasticity, including dynamic effects of separated flow --- launch vehicle response
p0592 N81-31118
LAUNCH VEHICLES
The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475
LAUNCHERS
NT AIRCRAFT LAUNCHING DEVICES
NT CATAPULTS
NT GUN LAUNCHERS
NT MISSILE LAUNCHERS
NT ROCKET LAUNCHERS
LAUNCHING
NT AIR LAUNCHING
NT SEA LAUNCHING
LAWS
NT NEWTON-BUSEMANN LAW
NT SCALING LAWS
NT SIMILITUDE LAW
LEADING EDGE FLAPS
Leading-edge 'Vortex Flaps' for enhanced subsonic aerodynamics of slender wings
p0012 A81-11648
The aerodynamics of inverted leading edge flaps on delta wings
[AIAA PAPER 81-0356] p0165 A81-20775
Effectiveness of leading-edge vortex flaps on 60 and 75 degree delta wings
p0352 A81-31368
Effects of yaw on leading edge vortex flap aerodynamics
[AIAA PAPER 81-1660] p0526 A81-43147
Effect of leading-edge vortex flaps on aerodynamic performance of delta wings
p0559 A81-44424
Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
p0243 N81-17986
Leading edge vortex flaps for drag reduction --- during subsonic flight
[NASA-CASE-LAR-12750-1] p0261 N81-19016
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164833] p0627 N81-32117
LEADING EDGE SLATS
Design and test of a graphite-epoxy composite A-10 slat
p0006 A81-11339
Design and analysis of slat systems in transonic flow
p0050 A81-14392
Leading edge high lift devices for agricultural aircraft
[SAE PAPER 810608] p0522 A81-42765
Subsonic pitch-up alleviation on a 74 deg delta wing
[NASA-CR-165749] p0584 N81-30137
LEADING EDGE SWEEP
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] p0627 N81-32119
LEADING EDGE THRUST
Supersonic wings with significant leading-edge thrust at cruise
p0244 N81-17990
LEADING EDGES
NT SHARP LEADING EDGES
Optimizing the fixed leading edge shape of a transonic wing to suit the leading high-lift requirements
p0011 A81-11688
Simplified vortex models for slender lifting surfaces with leading edge separation
p0016 A81-11777
Numerical prediction of vortex cores of the leading and trailing edges of delta wings
p0659 A81-14475
Numerical lifting line theory applied to drooped leading-edge wings below and above stall
p0066 A81-15861
On a linear theory of a supersonic flow past a delta wing with subsonic leading edges
p0149 A81-19872
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20837
Role of laminar separation bubbles in airfoil leading-edge stalls
p0354 A81-31613
Leading-edge separation from a thick, conical, slender wing at small angles of incidence
p0355 A81-31687
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
Calculation of supersonic flow around a wing with constant curvature of its leading edges
p0413 A81-35916
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090
The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] p0610 A81-47601
Experimental study of supersonic viscous leeside flow over a slender delta wing
[NASA-TM-81248] p0133 N81-14265
Leading-edge deflection optimization for a highly swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974
An investigation of a swept wing-body configuration with drooped leading edge at low and transonic speeds
p0189 N81-16012
Natural laminar flow flight experiment --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19010
Study of the vortex conditions of wings with large sweepback by extrapolation of the Jones method
[NASA-TM-75863] p0262 N81-19026
Leading-edge separation from a slender rolling wing-body combination --- vortex sheet model
[RAE-TR-80039] p0330 N81-20040
On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042
Design and experimental results for a natural-laminar-flow airfoil for general aviation applications
[NASA-TP-1861] p0423 N81-24022
Aerodynamic investigation of C-141 leading edge modifications for cruise drag reduction, test 2
[AD-A099662] p0492 N81-27051

Investigation of aerodynamic stall alleviation on a swept planform wing using leading edge modifications
[AD-A101239] p0548 N81-29122
MM&T: Low cost production/installation of urethane leading edge guards on rotor blades
[AD-A101603] p0582 N81-30117
LEAKAGE
Rotor-tip leakage. I - Basic methodology
[ASME PAPER 81-GT-71] p0313 A81-29980
Rotor-tip leakage. II - Design optimization through viscous analysis and experiment
[ASME PAPER 81-GT-72] p0313 A81-29981
LEAR JET AIRCRAFT
Lear fan propulsion system
[SAE PAPER 800609] p0062 A81-15332
Aircraft accident report: Champion Home Builders company, Gates Learjet 25B, N999HG, Sanford, North Carolina, September 8, 1977
[NTSB-AAR-79-15] p0074 N81-12046
LEARNING
NT TRANSFER OF TRAINING
LEAST SQUARES METHOD
Output predictive algorithmic control - Precision tracking with application to terrain following
p0564 A81-45573
An analytical technique for approximating unsteady aerodynamics in the time domain
[NASA-TP-1738] p0043 N81-11422
LED (DIODES)
U LIGHT EMITTING DIODES
LEGENDRE CODE
U COMPUTER PROGRAMMING
LENGTH
A method for determining landing runway length for a STOL aircraft
p0264 N81-19041
LENSES
NT FRESNEL LENSES
Optical infinity lens development for flight simulator visual displays
p0212 N81-17071
LETTERS (SYMBOLS)
U SYMBOLS
LEVEL (QUANTITY)
NT EFFECTIVE PERCEIVED NOISE LEVELS
LICENSING
Spin recovery training
[GPO-67-439] p0216 N81-17098
LIDAR
U OPTICAL RADAR
LIFE (BIOLOGY)
U LIFE SCIENCES
LIFE (DURABILITY)
NT FATIGUE LIFE
NT SERVICE LIFE
Application of fracture mechanics to US Air Force aircraft structural integrity requirements
[AAAF-NT-79-25] p0066 N81-12463
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
Derivation and correlation of accelerated mission endurance testing
p0431 N81-24088
An introduction to NASA's turbine engine hot section technology (HCST) project
p0599 N81-31206
LIFE CYCLE COSTS
ECS integration for fuel efficient/low life cycle cost design --- Environmental Control Systems in aircraft
p0015 A81-11676
Standardization in military system architecture
p0050 A81-13168
Development of specifications from measured environments
p0067 A81-16119
The engineering basis for the application of life cycle cost or supportability criteria to gas turbine engines
p0298 A81-29119
Engine maintenance cost calculation method
[ASME PAPER 81-GT-34] p0312 A81-29948
Life cycle cost before, during and after the design of aircraft propulsion systems
[ASME PAPER 81-GT-111] p0315 A81-30016
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1331] p0352 A81-31376
The Modular Life Cycle Cost Model for advanced aircraft systems - An overview
[SAWE PAPER 1351] p0353 A81-31386
Component research for future propulsion systems
p0454 A81-38058
Design of rotorcraft powerplants - Use of life cycle costing as an aid to design optimisation
p0469 A81-40109
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882
Advanced technology engine studies /ATES/ - A status report
[AIAA PAPER 81-1502] p0516 A81-42205
Avionics Availability Study
[AIAA PAPER 81-1619] p0525 A81-43129
Investigation of influences on the definition of engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938
Maintenance and repair of advanced composite structure
p0558 A81-44302
Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance
p0559 A81-44396
Aircraft turbine engine monitoring experience. An overview and lessons learned from selected case studies
[AD-A089752] p0036 N81-11042
Design to Cost and Life Cycle Cost
[AGARD-CP-289] p0045 N81-11902
Life Cycle Cost Analysis (LCCA) in military aircraft procurement
p0045 N81-11903
US Army design-to-cost experience
p0045 N81-11905
A review and assessment of system cost reduction activities
p0045 N81-11906
Design to life cycle cost research
p0045 N81-11907
Evolution of techniques for LCC analysis
p0045 N81-11909
The Hornet program: A design to life cycle cost case study
p0046 N81-11910
Design to cost and the F-16 multirole fighter
p0046 N81-11911
Organizing a design-to-cost program
p0046 N81-11914
Some engineering aspects of life cycle costing
p0047 N81-11918
Balanced design: Minimum cost solution
p0047 N81-11919
Design to cost and systems, LCC
p0047 N81-11920
Impact of maintainability of life cycle costs
p0047 N81-11921
Using cost reduction concepts at Messier-Hispano-Bugatti
p0047 N81-11923
Summary of AGARD Lecture Series 100: Methodology for control of life cycle costs for avionics systems
p0047 N81-11924
Summary of AGARD Lecture Series 107: The Application of Design to Cost and Life Cycle Cost to Aircraft Engines
p0047 N81-11926
The role of advanced technology of turbine engine life cycle cost
p0047 N81-11927
Naval aircraft operating and support cost-estimating model: FY78 revision
[AD-A090044] p0071 N81-12013
Digital Avionics Information System (DAIS): Life Cycle Cost Impact Modeling System (LCCIM). A managerial overview
[AD-A093281] p0211 N81-17062
Airborne-fiber optics manufacturing technology, aircraft installation processes
[AD-A093304] p0221 N81-17902
Concept definition: Retirement for cause of F-100 rotor components
[AD-A095584] p0335 N81-20080
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085

Digital Avionics Information System (DAIS).
Volume 1: Impact of DAIS concept on life cycle
cost
[AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS).
Volume 2: Impact of DAIS concept on life cycle
cost. Supplement
[AD-A097438] p0390 N81-23084
Helicopter transmission qualification procedures
and tests
p0433 N81-24101
LIFE SCIENCES
Ames Research Center publications: A continuing
bibliography, 1980
[NASA-TM-81308] p0641 N81-34130
LIFE SUPPORT SYSTEMS
NT EMERGENCY LIFE SUSTAINING SYSTEMS
The influence of beards on the efficiency of
aviators' oxygen masks
p0176 A81-22100
Helicopter emergency underwater escape
p0176 A81-22101
Aircraft accident investigation as it relates to
life support equipment
p0176 A81-22103
Contaminant increase in aircraft liquid oxygen
converters: Analysis of data
[AD-A090975] p0092 N81-13049
Aeronautical systems technology needs: Escape,
rescue and survival and test facilities and test
equipment
[AD-A097827] p0423 N81-24020
LIFETIME (DURABILITY)
U LIFE (DURABILITY)
LIFT
NT INTERFERENCE LIFT
NT JET LIFT
NT ZERO LIFT
Numerical lifting line theory applied to drooped
leading-edge wings below and above stall
p0066 A81-15881
Lift effect on transonic wind-tunnel blockage
p0066 A81-15883
Angle of attack - Its measurement and usage. I
p0149 A81-19799
Experimental development of an advanced
circulation control wing system for Navy STOL
aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
An approximate analytical method for vortex-lift
and centre of pressure on the slender wing
p0223 A81-23726
On the unsteady wake-induced lift on a slotted
airfoil. II - The influence of displacement
thickness fluctuations
p0229 A81-24237
Wing flapping with minimum energy
p0283 A81-27889
The effect of jet non-uniformity on the lift of an
augmentor wing
p0298 A81-29144
Wing-body carryover at supersonic speeds with
finite afterbodies
p0354 A81-31622
Quiet propulsive-lift technology ready for civil
and military applications
p0359 A81-32521
A comparison of propulsion systems for V/STOL
supersonic combat aircraft
[SAE PAPER 801141] p0398 A81-34171
Spanwise lift distribution of forward-and
aft-swept wings in comparison to the optimum
distribution form
p0453 A81-38017
Aerodynamic features of designed strake-wing
configurations
[AIAA PAPER 81-1214] p0454 A81-38084
Quasi-hybrid airships
[AIAA 81-1333] p0456 A81-38538
The calculation of lift and drag characteristics
of subsonic wings with winglets
p0480 A81-40442
Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740
Summary of high-lift and control surface research
on NASA general aviation airfoils
[SAE PAPER 810629] p0524 A81-42781
The use of direct lift control of an aircraft in a
guided landing run
p0624 A81-49928
Experimental and theoretical aerodynamic
characteristics of two hypersonic cruise
aircraft concepts at Mach numbers of 2.96, 3.96,
and 4.63
[NASA-TP-1767] p0072 N81-12021
Evaluation of Levinsky's method for the
calculation of the lift distribution on a wing
in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033
Unsteady pressure distributions on airfoils in
cascade
[AD-A091173] p0090 N81-13033
The high lift characteristics in the case of the
v-wing concept
[NASA-TM-75872] p0253 N81-18061
Basic research in wake vortex alleviation using a
variable twist wing
p0267 N81-19050
An asymptotic unsteady lifting-line theory with
energetics and optimum motion of
thrust-producing lifting surfaces
[NASA-CR-165679] p0385 N81-23035
Design and experimental results for a
natural-laminar-flow airfoil for general
aviation applications
[NASA-TP-1861] p0423 N81-24022
Comparison of selected lift and sideslip
characteristics of the Ayres Thrush S2R-800,
winglets off and winglets on, to full-scale
wind-tunnel data
[NASA-CR-165710] p0423 N81-24026
An engineering method for estimating the induced
lift on V/STOL aircraft hovering in and out of
ground effect
[AD-A098509] p0441 N81-25069
Prediction of transonic flutter for a
supercritical wing by modified strip analysis
and comparison with experiment
[NASA-TM-83126] p0445 N81-25432
Preliminary design of a tip-jet-driven heavy lift
helicopter incorporating circulation control
[AD-A099192] p0486 N81-26120
Evaluation of Ting's method for the calculation of
the lift distribution on a wing in propulsive jets
[NLR-TR-80078-U] p0594 N81-31157
LIFT AUGMENTATION
Circulation Control Wing /CCW/ flight tests
p0122 A81-19469
An analytical solution of lift loss for a round
planform with a central lifting jet
[AIAA PAPER 81-0011] p0157 A81-20535
Some recent applications of high-lift
computational methods at Boeing
[AIAA PAPER 81-1657] p0534 A81-43940
Lift-enhancing surfaces on several advanced V/STOL
fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-43946
Downwash calculation at close range behind a
trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925
Feasibility study for C-141B reduction of wing
loads by uprigging the ailerons
[AD-A094634] p0272 N81-19105
High lift technology
p0593 N81-31147
Evaluation of pressure and thermal data from a
wind tunnel test of a large-scale, powered, STOL
fighter model
[NASA-CR-166170] p0635 N81-33162
LIFT COEFFICIENTS
U AERODYNAMIC COEFFICIENTS
U LIFT
LIFT DEVICES
High lift research and its application to aircraft
design
p0011 A81-11682
Leading edge high lift devices for agricultural
aircraft
[SAE PAPER 810608] p0522 A81-42765
Design, analyses, and model tests of an
aeroelastically tailored lifting surface
[AIAA PAPER 81-1673] p0566 A81-45974
A higher-order trapezoidal vector vortex panel for
subsonic flow
[AD-A094775] p0263 N81-19032
A study of high-altitude manned research aircraft
employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067

A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012
An asymptotic unsteady lifting-line theory with energetics and optimum motion of thrust-producing lifting surfaces
[NASA-CR-165679] p0305 N81-23035
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160
LIFT DISTRIBUTION
U FORCE DISTRIBUTION
U LIFT
LIFT DRAG RATIO
Calculation of the lift dependent drag polar of cambered fighter plane configurations with deflected maneuver flaps in the subsonic region by means of a modified procedure according to Lamar
[DGLR PAPER 80-109] p0120 A81-19395
The optimal lift-drag ratio of a civil aircraft
[AAAF PAPER NT 80-35] p0369 A81-33923
Jet wing interaction to give improved combat performance
p0188 N81-16007
A study of wing body blending for an advanced supersonic transport
p0244 N81-17987
Analytic development of improved supersonic cruise aircraft based on wind tunnel data
p0244 N81-17989
Preliminary wind-tunnel investigation of the effects of engine nacelles on a transport configuration with high lift drag ratios to a Mach number of 1.00
[NASA-TM-82312] p0272 N81-19099
LIFT FANS
A design analysis technique for evaluating size and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402
LIFT FORCES
U LIFT
LIFTING BODIES
Simplified vortex models for slender lifting surfaces with leading edge separation
p0016 A81-11777
A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14394
A lifting surface theory for the sound generated by the interaction of velocity disturbances with a leaned vane stator
[AIAA PAPER 81-0091] p0160 A81-20595
An analysis of gap effects on wing-elevon aerodynamic characteristics
[AIAA PAPER 81-0364] p0166 A81-20783
Lifting surface theory and the numerical method of wings with small angles of sideslip at subsonic and supersonic speeds
p0224 A81-23851
On the inter-relationship of the basic parameters and characteristics of various flight vehicles
p0236 A81-25694
On some methods of supersonic unsteady lifting surface analysis
[AIAA 81-0644] p0307 A81-29497
A hybrid state vector approach to aeroelastic analysis with application to composite lifting surfaces
[AIAA 81-0626] p0308 A81-29512
A theoretical treatment of lifting surface theory of an elliptic wing
p0347 A81-30653
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 2: Aerodynamic effects
[AD-A093063] p0209 N81-17048
LIFTING ROTORS
NT BEARINGLESS ROTORS
Computer simulation of unsteady flow past lifting rotors of coaxial configuration
p0230 A81-24389
Recent progress in performance prediction of high advance ratio circulation controlled rotors
p0468 A81-40100
Computerized three-dimensional aerodynamic design of a lifting rotor blade
[AHS 80-2] p0473 A81-40137
Wind-tunnel test of an articulatud helicopter rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13918
LIFTING SURFACES
U LIFT DEVICES
U LIFTING BODIES
LIGHT (VISIBLE RADIATION)
NT SUNLIGHT
LIGHT ABSORPTION
U ELECTROMAGNETIC ABSORPTION
LIGHT AIRBORNE MULTIPURPOSE SYSTEM
NATASS/LAMPS MK III --- Moored Airship Towed Array Sonar System/Light Airborne Multiperpose System
[AIAA 81-1309] p0455 A81-38527
LIGHT AIRCRAFT
NT CESSNA 402B AIRCRAFT
NT DH 125 AIRCRAFT
NT MYSTERE 20 AIRCRAFT
NT PIPER AIRCRAFT
Experiments on the validity of ground effect predictions for static noise testing of propeller aircraft
p0054 A81-13811
Influence of a change in power at the propeller on the properties of the aircraft
p0059 A81-14754
A status report on NASA general aviation stall/spin flight testing
p0122 A81-19471
The design, testing, certification and production of an emergency parachute for use in light aircraft
[AIAA PAPER 81-0413] p0168 A81-20817
Pulsed laser mapping system for light aircraft
p0223 A81-23671
Cygnet - A canard configuration powered ultralight aircraft
p0231 A81-24746
A new breed of an air breathing engine
p0292 A81-29070
Equilibrium spinning of a typical single-engine low-wing light aircraft
p0354 A81-31590
Design of low powered aircraft, a philosophy for future personal sport aircraft
[AIAA PAPER 81-0905] p0362 A81-32926
The development of a lightweight aircraft towing tractor
[SAE PAPER 801237] p0405 A81-34235
Solo navigation in a light aircraft
p0407 A81-34337
A new lightweight fighter
p0410 A81-35025
Light aviation in the United States - September 1980 --- French book
p0513 A81-41903
AMX - Italo-Brazilian bantam battler
p0518 A81-42630
Analytical studies on the effects of cooling flows on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
Crashworthy design concepts for airframe structures of light aircraft
[SAE PAPER 810613] p0522 A81-42769
Full-scale study of the cooling system aerodynamics of an operating piston engine installed in a light aircraft wing panel
[SAE PAPER 810623] p0323 A81-42777
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618
Performance prediction for light airplanes
p0622 A81-49378
Annoyance from light aircraft investigation carried out around four airports near Paris
[NASA-TM-75823] p0032 N81-10577
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
Light transport and general aviation aircraft icing research requirements

[NASA-CR-165290] p0269 N81-19079
Flight data recording and data processing for light airplanes and gliders
p0328 N81-20008
Annoyance caused by light aircraft noise
[NASA-TM-76533] p0379 N81-22589
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845
Flight test evaluation of predicted light aircraft drag, performance, and stability
[NASA-CR-159062] p0494 N81-27078
LIGHT ALLOYS
NT ALUMINUM ALLOYS
NT MAGNESIUM ALLOYS
LIGHT BULBS
U LUMINAIRES
LIGHT COMMUNICATION
U OPTICAL COMMUNICATION
LIGHT EMISSION
NT ELECTROLUMINESCENCE
NT FLUORESCENCE
NT X RAY FLUORESCENCE
LIGHT EMITTING DIODES
Flight evaluation of a helmet mounted LED matrix display in a Lynx helicopter
p0472 A81-40129
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Flat panel display technology review
p0211 N81-17065
LIGHT SCATTERING
Liquid crystal displays
p0212 N81-17068
LIGHT SOURCES
NT ILLUMINATORS
LIGHT TRANSMISSION
NT LIGHT SCATTERING
Light transmission measurements in solid fuel ramjet combustors
p0288 A81-27910
LIGHT TRANSPORT AIRCRAFT
Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740
LIGHTING EQUIPMENT
NT AIRPORT LIGHTS
NT ILLUMINATORS
NT LUMINAIRES
NT RUNWAY LIGHTS
Lighting systems for flight support --- Russian book
p0564 A81-45602
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] p0636 N81-33175
LIGHTNING
Multiple-component lightning high-current testing
p0056 A81-14255
Lightning near fields generated by return stroke current
p0056 A81-14257
A case for submicrosecond rise-time lightning current pulses for use in aircraft induced-coupling studies
p0057 A81-14267
New techniques for the measurement of natural and simulated lightning phenomena
p0057 A81-14268
Evaluation of lightning-induced transients in aircraft using high-voltage shock excitation techniques
p0057 A81-14269
Electromagnetic measurement of lightning strikes to aircraft
[AIAA PAPER 81-0083] p0160 A81-20588
Assessing the behavior of high modulus composite materials in lightning
p0040 N81-11141
Lightning protection considerations for graphite/epoxy aircraft structure
p0040 N81-11142
Observing lightning from ground-based and airborne stations
p0136 N81-14566
Aeronautical concerns and National Aeronautics and Space Administration atmospheric electricity projects
p0136 N81-14567
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857] p0146 N81-15648
A French flight test program on the electromagnetic effects of lightning
p0199 N81-16155
Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current
p0200 N81-16158
Advanced aerodynamics and active controls. Selected NASA research
[NASA-CP-2172] p0259 N81-19001
In flight direct strike lightning research --- Using an F-106B Aircraft
p0259 N81-19005
Ground and flight test experience with a triple redundant digital fly by wire control system --- installed in F-8C aircraft
p0259 N81-19006
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048
In-flight direct-strike lightning research
p0266 N81-19054
Airborne lightning warning systems: A survey
[AD-A095354] p0331 N81-20045
Lightning electric field measurements which correlate with strikes to the NASA F-106B aircraft, 22 July 1980
[NASA-TM-82142] p0491 N81-26643
Thunderstorm hazards flight research: Storm hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062
LIGHTNING SUPPRESSION
A lightning protection program for the F-16 fly-by-wire system
p0056 A81-14254
A design guide for lightning protection of aircraft
p0056 A81-14259
A case study on the F-16 fly-by-wire flight control system --- Book
p0101 A81-16719
Aircraft and environmental factors influencing lightning strike
[AIAA PAPER 81-0084] p0160 A81-20589
Lightning threat definition for aircraft electrical power systems
p0322 A81-30284
LIGHTS
U LUMINAIRES
LIMBS (ANATOMY)
Limb restraint F-18 style
p0587 A81-46325
LIMITATIONS
U CONSTRAINTS
LINEAR ARRAYS
NT ENDFIRE ARRAYS
LINEAR EQUATIONS
Numerical techniques in linear duct acoustics - A status report
[ASME PAPER 80-WA/NC-2] p0170 A81-21120
Linear/nonlinear behavior in unsteady transonic aerodynamics
[AIAA 81-0643] p0306 A81-29496
Effects of rotor-body coupling in a linear rotorcraft vibration model
[AHS 80-26] p0475 A81-40156
LINEAR FILTERS
NT KALMAN FILTERS
LINEAR PROGRAMMING
A slot allocation model for high-density airports
[AD-A098097] p0438 N81-24846
LINEAR SYSTEMS
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
SCI Identification (SCIDNT) program user's guide --- maximum likelihood method for linear rotorcraft models
[NASA-CR-159082] p0379 N81-22723
LINEARIZATION
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022
Generalized dynamic stability for linearized yawing motion --- The stability of spinning projectiles

[RMCS-80002] p0601 N81-31225
LINERS
U LININGS
LING-TEMCO-VOUGHT AIRCRAFT
NT A-7 AIRCRAFT
NT F-8 AIRCRAFT
LININGS
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0118 A81-18758
Film cooling performance of liner cooling devices
p0293 A81-29075
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
Advanced oxide dispersion strengthened sheet alloys for improved combustor durability
p0598 N81-31204
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] p0639 N81-33205
Noise suppression characteristics of peripherally segmented duct liners
[NASA-TP-1904] p0641 N81-33946
LINKAGES
Compensating linkage for main rotor control
[NASA-CASE-LAR-11797-1] p0270 N81-19087
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25071
LINKING
U JOINING
LIQUEFIED GASES
NT LIQUID HYDROGEN
NT LIQUID OXYGEN
LIQUID AMMONIA
NT LIQUID FUELS
LIQUID ATOMIZATION
Droplet breakup regimes and criteria for their existence
p0614 A81-48079
LIQUID CHROMATOGRAPHY
Quality assurance of an epoxy resin prepreg using HPLC
p0531 A81-43642
The 1H and 13C fourier transform NMR characterization of jet fuels derived from alternate energy sources
[AD-A098305] p0437 N81-24284
Chromatographic separation of conventional and experimental fuels
[AD-A101673] p0586 N81-30282
LIQUID COOLING
NT FILM COOLING
Application of water cooling for improved gas turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977
Heat pipe avionic cooling
p0326 A81-30343
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
LIQUID CRYSTALS
The application of liquid crystals in experimental aerodynamics
p0238 A81-26123
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Flat panel display technology review
p0211 N81-17065
Liquid crystal displays
p0212 N81-17068
Investigation of the use of liquid crystal thermography to study flow over turbomachinery blades
[AD-A097289] p0391 N81-23089
LIQUID DROPS
U DROPS (LIQUIDS)
LIQUID FUELS
A comparison of two droplet models for gas-turbine combustion chamber flows
p0294 A81-29086
Some factors affecting altitude relighting performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962
Modified Brayton cycles utilizing alcohol fuels
[ASME PAPER 81-GT-103] p0315 A81-30009
Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40807
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10128
Chromatographic separation of conventional and experimental fuels
[AD-A101673] p0586 N81-30282
LIQUID HYDROGEN
NT LIQUID FUELS
On the utilization of hydrogen as a fuel for gas turbine. I - On the utilization of low temperature exergy of liquid hydrogen
p0055 A81-14075
Status of the program to develop LH2 for aircraft
[SAE PAPER 801153] p0407 A81-34244
Alternative aircraft fuels - When will the action start
p0465 A81-39987
LIQUID OXYGEN
Contaminant increase in aircraft liquid oxygen converters: Analysis of data
[AD-A090975] p0092 N81-13049
LIQUID PROPELLANT ROCKET ENGINES
Hydrodynamic modelling of the starting process in liquid-propellant engines
p0351 A81-31287
LIQUID ROCKET PROPELLANTS
NT LIQUID FUELS
NT SLURRY PROPELLANTS
LIQUID ROTATION
U ROTATING LIQUIDS
LIQUID SLOSHING
Damping in the problem of natural vibrations of an elastic system with internal resonance
p0236 A81-25696
LIQUID-GAS MIXTURES
NT FOG
LIQUID-SOLID INTERFACES
Drag reduction of an oscillating flat plate with an interface film
p0239 A81-26504
LIQUIDS
NT HYDRAULIC FLUIDS
NT LIQUID FUELS
NT LIQUID HYDROGEN
NT LIQUID OXYGEN
NT ROTATING LIQUIDS
NT SLURRY PROPELLANTS
LISTS
Listing of accidents/incidents by aircraft make and model, United States Civil Aviation, 1978
[PB81-110280] p0205 N81-16999
LITERATURE
NT PROCEEDINGS
LITHOSPHERE
NT EARTH SURFACE
LOAD DISTRIBUTION (FORCES)
Aerodynamic load distribution along the span of an asymmetric wing
p0413 A81-35915
Aerodynamic characteristics of wings of arbitrary planform
p0461 A81-39267
Matrix load analysis method for flexible aircraft structures
[PAPER 810610] p0522 A81-42766
Optimization theory applied to higher harmonic control of circulation controlled rotors
p0571 A81-46606
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461] p0582 N81-30119
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 31 December 1980
[AD-A102495] p0596 N81-31107
LOAD FACTORS
U LOADS (FORCES)
LOAD TESTS
Structural flight load testing, calibration and analysis
p0013 A81-11656
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672

The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
Effect of load spectrum variables on fatigue crack initiation and propagation; Proceedings of the Symposium, San Francisco, Calif., May 21, 1979
p0172 A81-21730
Effect of transport aircraft wing loads spectrum variation on crack growth
p0172 A81-21738
Effects of fighter attack spectrum on crack growth
p0172 A81-21741
Modern techniques of conducting a flight loads survey based on experience gained on the Black Hawk helicopter
p0356 A81-32014
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
p0611 A81-47801
Developing design allowables for composite helicopter structures
p0611 A81-47811
Cost-effective mechanical property characterization
p0612 A81-47813
Additional information about Fighter Aircraft Loading Standard for Fatigue Evaluation (FALSTAFF)
[NLR-TR-79056-U] p0344 N81-21391
State of the art and statistical aspects of helicopter fatigue substantiation procedures
p0487 N81-26127
Fatigue Assessment of UK military aeroplanes
p0487 N81-26128
Helicopter component fatigue life determination
p0488 N81-26135
Fatigue testing of helicopter gearboxes
p0488 N81-26138

LOADING
Development of standardised fatigue test load histories for helicopter rotors: Basic consideration and definition of Helix and Felix
p0489 N81-26141
Fatigue test program and test results
p0489 N81-25142

LOADING FORCES
U LOADS (FORCES)

LOADING MOMENTS
Structural flight loads simulation capability, volume 1
[AD-A096572] p0374 N81-22044
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22045
A structural load alleviation control system for a large transport aircraft
[TT-8002] p0541 N81-28106

LOADING OPERATIONS
Helicopter external load acquisition technology investigation
[AD-A094672] p0272 N81-19106

LOADING WAVES
U ELASTIC WAVES
U LOADS (FORCES)

LOADS (FORCES)
NT AERODYNAMIC LOADS
NT BLAST LOADS
NT COMPRESSION LOADS
NT CRITICAL LOADING
NT CYCLIC LOADS
NT DYNAMIC LOADS
NT GUST LOADS
NT IMPACT LOADS
NT LANDING LOADS
NT RANDOM LOADS
NT ROLLING CONTACT LOADS
NT SHOCK LOADS
NT STATIC LOADS
NT THRUST LOADS
NT WING LOADING
Research into a helicopter rotor's speed and load factor limits
p0471 A81-40126
Probabilistic analysis of foundation forces for a class of unbalanced rotating machines
p0145 N81-15362
Cold-air investigation of first stage of 4-1/2-stage, fan drive turbine with average stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050
Environment-load interaction effects on crack growth in landing gear steels
[AD-A093803] p0218 N81-17242
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions
[AD-A095634] p0334 N81-20072
JT9D performance deterioration results from a simulated aerodynamic load test
[NASA-TM-82640] p0443 N81-25082
The fatigue crack growth under variable amplitude loading in built-up structures
[AD-A098417] p0446 N81-25437
Synopsis of Specialists' Meeting on Helicopter Fatigue Methodology
p0487 N81-26129
Development of standardised fatigue test load histories for helicopter rotors: Basic consideration and definition of Helix and Felix
p0489 N81-26141
Research on the functional limits of a helicopter rotor: Speed and load factor
p0545 N81-29078

LOCALIZATION
U POSITION (LOCATION)

LOCATION
U POSITION (LOCATION)

LOCKHEED AIRCRAFT
NT C-130 AIRCRAFT
NT C-141 AIRCRAFT
NT L-1011 AIRCRAFT
NT P-3 AIRCRAFT

LOCKS (FASTENERS)
Aircraft canopy lock
[NASA-CASE-FRC-11065-1] p0426 N81-24087

LOGIC CIRCUITS
The 33 transition --- flight control logic circuit analysis
p0240 A81-26617

LOGIC DESIGN
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase
[AD-A102163] p0595 N81-31181

LOGIC NETWORKS
U LOGIC CIRCUITS

LOGISTICS
Commercial engine logistics cost projections - A dynamic and flexible approach
[ASME PAPER 81-GT-114] p0315 A81-30018
Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing
[AD-A089794] p0035 N81-11034
Design to life cycle cost research
p0045 N81-11907
Testing aircraft instruments
[AD-A095680] p0334 N81-20075
Weapons system support resources demand parameters - logistics
[AD-A097517] p0394 N81-23937

LOGISTICS MANAGEMENT
NT INVENTORY CONTROLS
NT INVENTORY MANAGEMENT
Avionic architectural standardisation - logistic support perspective
p0050 A81-13171
Determination of cargo container inventories through logistics simulation --- for air shipment
p0616 A81-48380
An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS)
[AD-A089365] p0028 N81-10070
Digital Avionics Information System (DAIS): Life Cycle Cost Impact Modeling System (LCCIM). A managerial overview
[AD-A093201] p0211 N81-17062
Turbine engine fault detection and isolation program, phase 1. Volume 2: Requirements definition for an integrated engine monitoring system
[AD-A093226] p0215 N81-17068

Application of scheduling heuristics on the aircraft maintenance depot
[AD-A098815] p0261 N81-19015
Aircraft modification management evaluation
[AD-A096458] p0381 N81-22974
F-16 integrated logistics support: Still time to consider economical alternatives
[PB81-137473] p0389 N81-23079
NAVAIR Avionics Master Plan
[AD-A097522] p0389 N81-23082
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692] p0392 N81-23325
Operational and support costs of the Navy's F/A-18 can be substantially reduced
[PB81-160814] p0487 N81-26125
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103783] p0631 N81-33134
A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] p0632 N81-33135
Development of maintenance metrics to forecast resource demands of weapon systems
[AD-A104089] p0632 N81-33136

LONG RANGE NAVIGATION
U LORAN

LONG TERM EFFECTS
Effects of commercial aircraft operating environment on composite materials
p0182 A81-22681
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165649] p0198 N81-16139

LONGITUDINAL CONTROL
A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622
Piloting techniques on the backside - Flight path angle control
p0171 A81-21673
Analysis of aircraft longitudinal handling qualities
[AIAA 81-1771] p0554 A81-44092
Longitudinal equivalent systems analysis of Navy tactical aircraft
[AIAA 81-1775] p0554 A81-44094
Modern control synthesis applied to the longitudinal decoupled motion of an aircraft
[AIAA 81-1839] p0555 A81-44123
Closed-loop criteria for assessing longitudinal-axis handling qualities of transports in final approach
[AIAA 81-1773] p0556 A81-44133
A unifying framework for longitudinal flying qualities criteria
[AIAA PAPER 81-1889] p0561 A81-44580
Inverse problems of guided-flight dynamics - Longitudinal motion
p0577 A81-46749
Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969
Application of vector performance optimization to a robust control loop design for a fighter aircraft
[DFVLR-FB-80-14] p0130 N81-13970
System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
[DFVLR-MITT-79-16] p0130 N81-13971
Pitch attitude stabilization system utilizing engine pressure ratio feedback signals
[NASA-CASE-LAR-12562-1] p0490 N81-26152
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118
Subsonic pitch-up alleviation on a 74 deg delta wing
[NASA-CR-165749] p0584 N81-30137
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] p0639 N81-33211

LONGITUDINAL STABILITY
Longitudinal motion of low-flying vehicles in nonlinear flowfields
p0009 A81-11626
Longitudinal instability in braked landing gear
[ASME PAPER 80-WA/DSC-12] p0170 A81-21083
Dynamics of longitudinal motion of a variable-sweepback aeroplane with a deformable control system
p0231 A81-24722
Aircraft stability at high incidence
p0282 A81-27878
A hybrid composite horizontal stabilizer for the XH-2/CCW Flight Demonstrator Aircraft
[AHS 80-35] p0476 A81-40164
A vortex-lattice method for calculating longitudinal dynamic stability derivatives of oscillating delta wings
[AIAA PAPER 81-1876] p0561 A81-44570
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] p0610 A81-47609
Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results --- Ames 7- by 10-ft wind tunnel tests
[NASA-TM-81269] p0423 N81-24025

LORAN
RT LORAN C
Omega - An economic Loran A replacement
p0113 A81-18077
Recommended short-term ATC improvements for helicopters. Volume 3: Operational description of experimental LORAN-C flight following (LOFF) in the Houston area
[AD-A089385] p0024 N81-10030
Proposed ATC system for the Gulf of Mexico: Helicopter operations development program
[AD-A089430] p0025 N81-10036
Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037
DMAHTC's support to National Ocean Survey LORAN-C-charting
[AD-A093748] p0206 N81-17027
Production of LORAN-C reliability diagrams at the Defense Mapping Agency
[AD-A093749] p0206 N81-17028

LORAN C
Flight test investigation of LORAN-C for civil aviation applications
p0512 A81-41762
Evaluation of LORAN-C for non-precision approach applications
p0512 A81-41763
Evaluation of Loran-C for enroute navigation and non-precision approach within the state of Vermont
p0516 A81-42433
Flight test investigation of LORAN-C for en route navigation in the Gulf of Mexico
[AD-A091637] p0128 N81-13945
DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850] p0141 N81-14989
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS)
[AD-A094169] p0250 N81-18036
Use of Loran-C for general aviation aircraft navigation
p0371 N81-22002
An analysis of the adaptability of Loran-C to air navigation
p0371 N81-22003
Results of a Loran-C flight test using an absolute data reference --- vhf omnirange navigation system and discrete address beacon system
p0371 N81-22006
Microcomputer processing for Loran-C
p0371 N81-22007

LOUDNESS
Community reaction to impulse noise: Initial Army survey
[AD-A101674] p0588 N81-30659

LOW ALLOY STEELS
U HIGH STRENGTH STEELS

LOW ALTITUDE
Low level, adverse attitude escape using a vertical seeking ejection seat
p0176 A81-22098
A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119

Impact of low altitude coverage requirements on air-ground communications
[AD-A101642] p0586 N81-30338

LOW ASPECT RATIO
High-lift investigations on some small aspect ratio wings
p0011 A81-11643
Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates
p0348 A81-30914

LOW ASPECT RATIO WINGS
NT DELTA WINGS
NT TRAPEZOIDAL WINGS
Determination of the vorticity of a small-aspect-ratio wing in hypersonic flow
p0054 A81-13544
On the theory of a wing with small aspect ratio in a hypersonic flow
p0309 A81-29860
Determination of the vorticity on a wing of small aspect ratio in a hypersonic stream
p0411 A81-35660
Analytical estimation on nonlinear longitudinal characteristics of wings with small and moderate aspect ratio by the vortex lattice method in incompressible flow
[ESA-TT-585] p0022 N81-10018
The high lift characteristics in the case of the v-wing concept
[NASA-TM-75872] p0253 N81-18061

LOW COST
ECS integration for fuel efficient/low life cycle cost design --- Environmental Control Systems in aircraft
p0015 A81-11676
Low cost technology for expendable RPV applications
p0049 A81-12795
Commuter turboprop propulsion technology
[SAE PAPER 801243] p0406 A81-34239
Low cost start-up for rigid-pressure airship
[AIAA 81-1337] p0457 A81-38541
Design concepts for low-cost composite turbofan engine frame
[NASA-CR-165217] p0376 N81-22053

LOW FREQUENCIES
NT VERY LOW FREQUENCIES
Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/
p0517 A81-42437
Low-frequency radio navigation system
[NASA-CASE-NPO-15264-1] p0373 N81-22036

LOW FREQUENCY BANDS
NT VERY LOW FREQUENCIES
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116

LOW LEVEL TURBULENCE
Wind shear effects on aircraft - Low-level shear and clear-air turbulence as accident causes
p0067 A81-16136
Microbursts as an aviation wind shear hazard
[AIAA PAPER 81-0386] p0167 A81-20798
Effect of contraction on screen-generated turbulence
p0284 A81-27900
Wind shear detection - Automatic alerting system for airport applications
p0412 A81-35771

LOW PRESSURE
NT HIGH ALTITUDE PRESSURE
Noise generation mechanism of low pressure propeller fans
[AIAA PAPER 81-0090] p0160 A81-20594

LOW SPEED
Air augmentation of rockets for low speed application
p0292 A81-29068
Stability and flutter analysis of turbine blades at low speed
p0612 A81-47959
A computer program for the design and analysis of low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921
A study of a VTOL thrusting ejector in low speed flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017
A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0490 N81-27118

LOW SPEED STABILITY
A method of helicopter low airspeed estimation based on measurement of control parameters
[MBB-UD-276-79-O] p0018 A81-12094
Concerning Khristianovich's transformation of a subsonic flow past an airfoil into a low-speed flow
p0349 A81-31045
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
p0470 A81-40111
An empirical prediction method for helicopter performance in low speed level flight and in vertical and forward flight climbs
p0471 A81-40118
A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119
Flight tests and statistical data analysis for flying qualities investigations
p0471 A81-40121
Equivalent system analysis of translation rate command systems for hover and low speed flight
[AIAA PAPER 81-1858] p0560 A81-44557
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
Simulator investigation of arrow-wing low-speed handling qualities
p0246 N81-17993
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters --- hingeless rotor helicopters
[MBB-UD-306/80-OE] p0584 N81-30139

LOW SPEED WIND TUNNELS
NT SUBSONIC WIND TUNNELS
Low-speed airfoil section research at Delft University of Technology
p0010 A81-11636
High-lift investigations on some small aspect ratio wings
p0011 A81-11643
Roll and spin measurements in the low speed wind tunnel at Braunschweig
p0065 A81-15704
Flow visualization through the use of the smoke-wire technique
[AIAA PAPER 81-0412] p0160 A81-20816
Low-speed wind tunnels with deformable walls
p0299 A81-29304
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
p0243 N81-17986

LOW TEMPERATURE
Behavior of fuels at low temperatures
[AD-A100332] p0542 N81-28276

LOW THRUST PROPULSION
Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165

LOW TURBULENCE
Experimental investigation into the reaction of a boundary layer to external periodic disturbances
p0309 A81-29866

LOW VELOCITY
U LOW SPEED

LOW VISIBILITY
A head-up display for low-visibility approach and landing
[AIAA PAPER 81-0130] p0161 A81-20623
Landings according to CAT II
p0230 A81-24523
Low-visibility visual simulation with real fog
[AIAA 81-0982] p0415 A81-36569
Helicopter external load acquisition technology investigation

[AD-A094672] p0272 N81-19106
LOW WEIGHT
Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source --- aircraft equipment p0288 A81-28574

LOW WING AIRCRAFT
Equilibrium spinning of a typical single-engine low-wing light aircraft p0354 A81-31598
A geometrical study of the steady-state spin for a typical low-wing general aviation aircraft p0454 A81-38023

LOWER ATMOSPHERE
NT OZONOSPHERE
NT TROPOSPHERE
LOWER BODY NEGATIVE PRESSURE (LBNP)
U ACCELERATION STRESSES (PHYSIOLOGY)
LOX (OXYGEN)
U LIQUID OXYGEN
LSI
U LARGE SCALE INTEGRATION
LUBRICANT TESTS
Joint-laboratory qualification testing of oils for gas turbine engines p0103 A81-17375
Lubrication of rolling element bearings p0118 A81-18738

LUBRICANTS
NT GAS LUBRICANTS
NT LUBRICATING OILS
LUBRICATING OILS
Substantiation of oil change periods for ship and aircraft turbine engines p0065 A81-15720
Composition of sludge formed in B-3V oil p0103 A81-17373
Joint-laboratory qualification testing of oils for gas turbine engines p0103 A81-17375
Water content of helicopter gear oils [ASME PAPER 80-C2/DET-12] p0116 A81-18640
Surface analysis of bearing steels after solvent treatments. II - Lubricant-coated bearing surfaces [ASLE PREPRINT 80-LC-8A-6] p0118 A81-18748
Some experience with ferrography in monitoring the condition of aircraft engines p0285 A81-27943
Device for lubricant flow measurement and conservation p0288 A81-28743
Evaluation of multi-viscosity oils designed for aircraft reciprocating engines [SAE PAPER 810572] p0519 A81-42737
The new aviation multiviscosity oil, SAE 20W-50 for general aviation [SAE PAPER 810573] p0519 A81-42738
X-ray fluorescence spectrometric analysis of wear metals in used lubricating oils [AD-A097552] p0390 N81-23087
LUBRICATION
Lubrication of rolling element bearings p0118 A81-18738

LUDER BANDS
U PLASTIC DEFORMATION
LUGS
Crack propagation in lugs p0180 A81-22629
Research on fatigue at the Department of Aerospace Engineering of the Delft University p0232 A81-24939
An application of the energy release rate concept to crack growth in attachment lugs [AIAA 81-0491] p0302 A81-29420
LUMINAIRES
NT AIRPORT LIGHTS
NT RUNWAY LIGHTS
Energy-saving ramp lighting with high-pressure sodium lamps p0056 A81-14243

LUMINESCENCE
NT ELECTROLUMINESCENCE
NT FLUORESCENCE
NT X RAY FLUORESCENCE

M

M WINGS
U VARIABLE SWEEP WINGS

MACH CONES
Hypersonic gas flow over a delta wing p0123 A81-19632

MACH NUMBER
Modification of wing sections to optimize transonic performance p0226 A81-24011
Factors affecting afterbody drag p0292 A81-29069
A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel [NASA-TP-1752] p0021 N81-10005
The impact of materials technology and operational constraints on the economics of cruise speed selection p0240 N81-18021
Influence of free-stream Mach number on transonic shock-wave boundary-layer interaction [NLR-MP-78013-U] p0256 N81-18325
Operating characteristics of the Langley Mach 7 Scramjet Test Facility [NASA-TM-81929] p0335 N81-20083
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5 [AD-A010210] p0585 N81-30159
MACH-ZEHNDER INTERFEROMETERS
The Dalembertometer [ISL-CO-220/79] p0133 N81-14292
MACHINE LIFE
U SERVICE LIFE
MACHINE TOOLS
NT GRINDING MACHINES
NT LATHES
MACHINERY
Vibrations in technical equipment. Volume 3 - Oscillations of machines, structures, and their components --- Russian book p0511 A81-41725

MACHINING
NT ULTRASONIC MACHINING
IPAD applications to the design, analysis, and/or machining of aerospace structures --- Integrated Program for Aerospace-vehicle Design [AIAA 81-0512] p0301 A81-29388
Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material [NASA-TP-1716] p0078 N81-12089
Metallurgical aspects of materials processing and manufacturing for aero-engine components --- gas turbine engines [PNR-90019] p0084 N81-12209
F-111 windscreen machining [Y-2232] p0142 N81-14995
Tool force evaluation of lathe machined high explosives [MHSMP-80-20] p0144 N81-15148
Metalspinning, shear- and flowforming p0551 N81-29281
Cold-forming of internal threads p0551 N81-29294

MACROCLIMATE
U CLIMATE
MAGNESIUM ALLOYS
Thermomechanical behavior of a mechanically alloyed Al-4.0Mg powder alloy p0409 A81-34851

MAGNETIC ABSORPTION
U ELECTROMAGNETIC ABSORPTION
MAGNETIC COILS
Application of superconducting coils to the NASA prototype magnetic balance [NASA-CR-165660] p0336 N81-20086
MAGNETIC CONTROL
The analytical ferrograph - Some factors affecting deposit formation p0293 A81-29077

MAGNETIC FIELDS
NT INTERPLANETARY MAGNETIC FIELDS
MAGNETIC INDUCTION
Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current p0200 N81-16150

MAGNETIC MATERIALS
A new technology - Piezoelectric polyvinylidene fluoride communications transducers p0176 A81-22099

MAGNETIC METALS
U MAGNETIC MATERIALS
U METALS
MAGNETIC PROPERTIES
NT MAGNETIC INDUCTION
NT MAGNETIC SUSPENSION
MAGNETIC RESONANCE
NT NUCLEAR MAGNETIC RESONANCE
MAGNETIC SUSPENSION
Application of superconducting coils to the NASA prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086
MAGNETIC TAPE RECORDERS
U TAPE RECORDERS
MAGNETOGASDYNAMICS
U MAGNETOHYDRODYNAMICS
MAGNETOHYDRODYNAMIC FLOW
A new helicopter map display device MKG-5
p0418 A81-36967
MAGNETOHYDRODYNAMICS
Adiabatic gas flow. Citations from the NTIS data base
[PB80-808546] p0026 N81-10048
MAGNETOIONIC PLASMA
U PLASMAS (PHYSICS)
MAGNETOPLASMAS
U PLASMAS (PHYSICS)
MAGNETS
NT SUPERCONDUCTING MAGNETS
MAGNIFICATION
Optical infinity lens development for flight simulator visual displays
p0212 N81-17071
MAGNIFIERS
U MAGNIFICATION
MAINTAINABILITY
Reliability and maintainability evaluation of rotor systems
p0576 A81-46645
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111
The F/A-18 Naval Strike Fighter: Progress has been made but problems and concerns continue
[AD-A095287] p0333 N81-20069
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
p0632 N81-33141
MAINTENANCE
NT AIRCRAFT MAINTENANCE
NT FILE MAINTENANCE (COMPUTERS)
Substantiation of oil change periods for ship and aircraft turbine engines
p0065 A81-15720
Jet engine maintenance and reliability programs - Objectives and management
p0287 A81-28475
Engine maintenance cost calculation method
[ASME PAPER 81-GT-34] p0312 A81-29948
Lighting systems for flight support --- Russian book
p0564 A81-45602
Polymer research in rapid runway repair materials
[AD-A089506] p0030 N81-10080
The potential for damage from the accidental release of conductive carbon fibers from aircraft composites
p0041 N81-11143
A new method for estimating transport aircraft direct operating costs
p0046 N81-11915
System for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] p0138 N81-14967
Scarf joints in unidirectional carbon fiber reinforced plastics --- tests of repairs made using adhesives
[BU-258] p0336 N81-20193
Turbine engine tests as seen by an aircraft company
p0430 N81-24084
Airborne Systems Software Acquisition Engineering Guidebook for supportable airborne software
[AD-A100213] p0543 N81-28788
Aircraft Engine Diagnostics
[NASA-CP-2190] p0597 N81-31196
Performance deterioration: An airline perspective
p0598 N81-31202
Who needs engine monitoring?
p0599 N81-31209
F100 engine diagnostic system status to date
p0599 N81-31210
MAINTENANCE TRAINING
Aircraft modification management evaluation
[AD-A096458] p0381 N81-22978
Actual versus simulated equipment for aircraft maintenance training: Cost implications of the incremental versus the unique device
[AD-A102388] p0590 N81-31104
MAN MACHINE SYSTEMS
Head-up displays. III
p0005 A81-11320
The future cockpit of the next generation of civil aircraft
p0010 A81-11630
The role of flight simulation in the design and development of the Sea Harrier Nav-Attack System
p0010 A81-11635
Initial experience with methods to evaluate flight test characteristics with operational flight maneuvers
p0017 A81-11782
Midair collisions - The accidents, the systems, and the Realpolitik
p0052 A81-13413
The measurement of the air traffic controller
p0053 A81-13415
Analyst/IAP interface and interactive graphics --- for EMC analysis and display
p0057 A81-14270
Integrated flight displays
p0064 A81-15681
Rate-field displays --- cockpit devices
p0064 A81-15682
A cockpit view of advanced airline avionics
p0100 A81-16585
A new system for the study of visual information presentation in aeronautics - GIBI
p0100 A81-16688
Computer generated displays and pilot effectiveness
p0114 A81-18082
Air traffic control problems - A pilot's view
p0169 A81-20914
The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475
New directions in cockpit alerting
p0286 A81-28298
Design and development of the control laws for the F-18 primary flight control system
p0320 A81-30285
Cybernetic airborne fire control - Issues and potential
p0326 A81-30387
B-52 Offensive Avionics System /OAS/ control and display design, using a Dynamic Mockup
p0327 A81-30354
A microprocessor based land navigator
p0360 A81-32833
Integrated CAD/CAM for the 1980s
[SAE PAPER 801170] p0400 A81-34185
Integration of navigational information in aircraft
p0407 A81-34336
Subsystem status monitor --- for military helicopters
[AHS 80-17] p0474 A81-40108
The indication of the characteristics of aircraft controllability with prediction in dynamic ergatic systems
p0517 A81-42603
Electronic Master Monitor and Advisory Display System
p0573 A81-46615
System simulation applied to the evaluation of displays for guidance and control
[DFVLR-MITT-79-10] p0028 N81-10064
Aircrew compliance with standard operating procedures as a component of airline safety
[AD-A092443] p0191 N81-16023
Characteristics of flight simulator visual systems
[NASA-TM-81278] p0340 N81-21060
Flight evaluation of the concept of the stage A Peripheral Vision Horizon Device (PVHD) using the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870] p0375 N81-22050
Application of computer colour raster displays in the cockpit in research flight simulation
[AD-A096542] p0377 N81-22063

The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies 7 and 8 [AD-A100551] p0539 N81-28088
Definition of investigative areas for human-factor aspects of aircraft accidents [AD-A101601] p0580 N81-30102
The effects of various fidelity factors on simulated helicopter hover [AD-A102028] p0601 N81-31232
The control anticipation parameter for augmented aircraft [AD-A102626] p0629 N81-32152
MAN POWERED AIRCRAFT
The Gossamer Condor and Albatross: A case study in aircraft design --- Book [AV-R-80/540] p0101 A81-16721
Building the Gossamer Albatross p0286 A81-28461
Not all student design projects end on paper - Chronology of the Chrysalis --- test procedure of human powered aircraft p0455 A81-38332
MANAGEMENT
NT CONFIGURATION MANAGEMENT
NT DATA MANAGEMENT
NT ENVIRONMENT MANAGEMENT
NT FINANCIAL MANAGEMENT
NT INFORMATION MANAGEMENT
NT INVENTORY CONTROLS
NT INVENTORY MANAGEMENT
NT LOGISTICS MANAGEMENT
NT PERSONNEL MANAGEMENT
NT PROCUREMENT MANAGEMENT
NT PRODUCTION MANAGEMENT
NT PROJECT MANAGEMENT
NT RESEARCH MANAGEMENT
NT RESOURCES MANAGEMENT
NT SAFETY MANAGEMENT
NT SYSTEMS MANAGEMENT
NT TERMINAL AREA ENERGY MANAGEMENT
NT WEAPON SYSTEM MANAGEMENT
MANAGEMENT ANALYSIS
The technical and managerial challenge of integrated flight/fire control [AIAA PAPER 81-1706] p0527 A81-43162
An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS) [AD-A089365] p0028 N81-10070
MANAGEMENT INFORMATION SYSTEMS
Delco Electronics Flight Management System for Air Force C-141 aircraft p0321 A81-30249
MANAGEMENT METHODS
NT PATTERN METHOD (FORECASTING)
Using cost reduction concepts at Messier-Hispano-Bugatti p0047 N81-11923
Summary of AGARD Lecture Series 100: Methodology for control of life cycle costs for avionics systems p0047 N81-11924
Productivity in aerospace research and development [NASA-TM-82388] p0097 N81-13804
Aircraft modification management evaluation [AD-A096458] p0381 N81-22974
MANAGEMENT PLANNING
NT PRODUCTION PLANNING
NT PROJECT PLANNING
Air Force technical objective document FY 1981 [AD-A089709] p0048 N81-12010
Microwave landing systems. Citations from the Engineering Index data base [PB80-814643] p0128 N81-13947
Microwave landing systems. Citations from the NTIS data base [PB80-814635] p0128 N81-13948
Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy [AD-A093774] p0206 N81-17030
Federal Radionavigation Plan. Volume 2: Requirements [AD-A093775] p0207 N81-17031
Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics [AD-A093776] p0207 N81-17032
Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development [AD-A093777] p0207 N81-17033
NAVAIR Avionics Master Plan [AD-A097522] p0389 N81-23082
Development of maintenance metrics to forecast resource demands of weapon systems [AD-A104089] p0632 N81-33136
MANAGEMENT SYSTEMS
NT MANAGEMENT INFORMATION SYSTEMS
L-1011 Flight Management System design considerations p0113 A81-18074
Modeling of the terminal area Air Traffic Management and Control p0114 A81-18085
Runway Configuration Management System concepts p0114 A81-18089
Boeing 757 and 767 Flight Management System p0286 A81-28299
Goals of flight management system integration for a forward-swept-wing demonstrator aircraft p0421 A81-37524
Digital Avionics Information System (DAIS): Life Cycle Cost Impact Modeling System (LCCIM). A managerial overview [AD-A093281] p0211 N81-17062
MANEUVERABILITY
Investigation of high-manoeuvrability flight vehicle dynamics p0009 A81-11625
Energy maneuverability displays for air combat training [SAE PAPER 801185] p0401 A81-34198
A multivariate approach to handling qualities rating scale development [AD-A089825] p0037 N81-11047
The collision course: Conditions, guidance laws and properties [DFVLR-FB-80-06] p0127 N81-13942
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control [DFVLR-FB-80-07] p0131 N81-13975
A pure direct force/moment control for coaxial counterrotating rotors p0144 N81-15007
Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS) [AD-A092974] p0208 N81-17041
A computer technique for detailed analysis of mission radius and maneuverability characteristics of fighter aircraft [NASA-TP-1837] p0329 N81-20026
Application of the joined wing to cruise missiles [AD-A096450] p0441 N81-25068
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems [NLR-TR-79127-U] p0498 N81-27118
Handling qualities of large flexible aircraft p0538 N81-28081
Investigation of high-angle-of-attack maneuver-limiting factors. Part 1: Analysis and simulation --- F-4J and F-14A aircraft [AD-A101646] p0581 N81-30113
MANEUVERS
NT AIRCRAFT MANEUVERS
NT EVASIVE ACTIONS
NT SIDESLIP
MANNED SPACE FLIGHT
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981 [IAF PAPER 81-251] p0607 A81-47425
MANNED SPACECRAFT
NT SPACE BASE COMMAND CENTER
NT SPACE SHUTTLES
MANUAL CONTROL
NT VISUAL CONTROL
Predictive steering control of dirigibles using the switching curve approach [AIAA 81-1327] p0456 A81-38535
A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks p0471 A81-40120
Flight-test evaluation of STOL control and flight director concepts in a powered-lift aircraft flying curved decelerating approaches [NASA-TP-1641] p0275 N81-19131

MANUALS
NT USER MANUALS (COMPUTER PROGRAMS)
A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119
A pilot training manual for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-81959] p0330 N81-20044
MANUFACTURING
DRAPO - Computer-assisted design and manufacturing system
p0007 A81-11610
New developments of data processing in computer-controlled manufacturing systems /DNC, FMS/
p0149 A81-19045
The manufacture of composite rotor blades
p0283 A81-27886
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174
Integrated CAD/CAM for the 1980s
[SAE PAPER 801170] p0400 A81-34185
Processing for an improved impact resistant composite blade --- for turbofan aircraft engines
[AIAA PAPER 81-1356] p0501 A81-40838
Flight-vehicle production technology --- Russian book
p0564 A81-45603
Cast Aluminum Structures Technology (CAST). Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152
A feasibility study for advanced technology integration for general aviation
[AD-A092437] p0185 N81-15975
Development and design of a large wind-turbine blade --- fiber reinforced composites
[MBB-UD-301/80-OE] p0586 N81-30198
MAP MATCHING GUIDANCE
Radar target detection and map-matching algorithm studies
p0005 A81-11150
MAPPING
NT PHOTOMAPPING
Map-type displays --- for air navigation
p0121 A81-19443
A general mapping procedure for variable area duct acoustics
[AIAA PAPER 81-0094] p0160 A81-20597
Pulsed laser mapping system for light aircraft
p0223 A81-23671
Helicopter noise contour development techniques and directivity analysis
[AD-A093426] p0221 N81-17851
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-30143
MAPS
NT PHOTOMAPS
NT RADAR CLUTTER MAPS
NT RADAR MAPS
NT RELIEF MAPS
MARAGING STEELS
Tensile stress/strain characterization of non-linear materials
p0348 A81-30915
MARINE NAVIGATION
U SURFACE NAVIGATION
MARINE PROPULSION
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401
MARINE TECHNOLOGY
Avionics system design requirements for the United States Coast Guard HH-65A Dolphin
p0472 A81-40133
MARINE TRANSPORTATION
The aerodynamics of airfoil boats
p0065 A81-15705
QSRA Joint Navy/NASA sea trials --- Quiet Short Haul Research Aircraft
[AIAA PAPER 81-0152] p0161 A81-20633
Published results of the program of university research. Transportation research results
[PB81-210130] p0641 N81-34108
MARITIME SATELLITES
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318
MARKET RESEARCH
The turboprop aircraft role in the 1980s
[AIAA PAPER 81-1730] p0529 A81-43169
Articulating user requirements for the commuter aircraft industry
[AIAA PAPER 81-1733] p0528 A81-43171
Airport catchment areas and air passenger demand --- econometric models for air travel
p0571 A81-46575
Air cargo market outlook and impact via the NASA CLASS project --- Cargo/Logistics Airlift Systems Study
[NASA-TM-81086] p0073 N81-12039
Long-range airplane study: The consumer looks at SST travel
p0247 N81-18014
Assessment of the impact of advanced air-transport technology
p0247 N81-18015
A family of supersonic airplanes: Technical and economic feasibility
p0248 N81-18017
Supersonic market and economic analyses
p0248 N81-18020
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270] p0248 N81-18023
MARKETING
Battle of the 15 tonne fans
p0480 A81-40457
MARKING
NT ISOTOPIC LABELING
MASKS
NT OXYGEN MASKS
MASS BALANCE
The 'light-weight' system - A novel concept for on-board weight and balance measurement using fiber optics
[SAWE PAPER 1336] p0352 A81-31377
Test procedures used in determining aircraft suitability for STAN integral weight and balance system
[SAWE PAPER 1339] p0352 A81-31379
Development and testing of a new technology weight and balance indicator
[SAWE PAPER 1341] p0353 A81-31381
MASS DISTRIBUTION
Some dynamic properties of rigid two-bladed fully gimballed tip-jet helicopter rotor with circulation control
[AD-A094031] p0252 N81-18054
MASS FLOW
Projected power and specific fuel consumption development of the Rolls Royce Gem engine
p0575 A81-46637
MASS SPECTROMETRY
U MASS SPECTROSCOPY
MASS SPECTROSCOPY
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966
Analysis of middle distillate fuels by field ionization mass spectrometry
[AD-A099407] p0491 N81-26209
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260
MATERIAL REMOVAL (MACHINING)
U MACHINING
MATERIALS HANDLING
NT GROUND HANDLING
'Load snubbing' - A solution to the problem of terrain flying with external cargo
[AHS 80-32] p0476 A81-40162
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270] p0248 N81-18023
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049
MATERIALS RECOVERY
NASA's activities in the conservation of strategic aerospace materials
p0179 A81-22535
MATERIALS TESTS
The contribution of structural testing to total airworthiness
p0068 A81-16424
Nondestructive dynamic testing
p0124 A81-19657

The 1980's - Payoff decade for advanced materials; Proceedings of the Twenty-fifth National Symposium and Exhibition, San Diego, Calif., May 6-8, 1980 p0181 A81-22636

Experiences with composite aircraft structures p0182 A81-22678

Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry p0182 A81-22692

The manufacture of composite rotor blades p0283 A81-27886

Kevlar - Thermophysical properties [AIAA PAPER 81-1104] p0459 A81-39104

Composite helicopter rotor blades - Design, development, and operational performance p0481 A81-40588

Blade tip ceramic outer air seal for long life turbine engines [AIAA PAPER 81-1440] p0504 A81-40874

Development of graphite-epoxy covers for L-1011 advanced composite vertical fin p0530 A81-43627

A low-cost forward fairing for the Bell Long Ranger Helicopter p0531 A81-43644

Use of carbon composites in aircraft structures p0577 A81-46813

Testing of aircraft passenger seat cushion material, full scale. Data, volume 2 [NASA-CR-160963] p0440 N81-25050

MATHEMATICAL LOGIC

NT ALGORITHMS

NT LATTICES (MATHEMATICS)

A mode decomposition control logic for system performance enhancement [AIAA 81-1753] p0554 A81-44083

MATHEMATICAL MODELS

NT ANALOG SIMULATION

NT DIGITAL SIMULATION

A simple model of the threshold voltage of short and narrow channel MOSFETs p0051 A81-13285

Nonstationary method for the direct statistical modeling of rarefied-gas flows p0069 A81-16454

Economics of technological change - A joint model for the aircraft and airline industries p0169 A81-21010

Analytical methods for store separation flight test p0177 A81-22344

Stochastic modeling of an aircraft traversing a runway using time series analysis p0183 A81-23368

Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model p0228 A81-24078

Parametric analysis of multipurpose airplanes based on utilization effectiveness criteria p0236 A81-25691

A mathematical computer simulation of stationary and nonstationary flow of an ideal incompressible fluid around solid profiles and arrays p0237 A81-26045

Improved particle trajectory calculations through turbomachinery affected by coal ash particles [ASME PAPER 81-GT-53] p0312 A81-29965

Supersonic stall flutter of high-speed fans [ASME PAPER 81-GT-184] p0317 A81-30078

A generalized mathematical model to estimate gas turbine starting characteristics [ASME PAPER 81-GT-202] p0318 A81-30092

Mathematical model of the linear unsteady aerodynamics of the entire aircraft p0349 A81-31039

Application of an aerodynamic configuration modeling technique to the design and analysis of X-Wing aircraft configurations p0356 A81-32013

Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators [SAE PAPER 801135] p0397 A81-34166

Stability of nonuniform rotor blades in hover using a mixed formulation p0467 A81-40088

ASW helicopter/sonar dynamics mathematical model p0470 A81-40115

A study of the effect of aft fuselage shape on helicopter drag p0470 A81-40116

Modeling of ramjet combustors using simple reactor theory [AIAA PAPER 81-1429] p0515 A81-42196

Adaptive multivariable model following --- for aircraft control p0564 A81-45540

Spin - Angles and inertial moments p0567 A81-46023

The use of parametric cost estimating relationships as they pertain to aircraft airframes: A new perspective [AD-A089525] p0027 N81-10060

Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901) [AD-A089524] p0029 N81-10074

A method of performance prediction for centrifugal compressors. Part 1: Analysis. Part 2: Comparison with experiment [ARC-R/M-3843] p0031 N81-10436

Predictability of moisture absorption in graphite/epoxy sandwich panels p0039 N81-11131

Transducer installation for the Sea King MK 50 mathematical model validation flight tests [AD-A089924] p0043 N81-11365

An analytical technique for approximating unsteady aerodynamics in the time domain [NASA-TP-1738] p0043 N81-11422

Turbulence modeling for application to V/STOL propulsion induced effects: Two dimensional formulation [AD-A090331] p0072 N81-12026

Multivariable identification using centralized fixed modes p0079 N81-12091

Mixing and combustion in high speed air flows [AD-A090536] p0083 N81-12192

The implications of alternative aviation fuels on airbase air quality [AD-A090283] p0087 N81-12652

Transonic rotor noise - theoretical and experimental comparisons [AD-A090806] p0088 N81-12824

The response of turbine engine rotors to interference rubs [AD-A090408] p0093 N81-13060

A contribution to stabilization of flight vehicle parachute systems [DFVLR-MITT-80-05] p0126 N81-13926

Service life determination for the UH-60-A (UTTAS) helicopter elastomeric bearings [AD-A091756] p0134 N81-14324

An analytic model of subsonic flow around an airflow with a spoiler p0138 N81-14966

Application of transonic potential calculations to aircraft and wind tunnel configurations p0186 N81-15992

Sample data effects of high-pass filters [NASA-TP-1797] p0193 N81-16040

Propulsion system mathematical model for a lift/cruise fan V/STOL aircraft [NASA-TM-81663] p0195 N81-16055

Validation of a two dimensional primitive variable computer code for flow fields in jet engine test cells [AD-A092138] p0196 N81-16060

Demonstration of a method for determining critical store configurations for wing store flutter [AD-A092257] p0197 N81-16068

Evaluation of bird load models for dynamic analysis of aircraft transparencies [AD-A092909] p0204 N81-16995

Air traffic control simulation models. Citations from the NTIS data base [PB81-800104] p0207 N81-17037

A method for the prediction of wing response to nonstationary buffet loads [AD-A093037] p0208 N81-17043

Modeling, acquisition and processing during large displacements --- associated with experiments in flight mechanics [AAAF-NT-80-16] p0210 N81-17056

Analysis and modeling of information handling
tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061
Turbine modeling technique to generate off-design
performance data for both single and multistage
axial-flow turbines
[NASA-CR-165244] p0213 N81-17078
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
Active controls for flutter suppression and gust
alleviation in supersonic aircraft --- YF-17
flutter model
[NASA-CR-163934] p0216 N81-17097
Continued development and correlation of
analytically based weight estimation codes for
wings and fuselages
[NASA-CR-152331] p0251 N81-18044
Research in multirate estimation and control
[AD-A094070] p0253 N81-18062
Analytical prediction of the interior noise for
cylindrical models of aircraft fuselages for
prescribed exterior noise fields. Phase 1:
Development and validation of preliminary
analytical models
[NASA-CR-159363] p0258 N81-18799
Math model study, runway 16R instrument landing
system localizer at Seattle-Tacoma Airport,
Washington
[AD-A095076] p0270 N81-19085
Development of advanced techniques for rotorcraft
state estimation and parameter identification
[NASA-CR-159297] p0271 N81-19098
Leading-edge separation from a slender rolling
wing-body combination --- vortex sheet model
[RAE-TR-80039] p0330 N81-20040
Optimum manoeuvers of supersonic aircraft, volumes
1 and 2
p0332 N81-20060
Extended frequency turbofan model
[NASA-CR-165261] p0335 N81-20078
Sea King mathematical model validation trials.
Flight data channel calibration
[AD-A096587] p0374 N81-22043
The development of a theoretical and experimental
model for the study of active suppression of
wing flutter
p0376 N81-22058
SCI model structure determination program (OSR)
user's guide --- optimal subset regression
[NASA-CR-159084] p0380 N81-22725
An evaluation of a simplified near field noise
model for supersonic helical tip speed propellers
[NASA-TM-81727] p0380 N81-22836
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059
An airport community noise-impact assessment model
[NASA-TM-80198] p0393 N81-23713
Continued research on selected parameters to
minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602
Semi-actuator disk theory for compressor choke
flutter
[NASA-CR-3426] p0442 N81-25075
A mathematical model for Vertical Attitude Takeoff
and Landing (VATOL) aircraft simulation. Volume
1: Model description application
[NASA-CR-166129-VOL-1] p0538 N81-28084
A mathematical model for Vertical Attitude Takeoff
and Landing (VATOL) aircraft simulation. Volume
2: Model equations and base aircraft data
[NASA-CR-166129-VOL-2] p0538 N81-28085
A mathematical model for Vertical Attitude Takeoff
and Landing (VATOL) aircraft simulation. Volume
3: User's manual for VATOL simulation program
[NASA-CR-166129-VOL-3] p0538 N81-28086
Optimization of strategic airlift in flight
refueling
[AD-A101137] p0539 N81-28090
An investigation of the linear and angular
vibration environments of trials aircraft
p0545 N81-29087
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 3: Appendices,
aerodynamic models
[AD-A101648] p0581 N81-30115
The effect of boundary layer growth on the
stability of compressible flows
p0587 N81-30389
Computer modeling of internal combustion engines:
Combustion and related processes
[NTS/79/3] p0587 N81-30454
Aerodynamic mathematical modeling - basic concepts
p0590 N81-31106
A model-following technique for insensitive
aircraft control systems
p0600 N81-31223
Sting interference effects on the static dynamic
and base pressure measurements of the standard
dynamics model aircraft at Mach numbers 0.3
through 1.3
[AD-A102612] p0627 N81-32124
Simplified off-design performance model of a day
turbofan engine cycle
[NASA-TM-83204] p0639 N81-33206
MATHEMATICAL PROGRAMMING
NT DYNAMIC PROGRAMMING
NT LINEAR PROGRAMMING
NT NONLINEAR PROGRAMMING
Discrete-continuous variable structural synthesis
using dual methods
p0066 A81-15894
Structural synthesis - Its genesis and development
p0622 A81-49076
MATRICES (MATHEMATICS)
NT EIGENVALUES
NT STIFFNESS MATRIX
New approach to the solution of large, full matrix
equations --- Neumann problem for inviscid
incompressible flow past airfoils
p0171 A81-21552
A comparison of methods for calibration and use of
multi-component strain gauge wind tunnel balances
[AD-A090484] p0084 N81-12394
Grid generation for general three-dimensional
configurations
p0137 N81-14714
MATRIX ANALYSIS
U MATRICES (MATHEMATICS)
MATRIX MATERIALS
Effect of service environment on composite materials
[AGARD-CP-288] p0039 N81-11128
Effect of various environmental conditions on
polymer matrix composites
p0039 N81-11130
MATRIX METHODS
The automatic matrix force method and techniques
for handling more complex computations with
given computer capacity
p0108 A81-17815
Structural analysis of fuselages with cutouts by
finite element method
p0108 A81-17816
The matrix analysis of wings
p0108 A81-17818
Supermatrix method for multi-substructure analysis
p0225 A81-23854
Matrix load analysis method for flexible aircraft
structures
[PAPER 810610] p0522 A81-42766
MATRIX STRESS CALCULATION
U MATRIX METHODS
MATES (SYSTEMS)
Formation tracking. Part 2: Tracking and control
procedures
[FPH-279-PT-2] p0218 N81-17110
MAXIMUM LIKELIHOOD ESTIMATES
Failure detection and isolation for tactical
aircraft using the generalized likelihood test
p0321 A81-36261
Maximum likelihood elevation angle estimates of
radar targets using subapertures
p0359 A81-32691
Nonlinear estimation of generalized vector shot
processes
p0529 A81-43583
System identification of the longitudinal motion
of the DFVLR HFB 320 research aircraft with
particular consideration of control surface
effectiveness
[DFVLR-MITT-79-16] p0130 N81-13971
Maximum likelihood identification of aircraft
lateral parameters with unsteady aerodynamic
modelling
p0376 N81-22057
SCI Identification (SCIDNT) program user's guide
--- maximum likelihood method for linear
rotorcraft models

[NASA-CR-159082] p0379 N81-22723
MLSCIDNT user's guide maximum likehood parameter identification computer program with nonlinear rotorcraft model
[NASA-CR-159083] p0380 N81-22724
System identification for controlled aircraft --- maximum likelihood estimates, parameter identification
p0631 N81-33132
MCDONNELL AIRCRAFT
NT DC 10 AIRCRAFT
NT F-4 AIRCRAFT
NT F-101 AIRCRAFT
NT PHANTOM AIRCRAFT
NT RF-4 AIRCRAFT
MCDONNELL DOUGLAS AIRCRAFT
NT DC 3 AIRCRAFT
NT DC 8 AIRCRAFT
NT DC 9 AIRCRAFT
NT DC 10 AIRCRAFT
NT DOUGLAS AIRCRAFT
NT F-4 AIRCRAFT
NT F-18 AIRCRAFT
NT F-101 AIRCRAFT
NT PHANTOM AIRCRAFT
NT RF-4 AIRCRAFT
MEAN SQUARE VALUES
Choice of optimal parameters of a gyrovertical on the basis of a standard program
p0622 A81-48744
MEAN TIME BETWEEN FAILURES
U MTBF
MEASURE AND INTEGRATION
NT NUMERICAL INTEGRATION
NT WEIGHTING FUNCTIONS
MEASURING INSTRUMENTS
NT ACCELEROMETERS
NT ALTIMETERS
NT ANEMOMETERS
NT APPROACH INDICATORS
NT ATTITUDE INDICATORS
NT CAPACITIVE FUEL GAGES
NT DISTANCE MEASURING EQUIPMENT
NT DYNAMOMETERS
NT ELASTOMETERS
NT ENGINE ANALYZERS
NT ENGINE MONITORING INSTRUMENTS
NT FABRY-PEROT INTERFEROMETERS
NT FLIGHT LOAD RECORDERS
NT FLIGHT RECORDERS
NT FLIR DETECTORS
NT FLOW DIRECTION INDICATORS
NT GYRO HORIZONS
NT GYROCOMPASSES
NT HOT-WIRE FLOWMETERS
NT INDICATING INSTRUMENTS
NT INFRARED DETECTORS
NT INFRARED INSTRUMENTS
NT INFRARED RADIOMETERS
NT INFRARED SCANNERS
NT INFRARED SPECTROMETERS
NT INTERFEROMETERS
NT LASER ALTIMETERS
NT LASER ANEMOMETERS
NT LASER DOPPLER VELOCIMETERS
NT LASER RANGE FINDERS
NT MACH-ZEHNDER INTERFEROMETERS
NT METEOROLOGICAL INSTRUMENTS
NT MICHELSON INTERFEROMETERS
NT MICROWAVE RADIOMETERS
NT MULTISPECTRAL BAND SCANNERS
NT OMEGA NAVIGATION SYSTEM
NT OPTICAL MEASURING INSTRUMENTS
NT OPTICAL SCANNERS
NT PLAN POSITION INDICATORS
NT POSITION INDICATORS
NT RADIATION PYROMETERS
NT RADIO ALTIMETERS
NT RADIO DIRECTION FINDERS
NT RADIO INTERFEROMETERS
NT RADIOSONDES
NT SPEED INDICATORS
NT STRAIN GAGE BALANCES
NT STRAIN GAGES
NT TEMPERATURE MEASURING INSTRUMENTS
NT TENSOMETERS
NT THERMOCOUPLE PYROMETERS
NT TURBULENCE METERS
NT VOLTMETERS
NT WEIGHT INDICATORS
Aircraft instruments and measuring systems --- Russian book
p0564 A81-45608
Instrumentation for measurement of flow properties on a swept wing in flight
[DGLR PAPER 81-034] p0609 A81-47585
Performance verification of the superjet laminar angular rate sensor
[AD-A091089] p0091 N81-13040
Skin friction measuring device for aircraft
[NASA-CASE-FRC-11029-1] p0210 N81-17057
Low-range airspeed sensors
[AD-A096359] p0342 N81-21076
MECHANICAL DEVICES
Sputtering and ion plating for aerospace applications
[NASA-TM-81726] p0337 N81-20424
MECHANICAL DRAWINGS
U ENGINEERING DRAWINGS
MECHANICAL DRIVES
NT HELICOPTER PROPELLER DRIVE
NT PROPELLER DRIVE
NT TRANSMISSIONS (MACHINE ELEMENTS)
Advanced transmission component development
p0575 A81-46634
Experimental analysis of IMEP in a rotary combustion engine
[NASA-TM-81662] p0195 N81-16054
High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400
MECHANICAL ENGINEERING
An analytical method to calculate misalignment in the journal bearing of a planetary gear system
p0004 A81-10839
Classification of links of assembly units with respect to the character of their connections, and calculation of the accuracy of their execution --- in airframe construction
p0319 A81-30168
MECHANICAL IMPEDANCE
Determining the natural frequency of the combinative system of the helicopter rotor and elastic fuselage with mechanical impedance technique
[AIAA 81-0613] p0305 A81-29475
Reduction of helicopter vibration through control of hub-impedance
p0356 A81-32009
MECHANICAL MEASUREMENT
NT DISPLACEMENT MEASUREMENT
NT DRAG MEASUREMENT
NT FLOW MEASUREMENT
NT PRESSURE MEASUREMENTS
NT STRESS MEASUREMENT
NT THRUST MEASUREMENT
NT VELOCITY MEASUREMENT
NT VIBRATION MEASUREMENT
NT WIND MEASUREMENT
NT WIND VELOCITY MEASUREMENT
MECHANICAL OSCILLATORS
NT GYROSCOPIC PENDULUMS
NT PENDULUMS
Forced vibrations of a nonlinear system excited by a centrifugal oscillator with a sloping engine characteristic
p0002 A81-10439
Non-linear oscillator models in bluff body aeroelasticity
p0348 A81-30786
Vibrations in technical equipment. Volume 3 - Oscillations of machines, structures, and their components --- Russian book
p0511 A81-41725
MECHANICAL PROPERTIES
NT AEROELASTICITY
NT AEROTHERMOELASTICITY
NT COMPRESSIBILITY
NT COMPRESSIVE STRENGTH
NT CREEP PROPERTIES
NT CREEP RUPTURE STRENGTH
NT ELASTIC PROPERTIES
NT FATIGUE LIFE
NT FLEXIBILITY
NT FRACTURE STRENGTH
NT HARDNESS
NT IMPACT STRENGTH
NT SHEAR PROPERTIES

NT SHEAR STRENGTH
NT SHELL STABILITY
NT STIFFNESS
NT STRESS CYCLES
NT STRUCTURAL STABILITY
NT SUPERPLASTICITY
NT TENSILE PROPERTIES
NT TENSILE STRENGTH
NT THERMAL RESISTANCE
NT THERMOPLASTICITY
NT VISCOELASTICITY
The manufacture of composite rotor blades
p0283 A81-27086
Carbon/carbon components for advanced gas turbine engines
[ASME PAPER 81-GT-35] p0312 A81-29949
Effect of temperature dependent mechanical properties on thermal stress in cooled turbine blades
[ASME PAPER 81-GT-105] p0315 A81-30010
Fatigue strength of gas turbine engine rotor blades in connection with structural changes in service
p0355 A81-31673
An evaluation of vacuum centrifuged titanium castings for helicopter components
p0510 A81-41516
Effect of beta flecks on the fatigue behaviour of Ti-6Al-6V-2Sn
p0510 A81-41634
Advanced aluminum metallic materials and processes for application to naval aircraft structures
p0531 A81-43637
High-char-forming composite laminates
p0532 A81-43652
Challenges in alloy design - Titanium for the aerospace industry
p0553 A81-43998
Cost-effective mechanical property characterization
p0612 A81-47813
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165649] p0198 N81-16139
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions
[AD-A095634] p0334 N81-20072
Scarf joints in unidirectional carbon fiber reinforced plastics --- tests of repairs made using adhesives
[BU-258] p0336 N81-20193
Static and yawed-rolling mechanical properties of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24471
Use of composite materials for helicopter rotor blades --- glass fiber reinforced epoxy
[CSIR-ME-1674] p0550 N81-29167
Application of damage tolerance concepts for MBB helicopters --- mechanical properties
[MBB-UD-309/80-OE] p0580 N81-30105
MECHANICAL RESONANCE
U RESONANT VIBRATION
MECHANICAL SHOCK
The Shock and Vibration Digest, volume 12, number 11
[AD-A092384] p0257 N81-18403
MEDICAL EQUIPMENT
NT X RAY APPARATUS
MEDICAL PERSONNEL
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
MEDICAL SCIENCE
NT EPIDEMIOLOGY
NT NEUROLOGY
NT PATHOLOGY
MEDICAL SERVICES
Medical coordination in airport disasters
p0053 A81-13512
Developing an emergency medical disaster plan for an airport
p0053 A81-13513
Airborne emergency hospital
p0299 A81-29207
The medical use of the helicopter in the field of air rescue
p0409 A81-34870
MEDITERRANEAN SEA
Design for maximum effectiveness in the Navy role
p0634 N81-33154
MEETINGS
U CONFERENCES
MEMBRANE ANALOGY
U MEMBRANE STRUCTURES
U STRUCTURAL ANALYSIS
MEMBRANE STRUCTURES
NT SKIN (STRUCTURAL MEMBER)
Post-buckling and membrane structural capability of composite shell structures
p0482 A81-40602
MEMBRANE THEORY
U STRUCTURAL ANALYSIS
MEMBRANES
NT MEMBRANE STRUCTURES
NT SKIN (STRUCTURAL MEMBER)
MENTAL HEALTH
Effect of aircraft noise on the equilibrium of airport residents: Longitudinal study around Roissy, phase 3
[NASA-TM-75906] p0499 N81-27692
MENTAL STRESS
U STRESS (PSYCHOLOGY)
MESOSCALE PHENOMENA
NT JET STREAMS (METEOROLOGY)
Investigative technical measurements of the planetary boundary layer made onboard an instrumented motorized glider
[REPT-149] p0379 N81-22666
MESSAGE PROCESSING
Formats for DABS data link applications
[AD-A089963] p0034 N81-11028
METAL BONDING
NT METAL-METAL BONDING
Prospects for bonding primary aircraft structure in the 80's
p0182 A81-22679
The use of bonded crack-stoppers in pressure cabins
p0233 A81-25378
The bonding of titanium and its alloys
p0417 A81-36663
Concurrent superplastic forming/diffusion bonding of titanium airframe components
p0531 A81-43638
Thirty years experience with primary adhesive bonded structures --- aircraft construction
[FOK-BO-1240] p0541 N81-28189
METAL COATINGS
NT ALUMINUM COATINGS
Coatings in the aero gas turbine
p0103 A81-17167
Prevention of spline wear by soft metallic coatings --- aircraft engines
[AD-A091061] p0132 N81-14064
Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24060
METAL CORROSION
U CORROSION
METAL CUTTING
Optimization of finishing conditions --- metal cutting
p0319 A81-30163
METAL FATIGUE
On understanding environment-enhanced fatigue crack growth - A fundamental approach
p0003 A81-10749
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminium
p0013 A81-11657
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A8[illegible]
Prediction methods for fatigue crack growth in aircraft material
p0118 A81-18777
Evaluation and comparison of nondestructive service inspection methods
p0153 A81-20135
An engineering model for assessing load sequencing effects --- cracks in aircraft structures
p0172 A81-21737
Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures
p0232 A81-24982
Failure by fatigue
p0238 A81-26419
Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles

p0285 A81-28134
Fatigue strength of gas turbine engine rotor blades in connection with structural changes in service
p0355 A81-31673
Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
p0365 A81-33169
Relationship between creep characteristics and fracture resistance under the combined effect of fatigue and creep
p0414 A81-36474
Estimated service life of gas turbine engine compressor blades
p0417 A81-36680
Crack growth model for flight-type loading
p0460 A81-39247
Application of BFRP Crack Patching to Mirage III aircraft
p0481 A81-40586
Effect of beta flecks on the fatigue behaviour of Ti-6Al-6V-2Sn
p0510 A81-41634
Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures --- of Al alloys
p0516 A81-42356
Predicting fatigue crack growth on aircraft structures
[SAE PAPER 810593] p0520 A81-42752
Determination of fatigue life by testing materials for thermal fatigue
p0532 A81-43774
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum --- wing panels for transport aircraft
[NLR-MP-80003-U] p0043 N81-11415
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489
Fatigue crack growth in 7475-T7651 material under flight simulation loading. Information from a Douglas report --- effect of transport/bomber loads spectrum on crack growth
[VTH-M-392] p0542 N81-28493
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222

METAL FINISHING
NT SHOT PEENING

METAL FORGING
U FORGING

METAL FORMING
U FORMING TECHNIQUES
U METAL WORKING

METAL JOINTS
Use of speckle-holographic interferometry to study the strain-strain state of a gas-turbine engine disk close to the blade root fixing
p0170 A81-21366
Prospects for bonding primary aircraft structure in the 80's
p0182 A81-22679
The possibility of single-impact riveting of flat-top countersunk-head rivets --- for aircraft structures
p0319 A81-30164
Pilot installations for deposition techniques in the case of components exposed to heat and for diffusion joining of power plant components
p0449 A81-37634

METAL MATRIX COMPOSITES
NT [illegible]
The 1980's - Payoff decade for advanced materials; Proceedings of the Twenty-fifth National Symposium and Exhibition, San Diego, Calif., May 6-8, 1980
p0181 A81-22636
High temperature metal matrix composites for gas turbines
p0295 A81-29090
Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11412

METAL OXIDE SEMICONDUCTORS
NT CHARGE COUPLED DEVICES
A simple model of the threshold voltage of short and narrow channel MOSFETs
p0051 A81-13285

METAL PARTICLES
NT METAL POWDER

METAL POWDER
Plasma arc improves PM process - Tungsten free Ti powder
p0227 A81-24045
From sponge to powder alternatives in titanium processing
p0511 A81-41647
Evaluation of powder coatings for application to aircraft component parts
[AD-A094724] p0277 N81-19305

METAL PROPELLANTS
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066

METAL SHEETS
Thermal considerations in the patching of metal sheets with composite overlays
p0153 A81-20297
Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures
p0232 A81-24942
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174
Integrated flexible sheet-metal components - Manufacturing center
p0449 A81-37633
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489

METAL SHELLS
Post-buckling and membrane structural capability of composite shell structures
p0482 A81-40602

METAL SPINNING
Metalspinning, shear- and flowforming
p0551 N81-29281

METAL SURFACES
Surface analysis of bearing steels after solvent treatments. II - Lubricant-coated bearing surfaces
[ASLE PREPRINT 80-LC-8A-6] p0118 A81-18748
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077

METAL VAPORS
NT SODIUM VAPOR

METAL WORKING
NT EXPLOSIVE FORMING
NT FORGING
NT METAL SPINNING
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796
The state of the technologies involved in the forming of TA6V titanium alloy
p0416 A81-36659
Integrated flexible sheet-metal components - Manufacturing center
p0449 A81-37633
From sponge to powder alternatives in titanium processing
p0511 A81-41647
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636

METAL-METAL BONDING
Application of weldbonding to A-10 production aircraft
p0013 A81-11652
Evaluation of high-temperature structural adhesives for extended service
p0247 N81-18010
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489

METAL-NITRIDE-OXIDE-SEMICONDUCTORS
New storage medium - Greater safety. II - Testing, fabrication, implementation --- MNOS block oriented random access memory (BORAM) circuits
p0227 A81-24044

METALLIZING
A process for protecting gas turbine blade cooling passages against degradation

p0622 A81-49209
METALLOGRAPHY
Ferrography as a health monitor and a design aid for the development of helicopter gearboxes
p0118 A81-18759
Acoustic emission and corrosion
p0153 A81-20211
Metallographic analysis techniques used during the Cast Aluminum Structures Technology /CAST/ program --- microstructure of aluminum cast alloy
p0531 A81-43650
METALS
NT ALUMINUM
NT ALUMINUM COATINGS
NT COBALT
NT IRON ISOTOPES
NT METAL COATINGS
NT METAL MATRIX COMPOSITES
NT METAL POWDER
NT SILVER
NT SODIUM VAPOR
NT TITANIUM
NT TRANSITION METALS
NT TUNGSTEN
NT ULTRAPURE METALS
The certification of composite airframe structures
p0283 A81-27887
X-ray fluorescence spectrometric analysis of wear metals in used lubricating oils
[AD-A097552] p0390 N81-23087
Conservation of Strategic Aerospace Materials (COSAM)
p0599 N81-31208
METEORITE COMPRESSION TESTS
U COMPRESSION TESTS
U MECHANICAL PROPERTIES
METEOROLOGICAL INSTRUMENTS
NT RADIOSONDES
Survey of Workshops on Meteorological and Environmental Inputs to Aviation Systems
p0135 N81-14556
Winds and wind shear in-situ sensors
p0136 N81-14563
Bird flight and airplane flight --- instruments to measure air currents and flight characteristics
[NASA-TM-75777] p0138 N81-14962
METEOROLOGICAL PARAMETERS
Reduction of the take-off ground run distance to a given set of atmospheric conditions
p0010 A81-11634
General aviation considerations on bad weather approaches at regional airports
p0052 A81-13315
Measurement of natural aircraft icing conditions
[AIAA PAPER 81-1646] p0526 A81-43143
Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation systems
[NASA-CP-2139] p0135 N81-14555
Survey of Workshops on Meteorological and Environmental Inputs to Aviation Systems
p0135 N81-14556
Aviation meteorology research and development: A status report
p0135 N81-14557
Federal Aviation Administration and National Weather Service Aviation Research and Development
p0135 N81-14558
Aircraft icing instrumentation: Unfilled needs --- rotary wing aircraft
p0135 N81-14560
METEOROLOGICAL RADAR
Operational radar display of the structure of thunderstorm hail clouds
p0069 A81-16474
Pulsed Doppler radar detects weather hazards to aviation
[AIAA PAPER 81-0235] p0163 A81-20691
New airborne weather radar systems
[AIAA PAPER 81-0237] p0163 A81-20692
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0042 N81-11290
Wallops severe storms measurement capability
p0266 N81-19049
Minimum operational performance standards for airborne weather and ground mapping pulsed radars
[RTCA/DO-173] p0336 N81-20323
METEOROLOGICAL SERVICES
An assessment of General Aviation utilization of advanced avionics technology
[NASA-CR-159328] p0127 N81-13941
Measuring weather for aviation safety in the 1980's
p0136 N81-14568
METEOROLOGICAL STATIONS
U WEATHER STATIONS
METEOROLOGY
NT RADIO METEOROLOGY
NT SYNOPTIC METEOROLOGY
NT WEATHER FORECASTING
Microbursts as an aviation wind shear hazard
[AIAA PAPER 81-0386] p0167 A81-20798
New developments in the field of solar-terrestrial relationships --- Russian book
p0281 A81-27326
Electronic flight rules: An alternative separation assurance concept
[AD-A097570] p0387 N81-23063
METERS
U MEASURING INSTRUMENTS
METHANE
Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177
Alternative aircraft fuels - When will the action start
p0465 A81-39981
METHOD OF CHARACTERISTICS
Review of numerical methods for the problem of the supersonic flow around bodies at angle of attack
p0011 A81-11639
Analytical characteristics methods: Applications
[VKI-PREPRINT-1980-10] p0021 N81-10011
METHODS
U PROCEDURES
METROLOGY
Optics in metrology and quality assurance; Proceedings of the Seminar, Los Angeles, Calif., February 6, 7, 1980
p0358 A81-32504
Aircraft quality assurance using close-range photogrammetry
p0358 A81-32508
MICHELSON INTERFEROMETERS
Design characteristics of Michelson interferometers used on the AFGL NKC-135 infrared flying laboratory
p0463 A81-39505
Staring infrared mosaic observation of an F-15 aircraft
p0463 A81-39636
MICROBES
U MICROORGANISMS
MICROCIRCUITS
U MICROELECTRONICS
MICROCOMPUTERS
Military aircraft avionics in the 1980's
p0050 A81-13169
Flight control and display computation - A 25-year perspective
[AIAA PAPER 81-0865] p0408 A81-34354
Microcomputer system for controlling an infrared scanning camera --- with application to rocket plume radiation measurement
p0453 A81-37749
COMLINK - A communications/EW analytical and modeling tool
p0617 A81-48547
Microcomputer array processor system --- design for electronic warfare
p0044 N81-11673
A unified approach to the mass balancing of rotating flexible shafts
p0095 N81-13355
Automated pilot advisory system test and evaluation at Manassas Municipal Airport
p0264 N81-19040
Dead reckoner navigation project
p0372 N81-22010
A microcomputer-based signal data converter for runway visual range measurements
[AD-A097563] p0386 N81-23060

MICROCRACKS
Microcracking in graphite-epoxy composites
[AD-A089894] p0038 N81-11118
MICROELECTRONICS
NT LARGE SCALE INTEGRATION
A new approach to thick-film resistors
p0232 A81-24968
Recommendations for the NASA Avionics program for the 1980's
p0517 A81-42436
MICROMINIATURIZATION
NT LARGE SCALE INTEGRATION
A new generation IFF - The AN/APX-100/V/ transponder
p0350 A81-31132
MICROORGANISMS
The resistance of tank protective measures to microorganisms
[SNIAS-801-551-107] p0144 N81-15072
MICROPARTICLES
Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277
MICROPHONES
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099
Improvement of the imaging of moving acoustic sources by the knowledge of their motion
[ONERA, TP NO. 1981-17] p0359 A81-32534
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376
A comparison of the three methods used to obtain acoustic measurements for the NASA Flight Effects Program
[NASA-TM-81906] p0088 N81-12822
An automated multiple choice intelligibility testing system
p0604 N81-31468
MICROPROCESSORS
Wind tunnel model support, controlled by four microprocessors
[ONERA, TP NO. 1980-149] p0174 A81-21917
A low-level wind shear detection system
p0223 A81-23514
A versatile microprocessor controller for low cost helicopter applications
[ASME PAPER 81-GT-137] p0316 A81-30039
Using microprocessors in fault monitoring of aircraft electronics
[ASME PAPER 81-GT-138] p0316 A81-30040
The Z8000 provides the basis for a powerful new airborne computer
p0321 A81-30252
Advanced avionic systems for multi-mission applications
p0321 A81-30258
A microprocessor based land navigator
p0360 A81-32833
Microprocessor-based digital air data computer for flight test
p0361 A81-32858
A flight test real-time GW-CG computing system
p0361 A81-32860
Real-time microprocessor technology applied to automatic braking systems
[SAE PAPER 801194] p0402 A81-34204
MLS - An example of microprocessor utilization
p0409 A81-35022
Microcomputer based engine model used in flight simulation applications
[AIAA 81-0973] p0415 A81-36562
Microprocessor-based airborne spectrometer system
p0453 A81-37744
Automated celestial position determination
p0557 A81-44324
The application of computers to navigation - New developments employing microprocessors
p0565 A81-45761
Microprocessor software applications for flight training simulators
p0044 N81-11658
The P/POD project: Programmable/Pilot Oriented Display --- general aviation aircraft
p0371 N81-22004
Microcomputer processing for Loran-C
p0371 N81-22007
A microcomputer-based signal data converter for runway visual range measurements
[AD-A097568] p0386 N81-23060
Summary of transponder data, May 1979 - November 1979
[AD-A097569] p0386 N81-23061
Microcomputer Applications in Power and Propulsion Systems
[AGARD-LS-113] p0497 N81-27103
Microprocessor characteristics and comparative features
p0497 N81-27104
Microprocessor system test and monitoring
p0497 N81-27108
A continuously reconfiguring multi-microprocessor flight control system
[AD-A101412] p0584 N81-30138
MICROPROGRAMMING
Microprocessor software applications for flight training simulators
p0044 N81-11658
MICROSCOPY
NT ELECTRON MICROSCOPY
MICROSTRIP TRANSMISSION LINES
A 7.5-GHz microstrip phased array for aircraft-to-satellite communication
p0347 A81-30776
A 7.5 GHz microstrip phased array for aircraft-to-satellite communication
p0562 A81-44623
MICROSTRUCTURE
Effect of beta flecks on the fatigue behaviour of Ti-6Al-6V-2Sn
p0510 A81-41634
Metallographic analysis techniques used during the Cast Aluminum Structures Technology /CAST/ program --- microstructure of aluminum cast alloy
p0531 A81-43650
MICROWAVE AMPLIFIERS
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122
MICROWAVE ANTENNAS
NT SLOT ANTENNAS
MICROWAVE CIRCUITS
A review of current and future components for electronic warfare receivers
p0357 A81-32252
MICROWAVE EQUIPMENT
NT IMAGE TUBES
NT MICROWAVE AMPLIFIERS
NT MICROWAVE RADIOMETERS
NT SLOT ANTENNAS
Integrated avionics studies target future technologies
p0223 A81-23499
A millimeter wave radar for U.S. Army helicopters in the 80's
p0323 A81-30302
Microwave Landing System (MLS) clearance format assessment tests
[AD-A092553] p0206 N81-17024
Analytic determination of interference thresholds for microwave landing system equipment and TACAN/DME equipment
[AD-A093448] p0206 N81-17025
MLS channel assignment model
[AD-A093449] p0206 N81-17026
MICROWAVE FREQUENCIES
NT C BAND
NT SUPERHIGH FREQUENCIES
MICROWAVE LANDING SYSTEMS
Wind shear detection from PCM-recorded MLS-flight data
p0015 A81-11675
The present state of the MLS --- Microwave Landing System standardization
p0051 A81-13312
Air traffic control using a microwave landing system
p0053 A81-13421
How will it be possible to pass from ILS to MLS
p0059 A81-14473
International Air Transportation Conference, New Orleans, La., April 30-May 3, 1979, Proceedings. Volumes 1 & 2
p0110 A81-18051
Micro-wave landing system - An operational point of view
p0111 A81-18055
The importance of 'Interim Standard Microwave Landing System' for small community airports
p0114 A81-18087

Concepts and state of the art of the precision DME of the microwave landing system
p0233 A81-25376
MLS - An example of microprocessor utilization
p0409 A81-35022
INTERSCAN - The development and international acceptance of a new microwave landing system for civil aviation
p0418 A81-37114
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
Analysis of helicopter operations and the use of MLS in the offshore environment
p0512 A81-41764
Airborne antenna pattern calculations
p0532 A81-43708
Automatic helical rotorcraft descent and landing using a Microwave Landing System
[AIAA PAPER 81-1657] p0560 A81-44556
Navigation and landing - The prospects of new systems
p0566 A81-45766
Precision DME for microwave landing system
p0578 A81-47125
Simulation of Microwave Landing System
p0615 A81-48368
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 1
[RAE-TR-79052-VOL-1] p0026 N81-10044
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 2
[RAE-TR-79052-VOL-2] p0026 N81-10045
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 3
[RAE-TR-79052-VOL-3] p0026 N81-10046
Low cost airborne microwave landing system receiver, task 3
[NASA-CR-152409] p0075 N81-12054
Microwave landing systems. Citations from the Engineering Index data base
[PB80-814643] p0128 N81-13947
Microwave landing systems. Citations from the NTIS data base
[PB80-814635] p0128 N81-13948
Analytic determination of interference thresholds for microwave landing system equipment and TACAN/DME equipment
[AD-A093448] p0206 N81-17025
Operational considerations in utilization of microwave landing system approach and landing guidance --- terminal configured vehicle
p0264 N81-19039
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042
Operational considerations in utilization of microwave landing system approach and landing guidance
[NASA-TM-81945] p0331 N81-20050
Flight tests of the microwave landing system multimode digital processor
[AD-A095449] p0332 N81-20056
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21048
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22282
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059
NAVTOLAND microwave scanning beam tests at NOSC. Three landing guidance systems tested in a specular multipath environment
[AD-A099298] p0484 N81-26086
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
An analysis of the requirements for and the costs and benefits of the National Microwave Landing System (MLS), volume 1
[AD-A099632] p0493 N81-27071
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS), volume 2
[AD-A100018] p0493 N81-27072
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS)
[AD-A100136] p0537 N81-28076
Evaluation of Microwave Landing System (MLS) effect on the delivery performance of a fixed-path metering and spacing system
[NASA-TP-1844] p0546 N81-29111
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0595 N81-31180
Terminal area automatic navigation, guidance, and control 1: Automatic rollout, turnoff, and taxis
[NASA-CR-3451] p0600 N81-31224
MLS antenna locations for the deHaviland DASH 7 aircraft
[NASA-TM-83195] p0602 N81-31416
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0628 N81-32133
Characteristics of a digital filter for a precision DME system in microwave landing systems
[FUB-43-1980] p0628 N81-32136
MICROWAVE RADIATION
U MICROWAVES
MICROWAVE RADIOMETERS
An airborne sensor for the avoidance of clear air turbulence
[AIAA PAPER 81-0297] p0164 A81-20735
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677
Clear air turbulence studies with microwave radiometers
p0266 N81-19053
MICROWAVE TUBES
NT IMAGE TUBES
MICROWAVES
NT MILLIMETER WAVES
Microwave system for real time space position measurement
p0545 N81-29089
MICROWEIGHING
U WEIGHT MEASUREMENT
MIDAIR COLLISIONS
NT BIRD-AIRCRAFT COLLISIONS
Midair collisions - The accidents, the systems, and the Realpolitik
p0052 A81-13413
Aircraft collision avoidance and separation assurance
[SAE PAPER 800616] p0062 A81-15336
Air traffic control problems - A pilot's view
p0169 A81-20914
NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021
Aircraft accident reports. Brief format, US civil aviation: Issue no. 11, 1979 accidents
[NTSB-BA-80-8] p0075 N81-12053
Aircraft collision avoidance
[GPO-50-158] p0091 N81-13041
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944
Listing of accidents/incidents by aircraft make and model, United States Civil Aviation, 1978
[PB81-110280] p0205 N81-16999
MIDDLE ATMOSPHERE
NT OZONOSPHERE
NT STRATOSPHERE
MIE SCATTERING
NT RAYLEIGH SCATTERING
MILITARY AIR FACILITIES
Study of heliport airspace and real estate requirements
[AD-A091156] p0095 N81-13072
Southern California aviation system study
[PB80-215544] p0125 N81-13916
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
p0632 N81-33142

MILITARY AIRCRAFT
A theoretical and practical design investigation of the future military cockpit p0010 A81-11631
Standardization in military avionics systems architecture; Proceedings of the Seminar, Dayton, Ohio, November 28, 1979 p0050 A81-13167
Military aircraft avionics in the 1980's p0050 A81-13169
Avionic standardization from a designer's perspective p0050 A81-13170
Promoting rational standardization --- for military avionics systems architecture p0050 A81-13172
The RAE research and development program on EMC for aircraft and flight weapons systems p0056 A81-14263
Development of specifications from measured environments p0067 A81-16119
The implications of current flight control research and development p0099 A81-16578
Optimum selection of main parameters for the reverse design of a supersonic military aircraft p0102 A81-17047
Cruise-missile-carrier navigation requirements p0116 A81-18576
Design to cost and new technologies p0120 A81-19347
Solid-state power system use expands p0122 A81-19491
Primary training of military pilots - Changing theories and new trainers p0122 A81-19498
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook [AIAA PAPER 81-0302] A81-20739
An inflatable seat for aircraft passengers p0175 A81-22091
Analytical methods for store separation flight test p0177 A81-22344
Fiber optics study technology for military aircraft p0178 A81-22503
Development of conceptual Navy aircraft Reliability Prediction Models p0229 A81-24280
Parametric analysis of multipurpose airplanes based on utilization effectiveness criteria p0236 A81-25691
Applications of carbon fibre composites to military aircraft structures p0283 A81-27885
Investigation into the vibration of the starter gearbox of an aircraft turbine engine p0291 A81-29059
A look at comprehensive engine/airframe integration for high performance aircraft p0298 A81-29118
The engineering basis for the application of life cycle cost or supportability criteria to gas turbine engines p0298 A81-29119
An operational tilt-rotor this decade p0309 A81-29774
NASA research in aeropropulsion [ASME PAPER 81-GT-96] p0314 A81-30003
The Navy PATE program --- Propulsion Automatic Test Equipment [ASME PAPER 81-GT-189] p0317 A81-30082
Failure detection and isolation for tactical aircraft using the generalized likelihood test p0321 A81-30261
Synergistic benefits of fully integrating JTIDS and GPS --- Joint Tactical Information Distribution System and Global Positioning System p0323 A81-30311
DAIS controls and displays - A systems approach to avionics subsystem integration p0325 A81-30336
Cybernetic airborne fire control - Issues and potential p0326 A81-30347
Effects of sunlight on display filters p0326 A81-30352
The variable-speed tail-chase aerial combat problem p0351 A81-31295
A review of current and future components for electronic warfare receivers p0357 A81-32252
Quiet propulsive-lift technology ready for civil and military applications p0359 A81-32521
The rise of air and space p0366 A81-33719
The F100 engine [SAE PAPER 801110] p0395 A81-34151
A multiplexed digital voice intercommunications system for military applications [SAE PAPER 801144] p0396 A81-34173
New hydraulic system technology for future aircraft [SAE PAPER 801188] p0401 A81-34200
Secondary power system options for future military aircraft [SAE PAPER 801192] p0401 A81-34202
The status of the expendable gasifier program --- gas generator for aircraft engine [SAE PAPER 801151] p0406 A81-34242
Developing a Fighter Engine Derivative of the B-1/F101 engine [SAE PAPER 801156] p0407 A81-34246
The Tactical Air Forces - Outlook for the next decade [AIAA PAPER 81-0932] p0408 A81-34364
A study of factors affecting aircrew survivability following emergency escape over water p0409 A81-34697
A very complete electronic warfare system p0412 A81-35674
Multi-mission V/STOL with vectored thrust engines [AIAA PAPER 81-1363] p0502 A81-40843
Recent developments in Naval aircraft jet engine usage [AIAA PAPER 81-1366] p0502 A81-40846
Acceptability of shale derived fuel for Navy aircraft propulsion systems [AIAA PAPER 81-1424] p0503 A81-40868
NAFC gyroscopic moment test facility [AIAA PAPER 81-1480] p0506 A81-40900
Combat survivability with advanced aircraft propulsion development [AIAA PAPER 81-1506] p0507 A81-40913
CAINS II - An application of standard laser gyro inertial and computer technology for existing naval carrier aircraft p0516 A81-42434
U.S. Army crashworthiness program [SAE PAPER 810615] p0522 A81-42771
Avionics Availability Study [AIAA PAPER 81-1619] p0525 A81-43129
Wright Field turboprop study [AIAA PAPER 81-1685] p0526 A81-43157
On certification of composite structures for USAF aircraft [AIAA PAPER 81-1686] p0527 A81-43158
C-X - A case for scenario-oriented requirements --- new long-range military transport program [AIAA PAPER 81-1690] p0527 A81-43159
Application of pulse code modulation technology to aircraft dynamics data acquisition [AIAA PAPER 81-1736] p0528 A81-43173
Advanced aluminum metallic materials and processes for application to naval aircraft structures p0531 A81-43637
Historical trend in the research and development of aircraft [AIAA PAPER 81-1613] p0533 A81-43934
Engine life and usage methodologies for conceptual design [AIAA PAPER 81-1651] p0533 A81-43937
Investigation of influences on the definition of engine usage for future systems [AIAA PAPER 81-1652] p0533 A81-43938
Military aircraft technology - Needs and trends for the 80's [AIAA PAPER 81-1691] p0535 A81-43952
Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development [AIAA PAPER 81-1696] p0535 A81-43953
Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications [AIAA PAPER 81-1697] p0535 A81-43954

Longitudinal equivalent systems analysis of Navy tactical aircraft
[AIAA 81-1775] p0554 A81-44094
Low-order approaches to high-order systems - Problems and promises --- for analysis of aircraft pitch dynamics
[AIAA 81-1774] p0556 A81-44134
Future applications of adhesive bonding in the U.S. Air Force
p0558 A81-44378
Advanced structural repair for lower cost
p0558 A81-44393
Numerical and classical analysis of V/STOL aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898
Soviet practice in designing and procuring military aircraft
p0567 A81-46340
Plans for control of the noise exposure produced by military aircraft in the 1980's - Aircraft noise
p0568 A81-46364
Airbase induced community noise - Facilitating the military/civil interface
p0569 A81-46368
Developing test profiles for multiple mission situations --- standards for military aircraft
p0570 A81-46483
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] p0616 A81-48416
Design options study. Volume 1: Executive summary --- user requirements for the advanced civil military aircraft
[AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results --- advanced civil military aircraft: cost estimates
[AD-A089537] p0027 N81-10057
Design options study. Volume 3: Qualitative assessment --- advanced civil military aircraft
[AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices --- advanced civil military aircraft
[AD-A089539] p0027 N81-10059
Life Cycle Cost Analysis (LCCA) in military aircraft procurement
p0045 N81-11903
Impact of maintainability of life cycle costs
p0047 N81-11921
NASA Research in aeropropulsion
[NASA-TM-81623] p0093 N81-13056
Airborne-fiber optics manufacturing technology, aircraft installation processes
[AD-A093304] p0221 N81-17902
Certification procedure for military engines in Germany
p0429 N81-24074
Development of test requirements for civil and military auxiliary power units
p0430 N81-24083
Engine in-flight data collection and analysis in United Kingdom aircraft
p0431 N81-24085
Research related to variable sweep aircraft development
[NASA-TM-83121] p0441 N81-35067
Practical aspects of instrumentation installation in support of subsystem testing
p0546 N81-29090

MILITARY AVIATION
Pyrotechnics serving safety --- in aircraft air and ground escape systems
p0120 A81-19348
Army aviation - A perspective into the eighties
[AIAA PAPER 81-0931] p0363 A81-32935
Aircraft maintenance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0859/3] p0125 N81-13917

MILITARY HELICOPTERS
NT AH-1G HELICOPTER
NT AH-64 HELICOPTER
NT CH-47 HELICOPTER
NT H-53 HELICOPTER
NT HEAVY LIFT HELICOPTERS
NT S-61 HELICOPTER
NT UH-1 HELICOPTER
NT UH-60A HELICOPTER

Helicopter tail configurations to survive tail rotor loss
p0003 A81-10168
Helicopter propulsion system development and qualification
p0105 A81-17511
Issues regarding Army turboshaft engines diagnostics and condition monitoring
p0105 A81-17514
US Army working group on aircraft noise
p0150 A81-20053
United States Army helicopter icing qualification 1980
[AIAA PAPER 81-0406] p0167 A81-20812
Helicopter-ship qualification testing
p0232 A81-24941
General considerations on the importance of reliability studies for helicopters
p0287 A81-28471
A millimeter wave radar for U.S. Army helicopters in the 80's
p0323 A81-30302
Crashworthiness versus cost based on a study of severe Army helicopter accidents during 1970 and 1971
p0355 A81-32006
Army aviation - A perspective into the eighties
[AIAA PAPER 81-0931] p0363 A81-32935
Multi service applications for advancing blade concept aircraft
[SAE PAPER 801226] p0405 A81-34229
Evaluation of image processing for man-in-loop target acquisition
p0461 A81-39337
French Army testing of Forward Looking Infra-Red System /FLIR/ on helicopters /November 1976-June 1977/
p0464 A81-39680
European cooperation in the tactical transport helicopter
p0466 A81-40081
Westland WG30
p0466 A81-40082
ABC aircraft development status
p0467 A81-40084
Flight evaluation of a helmet mounted LED matrix display in a Lynx helicopter
p0472 A81-40129
Weapon system evolution of attack helicopters
p0472 A81-40130
Integrated multiplex for the Agusta A-129 attack helicopter
p0472 A81-40131
ABC development status and design considerations for several military applications --- Advancing Blade Concept for helicopter
[AHS 80-12] p0474 A81-40145
Achieving the full benefits of integrated multiplex in the 1980's --- for military helicopter avionics
[AHS 80-15] p0474 A81-40146
Subsystem status monitor --- for military helicopters
[AHS 80-17] p0474 A81-40148
Results of a simulator investigation of control system and display variations for an attack helicopter mission
[AHS 80-28] p0475 A81-40158
Flight test results for task oriented flying qualities evaluation
[AHS 80-29] p0475 A81-40159
Regenerative engine for helicopter application
[AHS 80-39] p0477 A81-40168
Advanced composite airframe program - Preliminary design phase
[AHS 80-45] p0477 A81-40172
Doppler radar systems for helicopters
p0512 A81-41758
Helicopter accidents
[SAE PAPER 810592] p0520 A81-42751
Helicopter airflow and wake characteristics for low speed and hovering flight from rocket interference investigations
p0572 A81-46608
An ABC status report --- Advancing Blade Concept for XH-59A rotors
p0572 A81-46610
An evaluation of advanced rotorcraft configurations for emerging military applications

p0572 A81-46611
Computer aided helicopter design
p0572 A81-46613
Nonlinear dynamic characteristics of the rotor bifilar absorber
p0574 A81-46622
The impact on helicopter cockpits of integrated advanced flight controls, avionics and optics
p0574 A81-46624
Handling qualities of the SH-60B Seahawk
p0574 A81-46627
Helicopter External Gondola System
p0576 A81-46642
Reliability and maintainability evaluation of rotor systems
p0576 A81-46645
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061
Service experience with GRC helicopter blades (BO-105)
p0041 N81-11146
Test and evaluation of improved aircrew restraint systems for combat helicopers
p0205 N81-17017
V/STOL AND digital avionics system for UH-1H
[NASA-CR-152179] p0273 N81-19112
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060
Fatigue Assessment of UK military aeroplanes
p0487 N81-26128
Combat damage assessment
p0488 N81-26132
An evaluation of fatigue procedures for UK military helicopters
p0488 N81-26133
The methodology of fatigue analysis and testing: Main rotor blades and hub, Hughes YAH-64 advanced attack helicopter
p0488 N81-26139
Structural response methods and evaluation results for helicopter landing decks on 210- and 270-foot USCCG cutters
[AD-A102420] p0601 N81-31233
The background and bases for the proposed military standard on acoustical noise limits in helicopters
p0604 N81-31459
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] p0632 N81-33137
Incidents of problems in setting to work on the conceptual design of helicopters
p0632 N81-33138
Applications of composite materials for the construction of military helicopters
p0633 N81-33147
Advancing blade concept helicopter mission capabilities
p0634 N81-33151
The consequences of certain operational requirements on the conceptual design of combat helicopters
p0634 N81-33153
Design for maximum effectiveness in the Navy role
p0634 N81-33154
The impact of operational requirements on the compromise of desired features in rotorcraft design
p0634 N81-33155

MILITARY OPERATIONS
NT COMBAT
Planning for and evaluating the potential of a land based aircraft for carrier operations
p0122 A81-19470
Aerodynamic trials with the linear motor-driven platform at the Toulouse Aeronautic Testing Center --- for aircraft acceleration and deceleration tests
[AAAF PAPER NT 80-41] p0369 A81-33943
AV-8B operational features for rapid deployment
[SAE PAPER 801228] p0405 A81-34231
MATASS/LAMPS MK III --- Moored Airship Towed Array Sonar System/Light Airborne Multipurpose System
[AIAA 81-1309] p0455 A81-38527
More fight for the Fighting Falcon
p0622 A81-49075
An assessment of technical factors influencing the potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16047
Air Force and Navy plans to acquire trainer aircraft
[AD-A096237] p0342 N81-21072
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] p0632 N81-33137
Vertical lift capabilities for the 80's and 90's
p0632 N81-33139
Ten years of US Marine Corps Harrier operations
p0632 N81-33140
Controls and displays for all-weather operation of helicopters
p0633 N81-33145

MILITARY TECHNOLOGY
Head-up displays. III
p0005 A81-11320
Low cost technology for expendable RPV applications
p0049 A81-12795
History and prospects for mini-RPVs and drones
p0049 A81-12797
Advanced Attack Helicopter /YAH-64/ - Status report
p0099 A81-16580
Head-Up-Display flight tests
p0099 A81-16582
Measurement of radar in radio service aircraft
p0151 A81-20079
A case study - Real time simulation and structured design
p0172 A81-21721
Development of the first ram air emergency parachute for personnel applications
p0174 A81-22078
Ejection system evolution
p0175 A81-22080
QF-100 Full-Scale Aerial Target program
p0179 A81-22612
A low cost multiple drone command and tracking system
p0179 A81-22613
A distributed airborne surveillance system
p0180 A81-22618
Superconducting generator design for airborne applications
p0241 A81-26662
Offensive avionics system /OAS/ design
p0321 A81-30259
The USAF Armament Division Structural Dynamics Lab
p0347 A81-30689
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122
Development and applications of MIL-STD-1553 --- for avionics data buses
[SAE PAPER 801142] p0398 A81-34172
U.S. Navy/USAF development of Tactical Aircrew Combat Training System/Air Combat Maneuvering Instrumentation /TACTS/ACMI/
[SAE PAPER 801183] p0401 A81-34196
New hydraulic system technology for future aircraft
[SAE PAPER 801188] p0401 A81-34200
The development of a lightweight aircraft towing tractor
[SAE PAPER 801237] p0405 A81-34235
Coming challenge - Integrating the technologies for forward-swept-wing fighters
p0420 A81-37522
Topside weapons release - An analytical study
[AIAA PAPER 81-1655] p0533 A81-43939
Military aircraft technology - Needs and trends for the 80's
[AIAA PAPER 81-1691] p0535 A81-43952
Survivors on the RPV front
p0577 A81-46725
Combat cockpit design
p0622 A81-49173
US Army design-to-cost experience
p0045 N81-11905
Air Force technical objective document FY 1981
[AD-A089709] p0048 N81-12010
Navstar field test results
p0484 N81-26100
US military V/STOL: Who needs it? Wants it? Can afford it?
p0634 N81-33156

MILITARY VEHICLES
Soviet military air cushion vehicles - Mechanised amphibious assault
p0577 A81-46714

MILLIMETER WAVES
LPI, short-range communications between aircraft
in rendezvous --- Low Probability of Intercept
p0177 A81-22493

MINERALS
NT GRAPHITE
MINES (ORDNANCE)
An assessment of technical factors influencing the
potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16047
MINIATURE ELECTRONIC EQUIPMENT
Tactical miniature crystal oscillator
[AD-A098490] p0440 N81-25058
MINIATURIZATION
NT MICROMINIATURIZATION
Mini-RPV radar test program
p0180 A81-22619

MINICOMPUTERS
Weights information systems using minicomputers
[SAWE PAPER 1347] p0353 A81-31385
AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329
A simulation approach to MIL-STD-1553 Multiplex
Bus interfacing
[AIAA 81-0971] p0415 A81-36560
An economical approach to automated flight test
data reduction
p0576 A81-46643

MINIMIZATION
U OPTIMIZATION
MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
Mirage 2000, a totally multi-purpose aircraft
p0419 A81-37166
Mirage 2000 and Mirage 4000 fiber structures
[AAAF-NT-79-48] p0083 N81-12183
Limiting application of the concept 'damage
tolerance' with regard to fighter aircraft
[AAAF-NT-79-32] p0210 N81-17054
The specification of development tests for the
engine of a combat aircraft --- engines for the
Mirage 2000 and 4000 aircraft
p0430 N81-28082
The interface arrangement of digibus systems ---
Mirage 2000 aircraft
p0545 N81-29084
MIRAGE 3 AIRCRAFT
Application of BFRP Crack Patching to Mirage III
aircraft
p0481 A81-40586
MIRRORS
NT SOLAR COLLECTORS
Figure control of flexible structures - Optical
surfaces of thin deformable primary mirrors
p0060 A81-14994
MISALIGNMENT
An analytical method to calculate misalignment in
the journal bearing of a planetary gear system
p0004 A81-10839
MISCIBILITY
U SOLUBILITY
MISORIENTATION
U MISALIGNMENT
MISS DISTANCE
The collision course: Conditions, guidance laws
and properties
[DFVLR-FB-80-06] p0127 N81-13942
Velocity tolerance of escape systems
[AD-A096881] p0373 N81-22035
Gun harmonisation using the sector acoustic miss
distance indicator
p0544 N81-29074
MISSILE BODIES
Aerodynamic effects of body slots on a guided
projectile with cruciform surfaces
[AIAA PAPER 79-1658] p0066 A81-15087
MISSILE CASES
U MISSILE BODIES
MISSILE COMPONENTS
NT MISSILE BODIES
MISSILE CONFIGURATIONS
Effect of wing location and strakes on stability
and control characteristics of a monoplanar
circular missile with low-profile tail fins at
supersonic speeds
[NASA-TM-81878] p0186 N81-15978
Aerodynamic subsonic/transonic aircraft design
studies by numerical methods
p0187 N81-15999

Application of the joined wing to cruise missiles
[AD-A096450] p0441 N81-25068
MISSILE CONSTRUCTION
U MISSILE STRUCTURES
MISSILE CONTROL
Computer-aided methods for redesigning the
stabilized pitch control system of a semi-active
thermal homing missile
p0051 A81-13250
Design of guidance and control digital autopilots
p0183 A81-22973
Forward looking infrared /FLIR/ image enhancement
for the automatic target cuer system
p0461 A81-39335
Autopilot design via improved discrete modal control
[AIAA 81-1777] p0554 A81-44095
Boost-glide range-optimal guidance
[AIAA 81-1781] p0554 A81-44096
Vortex bursting on slender delta wings in
transonic flow and its influence on missile
aerodynamic characteristics
[DGLR PAPER 81-047] p0611 A81-47622
Missile motion sensitivity to dynamic stability
derivatives
[AD-A089750] p0038 N81-11093
The collision course: Conditions, guidance laws
and properties
[DFVLR-FB-80-06] p0127 N81-13942
Auto-adaptive piloting --- of missiles
[GA-380] p0217 N81-17102
Dynamic Stability Parameters --- conferences
[AGARD-LS-114] p0590 N81-31105
Impact of high-alpha aerodynamics on dynamic
stability parameters of aircraft and missiles
p0590 N81-31107
Rotary and Magnus balances
p0591 N81-31111
Analytical determination of dynamic stability
parameters
p0592 N81-31117

MISSILE DEFENSE
General Electric infrared suppressors for the
Black Hawk helicopter
p0106 A81-17520
MISSILE DESIGN
Computer-aided methods for redesigning the
stabilized pitch control system of a semi-active
thermal homing missile
p0051 A81-13250
Wing-alone aerodynamic characteristics at high
angles of attack
[AIAA PAPER 81-0008] p0157 A81-20532
A computer-aided design system geared toward
conceptual design in a research environment ---
for hypersonic vehicles
[AIAA PAPER 81-0372] p0166 A81-20789
Autopilot design via improved discrete model control
[AIAA 81-1777] p0554 A81-44095
Application of the joined wing to cruise missiles
[AD-A096450] p0441 N81-25068
MISSILE DETECTION
NT RADAR DETECTION
MISSILE ENGINE CASES
U ROCKET ENGINE CASES
MISSILE GUIDANCE
U MISSILE CONTROL
MISSILE LAUNCHERS
Cruise-missile-carrier navigation requirements
p0116 A81-10576

MISSILE STABILIZATION
U MISSILE CONTROL
U STABILIZATION
MISSILE STRUCTURES
The present and future applications of titanium
alloys - Airframes, helicopters, missiles
p0417 A81-36665
Development of advanced interceptor substructural
material --- graphite epoxy missile structures
[AD-A090127] p0030 N81-11116
MISSILE SYSTEMS
Effects of advances in propulsion technology on
missile effectiveness --- solid fuel ramjets
[AD-A090645] p0081 N81-12106
MISSILE TESTS
Firebrand ramjet propulsion system development
[AIAA PAPER 81-1486] p0506 A81-40909
MISSILE TRACKING
Autonomous target handoff from an airborne sensor
to a missile seeker

p0358 A81-32498
MISSILE TRAJECTORIES
Single-parameter terrain classification for terrain following p0066 A81-15882
An approach to ramjet trajectory simulation test p0292 A81-29065
Maximum information trajectory for an air to air missile intercept [AD-A101497] p0585 N81-30160
MISSILES
NT AIR TO AIR MISSILES
NT AIR TO SURFACE MISSILES
NT ANTIAIRCRAFT MISSILES
NT BALLISTIC MISSILES
NT CRUISE MISSILES
NT RAMJET MISSILES
NT TOW MISSILES
Automatic handoff of multiple targets [AD-A093483] p0217 N81-17101
US and USSR military aircraft and missile aerodynamics 1970-1980. A selected, annotated bibliography, volume 1 [NASA-TM-81951] p0547 N81-29119
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5 [AD-A010210] p0585 N81-30159
MISSION PLANNING
Advanced avionic systems for multi-mission applications p0321 A81-30258
Impact of terrain correlation elevation reference data on Boeing's Air Launched Cruise Missile p0517 A81-42439
A computer technique for detailed analysis of mission radius and maneuverability characteristics of fighter aircraft [NASA-TP-1837] p0329 N81-20026
MIST
Degradation and characterization of antimisting kerosene /AMK/ [AIAA PAPER 81-1423] p0503 A81-40867
MIXED FLOW
U MULTIPHASE FLOW
MIXERS
Factors which influence the behavior of turbofan forced mixer nozzles [AIAA PAPER 81-0274] p0359 A81-32549
Mixer nozzle aeroacoustic characteristics for the energy efficient engine [AIAA PAPER 81-1994] p0621 A81-48639
JT8D engine internal exhaust mixer technology program [AD-A093057] p0215 N81-17091
QCGAT mixer compound exhaust system design and static big model test report [NASA-CR-135386] p0274 N81-19119
Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude [NASA-TM-82663] p0496 N81-27095
MIXING
NT PREMIXING
NT TURBULENT MIXING
MIXTURES
NT EMULSIONS
NT FOG
NT GAS MIXTURES
NT METAL MATRIX COMPOSITES
NT NUCLEAR EMULSIONS
NT SOLID SUSPENSIONS
MODAL RESPONSE
Interactive multi-mode blade impact analysis [ASME PAPER 81-GT-79] p0314 A81-29987
Inflight aircraft vibration modes and their effect on aircraft radar cross section p0352 A81-31370
A new method for modal identification p0365 A81-33293
Damage recognition and localization by means of differential modal analysis [DGLR PAPER 81-056] p0610 A81-47603
Improved methods for fan sound field determination [NASA-CR-165188] p0147 N81-15769
Nastran level 16 theoretical manual updates for aeroelastic analysis of bladed discs [NASA-CR-159823] p0279 N81-19480
Application of a flight test and data analysis technique to flutter of a drone aircraft [NASA-TM-83136] p0441 N81-25066
Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective --- aircraft gas turbine engines [NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification [NASA-CR-165373-VOL-2] p0496 N81-27090
MODE OF VIBRATION
U VIBRATION MODE
MODE SHAPES
U MODAL RESPONSE
MODELS
NT AIRCRAFT MODELS
NT ANALOG SIMULATION
NT ATMOSPHERIC MODELS
NT DIGITAL SIMULATION
NT DYNAMIC MODELS
NT MATHEMATICAL MODELS
NT SCALE MODELS
NT SEMISPAN MODELS
NT WIND TUNNEL MODELS
The development of a substitute bird model [ASME PAPER 81-GT-23] p0311 A81-29939
New tower cab mockup for Philadelphia, Pennsylvania [AD-A098528] p0440 N81-25060
MODES
NT COUPLED MODES
NT FAILURE MODES
NT VIBRATION MODE
MODIFICATION
U REVISIONS
MODULATION
NT AMPLITUDE MODULATION
NT PULSE CODE MODULATION
Accuracy of noise-modulated radio altimeter p0359 A81-32694
MOHR CIRCLES
U FRACTURE MECHANICS
MOISTURE CONTENT
NT ATMOSPHERIC MOISTURE
Water content of helicopter gear oils [ASME PAPER 80-C2/DET-12] p0116 A81-18640
Predictability of moisture absorption in graphite/epoxy sandwich panels p0039 N81-11131
MOLDS
Thermal expansion molding process for aircraft composite structures [SAE PAPER 800612] p0062 A81-15334
New method for cast superalloy frames - Segmented mold and HIP utilized p0408 A81-34693
Use of segmented mold process to produce large superalloy engine castings [AIAA PAPER 81-1404] p0503 A81-40861
Development and design of a large wind-turbine blade --- fiber reinforced composites [MBB-UD-301/80-OE] p0586 N81-30198
MOLECULAR ELECTRONICS
NT LARGE SCALE INTEGRATION
MOLECULAR FLOW
NT TRANSITION FLOW
MOLECULAR SPECTRA
NT RAMAN SPECTRA
MOLIERE FORMULA
U SPATIAL DISTRIBUTION
MOLYBDENUM ALLOYS
NT RENE 77
MOMENT DISTRIBUTION
Force and moment coefficients for high deflection cascades [CUED/A-TURBO/TR-98] p0090 N81-13021
MOMENTS
NT BENDING MOMENTS
NT LOADING MOMENTS
NT MOMENTS OF INERTIA
NT ORTHOGONALITY
NT PITCHING MOMENTS
NT ROLLING MOMENTS
NT STABILITY DERIVATIVES
NT TORQUE
NT YAWING MOMENTS
MOMENTS OF INERTIA
Spin - Angles and inertial moments p0567 A81-46023
MOMENTUM ENERGY
U KINETIC ENERGY

MOMENTUM THEORY
An extension of the local momentum theory to a distorted wake model of a hovering rotor
[NASA-TM-81258] p0329 N81-20030
MOMENTUM TRANSFER
Vertical momentum of the fountain produced by multijet vertical impingement on a flat ground plane
p0529 A81-43396
MONITORS
NT INFRARED RADIOMETERS
Turbine engine fault detection and isolation program, phase 1. Volume 1: Requirements definition for an integrated engine monitoring system
[AD-A093225] p0215 N81-17089
Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels
[NASA-CR-152145] p0276 N81-19136
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060
Application of an in-line contamination monitoring unit to the AHT-64 Hydraulic Test Stand
[AD-A100696] p0550 N81-29140
MONOCRYSTALS
U SINGLE CRYSTALS
MONOLITHIC CIRCUITS
U INTEGRATED CIRCUITS
MONOPLANES
NT A-6 AIRCRAFT
NT A-7 AIRCRAFT
NT B-52 AIRCRAFT
NT B-58 AIRCRAFT
NT BOEING 737 AIRCRAFT
NT BOEING 757 AIRCRAFT
NT BOEING 767 AIRCRAFT
NT C-130 AIRCRAFT
NT C-135 AIRCRAFT
NT C-141 AIRCRAFT
NT CESSNA 402B AIRCRAFT
NT DC 3 AIRCRAFT
NT DC 8 AIRCRAFT
NT DH 121 AIRCRAFT
NT DH 125 AIRCRAFT
NT F-5 AIRCRAFT
NT F-8 AIRCRAFT
NT F-17 AIRCRAFT
NT F-27 AIRCRAFT
NT F-100 AIRCRAFT
NT F-106 AIRCRAFT
NT HFB-320 AIRCRAFT
NT JINDIVIK TARGET AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT MYSTERE 20 AIRCRAFT
NT P-3 AIRCRAFT
NT PHANTOM AIRCRAFT
NT RF-4 AIRCRAFT
NT SE-210 AIRCRAFT
NT T-37 AIRCRAFT
NT T-38 AIRCRAFT
MONOPROPELLANTS
NT LIQUID FUELS
MONOPULSE RADAR
New techniques for the monopulse-radar tracking of high-maneuverability aircraft
p0153 A81-20102
Optimal tracking design and simulation for a monopulse airborne radar system utilizing a predicted dual beam antenna design
p0323 A81-30293
Detection of target multiplicity using monopulse quadrature angle
p0360 A81-32696
Development of an astro-inertial hybrid navigation system and a star tracker
p0420 A81-37343
The development of secondary radar in air traffic control
p0565 A81-45762
Parameter estimation of an SSR amplitude comparison monopulse extractor --- Secondary Surveillance Radar
p0571 A81-46537
MONTE CARLO METHOD
Simulation model validation - Airport applications
p0461 A81-39320
Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061
MOS (SEMICONDUCTORS)
U METAL OXIDE SEMICONDUCTORS
MOSAICS
Evaluation of flight data from a mosaic sensor
p0452 A81-37681
MOSFET
U FIELD EFFECT TRANSISTORS
MOTION
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to spectral analysis and imaging. Part 2
p0447 N81-26013
MOTION EQUATIONS
U EQUATIONS OF MOTION
MOTION PERCEPTION
Display motion relationships
p0064 A81-15683
Improved G-Cueing System
[AIAA 81-0987] p0416 A81-36572
MOTION SIMULATORS
TA-4J spin training through simulation
[AIAA 81-0965] p0414 A81-36556
Sample data effects of high-pass filters
[NASA-TP-1797] p0193 N81-16040
Store separation simulation in subsonic wind tunnels
[MBB-FE-123/S/PUB/20] p0203 N81-16988
Rotative balance of the I.M.F. Lille and associated experimental techniques
[NASA-TM-75886] p0276 N81-19137
The problems with the interface system of the visual simulator as a cause of Pilot Induced Oscillations (PIO's) in flight simulators
[MBB-UA-528-80-OE] p0276 N81-19140
MOTION STABILITY
NT AERODYNAMIC STABILITY
NT AIRCRAFT STABILITY
NT BOUNDARY LAYER STABILITY
NT DIRECTIONAL STABILITY
NT FLAME STABILITY
NT FLOW STABILITY
NT GYROSCOPIC STABILITY
NT HOVERING STABILITY
NT LATERAL STABILITY
NT LONGITUDINAL STABILITY
NT LOW SPEED STABILITY
NT ROTARY STABILITY
MOTOR VEHICLES
NT AUTOMOBILES
NT ELECTRIC MOTOR VEHICLES
NT TRACTORS
MOTORS
NT ASYNCHRONOUS MOTORS
NT ELECTRIC MOTORS
MOUNTS
U SUPPORTS
MOVEMENT
U MOTION
MOVING TARGET INDICATORS
Time-compressed displays for target detection
p0064 A81-15686
Detection of moving objects --- Russian book
p0118 A81-18773
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
Detection of direction changes of flying targets from position coordinates of the radar data
p0152 A81-20099
Mini-RPV radar test program
p0180 A81-22619
An MTI /moving target indicator/ algorithm for passive sensors
p0320 A81-30239
Ground moving target radar signal simulation
p0323 A81-30304
Moving target identification /MTI/ algorithm for passive sensors
p0359 A81-32502
MRCA AIRCRAFT
Back to basics - The philosophy adopted for the flight testing of the Panavia Tornado avionics system in hack aircraft
p0282 A81-27881
RB.199 - Compact Tornado power
p0567 A81-46338

Structural integration as a means of cost reduction
p0046 N81-11912
TORNADO: Flight characteristics at high angles of
incidence
[MBB-FE-127/S/PUB/23] p0495 N81-27085
Fuel system testing and test instrumentation ---
MRCA aircraft
p0544 N81-29076
MTBF
The necessity of 'testing-in' hardware reliability
p0229 A81-24277
MTI RADAR
U MOVING TARGET INDICATORS
MULTI-ROLE COMBAT AIRCRAFT
U MRCA AIRCRAFT
MULTICHANNEL COMMUNICATION
IMUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175
MULTIENGINE VEHICLES
Critical field length calculations for preliminary
design
p0183 A81-23366
Assessment of propeller influence on
lateral-directional stability of multiengine
aircraft
p0411 A81-35632
An investigation of the recovery from an engine
failure in a twin engine augmentor wing aircraft
using the NAE Airborne Simulator
p0509 A81-41199
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943
MULTILAYER STRUCTURES
U LAMINATES
MULTILOOP SYSTEMS
U CASCADE CONTROL
MULTIPATH TRANSMISSION
Multipath and interference effects in secondary
surveillance radar systems
p0183 A81-23359
Radio direction finding on high frequency short
duration signals
[AD-A092136] p0192 N81-16029
Active BCAS: Design and validation of the
surveillance subsystem
[AD-A095049] p0270 N81-19084
NAVTOLAND microwave scanning beam tests at NOSC.
Three landing guidance systems tested in a
specular multipath environment
[AD-A099298] p0484 N81-26086
Radar Beacon Transponder (RBX) functional
description
[AD-A100665] p0547 N81-29112
MULTIPHASE FLOW
NT TWO PHASE FLOW
Interaction of a gas jet from a jet engine with
the destroyed surface of a multiphase disperse
medium
p0319 A81-30152
QCGAT mixer compound exhaust system design and
static big model test report
[NASA-CR-135386] p0274 N81-19119
MULTIPLE ACCESS
NT TIME DIVISION MULTIPLE ACCESS
MULTIPLE TARGET TRAJECTORY SYSTEMS
U MATTS (SYSTEMS)
MULTIPLEX TRANSMISSION
U MULTIPLEXING
MULTIPLEXERS
U MULTIPLEXING
MULTIPLEXING
A multiplexed digital voice intercommunications
system for military applications
[SAE PAPER 801144] p0398 A81-34173
IMUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175
A simulation approach to MIL-STD-1553 Multiplex
Bus interfacing
[AIAA 81-0971] p0415 A81-36560
Integrated multiplex for the Agusta A-129 attack
helicopter
p0472 A81-40131
Multiplexing in general aviation aircraft
[SAE PAPER 810570] p0519 A81-42735
The interface arrangement of digibus systems ---
Mirage 2000 aircraft
p0545 N81-29084
High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191
A multiplexed digital voice intercommunications
system compatible with future voice conversion
techniques
p0605 N81-31474
MULTIPROCESSING (COMPUTERS)
NT PIPELINING (COMPUTERS)
A fault tolerant multiprocessor system with
reconfiguration suitable for multiaxial flight
stabilization and trimming
p0118 A81-19296
A six-channel quick-look unit for the aerodynamics
division MKI airborne data acquisition package
[AD-A089975] p0043 N81-11364
Microcomputer array processor system --- design
for electronic warfare
p0044 N81-11673
Discrete Address Beacon System (DABS) computer
performance/test and evaluation
[AD-A099326] p0484 N81-26088
MULTISPECTRAL BAND SCANNERS
A solid-state airborne sensing system for remote
sensing
p0183 A81-23034
MULTISTAGE COMPRESSORS
U TURBOCOMPRESSORS
MULTIVARIATE STATISTICAL ANALYSIS
NT COVARIANCE
NT DISCRETE FUNCTIONS
NT ORTHOGONALITY
NT REGRESSION ANALYSIS
Some experiences with numerical optimisation in
aircraft specification and preliminary design
studies
p0007 A81-11609
Multivariable closed-loop analysis and flight
control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11046
A multivariate approach to handling qualities
rating scale development
[AD-A089825] p0037 N81-11047
Research in multirate estimation and control
[AD-A094070] p0253 N81-18062
MYLAR (TRADEMARK)
Design and engineering of solar balloons
p0455 A81-38333
MYSTERE 20 AIRCRAFT
Finite element method study of
wing-fuselage-nacelle interactions of a Falcon
20 type aircraft at Mach = 0.79
p0187 N81-15994

N

N-156 AIRCRAFT
U F-5 AIRCRAFT
NACELLES
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Calculation of shells in aircraft turbine engines
p0285 A81-28078
Propulsion system installation design for
high-speed prop-fans
[AIAA PAPER 81-1649] p0526 A81-43144
High-char-forming composite laminates
p0532 A81-43652
Aircraft engine nacelle fire test simulator.
Volume 1: Technical
[AD-A089629] p0030 N81-10081
Experimental and theoretical aerodynamic
characteristics of two hypersonic cruise
aircraft concepts at Mach numbers of 2.96, 3.96,
and 4.63
[NASA-TP-1767] p0072 N81-12021
The development of the composite material engine
nacelle
[AAAF-NT-79-38] p0083 N81-12180
P-3 Orion fuel-saving modification wind tunnel study
[AD-A091906] p0194 N81-16044
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
Prediction of nacelle aerodynamic interference
effects at low supersonic Mach numbers
p0244 N81-17988
Investigation of powered nacelles on a high aspect
ratio NASA supercritical wing, phase 2 ---
Langley 8 Foot Transonic Pressure Tunnel
p0260 N81-19008
Advanced turboprop installation aerodynamics
p0260 N81-19013

Preliminary wind-tunnel investigation of the effects of engine nacelles on a transport configuration with high lift drag ratios to a Mach number of 1.00
[NASA-TM-82312] p0272 N81-19099
Design of a V/STOL propulsion system for a large-scale fighter model
[NASA-CR-166162] p0442 N81-25074
Additional testing of the inlets designed for a tandem fan V/STOL nacelle
[NASA-CR-165310] p0483 N81-26075
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30085
Performance retention of the RB211 powerplant in service
p0593 N81-31201

NAP-OF-THE-EARTH NAVIGATION
A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks
p0471 A81-40120
A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 A81-46626

NASA PROGRAMS
NT GLOBAL ATMOSPHERIC RESEARCH PROGRAM
NT QUIET ENGINE PROGRAM
NT SUPERSONIC CRUISE AIRCRAFT RESEARCH
NT TACT PROGRAM
NT TERMINAL CONFIGURED VEHICLE PROGRAM
NT TILT ROTOR RESEARCH AIRCRAFT PROGRAM
NASA presses fighter gains --- long-range supersonic cruise aircraft
p0002 A81-10575
The future of airfreight - NASA study looks into the next century
p0056 A81-14242
Shipboard trials of the Quiet Short-Haul Research Aircraft /QSRA/
p0099 A81-16581
A status report on NASA general aviation stall/spin flight testing
p0122 A81-19471
NASA's activities in the conservation of strategic aerospace materials
p0179 A81-22535
NASA research in aeropropulsion
[ASME PAPER 81-GT-96] p0314 A81-30003
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
NASA aeronautics R&T - A resource for aircraft design
[AIAA PAPER 81-0925] p0408 A81-34363
Recommendations for the NASA Avionics program for the 1980's
p0517 A81-42436
Progress in supersonic cruise technology
[AIAA PAPER 81-1687] p0535 A81-43950
Research and technology of the Langley Research Center
[NASA-TM-81910] p0089 N81-12977
Productivity in aerospace research and development
[NASA-TM-82388] p0097 N81-13804
An overview of general aviation propulsion research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16052
Posture hearings (NASA and FAA)
[GPO-65-265] p0203 N81-16952
NASA authorization, 1981
[GPO-71-290] p0203 N81-16953
The 1980 Aircraft Safety and Operating Problems, part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
Scientific and Technical Information Output of the Langley Research Center, for calendar year 1976
[NASA-TM-82310] p0279 N81-19964
An evaluation of NASA's program for advancing rotorcraft technology
[PB81-144180] p0369 N81-23078
Aircraft energy efficiency. Overview
[NASA-FACTS-96/9-80] p0538 N81-28083
NASA's aeronautics program: Systems technology and experimental program
[NASA-CR-164642] p0543 N81-29034
Aerospace in the future
[NASA-TM-82664] p0543 N81-29063
NASA authorization, 1982, volume 4
[GPO-79-432-VOL-4] p0590 N81-31030
Ames Research Center publications: A continuing bibliography, 1980
[NASA-TM-81308] p0641 N81-34138

NASA STRUCTURAL ANALYSIS PROGRAM
U NASTRAN

NASTRAN
Initial development for a flutter analysis of damaged T-38 horizontal stabilators using NASTRAN
[AIAA PAPER 81-0365] p0166 A81-20784
Fatigue life evaluation of a helicopter main rotor hub
p0180 A81-22631
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
p0467 A81-40087
Crashworthy design concepts for airframe structures of light aircraft
[SAE PAPER 810613] p0522 A81-42769
Calculation of airloads for a flexible wing via NASTRAN
[AD-A094770] p0263 N81-19031
Investigation of an improved flutter speed prediction technique for damaged T-38 horizontal stabilators using NASTRAN
[AD-A094769] p0273 N81-19109
Aeroelastic and dynamic finite element analyses of a bladder shrouded disk
[NASA-CR-159728] p0278 N81-19479
Nastran level 16 theoretical manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
NASTRAN level 16 user's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159824] p0279 N81-19481
NASTRAN level 16 programmer's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
A comparison of laboratory measured temperatures with predictions for a spar/skin type aircraft structure
[NASA-TM-81359] p0387 N81-23067

NATIONAL AIRSPACE UTILIZATION SYSTEM
The evolution of operational systems --- approach to National Airspace System automation
p0064 A81-15699
NAS automation equipment operating cost estimates, FY 1978 - 1979
[AD-A102023] p0595 N81-31182
Airport and airway system development act of 1981
[GPO-75-804] p0601 N81-31231

NATIONAL AVIATION SYSTEM
Canada's national aviation forecasting models
p0112 A81-16072
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A089971] p0033 N81-11022

NATURAL FREQUENCIES
G RESONANT FREQUENCIES

NATURAL LASERS
U LASERS

NAVIER-STOKES EQUATION
Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659
Numerical study on viscous shear flow past a circular cylinder
p0228 A81-24077
On the solution of Navier Stokes equations of the flow in turbomachines
p0296 A81-29099
A PANSONIC Navier-Stokes solver --- for two dimensional flow about arbitrary airfoil sections
[AIAA PAPER 81-1195] p0454 A81-38077
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14964
An approximate factorization solution of the Navier-Stokes equations for transonic flow using body-fitted coordinates with application to NACA 64A010 airfoils
p0249 N81-18024
Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053

NAVIGATION
NT AIR NAVIGATION
NT ALL-WEATHER AIR NAVIGATION
NT AREA NAVIGATION
NT ASTRONAVIGATION
NT CELESTIAL NAVIGATION
NT DEAD RECKONING
NT DIGITAL NAVIGATION
NT DOPPLER NAVIGATION
NT HYBRID NAVIGATION SYSTEMS
NT HYPERBOLIC NAVIGATION
NT INERTIAL NAVIGATION
NT LORAN
NT LORAN C
NT NAP-OF-THE-EARTH NAVIGATION
NT OMEGA NAVIGATION SYSTEM
NT RADAR NAVIGATION
NT RADIO NAVIGATION
NT SPACE NAVIGATION
NT SURFACE NAVIGATION
NT TACAN
NT VHF OMNIRANGE NAVIGATION
Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116

NAVIGATION AIDS
NT BEACONS
NT DISCRETE ADDRESS BEACON SYSTEM
NT GYROCOMPASSES
NT LASER ALTIMETERS
NT LIGHT AIRBORNE MULTIPURPOSE SYSTEM
NT NAVIGATION INSTRUMENTS
NT OMNIDIRECTIONAL RADIO RANGES
NT RADAR BEACONS
NT RADIO BEACONS
NT RADIO DIRECTION FINDERS
NT TERCOM
Gyrostabilizers for inertial control systems --- Russian book
p0017 A81-12024
Air-traffic police steer a new approach
p0061 A81-15167
International Air Transportation Conference, New Orleans, La., April 30-May 3, 1979, Proceedings. Volumes 1 & 2
p0110 A81-18051
Omega - An economic Loran A replacement
p0113 A81-18077
Map-type displays --- for air navigation
p0121 A81-19443
Improved secondary radar antennas for flight safety installations
p0151 A81-20083
New techniques and development trends in the system architecture of EDP systems for radar data processing and airspace control
p0153 A81-20103
Pulsed Doppler radar detects weather hazards to aviation
[AIAA PAPER 81-0235] p0163 A81-20691
New navigation systems for helicopters
p0177 A81-22167
The ANK - A four dimensional navigation/flight management system for today
p0180 A81-22615
New technology for the NDB system and its reliability. II --- omnidirectional radio beacons
p0230 A81-24524
Aircraft radar equipment and its operation --- Russian book
p0289 A81-28759
Information requirements for airborne electronic terrain maps
p0325 A81-30334
Some design and procedural aspects of in-flight collision avoidance
[AIAA PAPER 81-0805] p0368 A81-33885
Integration of navigational information in aircraft
p0407 A81-34336
SINTAC and its position-finding performance
p0409 A81-35021
The optical-fiber interferometer gyroscope for aviation navigation
p0451 A81-37650
The DME-aided Azimuth System - DAS
p0452 A81-37653
Subsystem status monitor --- for military helicopters
[AHS 80-17] p0474 A81-40148
Summary of interface testing of the digital AN/ASN-123 tactical navigation avionic system in the SH-3H helicopter
[AHS 80-18] p0474 A81-40149
Evaluation of LORAN-C for non-precision approach applications
p0512 A81-41763
Helicopter navigation in the 80's
p0516 A81-42432
CAINS II - An application of standard laser gyro inertial and computer technology for existing naval carrier aircraft
p0516 A81-42434
Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/
p0517 A81-42437
Doppler aided low accuracy strapdown inertial navigation system
[AIAA 81-1798] p0555 A81-44101
Automated celestial position determination
p0557 A81-44324
Trends in the future development of air traffic control systems
p0566 A81-45764
Errors of phase VLF-navigation systems under conditions of auroral disturbances
p0607 A81-47533
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy
[DGLR PAPER 81-066] p0610 A81-47616
Ten years activity in the area of flight control for helicopters at night and in bad weather
[DGLR PAPER 81-064] p0611 A81-[illegible]
LR-80 flight test report --- attitude and heading reference system
[AD-A090284] p0075 N81-1205[illegible]
Development of a computer program data base of a navigation aid environment for simulated IFR flight and landing studies
[NASA-TM-80064] p0129 N81-1[illegible]
A preliminary human factors flight assessment of the Marconi automatic map
[AD-A092585] p0193 N81-16036
DMAHTC's support to National Ocean Survey LORAN-C-charting
[AD-A093748] p0206 N81-17027
Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029
MIT Annotated Bibliography
p0371 N81-22001
Use of Loran-C for general aviation aircraft navigation
p0371 N81-22002
An analysis of the adaptability of Loran-C to air navigation
p0371 N81-22003
Investigation of air transportation technology at Ohio University, 1980 --- general aviation aircraft and navigation aids
p0371 N81-22005
Low-frequency radio navigation system
[NASA-CASE-NPO-15264-1] p0373 N81-22036
Navaids calibration evaluation with a computer-controlled avionics data acquisition system
p0383 N81-23020
Functional testing airborne navigation equipment
[AD-A097115] p0387 N81-23062
Definition of a system concept study for future air traffic guidance
[BMFT-FB-W-80-008] p0425 N81-24046
Navstar GPS receiver for satellite applications
p0485 N81-26111
A method for evaluating radio navigation systems for the terminal maneuvering area --- approach control
[DFVLR-MITT-81-02] p0538 N81-28080
Microwave system for real time space position measurement
p0545 N81-29089

NAVIGATION INSTRUMENTS
NT ATTITUDE INDICATORS
NT GYRO HORIZONS

NT GYROCOMPASSES
NT RADIO ALTIMETERS
NT RADIO DIRECTION FINDERS
Computer generated radar images for navigation
p0049 A81-12793
Radio navigation for aircraft: Handbook --- Russian book
p0116 A81-18599
Position-determination accuracies of navigation methods
p0233 A81-25374
The behavior of quartz oscillators in the presence of accelerations --- in missile and aircraft time-frequency navigation systems
[ONERA, TP NO. 1981-31] p0351 A81-31285
Aircraft equipment /2nd revised and enlarged edition/ --- Russian book
p0355 A81-31823
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
Night flight of helicopters
p0510 A81-41335
Aircraft radio systems --- Book
p0513 A81-41871
Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037
Functional testing airborne navigation equipment
[AD-A097115] p0387 N81-23062
Tactical navigation system testing
p0544 N81-29066
Flight testing and instrumentation of aircraft navigation systems
p0544 N81-29067
Alignment of a navigation and attack system for the alpha jet aircraft
p0544 N81-29070

NAVIGATION SATELLITES
NT NAVSTAR SATELLITES
NT TRANSIT SATELLITES
The use of satellite systems for communication
p0051 A81-13310
Satellites to aid flight safety
[IAF PAPER 80-IAA-17] p0115 A81-18410
Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029

NAVIGATORS
A microprocessor based land navigator
p0360 A81-32833

NAVSTAR SATELLITES
The use of satellite systems for communication
p0051 A81-13310
Geometric dilution of precision in Global Positioning System navigation
p0115 A81-18100
Characteristics of NAVSTAR user stations
p0121 A81-19425
Civil aviation applications of Navstar/GPS through differential techniques
p0177 A81-22374
GPS Navstar, the universal positioning system of the future
p0349 A81-30975
Perspectives on the civil utilization of the Navstar/GPS
p0409 A81-35023
Status report - Global Positioning System
p0511 A81-41752
Optimal processing of GPS signals
p0512 A81-41761
Navstar field test results
p0484 N81-26100
Rapid alignment of aircraft strapdown inertial navigation systems using Navstar Global Positioning System (GPS)
p0485 N81-26107
Navstar GPS receiver for satellite applications
p0485 N81-26111

NAVY
US Navy service experience with advanced composites --- in aircraft composite structures
p0041 N81-11149
Naval aircraft operating and support cost-estimating model: FY78 revision
[AD-A090044] p0071 N81-12013
NAVAIR Avionics Master Plan
[AD-A097522] p0389 N81-23082
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103783] p0631 N81-33134

NC-130 AIRCRAFT
U C-130 AIRCRAFT

NEAR FIELDS
Lightning near fields generated by return stroke current
p0056 A81-14257
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] p0618 A81-48606
An evaluation of a simplified near field noise model for supersonic helical tip speed propellers
[NASA-TM-81727] p0380 N81-22836

NEAR WAKES
Mean-flow and turbulence measurements in the vicinity of the trailing edge of an NACA (63 sub 1)-012 airfoil
[NASA-TP-1845] p0392 N81-23410

NEGATIVE FEEDBACK
NT SENSORY FEEDBACK

NERVOUS SYSTEM
Neurotramatological aspects in ejected pilots
p0205 N81-17012

NETS
Titanium net shapes by a new technology. I - F-14A parts evaluation
p0511 A81-41649

NETWORK ANALYSIS
The S3 transition --- flight control logic circuit analysis
p0240 A81-26617
Theoretical study of network design methodologies for the aerial relay system --- energy consumption and air traffic control
[NASA-CR-159365] p0249 N81-18033

NETWORK CONTROL
Contention information transfer systems analysis
p0322 A81-30274

NETWORK SYNTHESIS
Design of guidance and control digital autopilots
p0183 A81-22973
Analysis and synthesis of the digital attitude control system of the aerospace vehicle
p0224 A81-23837
ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783

NEUMANN PROBLEM
New approach to the solution of large, full matrix equations --- Neumann problem for inviscid incompressible flow past airfoils
p0171 A81-21552

NEUROLOGY
Neurotramatological aspects in ejected pilots
p0205 N81-17012

NEUROSCIENCE
U NEUROLOGY

NEWTON-BUSEMANN LAW
Unsteady Newton-Busemann flow theory. I - Airfoils
p0234 A81-25512

NEWTON-RAPHSON METHOD
Helicopter trim by periodic shooting with Newton-Raphson iteration
p0573 A81-46621
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017

NICKEL ALLOYS
NT RENE 77
Low cycle fatigue of Rene 77 at elevated temperatures
p0289 A81-28909
Directionally solidified Soviet superalloy - ZHS6-K
p0532 A81-43770
Creep properties of single-crystal nickel-based superalloys. II - Creep at medium temperature /760 C/
p0567 A81-46345
Low-cost directionally-solidified turbine blades, volume 2 --- TFE731-3 turbofan engine
[NASA-CR-159562] p0078 N81-12088
The stress behavior of three advanced nickel base superalloys during high temperature low cycle fatigue
[AD-A091694] p0131 N81-14061

NASA's activities in the conservation of strategic aerospace materials
[NASA-TM-81617] p0550 N81-29205
NICKEL CADMIUM BATTERIES
A new airborne nickel cadmium battery concept
p0235 A81-25618
NIGHT FLIGHTS (AIRCRAFT)
The flying hologram - Latest in head-up display systems
p0123 A81-19500
French Army testing of Forward Looking Infra-Red System /FLIR/ on helicopters /November 1976-June 1977/
p0464 A81-39680
Helicopter cockpit design for night goggle compatibility
p0472 A81-40128
Night flight of helicopters
p0510 A81-41335
CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617
Ten years activity in the area of flight control for helicopters at night and in bad weather
[DGLR PAPER 81-064] p0611 A81-47620
Helicopter electro-optical system display requirements. 1. The effects of CRT display size, system gamma function, and terrain type on pilots required display luminance
[AD-A089755] p0035 N81-11035
Survivability study of a FLIR equipment fighter on a night penetration of a Soviet army
[AD-A101186] p0547 N81-29120
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] p0629 N81-32151
NIGHT VISION
Development of an aviator's night vision imaging system /ANVIS/
p0463 A81-39573
Helicopter cockpit design for night goggle compatibility
p0472 A81-40128
CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617
Helicopter electro-optical system display requirements. 1. The effects of CRT display size, system gamma function, and terrain type on pilots required display luminance
[AD-A089755] p0035 N81-11035
Operational problems associated with head-up displays during instrument flight
[AD-A092992] p0210 N81-17058
NITRIDES
NT SILICON NITRIDES
NITROGEN
A system for model access in tunnels with an unbreathable test medium
p0015 A81-11672
NITROGEN COMPOUNDS
NT NITROGEN OXIDES
NT SILICON NITRIDES
NITROGEN OXIDES
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741
The influence of premixed combustion flame stabilizer geometry on flame stability and emissions
[ASME PAPER 81-GT-26] p0311 A81-29942
Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
The application of UV spectroscopy to the quantitative analysis of nitrogen oxide
p0089 N81-13008
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21078
NMR
U NUCLEAR MAGNETIC RESONANCE
NOBLE METALS
NT SILVER
NOE NAVIGATION
U NAP-OF-THE-EARTH NAVIGATION
NOISE (SOUND)
NT AERODYNAMIC NOISE
NT AIRCRAFT NOISE
NT ENGINE NOISE
NT JET AIRCRAFT NOISE
NT SONIC BOOMS
The Dalembertometer
[ISL-CO-220/79] p0133 N81-14292
Validation of helicopter noise prediction techniques
[NASA-CR-165715] p0447 N81-25768
NOISE ATTENUATION
U NOISE REDUCTION
NOISE ELIMINATION
U NOISE REDUCTION
NOISE GENERATORS
Experiments on effective source locations and velocity dependence of the broad band noise from a rotating rod
p0016 A81-11724
Status of knowledge of sonic booms -
p0017 A81-11822
The status of rotor noise technology
p0019 A81-12737
Noise generation mechanism of low pressure propeller fans
[AIAA PAPER 81-0090] p0160 A81-20594
A lifting surface theory for the sound generated by the interaction of velocity disturbances with a leaned vane stator
[AIAA PAPER 81-0091] p0160 A81-20595
Perspectives on jet noise
[AIAA PAPER 81-0428] p0168 A81-20829
Core noise measurements from a small, general aviation turbofan engine
p0178 A81-22531
The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] p0618 A81-48607
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] p0620 A81-48629
Cooperative investigation of the noise producing region of an axisymmetric jet
[AD-A089692] p0045 N81-11774
NOISE HAZARDS
U HAZARDS
U NOISE (SOUND)
NOISE INTENSITY
Community response to noise from a general aviation airport
p0017 A81-11821
Helicopter internal noise - An overview
p0150 A81-20055
Fuel consumption aspects of some noise abatement procedures
p0154 A81-20350
Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
p0454 A81-38062
Airport noise. Citations from the NTIS data base
[PB80-813231] p0088 N81-12667
NOISE MEASUREMENT
Experimental investigations on shock-associated noise
p0107 A81-17735
The spectral analysis of nonstationary random processes - Applications to aircraft overflight-type noises --- French thesis
p0174 A81-21922
Installation effects on propeller noise
[AIAA PAPER 80-0993] p0352 A81-31369
Noise characteristics of two parallel jets with unequal flow
[AIAA PAPER 80-0168] p0354 A81-31601
Improvement of the imaging of moving acoustic sources by the knowledge of their motion
[CNERA, TP NO. 1981-17] p0359 A81-32534
Contribution to the study of non stationary signals emitted by moving jet engine - Application to special analysis and imaging. I.
p0365 A81-33280
Acoustic performance evaluation of an advanced UH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33957

In-flight jet engine noise measurement system
p0410 A81-35553
The influence of helicopter operating conditions on rotor noise characteristics and measurement repeatability
p0468 A81-40095
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] p0621 A81-48640
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] p0621 A81-48647
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] p0623 A81-49728
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] p0623 A81-49729
Core noise measurements from a small, general aviation turbofan engine
[NASA-TM-81610] p0044 N81-11769
A comparison of the three methods used to obtain acoustic measurements for the NASA Flight Effects Program
[NASA-TM-81906] p0008 N81-12822
Spectral analysis of nonstationary random processes. Application to noise of flyover type
[ESA-TT-639] p0008 N81-12826
Noise levels and data correction analysis for seven general aviation propeller aircraft
[AD-A091292] p0096 N81-13717
Correction procedures for aircraft noise data. Volume 3: Filter effects
[AD-A091016] p0096 N81-13719
Correction procedures for aircraft noise data. Volume 5: Propeller aircraft noise
[AD-A091017] p0096 N81-13720
The measurement of aero gas turbine noise
[PNR-90032] p0138 N81-14795
The need for airport noise monitoring systems. Their uses, and value in promoting civil aviation
[AD-A092240] p0201 N81-16627
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980
[NASA-CR-152356] p0220 N81-17623
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980
[NASA-CR-152357-VOL-2] p0220 N81-17624
NOISECHECK procedures for measuring noise exposure from aircraft operations
[AD-A093948] p0221 N81-17849
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-164214] p0380 N81-22833
An evaluation of a simplified near field noise model for supersonic helical tip speed propellers
[NASA-TM-81727] p0380 N81-22836
Diagnostic experiments on supersonic jet noise
[NASA-CR-164348] p0438 N81-24856
NOISEMAP: The USAF'S computer program for predicting noise exposure around an airport
[AD-A094264] p0446 N81-25578
Additional noise data on the SR-3 propeller
[NASA-TM-81736] p0447 N81-25767
YC-15 interior noise measurements. Technical discussion
[AD-A098788] p0492 N81-26847
YC-14 interior noise measurements program
[NASA-CR-164523] p0492 N81-26849
Incidences from modifications of the computational methods of the psophic index
[NASA-TM-76577] p0542 N81-28608
Helicopter noise exposure level data: Variations with test target. Indicated airspeed, distance, main rotor RPM and takeoff power
[AD-A100691] p0552 N81-29661
Flight test of a pure-tone acoustic source --- aircraft noise
[NASA-TP-1898] p0641 N81-33945
Helicopter noise analysis: Round-robin test
[AD-A103724] p0641 N81-33948

NOISE POLLUTION
Community response to noise from a general aviation airport
p0017 A81-11821
Model for airport noise exposure on a national basis - 1960 to 2000
p0568 A81-46363
Airbase induced community noise - Facilitating the military/civil interface
p0569 A81-46368
Aircraft noise and land use compatibility tradeoff analyses
p0569 A81-46370
A program to support the full utilization of data from existing social surveys of environmental noise
p0570 A81-46374
Survey population response to airplane noise, part 1
[NASA-TM-75790] p0031 N81-10576
Annoyance from light aircraft investigation carried out around four airports near Paris
[NASA-TM-75823] p0032 N81-10577
Airport noise. Citations from the NTIS data base
[PB80-813231] p0088 N81-12667
Maneuvering aircraft: Noise pollution and control. Citations from the NTIS data base
[PB80-815566] p0135 N81-14525
The effect of airplane noise on the inhabitants of areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22592
An airport community noise-impact assessment model
[NASA-TM-80198] p0393 N81-23713
Continued research on selected parameters to minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602
Aviation noise overload in the immediate proximity of the Warsaw-Okecie airport
[NASA-TM-75892] p0500 N81-27883
Incidences from modifications of the computational methods of the psophic index
[NASA-TM-76577] p0542 N81-28608
Evaluation of the disturbance caused by aircraft noise by opinion surveys
[NASA-TM-76579] p0542 N81-28610
Community reaction to impulse noise: Initial Army survey
[AD-A101674] p0588 N81-30659
Minimum noise impact aircraft trajectories
[NASA-CR-164719] p0594 N81-31159

NOISE PREDICTION (AIRCRAFT)
Some thoughts on the effects of flight on jet noise as observed in actual flight and in wind tunnels
p0016 A81-11723
The status of rotor noise technology
p0019 A81-12737
Simple method for prediction of aircraft noise contours
p0050 A81-13217
Experiments on the validity of ground effect predictions for static noise testing of propeller aircraft
p0054 A81-13811
Numerical prediction of bypass engine jet noise
[AIAA PAPER 80-1006] p0057 A81-14300
The effects of noise on laminar flow control drag reduction systems
p0058 A81-14390
Development and application of an analytical method for predicting helicopter transmission noise
p0150 A81-20062
Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
A lifting surface theory for the sound generated by the interaction of velocity disturbances with a leaned vane stator
[AIAA PAPER 81-0091] p0160 A81-20595
Experiments on the linear and non-linear evolution of the double helical instability in jets
[AIAA PAPER 81-0415] p0168 A81-20818
Empirical method for the prediction of business executive jet cabin noise levels
p0224 A81-23884
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-28943

Transonic rotor noise - Theoretical and experimental comparisons p0364 A81-33049

Trailing-edge airframe noise source studies on aircraft wings [AIAA PAPER 80-0976] p0411 A81-35634

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements p0454 A81-38062

Trailing edge noise from hovering rotors [AHS 80-60] p0479 A81-40184

A study of the economic impact of noise limits on new design and current production helicopters [AHS 80-64] p0479 A81-40187

General aviation propeller noise reduction - Penalties and potential [SAE PAPER 810585] p0520 A81-42746

Helicopter noise - Is technology the answer [SAE PAPER 810591] p0520 A81-42750

A prediction procedure for propeller aircraft flyover noise based on empirical data [SAE PAPER 810604] p0521 A81-42761

Integrated noise model - The Federal Aviation Administration's computer program for predicting noise exposure around an airport p0568 A81-46354

Remaining problems in the prediction, measurement, evaluation, and control of aircraft noise p0568 A81-46356

Airport noise contour predictions - Improving their accuracy p0569 A81-46367

Helicopter manufacturers economic impact assessment of FAA proposed helicopter certification noise rules /NPRM 79-13/ p0576 A81-46647

Prediction of helicopter rotor noise from measured blade surface pressure p0577 A81-46649

The influence of the airspeed on jet turbulence and the consequences for the jet noise [DGLR PAPER 81-021] p0609 A81-47595

Trailing edge noise prediction from measured surface pressures p0616 A81-48395

Ray-theory predictions of the sound radiated from realistic engine intakes [AIAA PAPER 81-1982] p0618 A81-48602

An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets [AIAA PAPER 81-2022] p0618 A81-48606

The role of the helical jet mode in aerodynamic noise generation [AIAA PAPER 81-1963] p0618 A81-48607

Prediction of flyover jet noise spectra [AIAA PAPER 81-2025] p0618 A81-48610

Laboratory study of efficient add-on treatments for interior noise control in light aircraft [AIAA PAPER 81-1969] p0619 A81-48618

Prediction of jet exhaust noise on airframe surfaces during flight [AIAA PAPER 81-2035] p0619 A81-48626

Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements [AIAA PAPER 81-2053] p0620 A81-48635

Ground effects on aircraft noise for a wide-body commercial airplane [AIAA PAPER 81-1988] p0620 A81-48638

Prediction method for aeroacoustic loads on under the wing blown flaps [AIAA PAPER 81-2038] p0621 A81-48644

High bypass ratio engine noise component separation by coherence technique [AIAA PAPER 81-2054] p0621 A81-48653

An iterative finite element-integral technique for predicting sound radiation from turbofan inlets [AIAA PAPER 81-1981] p0624 A81-49736

An improved prediction method for noise generated by conventional profile coaxial jets [AIAA PAPER 81-1991] p0624 A81-49743

Weapon bay cavity noise environments, data correlation and prediction for the B-1 aircraft [AD-A089770] p0045 N81-11778

Prediction of sound radiated from different practical jet engine inlets [NASA-CR-163824] p0137 N81-14789

Fluid-dynamic and aeroacoustic investigations of shrouded jets --- noise prediction (aircraft) p0256 N81-1831

Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models [NASA-CR-159363] p0258 N81-18799

Sources, control, and effects of noise from aircraft propellers and rotors --- noise prediction (aircraft p0269 N81-19073

NASA progress in aircraft noise prediction p0269 N81-19074

Handbook of aircraft noise metrics [NASA-CR-3406] p0345 N81-21871

Subjective field study of response to impulsive helicopter noise [NASA-TP-1833] p0345 N81-21873

Sources, control, and effects of noise from aircraft propellers and rotors [NASA-TM-81971] p0345 N81-21904

The relationship between noise and annoyance around Orly [NASA-TM-76573] p0379 N81-22594

Airframe noise of a small model transport aircraft and scaling effects --- Boeing 747 [NASA-TP-1858] p0380 N81-22832

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements [NASA-TM-81739] p0381 N81-22839

Diagnostic experiments on supersonic jet noise [NASA-CR-164348] p0438 N81-24856

NOISEMAP: The USAF'S computer program for predicting noise exposure around an airport [AD-A094264] p0446 N81-25578

Engine isolation for structural-borne interior noise reduction in a general aviation aircraft [NASA-CR-3427] p0446 N81-25766

Static tests of excess ground attenuation at Wallops Flight Center [NASA-CR-3435] p0491 N81-26846

Prediction of sound radiation from different practical jet engine inlets [NASA-CR-164620] p0500 N81-27886

User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers [NASA-TM-83135] p0631 N81-32966

Computer program to predict aircraft noise levels [NASA-TP-1913] p0641 N81-33947

NOISE PROPAGATION

Gear unit noise and transmission errors --- helicopter system p0150 A81-20060

Sandwich structures with high transmission loss p0151 A81-20069

A general mapping procedure for variable area duct acoustics [AIAA PAPER 81-0094] p0160 A81-20597

Ray-theory predictions of the sound radiated from realistic engine intakes [AIAA PAPER 81-1982] p0618 A81-48602

Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets [AIAA PAPER 81-2041] p0618 A81-48613

Engine noise source breakdown - Theory, simulation and results [AIAA PAPER 81-2040] p0619 A81-48620

Assessment of ground effects on the propagation of aircraft noise: The T-38A flight experiment [NASA-TP-1747] p0137 N81-14788

Noise and noise abatement in fans and blowers: A review [DFVLR-FB-80-16] p0138 N81-14796

Static source locations for four nozzles mounted on a J-85 engine [NASA-CR-152401] p0143 N81-14998

A study of the effect of terrain on helicopter noise propagation by acoustical modeling [AD-A097626] p0394 N81-23864

Diagnostic experiments on supersonic jet noise [NASA-CR-164348] p0438 N81-24856

Flight test of a pure-tone acoustic source --- aircraft noise [NASA-TP-1898] p0641 N81-33945

NOISE REDUCTION
Acoustic structures --- titanium brazing method
for producing honeycomb structures for jet
engine noise reduction
p0001 A81-10272
Noise control design problems on air cushion
vehicles and surface effect ships
p0017 A81-11818
Experiments on the validity of ground effect
predictions for static noise testing of
propeller aircraft
p0054 A81-13811
Application of the equivalent surface source
method to the acoustics of duct systems with
non-uniform wall impedance
p0055 A81-13824
Airline flight departure procedures - Choosing
between noise abatement, minimum fuel
consumption and minimum cost
p0101 A81-17044
A study of multiple jets
p0110 A81-18024
The federal role in airport noise control planning
p0113 A81-18073
Symposium on Internal Noise in Helicopters,
University of Southampton, Southampton, England,
July 17-20, 1979, Proceedings
p0150 A81-20051
US Army working group on aircraft noise
p0150 A81-20053
An overview of the research conducted in
Aerospatiale on internal noise
p0150 A81-20054
Helicopter internal noise - An overview
p0150 A81-20055
Development and application of an analytical
method for predicting helicopter transmission
noise
p0150 A81-20062
Modelling techniques for the reduction of noise
and vibration in gearboxes
p0151 A81-20063
Sandwich structures with high transmission loss
p0151 A81-20069
Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
Gearbox isolation for reducing gear tooth noise in
single rotor helicopter
p0151 A81-20073
Fuel consumption aspects of some noise abatement
procedures
p0154 A81-20350
A general mapping procedure for variable area duct
acoustics
[AIAA PAPER 81-0094] p0160 A81-20597
Numerical techniques in linear duct acoustics - A
status report
[ASME PAPER 80-WA/NC-2] p0170 A81-21120
Effect of a semi-annular thermal acoustic shield
on jet exhaust noise
p0178 A81-22532
Empirical method for the prediction of business
executive jet cabin noise levels
p0224 A81-23844
Noise from gas turbine combustors
p0236 A81-26008
Noise attenuation and associated thrust increase
of turbojet engines through hyper-mixing ejector
shrouds
p0291 A81-29062
Jet noise suppression for low bypass engines -
Have we reached a dead end
p0291 A81-29063
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442
Noise characteristics of two parallel jets with
unequal flow
[AIAA PAPER 80-0168] p0354 A81-31601
Federal policies affecting airport noise
compatibility programs
[AIAA PAPER 81-0829] p0367 A81-33879
Analysis of axial fan noise with the help of the
Lowson formalism
[AAAF PAPER NT 80-54] p0370 A81-33948
Airline flight departure procedures - Choosing
between noise abatement, minimum fuel
consumption and minimum cost
p0420 A81-37416
Numerical simulation for the design of a
supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1218] p0458 A81-39006
Suppression of jet noise peak by velocity profile
reshaping
p0458 A81-39039
Reduction of helicopter noise by use of a quiet
tail rotor
p0468 A81-40096
The dominant acoustic radiation surfaces of a
helicopter cabin
p0468 A81-40102
Reducing the cost impact of helicopter internal
noise control
[AHS 80-59] p0470 A81-40183
Strategies for aircraft interior noise reduction
in existing and future propeller aircraft
[SAE PAPER 810560] p0518 A81-42726
Summary of typical parameters that affect sound
transmission through general aviation aircraft
structures
[SAE PAPER 810562] p0518 A81-42728
Dielectric electrostatic charge reduction
[SAE PAPER 810571] p0519 A81-42736
General aviation propeller noise reduction -
Penalties and potential
[SAE PAPER 810585] p0520 A81-42746
Noise and performance of general aviation aircraft
- A review of the MIT study
[SAE PAPER 810586] p0520 A81-42747
Helicopter noise - Is technology the answer
[SAE PAPER 810591] p0520 A81-42750
The effect of proplets and bi-blades on the
performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
An aircraft landing system employing observers
p0562 A81-44699
Aircraft noise control in the 1980's
p0567 A81-46352
EPA proposed national strategy for further
reduction of aviation noise
p0567 A81-46353
Airport noise control in the 1980s - FAA's plans
and policies
p0568 A81-46355
Remaining problems in the prediction, measurement,
evaluation, and control of aircraft noise
p0568 A81-46356
Plans for control of the noise exposure produced
by military aircraft in the 1980's - Aircraft
noise
p0568 A81-46364
Noise control at general aviation airports
p0569 A81-46366
Optimizing complex runway use programs for airport
noise abatement
p0569 A81-46369
Optimization of takeoff flight paths with respect
to FAR Part 36 noise using dynamic programming
p0569 A81-46371
Airport Noise Control and Land Use Compatibility
Studies A U.S. case
p0570 A81-46372
A long range research programme of noise abatement
at the airport of Beograd and its practical
results
p0570 A81-46373
Noise reduction test facilities at Douglas Aircraft
p0570 A81-46375
The impact and future direction of aircraft noise
certification
p0570 A81-46377
Helicopter manufacturers economic impact
assessment of FAA proposed helicopter
certification noise rules /NPRM 79-13/
p0576 A81-46647
Ray-theory predictions of the sound radiated from
realistic engine intakes
[AIAA PAPER 81-1982] p0618 A81-48602
Procedure for evaluation of engine isolators for
reduced structure-borne interior noise
transmission
[AIAA PAPER 81-1970] p0618 A81-48608
Theoretical and experimental evaluation of
transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612

Tip geometry effects on the model helicopter rotor
  low frequency broadband noise
  [AIAA PAPER 81-2003] p0619 A81-48615
Laboratory study of efficient add-on treatments
  for interior noise control in light aircraft
  [AIAA PAPER 81-1969] p0619 A81-48618
Comparison of predicted engine core noise with
  current and proposed aircraft noise
  certification requirements
  [AIAA PAPER 81-2053] p0620 A81-48635
Mixer nozzle aeroacoustic characteristics for the
  energy efficient engine
  [AIAA PAPER 81-1994] p0621 A81-48639
A novel airborne technique for free-field
  measurements of aircraft noise above the flight
  path with application to noise-shielding studies
  [AIAA PAPER 81-2028] p0621 A81-48647
Shielding concepts for jet noise
  [AIAA PAPER 81-2020] p0623 A81-49730
Noise shielding by a hot subsonic jet
  [AIAA PAPER 81-2018] p0624 A81-49731
Aviation safety and noise abatement
  [GPO-50-923] p0032 N81-10578
Low-speed aerodynamic performance of
  50.8-centimeter-diameter noise-suppressing
  inlets for the Quiet, Clean, Short-haul
  Experimental Engine (QCSEE) --- Lewis 9- by
  15-foot low speed wind tunnel tests
  [NASA-TP-1178] p0035 N81-11037
Effect of a semi-annular thermal acoustic shield
  on jet exhaust noise
  [NASA-TM-81615] p0044 N81-11770
A simulator study for the development and
  evaluation of operating procedures on a
  supersonic cruise research transport to minimize
  airport-community noise
  [NASA-TP-1742] p0073 N81-12043
Noise exposure of civil aircarrier airplanes
  through the year 2000. Volume 1: Methods,
  procedures, results
  [EPA-550/9-79-313-1] p0087 N81-12644
Noise exposure of civil aircarrier airplanes
  through the year 2000. Volume 2: Appendices A
  through F
  [EPA-550/9-70-313-2] p0087 N81-12645
Shear layer instability noise produced by various
  jet nozzle configurations
  [PNR-90018] p0088 N81-12825
Technological forecasting--aircraft design.
  Citations from the International Aerospace data
  base
  [NASA-CR-163833] p0129 N81-13957
Noise and noise abatement in fans and blowers: A
  review
  [DFVLR-FB-80-16] p0138 N81-14796
Curved centerline air intake for a gas turbine
  engine
  [NASA-CASE-LEW-13201-1] p0143 N81-14999
A guidance document on airport noise control
  [AD-A092228] p0202 N81-16629
JT8D engine internal exhaust mixer technology
  program
  [AD-A093057] p0215 N81-17091
Transport jet aircraft noise abatement in foreign
  countries: Growth, structure, impact. Volume
  1: Europe, July 1980
  [NASA-CR-152356] p0220 N81-17623
Transport jet aircraft noise abatement in foreign
  countries: Growth, structure, impact. Volume
  2: Pacific basin, August 1980
  [NASA-CR-152357-VOL-2] p0220 N81-17624
Aerodynamic/acoustic performance of YJ101/double
  bypass VCE with coannular plug nozzle
  [NASA-CR-159869] p0220 N81-17846
Development of SCR Aircraft takeoff and landing
  procedures for community noise abatement and
  their impact on flight safety
  p0245 N81-17994
Status of noise technology for advanced supersonic
  cruise aircraft
  p0246 N81-18002
Forward velocity effects on fan noise and the
  suppression characteristics of advanced inlets
  as measured in the NASA Ames 40 by 80 foot wind
  tunnel: Acoustic data report
  [NASA-CR-152329] p0258 N81-18798
The 1980 Aircraft Safety and Operating Problems,
  part 2
  [NASA-CP-2170-PT-2] p0267 N81-19056
Recent developments in aircraft engine noise
  reduction technology
  p0269 N81-19072
Sources, control, and effects of noise from
  aircraft propellers and rotors --- noise
  prediction (aircraft
  p0269 N81-19073
Design of an exhaust mixer nozzle for the
  Avco-Lycoming Quiet Clean General Aviation
  Turbofan (QCGAT)
  [NASA-CR-159426] p0274 N81-19120
Coupling of unsteady lift to acoustic duct modes
  in an axial flow fan
  [AD-A095080] p0274 N81-19124
Comments on settling chamber design for quiet,
  blowdown wind tunnels
  [NASA-TM-81948] p0335 N81-20085
Aerodynamic and acoustic behavior of a YF-12 inlet
  at static conditions
  [NASA-CR-163106] p0342 N81-21079
Sources, control, and effects of noise from
  aircraft propellers and rotors
  [NASA-TM-81971] p0345 N81-21904
Airport noise impact reduction through operations
  [NASA-TM-81970] p0438 N81-24855
Study of noise reduction characteristics of
  multilayered panels and dual pane windows with
  Helmholtz resonators
  [NASA-CR-164370] p0438 N81-24857
VLF P-static noise reduction in aircraft. Volume
  1: Current knowledge
  [AD-A098451] p0440 N81-25061
NOISEMAP: The USAF'S computer program for
  predicting noise exposure around an airport
  [AD-A094264] p0446 N81-25578
Engine isolation for structural-borne interior
  noise reduction in a general aviation aircraft
  [NASA-CR-3427] p0446 N81-25766
VLF P-static noise reduction in aircraft. Volume
  2: Recommended action
  [AD-A099130] p0491 N81-26394
Noise and performance of propellers for light
  aircraft
  [NASA-CR-165732] p0491 N81-26845
Aeroacoustics of a porous plug jet noise suppressor
  [NASA-CR-164549] p0500 N81-27884
The background and bases for the proposed military
  standard on acoustical noise limits in helicopters
  [AD-A099814] p0500 N81-27890
Optimization of barriers --- for screening engine
  noise, diffraction
  [ESA-TT-648] p0500 N81-27893
A rectangular rod-wall sound shield
  [NASA-CASE-LAR-12863-1] p0550 N81-29138
Noise suppression methods for robust speech
  processing
  [AD-A100629] p0551 N81-29323
A study of the performance of an Olson type active
  noise controller and the possibility of the
  reduction of cabin noise
  [UTIAS-TN-228] p0552 N81-29924
Rotor wake characteristics relevant to
  rotor-stator interaction noise generation
  [NASA-TM-82703] p0583 N81-30130
Shock associated noise reduction from
  inverted-velocity-profile coannular jets
  [NASA-CR-3454] p0589 N81-30908
Noise abatement technology options for
  conventional turboprop airplanes
  [AD-A101828] p0589 N81-30910
Minimum noise impact aircraft trajectories
  [NASA-CR-164719] p0594 N81-31159
The background and bases for the proposed military
  standard on acoustical noise limits in helicopters
  p0604 N81-31459
An active noise reduction system for aircrew helmets
  p0604 N81-31470
Flying helmet attenuation, and the measurement,
  with particular reference to the Mk 4 helmet
  p0604 N81-31173
Sidetone-level considerations in aircraft
  communication systems
  p0605 N81-31475
Design and evaluation of an integrated Quiet,
  Clean General Aviation Turbofan (QCGAT) engine
  and aircraft propulsion system
  [NASA-CR-165185] p0629 N81-32147
Development of an analytical technique for the
  optimization of jet engine and duct acoustic

liners
[NASA-CR-164872] p0639 N81-33205

Noise suppression characteristics of peripherally segmented duct liners
[NASA-TP-1904] p0641 N81-33946

NOISE SPECTRA

Experiments on the validity of ground effect predictions for static noise testing of propeller aircraft
p0054 A81-13811

Experimental investigations on shock-associated noise
p0107 A81-17735

A study of multiple jets
p0110 A81-18024

Acoustics of rotors utilizing circulation control
[AIAA PAPER 81-0092] p0160 A81-20596

The spectral analysis of nonstationary random processes - Applications to aircraft overflight-type noises --- French thesis
p0174 A81-21922

Contribution to the study of non stationary signals emitted by moving jet engine - Application to special analysis and imaging. I.
p0365 A81-33288

Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II
p0366 A81-33294

Trailing edge noise prediction from measured surface pressures
p0616 A81-48395

Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025] p0618 A81-48610

Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] p0619 A81-48625

Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] p0620 A81-48636

Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] p0620 A81-48638

Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] p0621 A81-48651

Spectral analysis of nonstationary random processes. Application to noise of flyover type
[ESA-TT-639] p0088 N81-12826

Correction procedures for aircraft noise data. Volume 3: Filter effects
[AD-A091016] p0096 N81-13719

Analysis of pressure spectra measurements in a ducted combustion system
[NASA-TM-81583] p0146 N81-15768

Contribution to the study of nonstationary signals emitted by moving jet engines: Application to special analysis and imaging. Part 1
p0447 N81-26006

NOISE SUPPRESSORS

U NOISE REDUCTION

NOISE TOLERANCE

Investigation of the physical working environment for cabin attendants within Scandinavian Airlines System /SAS/ --- noise conditions and aircraft vibration
p0568 A81-46357

The annoyance caused by noise around airports
[NASA-TM-75784] p0146 N81-15579

Annoyance caused by light aircraft noise
[NASA-TM-76533] p0379 N81-22589

The annoyance caused by airplane noise in the vicinity of Orly Airport and the reaction of neighboring residents
[NASA-TM-76575] p0379 N81-22590

The relationship between noise and annoyance around Orly
[NASA-TM-76573] p0379 N81-22594

Effect of aircraft noise on the equilibrium of airport residents: Longitudinal study around Roissy, phase 3
[NASA-TM-75906] p0499 N81-27692

NOMINAL VALUES

U APPROXIMATION

NONADIABATIC PROCESSES

U HEAT TRANSFER

NONDESTRUCTIVE TESTS

NT STATIC FIRING

Nondestructive evaluation of composite structures
p0013 A81-11654

Holographic non-destructive testing of materials using pulsed lasers --- for aircraft structures
p0013 A81-11655

Non-destructive pavement evaluation
p0111 A81-18062

Recent developments in NDT techniques --- for airport pavement testing
p0113 A81-18070

Nondestructive dynamic testing
p0124 A81-19657

Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110

Evaluation and comparison of nondestructive service inspection methods
p0153 A81-20135

Non-destructive testing of adhesive-bonded joints
p0153 A81-20162

New NDT techniques used for aircraft maintenance
p0153 A81-20168

Acoustic emission and corrosion
p0153 A81-20211

Application of exoelectron emission for quality control of gas-turbine engine parts
p0171 A81-21367

Mathematical aspects of the probabilistic evaluations of structural safety and NDI capabilities
p0181 A81-22635

Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563

Advanced ultrasonic testing of aerospace structures
p0557 A81-44329

Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] p0609 A81-47565

High peak energy shaped-pulse electromagnetic crack detection
p0611 A81-47785

Acoustic emission as a NDE technique for determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070

Testing of composite structures
[AAAF-NT-79-41] p0083 N81-12181

Mirage 2000 and Mirage 4000 fiber structures
[AAAF-NT-79-44] p0083 N81-12183

Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-219/79] p0133 N81-14300

Feasibility evaluation of advanced multifrequency eddy current technology for use in naval air maintenance environment
[AD-A093314] p0220 N81-17476

Computer techniques for ultrasonic inspection
[AD-A095285] p0337 N81-20447

Nondestructive testing of adhesive bonded joints
[FOK-BO-1241] p0542 N81-28190

Damage tolerance of a landing gear component after many takeoffs and landings --- nondestructive tests
[NLR-MP-79039-U] p0596 N81-31189

NONEQUILIBRIUM DRAG

U FRICTION DRAG

NONEQUILIBRIUM FLOW

Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732

NONFLAMMABLE MATERIALS

Textile materials for commercial transportation vehicles --- passenger aircraft
p0532 A81-43653

Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933

Testimony of James J. Kramer, Associate Administrator for Aeronautics and Space Technology, National Aeronautics and Space Administration, accompanied by John H. Enders, Project Manager, Aviation Safety Technology Office, John A. Parker, Chemical Research Projects Office, NASA-Ames Research Center, and Demitrius A. Kourtides, Chemical Research Projects Office, NASA-AMES Research Center
p0127 N81-13935

Testimony of Richard W. Taylor, Vice President and Special Assistant to the President, and Eugene A. Bara, Chief Engineer, Payloads Systems,

Boeing Commercial Airplane Company
p0127 N81-13936

Testimony of a panel consisting of: Lloyd E. Frisbee, Vice President, Engineering and Operations, Lockheed California Company; Lyle A. Wright, Director, Powerplant Engineering, Douglas Aircraft Company, accompanied by Doctor H. C. Schjelderup, Chief Technology Engineer, Materials and Process Engineering, and F. E. Duskin, Senior Design Engineer, Interiors Engineering, Douglas Aircraft Company
p0127 N81-13937

Fireworthiness of transport aircraft interior systems
p0267 N81-19061

Study of materials performance model for aircraft interiors
[NASA-CR-152378] p0333 N81-20063

Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051

NONHOLONOMIC EQUATIONS

Self-oscillations of a self-aligned landing gear strut in the case of classical nonholonomic rolling constraints
p0563 A81-45315

NONISOTROPIC PLATES
U ANISOTROPIC PLATES

NONLINEAR EQUATIONS

Calculation of the nonlinear aerodynamic characteristics of finite-span wing
p0063 A81-15388

An analytical study of nonlinear stabilization during ballistic descent
p0237 A81-26028

Linear/nonlinear behavior in unsteady transonic aerodynamics
[AIAA 81-0643] p0306 A81-29496

Non-linear oscillator models in bluff body aeroelasticity
p0348 A81-30786

Calculation of the nonlinear aerodynamic characteristics of a wing of finite span
p0417 A81-36738

Pseudosteady-state analysis of nonlinear aircraft maneuvers
[NASA-TP-1758] p0094 N81-13065

A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 1: Model description application
[NASA-CR-166129-VOL-1] p0538 N81-28084

A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 2: Model equations and base aircraft data
[NASA-CR-166129-VOL-2] p0538 N81-28085

A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 3: User's manual for VATOL simulation program
[NASA-CR-166129-VOL-3] p0538 N81-28086

NONLINEAR FILTERS

Nonlinear estimation of generalized vector shot processes
p0529 A81-43583

NONLINEAR PROGRAMMING

Optimum design of axial flow gas turbine stage. I - Formulation and analysis of optimization problem. II - Solution of the optimization problem and numerical results
p0019 A81-12608

Use of optimization in helicopter vibration control by structural modification
p0241 A81-26945

Sensitivity of optimum solutions to problem parameters --- in aircraft design
[AIAA 81-0548] p0301 A81-29399

The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400

Finite-difference gradients versus error-quadrature gradients in the solution of parameterized optimal control problems
p0421 A81-37568

Use of constrained optimization in the conceptual design of a medium-range subsonic transport
[NASA-TP-1762] p0193 N81-16039

A method for obtaining reduced-order control laws for high-order systems using optimization techniques
[NASA-TP-1876] p0589 N81-30851

NONLINEAR SYSTEMS

Forced vibrations of a nonlinear system excited by a centrifugal oscillator with a sloping engine characteristic
p0002 A81-10439

Nonlinear incremental analysis up to failure of aeronautical structures
p0068 A81-16307

On the use of complex form of the Strouhal number in the study of nonlinear aeroelasticity
p0231 A81-24723

Stability of aircraft motion in critical cases
[AIAA PAPER 81-1885] p0561 A81-44577

General describing function method for systems with many nonlinearities, with application to aircraft performance
p0564 A81-45508

Self-oscillations of a wheel on a self-aligning landing gear strut with a nonlinear damper
A81-46847

A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
p0615 A81-48333

Analytical estimation on nonlinear longitudinal characteristics of wings with small and moderate aspect ratio by the vortex lattice method in incompressible flow
[ESA-TT-585] p0022 N81-10018

Application of the MNA design method to a nonlinear turbofan engine --- multivariable Nyquist array method
[NASA-CR-163855] p0143 N81-15001

Nonlinear rotor dynamics analysis --- computerized simulation
p0257 N81-18405

NLSCIDNT user's guide maximum likehood parameter identification computer program with nonlinear rotorcraft model
[NASA-CR-159083] p0380 N81-22724

INDES User's guide multistep input design with nonlinear rotorcraft modeling
[NASA-CR-159085] p0380 N81-22726

A nonlinear propulsion system simulation tehnique for piloted simulators
[NASA-TM-82600] p0390 N81-23085

NONLINEARITY

Study of the characteristics of a base-vented wing in nonlinear theory
[AAAF PAPER NT 80-40] p0369 A81-33927

Estimation of wing nonlinear aerodynamic characteristics at supersonic speeds
[NASA-TP-1718] p0021 N81-10004

Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13978

Development of a nonlinear vortex method --- steady and unsteady aerodynamic loads of highly sweptback wings
[NASA-CR-164351] p0423 N81-24024

Flap-lag-torsional dynamic modelling of rotor blades in hover and in forward flight, including the effect of cubic nonlinearities
[NASA-CR-166194] p0486 N81-26116

Investigation of low level aircraft nonavionic nonlinear interference
[AD-A098784] p0491 N81-26349

NONREFLECTION
U ENERGY ABSORPTION

NONRIGIDITY
U FLEXIBILITY

NONSTABILIZED OSCILLATION

The problems with the interface system of the visual simulator as a cause of Pilot Induced Oscillations (PIO's) in flight simulators
[MBB-UA-528-80-OE] p0276 N81-19180

NONSYNCHRONIZATION

A technique for recovering nonsynchronized data from a digital flight data recorder
p0328 N81-20020

NONUNIFORM FLOW

Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream
p0060 A81-14959

The linear instability due to the compressible crossflow on a swept wing
p0170 A81-21168

Calculation of circular flow inhomogeneities downstream of the turbine wheel
p0281 A81-27372
The effect of jet non-uniformity on the lift of an augmentor wing
p0296 A81-29144
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957
Factors influencing the predicted performance of advanced propeller designs
[NASA-TM-82676] p0492 N81-27042
NONVISCOUS FLOW
U INVISCID FLOW
NORMAL DENSITY FUNCTIONS
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0154 A81-20448
NORMAL DISTRIBUTIONS
U NORMAL DENSITY FUNCTIONS
NORMAL FORCE DISTRIBUTION
U FORCE DISTRIBUTION
NORTH AMERICAN AIRCRAFT
NT B-1 AIRCRAFT
NT F-100 AIRCRAFT
NORTHROP AIRCRAFT
NT F-5 AIRCRAFT
NT F-18 AIRCRAFT
NT T-38 AIRCRAFT
NOSE INLETS
Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
p0224 A81-23730
NOTCH TESTS
Prediction of structural fatigue response under aircraft loads from material stress-strain behavior
p0226 A81-24009
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate
p0418 A81-37137
Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures --- of Al alloys
p0516 A81-42356
NOTCHED METALS
U NOTCH TESTS
NOXIOUS MATERIALS
U CONTAMINANTS
NOZZLE COEFFICIENT
U NOZZLE FLOW
NOZZLE DESIGN
Analysis and design of a ceramic nozzle insert for the Langley 8-foot high temperature structures tunnel
p0060 A81-14996
One-dimensional considerations concerning the stability behavior of inlet diffusers for supersonic aircraft --- German thesis
p0107 A81-17548
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061
Development and validation of computational flow analysis for design of inlets and nozzles
p0298 A81-29117
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1218] p0458 A81-39006
Advanced nozzle integration for supersonic strike fighter application
[AIAA PAPER 81-1441] p0504 A81-40875
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878
Development of exhaust nozzle internal performance prediction techniques for advanced aircraft applications
[AIAA PAPER 81-1490] p0506 A81-40908
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43947
Graphite/polyimide augmentor and nozzle components --- of advanced military gas turbine engines
[AIAA PAPER 81-1358] p0625 A81-49976
Investigation of convergent-divergent nozzles applicable to reduced-power supersonic cruise aircraft
[NASA-TP-1766] p0139 N81-14972
Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976
QCGAT mixer compound exhaust system design and static big model test report
[NASA-CR-135386] p0274 N81-19119
Design of an exhaust mixer nozzle for the Avco-Lycoming Quiet Clean General Aviation Turbofan (QCGAT)
[NASA-CR-159425] p0274 N81-19120
Jet-diffuser ejector - Attached nozzle design
[NASA-CR-152361] p0278 N81-19412
Aeroacoustics of a porous plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884
NOZZLE EFFICIENCY
Gas dynamic characteristics of the nozzle diaphragms of partial supersonic turbines
p0281 A81-27374
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions
p0417 A81-36737
Static test of a fan-powered chin nozzle for V/STOL applications
[NASA-CR-165361] p0546 N81-29093
NOZZLE FLOW
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles
p0004 A81-10913
An experimental investigation of jet screech by air jet impingement on solid boundaries
p0005 A81-11302
Calibration of the high speed wind tunnel TVM 150 in the supersonic range
p0016 A81-11778
Attainability of an attached flow in a nozzle with heavily curved walls
p0054 A81-13540
Interferometric study of the initial stage of supersonic jets of gases with various specific-heat ratios from conical nozzles
p0068 A81-16231
Effects of axisymmetric sonic nozzle geometry on Mach disk characteristics
p0110 A81-18022
A study of multiple jets
p0110 A81-18024
Effect of facility variation on the acoustic characteristics of three single stream nozzles
p0176 A81-22534
Transonic flows of a multireacting gas mixture through a Laval nozzle
p0225 A81-23909
Numerical computation of transonic potential flow through nozzles
p0233 A81-25353
Partially confined multiple jet mixing
p0234 A81-25513
Gas dynamic characteristics of the nozzle diaphragms of partial supersonic turbines
p0281 A81-27374
Numerical solution of the direct one-dimensional problem of a critical flow in nozzles
p0288 A81-28578
Development and validation of computational flow analysis for design of inlets and nozzles
p0298 A81-29117
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1218] p0458 A81-39006
Analysis of steady, two-dimensional, chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique --- for performance prediction of ramjet propulsion system
[AIAA PAPER 81-1432] p0504 A81-40869
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43947
Some ejector characteristics
[AIAA PAPER 81-1679] p0534 A81-43948
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-49979
Adiabatic gas flow. Citations from the NTIS data base
[PB80-808546] p0023 N81-10048

Jet wing interference for an overwing engine configuration
p0188 N81-16008
Exhaust emission characteristics and variability for maintained General Electric CF6-50 turbofan engines
[AD-A092291] p0196 N81-16064
Rig investigation of a two stage single shaft low cost turbine
p0432 N81-24099
The criticality of engine exhaust simulation on VSTOL model-measured ground effects
p0486 N81-26115
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
[NASA-TM-82658] p0552 N81-29782

NOZZLE GEOMETRY
Effects of axisymmetric sonic nozzle geometry on Mach disk characteristics
p0110 A81-18022
Suppression of jet noise peak by velocity profile reshaping
p0458 A81-39039
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878
Some ejector characteristics
[AIAA PAPER 81-1679] p0534 A81-43948
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] p0621 A81-48651
Cooperative investigation of the noise producing region of an axisymmetric jet
[AD-A089692] p0045 N81-11774
NASA contributions to radial turbine aerodynamic analyses
[NASA-TM-81644] p0090 N81-13019
Static source locations for four nozzles mounted on a J-85 engine
[NASA-CR-152401] p0143 N81-14998
Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976
Effects of nozzle design on the noise from supersonic jets
p0246 N81-18001
Axisymmetric & non-axisymmetric exhaust jet induced-effects on a V/STOL vehicle design. Part 1: Data presentation --- conducted in Ames 11-foot transonic tunnel
[NASA-CR-166146] p0441 N81-25064
Shock associated noise reduction from inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30908

NOZZLE INSERTS
Analysis and design of a ceramic nozzle insert for the Langley 8-foot high temperature structures tunnel
p0060 A81-14996
Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis
p0309 A81-29867

NOZZLE THRUST COEFFICIENTS
Comparison of three thrust calculation methods using in-flight thrust data
[NASA-TM-81360] p0581 N81-30111

NOZZLE WALLS
Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976

NUCLEAR AUXILIARY POWER UNITS
NT SNAP

NUCLEAR ELECTRIC POWER GENERATION
NT SNAP

NUCLEAR EMULSIONS
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476

NUCLEAR EXPLOSION EFFECT
Nuclear hardness assurance for aeronautical systems
[SAE PAPER 801227] p0405 A81-34230

NUCLEAR INTERACTIONS
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476

NUCLEAR MAGNETIC RESONANCE
The 1H and 13C fourier transform NMR characterization of jet fuels derived from alternate energy sources
[AD-A098305] p0437 N81-24284

NUCLEAR RADIATION
Optimal nuclear radiation criteria for aeronautical systems
[AD-A101651] p0548 N81-29125

NUCLEAR REACTIONS
NT HIGH ENERGY INTERACTIONS
NT NUCLEAR INTERACTIONS

NUCLEAR REACTORS
High intensity acoustic testing to determine structural fatigue life and to improve reliability in nuclear reactor and aerospace structures
p0455 A81-38372

NUCLEAR SHIELDING
U RADIATION SHIELDING

NUCLEAR VULNERABILITY
Nuclear hardness assurance for aeronautical systems
[SAE PAPER 801227] p0405 A81-34230

NUCLEAR WEAPONS
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] p0635 N81-33173

NUCLIDES
NT IRON ISOTOPES
NT RADIOACTIVE ISOTOPES

NUMERICAL ANALYSIS
NT APPROXIMATION
NT COMPUTATIONAL FLUID DYNAMICS
NT DIFFERENCE EQUATIONS
NT ERROR ANALYSIS
NT FINITE DIFFERENCE THEORY
NT FINITE ELEMENT METHOD
NT FINITE VOLUME METHOD
NT ITERATIVE SOLUTION
NT LEAST SQUARES METHOD
NT MEAN SQUARE VALUES
NT MONTE CARLO METHOD
NT NEWTON-RAPHSON METHOD
NT NUMERICAL DIFFERENTIATION
NT NUMERICAL INTEGRATION
NT PADE APPROXIMATION
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14581
The automatic matrix force method and techniques for handling more complex computations with given computer capacity
p0108 A81-17815
Radiation boundary conditions for wave-like equations --- numerical jet acoustics experimentation
p0153 A81-20223
Convective amplification of gas turbine engine internal noise sources
p0171 A81-21595
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168
Numerical solution of a supersonic ejector pump
p0413 A81-35939
Modeling of 2D-nozzle plume for IR signature prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107
On the numerical analysis of stall flutter in turbine cascade
p0613 A81-47963
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017
Numerical analysis of the flow in the connecting passage between the fan section and high pressure section of a turbojet engine
[AD-A090506] p0081 N81-12107
Dual methods and approximation concepts in structural synthesis
[NASA-CR-3226] p0134 N81-14347
Aerodynamic subsonic/transonic aircraft design studies by numerical methods
p0187 N81-15999
Numerical computation of flows with rolled-up vortex sheets
p0255 N81-18256

Application of holography to the study of
helicopter rotor flow fields
[NASA-CR-164293] p0392 N81-23433
Development of an analytical technique for the
optimization of jet engine and duct acoustic
liners
[NASA-CR-164872] p0639 N81-33205
NUMERICAL CONTROL
Computerized flight management for fuel saving
p0018 A81-12349
Digital control for helicopter powerplants
p0104 A81-17504
New developments of data processing in
computer-controlled manufacturing systems /DNC,
FMS/
p0149 A81-19845
Design of guidance and control digital autopilots
p0183 A81-22973
Full-authority digital electronic controls for
civil aircraft engines
[ASME PAPER 81-GT-138] p0316 A81-30041
Digital control makes a commercial debut on the
JT9D engine
[ASME PAPER 81-GT-199] p0317 A81-30090
YC-14 digital flight control experience
p0320 A81-30246
The use of finite-state machines for describing
and validating flight control systems
p0322 A81-30265
Real-time microprocessor technology applied to
automatic braking systems
[SAE PAPER 801194] p0402 A81-34204
Full authority digital electronic control
application to a variable cycle engine
[SAE PAPER 801203] p0403 A81-34212
An alternative approach to engine rating
structures using monitoring systems
[SAE PAPER 801225] p0405 A81-34220
Wind shear detection - Automatic alerting system
for airport applications
p0412 A81-35771
Electronic control system for a modern turboprop
engine
[SAE PAPER 810620] p0523 A81-42775
Digital controls in a large engine test facility
p0532 A81-43715
Output predictive algorithmic control - Precision
tracking with application to terrain following
p0564 A81-45573
Output predictive algorithmic control - Precision
tracking with application to terrain following
p0567 A81-46280
Development considerations for real-time
aircraft/avionic distributed computer control
systems
p0616 A81-48376
Reliability validation of systems for
life-critical applications
p0617 A81-48559
Propulsion control and control theory: A new
research focus
p0080 N81-12099
YF-12 cooperative airframe/propulsion control
system program, volume 1
[NASA-CR-163099] p0092 N81-13044
Formation tracking. Part 2: Tracking and control
procedures
[FPM-279-PT-2] p0218 N81-17110
Microprocessor characteristics and comparative
features
p0497 N81-27104
Microprocessor system test and monitoring
p0497 N81-27108
Applied techniques for the control of approach
traffic --- air traffic control
[ESA-TT-668] p0530 N81-28079
Programmable multipurpose flight test
instrumentation system
p0545 N81-29085
NUMERICAL DIFFERENTIATION
Physical and numerical aspects of shock boundary
layer interactions
p0256 N81-18328
NUMERICAL FLOW VISUALIZATION
Engine air intake design support by use of
computational methods and comparison of
theoretically derived pressure distributions
with experimental data
p0008 A81-11614
Research on transonic wings at the National
Aerospace Laboratory, Japan
p0011 A81-11640
Numerical investigation of a model of turbulent
combustion of hydrocarbons
[AIAA PAPER 81-0039] p0158 A81-20559
Numerical simulation of wing-fuselage interference
[AIAA PAPER 81-0048] p0158 A81-20564
A numerical simulation of hypersonic viscous flow
over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566
Three-dimensional model of spray combustion in gas
turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
On the derivation of universal indicial functions
--- for unsteady transonic flow
[AIAA PAPER 81-0328] p0165 A81-20753
Flight experiments with a slender cone at angle of
attack
[AIAA PAPER 81-0337] p0165 A81-20761
A mathematical computer simulation of stationary
and nonstationary flow of an ideal
incompressible fluid around solid profiles and
arrays
p0237 A81-26045
Transonic wing design using potential-flow codes -
Successes and failures
[SAE PAPER 810565] p0518 A81-42730
Numerical simulation of hydrodynamic ram --- for
aircraft fuel tanks
p0615 A81-48351
An analytic model of subsonic flow around an
airflow with a spoiler
p0138 N81-14966
Three dimensional internal flows in
turbomachinery, volume 1
[AD-A092737] p0197 N81-16065
EDRAFT-3 graphite code for VTOL aircraft ground
footprint visualization
[AD-A093311] p0208 N81-17042
Cascade design through an inverse method
p0448 N81-26022
End wall flows in rotors and stators of a single
stage compressor
[NASA-CR-164635] p0540 N81-28697
Application of computer generated color graphic
techniques to the processing and display of
three dimensional fluid dynamic data
[NASA-TM-82650] p0552 N81-29782
Evaluation of Ting's method for the calculation of
the lift distribution on a wing in propulsive jets
[DLR-FB-80078-U] p0594 N81-31157
NUMERICAL INTEGRATION
Wing analysis by the plate analogy using an
integral-difference method
p0235 A81-25680
Integral methods for solving thermal conductivity
problems and their application to evaluating
heat exchange in certain gas-turbine elements
p0285 A81-28128
Analysis of turbulent boundary layer on cascade
and rotor blades of turbomachinery
p0296 A81-29106
An implicit finite volume method for elliptical
flow computation --- numerical integration,
aerothermodynamics
p0255 N81-18248
NUMERICAL STABILITY
Some implementation considerations for numerically
stable flight filters
p0156 A81-20485
NYQUIST DIAGRAM
Multivarable nyquist array method with application
to turbofan engine control
p0080 N81-12101
Application of the MNA design method to a
nonlinear turbofan engine --- multivariable
Nyquist array method
[NASA-CR-163855] p0143 N81-15001

O

OBLIQUE SHOCK WAVES
An experimental investigation of the interaction
between a glancing shock wave and a turbulent
boundary layer
p0012 A81-11649
OBLIQUE WINGS
Lifting-line theory of oblique wings - Application

of the Galerkin method to the lifting-line equation p0149 A81-19873
AD-1 oblique wing aircraft program [SAE PAPER 801180] p0400 A81-34193

OBSERVABILITY (SYSTEMS)
An aircraft landing system employing observers p0562 A81-44699
Estimation of kinetic quantities of flight mechanics with a nonlinear observer [DGLR PAPER 81-067] p0608 A81-47562

OBSERVATION
NT EARTH OBSERVATIONS (FROM SPACE)
NT SATELLITE OBSERVATION
NT VISUAL OBSERVATION

OBSERVATION AIRCRAFT
NT F-5 AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT RF-4 AIRCRAFT

OCEAN SURFACE
Seasat altimeter height calibration --- related to sea surface heights near bermuda [NASA-TM-82040] p0279 N81-19526

OCEANOGRAPHY
Compact and highly sensitive fluorescence lidar for oceanographic measurements p0623 A81-49378

OCEANS
NT ATLANTIC OCEAN

OFF-ON CONTROL
Bounds for the additional cost of near-optimal controls p0170 A81-21075

OFFSHORE PLATFORMS
Analysis of helicopter operations and the use of MLS in the offshore environment p0512 A81-41764

OFT 1
U SPACE TRANSPORTATION SYSTEM 1 FLIGHT

OGEE WINGS
U VARIABLE SWEEP WINGS

OGIVES
Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack [AIAA PAPER 81-0007] p0156 A81-20531
Basic studies of body vortices at high angles of attack and supersonic speeds [AD-A102241] p0594 N81-31154

OIL ADDITIVES
Composition of sludge formed in B-3V oil p0103 A81-17373

OIL EXPLORATION
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs [AHS 80-16] p0474 A81-40147

OILS
NT CRUDE OIL
NT FUEL OILS
NT LUBRICATING OILS
NT SHALE OIL
Methodology for determining sampling intervals [AD-A092591] p0202 N81-16825

OMEGA NAVIGATION SYSTEM
Omega - An economic Loran A replacement p0113 A81-18077
Omega station 10.2 kHz signal coverage prediction diagrams p0512 A81-41760
An integrated Omega/satellite radio navigation system p0566 A81-45767
Proposed ATC system for the Gulf of Mexico: Helicopter operations development program [AD-A089430] p0025 N81-10036
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach [AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams [AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables [AD-A092744] p0192 N81-16032
Omega transmitter outages, January to December 1979 [AD-A093425] p0207 N81-17035
Investigation of air transportation technology at Princeton University, 1980 p0371 N81-22008

OMNIDIRECTIONAL ANTENNAS
Diversity techniques for omnidirectional telemetry coverage of the HiMAT research vehicle [NASA-TP-1830] p0334 N81-20074

OMNIDIRECTIONAL RADIO RANGES
New technology for the NDB system and its reliability. II --- omnidirectional radio beacons p0230 A81-24524
New technology for the NDB system and its reliability. III --- omnidirectional radio beacon p0231 A81-24525

OMNIRANGE NAVIGATION
U VHF OMNIRANGE NAVIGATION

ONBOARD COMPUTERS
U AIRBORNE/SPACEBORNE COMPUTERS

ONBOARD DATA PROCESSING
Application of singular perturbation theory to onboard aircraft trajectory optimization --- for commercial jet transport aircraft [AIAA PAPER 81-0019] p0158 A81-20543
New airborne weather radar systems [AIAA PAPER 81-0237] p0163 A81-20692
Considerations concerning an 'information busbar' for distributing on-board measurement and control information p0233 A81-25375
Engine performance monitoring systems expansion on Alitalia aircraft p0290 A81-29054
Charge-coupled device /CCD/ camera/memory optimization for expendable autonomous vehicles p0357 A81-32491
Airborne ground velocity determination by digital processing of electro-optical line sensor signals p0358 A81-32496
Airborne electronic displays p0364 A81-32989
Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem p0563 A81-45515
Precision DME for microwave landing system p0578 A81-47125
Relationships for a flight performance computer p0382 N81-23014
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters [AD-A098236] p0427 N81-24063
Characteristics of a digital filter for a precision DME system in microwave landing systems [FUB-43-1980] p0628 N81-32136

ONBOARD EQUIPMENT
NT AIRBORNE EQUIPMENT
NT AIRBORNE/SPACEBORNE COMPUTERS
NT AIRCRAFT EQUIPMENT
NT FLYING EJECTION SEATS
NT LIGHT AIRBORNE MULTIPURPOSE SYSTEM
NT SPACECRAFT ELECTRONIC EQUIPMENT
NT TERCOM
Design of disturbance-rejection controllers for linear multivariable discrete-time systems using entire eigenstructure assignment --- onboard digital flight system of F-4 aircraft p0155 A81-20454
The 'light-weight' system - A novel concept for on-board weight and balance measurement using fiber optics [SAWE PAPER 1336] p0352 A81-31377
Helicopter cockpit design for night goggle compatibility p0472 A81-40128
Onboard procedure for the measurement of wind shear gradients [DGLR PAPER 81-060] p0610 A81-47612
Head up displays. Citations from the International Aerospace Abstracts data base [NASA-CR-163656] p0026 N81-10049
Fuel jettisoning by U.S. Air Force aircraft. Volume 2: Fuel dump listings [AD-A089076] p0032 N81-10581
Survey of Workshops on Meteorological and Environmental Inputs to Aviation Systems p0135 N81-14556
Winds and wind shear in-situ sensors p0136 N81-14563

Collision avoidance systems. Citations from the NTIS data base
[PB80-815020] p0193 N81-16038
Seat pack for fighter aircraft operating on the NATO Northern Flank
p0205 N81-17010
General Aviation Avionics Statistics
[AD-A095148] p0273 N81-19114
An analysis of the adaptability of Loran-C to air navigation
p0371 N81-22003
The P/POD project: Programmable/Pilot Oriented Display --- general aviation aircraft
p0371 N81-22004
Investigation of air transportation technology at Ohio University, 1980 --- general aviation aircraft and navigation aids
p0371 N81-22005
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29088
Microwave system for real time space position measurement
p0545 N81-29089
Crash survivable flight data recording system study
[AD-A101503] p0583 N81-30127
ONE DIMENSIONAL FLOW
Computational design of large-scale blast simulators
[AIAA PAPER 81-0159] p0162 A81-20639
A one-dimensional analysis and performance prediction of subsonic radial turbines
p0228 A81-24086
OPERATING COSTS
Engine maintenance cost calculation method
[ASME PAPER 81-GT-34] p0312 A81-29948
The turboprop aircraft role in the 1980s
[AIAA PAPER 81-1730] p0528 A81-43169
Can advanced technology improve future commuter aircraft
[AIAA PAPER 81-1729] p0536 A81-43959
Concorde with the airlines --- operating costs and performance
p0247 N81-18013
GASP- General Aviation Synthesis Program. Volume 7: Economics. Part 1: Theoretical development
[NASA-CR-152303-VOL-7-PT-1] p0271 N81-19094
Engine life development --- operating costs and propulsion system performance
p0430 N81-24081
NAS automation equipment operating cost estimates, FY 1978 - 1979
[AD-A102023] p0595 N81-31182
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] p0637 N81-33190
OPERATIONAL HAZARDS
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021
OPERATIONAL PROBLEMS
The evolution of operational systems --- approach to National Airspace System automation
p0064 A81-15699
Problems of flight mechanics involved in all-weather helicopter operation
p0104 A81-17467
Operational responses to aft empty C.G. --- Center of Gravity location in Boeing 727-200 aircraft
[SAWE PAPER 1338] p0352 A81-31378
The 1980 Aircraft Safety and Operating Problems, part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
Studies of some unconventional systems for solving various landing problems --- air cushion landing system
p0268 N81-19067
Uses of AIDS data in airlines engine maintenance
p0328 N81-20016
Operational problems experienced by single pilots in instrument meteorological conditions
[NASA-CR-166236] p0581 N81-30106
Operational experience with adhesive bonded structures --- aircraft structures
[FOK-BO-1235] p0582 N81-30120
OPERATIONS RESEARCH
NT LINEAR PROGRAMMING
NT MATHEMATICAL PROGRAMMING
NT NONLINEAR PROGRAMMING
Recommended short-term ATC improvements for helicopters. Volume 1: Summary of short term improvements
[AD-A089521] p0025 N81-10041
An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS)
[AD-A089365] p0028 N81-10070
Annual report to the NASA Administrator by the Aerospace Safety Advisory Panel on the space shuttle program. Part 2: Summary of information developed in the panel's fact-finding activities
[NASA-TM-82252] p0198 N81-16114
NASA's aeronautics program: Systems technology and experimental program
[NASA-CR-164642] p0543 N81-29030
OPERATOR PERFORMANCE
Air traffic control using a microwave landing system
p0053 A81-13921
Application of signal detection theory to decision making in supervisory control - The effect of the operator's experience
p0351 A81-31288
New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11025
The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies 7 and 8
[AD-A100551] p0539 N81-28088
OPERATORS (PERSONNEL)
NT AIRCRAFT PILOTS
OPTICAL ABSORPTION
U ELECTROMAGNETIC ABSORPTION
U LIGHT TRANSMISSION
OPTICAL COMMUNICATION
An airborne integrated communications network utilizing fiber optics
p0173 A81-21880
LPI, short-range communications between aircraft in rendezvous --- Low Probability of Intercept
p0177 A81-22493
Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112
OPTICAL CORRECTION PROCEDURE
Tri-bar reading correction for oblique imagery
p0178 A81-22495
OPTICAL COUPLING
Evolution of an optical control system for aircraft hydraulics
[SAE PAPER 801195] p0402 A81-34205
OPTICAL DATA PROCESSING
NT SCENE ANALYSIS
OPTICAL EQUIPMENT
NT CAMERAS
NT IMAGE CONVERTERS
NT IMAGE TUBES
NT INFRARED SPECTROMETERS
NT LASER DOPPLER VELOCIMETERS
NT MULTISPECTRAL BAND SCANNERS
NT OPTICAL GYROSCOPES
NT OPTICAL MEASURING INSTRUMENTS
NT OPTICAL RADAR
NT OPTICAL SCANNERS
NT TELEVISION CAMERAS
Optics in metrology and quality assurance; Proceedings of the Seminar, Los Angeles, Calif., February 6, 7, 1980
p0350 A81-32504
Development of an aviator's night vision imaging system /ANVIS/
p0443 A81-39573
The Passive Optical Sample Assembly (POSA) on STS-[illegible]
[NASA-TM-82407] p0337 N81-20868
OPTICAL GYROSCOPES
The optical-fiber interferometer gyroscope for aviation navigation
p0451 A81-37650
OPTICAL IMAGES
U IMAGES
OPTICAL MASERS
U LASERS
OPTICAL MEASUREMENT
Light transmission measurements in solid fuel ramjet combustors

p0284 A81-27910
Techniques for evaluation of aircraft windscreen optical distortion
p0358 A81-32507
OPTICAL MEASURING INSTRUMENTS
NT INFRARED SPECTROMETERS
NT MULTISPECTRAL BAND SCANNERS
NT OPTICAL SCANNERS
Laser measurement of angle of attack on wind-tunnel models
p0154 A81-20419
An opto-electronic method for wind tunnel model alignment
p0361 A81-32849
High frequency angular vibration measurements in vehicles
[AAS PAPER 81-024] p0361 A81-32886
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187
Aircraft penetration under cloud cover
p0463 A81-39640
Probe protection in camera/model visual systems --- for helicopter flight simulators
p0615 A81-48359
Application of optical methods to the study of jet noise and turbulence
[ISL-CO-201/80] p0147 N81-15819
Fiber optics for aircraft engine/inlet control
[NASA-TM-82654] p0597 N81-31190
OPTICAL PROPERTIES
NT BRIGHTNESS
NT OPTICAL REFLECTION
NT REFLECTANCE
NT TRANSPARENCE
Techniques for evaluation of aircraft windscreen optical distortion
p0358 A81-32507
Potential of optical Fourier analysis for measuring windscreen distortion
[AD-A094127] p0259 N81-18853
OPTICAL RADAR
Pulsed laser mapping system for light aircraft
p0223 A81-23671
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49378
Remote sensing methods for the determination of slant range visibility
[ESA-TT-627] p0086 N81-12536
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051
OPTICAL RANGE FINDERS
NT LASER RANGE FINDERS
OPTICAL REFLECTION
Apparatus for and method of compensating dynamic unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
OPTICAL SCANNERS
NT MULTISPECTRAL BAND SCANNERS
Analysis, design and simulation of line scan aerial surveillance systems
p0357 A81-32492
OPTICAL SENSORS
U OPTICAL MEASURING INSTRUMENTS
OPTICAL SIGNALS
U OPTICAL COMMUNICATION
OPTICAL SLANT RANGE
Remote sensing methods for the determination of slant range visibility
[ESA-TT-627] p0086 N81-12536
OPTICAL TRACKING
Precision correlation tracking via optimal weighting functions
p0154 A81-20450
OPTIMAL CONTROL
NT TIME OPTIMAL CONTROL
Improved flight control performance and failure tolerance using modern control techniques
p0008 A81-11619
Aircraft performance optimization by forced singular perturbation
p0014 A81-11667
Model-following system with assignable error dynamics and its application to aircraft
p0116 A81-18577
Frequency-shaped cost functionals - Extension of linear-quadratic-Gaussian design methods
p0116 A81-18578
Precision correlation tracking via optimal weighting functions
p0154 A81-20450
Classical and modern control design of a speed-hold system for a STOL airplane
[AIAA PAPER 81-0017] p0157 A81-20541
Application of singular perturbation theory to onboard aircraft trajectory optimization --- for commercial jet transport aircraft
[AIAA PAPER 81-0019] p0158 A81-20543
Robustness properties of a new multirate digital control system
[AIAA PAPER 81-0022] p0158 A81-20545
Bounds for the additional cost of near-optimal controls
p0170 A81-21075
Piloting techniques on the backside - Flight path angle control
p0171 A81-21673
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732
Analytic design of regulators with limitations
p0235 A81-25688
Trajectory generation techniques for multivariable control of aircraft turbine engines
p0240 A81-26609
Control design for reduction of aerodynamic tail forces using quadratic synthesis
p0240 A81-26610
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0299 A81-29205
Control settings for a trimmed, stalled rotor by an automatic feedback system
[AIAA 81-0617] p0305 A81-29478
Evaluation of the effect of actuator time lag on the minimum control power of a VTOL aircraft
p0319 A81-30160
Cybernetic airborne fire control - Issues and potential
p0326 A81-30347
Energy modeling for aviation fuel efficiency
[AIAA PAPER 81-0789] p0368 A81-33883
The problem of the minimum-time turn of a maneuverable aircraft velocity vector to a specified course angle
p0413 A81-36472
Finite-difference gradients versus error-quadrature gradients in the solution of parameterized optimal control problems
p0421 A81-37568
Pole placement with output feedback
p0458 A81-38899
Helicopter gust alleviation - An optimal sampled-data approach
[AHS 80-31] p0476 A81-40161
Flight control strategies for performance computers
p0512 A81-41759
LQG controls for highly maneuverable aircraft --- Linear quadratic Gaussian
[AIAA PAPER 81-1709] p0527 A81-43163
Effects of displacement and rate saturation on the control of statically unstable aircraft
[AIAA 81-1752] p0554 A81-44082
A mode decomposition control logic for system performance enhancement
[AIAA 81-1753] p0554 A81-44083
Analysis of aircraft longitudinal handling qualities
[AIAA 81-1771] p0554 A81-44092
An analytical pilot rating method for highly elastic aircraft
[AIAA 81-1772] p0554 A81-44093
Boost-glide range-optimal guidance
[AIAA 81-1781] p0554 A81-44096
Multiobjective insensitive design of airplane control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Optimal multirate flight control design
p0563 A81-45522
Optimization theory applied to higher harmonic control of circulation controlled rotors
p0571 A81-46606
A piloted simulation of the backup control system engagement for the YAH-64

p0576 A81-46646
Application of optimal control and estimation to autopilot and autothrottle systems
p0615 A81-48371
Model following control of gas turbine engines
p0624 A81-49900
Realization of a method of extremal targeting in a problem of aircraft landing control
p0625 A81-49943
Multivariable closed-loop analysis and flight control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11046
Performance seeking controls
p0079 N81-12092
Road map to adaptive optimal control --- jet engine control
p0079 N81-12098
Practical optimal flight control system design for helicopter aircraft. Volume 2: Software user's guide
[NASA-CR-152306] p0081 N81-12110
Research in multirate estimation and control
[AD-A094070] p0253 N81-18062
Pilot-optimal multivariable control synthesis by output feedback
[NASA-CR-163112] p0540 N81-28102
A structural load alleviation control system for a large transport aircraft
[TT-8002] p0541 N81-28106
OPTIMIZATION
NT FLIGHT OPTIMIZATION
NT OPTIMAL CONTROL
NT TIME OPTIMAL CONTROL
NT TRAJECTORY OPTIMIZATION
Design of airfoils in incompressible viscous flows by numerical optimization
p0001 A81-10096
Some experiences with numerical optimisation in aircraft specification and preliminary design studies
p0007 A81-11609
Structural optimization of advanced aircraft structures
p0013 A81-11651
Optimal flight vehicle design and linear vector spaces
p0014 A81-11668
Optimum design of axial flow gas turbine stage. I - Formulation and analysis of optimization problem. II - Solution of the optimization problem and numerical results
p0019 A81-12608
Discrete-continuous variable structural synthesis using dual methods
p0066 A81-15894
Optimal design of frames with substructuring
p0068 A81-16276
Some aspects of optimizing the aerodynamics of turbine stages
p0119 A81-19325
New ways in antenna technology for optimal adjustment of the background clutter
p0151 A81-20084
Conforming element with out-element nodes
p0225 A81-23855
Modification of wing sections to optimize transonic performance
p0226 A81-24011
Some optimization problems of internal aerodynamics
p0237 A81-26120
Use of optimization in helicopter vibration control by structural modification
p0241 A81-26945
Sensitivity of optimum solutions to problem parameters --- in aircraft design
[AIAA 81-0548] p0301 A81-29399
The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400
Optimality criterion techniques applied to frames having nonlinear cross-sectional properties
[AIAA 81-0552] p0301 A81-29402
Shape optimization of plate and shell structures
[AIAA 81-0553] p0302 A81-29403
The stretched C-14 - Cost effective application of structural technology
[AIAA 81-0514] p0302 A81-29427
Optimization of finishing conditions --- metal cutting
p0319 A81-30163
Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31297
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174
Global optimization of a glider
[AAAF PAPER NT 80-36] p0369 A81-33937
Spanwise lift distribution of forward-and aft-swept wings in comparison to the optimum distribution form
p0453 A81-38017
On making things the best - Aeronautical uses of optimization /Wright Bros. lecture/
[AIAA PAPER 81-1738] p0528 A81-43175
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518
Choice of optimal parameters of a gyrovertical on the basis of a standard program
p0622 A81-48744
Aeroelastic optimization with multiple constraints
[AD-A090775] p0085 N81-12451
Optimized pitch controller for load alleviation on wind turbines
[FFA-TN-HU-2189-PT-1] p0087 N81-12634
Computational aerodynamic design tools and techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0128 N81-13950
Fundamentals of conceptual design optimization of subsonic transport aircraft
[VTH-LR-292] p0128 N81-13951
Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968
Application of vector performance optimization to a robust control loop design for a fighter aircraft
[DFVLR-FB-80-14] p0130 N81-13970
Dual methods and approximation concepts in structural synthesis
[NASA-CR-3226] p0134 N81-14347
Use of constrained optimization in the conceptual design of a medium-range subsonic transport
[NASA-TP-1762] p0193 N81-16039
Multicyclic controllable twist rotor data analysis
[NASA-CR-152251] p0249 N81-18028
The optimum design of by-pass engines with jet mixing
[FNR-90017] p0335 N81-20081
An analysis of opportunistic maintenance policy for the F100PW100 aircraft engine
[AD-A097548] p0384 N81-23025
A cost function for an airframe production program
[AD-A097540] p0394 N81-23967
A slot allocation model for high-density airports
[AD-A098097] p0438 N81-24846
Optimization of strategic airlift in flight refueling
[AD-A101137] p0539 N81-28090
ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783
Conceptual/preliminary design study of subsonic v/stol and stovl aircraft derivatives of the S-3A
[NASA-TM-81310] p0547 N81-29118
Structural optimization of advanced aircraft structures --- computerized design
[MBB-S/PUB/32] p0582 N81-30122
A method for obtaining reduced-order control laws for high-order systems using optimization techniques
[NASA-TP-1876] p0589 N81-30851
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] p0639 N81-33205
OPTIMUM CONTROL
U OPTIMAL CONTROL
ORBIT TRANSFER VEHICLES
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882
ORBITAL FLIGHT TEST 1 (SHUTTLE)
U SPACE TRANSPORTATION SYSTEM 1 FLIGHT
ORBITS
NT EQUATORIAL ORBITS

NT SATELLITE ORBITS
ORGANIC COMPOUNDS
NT FLUOROCARBONS
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936
ORGANIC MATERIALS
The quality of nonmetallic materials
p0238 A81-26244
ORIFICE FLOW
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40887
ORIFICES
Subsonic tests of an all-flush-pressure-orifice air data system
[NASA-TP-1871] p0489 N81-26144
ORION AIRCRAFT
U P-3 AIRCRAFT
ORNITHOPTER AIRCRAFT
U RESEARCH AIRCRAFT
OROGRAPHY
Experimental investigation of orographic waves and vertical motions in the Krasnovodsk airport area
p0121 A81-19441
ORTHOGONALITY
Orthogonal multiblade coordinates
p0453 A81-38021
OSCILLATING FLOW
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AIAA PAPER 81-0051] p0159 A81-20567
A computerized study of wave characteristics in a time dependent compressible flow
[AIAA PAPER 81-0410] p0169 A81-20838
Self-excited oscillations of supersonic flow in a sudden enlargement of a duct
p0228 A81-24081
Drag reduction of an oscillating flat plate with an interface film
p0239 A81-26504
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0241 A81-26933
Laminar boundary layer on an oscillating wedge
p0309 A81-29864
Non-linear oscillator models in bluff body aeroelasticity
p0348 A81-30786
Unsteady aerodynamics of an aerofoil at high angle of incidence performing various linear oscillations in a uniform stream
p0357 A81-32017
Experimental investigation of oscillating subsonic jets
p0360 A81-32777
Three-dimensional oscillatory piecewise continuous-kernel function method. I - Basic problems. II - Geometrically continuous wings. III - Wings with geometrical discontinuities
p0411 A81-35631
Measurement of derivatives for an oscillating airfoil with flap
p0411 A81-35635
Wind tunnel determination of dynamic cross-coupling derivatives - A new approach
p0413 A81-35927
Numerical experiments on unsteady flows through vibrating cascades
p0613 A81-47961
A panel method to determine loads on oscillating airfoils in transonic flow with embedded shock waves
[NLR-MP-80005-U] p0330 N81-20039
Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels
p0386 N81-23056
OSCILLATIONS
NT HARMONIC OSCILLATION
NT NONSTABILIZED OSCILLATION
NT PRESSURE OSCILLATIONS
NT SELF OSCILLATION
NT TRANSIENT OSCILLATIONS
NT WING OSCILLATIONS
An introduction to dynamic derivatives (3) methods of oscillating models in pitch and yaw in a 530 by 810 millimetre transonic wind tunnel
[ARL/AERO-NOTE-390] p0021 N81-10007
On the use of active higher harmonic blade pitch control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074
Dynamics of a helicopter-slung load system
p0092 N81-13051
Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations
[NASA-TP-1776] p0142 N81-14997
OSCILLATORS
NT CATHODE RAY TUBES
NT CRYSTAL OSCILLATORS
NT GYROSCOPIC PENDULUMS
NT MECHANICAL OSCILLATORS
NT PENDULUMS
OTV
U ORBIT TRANSFER VEHICLES
OUTLET FLOW
Investigation and improvement of an elbow-type gas outlet of a turboprop engine
p0509 A81-41048
OVERCAST
U CLOUD COVER
OVERPRESSURE
Charts for determining potential minimum sonic-boom overpressures for supersonic cruise aircraft
[NASA-TP-1820] p0337 N81-21016
OVERTONES
U HARMONICS
OXIDATION
Formation of solid phase during the heating of jet fuels
p0103 A81-17372
OXIDATION RESISTANCE
Joint-laboratory qualification testing of oils for gas turbine engines
p0103 A81-17375
Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24068
OXIDES
NT CARBON DIOXIDE
NT CARBON MONOXIDE
NT NITROGEN OXIDES
OXIDIZERS
NT LIQUID OXYGEN
OXYGEN
NT LIQUID OXYGEN
NT OZONE
The effect of oxygen concentration distribution on altitude relighting performance of a turbo-jet engine combustor
p0295 A81-29089
OXYGEN COMPOUNDS
Effect of oxygen-containing additives on the antiwear properties of fuels for gas-turbine aircraft engines
p0517 A81-42558
OXYGEN MASKS
The influence of beards on the efficiency of aviators' oxygen masks
p0176 A81-22100
OXYGEN SUPPLY EQUIPMENT
NT OXYGEN MASKS
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891
OXYGEN SYSTEMS
U OXYGEN SUPPLY EQUIPMENT
OZONE
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20781
Ozone contamination in aircraft cabins: Results from GASP data and analyses
[NASA-TM-81671] p0191 N81-16021
OZONOMETRY
Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20780
Tabulations of ambient ozone data obtained by GASP airliners, March 1975 to December 1977
[NASA-TM-81528] p0096 N81-13568

Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977 --- Global Atmospheric Sampling Program
[NASA-TP-1607] p0345 N81-21685

OZONOSPHERE
The aircraft in the stratosphere --- effects on ozone layer equilibrium
p0002 A81-10499

P

P-3 AIRCRAFT
P-3 Orion fuel-saving modification wind tunnel study
[AD-A091906] p0194 N81-16044

P-531 HELICOPTER
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041

PACIFIC ISLANDS
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980
[NASA-CR-152357-VOL-2] p0220 N81-17624

PACKAGING
NT ELECTRONIC PACKAGING
Evaluation/redesign of the P-105 pitch rate gyro pack
[AD-A092109] p0194 N81-16048

PACKING DENSITY
High-density avionic power supply
p0005 A81-11157

PADE APPROXIMATION
An analytical technique for approximating unsteady aerodynamics in the time domain
[NASA-TP-1738] p0043 N81-11422

PAINTS
Technology for rustproofing aircraft and helicopters --- Russian book
p0529 A81-43520
Development of a water displacing, touch-up paint
[AD-A097125] p0392 N81-23288
PACER LIME: An environmental corrosion severity classification system, part 1
[AD-A100496] p0539 N81-28089

PANEL FLUTTER
Response of stiffened sandwich panels
[AIAA 81-0557] p0303 A81-29455
Effect of post buckling on the fatigue of composite structures
p0418 A81-37127

PANEL METHOD (FLUID DYNAMICS)
Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20540
An optimal-surface-transpiration subsonic panel-method for iterative design of complex aircraft configurations
[AIAA PAPER 81-1254] p0458 A81-39012
Solution of plane cascade flow using improved surface singularity methods --- application of panel method to internal aerodynamics
[NASA-TM-81589] p0140 N81-14979
The influence of the compressibility in simulating the conduct of exterior loads of a carrier
[MBB-FE-122/S/PUB/17] p0220 N81-17483
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022
A panel method to determine loads on oscillating airfoils in transonic flow with embedded shock waves
[NLR-MP-80005-U] p0330 N81-20039
Computation of pressure distribution on the DFVLR wing-body model by the panel method
[DFVLR-FB-80-02] p0372 N81-22029

PANELS
NT WING PANELS
Design and fabrication of stabilized organic matrix composites
p0005 A81-11338
Crack propagation in panels of pressurized fuselages upon simultaneous action of cyclic loading by pressurization and high-frequency vibrations
p0054 A81-13612
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
Sonic fatigue design techniques for graphite-epoxy stiffened-skin panels
[AIAA 81-0633] p0305 A81-29488
Transient vibrations of elastic panels due to the impact of shock waves
p0616 A81-48385
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin systems
[NASA-CR-152292] p0218 N81-17175
Development of assembly techniques for fire resistant aircraft interior panels
[NASA-CR-152119] p0254 N81-18097
Design and fabrication of a stringer stiffened discrete-tube actively cooled panel for a hypersonic aircraft
[NASA-CR-3403] p0279 N81-19484
Behavior of continuous filament advanced composite isogrid structure
p0377 N81-22095

PANT PROGRAM
Correlation of artificially induced boundary-layer transition data at hypersonic speeds
p0285 A81-27911

PARABOLIC BODIES
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017

PARABOLIC DIFFERENTIAL EQUATIONS
Hyperbolic/parabolic development for the GIM-STAR code --- flow fields in supersonic inlets
[NASA-CR-3369] p0201 N81-16416

PARABOLIC REFLECTORS
Apparatus for and method of compensating dynamic unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
Parabolic Dish Solar Thermal Power Annual Progress Review Proceedings
[NASA-CR-164696] p0587 N81-30525
First phase testing of solar thermal engine at United Stirling
p0588 N81-30530
Non-heat pipe receiver/p-40 Stirling engine
p0588 N81-30531

PARABOLOIDS
U PARABOLIC BODIES

PARACHUTE DESCENT
Subsonic parachute design, performance, and similarity laws /scale effects/ - A review of the Institute's activities during the last years
p0060 A81-14799
Preliminary consideration of parameter identification analysis from parachute aerodynamic flight test data
p0067 A81-16020
Effects of drive slots on parachute performance
p0453 A81-38020

PARACHUTE FABRICS
System for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] p0138 N81-14967

PARACHUTES
NT DRAG CHUTES
NT RECOVERY PARACHUTES
The measurement of pressure distribution around a parachute canopy
p0067 A81-16019
The design, testing, certification and production of an emergency parachute for use in light aircraft
[AIAA PAPER 81-0413] p0168 A81-20817
Development of the first ram air emergency parachute for personnel applications
p0174 A81-22078
Some experimental study on parachute dynamics by utilizing a deceleration system simulator
p0481 A81-40871
System for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] p0138 N81-14967

PARACHUTING
U PARACHUTE DESCENT

PARAGLIDERS
NT FLEXIBLE WINGS

PARALLEL FLOW
NT PIPE FLOW

NT THREE DIMENSIONAL FLOW
Noise characteristics of two parallel jets with unequal flow [AIAA PAPER 80-0168] p0354 A81-31601

PARALLEL PLATES
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures [NASA-CR-3444] p0507 N81-30392

PARALLEL PROCESSING (COMPUTERS)
Dispersed flight control computer systems p0321 A81-30250
The array processor - A real-time simulator p0614 A81-48328
An approach to real-time simulation using parallel processing [NASA-TM-81731] p0345 N81-21803

PARALLEL STRIP LINES
U MICROSTRIP TRANSMISSION LINES

PARAMETER IDENTIFICATION
Preliminary consideration of parameter identification analysis from parachute aerodynamic flight test data p0067 A81-16020
Parameter identification and discriminant analysis for jet engine mechanical state diagnosis p0156 A81-20474
Aircraft lateral parameter estimation from flight data with unsteady aerodynamic modelling [AIAA PAPER 81-0221] p0162 A81-20684
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters p0470 A81-40111
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability p0471 A81-40123
Data analysis for aircraft parameter estimates [AIAA PAPER 81-1664] p0560 A81-44561
An aircraft landing system employing observers p0562 A81-44699
Real-time estimation in advanced turbofan engines p0564 A81-45553
Simulating study of the interaction between the propulsion and flight control systems of a subsonic lift fan VTOL [NASA-TM-81239] p0036 N81-11043
Multivariable identification using centralized fixed modes p0079 N81-12091
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control [DFVLR-FB-80-07] p0131 N81-13975
Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics [AD-A093776] p0207 N81-17032
Modeling, acquisition and processing during large displacements --- associated with experiments in flight mechanics [AAAF-NT-80-16] p0210 N81-17056
Development of advanced techniques for rotorcraft state estimation and parameter identification [NASA-CR-159297] p0271 N81-19098
Flight test evaluation of predicted light aircraft drag, performance, and stability [NASA-CR-159062] p0494 N81-27078
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability [MBB-UD-307/80-OE] p0584 N81-30140
Determination of aircraft dynamic stability and control parameters from flight testing p0591 N81-31115
Estimation of dynamic stability parameters from drop model flight tests p0591 N81-31116
Analytical determination of dynamic stability parameters p0592 N81-31117
Aeroelasticity, including dynamic effects of separated flow --- launch vehicle response p0592 N81-31118
Control derivatives p0592 N81-31119
Sensitivity of aircraft motion to cross coupling and acceleration derivatives p0592 N81-31120
Some applications of aerodynamic formulations to problems in aircraft dynamics p0592 N81-31121
Applications of dynamic stability parameters to problems in aircraft dynamics p0592 N81-31122
Design of optimal inputs for the identification of characteristics of aircraft flights --- parameter identification control theory p0631 N81-33131
System identification for controlled aircraft --- maximum likelihood estimates, parameter identification p0631 N81-33132

PARAMETERIZATION
NT PARAMETER IDENTIFICATION
Application of the parameter space method to aerospace vehicle digital control system design p0359 A81-32647
A nonlinear propulsion system simulation technique for piloted simulators p0454 A81-38064
Parametric synthesis of an automatic system for flight-vehicle stabilization p0625 A81-49940
Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability [NASA-TP-1760] p0130 N81-13968

PARTIAL DIFFERENTIAL EQUATIONS
NT PARABOLIC DIFFERENTIAL EQUATIONS
The calculation of quasi-three-dimensional frictionless compressible flow in axial turbomachines --- partial differential equations [PNR-90047] p0275 N81-19127

PARTIAL PRESSURE
Conditioned pressure spectra and coherence measurements in the core of a turbofan engine [NASA-TM-82688] p0589 N81-30907

PARTICLE DENSITY (CONCENTRATION)
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements [ESA-TT-625] p0197 N81-16069

PARTICLE EMISSION
NT ELECTRON EMISSION

PARTICLE INTERACTIONS
NT NUCLEAR INTERACTIONS

PARTICLE MOTION
Particulate flow in centrifugal compressors used in helicopters p0297 A81-29109

PARTICLE PRECIPITATION
Electromagnetic precipitation and ducting of particles in turbulent boundary layers p0239 A81-26506
The analytical ferrograph - Some factors affecting deposit formation p0293 A81-29077

PARTICLE SIZE DISTRIBUTION
An automatic isokinetic sampler for particulate emissions from aircraft gas turbine engines [AD-A090280] p0088 N81-12653
Laser scattering applications development test in AEDC tunnel B at Mach number 8 [AD-A093929] p0217 N81-17105
Ultrasonic dispersion of particulate high density fuels [AD-A102771] p0630 N81-32290

PARTICLE TRAJECTORIES
Particle dynamics of inlet flow fields with swirling vanes [AIAA PAPER 81-0001] p0156 A81-20523
Improved particle trajectory calculations through turbomachinery affected by coal ash particles [ASME PAPER 81-GT-53] p0312 A81-29965

PARTICLES
NT ANIONS
NT CHARGED PARTICLES
NT DROPS (LIQUIDS)
NT FOG
NT MICROPARTICLES
NT MIST
NT PLASMA JETS
NT PLASMAS (PHYSICS)
NT POWDER (PARTICLES)
NT RAREFIED PLASMAS
NT SOOT

PARTICULATE SAMPLING
An exploratory study of soot sample integrity and probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
An automatic isokinetic sampler for particulate emissions from aircraft gas turbine engines
[AD-A090280] p0088 N81-12653

PASSENGER AIRCRAFT
NT A-300 AIRCRAFT
NT BO-105 HELICOPTER
NT BOEING 727 AIRCRAFT
NT BOEING 737 AIRCRAFT
NT BOEING 747 AIRCRAFT
NT BOEING 757 AIRCRAFT
NT BOEING 767 AIRCRAFT
NT CESSNA 402B AIRCRAFT
NT CH-47 HELICOPTER
NT DC 8 AIRCRAFT
NT DC 10 AIRCRAFT
NT DH 121 AIRCRAFT
NT DH 125 AIRCRAFT
NT EUROPEAN AIRBUS
NT F-27 AIRCRAFT
NT H-53 HELICOPTER
NT HFB-320 AIRCRAFT
NT L-1011 AIRCRAFT
NT MYSTERE 20 AIRCRAFT
NT SN-210 AIRCRAFT
The relevance of the Flex-Hub Prop-Fan for fuel-efficient airliners
p0006 A81-11605
OLGA, a qust alleviation system for improvement of passenger comfort of general aviation aircraft
p0008 A81-11620
Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison
p0054 A81-13515
A case study in aircraft design: The de Havilland family of STOL commuter aircraft --- Book
p0101 A81-16717
Principle for the design of hybrid control systems for passenger transport systems
p0107 A81-17577
The introduction of STOL and RNAV to large commercial operations
p0111 A81-18057
Canada's national aviation forecasting models
p0112 A81-18072
The role of aircraft separation assurance in the cockpit
p0115 A81-18092
An overview of the research conducted in Aerospatiale on internal noise
p0150 A81-20054
New NDT techniques used for aircraft maintenance
p0153 A81-20168
An inflatable seat for aircraft passengers
p0175 A81-22091
Design for supercommuters
p0227 A81-24048
Design considerations for future turboprop transports
[SAWE PAPER 1340] p0352 A81-31380
Flatbed - The universal transport airplane
[SAWE PAPER 1343] p0353 A81-31382
Commuter aircraft design
[AIAA PAPER 81-0513] p0363 A81-32931
The optimal lift-drag ratio of a civil aircraft
[AAAF PAPER NT 80-35] p0369 A81-33923
Application of CRT displays to the cockpit of tomorrow
[SAE PAPER 801168] p0399 A81-34183
Small Transport Aircraft Technology /STAT/ Propulsion Study
[SAE PAPER 801198] p040[illegible] A81-34208
Commuter turboprop propulsion technology
[SAE PAPER 801243] p0406 A81-34239
Feederjet for the 'eighties
p0410 A81-35024
Aerodynamic efficiency of the wing of new technology, a comparison of design expectation and flight test result
p0450 A81-37645
The new utility - Commuter-technology in the sky
p0457 A81-38801
ATR 42 - A regional transport aircraft designed to save energy
p0464 A81-39696
The future role of helicopters in public transport
p0466 A81-40078
Reducing the cost impact of helicopter internal noise control
[AHS 80-59] p0470 A81-40183
The ATR 42 - Progress report on a new aircraft
p0480 A81-40456
Aerodynamic characteristics of an advanced technology propeller for commuter aircraft
[AIAA PAPER 81-1565] p0507 A81-40948
Some propeller developments in the United Kingdom
[AIAA PAPER 81-1566] p0507 A81-40949
A large executive jet design project
p0513 A81-42051
The turboprop aircraft role in the 1980s
[AIAA PAPER 81-1730] p0528 A81-43169
The PW100 commuter powerplant
[AIAA PAPER 81-1731] p0528 A81-43170
Articulating user requirements for the commuter aircraft industry
[AIAA PAPER 81-1733] p0528 A81-43171
Textile materials for commercial transportation vehicles --- passenger aircraft
p0532 A81-43653
Can advanced technology improve future commuter aircraft
[AIAA PAPER 81-1729] p0536 A81-43959
Boeing 767 - The new fuel saver
p0553 A81-44042
New visual displays for the next generation of civil aircraft
p0556 A81-44299
The 146 emerges from the shadows
p0560 A81-44474
Pressure fluctuations on the surface of a small passenger aircraft. I - Periodic disturbances caused by the rotation of the propeller
p0561 A81-44615
Pressure fluctuations on the surface of a small passenger aircraft. II - The effect of the turbulent boundary layer
p0562 A81-44618
A new aircraft is born - The CN-235
p0565 A81-45756
Model for airport noise exposure on a national basis - 1960 to 2000
p0568 A81-46363
Commercial airliners - Design and flight operation
p0623 A81-49575
Long-range airplane study: The consumer looks at SST travel
p0247 N81-18014
A family of supersonic airplanes: Technical and economic feasibility
p0248 N81-18017
Small transport aircraft technology --- STAT
p0260 N81-19007
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-31104
Airport activity statistics of certificated route air carriers
[AD-A102355] p0602 N81-31236

PASSENGERS
Aircraft crash dynamics: Some major considerations
p0378 N81-22437
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064

PASSIVE NOSETIP TECHNOLOGY
U PANT PROGRAM

PATHOLOGY
The annoyance caused by noise around airports
[NASA-TM-75784] p0146 N81-15579

PATTERN METHOD (FORECASTING)
Computer graphics applications
[PB81-215246] p0637 N81-33180

PATTERN RECOGNITION
Model-based scene matching
p0461 A81-39349
Image processing design for autonomous acquisition of targets
p0562 A81-44700
Aircraft recognition by means of monostatic radar
p0607 A81-47142

An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
p0607 A81-47143
Airborne antenna pattern calculations
[NASA-CR-164350] p0437 N81-24321
PATTERN REGISTRATION
Automatic handoff of multiple targets
[AD-A093483] p0217 N81-17101
PAVEMENTS
Airfield pavement demonstration-validation study
p0003 A81-10716
Introduction to a rigid pavement design procedure
p0111 A81-18054
Non-destructive pavement evaluation
p0111 A81-18062
Prestressed concrete airfield pavements
p0112 A81-18063
Runway rehabilitation, Washington National Airport
p0112 A81-18066
Fully bonded concrete overlay for an airport runway
p0113 A81-18075
UK pavement design and evaluation - A new approach
p0113 A81-18076
Recent developments in NDT techniques --- for airport pavement testing
p0113 A81-18078
Fiberglass-reinforced rigid polyurethane expedient pavement subject to simulated F-4 aircraft traffic
[AD-A089266] p0030 N81-10079
Airfield pavement evaluation. Citations from the NTIS data base
[PB80-812860] p0030 N81-10083
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182
Shrinkage-compensating cement for airport pavement. Phase 3: Fibrous concretes. Addendum
[AD-A092945] p0219 N81-17299
Recent progress towards predicting aircraft ground handling performance
[NASA-TM-81952] p0339 N81-21044
National runway friction measurement program
[AD-A097334] p0391 N81-23097
Porous portland cement concrete: The state of the art
[AD-A098177] p0436 N81-24187
Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] p0630 N81-32156
PAYLOAD DELIVERY (STS)
NT WEAPONS DELIVERY
PAYLOADS
NT SPACE SHUTTLE PAYLOADS
Structural flight loads simulation capability, volume 1
[AD-A096572] p0374 N81-22044
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22045
PCM (MODULATION)
U PULSE CODE MODULATION
PCM TELEMETRY
Modeling, acquisition and processing during large displacements --- associated with experiments in flight mechanics
[AAAF-NT-80-16] p0210 N81-17056
PEENING
NT SHOT PEENING
PEGASUS ENGINE
U BRISTOL-SIDDELEY BS 53 ENGINE
PENALTY FUNCTION
A penalty function method for structural optimum design with aeroelastic constraints
p0223 A81-23727
PENDULOUS GYROSCOPES
U GYROSCOPIC PENDULUMS
PENDULUMS
NT GYROSCOPIC PENDULUMS
An objective method of assessing the realism of a simulation of a simple control system
p0284 A81-27898
PENETRATION BALLISTICS
U TERMINAL BALLISTICS
PENNSYLVANIA
New tower cab mockup for Philadelphia, Pennsylvania
[AD-A098528] p0440 N81-25060
PERCEPTION
NT AUDITORY PERCEPTION
NT MOTION PERCEPTION
NT SPACE PERCEPTION
NT VISUAL PERCEPTION
PERFECT GAS
U IDEAL GAS
PERFORATED PLATES
Film cooling performance by injection through discrete holes
p0293 A81-29074
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers
p0418 A81-37136
PERFORMANCE
JT8D-15/17 high pressure turbine root discharged blade performance improvement --- engine design
[NASA-CR-165220] p0214 N81-17080
Detection performance evaluation of the ASDE-3 using fixed frequency and frequencyagile operation
[AD-A099513] p0499 N81-27372
PERFORMANCE PREDICTION
NT PREDICTION ANALYSIS TECHNIQUES
A case study in aircraft design: The de Havilland family of STOL commuter aircraft --- Book
p0101 A81-16717
Non-destructive pavement evaluation
p0111 A81-18062
The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-18654
Prediction methods for fatigue crack growth in aircraft material
p0118 A81-18777
Application of aerodynamic jump prediction theory to supersonic, high fineness ratio, cruciform finned bodies
[AIAA PAPER 81-0222] p0162 A81-20685
An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810
Semi-empirical correlations for gas turbine emissions, ignition, and flame stabilization
p0171 A81-21505
Escape systems testing on the Holloman high speed test track
p0175 A81-22088
SAFEST computer simulation of ejection seat performance
p0175 A81-22089
An approximate analytical method for vortex-lift and centre of pressure on the slender wing
p0223 A81-23726
A one-dimensional analysis and performance prediction of subsonic radial turbines
p0228 A81-24086
Current and future concepts in FMEA --- Failure Modes and Effects Analysis
p0229 A81-24283
Design requirements of agricultural aircraft
p0282 A81-27880
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066
Discrete hole film cooling of turbine blades
p0293 A81-29073
Model for axial compressors operating with water ingestion
p0297 A81-29111
Evaluation of methods for prediction and prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Efficiency prediction for axial-flow turbines operating with nonconventional fluids
[ASME PAPER 81-GT-15] p0310 A81-29937
Further studies of the influence of thermal effects on the predicted acceleration of gas turbines
[ASME PAPER 81-GT-21] p0311 A81-29938
Cooling air flow characteristics in gas turbine components

[ASME PAPER 81-GT-76] p0313 A81-29984
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078
A generalized mathematical model to estimate gas turbine starting characteristics
[ASME PAPER 81-GT-202] p0318 A81-30092
Program Navigate - A simulation computer program to verify CAS navigation capability --- Offensive Avionics System
p0322 A81-30289
Integrated displays and controls design factors for the 1990's transport aircraft
p0325 A81-30338
Acoustic performance evaluation of an advanced UH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33952
Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-34166
SINTAC and its position-finding performance
p0409 A81-35021
Numerical solution of a supersonic ejector pump
p0413 A81-35939
Predictive steering control of dirigibles using the switching curve approach
[AIAA 81-1327] p0456 A81-38535
A survey of heating and turbulent boundary layer characteristics of several hypersonic research aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39134
A theoretical and experimental study of combustion chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242
Aircraft penetration under cloud cover
p0463 A81-39640
Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39898
Recent progress in performance prediction of high advance ratio circulation controlled rotors
p0468 A81-40100
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115
Aerodynamic design of engine air intakes for improved performance
p0470 A81-40117
An empirical prediction method for helicopter performance in low speed level flight and in vertical and forward flight climbs
p0471 A81-40118
On the use of approximate models in helicopter flight mechanics
p0471 A81-40122
Interpretation of ramjet combustor test data
[AIAA PAPER 81-1433] p0504 A81-40870
Firebrand ramjet propulsion system development
[AIAA PAPER 81-1486] p0506 A81-40904
Development of exhaust nozzle internal performance prediction techniques for advanced aircraft applications
[AIAA PAPER 81-1490] p0506 A81-40908
Critical considerations in the design of supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1284] p0511 A81-41740
Engine life methodologies for conceptual design
[AIAA PAPER 81-1398] p0515 A81-42188
Factors influencing the predicted performance of advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Comparison of model testing with computer simulations of an air landing system
[AIAA PAPER 81-1663] p0534 A81-43942
A model-following technique for insensitive aircraft control systems
[AIAA PAPER 81-1867] p0560 A81-44563
A vortex-lattice method for calculating longitudinal dynamic stability derivatives of oscillating delta wings
[AIAA PAPER 81-1876] p0561 A81-44570
General describing function method for systems with many nonlinearities, with application to aircraft performance
p0564 A81-45508
The predictability of turbine vane convection heat transfer
[AIAA PAPER 81-1435] p0566 A81-45892
Prediction of range and endurance of jet aircraft at constant altitude
p0611 A81-47725
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401
Performance prediction for light airplanes
p0622 A81-49374
A method of performance prediction for centrifugal compressors. Part 1: Analysis. Part 2: Comparison with experiment
[ARC-R/M-3843] p0031 N81-10436
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492
Engine diagnostics program: CF6-50 engine performance deterioration
[NASA-CR-159867] p0078 N81-12085
Mixing and combustion in high speed air flows
[AD-A090536] p0083 N81-12192
Prediction and evaluation of thrust augmenting ejector performance at the conceptual design stage
[AD-A093953] p0216 N81-17694
Recent progress toward predicting aircraft ground handling performance
p0268 N81-19068
Evaluation of emergency-locator-transmitter performance in real and simulated crash tests
p0268 N81-19070
Method for computation of structural failure probability for an aircraft
[AD-A098294] p0426 N81-24050
JT9D performance deterioration results from a simulated aerodynamic load test
[NASA-TM-82640] p0443 N81-25082
Factors influencing the predicted performance of advanced propeller designs
[NASA-TM-82676] p0492 N81-27082
The supersonic fan engine: An advanced concept in supersonic cruise propulsion
[NASA-TM-82657] p0496 N81-27094
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] p0637 N81-33191

PERFORMANCE TESTS
Comparative performance of two centrifugal fan impellers differing in blade section
p0001 A81-10162
Airfield pavement demonstration-validation study
p0003 A81-10718
Model tests for an active rotor isolation system
[MBB-276-79-0] p0018 A81-12095
United States Army helicopter icing qualification 1980
[AIAA PAPER 81-0406] p0167 A81-20812
The design, testing, certification and production of an emergency parachute for use in light aircraft
[AIAA PAPER 81-0413] p0168 A81-20817
The necessity of 'testing-in' hardware reliability
p0229 A81-24277
Helicopter-ship qualification testing
p0232 A81-24981
Film cooling performance of liner cooling devices
p0293 A81-29075
Application of scaling in afterburner test and development
[ASME PAPER 81-GT-194] p0317 A81-30086
Helicopter rotor blade effects on mast-mounted sensor images
p0350 A81-31114
Design, fabrication, calibration, application, and testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
Quarter-scale testing of an advanced rotor system for the UH-1 helicopter
p0395 A81-34121
Supersonic aircraft test experience - Test techniques and data analysis methods
p0419 A81-37299
Fundamental investigation on jet engine ignition of fuel sprays and its application
p0420 A81-37381
KS-127A long range oblique reconnaissance camera for RF-4 aircraft
p0462 A81-39419
The requirements for and evolution of a test rig for exhaust gas recirculation studies of V/STOL aircraft
p0469 A81-40106

Summary of interface testing of the digital AN/ASN-123 tactical navigation avionic system in the SH-3H helicopter
[AHS 80-18] p0474 A81-40149
Results of a simulator investigation of control system and display variations for an attack helicopter mission
[AHS 80-28] p0475 A81-40158
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906
Evolution of transport wings - From C-130, C-141, and C-5 to C-XX
p0510 A81-41333
F-16 variable-geometry inlet design and performance
[AIAA PAPER 81-1394] p0514 A81-42184
F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
NASA service experience with composite components --- for aircraft structures
p0529 A81-43607
S-3A composite spoilers service experience
p0529 A81-43615
Aircraft ground mobility system for the F-16 aircraft
[AIAA PAPER 81-1735] p0536 A81-43960
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] p0624 A81-49732
Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448
Pilatus porter: Provision of revised take-off and landing performance data
[AD-A089964] p0076 N81-12068
An automatic isokinetic sampler for particulate emissions from aircraft gas turbine engines
[AD-A090280] p0088 N81-12653
Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility
[LA-UR-80-2485] p0135 N81-14550
Investigation of convergent-divergent nozzles applicable to reduced-power supersonic cruise aircraft
[NASA-TP-1766] p0139 N81-14972
Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests
[AD-A094124] p0250 N81-18037
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] p0277 N81-19316
Investigation of Flight Test Methods for measuring the performance of general aviation aircraft
[NASA-CR-164057] p0333 N81-20065
Minimum operational performance standards for airborne radar approach and beacon systems for helicopters
[RTCA/DO-172] p0336 N81-20322
Minimum operational performance standards for airborne weather and ground mapping pulsed radars
[RTCA/DO-173] p0336 N81-20323
Functional analysis and operational assessment of an onboard glide path guidance system for visual approaches (visual approach monitor VAM)
[ESA-TT-655] p0373 N81-22038
Erosion resistant coatings
[NASA-TM-75870] p0377 N81-22098
Functional testing airborne navigation equipment
[AD-A097115] p0387 N81-23062
Functional testing airborne radars
[AD-A097562] p0392 N81-23358
performance control and qualification tests of civil aviation turbine engines in tests conducted by airframe manufacturers
p0430 N81-24078
Development test requirements --- impact of weapon systems on propulsion system performance
p0430 N81-24080
Turbine engine tests as seen by an aircraft company
p0430 N81-24084
Investigation of performance deterioration of the CF6/JT9D high bypass ratio turbofan engines
p0431 N81-24086
Performance assessment of an advanced reheated turbo fan engine
p0432 N81-24094
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[NASA-TM-82617] p0443 N81-25081
High performance auxiliary power unit technology demonstrator
[AD-A098618] p0444 N81-25085
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-A098794] p0486 N81-26121
Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude
[NASA-TM-82663] p0496 N81-27095
Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112
Fuel system testing and test instrumentation --- MRCA aircraft
p0544 N81-29076
Research on the functional limits of a helicopter rotor: Speed and load factor
p0545 N81-29078
Aircraft brake systems testing handbook
[AD-A101516] p0548 N81-29123
Testing and evaluation of a stall-flutter-suppression system for helicopter rotors using individual-blade-control
[NASA-CR-166233] p0549 N81-29135
Computer analysis of 400 HZ Aircraft electrical generator test data
[AD-A100785] p0552 N81-29354
Aircraft sensor quality in SESAME 1979: Results of tower fly-bys and aircraft intercomparison
[PB81-176596] p0552 N81-29722
JT9D jet engine diagnostics program
p0598 N81-31199
JT8D engine performance retention
p0598 N81-31200
Performance retention of the RB211 powerplant in service
p0598 N81-31201
Voice communication capability of selected inflight headgear devices
p0604 N81-31467
An automated multiple choice intelligibility testing system
p0604 N81-31468
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0628 N81-32133

PERFUSION
U DIFFUSION

PERIODIC VARIATIONS
Improved aircraft cruise by periodic control
p0034 N81-11030

PERIODICITY
U PERIODIC VARIATIONS

PERIPHERAL EQUIPMENT (COMPUTERS)
NT CONSOLES
NT RANDOM ACCESS MEMORY
NT READ-ONLY MEMORY DEVICES
The BQM-74C target as a flying computer - Its language and its peripherals
p0179 A81-22611

PERIPHERAL JET FLOW
Downwash calculation at close range behind a trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925

PERIPHERAL VISION
Flight evaluation of the concept of the stage A Peripheral Vision Horizon Device (PVHD) using the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870] p0375 N81-23050

PERSONNEL
NT AIR TRAFFIC CONTROLLERS (PERSONNEL)
NT AIRCRAFT PILOTS
NT FLIGHT CREWS
NT MEDICAL PERSONNEL
NT NAVIGATORS
NT SPACECREWS

PERSONNEL MANAGEMENT
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688] p0381 N81-22971

Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689] p0381 N81-22972
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A
[AD-A096690] p0381 N81-22973
PERTURBATION THEORY
Aircraft performance optimization by forced singular perturbation
p0014 A81-11667
A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14394
Lift effect on transonic wind-tunnel blockage
p0066 A81-15883
Second order approximation theory of an arbitrary aerofoil in incompressible potential flow
p0108 A81-17803
Application of singular perturbation theory to onboard aircraft trajectory optimization --- for commercial jet transport aircraft
[AIAA PAPER 81-0019] p0158 A81-20543
Synthesis of gyrostabilizer state evaluation system under unknown perturbations
p0299 A81-29311
Analytical characteristics methods: Applications
[VKI-PREPRINT-1980-10] p0021 N81-10011
PETROLEUM
U CRUDE OIL
PETROLEUM PRODUCTS
NT ASPHALT
NT DIESEL FUELS
NT LUBRICATING OILS
Analysis of middle distillate fuels by field ionization mass spectrometry
[AD-A099407] p0491 N81-26209
PHANTOM AIRCRAFT
NT F-4 AIRCRAFT
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet --- earphones
[RAE-TM-FS-313] p0084 N81-12320
PHASE DETECTORS
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables
[AD-A092744] p0192 N81-16032
PHASE MATCHING
Model-based scene matching
p0461 A81-39349
PHASE TRANSFORMATIONS
NT PREVAPORIZATION
NT TRANSPIRATION
NT VAPORIZING
PHASED ARRAYS
A 7.5-GHz microstrip phased array for aircraft-to-satellite communication
p0347 A81-30776
An extremely lightweight fuselage-integrated phased array for airborne applications
p0348 A81-30779
A 7.5 GHz microstrip phased array for aircraft-to-satellite communication
p0562 A81-44623
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] p0640 N81-33390
Tent shaped phased array
[AD-A103927] p0640 N81-33393
PHENOLIC RESINS
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin systems
[NASA-CR-152292] p0218 N81-17175
PHENOMENOLOGY
NT MESOSCALE PHENOMENA
PHOSPHATES
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776
PHOSPHORUS COMPOUNDS
NT PHOSPHATES
PHOTOELASTIC ANALYSIS
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
PHOTOELASTIC STRESS MEASUREMENT
U PHOTOELASTIC ANALYSIS
PHOTOELECTRONICS
U ELECTRONICS
PHOTOGRAMMETRY
Aircraft quality assurance using close-range photogrammetry
p0358 A81-32508
PHOTOGRAPH INTERPRETATION
U PHOTOINTERPRETATION
PHOTOGRAPHIC EMULSIONS
NT NUCLEAR EMULSIONS
PHOTOGRAPHIC EQUIPMENT
NT CAMERAS
NT TELEVISION CAMERAS
Aerial survey photography
p0018 A81-12350
Bird flight and airplane flight --- instruments to measure air currents and flight characteristics
[NASA-TM-75777] p0138 N81-14962
PHOTOGRAPHIC MEASUREMENT
NT PHOTOGRAMMETRY
PHOTOGRAPHY
NT AERIAL PHOTOGRAPHY
NT ELECTRO-OPTICAL PHOTOGRAPHY
NT FRACTOGRAPHY
NT HOLOGRAPHY
NT INFRARED IMAGERY
NT SATELLITE-BORNE PHOTOGRAPHY
NT SCHLIEREN PHOTOGRAPHY
NT STEREOPHOTOGRAPHY
PHOTOINTERPRETATION
Big 'R', little 'c', integrated data annotation and sensor control for long range oblique photography /LOROP/ --- increased reliability and reduced complexity
p0462 A81-39435
PHOTOLUMINESCENCE
NT X RAY FLUORESCENCE
PHOTOMAPPING
Aerial survey photography
p0018 A81-12350
PHOTOMAPS
F/A-18 horizontal situation display
p0327 A81-30353
PHOTON ABSORPTION
U ELECTROMAGNETIC ABSORPTION
PHOTORECONNAISSANCE
Autonomous navigation using passively sensed terrain images
p0110 A81-17977
Long focal length, high altitude standoff reconnaissance; Proceedings of the Seminar, San Diego, CA, July 29, 30, 1980
p0461 A81-39417
PHOTOSTRESSES
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
PHOTOTHERMOTROPISM
U TEMPERATURE EFFECTS
PHUGOID OSCILLATIONS
U OSCILLATIONS
U PITCH (INCLINATION)
PHYSIOLOGICAL EFFECTS
NT PHYSIOLOGICAL RESPONSES
Airport noise. Citations from the NTIS data base
[PB80-813231] p0088 N81-12667
Contaminant increase in aircraft liquid oxygen converters: Analysis of data
[AD-A090975] p0092 N81-13049
The annoyance caused by noise around airports
[NASA-TM-75784] p0146 N81-15579
The problems with the interface system of the visual simulator as a cause of Pilot Induced Oscillations (PIO's) in flight simulators
[MBB-UA-528-80-OE] p0276 N81-19140
Aviation noise overload in the immediate proximity of the Warsaw-Okecie airport
[NASA-TM-75892] p0500 N81-27883
PHYSIOLOGICAL RESPONSES
Physiological effects of high-G flight - Their impact on flight simulator design
[AIAA 81-0986] p0416 A81-36573
The problems with the interface system of the visual simulator as a cause of Pilot Induced Oscillations (PIO's) in flight simulators
[MBB-UA-528-80-OE] p0276 N81-19140

PHYSIOLOGY
NT WORKLOADS (PSYCHOPHYSIOLOGY)
PICKOFFS
U SENSORS
PICKUPS
U SENSORS
PIEZOELECTRIC TRANSDUCERS
Acoustic emission techniques for in-flight structural monitoring
[SAE PAPER 801211] p0404 A81-34219
PILOT ERROR
Air traffic control problems - A pilot's view
p0169 A81-20914
Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs
[NASA-CR-152390] p0023 N81-10019
Aviation safety
[GPO-68-717] p0073 N81-12040
Aircraft accident report: Allegheny Airlines, Inc., Nord 262, Mohawk/Frakes 298, n29824, Benedum Airport, Clarksburg, West Virginia, February 12, 1979
[NTSB-AAR-79-12] p0073 N81-12044
Application of the epidemiological model in studying human error in aviation
p0265 N81-19046
A review of in-flight emergencies in the ASRS data base
[NASA-CR-166166] p0372 N81-22031
Definition of investigative areas for human-factor aspects of aircraft accidents
[AD-A101601] p0580 N81-30102
PILOT PERFORMANCE
Evaluation of the potential format and content of a cockpit display of traffic information
p0053 A81-13419
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
Avionics and displays in a future airspace system
p0112 A81-18070
Computer generated displays and pilot effectiveness
p0114 A81-18082
Airport visual approach, guidance and landing systems - Airline pilots viewpoint
p0114 A81-18083
Delayed ejection --- decision factor importance for pilot safety
p0176 A81-22102
The apparent ignoring of pilot fatigue by the NTSB in airline crashes
p0177 A81-22104
Tailoring software logic to the needs of the pilot - A software designer's nightmare
p0325 A81-30335
DAIS controls and displays - A systems approach to avionics subsystem integration
p0325 A81-30336
KC-135 modernization program --- cockpit avionics subsystems integration for pilot workload reduction
p0325 A81-30337
A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks
p0471 A81-40120
Pilot guidance and display considerations for energy efficient flight profiles
p0513 A81-41924
Analysis of aircraft longitudinal handling qualities
[AIAA 81-1771] p0554 A81-44092
An analytical pilot rating method for highly elastic aircraft
[AIAA 81-1772] p0554 A81-44093
Pilot-aircraft system reponse to wind shear
[NASA-CR-3342] p0031 N81-10636
A multivariate approach to handling qualities rating scale development
[AD-A089825] p0037 N81-11047
Simulation comparison of a decoupled longitudinal control system and a velocity vector control wheel steering system during landings in wind shear
[NASA-TP-1734] p0081 N81-12109
Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13958
Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations
[NASA-TP-1776] p0142 N81-14997
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-16994
Application of the epidemiological model in studying human error in aviation
p0265 N81-19046
How a pilot looks at altitude
p0265 N81-19047
R.A.N. Sea King cabin environment survey. Part 2: Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068
Candidate CDTI procedures study
[NASA-CR-165673] p0373 N81-22032
A study of ASRS reports involving general aviation and weather encounters
[NASA-CR-166212] p0493 N81-27063
Handling qualities of large flexible aircraft
p0538 N81-28081
Pilot-optimal multivariable control synthesis by output feedback
[NASA-CR-163112] p0540 N81-28102
Operational problems experienced by single pilots in instrument meteorological conditions
[NASA-CR-166236] p0581 N81-30106
Voice warning systems: Some experimental evidence concerning application
p0603 N81-31458
PILOT TRAINING
The future of training for aerial combat
p0060 A81-15118
Display motion relationships
p0064 A81-15683
Transfer and cost effectiveness of ground-based flight trainers
p0064 A81-15693
Visual cue requirements in contact flight simulators
p0064 A81-15695
Visual cue augmentation in contact flight simulation
p0064 A81-15696
Primary training of military pilots - Changing theories and new trainers
p0122 A81-19498
Visual systems at Lufthansa's simulator centre
p0122 A81-19499
Integration of the F-16 Weapon System Trainer
p0325 A81-30332
Operator training systems/simulators
p0349 A81-31109
U.S. Navy/USAF development of Tactical Aircrew Combat Training System/Air Combat Maneuvering Instrumentation /TACTS/ACMI/
[SAE PAPER 801183] p0401 A81-34196
Simulated A-10 combat environment
[SAE PAPER 801187] p0401 A81-34199
A-10A Operational Flight Trainer simulator flight control system and aerodynamics
[AIAA 81-0964] p0414 A81-36555
TA-4J spin training through simulation
[AIAA 81-0965] p0414 A81-36556
Design verification by emulation --- computer image generation for aircrew training simulation
[AIAA 81-0975] p0415 A81-36564
Improved G-Cueing System
[AIAA 81-0987] p0416 A81-36572
The evolution of real-time digital simulation of aircraft for training applications
p0615 A81-48358
Flight test handbook: Flying qualities theory and flight test techniques
[AD-A090525] p0076 N81-12073
Critical research issues and visual system requirements for a V/STOL training research simulator
[AD-A092561] p0198 N81-16072
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-16994
Spin recovery training
[GPO-67-439] p0216 N81-17098
A pilot training manual for the terminal configured vehicle electronic horizontal

situation indicator
[NASA-TM-81959] p0330 N81-20044
Visual system Technology: Status and problems --- training simulators
p0336 N81-20099
Training effectiveness of platform motion: Review of motion research involving the advanced simulator for pilot training and the simulator for air-to-air combat
[AD-A095930] p0343 N81-21089
Cockpit simulation study of use of flight path angle for instrument approaches
[NASA-CR-165708] p0425 N81-24040
A pilot training manual for the terminal configured vehicle electronic attitude director indicator
[NASA-CR-159195] p0434 N81-24111
A learning guide for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-83128] p0484 N81-26083
Development and evaluation of a prototype in-flight instrument flight rules (IFR) procedures trainer
[NASA-TM-73292] p0490 N81-26156
Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel
[NASA-CR-165751] p0580 N81-30098
Guidelines for line-oriented flight training, volume 1
[NASA-CP-2184] p0580 N81-30101
Flight simulator: Use of spacegraph display in an instructor/operator station
[AD-A101951] p0602 N81-31235
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] p0630 N81-32164
PILOTLESS AIRCRAFT
NT DRONE AIRCRAFT
NT JINDIVIK TARGET AIRCRAFT
NT TARGET DRONE AIRCRAFT
Gyrostabilizers for inertial control systems --- Russian book
p0017 A81-12024
PILOTS
Information transfer within the cockpit: Problems in intracockpit communications
p0595 N81-31167
PILOTS (PERSONNEL)
NT AIRCRAFT PILOTS
PIPE FLOW
Calculation of the coefficients of head and local drag of bluff bodies
p0466 A81-40023
Flow in bent pipes
[CETIM-14-F-091] p0256 N81-18322
PIPELINES
Alternative energy sources for non-highway transportation, volume 1
[DOE/CS-05438/T1-VOL-1] p0044 N81-11513
PIPELINING (COMPUTERS)
The array processor - A real-time simulator
p0614 A81-48328
PIPER AIRCRAFT
Aircraft Accident Report: Air Pennsylvania 501, Piper PA-31-350, N5MS Philadelphia, Pennsylvania, July 25, 1980
[PB81-910401] p0269 N81-19077
A flight investigation of the ultra-deep-stall descent and spin recovery characteristics of a 1/6 scale radiocontrolled model of the Piper PA38 Tomahawk
[NASA-CR-156871] p0343 N81-21084
Airborne antenna pattern calculations
[NASA-CR-164350] p0437 N81-24321
PIPES (TUBES)
Elimination of vibrations in aircraft piping systems --- Russian book
p0116 A81-16497
Elastomers used in aeronautics industry
[SNIAS-801-[illegible]-105] p0031 N81-10168
PISTON ENGINES
NT DIESEL ENGINES
High pressure fuel pumps - Their design and evolution /The 13th J. D. North Memorial Lecture/
p0513 A81-42052
Evaluation of multi-viscosity oils designed for aircraft reciprocating engines
[SAE PAPER 810572] p0519 A81-42737
Full-scale study of the cooling system aerodynamics of an operating piston engine installed in a light aircraft wing panel
[SAE PAPER 810623] p0523 A81-42777
Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067
Advanced Technology Spark-Ignition Aircraft Piston Engine Design Study
[NASA-CR-165162] p0130 N81-13963
PISTONS
Power control for hot gas engines
[NASA-CASE-NPO-14220-1] p0133 N81-14318
PITCH (INCLINATION)
A half-model free-oscillation rig for pitch-damping measurements in high speed wind tunnels
p0461 A81-39263
Optimal higher harmonic blade pitch control for minimum vibration of a hinged rotor
p0473 A81-40134
An active control system for helicopter vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189
The flying qualities of aircraft with actively augmented pitch and yaw stability
[ARC-R/M-3848] p0082 N81-12113
Optimized pitch controller for load alleviation on wind turbines
[FFA-TN-HU-2189-PT-1] p0087 N81-12634
Results of oscillatory pitch and ramp tests on the NACA 0012 blade section
[ARA-MEMO-220] p0090 N81-13024
A direct model pitch measurement with a laser interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969
Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106
Pitch-flap-phase coupling. A preliminary analysis of an evolving concept of helicopter autostabilization
[BU-242] p0434 N81-24109
Pitch attitude stabilization system utilising engine pressure ratio feedback signals
[NASA-CASE-LAR-12562-1] p0490 N81-26152
Quiet Clean Short-haul Experimental Engine (QCSEE): acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet, test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097
PITCH ANGLES
U PITCH (INCLINATION)
PITCH ATTITUDE CONTROL
U LONGITUDINAL CONTROL
PITCHING MOMENTS
An introduction to dynamic derivatives (3) methods of oscillating models in pitch and yaw in a 530 by 810 millimetre transonic wind tunnel
[ARL/AERO-NOTE-390] p0021 N81-10007
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
Unsteady pressure distributions on airfoils in cascade
[AD-A091173] p0090 N81-13033
Probabilistic analysis of foundation forces for a class of unbalanced rotating machines
p0145 N81-15362
Unsteady airloads on a harmonically pitching wing with external store
[NLR-MP-80004-U] p0330 N81-20038
Kinematic properties of the helicopter in coordinated turns
[NASA-TP-1773] p0374 N81-22039
PITOT TUBES
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] p0638 N81-33204
PLAN POSITION INDICATORS
Computer generated radar images for navigation
p0049 A81-12793
PLANETARY BOUNDARY LAYER
Investigative technical measurements of the

planetary boundary layer made onboard an
instrumented motorized glider
[REPT-149] p0379 N81-22666
PLANETARY ENTRY
U ATMOSPHERIC ENTRY
PLANETOCENTRIC COORDINATES
NT GEOCENTRIC COORDINATES
PLANFORMS
NT ARROW WINGS
NT DELTA WINGS
NT INFINITE SPAN WINGS
NT RECTANGULAR WINGS
NT SWEPT FORWARD WINGS
NT SWEPTBACK WINGS
NT TRAPEZOIDAL WINGS
NT VARIABLE SWEEP WINGS
NT WING PLANFORMS
An analytical solution of lift loss for a round
planform with a central lifting jet
[AIAA PAPER 81-0011] p0157 A81-20535
Supersonic wings with significant leading-edge
thrust at cruise
p0244 N81-17990
PLANNING
NT AIRPORT PLANNING
NT MANAGEMENT PLANNING
NT MISSION PLANNING
NT PRODUCTION PLANNING
NT PROJECT PLANNING
NT REGIONAL PLANNING
NT URBAN PLANNING
US military V/STOL: Who needs it? Wants it? Can
afford it?
p0634 N81-33156
PLASMA ARCS
U PLASMA JETS
PLASMA DISCHARGES
U PLASMA JETS
PLASMA FLOW
U MAGNETOHYDRODYNAMIC FLOW
PLASMA INTERACTIONS
A new helicopter map display device HKG-5
p0418 A81-36967
PLASMA JETS
Plasma arc improves PM process - Tungsten free Ti
powder
p0227 A81-24045
PLASMA PHYSICS
A new helicopter map display device HKG-5
p0418 A81-36967
PLASMA SPRAYING
Automated Plasma Spray (APS) process feasibility
study
[NASA-CR-165418] p0597 N81-31193
PLASMA THEORY
U PLASMA PHYSICS
PLASMAS (PHYSICS)
NT RAREFIED PLASMAS
Cathode ray tubes and plasma panels as display
devices for aircraft displays
p0212 N81-17069
Large area gas discharge displays
p0212 N81-17070
PLASMOIDS
U PLASMAS (PHYSICS)
PLASTIC AIRCRAFT STRUCTURES
Building the Gossamer Albatross
p0286 A81-28461
Helicopter blade reliability
p0287 A81-28474
The use of carbon-reinforced plastic in the
construction of a deflector and a stabilizer
p0299 A81-29310
PLASTIC DEFORMATION
Numerical study of stream surface structure near
highly loaded wings
p0235 A81-25682
PLASTIC FILMS
U POLYMERIC FILMS
PLASTIC MATERIALS
U PLASTICS
PLASTIC PROPERTIES
NT SUPERPLASTICITY
NT THERMOPLASTICITY
PLASTIC YIELDING
U PLASTIC DEFORMATION
PLASTICS
NT CARBON FIBER REINFORCED PLASTICS
NT EPOXY RESINS
NT KEVLAR (TRADEMARK)
NT PHENOLIC RESINS
NT POLYESTER RESINS
NT POLYTETRAFLUOROETHYLENE
NT REINFORCED PLASTICS
NT THERMOPLASTIC RESINS
Impact of modern materials on the development of
rotating airfoil equipment
[AAAF-NT-79-43] p0083 N81-12182
PLATE THEORY
Wing analysis by the plate analogy using an
integral-difference method
p0235 A81-25680
PLATES (STRUCTURAL MEMBERS)
NT ANISOTROPIC PLATES
NT CANTILEVER PLATES
NT ELASTIC PLATES
NT PERFORATED PLATES
NT POROUS PLATES
NT REINFORCED PLATES
Research on fatigue at the Department of Aerospace
Engineering of the Delft University
p0232 A81-24939
Flutter of plates and shells in practice
p0282 A81-27611
Shape optimization of plate and shell structures
[AIAA 81-0553] p0302 A81-29403
A periodic problem in viscoelasticity with
variable coefficients
p0419 A81-37143
PLATING
NT ELECTROPLATING
NT ION PLATING
PLENUM CHAMBERS
Numerical simulations of a segmented-plenum,
perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640
The resonance frequencies of ventilated wind tunnels
[ARC-R/M-3841] p0144 N81-15009
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088
PLUG NOZZLES
Acoustic and aerodynamic performance investigation
of inverted velocity profile coannular plug
nozzles --- variable cycle engines
[NASA-CR-3149] p0203 N81-16854
VCE early acoustic test results of General
Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999
Aeroacoustics of a porous plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884
PLUMES
NT ROCKET EXHAUST
Modeling of 2D-nozzle plume for IR signature
prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107
Comparison of computational and experimental jet
effects
[AIAA PAPER 81-1492] p0626 A81-49979
Investigation of plume induced separation on a
full-size missile at supersonic velocities
[AD-A094742] p0277 N81-19212
PLUVIOGRAPHS
U RECORDING INSTRUMENTS
PNEUMATIC EQUIPMENT
Dynamics and calculations for an aircraft landing
gear pneumatic shock absorber system
p0417 A81-36718
Pneumatic boot for helicopter rotor deicing
p0267 N81-19059
Evaluation of a pneumatic boot deicing system on a
general aviation wing model
[NASA-TM-82363] p0441 N81-25065
POINT MATCHING METHOD (MATHEMATICS)
U BOUNDARY VALUE PROBLEMS
POISEUILLE FLOW
U LAMINAR FLOW
POISONS
NT URETHANES
POISSON PROCESS
U STOCHASTIC PROCESSES
POLAND
The effect of airplane noise on the inhabitants of
areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22593
POLARIZATION CHARTS
U GRAPHS (CHARTS)
POLICIES
NT ENERGY POLICY

NT PROCUREMENT POLICY
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980
[NASA-CR-152356] p0220 N81-17623
Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980
[NASA-CR-152357-VOL-2] p0220 N81-17624
DOD's use of remotely piloted vehicle technology offers opportunities for saving lives and dollars
[AD-A097419] p0388 N81-23074
POLLUTANTS
U CONTAMINANTS
POLLUTION
NT AIR POLLUTION
NT ENVIRONMENT POLLUTION
NT NOISE POLLUTION
NASA's aeronautics research and technology base
[NASA-CR-164195] p0381 N81-22969
POLLUTION CONTROL
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609
The federal role in airport noise control planning
p0113 A81-18073
Gas turbine engine emission abatement - Status and needed advancements
p0237 A81-26015
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
EPA proposed national strategy for further reduction of aviation noise
p0567 A81-46353
Integrated noise model - The Federal Aviation Administration's computer program for predicting noise exposure around an airport
p0568 A81-46354
Airport noise control in the 1980s - FAA's plans and policies
p0568 A81-46355
Remaining problems in the prediction, measurement, evaluation, and control of aircraft noise
p0568 A81-46356
Noise control at general aviation airports
p0569 A81-46366
Airport noise contour predictions - Improving their accuracy
p0569 A81-46367
Aircraft noise and land use compatibility tradeoff analyses
p0569 A81-46370
Airport Noise Control and Land Use Compatibility Studies A U.S. case
p0570 A81-46372
A long range research programme of noise abatement at the airport of Beograd and its practical results
p0570 A81-46373
The impact and future direction of aircraft noise certification
p0570 A81-46377
Aircraft towing feasibility study
[DOE/CS-50069/1] p0074 N81-12051
Maneuvering aircraft: Noise pollution and control. Citations from the NTIS data base
[PB80-815566] p0135 N81-14525
Two-stage combustion for reducing pollutant emissions from gas turbine combustors
[NASA-CR-163877] p0196 N81-16056
Advanced technology for controlling pollutant emissions from supersonic cruise aircraft
p0246 N81-18004
Supercritical fuel injection system
[NASA-CASE-LEW-12990-1] p0549 N81-29129
POLLUTION MONITORING
Aircraft pollution in the vicinity of airports
[AIAA PAPER 81-0309] p0164 A81-20743
Aircraft and air pollution
p0288 A81-28698
The influence of aircraft operations on air quality at airports
p0553 A81-44074
A program to support the full utilization of data from existing social surveys of environmental noise
p0570 A81-46374
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
Exhaust emission characteristics and variability for maintained General Electric CF6-50 turbofan engines
[AD-A092291] p0196 N81-16064
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962] p0201 N81-16620
POLYAMIDE RESINS
NT KEVLAR (TRADEMARK)
POLYESTER RESINS
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
POLYIMIDE RESINS
High-char-forming composite laminates
p0532 A81-43652
POLYMER CHEMISTRY
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32
POLYMER MATRIX COMPOSITE MATERIALS
Captive carry and free flight rain erosion considerations for reinforced ablative fluorocarbon radome materials
p0103 A81-17453
The 1980's - Payoff decade for advanced materials: Proceedings of the Twenty-fifth National Symposium and Exhibition, San Diego, Calif., May 6-8, 1980
p0191 A81-22636
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
p0611 A81-47801
POLYMERIC FILMS
NT MYLAR (TRADEMARK)
High-solids coatings for exterior aircraft
p0169 A81-20861
Drag reduction of an oscillating flat plate with an interface film
p0239 A81-26504
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077
POLYNOMIALS
Approximations and short cuts based on generalized functions
p0347 A81-30730
POLYTETRAFLUOROETHYLENE
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0118 A81-18750
POLYURETHANE FOAM
Fiberglass-reinforced rigid polyurethane expedient pavement subject to simulated F-4 aircraft traffic
[AD-A089266] p0030 N81-10079
POLYURETHANE RESINS
High-solids coatings for exterior aircraft
p0169 A81-20861
Aluminized coding study for retrofitting in-service slide materials
[AD-A094170] p0255 N81-18201
MM&T: Low cost production/installation of urethane leading edge guards on rotor blades
[AD-A101603] p0582 N81-30117
PORES
U POROSITY
POROSITY
Method for reducing the tangential velocities in aircraft trailing vortices
p0066 A81-15880
POROUS BOUNDARY LAYER CONTROL
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14581
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24079

POROUS MATERIALS
Porous portland cement concrete: The state of the art
[AD-A098177] p0436 N81-24187
Aeroacoustics of a porous plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884
POROUS PLATES
Transient three-dimensional flow along a porous plate
p0231 A81-24815
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513
POROUS WALLS
Transonic flow past a wing profile in channels with permeable walls
p0054 A81-13533
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122
Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
PORTABLE EQUIPMENT
Portable servoactuator test system
[AIAA PAPER 81-1620] p0525 A81-43130
POSITION (LOCATION)
Detection of direction changes of flying targets from position coordinates of the radar data
p0152 A81-20099
SINTAC and its position-finding performance
p0409 A81-35021
Contribution of the DFVLR to the DAS program
p0452 A81-37657
Status report on Position Location Reporting System /PLRS/
p0517 A81-42440
Hyperbolic origins --- of radio position-fixing systems
p0612 A81-47842
An analytical solution of the two star sight problem of celestial navigation
p0614 A81-48121
Army GPS-doppler hybrid navigation system
[AD-A090394] p0075 N81-12062
Field evaluation of the LR80 land navigation system
[AD-A091885] p0193 N81-16035
Passive imagery navigation
[AD-A096245] p0339 N81-21051
Precision Positioning and Inertial Guidance Sensors: Technology and Operational Aspects
[AGARD-CP-298] p0484 N81-26091
Microwave system for real time space position measurement
p0545 N81-29089
POSITION ERRORS
The Global Positioning System versus gravity disturbance modeling in an inertial navigation system --- error reduction at aircraft altitude
[AIAA PAPER 81-0087] p0160 A81-20591
Position-determination accuracies of navigation methods
p0233 A81-25374
Passive location finding with a multiwavelength two element interferometer
p0350 A81-31125
Maximum likelihood elevation angle estimates of radar targets using subapertures
p0359 A81-32691
SINTAC and its position-finding performance
p0409 A81-35021
Errors of phase VLF-navigation systems under conditions of auroral disturbances
p0607 A81-47533
POSITION INDICATORS
NT PLAN POSITION INDICATORS
NT RADIO DIRECTION FINDERS
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21828
Passive location finding with a multiwavelength two element interferometer
p0350 A81-31125
Status report on Position Location Reporting System /PLRS/
p0517 A81-42440
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS)
[AD-A094169] p0250 N81-18036
A pilot training manual for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-81959] p0330 N81-20044
A method for evaluating radio navigation systems for the terminal maneuvering area --- approach control
[DFVLR-MITT-81-02] p0538 N81-28080
POSITIONING
Reduction of strut induced rotor blade vibration with the modified stator setting angles
p0295 A81-29097
POSITIONING DEVICES (MACHINERY)
NT BOOMS (EQUIPMENT)
KC-10A refueling boom control system
p0322 A81-30266
POTENTIAL ENERGY
NT ELECTRIC POTENTIAL
Flight evaluation of a simple total energy-rate system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24058
POTENTIAL FLOW
Flow past a slender profile in a channel with permeable walls
p0004 A81-10916
Recent selected papers of Northwestern Polytechnical University. Parts 1 & 2 --- Book
p0107 A81-17801
Finite difference computation of the steady transonic potential flow around airplanes
p0107 A81-17802
Second order approximation theory of an arbitrary aerofoil in incompressible potential flow
p0108 A81-17803
Aerodynamic calculations and design of subcritical aerofoils
p0108 A81-17804
Body-fitted 3-D full-potential flow analysis of complex ducts and inlets
[AIAA PAPER 81-0002] p0156 A81-20527
A method for calculating the aerodynamic forces and moments on external stores of aircraft
p0226 A81-24006
Numerical computation of transonic potential flow through nozzles
p0233 A81-25353
The effect of jet non-uniformity on the lift of an augmentor wing
p0298 A81-29144
Transonic wing design using potential-flow codes - Successes and failures
[SAE PAPER 810565] p0518 A81-42730
Overview of advanced wing design --- Ames 12-Foot Pressure Tunnel and 11-Foot Transonic Wind Tunnel
p0260 N81-19012
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
Analytical study of STOL Aircraft in ground effect. Part 2: Nonplanar, nonlinear method applicable to three dimensional jets of finite thickness
[NASA-CR-152088-PT-2] p0271 N81-19097
Cascade design through an inverse method
p0448 N81-26022
POWDER (PARTICLES)
NT METAL POWDER
Evaluation of powder coatings for application to aircraft component parts
[AD-A094724] p0277 N81-19305
POWDER METALLURGY
Progress in P/M superalloy and titanium for aircraft applications
p0181 A81-22641
Plasma arc improves PM process - Tungsten free Ti powder
p0227 A81-24045
Thermomechanical behavior of a mechanically alloyed Al-4.0Mg powder alloy
p0409 A81-34051
Development in powder metallurgy /PM/ Ti6Al4V technology for aircraft parts
p0511 A81-41640
From sponge to powder alternatives in titanium processing
p0511 A81-41647
Titanium net shapes by a new technology. I - F-14A parts evaluation
p0511 A81-41649

Titanium net shapes by a new technology. II - F-18A parts evaluation
p0511 A81-41650
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636
Crack growth modeling in an advanced powder metallurgy alloy
[AD-A093992] p0218 N81-17235
POWDERED METALS
U METAL POWDER
POWER AMPLIFIERS
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122
POWER CONDITIONING
High-density avionic power supply
p0005 A81-11157
Business aircraft APU's --- Auxiliary Power Units
[SAE PAPER 800608] p0061 A81-15331
POWER EFFICIENCY
Some aspects of optimizing the aerodynamics of turbine stages
p0119 A81-19325
Aerodynamic study of flat turbine cascades with additional blades in blade passages
p0281 A81-27373
Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source --- aircraft equipment
p0288 A81-28574
The possibilities of improving the efficiency of gas turbines
p0288 A81-28614
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022
The all-electric airplane as an energy efficient transport
[SAE PAPER 801131] p0396 A81-34162
A new approach to turboshaft engine growth
[AHS 80-41] p0477 A81-40169
Projected power and specific fuel consumption development of the Rolls Royce Gem engine
p0575 A81-46637
POWER GENERATORS
U ELECTRIC GENERATORS
POWER LINES
Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current
p0200 N81-16158
POWER PROCESSING SYSTEMS
U POWER CONDITIONING
POWER SPECTRA
A method for the prediction of wing response to nonstationary buffet loads
[AD-A093037] p0208 N81-17043
POWER SUPPLY CIRCUITS
Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source --- aircraft equipment
p0288 A81-28574
Delta electrical load analysis C-141B JACC/CP Aircraft
[AD-A095659] p0334 N81-20071
POWERED LIFT AIRCRAFT
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] p0635 N81-33162
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579] p0637 N81-33195
PPI (POSITION INDICATORS)
U PLAN POSITION INDICATORS
PRACTICES
U PROCEDURES
PRECAUTIONS
U ACCIDENT PREVENTION
PRECIPITATION (CHEMISTRY)
Composition of sludge formed in B-3V oil
p0103 A81-17373
PRECIPITATION (METEOROLOGY)
NT ACID RAIN
NT HAIL
VLF P-static noise reduction in aircraft. Volume 1: Current knowledge
[AD-A098451] p0440 N81-25061
PRECIPITATION PARTICLE MEASUREMENT
Electromagnetic precipitation and ducting of particles in turbulent boundary layers
p0239 A81-26506
PRECISION
Characteristics of a digital filter for a precision DME system in microwave landing systems
[PUB-43-1980] p0628 N81-32136
PREDICTION ANALYSIS TECHNIQUES
Prediction of changes in aircraft noise exposure
p0017 A81-11820
Preliminary consideration of parameter identification analysis from parachute aerodynamic flight test data
p0067 A81-16020
Numerical investigation of a model of turbulent combustion of hydrocarbons
[AIAA PAPER 81-0039] p0158 A81-20559
Prediction method for the overall performance of turbofan engines
[AIAA PAPER 81-0367] p0166 A81-20796
Empirical method for the prediction of business executive jet cabin noise levels
p0224 A81-23044
Development of conceptual Navy aircraft Reliability Prediction Models
p0229 A81-24280
The Modular Life Cycle Cost Model for advanced aircraft systems - An overview
[SAWE PAPER 1351] p0353 A81-31386
Aerodynamic characteristics of two VSTOL fighter configurations
[AIAA PAPER 81-1292] p0454 A81-38119
Airship survivability in atmospheric turbulence
[AIAA 81-1323] p0456 A81-38533
A perspective on developing new inlet distortion measurement and predictive methods
[AIAA PAPER 81-1589] p0507 A81-40964
Engine usage prediction for advanced fighter aircraft
[AIAA PAPER 81-1367] p0514 A81-42178
Predicting fatigue crack growth on aircraft structures
[SAE PAPER 810593] p0520 A81-42752
A prediction procedure for propeller aircraft flyover noise based on empirical data
[SAE PAPER 810604] p0521 A81-42761
Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953
Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954
Output predictive algorithmic control - Precision tracking with application to terrain following
p0567 A81-46280
Prediction method for aeroacoustic loads on under the wing blown flaps
[AIAA PAPER 81-2030] p0621 A81-48644
An evaluation of statistical methods for the prediction of maximum time-variant inlet total pressure distortion
[AD-A089817] p0036 N81-11040
Optimal bodies for minimum total drag at supersonic speeds
[AD-A091235] p0091 N81-13036
Service life determination for the UH-60-A (UTTAS) helicopter elastomeric bearings
[AD-A091756] p0134 N81-14324
Study of transonic flow fields about aircraft: Application to external stores
p0187 N81-15998
Data base for the prediction of inlet external drag
p0190 N81-16010
A method for the prediction of wing response to nonstationary buffet loads
[AD-A093037] p0208 N81-17043
Prediction of nacelle aerodynamic interference effects at low supersonic Mach numbers
p0244 N81-17988
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111
Identification of jet engine damages by engine trend analysis LEADS 200 data
p0328 N81-20014

Comparison of theoretical predictions of orbiter airloads with wind tunnel and flight test results for a Mach number of 0.52
[NASA-TM-81358] p0387 N81-23066
Validation of helicopter noise prediction techniques
[NASA-CR-165715] p0447 N81-25768
Impact of prediction accuracy on costs - noise technology applications in helicopters
[AD-A101768] p0589 N81-30911
Aeroelastic buffeting prediction techniques: A general review
[DFVLR-FB-81-15] p0601 N81-31226

PREDICTIONS
NT NOISE PREDICTION (AIRCRAFT)
NT PERFORMANCE PREDICTION
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473
The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12036
The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2 --- air traffic control
[NLR-MP-79038-U] p0332 N81-20059

PREDICTORS
U PREDICTIONS

PREHEATING
U HEATING

PRELAUNCH TESTS
NT STATIC FIRING

PRELOADING
U PRESTRESSING

PREMIXED FLAMES
Numerical investigation of a model of turbulent combustion of hydrocarbons
[AIAA PAPER 81-0039] p0158 A81-20559
Fresh mixture entrainment in a jet curtain flameholder
p0294 A81-29084
The influence of flames on the formation of self-excited combustion chamber oscillations
p0298 A81-29197
The influence of premixed combustion flame stabilizer geometry on flame stability and emissions
[ASME PAPER 81-GT-26] p0311 A81-29942
Premixing and flash vaporization in a two-stage combustor
[ASME PAPER 81-GT-41] p0312 A81-29955

PREMIXING
A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465

PREPARATION
NT PRESTRESSING

PREPREGS
Quality assurance of an epoxy resin prepreg using HPLC
p0531 A81-43642

PRESIDENTIAL REPORTS
Aeronautics and Space Report of the President, 1979 activities
p0089 N81-12956
Carbon/graphite composite material study
[AR-3] p0585 N81-30188

PRESSING (FORMING)
NT STAMPING
Development of high strength silicon carbide materials for gas turbine applications
[BMFT-FB-T-80-025] p0497 N81-27102
Development of a CFC window frame, using short fiber pressing technology --- jet aircraft cabin windows
[BMFT-FB-W-80-032] p0499 N81-27208

PRESSURE
NT ATMOSPHERIC PRESSURE
NT BASE PRESSURE
NT DENSIFICATION
NT DYNAMIC PRESSURE
NT FLUID PRESSURE
NT GAS PRESSURE
NT HIGH ALTITUDE PRESSURE
NT HIGH PRESSURE
NT IMPACT LOADS
NT INLET PRESSURE
NT ISOSTATIC PRESSURE
NT LOW PRESSURE
NT OVERPRESSURE
NT PARTIAL PRESSURE
NT SOUND PRESSURE
NT STAGNATION PRESSURE
NT STATIC PRESSURE
NT THRUST CHAMBER PRESSURE
NT WALL PRESSURE
NT WIND PRESSURE
Flap noise characteristics measured by pressure cross correlation techniques
p0259 N81-18808
Computer evaluation of the on-and-off design of an axial air turbine
[AD-A101102] p0549 N81-29131

PRESSURE CABINS
U PRESSURIZED CABINS

PRESSURE DISTRIBUTION
Engine air intake design support by use of computational methods and comparison of theoretically derived pressure distributions with experimental data
p0008 A81-11614
Experimental investigations on a harmonically swinging trail edge flap with a space
[DGLR PAPER 80-029] p0055 A81-13925
The measurement of pressure distribution around a parachute canopy
p0067 A81-16019
Some characteristics of subsonic flow over the root area of a sweptback wing
p0123 A81-19633
An approximate analytical method for vortex-lift and centre of pressure on the slender wing
p0223 A81-23726
The influence of a wake splitter plate on the aerodynamic characteristics of a two-dimensional cylinder
p0226 A81-23949
Plane transonic solution with shock by direct iteration
p0231 A81-24814
Experimental investigations of the base pressures found on a bluff body in ground effect
p0234 A81-25379
Analysis of the difficulties in high performance compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107
Comparison of computed and measured unsteady pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541
Pressure distribution computation on a non-lifting symmetrical helicopter blade in forward flight
p0365 A81-33291
Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39890
Prediction of helicopter rotor noise from measured blade surface pressure
p0577 A81-46649
Measured pressure distributions and shock shapes on a simple delta wing
p0617 A81-48479
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration
[ARC-R/M-3842-PT-2] p0021 N81-10010
Comparison of Unsteady Pressure Fields Computed and Measured on the ZKP model
[AGARD-R-688] p0033 N81-11019
System to measure the pressure distribution on fan aerofoil surfaces during flutter conditions
[PNR-90013] p0072 N81-12029
Measured pressure distributions and shock shapes on a Butler wing
[CUED/A-AERO/TR-9] p0090 N81-13026
Unsteady pressure distributions on airfoils in cascade
[AD-A091173] p0090 N81-13033
Analysis of unsteady pressure measurements on an aerofoil section with an harmonically oscillating, slotted flap
[DFVLR-FB-80-22] p0126 N81-13929
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with

underwing: Store
[AD-A077370] p0139 N81-14969
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow
p0188 N81-16006
Jet wing interference for an overwing engine configuration
p0188 N81-16008
The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
p0243 N81-17984
Advanced turboprop installation aerodynamics
p0260 N81-19013
Pressure distributions for the GA(W)-2 airfoil with 20% aileron, 25% slotted flap and 30% Fowler flap
[NASA-CR-2948] p0262 N81-19023
VTOL in ground effect flows for closely spaced jets --- to predict pressure and upwash forces on aircraft structures
[NASA-CR-152321] p0271 N81-19095
Effects of window configuration on model pressure distribution in wind tunnels with perforated walls
[AD-A094213] p0277 N81-19142
Computation of pressure distribution on the DFVLR wing-body model by the panel method
[DFVLR-FB-80-02] p0372 N81-22029
Two-dimensional aerodynamic characteristics of the NACA 0012 airfoil in the Langley 8 foot transonic pressure tunnel
[NASA-TM-81927] p0385 N81-23036
Development of a nonlinear vortex method --- steady and unsteady aerodynamic loads of highly sweptback wings
[NASA-CR-164351] p0423 N81-24024
Wind tunnel corrections for high angles of attack: A brief review of recent UK work
p0436 N81-24127
Pressure distribution computation on a nonlifting symmetrical helicopter blade in forward flight
p0447 N81-26010
A procedure for designing forebodies with constraints on cross-section shape and axial area distribution
[NASA-TP-1881] p0483 N81-26078
The criticality of engine exhaust simulations on VSTOL model-measured ground effects
p0486 N81-26115
Subsonic tests of an all-flush-pressure-orifice air data system
[NASA-TP-1871] p0489 N81-26144
Static test of a fan-powered chin nozzle for V/STOL applications
[NASA-CR-165361] p0546 N81-29093
A program to evaluate a control system based on feedback of aerodynamic pressure differentials, part 1
[NASA-CR-164684] p0583 N81-30134
User's manual for FSLIP-3, FLEXSTAB loads integration program
[NASA-TM-81364] p0589 N81-30815
PRESSURE DRAG
NT SUPERSONIC DRAG
NT WAVE DRAG
Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
p0224 A81-23730
The influence of a wake splitter plate on the aerodynamic characteristics of a two-dimensional cylinder
p0226 A81-23949
PRESSURE EFFECTS
Discussion of the pressure-source aerosonic theory and of Doak's criticism
p0238 A81-26189
Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor --- heated intake air
[FBB-90022] p0275 N81-19126
PRESSURE FIELDS
U PRESSURE DISTRIBUTION
PRESSURE GRADIENTS
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24079
An experimental investigation of separating flow on a convex surface
p0230 A81-24488
Eddy viscosity in accelerated and retarded cascade-wake flows
p0233 A81-25267
Stalling pressure rise capability of axial flow compressor stages
[ASME PAPER 81-GT-3] p0310 A81-29928
Wind tunnel wall interference
[AD-A093301] p0217 N81-17104
Natural laminar flow flight experiment --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19010
PRESSURE MEASUREMENTS
An experimental and theoretical investigation of pressures in four-lobe bearings
p0004 A81-10840
Unsteady fan blade pressure and acoustic radiation from a JT15D-1 turbofan engine at simulated forward speed
[AIAA PAPER 81-0096] p0161 A81-20598
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122
Measurement of heat flux and pressure in a turbine stage
[ASME PAPER 81-GT-88] p0314 A81-29995
Centralized in-place pressure calibration system for multiple turbine engine aerodynamic pressure measurement systems
p0360 A81-32847
Trailing-edge airframe noise source studies on aircraft wings
[AIAA PAPER 80-0976] p0411 A81-35634
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] p0610 A81-47612
Trailing edge noise prediction from measured surface pressures
p0616 A81-48395
Flow in bent pipes
[CETIM-14-F-091] p0256 N81-18322
Unsteady pressure measurements during stall and buffeting --- wind tunnel tests
[ESA-TT-641] p0339 N81-21041
Study of an experimental probe for the measurement of the acoustic pressure inside an air flow
[ESA-TT-633] p0344 N81-21340
Preliminary calibration of the transonic test section of the NIAST trisonic tunnel
[NIAST-80/19] p0435 N81-24116
Surface pressure measurements on a projectile shape at Mach 0.908
[AD-A098589] p0439 N81-25045
Measurements of temperature and pressure fluctuations in the T prime 2 cryogenic wind tunnel
[NASA-TM-75408] p0490 N81-26158
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] p0638 N81-33204
PRESSURE OSCILLATIONS
Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
Analysis of total and static pressure fluctuations in an air intake at high incidence
[AAAF PAPER NT 80-61] p0370 A81-33950
Fluctuation of gas parameters behind the combustion chamber of gas turbine engines
p0466 A81-40024
Excitation of surging type oscillations due to aperiodic external effects --- in multishaft turbojet engines
p0509 A81-41032
Pressure fluctuations on the surface of a small passenger aircraft. I - Periodic disturbances caused by the rotation of the propeller

p0561 A81-44615
Pressure fluctuations on the surface of a small passenger aircraft. II - The effect of the turbulent boundary layer
p0562 A81-44618
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] p0619 A81-48625
Evaluation of flow quality in two large NASA wind tunnels at transonic speeds
[NASA-TP-1737] p0095 N81-13303
Analysis of unsteady pressure measurements on an aerofoil section with an harmonically oscillating, slotted flap
[DFVLR-FB-80-22] p0126 N81-13929
PRESSURE PROBES
U PRESSURE SENSORS
PRESSURE PULSES
Influence of boundary-layer suction on the emission spectrum on a thin plate performing oscillations under the action of pressure pulsations --- in aircraft noise reduction
p0054 A81-13573
Influence of boundary-layer suction on the spectrum of radiation from a thin plate vibrating under the action of pressure fluctuations --- in aircraft noise reduction
p0238 A81-26137
PRESSURE RATIO
Test results from an analytically designed axial compressor stage of 1.65:1 pressure ratio
[SAE PAPER 800629] p0063 A81-15344
Fuel character effects on current, high pressure ratio, can-type turbine combustion systems
[AD-A089182] p0029 N81-10073
PRESSURE REDUCTION
Losses of total pressure during mixing of flows in a step diffuser
p0242 A81-26991
The M.45SD-02 variable pitch geared fan engine demonstrator test and evaluation experience
p0283 A81-27897
Application of model laws when determining the heat transfer coefficients by experiments on cooled turbine blades
p0089 N81-12998
Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection --- suppressing combustion overpressure
[AD-A093542] p0208 N81-17046
Thermal and flow analysis of a convection air-cooled ceramic coated porous metal concept for turbine vanes
[NASA-TM-81749] p0376 N81-22056
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AD-A101309] p0581 N81-30116
PRESSURE REGULATORS
Cabin pressure control systems for general aviation aircraft
[SAE PAPER 800606] p0061 A81-15329
PRESSURE SENSORS
Miniature pressure probe for measuring the surface-shear-stress vector in turbulent flow
p0233 A81-25354
System to measure the pressure distribution on fan aerofoil surfaces during flutter conditions
[PNR-90013] p0072 N81-12029
Comparison of flight load measurements obtained from calibrated strain gages and pressure transducers
[AD-A093758] p0208 N81-17044
Study of an experimental probe for the measurement of the acoustic pressure inside an air flow
[ESA-TT-633] p0344 N81-21340
PRESSURE TRANSDUCERS
U PRESSURE SENSORS
PRESSURE VESSELS
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
PRESSURE WAVES
U ELASTIC WAVES
PRESSURE WELDING
NT DIFFUSION WELDING
PRESSURIZED CABINS
Cabin pressure control systems for general aviation aircraft
[SAE PAPER 800606] p0061 A81-15329
The use of bonded crack-stoppers in pressure cabins
p0233 A81-25378
PRESSURIZING
Crack propagation in panels of pressurized fuselages upon simultaneous action of cyclic loading by pressurization and high-frequency vibrations
p0054 A81-13612
PRESTON TUBES
U PITOT TUBES
U SPEED INDICATORS
PRESTRAINING
U PRESTRESSING
PRESTRESSING
Prestressed concrete airfield pavements
p0112 A81-18063
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29405
PRETREATMENT
NT PRESTRESSING
PRETWISTING
U PRESTRESSING
U TWISTING
PREVAPORIZATION
A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465
PREVENTION
NT ACCIDENT PREVENTION
NT CORROSION PREVENTION
NT FIRE PREVENTION
NT ICE PREVENTION
PRIMARY BATTERIES
NT THERMAL BATTERIES
PRIMERS (COATINGS)
Evaluation of powder coatings for application to aircraft component parts
[AD-A094724] p0277 N81-19305
PRINCETON SAILWINGS
U SAILWINGS
PRINTED CIRCUITS
NT LARGE SCALE INTEGRATION
PRIVATE AIRCRAFT
U GENERAL AVIATION AIRCRAFT
PROBABILITY
U PROBABILITY THEORY
PROBABILITY DENSITY FUNCTIONS
NT NORMAL DENSITY FUNCTIONS
PROBABILITY DISTRIBUTION FUNCTIONS
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0453 A81-37822
PROBABILITY THEORY
The evaluation of aircraft collision probabilities at intersecting air routes
p0174 A81-21967
Mathematical aspects of the probabilistic evaluations of structural safety and NDI capabilities
p0181 A81-22635
Is it safe - The safety assessment of aircraft systems. III - The use of probability methods
p0290 A81-29029
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888
Computer graphics applications
[PB81-215246] p0637 N81-33108
PROBLEM SOLVING
NT ASYMPTOTIC METHODS
NT ITERATIVE SOLUTION
PROCEDURES
NT FINITE ELEMENT METHOD
NT FINITE VOLUME METHOD
NT OPTICAL CORRECTION PROCEDURE
NT PANEL METHOD (FLUID DYNAMICS)
A unified approach to the mass balancing of rotating flexible shafts
p0095 N81-13355

Functional testing airborne radars
[AD-A097562] p0392 N81-23350
PROCEEDINGS
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 1: Proceedings
[AD-A100575] p0539 N81-28092
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093
PROCESS CONTROL (INDUSTRY)
New developments of data processing in computer-controlled manufacturing systems /DNC, FMS/
p0149 A81-19845
A new approach to thick-film resistors
p0232 A81-24968
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines --- by hot pressing
[BMFT-FB-T-79-137] p0275 N81-19128
PROCESSORS (COMPUTERS)
U CENTRAL PROCESSING UNITS
PROCUREMENT
NT GOVERNMENT PROCUREMENT
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data
[NASA-CR-152336-2] p0387 N81-23065
PROCUREMENT MANAGEMENT
Air Force Integration Support Facilities - Their total utility
p0320 A81-30240
Aircraft/avionics environmental integration program
p0570 A81-46480
Design to cost and systems, LCC
p0047 N81-11920
PROCUREMENT POLICY
Soviet practice in designing and procuring military aircraft
p0567 A81-46340
Boeing Commercial Airplane Company engine procurement practices
p0429 N81-24076
PRODUCT DEVELOPMENT
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design --- Book
p0101 A81-16720
The design-to-cost of aircraft
p0119 A81-19344
Feederjet for the 'eighties
p0410 A81-35024
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
Development of an integrated fault tolerant engine control
[AIAA PAPER 81-1365] p0502 A81-40845
A strategy for developing the next generation fighter/attack aircraft engine
[AIAA PAPER 81-1478] p0505 A81-40898
The PW100 commuter powerplant
[AIAA PAPER 81-1731] p0528 A81-43170
The new generation of turboshaft and turboprop engines
p0560 A81-44473
Low cost airborne microwave landing system receiver, task 3
[NASA-CR-152409] p0075 N81-12054
Development of high-temperature turbine subsystem technology to a technology readiness status, phase 2
[FE-1806-72] p0134 N81-14332
Development of gas turbine components, using silicon nitride --- forming techniques
[BMFT-FB-T-79-152] p0275 N81-19129
SRDS Technical Program document. Fiscal year 1981. Research and Development approved projects
[AD-A096293] p0339 N81-21050
Development of a water displacing, touch-up paint
[AD-A097125] p0392 N81-23288
Helicopter gearbox testing
p0488 N81-26137
Manufacturing development of DC-10 advanced rudder
[NASA-CR-159060] p0494 N81-27077
Development of high strength silicon carbide materials for gas turbine applications
[BMFT-FB-T-80-025] p0497 N81-27102
PRODUCTION COSTS
Aircraft engine programs employing cost objectives
p0119 A81-19346
Producibility engineering at ASD
p0326 A81-30341
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for metallic structures
p0558 A81-44374
PRODUCTION ENGINEERING
NT PRODUCTION PLANNING
Reduction of energy consumption in the vibrational shot peening of axial compressor vanes
p0005 A81-11321
Design to cost and new technologies
p0120 A81-19347
Isothermal rolling of aircraft parts - Versatile process saves costly materials
p0227 A81-24047
Optimization of finishing conditions --- metal cutting
p0319 A81-30163
Producibility engineering at ASD
p0326 A81-30341
Integrated CAD/CAM for the 1980s
[SAE PAPER 801170] p0400 A81-34185
CAD - The designers' new tool --- in aircraft production
[AIAA PAPER 81-0850] p0407 A81-34352
Integrated flexible sheet-metal components - Manufacturing center
p0449 A81-37633
Computer-aided design and manufacture in aircraft production /CAD/CAM/
p0451 A81-37647
Advanced production methods for the Dornier 228
p0457 A81-38802
Flight-vehicle production technology --- Russian book
p0564 A81-45603
Design of production processes for flight-vehicle engines --- Russian book
p0623 A81-49475
US Army design-to-cost experience
p0045 N81-11905
Environmental burn-in effectiveness
[AD-A093307] p0211 N81-17060
PRODUCTION MANAGEMENT
Producibility engineering at ASD
p0326 A81-30341
Quality in design --- and production of aircraft
[SNIAS-802-111-106] p0427 N81-24054
PRODUCTION METHODS
U PRODUCTION ENGINEERING
PRODUCTION PLANNING
Computer-aided process planning system for aircraft engine rotating parts
p0149 A81-19836
New developments of data processing in computer-controlled manufacturing systems /DNC, FMS/
p0149 A81-19845
A review and assessment of system cost reduction activities
p0045 N81-11906
Design to life cycle cost research
p0045 N81-11907
Organizing a design-to-cost program
p0046 N81-11914
PRODUCTIVITY
Producibility engineering at ASD
p0326 A81-30341
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103783] p0631 N81-33134
PRODUCTS
NT ASPHALT
NT PETROLEUM PRODUCTS
PROGRAM MANAGEMENT
U PROJECT MANAGEMENT
PROGRAM VERIFICATION (COMPUTERS)
The use of finite-state machines for describing and validating flight control systems
p0322 A81-30265
A simulator to test compressor research facility control system software
p0349 A81-31110
Optimization of simulation models for avionics software verification
p0615 A81-48373

Validation of a two dimensional primitive variable
computer code for flow fields in jet engine test
cells
[AD-A092138] p0196 N81-16060
Validation of a two-dimensional primitive variable
computer code for flow fields in jet engine test
cells
[AD-A094615] p0254 N81-18067
Blade loss transient dynamics analysis, volume 2.
Task 2: Theoretical and analytical development.
Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27690
Airborne Systems Software Acquisition Engineering
Guidebook for software development and support
facilities
[AD-A100214] p0543 N81-28789
PROGRAMMED INSTRUCTION
NT COMPUTER ASSISTED INSTRUCTION
PROGRAMMING LANGUAGES
NT FORTRAN
NT HIGH LEVEL LANGUAGES
PROGRAMS
NT DEFENSE PROGRAM
NT GLOBAL ATMOSPHERIC RESEARCH PROGRAM
NT NASA PROGRAMS
NT PANT PROGRAM
NT QUIET ENGINE PROGRAM
NT SPACE PROGRAMS
NT SUPERSONIC CRUISE AIRCRAFT RESEARCH
NT TACT PROGRAM
NT TERMINAL CONFIGURED VEHICLE PROGRAM
NT TILT ROTOR RESEARCH AIRCRAFT PROGRAM
SRDS Technical Program document. Fiscal year
1981. Research and Development approved projects
[AD-A096293] p0339 N81-21050
PROJECT MANAGEMENT
Jet engine maintenance and reliability programs -
Objectives and management
p0287 A81-28475
European transonic wind tunnel ETW - Status of the
project at the end of the predesign phase
[DGLR PAPER 81-027] p0609 A81-47563
Review of Air Force's next generation trainer
aircraft program Department of Defense
[AD-A096238] p0341 N81-21071
PROJECT PLANNING
Project Prosat --- communication satellite network
for land, sea and air traffic control
p0565 A81-45760
Preliminary design study of advanced composite
blade and hub and nonmechanical control system
for the tilt-rotor aircraft. Volume 2: Project
planning data
[NASA-CR-152336-2] p0387 N81-23065
Structures and Dynamics Division research and
technology plans, fiscal year, 1981
[NASA-TM-83137] p0491 N81-26497
PROJECTILE PENETRATION
U TERMINAL BALLISTICS
PROJECTILES
NT SABOT PROJECTILES
Aerodynamic effects of body slots on a guided
projectile with cruciform surfaces
[AIAA PAPER 79-1658] p0066 A81-15887
Optimal bodies for minimum total drag at
supersonic speeds
[AD-A091235] p0091 N81-13036
Surface pressure measurements on a projectile
shape at Mach 0.908
[AD-A098589] p0439 N81-25045
Generalized dynamic stability for linearized
yawing motion --- The stability of spinning
projectiles
[RMCS-80002] p0601 N81-31225
PROOFS
U PROVING
PROP-FAN TECHNOLOGY
Low and high speed propellers for general aviation
- Performance potential and recent wind tunnel
test results
p0521 A81-42758
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
Wright Field turboprop study
[AIAA PAPER 81-1685] p0526 A81-43157
Turboprop engine propulsion for the 1990's
[AIAA PAPER 81-1648] p0533 A81-43935
PROPAGATION (EXTENSION)
NT CRACK PROPAGATION
NT FLAME PROPAGATION
PROPAGATION VELOCITY
Crack propagation in lugs
p0180 A81-22629
Investigation of the influence of active particles
on the basic combustion characteristics in
turbulent flow
p0242 A81-26986
PROPELLANT ADDITIVES
Fire-proof fuel
p0480 A81-40458
Effect of oxygen-containing additives on the
antiwear properties of fuels for gas-turbine
aircraft engines
p0517 A81-42558
Application of General Technology Applications,
Incorporated (GTA) blending process to
antimisting fuel additives
[AD-A100692] p0551 N81-29247
PROPELLANT COMBUSTION
NT SOLID PROPELLANT COMBUSTION
A study of air breathing rockets - Subsonic mode
combustion
[IAF PAPER 80-F-270] p0115 A81-18371
Preliminary experimental study of combustion in
the solid rocket-ramjet
p0292 A81-29067
PROPELLANT DECOMPOSITION
Degradation and characterization of antimisting
kerosene /AMK/
[AIAA PAPER 81-1423] p0503 A81-40867
PROPELLANT EXPLOSIONS
Testimony of Elwood T. Driver, Vice Chairman,
National Transportation Safety Board,
accompanied by Gerrit J. Walhout, Chief, Human
Factors Division, and Matthew H. McCormick,
Senior Air Safety Investigator, Human Factors
Division
p0126 N81-13934
PROPELLANT GRAINS
Light transmission measurements in solid fuel
ramjet combustors
p0284 A81-27910
PROPELLANT PROPERTIES
Degradation and characterization of antimisting
kerosene /AMK/
[AIAA PAPER 81-1423] p0503 A81-40867
PROPELLANTS
NT GASEOUS ROCKET PROPELLANTS
NT METAL PROPELLANTS
NT SLURRY PROPELLANTS
NT SOLID PROPELLANTS
NT SOLID ROCKET PROPELLANTS
PROPELLER BLADES
Helicopter blade reliability
p0287 A81-28474
Propellers for economic flight at high speeds
[AAAF PAPER NT 80-34] p0369 A81-33936
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
Multi service applications for advancing blade
concept aircraft
[SAE PAPER 801226] p0405 A81-34229
Propfan progress
p0480 A81-40459
Impact of advanced propeller technology on
aircraft/mission characteristics of several
general aviation aircraft
[SAE PAPER 810584] p0520 A81-42745
General aviation propeller noise reduction -
Penalties and potential
[SAE PAPER 810585] p0520 A81-42746
The effect of proplets and bi-blades on the
performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757
Investigation of performance, noise and
detectability characteristics of small-scale
remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] p0624 A81-49732
The high-speed airfoil program
p0185 N81-15970
The high-speed propeller program
p0185 N81-15972
Low and high speed propellers for general
aviation: Performance potential and recent wind
tunnel test results
[NASA-TM-81745] p0338 N81-21028
An evaluation of a simplified near field noise
model for supersonic helical tip speed propellers

[NASA-TM-81727] p0380 N81-22836
The theoretical performance of high efficiency propellers
p0537 N81-28049
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] p0637 N81-33194

PROPELLER DRIVE
NT HELICOPTER PROPELLER DRIVE
Experiments on the validity of ground effect predictions for static noise testing of propeller aircraft
p0054 A81-13811
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442
Propeller performance and design as influenced by the installation
[SAE PAPER 810602] p0521 A81-42759
Investigation of a flight test method for the measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760
Correction procedures for aircraft noise data. Volume 5: Propeller aircraft noise
[AD-A091017] p0096 N81-13720

PROPELLER EFFICIENCY
Aerodynamic design of a ducted propeller - Optimization of efficiency
p0102 A81-17146
Calculation of propeller efficiency for an ideal propeller
p0121 A81-19444
Propellers for economic flight at high speeds
[AAAF PAPER NT 80-34] p0369 A81-33936
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
Propellers for economic flight at high speeds
p0464 A81-39698
Impact of advanced propeller technology on aircraft/mission characteristics of several general aviation aircraft
[SAE PAPER 810584] p0520 A81-42745
The effect of proplets and bi-blades on the performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757
Propeller performance and design as influenced by the installation
[SAE PAPER 810602] p0521 A81-42759
Electronic control system for a modern turboprop engine
[SAE PAPER 810620] p0523 A81-42775
Factors influencing the predicted performance of advanced propeller designs
[NASA-TM-82676] p0492 N81-27042
The theoretical performance of high efficiency propellers
p0537 N81-28049

PROPELLER FANS
The relevance of the Flex-Hub Prop-Fan for fuel-efficient airliners
p0006 A81-11605
Noise generation mechanism of low pressure propeller fans
[AIAA PAPER 81-0090] p0160 A81-20594
Propellers for economic flight at high speeds
p0464 A81-39698
Propfan progress
p0480 A81-40459
Propulsion system installation design for high-speed prop-fans
[AIAA PAPER 81-1649] p0526 A81-43144
Advanced turboprop installation aerodynamics
p0260 N81-19013

PROPELLER SLIPSTREAMS
Installation effects on propeller noise
[AIAA PAPER 80-0993] p0352 A81-31369
Assessment of propeller influence on lateral-directional stability of multiengine aircraft
p0411 A81-35632
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163967] p0251 N81-10046

PROPELLERS
NT PROPELLER FANS
NT SHROUDED PROPELLERS
NT VARIABLE PITCH PROPELLERS
Influence of a change in power at the propeller on the properties of the aircraft
p0059 A81-14754
Aerodynamic characteristics of an advanced technology propeller for commuter aircraft
[AIAA PAPER 81-1565] p0507 A81-40948
Factors influencing the predicted performance of advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Noise and performance of general aviation aircraft - A review of the MIT study
[SAE PAPER 810586] p0520 A81-42747
Low and high speed propellers for general aviation - Performance potential and recent wind tunnel test results
p0521 A81-42758
A prediction procedure for propeller aircraft flyover noise based on empirical data
[SAE PAPER 810604] p0521 A81-42761
Pressure fluctuations on the surface of a small passenger aircraft. I - Periodic disturbances caused by the rotation of the propeller
p0561 A81-44615
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634
Noise levels and data correction analysis for seven general aviation propeller aircraft
[AD-A091292] p0096 N81-13717
Propeller propulsion integration, phase 1 --- conducted in langley 30 by 60 foot full scale wind tunnel
[NASA-CR-163921] p0196 N81-16058
Sources, control, and effects of noise from aircraft propellers and rotors --- noise prediction (aircraft
p0269 N81-19073
Sources, control, and effects of noise from aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838
Full-scale aerodynamic characteristics of a propellar installed on a small twin-engine aircraft wing panel
[NASA-TM-81285] p0385 N81-23039
Additional noise data on the SR-3 propeller
[NASA-TM-81736] p0447 N81-25767
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845
Factors influencing the predicted performance of advanced propeller designs
[NASA-TM-82676] p0492 N81-27042
The theoretical performance of high efficiency propellers
p0537 N81-28049
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] p0631 N81-32966

PROPULSION
NT AUXILIARY PROPULSION
NT ELECTRIC PROPULSION
NT HYBRID PROPULSION
NT JET PROPULSION
NT LOW THRUST PROPULSION
NT MARINE PROPULSION
NT SPACECRAFT PROPULSION
NASA Research in aeropropulsion
[NASA-TM-81633] p0093 N81-13056
Bibliography of Supersonic Cruise Research (SCR) program from 1977 to mid-1980
[NASA-RP-1063] p0139 N81-14973
Engineering and development program plan propulsion safety
[AD-A098709] p0444 N81-25088

PROPULSION SYSTEM CONFIGURATIONS
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0058 A81-14389

Lear fan propulsion system
[SAE PAPER 800609] p0062 A81-15332
Aircraft thrust augmentors of ejector type --- Russian book
p0289 A81-28760
NASA research in aeropropulsion
[ASME PAPER 81-GT-96] p0314 A81-30003
Study of a propulsive system --- aerodynamic characteristics of proposed model
p0366 A81-33673
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
Combat survivability with advanced aircraft propulsion development
[AIAA PAPER 81-1506] p0507 A81-40913
Propulsion system installation design for high-speed prop-fans
[AIAA PAPER 81-1649] p0526 A81-43144
Fiber-reinforced composites - The future for aeropropulsion
[AIAA PAPER 81-1713] p0527 A81-43164
Numerical and classical analysis of V/STOL aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898
Aerodynamic integration of externally mounted engines on a long-range bomber
[AIAA PAPER 81-1693] p0563 A81-44899
Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45891
Bibliography on aerodynamics of airframe/engine integration of high-speed turbine-powered aircraft, volume 1
[NASA-TM-81814] p0035 N81-11032
Simulating study of the interaction between the propulsion and flight control systems of a subsonic lift fan VTOL
[NASA-TM-81239] p0036 N81-11043
NASA Research in aeropropulsion
p0089 N81-12980
Progress in materials and structures at Lewis Research Center
p0089 N81-12982
Advanced Technology Spark-Ignition Aircraft Piston Engine Design Study
[NASA-CR-165162] p0130 N81-13963
Experimental analysis and methods to determine the dynamic behavior of propulsion shafting systems
p0145 N81-15401
Progress with variable cycle engines
p0245 N81-17997
Supersonic cruise vehicle research/business jet
p0248 N81-18022
Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045
GASP- General Aviation Synthesis Program. Volume 4: Propulsion. Part 1: Theoretical development
[NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466
Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81761] p0443 N81-25079
Microcomputer Applications in Power and Propulsion Systems
[AGARD-LS-113] p0497 N81-27103
The packaging of electronic engine control units and related subcomponents
p0497 N81-27105
Small turbine engine augmentor. Phase 1: Preliminary design studies of afterburner and duct-burner configurations
[AD-A101595] p0583 N81-30131

PROPULSION SYSTEM PERFORMANCE
A survey on airbreathing propulsion education
p0063 A81-15375
Specialists' Meeting on Helicopter Propulsion Systems, Williamsburg, Va., November 6-8, 1979, Technical Papers
p0104 A81-17501
Helicopter propulsion system development and qualification
p0105 A81-17511
A survey of propulsion systems' malfunctions/failures resulting in helicopter mishaps
p0105 A81-17513
The future of aeronautical propulsion
p0290 A81-29052
Effectiveness of turbine engine diagnostic systems
p0290 A81-29053
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067
Air augmentation of rockets for low speed application
p0292 A81-29068
A new breed of an air breathing engine
p0292 A81-29070
Gas turbine engineering: Applications, cycles and characteristics --- Book
p0309 A81-29680
Life cycle cost before, during and after the design of aircraft propulsion systems
[ASME PAPER 81-GT-111] p0315 A81-30016
New correlations of the two-dimensional turbine cascade aerodynamic performance
[ASME PAPER 81-GT-128] p0316 A81-30032
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093
Improvement of the energy efficiency of helicopters
[AAAF PAPER NT 80-33] p0369 A81-33933
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152
JT8D performance improvement to offset rising fuel costs
[SAE PAPER 801117] p0395 A81-34153
Performance deterioration of commercial high-bypass ratio turbofan engines
[SAE PAPER 801118] p0396 A81-34154
A review of the installation, performance and economic aspects of a high altitude facility for small gas turbines
[SAE PAPER 801121] p0396 A81-34157
An alternative approach to engine rating structures using monitoring systems
[SAE PAPER 801225] p0405 A81-34228
Multi service applications for advancing blade concept aircraft
[SAE PAPER 801226] p0405 A81-34229
Development requirements for integrated aircraft power systems
[SAE PAPER 801149] p0406 A81-34241
Component research for future propulsion systems
p0454 A81-38058
A nonlinear propulsion system simulation technique for piloted simulators
p0454 A81-38064
V/STOL combat aircraft progress from the powerplant viewpoint
p0469 A81-40105
Design and development of the Model 412 helicopter
[AHS 80-56] p0478 A81-40181
V/STOL technology requirements for future fighter aircraft
[AIAA PAPER 81-1360] p0502 A81-40841
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842
Fuel character effects on the TF41 engine combustion system
[AIAA PAPER 81-1391] p0503 A81-40858
Selected results from combustion research at the Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859
Analysis of steady, two-dimensional, chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique --- for performance prediction of ramjet propulsion system
[AIAA PAPER 81-1432] p0504 A81-40869
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878
External burning propulsion analysis
[AIAA PAPER 81-1477] p0505 A81-40897
Firebrand ramjet propulsion system development
[AIAA PAPER 81-1486] p0506 A81-40904
JT9D performance deterioration results from a simulated aerodynamic load test

[AIAA PAPER 81-1588] p0507 A81-40963
Performance analysis of a family of planar pulse
generators
[AIAA PAPER 81-1590] p0507 A81-40965
NASA VCE test bed engine aerodynamic performance
characteristics and test results
[AIAA PAPER 81-1594] p0508 A81-40969
Advanced supersonic transport propulsion and
configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Turbine bypass engine - A new supersonic cruise
propulsion concept
[AIAA PAPER 81-1596] p0508 A81-40971
The supersonic fan engine - An advanced concept in
supersonic cruise propulsion
[AIAA PAPER 81-1599] p0508 A81-40973
Factors influencing the predicted performance of
advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Small turbofan engines - Their impact on general
aviation aircraft
[SAE PAPER 810622] p0523 A81-42776
An overview of general aviation propulsion
research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-42778
Aerodynamic design data for a cruise-matched high
performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779
Sensor/actuator failure detection and isolation
for airbreathing propulsion systems
p0564 A81-45551
Propulsion Controls, 1979 --- air breathing engine
control
[NASA-CP-2137] p0078 N81-12090
Performance seeking controls
p0079 N81-12092
F100 multivariable control synthesis program: A
review of full scale engine altitude tests ---
F100 engine
p0079 N81-12093
Design of a multivariable integrated control for a
supersonic propulsion system --- variable stream
control engine
p0079 N81-12094
Propulsion controls
p0079 N81-12095
Propulsion system mathematical model for a
lift/cruise fan V/STOL aircraft
[NASA-TM-81663] p0195 N81-16055
Propeller propulsion integration, phase 1 ---
conducted in langley 30 by 60 foot full scale
wind tunnel
[NASA-CR-163921] p0196 N81-16058
Compilation of energy efficient concepts in
advanced aircraft design and operations. Volume
2: Abstract data base
[AD-A094226] p0252 N81-18050
Energy efficient engine flight propulsion system:
Aircraft/engine integration evaluation
[NASA-CR-159584] p0375 N81-22051
Component research for future propulsion systems
[NASA-TM-82613] p0376 N81-22055
A nonlinear propulsion system simulation tehnique
for piloted simulators
[NASA-TM-82600] p0390 N81-23085
Performance deterioration based on simulated
aerodynamic loads test, JT9D jet engine
diagnostics program
[NASA-CR-165297] p0390 N81-23086
Development test requirements --- impact of weapon
systems on propulsion system performance
p0430 N81-24080
Engine life development --- operating costs and
propulsion system performance
p0430 N81-24081
Development for new laboratories for future testing
p0433 N81-24105
Propulsion system study for Small Transport
Aircraft Technology (STAT)
[NASA-CR-165330] p0442 N81-25078
Turbine bypass engine: A new supersonic cruise
propulsion concept
[NASA-TM-82608] p0489 N81-26145
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
Helicopter propulsion system reliability and
engine monitoring assessments
p0599 N81-31213
Simplified off-design performance model of a day
turbofan engine cycle
[NASA-TM-83204] p0639 N81-33206
PROPULSIVE EFFICIENCY
NT PROPELLER EFFICIENCY
The impact of contingency ratings on advanced
turboshaft engine design
p0104 A81-17502
Unsteady aerodynamic propulsion
[AIAA 81-0645] p0307 A81-29490
Efficiency prediction for axial-flow turbines
operating with nonconventional fluids
[ASME PAPER 81-GT-15] p0310 A81-29937
Further studies of the influence of thermal
effects on the predicted acceleration of gas
turbines
[ASME PAPER 81-GT-21] p0311 A81-29938
Improvement of the energy efficiency of helicopters
[AAAF PAPER NT 80-33] p0369 A81-33933
Fuel efficiency improvements to the T56 turboprop
engine
[SAE PAPER 801158] p0399 A81-34178
Turbine engine design --- engineering for cost
effectiveness and propulsive efficiency
[AIAA PAPER 81-0915] p0408 A81-34362
Optimization of aircraft propulsion
p0464 A81-39697
ABC development status and design considerations
for several military applications --- Advancing
Blade Concept for helicopter
[AHS 80-12] p0474 A81-40145
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401
Propulsion energy for tomorrow's aviation
p0622 A81-49161
Development test requirements --- impact of weapon
systems on propulsion system performance
p0430 N81-24080
Axisymmetric & non-axisymmetric exhaust jet
induced-effects on a V/STOL vehicle design.
Part 1: Data presentation --- conducted in Ames
11-foot transonic tunnel
[NASA-CR-166146] p0441 N81-25064
PROTECTION
NT CIRCUIT PROTECTION
NT CORROSION PREVENTION
NT ENVIRONMENT PROTECTION
NT RADIATION SHIELDING
NT THERMAL PROTECTION
Flame tube and ballistic evaluation of Explosafe
aluminum foil for aircraft fuel tank explosion
protection --- suppressing combustion overpressure
[AD-A093542] p0208 N81-17046
PROTECTIVE CLOTHING
NT HELMETS
PROTECTIVE COATINGS
NT CERAMIC COATINGS
NT PRIMERS (COATINGS)
Turbine airfoil coating refurbishment
[AIME PAPER F79-10] p0059 A81-14770
Coatings in the aero gas turbine
p0103 A81-17167
Mechanical properties of aluminum coatings on
heat-resistant steels
p0355 A81-31668
Technology for rustproofing aircraft and helicopters
--- Russian book
p0529 A81-43520
Development of graphite-epoxy covers for L-1011
advanced composite vertical fin
p0530 A81-43627
A process for protecting gas turbine blade cooling
passages against degradation
p0622 A81-49209
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
Mechanical property improvement of protective
coatings for turbine engines using coal-derived
fuels
[DOE/ET-12293/T1] p0094 N81-13064
The resistance of tank protective measures to
microorganisms
[SNIAS-801-551-107] p0144 N81-15072
Ceramic and coating applications in the hostile
environment of a high temperature hypersonic
wind tunnel --- Langley 8-foot high temperature
structures tunnel
[NASA-TM-81931] p0254 N81-18199

Evaluation of powder coatings for application to aircraft component parts
[AD-A094724] p0277 N81-19305
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069
Erosion resistant coatings
[NASA-TM-75870] p0377 N81-22098
Development of a water displacing, touch-up paint
[AD-A097125] p0392 N81-23288
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28094
Improving turbine engine compressor performance retention through airfoil coatings
p0598 N81-31203
An introduction to NASA's turbine engine hot section technology (HOST) project
p0599 N81-31206

PROTECTORS
NT EAR PROTECTORS
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-25041

PROTUBERANCES
An investigation of support-interference effects
[NAL-TR-627] p0141 N81-14984

PROVING
Sea King mathematical model validation trials. Flight data channel calibration
[AD-A096587] p0374 N81-22043

PSYCHOACOUSTICS
A program to support the full utilization of data from existing social surveys of environmental noise
p0570 A81-46374
Survey population response to airplane noise, part 1
[NASA-TM-75790] p0031 N81-10576
Subjective field study of response to impulsive helicopter noise
[NASA-TP-1833] p0345 N81-21873
Sources, control, and effects of noise from aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904
Annoyance caused by light aircraft noise
[NASA-TM-76533] p0379 N81-22589
The annoyance caused by airplane noise in the vicinity of Orly Airport and the reaction of neighboring residents
[NASA-TM-76575] p0379 N81-22590
The effect of airplane noise on the inhabitants of areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22593
The relationship between noise and annoyance around Orly
[NASA-TM-76573] p0379 N81-22594
Acoustic facilities for human factors research at NASA Langley Research Center: Description and operational capabilities
[NASA-TM-81975] p0446 N81-25765
Sidetone-level considerations in aircraft communication systems
p0605 N81-31475

PSYCHOLOGY
NT PSYCHOACOUSTICS

PSYCHOPHYSICS
NT PSYCHOACOUSTICS

PSYCHOPHYSIOLOGY
NT WORKLOADS (PSYCHOPHYSIOLOGY)

PULSATING FLOW
U UNSTEADY FLOW

PULSE CODE MODULATION
Wind shear detection from PCM-recorded MLS-flight data
p0015 A81-11675
Application of pulse code modulation technology to aircraft dynamics data acquisition
[AIAA PAPER 81-1736] p0528 A81-43173

PULSE COMMUNICATION
A multiplexed digital voice intercommunications system for military applications
[SAE PAPER 801144] p0398 A81-34173
A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test
[NASA-CR-3461-VOL-1] p0595 N81-31171
A multiplexed digital voice intercommunications system compatible with future voice conversion techniques
p0605 N81-31474

PULSE DOPPLER RADAR
NT MONOPULSE RADAR
Pulsed Doppler radar detects weather hazards to aviation
[AIAA PAPER 81-0235] p0163 A81-20691
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051

PULSE GENERATORS
Performance analysis of a family of planar pulse generators
[AIAA PAPER 81-1590] p0507 A81-40965
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333

PULSE MODULATION
NT PULSE CODE MODULATION

PULSE RADAR
NT MONOPULSE RADAR
NT PULSE DOPPLER RADAR
Coherent signal processing in frequency agile pulse radar units
p0152 A81-20097
Minimum operational performance standards for airborne weather and ground mapping pulsed radars
[RTCA/DO-173] p0336 N81-20323

PULSED LASERS
Holographic non-destructive testing of materials using pulsed lasers --- for aircraft structures
p0013 A81-11655
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
Pulsed laser mapping system for light aircraft
p0223 A81-23671
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISI-CO-218/79] p0133 N81-14300
A study in flow control and screening methods for aircraft laser turrets
[AD-A101723] p0548 N81-29126

PULSED RADIATION
NT ELECTROMAGNETIC PULSES
NT SYSTEM GENERATED ELECTROMAGNETIC PULSES

PULSES
NT ELECTRIC PULSES
NT ELECTROMAGNETIC PULSES
NT PRESSURE PULSES
NT SYSTEM GENERATED ELECTROMAGNETIC PULSES

PUMP IMPELLERS
Inlet flow in centrifugal pumps at partial deliveries
[VKI-PREPRINT-1979-16] p0031 N81-10437

PUMPS
NT CENTRIFUGAL PUMPS
NT FUEL PUMPS
NT TURBINE PUMPS
NT WINDPOWERED PUMPS

PURSUIT TRACKING
The variable-speed tail-chase aerial combat problem
p0351 A81-31295
Design of a lateral stability augmentation system for the F106 to improve lateral handling qualities during tracking
[AD-A091014] p0094 N81-13067
Formation tracking. Part 2: Tracking and control procedures
[FPM-279-PT-2] p0216 N81-17110

PYLONS
Wind tunnel tests of large- and small-scale rotor hubs and pylons
[AD-A098510] p0439 N81-25043

PYROGRAPHALLOY
U COMPOSITE MATERIALS
U REFRACTORY MATERIALS

PYROLYSIS
Determination of coking rate in jet fuel
p0570 A81-46440

PYROMETERS
NT RADIATION PYROMETERS
NT THERMOCOUPLE PYROMETERS

PYROMETRY
U TEMPERATURE MEASUREMENT

PYROTECHNICS
Pyrotechnics serving safety --- in aircraft air and ground escape systems
p0120 A81-19348

Applications of pyrotechniques in aviation
[SNIAS-792-422-103] p0023 N81-10025
P3V AIRCRAFT
U P-3 AIRCRAFT

Q

QUALITY
NT AIR QUALITY
NT ENVIRONMENTAL QUALITY
NT WATER QUALITY
A United Kingdom view on future fuels
[PNR-90068] p0602 N81-31398
QUALITY CONTROL
Nondestructive evaluation of composite structures
p0013 A81-11654
Quality control of precision castings for turbojet engine parts
p0052 A81-13330
Inspection methods for various critical steel parts for airframes
p0052 A81-13331
New avenues of research in ultrasonic inspection and their applications in the aerospace industry
p0052 A81-13332
The contribution of structural testing to total airworthiness
p0068 A81-16424
Comparative evaluation of the quality of jet fuels
p0103 A81-17371
Automatization of the adhesion process for supporting airframe parts in light contour systems
p0118 A81-19297
Evaluation and comparison of nondestructive service inspection methods
p0153 A81-20135
Application of exoelectron emission for quality control of gas-turbine engine parts
p0171 A81-21367
Aircraft accident investigation as it relates to life support equipment
p0176 A81-22103
Prospects for bonding primary aircraft structure in the 80's
p0182 A81-22679
The necessity of 'testing-in' hardware reliability
p0229 A81-24277
A new approach to thick-film resistors
p0232 A81-24968
The quality of nonmetallic materials
p0238 A81-26244
Optics in metrology and quality assurance; Proceedings of the Seminar, Los Angeles, Calif., February 6, 7, 1980
p0358 A81-32504
Aircraft quality assurance using close-range photogrammetry
p0358 A81-32506
Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563
Quality assurance of an epoxy resin prepreg using HPLC
p0531 A81-43642
Manufacturing the F-16 composite horizontal tail
p0531 A81-43646
Development of composite material helicopter structures
p0576 A81-46641
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] p0610 A81-47603
Quality in design --- and production of aircraft
[SNIAS-802-111-108] p0427 N81-24054
Thirty years experience with primary adhesive bonded structures --- aircraft construction
[FOK-BO-1240] p0541 N81-28189
QUANTITATIVE ANALYSIS
The application of UV spectroscopy to the quantitative analysis of nitrogen oxide
p0089 N81-13008
QUARTZ CRYSTALS
The behavior of quartz oscillators in the presence of accelerations --- in missile and aircraft time-frequency navigation systems
[ONERA, TP NO. 1981-31] p0351 A81-31285
QUASILINEARITY
U NONLINEARITY
QUATERNARY ALLOYS
Effect of beta flecks on the fatigue behaviour of Ti-6Al-6V-2Sn
p0510 A81-41634
QUIET ENGINE PROGRAM
QSRA Joint Navy/NASA sea trials --- Quiet Short Haul Research Aircraft
[AIAA PAPER 81-0152] p0161 A81-20633
Reverse thrust performance of the QCSEE variable pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
The design and development of a mixer compound exhaust system for a quiet clean general aviation turbofan
[AIAA PAPER 81-1494] p0566 A81-45893
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] p0619 A81-48621
Low-speed aerodynamic performance of 50.8-centimeter-diameter noise-suppressing inlets for the Quiet, Clean, Short-haul Experimental Engine (QCSEE) --- Lewis 9- by 15-foot low speed wind tunnel tests
[NASA-TP-1178] p0035 N81-11037
QCGAT mixer compound exhaust system design and static big model test report
[NASA-CR-135386] p0274 N81-19119
Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81751] p0443 N81-25079
Quiet Clean Short-haul Experimental Engine (QCSEE): acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet, test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] p0629 N81-32147

R

RACON BEACONS
U RADAR BEACONS
RADAR
NT AIRBORNE SURVEILLANCE RADAR
NT COHERENT RADAR
NT CONTINUOUS WAVE RADAR
NT DOPPLER RADAR
NT INFRARED RADAR
NT LANDING RADAR
NT METEOROLOGICAL RADAR
NT MONOPULSE RADAR
NT MOVING TARGET INDICATORS
NT OPTICAL RADAR
NT PULSE DOPPLER RADAR
NT PULSE RADAR
NT RADAR MEASUREMENT
NT SEARCH RADAR
NT SECONDARY RADAR
NT SIDE-LOOKING RADAR
NT SURVEILLANCE RADAR
NT SYNTHETIC APERTURE RADAR
NT TRACKING RADAR
Modern radar: Theory, operation and maintenance /2nd edition/ --- Book
p0223 A81-23372
RADAR ALTIMETERS
U RADIO ALTIMETERS
RADAR ANTENNAS
Improved secondary radar antennas for flight safety installations
p0151 A81-20083
New ways in antenna technology for optimal adjustment of the background clutter
p0151 A81-20084
Increased target resolution and minor lobe reduction with active group antennas
p0152 A81-20090
Improvement of effective minor lobe behavior of radar antennas through signal processing
p0152 A81-20091
Side lobe suppression with digital signal processing
p0152 A81-20092
Rotating blades radio interference in a helicopter-borne CW Doppler radar
p0224 A81-23013

Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35891
Wind loads for bar-truss structures
p0259 N81-18997
Multiple arrested synthetic aperture radar
[AD-A101143] p0551 N81-29317
RADAR APPROACH CONTROL
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44681
RADAR BEACONS
NT DISCRETE ADDRESS BEACON SYSTEM
The Discrete Address Beacon System/Air Traffic Control Radar Beacon System/ATCRBS IFF Mark 12 system (DABS/ATCRBS/AIMS) performance prediction model
[AD-A089440] p0024 N81-10034
Impact of the discrete Address Beacon System (DABS) on Air Traffic Control Radar Beacon System (ATCRBS) performance in selected deployments
[AD-A089611] p0025 N81-10039
Noncoherent C-band transponder standards
[AD-A091282] p0095 N81-13251
Detection of military aircraft in an Air Traffic Control Radar Beacon System (ATCRBS) environment
[AD-A093427] p0207 N81-17036
Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests
[AD-A094124] p0250 N81-18037
Active Beacon Collision Avoidance System (BCAS) functional overview
[AD-A094177] p0250 N81-18040
Minimum operational performance standards for airborne radar approach and beacon systems for helicopters
[RTCA/DO-172] p0336 N81-20322
Discrete Address Beacon System (DABS) computer performance/test and evaluation
[AD-A099326] p0484 N81-26088
Radar Beacon Transponder (RBX) functional description
[AD-A100665] p0547 N81-29112
Radar Beacon Transponder (RBX) installation and siting criteria
[AD-A100666] p0547 N81-29113
RADAR CLUTTER MAPS
New ways in antenna technology for optimal adjustment of the background clutter
p0151 A81-20084
Evaluation of false alarm information with the ELRA
p0152 A81-20100
RADAR CROSS SECTIONS
Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370
Detection of target multiplicity using monopulse quadrature angle
p0360 A81-32696
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
p0607 A81-47143
Electromagnetic scattering by open circular waveguides --- modeling jet engine inlets
[AD-A095554] p0336 N81-20345
RADAR DATA
The state of development and design of target data processing of the ELRA system
p0152 A81-20089
New techniques and development trends in the system architecture of EDP systems for radar data processing and airspace control
p0153 A81-20103
Ground moving target radar signal simulation
p0323 A81-30304
RADAR DETECTION
Radar target detection and map-matching algorithm studies
p0005 A81-11158
Time-compressed displays for target detection
p0064 A81-15686
Adaptive control for electronic countermeasures
p0155 A81-20470
Mini-RPV radar test program
p0180 A81-22619
Advanced techniques for airborne target screener
p0320 A81-30238
Detection of target multiplicity using monopulse quadrature angle
p0360 A81-32696
RADAR DIRECTION FINDERS
U RADIO DIRECTION FINDERS
RADAR DISPLAYS
U RADARSCOPES
RADAR ECHOES
NT CLUTTER
RADAR EQUIPMENT
NT DISCRETE ADDRESS BEACON SYSTEM
NT PLAN POSITION INDICATORS
NT RADAR ANTENNAS
NT RADAR BEACONS
NT RADAR FILTERS
NT RADAR RECEIVERS
NT RADARSCOPES
Measurement of radar in radio service aircraft
p0151 A81-20079
Coherent signal processing in frequency agile pulse radar units
p0152 A81-20097
Aircraft radar equipment and its operation --- Russian book
p0289 A81-26759
A millimeter wave radar for U.S. Army helicopters in the 80's
p0323 A81-30302
Technology advances allow multiple role radar design for the F/A-18
[SAE PAPER 801163] p0399 A81-34179
Optimized computer systems for avionics applications
[AD-A089570] p0028 N81-10063
Minimum operational performance standards for airborne weather and ground mapping pulsed radars
[RTCA/DO-173] p0336 N81-20323
Functional testing airborne radars
[AD-A097562] p0392 N81-23350
RADAR FILTERS
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
RADAR IMAGERY
Computer generated radar images for navigation
p0049 A81-12793
New airborne weather radar systems
[AIAA PAPER 81-0237] p0163 A81-20692
Versatile and economical real-time simulation for digital flight control systems
[AIAA 81-0974] p0415 A81-36563
Detection performance evaluation of the ASDE-3 using fixed frequency and frequencyagile operation
[AD-A099513] p0499 N81-27372
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-30143
Development of a ground signal processor for digital synthetic array radar data
[NASA-CR-161074] p0602 N81-31421
RADAR MAPS
NT RADAR IMAGERY
Radar target detection and map-matching algorithm studies
p0005 A81-11158
A preliminary human factors flight assessment of a Marconi automatic map
[AD-A092585] p0193 N81-16036
Minimum operational performance standards for airborne weather and ground mapping pulsed radars
[RTCA/DO-173] p0336 N81-20323
RADAR MEASUREMENT
Adaptive features and measurement requirements for advanced surveillance radars
p0617 A81-48544
RADAR NAVIGATION
Aircraft radar equipment and its operation --- Russian book
p0289 A81-28759
The development of secondary radar in air traffic control
p0565 A81-45762
Trends in the future development of air traffic control systems
p0566 A81-45764
A simple radar for navigation accuracy measurements
p0612 A81-47044
Proposed ATC system for the Gulf of Mexico: Helicopter operations development program

[AD-A089430] p0025 N81-10036
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116
RADAR OBSERVATION
U RADAR TRACKING
RADAR RECEIVERS
Parameter estimation of an SSR amplitude comparison monopulse extractor --- Secondary Surveillance Radar
p0571 A81-46537
RADAR RESOLUTION
Detection of target multiplicity using monopulse quadrature angle
p0360 A81-32696
RADAR SCATTERING
Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35891
RADAR TARGETS
The state of development and design of target data processing of the ELRA system
p0152 A81-20089
Detection of direction changes of flying targets from position coordinates of the radar data
p0152 A81-20099
Automatic clustering of synthetic aperture radar /SAR/ targets
p0323 A81-30303
Maximum likelihood elevation angle estimates of radar targets using subapertures
p0359 A81-32691
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
p0607 A81-47143
Adaptive features and measurement requirements for advanced surveillance radars
p0617 A81-48544
RADAR TRACKING
A mobile computer-aided detection and tracking system for low-flying attack aircraft
p0152 A81-20098
Detection of direction changes of flying targets from position coordinates of the radar data
p0152 A81-20099
Application of Doppler information to automatic target tracking
p0153 A81-20101
New techniques for the monopulse-radar tracking of high-manoeuverability aircraft
p0153 A81-20102
Adaptive control for electronic countermeasures
p0155 A81-20470
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21828
Implementation of target orientation angles in improved Kalman filter based short range radar tracking
p0326 A81-30340
Maximum likelihood elevation angle estimates of radar targets using subapertures
p0359 A81-32691
Dynamic errors of the Kalman filtering of trajectory parameters --- for radar tracking of aircraft maneuvers
p0366 A81-33687
AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329
Nonlinear estimation of generalized vector shot processes
p0529 A81-43583
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44681
Aircraft recognition by means of monostatic radar
p0607 A81-47142
The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2 --- air traffic control
[NLR-MP-79038-U] p0332 N81-20059
Airport Surface Detection Equipment (ASDE)-3 operational evaluation
[AD-A098480] p0440 N81-25059
Analytical investigation of time correction in alpha-beta tracking filters with application to en route tracking
[AD-A099218] p0484 N81-26090
Multiple arrested synthetic aperture radar
[AD-A101143] p0551 N81-29317
RADAR TRANSMISSION
Multipath and interference effects in secondary surveillance radar systems
p0183 A81-23359
RADARSCOPES
NT PLAN POSITION INDICATORS
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024
RADIAL FLOW
Cooled radial in-flow turbines for advanced gas turbine engines
[ASME PAPER 81-GT-213] p0318 A81-30102
Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-34166
An experimental and theoretical investigation of a twin-entry radial flow turbine under non-steady flow conditions
[SAE PAPER 801136] p0397 A81-34167
Experiments with a supersonic multi-channel radial diffuser
[AD-A094192] p0257 N81-18374
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-164214] p0300 N81-22833
RADIANT HEATING
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10120
RADIATION ABSORPTION
NT ATMOSPHERIC ATTENUATION
NT ELECTROMAGNETIC ABSORPTION
RADIATION DISTRIBUTION
NT ANTENNA RADIATION PATTERNS
NT DIFFRACTION PATTERNS
Radiation boundary conditions for wave-like equations --- numerical jet acoustics experimentation
p0153 A81-20223
RADIATION FIELDS
U RADIATION DISTRIBUTION
RADIATION HARDENING
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940
Nuclear hardness assurance for aeronautical systems
[SAE PAPER 801227] p0405 A81-34230
Optimal nuclear radiation criteria for aeronautical systems
[AD-A101651] p0546 N81-29125
RADIATION HEATING
U RADIANT HEATING
RADIATION MEASUREMENT
Microcomputer system for controlling an infrared scanning camera --- with application to rocket plume radiation measurement
p0453 A81-37749
Test facility for the measurement of infrared radiation from jet engine exhaust systems
p0462 A81-39503
RADIATION MEASURING INSTRUMENTS
NT FLIR DETECTORS
NT INFRARED DETECTORS
NT INFRARED INSTRUMENTS
NT INFRARED RADIOMETERS
NT INFRARED SCANNERS
NT INFRARED SPECTROMETERS
NT MICROWAVE RADIOMETERS
RADIATION NOISE
U ELECTROMAGNETIC NOISE
RADIATION PRESSURE
NT SOUND PRESSURE
RADIATION PROTECTION
NT RADIATION SHIELDING
RADIATION PYROMETERS
Surface pyrometry in presence of radiation from other sources with application to turbine blade temperature measurement
[NASA-TP-1754] p0036 N81-11039
RADIATION RESISTANCE
U RADIATION TOLERANCE

RADIATION SHIELDING
General Electric infrared suppressors for the Black Hawk helicopter
p0106 A81-17520
RADIATION SPECTRA
NT EMISSION SPECTRA
NT INFRARED SPECTRA
NT RAMAN SPECTRA
RADIATION TOLERANCE
Nuclear hardness assurance for aeronautical systems
[SAE PAPER 801227] p0405 A81-34230
RADIATIVE HEAT TRANSFER
Analysis of a reverse flow, annular combustion chamber
p0294 A81-29081
RADIATIVE TRANSFER
NT RADIATIVE HEAT TRANSFER
RADIO ALTIMETERS
Accuracy of noise-modulated radio altimeter
p0359 A81-32694
Seasat altimeter height calibration --- related to sea surface heights near bermuda
[NASA-TM-82040] p0279 N81-19526
RADIO ANTENNAS
Excitation of a circular array of cylinders with longitudinal slits --- in radio antennas
p0019 A81-12619
Antenna-to-antenna coupling in aircraft radio systems
p0057 A81-14280
Flight-vehicle antennas /2nd revised and enlarged edition/ --- Russian book
p0281 A81-27534
RADIO BEACONS
NT OMNIDIRECTIONAL RADIO RANGES
New technology for the NDB system and its reliability. II --- omnidirectional radio beacons
p0230 A81-24524
New technology for the NDB system and its reliability. III --- omnidirectional radio beacon
p0231 A81-24525
Investigation of Wilcox model 585B very high frequency omnidirectional radio range system, part 2
[AD-A099525] p0094 N81-27073
RADIO COMMUNICATION
NT TIME DIVISION MULTIPLE ACCESS
The use of satellite systems for communication
p0051 A81-13310
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318
Automated pilot advisory system test and evaluation at Manassas Municipal Airport
p0264 N81-19040
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116
Transverse Voice Radio Link for Stratospheric Balloons
[INPE-1992-RPE/285] p0586 N81-30331
Impact of low altitude coverage requirements on air-ground communications
[AD-A101642] p0586 N81-30338
Clear speech: A strategem for improving radio communications and automatic speech recognition in noise
p0603 N81-31453
RADIO CONTROL
Aerial surveying of small areas from a small remotely controlled drone
p0107 A81-17525
RADIO DIRECTION FINDERS
Passive location finding with a multiwavelength two element interferometer
p0350 A81-31125
Hyperbolic origins --- of radio position-fixing systems
p0612 A81-47842
Radio direction finding on high frequency short duration signals
[AD-A092136] p0192 N81-16029
RADIO EQUIPMENT
NT OMNIDIRECTIONAL RADIO RANGES
NT RADIO ANTENNAS
NT RADIO BEACONS
NT RADIO RECEIVERS
NT RADIO TRANSMITTERS
NT RADIOSONDES
NT RECEPTION DIVERSITY
NT SONOBUOYS
NT SPACECRAFT ANTENNAS
NT TRANSPONDERS
Antenna-to-antenna coupling in aircraft radio systems
p0057 A81-14280
Aircraft equipment /2nd revised and enlarged edition/ --- Russian book
p0355 A81-31823
Aircraft radio systems --- Book
p0513 A81-41871
Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037
RADIO FREQUENCIES
NT C BAND
NT HIGH FREQUENCIES
NT LOW FREQUENCIES
NT LOW FREQUENCY BANDS
NT SUPERHIGH FREQUENCIES
NT VERY HIGH FREQUENCIES
NT VERY LOW FREQUENCIES
RADIO FREQUENCY INTERFERENCE
NT ELECTROMAGNETIC NOISE
RF compatibility-environment to component part
p0056 A81-14260
Determination if fiber-optic immunity is adequate for deployment in the V/STOL airframe --- to compensate nonmetallic material LF transparency
p0057 A81-14265
Rotating blades radio interference in a helicopter-borne CW Doppler radar
p0224 A81-23813
Dielectric electrostatic charge reduction
[SAE PAPER 810571] p0519 A81-42736
A supplementary EMC analysis of the proposed Airport Surface Detection Equipment (ASDE-3) radar
[AD-A092965] p0219 N81-17342
Evaluation of Discrete Address Beacon System (DABS) EMC
[PB81-154387] p0441 N81-25062
RADIO FREQUENCY NOISE
U ELECTROMAGNETIC NOISE
RADIO FREQUENCY RADIATION
U RADIO WAVES
RADIO INTERFERENCE
U RADIO FREQUENCY INTERFERENCE
RADIO INTERFEROMETERS
Passive location finding with a multiwavelength two element interferometer
p0350 A81-31125
RADIO METEOROLOGY
An observational experiment using a monostatic sodar at the airport of Fiumicino
p0282 A81-27548
RADIO NAVIGATION
NT HYPERBOLIC NAVIGATION
NT LORAN
NT LORAN C
NT TACAN
NT VHF OMNIRANGE NAVIGATION
The outfitting of regional airports in the future with radio assistance for approach and landing, with emphasis on landing site obstacles for general aviation
p0051 A81-13313
Omega - An economic Loran A replacement
p0113 A81-18077
Radio navigation for aircraft: Handbook --- Russian book
p0116 A81-16599
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21828
Band sharing - A case study
p0173 A81-21869
GPS Navstar, the universal positioning system of the future
p0349 A81-30975
Perspectives on the civil utilization of the Navstar/GPS
p0409 A81-35022
Omega station 10.2 kHz signal coverage prediction diagrams
p0512 A81-41760
Aircraft radio systems --- Book
p0513 A81-41871

Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/
p0517 A81-42437
The selection of air radio navigation system for the post-1990 period
p0556 A81-44322
An integrated Omega/satellite radio navigation system
p0566 A81-45767
Errors of phase VLF-navigation systems under conditions of auroral disturbances
p0607 A81-47533
Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy
[AD-A093774] p0206 N81-17030
Federal Radionavigation Plan. Volume 2: Requirements
[AD-A093775] p0207 N81-17031
Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics
[AD-A093776] p0207 N81-17032
Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development
[AD-A093777] p0207 N81-17033
A method for evaluating radio navigation systems for the terminal maneuvering area --- approach control
[DFVLR-MITT-81-02] p0538 N81-28080
RADIO PROBING
Measurement of radar in radio service aircraft
p0151 A81-20079
RADIO RANGES
U RADIO BEACONS
RADIO RECEIVERS
GPS receiver simulation
p0173 A81-21913
A review of current and future components for electronic warfare receivers
p0357 A81-32252
Low cost airborne microwave landing system receiver, task 3
[NASA-CR-152409] p0075 N81-12054
RADIO RELAY SYSTEMS
NT TIME DIVISION MULTIPLE ACCESS
RADIO TRANSMISSION
NT MULTIPATH TRANSMISSION
NT SHORT WAVE RADIO TRANSMISSION
NT SPREAD SPECTRUM TRANSMISSION
RADIO TRANSMITTERS
NT OMNIDIRECTIONAL RADIO RANGES
NT RADIO BEACONS
NT RADIOSONDES
NT SONOBUOYS
AN/TPX-54 interrogator
p0350 A81-31131
Low-frequency radio navigation system
[NASA-CASE-NPO-15264-1] p0373 N81-22036
RADIO WAVES
NT MICROWAVES
NT MILLIMETER WAVES
Lightning electric field measurements which correlate with strikes to the NASA F-106B aircraft, 22 July 1980
[NASA-TM-82142] p0491 N81-26643
RADIOACTIVE ELEMENTS
U RADIOACTIVE ISOTOPES
RADIOACTIVE ISOTOPES
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33868
RADIOACTIVE MATERIALS
Aviation safety: Hazardous materials handling
[GPO-69-199] p0439 N81-25049
RADIOACTIVE NUCLIDES
U RADIOACTIVE ISOTOPES
RADIOGRAPHY
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
RADIOMETERS
NT INFRARED DETECTORS
NT INFRARED RADIOMETERS
NT INFRARED SCANNERS
NT MICROWAVE RADIOMETERS
RADIONUCLIDES
U RADIOACTIVE ISOTOPES
RADIOSENSITIVITY
U RADIATION TOLERANCE
RADIOSONDES
Helicopter-borne radiosonde system and its experimental uses
p0231 A81-24870
RADOME MATERIALS
Captive carry and free flight rain erosion considerations for reinforced ablative fluorocarbon radome materials
p0103 A81-17453
RADOMES
An investigation of the liquid impact properties of a GFRP radome material
p0427 A81-30571
RAFTS
Development of retardation and automatic flotation system (R.A.F.T.)
[AD-A096828] p0439 N81-25047
RAIL TRANSPORTATION
Drag estimations for stream-line and cylindrical contour distortions on aircraft fuselages and train cars
[DGLR PAPER 80-116] p0121 A81-19399
Alternative energy sources for non-highway transportation, appendices
[DOE/CS-05438/T1-VOL-3] p0044 N81-11500
Published results of the program of university research. Transportation research results
[PB81-210130] p0641 N81-34108
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] p0641 N81-34109
RAILROADS
U RAIL TRANSPORTATION
RAILS
Study of a crack propagation on the flap rail of a transport aircraft
p0181 A81-22633
RAIN
NT ACID RAIN
RAIN EROSION
Captive carry and free flight rain erosion considerations for reinforced ablative fluorocarbon radome materials
p0103 A81-17453
The effect of the in-service environment on composite materials (resume of the April 1980 Athens conference)
p0199 N81-16146
RAINSTORMS
NT THUNDERSTORMS
The effect of heavy rain on windshear attributed accidents
[AIAA PAPER 81-0390] p0167 A81-20800
RAKES
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163967] p0251 N81-18046
RAMAN EFFECT
U RAMAN SPECTRA
RAMAN SCATTERING
U RAMAN SPECTRA
RAMAN SPECTRA
Laser-Raman/Rayleigh flow diagnostic techniques applied to subsonic flow
[AD-A091695] p0133 N81-14275
RAMJET ENGINES
NT SUPERSONIC COMBUSTION RAMJET ENGINES
Comparison of systems of power generation during emergencies /aboard aircraft/
p0177 A81-22203
Light transmission measurements in solid fuel ramjet combustors
p0284 A81-27910
Flowfield studies of dump combustors
p0282 A81-29064
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067
Sudden expansion injection for ram-rockets
p0293 A81-29071

Analysis of steady, two-dimensional, chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique --- for performance prediction of ramjet propulsion system
[AIAA PAPER 81-1432] p0504 A81-40869
Interpretation of ramjet combustor test data
[AIAA PAPER 81-1433] p0504 A81-40870
Prediction of swirling reacting flow in ramjet combustors
[AIAA PAPER 81-1485] p0506 A81-40903
Firebrand ramjet propulsion system development
[AIAA PAPER 81-1486] p0506 A81-40904
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906
Modeling of ramjet combustors using simple reactor theory
[AIAA PAPER 81-1429] p0515 A81-42196
Effects of advances in propulsion technology on missile effectiveness --- solid fuel ramjets
[AD-A090645] p0081 N81-12106
Mixing and combustion in high speed air flows
[AD-A090536] p0083 N81-12192
High-speed cowlings, air inlets and outlets, and internal-flow systems
p0185 N81-15973
The 17th JANNAF combustion meeting, volume 1
[NASA-TM-82238] p0200 N81-16253
An investigation of the reacting and non-reacting flow characteristics of solid ramjets
[AD-A094567] p0253 N81-18059
Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63 --- Langley unitary plan wind tunnel tests
[NASA-TM-81937] p0329 N81-20025
Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3433] p0392 N81-23411
An investigation of the combustion behavior of solid fuel ramjets
[AD-A098481] p0445 N81-25240
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320

RAMJET MISSILES
An approach to ramjet trajectory simulation test
p0292 A81-29065
O.N.E.R.A. ramjet test facilities
p0365 A81-33285
Firebrand ramjet propulsion system development
[AIAA PAPER 81-1486] p0506 A81-40904

RAMP FUNCTIONS
Results of oscillatory pitch and ramp tests on the NACA 0012 blade section
[ARA-MEMO-220] p0090 N81-13024

RANDOM ACCESS MEMORY
New storage medium - Greater safety. II - Testing, fabrication, implementation --- MNOS block oriented random access memory (BORAM) circuits
p0227 A81-24044

RANDOM LOADS
NT GUST LOADS
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47552

RANDOM NOISE
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473
The spectral analysis of nonstationary random processes - Applications to aircraft overflight-type noises --- French thesis
p0174 A81-21922
Accuracy of noise-modulated radio altimeter
p0359 A81-32694
Contribution to the study of non stationary signals emitted by moving jet engine - Application to special analysis and imaging. I.
p0365 A81-33288
Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II
p0366 A81-33294
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to special analysis and imaging. Part 1
p0447 N81-26006

RANDOM NUMBERS
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0154 A81-2044
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0453 A81-37822

RANDOM PROCESSES
NT RANDOM WALK
Detection of moving objects --- Russian book
p0118 A81-18773
The spectral analysis of nonstationary random processes - Applications to aircraft overflight-type noises --- French thesis
p0174 A81-21922

RANDOM WALK
Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0228 A81-24078

RANGE (EXTREMES)
Prediction of range and endurance of jet aircraft at constant altitude
p0611 A81-47725

RANGE CONTROL
U TRAJECTORY CONTROL

RANGE FINDERS
NT LASER RANGE FINDERS

RANGE SAFETY
Flight termination receiver/decoders design, performance and certification
[AD-A089746] p0037 N81-1108

RANGEFINDING
NT SOUND RANGING

RANGES (FACILITIES)
NT BALLISTIC RANGES

RAPCON (CONTROL)
U RADAR APPROACH CONTROL

RAREFACTION WAVES
U ELASTIC WAVES

RAREFIED GAS DYNAMICS
Nonstationary method for the direct statistical modeling of rarefied-gas flows
p0069 A81-1645

RAREFIED PLASMAS
A new helicopter map display device MKG-5
p0418 A81-3696

RATE METERS
U MEASURING INSTRUMENTS

RATES (PER TIME)
NT ACCELERATION (PHYSICS)
NT ACOUSTIC VELOCITY
NT AIRSPEED
NT ANGULAR ACCELERATION
NT ANGULAR VELOCITY
NT BURNING RATE
NT CRITICAL VELOCITY
NT DECELERATION
NT FLOW VELOCITY
NT GROUND SPEED
NT HEAT FLUX
NT HIGH ACCELERATION
NT HIGH SPEED
NT LANDING SPEED
NT LOW SPEED
NT PROPAGATION VELOCITY
NT ROTOR SPEED
NT SOUND INTENSITY
NT SPIN REDUCTION
NT SUBSONIC SPEED
NT SUPERSONIC SPEEDS
NT TIP SPEED
NT TRANSONIC SPEED
NT TRANSVERSE ACCELERATION
NT WIND VELOCITY
Rate-field displays --- cockpit devices
p0064 A81-156

RATIOS
NT ASPECT RATIO
NT COMPRESSION RATIO
NT FUEL-AIR RATIO
NT HIGH ASPECT RATIO
NT LIFT DRAG RATIO
NT LOW ASPECT RATIO
NT MACH NUMBER
NT PRESSURE RATIO

NT REYNOLDS NUMBER
NT SIGNAL TO NOISE RATIOS
NT STROUHAL NUMBER
NT THICKNESS RATIO
NT THRUST-WEIGHT RATIO
RAY OPTICS
U GEOMETRICAL OPTICS
RAY TRACING
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[DFVLR-FB-80-01] p0132 N81-14195
RAYLEIGH SCATTERING
Laser-Raman/Rayleigh flow diagnostic techniques applied to subsonic flow
[AD-A091695] p0133 N81-14275
REACTION CONTROL
Air combat advantages from reaction control systems
[SAE PAPER 801177] p0400 A81-34190
REACTION JETS
U JET FLOW
U JET THRUST
REACTION KINETICS
Sudden expansion injection for ram-rockets
p0293 A81-29071
A theoretical and experimental study of combustion chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242
Critical considerations in the design of supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1204] p0511 A81-41748
REACTION RATE
U REACTION KINETICS
REACTION TIME
The speed of response to synthesized voice messages
p0603 N81-31456
READ-ONLY MEMORY DEVICES
Logistics support of avionic software stored on erasable programmable read only memory
p0327 A81-30356
READERS
A preliminary human factors flight assessment of a Marconi automatic map
[AD-A092585] p0193 N81-16036
READING MACHINES
U READERS
READOUT
Recent improvements on generating voltmeters
[DOE/ER-01388/463] p0257 N81-18359
REAL TIME OPERATION
A case study - Real time simulation and structured design
p0172 A81-21721
A flight test real-time GW-C6 computing system
p0361 A81-32860
Real-time microprocessor technology applied to automatic braking systems
[SAE PAPER 801194] p0402 A81-34204
A nonlinear propulsion system simulation technique for piloted simulators
p0454 A81-38064
The Bundeswehr Drone Program - Where are we today
p0458 A81-38806
Real time analysis for helicopter flight testing
p0470 A81-40112
An active control system for helicopter vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189
Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563
Real-time estimation in advanced turbofan engines
p0564 A81-45553
The array processor - A real-time simulator
p0614 A81-48328
Function generation techniques --- in real time hybrid simulations
p0614 A81-48329
A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
p0615 A81-48333
Development considerations for real-time aircraft/avionic distributed computer control systems
p0616 A81-48376
ATARS implementation tradeoff
[AD-A089977] p0034 N81-11026
Experimental analysis of IMEP in a rotary combustion engine
[NASA-TM-81662] p0195 N81-16054
Possible online uses of AIDS data in future ATC systems
p0328 N81-20018
An approach to real-time simulation using parallel processing
[NASA-TM-81731] p0345 N81-21803
A study of real-time computer graphic display technology for aeronautical applications
[NASA-CR-164221] p0380 N81-22727
Tests of large compressors at CE Pr
p0432 N81-24096
Programmable multipurpose flight test instrumentation system
p0545 N81-29065
Microwave system for real time space position measurement
p0549 N81-29089
REAL VARIABLES
NT DELTA FUNCTION
NT DIFFERENTIAL EQUATIONS
NT EXTREMUM VALUES
NT FOURIER SERIES
NT GREEN FUNCTION
NT KERNEL FUNCTIONS
NT LINEAR EQUATIONS
NT NEUMANN PROBLEM
NT NONLINEAR EQUATIONS
NT NUMERICAL DIFFERENTIATION
NT NUMERICAL INTEGRATION
NT PADE APPROXIMATION
NT PARABOLIC DIFFERENTIAL EQUATIONS
NT PARTIAL DIFFERENTIAL EQUATIONS
NT VECTOR ANALYSIS
NT VORTICITY
NT WEIGHTING FUNCTIONS
REATTACHED FLOW
Attainability of an attached flow in a nozzle with heavily curved walls
p0054 A81-13548
Some qualitative experiments on the local flow about spoilers in unsteady motion at low speeds
[PB81-166159] p0487 N81-26124
RECEIVERS
NT RADAR RECEIVERS
NT RADIO RECEIVERS
Investigation of low level aircraft nonavionic nonlinear interference
[AD-A098784] p0491 N81-26349
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0595 N81-31180
RECEIVING SYSTEMS
U RECEIVERS
RECEPTION DIVERSITY
New technology applied to an IFF diversity transponder
p0350 A81-31133
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach
[AD-A092741] p0192 N81-16030
Diversity techniques for omnidirectional telemetry coverage of the HiMAT research vehicle
[NASA-TP-1830] p0334 N81-20078
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22282
RECIPROCATING ENGINES
U PISTON ENGINES
RECIRCULATIVE FLUID FLOW
A theoretical and experimental study of combustion chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242
The requirements for and evolution of a test rig for exhaust gas recirculation studies of V/STOL aircraft
p0469 A81-40106
RECLAMATION
NT MATERIALS RECOVERY
RECOGNITION
NT PATTERN RECOGNITION
NT SPEECH RECOGNITION
NT TARGET RECOGNITION
RECOILINGS
High impulse gun airborne demonstration. GAU-13/A

weapon, feed system, gun drive and electronic controls
[AD-A101698] p0562 N81-30120
RECONNAISSANCE
NT AERIAL RECONNAISSANCE
NT PHOTORECONNAISSANCE
RECONNAISSANCE AIRCRAFT
NT F-5 AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT WEATHER RECONNAISSANCE AIRCRAFT
Coast Guard airship development
[AIAA 81-1311] p0455 A81-38528
Twin-rotor patrol airship flying model
[AIAA 81-1312] p0456 A81-38529
RF-5E tactical reconnaissance standoff photography concept
p0462 A81-39421
Image stabilization techniques for long range reconnaissance camera
p0462 A81-39436
SR-71 impressive in high-speed regime
p0565 A81-45747
SR-71 imposes burden on maintenance units
p0565 A81-45748
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 2: Appendix A. Performance data - GE27/T3 study a1 turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 3: Appendix B. Performance data - TF34/T7 study A1 turboprop
[AD-A089279] p0028 N81-10069
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041
Twin-rotor patrol airship flying model design rationale
[AD-A102575] p0628 N81-32141
RECONSTRUCTION
Rebuild of aircraft ground support equipment
[SAE PAPER 801238] p0406 A81-34236
RECORDING
NT DATA RECORDING
NT DATA SMOOTHING
RECORDING INSTRUMENTS
NT FLIGHT LOAD RECORDERS
NT FLIGHT RECORDERS
Wind shear detection from PCM-recorded MLS-flight data
p0015 A81-11675
Quantitative thermography in aero-engine research and development
[PNR-90021] p0029 N81-10075
Experiences with flight recorders obtained by analyzing aircraft accidents
p0328 N81-20019
RECOVERABLE SPACECRAFT
NT SPACE SHUTTLES
RECOVERY PARACHUTES
Research on mechanical flight problems in aircraft parachute systems
p0065 A81-15706
RECOVERY VEHICLES
Development of retardation and automatic flotation system (R.A.F.T.)
[AD-A096828] p0439 N81-25047
RECTANGULAR COORDINATES
U CARTESIAN COORDINATES
RECTANGULAR PLANFORMS
NT RECTANGULAR WINGS
RECTANGULAR WINGS
A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14394
Calculation of the nonlinear aerodynamic characteristics of finite-span wing
p0063 A81-15386
Numerical lifting line theory applied to drooped leading-edge wings below and above stall
p0066 A81-15881
Steady flow past a rectangular wing with circulation that is variable along the span
p0099 A81-16551
Determination of the effect of transverse cutouts on the hydrodynamic characteristics of a finite-span wing in the case of steady and unsteady motion near a wall
p0119 A81-19335
Experimental investigation of a right angle wing with partially separated flow with and without ground effects
[DGLR PAPER 80-111] p0120 A81-19397
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
Calculation of the nonlinear aerodynamic characteristics of a wing of finite span
p0417 A81-36738
The calculation of lift and drag characteristics of subsonic wings with winglets
p0480 A81-40442
Evaluation of Levinsky's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033
RECUPERATORS
C REGENERATORS
RECYCLING
Recycling of Portland Cement Concrete airport pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141
REDUCTION
Design to cost and the F-16 multirole fighter
p0046 N81-11911
REDUCTION (CHEMISTRY)
NT HYDROGENATION
REDUCTION (MATHEMATICS)
U OPTIMIZATION
REDUNDANCY
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy
[DGLR PAPER 81-066] p0610 A81-47616
Detecting the failure of aircraft sensors using analytical redundancy
p0042 N81-11270
F-8 digital fly-by-wire aircraft analytic redundancy management flight test experience
p0485 N81-26109
Helicopter Fatigue Life Assessment
[AGARD-CP-297] p0487 N81-26126
REDUNDANCY ENCODING
Computer based in-flight monitoring
p0042 N81-11269
Flight experience with flight control redundancy management
p0042 N81-11274
Robust control system design
p0042 N81-11275
Ground and flight test experience with a triple redundant digital fly by wire control system --- installed in F-8C aircraft
p0259 N81-19006
REDUNDANT COMPONENTS
The automatic matrix force method and techniques for handling more complex computations with given computer capacity
p0108 A81-17815
The development of multiple redundant flight control systems for high integrity applications
p0284 A81-27903
An application of redundancy in digital electronic engine control
[SAE PAPER 801200] p0402 A81-34210
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135
REDUNDANT STRUCTURES
U REDUNDANT COMPONENTS
REENTRY BODIES
U REENTRY VEHICLES
REENTRY VEHICLES
NT BOOSTGLIDE VEHICLES
High Reynolds number research requirements for space vehicle design
p0593 N81-31151
REFERENCES (STANDARDS)
U STANDARDS
REFINING
NT ELECTROREFINING
Effect of refining variables on the properties and composition of JP-5

[AD-A093842] p0219 N81-17281
REFLECTANCE
Aluminized coding study for retrofitting
in-service slide materials
[AD-A094170] p0255 N81-18201
REFLECTED RADIATION
U REFLECTED WAVES
REFLECTED RAYS
U REFLECTED WAVES
REFLECTED WAVES
Exhaust noise in flight: The role of acoustic
installation effects
[PNR-90029] p0138 N81-14793
REFLECTION
NT OPTICAL REFLECTION
REFLECTION COEFFICIENT
U REFLECTANCE
REFLECTIVITY
U REFLECTANCE
REFLECTORS
NT PARABOLIC REFLECTORS
NT SOLAR COLLECTORS
NT SOLAR REFLECTORS
REFRACTORY MATERIALS
NT RENE 77
NT TUNGSTEN
Fabrication of injection molded sintered alpha SiC
turbine components
[ASME PAPER 81-GT-161] p0317 A81-30060
Development and fabrication of refractory silicon
carbide bodies, especially for gas turbine engines
--- by hot pressing
[BMFT-FB-T-79-137] p0275 N81-19128
REFRACTORY METAL ALLOYS
NT RENE 77
REFRACTORY METALS
NT TUNGSTEN
REFRIGERATING MACHINERY
Analysis of the operation of air
turborefrigeration plants and their use for
on-the-ground air-conditioning of aircraft
p0614 A81-48196
REFUELING
NT AIR TO AIR REFUELING
Static charge in aircraft fuel tanks
[AD-A093552] p0208 N81-17045
REGENERATION (ENGINEERING)
Regenerative engine for helicopter application
[AHS 80-39] p0477 A81-40168
Regenerative engine analysis program
[AD-A095144] p0274 N81-19123
REGENERATIVE CYCLES
U REGENERATION (ENGINEERING)
REGENERATORS
New developments in compact plate-fin heat
exchangers
p0613 A81-48062
REGIONAL PLANNING
NT URBAN PLANNING
Environmental aspects of airport planning
p0115 A81-18091
Airbase induced community noise - Facilitating the
military/civil interface
p0569 A81-46368
Aircraft noise and land use compatibility tradeoff
analyses
p0569 A81-46370
Airport Noise Control and Land Use Compatibility
Studies A U.S. case
p0570 A81-46372
Computer graphics applications
[PB81-215246] p0637 N81-33188
REGIONS
NT AURORAL ZONES
REGRESSION (STATISTICS)
U REGRESSION ANALYSIS
REGRESSION ANALYSIS
Determination of model structure and parameters of
an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562
Methodology for determining sampling intervals
[AD-A092591] p0202 N81-16825
SCI model structure determination program (OSR)
user's guide --- optimal subset regression
[NASA-CR-159084] p0380 N81-22725
Fatigue testing of composite rotor blades
p0489 N81-26140
REGULATIONS
Federal policies affecting airport noise
compatibility programs
[AIAA PAPER 81-0829] p0367 A81-33879
Noise exposure of civil aircarrier airplanes
through the year 2000. Volume 1: Methods,
procedures, results
[EPA-550/9-79-313-1] p0087 N81-12644
Noise exposure of civil aircarrier airplanes
through the year 2000. Volume 2: Appendices A
through F
[EPA-550/9-70-313-2] p0087 N81-12645
Transport jet aircraft noise abatement in foreign
countries: Growth, structure, impact. Volume
1: Europe, July 1980
[NASA-CR-152356] p0220 N81-17623
Transport jet aircraft noise abatement in foreign
countries: Growth, structure, impact. Volume
2: Pacific basin, August 1980
[NASA-CR-152357-VOL-2] p0220 N81-17624
Engineering and development program plan
propulsion safety
[AD-A098709] p0444 N81-25080
REGULATORS
NT CURRENT REGULATORS
NT PRESSURE REGULATORS
NT VOLTAGE REGULATORS
REHEATING
U HEATING
REIGNITION
U IGNITION
REINFORCED MATERIALS
U COMPOSITE MATERIALS
REINFORCED PLASTICS
NT GLASS FIBER REINFORCED PLASTICS
Development of the A300 fin in modern composite
fibre construction
p0013 A81-11653
Finite element analysis of a bird-resistant
monolithic stretched acrylic canopy design for
the F-16A aircraft
[AIAA PAPER 81-1640] p0525 A81-43140
Vanadium trineodecanoate promoter for
fiberglass-polyester soil surfacings
[AD-AC91785] p0132 N81-14084
REINFORCED PLATES
Periodically stiffened fluid-loaded plates. I -
Response to convected harmonic pressure and free
wave propagation. II - Response to line and
point forces
p0102 A81-17067
The optimum design of non-moment laminated
composite plate - According to static failure
strength condition
p0480 A81-40449
REINFORCED SHELLS
Finite element calculation of thin-wall reinforced
shells of the fuselage type with account for
physical nonlinearity and loss of stability of
certain elements
p0235 A81-25679
Instability of short stiffened and composite
cylindrical shells acting under pure bending
moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29405
Calculation of natural vibrations for thin-walled
irregular reinforced shells of the helicopter
fuselage type using the finite-element work method
p0614 A81-48097
REINFORCEMENT (STRUCTURES)
Thermal considerations in the patching of metal
sheets with composite overlays
p0153 A81-20297
The use of bonded crack-stoppers in pressure cabins
p0233 A81-25378
Unistructure - A new concept for light weight
integrally stiffened skin structures
[SAE PAPER 801231] p0405 A81-34233
Potential use of geotechnical fabric in airfield
runway design --- reinforced soil systems
[AD-A032686] p0198 N81-16071
Recycling of Portland Cement Concrete airport
pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141
REINFORCING FIBERS
NT CARBON FIBERS
Development of the A300 fin in modern composite
fibre construction
p0013 A81-11653
Optimization of fiber reinforced structures to
satisfy aeroelastic requirements

[NASA-CR-164536] p0499 N81-27200

RELEASING
NT FIBER RELEASE

RELIABILITY
NT AIRCRAFT RELIABILITY
NT CIRCUIT RELIABILITY
NT COMPONENT RELIABILITY
NT STRUCTURAL RELIABILITY
Acoustic emission as a NDE technique for determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070
Omega transmitter outages, January to December 1979
[AD-A093425] p0207 N81-17035
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111

RELIABILITY ANALYSIS
Reliability and engineering-economic characteristics of aircraft engines --- Russian book
p0001 A81-10045
How do aircraft break down - Some studies of reliability data feedback
p0068 A81-16423
Mathematical aspects of the probabilistic evaluations of structural safety and NDI capabilities
p0181 A81-22635
ORLA - An assessment of risks --- Optimum Repair Level Analysis
p0229 A81-24257
The new look in reliability - It works --- Operational Mission Environment test program for F/A-18 aircraft
p0229 A81-24268
The necessity of 'testing-in' hardware reliability
p0229 A81-24277
Development of conceptual Navy aircraft Reliability Prediction Models
p0229 A81-24280
Current and future concepts in FMEA --- Failure Modes and Effects Analysis
p0229 A81-24283
Reliability growth measured by AFM 66-1 data
p0230 A81-24286
New technology for the NDB system and its reliability. II --- omnidirectional radio beacons
p0230 A81-24524
New technology for the NDB system and its reliability. III --- omnidirectional radio beacon
p0231 A81-24525
Efficiency of the methods and algorithms used for estimating the reliability in aviation techniques
p0365 A81-33173
Flight test reliability demonstration of electronic engine controls
[SAE PAPER 801201] p0403 A81-34211
Principles of the reliability of gas turbine engines --- Russian book
p0482 A81-40621
Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911
Philosophy of safety and reliability --- in aviation
p0561 A81-44616
Developing test profiles for multiple mission situations --- standards for military aircraft
p0570 A81-46483
Wind shear systems integration plan, VICON (visual confirmation) reliability analysis
[PB80-218233] p0128 N81-13949
Validation Methods Research for Fault-Tolerant Avionics and Control Systems Sub-Working Group Meeting. CARE 3 peer review
[NASA-CP-2167] p0146 N81-15702
MEGA16 - Computer program for analysis and extrapolation of stress-rupture data
[NASA-TP-1809] p0393 N81-23486
State of the art and statistical aspects of helicopter fatigue substantiation procedures
[NLR-MP-80025-U] p0496 N81-27087

RELIABILITY CONTROL
U QUALITY CONTROL
U RELIABILITY ENGINEERING

RELIABILITY ENGINEERING
Stress measurements on landing gear for the Airbus A-300 B2
p0119 A81-19299
The necessity of 'testing-in' hardware reliability
p0229 A81-24277
Current and future concepts in FMEA --- Failure Modes and Effects Analysis
p0229 A81-24283
Reliability growth measured by AFM 66-1 data
p0230 A81-24286
Jet engine maintenance and reliability programs - Objectives and management
p0287 A81-28475
Design for economy --- of high-bypass turbofan engines
p0290 A81-29030
New technology applied to an IFF diversity transponder
p0359 A81-31133
An application of redundancy in digital electronic engine control
[SAE PAPER 801200] p0402 A81-34210
Big 'R', little 'c', integrated data annotation and sensor control for long range oblique photography /LOROP/ --- increased reliability and reduced complexity
p0462 A81-39435
Reliability of commercial helicopters
p0472 A81-40126
Principles of the reliability of gas turbine engines --- Russian book
p0482 A81-40621
Combined environment reliability testing /CERT/ as applied to engine mounted electronic controls
[AIAA PAPER 81-1500] p0516 A81-42204
Avionics thermal integration for the Boeing 767 airplane
p0570 A81-46478
Aircraft/avionics environmental integration program
p0570 A81-46480
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] p0609 A81-47563
Reliability validation of systems for life-critical applications
p0617 A81-48559
Reliability-centered maintenance
p0047 N81-11917
The changing scene of structural airworthiness
[AAAF-NT-79-24] p0077 N81-12076
An investigation of safety hazards and reliability problems in aerial refueling stores
[AD-A091788] p0127 N81-13938
Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15332/T1] p0145 N81-15414
Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025
The electro-optical display/visual system interface: Human factors considerations
p0212 N81-17066
An analysis of the adaptability of Loran-C to air navigation
p0371 N81-22003
Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers
[AD-A098614] p0444 N81-25086
Fault trees and system reliability analysis with reference to the control of aircraft engines
p0498 N81-27109
Aircraft Engine Diagnostics
[NASA-CP-2190] p0597 N81-31196
A-10/TF34 Turbine Engine Monitoring System (TEMS)
p0599 N81-31211
Review of AIDS development --- airborne computers for reliability engineering
p0599 N81-31212
Helicopter propulsion system reliability and engine monitoring assessments
p0599 N81-31213
Engine health monitoring systems: Tools for improved maintenance management in the 1980's
p0599 N81-31214
Engine condition monitoring: CF6 family 60's through the 80's
p0600 N81-31215

RELIEF MAPS
Information requirements for airborne electronic terrain maps
p0325 A81-30334

REMOTE CONTROL
NT RADIO CONTROL

REMOTE SENSING
Design and preliminary tests of an IR-airborne LLWS remote sensing system --- Low Level Wind Shear
[AIAA PAPER 81-0239] p0163 A81-20694
Tri-bar reading correction for oblique imagery
p0178 A81-22495
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49378
Aeronautics and Space Report of the President, 1979 activities
p0089 N81-12956

REMOTE SENSORS
Sensor Systems for the 80's Conference, Colorado Springs, Colo., December 2-4, 1980, Technical Papers
p0052 A81-13351
An airborne sensor for the avoidance of clear air turbulence
[AIAA PAPER 81-0297] p0164 A81-20735
Mini-RPV radar test program
p0180 A81-22619
Helicopter rotor blade effects on mast-mounted sensor images
p0350 A81-31114
Charge-coupled device /CCD/ camera/memory optimization for expendable autonomous vehicles
p0357 A81-32491
Airborne ground velocity determination by digital processing of electro-optical line sensor signals
p0358 A81-32496
Autonomous target handoff from an airborne sensor to a missile seeker
p0358 A81-32498
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
Moving target identification /MTI/ algorithm for passive sensors
p0358 A81-32502
Big 'R', little 'c', integrated data annotation and sensor control for long range oblique photography /LOROP/ --- increased reliability and reduced complexity
p0462 A81-39435
Integrated sensor control system for RF-5E demonstrator
p0462 A81-39438
Winds and wind shear in-situ sensors
p0136 N81-14563

REMOTELY PILOTED VEHICLES
Low cost technology for expendable RPV applications
p0049 A81-12795
A concept for dynamic control of RPV information system parameters
p0049 A81-12796
History and prospects for mini-RPVs and drones
p0049 A81-12797
Aerial surveying of small areas from a small remotely controlled drone
p0107 A81-17525
Development and demonstration of an automatic control and recovery system for remotely piloted vehicles
p0156 A81-20676
Qualification of HiMAT flight systems
p0179 A81-22603
Mini-RPV radar test program
p0180 A81-22619
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[AIAA 81-0655] p0308 A81-29507
An extremely lightweight fuselage-integrated phased array for airborne applications
p0348 A81-30779
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115
Forward-looking infrared /FLIR/ sensor for autonomous vehicles
p0357 A81-32490
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936] p0363 A81-32937
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
LQG controls for highly maneuverable aircraft --- Linear quadratic Gaussian
[AIAA PAPER 81-1709] p0527 A81-43163
Materials and processes for a small remotely piloted vehicle
p0532 A81-43663
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126
Survivors on the RPV front
p0577 A81-46725
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] p0624 A81-49732
Closed loop control systems: Aircraft. Citations from the NTIS data base
[PB80-813710] p0082 N81-12114
Remotely piloted vehicles. Citations from the International Aerospace abstracts data base
[NASA-CR-163864] p0142 N81-14996
An assessment of technical factors influencing the potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16047
The DAST-1 remotely piloted research vehicle development and initial flight testing
[NASA-CR-163105] p0207 N81-17038
On the flight mechanics of remotely piloted vehicles
[BMVG-FBWT-79-28] p0209 N81-17049
Diversity techniques for omnidirectional telemetry coverage of the HiMAT research vehicle
[NASA-TP-1830] p0334 N81-20074
Analytical study of the cruise performance of a class of remotely piloted, microwave-powered, high-altitude airplane platforms
[NASA-TM-81969] p0374 N81-22040
NASA's aeronautics research and technology base
[NASA-CR-164195] p0381 N81-22969
DOD's use of remotely piloted vehicle technology offers opportunities for saving lives and dollars
[AD-A097419] p0388 N81-23074
Development tests of an engine with limited life --- Microturbo TRI 60
p0433 N81-24103
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[NASA-TM-83132] p0486 N81-26118
The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies 7 and 8
[AD-A100551] p0539 N81-28080
Flight control system analysis and design for a remotely piloted vehicle with thrust vectoring unit
[AD-A100808] p0540 N81-28105

RENE 77
Low cycle fatigue of Rene 77 at elevated temperatures
p0289 A81-28989

REPAIRING
U MAINTENANCE
REPORTS
NT CONGRESSIONAL REPORTS
NT PRESIDENTIAL REPORTS
REPUBLIC AIRCRAFT
NT A-10 AIRCRAFT
REPUBLIC MILITARY AIRCRAFT
U MILITARY AIRCRAFT
REQUIREMENTS
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068
Estimation of fan pressure ratio requirements and operating performance for the National Transonic Facility
[NASA-TM-81802] p0435 N81-24115

RESCUE OPERATIONS
Sarsat - A rescue system for ships and aircraft
p0100 A81-16684
Electronic search and rescue aids
p0206 A81-26300
Mission-dedicated vehicle for passenger rescue from burning aircraft
p0412 A81-35772
Design considerations for U.S. Coast Guard search and surveillance Forward Looking Infrared /FLIR/ system
p0463 A81-39647
Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft

[NASA-CR-160036] p0023 N81-10020
Search and rescue methods and equipment. A bibliography with abstracts
[PB80-812837] p0023 N81-10026
CH-53E emergency flotation system design study
[AD-A101640] p0548 N81-29124

RESEARCH
NT DYNAMIC PROGRAMMING
NT GAME THEORY
NT HIGH TEMPERATURE RESEARCH
NT LINEAR PROGRAMMING
NT MARKET RESEARCH
NT MATHEMATICAL PROGRAMMING
NT NONLINEAR PROGRAMMING
NT OPERATIONS RESEARCH

RESEARCH AIRCRAFT
NT ROTOR SYSTEMS RESEARCH AIRCRAFT
Hydrogen-fueled aircraft
p0016 A81-11753
Shipboard trials of the Quiet Short-Haul Research Aircraft /QSRA/
p0099 A81-16581
QSRA Joint Navy/NASA sea trials --- Quiet Short Haul Research Aircraft
[AIAA PAPER 81-0152] p0161 A81-20633
Qualification of HiMAT flight systems
p0179 A81-22603
Quiet propulsive-lift technology ready for civil and military applications
p0359 A81-32521
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
Experimental aircraft of the DFVLR for in-flight simulation and flight control technology
p0452 A81-37654
A survey of heating and turbulent boundary layer characteristics of several hypersonic research aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39134
Preliminary evaluation of RSRA data comparing pure helicopter, auxiliary propulsion and compound helicopter flight characteristics --- Rotor Systems Research Aircraft
[AHS 80-10] p0473 A81-40143
Free flight research at Lockheed-Georgia
[SAE PAPER 810567] p0518 A81-42732
An overview of general aviation propulsion research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-42778
Historical trend in the research and development of aircraft
[AIAA PAPER 81-1613] p0533 A81-43934
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Advancing Blade Concept (ABC) technology demonstrator
[AD-A100181] p0538 N81-28087

RESEARCH AND DEVELOPMENT
The RAE research and development program on EMC for aircraft and flight weapons systems
p0056 A81-14263
Aerospace highlights 1980
p0063 A81-15374
The implications of current flight control research and development
p0099 A81-16578
A computer-aided design system geared toward conceptual design in a research environment --- for hypersonic vehicles
[AIAA PAPER 81-0372] p0166 A81-20789
China aims for modern wings
p0227 A81-24050
Airbus Industrie - Past, present and future /26th Mitchell Memorial Lecture/
p0284 A81-27907
NASA research in aeropropulsion
[ASME PAPER 81-GT-96] p0314 A81-30003
The role of flight research vehicles in prop-fan technology development
[ASME PAPER 81-GR-216] p0318 A81-30104
An aircraft manufacturer's view of airport R&D needs
[AIAA PAPER 81-C793] p0368 A81-33887
Components in hybrid- and fiber technology for commercial aircraft of the Airbus family /flap support, spoiler, and window frame/
p0450 A81-37644
The state-of-the-art in avionics
p0451 A81-37649
Contribution of the DFVLR to the DAS program
p0452 A81-37657
Coast Guard airship development
[AIAA 81-1311] p0455 A81-38528
LTA developments in Great Britain
[AIAA 81-1321] p0456 A81-38532
Development of small fuel efficient aircraft engines
[AHS 80-38] p0477 A81-40167
U.S. Army crashworthiness program
[SAE PAPER 810615] p0522 A81-42771
Historical trend in the research and development of aircraft
[AIAA PAPER 81-1613] p0533 A81-43934
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43947
The selection of air radio navigation system for the post-1990 period
p0556 A81-44322
Prospects for the employment of dirigibles in the 1980s
p0565 A81-45763
Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45891
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 1
[RAE-TR-79052-VOL-1] p0026 N81-10044
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 2
[RAE-TR-79052-VOL-2] p0026 N81-10045
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 3
[RAE-TR-79052-VOL-3] p0026 N81-10046
Research and technology of the Langley Research Center
[NASA-TM-81910] p0089 N81-12977
Productivity in aerospace research and development
[NASA-TM-82388] p0097 N81-13804
The state of the art of general aviation autopilots
[NASA-CR-159371] p0197 N81-16066
Scientific and Technical Information Output of the Langley Research Center, for calendar year 1976
[NASA-TM-82310] p0279 N81-19964
SRDS Technical Program document. Fiscal year 1981. Research and Development approved projects
[AD-A096293] p0339 N81-21050
Fundamental heat transfer research for gas turbine engines
[NASA-CP-2178] p0428 N81-24063
Aerospace in the future
[NASA-TM-82664] p0543 N81-29063
The role of the research simulator in the systems development of rotorcraft
p0633 N81-33146

RESEARCH FACILITIES
Flight simulation at Cranfield Institute of Technology
p0283 A81-27893
Test-stand combustion chamber for the study and development of forced working processes --- for jet engines
p0319 A81-30151
A simulator to test compressor research facility control system software
p0349 A81-31110
Research and technology of the Langley Research Center
[NASA-TM-81910] p0089 N81-12977
Effects of downstream distance on turbulence decay for the compressor research facility low conditioning system
[AD-A091543] p0133 N81-14276
Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331] p0142 N81-14994
Survey of aircraft icing simulation test facilities in North America
[NASA-TM-81707] p0269 N81-19070
Structural flight loads simulation capability, volume 1
[AD-A096572] p0374 N81-22044
National icing facilities requirements investigation
[AD-A102520] p0602 N81-31238

RESEARCH MANAGEMENT
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report

[AD-A094225] p0252 N81-18051

NASA's aeronautics program: Systems technology and experimental program
[NASA-CR-164642] p0543 N81-29034

RESEARCH PROJECTS

A summary of proposals for airflight research by the DMFT
p0118 A81-19298

RESEARCH VEHICLES

Mission Adaptive Wing research programme
p0227 A81-24057

In-flight research - At low cost
p0299 A81-29208

Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[AIAA 81-0655] p0308 A81-29507

Materials and processes for a small remotely piloted vehicle
p0532 A81-43663

RESERVES

The relation between aircraft fuel reserves and navigation
p0612 A81-47843

RESIDENTIAL AREAS

Community response to noise from a general aviation airport
p0017 A81-11821

RESIDUAL STRESS

Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
p0365 A81-33169

Investigation of shot peening as a forming process for aircraft wing skins
p0458 A81-39046

RESIN BONDING

Development of repair procedures for graphite/epoxy structures on commercial transports
p0531 A81-43645

RESIN MATRIX COMPOSITES

Thermal expansion molding process for aircraft composite structures
[SAE PAPER 800612] p0062 A81-15334

Development program for a graphite/PMR 15 polyimide duct for the F404 engine
p0181 A81-22647

The joints of aeronautical carbon resin composite structural elements
p0238 A81-26242

Fatigue strength of CFRP under combined flight-by-flight loading and flight-by-flight temperature changes
p0039 N81-11134

Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11412

RESINS

NT EPOXY RESINS
NT KEVLAR (TRADEMARK)
NT PHENOLIC RESINS
NT POLYESTER RESINS
NT POLYIMIDE RESINS
NT POLYURETHANE RESINS
NT THERMOPLASTIC RESINS

RESISTIVITY

U ELECTRICAL RESISTIVITY

RESISTORS

A new approach to thick-film resistors
p0232 A81-24968

RESOLUTION

NT ANGULAR RESOLUTION
NT HIGH RESOLUTION
NT IMAGE RESOLUTION
NT RADAR RESOLUTION
NT SPATIAL RESOLUTION

The presentation of static information on air traffic control displays
p0211 N81-17064

RESOLVING POWER

U RESOLUTION

RESONANCE

NT NUCLEAR MAGNETIC RESONANCE
NT RESONANT VIBRATION

RESONANT FREQUENCIES

Resonance of forwards and backwards vibration mode of impeller with gyroscopic effect
[AIAA 81-0524] p0303 A81-29405

Determining the natural frequency of the combinative system of the helicopter rotor and elastic fuselage with mechanical impedance technique
[AIAA 81-0613] p0305 A81-29475

Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] p0610 A81-47603

The resonance frequencies of ventilated wind tunnels
[ARC-R/M-3841] p0144 N81-15009

RESONANT VIBRATION

Development of antiresonance force isolators for helicopter vibration reduction
p0467 A81-40091

LIVE - Liquid inertia vibration eliminator
[AHS 80-22] p0475 A81-40152

Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method
p0614 A81-48097

Finite strip analysis of singly curved skin-stringer structures
p0616 A81-48390

Total main rotor isolation system analysis
[NASA-CR-165666] p0329 N81-20027

Developement of antiresonance force isolators for helicopter vibration reduction
[MBB-UD-305/80-OE] p0582 N81-30123

RESOURCES

NT CRUDE OIL

RESOURCES MANAGEMENT

NASA's activities in the conservation of strategic aerospace materials
p0179 A81-22535

Guidelines for line-oriented flight training, volume 1
[NASA-CP-2184] p0580 N81-30101

A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] p0632 N81-33135

RESPONDERS

U TRANSPONDERS

RESPONSES

NT DYNAMIC RESPONSE
NT MODAL RESPONSE
NT PHYSIOLOGICAL RESPONSES
NT TRANSIENT RESPONSE

RESTRAINTS

U CONSTRAINTS

RETARDANTS

NT FLAME RETARDANTS

RETRACTABLE LANDING GEAR

U LANDING GEAR

RETRIEVAL

NT DATA RETRIEVAL
NT INFORMATION RETRIEVAL

Development and demonstration of an automatic control and recovery system for remotely piloted vehicles
p0156 A81-20476

Development of retardation and automatic flotation system (R.A.F.T.)
[AD-A096828] p0439 N81-25047

RETROFITTING

CFM56 rejuvenates the DC-8
p0455 A81-38196

REUSABLE SPACECRAFT

NT SPACE SHUTTLES

REVERSE TIME

U REACTION TIME

REVERSED FLOW

Analysis of a reverse flow, annular combustion chamber
p0294 A81-29081

Reverse flow, pre-rotation and unsteady inlet flow in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433

REVISIONS

Transonic cascade wind tunnel modification and initial tests
[AD-A091080] p0090 N81-13031

Aircraft modification management evaluation
[AD-A096458] p0381 N81-22974

A method for estimating the cost of aircraft structural modification
[AD-A099327] p0483 N81-26035

REYNOLDS NUMBER

Some problems of modeling high-speed aerodynamics --- in wind tunnels and tubes
p0237 A81-26118

Factors affecting afterbody drag
p0292 A81-29069
Tests of air inlets at Reynolds numbers comparable to flight in the ONERA F1 and S1MA wind tunnels
[ONERA, TP NO. 1981-36] p0460 A81-39239
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] p0618 A81-48613
A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel
[NASA-TP-1752] p0021 N81-10005
The principles and applications of cryogenic wind tunnels
p0037 N81-11049
Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975
Experimental flutter at high subsonic speeds and its theoretical prediction, taking into account wing thickness and Reynolds number
p0385 N81-23052
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0585 N81-30159
Wall interference effects: Status review
p0592 N81-31141
Comments on Reynolds number effects and the role of NTF in the development of air vehicles
p0592 N81-31142
Aircraft design using the National Transonic Facility
p0593 N81-31143
Proposed aeroelastic and flutter tests for the National Transonic Facility
p0593 N81-31144
Preliminary user planning for the NASA National Transonic Facility
p0593 N81-31145
Report of the panel on fluid dynamics
p0593 N81-31146
High lift technology
p0593 N81-31147
Configuration aerodynamics
p0593 N81-31148
Report of the panel on aeroelasticity and unsteady aerodynamics
p0593 N81-31149
Report of the wind tunnel/flight correlation panel
p0593 N81-31150
High Reynolds number research requirements for space vehicle design
p0593 N81-31151
Report of the panel on theoretical aerodynamics
p0593 N81-31152

REYNOLDS STRESS
Partially confined multiple jet mixing
p0234 A81-25513
Mean-flow and turbulence measurements in the vicinity of the trailing edge of an NACA (63 sub 1)-012 airfoil
[NASA-TP-1845] p0392 N81-23410

RF-8 AIRCRAFT
U F-8 AIRCRAFT

RF-4 AIRCRAFT
KS-127A long range oblique reconnaissance camera for RF-4 aircraft
p0462 A81-39419

RH-2 HELICOPTER
U UH-1 HELICOPTER

RIBBONS
An assessment of buffer strips for improving damage tolerance
p0247 N81-18009

RIBS (SUPPORTS)
Drag characteristics of V-groove and transverse curvature riblets
p0239 A81-26510
Unistructure - A new concept for light weight integrally stiffened skin structures
[SAE PAPER 801231] p0405 A81-34233

RICHARDSON-DUSHMAN EQUATION
U TEMPERATURE EFFECTS

RIGID BODIES
U RIGID STRUCTURES

RIGID ROTOR HELICOPTERS
Engine-airframe transient compatibility - Analysis and test
p0106 A81-17517
An ABC status report --- Advancing Blade Concept for XH-59A rotors
p0572 A81-46610

RIGID ROTORS
An exact solution of the problem of the motion of a gyroscope in a Cardan suspension
p0019 A81-12708
Hingeless tailrotor in fiber composite construction and vibration-isolation systems /ARIS, ASIS/ for helicopters
[MBB-UD-311-80-0] p0119 A81-19300
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight
p0364 A81-33050
Analysis and application of compliant rotor technology
p0467 A81-40086
Rotor blade aeroelastic stability and response in forward flight
p0467 A81-40089
Aeroelastic stability analysis of hingeless rotor helicopters in forward flight using blade and airframe normal modes
[AHS 80-24] p0475 A81-40154
Advancing Blade Concept (ABC) technology demonstrator
[AD-A100181] p0538 N81-28087
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters --- hingeless rotor helicopters
[MBB-UD-306/80-OE] p0584 N81-36139

RIGID STRUCTURES
NT RIGID ROTORS
NT RIGID WINGS
Design and fabrication of stabilized organic matrix composites
p0005 A81-11338
Introduction to a rigid pavement design procedure
p0111 A81-18054
Unistructure - A new concept for light weight integrally stiffened skin structures
[SAE PAPER 801231] p0405 A81-34233

RIGID WINGS
The development of the secondary wing structure for a rigid wing hang glider --- sandwich structure techniques
[BU-251] p0375 N81-22046

RING LASERS
Ring laser gyro
[AD-A090643] p0085 N81-12395
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros
p0484 N81-26092
Flight test results of an advanced development model Ring Laser Gyro Navigator (RLGN)
p0485 N81-26193

RING STRUCTURES
On the steady state and dynamic performance characteristics of floating ring bearings
[ASME PAPER 80-C2/LUB-17] p0117 A81-18671

RISK
ORLA - An assessment of risks --- Optimum Repair Level Analysis
p0229 A81-24257
Assessment of the impact of advanced air-transport technology
p0247 N81-18015
Risk to the public from carbon fibers released in civil aircraft accidents
[NASA-SP-448] p0254 N81-18096
Carbon/graphite composite material study
[AR-3] p0585 N81-30188
Carbon/graphite composite material study, appendix A and appendix B
p0585 N81-30190

RIVETED JOINTS
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] p0609 A81-47568
Application of fracture mechanics to built-up structures --- aircraft handbooks
[NLR-MP-79044-U] p0006 N81-12475

RIVETING
The possibility of single-impact riveting of flat-top countersunk-head rivets --- for aircraft structures

p0319 A81-30164
Automatic riveting installation for spherical aircraft parts
p0450 A81-37641

ROBUSTNESS (MATHEMATICS)
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473
Robustness properties of a new multirate digital control system
[AIAA PAPER 81-0022] p0150 A81-20545
Application of vector performance optimization to a robust control loop design for a fighter aircraft
[DFVLR-FB-80-14] p0130 N81-13970

ROCKET BOOSTERS
U BOOSTER ROCKET ENGINES

ROCKET CHAMBERS
U THRUST CHAMBERS

ROCKET ENGINE CASES
Kevlar - Thermophysical properties
[AIAA PAPER 81-1104] p0459 A81-39104

ROCKET ENGINE DESIGN
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067
Air augmentation of rockets for low speed application
p0292 A81-29068

ROCKET ENGINES
NT BOOSTER ROCKET ENGINES
NT LIQUID PROPELLANT ROCKET ENGINES
NT SOLID PROPELLANT ROCKET ENGINES
A study of air breathing rockets - Subsonic mode combustion
[IAF PAPER 80-F-270] p0115 A81-18371
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906
Design of production processes for flight-vehicle engines --- Russian book
p0623 A81-49475
Investigation of plume induced separation on a full-size missile at supersonic velocities
[AD-A094742] p0277 N81-19212
Velocity tolerance of escape systems
[AD-A096881] p0373 N81-22035
Free-jet testing of powerplants for aircraft and missiles
p0431 N81-24089

ROCKET EXHAUST
An approach to ramjet trajectory simulation test
p0292 A81-29065
Microcomputer system for controlling an infrared scanning camera --- with application to rocket plume radiation measurement
p0453 A81-37749

ROCKET FLIGHT
Helicopter airflow and wake characteristics for low speed and hovering flight from rocket interference investigations
p0572 A81-46608

ROCKET LAUNCHERS
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461] p0582 N81-30119

ROCKET MOTOR CASES
U ROCKET ENGINE CASES

ROCKET PROPELLANTS
NT GASEOUS ROCKET PROPELLANTS
NT LIQUID FUELS
NT METAL PROPELLANTS
NT SLURRY PROPELLANTS
NT SOLID ROCKET PROPELLANTS

ROCKET TEST FACILITIES
O.N.E.R.A. ramjet test facilities
p0365 A81-33285

ROCKET THRUST
Velocity tolerance of escape systems
[AD-A096881] p0373 N81-22035

RODS
Geometrically nonlinear theory for calculating thin rods of a wing profile
p0625 A81-49935
Strength calculation of thin-wall rods of significant taper
p0625 A81-49937

ROGALLO WINGS
U FLEXIBLE WINGS
U FOLDING STRUCTURES

ROLL
Roll and spin measurements in the low speed wind tunnel at Braunschweig
p0065 A81-15704
The effect of aerodynamic coupling on the dynamics of aircraft in fast rolling motion
p0104 A81-17471
Roll stabilization of flight vehicles by means of rollerons
p0290 A81-29016
Kinematic properties of the helicopter in coordinated turns
[NASA-TP-1773] p0374 N81-22039

ROLL CONTROL
U LATERAL CONTROL

ROLL FORMING
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796
Isothermal rolling of aircraft parts - Versatile process saves costly materials
p0227 A81-24047
Titanium forging - Stamping /stamp, screw-press/, circular rolling and isothermal forging
p0416 A81-36657
Metalspinning, shear- and flowforming
p0551 N81-29281
Cold-forming of internal threads
p0551 N81-29294

ROLLER BEARINGS
Calculated and experimental data for a 118-mm bore roller bearing to 3 million DN
[ASME PAPER 80-C2/LUB-14] p0117 A81-18668
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672
Lubrication of rolling element bearings
p0118 A81-18738
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33868
Advanced transmission components investigation program: Bearing and seal development
[AD-A090675] p0076 N81-12075
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

ROLLING CONTACT LOADS
Performance of aircraft pneumatic tyres in soft soil
p0226 A81-24000
Self-oscillations of a self-aligned landing gear strut in the case of classical nonholonomic rolling constraints
p0563 A81-45315

ROLLING MOMENTS
Stability of aircraft motion in critical cases
[AIAA PAPER 81-1885] p0561 A81-44577
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
Leading-edge separation from a slender rolling wing-body combination --- vortex sheet model
[RAE-TR-80039] p0330 N81-20040
The prediction of normal force and rolling moment coefficients for a spinning wing
[NASA-CR-165680] p0333 N81-20068
Static and yawed-rolling mechanical properties of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24871
Application of vortex lattice methods to calculate Lv (rolling moment due to sideslip)
[PB81-166167] p0487 N81-26123

ROLLUP SOLAR ARRAYS
U SOLAR ARRAYS

ROOFS
All composite helicopter airframe roof structure
[AHS 80-47] p0477 A81-40174

ROOTS OF EQUATIONS
Exact solutions of the equations of motion of a gyro horizon compass

p0290 A81-29001
ROTARY DRIVES
U MECHANICAL DRIVES
ROTARY GYROSCOPES
An exact solution of the problem of the motion of a gyroscope in a Cardan suspension
p0019 A81-12704
ROTARY STABILITY
NT GYROSCOPIC STABILITY
Finite element analysis of natural and forced flexural vibrations of rotor systems
p0017 A81-11956
An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826
Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732
The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856
The influence of gyroscopic forces on the dynamic behavior of rotating blades
p0295 A81-29098
Equilibrium spinning of a typical single-engine low-wing light aircraft
p0354 A81-31598
Rotary balance data for a single engine general aviation design having a high aspect-ratio canard for an angle-of-attack range of 30 deg to 90 deg
[NASA-CR-3170] p0090 N81-13022
Apparatus for and method of compensating dynamic unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
ROTARY WING AIRCRAFT
NT AH-64 HELICOPTER
NT AUTOGIROS
NT BO-105 HELICOPTER
NT CH-47 HELICOPTER
NT COMPOUND HELICOPTERS
NT H-53 HELICOPTER
NT HEAVY LIFT HELICOPTERS
NT HELICOPTERS
NT MILITARY HELICOPTERS
NT P-531 HELICOPTER
NT RIGID ROTOR HELICOPTERS
NT ROTOR SYSTEMS RESEARCH AIRCRAFT
NT S-61 HELICOPTER
NT SH-3 HELICOPTER
NT TANDEM ROTOR HELICOPTERS
NT TILT ROTOR AIRCRAFT
NT UH-1 HELICOPTER
NT UH-60A HELICOPTER
NT XV-15 AIRCRAFT
A pursuit of the aerial carriage /25th Henson and Stringfellow Memorial Lecture/
p0284 A81-27901
Multi service applications for advancing blade concept aircraft
[SAE PAPER 801226] p0405 A81-34229
Identification of a linear model of rotor-fuselage dynamics from nonlinear simulation data
p0472 A81-40125
Kinematic properties of rotary-wing and fixed-wing aircraft in steady coordinated high-g turns
[AIAA PAPER 81-1855] p0560 A81-44554
Automatic helical rotorcraft descent and landing using a Microwave Landing System
[AIAA PAPER 81-1857] p0560 A81-44556
An evaluation of advanced rotorcraft configurations for emerging military applications
p0572 A81-46611
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
Aircraft icing instrumentation: Unfilled needs --- rotary wing aircraft
p0135 N81-14560
Development of advanced techniques for rotorcraft state estimation and parameter identification
[NASA-CR-159297] p0271 N81-19098
The role of the research simulator in the systems development of rotorcraft
[NASA-TM-81276] p0272 N81-19101
First results obtained by the AMD-BA Company from the rotary assembly of the AMF Lille
[NASA-TM-75887] p0276 N81-19139
DEKFIS user's guide: Discrete Extended Kalman Filter/Smoother program for aircraft and rotorcraft data consistency
[NASA-CR-159081] p0379 N81-22722
SCI Identification (SCIDNT) program user's guide --- maximum likelihood method for linear rotorcraft models
[NASA-CR-159082] p0379 N81-22723
NLSCIDNT user's guide maximum likehood parameter identification computer program with nonlinear rotorcraft model
[NASA-CR-159083] p0380 N81-22724
SCI model structure determination program (OSR) user's guide --- optimal subset regression
[NASA-CR-159084] p0380 N81-22725
INDES User's guide multistep input design with nonlinear rotorcraft modeling
[NASA-CR-159085] p0380 N81-22726
Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070
An evaluation of NASA's program for advancing rotorcraft technology
[PB81-144180] p0389 N81-23078
National icing facilities requirements investigation
[AD-A102520] p0602 N81-31238
Twin-rotor patrol airship flying model design rationale
[AD-A102575] p0628 N81-32181
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] p0632 N81-33137
ROTARY WINGS
NT BEARINGLESS ROTORS
NT CIRCULATION CONTROL ROTORS
NT LIFTING ROTORS
NT RIGID ROTORS
NT TIP DRIVEN ROTORS
NT X WING ROTORS
The aerodynamic characteristics of some new RAE blade sections, and their potential influence on rotor performance
p0004 A81-10769
Design and tests of an helicopter rotor blade with evolutive profile
[ONERA, TP NO. 1980-125] p0011 A81-11638
A method of helicopter low airspeed estimation based on measurement of control parameters
[MBB-UD-276-79-0] p0018 A81-12094
Model tests for an active rotor isolation system
[MBB-278-79-0] p0018 A81-12095
The status of rotor noise technology
p0019 A81-12737
Practical aerodynamics of the helicopter Mi-6A --- Russian book
p0116 A81-18600
A low height 2300 kW helicopter transmission with an enclosed planetary gear
[ASME PAPER 80-C2/DET-17] p0116 A81-18582
Fatigue life evaluation of a helicopter main rotor hub
p0180 A81-22631
Analysis of the influence of atmospheric turbulence on alternating bending stress level in helicopter main rotor blades
p0236 A81-25690
The manufacture of composite rotor blades
p0283 A81-27886
Helicopter blade reliability
p0287 A81-28474
Helicopter transmission fatigue life
p0291 A81-29058
Determining the natural frequency of the combinative system of the helicopter rotor and elastic fuselage with mechanical impedance technique
[AIAA 81-0613] p0305 A81-29475
Free-vibration analysis of rotating beams by a variable-order finite-element method
[AIAA 81-0614] p0305 A81-29476

Response characteristics of a linear rotorcraft vibration model
[AIAA 81-0616] p0305 A81-29477
Control settings for a trimmed, stalled rotor by an automatic feedback system
[AIAA 81-0617] p0305 A81-29478
Dynamic analysis of a free-tip rotor
[AIAA 81-0618] p0305 A81-29479
The bearingless main rotor
p0356 A81-32008
Reduction of helicopter vibration through control of hub-impedance
p0356 A81-32009
Use of multiblade sensors for on-line rotor tip-path plane estimation
p0356 A81-32010
Unsteady aerodynamics of an aerofoil at high angle of incidence performing various linear oscillations in a uniform stream
p0357 A81-32017
Comparison of calculated and measured helicopter rotor lateral flapping angles
p0357 A81-32018
Fluid mechanics mechanisms in the stall process of airfoils for helicopters
p0360 A81-32779
Transonic rotor noise - Theoretical and experimental comparisons
p0364 A81-33049
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight
p0364 A81-33050
Pressure distribution computation on a non-lifting symmetrical helicopter blade in forward flight
p0365 A81-33291
Propeller and wing --- Russian book
p0366 A81-33696
Analysis of axial fan noise with the help of the Lowson formalism
[AAAF PAPER NT 80-54] p0370 A81-33948
Broadband helicopter rotor noise
[AAAF PAPER NT 80-58] p0370 A81-33949
Acoustic performance evaluation of an advanced OH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33952
Finite element analysis of self-excited vibrations of helicopter rotor blades
p0395 A81-34120
Quarter-scale testing of an advanced rotor system for the UH-1 helicopter
p0395 A81-34121
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0418 A81-36940
Efficient manufacturing procedures for the production of helicopter rotor blades
[MBB-UD-312-80-OE] p0449 A81-37636
Experimental substantiation for hovering rotor vertical impedance calculations
p0453 A81-38015
Orthogonal multiblade coordinates
p0453 A81-38021
Application of unsteady airfoil theory to rotary wings
p0465 A81-39874
Development of a comprehensive analysis for rotorcraft. I - Rotor model and wake analysis
p0465 A81-39896
Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39898
Gust response of rotary wing aircraft and its alleviation
p0465 A81-39900
A review of some topics of UK research on helicopters
p0466 A81-40080
ABC aircraft development status
p0467 A81-40084
Stability of nonuniform rotor blades in hover using a mixed formulation
p0467 A81-40088
Experimental and analytical studies of a model helicopter rotor in hover
p0468 A81-40097
Aerodynamic study of a hovering rotor
p0468 A81-40098
Recent progress in performance prediction of high advance ratio circulation controlled rotors
p0468 A81-40100
U.K. development of a rotor de-icing system
p0469 A81-40103
Helicopter rotor ice accretion and protection research
p0469 A81-40104
Research into a helicopter rotor's speed and load factor limits
p0471 A81-40124
Optimal higher harmonic blade pitch control for minimum vibration of a hinged rotor
p0473 A81-40134
Gust response of rotary wing and its alleviation
p0473 A81-40135
Hover performance methodology at Bell Helicopter Textron
[AHS 80-3] p0473 A81-40138
ABC development status and design considerations for several military applications --- Advancing Blade Concept for helicopter
[AHS 80-12] p0474 A81-40145
Coupled rotor/airframe vibration analysis by a combined harmonic-balance, impedance-matching method
[AHS 80-21] p0474 A81-40151
Wind tunnel evaluation of aeroelastically conformable rotors
[AHS 80-23] p0475 A81-40153
Aeroelastic stability analysis of hingeless rotor helicopters in forward flight using blade and airframe normal modes
[AHS 80-24] p0475 A81-40154
An experimental investigation of the effects of aeroelastic couplings on aeromechanical stability of a hingeless rotor helicopter
[AHS 80-25] p0475 A81-40155
Effects of rotor-body coupling in a linear rotorcraft vibration model
[AHS 80-26] p0475 A81-40156
Design and development of the Model 412 helicopter
[AHS 80-56] p0478 A81-40181
Advancing blade concept /ABC/ high speed development
p0478 A81-40182
Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by tip modification
[AHS 80-62] p0479 A81-40185
Acoustic shock waves generated by a transonic helicopter blade
[AHS 80-63] p0479 A81-40186
Active control of the helicopter rotor for vibration reduction
[AHS 80-68] p0479 A81-40188
An active control system for helicopter vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189
Composite helicopter rotor blades - Design, development, and operational performance
p0481 A81-40588
Fatigue life evaluation of helicopter rotor heads
p0482 A81-40687
Helicopter theory --- Book
p0513 A81-41823
Mi-26 - The first true heavy lift helicopter
p0559 A81-44471
American Helicopter Society, Annual Forum, 37th, New Orleans, LA, May 17-20, 1981, Proceedings
p0571 A81-46603
Prediction of dynamic stall and unsteady airloads for rotor blades
p0571 A81-46604
Active elimination of stall conditions --- in helicopters
p0571 A81-46605
Optimization theory applied to higher harmonic control of circulation controlled rotors
p0571 A81-46606
The aerodynamic influences of rotor blade airfoils, twist, taper and solidity on hover and forward flight performance
p0572 A81-46607
An ABC status report --- Advancing Blade Concept for XH-59A rotors
p0572 A81-46610

Late 80's advanced rotary wing aircraft potential
based on ATDE, ACAP, and ITR --- Advanced
Technology Demonstrator Engine, Advanced
Composite Airframe Program and Integrated
Technology Rotor
p0580 A81-46612
Determination of in-flight helicopter loads
p0573 A81-46618
A unified approach to the optimal design of
adaptive and gain scheduled controllers to
achieve minimum helicopter rotor vibration
p0573 A81-46619
Full-scale wind-tunnel test of the aeroelastic
stability of a bearingless main rotor
p0573 A81-46620
Helicopter trim by periodic shooting with
Newton-Raphson iteration
p0573 A81-46621
Nonlinear dynamic characteristics of the rotor
bifilar absorber
p0574 A81-46622
Manufacturing methods for a composite main rotor
blade for the YAH-64 helicopter
p0575 A81-46629
Reliability and maintainability evaluation of
rotor systems
p0576 A81-46645
Prediction of helicopter rotor noise from measured
blade surface pressure
p0577 A81-46649
The calculation of transonic blade tip flow at
helicopter rotors
[DGLR PAPER 81-025] p0608 A81-47554
Tip geometry effects on the model helicopter rotor
low frequency broadband noise
[AIAA PAPER 81-2003] p0619 A81-48615
Civil helicopter wire strike assessment study.
Volume 2: Accident analysis briefs
[NASA-CR-152390] p0023 N81-10019
Preliminary airworthiness evaluation AH-1S
helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061
Full scale wind tunnel investigation of a
bearingless main helicopter rotor --- Ames 40 by
80 foot wind tunnel test using the BO-105
helicopter
[NASA-CR-152373] p0033 N81-11014
Experimental and analytical studies of a model
helicopter rotor in hover
[AD-A089780] p0035 N81-11033
Erosion and impacts on composite helicopter blades
p0040 N81-11138
Fatigue and damage propagation in composite rotor
blades
p0041 N81-11145
Service experience with GRC helicopter blades
(BO-105)
p0041 N81-11146
Stability of nonuniform rotor blades in hover
using a mixed formulation
[AD-A090756] p0076 N81-12071
On the use of active higher harmonic blade pitch
control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074
Transonic rotor noise - theoretical and
experimental comparisons
[AD-A090806] p0088 N81-12824
Service life determination for the UH-60-A (UTTAS)
helicopter elastomeric bearings
[AD-A091756] p0134 N81-14324
A pure direct force/moment control for coaxial
counterrotating rotors
p0144 N81-15007
A flight investigation of performance and loads
for a helicopter with RC-SC2 main-rotor blade
sections
[NASA-TM-81898] p0186 N81-15982
Nonlinear analysis of squeeze film dampers applied
to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062
Unsteady wakes downstream from a profile
oscillating in incidence --- aerodynamic flow
tests on helicopter rotor blade profiles
[AAAF-NT-80-10] p0204 N81-16989
Multicyclic controllable twist rotor data analysis
[NASA-CR-152251] p0249 N81-18028
Application of the finite element method to rotary
wing aeroelasticity
p0251 N81-18043

Helicopter icing review
[AD-A094175] p0252 N81-18053
Some dynamic properties of rigid two-bladed fully
gimballed tip-jet helicopter rotor with
circulation control
[AD-A094031] p0252 N81-18054
Pneumatic boot for helicopter rotor deicing
p0267 N81-19059
Compensating linkage for main rotor control
[NASA-CASE-LAR-11797-1] p0270 N81-19087
Static deflection and eigenfrequency analysis of
the Nibe wind turbine rotors. Theoretical
background --- structural vibration
[RISOE-M-2199] p0279 N81-19497
An extension of the local momentum theory to a
distorted wake model of a hovering rotor
[NASA-TM-81258] p0329 N81-20030
The elaboration of a new family of helicopter
blade profiles
[NASA-TM-75907] p0330 N81-20031
JUH-1H ice phobic coating icing tests
[AD-A096361] p0340 N81-21062
Artificial and natural icing tests production
UH-60A helicopter
[AD-A096239] p0340 N81-21063
Sources, control, and effects of noise from
aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904
Preliminary design study of advanced composite
blade and hub and nonmechanical control system
for the tilt-rotor aircraft. Volume 1:
Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
Preliminary design study of advanced composite
blade and hub and nonmechanical control system
for the tilt-rotor aircraft. Volume 2: Project
planning data
[NASA-CR-152336-2] p0387 N81-23065
Application of holography to the study of
helicopter rotor flow fields
[NASA-CR-164293] p0392 N81-23433
Main rotor six degree-of-freedom isolation system
analysis
[NASA-CR-165665] p0444 N81-25090
Validation of helicopter noise prediction techniques
[NASA-CR-165715] p0447 N81-25768
Pressure distribution computation on a nonlifting
symmetrical helicopter blade in forward flight
p0447 N81-26010
Flight test evaluation of a nonlinear hub spring
on a UH-1H helicopter
[AD-A098794] p0486 N81-26121
Helicopter component fatigue life determination
p0488 N81-26135
The methodology of fatigue analysis and testing:
Main rotor blades and hub, Hughes YAH-64
advanced attack helicopter
p0488 N81-26139
Fatigue testing of composite rotor blades
p0489 N81-26140
Development of standardised fatigue test load
histories for helicopter rotors: Basic
consideration and definition of Helix and Felix
p0489 N81-26141
Fatigue test program and test results
p0489 N81-26142
Fatigue behavior of helicopter dynamic components
under constant amplitude and spectrum loading
p0489 N81-26143
Lift-propulsion system weight variation for very
heavy lift helicopters
[AD-A099169] p0490 N81-26151
Research on the functional limits of a helicopter
rotor: Speed and load factor
p0545 N81-29078
Testing and evaluation of a
stall-flutter-suppression system for helicopter
rotors using individual-blade-control
[NASA-CR-166233] p0549 N81-29135
Use of composite materials for helicopter rotor
blades --- glass fiber reinforced epoxy
[CSIR-ME-1674] p0550 N81-29167
MM&T: Low cost production/installation of
urethane leading edge guards on rotor blades
[AD-A101603] p0582 N81-30117
Parameter identification of a hingeless rotor
helicopter in flight conditions with increased
instability
[MBB-UD-307/80-OE] p0584 N81-30140

Fatigue testing of composite rotor blades --- helicopter rotors
[MBB-UD-306/80-OE] p0587 N81-30485

Determination of aircraft dynamic stability and control parameters from flight testing
p0591 N81-31115

A full-scale wind tunnel investigation of a helicopter bearingless main rotor --- Ames 40 by 80 Wind Tunnel
[NASA-TM-81321] p0628 N81-32137

Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] p0629 N81-32154

Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] p0637 N81-33194

ROTATING
U ROTATION

ROTATING BODIES
NT BEARINGLESS ROTORS
NT CIRCULATION CONTROL ROTORS
NT COMPRESSOR ROTORS
NT FLYWHEELS
NT HELICOPTER TAIL ROTORS
NT IMPELLERS
NT LIFTING ROTORS
NT PUMP IMPELLERS
NT RIGID ROTORS
NT ROTARY WINGS
NT ROTATING CYLINDERS
NT ROTATING DISKS
NT ROTORS
NT TAIL ROTORS
NT TIP DRIVEN ROTORS
NT TURBINE WHEELS
NT X WING ROTORS

Computer-aided process planning system for aircraft engine rotating parts
p0149 A81-19836

Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates
p0348 A81-30914

An experimental study of heat transfer in rotating slots and bends --- in gas turbine engines
p0509 A81-41049

A rotating, wind tunnel balance and associated experimental techniques
[AAAF-NT-80-13] p0218 N81-17108

First results obtained with a rotating construction --- used in measuring flying qualities of wind tunnel aircraft models
[AAAF-NT-80-14] p0218 N81-17109

Total main rotor isolation system analysis
[NASA-CR-165666] p0329 N81-20027

Apparatus for and method of compensating dynamic unbalance
[NASA-CASE-GSC-12550-1] p0370 N81-22358

The mechanical testing of compressors and turbines for aircraft gas turbine engines
p0433 N81-24100

ROTATING CYLINDERS

Experiments on effective source locations and velocity dependence of the broad band noise from a rotating rod
p0016 A81-11724

ROTATING DISKS

Use of speckle-holographic interferometry to study the strain-strain state of a gas-turbine engine disk close to the blade root fixing
p0170 A81-21366

ROTATING ENVIRONMENTS

Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-29110

ROTATING FLUIDS
NT ROTATING LIQUIDS

Linearized analysis of the three-dimensional compressible flow through a rotating annular blade row
p0234 A81-25446

ROTATING GENERATORS
NT AC GENERATORS
NT DYNAMOMETERS
NT TURBOGENERATORS

Wingtip vortex turbine
[NASA-CASE-LAR-12544-1] p0496 N81-27096

ROTATING LIQUIDS

Reverse flow, pre-rotation and unsteady inlet flow in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433

ROTATING SHAFTS
NT SHAFTS (MACHINE ELEMENTS)
NT TURBOSHAFTS

Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports
p0228 A81-24089

Analysis of vibration related failures in aero turbo-shaft engines
p0291 A81-29057

A new method for torsion of shaft with variable diameter using non-orthogonal curvilinear coordinates and its application
[AIAA 81-0477] p0300 A81-29378

Resonance of forwards and backwards vibration mode of impeller with gyroscopic effect
[AIAA 81-0524] p0303 A81-29445

A unified approach to the mass balancing of rotating flexible shafts
p0095 N81-13355

ROTATING STALLS

An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826

The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856

Stalling pressure rise capability of axial flow compressor stages
[ASME PAPER 81-GT-3] p0310 A81-29928

A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29982

A model for dynamic loss response in axial-flow compressors
[ASME PAPER 81-GT-154] p0317 A81-30053

ROTATING VEHICLES
U ROTATING BODIES

ROTATION
NT AUTOROTATION

Spin - Angles and inertial moments
p0567 A81-46023

Unsteady three-dimensional subsonic flow in a solid propellant rocket motor including the effect of motor rotation
p0095 N81-13085

Rotative balance of the I.M.F. Lille and associated experimental techniques
[NASA-TM-75886] p0276 N81-19137

ROTATIONAL FLOW
U FLUID FLOW
U VORTICES

ROTOR AERODYNAMICS

An experimental and theoretical investigation of pressures in four-lobe bearings
p0004 A81-10840

Towing tank tests on model wind turbine rotors
p0055 A81-13860

Wind speed measurement for wind turbine testing
p0055 A81-13873

An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826

Practical aerodynamics of the helicopter Mi-6A --- Russian book
p0116 A81-18600

Prediction of tilt rotor outwash
[AIAA PAPER 81-0013] p0157 A81-20537

Noise generation mechanism of low pressure propeller fans
[AIAA PAPER 81-0090] p0160 A81-20594

Forced vortices near a wall
[AIAA PAPER 81-0256] p0163 A81-20704

Computer simulation of unsteady flow past lifting rotors of coaxial configuration
p0230 A81-24389

Calculation of shells in aircraft turbine engines
p0285 A81-28078

Experimental verification of unsteady aerodynamic models of supersonic unstalled flutter
p0295 A81-29094

The effect of the atmospheric turbulence on the rotor blade flap-leadlag motion stability in hovering
[AIAA 81-0610] p0308 A81-29472

Feasibility of a rotor flight-dynamics model with first-order cyclic inflow and multiblade modes

[AIAA 81-0611] p0304 A81-29473
New correlations of the two-dimensional turbine
cascade aerodynamic performance
[ASME PAPER 81-GT-128] p0316 A81-30032
Use of multiblade sensors for on-line rotor
tip-path plane estimation
p0356 A81-32010
Comparison of calculated and measured helicopter
rotor lateral flapping angles
p0357 A81-32016
A Galerkin type finite element method for
rotary-wing aeroelasticity in hover and forward
flight
p0364 A81-33050
Pressure distribution computation on a non-lifting
symmetrical helicopter blade in forward flight
p0365 A81-33291
Prop-Fan technical progress leading to technology
readiness
[AIAA PAPER 81-0810] p0367 A81-33878
Finite element analysis of self-excited vibrations
of helicopter rotor blades
p0395 A81-34120
Quarter-scale testing of an advanced rotor system
for the UH-1 helicopter
p0395 A81-34121
Co-axial rotor aerodynamics in hover
p0465 A81-39899
Gust response of rotary wing aircraft and its
alleviation
p0465 A81-39900
A review of some topics of UK research on
helicopters
p0466 A81-40080
Rotor blade aeroelastic stability and response in
forward flight
p0467 A81-40089
Experimental and analytical studies of a model
helicopter rotor in hover
p0468 A81-40097
Aerodynamic study of a hovering rotor
p0468 A81-40098
Aerodynamic design of the Aerospatiale SA 365 N
Dauphin 2 helicopter
p0468 A81-40099
Recent progress in performance prediction of high
advance ratio circulation controlled rotors
p0468 A81-40100
An integrated performance and air data system for
helicopters
p0470 A81-40110
Identification of a linear model of rotor-fuselage
dynamics from nonlinear simulation data
p0472 A81-40125
Optimal higher harmonic blade pitch control for
minimum vibration of a hinged rotor
p0473 A81-40134
Computerized three-dimensional aerodynamic design
of a lifting rotor blade
[AHS 80-2] p0473 A81-40137
Hover performance methodology at Bell Helicopter
Textron
[AHS 80-3] p0473 A81-40138
Wind tunnel evaluation of aeroelastically
conformable rotors
[AHS 80-23] p0475 A81-40153
An experimental investigation of the effects of
aeroelastic couplings on aeromechanical
stability of a hingeless rotor helicopter
[AHS 80-25] p0475 A81-40155
Aerodynamic characteristics of an advanced
technology propeller for commuter aircraft
[AIAA PAPER 81-1565] p0507 A81-40948
Change of static pressure on the rotating blades
of an axial-flow compressor during surging
p0509 A81-41039
Helicopter theory --- Book
p0513 A81-41823
Wind tunnel tests of sailwings for Darrieus rotors
p0518 A81-42678
Pressure fluctuations on the surface of a small
passenger aircraft. I - Periodic disturbances
caused by the rotation of the propeller
p0561 A81-44615
The calculation of transonic blade tip flow at
helicopter rotors
[DGLR PAPER 81-025] p0608 A81-47554
Stability and flutter analysis of turbine blades
at low speed
p0612 A81-47959
Experimental and analytical studies of a model
helicopter rotor in hover
[AD-A089780] p0035 N81-11033
The effects of solidity, interblade phase angle
and reduced frequency on the time-variant
aerodynamic response of a compressor stator
[AD-A090546] p0081 N81-12108
Results of oscillatory pitch and ramp tests on the
NACA 0012 blade section
[ARA-MEMO-220] p0090 N81-13024
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467
A flight investigation of performance and loads
for a helicopter with RC-SC2 main-rotor blade
sections
[NASA-TM-81898] p0186 N81-15982
Some wake-related operational limitations of
rotorcraft
[NASA-TM-81920] p0186 N81-15985
Mean rotor wake characteristics of an
aerodynamically loaded 0.5 m diameter fan
[NASA-TM-81657] p0195 N81-16053
Multicyclic controllable twist rotor data analysis
[NASA-CR-152251] p0249 N81-18028
Some dynamic properties of rigid two-bladed fully
gimballed tip-jet helicopter rotor with
circulation control
[AD-A094031] p0252 N81-18054
Nonlinear rotor dynamics analysis --- computerized
simulation
p0257 N81-18405
Total main rotor isolation system analysis
[NASA-CR-165666] p0329 N81-20027
Fluid mechanics mechanisms in the stall process of
helicopters
[NASA-TM-81956] p0338 N81-21027
Wind tunnel tests of large- and small-scale rotor
hubs and pylons
[AD-A090510] p0439 N81-25043
Total main rotor isolation system analysis
[NASA-CR-165667] p0494 N81-27076
Blade loss transient dynamics analysis, volume 1.
Task 1: Survey and perspective --- aircraft gas
turbine engines
[NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2.
Task 2: Theoretical and analytical development.
Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27099
Aerodynamic and aeroelastic research on tipvane
turbines
[VTH-LR-302] p0540 N81-28100
Alleviation of helicopter fuselage-induced rotor
unsteady loads through deterministic variation
of the individual blade pitch
[NASA-CR-166234] p0549 N81-29138
Determination of aerodynamically adequate fillet
geometry in turbocompressor blade rows
[AD-A102170] p0600 N81-31215
Two-dimensional dynamic stall as simulated in a
varying freestream
[NASA-CR-164029] p0629 N81-32154
ROTOR BLADES
Helicopter flight characteristics improvement
through swept-tip rotor blades
[MBB-UD-275-79-0] p0018 A81-12097
Rotating blades radio interference in a
helicopter-borne CW Doppler radar
p0224 A81-23813
Dynamic stability of a rotor blade using finite
element analysis
[AIAA 81-0615] p0309 A81-29513
Helicopter rotor blade effects on mast-mounted
sensor images
p0350 A81-31114
Use of multiblade sensors for on-line rotor
tip-path plane estimation
p0356 A81-32010
ABC development status and design considerations
for several military applications --- Advancing
Blade Concept for helicopter
[AHS 80-12] p0474 A81-40185
Acoustic emission as a NDE technique for
determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070
ROTOR BLADES (TURBOMACHINERY)
Comparative performance of two centrifugal fan
impellers differing in blade section

p0001 A81-10162
Discrete frequency noise due to irregularity in
  blade row of axial fan rotor
p0002 A81-10633
Structure and decay characteristics of turbulence
  in the near- and far-wake of a moderately loaded
  compressor rotor-blade
  [ASME PAPER 80-GT-95] p0109 A81-17954
Dynamic pressure response with stall on axial flow
  compressor rotor blades
  [AIAA PAPER 81-0069] p0159 A81-20578
Mean rotor wake characteristics of an
  aerodynamically loaded 0.5 m diameter fan
  [AIAA PAPER 81-0208] p0168 A81-20830
Stability of large horizontal-axis axisymmetric
  wind turbines
p0178 A81-22526
Linearized analysis of the three-dimensional
  compressible flow through a rotating annular
  blade row
p0234 A81-25446
Coupled bending-torsion vibrations of rotating
  blades of asymmetric aerofoil cross section with
  allowance for shear deflection and rotary
  inertia by use of the Reissner method
p0289 A81-28942
Experimental verification of unsteady aerodynamic
  models of supersonic unstalled flutter
p0295 A81-29094
Reduction of strut induced rotor blade vibration
  with the modified stator setting angles
p0295 A81-29097
The influence of gyroscopic forces on the dynamic
  behavior of rotating blades
p0295 A81-29098
Evaluation of blade element performance of
  compressor rotor blade cascades in transonic and
  low supersonic flow range
p0296 A81-29102
Analysis of turbulent boundary layer on cascade
  and rotor blades of turbomachinery
p0296 A81-29106
Resonance of forwards and backwards vibration mode
  of impeller with gyroscopic effect
  [AIAA 81-0524] p0303 A81-29445
The effect of the atmospheric turbulence on the
  rotor blade flap-leadlag motion stability in
  hovering
  [AIAA 81-0610] p0304 A81-29472
Feasibility of a rotor flight-dynamics model with
  first-order cyclic inflow and multiblade modes
  [AIAA 81-0611] p0304 A81-29473
The development of a substitute bird model
  [ASME PAPER 81-GT-23] p0311 A81-29939
Improved particle trajectory calculations through
  turbomachinery affected by coal ash particles
  [ASME PAPER 81-GT-53] p0312 A81-29965
Rotor-tip leakage. I - Basic methodology
  [ASME PAPER 81-GT-71] p0313 A81-29980
Rotor-tip leakage. II - Design optimization
  through viscous analysis and experiment
  [ASME PAPER 81-GT-72] p0313 A81-29981
Inverse or design calculations for non-potential
  flow in turbomachinery blade passages
  [ASME PAPER 81-GT-78] p0314 A81-29986
New features in the design of axial-flow
  compressors with tandem blades
  [ASME PAPER 81-GT-113] p0315 A81-30017
Fatigue strength of gas turbine engine rotor
  blades in connection with structural changes in
  service
p0355 A81-31673
Study of the secondary flow in the downstream of a
  moving blade row in an axial flow fan
p0355 A81-31767
Inlet distortion and blade vibration in
  turbomachines
p0421 A81-37631
Investigation of the cooling of the turbine rotor
  blade of a gas-turbine power system
p0465 A81-40020
Prevention of corrosion and fatigue failure of
  helicopter gas turbine compressors
p0469 A81-40107
Computerized three-dimensional aerodynamic design
  of a lifting rotor blade
  [AHS 80-2] p0473 A81-40137
An experimental study of heat transfer on turbine
  rotor blades
p0509 A81-41033
Effects of blade-vane ratio and rotor-stator
  spacing on fan noise with forward velocity
  [AIAA PAPER 81-2032] p0620 A81-48628
Preliminary airworthiness evaluation AH-1S
  helicopter with ogee tip shape rotor blades
  [AD-A089625] p0027 N81-10061
Fatigue and damage propagation in composite rotor
  blades
p0041 N81-11145
An investigation of the dynamic stalling
  characteristics of rotating axial-flow
  compressor blades
p0093 N81-13054
Gerry casing treatment
  [CUED/A-TURBO/TR-101] p0093 N81-13059
Rotor model for verification of computation methods
  [ISD-262] p0145 N81-15467
Multi-plane high speed balancing techniques and
  the use of a high specific stiffness Ti-Borsic
  material for vibration control
  [AD-A093122] p0215 N81-17092
Compressor blade monitoring system for a VA1310
  (Allis Chalmers) Wind Tunnel Compressor
  [AD-A092920] p0217 N81-17103
Flap-lag-torsional dynamic modelling of rotor
  blades in hover and in forward flight, including
  the effect of cubic nonlinearities
  [NASA-CR-166194] p0486 N81-26116
Flag-lag-torsional dynamics of extensional and
  inextensional rotor blades in hover and in
  forward flight
  [NASA-CR-164475] p0486 N81-26117
End wall flows in rotors and stators of a single
  stage compressor
  [NASA-CR-164635] p0540 N81-28097
MM&T: Low cost production/installation of
  urethane leading edge guards on rotor blades
  [AD-A101603] p0582 N81-30117
Rotor wake characteristics relevant to
  rotor-stator interaction noise generation
  [NASA-TM-82703] p0583 N81-30130
Recent darrieus Vertical-Axis Wind Turbine
  aerodynamical experiments at Sandia National
  Laboratories
  [SAND-81-1108C] p0588 N81-30615
ROTOR DISKS
 U TURBINE WHEELS
ROTOR HUBS
 U HUBS
 U ROTORS
ROTOR SPEED
  Improving the mechanical load matching of wind
    energy converters
p0055 A81-13870
  Transonic rotor noise - Theoretical and
    experimental comparisons
p0364 A81-33049
  Research into a helicopter rotor's speed and load
    factor limits
p0471 A81-40124
  The effect of vane-frame design on rotor-stator
    interaction noise
    [AIAA PAPER 81-2034] p0619 A81-48627
  Research on the functional limits of a helicopter
    rotor: Speed and load factor
p0545 N81-29078
ROTOR SYSTEMS RESEARCH AIRCRAFT
  Control characteristics of a Buoyant Quad-Rotor
    Research Aircraft
    [AIAA 81-1838] p0555 A81-44122
ROTORCRAFT
 U ROTARY WING AIRCRAFT
ROTORCRAFT AIRCRAFT
  Testing model rotorcraft for overwater operations
p0111 A81-18058
  Requirements and possibilities - Rotorcraft
    powerplants /The 15th Halford Memorial Lecture/
p0226 A81-23999
  Development of a comprehensive analysis for
    rotorcraft. I - Rotor model and wake analysis
p0465 A81-39896
  The Impact of Military Applications on Rotorcraft
    and V/STOL Aircraft Design
    [AGARD-CP-313] p0632 N81-33137
  The role of the research simulator in the systems
    development of rotorcraft
p0633 N81-33146

ROTORS
NT BEARINGLESS ROTORS
NT CIRCULATION CONTROL ROTORS
NT COMPRESSOR ROTORS
NT FLYWHEELS
NT HELICOPTER TAIL ROTORS
NT IMPELLERS
NT LIFTING ROTORS
NT PUMP IMPELLERS
NT RIGID ROTORS
NT ROTARY WINGS
NT TAIL ROTORS
NT TIP DRIVEN ROTORS
NT TURBINE WHEELS
NT X WING ROTORS
The vibration of a multi-bearing rotor
p0015 A81-11722
Finite element analysis of natural and forced flexural vibrations of rotor systems
p0017 A81-11956
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17488
Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683
The balancing of flexible rotors - Theoretical relation of each balancing method and accuracies
p0228 A81-24088
Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I
p0229 A81-24090
Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448
The response of turbine engine rotors to interference rubs
[AD-A090408] p0093 N81-13060
A unified approach to the mass balancing of rotating flexible shafts
p0095 N81-13355
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DOE/ER-10570/1] p0135 N81-14363
Probabilistic analysis of foundation forces for a class of unbalanced rotating machines
p0145 N81-15362
Recent improvements on generating voltmeters
[DOE/ER-01388/463] p0257 N81-18359
Sources, control, and effects of noise from aircraft propellers and rotors --- noise prediction (aircraft
p0269 N81-19073
NASTRAN level 16 demonstration manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159826] p0279 N81-19483
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data
[NASA-CR-152336-2] p0387 N81-23065
Measurement of aerodynamic work during fan flutter
[NASA-TM-82652] p0443 N81-25080
The methodology of fatigue analysis and testing: Main rotor blades and hub, Hughes YAH-64 advanced attack helicopter
p0488 N81-26139
Total main rotor isolation system analysis
[NASA-CR-165667] p0494 N81-27076
Alleviation of helicopter fuselage-induced rotor unsteady loads through deterministic variation of the individual blade pitch
[NASA-CR-166234] p0549 N81-29134
ROUGHNESS
NT SURFACE ROUGHNESS
ROUTES
Characterizing cross-track error distributions for continental jet routes
p0174 A81-21969
Conflict monitoring analysis of parallel route spacing in the high altitude airspace, volume 2
[AD-A094152] p0250 N81-18038
Conflict monitoring analysis of parallel route spacing in the high altitude conus airspace, volume 1
[AD-A094071] p0250 N81-18041
Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System
[AD-A104150] p0636 N81-33104
RP-1 ROCKET PROPELLANTS
NT LIQUID FUELS
RPV
U REMOTELY PILOTED VEHICLES
RUBBER
NT ELASTOMERS
RUBY LASERS
Holographic non-destructive testing of materials using pulsed lasers --- for aircraft structures
p0013 A81-11655
RUDDERS
NT AERIAL RUDDERS
RULES
NT FLIGHT RULES
NT INSTRUMENT FLIGHT RULES
NT VISUAL FLIGHT RULES
RUN TIME (COMPUTERS)
A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh
p0347 A81-30717
RUNWAY CONDITIONS
Runway rehabilitation, Washington National Airport
p0112 A81-18066
Fully bonded concrete overlay for an airport runway
p0113 A81-18075
Maximizing the capacity of a single-runway airport
p0177 A81-22193
Hydroplaning and coefficient of friction in wet runway testing
p0419 A81-37300
Runway and deck temperatures in vertical takeoff/landing operations
[AIAA PAPER 81-1623] p0525 A81-43132
Investigation of landing gear alternatives for high performance aircraft
[AIAA PAPER 81-1639] p0525 A81-43139
Modal analysis for aircraft response to runway surface roughness
[AD-A092057] p0194 N81-16043
National runway friction measurement program
[AD-A097334] p0391 N81-23097
Behavior of aircraft antiskid braking systems on dry and wet runway surfaces: Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112
RUNWAY LIGHTS
Energy-saving ramp lighting with high-pressure sodium lamps
p0056 A81-14243
Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24041
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] p0629 N81-32151
RUNWAYS
Prestressed concrete airfield pavements
p0112 A81-18063
UK pavement design and evaluation - A new approach
p0113 A81-18076
Runway Configuration Management System concepts
p0114 A81-18089
Runway surface loading during aircraft landings
p0149 A81-19800
Stochastic modeling of an aircraft traversing a runway using time series analysis
p0183 A81-23368
Airport capacity enhancement by innovative use of runway geometry
[AIAA PAPER 81-0801] p0368 A81-33891
Aircraft ground mobility system for the F-16 aircraft
[AIAA PAPER 81-1735] p0536 A81-43960
Optimizing complex runway use programs for airport noise abatement
p0569 A81-46369

Analysis of potentially correctable landing delays
at Atlanta
[AD-A089408] p0024 N81-10032
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10080
Airfield pavement evaluation. Citations from the
NTIS data base
[PB80-812860] p0030 N81-10083
Potential use of geotechnical fabric in airfield
runway design --- reinforced soil systems
[AD-A092606] p0198 N81-16071
Shrinkage-compensating cement for airport
pavement. Phase 3: Fibrous concretes. Addendum
[AD-A092945] p0219 N81-17299
A method for determining landing runway length for
a STOL aircraft
p0264 N81-19041
Math model study, runway 16R instrument landing
system localizer at Seattle-Tacoma Airport,
Washington
[AD-A095076] p0270 N81-19085
Recent progress towards predicting aircraft ground
handling performance
[NASA-TM-81952] p0339 N81-21044
Candidate CDTI procedures study
[NASA-CR-165673] p0373 N81-22032
A microcomputer-based signal data converter for
runway visual range measurements
[AD-A097568] p0386 N81-23060
National runway friction measurement program
[AD-A097334] p0391 N81-23097
High speed exit taxiways
[AD-A098178] p0435 N81-24118
Airport Surface Detection Equipment (ASDE)-3
operational evaluation
[AD-A098480] p0440 N81-25059
Recycling of Portland Cement Concrete airport
pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141
Lime-stabilized native soil as base course for
light aircraft pavement
[AD-A102196] p0630 N81-32156
Water-compatible polymer concrete materials for
use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273
Fabric installation to minimize reflection crack
on taxiways at Thule Airbase, Greenland
[AD-A103737] p0639 N81-33214
Upgraded FAA Airfield Capacity Model. Volume 1:
Supplemental user's guide
[AD-A104154] p0639 N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2:
Technical description of revisions
[AD-A104155] p0639 N81-33217

S

S BAND
U SUPERHIGH FREQUENCIES
S-A-W DEVICES
U SURFACE ACOUSTIC WAVE DEVICES
S-N DIAGRAMS
State of the art and statistical aspects of
helicopter fatigue substantiation procedures
p0487 N81-26127
S-61 HELICOPTER
Aircraft accident report: New York Airways, Inc.,
Sikorsky S61-L, N618PA Newark, New Jersey, April
18, 1979
[NTSB-AAR-79-14] p0074 N81-12045
SAAB AIRCRAFT
NT SAAB 37 AIRCRAFT
SAAB 37 AIRCRAFT
Failure management for the SAAB Viggen JA37 aircraft
p0042 N81-11273
SABOT PROJECTILES
Application of aerodynamic jump prediction theory
to supersonic, high fineness ratio, cruciform
finned bodies
[AIAA PAPER 81-0222] p0162 A81-20685
SAFETY
NT AIRCRAFT SAFETY
NT FLIGHT SAFETY
NT RANGE SAFETY
SAFETY DEVICES
NT ABORT APPARATUS
NT ARRESTING GEAR
NT EJECTION SEATS
NT FLYING EJECTION SEATS
NT HELMETS
NT SEAT BELTS
Aircraft fire and overheat detection and
extinguishment
[SAE PAPER 800622] p0063 A81-15340
Pyrotechnics serving safety --- in aircraft air
and ground escape systems
p0120 A81-19348
High 'Q' ejection protection device
p0175 A81-22093
Aircraft equipment /2nd revised and enlarged
edition/ --- Russian book
p0355 A81-31023
Summary of Federal Aviation Administration
responses to National Transportation Safety
Board safety recommendations
[AD-A089971] p0033 N81-11022
Test and evaluation of improved aircrew restraint
systems for combat helicopers
p0205 N81-17017
SAFETY FACTORS
Civil aviation safety. IV - Accident severity
p0068 A81-16422
Safety considerations for helicopter drive systems
of the 1980s
p0105 A81-17510
The influence of beards on the efficiency of
aviators' oxygen masks
p0176 A81-22100
Progress in the use of automatic flight controls
in safety critical applications
p0204 A81-27902
Conditions for safe separation of external stores
p0529 A81-43395
Philosophy of safety and reliability --- in aviation
p0561 A81-44616
Safety - A prime factor in the design of
Aerospatiales Super-Puma AS 332
p0572 A81-46609
Designing safety into helicopter transmissions
p0575 A81-46638
Search and rescue methods and equipment. A
bibliography with abstracts
[PB80-812837] p0023 N81-10026
Human Factors of Flight-deck Automation:
NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022
Special Aviation Fire and Explosion Reduction
(SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction
(SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065
Factors of safety related to structural integrity.
A review of data from military airworthiness
authorities
[AGARD-R-677] p0596 N81-31186
SAFETY MANAGEMENT
The accident/injury matrix - A tool for aircraft
accident investigation
p0018 A81-12241
Is it safe - The safety assessment of aircraft
systems. IV - Methods, techniques, and
organisation
p0366 A81-33709
Design analysis of wide-body aircraft
[GPO-60-652] p0092 N81-13045
An investigation of safety hazards and reliability
problems in aerial refueling stores
[AD-A051788] p0127 N81-13930
Commuter airline safety
[PB81-104267] p0141 N81-14988
A feasibility study for advanced technology
integration for general aviation
[NASA-CR-159381] p0185 N81-15974
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16020
Evaluation of RF anechoic chamber fire protection
systems
[AD-A092478] p0197 N81-16070
Annual report to the NASA Administrator by the
Aerospace Safety Advisory Panel on the space
shuttle program. Part 2: Summary of
information developed in the panel's
fact-finding activities
[NASA-TM-82252] p0198 N81-16114
Aircraft crash dynamics: Some major considerations
p0378 N81-22437

Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
SAILPLANES
U GLIDERS
SAILS
NT SAILWINGS
SAILWINGS
Wind tunnel tests of sailwings for Darrieus rotors
p0518 A81-42678
SAINT VENANT FLEXURE PROBLEM
U SAINT VENANT PRINCIPLE
SAINT VENANT PRINCIPLE
On St. Venant flexure and torsion problem for symmetrical airfoil sections
p0365 A81-33245
SAMPLED DATA
U DATA SAMPLING
SAMPLED DATA SYSTEMS
U DATA SAMPLING
SAMPLERS
An automatic isokinetic sampler for particulate emissions from aircraft gas turbine engines
[AD-A090280] p0088 N81-12653
SAMPLING
NT AIR SAMPLING
NT DATA SAMPLING
NT PARTICULATE SAMPLING
Methodology for determining sampling intervals
[AD-A092591] p0202 N81-16825
SAMPLING DEVICES
U SAMPLERS
SANDWICH CONSTRUCTION
U SANDWICH STRUCTURES
SANDWICH STRUCTURES
Sandwich structures with high transmission loss
p0151 A81-20069
Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
Response of stiffened sandwich panels
[AIAA 81-0557] p0303 A81-29455
Bonded laminated structures in aircraft manufacture --- Russian book
p0366 A81-33700
Model 206L composite vertical fin
[AHS 80-34] p0478 A81-40175
Structural aspects in applications of adhesive bonding
[POK-BO-1238] p0514 A81-42139
S-3A composite spoilers service experience
p0529 A81-43615
EF-111A graphite/epoxy Horizontal Stabilizer Trailing Edge
p0557 A81-44342
Composite repair concepts for depot level use
p0558 A81-44384
Predictability of moisture absorption in graphite/epoxy sandwich panels
p0039 N81-11131
Application of fracture mechanics to built-up structures --- aircraft handbooks
[NLR-MP-79044-U] p0086 N81-12475
Current and projected use of carbon composites in United States aircraft
p0198 N81-16145
Opportunities for structural improvements for an advanced supersonic transport vehicle
p0246 N81-18007
Development of assembly techniques for fire resistant aircraft interior panels
[NASA-CR-152119] p0254 N81-18097
The development of the secondary wing structure for a rigid wing hang glider --- sandwich structure techniques
[BU-251] p0375 N81-22046
SARSAT
Sarsat - A rescue system for ships and aircraft
p0100 A81-16684
Electronic search and rescue aids
p0286 A81-28300
SATAN (SENSOR)
U TERRAIN ANALYSIS
SATELLITE ANTENNAS
A 7.5 GHz microstrip phased array for aircraft-to-satellite communication
p0562 A81-44623
SATELLITE COMMUNICATION
U SPACECRAFT COMMUNICATION
SATELLITE DRAG
Estimation of aerodynamic forces acting on Earth satellites, application to an experimental satellite
[INPE-1944-RPE/262] p0585 N81-30158
SATELLITE INSTRUMENTS
NT LASER ALTIMETERS
Dynamically tunable, dry gyroscope in aeronautics and astronautics
p0452 A81-37655
SATELLITE NAVIGATION SYSTEMS
Characteristics of NAVSTAR user stations
p0121 A81-19425
Satellite constellations for three-dimensional coverage of the Atlantic Ocean --- for geosynchronous navigation systems
p0323 A81-30291
GPS Navstar, the universal positioning system of the future
p0349 A81-30975
Perspectives on the civil utilization of the Navstar/GPS
p0409 A81-35023
Navstar field test results
p0484 N81-26100
SATELLITE NETWORKS
The use of satellite systems for communication
p0051 A81-13310
Air traffic control and position location by satellite constellation in equatorial orbit
p0173 A81-21912
Status report - Global Positioning System
p0511 A81-41752
Project Prosat --- communication satellite network for land, sea and air traffic control
p0565 A81-45760
SATELLITE OBSERVATION
Catalog of sea state and wind speed in the South Atlantic Bight
[NASA-CR-156872] p0137 N81-14601
SATELLITE ORBITS
Estimation of aerodynamic forces acting on Earth satellites, application to an experimental satellite
[INPE-1944-RPE/262] p0585 N81-30158
SATELLITE TRACKING
Time-compressed displays for target detection
p0064 A81-15686
GPS receiver simulation
p0173 A81-21913
Optimal processing of GPS signals
p0512 A81-41761
SATELLITE-BORNE PHOTOGRAPHY
Comparative efficiency of aircraft and satellites in the remote sensing of earth resources
p0412 A81-35739
SATELLITES
NT AERONAUTICAL SATELLITES
NT COMMUNICATION SATELLITES
NT EARTH SATELLITES
NT MARITIME SATELLITES
NT NAVIGATION SATELLITES
NT NAVSTAR SATELLITES
NT SARSAT
NT SEASAT-A SATELLITE
NT SYNCHRONOUS SATELLITES
NT TRANSIT SATELLITES
SAUDI ARABIA
Saudi Arabia's new Gateway Airports
p0115 A81-18093
SCALE EFFECT
Scale effects on turbulent boundary layer development and flow separation around V/STOL inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration
[ARC-R/M-3842-PT-2] p0021 N81-10010
Airframe noise of a small model transport aircraft and scaling effects --- Boeing 747
[NASA-TP-1858] p0380 N81-22832
Experimental studies of scale effects on oscillating airfoils at transonic speeds
p0386 N81-23054

SCALE MODELS
Measurements of structural mobility on helicopter structures
p0151 A81-20064
Equilibrium spinning of a typical single-engine low-wing light aircraft
p0354 A81-31598
Quarter-scale testing of an advanced rotor system for the UH-1 helicopter
p0395 A81-34121
The requirements for and evolution of a test rig for exhaust gas recirculation studies of V/STOL aircraft
p0469 A81-40106
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by tip modification
[AHS 80-62] p0479 A81-40185
Free flight research at Lockheed-Georgia
[SAE PAPER 810567] p0518 A81-42732
Rotary balance data for a single-engine agricultural airplane configuration for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3311] p0125 N81-13923
Active control of an explosive wing-store flutter case
[MBB-FE-17/S/PUB/25] p0131 N81-13973
Effects of angle of attack and ventral fin on transonic flutter characteristics of an arrow-wing configuration
[NASA-TM-81914] p0145 N81-15397
Philosophy and results of steady and unsteady test techniques on a large scale transport aircraft model in the ONERA transonic tunnel S1 MA. Part 1: Philosophy and results of steady tests. Part 2: Interest of large models in unsteady aerodynamics
p0190 N81-16019
Store separation simulation in subsonic wind tunnels
[MBB-FE-123/S/PUB/20] p0203 N81-16988
Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061
A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] p0627 N81-32124
SCALING LAWS
A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel
[NASA-TP-1752] p0021 N81-10005
Report of the panel on theoretical aerodynamics
p0593 N81-31152
SCANNERS
NT INFRARED SCANNERS
NT MULTISPECTRAL BAND SCANNERS
NT OPTICAL SCANNERS
Sensor Systems for the 80's Conference, Colorado Springs, Colo., December 2-4, 1980, Technical Papers
p0052 A81-13351
SCANNING DEVICES
U SCANNERS
SCAR PROGRAM
U SUPERSONIC CRUISE AIRCRAFT RESEARCH
SCARS (GEOLOGY)
U EROSION
SCAT
U SUPERSONIC COMMERCIAL AIR TRANSPORT
SCATTERING
NT ACOUSTIC SCATTERING
NT ELECTROMAGNETIC SCATTERING
NT LIGHT SCATTERING
NT RADAR SCATTERING
NT RAMAN SPECTRA
NT RAYLEIGH SCATTERING
SCENE ANALYSIS
An MTI /moving target indicator/ algorithm for passive sensors
p0320 A81-30239
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
Moving target identification /MTI/ algorithm for passive sensors
p0358 A81-32502
Model-based scene matching
p0461 A81-39349
SCHEDULING
NT PREDICTION ANALYSIS TECHNIQUES
Performance evaluation of an interrogation-reply scheduling technique for a discrete address beacon system --- of radar surveillance and aircraft communication in ATC
p0121 A81-19417
A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032
Application of scheduling heuristics on the aircraft maintenance depot
[AD-A094815] p0261 N81-19015
An analysis of opportunistic maintenance policy for the F100PW100 aircraft engine
[AD-A097548] p0384 N81-23025
A slot allocation model for high-density airports
[AD-A098097] p0438 N81-24846
SCHEMATICS
U CIRCUIT DIAGRAMS
SCHLIEREN PHOTOGRAPHY
A simple laser interferometer for wind tunnel flow visualisation
p0018 A81-12078
Measured pressure distributions and shock shapes on a Butler wing
[CUED/A-AERO/TR-9] p0090 N81-13026
SCISSION
U CLEAVAGE
SCOUT HELICOPTER
U P-531 HELICOPTER
SCRAMJET ENGINES
U SUPERSONIC COMBUSTION RAMJET ENGINES
SCRAMJETS
U SUPERSONIC COMBUSTION RAMJET ENGINES
SCRAP
Silver recovery from aircraft scrap
[PB81-150021] p0392 N81-23269
SCREEN EFFECT
Effect of contraction on screen-generated turbulence
p0284 A81-27900
SCREENS
Unsteady subsonic motion of a wing near a screen
p0225 A81-23889
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
p0625 A81-49948
SCRUBBING
U WASHING
SE-210 AIRCRAFT
Aging study of the Caravelle 38
p0061 A81-15119
SEA KING HELICOPTER
U SH-3 HELICOPTER
SEA LAUNCHING
F/A-18A Initial Sea Trials
p0458 A81-38857
SEA STATES
VTOL control for shipboard landing in high sea states
p0155 A81-20471
Catalog of sea state and wind speed in the South Atlantic Bight
[NASA-CR-156872] p0137 N81-14601
Seasat altimeter height calibration --- related to sea surface heights near bermuda
[NASA-TM-82040] p0279 N81-19526
SEALING
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182
SEALS (STOPPERS)
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
Blade tip ceramic outer air seal for long life turbine engines
[AIAA PAPER 81-1440] p0504 A81-40874
Advanced transmission components investigation program: Bearing and seal development
[AD-A090675] p0076 N81-12075
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27098
SEARCH AND RESCUE SATELLITE
U SARSAT
SEARCH RADAR
Search and rescue methods and equipment. A

bibliography with abstracts
[PB80-812837] p0023 N81-10026

SEARCHING
A description of the general aviation fixed wing accident p0408 A81-34696

Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft
[NASA-CR-160036] p0023 N81-10020

SEAS
NT MEDITERRANEAN SEA

SEASAT SATELLITES
NT SEASAT-A SATELLITE

SEASAT-A SATELLITE
Seasat altimeter height calibration --- related to sea surface heights near bermuda
[NASA-TM-82040] p0279 N81-19526

SEAT BELTS
MPES negative G restraint strap design options
[AD-A098030] p0424 N81-24037

Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] p0636 N81-33177

SEATS
NT EJECTION SEATS
NT FLYING EJECTION SEATS

An inflatable seat for aircraft passengers p0175 A81-22091

Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767

Simulation of aircraft seat response to a crash environment
[SAE PAPER 810612] p0522 A81-42768

General aviation aircraft rear-seated occupant protection - Shoulder restraints in rear seats
[AIAA PAPER 81-1669] p0534 A81-43944

Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23058

Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050

Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051

SECONDARY FLOW
Aerodynamic study of flat turbine cascades with additional blades in blade passages p0281 A81-27373

Study of the secondary flow in the downstream of a moving blade row in an axial flow fan p0355 A81-31767

Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051

Three dimensional internal flows in turbomachinery, volume 1
[AD-A092737] p0197 N81-16065

SECONDARY RADAR
Improved secondary radar antennas for flight safety installations p0151 A81-20083

Multipath and interference effects in secondary surveillance radar systems p0183 A81-23359

Discrete Address Beacon System p0350 A81-31134

The development of secondary radar in air traffic control p0565 A81-45762

Parameter estimation of an SSR amplitude comparison monopulse extractor --- Secondary Surveillance Radar p0571 A81-46537

SECULAR PERTURBATION
U LONG TERM EFFECTS

SEEKERS
U HOMING DEVICES

SELECTION
Methodology for engine/aircraft selection with life and utilization considerations
[AIAA PAPER 81-1401] p0515 A81-42190

SELF ADAPTIVE CONTROL SYSTEMS
Auto-adaptive piloting --- of missiles
[GA-380] p0217 N81-17102

SELF ALIGNMENT
An opto-electronic method for wind tunnel model alignment p0361 A81-32089

The influence of structural parameters and velocity on the shimmy of self-aligned wheels p0556 A81-44268

Self-oscillations of a self-aligned landing gear strut in the case of classical nonholonomic rolling constraints p0563 A81-45315

SELF EXCITATION
The influence of flames on the formation of self-excited combustion chamber oscillations p0298 A81-29197

SELF INDUCED VIBRATION
NT PANEL FLUTTER
NT SUBSONIC FLUTTER
NT SUPERSONIC FLUTTER
NT TRANSONIC FLUTTER

Finite element analysis of self-excited vibrations of helicopter rotor blades p0395 A81-34120

SELF OSCILLATION
Self-excited oscillations of supersonic flow in a sudden enlargement of a duct p0228 A81-24081

Experimental investigation into the reaction of a boundary layer to external periodic disturbances p0309 A81-29866

A dynamic shimmy analysis
[AIAA PAPER 81-1700] p0527 A81-43161

Self-oscillations of a self-aligned landing gear strut in the case of classical nonholonomic rolling constraints p0563 A81-45315

Self-oscillations of a wheel on a self-aligning landing gear strut with a nonlinear damper A81-46047

SELF REGULATING
U AUTOMATIC CONTROL

SEMICONDUCTOR DEVICES
NT CHARGE COUPLED DEVICES
NT FIELD EFFECT TRANSISTORS
NT LIGHT EMITTING DIODES
NT METAL OXIDE SEMICONDUCTORS
NT TRANSISTOR AMPLIFIERS

High temperature electronic requirements in aeropropulsion systems
[NASA-TM-81682] p0201 N81-16388

Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue
[NASA-TM-75733] p0376 N81-22054

SEMICONDUCTOR DIODES
NT LIGHT EMITTING DIODES

SEMICONDUCTORS (MATERIALS)
NT METAL OXIDE SEMICONDUCTORS
NT METAL-NITRIDE-OXIDE-SEMICONDUCTORS

SEMISPAN MODELS
Dynamic response of a forward-swept-wing model at angles of attack up to 15 deg at a Mach number of 0.8 --- Langley transonic dynamics tunnel tests
[NASA-TM-81863] p0085 N81-12448

Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] p0627 N81-32128

SENDERS
U TRANSMITTERS

SENSIBILITY
U SENSITIVITY

SENSING
U DETECTION

SENSITIVITY
NT IMPACT RESISTANCE
NT RADIATION TOLERANCE
NT SPECTRAL SENSITIVITY

Missile motion sensitivity to dynamic stability derivatives
[AD-A089750] p0038 N81-11095

SENSORS
Integration of sensors with displays p0212 N81-17067

SENSORY FEEDBACK
Gust response of rotary wing and its alleviation p0473 A81-40135

SENSORY PERCEPTION
NT AUDITORY PERCEPTION

NT SPACE PERCEPTION
NT VISUAL PERCEPTION
SEPARATED FLOW
NT BOUNDARY LAYER SEPARATION
Simplified vortex models for slender lifting surfaces with leading edge separation
p0016 A81-11777
Local properties of three-dimensional separation lines --- in vortex layers
[DGLR PAPER 79-063] p0016 A81-11780
Calculation of separated viscous flows on wing profiles by a coupling approach
[ONERA, TP NO. 1980-122] p0017 A81-11920
Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream
p0060 A81-14959
Separation of laminar boundary layer induced by aerodynamic interference
p0067 A81-15897
Experimental investigation of a right angle wing with partially separated flow with and without ground effects
[DGLR PAPER 80-111] p0120 A81-19397
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AIAA PAPER 81-0051] p0159 A81-20567
Calculation of viscous, sonic flow over hemisphere-cylinder at 19 deg incidence - The capturing of nose vortices
[AIAA PAPER 81-0189] p0162 A81-20661
3-D viscous analysis of ducts and flow splitters
[AIAA PAPER 81-0277] p0163 A81-20720
Flight experiments with a slender cone at angle of attack
[AIAA PAPER 81-0337] p0165 A81-20761
A discrete vortex method for the non-steady separated flow over an airfoil
p0179 A81-22560
Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0228 A81-24078
Numerical simulation of supersonic flow around solids of revolution with a leading detachment zone
p0231 A81-24757
A method for measuring the velocity field in a stalled flow
p0287 A81-28523
Flow separation in inlets at incidence angles
p0297 A81-29114
Leading-edge separation from a thick, conical, slender wing at small angles of incidence
p0355 A81-31687
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0365 A81-33281
The challenge of unsteady separating flows
p0411 A81-35647
The effect of the aspect ratio of delta wings on the structure of the near vortex wake
p0413 A81-36467
The calculation of separated flow at helicopter bodies
[DGLR PAPER 81-026] p0608 A81-47555
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] p0610 A81-47601
The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12038
Experimental study of supersonic viscous leeside flow over a slender delta wing
[NASA-TM-81248] p0133 N81-14265
An analytic model of subsonic flow around an airflow with a spoiler
p0138 N81-14966
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
Discussion of test results in the design of laminar airfoils for competition gliders
[NASA-TM-75402] p0186 N81-15984
Structures of flow separations over swept wings
p0255 N81-18246
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0255 N81-18257
Separation behavior of boundary layers on three-dimensional wings
[NASA-TM-75877] p0262 N81-19027
Investigation of plume induced separation on a full-size missile at supersonic velocities
[AD-A094742] p0277 N81-19212
Leading-edge separation from a slender rolling wing-body combination --- vortex sheet model
[RAE-TR-80039] p0330 N81-20040
Topology of three-dimensional separated flows
[NASA-TM-81294] p0385 N81-23037
Analysis of laminar and turbulent symmetric blunt trailing-edge flows
[AD-A098703] p0439 N81-25046
Aeroelasticity, including dynamic effects of separated flow --- launch vehicle response
p0592 N81-31118
Determination of aerodynamically adequate fillet geometry in turbocompressor blade rows
[AD-A102170] p0600 N81-31219
SEPARATORS
NT AIR FILTERS
SERIES (MATHEMATICS)
NT FOURIER SERIES
NT PADE APPROXIMATION
SERVICE LIFE
Operational durability of airframe structures
p0014 A81-11662
Aging study of the Caravelle 38
p0061 A81-15119
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719
Fatigue design criteria and fleet fatigue life survey at Aeronautica Macchi
p0180 A81-22624
Advanced ATC computer system
p0286 A81-28302
Statistical crack growth in durability and damage tolerant analyses
[AIAA 81-0492] p0300 A81-29382
Material shortages - Effect on the aircraft engine industry
[AIAA 81-0509] p0301 A81-29387
Impacts of broadened-specification fuels on aircraft turbine engine combustors
[ASME PAPER 81-GT-2] p0310 A81-29927
Numerical methods for studying the stress-strain state and service life of aircraft gas-turbine engine disks
p0351 A81-31250
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1332] p0352 A81-31376
Fatigue strength of gas turbine engine rotor blades in connection with structural changes in service
p0355 A81-31673
Orientation of measurement sensors for optimum end-of-life performance
p0360 A81-32697
Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836
Recent developments in Naval aircraft jet engine usage
[AIAA PAPER 81-1366] p0502 A81-40846
Engine usage prediction for advanced fighter aircraft
[AIAA PAPER 81-1367] p0514 A81-42178
Engine duty cycle estimation for conceptual design aircraft
[AIAA PAPER 81-1368] p0514 A81-42179
Engine life methodologies for conceptual design
[AIAA PAPER 81-1398] p0515 A81-42188
The use of engine operating experience in the preliminary design of aircraft gas turbine combustion systems
[AIAA PAPER 81-1399] p0515 A81-42189
Methodology for engine/aircraft selection with life and utilization considerations
[AIAA PAPER 81-1401] p0515 A81-42190
A-7 composite outer wing service experience
p0530 A81-43617
Engine life and usage methodologies for conceptual design
[AIAA PAPER 81-1651] p0533 A81-43937

Investigation of influences on the definition of
engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938
Measures for increasing the service life of
riveted, aircraft-relevant joints
[DGLR PAPER 81-052] p0609 A81-47564
Service experience with GRC helicopter blades
(BO-105)
p0041 N81-11146
US Navy service experience with advanced composites
--- in aircraft composite structures
p0041 N81-11149
Service life determination for the UH-60-A (UTTAS)
helicopter elastomeric bearings
[AD-A091756] p0134 N81-14324
Structure and lifetime attestation of TORNADO
[MBB-FUB-P-0001] p0251 N81-18048
Concept definition: Retirement for cause of F-100
rotor components
[AD-A095584] p0335 N81-20080
Review of Air Force's next generation trainer
aircraft program Department of Defense
[AD-A096238] p0341 N81-21071
The 737 graphite composite flight spoiler flight
service evaluation
[NASA-CR-159362] p0343 N81-21131
Service evaluation of aluminum-brazed titanium
(ABTi) --- aircraft structures
[NASA-CR-3418] p0378 N81-22129
An analysis of opportunistic maintenance policy
for the F100PW100 aircraft engine
[AD-A097548] p0384 N81-23025
Engine life development --- operating costs and
propulsion system performance
p0430 N81-24081
Fatigue analysis of composite materials using the
fail-safe concept
p0487 N81-26131
State of the art and statistical aspects of
helicopter fatigue substantiation procedures
[NLR-MP-80025-U] p0496 N81-27087
Damage tolerance of a landing gear component after
many takeoffs and landings --- nondestructive
tests
[NLR-MP-79039-U] p0596 N81-31189
SERVICES
NT MEDICAL SERVICES
NT METEOROLOGICAL SERVICES
SERVOCONTROL
Aeroservoelasticity in the time domain --- for
YF-16 aircraft
[AIAA 81-0635] p0306 A81-29489
SERVOMECHANISMS
Effect of mixed phosphate ester fluids on aircraft
hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776
Portable servoactuator test system
[AIAA PAPER 81-1620] p0525 A81-43130
A brief analysis and its experiment of the
hydraulic-electric loading servosystem --- a
force simulator
[NASA-TM-76458] p0276 N81-19132
SERVOSTABILITY CONTROL
U SERVOCCNTROL
SES
U SURFACE EFFECT SHIPS
SGEMP
U SYSTEM GENERATED ELECTROMAGNETIC PULSES
SH-3 HELICOPTER
Summary of interface testing of the digital
AN/ASN-123 tactical navigation avionic system in
the SH-3H helicopter
[AHS 80-18] p0474 A81-40149
R.A.N. Sea King cabin environment survey. Part 2:
Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065
An analysis of thermal balance in the cooled cabin
of a Sea King Helicopter
[AD-A097199] p0389 N81-23077
SHADOWGRAPH PHOTOGRAPHY
NT SCHLIEREN PHOTOGRAPHY
SHAFTS (MACHINE ELEMENTS)
NT TURBOSHAFTS
Coupled torsional-flexural vibration of a shaft in
a geared system of rotors. I
p0229 A81-24090
Device for lubricant flow measurement and
conservation
p0288 A81-28743
Improved capabilities to detect incipient bearing
failures
[AD-A091687] p0134 N81-14325
High bypass turbofan component development,
modification 2
[AD-A093156] p0215 N81-17093
Full-scale aerodynamic characteristics of a
propellar installed on a small twin-engine
aircraft wing panel
[NASA-TM-81285] p0385 N81-23039
SHALE OIL
Acceptability of shale derived fuel for Navy
aircraft propulsion systems
[AIAA PAPER 81-1424] p0503 A81-40868
Alternative energy sources for non-highway
transportation, volume 1
[DOE/CS-05438/T1-VOL-1] p0044 N81-11513
Impact of changing fuel characteristics on
supersonic cruise airplane
p0248 N81-18018
Effect of hydroprocessing severity on
characteristics of jet fuel from OSCO 2 and
Paraho distillates
[NASA-TP-1768] p0436 N81-24283
A Matrix Approach to Biological Investigation of
Synthetic Fuels
[PB81-183477] p0586 N81-30313
SHANKS
U JOINTS (JUNCTIONS)
SHAPES
NT CONVEXITY
NT ELLIPTICITY
A procedure for designing forebodies with
constraints on cross-section shape and axial
area distribution
[NASA-TP-1881] p0463 N81-26078
SHARP LEADING EDGES
Calculation of flow past wings with supersonic
sharp edges
p0418 A81-36944
Experimental and theoretical study of three
interacting, closely-spaced, sharp-edged 60 deg
delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160
SHATTERING
U FRAGMENTATION
SHEAR FATIGUE
U SHEAR STRESS
SHEAR FLOW
Numerical study on viscous shear flow past a
circular cylinder
p0228 A81-24077
An experimental investigation of separating flow
on a convex surface
p0230 A81-24488
Turbulence modeling for application to V/STCL
propulsion induced effects: Two dimensional
formulation
[AD-A090331] p0072 N81-12026
SHEAR LAYERS
Dialogue on bridging some gaps in stability and
transition research --- in external, internal
and free-shear layer through-flow systems
p0115 A81-18105
Shear layer instability noise produced by various
jet nozzle configurations
[FNR-90018] p0088 N81-12825
The velocity induced by the wake of a wind turbine
in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985
SHEAR PROPERTIES
NT SHEAR STRENGTH
Alleviation of helicopter fuselage-induced rotor
unsteady loads through deterministic variation
of the individual blade pitch
[NASA-CR-166234] p0549 N81-29134
SHEAR STRENGTH
Stability and ultimate strength of carbon fiber
reinforced plastic panels
p0481 A81-40521
Air Force Geophysics Laboratory aerodynamically
tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023
SHEAR STRESS
NT TORSIONAL STRESS
Miniature pressure probe for measuring the
surface-shear-stress vector in turbulent flow
p0233 A81-25354

A new method for torsion of shaft with variable diameter using non-orthogonal curvilinear coordinates and its application
[AIAA 81-0477] p0300 A81-29378
Developments in the analysis and repair of cracked and uncracked structures
p0354 A81-31561
Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers
[ONERA-NT-1980-4] p0126 N81-13930

SHEARING
Metalspinning, shear- and flowforming
p0551 N81-29281

SHEARING STRESS
U SHEAR STRESS

SHEET METAL
U METAL SHEETS

SHELL STABILITY
Finite element calculation of thin-wall reinforced shells of the fuselage type with account for physical nonlinearity and loss of stability of certain elements
p0235 A81-25679
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29405
Post-buckling and membrane structural capability of composite shell structures
p0482 A81-40602

SHELL THEORY
Calculation of shells in aircraft turbine engines
p0285 A81-28078

SHELLS (STRUCTURAL FORMS)
NT CYLINDRICAL SHELLS
NT DOMES (STRUCTURAL FORMS)
NT METAL SHELLS
NT RADOMES
NT REINFORCED SHELLS
NT SPHERICAL SHELLS
NT THIN WALLED SHELLS
Flutter of plates and shells in practice
p0282 A81-27611
Shape optimization of plate and shell structures
[AIAA 81-0553] p0302 A81-29403
Vibrations of turbine engine blades by shell analysis
p0257 N81-18404

SHIELDING
NT ELECTROMAGNETIC SHIELDING
NT HEAT SHIELDING
NT RADIATION SHIELDING
Shielding concepts for jet noise
[AIAA PAPER 81-2020] p0623 A81-49730
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] p0624 A81-49731
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
EMC, lightning and NEMP-protection-new requirements for approved specifications when using CFRP
p0199 N81-16152

SHIPS
NT AIRCRAFT CARRIERS
NT SURFACE EFFECT SHIPS
Sarsat - A rescue system for ships and aircraft
p0100 A81-16680
Alternative energy sources for non-highway transportation, appendices
[DOE/CS-05438/T1-VOL-3] p0044 N81-11500
Collision avoidance systems. Citations from the NTIS data base
[PB80-815020] p0193 N81-16038

SHOCK ABSORBERS
Landing gear shock absorber design criteria and the assessment of tire/wheel configurations
p0232 A81-24940
Dynamics and calculations for an aircraft landing gear pneumatic shock absorber system
p0417 A81-36718

SHOCK DIFFUSERS
U DIFFUSERS
U SHOCK WAVE ATTENUATION

SHOCK LOADS
NT BLAST LOADS
Measured pressure distributions and shock shapes on a Butler wing
[CUED/A-AERO/TR-9] p0090 N81-13026

A panel method to determine loads on oscillating airfoils in transonic flow with embedded shock waves
[NLR-MP-80005-U] p0330 N81-20039

SHOCK RESISTANCE
NT IMPACT RESISTANCE
Evaluation/redesign of the F-105 pitch rate gyro pack
[AD-A092109] p0194 N81-16048

SHOCK SIMULATORS
Evaluation of lightning-induced transients in aircraft using high-voltage shock excitation techniques
p0057 A81-14269

SHOCK TESTS
Development of high-temperature turbine subsystem technology to a technology readiness status, phase 2
[FZ-1806-72] p0134 N81-14332
Test and evaluation of foam-in-place fuel tank container
[AD-A095747] p0334 N81-20073

SHOCK TUBES
Computational design of large-scale blast simulators
[AIAA PAPER 81-0159] p0162 A81-20639
Droplet breakup regimes and criteria for their existence
p0614 A81-48079

SHOCK WAVE ATTENUATION
Design of advanced technology transonic airfoils and wings
p0187 N81-16000

SHOCK WAVE GENERATORS
NT SHOCK TUBES

SHOCK WAVE INTERACTION
An experimental investigation of the interaction between a glancing shock wave and a turbulent boundary layer
p0012 A81-11649
Transient vibrations of elastic panels due to the impact of shock waves
p0616 A81-48305
Physical and numerical aspects of shock boundary layer interactions
p0256 N81-18324
Influence of free-stream Mach number on transonic shock-wave boundary-layer interaction
[NLR-MP-78013-U] p0256 N81-18325

SHOCK WAVE PROFILES
Calculation of plane transonic flows using the integral equation method and shock fitting
p0016 A81-11779
Measured pressure distributions and shock shapes on a simple delta wing
p0617 A81-48479

SHOCK WAVE PROPAGATION
Stationary displacement of a body by a shock wave
p0107 A81-17622
Experimental investigations on shock-associated noise
p0107 A81-17735
Comparison of experimental and computational shock structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953
The sonic boom from an aircraft flying along an arbitrary path in a stratified atmosphere in the presence of a three-component wind
p0123 A81-19636
Self-excited oscillations of supersonic flow in a sudden enlargement of a duct
p0228 A81-24081
A method for obtaining shockless transonic flows past two-dimensional airfoils whose profiles are partially modified from a given arbitrary profile
p0298 A81-29201

SHOCK WAVES
NT MACH CONES
NT OBLIQUE SHOCK WAVES
NT SONIC BOOMS
A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796
New interpretations of shock-associated noise with and without screech
p0178 A81-22527
Plane transonic solution with shock by direct iteration
p0231 A81-24814

Semi-inverse method of computation in inviscid
transonic flows - Application to the design of
turbomachines blades profiles
[ASME PAPER 81-GT-206] p0318 A81-30096
Acoustic shock waves generated by a transonic
helicopter blade
[AHS 80-63] p0479 A81-40186
New interpretations of shock-associated noise with
and without screech
[NASA-TM-81590] p0032 N81-10807
Unsteady transonic small disturbance theory with
strong shock waves
[NASA-CR-166157] p0261 N81-19020
A panel method to determine loads on oscillating
airfoils in transonic flow with embedded shock
waves
[NLR-MP-80005-U] p0330 N81-20039
Oscillatory flows from shock induced separations
on biconvex aerofoils of varying thickness in
ventilated wind tunnels
p0386 N81-23056
Shock associated noise reduction from
inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30908
Analysis and design of supersonic aircraft based
on inviscid nonlinear Eulerian equations. Part
1: Rotational Euler solutions with explicit
shock fitting
[AD-A103434] p0637 N81-33192

SHORT HAUL AIRCRAFT
NT A-300 AIRCRAFT
NT CESSNA 402B AIRCRAFT
NT EUROPEAN AIRBUS
Shipboard trials of the Quiet Short-Haul Research
Aircraft /QSRA/
p0099 A81-16581
QSRA Joint Navy/NASA sea trials --- Quiet Short
Haul Research Aircraft
[AIAA PAPER 81-0152] p0161 A81-20633
Rolls-Royce RB 211-535 power plant
[AIAA PAPER 81-0807] p0368 A81-33886
Reverse thrust performance of the QCSEE variable
pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
The role of the turboprop in the air
transportation system for the 1980's and onward
[SAE PAPER 801197] p0402 A81-34207
Feederjet for the 'eighties
p0410 A81-35024
The PW100 commuter powerplant
[AIAA PAPER 81-1731] p0528 A81-43170
Articulating user requirements for the commuter
aircraft industry
[AIAA PAPER 81-1733] p0528 A81-43171
Low-speed aerodynamic performance of
50.8-centimeter-diameter noise-suppressing
inlets for the Quiet, Clean, Short-haul
Experimental Engine (QCSEE) --- Lewis 9- by
15-foot low speed wind tunnel tests
[NASA-TP-1178] p0035 N81-11037
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Quiet Clean Short-haul Experimental Engine
(QCSEE): acoustic performance of a 50.8-cm (20
inch) diameter variable pitch fan and inlet,
test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097

SHORT TAKEOFF AIRCRAFT
NT A-300 AIRCRAFT
NT C-15 AIRCRAFT
NT EUROPEAN AIRBUS
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Shipboard trials of the Quiet Short-Haul Research
Aircraft /QSRA/
p0099 A81-16581
A case study in aircraft design: The de Havilland
family of STOL commuter aircraft --- Book
p0101 A81-16717
Turbopropeller engine PZL-10S
p0103 A81-17324
The introduction of STOL and RNAV to large
commercial operations
p0111 A81-18057
Classical and modern control design of a
speed-hold system for a STOL airplane
[AIAA PAPER 81-0017] p0157 A81-20541
Disturbance estimation for a STOL transport during
landing
[AIAA PAPER 81-0018] p0158 A81-20542
Experimental development of an advanced
circulation control wing system for Navy STOL
aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
Piloting techniques on the backside - Flight path
angle control
p0171 A81-21673
Aircraft thrust augmentors of ejector type ---
Russian book
p0289 A81-28760
The effect of jet non-uniformity on the lift of an
augmentor wing
p0298 A81-29144
Establishing cruise-engine cycle payoffs for a
supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007
On-line wind shear generation for flight simulator
applications
[AIAA 81-0970] p0414 A81-36559
STOL performance of the tilt rotor
p0467 A81-40085
Flight evaluation of stabilization and command
augmentation system concepts and cockpit
displays during approach and landing of
powered-lift STOL aircraft
[NASA-TP-1551] p0037 N81-11044
A computer program to calculate the longitudinal
aerodynamic characteristics of
upper-surface-blown wing-flap configurations
[NASA-CR-3005] p0071 N81-12014
Pilatus porter: Provision of revised take-off and
landing performance data
[AD-A089964] p0076 N81-12068
Development and evaluation of automatic landing
control laws for power lift STOL aircraft
[NASA-CR-152399] p0253 N81-18960
Flight investigation of a four-dimensional
terminal area guidance system for STOL aircraft
[NASA-TM-81271] p0260 N81-19016
A method for determining landing runway length for
a STOL aircraft
p0264 N81-19081
Analytical study of STOL Aircraft in ground
effect. Part 1: Nonplanar, nonlinear wing/jet
lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096
Analytical study of STOL Aircraft in ground
effect. Part 2: Nonplanar, nonlinear method
applicable to three dimensional jets of finite
thickness
[NASA-CR-152088-PT-2] p0271 N81-19097
Flight-test evaluation of STOL control and flight
director concepts in a powered-lift aircraft
flying curved decelerating approaches
[NASA-TP-1641] p0275 N81-19131
Application of variable structure system theory to
aircraft flight control --- AV-8A and the
Augmentor Wing Jet STOL Research Aircraft
[NASA-CR-164321] p0391 N81-23093
Design of a V/STOL propulsion system for a
large-scale fighter model
[NASA-CR-166162] p0442 N81-25074
YC-14 interior noise measurements program
[NASA-CR-164523] p0492 N81-26849
Conceptual/preliminary design study of subsonic
v/stol and stovl aircraft derivatives of the S-3A
[NASA-TM-81310] p0547 N81-29118
Experimental development of an advanced
circulation control wing system for Navy STOL
aircraft
[AD-A101309] p0581 N81-30116
Flight evaluation of the STOL flare and landing
during night operations
[NASA-TM-81312] p0629 N81-32151
V/STOL aircraft technology in Canada
p0634 N81-33152
Evaluation of pressure and thermal data from a
wind tunnel test of a large-scale, powered, STOL
fighter model
[NASA-CR-166170] p0635 N81-33162
A flight test evaluation of the Ball-Bartoe
jetwing propulsive lift concept
[AD-A103579] p0637 N81-33195

SHORT WAVE RADIATION
NT MICROWAVES
NT MILLIMETER WAVES

SHORT WAVE RADIO TRANSMISSION
Radio direction finding on high frequency short

duration signals
[AD-A092136] p0192 N81-16029
SHORTENING
U REDUCTION
SHOT PEENING
Reduction of energy consumption in the vibrational shot peening of axial compressor vanes
p0005 A81-11321
Investigation of shot peening as a forming process for aircraft wing skins
p0458 A81-39046
SHRINKAGE
Shrinkage-compensating cement for airport pavement. Phase 3: Fibrous concretes. Addendum
[AD-A092945] p0219 N81-17299
SHROUDED BODIES
U SHROUDS
SHROUDED PROPELLERS
Aerodynamic design of a ducted propeller - Optimization of efficiency
p0102 A81-17146
Aeroelastic and dynamic finite element analyses of a bladder shrouded disk
[NASA-CR-159728] p0278 N81-19479
SHROUDED TURBINES
An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27098
SHROUDS
Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
SHUNTS
U BYPASSES
SHUTTLE ORBITERS
U SPACE SHUTTLE ORBITERS
SIDE-LOOKING RADAR
NT RADAR IMAGERY
Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35891
Development of a ground signal processor for digital synthetic array radar data
[NASA-CR-161074] p0602 N81-31421
SIDELOBE REDUCTION
Increased target resolution and minor lobe reduction with active group antennas
p0152 A81-20090
Improvement of effective minor lobe behavior of radar antennas through signal processing
p0152 A81-20091
Side lobe suppression with digital signal processing
p0152 A81-20092
SIDESLIP
Lifting surface theory and the numerical method of wings with small angles of sideslip at subsonic and supersonic speeds
p0224 A81-23851
Stability characteristics of a forward swept wing aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576
Influence of sideslip on the kinematics of the helicopter in steady coordinated turns
p0576 A81-46644
Kinematic properties of the helicopter in coordinated turns
[NASA-TP-1773] p0374 N81-22039
Comparison of selected lift and sideslip characteristics of the Ayres Thrush S2R-800, winglets off and winglets on, to full-scale wind-tunnel data
[NASA-CR-165710] p0423 N81-24026
Application of vortex lattice methods to calculate Lv (rolling moment due to sideslip)
[PB81-166167] p0487 N81-26123
SIDEWASH
U BACKWASH
SIGHT
U VISUAL PERCEPTION
SIGNAL ANALYSIS
Detection of moving objects --- Russian book
p0118 A81-18773
Ground moving target radar signal simulation
p0323 A81-30308
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
p0607 A81-47103
SIGNAL DETECTION
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21020
Application of signal detection theory to decision making in supervisory control - The effect of the operator's experience
p0351 A81-31288
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053
SIGNAL DETECTORS
Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft
[NASA-CR-160036] p0023 N81-10020
SIGNAL DISCRIMINATORS
U SIGNAL DETECTORS
SIGNAL DISTORTION
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet --- earphones
[RAE-TR-FS-313] p0004 N81-12320
SIGNAL FADEOUT
U SIGNAL FADING
SIGNAL FADING
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22202
SIGNAL GENERATORS
NT FUNCTION GENERATORS
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-19116
SIGNAL PROCESSING
Signal processing for a six-component strain-gage wind tunnel balance
p0049 A81-12968
Improvement of effective minor lobe behavior of radar antennas through signal processing
p0152 A81-20091
Side lobe suppression with digital signal processing
p0152 A81-20092
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
Coherent signal processing in frequency agile pulse radar units
p0152 A81-20097
Application of Doppler information to automatic target tracking
p0153 A81-20101
Some implementation considerations for numerically stable flight filters
p0156 A81-20405
New airborne weather radar systems
[AIAA PAPER 81-0237] p0163 A81-20692
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21020
A digital technique for the analysis of the response of compressor/duct systems in unsteady flow
p0294 A81-29078
Synergistic benefits of fully integrating JTIDS and GPS --- Joint Tactical Information Distribution System and Global Positioning System
p0323 A81-30311
The RLU - An advanced remote terminal for avionic systems
p0327 A81-30358
AN/TPX-54 interrogator
p0350 A81-31131
Improvement of the imaging of moving acoustic sources by the knowledge of their motion
[ONERA, TP NO. 1981-17] p0359 A81-32538
Maximum likelihood elevation angle estimates of radar targets using subapertures
p0359 A81-32691
Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II
p0366 A81-33294
AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
p0471 A81-40123

Optimal processing of GPS signals p0512 A81-41761
Nonlinear estimation of generalized vector shot processes p0529 A81-43583
Three edge-point estimation schemes for tracking airborne targets p0562 A81-44681
High bypass ratio engine noise component separation by coherence technique [AIAA PAPER 81-2054] p0621 A81-48653
Optimized computer systems for avionics applications [AD-A089570] p0028 N81-10063
Active BCAS: Design and validation of the surveillance subsystem [AD-A095089] p0270 N81-19084
Microcomputer processing for Loran-C p0371 N81-22007
A microcomputer-based signal data converter for runway visual range measurements [AD-A097568] p0386 N81-23060
Precision Positioning and Inertial Guidance Sensors: Technology and Operational Aspects [AGARD-CP-298] p0484 N81-26091
Development of a ground signal processor for digital synthetic array radar data [NASA-CR-161074] p0602 N81-31421
Design of optimal inputs for the identification of characteristics of aircraft flights --- parameter identification control theory p0631 N81-33131

SIGNAL RECEPTION
NT SYMBOLS

SIGNAL TO NOISE RATIOS
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach [AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams [AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables [AD-A092744] p0192 N81-16032
DMAHTC's support to National Ocean Survey LORAN-C-charting [AD-A093748] p0206 N81-17027
Production of LORAN-C reliability diagrams at the Defense Mapping Agency [AD-A093749] p0206 N81-17028

SIGNAL TRANSMISSION
NT DATA TRANSMISSION
NT MULTIPATH TRANSMISSION
NT PCM TELEMETRY
NT RADAR TRANSMISSION
NT SHORT WAVE RADIO TRANSMISSION
NT TELEMETRY
Omega station 10.2 kHz signal coverage prediction diagrams p0512 A81-41760
Transverse Voice Radio Link for Stratospheric Balloons [INPE-1992-RPE/265] p0586 N81-30331
Definition, analysis and development of an optical data distribution network for integrated avionics and control systems [NASA-CR-159370] p0590 N81-30962

SIGNATURES
NT SPECTRAL SIGNATURES

SIGNS (SYMBOLS)
U SYMBOLS

SIKORSKY AIRCRAFT
NT H-53 HELICOPTER
NT S-61 HELICOPTER
NT SH-3 HELICOPTER
NT UH-60A HELICOPTER

SIKORSKY HSS-2 HELICOPTER
U SH-3 HELICOPTER

SIKORSKY S-61 HELICOPTER
U S-61 HELICOPTER

SIKORSKY S-65 HELICOPTER
U H-53 HELICOPTER

SILENCERS
Jet noise suppression for low bypass engines - Have we reached a dead end p0291 A81-29063

SILICON CARBIDES
Fabrication of injection molded sintered alpha SiC turbine components [ASME PAPER 81-GT-161] p0317 A81-30060
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines --- by hot pressing [BMFT-FB-T-79-137] p0275 N81-19123
Development of high strength silicon carbide materials for gas turbine applications [BMFT-FB-T-80-025] p0497 N81-27102

SILICON COMPOUNDS
NT SILICON CARBIDES
NT SILICON NITRIDES
Ceramic applications in turbine engines --- for improved component performance and reduced fuel usage [NASA-CR-159865] p0274 N81-19118

SILICON NITRIDES
NASA gas turbine stator vane ring [ASME PAPER 81-GT-208] p0318 A81-30097
Development of gas turbine components, using silicon nitride --- forming techniques [BMFT-FB-T-79-152] p0275 N81-19129

SILICON SOLAR CELLS
U SOLAR CELLS

SILVER
Silver recovery from aircraft scrap [PB81-150021] p0392 N81-23269

SILVER OXIDE ZINC BATTERIES
U SILVER ZINC BATTERIES

SILVER ZINC BATTERIES
High power silver zinc and thermal batteries for missiles and aviation applications p0235 A81-25612

SIMILITUDE LAW
Use of similitude in analyzing aircraft windshield anti-icing performance [AIAA PAPER 79-1822] p0051 A81-13218

SIMULATION
NT ACOUSTIC SIMULATION
NT ANALOG SIMULATION
NT COMPUTERIZED SIMULATION
NT CONTROL SIMULATION
NT DIGITAL SIMULATION
NT ENVIRONMENT SIMULATION
NT EXHAUST FLOW SIMULATION
NT FLIGHT SIMULATION
NT LANDING SIMULATION
NT SPACE ENVIRONMENT SIMULATION
NT SYSTEMS SIMULATION
NT THERMAL SIMULATION
Flight test results of the HFB 320 model following control system for the in-flight simulation of Airbus A 130 [DFVLR-MITT-79-13] p0030 N81-10078

SIMULATOR TRAINING
U TRAINING SIMULATORS

SIMULATORS
NT COCKPIT SIMULATORS
NT CONTROL SIMULATION
NT ENVIRONMENT SIMULATORS
NT FLIGHT SIMULATORS
NT MOTION SIMULATORS
NT SHOCK SIMULATORS
NT TRAINING SIMULATORS
NT VIBRATION SIMULATORS
A brief analysis and its experiment of the hydraulic-electric loading servosystem --- a force simulator [NASA-TM-76458] p0276 N81-19132
Design, development, and evaluation of lightweight hydraulic system, phase 1 --- A-7 aircraft [AD-A097505] p0388 N81-23075
Validation of a bird substitute for development and qualification of aircraft tranparencies [AD-A097736] p0424 N81-24036

SINE WAVES
Application of a flight test and data analysis technique to flutter of a drone aircraft [NASA-TM-83136] p0441 N81-25066

SINGLE CRYSTALS
Creep properties of single-crystal nickel-based superalloys. II - Creep at medium temperature /760 C/ p0567 A81-46385

SINGULAR INTEGRAL EQUATIONS
Approximations and short cuts based on generalized functions p0347 A81-30730

SINUSOIDS
U SINE WAVES

SITES
NT LANDING SITES
SIZE (DIMENSIONS)
Effect of display size on utilization of traffic situation display for self-spacing task --- transport aircraft
[NASA-TP-1885] p0546 N81-29109
SIZE DETERMINATION
NT PRECIPITATION PARTICLE MEASUREMENT
A design analysis technique for evaluating size and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402
SIZE DISTRIBUTION
NT PARTICLE SIZE DISTRIBUTION
SKEWNESS
The effect of the skewness of the skin panels on stresses in conical wings
p0625 A81-49930
SKIN (STRUCTURAL MEMBER)
Application of fracture mechanics in designing lower wing skin of transport aircraft
p0102 A81-17049
Unistructure - A new concept for light weight integrally stiffened skin structures
[SAE PAPER 801231] p0405 A81-34233
Investigation of shot peening as a forming process for aircraft wing skins
p0458 A81-39046
Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance
p0559 A81-44396
Finite strip analysis of singly curved skin-stringer structures
p0616 A81-48390
The effect of the skewness of the skin panels on stresses in conical wings
p0625 A81-49930
Application of fracture mechanics to built-up structures --- aircraft handbooks
[NLR-MP-79044-U] p0086 N81-12475
Structural design of BFRP patches for Mirage wing repair
[AD-A097195] p0304 N81-23024
A comparison of laboratory measured temperatures with predictions for a spar/skin type aircraft structure
[NASA-TM-81359] p0387 N81-23067
SKIN FRICTION
NT AERODYNAMIC DRAG
NT FRICTION DRAG
NT SUPERSONIC DRAG
NT VISCOUS DRAG
Local properties of three-dimensional separation lines --- in vortex layers
[DGLR PAPER 79-063] p0016 A81-11780
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975
Skin friction measuring device for aircraft
[NASA-CASE-FRC-11029-1] p0210 N81-17057
Topology of three-dimensional separated flows
[NASA-TM-81294] p0385 N81-23037
SLANT PERCEPTION
U SPACE PERCEPTION
SLENDER BODIES
NT SLENDER CONES
Two methods for calculating the load on the surface of a slender body executing axisymmetric vibrations in a sonic gas flow
p0004 A81-10920
Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197
The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835
Holographic investigation of slender body vortex wakes
[AD-A089496] p0021 N81-10008
Leading-edge separation from a slender rolling wing-body combination --- vortex sheet model
[RAE-TR-80039] p0330 N81-20040
SLENDER CONES
Flight experiments with a slender cone at angle of attack
[AIAA PAPER 81-0337] p0163 A81-20761
SLENDER WINGS
NT INFINITE SPAN WINGS
Flow past a slender profile in a channel with permeable walls
p0004 A81-10916
Leading-edge 'Vortex Flaps' for enhanced subsonic aerodynamics of slender wings
p0012 A81-11648
Simplified vortex models for slender lifting surfaces with leading edge separation
p0016 A81-11777
The determination of the induced drag on slim wings with high lift systems in the transonic region
[MBB-FE122] p0121 A81-19400
Nonlinear aerodynamic characteristics of a thin airfoil of arbitrary plane configuration
p0123 A81-19629
Thin minimum-drag airfoils
p0123 A81-19630
Lifting-line theory of oblique wings - Application of the Galerkin method to the lifting-line equation
p0149 A81-19873
An approximate analytical method for vortex-lift and centre of pressure on the slender wing
p0223 A81-23726
Leading-edge separation from a thick, conical, slender wing at small angles of incidence
p0355 A81-31687
Vortex-flow aerodynamics - An emerging design capability
p0366 A81-33717
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
Transonic wing technology for transport aircraft
p0180 N81-16002
Design and experimental verification of a transonic wing for a transonic aircraft
p0188 N81-16003
Leading edge vortex flaps for drag reduction --- during subsonic flight
[NASA-CASE-LAR-12750-1] p0261 N81-19016
Experimental flutter at high subsonic speeds and its theoretical prediction, taking into account wing thickness and Reynolds number
p0385 N81-23052
SLIP CASTING
NASA gas turbine stator vane ring
[ASME PAPER 81-GT-208] p0318 A81-30097
SLIPSTREAMS
NT PROPELLER SLIPSTREAMS
Aerodynamic effects of nearly uniform slipstreams on thin wings in the transonic regime
[NASA-CR-152351] p0249 N81-18027
Advanced turboprop installation aerodynamics
p0260 N81-19013
SLOPES
NT GLIDE PATHS
SLOSHING
U LIQUID SLOSHING
SLOT ANTENNAS
Excitation of a circular array of cylinders with longitudinal slits --- in radio antennas
p0019 A81-12619
Input impedance of a resonator-slot ring antenna on a spherical layer --- for aircraft
p0420 A81-37433
SLOTS
NT WING SLOTS
Aerodynamic effects of body slots on a guided projectile with cruciform surfaces
[AIAA PAPER 79-1658] p0066 A81-15887
Effects of drive slots on parachute performance
p0453 A81-38020
An experimental study of heat transfer in rotating slots and bends --- in gas turbine engines
p0509 A81-41089
Wind tunnel wall interference
[AD-A093301] p0217 N81-17104
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] p0637 N81-33194
SLOTTED ANTENNAS
U SLOT ANTENNAS

SLOTTED WIND TUNNELS
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513
The resonance frequencies of ventilated wind tunnels
[ARC-R/M-3841] p0144 N81-15009
Transonic wind tunnel development (1940 - 1950)
p0185 N81-15971
Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106
A review of research at NLR on wind-tunnel corrections for high angle of attack models
p0436 N81-24125
A review of some investigations on wind tunnel wall interference carried out in Sweden in recent years
p0436 N81-24126
SLURRY PROPELLANTS
NT LIQUID FUELS
Compound Cycle Turbofan Engine (CCTE). Task 9: Carbon-Slurry Fuel Combustion Evaluation Program
[AD-A089451] p0029 N81-10072
Ultrasonic dispersion of particulate high density fuels
[AD-A102771] p0630 N81-32290
SMALL PERTURBATION FLOW
Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197
Analysis of a symmetric transonic aerofoil with the finite element method - A new upwinding technique
p0183 A81-22984
Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090
A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations
[FFA-TN-AU-1418-PT-1] p0022 N81-10013
Experimental flutter at high subsonic speeds and its theoretical prediction, taking into account wing thickness and Reynolds number
p0385 N81-23052
SMOKE ABATEMENT
Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277
SMOOTHING
NT DATA SMOOTHING
SNAP
Experimental study of the snap-through oscillations of an empennage
p0299 A81-29313
SOARING
From paleoaeronautics to altostratus - A technical history of soaring
[AIAA PAPER 81-1611] p0533 A81-43933
SODAR
An observational experiment using a monostatic sodar at the airport of Fiumicino
p0282 A81-27548
SODIUM
NT SODIUM VAPOR
SODIUM COMPOUNDS
NT SODIUM SULFATES
SODIUM SULFATES
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0391 N81-23243
SODIUM VAPOR
Energy-saving ramp lighting with high-pressure sodium lamps
p0056 A81-14243
SOFTWARE (COMPUTERS)
U COMPUTER PROGRAMS
U COMPUTER SYSTEMS PROGRAMS
SOIL MECHANICS
Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] p0630 N81-32156
SOILS
Performance of aircraft pneumatic tyres in soft soil
p0226 A81-24000
Potential use of geotechnical fabric in airfield runway design --- reinforced soil systems
[AD-A092686] p0198 N81-16077
SOLAR ACTIVITY
New developments in the field of solar-terrestrial relationships --- Russian book
p0281 A81-27326
SOLAR ARRAYS
Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431
SOLAR AZIMUTH
U AZIMUTH
SOLAR CELLS
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431
SOLAR COLLECTORS
NT SOLAR REFLECTORS
Heat pipe solar receiver with thermal energy storage
p0588 N81-30532
SOLAR CONVERTERS
U SOLAR GENERATORS
SOLAR ENERGY CONVERSION
Parabolic Dish Solar Thermal Power Annual Program Review Proceedings
[NASA-CR-164696] p0587 N81-30525
First phase testing of solar thermal engine at United Stirling
p0588 N81-30530
SOLAR GENERATORS
NT SOLAR CELLS
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
Solar Brayton engine/alternator set
p0588 N81-30529
Non-heat pipe receiver/p-40 Stirling engine
p0588 N81-30531
Heat pipe solar receiver with thermal energy storage
p0588 N81-30532
SOLAR HEATING
Design and engineering of solar balloons
p0455 A81-38333
SOLAR POWER GENERATION
U SOLAR GENERATORS
SOLAR POWER SOURCES
U SOLAR GENERATORS
SOLAR POWERED AIRCRAFT
Solar powered aircraft
[NASA-CASE-LAR-12615-1] p0628 N81-32138
SOLAR RADIATION
NT SUNLIGHT
SOLAR REFLECTORS
Parabolic Dish Solar Thermal Power Annual Program Review Proceedings
[NASA-CR-164696] p0587 N81-30525
Non-heat pipe receiver/p-40 Stirling engine
p0588 N81-30531
SOLAR TERRESTRIAL INTERACTIONS
New developments in the field of solar-terrestrial relationships --- Russian book
p0281 A81-27326
SOLID PHASES
Formation of solid phase during the heating of jet fuels
p0103 A81-13372
SOLID PROPELLANT COMBUSTION
Light transmission measurements in solid fuel ramjet combustors
p0284 A81-27910
The 17th JANNAF combustion meeting, volume 1
[NASA-TM-82238] p0200 N81-14253
An investigation of the reacting and non-reacting flow characteristics of solid ramjets
[AD-A094567] p0253 N81-18059
SOLID PROPELLANT ROCKET ENGINES
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067
Air augmentation of rockets for low speed application
p0292 A81-29068
Unsteady three-dimensional subsonic flow in a solid propellant rocket motor including the effect of motor rotation

p0095 N81-13005
The 17th JANNAF combustion meeting, volume 1
[NASA-TM-82238] p0200 N81-16253
SOLID PROPELLANTS
NT METAL PROPELLANTS
NT SOLID ROCKET PROPELLANTS
Effects of advances in propulsion technology on missile effectiveness --- solid fuel ramjets
[AD-A090645] p0081 N81-12106
An investigation of the combustion behavior of solid fuel ramjets
[AD-A098481] p0445 N81-25240
SOLID ROCKET PROPELLANTS
NT LIQUID FUELS
NT METAL PROPELLANTS
Tensile stress/strain characterization of non-linear materials
p0348 A81-30915
The 17th JANNAF combustion meeting, volume 1
[NASA-TM-82238] p0200 N81-16253
Development for new laboratories for future testing
p0433 N81-24105
SOLID ROTATION
U ROTATING BODIES
SOLID STATE DEVICES
NT CHARGE COUPLED DEVICES
NT FIELD EFFECT TRANSISTORS
NT LIGHT EMITTING DIODES
NT METAL OXIDE SEMICONDUCTORS
NT METAL-NITRIDE-OXIDE-SEMICONDUCTORS
NT RUBY LASERS
NT SEMICONDUCTOR DEVICES
NT TRANSISTOR AMPLIFIERS
Solid-state power system use expands
p0122 A81-19491
A versatile miniature solid state television camera /CCD/
p0180 A81-22620
A solid-state airborne sensing system for remote sensing
p0183 A81-23034
AN/TPX-54 interrogator
p0350 A81-31131
New technology applied to an IFF diversity transponder
p0350 A81-31133
SOLID STATE LASERS
NT RUBY LASERS
SOLID SURFACES
Two methods for calculating the load on the surface of a slender body executing axisymmetric vibrations in a sonic gas flow
p0004 A81-10920
An experimental investigation of jet screech by air jet impingement on solid boundaries
p0005 A81-11302
SOLID SUSPENSIONS
Effects of solid particles suspended in fluid flow through an axial flow compressor stage
p0297 A81-29108
Prediction of particle paths for flow of a gas/solids suspension through a cascade of flat plates
p0256 N81-18352
SOLUBILITY
Investigation of air solubility in jet A fuel at high pressures
[NASA-CR-3422] p0378 N81-22130
SOLUTIONS
NT GAS MIXTURES
NT NUCLEAR EMULSIONS
SOLVENT EXTRACTION
High-solids coatings for exterior aircraft
p0169 A81-20861
SOLVENTS
Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover
[AD-A090049] p0039 N81-11120
SONAR
NT SONOBUOYS
NATASS/LAMPS MK III --- Moored Airship Towed Array Sonar System/Light Airborne Multipurpose System
[AIAA 81-1309] p0455 A81-38527
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115
SONDES
NT RADIOSONDES
SONIC BOOMS
Status of knowledge of sonic booms
p0017 A81-11822
The sonic boom from an aircraft flying along an arbitrary path in a stratified atmosphere in the presence of a three-component wind
p0123 A81-19636
Aircraft noise control in the 1980's
p0567 A81-46352
Transient vibrations of elastic panels due to the impact of shock waves
p0616 A81-48385
Charts for determining potential minimum sonic-boom overpressures for supersonic cruise aircraft
[NASA-TP-1820] p0337 N81-21016
SONIC FLOW
U TRANSONIC FLOW
SONIC NOZZLES
Effects of axisymmetric sonic nozzle geometry on Mach disk characteristics
p0110 A81-18022
Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis
p0309 A81-29867
SONIC SPEED
U ACOUSTIC VELOCITY
SONOBUOYS
Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20] p0474 A81-40150
SOOT
An exploratory study of soot sample integrity and probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-28099
SOUND
U ACOUSTICS
SOUND ABSORPTION
U SOUND TRANSMISSION
SOUND AMPLIFICATION
Sidetone-level considerations in aircraft communication systems
p0605 N81-31475
SOUND BARRIER
U ACOUSTIC VELOCITY
SOUND FIELDS
Experimental investigations on shock-associated noise
p0107 A81-17735
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122
Contribution to the study of non stationary signals emitted by moving jet engine - Application to special analysis and imaging. I.
p0365 A81-33288
Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II
p0366 A81-33294
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] p0624 A81-49736
SOUND GENERATORS
Sound generation by vortex shedding from a profile within a channel
p0054 A81-13570
Aerodynamic sound generated by a slotted trailing edge
p0066 A81-15798
Sound sources in aerodynamics - Fact and fiction
[AIAA PAPER 81-0056] p0159 A81-20570
Generation of vortex noise in flow past a profile in a channel
p0238 A81-26134
Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis
p0309 A81-29867
SOUND INTENSITY
NOISECHECK procedures for measuring noise exposure from aircraft operations
[AD-A093948] p0221 N81-17849
Effect of aircraft noise on the equilibrium of airport residents: Longitudinal study around Roissy, phase 3
[NASA-TM-75906] p0499 N81-27692

Computer program to predict aircraft noise levels
[NASA-TP-1913] p0641 N81-33947
SOUND MEASUREMENT
U ACOUSTIC MEASUREMENTS
SOUND PERCEPTION
U AUDITORY PERCEPTION
SOUND PRESSURE
On the unsteady wake-induced lift on a slotted airfoil. II - The influence of displacement thickness fluctuations
p0229 A81-24237
Discussion of the pressure-source aerosonic theory and of Doak's criticism
p0238 A81-26189
The influence of blade number ratio and blade row spacing on axial-flow compressor stator blade dynamic load and stage sound pressure level
[ASME PAPER 81-GT-165] p0317 A81-30064
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] p0618 A81-48608
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] p0619 A81-48626
New interpretations of shock-associated noise with and without screech
[NASA-TM-81590] p0032 N81-10807
A comparison of the three methods used to obtain acoustic measurements for the NASA Flight Effects Program
[NASA-TM-81906] p0088 N81-12822
Analysis of pressure spectra measurements in a ducted combustion system
[NASA-TM-81583] p0146 N81-15768
Handbook of aircraft noise metrics
[NASA-CR-3406] p0345 N81-21871
Prediction of sound radiation from different practical jet engine inlets
[NASA-CR-164620] p0500 N81-27886
SOUND PROPAGATION
NT VOICE
Numerical techniques in linear duct acoustics - A status report
[ASME PAPER 80-WA/NC-2] p0170 A81-21120
Sound radiation from vortex systems
p0171 A81-21591
Acoustic shock waves generated by a transonic helicopter blade
[AHS 80-63] p0479 A81-40186
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] p0624 A81-49736
Static tests of excess ground attenuation at Wallops Flight Center
[NASA-CR-3435] p0491 N81-26846
SOUND RANGING
Hyperbolic origins --- of radio position-fixing systems
p0612 A81-47842
Remote sensing methods for the determination of slant range visibility
[ESA-TT-627] p0086 N81-12536
SOUND TRANSDUCERS
NT ELECTROACOUSTIC TRANSDUCERS
NT MICROPHONES
SOUND TRANSMISSION
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-28943
Summary of typical parameters that affect sound transmission through general aviation aircraft structures
[SAE PAPER 810562] p0518 A81-42728
Procedure for evaluation of engine isolators for reduced structure-borne interior noise transmission
[AIAA PAPER 81-1970] p0618 A81-48608
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models
[NASA-CR-159363] p0258 N81-18799
Effect of propagation distance on aircraft flyover sound duration
[AD-A099694] p0500 N81-27889
SOUND VELOCITY
U ACOUSTIC VELOCITY
SOUND WAVES
NT AERODYNAMIC NOISE
NT AIRCRAFT NOISE
NT ENGINE NOISE
NT JET AIRCRAFT NOISE
NT NOISE (SOUND)
NT SONIC BOOMS
Sound radiation from a finite length unflanged circular duct with uniform axial flow. I - Theoretical analysis. II - Computed radiation characteristics
p0100 A81-16712
Periodically stiffened fluid-loaded plates. I - Response to convected harmonic pressure and free wave propagation. II - Response to line and point forces
p0102 A81-17067
Propagation of three-dimensional acoustic perturbations in channels of variable cross-sectional area at frequencies close to cutoff frequency
p0119 A81-19338
The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder
p0233 A81-25312
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] p0618 A81-48602
Prediction of sound radiated from different practical jet engine inlets
[NASA-CR-163824] p0137 N81-14789
Improved methods for fan sound field determination
[NASA-CR-165180] p0147 N81-15769
SOUNDING
NT ATMOSPHERIC SOUNDING
SOVIET UNION
U U.S.S.R.
SPACE BASE COMMAND CENTER
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882
SPACE COMMUNICATION
NT INTERPLANETARY COMMUNICATION
NT SPACECRAFT COMMUNICATION
SPACE COOLING (BUILDINGS)
Simulation of aeroheating or aerocooling Air Force stores by arrays of impinging jets
[AD-A095464] p0330 N81-20034
SPACE DIVERSITY
U RECEPTION DIVERSITY
SPACE ENVIRONMENT SIMULATION
A new helicopter map display device HKG-5
p0418 A81-36967
SPACE FLIGHT
NT MANNED SPACE FLIGHT
SPACE HEATING (BUILDINGS)
Simulation of aeroheating or aerocooling Air Force stores by arrays of impinging jets
[AD-A095464] p0330 N81-20034
SPACE NAVIGATION
Position-determination accuracies of navigation methods
p0233 A81-25374
SPACE PERCEPTION
Stochastic surfaces for flight simulator displays
p0324 A81-30330
SPACE PLASMAS
A new helicopter map display device HKG-5
p0418 A81-36967
SPACE PROGRAMS
Project Prosat --- communication satellite network for land, sea and air traffic control
p0565 A81-45760
Aeronautics and Space Report of the President, 1979 activities
p0089 N81-12956
Posture hearings (NASA and FAA)
[GPO-65-265] p0203 N81-16952
SPACE SCIENCES
U AEROSPACE SCIENCES
SPACE SHUTTLE ORBITAL FLIGHT TEST 1
U SPACE TRANSPORTATION SYSTEM 1 FLIGHT
SPACE SHUTTLE ORBITER 101
Comparison of theoretical predictions of orbiter airloads with wind tunnel and flight test results for a Mach number of 0.52

[NASA-TM-81358] p0387 N81-23066
SPACE SHUTTLE ORBITERS
NT SPACE SHUTTLE ORBITER 101
Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20582
Annual report to the NASA Administrator by the Aerospace Safety Advisory Panel on the space shuttle program. Part 2: Summary of information developed in the panel's fact-finding activities
[NASA-TM-82252] p0198 N81-16114
Correlation of predicted and flight derived stability and control derivatives with particular application to tailless delta wing configurations --- application to the space shuttle orbiter
[NASA-TM-81361] p0490 N81-26150
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163108] p0498 N81-27113
SPACE SHUTTLE PAYLOADS
The Passive Optical Sample Assembly (POSA) on STS-1
[NASA-TM-82407] p0337 N81-20868
SPACE SHUTTLES
Multiple-component lightning high-current testing
p0056 A81-14255
A parametric study of the static longitudinal aerodynamic characteristics of parallel lift delta wing configurations at low Reynolds numbers
[AIAA PAPER 81-0409] p0168 A81-20814
Structural tests on space shuttle thermal protection system constructed with nondensified and densified LI 900 and LI 2200 tile
[NASA-TM-81903] p0257 N81-18410
SPACE STATIONS
NT SPACE BASE COMMAND CENTER
SPACE SYSTEMS ENGINEERING
U AEROSPACE ENGINEERING
SPACE TRANSPORTATION
NT SPACE SHUTTLE ORBITER 101
NT SPACE SHUTTLE ORBITERS
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40082
SPACE TRANSPORTATION SYSTEM
NT SPACE SHUTTLE ORBITER 101
NT SPACE SHUTTLE ORBITERS
NT SPACE SHUTTLES
SPACE TRANSPORTATION SYSTEM FLIGHTS
NT SPACE TRANSPORTATION SYSTEM 1 FLIGHT
SPACE TRANSPORTATION SYSTEM 1 FLIGHT
The Passive Optical Sample Assembly (POSA) on STS-1
[NASA-TM-82407] p0337 N81-20868
SPACE VEHICLE CONTROL
U SPACECRAFT CONTROL
SPACE VEHICLES
U SPACECRAFT
SPACE WEAPONS
NT LASER WEAPONS
SPACEBORNE PHOTOGRAPHY
NT SATELLITE-BORNE PHOTOGRAPHY
SPACECRAFT
The rise of air and space
p0366 A81-33718
SPACECRAFT ANTENNAS
Flight-vehicle antennas /2nd revised and enlarged edition/ --- Russian book
p0281 A81-27534
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734
SPACECRAFT CHARGING
Multiple-component lightning high-current testing
p0056 A81-14255
SPACECRAFT COMMUNICATION
Satellites to aid flight safety
[IAF PAPER 80-IAA-17] p0115 A81-18410
A 7.5-GHz microstrip phased array for aircraft-to-satellite communication
p0347 A81-30776
Project Prosat --- communication satellite network for land, sea and air traffic control
p0565 A81-45760
Tent shaped phased array
[AD-A103927] p0640 N81-33393
SPACECRAFT CONTROL
An analytical study of nonlinear stabilization during ballistic descent
p0237 A81-26028
Synthesis of gyrostabilizer state evaluation system under unknown perturbations
p0299 A81-29311
Guidance and Control Conference, Albuquerque, NM, August 19-21, 1981, Collection of Technical Papers
p0553 A81-44076
SPACECRAFT DESIGN
The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475
Design and concepts of composite structures
p0481 A81-40503
High Reynolds number research requirements for space vehicle design
p0593 N81-31151
SPACECRAFT ELECTRONIC EQUIPMENT
Electronic search and rescue aids
p0286 A81-28300
SPACECRAFT INSTRUMENTS
NT LASER ALTIMETERS
NT SATELLITE INSTRUMENTS
Gyrocompasses. Citations from the International Aerospace Abstracts data base
[NASA-CR-163675] p0028 N81-10065
SPACECRAFT ORBITS
NT SATELLITE ORBITS
SPACECRAFT PERFORMANCE
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40082
SPACECRAFT POWER SUPPLIES
High power silver zinc and thermal batteries for missiles and aviation applications
p0235 A81-25612
SPACECRAFT PROPULSION
A study of air breathing rockets - Subsonic mode combustion
[IAF PAPER 80-F-270] p0115 A81-18371
Development for new laboratories for future testing
p0433 N81-24105
SPACECRAFT SENSORS
U SPACECRAFT INSTRUMENTS
SPACECRAFT STRUCTURES
Crack growth propagation under variable amplitude loading in aerospace structures
p0181 A81-22632
IPAD applications to the design, analysis, and/or machining of aerospace structures --- Integrated Program for Aerospace-vehicle Design
[AIAA 81-0512] p0301 A81-29388
High intensity acoustic testing to determine structural fatigue life and to improve reliability in nuclear reactor and aerospace structures
p0455 A81-38372
Electrical/electromagnetic concerns associated with advanced composite materials in aerospace systems
p0530 A81-43630
SPACECRAFT TRACKING
NT SATELLITE TRACKING
SPACECREWS
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] p0607 A81-47425
SPACING
NT AIRCRAFT APPROACH SPACING
SPANLOADER AIRCRAFT
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] p0627 N81-32119
SPANWISE BLOWING
NT BLOWING
Influence of jet location on the efficiency of spanwise blowing
p0154 A81-20352
In-flight research - At low cost
p0299 A81-29208
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] p0635 N81-33162
SPARE PARTS
Naval aircraft operating and support cost-estimating model: FY78 revision
[AD-A090044] p0071 N81-12013
SPARK IGNITION
Semi-empirical correlations for gas turbine

emissions, ignition, and flame stabilization
p0171 A81-21505
Basic ignition research related to altitude relight problems
p0237 A81-26014
Fundamental investigation on jet engine ignition of fuel sprays and its application
p0420 A81-37341
Advanced Technology Spark-Ignition Aircraft Piston Engine Design Study
[NASA-CR-165162] p0130 N81-13963
Computer modeling of internal combustion engines: Combustion and related processes
[NTS/79/3] p0587 N81-30454

SPATIAL DISTRIBUTION
Conflict monitoring analysis of parallel route spacing in the high altitude conus airspace, volume 1
[AD-A094071] p0250 N81-18041
Flight simulator: Use of spacegraph display in an instructor/operator station
[AD-A101951] p0602 N81-31235

SPATIAL FILTERING
Improvement of effective minor lobe behavior of radar antennas through signal processing
p0152 A81-20091

SPATIAL ISOTROPY
U SPATIAL DISTRIBUTION

SPATIAL RESOLUTION
Characteristics of flight simulator visual systems
[AGARD-AR-164] p0541 N81-28107

SPECIFIC HEAT
Calculation of flow with variable specific heat around a profile
p0235 A81-25689

SPECIFIC IMPULSE
Simplified design point performance model of a dry turbofan engine cycle
[NASA-TM-83112] p0490 N81-26148

SPECIFICATIONS
NT AIRCRAFT SPECIFICATIONS
NT EQUIPMENT SPECIFICATIONS
NT FUNCTIONAL DESIGN SPECIFICATIONS
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
Specification requirements for fighter engines
p0429 N81-24073
Specification and requirements rationale for military and civil helicopter engines
p0429 N81-24075
Practical aspects of instrumentation installation in support of subsystem testing
p0546 N81-29090

SPECKLE PATTERNS
Use of speckle-holographic interferometry to study the strain-strain state of a gas-turbine engine disk close to the blade root fixing
p0170 A81-21366

SPECTRA
NT EMISSION SPECTRA
NT ENERGY SPECTRA
NT INFRARED SPECTRA
NT NOISE SPECTRA
NT POWER SPECTRA
NT RAMAN SPECTRA

SPECTRAL ANALYSIS
U SPECTRUM ANALYSIS

SPECTRAL SENSITIVITY
Fatigue sensitivity of composite structure for fighter aircraft
[AIAA 81-0495] p0300 A81-29383
Design of multivariable feedback control systems via spectral assignment --- as applied to aircraft flight control
[NASA-CR-164189] p0345 N81-21864

SPECTRAL SIGNATURES
Microprocessor-based airborne spectrometer system
p0453 A81-37744
Modeling of 2D-nozzle plume for IR signature prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107

SPECTROMETERS
NT INFRARED SPECTROMETERS

SPECTROSCOPIC ANALYSIS
Some experience with ferrography in monitoring the condition of aircraft engines
p0285 A81-27943

SPECTROSCOPY
NT ABSORPTION SPECTROSCOPY
NT MASS SPECTROSCOPY
NT SPECTROSCOPIC ANALYSIS
NT ULTRASONIC SPECTROSCOPY
NT ULTRAVIOLET SPECTROSCOPY
NT X RAY SPECTROSCOPY

SPECTRUM ANALYSIS
The spectral analysis of nonstationary random processes - Applications to aircraft overflight-type noises --- French thesis
p0174 A81-21922
Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II
p0366 A81-33294
Acoustic spectrum analysis for gyro bearings
[AIAA PAPER 81-1616] p0524 A81-43128
Spectral analysis of nonstationary random processes. Application to noise of flyover type
[ESA-TT-639] p0088 N81-12826
Methodology for determining sampling intervals
[AD-A092591] p0202 N81-16825
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to special analysis and imaging. Part 1
p0447 N81-26006
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to spectral analysis and imaging. Part 2
p0447 N81-26013
Digital spectral analysis: A guide based on experience with aircraft vibration
[RAE-TR-81014] p0605 N81-3150

SPEECH
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323
Clear speech: A strategem for improving radio communications and automatic speech recognition in noise
p0603 N81-31453
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462

SPEECH DISCRIMINATION
U SPEECH RECOGNITION

SPEECH RECOGNITION
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet --- earphones
[RAE-TM-FS-313] p0084 N81-12320
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31452
Clear speech: A strategem for improving radio communications and automatic speech recognition in noise
p0603 N81-31453
Sidetone-level considerations in aircraft communication systems
p0605 N81-3147

SPEED CONTROL
Classical and modern control design of a speed-hold system for a STOL airplane
[AIAA PAPER 81-0017] p0157 A81-2050
Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
[SAE PAPER 801206] p0403 A81-34210

SPEED INDICATORS
NT ANEMOMETERS
NT LASER ANEMOMETERS
An airspeed vector sensor for V/STOL aircraft
[AIAA 80-1938] p0052 A81-1330
Measurement of aircraft speed and altitude --- Book
p0357 A81-3240
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters --- hingeless rotor helicopters
[MBB-UD-306/80-OE] p0584 N81-301
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] p0638 N81-332

SPEED REGULATION
U SPEED CONTROL

SPEEDOMETERS
U SPEED INDICATORS

SPHERICAL COORDINATES
An analytical solution of the two star sight problem of celestial navigation
p0614 A81-48121
SPHERICAL SHELLS
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14581
SPIN
NT METAL SPINNING
SPIN DYNAMICS
Roll and spin measurements in the low speed wind tunnel at Braunschweig
p0065 A81-15704
Concerning the motion of a piloted aircraft
p0299 A81-29312
The prediction of normal force and rolling moment coefficients for a spinning wing
[NASA-CR-165680] p0333 N81-20068
SPIN FORGING
U METAL SPINNING
SPIN REDUCTION
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
SPIN STABILIZATION
Thrust augmented spin recovery device
[NASA-CASE-LAR-11970-2] p0275 N81-19130
SPIN TESTS
A status report on NASA general aviation stall/spin flight testing
p0122 A81-19471
Equilibrium spinning of a typical single-engine low-wing light aircraft
p0354 A81-31598
TA-4J spin training through simulation
[AIAA 81-0965] p0414 A81-36556
Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756
SPINNING (METALLURGY)
U METAL SPINNING
SPLINES
Cost benefits of nonmetallic spline couplings
[SAE PAPER 801101] p0513 A81-41777
Prevention of spline wear by soft metallic coatings --- aircraft engines
[AD-A091861] p0132 N81-14064
SPOILERS
The possibility of improving the lateral-directional characteristics of a twin-engine aircraft by spoilers in the case of sudden engine failure
p0049 A81-12967
Effects of design variables on spoiler control effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581
A computational model for low speed flows past airfoils with spoilers
[AIAA PAPER 81-0253] p0163 A81-20702
S-3A composite spoilers service experience
p0529 A81-43615
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[DFVLR-FB-80-07] p0131 N81-13975
An analytic model of subsonic flow around an airflow with a spoiler
p0138 N81-14966
Wake vortex attenuation flight tests: A status report
p0267 N81-19057
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-159362] p0343 N81-21131
An introduction to the aerodynamics of spoilers
[PB81-166183] p0487 N81-26122
Some qualitative experiments on the local flow about spoilers in unsteady motion at low speeds
[PB81-166159] p0487 N81-26124
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83108] p0639 N81-33211
SPRAYED COATINGS
Coatings in the aero gas turbine
p0103 A81-17167
High-solids coatings for exterior aircraft
p0169 A81-20861
Aircraft surface coatings study: Energy efficient transport program --- sprayed and adhesive bonded coatings for drag reduction
[NASA-CR-158954] p0084 N81-12225
Automated Plasma Spray (APS) process feasibility study
[NASA-CR-165410] p0597 N81-31193
SPRAYED PROTECTIVE COATINGS
U PROTECTIVE COATINGS
U SPRAYED COATINGS
SPRAYERS
United States Army helicopter icing qualification 1980
[AIAA PAPER 81-0406] p0167 A81-20812
SPRAYING
NT PLASMA SPRAYING
Death and injury in aerial spraying - Pre-crash, crash, and post-crash prevention strategies
p0177 A81-22115
SPRAYING APPARATUS
U SPRAYERS
SPRAYS
U SPRAYERS
SPREAD SPECTRUM TRANSMISSION
Status report on Position Location Reporting System /PLRS/
p0517 A81-42440
SPRINGS (ELASTIC)
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-AC98794] p0486 N81-26121
SPUTTERING
Sputtering and ion plating for aerospace applications
[NASA-TM-81726] p0337 N81-20424
SQUEEZE FILMS
Investigation of the squeeze film bearing on two-spool turbo-fan engine
p0295 A81-29093
Nonlinear analysis of squeeze film dampers applied to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062
ST VENANT FLEXURE PROBLEM
U SAINT VENANT PRINCIPLE
STABILITY
NT AERODYNAMIC STABILITY
NT AIRCRAFT STABILITY
NT BOUNDARY LAYER STABILITY
NT COMBUSTION STABILITY
NT CONTROL STABILITY
NT DIRECTIONAL STABILITY
NT DYNAMIC STABILITY
NT PLANE STABILITY
NT FLOW STABILITY
NT FREQUENCY STABILITY
NT GYROSCOPIC STABILITY
NT HOVERING STABILITY
NT LATERAL STABILITY
NT LONGITUDINAL STABILITY
NT LOW SPEED STABILITY
NT ROTARY STABILITY
NT SHELL STABILITY
NT STATIC STABILITY
NT STRUCTURAL STABILITY
NT SURFACE STABILITY
NT SYSTEMS STABILITY
NT THERMAL STABILITY
Pilot-optimal multivariable control synthesis by output feedback
[NASA-CR-163112] p0540 N81-28102
MADY-1, a FORTRAN program for the compressible stability analysis of three-dimensional boundary layers
p0586 N81-30388
The effect of boundary layer growth on the stability of compressible flows
p0587 N81-30389
STABILITY AUGMENTATION
A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622
Precision flight path control in carrier landing approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43956
Effects of displacement and rate saturation on the control of statically unstable aircraft

[AIAA 81-1752] p0554 A81-44082
Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968
Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106

STABILITY DERIVATIVES
NT PITCHING MOMENTS
NT ROLLING MOMENTS
NT YAWING MOMENTS
A method for calculating the aerodynamic forces and moments on external stores of aircraft
p0226 A81-24006
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0241 A81-26933
Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756
Data analysis for aircraft parameter estimates
[AIAA PAPER 81-1864] p0560 A81-44561
A vortex-lattice method for calculating longitudinal dynamic stability derivatives of oscillating delta wings
[AIAA PAPER 81-1876] p0561 A81-44570
A unifying framework for longitudinal flying qualities criteria
[AIAA PAPER 81-1889] p0561 A81-44580
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
An introduction to the aerodynamics of spoilers
[PB81-166183] p0487 N81-26122
Correlation of predicted and flight derived stability and control derivatives with particular application to tailless delta wing configurations --- application to the space shuttle orbiter
[NASA-TM-81361] p0490 N81-26154
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
[MBB-UD-307/80-OE] p0584 N81-30140
Dynamic Stability Parameters --- conferences
[AGARD-LS-114] p0590 N81-31105
Review of techniques for determination of dynamic stability parameters in wind tunnels
p0590 N81-31108
Direct forced-oscillation techniques for the determination of stability derivatives in wind tunnels
p0590 N81-31109
Wind-tunnel measurement of aerodynamic derivatives using flexible-sting rigs
p0591 N81-31110
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0591 N81-31112
Applications of half-model technique in dynamic stability testing
p0591 N81-31114
Determination of aircraft dynamic stability and control parameters from flight testing
p0591 N81-31115
Estimation of dynamic stability parameters from drop model flight tests
p0591 N81-31116
Analytical determination of dynamic stability parameters
p0592 N81-31117
Aeroelasticity, including dynamic effects of separated flow --- launch vehicle response
p0592 N81-31118
Control derivatives
p0592 N81-31119
Sensitivity of aircraft motion to cross coupling and acceleration derivatives
p0592 N81-31120
Applications of dynamic stability parameters to problems in aircraft dynamics
p0592 N81-31122
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] p0627 N81-32124

STABILITY TESTS
NT FLIGHT STABILITY TESTS
NT WIND TUNNEL STABILITY TESTS
A new concept for dynamic stability testing --- for aircraft model in orbital path
[AIAA PAPER 81-0158] p0161 A81-20638
Experimental study of the stability of aircraft fuels at elevated temperatures
[NASA-CR-165165] p0088 N81-12255

STABILIZATION
NT SPIN STABILIZATION
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093888] p0204 N81-16996
Impact of high-alpha aerodynamics on dynamic stability parameters of aircraft and missiles
p0590 N81-31107

STABILIZED PLATFORMS
Gyrostabilizers for inertial control systems --- Russian book
p0017 A81-12024

STABILIZERS
The use of carbon-reinforced plastic in the construction of a deflector and a stabilizer
p0299 A81-29310

STABILIZERS (FLUID DYNAMICS)
NT HORIZONTAL TAIL SURFACES
Initial development for a flutter analysis of damaged T-38 horizontal stabilators using NASTRAN
[AIAA PAPER 81-0365] p0166 A81-2078
Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development
p0559 A81-4439
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44390
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 2: Aerodynamic effects
[AD-A093063] p0209 N81-170
Investigation of an improved flutter speed prediction technique for damaged T-38 horizontal stabilators using NASTRAN
[AD-A094769] p0273 N81-19109

STACKING FAULTS
U CRYSTAL DEFECTS

STAGNATION POINT
Effect of rear stagnation point position and trailing edge bluntness on airfoil characteristics
p0170 A81-21013

STAGNATION PRESSURE
Description of recent changes in the Langley 6- by 28-inch transonic tunnel
[NASA-TM-81947] p0391 N81-23096

STAGNATION REGION
U STAGNATION POINT

STAMPING
Titanium forging - Stamping /stamp, screw-press/, circular rolling and isothermal forging
p0416 A81-36657

STANDARDIZATION
NT COMMONALITY (EQUIPMENT)
Standardization in military avionics systems architecture; Proceedings of the Seminar, Dayton, Ohio, November 28, 1979
p0050 A81-13167
Standardization in military system architecture
p0050 A81-13168
Avionic standardization from a designer's perspective
p0050 A81-1317
Avionic architectural standardization - Logistic support perspective
p0050 A81-13171
Promoting rational standardization --- for military avionics systems architecture
p0050 A81-131
The present state of the MLS --- Microwave Landing System standardization
p0051 A81-133
Standardisation - An alternative approach to ATC automation
p0177 A81-221
History of SAE Committee S-7, Flight Deck and Handling Qualities Standards for Transport Category Aircraft
[SAE PAPER 801165] p0399 A81-34

Development of standardized fatigue test load
histories for helicopter rotors: Basic
consideration and definition of Helix and Felix
p0489 N81-26141
AFSC Standarization Conference, 1553, 1589, 1750,
1760, Ada. Volume 1: Proceedings
[AD-A100575]
p0539 N81-28092
AFSC Standarization Conference, 1553, 1589, 1750,
1760, Ada. Volume 2: Proceedings standards
[AD-A100577]
p0539 N81-28093
Helicopter noise analysis: Round-robin test
[AD-A103724]
p0641 N81-33940
STANDARDS
US Army working group on aircraft noise
p0150 A81-20053
Developing test profiles for multiple mission
situations --- standards for military aircraft
p0570 A81-46483
Noncoherent C-band transponder standards
[AD-A091282]
p0095 N81-13251
Limiting application of the concept 'damage
tolerance' with regard to fighter aircraft
[AAAF-NT-79-32]
p0210 N81-17054
Flight tests of IFR landing approach systems for
helicopters
p0265 N81-19042
Minimum operational performance standards for
airborne radar approach and beacon systems for
helicopters
[RTCA/DO-172]
p0336 N81-20322
Minimum operational performance standards for
airborne weather and ground mapping pulsed radars
[RTCA/DO-173]
p0336 N81-20323
Vibration test level criteria for aircraft equipment
[AD-A098675]
p0442 N81-25070
Fatigue test program and test results
p0489 N81-26142
The background and bases for the proposed military
standard on acoustical noise limits in helicopters
[AD-A099814]
p0500 N81-27890
Minimum operational performance standards for
Microwave Landing System (MLS) airborne
receiving equipment
[RTCA/DO-177]
p0595 N81-31180
The background and bases for the proposed military
standard on acoustical noise limits in helicopters
p0604 N81-31459
Minimum operational performance standards for
Microwave Landing System (MLS) airborne
receiving equipment
[RTCA/DO-177]
p0628 N81-32133
STANDS
U SUPPORTS
STAR TRACKERS
Development of an astro-inertial hybrid navigation
system and a star tracker
p0420 A81-37343
An analytical solution of the two star sight
problem of celestial navigation
p0614 A81-48121
STAR TRACKING
U STAR TRACKERS
STARLIFTER AIRCRAFT
U C-141 AIRCRAFT
STARTERS
NT ENGINE STARTERS
STARTING
Investigation of the starting process of a
supersonic wind tunnel
p0228 A81-24080
A generalized mathematical model to estimate gas
turbine starting characteristics
[ASME PAPER 81-GT-202]
p0318 A81-30092
Hydrodynamic modelling of the starting process in
liquid-propellant engines
p0351 A81-31287
STATE EQUATIONS
U EQUATIONS OF STATE
STATE VECTORS
Synthesis of gyrostabilizer state evaluation
system under unknown perturbations
p0299 A81-29311
A hybrid state vector approach to aeroelastic
analysis with application to composite lifting
surfaces
[AIAA 81-0626]
p0308 A81-29512
STATIC ELECTRICITY
VHF-UHF precipitation-static interference effects
on aircraft
p0056 A81-14234
STATIC FIRING
Static tests of the J97 powered, external
augmenter V/STOL wind tunnel model
[NASA-CR-152403]
p0337 N81-21010
STATIC LOADS
Mathematical aspects of the probabilistic
evaluations of structural safety and NDI
capabilities
p0181 A81-22635
Cast Aluminum Structures Technology (CAST).
Technology transfer (phase 6)
[AD-A087492]
p0030 N81-10152
Graphite-epoxy panel compression strength
reduction due to local impact
p0040 N81-11139
Static deflection and eigenfrequency analysis of
the Nibe wind turbine rotors. Theoretical
background --- structural vibration
[RISOE-M-2199]
p0279 N81-19497
Structural flight loads simulation capability,
volume 1
[AD-A096572]
p0374 N81-22044
Structural flight loads simulation capability.
Volume 2: Structural analysis computer program
user's manual
[AD-A096594]
p0375 N81-22045
Static and yawed-rolling mechanical properties of
two type 7 aircraft tires
[NASA-TP-1863]
p0437 N81-24471
STATIC PRESSURE
An experimental and theoretical investigation of
pressures in four-lobe bearings
p0004 A81-10880
The static pressure in a vortex core
p0228 A81-24072
Analysis of total and static pressure fluctuations
in an air intake at high incidence
[AAAF PAPER NT 80-61]
p0370 A81-33950
Change of static pressure on the rotating blades
of an axial-flow compressor during surging
p0509 A81-41039
Surface pressure measurements on a projectile
shape at Mach 0.908
[AD-A098589]
p0439 N81-25045
Aircraft sensor quality in SESAME 1979: Results
of tower fly-bys and aircraft intercomparison
[PB81-176596]
p0552 N81-29722
Development of an instrument for the accurate
measurement of aircraft airspeed and altitude
[AD-A103421]
p0638 N81-33204
STATIC STABILITY
NT SHELL STABILITY
NT STRUCTURAL STABILITY
Steady flow and static stability of airfoils in
extreme ground effect
p0355 A81-31606
A piloted simulator investigation of static
stability and stability/control augmentation
effects on helicopter handling qualities for
instrument approach
[AHS 80-30]
p0476 A81-40160
A flight investigation of static stability,
control augmentation, and flight director
influences on helicopter IFR handling qualities
p0574 A81-46623
Exploratory subsonic investigation of vortex-flap
concept on arrow wing configuration
p0243 N81-17985
STATIC TESTS
NT STATIC FIRING
Aerodynamic and acoustic behavior of a YF-12 inlet
at static conditions
[AIAA PAPER 81-1597]
p0508 A81-40972
Assessment of inflow control structure
effectiveness and design system development
[AIAA PAPER 81-2048]
p0620 A81-48637
Studies on proper simulation during static testing
of forward speed effects on fan noise
[NASA-CR-165626]
p0202 N81-16853
Aerodynamic and acoustic behavior of a YF-12 inlet
at static conditions
[NASA-CR-163106]
p0342 N81-21079
Static tests of excess ground attenuation at
Wallops Flight Center
[NASA-CR-3435]
p0491 N81-26086
Static test of a fan-powered chin nozzle for
V/STOL applications
[NASA-CR-165361]
p0546 N81-29093

STATIONS
NT CREW STATIONS
NT GROUND STATIONS
NT SPACE BASE COMMAND CENTER
NT TRACKING STATIONS
NT WEATHER STATIONS
STATISTICAL ANALYSIS
NT COVARIANCE
NT MULTIVARIATE STATISTICAL ANALYSIS
NT NORMAL DENSITY FUNCTIONS
NT ORTHOGONALITY
NT PROBABILITY DISTRIBUTION FUNCTIONS
NT REGRESSION ANALYSIS
NT STATISTICAL DECISION THEORY
Nonstationary method for the direct statistical modeling of rarefied-gas flows p0069 A81-16454
Crack growth propagation under variable amplitude loading in aerospace structures p0181 A81-22632
Is it safe - The safety assessment of aircraft systems. III - The use of probability methods p0290 A81-29029
Advanced techniques for airborne target screener p0320 A81-30238
Efficiency of the methods and algorithms used for estimating the reliability in aviation techniques p0365 A81-33173
High-temperature strength of alloys for gas turbine engines --- Russian book p0482 A81-40616
Helicopter accidents [SAE PAPER 810592] p0520 A81-42751
An evaluation of statistical methods for the prediction of maximum time-variant inlet total pressure distortion [AD-A089817] p0036 N81-11040
A probabilistic analysis of electrical equipment vulnerability to carbon fibers [NASA-TM-80217] p0038 N81-11113
Airport Crash/Fire/Rescue CFR service cost and benefit analysis. Volume 2: Appendixes [AD-A091155] p0094 N81-13069
Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility [LA-UR-80-2485] p0135 N81-14550
The annoyance caused by noise around airports [NASA-TM-75784] p0146 N81-15579
Correlation of helicopter noise levels with physical and performance characteristics [AD-A093428] p0221 N81-17852
Engine parameter trend analysis with LEADS 200: Possibilities and limitations --- using flight recorder data p0382 N81-23010
Nature of the annoyance and noise annoyance relation around airports [NASA-TM-75873] p0542 N81-28606
Evaluation of the disturbance caused by aircraft noise by opinion surveys [NASA-TM-76579] p0542 N81-28610
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 31 December 1980 [AD-A102495] p0596 N81-31187
Airport activity statistics of certificated route air carriers [AD-A102355] p0602 N81-31236
STATISTICAL DECISION THEORY
Renewal function for any arbitrary period - A Bayesian way p0101 A81-16939
STATISTICAL DISTRIBUTIONS
NT PROBABILITY DISTRIBUTION FUNCTIONS
STATISTICAL PROBABILITY
U PROBABILITY THEORY
STATOR BLADES
Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results p0293 A81-29072
The influence of blade number ratio and blade row spacing on axial-flow compressor stator blade dynamic load and stage sound pressure level [ASME PAPER 81-GT-165] p0317 A81-30064
NASA gas turbine stator vane ring [ASME PAPER 81-GT-208] p0318 A81-30097
Efficiency of cantilever compressor stator blades p0509 A81-41041
Off-design performance loss model for radial turbines with pivoting, variable-area stators [NASA-TP-1708] p0036 N81-11038
STATORS
A lifting surface theory for the sound generated by the interaction of velocity disturbances with a leaned vane stator [AIAA PAPER 81-0091] p0160 A81-20595
Reduction of strut induced rotor blade vibration with the modified stator setting angles p0295 A81-29097
Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators [SAE PAPER 801135] p0397 A81-34166
The effects of solidity, interblade phase angle and reduced frequency on the time-variant aerodynamic response of a compressor stator [AD-A090546] p0081 N81-12108
Turbine modeling technique to generate off-design performance data for both single and multistage axial-flow turbines [NASA-CR-165244] p0213 N81-17078
Recent improvements on generating voltmeters [DOE/ER-01388/463] p0257 N81-18359
End wall flows in rotors and stators of a single stage compressor [NASA-CR-164635] p0540 N81-28097
STEADY FLOW
A finite-span wing in transonic flow p0054 A81-13741
Steady flow past a rectangular wing with circulation that is variable along the span p0099 A81-16551
Finite difference computation of the steady transonic potential flow around airplanes p0107 A81-17802
A mathematical computer simulation of stationary and nonstationary flow of an ideal incompressible fluid around solid profiles and arrays p0237 A81-2[illegible]045
Numerical computation of compressible steady cascade flows p0296 A81-29100
Steady flow and static stability of airfoils in extreme ground effect p0355 A81-31686
Wing with finite span in a transonic flow p0420 A81-37880
Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations [AIAA PAPER 81-1239] p0454 A81-38096
Analysis of steady, two-dimensional, chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique --- for performance prediction of ramjet propulsion system [AIAA PAPER 81-1432] p0504 A81-40869
Philosophy and results of steady and unsteady test techniques on a large scale transport aircraft model in the ONERA transonic tunnel S1 MA. Part 1: Philosophy and results of steady tests. Part 2: Interest of large models in unsteady aerodynamics p0190 N81-16019
Predicted and experimental steady and unsteady transonic flows about a biconvex airfoil [NASA-TM-81262] p0258 N81-18742
STEAM TURBINES
Preliminary study on reheat combustor for advanced gas turbine [ASME PAPER 81-GT-29] p0311 A81-2994
New correlations of the two-dimensional turbine cascade aerodynamic performance [ASME PAPER 81-GT-128] p0316 A81-30032
Selection of turbine parameters for steam-hydrogen engine schemes p0509 A81-4103
STEEL STRUCTURES
Laws of unstable crack growth under cyclic loading p0236 A81-2570
Optimality criterion techniques applied to frames having nonlinear cross-sectional properties [AIAA 81-0552] p0301 A81-2940
STEELS
NT CARBON STEELS
NT CHROMIUM STEELS

NT HIGH STRENGTH STEELS
NT MARAGING STEELS
Mechanical properties of aluminum coatings on heat-resistant steels
p0355 A81-31668
Environment-load interaction effects on crack growth in landing gear steels
[AD-A093803] p0218 N81-17242
STEEP GRADIENT AIRCRAFT
U V/STOL AIRCRAFT
STEERING
Predictive steering control of dirigibles using the switching curve approach
[AIAA 81-1327] p0456 A81-38535
STELLAR DOPPLER SHIFT
U DOPPLER EFFECT
STEREOGRAPHY
U STEREOPHOTOGRAPHY
STEREOPHOTOGRAPHY
Passive imagery navigation
[AD-A096245] p0339 N81-21051
STEREOSCOPIC PHOTOGRAPHY
U STEREOPHOTOGRAPHY
STEREOSCOPY
NT STEREOPHOTOGRAPHY
STERNS
U AFTERBODIES
STIFF STRUCTURES
U RIGID STRUCTURES
STIFFNESS
The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-18654
Behavior of continuous filament advanced composite isogrid structure.
p0377 N81-22095
STIFFNESS MATRIX
The matrix analysis of wings
p0108 A81-17818
STIMULATED EMISSION DEVICES
NT CARBON DIOXIDE LASERS
NT HELIUM-NEON LASERS
NT HIGH POWER LASERS
NT LASERS
NT PULSED LASERS
NT RING LASERS
NT RUBY LASERS
STIRLING CYCLE
Power control for hot gas engines
[NASA-CASE-NPO-14220-1] p0133 N81-14318
Automotive technology development program
[DOE/CS-0069/1] p0278 N81-19464
First phase testing of solar thermal engine at United Stirling
p0588 N81-30530
Non-heat pipe receiver/p-40 Stirling engine
p0588 N81-30531
Heat pipe solar receiver with thermal energy storage
p0588 N81-30532
STOCHASTIC PROCESSES
NT RANDOM PROCESSES
NT RANDOM WALK
Frequency-shaped cost functionals - Extension of linear-quadratic-Gaussian design methods
p0116 A81-18578
Stochastic modeling of an aircraft traversing a runway using time series analysis
p0183 A81-23360
Synthesis of gyrostabiliser state evaluation system under unknown perturbations
p0299 A81-29311
Stochastic surfaces for flight simulator displays
p0324 A81-30330
Simulation model validation - Airport applications
p0461 A81-39320
Computer graphics applications
[PB81-215246] p0637 N81-33188
STOL AIRCRAFT
U SHORT TAKEOFF AIRCRAFT
STORABLE PROPELLANTS
NT AIRCRAFT FUELS
STORAGE BATTERIES
NT NICKEL CADMIUM BATTERIES
NT SILVER ZINC BATTERIES
STORE RELEASE
U EXTERNAL STORE SEPARATION
STORMS
NT RAINSTORMS
NT STORMS (METEOROLOGY)
NT THUNDERSTORMS
STORMS (METEOROLOGY)
NT RAINSTORMS
NT THUNDERSTORMS
Wallops severe storms measurement capability
p0266 N81-19049
STRAIGHT WINGS
U RECTANGULAR WINGS
STRAIN DISTRIBUTION
U STRESS CONCENTRATION
STRAIN ENERGY METHODS
Fatigue life evaluation of a helicopter main rotor hub
p0180 A81-22631
An application of the energy release rate concept to crack growth in attachment lugs
[AIAA 81-0491] p0302 A81-29420
STRAIN FATIGUE
U FATIGUE (MATERIALS)
STRAIN GAGE BALANCES
Signal processing for a six-component strain-gage wind tunnel balance
p0049 A81-12968
A comparison of methods for calibration and use of multi-component strain gauge wind tunnel balances
[AD-A090484] p0084 N81-12394
STRAIN GAGES
Aerodynamic blade excitation in turbocompressors
p0282 A81-27612
Development of the self-temperature compensated resistance strain gage used up to 700 C
[ASME PAPER 81-GT-118] p0316 A81-30022
Comparison of flight load measurements obtained from calibrated strain gages and pressure transducers
[AD-A093750] p0200 N81-17044
High temperature strain gage system for application to turbine engine components
[AD-A101713] p0583 N81-30132
STRAIN HARDENING
Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
p0365 A81-33169
Potential use of geotechnical fabric in airfield runway design --- reinforced soil systems
[AD-A092686] p0198 N81-16071
STRAIN SOFTENING
U PLASTIC DEFORMATION
STRAKES
Hinged strakes for enhanced maneuverability at high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
Aerodynamic features of designed strake-wing configurations
[AIAA PAPER 81-1214] p0454 A81-38084
Flow measurements in the wake of a wing fitted with a leading-edge root extension (strake)
[RAE-TR-79120] p0022 N81-10015
STRAPDOWN INERTIAL GUIDANCE
Laser-gyro strapdown inertial navigation
p0225 A81-23868
Strapdown navigation comes of age
[SAE PAPER 801167] p0399 A81-34182
Doppler aided low accuracy strapdown inertial navigation system
[AIAA 81-1798] p0555 A81-44101
Gyrocompasses. Citations from the International Aerospace Abstracts data base
[NASA-CR-163675] p0020 N81-10065
Field evaluation of the LN80 land navigation system
[AD-A091885] p0193 N81-16035
A single gimbal/strapdown inertial navigation system for use on spin stabilized flight test vehicles
[SAND-80-2479C] p0193 N81-16037
Estimation and statistical averaging applied to redundant strapped down inertial sensors for navigation and flight control
[AD-A094465] p0276 N81-19133
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros
p0484 N81-26092
Rapid alignment of aircraft strapdown inertial navigation systems using Navstar Global Positioning System (GPS)
p0485 N81-26107
An investigation of the linear and angular vibration environments of trials aircraft

p0545 N81-29087

STRATA
NT SUBSTRATES
STRATIFICATION
NT ATMOSPHERIC STRATIFICATION
STRATOFORTRESS AIRCRAFT
U B-52 AIRCRAFT
STRATOSPHERE
The aircraft in the stratosphere --- effects on ozone layer equilibrium p0002 A81-10499
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look [AIAA PAPER 81-0306] p0164 A81-20741
STRATOTANKER AIRCRAFT
U C-135 AIRCRAFT
STREAMLINE FLOW
U LAMINAR FLOW
STREAMLINED BODIES
NT FAIRINGS
A procedure for designing forebodies with constraints on cross-section shape and axial area distribution [NASA-TP-1881] p0483 N81-26078
STREAMS
NT GAS STREAMS
STRENGTH
Behavior of continuous filament advanced composite isogrid structure p0377 N81-22095

STRENGTH OF MATERIALS
U MECHANICAL PROPERTIES
STRESS (PHYSIOLOGY)
NT ACCELERATION STRESSES (PHYSIOLOGY)
NT CENTRIFUGING STRESS
STRESS (PSYCHOLOGY)
An information-processing interpretation of air traffic control stress p0053 A81-13416

STRESS ANALYSIS
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment p0013 A81-11659
Structural analysis of fuselages with cutouts by finite element method p0108 A81-17816
Conforming element with out-element nodes p0225 A81-23855
Stress analysis of first turbine vane using a 3-dimensional model with non linear material behavior subjected to transient temperatures [AIAA PAPER 81-1437] p0504 A81-40873
Matrix load analysis method for flexible aircraft structures [PAPER 810610] p0522 A81-42766
Advanced transmission component development p0575 A81-46634
Stress concentration in elements of aircraft structures --- Russian book p0623 A81-49471
Buckling of sandwich panels subjected to axial compression, shear forces and lateral pressure. Part 2: Analysis [SAAB-TN-AE-72-PT-2] p0006 N81-12465
The stress behavior of three advanced nickel base superalloys during high temperature low cycle fatigue [AD-A091694] p0131 N81-14061
Structure and lifetime attestation of TORNADO [MBB-PUB-P-0001] p0251 N81-18048
The Shock and Vibration Digest, volume 12, number 11 [AD-A092384] p0257 N81-18403
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions [AD-A095634] p0334 N81-20072
MEGA16 - Computer program for analysis and extrapolation of stress-rupture data [NASA-TP-1809] p0393 N81-23486
STRESS CALCULATIONS
U STRESS ANALYSIS
STRESS CONCENTRATION
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads p0295 A81-29091
Investigations of vortex formation on wings with cropped leading edges [DGLR PAPER 81-046] p0610 A81-47601
Stress concentration in elements of aircraft structures --- Russian book p0623 A81-49471
The effect of the skewness of the skin panels on stresses in conical wings p0625 A81-49930

STRESS CORROSION
NT STRESS CORROSION CRACKING
STRESS CORROSION CRACKING
On understanding environment-enhanced fatigue crack growth - A fundamental approach p0003 A81-10749
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminium p0013 A81-11657

STRESS CYCLES
Individual jet engine stress load monitoring with the aid of the flight data recording system LEADS 200 p0320 N81-20013

STRESS DISTRIBUTION
U STRESS CONCENTRATION
STRESS INTENSITY FACTORS
Simple methods of determining stress intensity factors p0289 A81-28984
An application of the energy release rate concept to crack growth in attachment lugs [AIAA 81-0491] p0302 A81-29420
Experimental determination of the stress intensity factor for cracks with a curvilinear front in complex parts /gas turbine blades/ p0351 A81-31264

STRESS MEASUREMENT
Miniature pressure probe for measuring the surface-shear-stress vector in turbulent flow p0233 A81-25354
Development of the self-temperature compensated resistance strain gage used up to 700 C [ASME PAPER 81-GT-118] p0316 A81-30022
Measuring dynamic stresses on helicopter transmission gear teeth utilizing telemetry p0361 A81-32859
Development of a noninterference compressor blade stress measurement system p0361 A81-32874
Possibility of development of an electron-fractographic method for measuring stress level produced by fatigue fracture of the material p0532 A81-43773
The design development and operation of gas turbine radio telemetry systems [XIR-00733] p0077 N81-12082
Performance evaluation of a prototype noninterference technique for measurement of turbine engines compressor blade stress [AD-A090566] p0094 N81-13061
Evaluation of bird load models for dynamic analysis of aircraft transparencies [AD-A092909] p0204 N81-16995
STRESS RUPTURE STRENGTH
U CREEP RUPTURE STRENGTH
STRESS-STRAIN DISTRIBUTION
U STRESS CONCENTRATION
STRESS-STRAIN RELATIONSHIPS
Use of speckle-holographic interferometry to study the strain-strain state of a gas-turbine engine disk close to the blade root fixing p0170 A81-21366
Prediction of structural fatigue response under aircraft loads from material stress-strain behavior p0226 A81-24009
Finite element calculation of thin-wall reinforced shells of the fuselage type with account for physical nonlinearity and loss of stability of certain elements p0235 A81-25679
Tensile stress/strain characterization of non-linear materials p0348 A81-3091
Numerical methods for studying the stress-strain state and service life of aircraft gas-turbine engine disks p0351 A81-3125
Stress analysis of first turbine vane using a 3-dimensional model with non linear material

behavior subjected to transient temperatures
[AIAA PAPER 81-1437] p0504 A81-40873
Geometrically nonlinear theory for calculating
thin rods of a wing profile
p0625 A81-49935

STRESS-STRAIN-TIME RELATIONS
Mechanisms of damage accumulation in
time-dependent cyclic deformation
[DOE/ER-10570/1] p0135 N81-14363

STRESSES
NT CRITICAL LOADING
NT PHOTOSTRESSES
NT RESIDUAL STRESS
NT REYNOLDS STRESS
NT SHEAR STRESS
NT THERMAL STRESSES
NT TORSIONAL STRESS
NT VIBRATIONAL STRESS

STRINGERS
Finite strip analysis of singly curved
skin-stringer structures
p0616 A81-48390
Application of fracture mechanics to built-up
structures --- aircraft handbooks
[NLR-MP-79044-U] p0086 N81-12475
Design and fabrication of a stringer stiffened
discrete-tube actively cooled panel for a
hypersonic aircraft
[NASA-CR-3403] p0279 N81-19484

STRIP TRANSMISSION LINES
NT MICROSTRIP TRANSMISSION LINES
Advanced microstrip antenna development. Volume
1: Technology studies for aircraft phased arrays
[AD-A103837] p0640 N81-33390

STROUHAL NUMBER
On the use of complex form of the Strouhal number
in the study of nonlinear aeroelasticity
p0231 A81-24723

STRUCTURAL ANALYSIS
NT DYNAMIC STRUCTURAL ANALYSIS
NT FLUTTER ANALYSIS
NT MATRIX METHODS
NT STRAIN ENERGY METHODS
Nonlinear incremental analysis up to failure of
aeronautical structures
p0068 A81-16307
An aeronautical structural analysis system for
static analysis /NAJIF-I/
p0224 A81-23728
Supermatrix method for multi-substructure analysis
p0225 A81-23854
Israel Annual Conference on Aviation and
Astronautics, 21st, Tel Aviv and Haifa, Israel,
February 28-March 1, 1979, Proceedings
p0226 A81-24003
B. M. Fraeijs de Veubeke memorial volume of
selected papers --- Book
p0232 A81-25174
Wing analysis by the plate analogy using an
integral-difference method
p0235 A81-25680
Application of hybrid schemes in analysis of
thin-wall structures by the displacement method
p0235 A81-25681
Structures, Structural Dynamics and Materials
Conference, 22nd, Atlanta, Ga., April 6-8, 1981,
Technical Papers. Part 1
p0300 A81-29377
Computation of wind tunnel model deflections ---
for transport type solid wing
[AIAA 81-0482] p0300 A81-29381
IPAD applications to the design, analysis, and/or
machining of aerospace structures --- Integrated
Program for Aerospace-vehicle Design
[AIAA 81-0512] p0301 A81-29386
Adhesive bonding of aircraft primary structures
[SAE PAPER 801209] p0404 A81-34217
The biparametric cycle count method and the
principle of simplification --- in determination
of aircraft structural fatigue life
p0419 A81-37337
Application of the Semi-Loof thin shell element to
the analysis of aircraft engine structures
p0518 A81-42704
Simulation of aircraft seat response to a crash
environment
[SAE PAPER 810612] p0522 A81-42768
Geometrically nonlinear theory for calculating
thin rods of a wing profile
p0625 A81-49935
Strength calculation of thin-wall rods of
significant taper
p0625 A81-49937
Design options study. Volume 4: Detailed
analyses supporting appendices --- advanced
civil military aircraft
[AD-A089539] p0027 N81-10059
The effect of thermal stresses on the integrity of
three built-up aircraft structures
[NASA-TM-81352] p0075 N81-12064
Aeroelastic optimization with multiple constraints
[AD-A090775] p0085 N81-12451
Experimental analysis and methods to determine the
dynamic behavior of propulsion shafting systems
p0145 N81-15401
Supersonic cruise research aircraft structural
studies: Methods and results
p0246 N81-18008
Description of the HIMAT Tailored composite
structure and laboratory measured vehicle shape
under load
[NASA-TM-81354] p0231 N81-18047
NASA/FAA general aviation crash dynamics program
p0268 N81-19064
Aeroelastic and dynamic finite element analyses of
a bladder shrouded disk
[NASA-CR-159728] p0278 N81-19479
NASTRAN level 16 programmer's manual updates for
aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
Statistical review of counting accelerometer data
for Navy and Marine fleet aircraft
[AD-A095617] p0334 N81-20070
Structural flight loads simulation capability.
Volume 2: Structural analysis computer program
user's manual
[AD-A096594] p0375 N81-22045
Overview: NASA/AF/Navy Symposium on
Aeroelasticity of Turbine Engines
[NASA-CR-164419] p0444 N81-25089
The methodology of fatigue analysis and testing:
Main rotor blades and hub, Hughes YAH-64
advanced attack helicopter
p0488 N81-26139
ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783
The use of interpractive graphic displays for
interpretation of surface design parameters
[NASA-TM-81963] p0581 N81-30110
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
Development of an aircraft maneuver load spectrum
based on VGH data
[AD-A102750] p0628 N81-32142

STRUCTURAL BEAMS
U BEAMS (SUPPORTS)

STRUCTURAL DESIGN
Airfield pavement demonstration-validation study
p0003 A81-10718
Atlanta's new central passenger terminal complex
p0003 A81-10719
Design and fabrication of stabilized organic
matrix composites
p0005 A81-11338
Design and test of a graphite-epoxy composite A-10
slat
p0006 A81-11339
Structural optimisation of advanced aircraft
structures
p0013 A81-11651
Acoustic fatigue assessment in the design of
aerospace vehicles
p0059 A81-14395
Discrete-continuous variable structural synthesis
using dual methods
p0066 A81-15894
Optimal design of frames with substructuring
p0068 A81-16276
Introduction to a rigid pavement design procedure
p0111 A81-18054
SNIAS helicopters
p0119 A81-19342
A penalty function method for structural optimum
design with aeroelastic constraints
p0223 A81-23727
IPAD applications to the design, analysis, and/or
machining of aerospace structures --- Integrated
Program for Aerospace-vehicle Design

[AIAA 81-0512] p0301 A81-29388
Use of flight simulators in developing design load
spectra for new aircraft
[AIAA 81-0513] p0301 A81-29389
Optimality criterion techniques applied to frames
having nonlinear cross-sectional properties
[AIAA 81-0552] p0301 A81-29402
Sonic fatigue design techniques for graphite-epoxy
stiffened-skin panels
[AIAA 81-0633] p0305 A81-29488
Principles of aircraft structural design /2nd
revised and enlarged edition/ --- Russian book
p0355 A81-31800
Past and future trends in structures and dynamics
--- of aircraft
[AIAA PAPER 81-0896] p0362 A81-32921
The CADAM system for aircraft structural design
[SAE PAPER 801208] p0403 A81-34216
Theory and application of finite element analysis
to structural crash simulation
p0416 A81-36614
Wing of new technology test specimen - Structural
design and method of wing construction
p0450 A81-37639
New structural technologies for future fighters
p0458 A81-38805
The application of interactive graphics to thermal
modeling
[AIAA PAPER 81-1180] p0459 A81-39159
Design and concepts of composite structures
p0481 A81-40503
New developments in compact plate-fin heat
exchangers
p0613 A81-48062
Structural synthesis - Its genesis and development
p0622 A81-49076
The Lear Fan 2100
p0625 A81-49975
Cast Aluminum Structures Technology (CAST).
Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152
Application of a method for aerodynamic analysis
and design of horizontal axis wind turbines,
part 1
[FFA-TN-AU-1499-PT-1] p0086 N81-12633
A computer program for the design and analysis of
low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921
Dual methods and approximation concepts in
structural synthesis
[NASA-CR-3226] p0134 N81-14347
Structure and lifetime attestation of TORNADO
[MBB-PUB-P-0001] p0251 N81-18048
Wind loading and response of a high-rise building
[CONF-810104-1] p0256 N81-18259
Advanced composite aileron for L-1011 transport
aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
Application of a structural optimization procedure
for advanced wings
[AGARD-R-691] p0333 N81-20064
Comments on settling chamber design for quiet,
blowdown wind tunnels
[NASA-TM-81948] p0335 N81-20085
Structures, performance, benefit, cost study ---
gas turbine engines
[NASA-CR-165313] p0428 N81-24067
STRUCTURAL DESIGN CRITERIA
Operational durability of airframe structures
p0014 A81-11662
Advanced transmission component development and
test program --- for helicopters
p0105 A81-17507
Safety considerations for helicopter drive systems
of the 1980s
p0105 A81-17510
Fatigue design criteria and fleet fatigue life
survey at Aeronautica Macchi
p0180 A81-22624
Nederlandse Vereniging voor Luchtvaarttechniek,
Yearbook 1979
p0232 A81-24938
The certification of composite airframe structures
p0283 A81-27887
Sensitivity of optimum solutions to problem
parameters --- in aircraft design
[AIAA 81-0548] p0301 A81-29399
The controlled growth method - A tool for
structural optimization
[AIAA 81-0549] p0301 A81-29400
Shape optimization of plate and shell structures
[AIAA 81-0553] p0302 A81-29403
Aeroelastic tailoring of a composite winglet for
KC-135
[AIAA 81-0607] p0304 A81-29470
Concepts for improving the damage tolerance of
composite compression panels
p0360 A81-32825
Structural optimization - Past, present and future
[AIAA PAPER 81-0897] p0362 A81-32922
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803] p0367 A81-33882
Helicopter vibration reduction through structural
manipulation
p0467 A81-40090
The substantiation of the structural integrity of
the YAH-64 control actuators with material
variations
[AHS 80-51] p0478 A81-40178
Development, production, calculation and testing
of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
A-7 composite outer wing service experience
p0530 A81-43617
Challenges in alloy design - Titanium for the
aerospace industry
p0553 A81-43998
EF-111A graphite/epoxy Horizontal Stabilizer
Trailing Edge
p0557 A81-44342
Manufacturing methods for a composite main rotor
blade for the YAH-64 helicopter
p0575 A81-46629
Designing safety into helicopter transmissions
p0575 A81-46638
Some results from a crash energy absorption test
for evaluating composite fuselage construction
p0575 A81-46639
Test methods and design allowables for fibrous
composites; Proceedings of the Symposium,
Dearborn, MI, October 2, 3, 1979
p0611 A81-47801
Exploratory study of hazard mitigation and
research in the air transport system
[AD-A089204] p0033 N81-11021
Optimal design studies on composite wings with
static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
Current developments in aircraft fatigue
evaluation procedures
[AAAF-NT-79-33] p0086 N81-12464
Clear air turbulence: Historical comments
p0136 N81-14562
Evaluation of bird load models for dynamic
analysis of aircraft transparencies
[AD-A092909] p0204 N81-16995
On the flight mechanics of remotely piloted vehicles
[BMVG-FBWT-79-28] p0209 N81-17049
Material and structural problems in aircraft
engine technology --- CFM-56 engine
[AAAF-NT-79-23] p0216 N81-17096
Flying qualities design criteria applicable to
supersonic cruise aircraft
p0244 N81-17931
Opportunities for structural improvements for an
advanced supersonic transport vehicle
p0246 N81-18007
Current research in aircraft tire design and
performance
p0268 N81-19065
The NASA digital VGH program, early results ---
structural design criteria
p0268 N81-19069
Design and fabrication of a stringer stiffened
discrete-tube actively cooled panel for a
hypersonic aircraft
[NASA-CR-3403] p0279 N81-19484
Aircraft crash dynamics: Some major considerations
p0378 N81-22437
Aircraft wing weight build-up methodology with
modification for materials and construction
techniques
[NASA-CR-166173] p0387 N81-23068
Development and design of a large wind-turbine blade
--- fiber reinforced composites
[MBB-UD-301/80-OE] p0586 N81-30198
The nature of operating flight loads and their
effect on propulsion system structures

p0599 N81-31207
STRUCTURAL DYNAMICS
U DYNAMIC STRUCTURAL ANALYSIS
STRUCTURAL ENGINEERING
Integrated flexible sheet-metal components - Manufacturing center
p0449 A81-37633
Airbus - Rudder unit in carbon fiber technology
p0451 A81-37651
Not all student design projects end on paper - Chronology of the Chrysalis --- test procedure of human powered aircraft
p0455 A81-38332
Design and engineering of solar balloons
p0455 A81-38333
Advanced production methods for the Dornier 228
p0457 A81-38802
Structural integration as a means of cost reduction
p0046 N81-11912
Potential use of geotechnical fabric in airfield runway design --- reinforced soil systems
[AD-A092686] p0198 N81-16071
Structural concept trends for commercial supersonic cruise aircraft design
p0246 N81-18006
A rectangular rod-wall sound shield
[NASA-CASE-LAR-12883-1] p0550 N81-29136
STRUCTURAL FAILURE
The analysis of fatigue failures
p0006 A81-11603
Crack propagation in panels of pressurized fuselages upon simultaneous action of cyclic loading by pressurization and high-frequency vibrations
p0054 A81-13612
New NDT techniques used for aircraft maintenance
p0153 A81-20168
Mathematical aspects of the probabilistic evaluations of structural safety and NDI capabilities
p0181 A81-22635
Failure by fatigue
p0238 A81-26419
Historical development of flutter
[AIAA 81-0591] p0302 A81-29419
Developments in the analysis and repair of cracked and uncracked structures
p0354 A81-31561
Acoustic emission techniques for in-flight structural monitoring
[SAE PAPER 801211] p0404 A81-34219
The optimum design of non-moment laminated composite plate - According to static failure strength condition
p0480 A81-40449
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888
Lightning protection considerations for graphite/epoxy aircraft structure
p0040 N81-11142
Helicopter Fatigue: A civil view
p0408 N81-26134
STRUCTURAL FATIGUE
U FATIGUE (MATERIALS)
STRUCTURAL FOUNDATIONS
U FOUNDATIONS
STRUCTURAL MATERIALS
U CONSTRUCTION MATERIALS
STRUCTURAL MEMBERS
NT ANISOTROPIC PLATES
NT BEAMS (SUPPORTS)
NT BOX BEAMS
NT CANTILEVER BEAMS
NT CANTILEVER PLATES
NT ELASTIC PLATES
NT FLAT PLATES
NT MEMBRANE STRUCTURES
NT PERFORATED PLATES
NT PLATES (STRUCTURAL MEMBERS)
NT POROUS PLATES
NT REINFORCED PLATES
NT SKIN (STRUCTURAL MEMBER)
NT STRAKES
NT STRINGERS
NT STRUTS
NT TRUSSES
NT WING PANELS
STRUCTURAL RELIABILITY
Part-through crack problems in aircraft structures
p0001 A81-10362
Subsequent proof of damage tolerance for a landing gear component after numerous takeoffs and landings
p0006 A81-11475
Development of specifications from measured environments
p0067 A81-14119
The contribution of structural testing to total airworthiness
p0068 A81-16424
Fully bonded concrete overlay for an airport runway
p0113 A81-18075
Recent developments in NDT techniques --- for airport pavement testing
p0113 A81-18078
Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking
p0173 A81-21742
Determination of aircraft structural inspection intervals
p0230 A81-24285
The use of bonded crack-stoppers in pressure cabins
p0233 A81-25378
The certification of composite airframe structures
p0283 A81-27887
Study of the crashworthiness of light aircraft structures
[AIAA 81-0574] p0302 A81-29407
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1331] p0352 A81-31376
Crashworthy design concepts for airframe structures of light aircraft
[SAE PAPER 810613] p0522 A81-42769
Composite Wing/Fuselage Program
p0530 A81-43629
Advanced structural repair for lower cost
p0558 A81-44393
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888
Factors of safety related to structural integrity. A review of data from military airworthiness authorities
[AGARD-R-677] p0596 N81-31186
STRUCTURAL RIGIDITY
U STRUCTURAL STABILITY
STRUCTURAL STABILITY
NT SHELL STABILITY
On the steady state and dynamic performance characteristics of floating ring bearings
[ASME PAPER 80-C2/LUB-17] p0117 A81-18671
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22526
Israel Annual Conference on Aviation and Astronautics, 21st, Tel Aviv and Haifa, Israel, February 28-March 1, 1979, Proceedings
p0226 A81-24003
Prediction of structural fatigue response under aircraft loads from material stress-strain behavior
p0226 A81-24009
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight
p0364 A81-33050
Stability of nonuniform rotor blades in hover using a mixed formulation
p0467 A81-40088
Rotor blade aeroelastic stability and response in forward flight
p0467 A81-40089
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521
Structural aspects in applications of adhesive bonding
[FOK-BO-1238] p0514 A81-42139
Selection of notch geometry and notching technique for studying the fracture toughness of materials

and full-scale structures --- of Al alloys
p0516 A81-42356
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems
p0530 A81-43624
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060

STRUCTURAL STRAIN
Fatigue damage mechanisms in composite materials - A review
p0003 A81-10747
High intensity acoustic testing to determine structural fatigue life and to improve reliability in nuclear reactor and aerospace structures
p0455 A81-38372
Crack growth model for flight-type loading
p0460 A81-39247

STRUCTURAL VIBRATION
NT BENDING VIBRATION
NT FLUTTER
NT PANEL FLUTTER
NT SELF INDUCED VIBRATION
NT SUBSONIC FLUTTER
NT SUPERSONIC FLUTTER
NT TORSIONAL VIBRATION
NT TRANSONIC FLUTTER
Two methods for calculating the load on the surface of a slender body executing axisymmetric vibrations in a sonic gas flow
p0004 A81-10920
Harmonically oscillating airfoil in transonic stream of air
p0054 A81-13753
Vibration aspects of small turbine engines in aircraft installations
[SAE PAPER 800617] p0062 A81-15337
Periodically stiffened fluid-loaded plates. I - Response to convected harmonic pressure and free wave propagation. II - Response to line and point forces
p0102 A81-17067
On the steady state and dynamic performance characteristics of floating ring bearings
[ASME PAPER 80-C2/LUB-17] p0117 A81-18671
Model vibrations beyond low-speed stall
[ONERA, TP NO. 1980-154] p0123 A81-19552
Gear meshing action as a source of vibratory excitation
p0150 A81-20061
Measurements of structural mobility on helicopter structures
p0151 A81-20064
Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports
p0228 A81-24089
Use of optimization in helicopter vibration control by structural modification
p0241 A81-26945
Vibrations of multispan stiffened plates via modified Bolotin method
p0241 A81-26954
Aerodynamic blade excitation in turbocompressors
p0282 A81-27612
Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, and AIAA Dynamics Specialists Conference, Atlanta, Ga., April 9, 10, 1981, Technical Papers. Part 2
p0303 A81-29428
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442
Response characteristics of a linear rotorcraft vibration model
[AIAA 81-0616] p0305 A81-29477
Unsteady aerodynamic propulsion
[AIAA 81-0645] p0307 A81-29498
Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370
High frequency angular vibration measurements in vehicles
[AAS PAPER 81-024] p0361 A81-32886
Helicopter vibration control - A survey
p0364 A81-33047
A new method for modal identification
p0365 A81-33293
Finite element analysis of asymmetric, lateral natural vibrations of a deformable aeroplane
p0366 A81-33736
Oscillating airfoils in shock-free transonic flows
p0410 A81-35026
Helicopter vibration reduction through structural manipulation
p0467 A81-40090
Coupled rotor/airframe vibration analysis by a combined harmonic-balance, impedance-matching method
[AHS 80-21] p0474 A81-40151
Effects of rotor-body coupling in a linear rotorcraft vibration model
[AHS 80-26] p0475 A81-40156
Vibrations in technical equipment. Volume 3 - Oscillations of machines, structures, and their components --- Russian book
p0511 A81-41725
The effect of various factors on the vibration characteristics of composite blades of gas turbine engines
p0524 A81-42793
Acoustic spectrum analysis for gyro bearings
[AIAA PAPER 81-1616] p0524 A81-43128
The influence of structural parameters and velocity on the shimmy of self-aligned wheels
p0556 A81-44260
A formulation of the shimmy problem for swiveling wheels
p0607 A81-47260
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, Il, November 16-21, 1980
p0613 A81-47993
Static deflection and eigenfrequency analysis of the Nibe wind turbine rotors. Theoretical background --- structural vibration
[RISOE-M-2199] p0279 N81-19497
Model vibrations below low speed stall
p0447 N81-26017
YC-15 interior noise measurements. Technical discussion
[AD-A098788] p0492 N81-26047
Digital spectral analysis: A guide based on experience with aircraft vibration
[RAE-TR-81014] p0605 N81-31508

STRUCTURAL WEIGHT
Weight optimization of wing structures according to the gradient method
p0012 A81-11650
Structural weight comparison of a joined wing and a conventional wing
[AIAA PAPER 81-0366] p0166 A81-20785
The 'light-weight' system - A novel concept for on-board weight and balance measurement using fiber optics
[SAWE PAPER 1336] p0352 A81-31377
Test procedures used in determining aircraft suitability for STAN integral weight and balance system
[SAWE PAPER 1339] p0352 A81-31379
Development and testing of a new technology weight and balance indicator
[SAWE PAPER 1341] p0353 A81-31381
An Interactive Weight Accounting Program /IWAP/
[SAWE PAPER 1345] p0353 A81-31383
Computer aided technology interface with weights engineering --- aircraft design
[SAWE PAPER 1346] p0353 A81-31384
The structural weight fraction - Revisited for fighter/attack type aircraft
[SAWE PAPER 1365] p0353 A81-31387
Design, fabrication, calibration, application, and testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
Unistructure - A new concept for light weight integrally stiffened skin structures
[SAE PAPER 801231] p0405 A81-34233
Components in hybrid- and fiber technology for commercial aircraft of the Airbus family /flap support, spoiler, and window frame/
p0450 A81-37644
Computer aided helicopter design
p0572 A81-46613
Continued development and correlation of analytically based weight estimation codes for wings and fuselages
[NASA-CR-152331] p0251 N81-18014

GASP- General Aviation Synthesis Program. Volume 5: Weights. Part 1: Theoretical development [NASA-CR-152303-VOL-5-PT-1] p0271 N81-19092

Application of a structural optimization procedure for advanced wings [AGARD-R-691] p0333 N81-20064

Aircraft wing weight build-up methodology with modification for materials and construction techniques [NASA-CR-166173] p0387 N81-23068

STRUTS

Reduction of strut induced rotor blade vibration with the modified stator setting angles p0295 A81-29097

Self-oscillations of a self-aligned landing gear strut in the case of classical nonholonomic rolling constraints p0563 A81-45315

Self-oscillations of a wheel on a self-aligning landing gear strut with a nonlinear damper A81-46847

A formulation of the shimmy problem for swiveling wheels p0607 A81-47268

Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing [NASA-CR-159361] p0032 N81-11013

A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio [NASA-CR-159262] p0333 N81-20067

STS-1

U SPACE TRANSPORTATION SYSTEM 1 FLIGHT

SUBASSEMBLIES

Design, fabrication and test of graphite/polyimide composite joints and attachments for advanced aerospace vehicles [NASA-CR-159112] p0194 N81-16082

SUBCIRCUITS

U SUBASSEMBLIES

SUBCRITICAL FLOW

Aerodynamic calculations and design of subcritical aerofoils p0108 A81-17804

Calculation of nonlinear compressibility effects of airfoils in subcritical conditions p0225 A81-23853

SUBLATTICES

U LATTICES (MATHEMATICS)

SUBLAYERS

U SUBSTRATES

SUBROUTINES

Estimation of aerodynamic forces acting on Earth satellites, application to an experimental satellite [INPE-1944-RPE/262] p0585 N81-30158

SUBSONIC AIRCRAFT

A survey of recent atmospheric turbulence measurements from a subsonic aircraft [AIAA PAPER 81-0298] p0164 A81-20736

The role of flight research vehicles in prop-fan technology development [ASME PAPER 81-GT-216] p0318 A81-30104

V/STOL advanced technology rewards and risk --- aircraft design [SAWE PAPER 1385] p0354 A81-31401

Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft [SAE PAPER 801155] p0407 A81-34245

Minimum fuel paths for a subsonic aircraft p0411 A81-35636

Zero-length inlets for subsonic V/STOL aircraft [AIAA PAPER 81-1396] p0515 A81-42186

The improvement of aircraft specific range by periodic control [AIAA 81-1748] p0553 A81-44080

Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale [AIAA PAPER 81-2004] p0620 A81-48634

Integrated Application of Active Controls (IAAC) technology to an advanced subsonic transport: Project plan [NASA-CR-3305] p0332 N81-20062

A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio [NASA-CR-159262] p0333 N81-20067

Tendencies in the development of subsonic transport-aircraft under special considerations of aerodynamics [DFVLR-MITT-80-15] p0338 N81-21080

SUBSONIC FLOW

Asymmetric flow of subsonic and sonic jets over an infinite wedge p0004 A81-10919

The aerodynamics of pure subsonic flow /4th revised edition/ --- German book p0006 A81-11441

Study of a variable sweep wing in sub or transonic flow [ONERA, TP NO. 1978-106] p0058 A81-14391

Calculation of critical flutter speeds on an aircraft in subsonic flow p0068 A81-16301

A study of air breathing rockets - Subsonic mode combustion [IAF PAPER 80-F-270] p0115 A81-18371

Some characteristics of subsonic flow over the root area of a sweptback wing p0123 A81-19633

Plane vortex gas flows --- emphasizing supersonic case p0123 A81-19634

Viscous-inviscid interaction on oscillating airfoils in subsonic flow [AIAA PAPER 81-0051] p0159 A81-20567

Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams [AIAA PAPER 81-0257] p0163 A81-20705

Computer simulation of airfoil icing without runback [AIAA PAPER 81-0402] p0167 A81-20809

Spanwise distribution of control points in the method of finite elementary solutions [AIAA PAPER 79-1879] p0169 A81-21011

Lifting surface theory and the numerical method of wings with small angles of sideslip at subsonic and supersonic speeds p0224 A81-23851

Calculation of nonlinear compressibility effects of airfoils in subcritical conditions p0225 A81-23853

Unsteady subsonic motion of a wing near a screen p0225 A81-23889

A one-dimensional analysis and performance prediction of subsonic radial turbines p0228 A81-24086

Research on vortex bursting in compressible flow --- Thesis p0230 A81-24477

Subsonic cascade flow analysis by a finite element method p0233 A81-25311

Factors affecting afterbody drag p0292 A81-29069

The accuracy of mean-stream-line method in subsonic and transonic regions p0296 A81-29105

Subsonic gas flow past a wing profile p0349 A81-31034

Concerning Khristianovich's transformation of a subsonic flow past an airfoil into a low-speed flow p0349 A81-31045

Subsonic and transonic flow on a wing at different sweep angles. I p0351 A81-31249

Subsonic and transonic flow on a wing at different sweep angles. II p0351 A81-31250

Experimental investigation of oscillating subsonic jets p0360 A81-32777

A PANSONIC Navier-Stokes solver --- for two dimensional flow about arbitrary airfoil sections [AIAA PAPER 81-1195] p0454 A81-38077

An optimal-surface-transpiration subsonic panel-method for iterative design of complex aircraft configurations [AIAA PAPER 81-1254] p0438 A81-39012

The calculation of lift and drag characteristics of subsonic wings with winglets p0480 A81-40442

An approach to conformal inlet diffuser design for integrated propulsion systems [AIAA PAPER 81-1395] p0514 A81-42185

Damping of turbomachine blade variations by subsonic flow

p0612 A81-47957
Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
p0617 A81-48480
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] p0624 A81-49731
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
p0625 A81-49948
Theoretical determination of subsonic oscillatory airforce coefficients for fin-tailplane configurations
[RAE-TR-79125] p0022 N81-10016
Unsteady three-dimensional subsonic flow in a solid propellant rocket motor including the effect of motor rotation
p0095 N81-13085
Laser-Raman/Rayleigh flow diagnostic techniques applied to subsonic flow
[AD-A091695] p0133 N81-14275
An analytic model of subsonic flow around an airflow with a spoiler
p0138 N81-14966
Finite element analysis of inviscid subsonic boattail flow
[NASA-TM-81650] p0140 N81-14977
A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow
p0188 N81-16006
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AD-A093970] p0203 N81-16983
Leading edge vortex flaps for drag reduction --- during subsonic flight
[NASA-CASE-LAR-12750-1] p0261 N81-19016
A higher-order trapezoidal vector vortex panel for subsonic flow
[AD-A094775] p0263 N81-19032
Some remarks on the unsteady airloads on oscillating control surfaces in subsonic flow
p0386 N81-23055
Technical evaluation report on the Fluid Dynamic Panel Symposium on Subsonic/Transonic Configuration/Aerodynamics
[AGARD-AR-146] p0392 N81-23431
Civil component program Wing Section. New calculation methods for subsonic and transonic interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034
Investigations of free-jet test requirements and techniques with emphasis on the adaptable jet stretcher
[AD-A098710] p0439 N81-25044
An aerodynamic analysis of deformed wings in subsonic and supersonic flow
[AD-A101675] p0580 N81-30091

SUBSONIC FLUTTER
Calculation of critical flutter speeds on an aircraft in subsonic flow
p0068 A81-16301
Measurement of the aerodynamic forces acting on a harmonically oscillating wing at high subsonic speeds
p0349 A81-31042
System to measure the pressure distribution on fan aerofoil surfaces during flutter conditions
[PNR-90013] p0072 N81-12029
Experimental flutter at high subsonic speeds and its theoretical prediction, taking into account wing thickness and Reynolds number
p0385 N81-23052

SUBSONIC SPEED
Subsonic parachute design, performance, and similarity laws /scale effects/ - A review of the Institute's activities during the last years
p0060 A81-14799
Calculation of the lift dependent drag polar of cambered fighter plane configurations with deflected maneuver flaps in the subsonic region by means of a modified procedure according to Lamar
[DGLR PAPER 80-109] p0120 A81-19395
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
Evaluation of aircraft interference effects on external stores at subsonic and transonic speeds
p0187 N81-15997
Development for new laboratories for future testing
p0433 N81-24105
Subsonic tests of an all-flush-pressure-orifice air data system
[NASA-TP-1871] p0489 N81-26144

SUBSONIC WIND TUNNELS
Three years of operation of the ONERA pressurized subsonic wind tunnel
[ONERA, TP NO. 1980-129] p0014 A81-11669
Prediction and experimental verification of transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568
Wind tunnel model support, controlled by four microprocessors
[ONERA, TP NO. 1980-149] p0174 A81-21917
Store separation simulation in subsonic wind tunnels
[MBB-FE-123/S/PUB/20] p0203 N81-16988
Evaluation of a subsonic cascade wind tunnel for compressor blade testing
[AD-A093591] p0218 N81-17107

SUBSTRATES
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048

SUBSTRUCTURES
Optimal design of frames with substructuring
p0068 A81-16276
An aeronautical structural analysis system for static analysis /HAJIF-I/
p0224 A81-23728
Supermatrix method for multi-substructure analysis
p0225 A81-23854
Wind loads for bar-truss structures
p0259 N81-18997

SUCTION
Thin minimum-drag airfoils
p0123 A81-19630
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24079
Transient three-dimensional flow along a porous plate
p0231 A81-24815
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513
Experimental investigation of the flow on the suction side of a thin Delta wing
[NASA-TM-75897] p0338 N81-21024
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121

SUD AVIATION AIRCRAFT
NT CONCCRDE AIRCRAFT
NT SE-210 AIRCRAFT

SUD AVIATION SE-210 AIRCRAFT
U SE-210 AIRCRAFT

SULFATES
NT SODIUM SULFATES

SULFUR COMPOUNDS
NT SODIUM SULFATES

SUNLIGHT
Effects of sunlight on display filters
p0326 A81-30352

SUPER SABRE AIRCRAFT
U F-100 AIRCRAFT

SUPERALLOYS
U HEAT RESISTANT ALLOYS

SUPERCAVITATING FLOW
Study of the characteristics of a base-vented wing in nonlinear theory
[AAAF PAPER NT 80-40] p0369 A81-33927

SUPERCAVITATION
U SUPERCAVITATING FLOW

SUPERCHARGERS
The effect of impeller tip design on the performance of a mixed flow turbocharger compressor
[ASME PAPER 81-GT-7] p0310 A81-29932
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842

Effect of a part-span variable inlet guide vane on
the performance of a high-bypass turbofan engine
[NASA-TM-82617] p0443 N81-25081
SUPERCHARGING
U SUPERCHARGERS
SUPERCONDUCTING MAGNETS
Application of superconducting coils to the NASA
prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086
SUPERCONDUCTORS
Superconducting generator design for airborne
applications
p0241 A81-26862
Application of superconducting coils to the NASA
prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086
SUPERCOOLING
NT CRYOGENIC COOLING
SUPERCRITICAL FLOW
Recent developments in integral equation method in
transonic flow
p0234 A81-25384
On the design of modern airfoil sections by
numerical methods
p0347 A81-30705
Supercritical airfoil technology program wake
experiments and modeling for fore and aft loaded
compressor cascades
[AD-A091378] p0091 N81-13934
Design of advanced technology transonic airfoils
and wings
p0187 N81-16000
Design study for the inner wing of a transonic
wing-body combination of aspect ratio 8
p0190 N81-16015
Supercritical flow past symmetrical airfoils
[AD-A093300] p0203 N81-16984
Pressure and force data for a flat wing and a
warped conical wing having a shockless
recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016
SUPERCRITICAL WINGS
The supercritical profile of the supercritical wing
p0107 A81-17522
Extraction of wavedrag from airfoil wake
measurements
[AIAA PAPER 81-0291] p0164 A81-20732
A cost-effective method for shock-free
supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796
Design considerations of advanced supercritical
low drag suction airfoils
p0240 A81-26514
Technology pays off on the AV-8B
p0291 A81-29060
Prediction of transonic flutter for a
supercritical wing by modified strip analysis
and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
A wind-tunnel study of the flutter characteristics
of a supercritical wing
p0308 A81-29504
Comparison of computed and measured unsteady
pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541
Experimental-programme - Transonic wing-TSY
p0457 A81-38804
Design and construction of a model which is
dynamically similar to the A310 wing
[DGLR PAPER 81-035] p0608 A81-47556
Comparison of Unsteady Pressure Fields Computed
and Measured on the ZKP model
[AGARD-R-688] p0033 N81-11019
The high-speed airfoil program
p0185 N81-15970
Transonic wing technology for transport aircraft
p0188 N81-16002
Some particular configuration effects on a thin
supercritical variable camber wing
p0188 N81-16005
Experimental study of the interaction between the
wing of a subsonic aircraft and a nacelle of a
high by-pass ratio engine
p0189 N81-16010
Development and wind tunnel investigation of three
supercritical airfoil profiles for transport
aircraft
[NASA-TM-75840] p0249 N81-18030
Advanced aerodynamics and active controls.
Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Status and future plans of the Drones for
Aerodynamic and Structural Testing (DAST) program
--- Aeroelastic Research Wing (ARW)
p0259 N81-19003
Investigation of powered nacelles on a high aspect
ratio NASA supercritical wing, phase 2 ---
Langley 8 Foot Transonic Pressure Tunnel
p0260 N81-19008
The EET Horizontal Tails Investigation and the EET
Lateral Controls Investigation --- Langley
8-Foot Transonic Pressure Tunnel
p0260 N81-19009
Natural laminar flow flight experiment --- Langley
8-Foot Transonic Pressure Tunnel
p0260 N81-19010
Advanced turboprop installation aerodynamics
p0260 N81-19013
Wind-tunnel investigation at Mach numbers from
0.25 to 1.01 of a transport configuration
designed to cruise at near-sonic speeds ---
conducted in langley 8-foot transonic pressure
tunnel
[NASA-TM-X-2622] p0262 N81-19025
Experimental studies of scale effects on
oscillating airfoils at transonic speeds
p0386 N81-23054
Civil component program Wing Section. New
calculation methods for subsonic and transonic
interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034
Prediction of transonic flutter for a
supercritical wing by modified strip analysis
and comparison with experiment
[NASA-TM-83126] p0445 N81-25432
The supercritical profile of the supercritical wing
[NASA-TM-76605] p0494 N81-27075
Investigation of the circulation control
wing/upper surface blowing high-lift system on a
low aspect ratio semispan model
[AD-A103090] p0627 N81-32120
SUPERHIGH FREQUENCIES
NAVTOLAND microwave scanning beam tests at NCSC.
Three landing guidance systems tested in a
specular multipath environment
[AD-A099298] p0484 N81-26086
SUPERHYBRID MATERIALS
NT GRAPHITE-EPOXY COMPOSITE MATERIALS
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
SUPERPLASTICITY
Concurrent superplastic forming/diffusion bonding
of titanium airframe components
p0531 A81-43638
Superplastic formed and diffusion bonded titanium
landing gear component feasibility study
[AD-A092788] p0200 N81-16213
SUPERSONIC AIRCRAFT
NT B-58 AIRCRAFT
NT CONCORDE AIRCRAFT
NT F-4 AIRCRAFT
NT F-5 AIRCRAFT
NT F-8 AIRCRAFT
NT F-14 AIRCRAFT
NT F-15 AIRCRAFT
NT F-16 AIRCRAFT
NT F-17 AIRCRAFT
NT F-100 AIRCRAFT
NT F-101 AIRCRAFT
NT F-106 AIRCRAFT
NT F-111 AIRCRAFT
NT JAGUAR AIRCRAFT
NT MIRAGE AIRCRAFT
NT MIRAGE 3 AIRCRAFT
NT PHANTOM AIRCRAFT
NT RF-4 AIRCRAFT
NT SAAB 37 AIRCRAFT
NT SUPERSONIC COMMERCIAL AIR TRANSPORT
NT SUPERSONIC TRANSPORTS
NT T-38 AIRCRAFT
New concepts for design of fully-optimized
configurations for future supersonic aircraft
p0007 A81-11606
Optimizing the fixed leading edge shape of a
transonic wing to suit the landing high-lift
requirements
p0011 A81-11644

Status of knowledge of sonic booms p0017 A81-11822

Optimum selection of main parameters for the reverse design of a supersonic military aircraft p0102 A81-17047

Transonic axisymmetric bodies with minimal wave drag p0102 A81-17048

One-dimensional considerations concerning the stability behavior of inlet diffusers for supersonic aircraft --- German thesis p0107 A81-17548

Sukhoi's pivotal interdictor p0109 A81-17832

Industry proposes supersonic V/STOL p0122 A81-19490

Supersonic V/STOL prospects brighten p0288 A81-28599

Development of a low NO/x/ lean premixed annular combustor [ASME PAPER 81-GT-40] p0312 A81-29954

Establishing cruise-engine cycle payoffs for a supersonic VSTOL aircraft [ASME PAPER 81-GT-100] p0315 A81-30007

Transonic rotor noise - Theoretical and experimental comparisons p0364 A81-33049

Propellers for economic flight at high speeds [AAAF PAPER NT 80-34] p0369 A81-33936

A comparison of propulsion systems for V/STOL supersonic combat aircraft [SAE PAPER 801141] p0398 A81-34171

Full Authority Digital Electronic Control turbofan engine demonstration [SAE PAPER 801199] p0402 A81-34209

Integrated active controls impact on supersonic cruise vehicle structural design [SAE PAPER 801210] p0404 A81-34218

Supersonic aircraft test experience - Test techniques and data analysis methods p0419 A81-37299

Propellers for economic flight at high speeds p0464 A81-39698

Multi-mission V/STOL with vectored thrust engines [AIAA PAPER 81-1363] p0502 A81-40843

Advanced nozzle integration for supersonic strike fighter application [AIAA PAPER 81-1441] p0504 A81-40875

The supersonic fan engine - An advanced concept in supersonic cruise propulsion [AIAA PAPER 81-1599] p0508 A81-40973

Experimental and analytical development of an advanced supersonic fighter concept [AIAA PAPER 81-1659] p0534 A81-43941

SR-71 impressive in high-speed regime p0565 A81-45747

SR-71 imposes burden on maintenance units p0565 A81-45748

Experimental and theoretical aerodynamic characteristics of two hypersonic cruise aircraft concepts at Mach numbers of 2.96, 3.96, and 4.63 [NASA-TP-1767] p0072 N81-12021

A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise [NASA-TP-1742] p0073 N81-12043

A system for aerodynamic design and analysis of supersonic aircraft. Part 1: General description and theoretical development [NASA-CR-3351] p0139 N81-14970

A system for aerodynamic design and analysis of supersonic aircraft. Part 3: Computer program description [NASA-CR-3353] p0139 N81-14971

A system for aerodynamic design and analysis of supersonic aircraft. Part 4: Test cases [NASA-CR-3354] p0185 N81-15977

Progress with variable cycle engines p0245 N81-17997

A family of supersonic airplanes: Technical and economic feasibility p0248 N81-18017

Supersonic cruise vehicle research/business jet p0248 N81-18022

Optimum maneuvers of supersonic aircraft, volumes 1 and 2 p0332 N81-20060

Turbine bypass engine: A new supersonic cruise propulsion concept [NASA-TM-82608] p0489 N81-26145

The supersonic fan engine: An advanced concept in supersonic cruise propulsion [NASA-TM-82657] p0496 N81-27094

Multi-mission STOVL with vectored thrust engines p0633 N81-33149

Wind tunnel testing of a windshield material or supersonic aircraft [AD-A103383] p0635 N81-33163

Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting [AD-A103434] p0637 N81-33192

SUPERSONIC AIRFOILS

Rotor redesign for a highly loaded 1800 ft/sec tip speed fan, 2 [NASA-CR-159879] p0078 N81-12087

The high-speed airfoil program p0185 N81-15970

The high-speed propeller program p0185 N81-15972

Some aerodynamic interference effects that influence the transonic performance of combat aircraft p0189 N81-16014

Design study for the inner wing of a transonic wing-body combination of aspect ratio 8 p0190 N81-16015

Civil component program Wing Section. The design of the transonic airfoil Va 2 [BMFT-FB-W-80-023] p0426 N81-24053

SUPERSONIC BOUNDARY LAYERS

The coordinate-deformation method in the problem of a supersonic gas flow over an airfoil --- delta wings p0123 A81-19631

The influence of flow disturbances on the laminar-turbulent transition in a supersonic boundary layer p0124 A81-19643

Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3 [NASA-TP-1789] p0140 N81-14975

SUPERSONIC COMBUSTION

Multiple-scale turbulence modeling of boundary layer flows for scramjet applications [NASA-CR-3433] p0392 N81-23411

SUPERSONIC COMBUSTION RAMJET ENGINES

A numerical study of candidate transverse fuel injector configurations in the Langley scramjet engine p0003 A81-10709

Flameholding characteristics of a swept-strut H2 fuel-injector for scramjet applications p0003 A81-10711

Numerical study of a scramjet engine flow field [AIAA PAPER 81-0186] p0162 A81-20659

O.N.E.R.A. ramjet test facilities p0365 A81-33205

Scramjet combustor wall boundary layer analysis [AIAA PAPER 81-1434] p0504 A81-40871

A parametric study of staged fuel injector configurations for scramjet applications [AIAA PAPER 81-1468] p0505 A81-40888

Critical considerations in the design of supersonic combustion ramjet /scramjet/ engines [AIAA PAPER 80-1284] p0511 A81-41749

Operating characteristics of the Langley Mach 7 Scramjet Test Facility [NASA-TM-81929] p0335 N81-20083

SUPERSONIC COMMERCIAL AIR TRANSPORT

A successful step toward an advanced supersonic transport engine - Acoustic and emission results from the Pratt and Whitney Aircraft Variable Cycle Engine Program [AIAA PAPER 81-1593] p0508 A81-40966

Turbine bypass engine - A new supersonic cruise propulsion concept [AIAA PAPER 81-1596] p0508 A81-40971

Design of a multivariable integrated control for a supersonic propulsion system --- variable stream control engine p0079 N81-12094

Structural concept trends for commercial supersonic cruise aircraft design

p0246 N81-18006
Opportunities for structural improvements for an advanced supersonic transport vehicle
p0246 N81-18007
Evaluation of high-temperature structural adhesives for extended service
p0247 N81-18010
Long-range airplane study: The consumer looks at SST travel
p0247 N81-18014
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport --- SCAT-15F model test in the Langley Transonic Dynamics Tunnel
[NASA-TM-81962] p0388 N81-23071
SUPERSONIC CRUISE AIRCRAFT RESEARCH
NASA presses fighter gains --- long-range supersonic cruise aircraft
p0002 A81-10575
The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146
Progress in supersonic cruise technology
[AIAA PAPER 81-1687] p0535 A81-43950
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions --- Lewis 8 by 6-foot supersonic wind tunnel tests
[NASA-CR-159818] p0093 N81-13057
Bibliography of Supersonic Cruise Research (SCR) program from 1977 to mid-1980
[NASA-RP-1063] p0139 N81-14973
A wind tunnel investigation of the aerodynamic characteristics of forward swept wings --- supersonic cruise aircraft research
p0189 N81-16011
Complex configuration analysis at transonic speeds
p0190 N81-16016
Active controls for flutter suppression and gust alleviation in supersonic aircraft --- YF-17 flutter model
[NASA-CR-163934] p0216 N81-17097
Supersonic Cruise Research 1979, part 1
[NASA-CP-2108-PT-1] p0243 N81-17981
Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
Exploratory subsonic investigation of vortex-flap concept on arrow wing configuration
p0243 N81-17985
Analytic development of improved supersonic cruise aircraft based on wind tunnel data
p0244 N81-17989
Flying qualities design criteria applicable to supersonic cruise aircraft
p0244 N81-17991
Development of SCR Aircraft takeoff and landing procedures for community noise abatement and their impact on flight safety
p0245 N81-17994
VCE test bed engine for supersonic cruise research
p0245 N81-17995
Effects on inlet technology on cruise speed selection
p0245 N81-17998
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999
Effects of nozzle design on the noise from supersonic jets
p0246 N81-18001
Status of noise technology for advanced supersonic cruise aircraft
p0246 N81-18002
Advanced technology for controlling pollutant emissions from supersonic cruise aircraft
p0246 N81-18004
Supersonic Cruise Research 1979, part 2 --- airframe structures and materials, systems integration, economic analysis
[NASA-CP-2108-PT-2] p0246 N81-18005
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
Overview of Boeing supersonic transport efforts, 1971 - 1979
p0247 N81-18016
Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18018
Charts for determining potential minimum sonic-boom overpressures for supersonic cruise aircraft
[NASA-TP-1820] p0337 N81-21016
SUPERSONIC DIFFUSERS
One-dimensional considerations concerning the stability behavior of inlet diffusers for supersonic aircraft --- German thesis
p0107 A81-17548
Some optimization problems of internal aerodynamics
p0237 A81-26120
Numerical solution of a supersonic ejector pump
p0413 A81-35939
Experiments with a supersonic multi-channel radial diffuser
[AD-A094192] p0257 N81-18374
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] p0635 N81-33158
SUPERSONIC DRAG
Procedures for optimal drag design of camber and flap deflection in supersonic regions with consideration to geometric limits
[DGLR PAPER 80-110] p0120 A81-19396
Experimental and theoretical aerodynamic characteristics of two hypersonic cruise aircraft concepts at Mach numbers of 2.96, 3.96, and 4.63
[NASA-TP-1767] p0072 N81-12021
Data base for the prediction of inlet external drag
p0190 N81-16018
SUPERSONIC FLIGHT
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476
Delta canard configuration at high angle of attack
p0154 A81-20351
Application of aerodynamic jump prediction theory to supersonic, high fineness ratio, cruciform finned bodies
[AIAA PAPER 81-0222] p0162 A81-20685
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] p0623 A81-49728
Computational aerodynamic design tools and techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0128 N81-13950
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 2: Users manual for the computer program
[AD-A099391] p0494 N81-27080
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081
SUPERSONIC FLOW
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles
p0004 A81-10913
Review of numerical methods for the problem of the supersonic flow around bodies at angle of attack
p0011 A81-11639
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14501
Thin-layer approximation for three-dimensional supersonic corner flows
p0067 A81-15900
Variational problems of gas dynamics
p0069 A81-16455
Characteristics of the velocity field near a wing-body combination located at an angle of attack to an oncoming supersonic flow
p0119 A81-19337
Plane vortex gas flows --- emphasizing supersonic case

p0123 A81-19634
On a linear theory of a supersonic flow past a delta wing with subsonic leading edges
p0149 A81-19872
A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796
Calculation of supersonic gas flows about wings
p0179 A81-21201
Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
p0224 A81-23730
Lifting surface theory and the numerical method of wings with small angles of sideslip at subsonic and supersonic speeds
p0224 A81-23851
Slightly blunted cone in a supersonic flow at angle of attack
p0225 A81-23908
Self-excited oscillations of supersonic flow in a sudden enlargement of a duct
p0228 A81-24031
Numerical simulation of supersonic flow around solids of revolution with a leading detachment zone
p0231 A81-24757
Evaluation of blade element performance of compressor rotor blade cascades in transonic and low supersonic flow range
p0296 A81-29102
On some methods of supersonic unsteady lifting surface analysis
[AIAA 81-0644] p0307 A81-29497
An improved potential gradient method to calculate airloads on oscillating supersonic interfering surfaces
[AIAA 81-0646] p0307 A81-29499
Interaction of a gas jet from a jet engine with the destroyed surface of a multiphase disperse medium
p0319 A81-30152
Calculation of supersonic flow around a wing with constant curvature of its leading edges
p0413 A81-35916
Calculation of supersonic flow past interfering wings
p0413 A81-36455
Calculation of flow past wings with supersonic sharp edges
p0418 A81-36944
Accuracy and application of a second-order theory for three-dimensional supersonic and low hypersonic unsteady flows aroung a thin wing
p0419 A81-37335
A PANSONIC Navier-Stokes solver --- for two dimensional flow about arbitrary airfoil sections
[AIAA PAPER 81-1195] p0454 A81-38077
Measured pressure distributions and shock shapes on a simple delta wing
p0617 A81-48479
Analytical characteristics methods: Applications
[VKI-PREPRINT-1980-10] p0021 N81-10011
Measured pressure distributions and shock shapes on a Butler wing
[CUED/A-AERO/TR-9] p0090 N81-13026
Downwash calculation at close range behind a trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925
Transonic wind tunnel development (1940 - 1950)
p0185 N81-15971
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022
Investigation of plume induced separation on a full-size missile at supersonic velocities
[AD-A094742] p0277 N81-19212
Investigations of free-jet test requirements and techniques with emphasis on the adaptable jet stretcher
[AD-A098710] p0439 N81-25044
An aerodynamic analysis of deformed wings in subsonic and supersonic flow
[AD-A101675] p0580 N81-30091
Basic studies of body vortices at high angles of attack and supersonic speeds
[AD-A102241] p0594 N81-31154

SUPERSONIC FLOW INLETS
U SUPERSONIC INLETS

SUPERSONIC FLUTTER
Experimental verification of unsteady aerodynamic models of supersonic unstalled flutter
p0295 A81-29094
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-188] p0317 A81-30078
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade
[NASA-CR-165166] p0140 N81-14976

SUPERSONIC INLETS
Experimental investigation of a high-aspect-ratio supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42187
Supersonic stall flutter of high speed fans --- in turbofan engines
[NASA-TM-81613] p0140 N81-14978
High-speed cowlings, air inlets and outlets, and internal-flow systems
p0185 N81-15973
Data base for the prediction of inlet external drag
p0190 N81-16018
Hyperbolic/parabolic development for the GIM-STAR code --- flow fields in supersonic inlets
[NASA-CR-3369] p0201 N81-16416
Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft --- V/STOL aircraft
[NASA-TM-81292] p0428 N81-24066

SUPERSONIC JET FLOW
Interferometric study of the initial stage of supersonic jets of gases with various specific-heat ratios from conical nozzles
p0068 A81-16231
Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705
New interpretations of shock-associated noise with and without screech
p0176 A81-22527
Calculation of the boundary of a supersonic inviscid jet flowing into a submerged space or a supersonic wake
p0229 A81-24172
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] p0616 A81-48613
Shock associated noise reduction from inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30908

SUPERSONIC NOZZLES
On screeching jets exhausting from an axisymmetric supersonic nozzle
p0008 A81-11616
Some optimization problems of internal aerodynamics
p0237 A81-26120
Characteristics of thermal energy separation in a gas ejector
p0281 A81-27371
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions
p0417 A81-36737
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1216] p0458 A81-39006
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] p0623 A81-45728
Effects of nozzle design on the noise from supersonic jets
p0246 N81-18001
Status of noise technology for advanced supersonic cruise aircraft
p0246 N81-18002

SUPERSONIC SPEEDS
Wing-alone aerodynamic characteristics at high angles of attack
[AIAA PAPER 81-0008] p0157 A81-20532
Wing-body carryover at supersonic speeds with finite afterbodies
p0354 A81-31622
Estimation of wing nonlinear aerodynamic characteristics at supersonic speeds

[NASA-TP-1718] p0021 N81-10004
Optimal bodies for minimum total drag at supersonic speeds
[AD-A091235] p0091 N81-13036
Effect of wing location and strakes on stability and control characteristics of a monoplanar circular missile with low-profile tail fins at supersonic speeds
[NASA-TM-81878] p0106 N81-15978
Prediction of nacelle aerodynamic interference effects at low supersonic Mach numbers
p0244 N81-17988
Supersonic wings with significant leading-edge thrust at cruise
p0244 N81-17990
An evaluation of a simplified near field noise model for supersonic helical tip speed propellers
[NASA-TM-81727] p0300 N81-22036
Development for new laboratories for future testing
p0433 N81-24105
Wing-alone aerodynamic characteristics for high angles of attack of supersonic speeds
[NASA-TP-1889] p0579 N81-30087
SUPERSONIC TRANSPORTS
NT CONCORDE AIRCRAFT
NT SUPERSONIC COMMERCIAL AIR TRANSPORT
The aircraft in the stratosphere --- effects on ozone layer equilibrium
p0002 A81-10499
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Motion-base simulator results of advanced supersonic transport handling qualities with active controls
[AIAA 81-1819] p0555 A81-44109
Optimization of takeoff flight paths with respect to FAR Part 36 noise using dynamic programming
p0569 A81-46371
Advanced supersonic transport fixed-base simulator evaluations at landing approach
p0244 N81-17992
Assessment of the impact of advanced air-transport technology
p0247 N81-18015
Technology development status at McDonnell Douglas
p0248 N81-18019
Supersonic market and economic analyses
p0248 N81-18020
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021
SUPERSONIC TURBINES
Gas dynamic characteristics of the nozzle diaphragms of partial supersonic turbines
p0281 A81-27374
Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098
ATES activity and status at Detroit Diesel Allison --- Advanced Technology Engine Studies
[AIAA PAPER 81-1504] p0516 A81-42206
SUPERSONIC WAKES
Calculation of the boundary of a supersonic inviscid jet flowing into a submerged space or a supersonic wake
p0229 A81-24172
SUPERSONIC WIND TUNNELS
Calibration of the high speed wind tunnel TVM 150 in the supersonic range
p0016 A81-11778
The influence of flow disturbances on the laminar-turbulent transition in a supersonic boundary layer
p0124 A81-19643
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities
p0124 A81-19644
Investigation of the starting process of a supersonic wind tunnel
p0228 A81-24080
A half-model free-oscillation rig for pitch-damping measurements in high speed wind tunnels
p0461 A81-39263
An experimental investigation of a large delta P settling chamber for a supersonic pilot quiet tunnel
[NASA-CR-3436] p0434 N81-24112
A rectangular rod-wall sound shield
[NASA-CASE-LAR-12883-1] p0550 N81-29138
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] p0635 N81-33158
SUPPORT INTERFERENCE
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
Support interference of wind tunnel models: A selective annotated bibliography
[NASA-TM-81909] p0335 N81-20084
Support interference
p0591 N81-31113
SUPPORT SYSTEMS
NT EMERGENCY LIFE SUSTAINING SYSTEMS
NT GROUND SUPPORT SYSTEMS
NT LIFE SUPPORT SYSTEMS
F-16 integrated logistics support: Still time to consider economical alternatives
[PB81-137473] p0309 N81-23079
SUPPORTS
NT PYLONS
Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack
[AIAA PAPER 81-0007] p0156 A81-20531
Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports
p0228 A81-24089
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] p0627 N81-32124
SUPPRESSORS
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0049 A81-11621
Advanced technology turboshaft IR suppression
p0106 A81-17519
General Electric infrared suppressors for the Black Hawk helicopter
p0106 A81-17520
SURFACE ACOUSTIC WAVE DEVICES
AN/TPX-54 interrogator
p0350 A81-31131
The behavior of quartz oscillators in the presence of accelerations --- in missile and aircraft time-frequency navigation systems
[ONERA, TP NO. 1981-31] p0351 A81-31285
SURFACE COOLING
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities
p0124 A81-19644
Heat transfer from a row of impinging jets to concave cylindrical surfaces
p0231 A81-24924
Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
[SAE PAPER 801155] p0407 A81-34245
SURFACE DEFECTS
Runway rehabilitation, Washington National Airport
p0112 A81-18066
SURFACE EFFECT SHIPS
Noise control design problems on air cushion vehicles and surface effect ships
p0017 A81-11818
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401
SURFACE FINISHING
Surface analysis of bearing steels after solvent treatments. II - Lubricant-coated bearing surfaces
[ASLE PREPRINT 80-LC-8A-6] p0118 A81-18748
Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover
[AD-A090049] p0039 N81-11120
Aircraft surface coatings study: Energy efficient transport program --- sprayed and adhesive bonded coatings for drag reduction
[NASA-CR-158954] p0084 N81-12225
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077

Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363] p0441 N81-25065
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] p0640 N81-33503

SURFACE GEOMETRY
Stochastic surfaces for flight simulator displays
p0324 A81-30330

SURFACE INTERACTIONS
U SURFACE REACTIONS

SURFACE NAVIGATION
A microprocessor based land navigator
p0360 A81-32833
Perspectives on the civil utilization of the Navstar/GPS
p0409 A81-35023
The role of the earth's shape in navigation - An example
p0614 A81-48120
Search and rescue methods and equipment. A bibliography with abstracts
[PB80-812837] p0023 N81-10026

SURFACE PRESSURE
U PRESSURE

SURFACE PROPERTIES
NT COEFFICIENT OF FRICTION
NT SURFACE DEFECTS
NT SURFACE ROUGHNESS
NT SURFACE STABILITY
NT SURFACE TEMPERATURE
NT WALL TEMPERATURE
Runway surface loading during aircraft landings
p0149 A81-19800
Prediction of helicopter rotor noise from measured blade surface pressure
p0577 A81-46649
Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue
[NASA-TM-75733] p0376 N81-22054
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

SURFACE REACTIONS
Dynamic, hot surface ignition of aircraft fuels and hydraulic fluids
[NASA-CR-163979] p0254 N81-18139

SURFACE ROUGHNESS
Correlation of artificially induced boundary-layer transition data at hypersonic speeds
p0285 A81-27911
A computer program for the design and analysis of low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921
Modal analysis for aircraft response to runway surface roughness
[AD-A092057] p0194 N81-16043
National runway friction measurement program
[AD-A097334] p0391 N81-23097

SURFACE ROUGHNESS EFFECTS
Effect of surface roughness over the blade in compressor cascade
p0060 A81-14924
The influence of surface roughness on boundary layer flow and separation at transonic speeds
p0413 A81-36468

SURFACE STABILITY
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage --- aircraft structures
[AGARD-MAN-10(ENG)] p0640 N81-33503

SURFACE TEMPERATURE
NT WALL TEMPERATURE
Runway and deck temperatures in vertical takeoff/landing operations
[AIAA PAPER 81-1623] p0525 A81-43132

SURFACE TO SURFACE MISSILES
NT CRUISE MISSILES
NT TOW MISSILES

SURFACE TREATMENT
U SURFACE FINISHING

SURFACE VEHICLES
NT AIRCRAFT CARRIERS
NT AUTOMOBILES
NT ELECTRIC HYBRID VEHICLES
NT ELECTRIC MOTOR VEHICLES
NT SURFACE EFFECT SHIPS
NT TRACTORS

SURFACE WATER
Determination of wind stress from water level fluctuations
N81-30774

SURGES
An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826
Turbo-compressors surge and surge control
[AIAA PAPER 81-0070] p0159 A81-20579

SURVEILLANCE
Analysis, design and simulation of line scan aerial surveillance systems
p0357 A81-32492

SURVEILLANCE RADAR
NT AIRBORNE SURVEILLANCE RADAR
Performance evaluation of an interrogation-reply scheduling technique for a discrete address beacon system --- of radar surveillance and aircraft communication in ATC
p0121 A81-19417
Side lobe suppression with digital signal processing
p0152 A81-20092
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
A distributed airborne surveillance system
p0180 A81-22618
Mini-RPV radar test program
p0180 A81-22619
Multipath and interference effects in secondary surveillance radar systems
p0183 A81-23359
Discrete Address Beacon System
p0350 A81-31134
Adaptive features and measurement requirements for advanced surveillance radars
p0617 A81-48584
New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11025
Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0042 N81-11290
Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches
[AD-A094073] p0251 N81-18042

SURVEYING
U SURVEYS

SURVEYS
Survey population response to airplane noise, part 1
[NASA-TM-75790] p0031 N81-10576
General Aviation Activity and Avionics Survey
[AD-A097604] p0389 N81-23081
Nature of the annoyance and noise annoyance relation around airports
[NASA-TM-75873] p0542 N81-28606
Evaluation of the disturbance caused by aircraft noise by opinion surveys
[NASA-TM-76579] p0542 N81-28610
A compendium of aircraft cockpit vision surveys, 1950 through 1980, volume 1
[AD-A101473] p0580 N81-30104

SURVIVAL
A study of factors affecting aircrew survivability following emergency escape over water
p0409 A81-34697
Optimal nuclear radiation criteria for aeronautical systems
[AD-A101651] p0548 N81-29125

SURVIVAL EQUIPMENT
Survival and Flight Equipment Association, Annual Symposium, 17th, Las Vegas, Nev., December 2-6, 1979, Proceedings
p0174 A81-22076
Seat pack for fighter aircraft operating on the NATO Northern Flank
p0205 N81-17010
The evolution of the helicopter seat pan mounted Personal Survival Pack (PSP)
p0205 N81-17016
Aeronautical systems technology needs: Escape, rescue and survival and test facilities and test equipment

[AD-A097827] p0423 N81-24020
SUSPENDING (HANGING)
NT MAGNETIC SUSPENSION
SUSPENSION SYSTEMS (VEHICLES)
Heave instabilities of amphibious air cushion suspension systems
[UTIAS-246] p0144 N81-15156
SWEAT COOLING
Transpiration air cooled turbine blade - A technology for future generation aircraft and industrial gas turbine engines using coal or coal derived fuels
p0297 A81-29115
Comparative efficiency of penetrating steam and air cooling of gas turbine blades
p0509 A81-41003
SWEEP ANGLE
NT LEADING EDGE SWEEP
An investigation of drag associated with the upswept rear fuselage of a helicopter
[BU-257] p0330 N81-20043
SWEEPBACK
NT LEADING EDGE SWEEP
SWEPT FORWARD WINGS
NT TRAPEZOIDAL WINGS
How to improve the performance of transport aircraft by variation of wing aspect-ratio and twist /12th Daniel and Florence Guggenheim International Memorial Lecture/
p0006 A81-11602
Forward swept wings and business airplanes
[SAE PAPER 800605] p0061 A81-15328
Active control of forward swept wings with divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491
Feasibility of forward-swept wing technology for V/STOL aircraft
[SAE PAPER 801176] p0400 A81-34189
Coming challenge - Integrating the technologies for forward-swept-wing fighters
p0420 A81-37522
Goals of flight management system integration for a forward-swept-wing demonstrator aircraft
p0421 A81-37524
Spanwise lift distribution of forward-and aft-swept wings in comparison to the optimum distribution form
p0453 A81-38017
Development and hardware verification of an aeroelastically tailored forward swept composite wing
p0557 A81-44355
Stability characteristics of a forward swept wing aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576
Dynamic response of a forward-swept-wing model at angles of attack up to 15 deg at a Mach number of 0.8 --- Langley transonic dynamics tunnel tests
[NASA-TM-81863] p0085 N81-12448
Design of advanced technology transonic airfoils and wings
p0187 N81-16000
A wind tunnel investigation of the aerodynamic characteristics of forward swept wings --- supersonic cruise aircraft research
p0189 N81-16011
Aeropropulsive characteristics of twin nonaxisymmetric vectoring nozzles installed with forward-swept and aft-swept wings --- in the Langley 16 Foot Transonic Tunnel
[NASA-TP-1778] p0261 N81-19019
SWEPT WINGS
NT ARROW WINGS
NT DELTA WINGS
NT SWEPT FORWARD WINGS
NT SWEPTBACK WINGS
NT TRAPEZOIDAL WINGS
Laminar boundary layer on swept-back wings of infinite span at an angle of attack
p0107 A81-17656
Three-dimensional boundary layer transition via the mechanisms of 'attachment line contamination' and 'cross flow instability'
p0115 A81-18122
Some characteristics of subsonic flow over the root area of a sweptback wing
p0123 A81-19633
The linear instability due to the compressible crossflow on a swept wing
p0170 A81-21168
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090
Wind tunnel experiments on the divergence of swept wings with composite structures
[AIAA PAPER 81-1670] p0526 A81-43152
Instrumentation for measurement of flow properties on a swept wing in flight
[DGLR PAPER 81-034] p0609 A81-47585
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
Interference aspects of the A310 high speed wing configuration
p0188 N81-16001
A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow
p0188 N81-16006
An investigation of a swept wing-body configuration with drooped leading edge at low and transonic speeds
p0189 N81-16012
Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014
Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982
Exploratory subsonic investigation of vortex-flap concept on arrow wing configuration
p0243 N81-17985
Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
p0243 N81-17986
The high lift characteristics in the case of the v-wing concept
[NASA-TM-75872] p0253 N81-18061
Structures of flow separations over swept wings
p0255 N81-18246
Leading edge vortex flaps for drag reduction --- during subsonic flight
[NASA-CASE-LAR-12750-1] p0261 N81-19016
Investigation of aerodynamic stall alleviation on a swept planform wing using leading edge modifications
[AD-A101239] p0548 N81-29122
MADY-1, a FORTRAN program for the compressible stability analysis of three-dimensional boundary layers
p0586 N81-30388
SWEPTBACK WINGS
NT ARROW WINGS
NT DELTA WINGS
NT TRAPEZOIDAL WINGS
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840
Spanwise lift distribution of forward-and aft-swept wings in comparison to the optimum distribution form
p0453 A81-38017
Transonic dip mechanism of flutter of a sweptback wing. II
p0559 A81-44447
Some particular configuration effects on a thin supercritical variable camber wing
p0188 N81-16005
Aerodynamic interaction between a close-coupled canard and a sweptback wing in transonic flow
p0189 N81-16013
Examination of the vortex regime for highly swept wings by extrapolation of the Jones method
[AAAF-NT-80-25] p0204 N81-16992
Aeropropulsive characteristics of twin nonaxisymmetric vectoring nozzles installed with forward-swept and aft-swept wings --- in the Langley 16 Foot Transonic Tunnel
[NASA-TP-1778] p0261 N81-19019
Study of the vortex conditions of wings with large sweepback by extrapolation of the Jones method
[NASA-TM-75863] p0262 N81-19026

Investigation of aerodynamic characteristics of wings having vortex flow using different numerical codes
[NASA-CR-165706] p0384 N81-23034
Development of a nonlinear vortex method --- steady and unsteady aerodynamic loads of highly sweptback wings
[NASA-CR-164351] p0423 N81-24024
SWIRLING
The combustion modelling of swirling flows for gas turbine combustors
p0295 A81-29087
SWIRLING WAKES
U TURBULENT WAKES
SWITCHES
NT SWITCHING CIRCUITS
SWITCHING
Predictive steering control of dirigibles using the switching curve approach
[AIAA 81-1327] p0456 A81-38535
SWITCHING CIRCUITS
The S3 transition --- flight control logic circuit analysis
p0240 A81-26617
SWITCHING ELEMENTS
U SWITCHING CIRCUITS
SWIVELS
A formulation of the shimmy problem for swiveling wheels
p0607 A81-47268
SYMBOLIC PROGRAMMING
ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783
SYMBOLS
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142
A pilot training manual for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-81959] p0330 N81-20044
SYMMETRICAL BODIES
NT AXISYMMETRIC BODIES
NT BODIES OF REVOLUTION
NT CONICAL BODIES
NT CYLINDRICAL BODIES
NT FAIRINGS
NT PARABOLIC BODIES
NT ROTATING CYLINDERS
NT SLENDER CONES
NT STREAMLINED BODIES
Pressure distribution computation on a nonlifting symmetrical helicopter blade in forward flight
p0447 N81-26010
SYMMETRY
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] p0639 N81-33238
SYNCHRONIZERS
A quick-look system for the processing of flight data recordings
p0329 N81-20021
SYNCHRONOUS SATELLITES
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318
Satellite constellations for three-dimensional coverage of the Atlantic Ocean --- for geosynchronous navigation systems
p0323 A81-30291
Project Prosat --- communication satellite network for land, sea and air traffic control
p0565 A81-45760
SYNOPTIC METEOROLOGY
Terminal Forecast Reference Notebook (TFRN) for George AFB, California
[AD-A098438] p0446 N81-25637
Terminal Forecast Reference Notebook (TFRN) for Luke AFB, Arizona
[AD-A098445] p0446 N81-25638
SYNTHETIC APERTURE RADAR
Automatic clustering of synthetic aperture radar /SAR/ targets
p0323 A81-30303
Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35891
Integrated strike avionics study, volume 1
[AD-A094705] p0273 N81-19113
Multiple arrested synthetic aperture radar
[AD-A101143] p0551 N81-29317
SYNTHETIC FIBERS
NT DACRON (TRADEMARK)
NT GLASS FIBERS
SYNTHETIC FUELS
NT LIQUID FUELS
Modified Brayton cycles utilizing alcohol fuels
[ASME PAPER 81-GT-103] p0315 A81-30009
Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177
Alternative aircraft fuels - When will the action start
p0465 A81-39981
Acceptability of shale derived fuel for Navy aircraft propulsion systems
[AIAA PAPER 81-1424] p0503 A81-40868
Toxicity of synthetic high density and conventional hydrocarbon jet fuels to a soil bacterium
[AD-A089527] p0041 N81-11233
Alternative energy sources for non-highway transportation, volume 1
[DOE/CS-05438/T1-VOL-1] p0044 N81-11513
A Matrix Approach to Biological Investigation of Synthetic Fuels
[PB81-183477] p0586 N81-30313
A United Kingdom view on future fuels
[PNR-90068] p0602 N81-31398
SYNTHETIC RESINS
NT EPOXY RESINS
NT KEVLAR (TRADEMARK)
NT PHENOLIC RESINS
NT POLYESTER RESINS
NT THERMOPLASTIC RESINS
SYNTHETIC RUBBERS
NT ELASTOMERS
SYSTEM EFFECTIVENESS
The measurement of the air traffic controller
p0053 A81-13415
Productivity - The challenge of aircraft and engine maintenance
p0102 A81-17045
High 'G' ejection protection device
p0175 A81-22093
Effectiveness of turbine engine diagnostic systems
p0290 A81-29053
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115
A-10/TF34 Turbine Engine Monitoring System evaluation and implementation
[AIAA PAPER 81-1447] p0505 A81-40880
Effects of advances in propulsion technology on missile effectiveness --- solid fuel ramjets
[AD-A090645] p0081 N81-12106
Wind shear systems integration plan, VICON (visual confirmation) reliability analysis
[PB80-218233] p0128 N81-13949
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase
[AD-A102163] p0595 N81-31101
SYSTEM FAILURES
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0154 A81-20448
Current and future concepts in FMEA --- Failure Modes and Effects Analysis
p0229 A81-24283
Is it safe - The safety assessment of aircraft systems. III - The use of probability methods
p0290 A81-29029
Is it safe - The safety assessment of aircraft systems. IV - Methods, techniques, and organisation
p0366 A81-33789
Maintenance program analysis for aircraft structures of the 80's - MSG-3
[SAE PAPER 801214] p0404 A81-34222
Is it safe - The safety assessment of aircraft systems. V - Some particular techniques
p0454 A81-36174
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135

Aircraft accident reports. Brief format, US civil aviation: Issue no. 11, 1979 accidents
[NTSB-BA-80-8] p0075 N81-12053
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059
Environmental burn-in effectiveness
[AD-A093307] p0211 N81-17060
Apparatus for sensor failure detection and correction in a gas turbine engine control system
[NASA-CASE-LEW-12907-2] p0273 N81-19115
Detection and location of faults in onboard aircraft systems with the aid of the Automatic Fault Identification System (AFIS)
p0383 N81-23022

SYSTEM GENERATED ELECTROMAGNETIC PULSES
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940

SYSTEMS ANALYSIS
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473
Analysis and synthesis of the digital attitude control system of the aerospace vehicle
p0224 A81-23837
Flight control system design through constrained output feedback
p0321 A81-30264
General describing function method for systems with many nonlinearities, with application to aircraft performance
p0564 A81-45588
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044
Math model study, runway 16R instrument landing system localizer at Seattle-Tacoma Airport, Washington
[AD-A095076] p0270 N81-19085
Definition of a system concept study for future air traffic guidance
[BMFT-FB-W-80-008] p0425 N81-24046
Advanced Scout Helicopter (ASH) fly-by-wire control system preliminary design. Volume 1: System design and analysis
[AD-A098155] p0434 N81-24108
The 747 primary flight control systems reliability and maintenance study
[NASA-CR-159010] p0498 N81-27116
Onboard and ground test of an autonomous navigation system based on terrain correlation
p0544 N81-29069
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
p0544 N81-29072
Air-to-air gunnery systems test and evaluation
p0544 N81-29073
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] p0636 N81-33181

SYSTEMS COMPATIBILITY
F/A-18A inlet/engine compatibility flight test results
[AIAA PAPER 81-1393] p0503 A81-40860

SYSTEMS DESIGN
U SYSTEMS ENGINEERING

SYSTEMS ENGINEERING
NT COMPUTER SYSTEMS DESIGN
The design of blowing-cooled aircraft electrical machines
p0002 A81-10474
The role of flight simulation in the design and development of the Sea Harrier Nav-Attack System
p0010 A81-11635
The evolution of operational systems --- approach to National Airspace System automation
p0064 A81-15699
The future ATC system as influenced by advanced avionics
p0100 A81-16586
Air traffic control and position location by satellite constellation in equatorial orbit
p0173 A81-21912
A distributed airborne surveillance system
p0180 A81-22618
Analytic design of regulators with limitations
p0235 A81-25688
The role of simulation in automatic flight control systems research
p0283 A81-27894
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
MS9001E - A new 100 MW gas turbine
[ASME PAPER 81-GT-31] p0312 A81-29946
Complex computation of flywheel power systems for flight vehicles
p0319 A81-30158
The Modular Life Cycle Cost Model for advanced aircraft systems - An overview
[SAWE PAPER 1351] p0353 A81-31386
Materials and processes for aircraft environmental controls in the 1990's
[SAE PAPER 801181] p0401 A81-34194
The DME-aided Azimuth System - DAS
p0452 A81-37653
RF-5E tactical reconnaissance standoff photography concept
p0462 A81-39421
An integrated performance and air data system for helicopters
p0470 A81-40110
Commercial rotorcraft automatic controls - The next generation
p0470 A81-40113
Avionics system design requirements for the United States Coast Guard HH-65A Dolphin
p0472 A81-40133
Development of an integrated fault tolerant engine control
[AIAA PAPER 81-1365] p0502 A81-40845
Standard INS program status
p0511 A81-41753
F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
Impact of EFIS on navigation --- Electronic Flight Instrument System
p0517 A81-42435
Antennas-avionics systems relationship
[SAE PAPER 810579] p0519 A81-42782
AFTI/F-16 advanced multimode control system design for task-tailored operations
[AIAA PAPER 81-1707] p0535 A81-43955
Ferranti mission managers
p0553 A81-44083
Multiobjective insensitive design of airplane control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Flying qualities criteria and flight control design
[AIAA 81-1823] p0556 A81-44127
A model-following technique for insensitive aircraft control systems
[AIAA PAPER 81-1867] p0560 A81-44563
Design of fault tolerant electronic engine controls
[AIAA PAPER 81-1496] p0566 A81-45894
Safety - A prime factor in the design of Aerospatiales Super-Puma AS 332
p0572 A81-46609
HH-65A Dolphin engine condition monitoring system
p0575 A81-46636
Precision DME for microwave landing system
p0578 A81-47125
Reliability validation of systems for life-critical applications
p0617 A81-48559
Evolution of techniques for LCC analysis
p0045 N81-11909
The Hornet program: A design to life cycle cost case study
p0046 N81-11910
Design to cost and the F-16 multirole fighter
p0046 N81-11911
Some engineering aspects of life cycle costing
p0047 N81-11918
Aerodynamic design of electric and hybrid vehicles: A guidebook
[NASA-CR-163744] p0088 N81-12943
Progress in materials and structures at Lewis Research Center
p0089 N81-12982
Microwave landing systems. Citations from the Engineering Index data base
[PB80-814643] p0120 N81-13947
Microwave landing systems. Citations from the NTIS data base
[PB80-814635] p0120 N81-13948

Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure [AD-A092292] p0191 N81-16025

Critical research issues and visual system requirements for a V/STOL training research simulator [AD-A092561] p0198 N81-16072

Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy [AD-A093774] p0206 N81-17030

Federal Radionavigation Plan. Volume 2: Requirements [AD-A093775] p0207 N81-17031

Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics [AD-A093776] p0207 N81-17032

Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development [AD-A093777] p0207 N81-17033

Total main rotor isolation system analysis [NASA-CR-165666] p0329 N81-20027

Initial design and experimental implementation of the traffic advisory service of ATARS [AD-A095462] p0331 N81-20055

Design, development, and evaluation of lightweight hydraulic system, phase 1 --- A-7 aircraft [AD-A097505] p0388 N81-23075

Generalities on active control. Potentials and research trends [SNIAS-802-111-112] p0427 N81-24056

Advanced Scout Helicopter (ASH) fly-by-wire control system preliminary design. Volume 1: System design and analysis [AD-A098155] p0434 N81-24108

Control augmentation for lateral control wheel steering [NASA-CR-164664] p0549 N81-29132

Testing and evaluation of a stall-flutter-suppression system for helicopter rotors using individual-blade-control [NASA-CR-166233] p0549 N81-29135

Report of the panel on aeroelasticity and unsteady aerodynamics p0593 N81-31149

SYSTEMS FOR NUCLEAR AUXILIARY POWER

U SNAP

SYSTEMS INTEGRATION

Promoting rational standardization --- for military avionics systems architecture p0050 A81-13172

Application of advanced technology for improving the integration of engine and airframe for future transport aircraft p0058 A81-14389

Integrated flight displays p0064 A81-15681

An overview - 1980 generation avionic developments p0111 A81-18061

Airline navigation planning p0174 A81-21966

Integrated avionics studies target future technologies p0223 A81-23499

A look at comprehensive engine/airframe integration for high performance aircraft p0298 A81-29118

Contention information transfer systems analysis p0322 A81-30274

Synergistic benefits of fully integrating JTIDS and GPS --- Joint Tactical Information Distribution System and Global Positioning System p0323 A81-30311

Integrated Flight/Weapon Control system concepts p0324 A81-30328

Integration of the F-16 Weapon System Trainer p0325 A81-30332

Tailoring software logic to the needs of the pilot - A software designer's nightmare p0325 A81-30335

DAIS controls and displays - A systems approach to avionics subsystem integration p0325 A81-30336

KC-135 modernization program --- cockpit avionics subsystems integration for pilot workload reduction p0325 A81-30337

Integrated flight and fire control development and demonstration of an F-15B aircraft p0327 A81-30359

Rapport tactical self protection systems design p0349 A81-31113

A new generation IFF - The AN/APX-100/V/ transponder p0350 A81-31132

Airborne electronic displays p0364 A81-32999

Future challenges in V/STOL flight propulsion control integration [SAE PAPER 801140] p0397 A81-34179

Flight control systems go digital - More than a binary mechanization of analog predecessors [SAE PAPER 801166] p0399 A81-34181

Integrated CAD/CAM for the 1980s [SAE PAPER 801170] p0400 A81-34185

Development requirements for integrated aircraft power systems [SAE PAPER 801149] p0406 A81-34241

Development of a flight simulation capability in the dynamic environment simulator [AIAA 81-0978] p0415 A81-36566

Coming challenge - Integrating the technologies for forward-swept-wing fighters p0420 A81-37522

Goals of flight management system integration for a forward-swept-wing demonstrator aircraft p0421 A81-37524

Big 'R', little 'c', integrated data annotation and sensor control for long range oblique photography /LOROP/ --- increased reliability and reduced complexity p0462 A81-39435

Integrated sensor control system for RF-5E demonstrator p0462 A81-39438

The digital core avionics system p0472 A81-40132

Achieving the full benefits of integrated multiplex in the 1980's --- for military helicopter avionics [AHS 80-15] p0474 A81-40146

An approach to conformal inlet diffuser design for integrated propulsion systems [AIAA PAPER 81-1395] p0514 A81-42185

AFCS integration requirements --- Automatic Flight Control System [SAE PAPER 810580] p0519 A81-42743

The technical and managerial challenge of integrated flight/fire control [AIAA PAPER 81-1706] p0527 A81-43162

Aerodynamic integration of externally mounted engines on a long-range bomber [AIAA PAPER 81-1693] p0563 A81-44899

Avionics thermal integration for the Boeing 767 airplane p0570 A81-46478

Aircraft/avionics environmental integration program p0570 A81-46480

Future challenges in helicopter flight/propulsion control integration p0575 A81-46633

Supersonic Cruise Research 1979, part 2 --- airframe structures and materials, systems integration, economic analysis [NASA-CP-2108-PT-2] p0246 N81-18005

Demonstration Advanced Avionics System (DAAS) functional description --- Cessna 402B aircraft [NASA-CR-152405] p0389 N81-23080

New Navy programs for development of integrated inertial sensors p0485 N81-26108

Tactical navigation system testing p0544 N81-29066

Systems integration of automatic flight control, navigational calculations, and visual control (caravelle alis) p0544 N81-29068

SYSTEMS MANAGEMENT

Airport/environs plan making - Managing the planning process p0114 A81-18088

An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS) [AD-A089365] p0028 N81-10070

Annual report to the NASA Administrator by the Aerospace Safety Advisory Panel on the space shuttle program. Part 2: Summary of information developed in the panel's fact-finding activities

[NASA-TM-82252] p0198 N81-16114
Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy
[AD-A093774] p0206 N81-17030
Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development
[AD-A093777] p0207 N81-17033

SYSTEMS SIMULATION
Air traffic control using a microwave landing system
p0053 A81-13421
Increasing capacity with computer-assisted decision making --- airport planning
p0113 A81-18080
Modeling of the terminal area Air Traffic Management and Control
p0114 A81-18085
Airspace simulation in airport system planning
p0114 A81-18086
Air traffic simulation as a validation tool
p0172 A81-21718
A case study - Real time simulation and structured design
p0172 A81-21721
GPS receiver simulation
p0173 A81-21913
Low level, adverse attitude escape using a vertical seeking ejection seat
p0176 A81-22094
Civil aviation applications of Navstar/GPS through differential techniques
p0177 A81-22374
An objective method of assessing the realism of a simulation of a simple control system
p0284 A81-27898
Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0299 A81-29205
Digital computer simulation of aircraft hydraulic systems
[SAE PAPER 801193] p0402 A81-34203
The Northrop F/A-18L Mission Simulator
[AIAA 81-0968] p0414 A81-36557
Versatile and economical real-time simulation for digital flight control systems
[AIAA 81-0974] p0415 A81-36563
Development of a generic airplane response simulation
[AIAA 81-0980] p0415 A81-36568
Dynamic simulation of hybrid video compression --- of airborne reconnaissance systems
p0463 A81-39555
Simulation model to evaluate maintenance strategies for large network of fielded systems
p0613 A81-48009
Function generation techniques --- in real time hybrid simulations
p0614 A81-48329
COMLINK - A communications/EW analytical and modeling tool
p0617 A81-48547
Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] p0619 A81-48620
A digital-analog hybrid system and its application to the automatic flight control system simulation research
[NASA-TM-76457] p0377 N81-22060
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059
A nonlinear propulsion system simulation tehnique for piloted simulators
[NASA-TM-82600] p0390 N81-23085
Tactical navigation system testing
p0544 N81-29066
Flight testing and instrumentation of aircraft navigation systems
p0544 N81-29067

SYSTEMS STABILITY
The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835

T

T-37 AIRCRAFT
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
p0616 A81-48379

T-38 AIRCRAFT
Initial development for a flutter analysis of damaged T-38 horizontal stabilators using NASTRAN
[AIAA PAPER 81-0365] p0166 A81-20784
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44398
Investigation of an improved flutter speed prediction technique for damaged T-38 horizontal stabilators using NASTRAN
[AD-A094769] p0273 N81-19109
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] p0638 N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] p0638 N81-33197

T-56 ENGINE
Fuel efficiency improvements to the T56 turboprop engine
[SAE PAPER 801158] p0399 A81-34178

TABLES (DATA)
Annual review of aircraft accident data, U.S. General aviation calendar year 1978
[PB80-203916] p0024 N81-10028
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] p0627 N81-32119

TABS (CONTROL SURFACES)
An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989] p0263 N81-19028

TACAN
Integrated Flight and Weapon Control for improved tactical combat effectiveness
p0324 A81-30329
U.S. Navy/USAF development of Tactical Aircrew Combat Training System/Air Combat Maneuvering Instrumentation /TACTS/ACMI/
[SAE PAPER 801183] p0401 A81-34196
Energy maneuverability displays for air combat training
[SAE PAPER 801185] p0401 A81-34198
Analytic determination of interference thresholds for microwave landing system equipment and TACAN/DME equipment
[AD-A093448] p0266 N81-17025
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS)
[AD-A094169] p0250 N81-18036
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21046

TACT PROGRAM
Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0238 A81-26503

TACTICAL AIR NAVIGATION
U TACAN

TACTICS
The Tactical Air Forces - Outlook for the next decade
[AIAA PAPER 81-0932] p0408 A81-34364

TAIL ASSEMBLIES
Control design for reduction of aerodynamic tail forces using quadratic synthesis
p0240 A81-26610
Experimental study of the snap-through oscillations of an empennage
p0299 A81-29313
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44398
Aircraft accident report: Allegheny Airlines, Inc., Nord 262, Mohawk/Frakes 298, N29824, Benedum Airport, Clarksburg, West Virginia, February 12, 1979
[NTSB-AAR-79-12] p0073 N81-12084
Application of linear quadratic control in reduction of aerodynamic forces on aircraft
p0332 N81-20061

Transonic wind tunnel measurements of tailplane and elevator effectiveness of the Jindivik 203B target aircraft
[AD-A098180] p0424 N81-24031

TAIL MOUNTINGS
U TAIL ASSEMBLIES

TAIL PLANES
U HORIZONTAL TAIL SURFACES

TAIL ROTORS
NT HELICOPTER TAIL ROTORS
Fatigue and damage propagation in composite rotor blades
p0041 N81-11145
Service experience with GRC helicopter blades (BO-105)
p0041 N81-11146
Development of a bearingless helicopter tail rotor --- application of composite materials
[MBB-UD-304/80-OE] p0586 N81-30199

TAIL SURFACES
NT HORIZONTAL TAIL SURFACES
Theoretical determination of subsonic oscillatory airforce coefficients for fin-tailplane configurations
[RAE-TR-79125] p0022 N81-10016

TAILLESS AIRCRAFT
NT B-58 AIRCRAFT
NT F-106 AIRCRAFT
NT MIRAGE 3 AIRCRAFT

TAILS (ASSEMBLIES)
U TAIL ASSEMBLIES

TAKEOFF
NT VERTICAL TAKEOFF
Some aspects of advanced flight management systems and their application to modern transport aircraft
p0154 A81-20353
Simulated aircraft takeoff performance with frosted wings
[AIAA PAPER 81-0404] p0167 A81-20811
Airport activity statistics of certificated route air carriers, calendar year 1979
[AD-A089748] p0034 N81-11023
Pilatus porter: Provision of revised take-off and landing performance data
[AD-A089964] p0076 N81-12068
Visual confirmation (VICON) of voice take-off clearance cf cost-and-deployment analyses and strategies
[AD-A091007] p0091 N81-13038
Wind shear systems integration plan, VICON (visual confirmation) reliability analysis
[PB80-218233] p0128 N81-13949
Development of SCR Aircraft takeoff and landing procedures for community noise abatement and their impact on flight safety
p0245 N81-17994
Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24041
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29088
Takeoff and missed approach under the influence of wind shear --- flight safety considerations
[TUBS/SFB-58-80-05-01] p0628 N81-32131

TAKEOFF RUNS
Reduction of the take-off ground run distance to a given set of atmospheric condition
p0010 A81-11634
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0101 A81-17044
Critical field length calculations for preliminary design
p0183 A81-23366
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0420 A81-37416
Optimization of takeoff flight paths with respect to FAR Part 36 noise using dynamic programming
p0569 A81-46371

A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise
[NASA-TP-1742] p0073 N81-12043

TAKEOFF SYSTEMS
U AIRCRAFT LAUNCHING DEVICES

TALON AIRCRAFT
U T-38 AIRCRAFT

TANDEM ROTOR HELICOPTERS
NT CH-47 HELICOPTER
The developing technology and economics of large helicopters
p0466 A81-40079

TANKER AIRCRAFT
KC-135 modernization program --- cockpit avionics subsystems integration for pilot workload reduction
p0325 A81-30337

TANKS (CONTAINERS)
NT FUEL TANKS
NT WING TANKS
Elastomers used in aeronautics industry
[SNIAS-801-551-105] p0031 N81-10168

TAPE RECORDERS
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060

TAPERED WINGS
U SWEPT WINGS

TARE (DATA REDUCTION)
U DATA REDUCTION

TARGET ACQUISITION
Time-compressed displays for target detection
p0064 A81-15686
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
Application of Doppler information to automatic target tracking
p0153 A81-20101
Implementation of target orientation angles in improved Kalman filter based short range radar tracking
p0326 A81-30340
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115
Autonomous target handoff from an airborne sensor to a missile seeker
p0358 A81-32498
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936] p0363 A81-32937
Evaluation of image processing for man-in-loop target acquisition
p0461 A81-39337
Feature extraction from forward looking infrared /FLIR/ imagery
p0461 A81-39338
Image processing design for autonomous acquisition of targets
p0562 A81-44700
Automatic handoff of multiple targets
[AD-A093483] p0217 N81-17101
Maximum information trajectory for an air to air missile intercept
[AD-A101497] p0585 N81-30160

TARGET DRONE AIRCRAFT
NT JINDIVIK TARGET AIRCRAFT
The BQM-74C target as a flying computer - Its language and its peripherals
p0179 A81-22611
QF-100 Full-Scale Aerial Target program
p0179 A81-22612
F-100s set to become target drones
p0614 A81-48067
The DAST-1 remotely piloted research vehicle development and initial flight testing
[NASA-CR-163105] p0207 N81-17038

TARGET PENETRATION
U TERMINAL BALLISTICS

TARGET RECOGNITION
Radar target detection and map-matching algorithm studies
p0005 A81-11150
Advanced techniques for airborne target screener
p0320 A81-30238

Automatic clustering of synthetic aperture radar /SAR/ targets
p0323 A81-30303
Multisensor track file correlation using attributes and kinematics
p0326 A81-30349
Detection of target multiplicity using monopulse quadrature angle
p0360 A81-32696
The Bundeswehr Drone Program - Where are we today
p0458 A81-38806
Forward looking infrared /FLIR/ image enhancement for the automatic target cuer system
p0461 A81-39335
Feature extraction from forward looking infrared /FLIR/ imagery
p0461 A81-39338
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44681
Aircraft recognition by means of monostatic radar
p0607 A81-47142
Critical research issues and visual system requirements for a V/STOL training research simulator
[AD-A092561] p0198 N81-16072

TARGETS
NT JINDIVIK TARGET AIRCRAFT
NT RADAR TARGETS

TAXIING
F-15 nose landing gear shimmy, taxi test and correlative analyses
[SAE PAPER 801239] p0406 A81-34237
High speed exit taxiways
[AD-A098178] p0435 N81-24118
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] p0639 N81-33214

TCV PROGRAM
U TERMINAL CONFIGURED VEHICLE PROGRAM

TDMA
U TIME DIVISION MULTIPLE ACCESS

TEACHING
U EDUCATION

TECHNOLOGICAL FORECASTING
NT PATTERN METHOD (FORECASTING)
NASA presses fighter gains --- long-range supersonic cruise aircraft
p0002 A81-10575
New concepts for design of fully-optimized configurations for future supersonic aircraft
p0007 A81-11606
The all-electric aircraft
p0008 A81-11617
Flying qualities criteria for advanced control technology transports
p0008 A81-11618
The future cockpit of the next generation of civil aircraft
p0010 A81-11630
Military aircraft avionics in the 1580's
p0050 A81-13169
The future of airfreight - NASA study looks into the next century
p0056 A81-14242
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0058 A81-14309
Future trends in automatic flight control systems
[SAE PAPER 800627] p0063 A81-15343
An overview - 1980 generation avionic developments
p0111 A81-18061
Aviation assumptions in the eighties
p0112 A81-18068
Avionics and displays in a future airspace system
p0112 A81-18070
Turbine blade technology - Present and future
[ASME PAPER 80-C2/AERO-10] p0116 A81-18639
Fighters for the 1990s
p0122 A81-19497
Integrated avionics studies target future technologies
p0223 A81-23499
Design for supercommuters
p0227 A81-24048
The future of aeronautical propulsion
p0290 A81-29052
The next combat aircraft
p0298 A81-29150
A UK view on future fuels --- for aircraft
[ASME PAPER 81-GT-87] p0314 A81-29994
Digital flight control - The generation of the 80's
p0320 A81-30248
Advanced avionic systems for multi-mission applications
p0321 A81-30258
Past and future trends in structures and dynamics --- of aircraft
[AIAA PAPER 81-0896] p0362 A81-32921
Structural optimization - Past, present and future
[AIAA PAPER 81-0897] p0362 A81-32922
The art of designing experimental aircraft - An overview
[AIAA PAPER 81-0944] p0363 A81-32939
Maintenance tomorrow and the day after --- of wide-bodied transport aircraft
p0367 A81-33790
Future U.S. jet fuels - A refiner's viewpoint
[AIAA PAPER 81-0770] p0367 A81-33876
A forward look at gas turbine testing facilities
[SAE PAPER 801124] p0396 A81-34159
Integrated CAD/CAM for the 1980s
[SAE PAPER 801170] p0400 A81-34185
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
Materials and processes for aircraft environmental controls in the 1990's
[SAE PAPER 801181] p0401 A81-34194
The role of the turboprop in the air transportation system for the 1980's and onward
[SAE PAPER 801197] p0402 A81-34207
The domain of the turboprop airplane
[SAE PAPER 801242] p0406 A81-34238
Coming challenge - Integrating the technologies for forward-swept-wing fighters
p0420 A81-37522
Advanced technology and the commuter aircraft - A look into the next two decades
p0455 A81-38209
V/STOL combat aircraft progress from the powerplant viewpoint
p0469 A81-40105
Forecasting the 80s - An outlook on aerospace developments of the decade by the Technical Committees of the AIAA
p0510 A81-41399
The state of the art of general aviation autopilots - Now and in the future
[SAE PAPER 810582] p0520 A81-42744
Military aircraft technology - Needs and trends for the 80's
[AIAA PAPER 81-1691] p0535 A81-43952
Can advanced technology improve future commuter aircraft
[AIAA PAPER 81-1729] p0536 A81-43959
Future applications of adhesive bonding in the U.S. Air Force
p0558 A81-44378
New technologies in future commercial aircraft
p0565 A81-45759
Trends in the future development of air traffic control systems
p0566 A81-45764
Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45891
Airport noise control in the 1980s - FAA's plans and policies
p0568 A81-46355
Late 80's advanced rotary wing aircraft potential based on ATDE, ACAP, and ITR --- Advanced Technology Demonstrator Engine, Advanced Composite Airframe Program and Integrated Technology Rotor
p0580 A81-46612
Air Force technical objective document FY 1981
[AD-A089709] p0040 N81-12010
Air cargo market outlook and impact via the NASA CLASS project --- Cargo/Logistics Airlift Systems Study
[NASA-TM-81886] p0073 N81-12039
Propulsion controls
p0079 N81-12095
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report
[AD-A094225] p0252 N81-18051

Aerospace in the future
[NASA-TM-82664] p0543 N81-29063
Incidents of problems in setting to work on the conceptual design of helicopters
p0632 N81-33138

TECHNOLOGIES
NT ENERGY TECHNOLOGY
NT MARINE TECHNOLOGY
NT MILITARY TECHNOLOGY
Design of production processes for flight-vehicle engines --- Russian book
p0623 A81-49475

TECHNOLOGY ASSESSMENT
New BBC high-efficiency gas turbines
p0017 A81-11797
Business aircraft turbofan technology progress in the 1970's, challenges in the 1980's
[SAE PAPER 800601] p0061 A81-15326
Aerospace highlights 1980
p0063 A81-15374
The origins of the turbojet revolution --- Book
p0068 A81-16248
The implications of current flight control research and development
p0099 A81-16578
Head-Up-Display flight tests
p0099 A81-16582
A cockpit view of advanced airline avionics
p0100 A81-16585
Today and the future in aircraft wheel and brake development
p0102 A81-17046
Rolls-Royce engines status report
p0102 A81-17166
New ways in antenna technology for optimal adjustment of the background clutter
p0151 A81-20084
40 years of helicopter ice protection experience at Sikorsky Aircraft
[AIAA PAPER 81-0407] p0168 A81-20813
Economics of technological change - A joint model for the aircraft and airline industries
p0169 A81-21010
Ejection experience in F/FB-111 aircraft - 1967-1978
p0176 A81-22098
Modern radar: Theory, operation and maintenance /2nd edition/ --- Book
p0223 A81-23372
Concepts and state of the art of the precision DME of the microwave landing system
p0233 A81-25376
Gas turbine engine emission abatement - Status and needed advancements
p0237 A81-26015
The impact of active controls on general aviation airplanes of the late 1980s
p0285 A81-28295
Optimization of finishing conditions --- metal cutting
p0319 A81-30163
V/STOL advanced technology rewards and risk --- aircraft design
[SAWE PAPER 1385] p0354 A81-31401
Airships - Transport of the future
p0355 A81-31699
Structural optimization - Past, present and future
[AIAA PAPER 81-0897] p0362 A81-32922
Army aviation - A perspective into the eighties
[AIAA PAPER 81-0931] p0363 A81-32935
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936] p0363 A81-32937
Is it safe - The safety assessment of aircraft systems. IV - Methods, techniques, and organisation
p0366 A81-33789
Prop-Fan technical progress leading to technology readiness
[AIAA PAPER 81-0810] p0367 A81-33878
Methods for the verification and validation of digital flight control systems
[SAE PAPER 801134] p0397 A81-34165
Adhesive bonding of aircraft primary structures
[SAE PAPER 801209] p0404 A81-34217
The status of the expendable gasifier program --- gas generator for aircraft engine
[SAE PAPER 801151] p0406 A81-34242
Flight control and display computation - A 25-year perspective
[AIAA PAPER 81-0865] p0408 A81-34354
Manufacturing technology for aircraft structural components made of carbon-fiber reinforced plastics
p0449 A81-37637
Wing of new technology test specimen - Structural design and method of wing construction
p0450 A81-37639
Aerodynamic efficiency of the wing of new technology, a comparison of design expectation and flight test result
p0450 A81-37645
The state-of-the-art in avionics
p0451 A81-37649
New technologies for compressors of aviation engines
p0452 A81-37656
The new utility - Commuter-technology in the sky
p0457 A81-38801
Experimental-programme - Transonic wing-TST
p0457 A81-38804
New structural technologies for future fighters
p0458 A81-38805
Analysis and application of compliant rotor technology
p0467 A81-40086
An integrated performance and air data system for helicopters
p0470 A81-40110
Development of small fuel efficient aircraft engines
[AHS 80-38] p0477 A81-40167
Advanced composite structure repair
p0481 A81-40595
Some propeller developments in the United Kingdom
[AIAA PAPER 81-1566] p0507 A81-40949
Status report - Global Positioning System
p0511 A81-41752
Standard INS program status
p0511 A81-41753
Advanced technology engine studies /ATES/ - A status report
[AIAA PAPER 81-1502] p0516 A81-42205
The state of the art of general aviation autopilots - Now and in the future
[SAE PAPER 810582] p0520 A81-42744
An overview of general aviation propulsion research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-42773
An assessment of advanced technologies for application to general aviation
[SAE PAPER 810630] p0524 A81-42782
On making things the best - Aeronautical uses of optimization /Wright Bros. lecture/
[AIAA PAPER 81-1738] p0528 A81-43175
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems
p0530 A81-43624
Progress in supersonic cruise technology
[AIAA PAPER 81-1687] p0535 A81-43950
Military aircraft technology - Needs and trends for the 80's
[AIAA PAPER 81-1691] p0535 A81-43952
New technologies in future commercial aircraft
p0565 A81-45759
Soviet military air cushion vehicles - Mechanized amphibious assault
p0577 A81-46718
More fight for the Fighting Falcon
p0622 A81-49075
Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067
The role of advanced technology of turbine engine life cycle cost
p0047 N81-11927
The development of the composite material engine nacelle
[AAAF-NT-79-38] p0083 N81-12180
NASA Research in aeropropulsion
p0089 N81-12980
A feasibility study for advanced technology integration for general aviation
[AD-A092437] p0185 N81-15975
A survey of computer simulations of digital avionics systems
[AD-A091943] p0195 N81-16049
The state of the art of general aviation autopilots
[NASA-CR-159371] p0197 N81-16066
Assessment of the impact of advanced air-transport technology
p0247 N81-18015

A family of supersonic airplanes: Technical and
economic feasibility
p0248 N81-18017
Rotor-bearing dynamics technology design guide.
Part 6: Status of gas bearing technology
applicable to aero propulsion machinery
[AD-A094167] p0257 N81-18394
Recent developments in aircraft engine noise
reduction technology
p0269 N81-19072
Historical overview of V/STOL aircraft technology
[NASA-TM-81280] p0272 N81-19100
Development of gas turbine components, using
silicon nitride --- forming techniques
[BMFT-FB-T-79-152] p0275 N81-19129
Visual system Technology: Status and problems ---
training simulators
p0336 N81-20099
Aircraft transparency optical quality: New
methods of measurement
[AD-A096183] p0341 N81-21070
Rotorcraft aviation icing research requirements:
Research review and recommendations
[NASA-CR-165344] p0388 N81-23070
DOD's use of remotely piloted vehicle technology
offers opportunities for saving lives and dollars
[AD-A097419] p0388 N81-23074
An evaluation of NASA's program for advancing
rotorcraft technology
[PB81-144180] p0389 N81-23078
Structures, performance, benefit, cost study ---
gas turbine engines
[NASA-CR-165313] p0428 N81-24067
Propulsion system study for Small Transport
Aircraft Technology (STAT)
[NASA-CR-165330] p0442 N81-25078
Engineering and development program plan
propulsion safety
[AD-A098709] p0444 N81-25088
The supersonic fan engine: An advanced concept in
supersonic cruise propulsion
[NASA-TM-82657] p0496 N81-27094
Advances in landing gear systems
p0545 N81-29077
Helicopter technologies of the future --- weight
reduction
[MBB-UD-314/80-OE] p0583 N81-30125
Vehicle concepts and technology requirements for
buoyant heavy-lift systems
[NASA-TP-1921] p0596 N81-31185
Vertical lift capabilities for the 80's and 90's
p0632 N81-33139
Historical overview of V/STOL aircraft technology
p0633 N81-33143
Mission potential of derivatives of the XV-15 tilt
rotor research aircraft
p0634 N81-33150
Advancing blade concept helicopter mission
capabilities
p0634 N81-33151
V/STOL aircraft technology in Canada
p0634 N81-33152
The impact of operational requirements on the
compromise of desired features in rotorcraft
design
p0634 N81-33155
US military V/STOL: Who needs it? Wants it? Can
afford it?
p0634 N81-33156
TECHNOLOGY TRANSFER
NT AEROSPACE TECHNOLOGY TRANSFER
Civil aviation applications of Navstar/GPS through
differential techniques
p0177 A81-22374
An assessment of General Aviation utilization of
advanced avionics technology
[NASA-CR-159328] p0127 N81-13941
Overview of Boeing supersonic transport efforts,
1971 - 1979
p0247 N81-18016
Challenge for operational experience feedback in
aircraft design: An aircraft design example
[AD-A096088] p0341 N81-21067
Ultrasonic cold forming of aircraft sheet materials
[AD-A096351] p0344 N81-21239
TECHNOLOGY UTILIZATION
Advanced fuel system technology for utilizing
broadened property aircraft fuels
p0007 A81-11612
Airbus Industrie's heavenly twins - A310 and
A300-600
p0018 A81-12348
The flight assessment and applications of DME/DME.
I, II
p0174 A81-21968
Applications of carbon fibre composites to
military aircraft structures
p0283 A81-27885
Impact of active controls on aircraft design and
operations - A helicopter industry perspective
p0285 A81-28294
Application of CRT displays to new generation
aircraft
p0286 A81-28297
Applications of new technology in the infrared
p0350 A81-31126
New technology applied to an IFF diversity
transponder
p0350 A81-31133
Advanced composites - Evolution of manufacturing
technology
[AIAA PAPER 81-0895] p0362 A81-32920
The evolution of fiber optics in avionics
[SAE PAPER 801145] p0398 A81-34174
Flight-management system - Key to the
advanced-technology fighter
p0421 A81-37523
Future strike aircraft design synthesis
[AIAA PAPER 81-0371] p0421 A81-37571
Airbus - Rudder unit in carbon fiber technology
p0451 A81-37651
Dynamically tunable, dry gyroscope in aeronautics
and astronautics
p0452 A81-37655
Advanced industrial gas turbine techology
readiness demonstration
[DOE/OR-05035/T1] p0085 N81-12426
Productivity in aerospace research and development
[NASA-TM-82388] p0097 N81-13804
The future of civil turbo-fan engines
[PWR-90034] p0130 N81-13964
A feasibility study for advanced technology
integration for general aviation
[NASA-CR-159381] p0185 N81-15974
Evolution of materials and associated technologies
in the makeup of aerospace materials, part 1
[AAAF-NT-79-22-PT-1] p0209 N81-17050
Evolution of materials and associated technologies
in the makeup of aerospace materials. Part 2:
Examples
[AAAF-NT-79-22-PT-2] p0209 N81-17051
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270] p0248 N81-18023
Tendencies in the development of subsonic
transport-aircraft under special considerations
of aerodynamics
[DFVLR-MITT-80-15] p0338 N81-21040
An evaluation of NASA's program for advancing
rotorcraft technology
[PB81-144180] p0389 N81-23078
Trouble shooting in aeronautics and the usefulness
of microscopes
[VTH-LR-305] p0537 N81-26069
Application of General Technology Applications,
Incorporated (GTA) blending process to
antimisting fuel additives
[AD-A100692] p0551 N81-29247
Application of advanced technolcgies to
derivatives of current small transport aircraft
[NASA-CR-166197] p0637 N81-33190
TELECOMMUNICATION
NT AIRCRAFT COMMUNICATION
NT COLOR TELEVISION
NT DATA LINKS
NT GROUND-AIR-GROUND COMMUNICATIONS
NT INTERPLANETARY COMMUNICATION
NT MULTICHANNEL COMMUNICATION
NT OPTICAL COMMUNICATION
NT PCM TELEMETRY
NT PULSE COMMUNICATION
NT RADIO COMMUNICATION
NT SPACECRAFT ANTENNAS
NT SPACECRAFT COMMUNICATION
NT TELEMETRY
NT TIME DIVISION MULTIPLE ACCESS
NT VIDEO COMMUNICATION
NT VOICE COMMUNICATION
NT VOICE DATA PROCESSING

COMLINK - A communications/EW analytical and modeling tool
p0617 A81-48547

TELEMETERS
U TELEMETRY
TELEMETRY
NT PCM TELEMETRY
A low cost multiple drone command and tracking system
p0179 A81-22613
Measuring dynamic stresses on helicopter transmission gear teeth utilizing telemetry
p0361 A81-32859
The design development and operation of gas turbine radio telemetry systems
[EIR-00733] p0077 N81-12082
Diversity techniques for omnidirectional telemetry coverage of the HiMAT research vehicle
[NASA-TP-1830] p0334 N81-20074
Transverse Voice Radio Link for Stratospheric Balloons
[INPE-1992-RPE/265] p0586 N81-30331
TELEVISION CAMERAS
Autonomous navigation using passively sensed terrain images
p0110 A81-17977
A versatile miniature solid state television camera /CCD/
p0180 A81-22620
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115
An equipment for testing and measuring a Helmet Mounted Sight and Display system with a coupled TV-camera in the flight simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0092 N81-13052
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960
TELEVISION EQUIPMENT
NT TELEVISION CAMERAS
TELEVISION SYSTEMS
NT COLOR TELEVISION
An airborne programmable digital to video converter interface and operation manual
[AD-A096422] p0446 N81-25691
TELLEGEN THEORY
U NETWORK ANALYSIS
U NETWORK SYNTHESIS
TEMPERATURE
NT ATMOSPHERIC TEMPERATURE
NT GAS TEMPERATURE
NT HIGH TEMPERATURE
NT INLET TEMPERATURE
NT LOW TEMPERATURE
NT SURFACE TEMPERATURE
NT WALL TEMPERATURE
R.A.N. Sea King cabin environment survey. Part 2: Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065
TEMPERATURE COMPENSATION
Development of the self-temperature compensated resistance strain gage used up to 700 C
[ASME PAPER 81-GT-118] p0316 A81-30022
TEMPERATURE CONTROL
Advanced technology turboshaft IR suppression
p0106 A81-17519
Heat pipe avionic cooling
p0326 A81-30343
Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel
[AIAA PAPER 81-1062] p0459 A81-39074
Real-time estimation in advanced turbofan engines
p0564 A81-45553
Avionics thermal integration for the Boeing 767 airplane
p0570 A81-46478
The control of pressure, temperature and Mach number in a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11063
TEMPERATURE DEPENDENCE
Effect of temperature dependent mechanical properties on thermal stress in cooled turbine blades
[ASME PAPER 81-GT-105] p0315 A81-30010
TEMPERATURE DIFFERENCES
U TEMPERATURE GRADIENTS
TEMPERATURE DISTRIBUTION
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002
The application of liquid crystals in experimental aerodynamics
p0238 A81-26123
Analysis of the difficulties in high performance compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107
Computation of wall temperature and heat flux distributions of the film cooled walls
p0348 A81-30802
Modeling of 2D-nozzle plume for IR signature prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107
TEMPERATURE EFFECTS
Formation of solid phase during the heating of jet fuels
p0103 A81-17372
Further studies of the influence of thermal effects on the predicted acceleration of gas turbines
[ASME PAPER 81-GT-21] p0311 A81-29938
Sensitivity of turbine blade temperatures to tolerances of design variables
[ASME PAPER 81-GT-90] p0314 A81-29997
Factors which influence the behavior of turbofan forced mixer nozzles
[AIAA PAPER 81-0274] p0359 A81-32549
Developing test profiles for multiple mission situations --- standards for military aircraft
p0570 A81-46483
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor --- heated intake air
[FNR-90022] p0275 N81-19126
Test and evaluation of foam-in-place fuel tank container
[AD-A095747] p0334 N81-20073
A discussion document on the thermal design of force balances for cryogenic wind tunnels
[OUEL-1321/80] p0435 N81-24119
TEMPERATURE FIELDS
U TEMPERATURE DISTRIBUTION
TEMPERATURE GRADIENTS
A periodic problem in viscoelasticity with variable coefficients
p0419 A81-37143
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
TEMPERATURE INDICATORS
U INDICATING INSTRUMENTS
U TEMPERATURE MEASURING INSTRUMENTS
TEMPERATURE INSTRUMENTS
U TEMPERATURE MEASURING INSTRUMENTS
TEMPERATURE INVERSIONS
NT CENTRIFUGING STRESS
TEMPERATURE MEASUREMENT
The design development and operation of gas turbine radio telemetry systems
[EIR-00733] p0077 N81-12082
Investigation of the use of liquid crystal thermography to study flow over turbomachinery blades
[AD-A097289] p0391 N81-23089
Heat generation in aircraft tires under free rolling conditions
[NASA-CR-164273] p0393 N81-23461
Measurements of temperature and pressure fluctuations in the T prime 2 cryogenic wind tunnel
[NASA-TM-75408] p0490 N81-26158
TEMPERATURE MEASURING INSTRUMENTS
NT RADIATION PYROMETERS
NT THERMOCOUPLE PYROMETERS
Helicopter-borne radiosonde system and its experimental uses
p0231 A81-24870
Quantitative thermography in aero-engine research and development
[FNR-90021] p0029 N81-10075

Aircraft sensor quality in SESAME 1979: Results
of tower fly-bys and aircraft intercomparison
[PB81-176596] p0552 N81-29722
TEMPERATURE SENSORS
An optimum design procedure of total-temperature
thermocouple probes
p0108 A81-17807
The application of liquid crystals in experimental
aerodynamics
p0238 A81-26123
TEMPORAL RESOLUTION
Characteristics of flight simulator visual systems
[AGARD-AR-164] p0541 N81-28107
TENSILE PROPERTIES
Microcracking in graphite-epoxy composites
[AD-A089894] p0038 N81-11118
TENSILE STRENGTH
Ductile fracture mechanic assessments of
2219-T851, 2024-T3 and 7075-T6 aluminum alloys
p0180 A81-22628
Effect of various environmental conditions on
polymer matrix composites
p0039 N81-11130
TENSILE TESTS
Tensile stress/strain characterization of
non-linear materials
p0348 A81-30915
Directionally solidified Soviet superalloy - ZHS6-K
p0532 A81-43773
TENSOMETERS
Signal processing for a six-component strain-gage
wind tunnel balance
p0049 A81-12968
TENSOR ANALYSIS
Geometric methods in computational fluid dynamics
--- turbomachinery
p0256 N81-18331
TENSOR FIELDS
U TENSORS
TENSORS
Surface-oriented coordinates for boundary-layer
calculations in the case of general configurations
[DGLR PAPER 81-014] p0608 A81-47557
TERCOM
Impact of terrain correlation elevation reference
data on Boeing's Air Launched Cruise Missile
p0517 A81-42439
TERMINAL AREA ENERGY MANAGEMENT
Integration of fuel conservative procedures in the
high density terminal area
p0155 A81-20468
TERMINAL BALLISTICS
The effects of warhead-induced damage on the
aeroelastic characteristics of lifting surfaces.
Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
TERMINAL CONFIGURED VEHICLE PROGRAM
Operation and evaluation of the Terminal
Configured Vehicle Mission Simulator in an
automated terminal area metering and spacing ATC
environment
p0171 A81-21709
Critical analysis and modern approaches to
integrated system aircraft
p0227 A81-24059
Flight test experience using advanced airborne
equipment in a time-based metered traffic
environment
[SAE PAPER 801207] p0403 A81-34215
Experiments using electronic display information
p0213 N81-17077
Test results of flight guidance for fuel
conservative descents in a time-based metered
air traffic environment --- terminal configured
vehicle
p0264 N81-19036
A pilot's subjective analysis of a Cockpit Display
of Traffic Information (CDTI) --- terminal
configured vehicle
p0264 N81-19037
Guidance and control system research for improved
terminal area operations --- terminal controlled
vehicle
p0264 N81-19038
Operational considerations in utilization of
microwave landing system approach and landing
guidance --- terminal configured vehicle
p0264 N81-19039
A pilot training manual for the terminal
configured vehicle electronic horizontal
situation indicator
[NASA-TM-81959] p0330 N81-20084
Operational considerations in utilization of
microwave landing system approach and landing
guidance
[NASA-TM-81945] p0331 N81-20050
Antenna design and development for the microwave
subsystem experiments for the terminal
configured vehicle project
[NASA-CR-164220] p0378 N81-22282
A pilot training manual for the terminal
configured vehicle electronic attitude director
indicator
[NASA-CR-159195] p0434 N81-24111
A learning guide for the terminal configured
vehicle electronic horizontal situation indicator
[NASA-TM-83128] p0484 N81-26083
Learning guide for the terminal configured vehicle
advanced guidance and control system mode select
panel
[NASA-CR-165751] p0580 N81-30098
TERMINAL FACILITIES
Atlanta's new central passenger terminal complex
p0003 A81-10719
The outfitting of regional airports in the future
with radio assistance for approach and landing,
with emphasis on landing site obstacles for
general aviation
p0051 A81-13313
Human error in ATC system operations
p0052 A81-13414
Carrier system simplifies freight handling - A new
technical concept for Lufthansa's Frankfurt
facility
p0056 A81-14241
Airspace analysis in airport system planning
p0111 A81-18052
Helicopters - Help for the all weather terminal
p0112 A81-18065
Investment decision-making in international airports
p0113 A81-18079
Design of the new Tehran International Airport
p0114 A81-18084
The importance of 'Interim Standard Microwave
Landing System' for small community airports
p0114 A81-18087
Saudi Arabia's new Gateway Airports
p0115 A81-18093
Wire communication systems and equipment at airports
--- Russian book
p0289 A81-28745
An aircraft manufacturer's view of airport R&D needs
[AIAA PAPER 81-0793] p0368 A81-33887
Airports and earthquakes - An important subject
often ignored
p0482 A81-40750
The 1980 Aircraft Safety and Operating Problems,
part 2
[NASA-CP-2170-PT-2] p0267 N81-19056
TERMINAL GUIDANCE
Procedures to improve flight safety in wind shear
conditions
p0014 A81-11666
Computer-aided methods for redesigning the
stabilized pitch control system of a semi-active
thermal homing missile
p0051 A81-13250
Realization of a method of extremal targeting in a
problem of aircraft landing control
p0625 A81-48943
Flight termination receiver/decoders design,
performance and certification
[AD-A089746] p0037 N81-11045
A mathematical model of the CH-53 helicopter
[NASA-TM-81238] p0075 N81-12065
Study of helicopter performance and terminal
instrument procedures
[AD-A090052] p0092 N81-13046
Flight evaluation of the terminal guidance system
[NASA-CR-163859] p0142 N81-14991
Applicated techniques for the control of approach
traffic
[DFVLR-MITT-79-20] p0142 N81-14992
Flight investigation of a four-dimensional
terminal area guidance system for STOL aircraft
[NASA-TM-81271] p0260 N81-15014

TERNARY SYSTEMS (DIGITAL)
U DIGITAL SYSTEMS
TERRAIN
Information requirements for airborne electronic terrain maps p0325 A81-30334
Aerial collisions with relief features p0557 A81-44323
Real-time feasibility for generation of nonlinear textured terrain [AD-A095070] p0277 N81-19141
TERRAIN ANALYSIS
Single-parameter terrain classification for terrain following p0066 A81-15882
Autonomous navigation using passively sensed terrain images p0110 A81-17977
TERRAIN CONTOUR MATCHING NAVIGATION SYSTEM
U TERCOM
TERRAIN FOLLOWING AIRCRAFT
Sukhoi's pivotal interdictor p0109 A81-17832
A mobile computer-aided detection and tracking system for low-flying attack aircraft p0152 A81-20098
'Load snubbing' - A solution to the problem of terrain flying with external cargo [AHS 80-32] p0476 A81-40162
Use of atmospheric electric fields for vertical stabilization and terrain avoidance [AIAA 81-1848] p0556 A81-44126
Output predictive algorithmic control - Precision tracking with application to terrain following p0564 A81-45573
Output predictive algorithmic control - Precision tracking with application to terrain following p0567 A81-46280
Evolution of tactical and map displays for high performance aircraft p0212 N81-17072
A study of the effect of terrain on helicopter noise propagation by acoustical modeling [AD-A097626] p0394 N81-23864
TEST BEDS
U TEST EQUIPMENT
TEST CHAMBERS
NT ANECHOIC CHAMBERS
A comparison between electric field strengths similarly generated and measured in the open air, in a shielded enclosure and in a large aircraft hangar, over frequency range 10 to 110 MHz [RSRE-MEMO-3248] p0084 N81-12353
Comments on settling chamber design for quiet, blowdown wind tunnels [NASA-TM-81948] p0335 N81-20085
TEST EQUIPMENT
Multiple-component lightning high-current testing p0056 A81-14255
An apparatus for the simulation of an air intake at high angle of attack in a compressor test facility [ONERA, TP NO. 1981-35] p0460 A81-39238
Standard Avionics Testbeds [AIAA PAPER 81-1734] p0528 A81-43172
An equipment for testing and measuring a Helmet Mounted Sight and Display system with a coupled TV-camera in the flight simulator for research of the DFVLR [DFVLR-MITT-80-04] p0092 N81-13052
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR [DFVLR-MITT-80-04] p0129 N81-13960
TEST FACILITIES
NT ANECHOIC CHAMBERS
NT BALLISTIC RANGES
NT BLOWDOWN WIND TUNNELS
NT CASCADE WIND TUNNELS
NT CRYOGENIC WIND TUNNELS
NT ENGINE TESTING LABORATORIES
NT ENVIRONMENTAL LABORATORIES
NT HYDRAULIC TEST TUNNELS
NT HYPERSONIC WIND TUNNELS
NT LOW SPEED WIND TUNNELS
NT ROCKET TEST FACILITIES
NT SLOTTED WIND TUNNELS
NT SUBSONIC WIND TUNNELS
NT SUPERSONIC WIND TUNNELS
NT TEST STANDS
NT TRANSONIC WIND TUNNELS
NT TRISONIC WIND TUNNELS
NT WIND TUNNELS
Wind tunnel model support, controlled by four microprocessors [ONERA, TP NO. 1980-149] p0174 A81-21917
Escape systems testing on the Holloman high speed test track p0175 A81-22088
Effect of facility variation on the acoustic characteristics of three single stream nozzles p0178 A81-22534
Simulation of apparent acceleration --- on flight test stands p0223 A81-23405
The USAF Armament Division Structural Dynamics Lab p0347 A81-30689
Aerodynamic trials with the linear motor-driven platform at the Toulouse Aeronautic Testing Center --- for aircraft acceleration and deceleration tests [AAAF PAPER NT 80-41] p0369 A81-33943
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center [SAE PAPER 801122] p0396 A81-34158
A forward look at gas turbine testing facilities [SAE PAPER 801124] p0396 A81-34159
Test stand for the study of flow systems in wind tunnels p0409 A81-35009
Test facility for the measurement of infrared radiation from jet engine exhaust systems p0462 A81-39503
NAPC gyroscopic moment test facility [AIAA PAPER 81-1480] p0506 A81-40900
TELS - A facility to observe the effect of simulated flight maneuver loads on turbine engines [AIAA PAPER 81-1591] p0508 A81-40966
A compact installation for testing vectored-thrust engines [AIAA PAPER 81-1592] p0508 A81-40967
Combined environment reliability testing /CERT/ as applied to engine mounted electronic controls [AIAA PAPER 81-1500] p0516 A81-42204
Digital controls in a large engine test facility p0532 A81-43715
Noise reduction test facilities at Douglas Aircraft p0570 A81-46375
Shielded enclosure test bed requirement [AD-A092589] p0198 N81-16073
Aeronautical systems technology needs: Escape, rescue and survival and test facilities and test equipment [AD-A097827] p0423 N81-24020
Investigations of free-jet test requirements and techniques with emphasis on the adaptable jet stretcher [AD-A098710] p0439 N81-25044
Guide for users of the National Transonic Facility [NASA-TM-83124] p0550 N81-29139
TEST FIRING
NT STATIC FIRING
Application of aerodynamic jump prediction theory to supersonic, high fineness ratio, cruciform finned bodies [AIAA PAPER 81-0222] p0162 A81-20685
TEST RANGES
NT BALLISTIC RANGES
TEST STANDS
Test-stand combustion chamber for the study and development of forced working processes --- for jet engines p0319 A81-30151
Test stand for the experimental study of auxiliary power supplies p0319 A81-30153
Propeller propulsion integration, phase 1 --- conducted in langley 30 by 60 foot full scale wind tunnel [NASA-CR-163921] p0196 N81-16058
Tests of large compressors at CE Pr p0432 N81-2409
TEST VEHICLES
NT FLIGHT TEST VEHICLES

High bypass turbofan component development, modification 2
[AD-A093156] p0215 N81-17093
TESTERS
U TEST EQUIPMENT
TESTING MACHINES
U TEST EQUIPMENT
TETHERED BALLOONS
Air Force Geophysics Laboratory aerodynamically tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023
TEXTILES
Textile materials for commercial transportation vehicles --- passenger aircraft
p0532 A81-43653
TF-30 ENGINE
A jet engine monitor /JEM/ for the TA-7C
[AIAA PAPER 81-1562] p0507 A81-40947
TF-34 ENGINE
Manufacturing technology for low temperature composite engine frames --- for TF-34 engine
[AIAA PAPER 81-1355] p0501 A81-40837
A-10/TF34 Turbine Engine Monitoring System evaluation and implementation
[AIAA PAPER 81-1447] p0505 A81-40880
TF34 engine compression system computer study --- simulation of flow stability
[NASA-CR-159889] p0143 N81-15005
A-10/TF34 Turbine Engine Monitoring System (TEMS)
p0599 N81-31211
TF-41 ENGINE
TF41/A7-E engine monitoring system implementation experience
[SAE PAPER 801222] p0404 A81-34226
TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833
Fuel character effects on the TF41 engine combustion system
[AIAA PAPER 81-1391] p0503 A81-40858
TFX AIRCRAFT
U F-111 AIRCRAFT
THEODORSEN TRANSFORMATION
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-164475] p0486 N81-26117
THEOREMS
NT BAYES THEOREM
THERMAL AGITATION
U THERMAL ENERGY
THERMAL BATTERIES
High power silver zinc and thermal batteries for missiles and aviation applications
p0235 A81-25612
THERMAL CONDUCTIVITY
Integral methods for solving thermal conductivity problems and their application to evaluating heat exchange in certain gas-turbine elements
p0285 A81-28128
THERMAL CONTROL COATINGS
Cost/benefit analysis of advanced materials technologies for future aircraft turbine engines
[NASA-CR-165225] p0144 N81-15006
THERMAL CURRENTS
U CONVECTIVE FLOW
THERMAL CYCLING TESTS
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168
Determination of fatigue life by testing materials for thermal fatigue
p0532 A81-43774
THERMAL DECOMPOSITION
NT PYROLYSIS
THERMAL EFFECTS
U TEMPERATURE EFFECTS
THERMAL EFFICIENCY
U THERMODYNAMIC EFFICIENCY
THERMAL ENERGY
Characteristics of thermal energy separation in a gas ejector
p0281 A81-27371
Parabolic Dish Solar Thermal Power Annual Program Review Proceedings
[NASA-CR-164696] p0587 N81-30525
THERMAL ENERGY STORAGE
U HEAT STORAGE
THERMAL EXPANSION
Thermal expansion molding process for aircraft composite structures
[SAE PAPER 800612] p0062 A81-15334
Effect of various environmental conditions on polymer matrix composites
p0039 N81-11130
THERMAL FATIGUE
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168
Determination of fatigue life by testing materials for thermal fatigue
p0532 A81-43774
Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue
[NASA-TM-75733] p0376 N81-22054
THERMAL INSULATION
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions
p0417 A81-36737
THERMAL POWER
U TURBOGENERATORS
THERMAL PROPERTIES
U THERMODYNAMIC PROPERTIES
THERMAL PROTECTION
Pilot installations for deposition techniques in the case of components exposed to heat and for diffusion joining of power plant components
p0449 A81-37634
Structural tests on space shuttle thermal protection system constructed with nondensified and densified LI 900 and LI 2200 tile
[NASA-TM-81903] p0257 N81-18410
THERMAL RADIATION
Effect of thermal radiation on the integrity pressurized aircraft evacuation slides and slide materials
[AD-A098179] p0424 N81-24039
THERMAL RESISTANCE
Development of the self-temperature compensated resistance strain gage used up to 700 C
[ASME PAPER 81-GT-118] p0316 A81-30022
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168
THERMAL SHIELDING
U HEAT SHIELDING
THERMAL SIMULATION
The application of interactive graphics to thermal modeling
[AIAA PAPER 81-1180] p0459 A81-39159
THERMAL STABILITY
NT TEMPERATURE DEPENDENCE
Joint-laboratory qualification testing of oils for gas turbine engines
p0103 A81-17375
High-temperature strength of alloys for gas turbine engines --- Russian book
p0482 A81-40616
High-char-forming composite laminates
p0532 A81-43652
THERMAL STRESSES
Effect of temperature dependent mechanical properties on thermal stress in cooled turbine blades
[ASME PAPER 81-GT-105] p0315 A81-30010
A periodic problem in viscoelasticity with variable coefficients
p0419 A81-37143
Investigation of the cooling of the turbine rotor blade of a gas-turbine power system
p0465 A81-40020
The effect of thermal stresses on the integrity of three built-up aircraft structures
[NASA-TM-81352] p0075 N81-12064
High temperature strain gage system for application to turbine engine components
[AD-A101713] p0583 N81-30132
The nature of operating flight loads and their effect on propulsion system structures
p0599 N81-31207
THERMAL VACUUM TESTS
Effect of various environmental conditions on polymer matrix composites
p0039 N81-11130
THERMOCHEMISTRY
Thermodynamics of organic compounds
[AD-A093067] p0222 N81-17936
THERMOCOUPLE PYROMETERS
Surface pyrometry in presence of radiation from

other sources with application to turbine blade
temperature measurement
[NASA-TP-1754] p0036 N81-11039

THERMOCOUPLES
An optimum design procedure of total-temperature
thermocouple probes p0108 A81-17807

THERMODYNAMIC CYCLES
NT BRAYTON CYCLE
NT STIRLING CYCLE
Economics of heavy fuels in gas turbines and
combined cycles
[ASME PAPER 81-GT-45] p0312 A81-29959
Engine cycle selection for advanced technology
engine studies
[ASME PAPER 81-GT-191] p0317 A81-30084
KONFIG and REKONFIG: Two interactive
preprocessing to the Navy/NASA Engine Program
(NNEP)
[NASA-TM-82636] p0446 N81-25698

THERMODYNAMIC EFFICIENCY
Preliminary study on reheat combustor for advanced
gas turbine
[ASME PAPER 81-GT-29] p0311 A81-29944
Application of water cooling for improved gas
turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977
Modified Brayton cycles utilizing alcohol fuels
[ASME PAPER 81-GT-103] p0315 A81-30009
Design analysis of high-efficiency low-stress
ceramic gas turbines
[ASME PAPER 81-GT-130] p0316 A81-30034
Thermodynamic comparison of the efficiencies of
semiclosed- and open-loop air cooling systems of
gas turbine engines p0509 A81-41029

THERMODYNAMIC PROPERTIES
NT CRITICAL POINT
NT SPECIFIC HEAT
NT THERMAL CONDUCTIVITY
NT THERMAL EXPANSION
NT THERMAL STABILITY
NT THERMOPHYSICAL PROPERTIES
Basic problem of the analytical design of aircraft
gas turbine engines. II
p0299 A81-29305
Time dependent Navier-Stokes solution of a
turbulent gas jet ejected from a rectangular
orifice into a high-subsonic crossflow
p0138 N81-14964
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
Investigation of air solubility in jet A fuel at
high pressures
[NASA-CR-3422] p0378 N81-22130

THERMODYNAMICS
NT AEROTHERMODYNAMICS
NT COMBUSTION PHYSICS
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936

THERMOELASTICITY
NT AEROTHERMOELASTICITY

THERMOGRAMS
U RECORDING INSTRUMENTS
U TEMPERATURE MEASURING INSTRUMENTS

THERMOMECHANICAL TREATMENT
Thermomechanical behavior of a mechanically
alloyed Al-4.0Mg powder alloy
p0409 A81-34851

THERMOMECHANICS
U THERMODYNAMICS

THERMOMETRY
U TEMPERATURE MEASUREMENT

THERMOPHYSICAL PROPERTIES
NT CRITICAL POINT
NT SPECIFIC HEAT
NT TEMPERATURE DEPENDENCE
NT THERMAL CONDUCTIVITY
NT THERMAL STABILITY
Kevlar - Thermophysical properties
[AIAA PAPER 81-1104] p0459 A81-39104
Aviation turbine fuel properties and their trends
[NASA-TM-82603] p0444 N81-25232

THERMOPHYSICS
U THERMODYNAMICS

THERMOPLASTIC RESINS
Graphite thermoplastic YC-14 outboard elevator
p0530 A81-43631
A resin injection technique for the fabrication of
aero engine composite components
[PNR-90024] p0131 N81-14004
Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22106

THERMOPLASTICITY
Thermoplastic strengthening of a gas-turbine
engine disk lock joint - Determination of the
residual stresses
p0365 A81-33169

THERMOSETTING RESINS
NT EPOXY RESINS
NT KEVLAR (TRADEMARK)
NT PHENOLIC RESINS

THERMOSTABILITY
U THERMAL STABILITY

THERMOTROPISM
U TEMPERATURE EFFECTS

THICK FILMS
A new approach to thick-film resistors
p0232 A81-24968

THICKNESS
On the unsteady wake-induced lift on a slotted
airfoil. II - The influence of displacement
thickness fluctuations
p0229 A81-24237
Determination of the thickness of blades of open
wheels of radial-axial turbines
p0242 A81-26994

THICKNESS RATIO
A mathematical computer simulation of stationary
and nonstationary flow of an ideal
incompressible fluid around solid profiles and
arrays
p0237 A81-26045

THIN AIRFOILS
NT INFINITE SPAN WINGS
NT THIN WINGS
Numerical solution of transonic flow through a
cascade with slender profiles
p0170 A81-21197
Analysis of a symmetric transonic aerofoil with
the finite element method - A new upwinding
technique
p0183 A81-22984
On the unsteady wake-induced lift on a slotted
airfoil. II - The influence of displacement
thickness fluctuations
p0229 A81-24237
Influence of hinge line gap on aerodynamic forces
acting on a harmonically oscillating thin
profile in an incompressible flow. I, II
p0348 A81-30956
Steady flow and static stability of airfoils in
extreme ground effect
p0355 A81-31606
Oscillating airfoils in shock-free transonic flows
p0410 A81-35026
Isothermal forging of fan blades
[AIAA PAPER 81-1405] p0503 A81-40862
Evaluation of two-dimensional subsonic oscillatory
airforce coefficients and loading distributions
p0617 A81-4[illegible]

THIN FILMS
The application of liquid crystals in experimental
aerodynamics
p0238 A81-26123
Sputtering and ion plating for aerospace
applications
[NASA-TM-81726] p0337 N81-2642[illegible]

THIN PLATES
Influence of boundary-layer suction on the
emission spectrum on a thin plate performing
oscillations under the action of pressure
pulsations --- in aircraft noise reduction
p0054 A81-13573
Influence of boundary-layer suction on the
spectrum of radiation from a thin plate
vibrating under the action of pressure
fluctuations --- in aircraft noise reduction
p0238 A81-261[illegible]
Stability and ultimate strength of carbon fiber
reinforced plastic panels
p0481 A81-40521

THIN WALLED SHELLS
Finite element calculation of thin-wall reinforced
shells of the fuselage type with account for
physical nonlinearity and loss of stability of
certain elements

p0235 A81-25679
Application of hybrid schemes in analysis of
thin-wall structures by the displacement method
p0235 A81-25681
Application of the Semi-Loof thin shell element to
the analysis of aircraft engine structures
p0518 A81-42704
Calculation of natural vibrations for thin-walled
irregular reinforced shells of the helicopter
fuselage type using the finite-element work method
p0614 A81-48097

THIN WALLS
Geometrically nonlinear theory for calculating
thin rods of a wing profile
p0625 A81-49935
Strength calculation of thin-wall rods of
significant taper
p0625 A81-49937

THIN WINGS
NT INFINITE SPAN WINGS
Flow past a slender profile in a channel with
permeable walls
p0004 A81-10916
A finite-span wing in transonic flow
p0054 A81-13741
Calculation of the nonlinear aerodynamic
characteristics of finite-span wing
p0063 A81-15388
Determination of the effect of transverse cutouts
on the hydrodynamic characteristics of a
finite-span wing in the case of steady and
unsteady motion near a wall
p0119 A81-19335
On a linear theory of a supersonic flow past a
delta wing with subsonic leading edges
p0149 A81-19872
Unsteady subsonic motion of a wing near a screen
p0225 A81-23889
The effect of the aspect ratio of delta wings on
the structure of the near vortex wake
p0413 A81-36467
Calculation of the nonlinear aerodynamic
characteristics of a wing of finite span
p0417 A81-36738
Accuracy and application of a second-order theory
for three-dimensional supersonic and low
hypersonic unsteady flows aroung a thin wing
p0419 A81-37335
Wing with finite span in a transonic flow
p0420 A81-37480
Calculation of the aerodynamic characteristics of
a deformable wing, moving near a screen
p0625 A81-49948
Some particular configuration effects on a thin
supercritical variable camber wing
p0188 N81-16005
Aerodynamic effects of nearly uniform slipstreams
on thin wings in the transonic regime
[NASA-CR-152351]
p0249 N81-18027
Experimental investigation of the flow on the
suction side of a thin Delta wing
[NASA-TM-75897]
p0338 N81-21024

THINNERS
U SOLVENTS

THREADS
Cold-forming of internal threads
p0551 N81-29294

THREE DIMENSIONAL BOUNDARY LAYER
Local properties of three-dimensional separation
lines --- in vortex layers
[DGLR PAPER 79-063]
p0016 A81-11780
Three-dimensional boundary layer transition via
the mechanisms of 'attachment line
contamination' and 'cross flow instability'
p0115 A81-18122
Three-dimensional wing boundary layer calculated
with eight different methods
p0171 A81-21555
Surface-oriented coordinates for boundary-layer
calculations in the case of general configurations
[DGLR PAPER 81-014]
p0608 A81-47557
Review of theoretical and experimental results on
three dimensional turbulent wakes and boundary
layers
[ONERA-NT-1980-4]
p0126 N81-13930
Core compressor exit stage study. Volume 2: Data
and performance report for the baseline
configuration
[NASA-CR-159498]
p0195 N81-16051
HADY-1, a FORTRAN program for the compressible
stability analysis of three-dimensional boundary
layers
p0586 N81-30388

THREE DIMENSIONAL FLOW
NT SECONDARY FLOW
Investigation of lateral forces and moments in the
case of asymmetric gas flows in nozzles
p0004 A81-10913
Review of numerical methods for the problem of the
supersonic flow around bodies at angle of attack
p0011 A81-11639
Experimental investigations to fully map the flow
field around a wind tunnel model of a transport
airplane
[SAE PAPER 800630]
p0063 A81-15345
Thin-layer approximation for three-dimensional
supersonic corner flows
p0067 A81-15900
The coordinate-deformation method in the problem
of a supersonic gas flow over an airfoil ---
delta wings
p0123 A81-19631
Body-fitted 3-D full-potential flow analysis of
complex ducts and inlets
[AIAA PAPER 81-0002]
p0156 A81-20527
Three-dimensional turbulent boundary layer
development and separation in V/STOL engine
inlets at incidence with small-cross flow and
curvature influences
[AIAA PAPER 81-0254]
p0163 A81-20703
3-D viscous analysis of ducts and flow splitters
[AIAA PAPER 81-0277]
p0163 A81-20720
Three-dimensional model of spray combustion in gas
turbine combustors
[AIAA PAPER 81-0324]
p0165 A81-20751
Flight experiments with a slender cone at angle of
attack
[AIAA PAPER 81-0337]
p0165 A81-20761
Calculation of supersonic gas flows about wings
p0170 A81-21201
Slightly blunted cone in a supersonic flow at
angle of attack
p0225 A81-23908
Transient three-dimensional flow along a porous
plate
p0231 A81-24815
Linearized analysis of the three-dimensional
compressible flow through a rotating annular
blade row
p0234 A81-25446
On the solution of Navier Stokes equations of the
flow in turbomachines
p0296 A81-29099
Numerical computation of compressible steady
cascade flows
p0296 A81-29100
Analysis of turbulent boundary layer on cascade
and rotor blades of turbomachinery
p0296 A81-29106
Three dimensional flow in annular diffusers with
two vortex distributions at entry
p0297 A81-29112
A diagonal form of an implicit
approximate-factorization algorithm
p0300 A81-29363
On the theory of a wing with small aspect ratio in
a hypersonic flow
p0309 A81-29860
Three-dimensional oscillatory piecewise
continuous-kernel function method. I - Basic
problems. II - Geometrically continuous wings.
III - Wings with geometrical discontinuities
p0411 A81-35631
Accuracy and application of a second-order theory
for three-dimensional supersonic and low
hypersonic unsteady flows aroung a thin wing
p0419 A81-37335
Some recent applications of high-lift
computational methods at Boeing
[AIAA PAPER 81-1657]
p0534 A81-43940
Analysis of calculated three-dimensional inviscid
flow fields with embedded shock waves
(presentation of a field solution), part 1
[ESA-TT-558]
p0022 N81-10017
Unsteady three-dimensional subsonic flow in a
solid propellant rocket motor including the
effect of motor rotation
p0095 N81-13085

Full potential solution of transonic quasi-3-D
flow through a cascade using artificial
compressability
[NASA-TM-81637] p0140 N81-14980
Development of finite-volume methods for
three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
Vortex methods for two- and three-dimensional flow
simulations p0145 N81-15313

Three dimensional internal flows in
turbomachinery, volume 1
[AD-A092737] p0197 N81-16065
Three-dimensional internal flows in
turbomachinery, volume 2
[AD-A093130] p0215 N81-17090
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
Separation behavior of boundary layers on
three-dimensional wings
[NASA-TM-75877] p0262 N81-19027
The calculation of quasi-three-dimensional
frictionless compressible flow in axial
turbomachines --- partial differential equations
[PNR-90047] p0275 N81-19127
Topology of three-dimensional separated flows
[NASA-TM-81294] p0385 N81-23037
Application of computer generated color graphic
techniques to the processing and display of
three dimensional fluid dynamic data
[NASA-TM-82658] p0552 N81-29782
Three-dimensional transonic flow analysis
[AD-A101944] p0593 N81-31153

THREE DIMENSIONAL MOTION
NT SECONDARY FLOW
NT THREE DIMENSIONAL FLOW
Concerning the motion of a piloted aircraft
p0299 A81-29312

THROTTLING
Engine usage prediction for advanced fighter
aircraft
[AIAA PAPER 81-1367] p0514 A81-42178

THRUST
NT JET THRUST
NT LEADING EDGE THRUST
NT ROCKET THRUST
Quarter-scale testing of an advanced rotor system
for the UH-1 helicopter
p0395 A81-34121

An application of wake survey rakes to the
experimental determination of thrust for a
propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
An application of wake survey rakes to the
experimental determination of thrust for a
propeller driven aircraft
[NASA-CR-163967] p0251 N81-18046
Full-scale aerodynamic characteristics of a
propellar installed on a small twin-engine
aircraft wing panel
[NASA-TM-81285] p0385 N81-23039
Effect of a part-span variable inlet guide vane on
the performance of a high-bypass turbofan engine
[NASA-TM-82617] p0443 N81-25081

THRUST AUGMENTATION
Aircraft thrust augmentors of ejector type ---
Russian book
p0289 A81-28760

Technology pays off on the AV-8B
p0291 A81-29060

Noise attenuation and associated thrust increase
of turbojet engines through hyper-mixing ejector
shrouds
p0291 A81-29062

Air augmentation of rockets for low speed
application
p0292 A81-29068

Unsteady aerodynamic propulsion
[AIAA 81-0645] p0307 A81-29498
An experimental investigation of the thrust and
discharge characteristics of multinozzle
low-head ejectors
p0413 A81-35920

An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43947
Some ejector characteristics
[AIAA PAPER 81-1679] p0534 A81-43948
Graphite/polyimide augmentor and nozzle components
--- of advanced military gas turbine engines
[AIAA PAPER 81-1358] p0625 A81-49976
Prediction and evaluation of thrust augmenting
ejector performance at the conceptual design stage
[AD-A093953] p0216 N81-17094
Thrust augmented spin recovery device
[NASA-CASE-LAR-11970-2] p0275 N81-19130
Static tests of the J97 powered, external
augmenter V/STOL wind tunnel model
[NASA-CR-152403] p0337 N81-21010
A study of a VTOL thrusting ejector in low speed
flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017
A study of a VTOL thrusting ejector in low speed
flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018

THRUST BEARINGS
Dynamic characteristics of a high-speed rotor with
radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683

THRUST CHAMBER PRESSURE
Pitch attitude stabilization system utilizing
engine pressure ratio feedback signals
[NASA-CASE-LAR-12562-1] p0490 N81-26152

THRUST CHAMBERS
An experimental investigation of the thrust and
discharge characteristics of multinozzle
low-head ejectors
p0413 A81-35920

THRUST CONTROL
NT THRUST VECTOR CONTROL

THRUST DISTRIBUTION
Investigation of a flight test method for the
measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760
Supersonic wings with significant leading-edge
thrust at cruise
p0244 N81-17990

THRUST LOADS
Effect of simulated in-flight thrust reversing on
vertical-tail loads of F-18 and F-15 airplane
models --- conducted in the Langley 16-foot
transonic tunnel
[NASA-TP-1890] p0579 N81-30086

THRUST MEASUREMENT
An experimental investigation of the thrust and
discharge characteristics of multinozzle
low-head ejectors
p0413 A81-35920

Determination of thrust and throttle-dependent
drag for fighter aircraft
[AIAA PAPER 81-1692] p0617 A81-48417
Comparison of three thrust calculation methods
using in-flight thrust data
[NASA-TM-81360] p0581 N81-30111

THRUST POWER
U THRUST

THRUST REVERSAL
Comparisons of model and flight testing with
respect to hot gas reingestion and debris
ingestion during thrust reversal
p0297 A81-29113

Reverse thrust performance of the QCSEE variable
pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
Effect of in-flight thrust reverser deployment on
tactical aircraft stability and control
[AIAA PAPER 81-1446] p0504 A81-40879
Axisymmetric approach and landing thrust reversers
[AIAA PAPER 81-1650] p0533 A81-43936
Time-constrained maximum-energy turns --- for
modern fighter aircraft
[AIAA PAPER 81-1886] p0561 A81-44570
Effect of simulated in-flight thrust reversing on
vertical-tail loads of F-18 and F-15 airplane
models --- conducted in the Langley 16-foot
transonic tunnel
[NASA-TP-1890] p0579 N81-30086

THRUST VECTOR CONTROL
Multi-mission V/STOL with vectored thrust engines
[AIAA PAPER 81-1363] p0502 A81-40883
Development of exhaust nozzle internal performance
prediction techniques for advanced aircraft
applications
[AIAA PAPER 81-1490] p0506 A81-40908
A compact installation for testing vectored-thrust
engines
[AIAA PAPER 81-1592] p0508 A81-40961
Two-axis, fluidically controlled thrust vector
control system for an ejection seat

[AD-A093868] p0204 N81-16996
Bench testing of a vectored thrust engine
p0432 N81-24093
Phase 2 and 3 wind tunnel tests of the J-97 powered, external augmentor V/STOL model --- conducted in Ames 40- by 80-foot wind tunnel
[NASA-CR-152380] p0483 N81-26076
Flight control system analysis and design for a remotely piloted vehicle with thrust vectoring unit
[AD-A100808] p0540 N81-28105
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] p0627 N81-32128
THRUST-WEIGHT RATIO
The F100 engine
[SAE PAPER 801110] p0395 A81-34151
THRUSTORS
U ROCKET ENGINES
THUNDERSTORMS
Operational radar display of the structure of thunderstorm hail clouds
p0069 A81-16474
Design and preliminary tests of an IR-airborne LLWS remote sensing system --- Low Level Wind Shear
[AIAA PAPER 81-0239] p0163 A81-20694
Sources and detection of atmospheric wind shear
[AIAA PAPER 81-0391] p0167 A81-20801
The microburst: Common factor in recent aircraft accidents
p0136 N81-14571
Doctor Fujita's microburst analysis at Chicago
p0136 N81-14572
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857] p0146 N81-15640
Thunderstorm hazards flight research: Storm hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062
TILT ROTOR AIRCRAFT
NT XV-15 AIRCRAFT
Prediction of tilt rotor outwash
[AIAA PAPER 81-0013] p0157 A81-20537
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
p0634 N81-33150
TILT ROTOR RESEARCH AIRCRAFT PROGRAM
The XV-15 tilt rotor research aircraft
p0100 A81-16588
The XV-15 - An initial Navy look
[AIAA PAPER 81-0155] p0161 A81-20635
STOL performance of the tilt rotor
p0467 A81-40085
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
[AHS 80-11] p0474 A81-40144
V/STOLAND digital avionics system for XV-15 tilt rotor
[NASA-CR-152320] p0375 N81-22047
TIME
NT DOWNTIME
NT FLIGHT TIME
NT MTBF
NT REACTION TIME
TIME DELAY
U TIME LAG
TIME DEPENDENCE
Determination of aircraft structural inspection intervals
p0230 A81-24285
Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31297
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14964
Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053
Method for computation of structural failure probability for an aircraft
[AD-A098294] p0426 N81-24050
TIME DIVISION MULTIPLE ACCESS
Status report on Position Location Reporting System /PLRS/
p0517 A81-42440
TIME LAG
INUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175
Time delays in flight simulator visual displays
p0615 A81-48369
TIME OPTIMAL CONTROL
Design of disturbance-rejection controllers for linear multivariable discrete-time systems using entire eigenstructure assignment --- onboard digital flight system of F-8 aircraft
p0155 A81-20454
Fuel optimal aircraft trajectories with fixed arrival times
[AIAA 81-1749] p0554 A81-44081
Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem
p0563 A81-45515
TIME RESPONSE
A case for submicrosecond rise-time lightning current pulses for use in aircraft induced-coupling studies
p0057 A81-14267
TIME SERIES ANALYSIS
Stochastic modeling of an aircraft traversing a runway using time series analysis
p0183 A81-23368
Identification of jet engine damages by engine trend analysis LEADS 200 data
p0328 N81-20014
TIP DRIVEN ROTORS
Preliminary design of a tip-jet-driven heavy lift helicopter incorporating circulation control
[AD-A099192] p0486 N81-26120
Lift-propulsion system weight variation for very heavy lift helicopters
[AD-A099169] p0490 N81-26151
TIP SPEED
Use of multiblade sensors for on-line rotor tip-path plane estimation
p0356 A81-32010
The high-speed propeller program
p0185 N81-15972
TIPS
NT BLADE TIPS
NT WING TIPS
TIRES
NT AIRCRAFT TIRES
TITANIUM
Acoustic structures --- titanium brazing method for producing honeycomb structures for jet engine noise reduction
p0001 A81-16272
The titanium industry and the fabrication of semimanufactures for aeronautics
p0416 A81-36651
From sponge to powder alternatives in titanium processing
p0511 A81-41647
Concurrent superplastic forming/diffusion bonding of titanium airframe components
p0531 A81-43638
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for metallic structures
p0558 A81-44374
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28094
TITANIUM ALLOYS
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796
Progress in P/M superalloy and titanium for aircraft applications
p0181 A81-22641
Plasma arc improves PM process - Tungsten free Ti powder
p0227 A81-24045
Aircraft applications of titanium - A review of the past and potential for the future
[AIAA PAPER 81-0893] p0362 A81-32918
Industrial titanium alloys - Use and characteristics
p0416 A81-36653
Titanium forging - Stamping /stamp, screw-press/, circular rolling and isothermal forging
p0416 A81-36657

The state of the technologies involved in the forming of TA6V titanium alloy p0416 A81-36659

The bonding of titanium and its alloys p0417 A81-36663

Fabrication problems related to the contamination of titanium alloys p0417 A81-36664

The present and future applications of titanium alloys - Airframes, helicopters, missiles p0417 A81-36665

The present and future applications of titanium alloys in engines p0417 A81-36666

An evaluation of vacuum centrifuged titanium castings for helicopter components p0510 A81-41516

Effect of beta flecks on the fatigue behaviour of Ti-6Al-6V-2Sn p0510 A81-41634

Structural applications for titanium castings p0510 A81-41637

Development in powder metallurgy /PM/ Ti6Al4V technology for aircraft parts p0511 A81-41640

Titanium net shapes by a new technology. I - F-14A parts evaluation p0511 A81-41649

Titanium net shapes by a new technology. II - F-18A parts evaluation p0511 A81-41650

Manufacture of cost-affordable high performance titanium components for advanced Air Force systems p0530 A81-43624

Advanced titanium metallic materials and processes for application to naval aircraft structures p0531 A81-43636

Challenges in alloy design - Titanium for the aerospace industry p0553 A81-43998

Developments in aircraft structural materials [NLR-MP-79042-U] p0077 N81-12081

Superplastic formed and diffusion bonded titanium landing gear component feasibility study [AD-A092788] p0200 N81-16213

Effects of geometric variables on rub characteristics of Ti-6Al-4V [NASA-TP-1835] p0336 N81-20245

Service evaluation of aluminum-brazed titanium (ABTi) --- aircraft structures [NASA-CR-3418] p0378 N81-22129

TOLERANCES (MECHANICS)

NT IMPACT TOLERANCES

Damage tolerance concept for transport aircraft structures p0050 A81-12970

Limiting application of the concept 'damage tolerance' with regard to fighter aircraft [AAAF-NT-79-32] p0210 N81-17054

Velocity tolerance of escape systems [AD-A096881] p0373 N81-22035

TOLERANCES (PHYSIOLOGY)

NT ACCELERATION TOLERANCE

NT HUMAN TOLERANCES

NT RADIATION TOLERANCE

TONOMETRY

U PRESSURE MEASUREMENTS

TOOLING

A hybrid composite horizontal stabilizer for the XH-2/CCR Flight Demonstrator Aircraft [AHS 80-35] p0476 A81-40164

Factors influencing the selection of tooling and fabrication methods in building a composite fuselage p0574 A81-46628

TOOLS

NT GRINDING MACHINES

NT LATHES

TOPOGRAPHY

NT TERRAIN

TOPOLOGY

Component-adaptive grid embedding p0137 N81-14697

Topology of three-dimensional separated flows [NASA-TM-81294] p0385 N81-23037

TORNADO AIRCRAFT

U MRCA AIRCRAFT

TORQUE

Wind-tunnel test of an articulated helicopter rotor model with several tip shapes [NASA-TM-80080] p0125 N81-13918

A brief analysis and its experiment of the hydraulic-electric loading servosystem --- a force simulator [NASA-TM-76458] p0276 N81-19132

Full-scale aerodynamic characteristics of a propellar installed on a small twin-engine aircraft wing panel [NASA-TM-81285] p0385 N81-23039

TORSION

Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor [AD-A092920] p0217 N81-17103

TORSIONAL STRESS

A new method for torsion of shaft with variable diameter using non-orthogonal curvilinear coordinates and its application [AIAA 81-0477] p0300 A81-29378

On St. Venant flexure and torsion problem for symmetrical airfoil sections p0365 A81-33245

Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models p0418 A81-36940

TORSIONAL VIBRATION

Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I p0229 A81-24090

Coupled bending-torsion vibrations of rotating blades of asymmetric aerofoil cross section with allowance for shear deflection and rotary inertia by use of the Reissner method p0289 A81-28942

Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates p0348 A81-30914

Experimental and analytical study on the flutter and gust response characteristics of a torsion-free-wing airplane model --- in the Langley transonic dynamics tunnel [NASA-CR-159283] p0340 N81-21059

Flag-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight [NASA-CR-164475] p0486 N81-26117

TOW MISSILES

AH-1S(Prod) airworthiness and flight characteristics for instrument flight [AD-A100946] p0548 N81-29121

TOWED BODIES

MATASS/LAMPS MK III --- Moored Airship Towed Array Sonar System/Light Airborne Multipurpose System [AIAA 81-1309] p0455 A81-38527

Lateral flutter of loads towed beneath helicopters and its avoidance p0470 A81-40116

TOWED TARGETS

U TOWED BODIES

TOWERS

NT AIRPORT TOWERS

TOWING

The development of a lightweight aircraft towing tractor [SAE PAPER 801237] p0405 A81-34235

Aircraft towing feasibility study [DOE/CS-50069/1] p0074 N81-12051

Responses to comments of Air Transport Association of America on aircraft towing feasibility study [DE81-029834] p0638 N81-33201

TOWNSEND DISCHARGE

NT GAS DISCHARGES

TOXIC HAZARDS

Environmental chemistry and management of hydrazine p0240 A81-2677

Tests on the fire resistance behavior of materials inside civil aircraft [SNIAS-801-551-101] p0074 N81-12052

Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels [PB81-136186] p0344 N81-211

TOXICITY

The development of low-toxic combustion chambers of transport gas turbine engines p0060 A81-147

Toxicity of synthetic high density and conventional hydrocarbon jet fuels to a soil

bacterium
[AD-A089527] p0041 N81-11233
TOXICITY AND SAFETY HAZARD
Aviation safety: Hazardous materials handling
[GPO-69-199] p0439 N81-25049
A Matrix Approach to Biological Investigation of Synthetic Fuels
[PB81-183477] p0586 N81-30313
TRACKING (POSITION)
NT INFRARED TRACKING
NT MISSILE TRACKING
NT OPTICAL TRACKING
NT PURSUIT TRACKING
NT RADAR TRACKING
NT SATELLITE TRACKING
NT STAR TRACKERS
A low cost multiple drone command and tracking system
p0179 A81-22613
Output predictive algorithmic control - Precision tracking with application to terrain following
p0567 A81-46280
Multivariable closed-loop analysis and flight control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11046
Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations
[NASA-TP-1776] p0142 N81-14997
TRACKING FILTERS
Detection of direction changes of flying targets from position coordinates of the radar data
p0152 A81-20099
Precision correlation tracking via optimal weighting functions
p0154 A81-20450
A new technique for tracking sequences of digitized images
p0156 A81-20508
Control strategy for tracking a maneuverable model
[AIAA PAPER 81-0089] p0160 A81-20593
GPS receiver simulation
p0173 A81-21913
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
Dynamic errors of the Kalman filtering of trajectory parameters --- for radar tracking of aircraft maneuvers
p0366 A81-33687
Nonlinear estimation of generalized vector shot processes
p0529 A81-43583
Output predictive algorithmic control - Precision tracking with application to terrain following
p0564 A81-45573
TRACKING NETWORKS
NT MATTS (SYSTEMS)
TRACKING RADAR
Adaptive control for electronic countermeasures
p0155 A81-20470
Optimal tracking design and simulation for a monopulse airborne radar system utilizing a predicted dual beam antenna design
p0323 A81-30293
TRACKING STATIONS
Air traffic control simulation models. Citations from the NTIS data base
[PB81-800104] p0207 N81-17037
TRACKING STUDIES
U TRACKING (POSITION)
TRACTORS
The development of a lightweight aircraft towing tractor
[SAE PAPER 801237] p0405 A81-34235
TRADEOFFS
ATARS implementation tradeoff
[AD-A089977] p0034 N81-11026
TRAFFIC
NT AIR TRAFFIC
TRAFFIC CONTROL
NT AIR TRAFFIC CONTROL
NT RADAR APPROACH CONTROL
Advanced ATC computer system
p0286 A81-28302
TRAILING EDGES
NT BLUNT TRAILING EDGES
Numerical prediction of vortex cores of the leading and trailing edges of delta wings
p0059 A81-14475
Structure and decay characteristics of turbulence in the near- and far-wake of a moderately loaded compressor rotor-blade
[ASME PAPER 80-GT-95] p0109 A81-17954
A computer code for the calculation of aircraft trailing vortices
p0347 A81-30710
The displacement-thickness theory of trailing edge noise
p0348 A81-30785
Steady flow and static stability of airfoils in extreme ground effect
p0355 A81-31686
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0365 A81-33281
Trailing-edge airframe noise source studies on aircraft wings
[AIAA PAPER 80-0976] p0411 A81-35634
Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184
Wind tunnel tests of sailwings for Darrieus rotors
p0510 A81-42678
EF-111A graphite/epoxy Horizontal Stabilizer Trailing Edge
p0557 A81-44342
Trailing edge noise prediction from measured surface pressures
p0616 A81-48395
Downwash calculation at close range behind a trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925
Jet wing interaction to give improved combat performance
p0188 N81-16007
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0255 N81-18257
An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989] p0263 N81-19028
Investigation of an improved flutter speed prediction technique for damaged T-38 horizontal stabilators using NASTRAN
[AD-A094769] p0273 N81-19109
Mean-flow and turbulence measurements in the vicinity of the trailing edge of an NACA (63 sub 1)-012 airfoil
[NASA-TP-1845] p0392 N81-23410
Flap survey test of a combined surface blowing model: Flow measurements at static flow conditions
[NASA-CR-152124] p0423 N81-24023
Analysis of laminar and turbulent symmetric blunt trailing-edge flows
[AD-A098703] p0439 N81-25046
TRAILING-EDGE FLAPS
Experimental investigations on a harmonically swinging trail edge flap with a space
[DGLR PAPER 80-029] p0055 A81-13925
Aerodynamic sound generated by a slotted trailing edge
p0066 A81-15798
The determination of the induced drag on slim wings with high lift systems in the transonic region
[MBB-FE122] p0121 A81-19400
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] p0619 A81-48625
Boundary layer measurements on a two-dimensional wing with flap
[NLR-TR-79009-U] p0022 N81-10014
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] p0639 N81-33210
TRAINERS
U TRAINING DEVICES

TRAINING
U EDUCATION
TRAINING AIRCRAFT
NT ALPHA JET AIRCRAFT
NT JAGUAR AIRCRAFT
NT T-37 AIRCRAFT
NT T-38 AIRCRAFT
Primary training of military pilots - Changing theories and new trainers p0122 A81-19498
Developments at VFW/Rhein-Flugzeugbau GmbH, Moenchengladbach --- trainer aircraft design p0171 A81-21574
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking p0173 A81-21742
TA-4J spin training through simulation [AIAA 81-0965] p0414 A81-36556
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 2: Aerodynamic effects [AD-A093063] p0209 N81-17048
Investigation of an improved flutter speed prediction technique for damaged T-38 horizontal stabilators using NASTRAN [AD-A094769] p0273 N81-19109
Review of Air Force's next generation trainer aircraft program Department of Defense [AD-A096238] p0341 N81-21071
TRAINING ANALYSIS
Simulated A-10 combat environment [SAE PAPER 801187] p0401 A81-34199
TRAINING DEVICES
The future of training for aerial combat p0060 A81-15118
Visual systems at Lufthansa's simulator centre p0122 A81-19499
Simulation techniques for new generation aircraft maintenance training devices p0324 A81-30331
Integration of the F-16 Weapon System Trainer p0325 A81-30332
Energy maneuverability displays for air combat training [SAE PAPER 801185] p0401 A81-34198
A pilot training manual for the terminal configured vehicle electronic attitude director indicator [NASA-CR-159195] p0434 N81-24111
Data acquisition and analysis system as a training device for simulated conventional weapon delivery p0544 N81-29072
Actual versus simulated equipment for aircraft maintenance training: Cost implications of the incremental versus the unique device [AD-A102388] p0590 N81-31104
Flight simulator: Use of spacegraph display in an instructor/operator station [AD-A101951] p0602 N81-31235
TRAINING EVALUATION
Application of signal detection theory to decision making in supervisory control - The effect of the operator's experience p0351 A81-31288
Improved G-Cueing System [AIAA 81-0987] p0416 A81-36572
Training effectiveness of platform motion: Review of motion research involving the advanced simulator for pilot training and the simulator for air-to-air combat [AD-A095930] p0343 N81-21089
TRAINING SIMULATORS
NT COCKPIT SIMULATORS
NT FLIGHT SIMULATORS
Visual cue augmentation in contact flight simulation p0064 A81-15696
Simulation techniques for new generation aircraft maintenance training devices p0324 A81-30331
Operator training systems/simulators p0349 A81-31109
A simulator to test compressor research facility control system software p0349 A81-31110
SIMCAT - A modular air traffic control simulator p0364 A81-33149
Simulated A-10 combat environment [SAE PAPER 801187] p0401 A81-34199
Flight Simulation Technologies Conference, Long Beach, Calif., June 16-18, 1981, Technical Papers p0414 A81-36554
Improved G-Cueing System [AIAA 81-0987] p0416 A81-36572
The evolution of real-time digital simulation of aircraft for training applications p0615 A81-48358
Microprocessor software applications for flight training simulators p0044 N81-11658
The problems with the interface system of the visual simulator as a cause of Pilot Induced Oscillations (PIO's) in flight simulators [MBB-UA-528-80-OE] p0276 N81-19140
Visual system Technology: Status and problems --- training simulators p0336 N81-20099
Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel [NASA-CR-165751] p0580 N81-30098
TRAJECTORIES
NT DESCENT TRAJECTORIES
NT MISSILE TRAJECTORIES
NT PARTICLE TRAJECTORIES
The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2 --- air traffic control [NLR-MP-79038-U] p0332 N81-20059
TRAJECTORY ANALYSIS
Store separation trajectory analysis p0050 A81-13216
Dynamic errors of the Kalman filtering of trajectory parameters --- for radar tracking of aircraft maneuvers p0366 A81-33687
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros p0484 N81-26092
Minimum noise impact aircraft trajectories [NASA-CR-164719] p0594 N81-31159
TRAJECTORY CONTROL
NT TRAJECTORY OPTIMIZATION
Output predictive algorithmic control - Precision tracking with application to terrain following p0567 A81-46280
Flight termination receiver/decoders design, performance and certification [AD-A089746] p0037 N81-11045
TRAJECTORY MEASUREMENT
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models p0418 A81-36940
TRAJECTORY OPTIMIZATION
Aircraft performance optimization by forced singular perturbation p0014 A81-11667
Single-parameter terrain classification for terrain following p0066 A81-15882
Application of trajectory optimization principles to minimize aircraft operating costs p0155 A81-20466
Application of singular perturbation theory to onboard aircraft trajectory optimization --- for commercial jet transport aircraft [AIAA PAPER 81-0019] p0158 A81-20583
High altitude launch of the Cruise Missile p0179 A81-22600
Optimization of airplane time to reach a given flight altitude and speed p0235 A81-25685
Finite-difference gradients versus error-quadrature gradients in the solution of parameterized optimal control problems p0421 A81-37568
The improvement of aircraft specific range by periodic control [AIAA 81-1748] p0553 A81-44309
Fuel optimal aircraft trajectories with fixed arrival times [AIAA 81-1749] p0550 A81-44081
Effects of displacement and rate saturation on the control of statically unstable aircraft [AIAA 81-1752] p0554 A81-44082
Boost-glide range-optimal guidance [AIAA 81-1781] p0554 A81-44086

Time-constrained maximum-energy turns --- for modern fighter aircraft [AIAA PAPER 81-1686] p0561 A81-44578
Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem p0563 A81-45515
Evaluation of a computer-generated perspective tunnel display for flight path following [NASA-TP-1736] p0129 N81-13958
Time-constrained maximum-energy turns [AD-A094733] p0273 N81-19107
Optimum maneuvers of supersonic aircraft, volumes 1 and 2 p0332 N81-20060
Maximum information trajectory for an air to air missile intercept [AD-A101497] p0505 N81-30160

TRANSCENDENTAL FUNCTIONS
NT EXPONENTIAL FUNCTIONS

TRANSDUCERS
NT ELECTROACOUSTIC TRANSDUCERS
NT ELECTRONIC TRANSDUCERS
NT MICROPHONES
NT PIEZOELECTRIC TRANSDUCERS
NT PRESSURE SENSORS
Transducer installation for the Sea King MK 50 mathematical model validation flight tests [AD-A089924] p0043 N81-11365

TRANSFER FUNCTIONS
Longitudinal equivalent systems analysis of Navy tactical aircraft [AIAA 81-1775] p0554 A81-44094
Low-order approaches to high-order systems - Problems and promises --- for analysis of aircraft pitch dynamics [AIAA 81-1774] p0556 A81-44134
Multivariable identification using centralized fixed modes p0079 N81-12091
Multivariable synthesis with transfer functions --- applications to gas turbine engines p0080 N81-12102
An investigation of the dynamic stalling characteristics of rotating axial-flow compressor blades p0093 N81-13054

TRANSFER OF TRAINING
Transfer and cost effectiveness of ground-based flight trainers p0064 A81-15693

TRANSFORMATION TENSORS
U TENSORS

TRANSFORMATIONS (MATHEMATICS)
NT COORDINATE TRANSFORMATIONS

TRANSFORMERS
Dynamic simulation of airborne high power systems [AD-A101316] p0552 N81-29362

TRANSIENT HEATING
Further studies of the influence of thermal effects on the predicted acceleration of gas turbines [ASME PAPER 81-GT-21] p0311 A81-29938
Stress analysis of first turbine vane using a 3-dimensional model with non linear material behavior subjected to transient temperatures [AIAA PAPER 81-1437] p0504 A81-40873

TRANSIENT LOADS
NT BLAST LOADS
NT GUST LOADS
NT IMPACT LOADS
NT LANDING LOADS
NT SHOCK LOADS

TRANSIENT OSCILLATIONS
Analysis of aircraft longitudinal handling qualities [AIAA 81-1771] p0554 A81-44092
Transient vibrations of elastic panels due to the impact of shock waves p0616 A81-48385

TRANSIENT RESPONSE
New techniques for the measurement of natural and simulated lightning phenomena p0057 A81-14268
Evaluation of lightning-induced transients in aircraft using high-voltage shock excitation techniques p0057 A81-14269
Prediction and experimental verification of transient airfoil motion in a small wind tunnel [AIAA PAPER 81-0052] p0159 A81-20568
Dielectric electrostatic charge reduction [SAE PAPER 810571] p0519 A81-42736
A method for the prediction of wing response to nonstationary buffet loads [AD-A093037] p0208 N81-17043
Extended frequency turbofan model [NASA-CR-165261] p0335 N81-20078
Gas turbine engine transient testing p0431 N81-24091
Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective --- aircraft gas turbine engines [NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification [NASA-CR-165373-VOL-2] p0496 N81-27090
Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program [NASA-CR-165373-VOL-3] p0496 N81-27091

TRANSIENTS (SURGES)
U SURGES

TRANSISTOR AMPLIFIERS
An X-band power GaAs FET amplifier for military avionics radar applications p0350 A81-31122

TRANSISTORS
NT FIELD EFFECT TRANSISTORS

TRANSIT SATELLITES
An integrated Omega/satellite radio navigation system p0566 A81-45767

TRANSITION FLOW
Nonstationary method for the direct statistical modeling of rarefied-gas flows p0069 A81-16454
Dialogue on bridging some gaps in stability and transition research --- in external, internal and free-shear layer through-flow systems p0115 A81-18105
Transient three-dimensional flow along a porous plate p0231 A81-24815

TRANSITION METALS
NT COBALT
NT IRON ISOTOPES
NT SILVER
NT TITANIUM
NT TUNGSTEN
Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue [NASA-TM-75733] p0376 N81-22054

TRANSLATIONAL MOTION
NT SECONDARY FLOW
NT THREE DIMENSIONAL FLOW
NT THREE DIMENSIONAL MOTION
Equivalent system analysis of translation rate command systems for hover and low speed flight [AIAA PAPER 81-1858] p0560 A81-44557
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade [NASA-CR-165166] p0140 N81-14976
Probabilistic analysis of foundation forces for a class of unbalanced rotating machines p0145 N81-15362

TRANSMISSION
NT ACOUSTIC PROPAGATION
NT AERODYNAMIC HEAT TRANSFER
NT CONVECTIVE HEAT TRANSFER
NT DATA TRANSMISSION
NT HEAT TRANSFER
NT LAMINAR HEAT TRANSFER
NT LIGHT SCATTERING
NT LIGHT TRANSMISSION
NT MULTIPATH TRANSMISSION
NT MULTIPLEXING
NT PCM TELEMETRY
NT RADAR TRANSMISSION
NT RADIATIVE HEAT TRANSFER
NT SHOCK WAVE PROPAGATION
NT SHORT WAVE RADIO TRANSMISSION
NT SIGNAL TRANSMISSION
NT SOUND TRANSMISSION
NT SPREAD SPECTRUM TRANSMISSION
NT TURBULENT HEAT TRANSFER
NT WAVE PROPAGATION

TRANSMISSION EFFICIENCY
INUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175
Omega station 10.2 kHz signal coverage prediction
diagrams p0512 A81-41760
A six-channel quick-look unit for the aerodynamics
division MKI airborne data acquisition package
[AD-A089975] p0043 N81-11364
TRANSMISSION LINES
NT BEAM WAVEGUIDES
NT COMMUNICATION CABLES
NT MICROSTRIP TRANSMISSION LINES
NT POWER LINES
NT STRIP TRANSMISSION LINES
NT WAVEGUIDES
TRANSMISSION LOSS
Theoretical and experimental evaluation of
transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
TRANSMISSIONS (MACHINE ELEMENTS)
An analytical method to calculate misalignment in
the journal bearing of a planetary gear system
p0004 A81-10839
Advanced transmission component development and
test program --- for helicopters
p0105 A81-17507
Drive system development for the 1980's ---
helicopter transmissions
p0105 A81-17508
Development of helicopter transmission components
for the 1980s
p0105 A81-17509
Water content of helicopter gear oils
[ASME PAPER 80-C2/DET-12] p0116 A81-18640
A low height 2300 kW helicopter transmission with
an enclosed planetary gear
[ASME PAPER 80-C2/DET-17] p0116 A81-18642
Approximation of gear transmission error by
standard gear errors
[ASME PAPER 80-C2/DET-71] p0117 A81-18646
Experience with advanced high performance gear steel
--- for CH-47
[ASME PAPER 80-C2/DET-77] p0117 A81-18648
Gear unit noise and transmission errors ---
helicopter system
p0150 A81-20060
Gear meshing action as a source of vibratory
excitation
p0150 A81-20061
Development and application of an analytical
method for predicting helicopter transmission
noise
p0150 A81-20062
Modelling techniques for the reduction of noise
and vibration in gearboxes
p0151 A81-20063
The reliability of helicopter reduction gears
p0287 A81-28473
Device for lubricant flow measurement and
conservation
p0288 A81-28743
Helicopter transmission fatigue life
p0291 A81-29058
Driving dynamics of a high-speed
positive-displacement pump and gas-turbine drive
during startup --- of flight vehicles
p0319 A81-30155
Drive system technology advancements ---
transmissions for CH-47D helicopter
p0356 A81-32015
Measuring dynamic stresses on helicopter
transmission gear teeth utilizing telemetry
p0361 A81-32859
Advanced generating system equipment for aircraft
p0420 A81-37414
Computerized gear grinding system development
[AHS 80-48] p0476 A81-40163
Advancements in dimensional inspection of
helicopter gearboxes and transmission cases
[AHS 80-36] p0476 A81-40165
Advanced transmission component development
p0575 A81-46634
Designing safety into helicopter transmissions
p0575 A81-46638
Advanced transmission components investigation
program: Bearing and seal development
[AD-A090675] p0076 N81-12075
Gas turbine engines and transmissions for bus
demonstration programs
[COO-4867-07] p0134 N81-14329
Compensating linkage for main rotor control
[NASA-CASE-LAR-11797-1] p0270 N81-19087
TRANSMITTERS
NT EMERGENCY LOCATOR TRANSMITTERS
NT OMNIDIRECTIONAL RADIO RANGES
NT RADIO BEACONS
NT RADIO TRANSMITTERS
NT RADIOSONDES
NT SONOBUOYS
Omega transmitter outages, January to December 1979
[AD-A093425] p0207 N81-17035
Investigation of low level aircraft nonavionic
nonlinear interference
[AD-A098784] p0491 N81-26349
TRANSOCEANIC FLIGHT
Solo navigation in a light aircraft
p0407 A81-34337
Aircraft operating efficiency on the North
Atlantic, a challenge for the 1980's
p0267 N81-19060
TRANSONIC AIRCRAFT
U SUPERSONIC AIRCRAFT
TRANSONIC AIRCRAFT TECHNOLOGY PROGRAM
U TACT PROGRAM
TRANSONIC COMPRESSORS
Comparison of experimental and computational shock
structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953
Analysis of the difficulties in high performance
compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107
Measurements of aerodynamic damping in the MIT
transonic rotor
[NASA-CR-163988] p0274 N81-19122
TRANSONIC FLIGHT
Research on transonic wings at the National
Aerospace Laboratory, Japan
p0011 A81-11640
Qualitative calculations of transonic drag-rise
characteristics using the equivalence rule
p0058 A81-14393
Transonic axisymmetric bodies with minimal wave drag
p0102 A81-17048
The determination of the induced drag on slim
wings with high lift systems in the transonic
region
[MBB-FE122] p0121 A81-19400
Adaptive airfoils and wings for efficient
transonic flight
p0153 A81-20349
Delta canard configuration at high angle of attack
p0154 A81-20351
An evaluation of wind tunnel test techniques for
aircraft nozzle afterbody testing at transonic
Mach numbers
[AD-A091775] p0126 N81-13931
Transonic wing technology for transport aircraft
p0188 N81-16002
Design and experimental verification of a
transonic wing for a transonic aircraft
p0188 N81-16003
Some particular configuration effects on a thin
supercritical variable camber wing
p0188 N81-16005
TRANSONIC FLOW
Asymmetric flow of subsonic and sonic jets over an
infinite wedge
p0004 A81-10919
Flow computation around multi-element airfoils in
viscous transonic flow
p0011 A81-11641
Calculation of plane transonic flows using the
integral equation method and shock fitting
p0016 A81-11779
An example of the transonic flow past a body with
a discontinuity in the contour curvature
p0019 A81-12367
Transonic flow past a wing profile in channels
with permeable walls
p0054 A81-13533
A finite-span wing in transonic flow
p0054 A81-13701
Harmonically oscillating airfoil in transonic
stream of air
p0054 A81-13753

Study of a variable sweep wing in sub or transonic flow
[ONERA, TP NO. 1978-106] p0058 A81-14391
Design and analysis of slat systems in transonic flow
p0058 A81-14392
A simplified theory of oscillating aerofoils in transonic flow - Review and extension
p0060 A81-14945
Numerical solutions of transonic flows by parametric differentiation and integral equation techniques
p0067 A81-15896
The supercritical profile of the supercritical wing
p0107 A81-17522
Finite difference computation of the steady transonic potential flow around airplanes
p0107 A81-17802
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805
Numerical simulations of a segmented-plenum, perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640
On the derivation of universal indicial functions --- for unsteady transonic flow
[AIAA PAPER 81-0328] p0165 A81-20753
Higher-accuracy finite-difference schemes for transonic airfoil flowfield calculations
[AIAA PAPER 81-0381] p0166 A81-20794
Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197
Analysis of a symmetric transonic aerofoil with the finite element method - A new upwinding technique
p0183 A81-22984
Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367
Transonic flows of a multireacting gas mixture through a Laval nozzle
p0225 A81-23909
A contribution to the computation of transonic supersonic flows over blunt bodies
p0230 A81-24423
Plane transonic solution with shock by direct iteration
p0231 A81-24814
Numerical computation of transonic potential flow through nozzles
p0233 A81-25353
Recent developments in integral equation method in transonic flow
p0234 A81-25384
Some problems of modeling high-speed aerodynamics --- in wind tunnels and tubes
p0237 A81-26118
Transonic maneuver/cruise airfoil design employing active diffusion control
p0239 A81-26511
Evaluation of blade element performance of compressor rotor blade cascades in transonic and low supersonic flow range
p0296 A81-29102
The accuracy of mean-stream-line method in subsonic and transonic regions
p0296 A81-29105
A method for obtaining shockless transonic flows past two-dimensional airfoils whose profiles are partially modified from a given arbitrary profile
p0298 A81-29201
A diagonal form of an implicit approximate-factorization algorithm
p0300 A81-29363
Linear/nonlinear behavior in unsteady transonic aerodynamics
[AIAA 81-0643] p0[illegible]6 A81-29496
Transonic flutter and gust-response te[illegible] and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
Finite element methods for transonic blade-to-blade calculation in turbomachines
[ASME PAPER 81-GT-5] p0310 A81-29930
Semi-inverse method of computation in inviscid transonic flows - Application to the design of turbomachines blades profiles
[ASME PAPER 81-GT-206] p0318 A81-30096

Subsonic and transonic flow on a wing at different sweep angles. I
p0351 A81-31249
Subsonic and transonic flow on a wing at different sweep angles. II
p0351 A81-31250
Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
p0354 A81-31612
Oscillating airfoils in shock-free transonic flows
p0410 A81-35026
The influence of surface roughness on boundary layer flow and separation at transonic speeds
p0413 A81-36468
Wing with finite span in a transonic flow
p0420 A81-37480
A PANSONIC Navier-Stokes solver --- for two dimensional flow about arbitrary airfoil sections
[AIAA PAPER 81-1195] p0454 A81-38077
Experimental-programme - Transonic wing-TST
p0457 A81-38804
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090
Transonic wing design using potential-flow codes - Successes and failures
[SAE PAPER 810565] p0518 A81-42730
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] p0606 A81-47554
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047] p0611 A81-47622
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-49979
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration
[ARC-R/M-3842-PT-2] p0021 N81-10010
A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations
[FFA-TN-AU-1418-PT-1] p0022 N81-10013
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017
Component-adaptive grid embedding
p0137 N81-14697
An investigation into grid patching techniques
p0137 N81-14708
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969
Full potential solution of transonic quasi-3-D flow through a cascade using artificial compressability
[NASA-TM-81637] p0140 N81-14980
A method for obtaining shockless transonic flows past airfoils, partially modified from a given arbitrary airfoil
[NAL-TR-602T] p0141 N81-14983
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
Application of transonic potential calculations to aircraft and wind tunnel configurations
p0186 N81-15992
Study of transonic flow fields about aircraft: Application to external stores
p0187 N81-15998
Design of advanced technology transonic airfoils and wings
p0187 N81-16000
Aerodynamic interaction between a close-coupled canard and a sweptback wing in transonic flow
p0189 N81-16013
Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014
Supercritical flow past symmetrical airfoils
[AD-A093300] p0203 N81-16984
An approximate factorization solution of the Navier-Stokes equations for transonic flow using body-fitted coordinates with application to NACA

64A010 airfoils
p0249 N81-18024
Aerodynamic effects of nearly uniform slipstreams on thin wings in the transonic regime
[NASA-CR-152351] p0249 N81-18027
Transonic flow studies
[NASA-CR-163965] p0249 N81-18029
Influence of free-stream Mach number on transonic shock-wave boundary-layer interaction
[NLR-MP-78013-U] p0256 N81-18325
Predicted and experimental steady and unsteady transonic flows about a biconvex airfoil
[NASA-TM-81262] p0258 N81-18742
Unsteady transonic small disturbance theory with strong shock waves
[NASA-CR-166157] p0261 N81-19020
A panel method to determine loads on oscillating airfoils in transonic flow with embedded shock waves
[NLR-MP-80005-U] p0330 N81-20039
Technical evaluation report on the Fluid Dynamic Panel Symposium on Subsonic/Transonic Configuration/Aerodynamics
[AGARD-AR-146] p0392 N81-23431
Civil component program Wing Section. New calculation methods for subsonic and transonic interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034
Preliminary calibration of the transonic test section of the NIAST trisonic tunnel
[NIAST-80/19] p0435 N81-24116
Turbulent interactions on airfoils at transonic speeds: Recent developments
p0483 N81-26047
Some applications of aerodynamic formulations to problems in aircraft dynamics
p0592 N81-31121
Three-dimensional transonic flow analysis
[AD-A101944] p0593 N81-31153
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] p0627 N81-32118

TRANSONIC FLUTTER
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
A wind-tunnel study of the flutter characteristics of a supercritical wing
p0308 A81-29504
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Transonic dip mechanism of flutter of a sweptback wing. II
p0559 A81-44447
Numerical study of transonic flutter of a two dimensional airfoil
[NAL-TR-617T] p0090 N81-13023
Effects of angle of attack and ventral fin on transonic flutter characteristics of an arrow-wing configuration
[NASA-TM-81914] p0145 N81-15397
Experimental and analytical study on the flutter and gust response characteristics of a torsion-free-wing airplane model --- in the Langley transonic dynamics tunnel
[NASA-CR-159283] p0340 N81-21059
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport --- SCAT-15F model test in the Langley Transonic Dynamics Tunnel
[NASA-TM-81962] p0388 N81-23071
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion free wing airplane
[NASA-TM-81961] p0388 N81-23072
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[NASA-TM-83126] p0445 N81-25432

TRANSONIC INLETS
U SUPERSONIC INLETS

TRANSONIC NOZZLES
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878

TRANSONIC SPEED
Modification of wing sections to optimize transonic performance
p0226 A81-24011
Transonic rotor noise - Theoretical and experimental comparisons
p0364 A81-33049
Propellers for economic flight at high speeds
[AAAF PAPER NT 80-34] p0369 A81-33936
Acoustic shock waves generated by a transonic helicopter blade
[AHS 80-63] p0479 A81-40186
Calibration of a blowdown-to-atmosphere cryogenic wind tunnel
p0030 N81-11060
Characteristics and status of the US National Transonic Facility
p0038 N81-11065
Evaluation of aircraft interference effects on external stores at subsonic and transonic speeds
p0187 N81-15997
An investigation of a swept wing-body configuration with drooped leading edge at low and transonic speeds
p0189 N81-16012
Overview of advanced wing design --- Ames 12-Foot Pressure Tunnel and 11-Foot Transonic Wind Tunnel
p0260 N81-19012
Experimental studies of scale effects on oscillating airfoils at transonic speeds
p0386 N81-23054
Development for new laboratories for future testing
p0433 N81-24105

TRANSONIC TURBINES
U SUPERSONIC TURBINES

TRANSONIC WIND TUNNELS
A system for model access in tunnels with an unbreathable test medium
p0015 A81-11672
A simple laser interferometer for wind tunnel flow visualisation
p0018 A81-12078
Testing stand for the measurement of nonsteady aerodynamic forces in the transonic wind tunnel at Goettingen
p0065 A81-15703
Measurements of flow quality in the Ames 2 x 2ft transonic wind tunnel
[AIAA PAPER 81-0156] p0161 A81-20636
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122
Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367
Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel
[AIAA PAPER 81-1062] p0459 A81-39074
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase
[DGLR PAPER 81-027] p0609 A81-47563
A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel
[NASA-TP-1752] p0021 N81-10005
An introduction to dynamic derivatives (3) methods of oscillating models in pitch and yaw in a 530 by 810 millimetre transonic wind tunnel
[ARL/AERO-NOTE-390] p0021 N81-10007
The European Transonic Wind tunnel ETW
p0038 N81-11064
Transonic cascade wind tunnel modification and initial tests
[AD-A091080] p0090 N81-13031
Further investigations of adaptive-wall wind tunnels
[AD-A091774] p0131 N81-13977
Transonic wind tunnel development (1940 - 1950)
p0185 N81-15971
Wind tunnel wall interference
[AD-A093301] p0217 N81-17104
Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106
Effects of window configuration on model pressure distribution in wind tunnels with perforated walls
[AD-A094213] p0277 N81-19192
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21080

Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061
High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400
Description of recent changes in the Langley 6- by 28-inch transonic tunnel
[NASA-TM-81947] p0391 N81-23096
Transonic wind tunnel measurements of tailplane and elevator effectiveness of the Jindivik 203B target aircraft
[AD-A098180] p0424 N81-24031
Evaluation of turbulence reduction devices for the Langley 8-foot Transonic Pressure Tunnel
[NASA-TM-81792] p0434 N81-24114
Estimation of fan pressure ratio requirements and operating performance for the National Transonic Facility
[NASA-TM-81802] p0435 N81-24115
Considerations for the installation of honeycomb and screens to reduce wind-tunnel turbulence
[NASA-TM-81868] p0550 N81-29137
Guide for users of the National Transonic Facility
[NASA-TM-83124] p0550 N81-29139
Wall interference effects: Status review
p0592 N81-31141
Comments on Reynolds number effects and the role of NTF in the development of air vehicles
p0592 N81-31142
Aircraft design using the National Transonic Facility
p0593 N81-31143
Proposed aeroelastic and flutter tests for the National Transonic Facility
p0593 N81-31144
Preliminary user planning for the NASA National Transonic Facility
p0593 N81-31145
Report of the panel on fluid dynamics
p0593 N81-31146
High lift technology
p0593 N81-31147
Configuration aerodynamics
p0593 N81-31148
Report of the panel on aeroelasticity and unsteady aerodynamics
p0593 N81-31149
Report of the wind tunnel/flight correlation panel
p0593 N81-31150
High Reynolds number research requirements for space vehicle design
p0593 N81-31151
Supplemental calibration of the AEDC-PWT 16 ft transonic tunnel aerodynamic test section
[AD-A102384] p0630 N81-32155
TRANSONICS
U TRANSONIC FLOW
TRANSPARENCE
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies
[AD-A091051] p0091 N81-13039
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
Aircraft transparency optical quality: New methods of measurement
[AD-A096183] p0341 N81-21070
Validation of a bird substitute for development and qualification of aircraft tranparencies
[AD-A097736] p0424 N81-24036
Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion
[AD-A097731] p0426 N81-24049
TRANSPARENT MATERIALS
U TRANSPARENCE
TRANSPIRATION
An optimal-surface-transpiration subsonic panel-method for iterative design of complex aircraft configurations
[AIAA PAPER 81-1254] p0458 A81-39012
TRANSPIRATION COOLING
U SWEAT COOLING
TRANSPONDERS
A new generation IFF - The AN/APX-100/V/ transponder
p0350 A81-31132
New technology applied to an IFF diversity transponder
p0350 A81-31133
Noncoherent C-band transponder standards
[AD-A091282] p0095 N81-13251
Detection of military aircraft in an Air Traffic Control Radar Beacon System (ATCRBS) environment
[AD-A093427] p0207 N81-17036
Summary of transponder data, May 1979 - November 1979
[AD-A097569] p0386 N81-23061
Radar Beacon Transponder (RBX) functional description
[AD-A100665] p0547 N81-29112
Radar Beacon Transponder (RBX) installation and siting criteria
[AD-A100666] p0547 N81-29113
TRANSPORT AIRCRAFT
NT A-300 AIRCRAFT
NT BOEING 727 AIRCRAFT
NT BOEING 737 AIRCRAFT
NT BOEING 747 AIRCRAFT
NT BOEING 757 AIRCRAFT
NT BOEING 767 AIRCRAFT
NT C-130 AIRCRAFT
NT C-135 AIRCRAFT
NT C-141 AIRCRAFT
NT CARGO AIRCRAFT
NT CH-47 HELICOPTER
NT CONCORDE AIRCRAFT
NT DC 3 AIRCRAFT
NT DC 8 AIRCRAFT
NT DC 9 AIRCRAFT
NT DC 10 AIRCRAFT
NT DH 121 AIRCRAFT
NT DH 125 AIRCRAFT
NT EUROPEAN AIRBUS
NT F-27 AIRCRAFT
NT H-53 HELICOPTER
NT HFB-320 AIRCRAFT
NT L-1011 AIRCRAFT
NT LIGHT TRANSPORT AIRCRAFT
NT MYSTERE 20 AIRCRAFT
NT S-61 HELICOPTER
NT SH-3 HELICOPTER
NT SHORT HAUL AIRCRAFT
NT SPANLOADER AIRCRAFT
NT TANKER AIRCRAFT
NT UH-60A HELICOPTER
NT YC-14 AIRCRAFT
How to improve the performance of transport aircraft by variation of wing aspect-ratio and twist /12th Daniel and Florence Guggenheim International Memorial Lecture/
p0006 A81-11602
Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11604
Flying qualities criteria for advanced control technology transports
p0008 A81-11618
Damage tolerance concept for transport aircraft structures
p0050 A81-12970
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0058 A81-14389
Experimental investigations to fully map the flow field around a wind tunnel model of a transport airplane
[SAE PAPER 800630] p0063 A81-15345
How do aircraft break down - Some studies of reliability data feedback
p0068 A81-16423
Principle for the design of hybrid control systems for passenger transport systems
p0107 A81-17577
Some aspects of advanced flight management systems and their application to modern transport aircraft
p0154 A81-20353
Disturbance estimation for a STOL transport during landing
[AIAA PAPER 81-0018] p0158 A81-20542
Application of singular perturbation theory to onboard aircraft trajectory optimization --- for commercial jet transport aircraft
[AIAA PAPER 81-0019] p0158 A81-20543

A head-up display for low-visibility approach and landing
[AIAA PAPER 81-0130] p0161 A81-20623
Effect of transport aircraft wing loads spectrum variation on crack growth
p0172 A81-21738
The influence of beards on the efficiency of aviators' oxygen masks
p0176 A81-22100
Study of a crack propagation on the flap rail of a transport aircraft
p0181 A81-22633
Integrated displays and controls design factors for the 1990's transport aircraft
p0325 A81-30338
Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31297
Design considerations for future turboprop transports
[SAWE PAPER 1340] p0352 A81-31380
CH-53E combat survivability assessment and survivability enhancement program
[SAWE PAPER 1384] p0354 A81-31400
Airships - Transport of the future
p0355 A81-31699
Comparison of computed and measured unsteady pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541
European approaches to transport aircraft design
[AIAA PAPER 81-0926] p0363 A81-32934
Maintenance tomorrow and the day after --- of wide-bodied transport aircraft
p0367 A81-33790
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803] p0367 A81-33882
Generalized active control - Its potential and directions of research
[AAAF PAPER NT 80-29] p0369 A81-33928
Air transport flight parameter measurements program - Concepts and benefits
[SAE PAPER 801132] p0396 A81-34163
History of SAE Committee S-7, Flight Deck and Handling Qualities Standards for Transport Category Aircraft
[SAE PAPER 801165] p0399 A81-34180
Secondary power system options for future military aircraft
[SAE PAPER 801192] p0401 A81-34202
Small Transport Aircraft Technology /STAT/ Propulsion Study
[SAE PAPER 801198] p0402 A81-34208
Rating hydrogen as a potential aviation fuel
[SAE PAPER 80-1152] p0406 A81-34243
Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
Wind-tunnel tests of engine-equipped models - Comparison of two jet wash simulation methods
[ONERA, TP NO. 1981-42] p0460 A81-39245
Contribution of technological progress to energy savings and conservation to the design of new aircraft
p0464 A81-39695
ATR 42 - A regional transport aircraft designed to save energy
p0464 A81-39696
The future role of helicopters in public transport
p0466 A81-40078
The developing technology and economics of large helicopters
p0466 A81-40079
European cooperation in the tactical transport helicopter
p0466 A81-40081
The ATR 42 - Progress report on a new aircraft
p0480 A81-40456
The supersonic fan engine - An advanced concept in supersonic cruise propulsion
[AIAA PAPER 81-1599] p0508 A81-40973
Evolution of transport wings - From C-130, C-141, and C-5 to C-XX
p0510 A81-41333
C-X - A case for scenario-oriented requirements --- new long-range military transport program
[AIAA PAPER 81-1690] p0527 A81-43159
Industrial leadership of an aircraft design class
[AIAA PAPER 81-1723] p0528 A81-43166
Development of repair procedures for graphite/epoxy structures on commercial transports
p0531 A81-43645
Closed-loop criteria for assessing longitudinal-axis handling qualities of transports in final approach
[AIAA 81-1773] p0556 A81-44133
Lateral-directional flying qualities of transport aircraft
[AIAA PAPER 81-1887] p0561 A81-44579
An analytical study of landing flare
[DFVLR-FB-79-40] p0027 N81-10062
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021
Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing
[AD-A089794] p0035 N81-11034
Assessment of variable camber for application to transport aircraft
[NASA-CR-158930] p0071 N81-12016
Air cargo market outlook and impact via the NASA CLASS project --- Cargo/Logistics Airlift Systems Study
[NASA-TM-81886] p0073 N81-12039
Fundamentals of conceptual design optimization of subsonic transport aircraft
[VTH-LR-292] p0128 N81-13951
Laminar-airfoils for transport aircraft
[DFVLR-MITT-80-07] p0129 N81-13952
Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[DFVLR-FB-80-07] p0131 N81-13975
A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993
Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331] p0142 N81-14994
Transonic wing technology for transport aircraft
p0188 N81-16002
Design and experimental verification of a transonic wing for a transonic aircraft
p0188 N81-16003
Experimental study of the interaction between the wing of a subsonic aircraft and a nacelle of a high by-pass ratio engine
p0189 N81-16010
Use of constrained optimization in the conceptual design of a medium-range subsonic transport
[NASA-TP-1762] p0193 N81-16039
Advanced aerodynamics and active controls. Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Small transport aircraft technology --- STAT
p0260 N81-19007
The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19009
Wind-tunnel investigation at Mach numbers from 0.25 to 1.01 of a transport configuration designed to cruise at near-sonic speeds --- conducted in langley 8-foot transonic pressure tunnel
[NASA-TM-X-2622] p0262 N81-19025
A head-up display format for transport aircraft approach and landing
p0265 N81-19043
An evaluation of head-up displays in civil transport operations
p0265 N81-19044
Fireworthiness of transport aircraft interior systems
p0267 N81-19061
Light transport and general aviation aircraft icing research requirements
[NASA-CR-165290] p0269 N81-19079
Preliminary wind-tunnel investigation of the effects of engine nacelles on a transport configuration with high lift drag ratios to a Mach number of 1.00

[NASA-TM-82312] p0272 N81-19099
Issues of commonality. Volume 2: Issue analysis
[AD-A095416] p0331 N81-20046
Application of linear quadratic control in reduction of aerodynamic forces on aircraft
p0332 N81-20061
Integrated Application of Active Controls (IAAC) technology to an advanced subsonic transport: Project plan
[NASA-CR-3305] p0332 N81-20062
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions
[AD-A095634] p0334 N81-20072
An analytical study of the longitudinal response of airplanes to positive wind shear
[NASA-TP-1765] p0335 N81-20082
Tendencies in the development of subsonic transport-aircraft under special considerations of aerodynamics
[DFVLR-MITT-80-15] p0338 N81-21040
Design considerations for composite fuselage structure of commercial transport aircraft
[NASA-CR-159296] p0378 N81-22419
Study of aircraft crashworthiness for fire protection
[NASA-CR-166159] p0424 N81-24035
A review of Australian investigations on aeronautical fatigue
[AD-A098300] p0426 N81-24051
Propulsion system testing requirements for a commercial transport
p0430 N81-24077
Development of test requirements for civil engines
p0430 N81-24079
Propulsion system study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165330] p0442 N81-25078
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118
Aircraft energy efficiency. Overview
[NASA-FACTS-96/9-80] p0538 N81-28083
A structural load alleviation control system for a large transport aircraft
[TT-8002] p0541 N81-28106
Effect of display size on utilization of traffic situation display for self-spacing task --- transport aircraft
[NASA-TP-1885] p0546 N81-29109
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] p0637 N81-33190

TRANSPORT PROPERTIES
NT EDDY VISCOSITY
NT ELECTRICAL RESISTIVITY
NT THERMAL CONDUCTIVITY
NT VISCOSITY

TRANSPORTATION
NT AIR TRANSPORTATION
NT MARINE TRANSPORTATION
NT RAIL TRANSPORTATION
NT SPACE SHUTTLE ORBITER 101
NT SPACE SHUTTLE ORBITERS
NT SPACE TRANSPORTATION
NT URBAN TRANSPORTATION
Collision avoidance systems. Citations from the NTIS data base
[PB80-815020] p0193 N81-16038

TRANSPORTATION ENERGY
Hydrogen - Its technology and implications. Volume 4 - Utilization of hydrogen --- Book
p0016 A81-11751
Alternative energy sources for non-highway transportation, appendices
[DOE/CS-05438/T1-VOL-3] p0044 N81-11500
Alternative energy sources for non-highway transportation, volume 1
[DOE/CS-05438/T1-VOL-1] p0044 N81-11513
Integrated Application of Active Controls (IAAC) technology to an advanced subsonic transport: Project plan
[NASA-CR-3305] p0332 N81-20062

TRANSPORTATION NETWORKS
A new perspective in aviation systems planning
p0112 A81-18069

TRANSVERSE ACCELERATION
Sensitivity of aircraft motion to cross coupling and acceleration derivatives
p0592 N81-31120

TRAPEZOIDAL WINGS
Downwash calculation at close range behind a trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925

TRAVELING WAVES
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840

TREES (MATHEMATICS)
NT FAULT TREES

TRENDS
A United Kingdom view on future fuels
[PNR-90068] p0602 N81-31398

TRIANGULAR WINGS
U DELTA WINGS

TRIDENT AIRCRAFT
U DH 121 AIRCRAFT

TRIGGERS
U ACTUATORS

TRIM (BALANCE)
U AERODYNAMIC BALANCE

TRISONIC WIND TUNNELS
Preliminary calibration of the transonic test section of the NIAST trisonic tunnel
[NIAST-80/19] p0435 N81-24116

TROPOPAUSE
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677

TROPOSPHERE
Analysis of wind vector components in the lower troposphere Applications to aircraft operations at terminals
[AIAA PAPER 81-0387] p0167 A81-20799
Diagnosis-prognosis of intense turbulence, causing aircraft buffeting, on the basis of temperature-wind sounding
p0241 A81-26836

TROUBLESHOOTING
U MAINTENANCE

TRUNCATION (MATHEMATICS)
U APPROXIMATION

TRUNNIONS
U SHAFTS (MACHINE ELEMENTS)

TRUSSES
Wind loads for bar-truss structures
p0259 N81-18997

TUBING
U PIPES (TUBES)

TUMBLING MOTION
Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1] p0375 N81-22048

TUNGSTEN
Plasma arc improves PM process - Tungsten free Ti powder
p0227 A81-24045

TUNNEL RESISTORS
U RESISTORS

TURBINE BLADES
Turbine airfoil coating refurbishment
[AIME PAPER F79-10] p0059 A81-14770
Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream
p0060 A81-14959
Variational principles and generalized variational principles for the hybrid aerodynamic problem of airfoil cascades on an arbitrary stream sheet of revolution
p0107 A81-17741
Turbine blade technology - Present and future
[ASME PAPER 80-C2/AERO-10] p0116 A81-18639
Features improved cooling - Turbine blade redesign boosts life
p0227 A81-24046
Heat transfer from a row of impinging jets to concave cylindrical surfaces
p0231 A81-24924
Determination of the thickness of blades of open wheels of radial-axial turbines
p0242 A81-26994
Aerodynamic study of flat turbine cascades with additional blades in blade passages
p0281 A81-27373
Aerodynamic blade excitation in turbocompressors
p0282 A81-27612

Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles
p0285 A81-28134

The possibilities of improving the efficiency of gas turbines
p0288 A81-28614

Discrete hole film cooling of turbine blades
p0293 A81-29073

Turbine blade cooling research at the von Karman Institute for Fluid Dynamics
p0293 A81-29076

High temperature metal matrix composites for gas turbines
p0295 A81-29090

Transpiration air cooled turbine blade - A technology for future generation aircraft and industrial gas turbine engines using coal or coal derived fuels
p0297 A81-29115

Turbine blade construction of multistage axial-flow compressors
p0309 A81-29850

Finite element methods for transonic blade-to-blade calculation in turbomachines
[ASME PAPER 81-GT-5] p0310 A81-29930

Sensitivity of turbine blade temperatures to tolerances of design variables
[ASME PAPER 81-GT-90] p0314 A81-29997

The present role of high speed cascade testing
[ASME PAPER 81-GT-95] p0314 A81-30002

Effect of temperature dependent mechanical properties on thermal stress in cooled turbine blades
[ASME PAPER 81-GT-105] p0315 A81-30010

Flow transition phenomena and heat transfer over the pressure surfaces of gas turbine blades
[ASME PAPER 81-GT-107] p0315 A81-30012

Fabrication of injection molded sintered alpha SiC turbine components
[ASME PAPER 81-GT-161] p0317 A81-30060

A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh
p0347 A81-30717

Experimental determination of the stress intensity factor for cracks with a curvilinear front in complex parts /gas turbine blades/
p0351 A81-31264

Mechanical properties of aluminum coatings on heat-resistant steels
p0355 A81-31668

Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187

A periodic problem in viscoelasticity with variable coefficients
p0419 A81-37143

Computer calculation of the characteristics of a hybrid system for the cooling of gas turbine blades
p0459 A81-39217

Experimental determination of the circumferential drift of edge wakes of guide vanes in a turbine stage
p0466 A81-40022

Processing for an improved impact resistant composite blade --- for turbofan aircraft engines
[AIAA PAPER 81-1356] p0501 A81-40838

Comparative efficiency of penetrating steam and air cooling of gas turbine blades
p0509 A81-41003

An experimental study of heat transfer on turbine rotor blades
p0509 A81-41033

The effect of various factors on the vibration characteristics of composite blades of gas turbine engines
p0524 A81-42793

Projected power and specific fuel consumption development of the Rolls Royce Gem engine
p0575 A81-46637

Stability and flutter analysis of turbine blades at low speed
p0612 A81-47959

A process for protecting gas turbine blade cooling passages against degradation
p0622 A81-49209

Surface pyrometry in presence of radiation from other sources with application to turbine blade temperature measurement
[NASA-TP-1754] p0036 N81-11039

Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448

Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11493

Low-cost directionally-solidified turbine blades, volume 2 --- TFE731-3 turbofan engine
[NASA-CR-159562] p0078 N81-12088

Optimized pitch controller for load alleviation on wind turbines
[FFA-TN-HU-2189-PT-1] p0087 N81-12634

Application of model laws when determining the heat transfer coefficients by experiments on cooled turbine blades
p0089 N81-12998

Performance evaluation of a prototype noninterference technique for measurement of turbine engines compressor blade stress
[AD-A090566] p0094 N81-13061

Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[NASA-TM-81657] p0195 N81-16053

JT8D-15/17 high pressure turbine root discharged blade performance improvement --- engine design
[NASA-CR-165220] p0214 N81-17080

The Shock and Vibration Digest, volume 12, number 11
[AD-A092384] p0257 N81-18403

Vibrations of turbine engine blades by shell analysis
p0257 N81-18404

Coupling of unsteady lift to acoustic duct modes in an axial flow fan
[AD-A095080] p0274 N81-19124

Design of turbine cascades with transitional profile boundary layers
p0278 N81-19456

Thermal and flow analysis of a convection air-cooled ceramic coated porous metal concept for turbine vanes
[NASA-TM-81749] p0376 N81-22056

Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24068

Experimental verification of turboblading aeromechanics
p0432 N81-24092

Fabrication process development of boron/aluminum fan blades for high bypass engines
[NASA-CR-165252] p0442 N81-25076

Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective --- aircraft gas turbine engines
[NASA-CR-165373-VOL-1] p0496 N81-27089

Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27090

Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program
[NASA-CR-165373-VOL-3] p0496 N81-27091

Wingtip vortex turbine
[NASA-CASE-LAR-12544-1] p0496 N81-27096

Turbojet engine blade damping
[NASA-CR-165406] p0549 N81-29130

Development and design of a large wind-turbine blade --- fiber reinforced composites
[MBB-UD-301/80-OE] p0586 N81-30198

Automated Plasma Spray (APS) process feasibility study
[NASA-CR-165418] p0597 N81-31193

TURBINE ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT DUCTED FAN ENGINES
NT GAS TURBINE ENGINES
NT J-65 ENGINE
NT J-79 ENGINE
NT J-85 ENGINE
NT J-97 ENGINE
NT JET ENGINES
NT RAMJET ENGINES
NT SUPERSONIC COMBUSTION RAMJET ENGINES
NT T-56 ENGINE
NT TF-30 ENGINE
NT TF-41 ENGINE

NT TURBOFAN ENGINES
NT TURBOJET ENGINES
NT TURBOPROP ENGINES
  Substantiation of oil change periods for ship and aircraft turbine engines
    p0065 A81-15720
  Helicopter propulsion system development and qualification
    p0105 A81-17511
  Effectiveness of turbine engine diagnostic systems
    p0290 A81-29053
  Fabrication of injection molded sintered alpha SiC turbine components
    [ASME PAPER 81-GT-161] p0317 A81-30060
  Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center
    [SAE PAPER 801122] p0396 A81-34158
  Control of particulate emissions from turbine engine test cells by cooling water injection
    p0453 A81-37796
  Blade tip ceramic outer air seal for long life turbine engines
    [AIAA PAPER 81-1440] p0504 A81-40874
  TELS - A facility to observe the effect of simulated flight maneuver loads on turbine engines
    [AIAA PAPER 81-1591] p0508 A81-40966
  Turbine bypass engine - A new supersonic cruise propulsion concept
    [AIAA PAPER 81-1596] p0508 A81-40971
  A technique for the implementation of nonlinear models as real-time digital simulations --- with application to aircraft turbine engine design
    p0615 A81-48333
  Fuel character effects on current, high pressure ratio, can-type turbine combustion systems
    [AD-A089182] p0029 N81-10073
  Off-design performance loss model for radial turbines with pivoting, variable-area stators
    [NASA-TP-1708] p0036 N81-11038
  Superhybrid composite blade impact studies
    [NASA-TM-81597] p0043 N81-11412
  The role of advanced technology of turbine engine life cycle cost
    p0047 N81-11927
  Cost/benefit analysis of advanced materials technology candidates for the 1980's, part 2
    [NASA-CR-165176] p0048 N81-11953
  Multivariable identification using centralized fixed modes
    p0079 N81-12091
  State-of-the-art review of flywheel burst containment
    [UCRL-15257] p0085 N81-12427
  Performance evaluation of a prototype noninterference technique for measurement of turbine engines compressor blade stress
    [AD-A090566] p0094 N81-13061
  Mechanical property improvement of protective coatings for turbine engines using coal-derived fuels
    [DOE/ET-12293/T1] p0094 N81-13064
  Vibrations of turbine engine blades by shell analysis
    p0257 N81-18404
  General Aviation Turbine Engine (GATE) study
    [NASA-CR-159482] p0274 N81-19117
  Ceramic applications in turbine engines --- for improved component performance and reduced fuel usage
    [NASA-CR-159865] p0274 N81-19118
  Reasons for low aerodynamic performance of 13.5-centimeter-tip-diameter aircraft engine starter turbine
    [NASA-TP-1810] p0334 N81-20076
  Combustion system processes leading to corrosive deposits
    [NASA-TM-81752] p0391 N81-23243
  Turbine Engine Testing
    [AGARD-CP-293] p0429 N81-24071
  Overview of all civil aviation engine certification/demonstration requirements and rationale, i.e., FAA, CAA, etcetera
    p0429 N81-24072
  Certification procedure for military engines in Germany
    p0429 N81-24074
  Boeing Commercial Airplane Company engine procurement practices
    p0429 N81-24076
  performance control and qualification tests of civil aviation turbine engines in tests conducted by airframe manufacturers
    p0430 N81-24078
  Development of test requirements for civil engines
    p0430 N81-24079
  Turbine engine tests as seen by an aircraft company
    p0430 N81-24084
  Design development, and certification of a CFM56 engine: Resistance to the ingestion of foreign bodies
    p0431 N81-24087
  Flight tests of the engines of combat aircraft: Validation methods used by CEV
    p0432 N81-24095
  Low pressure turbine testing
    p0432 N81-24098
  Rig investigation of a two stage single shaft low cost turbine
    p0432 N81-24099
  Prediction of future test needs, test facilities and procedures
    p0433 N81-24104
  Development for new laboratories for future testing
    p0433 N81-24105
  Aviation turbine fuel properties and their trends
    [NASA-TM-82603] p0444 N81-25232
  KONFIG and REKONFIG: Two interactive preprocessing to the Navy/NASA Engine Program (NNEP)
    [NASA-TM-82636] p0446 N81-25698
  Turbine bypass engine: A new supersonic cruise propulsion concept
    [NASA-TM-82608] p0489 N81-26145
  Improving turbine engine compressor performance retention through airfoil coatings
    p0598 N81-31203
TURBINE INSTRUMENTS
  Centralized in-place pressure calibration system for multiple turbine engine aerodynamic pressure measurement systems
    p0360 A81-32847
  Development of a noninterference compressor blade stress measurement system
    p0361 A81-32874
  Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
    [AD-A089791] p0036 N81-11041
TURBINE PUMPS
  Driving dynamics of a high-speed positive-displacement pump and gas-turbine drive during startup --- of flight vehicles
    p0319 A81-30155
TURBINE WHEELS
  Towing tank tests on model wind turbine rotors
    p0055 A81-13860
  Nonlinear incremental analysis up to failure of aeronautical structures
    p0068 A81-16307
  Comparison of experimental and computational shock structure in a transonic compressor rotor
    [ASME PAPER 80-GT-81] p0109 A81-17953
  Determination of the thickness of blades of open wheels of radial-axial turbines
    p0242 A81-26994
  Calculation of circular flow inhomogeneities downstream of the turbine wheel
    p0281 A81-27372
  An investigation of a preswirled cooling airflow to a turbine disc by measuring the air temperature in the rotating channels
    [ASME PAPER 81-GT-132] p0316 A81-30035
  Numerical methods for studying the stress-strain state and service life of aircraft gas-turbine engine disks
    p0351 A81-31258
  Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
    p0364 A81-33168
  Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
    p0365 A81-33169
TURBINES
NT AXIAL FLOW TURBINES
NT GAS TURBINES
NT SHROUDED TURBINES
NT STEAM TURBINES

NT SUPERSONIC TURBINES
NT TWO STAGE TURBINES
Wind speed measurement for wind turbine testing
p0055 A81-13873
Some aspects of optimizing the aerodynamics of turbine stages
p0119 A81-19325
Adiabatic gas flow. Citations from the NTIS data base
[PB80-808546] p0026 N81-10048
Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448
Component research for future propulsion systems
[NASA-TM-82613] p0376 N81-22055
Aerodynamic and aeroelastic research on tipvane turbines
[VTH-LR-302] p0540 N81-28100
TURBOCHARGERS
U SUPERCHARGERS
U TURBOCOMPRESSORS
TURBOCOMPRESSORS
Discrete frequency noise due to irregularity in blade row of axial fan rotor
p0002 A81-10633
Reduction of energy consumption in the vibrational shot peening of axial compressor vanes
p0005 A81-11321
Impact damage of aircraft gas turbine engines with axial compressors
p0005 A81-11324
Effect of surface roughness over the blade in compressor cascade
p0060 A81-14924
Test results from an analytically designed axial compressor stage of 1.65:1 pressure ratio
[SAE PAPER 800629] p0063 A81-15344
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826
Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952
Comparison of experimental and computational shock structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953
Structure and decay characteristics of turbulence in the near- and far-wake of a moderately loaded compressor rotor-blade
[ASME PAPER 80-GT-95] p0109 A81-17954
Dynamic pressure response with stall on axial flow compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578
Turbo-compressors surge and surge control
[AIAA PAPER 81-0070] p0159 A81-20579
Evaluation of compressor blade endurance limits by an accelerated method
p0177 A81-22182
The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856
Aerodynamic blade excitation in turbocompressors
p0282 A81-27612
A digital technique for the analysis of the response of compressor/duct systems in unsteady flow
p0294 A81-29078
On the solution of Navier Stokes equations of the flow in turbomachines
p0296 A81-29099
The axial velocity density ratio and the axial velocity density distribution in axial flow compressors and cascades
p0296 A81-29101
Analysis of the difficulties in high performance compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107
Effects of solid particles suspended in fluid flow through an axial flow compressor stage
p0297 A81-29108
Model for axial compressors operating with water ingestion
p0297 A81-29111
Gas turbine engineering: Applications, cycles and characteristics --- Book
p0309 A81-29680
Turbine blade construction of multistage axial-flow compressors
p0309 A81-29850
Stalling pressure rise capability of axial flow compressor stages
[ASME PAPER 81-GT-3] p0310 A81-29928
The effect of impeller tip design on the performance of a mixed flow turbocharger compressor
[ASME PAPER 81-GT-7] p0310 A81-29932
A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29982
Inverse or design calculations for non-potential flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29986
The present role of high speed cascade testing
[ASME PAPER 81-GT-95] p0314 A81-30002
New features in the design of axial-flow compressors with tandem blades
[ASME PAPER 81-GT-113] p0315 A81-30017
A model for dynamic loss response in axial-flow compressors
[ASME PAPER 81-GT-154] p0317 A81-30053
The influence of blade number ratio and blade row spacing on axial-flow compressor stator blade dynamic load and stage sound pressure level
[ASME PAPER 81-GT-165] p0317 A81-30064
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078
Study of the secondary flow in the downstream of a moving blade row in an axial flow fan
p0355 A81-31767
Estimated service life of gas turbine engine compressor blades
p0417 A81-36680
New technologies for compressors of aviation engines
p0452 A81-37656
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
p0469 A81-40107
Performance analysis of a family of planar pulse generators
[AIAA PAPER 81-1590] p0507 A81-40965
Change of static pressure on the rotating blades of an axial-flow compressor during surging
p0509 A81-41039
Efficiency of cantilever compressor stator blades
p0509 A81-41041
Axial flow compressors. Citations from the Engineering Index data base
[PB80-808611] p0029 N81-10076
Axial flow compressors. Citations from the NTIS data base
[PB80-808603] p0031 N81-10441
Advanced industrial gas turbine techology readiness demonstration
[DOE/OR-05035/T1] p0085 N81-12426
Force and moment coefficients for high deflection cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
Gerry casing treatment
[CUED/A-TURBO/TR-101] p0093 N81-13059
Supersonic stall flutter of high speed fans --- in turbofan engines
[NASA-TM-81613] p0140 N81-14978
Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation
[NASA-CR-165141] p0143 N81-15004
TF34 engine compression system computer study --- simulation of flow stability
[NASA-CR-159889] p0143 N81-15005
Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15332/T1] p0145 N81-15414
Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051
Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor

--- heated intake air
[PNR-90022] p0275 N81-19126
Nastran level 16 theoretical manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
NASTRAN level 16 demonstration manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159826] p0279 N81-19483
Some effects of compressor fouling on the behavior of a turbojet engine --- as evidenced by an engine monitoring system
p0320 N81-20015
The mechanical testing of compressors and turbines for aircraft gas turbine engines
p0433 N81-24100
Development tests of an engine with limited life --- Microturbo TRI 60
p0433 N81-24103
High temperature strain gage system for application to turbine engine components
[AD-A101713] p0583 N81-30132
Determination of aerodynamically adequate fillet geometry in turbocompressor blade rows
[AD-A102170] p0600 N81-31219
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222

TURBOCONVERTERS
U TURBOGENERATORS

TURBOELECTRIC CONVERSION
U TURBOGENERATORS

TURBOFAN AIRCRAFT
NT A-7 AIRCRAFT
NT BOEING 727 AIRCRAFT
NT BOEING 737 AIRCRAFT
NT BOEING 757 AIRCRAFT
NT BOEING 767 AIRCRAFT
NT C-141 AIRCRAFT
NT CONCORDE AIRCRAFT
NT DC 8 AIRCRAFT
NT DH 121 AIRCRAFT
NT F-111 AIRCRAFT
NT MYSTERE 20 AIRCRAFT
NT SAAB 37 AIRCRAFT
NT SR-210 AIRCRAFT
Sukhoi's pivotal interdictor
p0109 A81-17832
Prop-Fan technical progress leading to technology readiness
[AIAA PAPER 81-0810] p0367 A81-33878
Experimental study of the interaction between the wing of a subsonic aircraft and a nacelle of a high by-pass ratio engine
p0189 N81-16010
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
The supersonic fan engine: An advanced concept in supersonic cruise propulsion
[NASA-TM-82657] p0496 N81-27094

TURBOFAN ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT J-97 ENGINE
NT TF-30 ENGINE
NT TF-34 ENGINE
NT TF-41 ENGINE
Business aircraft turbofan technology progress in the 1970's, challenges in the 1980's
[SAE PAPER 800601] p0061 A81-15326
A new high bypass fan for general aviation
[SAE PAPER 800602] p0061 A81-15327
Lear fan propulsion system
[SAE PAPER 800609] p0062 A81-15332
Rolls-Royce engines status report
p0102 A81-17166
Unsteady fan blade pressure and acoustic radiation from a JT15D-1 turbofan engine at simulated forward speed
[AIAA PAPER 81-0096] p0161 A81-20590
Non-isoenergetic turbulent jet mixing in a constant area duct --- in turbofan engines
[AIAA PAPER 81-0347] p0165 A81-20768
Prediction method for the overall performance of turbofan engines
[AIAA PAPER 81-0367] p0166 A81-20786
Developments at VFW/Rhein-Flugzeugbau GmbH, Moenchengladbach --- trainer aircraft design
p0171 A81-21578
Core noise measurements from a small, general aviation turbofan engine
p0170 A81-22531
Design, durability and low cost processing technology for composite fan exit guide vanes
p0182 A81-22664
The M.45SD-02 variable pitch geared fan engine demonstrator test and evaluation experience
p0283 A81-27897
Design for economy --- of high-bypass turbofan engines
p0290 A81-29030
Investigation of the squeeze film bearing on two-spool turbo-fan engine
p0295 A81-29093
Experimental verification of unsteady aerodynamic models of supersonic unstalled flutter
p0295 A81-29094
Electronic engine control for commercial aircraft
p0309 A81-29775
Pattern factor improvement in the F-100 primary combustion system
[ASME PAPER 81-GT-25] p0311 A81-29941
Digital control makes a commercial debut on the JT9D engine
[ASME PAPER 81-GT-199] p0317 A81-30090
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093
Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098
The role of flight research vehicles in prop-fan technology development
[ASME PAPER 81-GR-216] p0318 A81-30104
Quiet propulsive-lift technology ready for civil and military applications
p0359 A81-32521
Rolls-Royce RB 211-535 power plant
[AIAA PAPER 81-0807] p0360 A81-33806
CFM56-3 high by-pass technology for single aisle twins
[AIAA PAPER 81-0808] p0368 A81-33889
The F100 engine
[SAE PAPER 801110] p0395 A81-34151
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152
JT8D performance improvement to offset rising fuel costs
[SAE PAPER 801117] p0395 A81-34153
Performance deterioration of commercial high-bypass ratio turbofan engines
[SAE PAPER 801118] p0396 A81-34154
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
Reverse thrust performance of the QCSEE variable pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
The development of a twin-turbofan V/STOL aircraft
[AHS 80-8] p0473 A81-40141
A new approach to turboshaft engine growth
[AHS 80-41] p0477 A81-40165
Battle of the 15 tonne fans
p0480 A81-40457
Processing for an improved impact resistant composite blade --- for turbofan aircraft engines
[AIAA PAPER 81-1356] p0501 A81-40838
Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842
Isothermal forging of fan blades
[AIAA PAPER 81-1405] p0503 A81-40862
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration
[AIAA PAPER 81-1498] p0506 A81-40910
JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1508] p0507 A81-40963
NASA VCE test bed engine aerodynamic performance characteristics and test results
[AIAA PAPER 81-1594] p0508 A81-40969
The supersonic fan engine - An advanced concept in supersonic cruise propulsion
[AIAA PAPER 81-1599] p0508 A81-40973
The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176

F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
Avco Lycoming's ALF 502 high bypass fan engine
[SAE PAPER 810618] p0523 A81-42773
Small turbofan engines - Their impact on general aviation aircraft
[SAE PAPER 810622] p0523 A81-42776
Numerical and classical analysis of V/STOL aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898
Real-time estimation in advanced turbofan engines
p0564 A81-45553
The design and development of a mixer compound exhaust system for a quiet clean general aviation turbofan
[AIAA PAPER 81-1494] p0566 A81-45893
RB.199 - Compact Tornado power
p0567 A81-46334
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
p0613 A81-47966
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control --- acoustic performance
[AIAA PAPER 81-2049] p0619 A81-48621
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48628
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] p0620 A81-48636
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] p0624 A81-49736
An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS)
[AD-A089365] p0028 N81-10070
Compound Cycle Turbofan Engine (CCTE). Task 9: Carbon-Slurry Fuel Combustion Evaluation Program
[AD-A089451] p0029 N81-10072
Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901)
[AD-A089524] p0029 N81-10074
An evaluation of statistical methods for the prediction of maximum time-variant inlet total pressure distortion
[AD-A089817] p0036 N81-11040
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN 100)
[AD-A089791] p0036 N81-11041
Aircraft turbine engine monitoring experience. An overview and lessons learned from selected case studies
[AD-A089752] p0036 N81-11042
An automated procedure for developing hybrid computer simulations of turbofan engines
[NASA-TM-81605] p0044 N81-11688
Core noise measurements from a small, general aviation turbofan engine
[NASA-TM-81610] p0044 N81-11769
Low-cost directionally-solidified turbine blades, volume 2 --- TFE731-3 turbofan engine
[NASA-CR-159562] p0078 N81-12088
F100 multivariable control synthesis program: A review of full scale engine altitude tests --- F100 engine
p0079 N81-12093
Engine identification for adaptive control
p0080 N81-12100
Multivarable nyquist array method with application to turbofan engine control
p0080 N81-12101
Sensor/actuator failure detection for turbofan engines
p0080 N81-12104
Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair
[AD-A091011] p0094 N81-13062
The future of civil turbo-fan engines
[PNR-90034] p0130 N81-13964
Supersonic stall flutter of high speed fans --- in turbofan engines
[NASA-TM-81613] p0140 N81-14978
Flight evaluation of a simplified gross thrust calculation technique using an F100 turbofan engine in an F-15 airplane
[NASA-TP-1782] p0143 N81-15000
Application of the MNA design method to a nonlinear turbofan engine --- multivariable Nyquist array method
[NASA-CR-163855] p0143 N81-15001
Improved methods for fan sound field determination
[NASA-CR-165188] p0147 N81-15769
Exhaust emission characteristics and variability for maintained General Electric CF6-50 turbofan engines
[AD-A092291] p0196 N81-16064
Samarium cobalt (SMCO) generator/engine integration study
[AD-A092904] p0214 N81-17087
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A093122] p0215 N81-17092
Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system
[AD-A093868] p0216 N81-17095
Material and structural problems in aircraft engine technology --- CFM-56 engine
[AAAF-NT-79-23] p0216 N81-17096
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA Ames 40 by 80 foot wind tunnel: Acoustic data report
[NASA-CR-152329] p0258 N81-18798
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-19116
Design of an exhaust mixer nozzle for the Avco-Lycoming Quiet Clean General Aviation Turbofan (QCGAT)
[NASA-CR-159426] p0274 N81-19120
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] p0277 N81-19316
Concept definition: Retirement for cause of F-100 rotor components
[AD-A095584] p0335 N81-20080
The RB211 engine and its development --- design and testing of turbofan engines
[PNR-90043] p0338 N81-21037
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21078
Energy efficient engine flight propulsion system: Aircraft/engine integration evaluation
[NASA-CR-159584] p0375 N81-22051
Quiet Clean General Aviation Turbofan (QCGAT) technology study, volume 1
[NASA-CR-164222] p0376 N81-22052
Design concepts for low-cost composite turbofan engine frame
[NASA-CR-165217] p0376 N81-22053
Specification requirements for fighter engines
p0429 N81-24073
Propulsion system testing requirements for a commercial transport
p0430 N81-24077
Investigation of performance deterioration of the CF6/JT9D high bypass ratio turbofan engines
p0431 N81-24086
Performance assessment of an advanced reheated turbo fan engine
p0432 N81-24094
Measurement of aerodynamic work during fan flutter
[NASA-TM-82652] p0443 N81-25080
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[NASA-TM-82617] p0443 N81-25081
High-response measurements of a turbofan engine during nonrecoverable stall
[NASA-TM-81759] p0443 N81-25084
Additional testing of the inlets designed for a tandem fan V/STOL nacelle
[NASA-CR-165310] p0483 N81-26075
Simplified design point performance model of a dry turbofan engine cycle
[NASA-TM-83112] p0490 N81-26148
The supersonic fan engine: An advanced concept in supersonic cruise propulsion
[NASA-TM-82657] p0496 N81-27094
Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude
[NASA-TM-82663] p0496 N81-27095

Full authority digital electronic control turbofan
  engine demonstration
  p0498 N81-27112
The E3 combustors: Status and challenges ---
  energy efficient turbofan engines
  [NASA-TM-82684]
  p0539 N81-28095
Conceptual/preliminary design study of subsonic
  v/stol and stovl aircraft derivatives of the S-3A
  [NASA-TM-81310]
  p0547 N81-29118
An investigation of engine influence on inlet
  performance --- conducted in the Ames 40- by
  80-foot wind tunnel
  [NASA-CR-166136]
  p0579 N81-30084
Small turbine engine augmentor. Phase 1:
  Preliminary design studies of afterburner and
  duct-burner configurations
  [AD-A101595]
  p0583 N81-30131
Conditioned pressure spectra and coherence
  measurements in the core of a turbofan engine
  [NASA-TM-82688]
  p0589 N81-30907
Structures performance, benefit, cost-study
  [NASA-CR-165456]
  p0597 N81-31194
Advanced subsonic transport propulsion
  [NASA-TM-82696]
  p0597 N81-31195
JT8D engine performance retention
  p0598 N81-31200
The nature of operating flight loads and their
  effect on propulsion system structures
  p0599 N81-31207
CF6-50 engine emissions testing with traverse probe
  [AD-A102159]
  p0600 N81-31218
Cruise missile engine program contract data
  requirements list sequence number 95.
  Qualification test report. Volume 39:
  Vibration and mission simulation testing on
  engine 828. XF-107-WR-400 cruise missile engine
  [AD-A102257]
  p0600 N81-31220
Design and evaluation of an integrated Quiet,
  Clean General Aviation Turbofan (QCGAT) engine
  and aircraft propulsion system
  [NASA-CR-165185]
  p0629 N81-32147
Simplified off-design performance model of a day
  turbofan engine cycle
  [NASA-TM-83204]
  p0639 N81-33206
TURBOFANS
Factors which influence the behavior of turbofan
  forced mixer nozzles
  [AIAA PAPER 81-0274]
  p0359 A81-32549
Axial flow compressors. Citations from the
  Engineering Index data base
  [PB80-808611]
  p0029 N81-10076
TF34 engine compression system computer study ---
  simulation of flow stability
  [NASA-CR-159889]
  p0143 N81-15005
High bypass turbofan component development,
  modification 2
  [AD-A093156]
  p0215 N81-17093
Extended frequency turbofan model
  [NASA-CR-165261]
  p0335 N81-20078
Quiet Clean Short-haul Experimental Engine
  (QCSEE): acoustic performance of a 50.8-cm (20
  inch) diameter variable pitch fan and inlet,
  test results and analysis, volume 1
  [NASA-CR-135117]
  p0497 N81-27097
Rotor wake characteristics relevant to
  rotor-stator interaction noise generation
  [NASA-TM-82703]
  p0583 N81-30130
TURBOGENERATORS
New BBC high-efficiency gas turbines
  p0017 A81-11797
Stability of large horizontal-axis axisymmetric
  wind turbines
  [NASA-TM-81623]
  p0085 N81-12446
First phase testing of solar thermal engine at
  United Stirling
  p0588 N81-30530
Heat pipe solar receiver with thermal energy storage
  p0588 N81-30532
TURBOJET AIRCRAFT
U JET AIRCRAFT
TURBOJET ENGINE CONTROL
Automation of aircraft gas-turbine power plants
  --- Russian book
  p0020 A81-12782
Electronic engine control for commercial aircraft
  p0309 A81-29775
Full Authority Digital Electronic Control turbofan
  engine demonstration
  [SAE PAPER 801199]
  p0402 A81-30209
Development of an integrated fault tolerant engine
  control
  [AIAA PAPER 81-1365]
  p0502 A81-40845
Full authority digital electronic control /FADEC/
  - Variable cycle engine demonstration
  [AIAA PAPER 81-1498]
  p0506 A81-40910
Electronic control system for a modern turboprop
  engine
  [SAE PAPER 810620]
  p0523 A81-42775
Engine identification for adaptive control
  p0080 N81-12100
Multivarable nyquist array method with application
  to turbofan engine control
  p0080 N81-12101
Sensor/actuator failure detection for turbofan
  engines
  p0080 N81-12104
Application of the MNA design method to a
  nonlinear turbofan engine --- multivariable
  Nyquist array method
  [NASA-CR-163855]
  p0143 N81-15001
Integrated control system for a gas turbine engine
  [NASA-CASE-LEW-12594-2]
  p0274 N81-19116
TURBOJET ENGINES
NT BRISTOL-SIDDELEY BS 53 ENGINE
NT DUCTED FAN ENGINES
NT J-65 ENGINE
NT J-79 ENGINE
NT J-85 ENGINE
NT J-97 ENGINE
NT T-56 ENGINE
NT TF-30 ENGINE
NT TF-41 ENGINE
NT TURBOFAN ENGINES
NT TURBOPROP ENGINES
Quality control of precision castings for turbojet
  engine parts
  p0052 A81-13330
The origins of the turbojet revolution --- Book
  p0068 A81-16248
Rolls-Royce engines status report
  p0102 A81-17166
A preliminary experimental investigation of the
  response of a turbojet engine to inlet pressure
  distortion
  p0108 A81-17824
The measurement and analysis of station parameters
  of a turbojet engine
  p0109 A81-17825
Conditions of generation and methods of damping
  the inlet vortex of a turbojet engine
  p0121 A81-19442
Noise attenuation and associated thrust increase
  of turbojet engines through hyper-mixing ejector
  shrouds
  p0291 A81-29062
The effect of oxygen concentration distribution on
  altitude relighting performance of a turbo-jet
  engine combustor
  p0295 A81-29089
Some factors affecting altitude relighting
  performance of turbojet engine combustor
  [ASME PAPER 81-GT-49]
  p0312 A81-29962
Fabrication problems related to the contamination
  of titanium alloys
  p0417 A81-36664
The present and future applications of titanium
  alloys in engines
  p0417 A81-36666
Tests for inlet distortion in a two-spool turbojet
  engine on the ground test bed
  p0419 A81-37340
Combat survivability with advanced aircraft
  propulsion development
  [AIAA PAPER 81-1506]
  p0507 A81-40913
Excitation of surging type oscillations due to
  aperiodic external effects --- in multishaft
  turbojet engines
  p0509 A81-41032
Hydrogen fueled catalytic combustion for low
  thrust expendable turbojet engine
  [AIAA PAPER 81-1715]
  p0527 A81-43165
Bibliography on aerodynamics of airframe/engine
  integration of high-speed turbine-powered
  aircraft, volume 1
  [NASA-TM-81814]
  p0035 N81-11052
Numerical analysis of the flow in the connecting
  passage between the fan section and high
  pressure section of a turbojet engine

[AD-A090506] p0081 N81-12107
Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996
Nuclear blast response of airbreathing propulsion systems. Laboratory measurements with an operational J-85-5 turbojet engine
[AD-A092229] p0196 N81-16063
The use of AntiMisting Kerosene (AMK) in turbojet engines
p0267 N81-19063
Some effects of compressor fouling on the behavior of a turbojet engine --- as evidenced by an engine monitoring system
p0328 N81-20015
Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63 --- Langley unitary plan wind tunnel tests
[NASA-TM-81937] p0329 N81-20025
Investigations into local fault detection on turbojet engines --- monitoring instruments
p0382 N81-23011
Specification requirements for fighter engines
p0429 N81-24073
Development tests of an engine with limited life --- Microturbo TRI 60
p0433 N81-24103
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-28099
Turbojet engine blade damping
[NASA-CR-165406] p0549 N81-29130

TURBOMACHINE BLADES
NT COMPRESSOR BLADES
NT ROTOR BLADES (TURBOMACHINERY)
NT STATOR BLADES
NT TURBINE BLADES
Choking effects in the blade rows of turbomachines
p0061 A81-15269
The accuracy of mean-stream-line method in subsonic and transonic regions
p0296 A81-29105
Development of a large-scale wind tunnel for the simulation of turbomachinery airfoil boundary layers
[ASME PAPER 81-GT-6] p0310 A81-29931
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
Semi-inverse method of computation in inviscid transonic flows - Application to the design of turbomachines blades profiles
[ASME PAPER 81-GT-206] p0318 A81-30096
Supersonic stall flutter of high speed fans --- in turbofan engines
[NASA-TM-81613] p0140 N81-14978
Solution of plane cascade flow using improved surface singularity methods --- application of panel method to internal aerodynamics
[NASA-TM-81589] p0140 N81-14979
Full potential solution of transonic quasi-3-D flow through a cascade using artificial compressability
[NASA-TM-81637] p0140 N81-14980
Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation
[NASA-CR-165141] p0143 N81-15004
NASTRAN level 16 user's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159824] p0279 N81-19481
NASTRAN level 16 programmer's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
Design development, and certification of a CFM56 engine: Resistance to the ingestion of foreign bodies
p0431 N81-24067
Energy efficient engine, low-pressure turbine boundary layer program
[NASA-CR-165338] p0442 N81-25077

TURBOMACHINERY
NT AXIAL FLOW TURBINES
NT CENTRIFUGAL COMPRESSORS
NT CENTRIFUGAL PUMPS
NT GAS TURBINES
NT SHROUDED TURBINES
NT STEAM TURBINES
NT SUPERSONIC TURBINES
NT TURBINE PUMPS
NT TURBINES
NT TURBOCOMPRESSORS
NT TURBOFANS
NT TURBOGENERATORS
NT TWO STAGE TURBINES
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
p0614 A81-48196
Axial flow compressors. Citations from the Engineering Index data base
[PB80-808611] p0029 N81-10076
Three dimensional internal flows in turbomachinery, volume 1
[AD-A092737] p0197 N81-16065
Three-dimensional internal flows in turbomachinery, volume 2
[AD-A093130] p0215 N81-17090
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
Physical and numerical aspects of shock boundary layer interactions
p0256 N81-18324
Geometric methods in computational fluid dynamics --- turbomachinery
p0256 N81-18331
NASA's aeronautics research and technology base
[NASA-CR-164195] p0381 N81-22969
Classification of operating conditions of turbomachines from solid borne sound
p0382 N81-23015
Development for new laboratories for future testing
p0433 N81-24105

TURBOPROP AIRCRAFT
NT C-130 AIRCRAFT
NT F-27 AIRCRAFT
Improvements required in air traffic control to meet increasing general aviation turbine powered aircraft operations
[SAE PAPER 800614] p0062 A81-15335
Prop-Fan technical progress leading to technology readiness
[AIAA PAPER 81-0810] p0367 A81-33878
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
The role of the turboprop in the air transportation system for the 1980's and onward
[SAE PAPER 801197] p0402 A81-34207
The domain of the turboprop airplane
[SAE PAPER 801242] p0406 A81-34238
Assessment of propeller influence on lateral-directional stability of multiengine aircraft
p0411 A81-35632
Advanced technology and the commuter aircraft - A look into the next two decades
p0455 A81-38209
ATR 42 - A regional transport aircraft designed to save energy
p0464 A81-39696
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
The turboprop aircraft role in the 1980s
[AIAA PAPER 81-1730] p0528 A81-43169
The PW100 commuter powerplant
[AIAA PAPER 81-1731] p0528 A81-43170
Can advanced technology improve future commuter aircraft
[AIAA PAPER 81-1729] p0536 A81-43959
The Lear Fan 2100
p0625 A81-49975
Aerodynamic effects of nearly uniform slipstreams on thin wings in the transonic regime
[NASA-CR-152351] p0249 N81-18027
Low and high speed propellers for general aviation: Performance potential and recent wind tunnel test results
[NASA-TM-81745] p0338 N81-21028
Additional noise data on the SR-3 propeller
[NASA-TM-81736] p0447 N81-25767
Aircraft energy efficiency. Overview
[NASA-FACTS-96/9-80] p0538 N81-28083
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30385
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane

[NASA-CR-165768] p0596 N81-31184
TURBOPROP ENGINES
NT T-56 ENGINE
Turbopropeller engine PZL-10S
p0103 A81-17324
Engine maintenance cost calculation method
[ASME PAPER 81-GT-34] p0312 A81-29948
The role of flight research vehicles in prop-fan
technology development
[ASME PAPER 81-GM-216] p0318 A81-30104
Design considerations for future turboprop
transports
[SAWE PAPER 1340] p0352 A81-31380
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
The GTCP331 Auxiliary Power Unit for the next
generation commercial transports
[SAE PAPER 801147] p0398 A81-34176
Commuter turboprop propulsion technology
[SAE PAPER 801243] p0406 A81-34239
Optimization of aircraft propulsion
p0464 A81-39697
Investigation and improvement of an elbow-type gas
outlet of a turboprop engine
p0509 A81-41048
Factors influencing the predicted performance of
advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Low and high speed propellers for general aviation
- Performance potential and recent wind tunnel
test results
p0521 A81-42758
Electronic control system for a modern turboprop
engine
[SAE PAPER 810620] p0523 A81-42775
Propulsion system installation design for
high-speed prop-fans
[AIAA PAPER 81-1689] p0526 A81-43144
Wright Field turboprop study
[AIAA PAPER 81-1685] p0526 A81-43157
The PW100 commuter powerplant
[AIAA PAPER 81-1731] p0528 A81-43170
Turboprop engine propulsion for the 1990's
[AIAA PAPER 81-1648] p0533 A81-43935
The new generation of turboshaft and turboprop
engines
p0560 A81-44473
Maritime patrol aircraft engine study. General
Electric derivative engines. Volume 2:
Appendix A. Performance data - GE27/T3 study A1
turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General
Electric derivative engines. Volume 3:
Appendix B. Performance data - TF34/T7 study A1
turboprop
[AD-A089279] p0028 N81-10069
Jet wing interference for an overwing engine
configuration
p0188 N81-16008
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041
Rig investigation of a two stage single shaft low
cost turbine
p0432 N81-24099
Noise abatement technology options for
conventional turboprop airplanes
[AD-A101828] p0589 N81-30910
Design and analysis of a fuel-efficient
single-engine, turboprop-powered, business
airplane
[NASA-CR-165768] p0596 N81-31184
TURBOPUMPS
U TURBINE PUMPS
TURBOROTORS
U TURBINE WHEELS
TURBOSHAFTS
The impact of contingency ratings on advanced
turboshaft engine design
p0104 A81-17502
Issues regarding Army turboshaft engines
diagnostics and condition monitoring
p0105 A81-17514
Engine maintenance cost calculation method
[ASME PAPER 81-GT-34] p0312 A81-29948
T700 engine integral inlet separator - All weather
operational protection
p0469 A81-40108
A new approach to turboshaft engine growth
[AHS 80-41] p0477 A81-40169
The new generation of turboshaft and turboprop
engines
p0560 A81-44473
Multi-plane high speed balancing techniques and
the use of a high specific stiffness Ti-Borsic
material for vibration control
[AD-A093122] p0215 N81-17092
TURBULENCE
NT ATMOSPHERIC TURBULENCE
NT CLEAR AIR TURBULENCE
NT GUSTS
NT LOW LEVEL TURBULENCE
NT LOW TURBULENCE
Effects of axisymmetric contractions on turbulence
of various scales
p0093 N81-13055
Time dependent Navier-Stokes solution of a
turbulent gas jet ejected from a rectangular
orifice into a high-subsonic crossflow
p0138 N81-14964
Application of linear quadratic control in
reduction of aerodynamic forces on aircraft
p0332 N81-20061
Fountain-jet turbulence
[AD-A098098] p0423 N81-24020
An experimental investigation of a large delta P
settling chamber for a supersonic pilot quiet
tunnel
[NASA-CR-3436] p0434 N81-24112
Evaluation of turbulence reduction devices for the
Langley 8-foot Transonic Pressure Tunnel
[NASA-TM-81792] p0434 N81-24114
Energy efficient engine, low-pressure turbine
boundary layer program
[NASA-CR-165338] p0442 N81-25077
TURBULENCE EFFECTS
Wind shear effects on aircraft - Low-level shear
and clear-air turbulence as accident causes
p0067 A81-16136
Analysis of the influence of atmospheric
turbulence on alternating bending stress level
in helicopter main rotor blades
p0236 A81-25690
Qualitative comparison of calculated turbulence
responses with wind-tunnel measurements for a
DC-10 derivative wing with an active control
system
[AIAA 81-0567] p0306 A81-29494
Factors which influence the behavior of turbofan
forced mixer nozzles
[AIAA PAPER 81-0274] p0359 A81-32549
The influence of the airspeed on jet turbulence
and the consequences for the jet noise
[DGLR PAPER 81-021] p0609 A81-47595
Qualitative comparison of calculated turbulence
responses with wind-tunnel measurements for a
DC-10 derivative wing with an active control
system
[NASA-TM-83144] p0491 N81-26496
TURBULENCE METERS
Acoustic and turbulence measurements of a
tone-excited jet with and without flight
simulation
[AIAA PAPER 81-2007] p0621 A81-48640
Considerations for the installation of honeycomb
and screens to reduce wind-tunnel turbulence
[NASA-TM-81868] p0550 N81-29137
TURBULENT BOUNDARY LAYER
An experimental investigation of the interaction
between a glancing shock wave and a turbulent
boundary layer
p0012 A81-11649
Influence of free-stream turbulence intensity on
heat transfer in the two-dimensional turbulent
boundary layer of an accelerated compressible flow
p0110 A81-17994
The influence of flow disturbances on the
laminar-turbulent transition in a supersonic
boundary layer
p0124 A81-19643
Scale effects on turbulent boundary layer
development and flow separation around V/STOL
inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Numerical simulations of a segmented-plenum,
perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640

Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703

Three-dimensional wing boundary layer calculated with eight different methods
p0171 A81-21555

Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24079

An experimental investigation of separating flow on a convex surface
p0230 A81-24488

Electromagnetic precipitation and ducting of particles in turbulent boundary layers
p0239 A81-26506

Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507

Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
p0239 A81-26508

Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513

Compliant surfaces - Introduction
p0240 A81-26515

Analysis of turbulent boundary layer on cascade and rotor blades of turbomachinery
p0296 A81-29106

The displacement-thickness theory of trailing edge noise
p0348 A81-30785

Role of laminar separation bubbles in airfoil leading-edge stalls
p0354 A81-31613

A survey of heating and turbulent boundary layer characteristics of several hypersonic research aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39134

Pressure fluctuations on the surface of a small passenger aircraft. II - The effect of the turbulent boundary layer
p0562 A81-44618

Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-13034

Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers
[ONERA-NT-1980-4] p0126 N81-13930

Mean-flow and turbulence measurements in the vicinity of the trailing edge of an NACA (63 sub 1)-012 airfoil
[NASA-TP-1845] p0392 N81-23410

Turbulent interactions on airfoils at transonic speeds: Recent developments
p0483 N81-26047

Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
[NASA-CR-3444] p0587 N81-30392

TURBULENT FLOW

NT CAVITATION FLOW

NT SUPERCAVITATING FLOW

Aerodynamic sound generated by a slotted trailing edge
p0066 A81-15798

Instantaneous velocity measurements in a periodically pulsed plane turbulent jet
p0066 A81-15895

Dialogue on bridging some gaps in stability and transition research --- in external, internal and free-shear layer through-flow systems
p0115 A81-18105

Plane vortex gas flows --- emphasizing supersonic case
p0123 A81-19634

Numerical investigation of a model of turbulent combustion of hydrocarbons
[AIAA PAPER 81-0039] p0158 A81-20559

The numerical solution of incompressible turbulent flow over airfoils
[AIAA PAPER 81-0047] p0158 A81-20563

Measurements of flow quality in the Ames 2 x 2ft transonic wind tunnel
[AIAA PAPER 81-0156] p0161 A81-20636

Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659

Eddy viscosity in accelerated and retarded cascade-wake flows
p0233 A81-25267

Miniature pressure probe for measuring the surface-shear-stress vector in turbulent flow
p0233 A81-25354

Some problems of modeling high-speed aerodynamics --- in wind tunnels and tubes
p0237 A81-26118

Drag characteristics of V-groove and transverse curvature riblets
p0239 A81-26510

Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-29110

Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
p0354 A81-31612

Analysis of total and static pressure fluctuations in an air intake at high incidence
[AAAF PAPER NT 80-61] p0370 A81-33950

Some applications of the turbulence amplifier to airborne systems
p0514 A81-42173

Turbulence modeling for application to V/STOL propulsion induced effects: Two dimensional formulation
[AD-A090331] p0072 N81-12026

Effects of axisymmetric contractions on turbulence of various scales
p0093 N81-13055

Effects of downstream distance on turbulence decay for the compressor research facility low conditioning system
[AD-A091543] p0133 N81-14276

Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14964

Three-dimensional internal flows in turbomachinery, volume 2
[AD-A093130] p0215 N81-17090

La Recherche Aerospatiale, Bimonthly Bulletin no. 1980-2, March - April 1980
[ESA-TT-652] p0255 N81-18244

Physical and numerical aspects of shock boundary layer interactions
p0256 N81-18320

Comments on settling chamber design for quiet, blowdown wind tunnels
[NASA-TM-81948] p0335 N81-20085

Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053

Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3433] p0392 N81-23411

Fountain-jet turbulence
[AD-A098098] p0423 N81-24028

Analysis of laminar and turbulent symmetric blunt trailing-edge flows
[AD-A098703] p0439 N81-25046

TURBULENT HEAT TRANSFER

Influence of free-stream turbulence intensity on heat transfer in the two-dimensional turbulent boundary layer of an accelerated compressible flow
p0110 A81-17994

TURBULENT JETS

Non-isoenergetic turbulent jet mixing in a constant area duct --- in turbofan engines
[AIAA PAPER 81-0347] p0165 A81-20768

A computer simulation of turbulent jet flow
p0230 A81-24424

Partially confined multiple jet mixing
p0234 A81-25513

Experimental investigation of oscillating subsonic jets
p0360 A81-32777

Prediction of swirling reacting flow in ramjet combustors
[AIAA PAPER 81-1485] p0506 A81-40903

An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] p0618 A81-48606

The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] p0618 A81-48607

Application of optical methods to the study of jet noise and turbulence
[ISL-CO-201/80] p0147 N81-15819

TURBULENT MIXING

Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0228 A81-24078

Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434] p0504 A81-40871

Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3433] p0392 N81-23411

TURBULENT WAKES

NT PROPELLER SLIPSTREAMS

NT SLIPSTREAMS

An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826

Structure and decay characteristics of turbulence in the near- and far-wake of a moderately loaded compressor rotor-blade
[ASME PAPER 80-GT-95] p0109 A81-17954

Effects of design variables on spoiler control effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581

Eddy viscosity in accelerated and retarded cascade-wake flows
p0233 A81-25267

A numerical study of vortex shedding from one and two circular cylinders
p0233 A81-25355

Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-13034

Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers
[ONERA-NT-1980-4] p0126 N81-13930

The velocity induced by the wake of a wind turbine in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985

Unsteady wakes downstream from a profile oscillating in incidence --- aerodynamic flow tests on helicopter rotor blade profiles
[AAAF-NT-80-10] p0204 N81-16989

The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838

Rotor wake characteristics relevant to rotor-stator interaction noise generation
[NASA-TM-82703] p0583 N81-30130

TURING MACHINES

The use of finite-state machines for describing and validating flight control systems
p0322 A81-30265

TURNING FLIGHT

The problem of the minimum-time turn of a maneuverable aircraft velocity vector to a specified course angle
p0413 A81-36472

Time-constrained maximum-energy turns --- for modern fighter aircraft
[AIAA PAPER 81-1806] p0561 A81-44578

Time-constrained maximum-energy turns
[AD-A094733] p0273 N81-19107

TURRET

Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137

TVC (CONTROL)

U THRUST VECTOR CONTROL

TWISTED WINGS

How to improve the performance of transport aircraft by variation of wing aspect-ratio and twist /12th Daniel and Florence Guggenheim International Memorial Lecture/
p0006 A81-11602

Analysis and application of compliant rotor technology
p0467 A81-40086

The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146

The aerodynamic influences of rotor blade airfoils, twist, taper and solidity on hover and forward flight performance
p0572 A81-46607

Basic research in wake vortex alleviation using a variable twist wing
p0267 N81-19058

TWISTING

Wind tunnel evaluation of aeroelastically conformable rotors
[AHS 80-23] p0475 A81-40153

Choice of the optimal angular velocity of the twist of a flight vehicle
p0625 A81-49946

A study of wing body blending for an advanced supersonic transport
p0244 N81-17987

TWO DIMENSIONAL BODIES

A method for obtaining shockless transonic flows past two-dimensional airfoils whose profiles are partially modified from a given arbitrary profile
p0298 A81-29201

The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12036

Extended frequency turbofan model
[NASA-CR-165261] p0335 N81-20078

TWO DIMENSIONAL BOUNDARY LAYER

Influence of free-stream turbulence intensity on heat transfer in the two-dimensional turbulent boundary layer of an accelerated compressible flow
p0110 A81-17994

Development of a large-scale wind tunnel for the simulation of turbomachinery airfoil boundary layers
[ASME PAPER 81-GT-6] p0310 A81-29931

Boundary layer measurements on a two-dimensional wing with flap
[NLR-TR-79009-U] p0022 N81-10014

TWO DIMENSIONAL FLOW

Calculation of plane transonic flows using the integral equation method and shock fitting
p0016 A81-11779

Instantaneous velocity measurements in a periodically pulsed plane turbulent jet
p0066 A81-15895

Plane vortex gas flows --- emphasizing supersonic case
p0123 A81-19634

Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659

Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367

Numerical study on viscous shear flow past a circular cylinder
p0228 A81-24077

Subsonic cascade flow analysis by a finite element method
p0233 A81-25311

Numerical computation of compressible steady cascade flows
p0296 A81-29100

The axial velocity density ratio and the axial velocity density distribution in axial flow compressors and cascades
p0296 A81-29101

The accuracy of mean-stream-line method in subsonic and transonic regions
p0296 A81-29105

Flow separation in inlets at incidence angles
p0297 A81-29114

A diagonal form of an implicit approximate-factorization algorithm
p0300 A81-29363

Streamwise flow and heat transfer distributions for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985

Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367

Measurement of derivatives for an oscillating airfoil with flap
p0411 A81-35635

Modeling of 2D-nozzle plume for IR signature
prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107
Analysis of steady, two-dimensional, chemically
reacting nonequilibrium flow by an unsteady,
asymptotically consistent technique --- for
performance prediction of ramjet propulsion system
[AIAA PAPER 81-1432] p0504 A81-40869
Numerical experiments on unsteady flows through
vibrating cascades
p0613 A81-47961
Analytical characteristics methods: Applications
[VKI-PREPRINT-1980-10] p0021 N81-10011
Turbulence modeling for application to V/STOL
propulsion induced effects: Two dimensional
formulation
[AD-A090331] p0072 N81-12026
An analytic model of subsonic flow around an
airflow with a spoiler
p0138 N81-14966
An interactive computational aerodynamics analysis
program
[AD-A094765] p0263 N81-19033
A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012
Model and boundary aerodynamic data from high
blockage two-dimensional airfoil tests in a
shallow unstreamlined transonic flexible walled
test section --- transonic self-streamlining
wind tunnel
[NASA-CR-165685] p0343 N81-21087

TWO FLUID MODELS
A comparison of two droplet models for gas-turbine
combustion chamber flows
p0294 A81-29086

TWO PHASE FLOW
Particle dynamics of inlet flow fields with
swirling vanes
[AIAA PAPER 81-0001] p0156 A81-20526
Three-dimensional model of spray combustion in gas
turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
Effects of solid particles suspended in fluid flow
through an axial flow compressor stage
p0297 A81-29108
Particulate flow in centrifugal compressors used
in helicopters
p0297 A81-29109
Droplet breakup regimes and criteria for their
existence
p0614 A81-48079

TWO STAGE TURBINES
Turbine blade construction of multistage
axial-flow compressors
p0309 A81-29850

U

U.S.S.R.
US and USSR Military Aircraft and Missile
Aerodynamics 1970-1980. A selected, annotated
bibliography, volume 1
[NASA-TM-81951] p0547 N81-29119

UH-1 HELICOPTER
Acoustic performance evaluation of an advanced
UH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33952
Quarter-scale testing of an advanced rotor system
for the UH-1 helicopter
p0395 A81-34121
Flight test evaluation of a nonlinear hub spring
on a UH-1H helicopter
[AD-A098794] p0486 N81-26121

UH-60A HELICOPTER
General Electric infrared suppressors for the
Black Hawk helicopter
p0106 A81-17520
Modern techniques of conducting a flight loads
survey based on experience gained on the Black
Hawk helicopter
p0356 A81-32014
Main rotor six degree-of-freedom isolation system
analysis
[NASA-CR-165665] p0444 N81-25090
Fielding of an advanced helicopter. The UH-60A
Black Hawk: Initial operational experience
p0632 N81-33141

ULTRAPURE METALS
Plasma arc improves PM process - Tungsten free Ti
powder
p0227 A81-24045

ULTRASONIC FLAW DETECTION
New avenues of research in ultrasonic inspection
and their applications in the aerospace industry
p0052 A81-13332
In-flight fatigue crack monitoring using acoustic
emission
p0361 A81-32857
Acoustic emission techniques for in-flight
structural monitoring
[SAE PAPER 801211] p0404 A81-34219
High intensity acoustic testing to determine
structural fatigue life and to improve
reliability in nuclear reactor and aerospace
structures
p0455 A81-38372
Advanced ultrasonic testing of aerospace structures
p0557 A81-44329
Recognizing defects in carbon-fiber-reinforced
plastics
[DGLR PAPER 81-057] p0609 A81-47565

ULTRASONIC GRINDING MACHINES
U ULTRASONIC MACHINING

ULTRASONIC MACHINING
Increased fatigue resistance for blades of
stationary gas-turbine engines by ultrasonic
hardening with spherical particles
p0285 A81-28134

ULTRASONIC SPECTROSCOPY
Non-destructive testing of adhesive-bonded joints
p0153 A81-20162

ULTRASONIC TESTS
Computer techniques for ultrasonic inspection
[AD-A095285] p0337 N81-20447

ULTRASONICS
Ultrasonic cold forming of aircraft sheet materials
[AD-A096351] p0344 N81-21239

ULTRAVIOLET SPECTROSCOPY
The application of UV spectroscopy to the
quantitative analysis of nitrogen oxide
p0089 N81-13008

UNDER SURFACE BLOWING
Prediction method for aeroacoustic loads on under
the wing blown flaps
[AIAA PAPER 81-2038] p0621 A81-48684

UNDERWATER BREATHING APPARATUS
Helicopter emergency underwater escape
p0176 A81-22101

UNIFORM FLOW
Sound radiation from a finite length unflanged
circular duct with uniform axial flow. I -
Theoretical analysis. II - Computed radiation
characteristics
p0100 A81-16712

UNIPOLAR TRANSISTORS
U FIELD EFFECT TRANSISTORS

UNITED KINGDOM
Specification and requirements rationale for
military and civil helicopter engines
p0429 N81-24075
Fatigue Assessment of UK military aeroplanes
p0487 N81-26128
An evaluation of fatigue procedures for UK
military helicopters
p0489 N81-26133

UNITED STATES OF AMERICA
NT CALIFORNIA
NT PENNSYLVANIA
Light aviation in the United States - September 1980
--- French book
p0513 A81-41903
US and USSR Military Aircraft and Missile
Aerodynamics 1970-1980. A selected, annotated
bibliography, volume 1
[NASA-TM-81951] p0547 N81-29119

UNMANNED SPACECRAFT
NT NAVIGATION SATELLITES
NT NAVSTAR SATELLITES
NT TRANSIT SATELLITES

UNSTEADY FLOW
NT OSCILLATING FLOW
Experimental investigations on a harmonically
swinging trail edge flap with a space
[DGLR PAPER 80-029] p0055 A81-13925
A nonlinear, discrete-vortex-perturbation method
for unsteady lifting-surface problems with edge
separations
p0058 A81-14394

Testing stand for the measurement of nonsteady
aerodynamic forces in the transonic wind tunnel
at Goettingen
p0065 A81-15703
Instantaneous velocity measurements in a
periodically pulsed plane turbulent jet
p0066 A81-15895
On the derivation of universal indicial functions
--- for unsteady transonic flow
[AIAA PAPER 81-0328] p0165 A81-20753
A computerized study of wave characteristics in a
time dependent compressible flow
[AIAA PAPER 81-0410] p0169 A81-20838
A discrete vortex method for the non-steady
separated flow over an airfoil
p0179 A81-22568
Unsteady subsonic motion of a wing near a screen
p0225 A81-23889
On the unsteady wake-induced lift on a slotted
airfoil. II - The influence of displacement
thickness fluctuations
p0229 A81-24237
Computer simulation of unsteady flow past lifting
rotors of coaxial configuration
p0230 A81-24389
The problem of the unsteady hypersonic flow past a
plane profile
p0231 A81-24730
Transient three-dimensional flow along a porous
plate
p0231 A81-24815
Unsteady Newton-Busemann flow theory. I - Airfoils
p0234 A81-25512
A mathematical computer simulation of stationary
and nonstationary flow of an ideal
incompressible fluid around solid profiles and
arrays
p0237 A81-26045
A digital technique for the analysis of the
response of compressor/duct systems in unsteady
flow
p0294 A81-29078
Experimental verification of unsteady aerodynamic
models of supersonic unstalled flutter
p0295 A81-29094
Linear/nonlinear behavior in unsteady transonic
aerodynamics
[AIAA 81-0643] p0306 A81-29496
On some methods of supersonic unsteady lifting
surface analysis
[AIAA 81-0644] p0307 A81-29497
A new frequency parameter for unsteady aerodynamics
[AIAA 81-0649] p0307 A81-29502
Inverse or design calculations for non-potential
flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29906
Unsteady aerodynamics of an aerofoil at high angle
of incidence performing various linear
oscillations in a uniform stream
p0357 A81-32017
Comparison of computed and measured unsteady
pressure fields on a sepercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541
An experimental and theoretical investigation of a
twin-entry radial flow turbine under non-steady
flow conditions
[SAE PAPER 801136] p0397 A81-34167
The challenge of unsteady separating flows
p0411 A81-35647
Accuracy and application of a second-order theory
for three-dimensional supersonic and low
hypersonic unsteady flows aroung a thin wing
p0419 A81-37335
Application of unsteady airfoil theory to rotary
wings
p0465 A81-39874
Performance analysis of a family of planar pulse
generators
[AIAA PAPER 81-1590] p0507 A81-40965
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137
Numerical experiments on unsteady flows through
vibrating cascades
p0613 A81-47961
On the numerical analysis of stall flutter in
turbine cascade
p0613 A81-47963
Comparison of Unsteady Pressure Fields Computed
and Measured on the ZKP model
[AGARD-R-680] p0033 N81-11019
Reverse flow, pre-rotation and unsteady inlet flow
in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433
Philosophy and results of steady and unsteady test
techniques on a large scale transport aircraft
model in the ONERA transonic tunnel S1 MA. Part
1: Philosophy and results of steady tests.
Part 2: Interest of large models in unsteady
aerodynamics
p0190 N81-16019
Unsteady wakes downstream from a profile
oscillating in incidence --- aerodynamic flow
tests on helicopter rotor blade profiles
[AAAF-NT-80-10] p0204 N81-16989
Transonic flow studies
[NASA-CR-163965] p0249 N81-18029
Predicted and experimental steady and unsteady
transonic flows about a biconvex airfoil
[NASA-TM-81262] p0258 N81-18742
Unsteady transonic small disturbance theory with
strong shock waves
[NASA-CR-166157] p0261 N81-19020
Unsteady airloads on a harmonically pitching wing
with external store
[NLR-MP-80004-U] p0330 N81-20038
Unsteady pressure measurements during stall and
buffeting --- wind tunnel tests
[ESA-TT-641] p0339 N81-21041
Semi-actuator disk theory for compressor choke
flutter
[NASA-CR-3426] p0442 N81-25075
Overview: NASA/AF/Navy Symposium on
Aeroelasticity of Turbine Engines
[NASA-CR-164419] p0444 N81-25089
Pressure distribution computation on a nonlifting
symmetrical helicopter blade in forward flight
p0447 N81-26010
Flutter analysis fo two-dimensional and
two-degree-of-freedom MBB A-3, CAST 7, an TF-8A
supercritical airfoils in small-disturbance
unsteady transonic flow
[AD-A100334] p0540 N81-28104
Report of the panel on aeroelasticity and unsteady
aerodynamics
p0593 N81-31149

UNSTEADY STATE
The spectral analysis of nonstationary random
processes - Applications to aircraft
overflight-type noises --- French thesis
p0174 A81-21922

UNSWEPT WINGS
NT INFINITE SPAN WINGS
NT RECTANGULAR WINGS

UPDRAFTS
U VERTICAL AIR CURRENTS

UPPER SURFACE BLOWING
Influence of jet location on the efficiency of
spanwise blowing
p0154 A81-20352
Experimental development of an advanced
circulation control wing system for Navy STOL
aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
Quiet propulsive-lift technology ready for civil
and military applications
p0359 A81-32521
Reverse thrust performance of the QCSEE variable
pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
Comparison of NASA and contractor results from
aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81761] p0443 N81-25079
Investigation of the circulation control
wing/upper surface blowing high-lift system on a
low aspect ratio semispan model
[AD-A103090] p0627 N81-32128
A flight test evaluation of the Ball-Bartoe
jetwing propulsive lift concept
[AD-A103579] p0637 N81-33195

UPPER SURFACE BLOWN FLAPS
A computer program to calculate the longitudinal
aerodynamic characteristics of
upper-surface-blown wing-flap configurations
[NASA-CR-3005] p0071 N81-12014
A theoretical investigation of ground effects on
USB configurations
[NASA-CR-159005] p0262 N81-19021

UPWASH
VTOL in ground effect flows for closely spaced jets --- to predict pressure and upwash forces on aircraft structures [NASA-CR-152321] p0271 N81-19095
Alleviation cf helicopter fuselage-induced rotor unsteady loads through deterministic variation of the individual blade pitch [NASA-CR-166234] p0549 N81-29134

URBAN PLANNING
Community participation in airport planning p0112 A81-18067

URBAN RESEARCH
Unrepresentative temperatures at a first-order meteorological station Washington National Airport p0622 A81-48847
Continued research on selected parameters to minimize community annoyance from airplane noise [NASA-CR-164299] p0438 N81-24602

URBAN TRANSPORTATION
A new perspective in aviation systems planning p0112 A81-18069
Gas turbine engines and transmissions for bus demonstration programs [COO-4867-07] p0134 N81-14329
Published results of the program of university research. Transportaticn research results [PB81-210130] p0641 N81-34108

URETHANES
Erosion resistant coatings [NASA-TM-75870] p0377 N81-22098

USA (UNITED STATES)
U UNITED STATES OF AMERICA

USER MANUALS (COMPUTER PROGRAMS)
A computer program to calculate the longitudinal aerodynamic characteristics of upper-surface-blcwn wing-flap configurations [NASA-CR-3005] p0071 N81-12014
A system for aerodynamic design and analysis of supersonic aircraft. Part 2: User's manual [NASA-CR-3352] p0125 N81-13920
Turbine modeling technique to generate off-design performance data for both single and multistage axial-flow turbines [NASA-CR-165244] p0213 N81-17078
GASP- General Aviation Synthesis Program. Volume 4: Propulsion. Part 1: Theoretical development [NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091
GASP- General Aviation Synthesis Program. Volume 7: Economics. Part 1: Theoretical development [NASA-CR-152303-VOL-7-PT-1] p0271 N81-19094
NASTRAN level 16 user's manual updates for aeroelastic analysis of bladed discs [NASA-CR-159824] p0279 N81-19481
NASTRAN level 16 demonstration manual updates for aeroelastic analysis of bladed discs [NASA-CR-159826] p0279 N81-19483
AIRCL: A programmed system for generating NC tapes for airplane models. User's manual [NASA-CR-165687] p0340 N81-21058
Structural flight loads simulaticn capability. Volume 2: Structural analysis computer program user's manual [AD-A096594] p0375 N81-22045
User's manual for flight Simulator Display System (FSDS) [NASA-CR-164295] p0391 N81-23095
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 2: Users manual for the computer program [AD-A099391] p0494 N81-27080
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 3: Appendices A and B. Details of program 1 [AD-A099331] p0495 N81-27082
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 4: Appendices C and D. Details of program 2 [AD-A099332] p0495 N81-27083
Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program [NASA-CR-165373-VOL-3] p0496 N81-27091
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 3: User's manual for VATOL simulation program [NASA-CR-166129-VOL-3] p0538 N81-28086
User's manual for FSLIP-3, FLEXSTAB loads integration program [NASA-TM-81364] p0589 N81-30815
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers [NASA-TM-83135] p0631 N81-32966

USER REQUIREMENTS
RNAV benefits today - Today and future requirements p0111 A81-18056
Articulating user requirements for the commuter aircraft industry [AIAA PAPER 81-1733] p0528 A81-43171
Design options study. Volume 1: Executive summary --- user requirements for the advanced civil military aircraft [AD-A089536] p0027 N81-10056
Federal Radionavigation Plan. Volume 2: Requirements [AD-A093775] p0207 N81-17031
A scheduling model for the aerial relay system [NASA-CR-159387] p0249 N81-18032
Guide for users of the National Transonic Facility [NASA-TM-83124] p0550 N81-29139
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements [AD-A102521] p0630 N81-32158

UTILITY AIRCRAFT
NT BO-105 HELICOPTER
NT P-531 HELICOPTER
NT UH-1 HELICOPTER
NT UH-60A HELICOPTER
The new utility - Commuter-technology in the sky p0457 A81-38801

UTILIZATION
NT COAL UTILIZATION
NT LASER APPLICATIONS
NT WASTE UTILIZATION
NT WINDPOWER UTILIZATION
Methodology for engine/aircraft selection with life and utilization considerations [AIAA PAPER 81-1401] p0515 A81-42190

V

V GROOVES
Drag characteristics of V-groove and transverse curvature riblets p0239 A81-26510

V/STOL AIRCRAFT
NT AH-1G HELICOPTER
NT AH-64 HELICOPTER
NT AUTOGYROS
NT BO-105 HELICOPTER
NT C-15 AIRCRAFT
NT CH-47 HELICOPTER
NT COMPOUND HELICOPTERS
NT FLYING PLATFORMS
NT FV-12A AIRCRAFT
NT H-53 HELICOPTER
NT HEAVY LIFT HELICOPTERS
NT HELICOPTERS
NT MILITARY HELICOPTERS
NT P-531 HELICOPTER
NT RIGID ROTOR HELICOPTERS
NT ROTARY WING AIRCRAFT
NT S-61 HELICOPTER
NT SA-3 HELICOPTER
NT SHORT TAKEOFF AIRCRAFT
NT TANDEM ROTOR HELICOPTERS
NT TILT ROTOR AIRCRAFT
NT UH-1 HELICOPTER
NT UH-60A HELICOPTER
NT VERTICAL TAKEOFF AIRCRAFT
NT XV-15 AIRCRAFT
An airspeed vector sensor for V/STOL aircraft [AIAA 80-1938] p0052 A81-13364
Determination if fiber-optic immunity is adequate for deployment in the V/STOL airframe --- to compensate nonmetallic material LF transparency p0057 A81-14265
Charting a course for V/STOL p0060 A81-16179
Industry proposes supersonic V/STOL p0122 A81-19490
An analytical solution of lift loss for a round planform with a central lifting jet [AIAA PAPER 81-0011] p0157 A81-20535

Scale effects on turbulent boundary layer
development and flow separation around V/STOL
inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Numerical optimization of circulation control
airfoils
[AIAA PAPER 81-0016] p0157 A81-20540
Three-dimensional turbulent boundary layer
development and separation in V/STOL engine
inlets at incidence with small-cross flow and
curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
Piloting techniques on the backside - Flight path
angle control
p0171 A81-21673
The M.45SD-02 variable pitch geared fan engine
demonstrator test and evaluation experience
p0283 A81-27897
Supersonic V/STOL prospects brighten
p0288 A81-28599
Aircraft thrust augmentors of ejector type ---
Russian book
p0289 A81-28760
Technology pays off on the AV-8B
p0291 A81-29060
V/STOL advanced technology rewards and risk ---
aircraft design
[SAWE PAPER 1385] p0354 A81-31401
A design analysis technique for evaluating size
and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402
Future challenges in V/STOL flight propulsion
control integration
[SAE PAPER 801140] p0397 A81-34170
A comparison of propulsion systems for V/STOL
supersonic combat aircraft
[SAE PAPER 801141] p0398 A81-34171
Feasibility of forward-swept wing technology for
V/STOL aircraft
[SAE PAPER 801176] p0400 A81-34189
Preliminary aerodynamic characteristics of several
advanced VSTOL fighter/attack aircraft concepts
[SAE PAPER 801178] p0403 A81-34191
V/STOL capability by modifying CTOL aircraft
[SAE PAPER 801179] p0400 A81-34192
Evaluation of several control/display concepts for
V/STOL shipboard landing
[SAE PAPER 801205] p0403 A81-34213
AV-8B operational features for rapid deployment
[SAE PAPER 801228] p0405 A81-34231
Aerodynamic characteristics of two VSTOL fighter
configurations
[AIAA PAPER 81-1292] p0454 A81-38119
V/STOL combat aircraft progress from the
powerplant viewpoint
p0469 A81-40105
The requirements for and evolution of a test rig
for exhaust gas recirculation studies of V/STOL
aircraft
p0469 A81-40106
The development of a twin-turbofan V/STOL aircraft
[AHS 80-8] p0473 A81-40141
V/STOL technology requirements for future fighter
aircraft
[AIAA PAPER 81-1360] p0502 A81-40841
Multi-mission V/STOL with vectored thrust engines
[AIAA PAPER 81-1363] p0502 A81-40843
Development of an integrated fault tolerant engine
control
[AIAA PAPER 81-1365] p0502 A81-40845
A compact installation for testing vectored-thrust
engines
[AIAA PAPER 81-1592] p0508 A81-40967
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186
Advanced technology engine studies /ATES/ - A
status report
[AIAA PAPER 81-1502] p0516 A81-42203
ATES activity and status at Detroit Diesel Allison
--- Advanced Technology Engine Studies
[AIAA PAPER 81-1504] p0516 A81-42206
Design concepts for minimizing hot-gas ingestion
in V/STOL aircraft
[AIAA PAPER 81-1624] p0525 A81-43133
Vertical momentum of the fountain produced by
multijet vertical impingement on a flat ground
plane
p0529 A81-43396
Lift-enhancing surfaces on several advanced V/STOL
fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-43946
Numerical and classical analysis of V/STOL
aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898
Turbulence modeling for application to V/STOL
propulsion induced effects: Two dimensional
formulation
[AD-A099333] p0072 N81-12026
Experimental aerodynamic characteristics of two
V/STOL fighter/attack aircraft configurations at
Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Propulsion system mathematical model for a
lift/cruise fan V/STOL aircraft
[NASA-TM-81663] p0195 N81-16055
Historical overview of V/STOL aircraft technology
[NASA-TM-81280] p0272 N81-19100
Experimental investigations on the V/STOL tunnel
at NASA/Langley Research Center
[NASA-CR-165655] p0329 N81-20028
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Static tests of the J97 powered, external
augmentor V/STOL wind tunnel model
[NASA-CR-152403] p0337 N81-21010
Low-range airspeed sensors
[AD-A096359] p0342 N81-21076
V/STOLAND digital avionics system for XV-15 tilt
rotor
[NASA-CR-152320] p0375 N81-22047
Analysis of wind tunnel test results for a
9.39-per cent scale model of a VSTOL
fighter/attack aircraft. Volume 1: Study
overview --- aerodynamic characteristics
[NASA-CR-152391-VOL-1] p0384 N81-23030
Analysis of wind tunnel test results for a
9.39-per cent scale model of a VSTOL
fighter/attack aircraft. Volume 2: Evaluation
of prediction methodologies
[NASA-CR-152391-VOL-2] p0384 N81-23031
Analysis of wind tunnel test results for a
9.39-per cent scale model of a VSTOL
fighter/attack aircraft. Volume 3: Effects of
configuration variations from baseline
[NASA-CR-152391-VOL-3] p0384 N81-23032
Analysis of wind tunnel test results for a
9.39-per cent scale model of a VSTOL
fighter/attack aircraft. Volume 4: RALS R104
aerodynamic characteristics and comparisons with
E205 configuration aerodynamic characteristics
[NASA-CR-152391-VOL-4] p0384 N81-23033
Method for predicting the jet-induced aerodynamics
of V/STOL configurations in transition
[AD-A097356] p0385 N81-23043
Flap survey test of a combined surface blowing
model: Flow measurements at static flow
conditions
[NASA-CR-152124] p0423 N81-24023
A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064
Top-mounted inlet system feasibility for
transonic-supersonic fighter aircraft --- V/STOL
aircraft
[NASA-TM-81292] p0420 N81-24066
Axisymmetric & non-axisymmetric exhaust jet
induced-effects on a V/STOL vehicle design.
Part 1: Data presentation --- conducted in Ames
11-foot transonic tunnel
[NASA-CR-166146] p0441 N81-25064
An engineering method for estimating the induced
lift on V/STOL aircraft hovering in and out of
ground effect
[AD-A098509] p0441 N81-25069
Additional testing of the inlets designed for a
tandem fan V/STOL nacelle
[NASA-CR-165310] p0483 N81-26075
Phase 2 and 3 wind tunnel tests of the J-97
powered, external augmentor V/STOL model ---
conducted in Ames 40- by 80-foot wind tunnel
[NASA-CR-152380] p0483 N81-26076
Validation study of the V/STOL aerodynamics and
stability and control manual
[AD-A099236] p0486 N81-26119
Study of an engine flow diverter system for a
large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096

An engineering method for estimating the lateral/directional characteristics of V/STOL configurations in transition [AD-A100386] p0540 N81-28103
Static test of a fan-powered chin nozzle for V/STOL applications [NASA-CR-165361] p0546 N81-29093
Conceptual/preliminary design study of subsonic v/stol and stovl aircraft derivatives of the S-3A [NASA-TM-81310] p0547 N81-29118
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0 --- Ames 9 by 7 foot supersonic wind tunnel [NASA-TM-81286] p0579 N81-30083
Vertical lift capabilities for the 80's and 90's p0632 N81-33139
Ten years of US Marine Corps Harrier operations p0632 N81-33140
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problem p0632 N81-33142
Historical overview of V/STOL aircraft technology p0633 N81-33143
Recent progress in V/STOL aircraft technology p0633 N81-33144
V/STOL aircraft technology in Canada p0634 N81-33152
US military V/STOL: Who needs it? Wants it? Can afford it? p0634 N81-33156

VACUUM TESTS
NT THERMAL VACUUM TESTS
VACUUM TUBE OSCILLATORS
NT CATHODE RAY TUBES
NT IMAGE TUBES
VACUUM TUBES
NT CATHODE RAY TUBES
NT IMAGE TUBES
VALIDATION
U PROVING
VALUE ENGINEERING
Aircraft engine programs employing cost objectives p0119 A81-19346
Design to Cost and Life Cycle Cost [AGARD-CP-289] p0045 N81-11902
US Army design-to-cost experience p0045 N81-11905
A review and assessment of system cost reduction activities p0045 N81-11906
Design to life cycle cost research p0045 N81-11907
Organizing a design-to-cost program p0046 N81-11914
A new method for estimating transport aircraft direct operating costs p0046 N81-11915
Design-to-cost applied to the AS350 helicopter p0046 N81-11916
Using cost reduction concepts at Messier-Hispano-Bugatti p0047 N81-11923
VALVES
NT PRESSURE REGULATORS
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion [SAE PAPER 801100] p0512 A81-41776
Study of an engine flow diverter system for a large scale ejector powered aircraft model [NASA-CR-166163] p0540 N81-28096
VANADIUM ALLOYS
Effects of geometric variables on rub characteristics of Ti-6Al-4V [NASA-TP-1835] p0336 N81-20245
VANADIUM COMPOUNDS
Vanadium trineodecanoate promoter for fiberglass-polyester soil surfacings [AD-A091785] p0132 N81-14084
VANELESS DIFFUSERS
The effect of impeller tip design on the performance of a mixed flow turbocharger compressor [ASME PAPER 81-GT-7] p0310 A81-29932
VANES
NT GUIDE VANES
NT JET VANES
Vortex drag reduction by aft-mounted diffusing vanes p0012 A81-11647
Stress analysis of first turbine vane using a 3-dimensional model with non linear material behavior subjected to transient temperatures [AIAA PAPER 81-1437] p0504 A81-40873
The predictability of turbine vane convection heat transfer [AIAA PAPER 81-1435] p0566 A81-45892
The effect of vane-frame design on rotor-stator interaction noise [AIAA PAPER 81-2034] p0619 A81-48627
Design development, and certification of a CFM56 engine: Resistance to the ingestion of foreign bodies p0431 N81-24087
Aerodynamic and aeroelastic research on tipvane turbines [VTH-LR-302] p0540 N81-28100
VAPORIZING
NT PREVAPORIZATION
NT TRANSPIRATION
A vaporizing combustor with double combustion spaces p0109 A81-17827
Premixing and flash vaporization in a two-stage combustor [ASME PAPER 81-GT-41] p0312 A81-29955
VAPORS
NT SODIUM VAPOR
NT WATER VAPOR
VARIABILITY
Methodology for determining sampling intervals [AD-A092591] p0202 N81-16825
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft p0603 N81-31452
VARIABLE AREA WINGS
U TRAILING-EDGE FLAPS
VARIABLE CYCLE ENGINES
Full authority digital electronic control application to a variable cycle engine [SAE PAPER 801203] p0403 A81-34212
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration [AIAA PAPER 81-1498] p0506 A81-40910
ATES activity and status at Detroit Diesel Allison --- Advanced Technology Engine Studies [AIAA PAPER 81-1504] p0516 A81-42206
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions --- Lewis 8 by 6-foot supersonic wind tunnel tests [NASA-CR-159818] p0093 N81-13057
Acoustic and aerodynamic performance investigation of inverted velocity profile coannular plug nozzles --- variable cycle engines [NASA-CR-3149] p0203 N81-16858
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 1: Design layouts [NASA-CR-159819-VOL-1] p0214 N81-17081
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aeroynamic data book 1 [NASA-CR-159819-VOL-2-BK-1] p0214 N81-17082
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 2 [NASA-CR-159819-VOL-2-BK-2] p0214 N81-17083
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 3 [NASA-CR-159819-VOL-2-BK-3] p0214 N81-17084
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 1 [NASA-CR-159819-VOL-3-BK-1] p0214 N81-17085

Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 2 [NASA-CR-159819-VOL-3-BK-2] p0214 N81-17086
Aerodynamic/acoustic performance of YJ101/double bypass VCE with coannular plug nozzle [NASA-CR-159869] p0220 N81-17846
VCE test bed engine for supersonic cruise research p0245 N81-17995
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle p0245 N81-17999
Supersonic cruise vehicle research/business jet p0248 N81-18022
Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers [AD-A098614] p0444 N81-25086
Reliability advancement for electronic engine controllers, volume 1 [AD-A098623] p0444 N81-25087

VARIABLE GEOMETRY STRUCTURES
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study [ASME PAPER 80-GT-16] p0019 A81-12609
Adaptive airfoils and wings for efficient transonic flight p0153 A81-20349
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack [AIAA PAPER 81-0050] p0158 A81-20566
Experimental determination of the stress intensity factor for cracks with a curvilinear front in complex parts /gas turbine blades/ p0351 A81-31264
F-16 variable-geometry inlet design and performance [AIAA PAPER 81-1394] p0514 A81-42184
Off-design performance loss model for radial turbines with pivoting, variable-area stators [NASA-TP-1708] p0036 N81-11036

VARIABLE LIFT
U LIFT

VARIABLE PITCH PROPELLERS
The M.45SD-02 variable pitch geared fan engine demonstrator test and evaluation experience p0283 A81-27897
Some propeller developments in the United Kingdom [AIAA PAPER 81-1566] p0507 A81-40949
Performance prediction for light airplanes p0622 A81-49374

VARIABLE STREAM CONTROL ENGINES
A successful step toward an advanced supersonic transport engine - Acoustic and emission results from the Pratt and Whitney Aircraft Variable Cycle Engine Program [AIAA PAPER 81-1593] p0508 A81-40968
Design of a multivariable integrated control for a supersonic propulsion system --- variable stream control engine p0079 N81-12094
Progress with variable cycle engines p0245 N81-17997

VARIABLE SWEEP WINGS
Study of a variable sweep wing in sub or transonic flow [ONERA, TP NO. 1978-166] p0058 A81-14391
Sukhoi's pivotal interdictor p0109 A81-17832
Project and experimental fatigue test of the wing of a modern combat aircraft p0180 A81-22625
Dynamics of longitudinal motion of a variable-sweepback aeroplane with a deformable control system p0231 A81-2472
Subsonic and transonic flow on a wing at different sweep angles. I p0351 A81-31249
Subsonic and transonic flow on a wing at different sweep angles. II p0351 A81-31250
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration [ARC-R/M-3842-PT-2] p0021 N81-10010
Some particular configuration effects on a thin supercritical variable camber wing p0188 N81-16005
Effect of wing-transition location and slotted and unslotted flaps on aerodynamic characteristics of a fighter model at high subsonic speeds --- conducted in langley 8-foot transonic pressure tunnel [NASA-TM-X-1849] p0262 N81-19024
Research related to variable sweep aircraft development [NASA-TM-83121] p0401 N81-25067

VARIANCE (STATISTICS)
NT COVARIANCE
NT MULTIVARIATE STATISTICAL ANALYSIS
NT REGRESSION ANALYSIS

VARIATIONAL PRINCIPLES
Variational problems of gas dynamics p0069 A81-16455
Variational principles and generalized variational principles for the hybrid aerodynamic problem of airfoil cascades on an arbitrary stream sheet of revolution p0107 A81-17741

VARIATIONS
NT PERIODIC VARIATIONS
NT WIND VARIATIONS

VASOMOTOR NERVOUS SYSTEM
U NERVOUS SYSTEM

VATOL AIRCRAFT
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 1: Model description application [NASA-CR-166129-VOL-1] p0538 N81-28084
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 2: Model equations and base aircraft data [NASA-CR-166129-VOL-2] p0538 N81-28085
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 3: User's manual for VATOL simulation program [NASA-CR-166129-VOL-3] p0538 N81-28086

VCE
U VARIABLE CYCLE ENGINES

VECTOR ANALYSIS
NT VORTICITY
Application of vector performance optimisation to a robust control loop design for a fighter aircraft [DFVLR-FB-80-14] p0130 N81-13970
A study of real-time computer graphic display technology for aeronautical applications [NASA-CR-164221] p0380 N81-22727
Total energy and flight control --- energy vectors as part of piloting schemes [SNIAS-802-111-102] p0434 N81-24110

VECTOR CALCULUS
U VECTOR SPACES

VECTOR CONTROL
U DIRECTIONAL CONTROL

VECTOR SPACES
NT EIGENVALUES
NT MATRICES (MATHEMATICS)
NT STATE VECTORS
NT STIFFNESS MATRIX
NT VORTICITY
Optimal flight vehicle design and linear vector spaces p0014 A81-11668
A higher-order trapezoidal vector vortex panel for subsonic flow [AD-A094775] p0263 N81-19032

VECTORS (MATHEMATICS)
NT STATE VECTORS
NT VORTICITY

VEHICLE WHEELS
The influence of structural parameters and velocity on the shimmy of self-aligned wheels p0556 A81-44260
A formulation of the shimmy problem for swiveling wheels p0607 A81-47268
Current research in aircraft tire design and performance p0268 N81-19065
Tire/wheel concept [NASA-CASE-LAR-11695-2] p0437 N81-24443

VELOCITY
NT ACOUSTIC VELOCITY

NT AIRSPEED
NT ANGULAR VELOCITY
NT CRITICAL VELOCITY
NT FLOW VELOCITY
NT GROUND SPEED
NT HIGH SPEED
NT LANDING SPEED
NT LOW SPEED
NT PROPAGATION VELOCITY
NT ROTOR SPEED
NT SUBSONIC SPEED
NT SUPERSONIC SPEEDS
NT TIP SPEED
NT TRANSONIC SPEED
NT WIND VELOCITY

VELOCITY DISTRIBUTION
Characteristics of the velocity field near a wing-body combination located at an angle of attack to an oncoming supersonic flow
p0119 A81-19337
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24079
A method for measuring the velocity field in a stalled flow
p0287 A81-28523
The axial velocity density ratio and the axial velocity density distribution in axial flow compressors and cascades
p0296 A81-29101
A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29982
Suppression of jet noise peak by velocity profile reshaping
p0458 A81-39039
Flow measurements in the wake of a wing fitted with a leading-edge root extension (strake)
[RAE-TR-79120] p0022 N81-10015
Experimental investigations on the V/STOL tunnel at NASA/Langley Research Center
[NASA-CR-165655] p0329 N81-20028
A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012
Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section --- transonic self-streamlining wind tunnel
[NASA-CR-165685] p0343 N81-21087

VELOCITY FIELDS
U VELOCITY DISTRIBUTION

VELOCITY MEASUREMENT
NT WIND VELOCITY MEASUREMENT
A survey of recent atmospheric turbulence measurements from a subsonic aircraft
[AIAA PAPER 81-0298] p0164 A81-20736
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208] p0168 A81-20830
A method for measuring the velocity field in a stalled flow
p0287 A81-28523
Airborne ground velocity determination by digital processing of electro-optical line sensor signals
p0358 A81-32496
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[NASA-TM-81657] p0195 N81-16053

VELOCITY PROFILES
U VELOCITY DISTRIBUTION

VENTILATION
Wind tunnel wall interference in a test section with ventilated walls
p0015 A81-11673

VENTILATION FANS
Noise and noise abatement in fans and blowers: A review
[DFVLR-FB-80-16] p0138 N81-14796

VERBAL COMMUNICATION
Bilingual air traffic control in Canada
p0169 A81-20915
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464

VERIFICATION (PROVING)
U PROVING

VERTEBRATES
NT BIRDS

VERTICAL AIR CURRENTS
Experimental investigation of orographic waves and vertical motions in the Krasnovodsk airport area
p0121 A81-19441
Analysis of wind vector components in the lower troposphere Applications to aircraft operations at terminals
[AIAA PAPER 81-0387] p0167 A81-20799
Evaluation of the effect of horizontal and vertical stratification on the stability of air flows
p0241 A81-26839
Magnitude and frequency of wind speed shears and associated downdrafts
p0267 N81-19055

VERTICAL ATTITUDE TAKEOFF-LANDING AIRCRAFT
U VATOL AIRCRAFT

VERTICAL FINS
U FINS

VERTICAL FLIGHT
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126

VERTICAL LANDING
Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
[SAE PAPER 801206] p0403 A81-34214
STOL performance of the tilt rotor
p0467 A81-40085
Runway and deck temperatures in vertical takeoff/landing operations
[AIAA PAPER 81-1623] p0525 A81-43132
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 1: Model description application
[NASA-CR-166129-VOL-1] p0538 N81-20084
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 3: User's manual for VATOL simulation program
[NASA-CR-166129-VOL-3] p0538 N81-20086
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] p0638 N81-33199

VERTICAL MOTION
Simulation of a third-order vertical channel mechanization --- for airplane inertial navigation
p0322 A81-30290
Experimental substantiation for hovering rotor vertical impedance calculations
p0453 A81-38015

VERTICAL ORIENTATION
Validation of the Wright-Patterson vertical wind tunnel
[AD-A094777] p0277 N81-19143

VERTICAL STABILIZERS
U STABILIZERS (FLUID DYNAMICS)

VERTICAL TAILS
U STABILIZERS (FLUID DYNAMICS)
U TAIL ASSEMBLIES

VERTICAL TAKEOFF
Numerical calculation of jet-induced ground effect in VTOL
[AIAA PAPER 81-0015] p0157 A81-20530
Runway and deck temperatures in vertical takeoff/landing operations
[AIAA PAPER 81-1623] p0525 A81-43132
Study of heliport airspace and real estate requirements
[AD-A091156] p0095 N81-13032

VERTICAL TAKEOFF AIRCRAFT
NT FLYING PLATFORMS
VTOL control for shipboard landing in high sea states
p0155 A81-20471
Flight test evaluation of a digital controller used in a VTOL automatic approach and landing system
p0179 A81-22549
Establishing cruise-engine cycle payoffs for a supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007

Evaluation of the effect of actuator time lag on the minimum control power of a VTOL aircraft
p0319 A81-30160
Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
[SAE PAPER 801206] p0403 A81-34214
Twin-rotor patrol airship flying model
[AIAA 81-1312] p0456 A81-38529
ABC aircraft development status
p0467 A81-40084
ZGRAFT-A graphite code for VTOL aircraft ground footprint visualization
[AD-A093311] p0208 N81-17042
A study of State Feedback Implicit Model following control for VSTOL aircraft
[AD-A093253] p0216 N81-17099
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
VTOL in ground effect flows for closely spaced jets --- to predict pressure and upwash forces on aircraft structures
[NASA-CR-152321] p0271 N81-19095
A study of a VTOL thrusting ejector in low speed flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017
A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068
Design of a V/STOL propulsion system for a large-scale fighter model
[NASA-CR-166162] p0442 N81-25074
NAVTOLAND microwave scanning beam tests at NOSC. Three landing guidance systems tested in a specular multipath environment
[AD-A099298] p0484 N81-26086
Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea
[NASA-TM-81305] p0579 N81-30080
Simulation study of two VTOL control/display systems in IMC approach and landing
[NASA-TM-81295] p0584 N81-30136
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] p0638 N81-33199
VERTICAL TAKEOFF AND LANDING
U VERTICAL LANDING
U VERTICAL TAKEOFF
VERTOL MILITARY HELICOPTERS
U BOEING AIRCRAFT
VERY HIGH FREQUENCIES
Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037
VERY LOW FREQUENCIES
Errors of phase VLF-navigation systems under conditions of auroral disturbances
p0607 A81-47533
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach
[AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams
[AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables
[AD-A092744] p0192 N81-16032
VLF P-static noise reduction in aircraft. Volume 2: Recommended action
[AD-A099130] p0491 N81-26394
VFR (RULES)
U VISUAL FLIGHT RULES
VHF OMNIRANGE NAVIGATION
The flight assessment and applications of DME/DME. I, II
p0174 A81-21968
Characterizing cross-track error distributions for continental jet routes
p0174 A81-21969
Results of a Loran-C flight test using an absolute data reference --- vhf omnirange navigation system and discrete address beacon system
p0371 N81-22006
Investigation of Wilcox model 585B very high frequency omnidirectional radio range system, part 2
[AD-A099525] p0494 N81-27073
VIBRATION
NT BENDING VIBRATION
NT COMBUSTION VIBRATION
NT FLUTTER
NT FORCED VIBRATION
NT FREE VIBRATION
NT PANEL FLUTTER
NT RESONANT VIBRATION
NT SELF INDUCED VIBRATION
NT STRUCTURAL VIBRATION
NT SUBSONIC FLUTTER
NT SUPERSONIC FLUTTER
NT TORSIONAL VIBRATION
NT TRANSONIC FLUTTER
On the use of active higher harmonic blade pitch control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047
The Shock and Vibration Digest, volume 12, number 11
[AD-A092384] p0257 N81-18403
Vibrations of turbine engine blades by shell analysis
p0257 N81-18404
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25071
VIBRATION DAMPERS
U VIBRATION ISOLATORS
VIBRATION DAMPING
Experimental application of a vibration reduction technique
p0004 A81-10770
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
Active suppression of aircraft flutter
p0059 A81-14397
Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream
p0060 A81-14959
Elimination of vibrations in aircraft piping systems --- Russian book
p0116 A81-18437
Modelling techniques for the reduction of noise and vibration in gearboxes
p0151 A81-20063
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology --- Linear Quadratic Gaussian
[AIAA PAPER 81-0021] p0158 A81-20544
Damping of aircraft wing vibrations by automatically controlled internal forces
p0170 A81-21060
Damping in the problem of natural vibrations of an elastic system with internal resonance
p0236 A81-25896
Investigation of the squeeze film bearing on two-spool turbo-fan engine
p0295 A81-29093
Reduction of strut induced rotor blade vibration with the modified stator setting angles
p0295 A81-29097
The influence of gyroscopic forces on the dynamic behavior of rotating blades
p0295 A81-29098
Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, Ga., April 6-8, 1981, and AIAA Dynamics Specialists Conference, Atlanta, Ga., April 9, 10, 1981, Technical Papers. Part 2
p0303 A81-29428
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442
Application of a Fourier analyzer to the analysis of shimmy test data
[AIAA 81-0533] p0303 A81-29453
Response of stiffened sandwich panels
[AIAA 81-0557] p0303 A81-29455
Active control of forward swept wings with divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing

[AIAA 81-0639] p0306 A81-29493
Qualitative comparison of calculated turbulence
responses with wind-tunnel measurements for a
DC-10 derivative wing with an active control
system
[AIAA 81-0567] p0306 A81-29494
Comparison of analysis and flight test data for a
drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
Flight test results of an active flutter
suppression system installed on a remotely
piloted research vehicle
[AIAA 81-0655] p0308 A81-29507
Application of a flight test and data analysis
technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
Improved jet engine maintenance through automated
vibration diagnostic systems
[ASME PAPER 81-GT-62] p0313 A81-29972
Test procedures used in determining aircraft
suitability for STAN integral weight and balance
system
[SAWE PAPER 1339] p0352 A81-31379
Reduction of helicopter vibration through control
of hub-impedance
p0356 A81-32009
Helicopter vibration control - A survey
p0364 A81-33047
A new method for modal identification
p0365 A81-33293
Some characteristics of aircraft motion at large
angles of attack
p0414 A81-36473
Helicopter vibration reduction through structural
manipulation
p0467 A81-40090
Optimal higher harmonic blade pitch control for
minimum vibration of a hinged rotor
p0473 A81-40134
An experimental investigation of the effects of
aeroelastic couplings on aeromechanical
stability of a hingeless rotor helicopter
[AHS 80-25] p0475 A81-40155
Active control of the helicopter rotor for
vibration reduction
[AHS 80-68] p0479 A81-40188
An active control system for helicopter vibration
reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189
Automatic damping of vibrations of an airplane
wing by internal control forces
p0577 A81-46783
Self-oscillations of a wheel on a self-aligning
landing gear strut with a nonlinear damper
A81-46847
Damping of turbomachine blade variations by
subsonic flow
p0612 A81-47957
Damping applications for vibration control;
Proceedings of the Winter Annual Meeting,
Chicago, IL, November 16-21, 1980
p0613 A81-47993
Damping applications in aero-propulsion systems
p0613 A81-47999
Passive control of wing/store flutter
[NASA-TM-81865] p0125 N81-13922
Multi-plane high speed balancing techniques and
the use of a high specific stiffness Ti-Borsic
material for vibration control
[AD-A093122] p0215 N81-17092
Design for active and passive flutter suppression
and gust alleviation
p0253 N81-18063
The development of a theoretical and experimental
model for the study of active suppression of
wing flutter
p0376 N81-22058
Flight test results of an active flutter
suppression system installed on a remotely
piloted research vehicle
[NASA-TM-83132] p0486 N81-26118
Final design and fabrication of an active control
system for flutter suppression on a
supercritical aeroelastic research wing
[NASA-CR-165714] p0498 N81-27114
Wind-tunnel evaluation of NASA developed control
laws for flutter suppression on a DC-10
derivative wing
[NASA-TM-83143] p0499 N81-27548

Turbojet engine blade damping
[NASA-CR-165406] p0549 N81-29130
Developement of antiresonance force isolators for
helicopter vibration reduction
[MBB-UD-305/80-OE] p0582 N81-30123
Some experiences with active control of
aeroelastic response
[NASA-TM-83179] p0587 N81-30469
VIBRATION EFFECTS
Crack propagation in panels of pressurized
fuselages upon simultaneous action of cyclic
loading by pressurization and high-frequency
vibrations
p0054 A81-13612
Review of engine/airframe/drive train dynamic
interface development problems
p0106 A81-17516
Engine-airframe transient compatibility - Analysis
and test
p0106 A81-17517
Sandwich structures with high transmission loss
p0151 A81-20069
Development of a shadow mask type high-resolution
color picture tube for cockpit display
p0183 A81-23095
Analysis of vibration related failures in aero
turbo-shaft engines
p0291 A81-29057
Laminar boundary layer on an oscillating wedge
p0309 A81-29864
Inlet distortion and blade vibration in
turbomachines
p0421 A81-37631
Investigation of the physical working environment
for cabin attendants within Scandinavian
Airlines System /SAS/ --- noise conditions and
aircraft vibration
p0568 A81-46357
Determination of in-flight helicopter loads
p0573 A81-46618
VIBRATION ISOLATORS
Model tests for an active rotor isolation system
[MBB-278-79-0] p0018 A81-12095
Hingeless tailrotor in fiber composite
construction and vibration-isolation systems
/ARIS, ASIS/ for helicopters
[MBB-UD-311-80-0] p0119 A81-193
Floor and fuel vibration isolation systems for the
Boeing Vertol commercial Chinook
p0356 A81-33016
Helicopter vibration control - A survey
p0364 A81-33047
Development of antiresonance force isolators for
helicopter vibration reduction
p0467 A81-400
LIVE - Liquid inertia vibration eliminator
[AHS 80-22] p0475 A81-46152
Nonlinear dynamic characteristics of the rotor
bifilar absorber
p0574 A81-46622
Self-oscillations of a wheel on a self-aligning
landing gear strut with a nonlinear damper
A81-46847
Procedure for evaluation of engine isolators for
reduced structure-borne interior noise
transmission
[AIAA PAPER 81-1970] p0618 A81-48600
Total main rotor isolation system analysis
[NASA-CR-165666] p0329 N81-20027
Total main rotor isolation system analysis
[NASA-CR-165667] p0494 N81-27076
Developement of antiresonance force isolators for
helicopter vibration reduction
[MBB-UD-305/80-OE] p0582 N81-30123
VIBRATION MEASUREMENT
High frequency angular vibration measurements in
vehicles
[AAS PAPER 81-024] p0361 A81-32886
Performance evaluation of a prototype
noninterference technique for measurement of
turbine engines compressor blade stress
[AD-A090566] p0094 N81-13061
Vibration test level criteria for aircraft equipment
[AD-A098675] p0442 N81-25070
VIBRATION MODE
A frequency-domain technique for aeroelastic mode
estimation
p0156 A81-20475

Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I
p0229 A81-24090
Coupled bending-torsion vibrations of rotating blades of asymmetric aerofoil cross section with allowance for shear deflection and rotary inertia by use of the Reissner method
p0289 A81-28942
Resonance of forwards and backwards vibration mode of impeller with gyroscopic effect
[AIAA 81-0524]
p0303 A81-29445
Application of a Fourier analyzer to the analysis of shimmy test data
[AIAA 81-0533]
p0303 A81-29453
Feasibility of a rotor flight-dynamics model with first-order cyclic inflow and multiblade modes
[AIAA 81-0611]
p0304 A81-29473
Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370
A new method for modal identification
p0365 A81-33293
Concerning one self-similarity property in flutter analysis
p0413 A81-36460
Vibrations in technical equipment. Volume 3 - Oscillations of machines, structures, and their components --- Russian book
p0511 A81-41725
The effect of various factors on the vibration characteristics of composite blades of gas turbine engines
p0524 A81-42793
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056]
p0610 A81-47603
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
p0613 A81-47966
Finite strip analysis of singly curved skin-stringer structures
p0616 A81-48390

VIBRATION PROTECTION
U VIBRATION ISOLATORS

VIBRATION SIMULATORS
Forced vibrations of a nonlinear system excited by a centrifugal oscillator with a sloping engine characteristic
p0002 A81-10439

VIBRATION TESTING MACHINES
U VIBRATION SIMULATORS

VIBRATION TESTS
NT DAMPING TESTS
Recent developments in NDT techniques --- for airport pavement testing
p0113 A81-18078
Nondestructive dynamic testing
p0124 A81-19657
Aerodynamic blade excitation in turbocompressors
p0282 A81-27612
Your next ground vibration test doesn't have to cost a million dollars
[AIAA 81-0529]
p0303 A81-29450
Application of a Fourier analyzer to the analysis of shimmy test data
[AIAA 81-0533]
p0303 A81-29453
F-15 nose landing gear shimmy, taxi test and correlative analyses
[SAE PAPER 801239]
p0406 A81-34237
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
p0467 A81-40087
Developing test profiles for multiple mission situations --- standards for military aircraft
p0570 A81-46483
The Hornet's operational mission environment
p0571 A81-46491
Determination of in-flight helicopter loads
p0573 A81-46618
Test and analyses of an active flutter suppression system on an FIDL model of YF17
p0082 N81-12110
Application of a flight test and data analysis technique to flutter of a drone aircraft
[NASA-TM-83136]
p0441 N81-25066
Applications of half-model technique in dynamic stability testing
p0591 N81-31114
Cruise missile engine program contract data requirements list sequence number 95. Qualification test report. Volume 39: Vibration and mission simulation testing on engine 828. XF-107-WR-400 cruise missile engine
[AD-A102257]
p0600 N81-31220
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12458-1]
p0603 N81-31230

VIBRATIONAL STRESS
Investigation into the vibration of the starter gearbox of an aircraft turbine engine
p0291 A81-29059
Vibration test level criteria for aircraft equipment
[AD-A098675]
p0442 N81-25070

VIDEO COMMUNICATION
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220]
p0378 N81-22282

VIDEO DATA
Dynamic simulation of hybrid video compression --- of airborne reconnaissance systems
p0463 A81-39555

VIDEO EQUIPMENT
New visual displays for the next generation of civil aircraft
p0556 A81-44299
An airborne programmable digital to video converter interface and operation manual
[AD-A096422]
p0446 N81-25691

VIEWING
NT FIELD OF VIEW
How a pilot looks at altitude
p0265 N81-19047

VISCOELASTIC DAMPING
Response of stiffened sandwich panels
[AIAA 81-0557]
p0303 A81-29455

VISCOELASTIC FLOW
U VISCOELASTICITY

VISCOELASTICITY
A periodic problem in viscoelasticity with variable coefficients
p0419 A81-37133

VISCOSITY
NT EDDY VISCOSITY
Evaluation of multi-viscosity oils designed for aircraft reciprocating engines
[SAE PAPER 810572]
p0519 A81-42737
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14960

VISCOUS DAMPING
NT VISCOELASTIC DAMPING

VISCOUS DRAG
Drag characteristics of V-groove and transverse curvature riblets
p0239 A81-26510

VISCOUS FLOW
NT BOUNDARY LAYER FLOW
NT BOUNDARY LAYER SEPARATION
NT REATTACHED FLOW
NT SECONDARY FLOW
NT SEPARATED FLOW
Design of airfoils in incompressible viscous flows by numerical optimization
p0001 A81-10096
Flow computation around multi-element airfoils in viscous transonic flow
p0011 A81-11641
Calculation of separated viscous flows on wing profiles by a coupling approach
[ONERA, TP NO. 1980-122]
p0017 A81-11920
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050]
p0158 A81-20366
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AIAA PAPER 81-0051]
p0159 A81-20567
Calculation of viscous, sonic flow over hemisphere-cylinder at 19 deg incidence - The capturing of nose vortices
[AIAA PAPER 81-0189]
p0162 A81-20661
3-D viscous analysis of ducts and flow splitters
[AIAA PAPER 81-0277]
p0163 A81-20720
Numerical study on viscous shear flow past a circular cylinder
p0228 A81-24077

Some aerodynamic properties of cones in viscous supersonic flow
p0237 A81-26119

Viscous flow drag reduction; Symposium, Dallas, Tex., November 7, 8, 1979, Technical Papers
p0238 A81-26501

On the solution of Navier Stokes equations of the flow in turbomachines
p0296 A81-29099

Rotor-tip leakage. II - Design optimization through viscous analysis and experiment
[ASME PAPER 81-GT-72] p0313 A81-29981

New interpretations in the theory of viscous incompressible fluid flow past airfoil profiles
p0349 A81-31044

Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AD-A093970] p0203 N81-16983

Three-dimensional internal flows in turbomachinery, volume 2
[AD-A093130] [illegible]215 N81-17090

An interactive computational aerodynamics analysis program
[AD-A094765] p0263 N81-19033

Aerodynamics of advanced axial-flow turbomachinery
[NASA-CR-163995] p0335 N81-20079

Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053

Experimental studies of scale effects on oscillating airfoils at transonic speeds
p0386 N81-23054

VISIBILITY
NT LOW VISIBILITY

Remote sensing methods for the determination of slant range visibility
[ESA-TT-627] p0086 N81-12536

Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility
[LA-UR-80-2485] p0135 N81-14550

Operational problems associated with head-up displays during instrument flight
[AD-A092992] p0210 N81-17058

A compendium of aircraft cockpit vision surveys, 1950 through 1980, volume 1
[AD-A101473] p0580 N81-30104

Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials --- visibility
[AD-A103191] p0636 N81-33175

VISION
NT COLOR VISION
NT NIGHT VISION
NT PERIPHERAL VISION

VISUAL ACUITY
Visual cue augmentation in contact flight simulation
p0064 A81-15696

Low-visibility visual simulation with real fog
[AIAA 81-0982] p0415 A81-36569

BIOCOMAID system (bionic control of acceleration induced dimming)
[AD-A102510] p0601 N81-31234

VISUAL AIDS
Visual systems at Lufthansa's simulator centre
p0122 A81-19499

Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033

Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068

VISUAL CONTROL
Analysis of the function principle and operational assessment of an onboard glidepath guidance system for visual approaches (Visual Approach Monitor (VAM)
[DFVLR-FB-79-38] p0025 N81-10043

Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24041

Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042

VISUAL DISPLAYS
U DISPLAY DEVICES

VISUAL FLIGHT
Visual cue requirements in contact flight simulators
p0064 A81-15695

Airport visual approach, guidance and landing systems - Airline pilots viewpoint
p0114 A81-18083

Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944

Optical Fiber Illumination System for visual flight simulation
[NASA-CR-3409] p0343 N81-21086

Methodological approaches to identifying relevant features for visual flight
[AD-A100199] p0541 N81-28108

VISUAL FLIGHT RULES
Visual confirmation (VICON) of voice take-off clearance of cost-and-deployment analyses and strategies
[AD-A091007] p0091 N81-13038

VISUAL OBSERVATION
Evaluation of the visual acquisition range of en-route air traffic from cockpit observations
[DFVLR-MITT-80-14] p0332 N81-20058

VISUAL PERCEPTION
NT SPACE PERCEPTION

A new system for the study of visual information presentation in aeronautics - GIBI
p0100 A81-16688

Critical research issues and visual system requirements for a V/STOL training research simulator
[AD-A092561] p0198 N81-16072

How a pilot looks at altitude
p0265 N81-19047

Visual system Technology: Status and problems --- training simulators
p0336 N81-20099

A microcomputer-based signal data converter for runway visual range measurements
[AD-A097568] p0386 N81-23060

Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion
[AD-A097731] p0426 N81-24049

Methodological approaches to identifying relevant features for visual flight
[AD-A100199] p0541 N81-28108

Assessment of scene complexity and cue validity in visual flight simulation
[AD-A100200] p0541 N81-28109

Dimensions of the information transfer problem --- human performance
p0594 N81-31163

VISUAL SIGNALS
Visual cue requirements in contact flight simulators
p0064 A81-15695

Voice warning systems: Some experimental evidence concerning application
p0603 N81-31058

VISUAL TRACKING
U OPTICAL TRACKING

VISUALIZATION OF FLOW
U FLOW VISUALIZATION

VOICE
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31052

The speed of response to synthesized voice messages
p0603 N81-31056

Voice warning systems: Some experimental evidence concerning application
p0603 N81-31058

VOICE COMMUNICATION
NT VOICE DATA PROCESSING

Problems of voice communication in helicopters
p0151 A81-20038

A multiplexed digital voice intercommunications system for military applications
[SAE PAPER 801144] p0398 A81-30173

Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053

Transverse Voice Radio Link for Stratospheric Balloons
[INPE-1992-RPE/285] p0586 N81-30237

Information transfer problems in the aviation system
[NASA-TP-1875]
p0594 N81-31162
Information transfer within the cockpit: Problems in intracockpit communications
p0595 N81-31167
Aural communication in aviation
[AGARD-CP-311]
p0603 N81-31449
Voice communication research and evaluation system
p0603 N81-31450
Clear speech: A strateges for improving radio communications and automatic speech recognition in noise
p0603 N81-31453
The background and bases for the proposed military standard on acoustical noise limits in helicopters
p0604 N81-31459
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
Second language speech comprehension in noise: A hazard to aviation safety
p0604 N81-31463
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464
Voice communication capability of selected inflight headgear devices
p0604 N81-31467
An automated multiple choice intelligibility testing system
p0604 N81-31468
An active noise reduction system for aircrew helmets
p0604 N81-31470
A multiplexed digital voice intercommunications system compatible with future voice conversion techniques
p0605 N81-31474
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351]
p0636 N81-33182
VOICE DATA PROCESSING
Noise suppression methods for robust speech processing
[AD-A100629]
p0551 N81-29323
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31452
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
VOLATILIZATION
U VAPORIZING
VOLT-AMPERE CHARACTERISTICS
A simple model of the threshold voltage of short and narrow channel MOSFETS
p0051 A81-13285
VOLTAGE
U ELECTRIC POTENTIAL
VOLTAGE BREAKDOWN
U ELECTRICAL FAULTS
VOLTAGE CONVERTERS (DC TO DC)
DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850]
p0141 N81-14989
VOLTAGE MEASUREMENT
U ELECTRICAL MEASUREMENT
VOLTAGE REGULATORS
High current power controller
[AD-A101643]
p0552 N81-29536
VOLTAGE VARIATION INDICATORS
U VOLTMETERS
VOLTMETERS
Recent improvements on generating voltmeters
[DOE/ER-01388/463]
p0257 N81-18359
VOODOO AIRCRAFT
U F-101 AIRCRAFT
VOR SYSTEMS
U VHF OMNIRANGE NAVIGATION
VORTEX ALLEVIATION
Vortex drag reduction by aft-mounted diffusing vanes
p0012 A81-11647
Wake vortex alleviation
[AIAA PAPER 81-0798]
p0412 A81-35723
Basic research in wake vortex alleviation using a variable twist wing
p0267 N81-19050
VORTEX AVOIDANCE
Conditions of generation and methods of damping the inlet vortex of a turbojet engine
p0121 A81-19482
Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-AC89407]
p0025 N81-10037
VORTEX BREAKDOWN
Hinged strakes for enhanced manoeuverability at high angles of attack
[AIAA PAPER 81-0357]
p0165 A81-20776
Research on vortex bursting in compressible flow --- Thesis
p0230 A81-24477
Vortex bursting on slender delta wings in transonic flow and its influence on missile aerodynamic characteristics
[DGLR PAPER 81-047]
p0611 A81-47622
Experimental investigation of the flow on the suction side of a thin Delta wing
[NASA-TM-75897]
p0338 N81-21024
VORTEX COLUMNS
U VORTICES
VORTEX DISTURBANCES
U VORTICES
VORTEX FLAPS
Vortex drag reduction by aft-mounted diffusing vanes
p0012 A81-11647
Leading-edge 'Vortex Flaps' for enhanced subsonic aerodynamics of slender wings
p0012 A81-11648
The aerodynamics of inverted leading edge flaps on delta wings
[AIAA PAPER 81-0356]
p0165 A81-20775
Effectiveness of leading-edge vortex flaps on 60 and 75 degree delta wings
p0352 A81-31368
Effects of yaw on leading edge vortex flap aerodynamics
[AIAA PAPER 81-1660]
p0326 A81-43147
Effect of leading-edge vortex flaps on aerodynamic performance of delta wings
p0559 A81-44424
Exploratory subsonic investigation of vortex-flap concept on arrow wing configuration
p0243 N81-17985
Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
p0243 N81-17986
Leading edge vortex flaps for drag reduction --- during subsonic flight
[NASA-CASE-LAR-12750-1]
p0261 N81-19016
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164833]
p0627 N81-32117
VORTEX FLOW
U VORTICES
VORTEX GENERATION
U VORTEX GENERATORS
VORTEX GENERATORS
Forced vortices near a wall
[AIAA PAPER 81-0256]
p0163 A81-20704
An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989]
p0263 N81-19028
Wingtip vortex turbine
[NASA-CASE-LAR-12544-1]
p0496 N81-27096
Subsonic pitch-up alleviation on a 74 deg delta wing
[NASA-CR-165749]
p0584 N81-30137
VORTEX RINGS
Sound radiation from vortex systems
p0171 A81-21591
VORTEX SHEDDING
The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963]
p0618 A81-48607
The phenomenon of dynamic stall --- vortex shedding phenomenon on oscillating airfoils
[NASA-TM-81264]
p0329 N81-20029
Fluid mechanics mechanisms in the stall process of helicopters
[NASA-TM-81956]
p0338 N81-21027
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5

[AD-A010210] p0585 N81-30159
VORTEX SHEETS
Simplified vortex models for slender lifting surfaces with leading edge separation
p0016 A81-11777
Local properties of three-dimensional separation lines --- in vortex layers
[DGLR PAPER 79-063] p0016 A81-11780
Linear vortex theories of a profile and wing with air intake
p0019 A81-12703
Numerical prediction of vortex cores of the leading and trailing edges of delta wings
p0059 A81-14475
Calculation of the nonlinear aerodynamic characteristics of finite-span wing
p0063 A81-15388
Nonlinear aerodynamic characteristics of a thin airfoil of arbitrary plane configuration
p0123 A81-19629
On a generalization of Kaden's problem --- of initially planar semi-infinite vortex sheet rollup
p0288 A81-28676
The effect of the aspect ratio of delta wings on the structure of the near vortex wake
p0413 A81-36467
Calculation of the nonlinear aerodynamic characteristics of a wing of finite span
p0417 A81-36738
Local approximation of a vortex layer by a system of discrete vortices
p0577 A81-46782
Analytical estimation on nonlinear longitudinal characteristics of wings with small and moderate aspect ratio by the vortex lattice method in incompressible flow
[ESA-TT-585] p0022 N81-10018
Examination of the vortex regime for highly swept wings by extrapolation of the Jones method
[AAAF-NT-80-25] p0204 N81-16992
Numerical computation of flows with rolled-up vortex sheets
p0255 N81-18256
Study of the vortex conditions of wings with large sweepback by extrapolation of the Jones method
[NASA-TM-75863] p0262 N81-19026
Leading-edge separation from a slender rolling wing-body combination --- vortex sheet model
[RAE-TR-80039] p0330 N81-20040
VORTEX STREETS
NT KARMAN VORTEX STREET
Method for reducing the tangential velocities in aircraft trailing vortices
p0066 A81-15880
The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder
p0233 A81-25312
A numerical study of vortex shedding from one and two circular cylinders
p0233 A81-25355

VORTEX TUBES
U VORTICES
VORTICES
NT WING TIP VORTICES
Sound generation by vortex shedding from a profile within a channel
p0054 A81-13570
Plane vortex gas flows --- emphasizing supersonic case
p0123 A81-19634
Influence of jet location on the efficiency of spanwise blowing
p0154 A81-20352
Calculation of viscous, sonic flow over hemisphere-cylinder at 19 deg incidence - The capturing of nose vortices
[AIAA PAPER 81-0189] p0162 A81-20661
Forced vortices near a wall
[AIAA PAPER 81-0256] p0163 A81-20704
Sound radiation from vortex systems
p0171 A81-21591
A discrete vortex method for the non-steady separated flow over an airfoil
p0179 A81-22568
Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0228 A81-24078
A computer simulation of turbulent jet flow
p0230 A81-24424
Generation of vortex noise in flow past a profile in a channel
p0238 A81-26134
Aerodynamic study of flat turbine cascades with additional blades in blade passages
p0281 A81-27373
Three dimensional flow in annular diffusers with two vortex distributions at entry
p0297 A81-29112
A computer code for the calculation of aircraft trailing vortices
p0347 A81-30710
Factors which influence the behavior of turbofan forced mixer nozzles
[AIAA PAPER 81-0274] p0359 A81-32549
Vortex-flow aerodynamics - An emerging design capability
p0366 A81-33717
Aerodynamic features of designed strake-wing configurations
[AIAA PAPER 81-1214] p0454 A81-38084
Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39898
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by tip modification
[AHS 80-62] p0479 A81-40185
A vortex-lattice method for calculating longitudinal dynamic stability derivatives of oscillating delta wings
[AIAA PAPER 81-1876] p0561 A81-44570
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957
Holographic investigation of slender body vortex wakes
[AD-A089496] p0021 N81-10008
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019
Experimental study of supersonic viscous leeside flow over a slender delta wing
[NASA-TM-81248] p0133 N81-14265
Vortex methods for two- and three-dimensional flow simulations
p0145 N81-15313
Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0188 N81-16009
Structures of flow separations over swept wings
p0255 N81-18244
Numerical computation of flows with rolled-up vortex sheets
p0255 N81-18256
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
A higher-order trapezoidal vector vortex panel for subsonic flow
[AD-A094775] p0263 N81-19032
Wake vortex attenuation flight tests: A status report
p0267 N81-19057
An extension of the local momentum theory to a distorted wake model of a hovering rotor
[NASA-TM-81258] p0329 N81-20030
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22830
Investigation of aerodynamic characteristics of wings having vortex flow using different numerical codes
[NASA-CR-165706] p0384 N81-23834
Development of a nonlinear vortex method --- steady and unsteady aerodynamic loads of highly sweptback wings
[NASA-CR-164351] p0423 N81-24020
Basic studies of body vortices at high angles of attack and supersonic speeds
[AD-A102241] p0594 N81-31154
VORTICITY
Determination of the vorticity of a small-aspect-ratio wing in hypersonic flow
p0054 A81-13384
A one-dimensional analysis and performance prediction of subsonic radial turbines

p0228 A81-24086
Flow transition phenomena and heat transfer over
the pressure surfaces of gas turbine blades
[ASME PAPER 81-GT-107]
p0315 A81-30012
Determination of the vorticity on a wing of small
aspect ratio in a hypersonic stream
p0411 A81-35668
An experimental investigation of a large delta P
settling chamber for a supersonic pilot quiet
tunnel
[NASA-CR-3436]
p0434 N81-24112
VORTICITY EQUATIONS
Co-axial rotor aerodynamics in hover
p0465 A81-39899
Examination of the vortex regime for highly swept
wings by extrapolation of the Jones method
[AAAF-NT-80-25]
p0204 N81-16992
Application of vortex lattice methods to calculate
Lv (rolling moment due to sideslip)
[PB81-166167]
p0487 N81-26123
VTOL
U VERTICAL LANDING
U VERTICAL TAKEOFF
VTOL AIRCRAFT
U VERTICAL TAKEOFF AIRCRAFT
VULNERABILITY
NT NUCLEAR VULNERABILITY
A probabilistic analysis of electrical equipment
vulnerability to carbon fibers
[NASA-TM-80217]
p0038 N81-11113
Directory of aircraft survivability specialists
and their affiliations
[AD-A096259]
p0341 N81-21066
Advanced composite aircraft electromagnetic
design and synthesis
[AD-A096291]
p0341 N81-21069
Carbon/graphite composite material study, appendix
A and appendix B
p0505 N81-30190
Fielding of an advanced helicopter. The UH-60A
Black Hawk: Initial operational experience
p0632 N81-33141
Views on V/STOL tactical fighter aircraft:
Technology needs and relationships to the runway
denial problems
p0632 N81-33142
Advanced composite aircraft electromagnetic design
and synthesis
[SAND-81-1278C]
p0638 N81-33200

W

W WINGS
U VARIABLE SWEEP WINGS
WAKES
NT AIRCRAFT WAKES
NT HELICOPTER WAKES
NT NEAR WAKES
NT PROPELLER SLIPSTREAMS
NT SLIPSTREAMS
NT SUPERSONIC WAKES
NT TURBULENT WAKES
The practical application of the Wake Blocking
Corrections according to Maskell --- for large
wind tunnel models
[DGLR PAPER 80-112]
p0121 A81-19398
Mean rotor wake characteristics of an
aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208]
p0168 A81-20830
The influence of a wake splitter plate on the
aerodynamic characteristics of a two-dimensional
cylinder
p0226 A81-23949
Wake vortex alleviation
[AIAA PAPER 81-0798]
p0412 A81-35723
Experimental determination of the circumferential
drift of edge wakes of guide vanes in a turbine
stage
p0466 A81-40022
The influence of blade wakes on the performance of
combustor pre-diffusers
[AIAA PAPER 81-1387]
p0502 A81-40856
Helicopter airflow and wake characteristics for
low speed and hovering flight from rocket
interference investigations
p0572 A81-46608
The calculation of separated flow at helicopter
bodies
[DGLR PAPER 81-026]
p0600 A81-47555
Damping of turbomachine blade variations by
subsonic flow
p0612 A81-47957
Holographic investigation of slender body vortex
wakes
[AD-A089496]
p0031 A81-10008
Wake vortex attenuation flight tests: A status
report
p0267 N81-19057
Basic research in wake vortex alleviation using a
variable twist wing
p0267 N81-19058
An extension of the local momentum theory to a
distorted wake model of a hovering rotor
[NASA-TM-81258]
p0329 N81-20030
WALL FLOW
Local properties of three-dimensional separation
lines --- in vortex layers
[DGLR PAPER 79-063]
p0016 A81-11780
A wall interference analysis --- in wind tunnels
p0104 A81-17472
The practical application of the Wake Blocking
Corrections according to Maskell --- for large
wind tunnel models
[DGLR PAPER 80-112]
p0121 A81-19398
Forced vortices near a wall
[AIAA PAPER 81-0256]
p0163 A81-20704
Drag characteristics of V-groove and transverse
curvature riblets
p0239 A81-26510
Compliant surfaces - Introduction
p0240 A81-26515
Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434]
p0504 A81-40871
Two-dimensional aerodynamic characteristics of the
NACA 0012 airfoil in the Langley 8 foot
transonic pressure tunnel
[NASA-TM-81927]
p0385 N81-23036
Expected improvements on high angle of attack
model testing
p0436 N81-24123
End wall flows in rotors and stators of a single
stage compressor
[NASA-CR-164635]
p0540 N81-28097
Report of the panel on theoretical aerodynamics
p0593 N81-31152
WALL JETS
Investigation of impingement region and wall jets
formed by the interaction of high aspect ratio
lift jets and a ground plane
[NASA-CR-152174]
p0261 N81-19017
VTOL in ground effect flows for closely spaced jets
--- to predict pressure and upwash forces on
aircraft structures
[NASA-CR-152321]
p0271 N81-19095
WALL PRESSURE
Wind tunnel wall interference in a test section
with ventilated walls
p0015 A81-11673
Wind tunnel corrections for high angle of attack
models
[AGARD-R-692]
p0435 N81-24120
A review of the wall pressure signature and other
tunnel constraint correction methods for high
angle-of-attack tests
p0435 N81-24122
Wind tunnel corrections for high angles of attack:
A brief review of recent UK work
p0436 N81-24127
Surface pressure measurements on a projectile
shape at Mach 0.908
[AD-A098589]
p0439 N81-25045
WALL TEMPERATURE
Computation of wall temperature and heat flux
distributions of the film cooled walls
p0348 A81-30803
WALLS
NT BULKHEADS
NT NOZZLE WALLS
NT POROUS WALLS
NT THIN WALLS
NT WIND TUNNEL WALLS
WAR GAMES
The variable-speed tail-chase aerial combat problem
p0351 A81-31295
WARFARE
NT COMBAT
The Tactical Air Forces - Outlook for the next
decade

[AIAA PAPER 81-0932] p0408 A81-34364
A very complete electronic warfare system p0412 A81-35674
Future strike aircraft design synthesis [AIAA PAPER 81-0371] p0421 A81-37571
Ferranti mission managers p0553 A81-44043

WARMING
U HEATING
WARNING DEVICES
U WARNING SYSTEMS
WARNING SIGNALS
U WARNING SYSTEMS
WARNING SYSTEMS
Aircraft fire and overheat detection and extinguishment [SAE PAPER 800622] p0063 A81-15340
Helicopter alarms - The use of ALAT incident and accident record cards p0100 A81-16689
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms p0154 A81-20448
Disturbance estimation for a STOL transport during landing [AIAA PAPER 81-0018] p0158 A81-20542
New directions in cockpit alerting p0286 A81-28298
Rapport tactical self protection systems design p0349 A81-31113
Wind shear detection - Automatic alerting system for airport applications p0412 A81-35771
Clear air turbulence - An airborne alert system p0562 A81-44648
Head up displays. Citations from the NTIS data base [PB80-809064] p0026 N81-10050
Aircraft alerting systems standardization study [AD-A090834] p0093 N81-13053
Collision avoidance systems. Citations from the NTIS data base [PB80-815020] p0193 N81-16038
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1 [AD-A094195] p0250 N81-18039
Conflict monitoring analysis of parallel route spacing in the high altitude conus airspace, volume 1 [AD-A094071] p0250 N81-18041
The 1979 clear air turbulence flight test program --- warning and detection devices p0266 N81-19050
Flight tests of a clear-air turbulence alerting system --- infrared radiometers p0266 N81-19052
Clear air turbulence studies with microwave radiometers p0266 N81-19053
Airborne lightning warning systems: A survey [AD-A095354] p0331 N81-20045
Detection and location of faults in onboard aircraft systems with the aid of the Automatic Fault Identification System (AFIS) p0383 N81-23022
Aural communication in aviation [AGARD-CP-311] p0603 N81-31449
The speed of response to synthesized voice messages p0603 N81-31456
Voice warning systems: Some experimental evidence concerning application p0603 N81-31458

WARPAGE
F-111 windscreen machining [Y-2232] p0142 N81-14995
WASHING
PACER LIME: An environmental corrosion severity classification system, part 1 [AD-A100496] p0539 N81-28089
WASTE UTILIZATION
Material shortages - Effect on the commercial aircraft industry [AIAA 81-0508] p0300 A81-29386
Silver recovery from aircraft scrap [PB81-150021] p0392 N81-23269
WATER
NT SURFACE WATER
Model for axial compressors operating with water ingestion p0297 A81-29111

WATER CONTENT
U MOISTURE CONTENT
WATER COOLING
U LIQUID COOLING
WATER JETS
U HYDRAULIC JETS
WATER LANDING
NT DITCHING (LANDING)
Helicopter survivability in overwater situations p0114 A81-18081
Design and testing of float landing gear systems for helicopters p0356 A81-32007
A study of factors affecting aircrew survivability following emergency escape over water p0409 A81-34697

WATER QUALITY
Development of a helicopter water quality monitoring/sampling system [PB81-168734] p0499 N81-27718
WATER TUNNEL TESTS
Experimental investigations of the base pressures found on a bluff body in ground effect p0234 A81-25379
Pattern factor improvement in the F-100 primary combustion system [ASME PAPER 81-GT-25] p0311 A81-29941
WATER TUNNELS
U HYDRAULIC TEST TUNNELS
WATER VAPOR
Comparative efficiency of penetrating steam and air cooling of gas turbine blades p0509 A81-41003

WATER VEHICLES
NT AIRCRAFT CARRIERS
NT SHIPS
NT SURFACE EFFECT SHIPS
WATER WAVES
Catalog of sea state and wind speed in the South Atlantic Bight [NASA-CR-156872] p0137 N81-14601
WAVE ATTENUATION
NT ACOUSTIC ATTENUATION
NT SHOCK WAVE ATTENUATION
WAVE DIFFRACTION
Exhaust noise in flight: The role of acoustic installation effects [PNR-90029] p0138 N81-14793
WAVE DRAG
Transonic axisymmetric bodies with minimal wave drag p0102 A81-17088
Extraction of wavedrag from airfoil wake measurements [AIAA PAPER 81-0291] p0164 A81-20732
WAVE EQUATIONS
Radiation boundary conditions for wave-like equations --- numerical jet acoustics experimentation p0153 A81-20223

WAVE EXCITATION
NT ACOUSTIC EXCITATION
NT HARMONIC EXCITATION
WAVE GENERATION
Acoustic shock waves generated by a transonic helicopter blade [AHS 80-63] p0479 A81-40186
WAVE INTERACTION
NT SHOCK WAVE INTERACTION
WAVE PROPAGATION
NT ACOUSTIC PROPAGATION
NT LIGHT SCATTERING
NT SHOCK WAVE PROPAGATION
Recent developments in NDT techniques --- for airport pavement testing p0113 A81-18078
A computerized study of wave characteristics in a time dependent compressible flow [AIAA PAPER 81-0410] p0169 A81-20838
WAVE RADIATION
U ELECTROMAGNETIC RADIATION
WAVE SCATTERING
NT ACOUSTIC SCATTERING
NT ELECTROMAGNETIC SCATTERING
NT LIGHT SCATTERING
NT RAMAN SPECTRA
NT RAYLEIGH SCATTERING
WAVEFORMS
Multiple-component lightning high-current testing

p0056 A81-14255

WAVEGUIDES
NT BEAM WAVEGUIDES
Electromagnetic scattering by open circular waveguides --- modeling jet engine inlets
[AD-A095554]
p0336 N81-20345

WAVELENGTHS
Surface pyrometry in presence of radiation from other sources with application to turbine blade temperature measurement
[NASA-TP-1754]
p0036 N81-11039

WEAPON SYSTEM MANAGEMENT
Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20]
p0474 A81-40150
Aiming computation for fighter weapon aiming system
p0480 A81-40448
Avionics Availability Study
[AIAA PAPER 81-1619]
p0525 A81-43129
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688]
p0381 N81-22971
Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689]
p0381 N81-22972
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A
[AD-A096690]
p0381 N81-22973
Weapons system support resources demand parameters - logistics
[AD-A097517]
p0394 N81-23937

WEAPON SYSTEMS
NT LASER WEAPONS
NT MISSILE SYSTEMS
Standardization in military system architecture
p0050 A81-13160
The RAE research and development program on EMC for aircraft and flight weapons systems
p0056 A81-14263
Development of specifications from measured environments
p0067 A81-16119
Advanced Attack Helicopter /YAH-64/ - Status report
p0099 A81-16580
QF-100 Full-Scale Aerial Target program
p0179 A81-22612
F-16 improvement program - Making the digits count
p0241 A81-26931
Air Force Integration Support Facilities - Their total utility
p0320 A81-30240
Augmenting ATE with dynamic simulation testing techniques
p0320 A81-30241
Program Navigate - A simulation computer program to verify OAS navigation capability --- Offensive Avionics System
p0322 A81-30289
BIT/FIT maturity before first flight --- in B-52 G/H Offensive Avionics System
p0324 A81-30320
Integration of the F-16 Weapon System Trainer
p0325 A81-30332
Producibility engineering at ASD
p0326 A81-30341
The USAF Armament Division Structural Dynamics Lab
p0347 A81-30689
The Tactical Air Forces - Outlook for the next decade
[AIAA PAPER 81-0932]
p0408 A81-34364
A very complete electronic warfare system
p0412 A81-35674
Weapon system evolution of attack helicopters
p0472 A81-40130
Advanced technology engine studies /ATES/ - A status report
[AIAA PAPER 81-1502]
p0516 A81-42205
New roles for the F-15 eagle
p0518 A81-42629
C-X - A case for scenario-oriented requirements --- new long-range military transport program
[AIAA PAPER 81-1690]
p0527 A81-43159
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654]
p0616 A81-48816
Life Cycle Cost Analysis (LCCA) in military aircraft procurement
p0045 N81-11903
Summary of AGARD Lecture Series 100: Methodology for control of life cycle costs for avionics systems
p0047 N81-11924
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688]
p0381 N81-22971
Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689]
p0381 N81-22972
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A
[AD-A096690]
p0381 N81-22973
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692]
p0392 N81-23325
Development test requirements --- impact of weapon systems on propulsion system performance
p0430 N81-24080
Air-to-air gunnery systems test and evaluation
p0544 N81-29073

WEAPONS
NT GUNS (ORDNANCE)
NT LASER WEAPONS
NT MINES (ORDNANCE)
NT NUCLEAR WEAPONS

WEAPONS DELIVERY
Analytical methods for store separation flight test
p0177 A81-22344
Integrated Flight/Weapon Control system concepts
p0324 A81-30328
Integrated Flight and Weapon Control for improved tactical combat effectiveness
p0324 A81-30329
Topside weapons release - An analytical study
[AIAA PAPER 81-1655]
p0533 A81-43939
Flying-qualities criteria for wings-level-turn maneuvering during an air-to-ground weapon delivery task
[NASA-TM-81266]
p0342 N81-21083
Navstar field test results
p0484 N81-26100
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
p0544 N81-29072
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U]
p0630 N81-32164

WEAPONS INDUSTRY
A review and assessment of system cost reduction activities
p0045 N81-11906

WEAR
Improved capabilities to detect incipient bearing failures
[AD-A091687]
p0134 N81-14325
Effects of geometric variables on rub characteristics of Ti-6Al-4V
[NASA-TP-1835]
p0336 N81-20245
X-ray fluorescence spectrometric analysis of wear metals in used lubricating oils
[AD-A097552]
p0390 N81-23087
JT9D jet engine diagnostics program
p0590 N81-31199
Improving turbine engine compressor performance retention through airfoil coatings
p0598 N81-31203

WEAR INHIBITORS
Effect of oxygen-containing additives on the antiwear properties of fuels for gas-turbine aircraft engines
p0517 A81-42558
Prevention of spline wear by soft metallic coatings --- aircraft engines
[AD-A091861]
p0132 N81-14064

WEAR TESTS
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3]
p0118 A81-18758
Ferrography as a health monitor and a design aid for the development of helicopter gearboxes
p0118 A81-18759
The analytical ferrograph - Some factors affecting deposit formation

p0293 A81-29077
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33868
Erosion strength of aircraft engine and power plant parts --- Russian book
p0578 A81=46848
Prevention of spline wear by soft metallic coatings --- aircraft engines
[AD-A091861] p0132 N81-14064
WEATHER
Measuring weather for aviation safety in the 1980's
p0136 N81-14568
Briefs of fatal accidents involving weather as a cause/factor, US General Aviation, 1978
[PB81-110827] p0192 N81-16028
A study of ASRS reports involving general aviation and weather encounters
[NASA-CR-166212] p0493 N81-27063
WEATHER CONDITIONS
U WEATHER
WEATHER FORECASTING
Diagnosis-prognosis of intense turbulence, causing aircraft buffeting, on the basis of temperature-wind sounding
p0241 A81-26836
Federal Aviation Administration and National Weather Service Aviation Research and Development
p0135 N81-14558
Terminal Forecast Reference Notebook (TFRN) for George AFB, California
[AD-A098438] p0446 N81-25637
Terminal Forecast Reference Notebook (TFRN) for Luke AFB, Arizona
[AD-A098445] p0446 N81-25638
WEATHER MODIFICATION
NT FOG DISPERSAL
NT LIGHTNING SUPPRESSION
WEATHER RADAR
U METEOROLOGICAL RADAR
WEATHER RECONNAISSANCE AIRCRAFT
Investigative technical measurements of the planetary boundary layer made onboard an instrumented motorized glider
[REPT-149] p0379 N81-22666
WEATHER STATIONS
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
p0622 A81-48847
Federal Aviation Administration and National Weather Service Aviation Research and Development
p0135 N81-14558
WEATHERING
Erosion and impacts on composite helicopter blades
p0040 N81-11138
The effect of the in-service environment on composite materials (resume of the April 1980 Athens conference)
p0199 N81-16146
WEAVING
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin systems
[NASA-CR-152292] p0218 N81-17175
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] p0639 N81-33238
WEDGE FLOW
Asymmetric flow of subsonic and sonic jets over an infinite wedge
p0004 A81-10919
Laminar boundary layer on an oscillating wedge
p0309 A81-29864
WEIGHT (MASS)
NT STRUCTURAL WEIGHT
Current aircraft survey (approach speeds, gross weights, and Dimensions)
[PB80-225691] p0129 N81-13956
Design, development, and evaluation of lightweight hydraulic system, phase 1 --- A-7 aircraft
[AD-A097505] p0388 N81-23075
WEIGHT ANALYSIS
Computer aided technology interface with weights engineering --- aircraft design
[SAWE PAPER 1346] p0353 A81-31384
A design analysis technique for evaluating size and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402
A flight test real-time GW-CG computing system
p0361 A81-32860
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for composite structures
p0557 A81-44373
Continued development and correlation of analytically based weight estimation codes for wings and fuselages
[NASA-CR-152331] p0251 N81-18044
Aircraft wing weight build-up methodology with modification for materials and construction techniques
[NASA-CR-166173] p0387 N81-23060
Lift-propulsion system weight variation for very heavy lift helicopters
[AD-AC99169] p0490 N81-26151
WEIGHT FACTORS
U WEIGHT (MASS)
WEIGHT INDICATORS
NT STRAIN GAGE BALANCES
In-flight measurement of aerodynamic loads on captive stores. Equipment and results
[NLR-MP-79013-U] p0022 N81-10012
A rotating, wind tunnel balance and associated experimental techniques
[AAAF-NT-80-13] p0218 N81-17108
First results obtained with a rotating construction --- used in measuring flying qualities of wind tunnel aircraft models
[AAAF-NT-80-14] p0218 N81-17109
WEIGHT MEASUREMENT
Design, fabrication, calibration, application, and testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
WEIGHT REDUCTION
Weight optimization of wing structures according to the gradient method
p0012 A81-11650
A penalty function method for structural optimum design with aeroelastic constraints
p0223 A81-23727
An extremely lightweight fuselage-integrated phased array for airborne applications
p0348 A81-30779
The structural weight fraction - Revisited for fighter/attack type aircraft
[SAWE PAPER 1365] p0353 A81-31387
PARAM - A new weight sizing routine --- cost-effective computerized design for aircraft
[SAWE PAPER 1367] p0353 A81-31385
The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
[SAE PAPER 801190] p0401 A81-34201
Unistructure - A new concept for light weight integrally stiffened skin structures
[SAE PAPER 801231] p0405 A81-34233
Manufacturing technology for aircraft structural components made of carbon-fiber reinforced plastics
p0449 A81-37637
Components in hybrid- and fiber technology for commercial aircraft of the Airbus family /flap support, spoiler, and window frame/
p0450 A81-37644
Reducing the cost impact of helicopter internal noise control
[AHS 80-59] p0478 A81-40183
The optimum design of non-moment laminated composite plate - According to static failure strength condition
p0480 A81-40449
Design and concepts of composite structures
p0481 A81-4050
Improving the economy of subsonic transport aircraft by means of aerodynamic approaches
p0510 A81-4133
Impact of advanced propeller technology on aircraft/mission characteristics of several general aviation aircraft
[SAE PAPER 810584] p0520 A81-427
Fibre reinforced composite applications at De Havilland
[SAE PAPER 810640] p0524 A81-427
Commercial composite component service experience --- in airplane structural design and manufacturing
p0530 A81-436

Advanced composite applications in McDonnell
Dougals commercial transport aircraft
p0530 A81-43620
A synopsis of the Navy A-7 Aircraft Fuel
Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949
Composite applications on Boeing commercial aircraft
p0557 A81-44341
Development of composite material helicopter
structures
p0576 A81-46641
Development of the carbon fiber-reinforced side
rudder for the Airbus
[DGLR PAPER 81-055] p0607 A81-47553
Structural synthesis - Its genesis and development
p0622 A81-49076
Current and projected use of carbon composites in
United States aircraft
p0198 N81-16145
Application of carbon fibre composites to military
aircraft structures
p0199 N81-16147
Optimization of fiber reinforced structures to
satisfy aeroelastic requirements
[NASA-CR-164536] p0499 N81-27200
Helicopter technologies of the future --- weight
reduction
[MBB-UD-314/80-OE] p0503 N81-30125
WEIGHTING FUNCTIONS
Precision correlation tracking via optimal
weighting functions
p0154 A81-20450
WELDED STRUCTURES
NT STEEL STRUCTURES
Sliding-seal electron beam slot welding of an
aircraft wing closure beam
p0614 A81-48142
WELDING
NT BRAZING
NT DIFFUSION WELDING
NT ELECTRON BEAM WELDING
Application of weldbonding to A-10 production
aircraft
p0013 A81-11652
WELDING MACHINES
Sliding-seal electron beam slot welding of an
aircraft wing closure beam
p0614 A81-48142
WEST GERMANY
U GERMANY
WESTLAND AIRCRAFT
NT P-531 HELICOPTER
Westland WG30
p0466 A81-40002
WESTLAND P-531 HELICOPTER
U P-531 HELICOPTER
WETNESS
U MOISTURE CONTENT
WHEELS
NT FLYWHEELS
NT TURBINE WHEELS
NT VEHICLE WHEELS
WHIRL
U ROTATION
WHIRL INSTABILITY
U ROTARY STABILITY
WHIRLING
U ROTATION
WHIRLING TESTS
U SPIN TESTS
WIDEBAND
U BROADBAND
WIENER FILTERING
Noise suppression methods for robust speech
processing
[AD-A100629] p0551 N81-29323
WIGHTMAN THEORY
U FIELD THEORY (PHYSICS)
WILDLIFE
NT BIRDS
WIND (METEOROLOGY)
NT GROUND WIND
NT GUSTS
NT JET STREAMS (METEOROLOGY)
Experimental investigation of orographic waves and
vertical motions in the Krasnovodsk airport area
p0121 A81-19441
Evaluation of the effect of horizontal and
vertical stratification on the stability of air
flows
p0241 A81-26839
Winds and wind shear in-situ sensors
p0136 N81-14563
Wind loads for bar-truss structures
p0259 N81-18997
WIND CIRCULATION
U ATMOSPHERIC CIRCULATION
WIND DIRECTION
Low-speed wind-tunnel tests of two weathercocking
sensors
[NSRL-0171-TM] p0136 N81-14575
WIND EFFECTS
The sonic boom from an aircraft flying along an
arbitrary path in a stratified atmosphere in the
presence of a three-component wind
p0123 A81-19636
Dynamics and control of a Heavy Lift Airship in
cross wind hover
[AIAA 81-1334] p0456 A81-38539
The turbulent wind and its effect on flight
[UTIAS-REVIEW-44] p0033 N81-11020
Wind loading and response of a high-rise building
[CONF-810104-1] p0256 N81-18259
Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431
WIND MEASUREMENT
NT WIND VELOCITY MEASUREMENT
A low-level wind shear detection system
p0223 A81-23514
Onboard procedure for the measurement of wind
shear gradients
[DGLR PAPER 81-060] p0610 A81-47612
WIND PRESSURE
Determination of wind stress from water level
fluctuations
N81-30774
WIND SHEAR
Procedures to improve flight safety in wind shear
conditions
p0014 A81-11666
Wind shear detection from PCM-recorded MLS-flight
data
p0015 A81-11675
Wind shear effects on aircraft - Low-level shear
and clear-air turbulence as accident causes
p0067 A81-16136
Design and preliminary tests of an IR-airborne
LLWS remote sensing system --- Low Level Wind
Shear
[AIAA PAPER 81-0239] p0163 A81-20694
Microbursts as an aviation wind shear hazard
[AIAA PAPER 81-0386] p0167 A81-20798
The effect of heavy rain on windshear attributed
accidents
[AIAA PAPER 81-0390] p0167 A81-20800
Sources and detection of atmospheric wind shear
[AIAA PAPER 81-0391] p0167 A81-20801
A low-level wind shear detection system
p0223 A81-23514
Wind shear detection - Automatic alerting system
for airport applications
p0412 A81-35771
On-line wind shear generation for flight simulator
applications
[AIAA 81-0970] p0414 A81-36559
Modelling of gusts and wind shear for aircraft
assessment and certification
p0528 A81-43376
Onboard procedure for the measurement of wind
shear gradients
[DGLR PAPER 81-060] p0610 A81-47612
Pilot-aircraft system reponse to wind shear
[NASA-CR-3342] p0031 N81-10646
Test and evaluation of the Airport Surveillance
Radar (ASR)-8 wind shear detection system (phase
2), revision
[AD-A090111] p0042 N81-11290
Investigation of landing flare in the presence of
wind shear
[ESA-TT-631] p0077 N81-12080
Simulation comparison of a decoupled longitudinal
control system and a velocity vector control
wheel steering system during landings in wind
shear
[NASA-TP-1734] p0081 N81-12108
Winds and wind shear in-situ sensors
p0136 N81-14563

The microburst: Common factor in recent aircraft accidents p0136 N81-14571

Doctor Fujita's microburst analysis at Chicago p0136 N81-14572

Clean air turbulence. Citations from the International Aerospace Abstracts data base [NASA-CR-163863] p0146 N81-15649

An airport wind shear detection and warning system using Doppler radar: A feasibility study [NASA-CR-3379] p0202 N81-16681

Wind shear systems implementation plan, benefit/cost study [AD-A094168] p0253 N81-18055

Magnitude and frequency of wind speed shears and associated downdrafts p0267 N81-19055

An analytical study of the longitudinal response of airplanes to positive wind shear [NASA-TP-1765] p0335 N81-20082

Groundspeed/airspeed differences as a wind shear indicator and flight evaluation of a DME-derived system to determine groundspeed [AD-A097566] p0393 N81-23768

Flight evaluation of a simple total energy-rate system with potential wind-shear application [NASA-TP-1854] p0427 N81-24058

Determination of wind stress from water level fluctuations N81-30774

Takeoff and missed approach under the influence of wind shear --- flight safety considerations [TUBS/SFB-58-80-05-01] p0628 N81-32131

Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear [NASA-TM-83188] p0639 N81-33211

WIND TUNNEL APPARATUS

NT WIND TUNNEL DRIVES

Add fluorescent minitufts to the aerodynamicist's bag of tricks p0005 A81-11245

Three years of operation of the ONERA pressurized subsonic wind tunnel [ONERA, TP NO. 1980-129] p0014 A81-11669

A system for model access in tunnels with an unbreathable test medium p0015 A81-11672

A vaporizing combustor with double combustion spaces p0109 A81-17827

Some optimization problems of internal aerodynamics p0237 A81-26120

Test stand for the study of flow systems in wind tunnels p0409 A81-35009

Digital simulation for energy conservation in a large wind tunnel plant system p0613 A81-48003

A rotating, wind tunnel balance and associated experimental techniques [AAAF-NT-80-13] p0218 N81-17108

First results obtained with a rotating construction --- used in measuring flying qualities of wind tunnel aircraft models [AAAF-NT-80-14] p0218 N81-17109

Rotative balance of the I.M.F. Lille and associated experimental techniques [NASA-TM-75886] p0276 N81-19137

Comments on settling chamber design for quiet, blowdown wind tunnels [NASA-TM-81948] p0335 N81-20085

Application of superconducting coils to the NASA prototype magnetic balance [NASA-CR-165660] p0336 N81-20086

Description of 0.186-scale model of high-speed duct of national transonic facility [NASA-TM-81949] p0377 N81-22061

Evaluation of turbulence reduction devices for the Langley 8-foot Transonic Pressure Tunnel [NASA-TM-81792] p0434 N81-24114

A discussion document on the thermal design of force balances for cryogenic wind tunnels [OUEL-1321/80] p0435 N81-24119

Wind-tunnel measurement of aerodynamic derivatives using flexible-sting rigs p0591 N81-31110

Rotary and Magnus balances p0591 N81-31111

Support interference p0591 N81-31113

Wind Tunnels of NASA [NASA-SP-440] p0629 N81-32153

WIND TUNNEL BALANCES

U WEIGHT INDICATORS

U WIND TUNNEL APPARATUS

WIND TUNNEL CALIBRATION

Calibration of the high speed wind tunnel TVM 150 in the supersonic range p0016 A81-11778

A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel [NASA-TP-1752] p0021 N81-10005

A comparison of methods for calibration and use of multi-component strain gauge wind tunnel balances [AD-A090484] p0084 N81-12394

Evaluation of a subsonic cascade wind tunnel for compressor blade testing [AD-A093591] p0218 N81-17107

Validation of the Wright-Patterson vertical wind tunnel [AD-A094777] p0277 N81-19143

Preliminary calibration of the transonic test section of the NIAST trisonic tunnel [NIAST-80/19] p0435 N81-24116

Wall interference effects: Status review p0592 N81-31141

Report of the wind tunnel/flight correlation panel p0593 N81-31150

Supplemental calibration of the AEDC-PWT 16 ft transonic tunnel aerodynamic test section [AD-A102384] p0630 N81-32155

WIND TUNNEL DRIVES

Development of wind tunnel fan blade made of composite materials [MBB-UD-277-79-0] p0018 A81-12096

Estimation of fan pressure ratio requirements and operating performance for the National Transonic Facility [NASA-TM-81802] p0435 N81-24115

Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel [NASA-TM-83168] p0635 N81-33158

WIND TUNNEL MODELS

High-lift investigations on some small aspect ratio wings p0011 A81-1168

Adaptable wind tunnel walls for 2D and 3D model tests p0014 A81-11671

A system for model access in tunnels with an unbreathable test medium p0015 A81-11672

Towing tank tests on model wind turbine rotors p0055 A81-1

Experimental investigations to fully map the flow field around a wind tunnel model of a transport airplane [SAE PAPER 800630] p0063 A81-1534

The practical application of the Wake Blocking Corrections according to Maskell --- for large wind tunnel models [DGLR PAPER 80-112] p0121 A81-1939

Model vibrations beyond low-speed stall [ONERA, TP NO. 1980-154] p0123 A81-19552

Laser measurement of angle of attack on wind-tunnel models p0150 A81-204

Wind tunnel model support, controlled by four microprocessors [ONERA, TP NO. 1980-149] p0174 A81-21917

Some aerodynamic properties of cones in viscous supersonic flow p0237 A81-26119

An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory p0289 A81-2894

Computation of wind tunnel model deflections --- for transport type solid wing [AIAA 81-0482] p0300 A81-293

Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane [AIAA 81-0650] p0307 A81-295

Transonic flutter study of a wind-tunnel model of
an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Comparison of calculated and measured helicopter
rotor lateral flapping angles
p0357 A81-32018
An opto-electronic method for wind tunnel model
alignment
p0361 A81-32849
An apparatus for the simulation of an air intake
at high angle of attack in a compressor test
facility
[ONERA, TP NO. 1981-35] p0460 A81-39238
Advanced nozzle integration for supersonic strike
fighter application
[AIAA PAPER 81-1441] p0504 A81-40875
The half-model technique in the wind tunnel and
its employment in the development of the Airbus
family
[DGLR PAPER 81-118] p0609 A81-47587
Model design and instrumentation experiences with
continuous-flow cryogenic tunnels
p0037 N81-11057
Model design and instrumentation for intermittent
cryogenic wind tunnels
p0037 N81-11058
The European Transonic Wind tunnel ETW
p0038 N81-11064
The prediction of the bursting of laminar
separation bubbles in the design of two
dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12038
Synthesis of test results obtained with Concorde
at high incidences
[AAAF-NT-80-26] p0077 N81-12079
Store separation simulation in subsonic wind tunnels
[MBB-FE-123/S/PUB/20] p0203 N81-16508
A rotating, wind tunnel balance and associated
experimental techniques
[AAAF-NT-80-13] p0218 N81-17108
Experimental investigations on the V/STOL tunnel
at NASA/Langley Research Center
[NASA-CR-165655] p0329 N81-20028
Support interference of wind tunnel models: A
selective annotated bibliography
[NASA-TM-81909] p0335 N81-20084
Static tests of the J97 powered, external
augmenter V/STOL wind tunnel model
[NASA-CR-152403] p0337 N81-21010
Model vibrations below low speed stall
p0447 N81-26017
Applications of half-model technique in dynamic
stability testing
p0591 N81-31114
Aeroelastic instability stoppers for wind-tunnel
models
[NASA-CASE-LAR-12720-1] p0601 N81-31229
Aeroelastic instability stoppers for wind-tunnel
models
[NASA-CASE-LAR-12458-1] p0601 N81-31230

WIND TUNNEL STABILITY TESTS
Curved-flow, rolling-flow, and oscillatory
pure-yawing wind-tunnel test methods for
determination of dynamic stability derivatives
p0241 A81-26933
Transonic flutter study of a wind-tunnel model of
an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Wind tunnel determination of dynamic
cross-coupling derivatives - A new approach
p0413 A81-35927
X-wing stability and control development and wind
tunnel demonstration tests - Helicopter,
conversion, and fixed wing flight
[AHS 80-27] p0475 A81-40157
Low-speed wind-tunnel tests of two weathercocking
sensors
[WSRL-0171-TM] p0136 N81-14575
Philosophy and results of steady and unsteady test
techniques on a large scale transport aircraft
model in the ONERA transonic tunnel S1 MA. Part
1: Philosophy and results of steady tests.
Part 2: Interest of large models in unsteady
aerodynamics
p0190 N81-16019
On the flight mechanics of remotely piloted vehicles
[BMVG-FBWT-79-28] p0209 N81-17049
Dynamic Stability Parameters --- conferences
[AGARD-LS-114] p0590 N81-31105
Review of techniques for determination of dynamic
stability parameters in wind tunnels
p0590 N81-31108
Direct forced-oscillation techniques for the
determination of stability derivatives in wind
tunnels
p0590 N81-31109
Rotary and Magnus balances
p0591 N81-31111
Curved-flow, rolling-flow, and oscillatory
pure-yawing wind-tunnel test methods for
determination of dynamic stability derivatives
p0591 N81-31112
Comments on Reynolds number effects and the role
of NTF in the development of air vehicles
p0592 N81-31142

WIND TUNNEL TESTS
Investigation of high-manoeuvrability flight
vehicle dynamics
p0009 A81-11625
An experimental investigation of the interaction
between a glancing shock wave and a turbulent
boundary layer
p0012 A81-11649
Investigation of the stalling characteristics of a
general aviation aircraft
p0014 A81-11665
Three years of operation of the ONERA pressurized
subsonic wind tunnel
[ONERA, TP NO. 1980-129] p0014 A81-11669
DFVLR-dynamic model testing in wind tunnels for
active controls research
p0014 A81-11670
Adaptable wind tunnel walls for 2D and 3D model
tests
p0014 A81-11671
Some thoughts on the effects of flight on jet
noise as observed in actual flight and in wind
tunnels
p0016 A81-11723
A simple laser interferometer for wind tunnel flow
visualisation
p0018 A81-12078
Towing tank tests on model wind turbine rotors
p0055 A81-13860
Analysis and design of a ceramic nozzle insert for
the Langley 8-foot high temperature structures
tunnel
p0060 A81-14996
Developments in the area of cryo-wind tunnel
technology by the DFVLR
p0065 A81-15702
Testing stand for the measurement of nonsteady
aerodynamic forces in the transonic wind tunnel
at Goettingen
p0065 A81-15703
Roll and spin measurements in the low speed wind
tunnel at Braunschweig
p0065 A81-15704
Model vibrations beyond low-speed stall
[ONERA, TP NO. 1980-154] p0123 A81-19552
Some characteristics of subsonic flow over the
root area of a sweptback wing
p0123 A81-19633
Experimental study of the influence of supports on
the aerodynamic loads on an ogive cylinder at
high angles of attack
[AIAA PAPER 81-0007] p0156 A81-20531
Prediction and experimental verification of
transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568
Effects of design variables on spoiler control
effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581
Unsteady fan blade pressure and acoustic radiation
from a JT15D-1 turbofan engine at simulated
forward speed
[AIAA PAPER 81-0096] p0161 A81-20598
Measurements of flow quality in the Ames 2 x 2ft
transonic wind tunnel
[AIAA PAPER 81-0156] p0161 A81-20636
Flight experiments with a slender cone at angle of
attack
[AIAA PAPER 81-0337] p0165 A81-20761
The aerodynamics of inverted leading edge flaps on
delta wings
[AIAA PAPER 81-0356] p0165 A81-20775
A parametric study of the static longitudinal
aerodynamic characteristics of parallel lift

delta wing configurations at low Reynolds numbers
[AIAA PAPER 81-0409] p0168 A81-20814
Wind tunnel model support, controlled by four microprocessors
[ONERA, TP NO. 1980-149] p0174 A81-21917
Investigation of the starting process of a supersonic wind tunnel
p0228 A81-24080
Experimental investigations of the base pressures found on a bluff body in ground effect
p0234 A81-25379
Some problems of modeling high-speed aerodynamics --- in wind tunnels and tubes
p0237 A81-26118
The application of liquid crystals in experimental aerodynamics
p0238 A81-26123
Effect of contraction on screen-generated turbulence
p0284 A81-27900
Correlation of artificially induced boundary-layer transition data at hypersonic speeds
p0285 A81-27911
Factors affecting afterbody drag
p0292 A81-29069
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[AIAA 81-0567] p0306 A81-29494
A wind-tunnel study of the flutter characteristics of a supercritical wing
p0308 A81-29504
Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
Experimental investigation into the reaction of boundary layer to external periodic disturbances
p0309 A81-29866
Development of a large-scale wind tunnel for the simulation of turbomachinery airfoil boundary layers
[ASME PAPER 81-GT-6] p0310 A81-29931
The present role of high speed cascade testing
[ASME PAPER 81-GT-35] p0314 A81-30002
An opto-electronic method for wind tunnel model alignment
p0361 A81-32849
Preliminary aerodynamic characteristics of several advanced VSTOL fighter/attack aircraft concepts
[SAE PAPER 801178] p0400 A81-34191
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
The influence of surface roughness on boundary layer flow and separation at transonic speeds
p0413 A81-36468
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0418 A81-36940
Aerodynamic characteristics of two VSTOL fighter configurations
[AIAA PAPER 81-1292] p0454 A81-38119
Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel
[AIAA PAPER 81-1062] p0459 A81-39074
Tests of air inlets at Reynolds numbers comparable to flight in the ONERA F1 and S1MA wind tunnels
[ONERA, TP NO. 1981-36] p0460 A81-39239
An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240
Wind-tunnel tests of engine-equipped models - Comparison of two jet wash simulation methods
[ONERA, TP NO. 1981-42] p0460 A81-39245
A half-model free-oscillation rig for pitch-damping measurements in high speed wind tunnels
p0461 A81-39263
Aerodynamic study of a hovering rotor
p0468 A81-40098
Aerodynamic design of the Aerospatiale SA 365 N Dauphin 2 helicopter
p0468 A81-40099

Wind tunnel evaluation of aeroelastically conformable rotors
[AHS 80-23] p0475 A81-40153
Active control of the helicopter rotor for vibration reduction
[AHS 80-68] p0479 A81-40188
Advanced nozzle integration for supersonic strike fighter application
[AIAA PAPER 81-1441] p0504 A81-40875
Effect of in-flight thrust reverser deployment on tactical aircraft stability and control
[AIAA PAPER 81-1446] p0504 A81-40879
A perspective on developing new inlet distortion measurement and predictive methods
[AIAA PAPER 81-1589] p0507 A81-40964
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186
Experimental investigation of a high-aspect-ratio supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42187
Wind tunnel tests of sailwings for Darrieus rotors
p0518 A81-42678
Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740
Noise and performance of general aviation aircraft - A review of the MIT study
[SAE PAPER 810586] p0520 A81-42747
Low and high speed propellers for general aviation - Performance potential and recent wind tunnel test results
p0521 A81-42750
Investigation of a flight test method for the measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760
Wind tunnel experiments on the divergence of swept wings with composite structures
[AIAA PAPER 81-1670] p0526 A81-43152
Experimental and analytical development of an advanced supersonic fighter concept
[AIAA PAPER 81-1659] p0534 A81-43941
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943
Lift-enhancing surfaces on several advanced V/STOL fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-43946
Prediction of dynamic stall and unsteady airloads for rotor blades
p0571 A81-46604
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor
p0573 A81-46620
New designs for improved aerodynamic stability on recent Aerospatiale helicopters
p0574 A81-46625
European transonic wind tunnel ETW - Status of the project at the end of the predesign phase
[DGLR PAPER 81-027] p0609 A81-47563
The influence of the airspeed on jet turbulence and the consequences for the jet noise
[DGLR PAPER 81-021] p0609 A81-47558
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
Digital simulation for energy conservation in a large wind tunnel plant system
p0613 A81-48003
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48628
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-49979
An introduction to dynamic derivatives (3) methods of oscillating models in pitch and yaw in a 530 by 810 millimetre transonic wind tunnel
[ARL/AERO-NOTE-390] p0021 N81-10007
Holographic investigation of slender body vortex wakes
[AD-A089496] p0021 N81-10009
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration
[ARC-R/M-3842-PT-2] p0021 N81-1001

Boundary layer measurements on a two-dimensional
  wing with flap
  [NLR-TR-79009-U]   p0022 N81-10014
Flow measurements in the wake of a wing fitted
  with a leading-edge root extension (strake)
  [RAE-TR-79120]   p0022 N81-10015
Full scale wind tunnel investigation of a
  bearingless main helicopter rotor --- Ames 40 by
  80 foot wind tunnel test using the BO-105
  helicopter
  [NASA-CR-152373]   p0033 N81-11014
Wind tunnel investigation of the aerodynamic
  hysteresis phenomenon on the F-4 aircraft and
  its effects on aircraft motion
  [AD-A089851]   p0033 N81-11016
Low speed aerodynamic performance of
  50.8 centimeter-diameter noise-suppressing
  inlets for the Quiet, Clean, Short-haul
  Experimental Engine (QCSEE) --- Lewis 9- by
  15-foot low speed wind tunnel tests
  [NASA-TP-1178]   p0035 N81-11037
Calibration of a blowdown-to-atmosphere cryogenic
  wind tunnel
                    p0038 N81-11060
Low-speed aerodynamic characteristics of a 13
  percent thick medium speed airfoil designed for
  general aviation applications
  [NASA-TP-1498]   p0071 N81-12015
Influence of light aircraft architecture on its
  spin characteristics
  [AAAF-NT-80-11]   p0081 N81-12111
Wind tunnel test of a fighter aircraft wing/store
  flutter suppression system: An international
  effort
                    p0082 N81-12116
Wind tunnel tests on a fighter aircraft wing/store
  flutter suppression system: The B.Ae control law
                    p0083 N81-12119
Dynamic response of a forward-swept-wing model at
  angles of attack up to 15 deg at a Mach number
  of 0.9 --- Langley transonic dynamics tunnel tests
  [NASA-TM-81863]   p0085 N81-12448
Results of oscillatory pitch and ramp tests on the
  NACA 0012 blade section
  [ARA-MEMO-220]   p0090 N81-13024
Model aerodynamic test results for two variable
  cycle engine coannular exhaust systems at
  simulated takeoff and cruise conditions ---
  Lewis 8 by 6-foot supersonic wind tunnel tests
  [NASA-CR-159818]   p0093 N81-13057
Wind-tunnel test of an articulated helicopter
  rotor model with several tip shapes
  [NASA-TM-80080]   p0125 N81-13918
Passive control of wing/store flutter
  [NASA-TM-81865]   p0125 N81-13922
Rotary balance data for a single-engine
  agricultural airplane configuration for an
  angle-of-attack range of 8 deg to 90 deg
  [NASA-CR-3311]   p0125 N81-13923
An evaluation of wind tunnel test techniques for
  aircraft nozzle afterbody testing at transonic
  Mach numbers
  [AD-A091775]
                    p0126 N81-13931
Evaluation of wind tunnel nozzle afterbody test
  techniques utilizing a modern twin engine
  fighter geometry at Mach numbers from 0.6 to 1.2
  --- YF-17 aircraft
  [AD-A091545]
                    p0126 N81-13932
Advanced ejection seat for high dynamic pressure
  escape. Wind tunnel test
  [AD-A091810]
                    p0127 N81-13940
Active control of an explosive wing-store flutter
  case
  [MBB-FE-17/S/PUB/25]   p0131 N81-13973
Laser-Raman/Rayleigh flow diagnostic techniques
  applied to subsonic flow
  [AD-A091695]
                    p0133 N81-14275
Transonic wind tunnel tests on an oscillating wing
  with external store. Part 4: The wing with
  underwing: Store
  [AD-A077370]
                    p0139 N81-14969
Wind-tunnel measurements and comparison with
  flight of the boundary layer and heat transfer
  on a hollow cylinder at Mach 3
  [NASA-TP-1789]
                    p0140 N81-14975
Experimental aerodynamic characteristics of two
  V/STOL fighter/attack aircraft configurations at
  Mach numbers from 0.4 to 1.4
  [NASA-TM-81238]
                    p0140 N81-14981
An investigation of support-interference effects
  [NAL-TR-622]   p0141 N81-14984
Development of finite-volume methods for
  three-dimensional transonic flows
  [AD-A090829]   p0141 N81-14986
Finite element method study of
  wing-fuselage-nacelle interactions of a Falcon
  20 type aircraft at Mach = 0.79
                    p0187 N81-15994
Design and experimental verification of a
  transonic wing for a transonic aircraft
                    p0188 N81-16003
Jet wing interference for an overwing engine
  configuration
                    p0188 N81-16008
Experimental study of the interaction between the
  wing of a subsonic aircraft and a nacelle of a
  high by-pass ratio engine
                    p0189 N81-16010
A wind tunnel investigation of the aerodynamic
  characteristics of forward swept wings ---
  supersonic cruise aircraft research
                    p0189 N81-16011
An investigation of a swept wing-body
  configuration with drooped leading edge at low
  and transonic speeds
                    p0189 N81-16012
Aerodynamic interaction between a close-coupled
  canard and a sweptback wing in transonic flow
                    p0189 N81-16013
P-3 Orion fuel-saving modification wind tunnel study
  [AD-A091906]   p0194 N81-16044
Gravimetric investigation of the particle number
  density distribution function in the high speed
  cascade wind tunnel for laser anemometry
  measurements
  [ESA-TT-625]   p0197 N81-16069
A theoretical method for the simulation of
  separation behavior of aircraft external stores
  --- applications to computerized wind tunnel tests
  [MBB-FE-122/S/PUB/16]   p0203 N81-16987
The effects of warhead-induced damage on the
  aeroelastic characteristics of lifting surfaces.
  Volume 2: Aerodynamic effects
  [AD-A093063]   p0209 N81-17046
Model aerodynamic test results for two variable
  cycle engine coannular exhaust systems at
  simulated takeoff and cruise conditions.
  Comprehensive data report. Volume 1: Design
  layouts
  [NASA-CR-159819-VOL-1]   p0214 N81-17081
Model aerodynamic test results for two variable
  cycle engine coannular exhaust systems at
  simulated takeoff and cruise conditions.
  Comprehensive data report. Volume 2: Tabulated
  aeroynamic data book 1
  [NASA-CR-159819-VOL-2-BK-1]   p0214 N81-17082
Model aerodynamic test results for two variable
  cycle engine coannular exhaust systems at
  simulated takeoff and cruise conditions.
  Comprehensive data report. Volume 2: Tabulated
  aerodynamic data book 2
  [NASA-CR-159819-VOL-2-BK-2]   p0214 N81-17083
Model aerodynamic test results for two variable
  cycle engine coannular exhaust systems at
  simulated takeoff and cruise conditions.
  Comprehensive data report. Volume 2: Tabulated
  aerodynamic data book 3
  [NASA-CR-159819-VOL-2-BK-3]   p0214 N81-17084
Model aerodynamic test results for two variable
  cycle engine coannular exhaust systems at
  simulated takeoff and cruise conditions.
  Comprehensive data report. Volume 3: Graphical
  data book 1
  [NASA-CR-159819-VOL-3-BK-1]   p0214 N81-17085
Model aerodynamic test results for two variable
  cycle engine coannular exhaust systems at
  simulated takeoff and cruise conditions.
  Comprehensive data report. Volume 3: Graphical
  data book 2
  [NASA-CR-159819-VOL-3-BK-2]   p0214 N81-17086
Laser scattering applications development test in
  AEDC tunnel B at Mach number 8
  [AD-A093929]   p0217 N81-17105
The prediction of pressure distributions on an
  arrow-wing configuration including the effect of
  camber, twist, and a wing fin
                    p0243 N81-17984

WIND TUNNEL TESTS CONTD

Analytic development of improved supersonic cruise aircraft based on wind tunnel data
p0244 N81-17989

Flight and tunnel test results of the MDC mechanical jet noise suppressor nozzle
p0245 N81-18000

Technology development status at McDonnell Douglas
p0248 N81-18019

Multicyclic controllable twist rotor data analysis
[NASA-CR-152251] p0249 N81-18028

Development and wind tunnel investigation of three supercritical airfoil profiles for transport aircraft
[NASA-TM-75840] p0249 N81-18030

Improvements in the determination of convective transfers from infrared thermography --- in wind tunnel tests
p0255 N81-18258

Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA Ames 40 by 80 foot wind tunnel: Acoustic data report
[NASA-CR-152329] p0258 N81-18798

The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19009

Natural laminar flow flight experiment --- Langley 8-Foot Transonic Pressure Tunnel
p0260 N81-19010

KC-135 winglet flight results
p0260 N81-19011

Overview of advanced wing design --- Ames 12-Foot Pressure Tunnel and 11-Foot Transonic Wind Tunnel
p0260 N81-19012

Aeropropulsive characteristics of twin nonaxisymmetric vectoring nozzles installed with forward-swept and aft-swept wings --- in the Langley 16 Foot Transonic Tunnel
[NASA-TP-1778] p0261 N81-19019

Pressure distributions for the GA(W)-2 airfoil with 20% aileron, 25% slotted flap and 30% Fowler flap
[NASA-CR-2948] p0262 N81-19023

Effect of wing-transition location and slotted and unslotted flaps on aerodynamic characteristics of a fighter model at high subsonic speeds --- conducted in langley 8-foot transonic pressure tunnel
[NASA-TM-X-1849] p0262 N81-19024

Wind-tunnel investigation at Mach numbers from 0.25 to 1.01 of a transport configuration designed to cruise at near-sonic speeds --- conducted in langley 8-foot transonic pressure tunnel
[NASA-TM-X-2622] p0262 N81-19025

Experimental and theoretical study of flow fields and store forces in close proximity to a triple ejection rack at transonic speeds
[AD-A094751] p0263 N81-19030

Survey of aircraft icing simulation test facilities in North America
[NASA-TM-81707] p0269 N81-19078

Preliminary wind-tunnel investigation of the effects of engine nacelles on a transport configuration with high lift drag ratios to a Mach number of 1.00
[NASA-TM-82312] p0272 N81-19099

Wind tunnel tests to determine the behavior during ejection of exterior stores at high and low speeds
[DLGR-79-096] p0272 N81-19102

Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63 --- Langley unitary plan wind tunnel tests
[NASA-TM-81937] p0329 N81-20025

The elaboration of a new family of helicopter blade profiles
[NASA-TM-75907] p0330 N81-20031

Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066

Support interference of wind tunnel models: A selective annotated bibliography
[NASA-TM-81909] p0335 N81-20084

A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018

Low and high speed propellers for general aviation: Performance potential and recent wind tunnel test results
[NASA-TM-81745] p0338 N81-21028

Unsteady pressure measurements during stall and buffeting --- wind tunnel tests
[ESA-TT-641] p0339 N81-21041

Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope --- wind tunnel tests for flight characteristics
[ESA-TT-634] p0339 N81-21046

Experimental and analytical study on the flutter and gust response characteristics of a torsion-free-wing airplane model --- in the Langley transonic dynamics tunnel
[NASA-CR-159283] p0340 N81-21059

High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400

Two-dimensional aerodynamic characteristics of the NACA 0012 airfoil in the Langley 8 foot transonic pressure tunnel
[NASA-TM-81927] p0385 N81-23036

Full-scale aerodynamic characteristics of a propellar installed on a small twin-engine aircraft wing panel
[NASA-TM-81285] p0385 N81-23039

Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels
p0386 N81-23056

Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data
[NASA-CR-152336-2] p0387 N81-23065

Comparison of theoretical predictions of orbiter airloads with wind tunnel and flight test results for a Mach number of 0.52
[NASA-TM-81358] p0387 N81-23066

Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport --- SCAT-15F model test in the Langley Transonic Dynamics Tunnel
[NASA-TM-81962] p0388 N81-23071

Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results --- Ames 7- by 10-ft wind tunnel tests
[NASA-TM-81269] p0423 N81-24025

Comparison of selected lift and sideslip characteristics of the Ayres Thrush S2R-800, winglets off and winglets on, to full-scale wind-tunnel data
[NASA-CR-165710] p0423 N81-24026

A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064

Canadian studies of wind tunnel corrections for high angle of attack models
p0435 N81-24121

A review of the wall pressure signature and other tunnel constraint correction methods for high angle-of-attack tests
p0435 N81-24122

Expected improvements on high angle of attack model testing
p0436 N81-24123

German activities on wind tunnel corrections
p0436 N81-24124

Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-25041

Wind tunnel tests of large- and small-scale rotor hubs and pylons
[AD-A098510] p0439 N81-25043

Energy efficient engine, low-pressure turbine boundary layer program
[NASA-CR-165338] p0442 N81-25077

Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431

Phase 2 and 3 wind tunnel tests of the J-97 powered, external augmentor V/STOL model --- conducted in Ames 40- by 80-foot wind tunnel
[NASA-CR-152380] p0483 N81-26076

Subsonic tests of an all-flush-pressure-orifice air data system
[NASA-TP-1871] p0489 N81-26104

Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control

system
[NASA-TM-83144] p0491 N81-26496
Design and wind tunnel tests of winglets on a DC-10 wing
[NASA-CR-3119] p0492 N81-27046
Aerodynamic investigation of C-141 leading edge modifications for cruise drag reduction, test 2
[AD-A099662] p0492 N81-27051
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[NASA-TM-83143] p0499 N81-27540
Unpowered aerodynamic characteristics of a 15-percent scale model of a twin-engine commuter aircraft
[NASA-TM-81284] p0537 N81-28055
From the civil component program 'IFAS': Fundamentals of engine simulation, using turbopowered simulator (TPS) technology in wind tunnel tests
[BMFT-FB-W-80-030] p0541 N81-28111
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0 --- Ames 9 by 7 foot supersonic wind tunnel
[NASA-TM-81286] p0579 N81-30083
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30085
Rotor wake characteristics relevant to rotor-stator interaction noise generation
[NASA-TM-82703] p0583 N81-30130
Subsonic pitch-up alleviation on a 74 deg delta wing
[NASA-CR-165749] p0584 N81-30137
Some experiences with active control of aeroelastic response
[NASA-TM-83179] p0587 N81-30469
Determination of aircraft dynamic stability and control parameters from flight testing
p0591 N81-31115
Aircraft design using the National Transonic Facility
p0593 N81-31143
Proposed aeroelastic and flutter tests for the National Transonic Facility
p0593 N81-31144
Preliminary user planning for the NASA National Transonic Facility
p0593 N81-31145
Report of the panel on fluid dynamics
p0593 N81-31146
High lift technology
p0593 N81-31147
Configuration aerodynamics
p0593 N81-31148
High Reynolds number research requirements for space vehicle design
p0593 N81-31151
Report of the panel on theoretical aerodynamics
p0593 N81-31152
Unsteady airloads on oscillating wings in post-stall condition
[DFVLR-FB-81-16] p0594 N81-31158
Wind-tunnel studies of advanced cargo aircraft concepts --- leading edge vortex flaps for drag reduction
[NASA-CR-164833] p0627 N81-32117
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] p0627 N81-32118
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect --- wind tunnel tests
[NASA-TM-80199] p0627 N81-32119
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] p0627 N81-32124
Recent progress in V/STOL aircraft technology
p0633 N81-33144
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] p0635 N81-33163

WIND TUNNEL WALLS
Adaptable wind tunnel walls for 2D and 3D model tests
p0014 A81-11671
Wind tunnel wall interference in a test section with ventilated walls
p0015 A81-11673
Lift effect on transonic wind-tunnel blockage
p0066 A81-15883
A wall interference analysis --- in wind tunnels
p0104 A81-17472
The practical application of the Wake Blocking Corrections according to Maskell --- for large wind tunnel models
[DGLR PAPER 80-112] p0121 A81-19398
Numerical simulations of a segmented-plenum, perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640
Studies on Thwaites' method for wind tunnel contraction
p0282 A81-27884
Low-speed wind tunnels with deformable walls
p0299 A81-29304
Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367
Further investigations of adaptive-wall wind tunnels
[AD-A091774] p0131 N81-13977
The resonance frequencies of ventilated wind tunnels
[ARC-R/M-3841] p0144 N81-15009
Wind tunnel wall interference
[AD-A093301] p0217 N81-17104
Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106
Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section --- transonic self-streamlining wind tunnel
[NASA-CR-165685] p0343 N81-21087
Wind tunnel corrections for high angle of attack models
[AGARD-R-692] p0435 N81-24120
A review of research at NLR on wind-tunnel corrections for high angle of attack models
p0436 N81-24125
A review of some investigations on wind tunnel wall interference carried out in Sweden in recent years
p0436 N81-24126
Wind tunnel corrections for high angles of attack: A brief review of recent UK work
p0436 N81-24127
Wall interference effects: Status review
p0592 N81-31141

WIND TUNNELS
NT BLOWDOWN WIND TUNNELS
NT CASCADE WIND TUNNELS
NT CRYOGENIC WIND TUNNELS
NT HYPERSONIC WIND TUNNELS
NT LOW SPEED WIND TUNNELS
NT SLOTTED WIND TUNNELS
NT SUBSONIC WIND TUNNELS
NT SUPERSONIC WIND TUNNELS
NT TRANSONIC WIND TUNNELS
NT TRISONIC WIND TUNNELS
Signal processing for a six-component strain-gage wind tunnel balance
p0049 A81-12960
Active control of an explosive wing-store flutter case --- Langley Research Center
p0082 N81-12117
A direct model pitch measurement with a laser interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
Evaluation of flow quality in two large NASA wind tunnels at transonic speeds
[NASA-TP-1737] p0095 N81-13303
A computer-based laser Doppler velocimeter
[DFVLR-MITT-79-14] p0133 N81-14209
Application of transonic potential calculations to aircraft and wind tunnel configurations
p0186 N81-15992
Propeller propulsion integration, phase 1 --- conducted in langley 30 by 60 foot full scale wind tunnel
[NASA-CR-163921] p0196 N81-16858

Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels
[NASA-CR-152145] p0276 N81-19136
Validation of the Wright-Patterson vertical wind tunnel
[AD-A094777] p0277 N81-19143
Operating characteristics of the Langley Mach 7 Scramjet Test Facility
[NASA-TM-81929] p0335 N81-20083
Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061
Measurements of temperature and pressure fluctuations in the T prime 2 cryogenic wind tunnel
[NASA-TM-75408] p0490 N81-26158
Computer analysis of flow perturbations generated by placement of choke bumps in a wind tunnel
[NASA-TP-1892] p0579 N81-30088
Wind Tunnels of NASA
[NASA-SP-440] p0629 N81-32153

WIND VARIATIONS
Analysis of wind vector components in the lower troposphere Applications to aircraft operations at terminals
[AIAA PAPER 81-0387] p0167 A81-20799

WIND VELOCITY
Catalog of sea state and wind speed in the South Atlantic Bight
[NASA-CR-156872] p0137 N81-14601

WIND VELOCITY MEASUREMENT
Wind speed measurement for wind turbine testing
p0055 A81-13873
Analysis of wind vector components in the lower troposphere Applications to aircraft operations at terminals
[AIAA PAPER 81-0387] p0167 A81-20799
Wind shear systems implementation plan, benefit/cost study
[AD-A094168] p0253 N81-18055

WINDING
NT FILAMENT WINDING

WINDMILLING
U AUTOROTATION

WINDMILLS (WINDPOWERED MACHINES)
Application of a method for aerodynamic analysis and design of horizontal axis wind turbines, part 1
[FFA-TN-AU-1499-PT-1] p0086 N81-12633
Optimized pitch controller for load alleviation on wind turbines
[FFA-TN-HU-2189-PT-1] p0087 N81-12634
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467
Static deflection and eigenfrequency analysis of the Nibe wind turbine rotors. Theoretical background --- structural vibration
[RISOE-M-2199] p0279 N81-19497
Development and design of a large wind-turbine blade --- fiber reinforced composites
[MBB-UD-301/80-OE] p0586 N81-30158

WINDOWS (APERTURES)
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
Effects of window configuration on model pressure distribution in wind tunnels with perforated walls
[AD-A094213] p0277 N81-19142
Development of a CFC window frame, using short fiber pressing technology --- jet aircraft cabin windows
[BMFT-FB-W-80-032] p0499 N81-27208

WINDPOWER UTILIZATION
Wind speed measurement for wind turbine testing
p0055 A81-13873
Stability of large horizontal-axis axisymmetric wind turbines
[NASA-TM-81623] p0085 N81-12446
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467

WINDPOWERED GENERATORS
Towing tank tests on model wind turbine rotors
p0055 A81-13860
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22526
Wind tunnel tests of sailwings for Darrieus rotors
p0518 A81-42678
Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492
Recent darrieus Vertical-Axis Wind Turbine aerodynamical experiments at Sandia National Laboratories
[SAND-81-1108C] p0588 N81-30615

WINDPOWERED PUMPS
Improving the mechanical load matching of wind energy converters
p0055 A81-13870

WINDS ALOFT
NT JET STREAMS (METEOROLOGY)

WINDSCREENS
U WINDSHIELDS

WINDSHIELDS
Use of similitude in analyzing aircraft windshield anti-icing performance
[AIAA PAPER 79-1022] p0051 A81-13218
Computer analysis of bird-resistant aircraft transparencies
p0175 A81-22087
Techniques for evaluation of aircraft windscreen optical distortion
p0358 A81-32507
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies
[AD-A091051] p0091 N81-13039
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
F-111 windscreen machining
[Y-2232] p0142 N81-14995
Evaluation of bird load models for dynamic analysis of aircraft transparencies
[AD-A092909] p0204 N81-16995
Potential of optical Fourier analysis for measuring windscreen distortion
[AD-A094127] p0259 N81-18853
Aircraft transparency optical quality: New methods of measurement
[AD-A096183] p0341 N81-21076
Validation of a bird substitute for development and qualification of aircraft tranparencies
[AD-A097736] p0424 N81-24036
Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion
[AD-A097731] p0426 N81-24049
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] p0635 N81-32163

WING CAMBER
Mission Adaptive Wing research programme
p0227 A81-24057
Unsteady aerodynamic propulsion
[AIAA 81-0645] p0307 A81-29490
Analysis and application of compliant rotor technology
p0467 A81-40006
A study of wing body blending for an advanced supersonic transport
p0244 N81-17987

WING FLAPS
NT LEADING EDGE FLAPS
NT LEADING EDGE SLATS
NT TRAILING-EDGE FLAPS
NT VORTEX FLAPS
Leading-edge 'Vortex Flaps' for enhanced subsonic aerodynamics of slender wings
p0012 A81-11646
The aerodynamics of inverted leading edge flaps on delta wings
[AIAA PAPER 81-0356] p0165 A81-20775
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
Prediction method for aeroacoustic loads on under the wing blown flaps
[AIAA PAPER 81-2038] p0621 A81-48694
A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012

WING FLOW METHOD TESTS
Add fluorescent minitufts to the aerodynamicist's bag of tricks
p0005 A81-11245
High-lift investigations on some small aspect ratio wings
p0011 A81-11643
Winglets development at Israel Aircraft Industries
p0012 A81-11645
Adaptable wind tunnel walls for 2D and 3D model tests
p0014 A81-11671
Transonic flow past a wing profile in channels with permeable walls
p0054 A81-13533
Wing-alone aerodynamic characteristics at high angles of attack
[AIAA PAPER 81-0068] p0157 A81-20532
Calculation of the flow pattern behind an aircraft wing
p0349 A81-31041
Philosophy and results of steady and unsteady test techniques on a large scale transport aircraft model in the ONERA transonic tunnel S1 MA. Part 1: Philosophy and results of steady tests. Part 2: Interest of large models in unsteady aerodynamics
p0190 N81-16019

WING LOADING
Weight optimization of wing structures according to the gradient method
p0012 A81-11650
Circulation Control Wing /CCW/ flight tests
p0122 A81-19469
Effect of transport aircraft wing loads spectrum variation on crack growth
p0172 A81-21738
Research on vortex bursting in compressible flow --- Thesis
p0230 A81-24477
Concerning the motion of a piloted aircraft
p0299 A81-29312
Fatigue sensitivity of composite structure for fighter aircraft
[AIAA 81-0495] p0300 A81-29383
Concepts for improving the damage tolerance of composite compression panels
p0360 A81-32825
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate
p0418 A81-37137
Aerodynamic characteristics of wings of arbitrary planform
p0461 A81-39267
Design, analyses, and model tests of an aeroelastically tailored lifting surface
[AIAA PAPER 81-1673] p0566 A81-45974
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47552
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] p0608 A81-47553
Estimation of wing nonlinear aerodynamic characteristics at supersonic speeds
[NASA-TP-1718] p0021 N81-10004
An analytical technique for approximating unsteady aerodynamics in the time domain
[NASA-TP-1738] p0043 N81-11422
Assessment of variable camber for application to transport aircraft
[NASA-CR-158930] p0071 N81-12016
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969
Feasibility study for C-141B reduction of wing loads by uprigging the ailerons
[AD-A094634] p0272 N81-19105
Unsteady airloads on a harmonically pitching wing with external store
[NLR-SP-80004-U] p0330 N81-20038
Experimental and analytical study on the flutter and gust response characteristics of a torsion-free-wing airplane model --- in the Langley transonic dynamics tunnel
[NASA-CR-159283] p0340 N81-21059
Additional information about Fighter Aircraft Loading Standard for Fatigue Evaluation (FALSTAFF)
[NLR-TR-79056-U] p0344 N81-21391
Comparison of theoretical predictions of orbiter airloads with wind tunnel and flight test results for a Mach number of 0.52
[NASA-TM-81358] p0387 N81-23066
Application of vortex lattice methods to calculate Lv (rolling moment due to sideslip)
[PB81-166167] p0487 N81-26123
A structural load alleviation control system for a large transport aircraft
[TT-8002] p0541 N81-28106
Fatigue crack growth in 7475-T7651 material under flight simulation loading. Information from a Douglas report --- effect of transport/bomber loads spectrum on crack growth
[VTH-M-392] p0542 N81-28493

WING NACELLE CONFIGURATIONS
Calculation of the flow field around engine-wing-configurations
p0007 A81-11613
Finite element method study of wing-fuselage-nacelle interactions of a Falcon 20 type aircraft at Mach = 0.79
p0187 N81-15994
Experimental study of the interaction between the wing of a subsonic aircraft and a nacelle of a high by-pass ratio engine
p0189 N81-16010
Theoretical and Experimental studies of aerodynamic interference effects --- aerodynamic forces on winglets and on wing nacelle configurations for the YC-14 and KC-135 aircraft
p0190 N81-16017
Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63 --- Langley unitary plan wind tunnel tests
[NASA-TM-81937] p0329 N81-20025
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30085

WING OSCILLATIONS
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14394
A simplified theory of oscillating aerofoils in transonic flow - Review and extension
p0060 A81-14945
The method of superelements in the dynamics of complex structures
p0101 A81-16969
Experimental study of the snap-through oscillations of an empennage
p0299 A81-29313
Active control of forward swept wings with divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[AIAA 81-0567] p0306 A81-29494
Aerodynamic modeling of an oscillating wing with external stores
[AIAA 81-0648] p0307 A81-29501
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
A wind-tunnel study of the flutter characteristics of a supercritical wing
p0308 A81-29504

Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[AIAA 81-0655] p0308 A81-29507
Application of a flight test and data analysis technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
Influence of hinge line gap on aerodynamic forces acting on a harmonically oscillating thin profile in an incompressible flow. I, II
p0348 A81-30956
Measurement of the aerodynamic forces acting on a harmonically oscillating wing at high subsonic speeds
p0349 A81-31042
Comparison of computed and measured unsteady pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541
A new method of airfoil flutter control
p0367 A81-33844
Three-dimensional oscillatory piecewise continuous-kernel function method. I - Basic problems. II - Geometrically continuous wings. III - Wings with geometrical discontinuities
p0411 A81-35631
Measurement of derivatives for an oscillating airfoil with flap
p0411 A81-35635
Concerning one self-similarity property in flutter analysis
p0413 A81-36464
A vortex-lattice method for calculating longitudinal dynamic stability derivatives of oscillating delta wings
[AIAA PAPER 81-1876] p0561 A81-44570
Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
p0617 A81-48480
Results of oscillatory pitch and ramp tests on the NACA 0012 blade section
[ARA-MEMO-220] p0090 N81-13024
Unsteady wakes downstream from a profile oscillating in incidence --- aerodynamic flow tests on helicopter rotor blade profiles
[AAAF-NT-80-10] p0204 N81-16989
An asymptotic unsteady lifting-line theory with energetics and optimum motion of thrust-producing lifting surfaces
[NASA-CR-165679] p0385 N81-23035
Experimental studies of scale effects on oscillating airfoils at transonic speeds
p0386 N81-23054
Some remarks on the unsteady airloads on oscillating control surfaces in subsonic flow
p0386 N81-23055
Airplane wing vibrations due to atmospheric turbulence
[NASA-CR-3431] p0438 N81-24679
Unsteady airloads on oscillating wings in post-stall condition
[DFVLR-FB-81-16] p0594 N81-31158

WING PANELS
Simulated aircraft takeoff performance with frosted wings
[AIAA PAPER 81-0404] p0167 A81-20811
Flow visualization through the use of the smoke-wire technique
[AIAA PAPER 81-0412] p0168 A81-20816
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
Vibrations of multispan stiffened plates via modified Bolotin method
p0241 A81-26954
Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
[SAE PAPER 801155] p0407 A81-34245
The optimum design of non-moment laminated composite plate - According to static failure strength condition
p0480 A81-40449
A-7 composite outer wing service experience
p0530 A81-43617
Sliding-seal electron beam slot welding of an aircraft wing closure beam
p0614 A81-48142
The effect of the skewness of the skin panels on stresses in conical wings
p0625 A81-49930
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum --- wing panels for transport aircraft
[NLR-MP-80003-U] p0043 N81-11415

WING PLANFORMS
NT ARROW WINGS
NT DELTA WINGS
NT INFINITE SPAN WINGS
NT SWEPT FORWARD WINGS
NT SWEPTBACK WINGS
NT TRAPEZOIDAL WINGS
NT VARIABLE SWEEP WINGS
Nonlinear aerodynamic characteristics of a thin airfoil of arbitrary plane configuration
p0123 A81-19629
Thin minimum-drag airfoils
p0123 A81-19630
A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796
Wing analysis by the plate analogy using an integral-difference method
p0235 A81-25680
Computation of wind tunnel model deflections --- for transport type solid wing
[AIAA 81-0482] p0300 A81-29301
Study of the characteristics of a base-vented wing in nonlinear theory
[AAAF PAPER NT 80-40] p0369 A81-33927
Aerodynamic load distribution along the span of an asymmetric wing
p0413 A81-35915
Integrated wing-engine system for airliners
p0450 A81-37638
Aerodynamic characteristics of wings of arbitrary planform
p0461 A81-39267
Experimental and analytical development of an advanced supersonic fighter concept
[AIAA PAPER 81-1659] p0534 A81-43981
Survivors on the RPV front
p0577 A81-46725
Induced drag ideal efficiency factor of arbitrary lateral-vertical wing forms
[NASA-CR-3357] p0072 N81-12022
Laminar-airfoils for transport aircraft
[DFVLR-MITT-80-07] p0129 N81-13952
Interference aspects of the A310 high speed wing configuration
p0188 N81-16001
Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0188 N81-16009
A study of wing body blending for an advanced supersonic transport
p0244 N81-17987
A higher-order trapezoidal vector vortex panel for subsonic flow
[AD-A094775] p0263 N81-19032
Analytical study of STOL Aircraft in ground effect. Part 1: Nonplanar, nonlinear wing/jet lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096
Conceptual/preliminary design study of subsonic v/stol and stovl aircraft derivatives of the S-3A
[NASA-TM-81310] p0547 N81-29118
Investigation of aerodynamic stall alleviation on a swept planform wing using leading edge modifications
[AD-A101239] p0548 N81-29122

WING PROFILES
NT WING SPAN
New concepts for design of fully-optimized configurations for future supersonic aircraft
p0007 A81-11606
Longitudinal motion of low-flying vehicles in nonlinear flowfields
p0009 A81-11626
Research on transonic wings at the National Aerospace Laboratory, Japan
p0011 A81-11640
Optimizing the fixed leading edge shape of a transonic wing to suit the landing high-lift requirements
p0011 A81-11644

Transonic flow past a wing profile in channels
with permeable walls
p0054 A81-13533
Determination of the vorticity of a
small-aspect-ratio wing in hypersonic flow
p0054 A81-13544
Experimental investigations on a harmonically
swinging trail edge flap with a space
[DGLR PAPER 80-029] p0055 A81-13925
The supercritical profile of the supercritical wing
p0107 A81-17522
Stationary displacement of a body by a shock wave
p0107 A81-17622
The matrix analysis of wings
p0108 A81-17810
Some characteristics of subsonic flow over the
root area of a sweptback wing
p0123 A81-19633
Hinged strakes for enhanced maneuverability at
high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
Structural weight comparison of a joined wing and
a conventional wing
[AIAA PAPER 81-0366] p0166 A81-20785
A parametric study of the static longitudinal
aerodynamic characteristics of parallel lift
delta wing configurations at low Reynolds numbers
[AIAA PAPER 81-0409] p0168 A81-20814
Calculation of supersonic gas flows about wings
p0170 A81-21201
A penalty function method for structural optimum
design with aeroelastic constraints
p0223 A81-23727
Lifting surface theory and the numerical method of
wings with small angles of sideslip at subsonic
and supersonic speeds
p0224 A81-23851
The controlled growth method - A tool for
structural optimization
[AIAA 81-0549] p0301 A81-29400
Prediction of transonic flutter for a
supercritical wing by modified strip analysis
and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
An improved potential gradient method to calculate
airloads on oscillating supersonic interfering
surfaces
[AIAA 81-0646] p0307 A81-29499
A hybrid state vector approach to aeroelastic
analysis with application to composite lifting
surfaces
[AIAA 81-0626] p0308 A81-29512
A theoretical treatment of lifting surface theory
of an elliptic wing
p0347 A81-30653
Subsonic gas flow past a wing profile
p0349 A81-31030
Study of a propulsive system --- aerodynamic
characteristics of proposed model
p0366 A81-33673
Vortex-flow aerodynamics - An emerging design
capability
p0366 A81-33717
Determination of the vorticity on a wing of small
aspect ratio in a hypersonic stream
p0411 A81-35668
Calculation of supersonic flow around a wing with
constant curvature of its leading edges
p0413 A81-35916
Concerning one self-similarity property in flutter
analysis
p0413 A81-36464
Integrated wing-engine system for airliners
p0450 A81-37630
Wing of new technology test specimen - Structural
design and method of wing construction
p0450 A81-37639
An optimal-surface-transpiration subsonic
panel-method for iterative design of complex
aircraft configurations
[AIAA PAPER 81-1254] p0458 A81-39012
Investigation of shot peening as a forming process
for aircraft wing skins
p0458 A81-39046
Transonic swept wings studied by the lifting-line
theory
p0509 A81-41090
Transonic wing design using potential-flow codes -
Successes and failures
[SAE PAPER 810565] p0518 A81-42730
Effects of wingtip modifications on handling
qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
Surface-oriented coordinates for boundary-layer
calculations in the case of general configurations
[DGLR PAPER 81-014] p0608 A81-47557
Geometrically nonlinear theory for calculating
thin rods of a wing profile
p0625 A81-49935
Measured pressure distributions and shock shapes
on a Butler wing
[CUED/A-AERO/TR-9] p0090 N81-13026
Development of finite-volume methods for
three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
A system for aerodynamic design and analysis of
supersonic aircraft. Part 4: Test cases
[NASA-CR-3354] p0185 N81-15977
A constrained inverse method for the aerodynamic
design of thick wings with given pressure
distribution in subsonic flow
p0188 N81-16006
Design study for the inner wing of a transonic
wing-body combination of aspect ratio 8
p0190 N81-16015
Development and wind tunnel investigation of three
supercritical airfoil profiles for transport
aircraft
[NASA-TM-75840] p0249 N81-18030
The elaboration of a new family of helicopter
blade profiles
[NASA-TM-75907] p0330 N81-20031
Experimental flutter at high subsonic speeds and
its theoretical prediction, taking into account
wing thickness and Reynolds number
p0385 N81-23052
Civil component program Wing Section. Transonic
wing development --- for the european airbus
[BMFT-FB-W-80-021] p0426 N81-24052
Civil component program Wing Section. The design
of the transonic airfoil Va 2
[BMFT-FB-W-80-023] p0426 N81-24053
The supercritical profile of the supercritical wing
[NASA-TM-76605] p0494 N81-27075
WING ROOTS
Some characteristics of subsonic flow over the
root area of a sweptback wing
p0123 A81-19633
Effect of impact damage on the XFV-12A composite
wing box
p0182 A81-22676
Solar powered aircraft
[NASA-CASE-LAR-12615-1] p0620 N81-32138
WING SLATS
U LEADING EDGE SLATS
WING SLOTS
The performance of slotted blades in cascade
p0002 A81-10632
Determination of the effect of transverse cutouts
on the hydrodynamic characteristics of a
finite-span wing in the case of steady and
unsteady motion near a wall
p0119 A81-19335
On the unsteady wake-induced lift on a slotted
airfoil. II - The influence of displacement
thickness fluctuations
p0229 A81-24237
Effect of wing-transition location and slotted and
unslotted flaps on aerodynamic characteristics
of a fighter model at high subsonic speeds ---
conducted in langley 8-foot transonic pressure
tunnel
[NASA-TM-X-1849] p0262 N81-19026
WING SPAN
A finite-span wing in transonic flow
p0054 A81-13741
Steady flow past a rectangular wing with
circulation that is variable along the span
p0099 A81-16551
Spanwise distribution of control points in the
method of finite elementary solutions
[AIAA PAPER 79-1879] p0169 A81-21011
Vibrations of multispan stiffened plates via
modified Bolotin method
p0241 A81-26954
Wing with finite span in a transonic flow
p0420 A81-37480

WING TANKS
Report on a cooperative programme on Active Flutter Suppression
[AGARD-R-689] p0082 N81-12115
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116
Active control of an explosive wing-store flutter case --- Langley Research Center
p0082 N81-12117
Wind tunnel tests on a fighter aircraft wing/store flutter suppression system: The B.Ae control law
p0083 N81-12119
A study of the effects of store aerodynamic on wing/store flutter
p0490 N81-26153

WING TIP VORTICES
Method for reducing the tangential velocities in aircraft trailing vortices
p0066 A81-15880
The static pressure in a vortex core
p0228 A81-24072
On a generalization of Kaden's problem --- of initially planar semi-infinite vortex sheet rollup
p0288 A81-28676
Co-axial rotor aerodynamics in hover
p0465 A81-39899
Vortex drag reduction by diffusing vanes - Design for the 'Thrush' agricultural aircraft
[SAE PAPER 810605] p0521 A81-42762
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] p0610 A81-47601

WING TIPS
Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20582
Effects of wingtip modifications on handling qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019
Wingtip vortex turbine
[NASA-CASE-LAR-12544-1] p0496 N81-27096

WING-FUSELAGE STORES
A study of the effect of store aerodynamics of wing/store flutter
[AIAA 81-0604] p0304 A81-29467
Evaluation of methods for prediction and prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
Flow phenomena along fuselages and wing-fuselage systems of gliders
[NASA-TM-75401] p0186 N81-15983
Demonstration of a method for determining critical store configurations for wing store flutter
[AD-A092257] p0197 N81-16068
A theoretical method for the simulation of separation behavior of aircraft external stores --- applications to computerized wind tunnel tests
[MBB-FE-122/S/PUB/16] p0203 N81-16987
A study of the effects of store aerodynamic on wing/store flutter
p0490 N81-26153

WINGLETS
Winglets development at Israel Aircraft Industries
p0012 A81-11645
Aeroelastic tailoring of a composite winglet for KC-135
[AIAA 81-0607] p0304 A81-29470
The calculation of lift and drag characteristics of subsonic wings with winglets
p0480 A81-40442
Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
Induced drag ideal efficiency factor of arbitrary lateral-vertical wing forms
[NASA-CR-3357] p0072 N81-12022
Theoretical and Experimental studies of aerodynamic interference effects --- aerodynamic forces on winglets and on wing nacelle configurations for the YC-14 and KC-135 aircraft
p0190 N81-16017
Advanced aerodynamics and active controls. Selected NASA research
[NASA-CP-2172] p0259 N81-19001
KC-135 winglet flight results
p0260 N81-19011
Design and wind tunnel tests of winglets on a DC-10 wing
[NASA-CR-3119] p0492 N81-27046

WINGS
NT ARROW WINGS
NT BEARINGLESS ROTORS
NT CAMBERED WINGS
NT CRUCIFORM WINGS
NT DELTA WINGS
NT FIXED WINGS
NT FLEXIBLE WINGS
NT GAW-2 AIRFOIL
NT INFINITE SPAN WINGS
NT LIFTING ROTORS
NT LOW ASPECT RATIO WINGS
NT OBLIQUE WINGS
NT RECTANGULAR WINGS
NT RIGID ROTORS
NT RIGID WINGS
NT ROTARY WINGS
NT SLENDER WINGS
NT SUPERCRITICAL WINGS
NT SWEPT FORWARD WINGS
NT SWEPT WINGS
NT SWEPTBACK WINGS
NT THIN WINGS
NT TIP DRIVEN ROTORS
NT TRAPEZOIDAL WINGS
NT TWISTED WINGS
NT VARIABLE SWEEP WINGS
Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11606
Advanced combat aircraft wing design
p0007 A81-11608
Linear vortex theories of a profile and wing with air intake
p0019 A81-12703
Application of fracture mechanics in designing lower wing skin of transport aircraft
p0102 A81-17049
Adaptive airfoils and wings for efficient transonic flight
p0153 A81-20349
An analysis of gap effects on wing-elevon aerodynamic characteristics
[AIAA PAPER 81-0364] p0166 A81-20703
Damping of aircraft wing vibrations by automatically controlled internal forces
p0170 A81-21060
On the use of complex form of the Strouhal number in the study of nonlinear aeroelasticity
p0231 A81-24723
The Coronel Transverse Wing Flight system
p0231 A81-24748
Numerical study of stream surface structure near highly loaded wings
p0235 A81-25682
Wing flapping with minimum energy
p0283 A81-27809
The effect of jet non-uniformity on the lift of an augmentor wing
p0298 A81-29144
Aerodynamic efficiency of the wing of new technology, a comparison of design expectation and flight test result
p0450 A81-37645
Application of BFRP Crack Patching to Mirage III aircraft
p0481 A81-40506
Effect of engine noise on aircraft wing laminar boundary-layer stability
p0510 A81-41255
Evolution of transport wings - From C-130, C-141, and C-5 to C-XX
p0510 A81-41333
Composite Wing/Fuselage Program
p0530 A81-43629
Automatic damping of vibrations of an airplane wing by internal control forces
p0577 A81-46783
Model design and instrumentation for intermittent cryogenic wind tunnels
p0037 N81-11058

Low drag airfoil design utilizing passive laminar flow and coupled diffusion control techniques
[AD-A090778]
p0072 N81-12024
Aircraft accident report: Allegheny Airlines, Inc., Nord 262, Mohawk/Frakes 298, N29824, Benedum Airport, Clarksburg, West Virginia, February 12, 1979
[NTSB-AAR-79-12]
p0073 N81-12044
Optimal design studies on composite wings with static and dynamic constraints
[AAAF-NT-79-29]
p0077 N81-12077
Aeroelastic optimization with multiple constraints
[AD-A090775]
p0085 N81-12451
Jet wing interference for an overwing engine configuration
p0188 N81-16008
A method for the prediction of wing response to nonstationary buffet loads
[AD-A093037]
p0208 N81-17043
Comparison of flight load measurements obtained from calibrated strain gages and pressure transducers
[AD-A093758]
p0208 N81-17044
Continued development and correlation of analytically based weight estimation codes for wings and fuselages
[NASA-CR-152331]
p0251 N81-18044
Description of the HiMAT Tailored composite structure and laboratory measured vehicle shape under load
[NASA-TM-81354]
p0251 N81-18047
Investigation of EMAT Lamb system for the detection of bolt hole type cracks. Part 2: Reliability evaluation and system definition for detection of cracks under fasteners by EMATs
[AD-A094350]
p0258 N81-18420
Overview of advanced wing design --- Ames 12-Foot Pressure Tunnel and 11-Foot Transonic Wind Tunnel
p0260 N81-19012
Application of a structural optimization procedure for advanced wings
[AGARD-R-691]
p0333 N81-20064
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262]
p0333 N81-20067
The prediction of normal force and rolling moment coefficients for a spinning wing
[NASA-CR-165680]
p0333 N81-20068
A study of a VTOL thrusting ejector in low speed flight, volume 1
[NASA-CR-166137-VOL-1]
p0337 N81-21017
A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2]
p0337 N81-21018
Structural flight loads simulation capability, volume 1
[AD-A096572]
p0374 N81-22044
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594]
p0375 N81-22045
The development of a theoretical and experimental model for the study of active suppression of wing flutter
p0376 N81-22058
An asymptotic unsteady lifting-line theory with energetics and optimum motion of thrust-producing lifting surfaces
[NASA-CR-165679]
p0385 N81-23035
Aircraft wing weight build-up methodology with modification for materials and construction techniques
[NASA-CR-166173]
p0387 N81-23068
Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363]
p0441 N81-25065
Aerodynamic analysis of a fighter aircraft with a higher order paneling method
[AD-A099404]
p0483 N81-26082
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[NASA-TM-83144]
p0491 N81-26496
Design and wind tunnel tests of winglets on a DC-10 wing
[NASA-CR-3119]
p0492 N81-27046
The supercritical profile of the supercritical wing
[NASA-TM-76605]
p0494 N81-27075
Protection against wing icing for Airbus A300 and A310
[NASA-TM-76584]
p0494 N81-27079
Wing-alone aerodynamic characteristics for high angles of attack of supersonic speeds
[NASA-TP-1889]
p0579 N81-30087
An aerodynamic analysis of deformed wings in subsonic and supersonic flow
[AD-A101675]
p0580 N81-30091
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699]
p0635 N81-33161
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170]
p0635 N81-33162
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579]
p0637 N81-33195

WIRE
Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs
[NASA-CR-152390]
p0023 N81-10019
Practical aspects of instrumentation installation in support of subsystem testing
p0546 N81-29090

WIRING
Electric installation work on aircraft --- Russian book
p0577 A81-46794

WIRING SYSTEMS
U WIRING

WORK CAPACITY
Maximizing the capacity of a single-runway airport
p0177 A81-22193

WORK HARDENING
NT STRAIN HARDENING
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174

WORKING FLUIDS
Efficiency prediction for axial-flow turbines operating with nonconventional fluids
[ASME PAPER 81-GT-15]
p0310 A81-29937

WORKLOADS (PSYCHOPHYSIOLOGY)
An information-processing interpretation of air traffic control stress
p0053 A81-13416
RNAV benefits today - Today and future requirements
p0111 A81-18056
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820]
p0555 A81-44110
Investigation of the physical working environment for cabin attendants within Scandinavian Airlines System /SAS/ --- noise conditions and aircraft vibration
p0568 A81-46357

WRAPAROUND CONTACT SOLAR CELLS
U SOLAR CELLS

X

X BAND
U SUPERHIGH FREQUENCIES

X RAY APPARATUS
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592

X RAY FLUORESCENCE
X-ray fluorescence spectrometric analysis of wear metals in used lubricating oils
[AD-A097552]
p0390 N81-23087

X RAY INSPECTION
U. of Dayton uses X-rays to study impact patterns at ballistic ranges
p0453 A81-37798

X RAY SPECTROGRAPHY
U X RAY SPECTROSCOPY

X RAY SPECTROMETRY
U X RAY SPECTROSCOPY

X RAY SPECTROSCOPY
X-ray fluorescence spectrometric analysis of wear metals in used lubricating oils
[AD-A097552]
p0390 N81-23087

X WING ROTORS
Acoustics of rotors utilising circulation control

[AIAA PAPER 81-0092] p0160 A81-20596
Application of an aerodynamic configuration modeling technique to the design and analysis of X-Wing aircraft configurations
p0356 A81-32013
Recent progress in performance prediction of high advance ratio circulation controlled rotors
p0468 A81-40100
X-wing stability and control development and wind tunnel demonstration tests - Helicopter, conversion, and fixed wing flight
[AHS 80-27] p0475 A81-40157
A preliminary divergence and flutter evaluation of an X-wing aircraft
[AIAA PAPER 81-1671] p0534 A81-43945
XBQM-106A AIRCRAFT
U VATOL AIRCRAFT
XJ-79-GE-1 ENGINE
U J-79 ENGINE
XV-15 AIRCRAFT
The XV-15 tilt rotor research aircraft
p0100 A81-16588
The XV-15 - An initial Navy look
[AIAA PAPER 81-0155] p0161 A81-20635
In-flight structural dynamic characteristics of the XV-15 tilt rotor research aircraft
[AIAA 81-0612] p0304 A81-29474
An operational tilt-rotor this decade
p0309 A81-29774
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
[AHS 80-11] p0474 A81-40144
The XV-15 tilt rotor research aircraft
[NASA-TM-81244] p0026 N81-10054
V/STOLAND digital avionics system for XV-15 tilt rotor
[NASA-CR-152320] p0375 N81-22047
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data
[NASA-CR-152336-2] p0387 N81-23065

Y

YAW
Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20582
Effects of yaw on leading edge vortex flap aerodynamics
[AIAA PAPER 81-1660] p0526 A81-43147
The flying qualities of aircraft with actively augmented pitch and yaw stability
[ARC-R/M-3848] p0082 N81-12113
Thrust augmented spin recovery device
[NASA-CASE-LAR-11970-2] p0275 N81-19130
Results of a feasibility study for determining the yaw angle of a landing aircraft
[AD-A099765] p0495 N81-27084
Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea
[NASA-TM-81305] p0579 N81-30080
Generalized dynamic stability for linearized yawing motion --- The stability of spinning projectiles
[RMCS-80002] p0601 N81-31225
YAWING MOMENTS
An introduction to dynamic derivatives (3) methods of oscillating models in pitch and yaw in a £30 by 810 millimetre transonic wind tunnel
[ARL/AERO-NOTE-390] p0021 N81-10007
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
Static and yawed-rolling mechanical properties of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24471
YAWMETERS
U ATTITUDE INDICATORS
U YAW
YC-15 AIRCRAFT
U C-15 AIRCRAFT
YC-14 AIRCRAFT
The development of multiple redundant flight control systems for high integrity applications
p0284 A81-27903
YC-14 digital flight control experience
p0320 A81-30246
Graphite thermoplastic YC-14 outboard elevator
p0530 A81-43631
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] p0619 A81-48626
Theoretical and Experimental studies of aerodynamic interference effects --- aerodynamic forces on winglets and on wing nacelle configurations for the YC-14 and KC-135 aircraft
p0190 N81-16017
YC-14 interior noise measurements program
[NASA-CR-164523] p0492 N81-26849
YF-17 AIRCRAFT
U F-17 AIRCRAFT
YF-12 AIRCRAFT
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[AIAA PAPER 81-1597] p0500 A81-40972
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079
YHU-1 HELICOPTER
U UH-1 HELICOPTER
YJ-79 ENGINE
U J-79 ENGINE
YJ-85 ENGINE
U J-85 ENGINE
YUH-1 HELICOPTER
U UH-1 HELICOPTER
YUH-60A HELICOPTER
U UH-60A HELICOPTER

Z

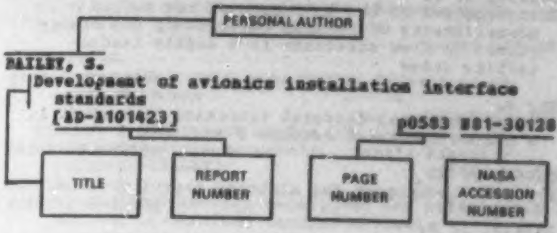
ZERO CROSSINGS
U ROOTS OF EQUATIONS
ZERO LIFT
Qualitative calculations of transonic drag-rise characteristics using the equivalence rule
p0058 A81-14393
Influence of zero-lift downwash on the relation between minimum-drag center-of-gravity position and inherent stability boundary
p0235 A81-25648
ZINC SILVER BATTERIES
U SILVER ZINC BATTERIES
ZINC SILVER OXIDE BATTERIES
U SILVER ZINC BATTERIES

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING/ *A Continuing Bibliography*
1981 Cumulative Index

JANUARY 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g. NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title, e.g. p0261 N78-19125. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

AARON, J. D., JR.
Development and evaluation of a prototype in-flight instrument flight rules (IFR) procedures trainer
[NASA-TM-73292] p0490 N81-26156

ABBEY, H. J.
Design options study. Volume 1: Executive summary
[AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results
[AD-A089537] p0027 N81-10057
Design options study. Volume 3: Qualitative assessment
[AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices
[AD-A089539] p0027 N81-10059

ABBINK, F. J.
Navaids calibration evaluation with a computer-controlled avionics data acquisition system
p0383 N81-23020

ABBOTT, J. L.
Computer generated radar images for navigation
p0049 A81-12793

ABBOTT, J. M.
Low-speed aerodynamic performance of 50.8-centimeter-diameter noise-suppressing inlets for the Quiet, Clean, Short-haul Experimental Engine (QCSEE)
[NASA-TP-1178] p0035 N81-11037

ABBOTT, T. S.
Effect of display size on utilization of traffic situation display for self-spacing task
[NASA-TP-1885] p0586 N81-29109

ABDEL AZIM, A. F.
Particulate flow in centrifugal compressors used in helicopters
p0297 A81-29109

ABEL, I.
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Application of a flight test and data analysis technique to flutter of a drone aircraft
[AIAA 81-0652] p0306 A81-29511
Langley Research Center contributions in advancing active control technology
p0259 N81-19002
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[NASA-TM-83143] p0499 N81-27580
Some experiences with active control of aeroelastic response
[NASA-TM-83179] p0587 N81-30469
A method for obtaining reduced-order control laws for high-order systems using optimization techniques
[NASA-TP-1876] p0589 N81-30851

ABELKIS, P. R.
Effect of transport aircraft wing loads spectrum variation on crack growth
p0172 A81-21738

ABELL, E. E.
Prediction of future test needs, test facilities and procedures
p0433 N81-24104

ABELSON, L. C.
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison
p0054 A81-13515

ABERNATHY, J. M.
An analysis of gap effects on wing-elevon aerodynamic characteristics
[AIAA PAPER 81-0364] p0166 A81-20783
An aerodynamic analysis of deformed wings in subsonic and supersonic flow
[AD-A101675] p0580 N81-30091

ABRAHAM, N.
Analysis, design and simulation of line scan aerial surveillance systems
p0357 A81-32492

ABRAIMOV, N. V.
Mechanical properties of aluminum coatings on heat-resistant steels
p0355 A81-31668

ABRAMS, C. R.
New Navy programs for development of integrated inertial sensors
p0405 N81-26108

ABRAMS, R.
Supersonic aircraft test experience - Test techniques and data analysis methods
p0419 A81-37299

ABRAMSON, J.
Optimization theory applied to higher harmonic control of circulation controlled rotors
p0571 A81-46606

ABSHAEV, M. T.
Operational radar display of the structure of thunderstorm hail clouds
p0069 A81-16474

ACE, R. E.
Candidate CDTI procedures study
[NASA-CR-165673] p0373 N81-22032

ACKERMANN, J.
Robust control system design
p0042 N81-11275

ACKERMANS, P. E.
High-level languages in affordable aircraft simulators
p0154 A81-20410

ADACHI, T.
The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder
p0233 A81-25312
Study of the secondary flow in the downstream of a moving blade row in an axial flow fan
p0355 A81-31767

On the numerical analysis of stall flutter in turbine cascade p0613 A81-47963
ADAM, C. F.
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter [AD-A092633] p0194 N81-16046
ADAM, E. C.
F/A-18 Hornet Crew Station p0327 A81-30355
ADAM, P.
Pilot installations for deposition techniques in the case of components exposed to heat and for diffusion joining of power plant components p0449 A81-37634
ADAMCZYK, J.
Full potential solution of transonic quasi-3-D flow through a cascade using artificial compressability [NASA-TM-81637] p0140 N81-14980
ADAMCZYK, J. J.
Inlet flow distortion in turbomachinery [ASME PAPER 80-GT-20] p0109 A81-17952
Supersonic stall flutter of high-speed fans [ASME PAPER 81-GT-184] p0317 A81-30078
Supersonic stall flutter of high speed fans [NASA-TM-81613] p0140 N81-14978
ADAMS, J. J.
Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations [NASA-TP-1776] p0142 N81-14997
Simulator evaluation of separation of display parameters in path-following tasks [NASA-TP-1915] p0638 N81-33203
ADAMS, J. W., JR.
Application of scheduling heuristics on the aircraft maintenance depot [AD-A094815] p0261 N81-19015
ADAMS, M. L.
Nonlinear rotor dynamics analysis p0257 N81-18405
ADAMS, R. J.
Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system [AD-A093868] p0216 N81-17095
National icing facilities requirements investigation [AD-A102520] p0602 N81-31238
ADAMS, W. M., JR.
A digital program for calculating the interaction between flexible structures, unsteady aerodynamics and active controls [NASA-TM-80040] p0498 N81-27115
ADAMSON, W. M.
Prop-Fan technical progress leading to technology readiness [AIAA PAPER 81-0810] p0367 A81-33878
ADCOCK, J. B.
Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel [AIAA PAPER 81-1062] p0459 A81-39074
A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel [NASA-TP-1752] p0021 N81-10005
ADDY, A. L.
Effects of axisymmetric sonic nozzle geometry on Mach disk characteristics p0110 A81-18022
ADICOFF, A.
Vanadium trineodecanoate promoter for fiberglass-polyester soil surfacings [AD-A091785] p0132 N81-14084
ADKINS, A.
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase [AD-A102163] p0595 N81-31181
ADKINS, L. A.
Design options study. Volume 1: Executive summary [AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results [AD-A089537] p0027 N81-10057
Design options study. Volume 3: Qualitative assessment [AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices [AD-A089539] p0027 N81-10059
ADSIT, N. R.
Development of advanced interceptor substructural material [AD-A090127] p0038 N81-11116
Development of advanced interceptor substructural material [AD-A103836] p0640 N81-33241
AFANASEVA, N. N.
Investigation of the influence of the radial nonuniformity of initial temperature and energy losses on flow structure in a highly loaded turbine stage p0465 A81-40019
AGATA, H.
Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I p0229 A81-24090
AGGARWAL, R. K.
Advanced techniques for airborne target screener p0320 A81-30238
AGLIULLIN, I. N.
Parametric analysis of multipurpose airplanes based on utilization effectiveness criteria p0236 A81-25691
Basic problem of the analytical design of aircraft gas turbine engines. II p0299 A81-29305
AGNOS, R.
Airborne Systems Software Acquisition Engineering Guidebook for contracting for software acquisition [AD-A100217] p0543 N81-28706
AGRAWAL, P. K.
Effect of surface roughness over the blade in compressor cascade p0060 A81-14924
AGRAWAL, R. K.
A generalized mathematical model to estimate gas turbine starting characteristics [ASME PAPER 81-GT-202] p0318 A81-30092
AGRAWAL, S.
Investigation of aerodynamic stall alleviation on a swept planform wing using leading edge modifications [AD-A101239] p0540 N81-29122
AGRELL, N.
A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations [FFA-TN-AU-1418-PT-1] p0022 N81-10013
AGROVSKII, B. S.
A method for measuring the velocity field in a stalled flow p0287 A81-28523
AGUZR, J. A.
Jet engine maintenance and reliability programs - Objectives and management p0287 A81-28475
AHMADI, A. R.
An asymptotic unsteady lifting-line theory with energetics and optimum motion of thrust-producing lifting surfaces [NASA-CR-165679] p0305 N81-23035
AHMED, S. R.
Computation of pressure distribution on the DFVLR wing-body model by the panel method [DFVLR-FB-80-02] p0372 N81-22029
AHUJA, K. K.
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory p0209 A81-20943
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation [AIAA PAPER 81-2007] p0621 A81-40640
AICHER, W.
Rotor model for verification of computation methods [ISD-262] p0145 N81-15467
AIDALA, P. V.
Complex configuration analysis at transonic speeds p0190 N81-16016
AIKEN, E. W.
Results of a simulator investigation of control system and display variations for an attack helicopter mission [AHS 80-28] p0475 A81-40150

A piloted simulation of the backup control system engagement for the YAH-64
p0576 A81-46646

AINO, H.
Fuel system testing and test instrumentation
p0544 N81-29076

AKAI, T. J.
Stability and flutter analysis of turbine blades at low speed
p0612 A81-47959

AKENTEV, V. G.
Calculation of the aerodynamic characteristics of aircraft with jet mechanization
p0299 A81-29301

AKGERMAN, N.
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796
AIRCL: A programmed system for generating NC tapes for airplane models. User's manual
[NASA-CR-165687] p0340 N81-21058

AKHTER, M. M.
Trajectory generation techniques for multivariable control of aircraft turbine engines
p0240 A81-26609

AKIMOV, V. M.
Principles of the reliability of gas turbine engines
p0482 A81-40621
Propulsion energy for tomorrow's aviation
p0622 A81-49161

AL DABBAGH, N. A.
The influence of premixed combustion flame stabilizer geometry on flame stability and emissions
[ASME PAPER 81-GT-26] p0311 A81-29942

ALAJAJIAN, C. J.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362

ALANSKY, I.
Handling qualities of the SH-60B Seahawk
p0574 A81-46627

ALARCON, G. A.
Design of turbine cascades with transitional profile boundary layers
p0278 N81-19456

ALASHEEV, O. IU.
The use of direct lift control of an aircraft in a guided landing run
p0624 A81-49928

ALBANES, W.
Design of guidance and control digital autopilots
p0183 A81-22973

ALBE, F.
Holographic non-destructive testing of materials using pulsed lasers
p0013 A81-11655
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300

ALBERY, W. B.
Development of a flight simulation capability in the dynamic environment simulator
[AIAA 81-0578] p0415 A81-36566
Optical infinity lens development for flight simulator visual displays
p0212 N81-17071

ALBION, N.
Active control of the helicopter rotor for vibration reduction
[AHS 80-60] p0479 A81-40188

ALBRECHT, C.
Drive system technology advancements
p0356 A81-32015
Designing safety into helicopter transmissions
p0575 A81-46638

ALBRIGHT, A. E.
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-25041
Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363] p0441 N81-25065

ALCEDO, A. M.
Design and testing of float landing gear systems for helicopters
p0356 A81-32007

ALCOCK, R. G.
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187

ALCORN, J.
Radio Technical Commission for Aeronautics, Technical Symposium and Annual Assembly Meeting, Washington, D.C., November 20, 21, 1980, Proceedings
p0265 A81-28293

ALCORTA, J. A.
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33060
Improved capabilities to detect incipient bearing failures
[AD-A091687] p0134 N81-14325

ALDERS, G. J.
In-flight measurement of aerodynamic loads on captive stores. Equipment and results
[NLR-MP-79013-U] p0022 N81-10012

ALDINIO, G.
Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143

ALEKSANDROV, V. V.
Simulation of apparent acceleration
p0223 A81-23405

ALEKSEEV, K. P.
Reliability and engineering-economic characteristics of aircraft engines
p0001 A81-10045

ALEKSEEV, N. A.
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities
p0124 A81-19644

ALEXANDER, A.
Interactive multi-mode blade impact analysis
[ASME PAPER 81-GT-79] p0310 A81-29907

ALEXANDER, H. R.
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064

ALEXANDER, M. B.
Magnitude and frequency of wind speed shears and associated downdrafts
p0267 N81-19055

ALFARO-BOU, E.
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767

ALFF, R. K.
Economics of heavy fuels in gas turbines and combined cycles
[ASME PAPER 81-GT-45] p0312 A81-29959

ALGAZIN, V. A.
Calculation of the nonlinear aerodynamic characteristics of finite-span wing
p0063 A81-15388
Calculation of the nonlinear aerodynamic characteristics of a wing of finite span
p0417 A81-36738

ALISHAHI, M. M.
Application of superconducting coils to the NASA prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086

ALLAIRE, P. E.
An experimental and theoretical investigation of pressures in four-lobe bearings
p0004 A81-10840
Nonlinear analysis of squeeze film dampers applied to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062

ALLARDICE, T. B.
'Load snubbing' - A solution to the problem of terrain flying with external cargo
[AHS 80-32] p0476 A81-40162

ALLEN, C. L.
NASA VCE test bed engine aerodynamic performance characteristics and test results
[AIAA PAPER 81-1594] p0508 A81-40969

ALLEN, H. J.
The role of flight simulation in the design and

development of the Sea Harrier Nav-Attack System
p0010 A81-11625

ALLEN, J. L.
Investigation of low level aircraft nonavionic nonlinear interference
[AD-A098784] p0491 N81-26349

ALLEN, J. R.
Effect of temperature dependent mechanical properties on thermal stress in cooled turbine blades
[ASME PAPER 81-GT-105] p0315 A81-30010

ALLEN, R. E.
Turbine blade technology - Present and future
[ASME PAPER 80-C2/AERO-10] p0116 A81-18639

ALLEN, R. R.
Longitudinal instability in braked landing gear
[ASME PAPER 80-WA/DSC-12] p0170 A81-21083

ALLIOT, J. C.
A French flight test program on the electromagnetic effects of lightning
p0199 N81-16155

ALLTON, J.
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103783] p0631 N81-33134

ALMAULA, N.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362

ALPERIN, M.
Jet-diffuser ejector - Attached nozzle design
[NASA-CR-152361] p0278 N81-19412

A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064

ALT, J. J.
Quantifying reactive maneuvers
[AD-A101136] p0539 N81-28091

ALTAN, T.
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796

ALTER, J. J.
Results of a feasibility study for determining the yaw angle of a landing aircraft
[AD-A099765] p0495 N81-27084

ALTHER, G. A.
The Windecker Eagle - A new era in general aviation aircraft manufacturing
p0240 A81-26747

ALTMAN, J. G.
The S3 transition
p0240 A81-26617

ALTMAN, R. L.
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923

ALWANG, J. R.
Engine-airframe transient compatibility - Analysis and test
p0106 A81-17517

AMBERG, R. L.
Advances in landing gear systems
p0545 N81-29077

AMICO, G. V.
The evolution of real-time digital simulation of aircraft for training applications
p0615 A81-48358

AMIN, N. F.
F/A-18A inlet/engine compatibility flight test results
[AIAA PAPER 81-1393] p0503 A81-40060

AMSDEN, R. C.
Design requirements of agricultural aircraft
p0282 A81-27080

AN, J. G.
Spanwise distribution of control points in the method of finite elementary solutions
[AIAA PAPER 79-1879] p0169 A81-21011

ANANEVA, Z. A.
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122

The influence of surface roughness on boundary layer flow and separation at transonic speeds
p0413 A81-36468

ANDERS, G.
Philosophy and results of steady and unsteady test techniques on a large scale transport aircraft model in the ONERA transonic tunnel S1 MA. Part 1: Philosophy and results of steady tests.

Part 2: Interest of large models in unsteady aerodynamics
p0190 N81-16019

ANDERSEN, N. B.
Performance deterioration: An airline perspective
p0598 N81-31202

ANDERSON, B. A.
Real-time estimation an advanced turbofan engines
p0564 A81-45553

ANDERSON, B. H.
Factors which influence the behavior of turbofan forced mixer nozzles
[AIAA PAPER 81-0274] p0359 A81-32509

Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
[NASA-TM-82658] p0552 N81-29782

ANDERSON, D. C.
AFTI/F-16 advanced multimode control system design for task-tailored operations
[AIAA PAPER 81-1707] p0535 A81-43955

ANDERSON, D. J.
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180

Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042

ANDERSON, D. L.
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13084

ANDERSON, J. D., JR.
Numerical lifting line theory applied to drooped leading-edge wings below and above stall
p0066 A81-15881

Aeronautical engineering - A historical perspective
p0562 A81-44049

ANDERSON, J. R.
Environmental burn-in effectiveness
[AD-A093307] p0211 N81-17060

ANDERSON, M. A.
Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel
[NASA-CR-165751] p0580 N81-30098

ANDERSON, O. L.
Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams
[AIAA PAPER 81-0257] p0163 A81-20785

A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767

ANDERSON, R. G.
Model 206L composite vertical fin
[AHS 80-34] p0478 A81-40175

ANDERSON, S. B.
Historical overview of V/STOL aircraft technology
[NASA-TM-81280] p0272 N81-19166

Historical overview of V/STOL aircraft technology
p0633 N81-33143

ANDERSON, V. G.
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28090

ANDERSON, W. J.
Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683

Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370

ANDRADA, T.
Staring infrared mosaic observation of an F-15 aircraft
p0463 A81-39636

ANDREAS, R. D.
A single gimbal/strapdown inertial navigation system for use on spin stabilized flight test vehicles
[SAND-80-2479C] p0193 N81-16037

ANDREEV, F. L.
Lighting systems for flight support
p0564 A81-45602

ANDREW, M. J.
Co-axial rotor aerodynamics in hover
p0465 A81-39099

ANDREWS, G. E.
The influence of premixed combustion flame

stabilizer geometry on flame stability and emissions
[ASME PAPER 81-GT-26] p0311 A81-29942

ANDREWS, J. W.
Electronic flight rules: An alternative separation assurance concept
[AD-A097570] p0387 N81-23063

ANDREWS, W. H.
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193

ANDRISANI, D., II
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] p0630 N81-33199

ANGELINI, J. J.
Comparison of computed and measured unsteady pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541
Comparison of Unsteady Pressure Fields Computed and Measured on the ZKP model
[AGARD-R-688] p0033 N81-11019

ANISIMOVA, N. P.
A method for measuring the velocity field in a stalled flow
p0287 A81-28523

ANIUTIN, A. N.
Efficiency of cantilever compressor stator blades
p0509 A81-41081

ANNIS, C. G., JR.
Concept definition: Retirement for cause of F-100 rotor components
[AD-A095584] p0335 N81-20080

ANQUEZ, L.
Braking of an aircraft tyre
p0412 A81-35892

ANSELL, G. S.
Composite structural materials
[NASA-CR-163946] p0207 N81-17033
Composite structural materials
[NASA-CR-164634] p0541 N81-28176

ANSON, L.
Design of an exhaust mixer nozzle for the Avco-Lycoming Quiet Clean General Aviation Turbofan (QCGAT)
[NASA-CR-159426] p0274 N81-19120

ANTHONY, F. M.
Design and fabrication of a stringer stiffened discrete-tube actively cooled panel for a hypersonic aircraft
[NASA-CR-3403] p0279 N81-19484

ANTHONY, S. R.
A new frequency parameter for unsteady aerodynamics
[AIAA 81-0649] p0307 A81-29502

ANTIS, G. W.
Airspace analysis in airport system planning
p0111 A81-18052

ANTL, B. J.
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152

ANTOLOVICH, S. D.
Low cycle fatigue of Rene 77 at elevated temperatures
p0289 A81-28989

ANTONA, E.
Mathematical aspects of the probabilistic evaluations of structural safety and NDI capabilities
p0181 A81-22635

ANTTILA, D.
Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20] p0474 A81-40150

APPICH, W. H., JR.
Aerodynamic effects of body slots on a guided projectile with cruciform surfaces
[AIAA PAPER 79-1650] p0066 A81-15887

APPLEYARD, R. D.
Evaluation of explosafe. Explosion suppression system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17087

ARAI, N.
An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
p0109 A81-17841

ARANAZ DEL RIO, F.
A new aircraft is born - The CN-235
p0565 A81-45736

ARATA, W. H., JR.
The technical contributions of the Wright brothers to aviation
p0038 A81-14368

ARBANELLA, R.
Digital computer simulation of generalised fault conditions on aircraft electrical power systems
p0322 A81-30285

ARCHER, R. J.
A process for protecting gas turbine blade cooling passages against degradation
p0622 A81-49209

ARCIDIACONO, P. J.
Preliminary evaluation of RSRA data comparing pure helicopter, auxiliary propulsion and compound helicopter flight characteristics
[AHS 80-10] p0473 A81-40163

ARDEMA, M. D.
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270] p0248 N81-18023
Vehicle concepts and technology requirements for buoyant heavy-lift systems
[NASA-TP-1921] p0596 N81-31185

ARENDTS, F. J.
Constant-amplitude and flight-by-flight tests on CFRP specimens
p0039 N81-11133
Constant-amplitude and flight-by-flight tests on CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006

ARESTOL, T. M.
Seat pack for fighter aircraft operating on the NATO Northern Flank
p0205 N81-17010

ARGYRIS, J. H.
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467

ARIE, M.
Numerical study on viscous shear flow past a circular cylinder
p0228 A81-24077
Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0226 A81-24078

ARLAN, L.
A high performance TV camera for use in target acquisition and laser designator systems
p0350 A81-31115

ARLAZOROV, M.
Propeller and wing
p0366 A81-33696

ARLINGER, B.
Design and analysis of slot systems in transonic flow
p0038 A81-14392

ARMEN, H., JR.
An application of the energy release rate concept to crack growth in attachment lugs
[AIAA 81-0491] p0302 A81-29420

ARMSTRONG, G. T.
High bypass turbofan component development, modification 2
[AD-A093156] p0215 N81-17093

ARMSTRONG, T. J.
Human factors aspects of emergency egress from a business jet
[SAE PAPER 810617] p0523 A81-42772

ARNAIZ, H.
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061

ARNAUD, J. L.
Holographic non-destructive testing of materials using pulsed lasers
p0013 A81-11655
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300

ARNDT, R. E. A.
Cooperative investigation of the noise producing region of an axisymmetric jet
[AD-A089692] p0045 N81-11774

ARNETT, R. B.
Engine identification for adaptive control
p0080 N81-12100

ARNTZEN, D. E.
Airfield pavement demonstration-validation study
p0003 A81-10718

ARORA, J. S.
Optimal design of frames with substructuring
p0068 A81-16276

ARPASI, D. J.
An approach to real-time simulation using parallel processing
[NASA-TM-81731] p0345 N81-21803

ARRIGO, A. M.
Preliminary airworthiness evaluation OH-58C helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052

ARSENEV, L. V.
Investigation of the cooling of the turbine rotor blade of a gas-turbine power system
p0465 A81-40020
Comparative efficiency of penetrating steam and air cooling of gas turbine blades
p0509 A81-41003

ARTAMONOV, L. T.
Practical aerodynamics of the helicopter Mi-6A
p0116 A81-18600

ARTEMOV, O. A.
Evaluation of the effect of actuator time lag on the minimum control power of a VTOL aircraft
p0319 A81-30160

ARTHUR, S. F.
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046

ARTMANN, J.
Weight optimization of wing structures according to the gradient method
p0012 A81-11650

ASCH, A.
Consolidated Cab Display (CCD) System, Project Planning Document (PPD)
[AD-A098651] p0440 N81-25056

ASCH, A. E.
Forward-looking infrared /FLIR/ sensor for autonomous vehicles
p0357 A81-32490

ASH, R. L.
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513

ASHKENAS, I. L.
Generic multi-body formulation of heavy lift airship equations of motion
p0563 A81-45539
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163108] p0490 N81-27113
Development of handling quality criteria for aircraft with independent control of six degrees of freedom
[AD-A100045] p0498 N81-27117

ASHLEY, H.
On making things the best - Aeronautical uses of optimization /Wright Bros. lecture/
[AIAA PAPER 81-1738] p0528 A81-43175

ASHWOOD, P. F.
Free-jet testing of powerplants for aircraft and missiles
p0431 N81-24089

ASHWORTH, D. R.
The effects of various fidelity factors on simulated helicopter hover
[AD-A102028] p0601 N81-31232

ASK, H.
New storage medium - Greater safety. II - Testing, fabrication, implementation
p0227 A81-24044

ASK, H. R.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A098584] p0442 N81-25072

ASSEO, S. J.
Detection of target multiplicity using monopulse quadrature angle
p0360 A81-32696

ASTAFEV, V. A.
Formation of solid phase during the heating of jet fuels
p0103 A81-17372

ASTRIDGE, B. L.
Performance retention of the RB211 powerplant in service
p0590 N81-31201

ASTRIDGE, D. G.
Modelling techniques for the reduction of noise and vibration in gearboxes
p0151 A81-20063

ATASSI, H.
Stability and flutter analysis of turbine blades at low speed
p0612 A81-47959

ATCHESON, J. E.
Issues of commonality. Volume 2: Issue analysis
[AD-A095414] p0331 N81-20040
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047

ATHANS, M.
VTOL control for shipboard landing in high sea states
p0155 A81-20471

ATKIN, E. L.
The analytical ferrograph - Some factors affecting deposit formation
p0293 A81-29077

ATRAGHJI, E.
The tale of two wings
p0180 N81-16084

ATTA, E. H.
Component-adaptive grid embedding
p0137 N81-14697

ATTLFELLNER, S.
A method of helicopter low airspeed estimation based on measurement of control parameters
[MBB-UD-276-79-0] p0018 A81-12094

ATTRI, N. S.
Advances in landing gear systems
p0545 N81-29077

ATTRIDGE, A. G.
Is the engine helicopter-worthy
p0106 A81-17510

ATTWOOLL, V. W.
The relation between aircraft fuel reserves and navigation
p0612 A81-47083

AUGUSTINE, N. R.
Vertical lift capabilities for the 80's and 90's
p0632 N81-33139

AULT, E. A.
Turbine airfoil coating refurbishment
[AIME PAPER F79-10] p0059 A81-10770

AUHE, N. E.
The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies 7 and 8
[AD-A100551] p0539 N81-28080

AUPOIX, B.
Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers
[ONERA-NT-1980-4] p0126 N81-13930

AUSROTAS, R. A.
A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032
Predicting the impacts of new technology aircraft on international air transportation demand
[NASA-CR-165654] p0598 N81-31160

AVANT, R. L.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362

AVERETT, B. T.
Simulator investigation of arrow-wing low-speed handling qualities
p0244 N81-17993

AVETISIAN, D. A.
Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft
p0281 A81-27304

AVILA, J. H.
Stability of nonuniform rotor blades in hover using a mixed formulation
p0467 A81-40080
Stability of nonuniform rotor blades in hover using a mixed formulation
[AD-A090756] p0076 N81-12071

AYATI, M. B.
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956

AYERS, T. G.
Effect of wing-transition location and slotted and

unslotted flaps on aerodynamic characteristics
of a fighter model at high subsonic speeds
[NASA-TM-X-1849] p0262 N81-19024
Report of the wind tunnel/flight correlation panel
p0593 N81-31150
AYERS, W. E.
Three-dimensional model of spray combustion in gas
turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
AZUMA, A.
Gust response of rotary wing aircraft and its
alleviation
p0465 A81-39900
Gust response of rotary wing and its alleviation
p0473 A81-40135

B

BAALS, D. D.
Wind Tunnels of NASA
[NASA-SP-440] p0629 N81-32153
BAARSPUL, M.
Development and application of a moving base
visual flight simulator including the design of
hydraulic actuators with hydrostatic bearings
p0010 A81-11633
BABINSKY, T. C.
Fiber release from impacted graphite reinforced
epoxy composites
[NASA-CR-163604] p0038 N81-11117
BABISTER, A. W.
Aircraft dynamic stability and response
p0232 A81-25173
Aircraft stability at high incidence
p0282 A81-27878
BABUSHKIN, A. I.
Classification of links of assembly units with
respect to the character of their connections,
and calculation of the accuracy of their execution
p0319 A81-30168
BACH, L. J.
Blade loss transient dynamics analysis, volume 1.
Task 1: Survey and perspective
[NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2.
Task 2: Theoretical and analytical development.
Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27090
BACHALO, W. D.
An exploratory study of soot sample integrity and
probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943
Fuel injector characterization studies
[NASA-CR-165200] p0143 N81-15003
BACHMAN, K. L.
Flight test results of an advanced development
model Ring Laser Gyro Navigator (RLGN)
p0485 N81-26103
BACKER, R. C.
A mobile emissions laboratory for on-line analysis
of combustion products from gas turbine engines
p0361 A81-32872
BACZYNSKI, R. J.
Development of test requirements for civil and
military auxiliary power units
p0430 N81-24083
BADER, R. M.
Past and future trends in structures and dynamics
[AIAA PAPER 81-0896] p0362 A81-32921
Application of fracture mechanics to US Air Force
aircraft structural integrity requirements
[AAAF-NT-79-25] p0086 N81-12463
BADGER, D. V.
Investigation of shot peening as a forming process
for aircraft wing skins
p0458 A81-39046
BADR, A. A.
Contribution to the improvement of the classical
method of maintenance of aeroengines
p0290 A81-29055
BAEK, J. H.
Scale effects on turbulent boundary layer
development and flow separation around V/STOL
inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
BAERST, C. F.
Small Transport Aircraft Technology /STAT/
Propulsion Study
[SAE PAPER 801198] p0402 A81-36200
Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45891
General Aviation Turbine Engine (GATE) study
[NASA-CR-159482] p0274 N81-19117
BAEV, V. K.
X-ray pulse method for investigation of the
internal structure of a fuel jet
p0059 A81-14592
BAGAEV, G. I.
Some problems of modeling high-speed aerodynamics
p0237 A81-26110
BAGANOFF, D.
Partially confined multiple jet mixing
p0234 A81-25513
Application of holography to the study of
helicopter rotor flow fields
[NASA-CR-164293] p0392 N81-23433
BAGGETT, D. W.
Implementation of target orientation angles in
improved Kalman filter based short range radar
tracking
p0326 A81-30380
BAHR, D. W.
Gas turbine engine emission abatement - Status and
needed advancements
p0237 A81-26015
Impacts of broadened-specification fuels on
aircraft turbine engine combustors
[ASME PAPER 81-GT-2] p0310 A81-29927
CF6-50 engine emissions testing with traverse probe
[AD-A102159] p0600 N81-31218
BAHR, H. H.
Status report on Position Location Reporting
System /PLRS/
p0517 A81-42840
BAIASITOV, F. F.
Calculation of natural vibrations for thin-walled
irregular reinforced shells of the helicopter
fuselage type using the finite-element work method
p0614 A81-48097
BAILEY, D. A.
Development of a large-scale wind tunnel for the
simulation of turbomachinery airfoil boundary
layers
[ASME PAPER 81-GT-6] p0310 A81-29931
BAILEY, J. E.
Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107
BAILEY, P. G.
New method for cast superalloy frames - Segmented
mold and HIP utilized
p0408 A81-24693
BAILEY, R.
Landing flying qualities evaluation criteria for
augmented aircraft
[NASA-CR-163097] p0130 N81-13969
BAILEY, R. H.
Aircraft accident investigation as it relates to
life support equipment
p0176 A81-22103
BAILEY, S.
Development of avionics installation interface
standards
[AD-A101823] p0583 N81-30120
BAILEY, W. R., JR.
B-52 wake investigation
[LOG-C3932] p0072 N81-12020
BAILY, S.
Aircraft modification management evaluation
[AD-A096458] p0381 N81-22974
BAIR, G. L., JR.
Ground moving target radar signal simulation
p0323 A81-30304
BAIRD, G. T.
Recent developments in NDT techniques
p0113 A81-18078
BAISCH, E. F.
Metalspinning, shear- and flowforming
p0551 N81-29281
BAKER, A. A.
Application of BFRP Crack Patching to Mirage III
aircraft
p0481 A81-40586
BAKER, A. E.
Fatigue testing of helicopter gearboxes
p0488 N81-26130
BAKER, D. J.
Composite flight service evaluation program for
helicopters

[ANS 80-46] p0477 A81-40173

BAKER, L. E.
Design of fault tolerant electronic engine controls
[AIAA PAPER 81-1496] p0566 A81-45894
Turbine engine fault detection and isolation program, phase 1. Volume 2: Requirements definition for an integrated engine monitoring system
[AD-A093226] p0215 N81-17088
Turbine engine fault detection and isolation program, phase 1. Volume 1: Requirements definition for an integrated engine monitoring system
[AD-A093225] p0215 N81-17089

BAKER, L. R.
Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests
[AD-A094124] p0250 N81-18037

BAKER, T. J.
Numerical computation of transonic potential flow through nozzles
p0233 A81-25353

BAKUT, P. A.
Detection of moving objects
p0118 A81-18773

BALAGEAS, D. L.
Improvements in the determination of convective transfers from infrared thermography
p0255 N81-18258

BALAKRISHNA, S.
Effects of boundary-layer treatment on cryogenic wind-tunnel controls
[NASA-CR-159372] p0083 N81-12120

BALALAEV, V. A.
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957

BALAN, C.
Effects of solid particles suspended in fluid flow through an axial flow compressor stage
p0297 A81-29108

BALD, W. B.
A discussion document on the thermal design of force balances for cryogenic wind tunnels
[OUEL-1321/80] p0435 N81-24119

BALES, K. S.
Structures and Dynamics Division research and technology plans, fiscal year, 1981
[NASA-TM-83137] p0491 N81-26497

BALL, E. G.
Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing
[AD-A089794] p0035 N81-11034

BALL, K. O. W.
Aircraft engine nacelle fire test simulator. Volume 1: Technical
[AD-A089629] p0030 N81-10081

BALL, M.
Forced vortices near a wall
[AIAA PAPER 81-0256] p0163 A81-20708

BALL, W. H.
Experimental investigation of a high-aspect-ratio supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42187

BALLAL, D. R.
Basic ignition research related to altitude relight problems
p0237 A81-26014

BALLARD, R. S.
Development of a noninterference compressor blade stress measurement system
p0361 A81-32874

BALLHAUS, W. F., JR.
Unsteady transonic small disturbance theory with strong shock waves
[NASA-CR-166157] p0261 N81-19020

BALOMBIN, J. R.
Rotor wake characteristics relevant to rotor-stator interaction noise generation
[NASA-TM-82703] p0583 N81-30130

BANE, G. L., JR.
Portable servoactuator test system
[AIAA PAPER 81-1620] p0525 A81-43130

BAMMERT, K.
New features in the design of axial-flow compressors with tandem blades
[ASME PAPER 81-GT-113] p0315 A81-30017

BANACH, H. J.
Turboprop engine propulsion for the 1990's
[AIAA PAPER 81-1648] p0533 A81-43935

BANDA, S. S.
Aircraft lateral parameter estimation from flight data with unsteady aerodynamic modelling
[AIAA PAPER 81-0221] p0162 A81-20684
Data analysis for aircraft parameter estimates
[AIAA PAPER 81-1864] p0560 A81-44561
Maximum likelihood identification of aircraft lateral parameters with unsteady aerodynamic modelling
p0376 N81-22057

BANDURIN, V. V.
The design of blowing-cooled aircraft electrical machines
p0002 A81-10474

BANERJEE, D.
Challenges in alloy design - Titanium for the aerospace industry
p0553 A81-43998

BANG, C.
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29405

BANGERT, L. S.
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Effects on inlet technology on cruise speed selection
p0245 N81-17998
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079

BANISH, R. J.
BIT/FIT maturity before first flight
p0324 A81-30320

BANKHEAD, H. R.
Experimental verification of turboblading aeromechanics
p0432 N81-24092

BANKS, J.
Regenerative engine analysis program
[AD-A095144] p0274 N81-19123

BAR-ITZHACK, I. Y.
Effect of acceleration switching during INS in-flight alignment
p0458 A81-36097
Doppler aided low accuracy strapdown inertial navigation system
[AIAA 81-1798] p0555 A81-44101

BARAN, H. A.
Digital Avionics Information System (DAIS): Life Cycle Cost Impact Modeling System (LCCIM). A managerial overview
[AD-A093281] p0211 N81-17062
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost
[AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement
[AD-A097438] p0390 N81-23084

BARATTA, F. I.
Simple methods of determining stress intensity factors
p0269 A81-28984

BARBER, M. R.
Wake vortex attenuation flight tests: A status report
p0267 N81-19057

BARBILLAT, A.
Helicopter blade reliability
p0287 A81-28474

BARCHE, J.
A wall interference analysis
p0104 A81-17472

BARDON, M. F.
Modified Brayton cycles utilizing alcohol fuels
[ASME PAPER 81-GT-103] p0315 A81-30009

BARE, E. A.
Effect of simulated in-flight thrust reversing on vertical-tail loads of F-18 and F-15 airplane models
[NASA-TP-1890] p0579 N81-30084

BAREISHIS, L. P.
Fatigue strength of certain materials used in airframe construction
p0285 A81-28108
BARENBERG, E. J.
Airfield pavement demonstration-validation study
p0003 A81-10718
Fully bonded concrete overlay for an airport runway
p0113 A81-18075
BARFIELD, A. F.
AFTI/F-16 advanced multimode control system design for task-tailored operations
[AIAA PAPER 81-1707] p0535 A81-43955
BARGA, N. A.
The role of advanced technology of turbine engine life cycle cost
p0047 N81-11927
BARGER, R. L.
A procedure for designing forebodies with constraints on cross-section shape and axial area distribution
[NASA-TP-1881] p0483 N81-26078
BARILE, A. J.
Binocular Camera for cockpit visibility of general aviation aircraft
[SAE PAPER 810628] p0524 A81-42780
A compendium of aircraft cockpit vision surveys, 1950 through 1980, volume 1
[AD-A101473] p0580 N81-30108
BARKER, C.
Gear unit noise and transmission errors
p0150 A81-20060
BARKER, W. R.
Introduction to a rigid pavement design procedure
p0111 A81-18054
BARLOW, J. B.
Full-scale aerodynamic characteristics of a propellar installed on a small twin-engine aircraft wing panel
[NASA-TM-81285] p0385 N81-23039
BARLOW, R. C.
Military aircraft technology - Needs and trends for the 80's
[AIAA PAPER 81-1681] p0535 A81-43952
BARMIN, V. P.
Hydrogen engines
p0625 A81-49949
BARMISH, B. R.
Pole placement with output feedback
p0458 A81-38899
BARNA, P. S.
Experimental investigations on the V/STOL tunnel at NASA/Langley Research Center
[NASA-CR-165655] p0329 N81-20028
BARNARD, A. J.
Fatigue and damage propagation in composite rotor blades
p0041 N81-11185
BARNES, L. T.
Effectiveness of turbine engine diagnostic systems
p0290 A81-29053
BARNETT, H. E.
Surface analysis of bearing steels after solvent treatments. II - Lubricant-coated bearing surfaces
[ASLE PREPRINT 80-LC-6A-6] p0118 A81-18748
BARNETT, Y.
Winglets development at Israel Aircraft Industries
p0012 A81-11645
Modification of wing sections to optimize transonic performance
p0226 A81-24011
BARON, A.
Aerodynamic design of a ducted propeller - Optimization of efficiency
p0102 A81-17146
BARRETT, J.
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069
BARRETT, L. E.
Nonlinear analysis of squeeze film dampers applied to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062
BARRETT, R. V.
Performance of aircraft pneumatic tyres in soft soil
p0226 A81-24000
BARRETT, W. J.
Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40812
BARROIS, W. G.
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage
[AGARD-MAN-10(ENG)] p0640 N81-33503
BARSCHDORFF, D.
Classification of operating conditions of turbomachines from solid borne sound
p0382 N81-23015
BARSOUM, R.
Application of the Semi-Loof thin shell element to the analysis of aircraft engine structures
p0518 A81-42704
BARTEL, C.
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 1: Methods, procedures, results
[EPA-550/9-79-313-1] p0087 N81-12644
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 2: Appendices A through F
[EPA-550/9-70-313-2] p0087 N81-12645
BARTELS, F.
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
BARTH, G. J.
A quick-look system for the processing of flight data recordings
p0329 N81-20021
BARTHELEMY, J.-F.
Sensitivity of optimum solutions to problem parameters
[AIAA 81-0548] p0301 A81-29399
BARTLETT, D. W.
The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation
p0260 N81-19009
BARTLEY, J. E.
Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
BARTO, J. J., JR.
Factors influencing the selection of tooling and fabrication methods in building a composite fuselage
p0574 A81-46628
BARTON, C. K.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618
BARTON, G.
Aircraft manufacturers approach to the E.M.C./Avionics problems associated with the use of composite materials
p0200 N81-16156
BARTSCH, T. B.
Developing a Fighter Engine Derivative of the B-1/F101 engine
[SAE PAPER 801156] p0407 A81-34246
BARUAH, P. C.
An experimental and theoretical investigation of a twin-entry radial flow turbine under non-steady flow conditions
[SAE PAPER 801136] p0397 A81-34167
BASHFORTH, S.
The effect of flight and the presence of an airframe on engine exhaust noise
[AIAA PAPER 81-2029] p0623 A81-49727
BASHUROV, B. P.
Aerodynamic study of flat turbine cascades with additional blades in blade passages
p0281 A81-27373
BASILI, V. R.
Evaluation of the A-7 requirements document by analysis of change data
[AD-A094888] p0272 N81-19103
BASKARAN, V.
Effect of rear stagnation point position and trailing edge bluntness on airfoil characteristics
p0170 A81-21013
BASKERVILLE, H. W.
Electrical bonding in aircraft
p0057 A81-14264
BASKIOTIS, C.
Parameter identification and discriminant analysis for jet engine mechanical state diagnosis

BASU, P. K.
p0156 A81-20474
BASU, P. K.
Adaptive finite element technology in integrated design and analysis
[NASA-CR-164560] p0543 N81-28810
BATEMAN, R. P.
Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733
BATENBURG, J.
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
p0544 N81-29072
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] p0630 N81-32164
BATRIN, L. E.
Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
p0365 A81-33169
BATTERSON, J. G.
Determination of model structure and parameters of an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562
BATTLES, R. A.
Development of helicopter transmission components for the 1980s
p0105 A81-17509
BATY, D.
An advanced electronic cockpit instrumentation system: The coordinated cockpit display
p0213 N81-17074
Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information
[NASA-TM-81171] p0548 N81-29127
BATY, D. L.
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
BAUCOM, R. M.
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
BAUDIN, G.
Crack growth model for flight-type loading
p0460 A81-39247
BAUER, K.
Influence of free-stream turbulence intensity on heat transfer in the two-dimensional turbulent boundary layer of an accelerated compressible flow
p0110 A81-17994
BAUGHMAN, J. L.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
BAUM, H. R.
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10128
BAUMANN, J. L.
Evaluation of image processing for man-in-loop target acquisition
p0461 A81-39337
BAUMBICK, R. J.
Fiber optics for aircraft engine/inlet control
[NASA-TM-82654] p0597 N81-31190
BAUMEISTER, K. J.
Numerical techniques in linear duct acoustics - A status report
[ASME PAPER 80-WA/NC-2] p0170 A81-21120
BAUMGARDNER, H.
Samarium cobalt (SMCO) generator/engine integration study
[AD-A092904] p0214 N81-17087
BAUMSHTEIN, M. V.
Estimated service life of gas turbine engine compressor blades
p0417 A81-36680
BAVELSKII, D. M.
Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles
p0285 A81-28134
BAYLISS, A.
Radiation boundary conditions for wave-like equations
p0153 A81-20223
BAZHAIKIN, A. N.
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
BEACHER, B.
Improved particle trajectory calculations through turbomachinery affected by coal ash particles
[ASME PAPER 81-GT-53] p0312 A81-29965
BEALE, H. A.
Mechanical property improvement of protective coatings for turbine engines using coal-derived fuels
[DOE/ET-12293/T1] p0094 N81-13064
BEALE, R. B.
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093808] p0204 N81-16996
BEAM, P. E., JR.
Development of small fuel efficient aircraft engines
[AHS 80-38] p0477 A81-40167
BEASLEY, W. D.
Low-speed aerodynamic characteristics of a 13 percent thick medium speed airfoil designed for general aviation applications
[NASA-TP-1498] p0071 N81-12015
BEATTIE, E. C.
Design of a multivariable integrated control for a supersonic propulsion system
p0079 N81-12094
BEATTY, A. J.
Micro-wave landing system - An operational point of view
p0111 A81-18055
BEAURAIN, L.
Influence of light aircraft architecture on its spin characteristics
[AAAF-NT-80-11] p0081 N81-12111
BEAUSSIER, J.
The behavior of quartz oscillators in the presence of accelerations
[ONERA, TP NO. 1981-31] p0351 A81-31285
BEAVIN, R. C.
Atmospheric electricity hazards protection for advanced technology flight vehicles
[AIAA PAPER 81-1642] p0525 A81-43141
BECART, O.
Light aviation in the United States - September 1980
p0513 A81-41903
BECHER, J.
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22202
BECK, C. E.
Advanced composite structure repair
p0481 A81-40595
Maintenance and repair of advanced composite structure
p0558 A81-44302
BECK, T. R.
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776
BECK, W. E.
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42106
BECKER, A.
The state of German involvement and future possibilities in the development of the DME-based landing system DLS
p0051 A81-13311
BECKER, R. E.
Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair
[AD-A091011] p0094 N81-13062
BECKER, H.
Integrated flexible sheet-metal components - Manufacturing center
p0449 A81-37633
BECKER, J.
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47551
BECKWITH, I. E.
Comments on settling chamber design for quiet,

blowdown wind tunnels
[NASA-TM-81940] p0335 N81-20085
A rectangular rod-wall sound shield
[NASA-CASE-LAR-12883-1] p0550 N81-29130

BECLE, J. P.
Wind-tunnel tests of engine-equipped models - Comparison of two jet wash simulation methods
[ONERA, TP NO. 1981-42] p0460 A81-39245

BEDARD, A. J., JR.
Sources and detection of atmospheric wind shear
[AIAA PAPER 81-0391] p0167 A81-20801

BEECK, S.
The automated transport process management system of INTERFLUG /PRIKAS/
p0288 A81-28744

BEHBEHANI, K.
Sensor/actuator failure detection and isolation for airbreathing propulsion systems
p0564 A81-45551
Sensor/actuator failure detection for turbofan engines
p0080 N81-12104

BEHNEN, S. W.
A Single Processor Synchronous Executive derived from the DAIS executive
p0324 A81-30326

BEHNING, F. P.
Cold-air investigation of first stage of 4-1/2-stage, fan drive turbine with average stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050

BEI, I.
Calculation of nonlinear compressibility effects of airfoils in subcritical conditions
p0225 A81-23853

BEILMAN, J. L.
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] p0638 N81-33199

BEINER, L.
Optimal higher harmonic blade pitch control for minimum vibration of a hinged rotor
p0473 A81-40138

BEINHAKER, P. H.
Investment decision-making in international airports
p0113 A81-18079

BEITLER, R. S.
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-15116

BEKBULATOV, R. S.
Evaluation of compressor blade endurance limits by an accelerated method
p0177 A81-22182

BELBRUNO, A. I.
MM&T: Low cost production/installation of urethane leading edge guards on rotor blades
[AD-A101603] p0582 N81-30117

BELL, G. F.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362

BELL, G. J.
A low-level wind shear detection system
p0223 A81-23514

BELL, J. W.
Failure detection and isolation for tactical aircraft using the generalized likelihood test
p0321 A81-30261
Estimation and statistical averaging applied to redundant strapped down inertial sensors for navigation and flight control
[AD-A094465] p0276 N81-19133

BELL, M.
Arts 3 enhancement design alternative study
[AD-A096276] p0339 N81-21049

BELL, V. L.
The potential for damage from the accidental release of conductive carbon fibers from aircraft composites
p0041 N81-11143

BELL, W.
Investigation of Wilcox model 585B very high frequency omnidirectional radio range system, part 2
[AD-A099525] p0494 N81-27073

BELLAVITA, P.
Design for maximum effectiveness in the Navy role
p0634 N81-33158

BELLEW, J. C.
The application of UV spectroscopy to the quantitative analysis of nitrogen oxide
p0089 N81-13008

BELLMAN, D. R.
Skin friction measuring device for aircraft
[NASA-CASE-FRC-11029-1] p0210 N81-17057

BELLOCCHIO, P. J.
Probe protection in camera/model visual systems
p0615 A81-48359

BELLOMO, B.
An observational experiment using a monostatic sodar at the airport of Fiumicino
p0282 A81-27548

BELOGLAZOV, M. I.
Errors of phase VLF-navigation systems under conditions of auroral disturbances
p0607 A81-47533

BELOGORODSKII, S. L.
Landings according to CAT II
p0230 A81-24523

BELOTSERKOVETS, I. S.
Calculation of the boundary of a supersonic inviscid jet flowing into a submerged space or a supersonic wake
p0229 A81-24172

BELOTSERKOVSKII, O. M.
Nonstationary method for the direct statistical modeling of rarefied-gas flows
p0069 A81-16454

BELOTSERKOVSKII, S. M.
Nonlinear aerodynamic characteristics of a thin airfoil of arbitrary plane configuration
p0123 A81-19629
Computer simulation of unsteady flow past lifting rotors of coaxial configuration
p0230 A81-24309
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47962

BELOV, I. A.
Numerical simulation of supersonic flow around solids of revolution with a leading detachment zone
p0231 A81-24757

BELTZ, J. C.
Chromatographic separation of conventional and experimental fuels
[AD-A101673] p0586 N81-30282

BEMENT, L. J.
Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107

BEN-DOR, G.
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002

BENDER, G. L.
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061

BENECKE, T.
The reconstruction of flight paths from AIDS data with the aid of modern filtering methods
p0383 N81-23021

BENETKA, J.
Harmonically oscillating airfoil in transonic stream of air
p0054 A81-13753

BENGTSSON, B.
Buckling of sandwich panels subjected to axial compression, shear forces and lateral pressure. Part 2: Analysis
[SAAB-TN-AB-72-PT-2] p0086 N81-12465

BENGUS, G. YU.
Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures
p0516 A81-42356

BENHAM, T. E.
Productivity - The challenge of aircraft and engine maintenance
p0102 A81-17045

BENNETT, B. R.
The use of parametric cost estimating relationships as they pertain to aircraft airframes: A new perspective
[AD-A089525] p0027 N81-10060

BENNETT, G.
Propeller propulsion integration, phase 1
[NASA-CR-163921] p0196 N81-16058

BENNETT, H. I.
The development of the composite material engine nacelle
[AAAF-NT-79-38] p0083 N81-12180
BENNETT, J. C.
Helicopter airflow and wake characteristics for low speed and hovering flight from rocket interference investigations
p0572 A81-46600

BENNETT, R. L.
Handbook of aircraft noise metrics
[NASA-CR-3406] p0345 N81-21871
BENNETT, R. M.
Application of a flight test and data analysis technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
Application of a flight test and data analysis technique to flutter of a drone aircraft
[NASA-TM-83136] p0441 N81-25066
BENNETT, W. A.
The effects of solidity, interblade phase angle and reduced frequency on the time-variant aerodynamic response of a compressor stator
[AD-A090546] p0081 N81-12108
BENNING, S. L.
Optimization of simulation models for avionics software verification
p0615 A81-48373

BENSIMHON, V.
Optimization of aircraft propulsion
p0464 A81-39697

BENSON, J. W.
Versatile and economical real-time simulation for digital flight control systems
[AIAA 81-0974] p0415 A81-36563
BENSON, T. P.
Preliminary airworthiness evaluation OH-58C helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052
BENT, R. D.
Aircraft electricity and electronics /3rd edition/
p0624 A81-49877

BENTLEY, L. R.
The measurement of aero gas turbine noise
[PNR-90032] p0138 N81-14795
BERAK, P.
New interpretations in the theory of viscous incompressible fluid flow past airfoil profiles
p0349 A81-31044

BERCHTOLD, M.
A new breed of an air breathing engine
p0292 A81-29070

BEREZIN, A. V.
Use of carbon composites in aircraft structures
p0577 A81-46813

BERGERON, H. P.
Development of a computer program data base of a navigation aid environment for simulated IFR flight and landing studies
[NASA-TM-80064] p0129 N81-13959
General aviation single pilot IFR autopilot study
p0265 N81-19045

BERGESON, J. E.
The reconstruction/refiltering approach to Kalman filter evaluation
p0326 A81-30339

BERGEY, K. H.
Leading edge high lift devices for agricultural aircraft
[SAE PAPER 810608] p0522 A81-42765
BERGMANN, H. W.
Predictability of moisture absorption in graphite/epoxy sandwich panels
p0039 N81-11131

BERINGER, D. B.
The evolution of operational systems
p0064 A81-15699

BERKOVITS, A.
Prediction of structural fatigue response under aircraft loads from material stress-strain behavior
p0226 A81-24009

BERKOWITZ, L. F.
Hover performance methodology at Bell Helicopter Textron
[AHS 80-3] p0473 A81-40138
BERMAN, C. H.
Numerical prediction of bypass engine jet noise
[AIAA PAPER 80-1006] p0057 A81-14300

BERMAN, H.
Improved flight control performance and failure tolerance using modern control techniques
p0008 A81-11619

BERNARD, F.
DRAFO - Computer-assisted design and manufacturing system
p0007 A81-11610

BERNARD, S. M.
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103783] p0631 N81-33134
BERNSTEIN, H. L.
The stress behavior of three advanced nickel base superalloys during high temperature low cycle fatigue
[AD-A091694] p0131 N81-14061
BERRIER, B. L.
Investigation of convergent-divergent nozzles applicable to reduced-power supersonic cruise aircraft
[NASA-TP-1766] p0139 N81-14972
Thrust augmented spin recovery device
[NASA-CASE-LAR-11970-2] p0275 N81-19130
Effect of simulated in-flight thrust reversing on vertical-tail loads of F-18 and F-15 airplane models
[NASA-TP-1890] p0579 N81-30086
BERRY, B. F.
The rating of helicopter noise: Development of a proposed impulse correction
[NPL-AC-93] p0138 N81-14792
BERRY, D. T.
Flying qualities criteria and flight control design
[AIAA 81-1823] p0556 A81-44127
BERRY, J. D.
Quarter-scale testing of an advanced rotor system for the UH-1 helicopter
p0395 A81-34121

Wind-tunnel test of an articulated helicopter rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13910
BERSON, B. L.
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053
BERT, C. W.
Prediction of range and endurance of jet aircraft at constant altitude
p0611 A81-47725

BERTELRUD, A.
Instrumentation for measurement of flow properties on a swept wing in flight
[DGLR PAPER 81-034] p0609 A81-47565
BERTHOU, B.
Light aviation in the United States - September 1980
p0513 A81-41903

BERTOGLIO, J. P.
Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-29116

BERTON, P.
O.N.E.R.A. ramjet test facilities
p0365 A81-33285

BERTYN, V. B.
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122

BERUBE, R. A.
RNAV benefits today - Today and future requirements
p0111 A81-1

BERWICK, J. C.
The art of single-engine aircraft design
[AIAA PAPER 81-0914] p0408 A81-34361
BESSE, J. M.
Research into a helicopter rotor's speed and load factor limits
p0471 A81-40124

Research on the functional limits of a helicopter rotor: Speed and load factor
p0545 N81-29075

BESSLING, H.
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements
[ESA-TT-625] p0197 N81-16069
BEST, D.
WR34-8 performance improvement program. The WR34-8 gas turbine compressor test

[AD-A098293] p0429 N81-24069

BETEILLE, R. E.
European approaches to transport aircraft design
[AIAA PAPER 81-0926] p0363 A81-32934

BETHKE, R. J.
Stochastic surfaces for flight simulator displays
p0324 A81-30330

BETZIG, R. E.
Experiments on the linear and non-linear evolution of the double helical instability in jets
[AIAA PAPER 81-0415] p0168 A81-20810

BEUCK, G.
Active gust- and maneuver load reduction concepts, taking into account, as an example, the Airbus A300. II - Design of a controller for gust and maneuver load reduction in the frequency range
[DGLR PAPER 81-065B] p0608 A81-47553

BEVALOT, J.
Inspection methods for various critical steel parts for airframes
p0052 A81-13331

BEVAN, A.
Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070

BEYER, R.
Night flight of helicopters
p0510 A81-41335

BEYERS, H. E.
Investigation of high-manoeuvrability flight vehicle dynamics
p0009 A81-11625
A new concept for dynamic stability testing
[AIAA PAPER 81-0150] p0161 A81-20638

BEZAUD, C.
The bonding of titanium and its alloys
p0417 A81-36663

BEZIAC, G.
Applications of composite materials for the construction of military helicopters
p0633 N81-33147

BHAT, W. V.
Noise characteristics of two parallel jets with unequal flow
[AIAA PAPER 80-0168] p0354 A81-31601

BHATTACHARYA, D. D.
Renewal function for any arbitrary period - A Bayesian way
p0101 A81-16939

BHUTIANI, P. K.
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999

BI, D.
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732
The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835

BIALOJAN, B.
Electronic engine control for commercial aircraft
p0309 A81-29775

BIASSONI, G.
Fatigue life evaluation of a helicopter main rotor hub
p0180 A81-22631

BICHENKOV, E. I.
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592

BIDWELL, L. R.
Thermomechanical behavior of a mechanically alloyed Al-4.0Mg powder alloy
p0409 A81-34851

BIEL, F.
Certification procedure for military engines in Germany
p0429 N81-24074

BIERTUEMPEL, R.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960

BILBRO, J. W.
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051

BILGER, J. M.
In-flight structural dynamic characteristics of the XV-15 tilt rotor research aircraft
[AIAA 81-0612] p0304 A81-29874

BILL, R. C.
Effects of geometric variables on rub characteristics of Ti-6Al-4V
[NASA-TP-1835] p0336 N81-20245

BILLHARDT, C. F.
AIRCL: A programmed system for generating NC tapes for airplane models. User's manual
[NASA-CR-165687] p0340 N81-21058

BILLIG, F. S.
Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434] p0504 A81-40071
Critical considerations in the design of supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1284] p0511 A81-41748

BILLINGS, C. E.
Application of the epidemiological model in studying human error in aviation
p0265 N81-19046
Information transfer problems in the aviation system
[NASA-TP-1875] p0594 N81-31162
Dimensions of the information transfer problem
p0594 N81-31163
Information transfer between air traffic control and aircraft: Communication problems in flight operations
p0595 N81-31166
The information transfer problem summary and comments
p0595 N81-31169

BILLINGSLEY, F.
Staring infrared mosaic observation of an F-15 aircraft
p0463 A81-39636

BILLMANN, B.
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase
[AD-A102163] p0595 N81-31181

BILWAKESH, K. R.
Quiet Clean Short-haul Experimental Engine (QCSEE): acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet, test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097

BINDER, S.
Experience with advanced high performance gear steel
[ASME PAPER 80-C2/DET-77] p0117 A81-18648

BINGHAM, G. J.
The aerodynamic influences of rotor blade airfoils, twist, taper and solidity on hover and forward flight performance
p0572 A81-46607

BINIARIS, S.
The calculation of quasi-three-dimensional frictionless compressible flow in axial turbomachines
[PNR-90087] p0275 N81-19127

BINIAS, G.
Formation tracking. Part 2: Tracking and control procedures
[FFE-279-PT-2] p0218 N81-17110

BINNS, K. E.
New hydraulic system technology for future aircraft
[SAE PAPER 801188] p0401 A81-34200

BIPPES, H.
Experimental investigation of a right angle wing with partially separated flow with and without ground effects
[DGLR PAPER 80-111] p0120 A81-19397

BIRCH, S. F.
Development and validation of computational flow analysis for design of inlets and nozzles
p0298 A81-29117

BIRD, D. E.
The all-electric aircraft
p0008 A81-11617

BIRKEN, J.
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069

BIRKEN, J. A.
Determination if fiber-optic immunity is adequate for deployment in the V/STOL airframe
p0057 A81-14265

Advanced composite aircraft electromagnetic design
and synthesis p0638 N81-33200
[SAND-81-1278C]
BIRKLER, J. L.
Aircraft turbine engine monitoring experience. An
overview and lessons learned from selected case
studies p0036 N81-11042
[AD-A089752]
A method for estimating the cost of aircraft
structural modification p0483 N81-26035
[AD-A099327]
BIRNIE, S. E.
Community response to noise from a general
aviation airport p0017 A81-11821
BIRRENBACH, R.
The new utility - Commuter-technology in the sky
p0457 A81-38801
BISCHOFF, D. E.
The control anticipation parameter for augmented
aircraft p0629 N81-32152
[AD-A102626]
BISHOP, D. E.
Aircraft noise and land use compatibility tradeoff
analyses p0569 A81-46370
NOISECHECK procedures for measuring noise exposure
from aircraft operations p0221 N81-17049
[AD-A093948]
BISHOP, G. J.
Detection performance evaluation of the ASDE-3
using fixed frequency and frequencyagile operation
p0499 N81-27372
[AD-A099513]
BISHOP, H. E.
The bearingless main rotor p0356 A81-32008
BISHOP, J. A.
Preliminary airworthiness evaluation OH-58C
helicopter configured with a mast mounted sight
p0252 N81-18052
[AD-A094172]
BISPLINGHOFF, R. L.
Exploratory study of hazard mitigation and
research in the air transport system p0033 N81-11021
[AD-A089204]
BISSERET, A.
Application of signal detection theory to decision
making in supervisory control - The effect of
the operator's experience p0351 A81-31288
BITTER, C.
Survey population response to airplane noise, part 1
p0031 N81-10576
[NASA-TM-75790]
BJORKLUND, C. M.
Passive imagery navigation p0339 N81-21051
[AD-A096245]
BJORNDAHL, D. L.
Strapdown navigation comes of age p0399 A81-34182
[SAE PAPER 801167]
BLACK, G. R.
Blade loss transient dynamics analysis. Volume 3:
User's manual for TETRA program p0496 N81-27091
[NASA-CR-165373-VOL-3]
BLACKBURN, C. L.
IPAD applications to the design, analysis, and/or
machining of aerospace structures p0301 A81-29388
[AIAA 81-0512]
BLACKERBY, W. T.
Aerodynamic investigation of C-141 leading edge
modifications for cruise drag reduction, test 2
p0492 N81-27051
[AD-A099662]
BLACKIE, I. T. E.
Integration of sensors with displays p0212 N81-17067
BLACKMAN, C. P.
The development of the secondary wing structure
for a rigid wing hang glider p0375 N81-22046
[BU-251]
BLACKMAN, J. P.
Axisymmetric approach and landing thrust reversers
p0533 A81-43936
[AIAA PAPER 81-1650]
BLACKMORE, W. L.
3-D viscous analysis of ducts and flow splitters
p0163 A81-20720
[AIAA PAPER 81-0277]
The design and development of a mixer compound
exhaust system for a quiet clean general
aviation turbofan p0566 A81-45893
[AIAA PAPER 81-1494]
QCGAT mixer compound exhaust system design and
static big model test report
p0278 N81-19119
[NASA-CR-135386]
BLACKWELL, R. H.
Wind tunnel evaluation of aeroelastically
conformable rotors p0475 A81-40153
[AHS 80-23]
BLAHA, B. J.
Pneumatic boot for helicopter rotor deicing
p0267 N81-19859
BLAIR, A. B., JR.
Effect of wing location and strakes on stability
and control characteristics of a monoplanar
circular missile with low-profile tail fins at
supersonic speeds p0186 N81-15978
[NASA-TM-81878]
BLAIR, M.
Wind tunnel experiments on the divergence of swept
wings with composite structures p0526 A81-43152
[AIAA PAPER 81-1670]
BLAIR, R. F.
Development of a large-scale wind tunnel for the
simulation of turbomachinery airfoil boundary
layers p0310 A81-29931
[ASME PAPER 81-GT-6]
BLAKE, C. L.
Electrical/electromagnetic concerns associated
with advanced composite materials in aerospace
systems p0530 A81-43630
BLAKE, R. L.
Advanced ATC computer system p0286 A81-28302
BLAKE, R. H.
Bench testing of a vectored thrust engine
p0432 N81-24093
BLANCHARD, A.
Measurements of temperature and pressure
fluctuations in the T prime 2 cryogenic wind
tunnel p0490 N81-26158
[NASA-TM-75408]
BLANCHARD, W. S., JR.
A flight investigation of the ultra-deep-stall
descent and spin recovery characteristics of a
1/6 scale radiocontrolled model of the Piper
PA38 Tomahawk p0343 N81-21084
[NASA-CR-156871]
BLAND, S. R.
Linear/nonlinear behavior in unsteady transonic
aerodynamics p0306 A81-29496
[AIAA 81-0643]
BLANKEN, C. L.
A piloted simulation of the backup control system
engagement for the YAH-64 p0576 A81-46646
BLASEMAN, J. E.
Non-isoenergetic turbulent jet mixing in a
constant area duct p0165 A81-20760
[AIAA PAPER 81-0347]
BLASZCZYK, J.
Finite element analysis of asymmetric, lateral
natural vibrations of a deformable aeroplane
p0366 A81-33736
BLAVY, A. A.
Tests on the fire resistance behavior of materials
inside civil aircraft p0074 N81-12052
[SNIAS-801-551-101]
BLAYDON, C. J.
The introduction of STOL and RNAV to large
commercial operations p0111 A81-18057
BLAZEK, W. S.
Use of segmented mold process to produce large
superalloy engine castings p0503 A81-40061
[AIAA PAPER 81-1404]
BLEASDALE, G. W.
Some engineering aspects of life cycle costing
p0047 N81-11910
BLECH, R. A.
An approach to real-time simulation using parallel
processing p0345 N81-21103
[NASA-TM-81731]
BLECHERMAN, S. S.
Design, durability and low cost processing
technology for composite fan exit guide vanes
p0182 A81-22664
Composite fan exit guide vanes for high bypass
ratio gas turbine engines p0501 A81-40039
[AIAA PAPER 81-1357]
BLEVINS, R. G.
Engine life methodologies for conceptual design

[AIAA PAPER 81-1398] p0515 A81-42188
BLEVINS, G.
Engine life and usage methodologies for conceptual design
[AIAA PAPER 81-1651] p0533 A81-43937
BLEVINS, R. S.
Summary of interface testing of the digital AN/ASN-123 tactical navigation avionic system in the SH-3H helicopter
[AES 80-18] p0474 A81-40149
BLIASHKO, IA. I.
Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles
p0285 A81-28134
BLICK, E. F.
An airport wind shear detection and warning system using Doppler radar: A feasibility study
[NASA-CR-3379] p0202 N81-16681
BLIGHT, J. D.
Classical and modern control design of a speed-hold system for a STOL airplane
[AIAA PAPER 81-0017] p0157 A81-20541
BLISS, D. B.
Wind tunnel wall interference
[AD-A093301] p0217 N81-17104
BLOM, J. J. H.
Low-speed airfoil section research at Delft University of Technology
p0010 A81-11636
BLOOM, P. J.
Detection performance evaluation of the ASDE-3 using fixed frequency and frequencyagile operation
[AD-A099513] p0499 N81-27372
BLOOMER, H. E.
Reverse thrust performance of the QCSEE variable pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81761] p0443 N81-25079
BLOOR, M. I. G.
Strake/delta wing interactions at high angles of attack
[NASA-CR-166183] p0483 N81-26072
BLOZY, J. T.
Development of exhaust nozzle internal performance prediction techniques for advanced aircraft applications
[AIAA PAPER 81-1490] p0506 A81-40908
Acoustic and aerodynamic performance investigation of inverted velocity profile coannular plug nozzles
[NASA-CR-3149] p0203 N81-16854
BLUISH, J. A.
An application of redundancy in digital electronic engine control
[SAE PAPER 801200] p0402 A81-34210
BLYNSKAIA, A. A.
Transonic flow past a wing profile in channels with permeable walls
p0054 A81-13533
BOBBITT, P. J.
The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
p0243 N81-17984
Report of the panel on fluid dynamics
p0593 N81-31146
BOBER, L. J.
Factors influencing the predicted performance of advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Factors influencing the predicted performance of advanced propeller designs
[NASA-TM-82676] p0492 N81-27042
BOBICK, J. C.
Airport and airspace delay model description
[AD-A090781] p0074 N81-12085
BOBORYKIN, IU. A.
Classification of links of assembly units with respect to the character of their connections, and calculation of the accuracy of their execution
p0319 A81-30168
BOBULA, G. A.
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[NASA-TM-82617] p0443 N81-25081
Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude
[NASA-TM-82663] p0496 N81-27395
BOCHAROV, V. P.
Faults of helicopter hydraulic amplifiers related to loading characteristics
p0319 A81-30156
BOCK, H.-W.
Improvement of effective minor lobe behavior of radar antennas through signal processing
p0152 A81-20091
BOCK, K.-W.
Drag reduction through formation flight
[DGLR PAPER 80-106] p0120 A81-19393
BOEHM-DAVIS, D. A.
Human Factors of Flight-deck Automation: NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022
BOEHME, H.
The outfitting of regional airports in the future with radio assistance for approach and landing, with emphasis on landing site obstacles for general aviation
p0051 A81-13313
BOEHMAN, L.
Transient, nonlinear response analysis of soft bodied impact on flat plates including interactive load determination
[AIAA 81-0621] p0305 A81-29882
BOEHMER, E.
Specifications for short instrument and precision approach path trajectories
p0051 A81-13314
BOEHNIG, F. T.
Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15425/T1] p0134 N81-14327
BOERMANS, L. M. M.
Low-speed airfoil section research at Delft University of Technology
p0010 A81-11636
BOGNER, F. K.
Structural flight loads simulation capability, volume 1
[AD-A096572] p0374 N81-22044
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22045
BOGOMOLOV, A. I.
Parametric synthesis of an automatic system for flight-vehicle stabilization
p0625 A81-49940
BOGORADOVSKII, G. I.
Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles
p0285 A81-28134
BOHN, J. G.
Development of advanced techniques for rotorcraft state estimation and parameter identification
[NASA-CR-159297] p0271 N81-19098
Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels
[NASA-CR-152165] p0276 N81-19136
BOHM, HR.
The present state of the MLS
p0051 A81-13312
BOIKO, L. V.
Composition of sludge formed in B-3V oil
p0103 A81-17373
BOILES, J. R.
Reliability growth measured by AFR 66-1 data
p0238 A81-24286
BOITSOV, B. V.
Electric installation work on aircraft
p0577 A81-46794
BOLAND, J. S., III
Automatic handoff of multiple targets
[AD-A093483] p0217 N81-17101
BOLL, S. F.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323

BOLLETER, U.
Aerodynamic blade excitation in turbocompressors
p0282 A81-27612

BOLLMANN, J.
Estimation of relative total cost for aircraft systems
p0047 N81-11922

BOLT, C. R.
Rotor redesign for a highly loaded 1800 ft/sec tip speed fan, 2
[NASA-CR-159879] p0078 N81-12087

BOLT, R. F.
A multiplexed digital voice intercommunications system for military applications
[SAE PAPER 801144] p0398 A81-34173
A multiplexed digital voice intercommunications system compatible with future voice conversion techniques
p0605 N81-31474

BOLUKBASI, A. O.
Simulation of aircraft seat response to a crash environment
[SAE PAPER 810612] p0522 A81-42768

BOLZ, E. H.
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS)
[AD-A094169] p0250 N81-18036

BOMBAUGH, K. J.
Chromatographic separation of conventional and experimental fuels
[AD-A101673] p0586 N81-30282

BONANNO, J. A.
Combined environment reliability testing /CERT/ as applied to engine mounted electronic controls
[AIAA PAPER 81-1500] p0516 A81-42204

BOND, B. F.
Wind shear systems implementation plan, benefit/cost study
[AD-A094168] p0253 N81-18055

BOND, D. C.
Digital controls in a large engine test facility
p0532 A81-43715

BOND, W.
New storage medium - Greater safety. II - Testing, fabrication, implementation
p0227 A81-24044

BONDAL, G. V.
Possibility of development of an electron-fractographic method for measuring stress level produced by fatigue fracture of the material
p0532 A81-43773

BONNATERRE, R.
A new airborne nickel cadmium battery concept
p0235 A81-25618

BONNER, E.
A study of wing body blending for an advanced supersonic transport
p0244 N81-17987
Aircraft design using the National Transonic Facility
p0593 N81-31143

BOOT, R. D.
Combat aircraft development - Looking backward to look forward 1935-1990
p0284 A81-27905
The next combat aircraft
p0298 A81-29150

BOOTH, T. C.
Rotor-tip leakage. I - Basic methodology
[ASME PAPER 81-GT-71] p0313 A81-29980
Rotor-tip leakage. II - Design optimization through viscous analysis and experiment
[ASME PAPER 81-GT-72] p0313 A81-29981
The predictability of turbine vane convection heat transfer
[AIAA PAPER 81-1435] p0566 A81-45892

BOPPE, C. W.
Complex configuration analysis at transonic speeds
p0190 N81-16016

BORAY, R. S.
Flowfield studies of dump combustors
p0292 A81-29064

BORCHERS, I. U.
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635

BORCHGREVINK, H. M.
Second language speech comprehension in noise: A hazard to aviation safety
p0604 N81-31463

BORDELON, W. J., JR.
Optimization of strategic airlift in flight refueling
[AD-A101137] p0539 N81-28090

BOREK, R. W.
Practical aspects of instrumentation installation in support of subsystem testing
p0546 N81-29090

BORGHI, R.
Numerical investigation of a model of turbulent combustion of hydrocarbons
[AIAA PAPER 81-0039] p0158 A81-20559

BORGMAN, D. C.
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
[AHS 80-11] p0474 A81-40144
Synopsis of Specialists' Meeting on Helicopter Fatigue Methodology
p0487 N81-26129

BORISEVICH, V. K.
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174

BORISOV, A. A.
Droplet breakup regimes and criteria for their existence
p0614 A81-48079

BORISOV, IU. IA.
Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis
p0309 A81-29867

BORODIN, IU. P.
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214

BOROVIK, V. O.
Basic problem of the analytical design of aircraft gas turbine engines. II
p0299 A81-29305

BORRI, M.
Acoustic fatigue assessment in the design of aerospace vehicles
p0059 A81-14395
Evaluation of section properties for hollow composite beams
[PAPER-88-35] p0031 N81-10454

BORST, H. V.
Propeller performance and design as influenced by the installation
[SAE PAPER 810602] p0521 A81-42759

BOSCO, C. J.
Flight test reliability demonstration of electronic engine controls
[SAE PAPER 801201] p0403 A81-34211

BOSE, E. B.
Improved G-Cueing System
[AIAA 81-0987] p0416 A81-36572

BOSSA, F.
Critical analysis and modern approaches to integrated system aircraft
p0227 A81-24059

BOSSI, J. A.
Disturbance estimation for a STOL transport during landing
[AIAA PAPER 81-0018] p0158 A81-20542

BOTERO, F. M.
A computerized study of wave characteristics in a time dependent compressible flow
[AIAA PAPER 81-0410] p0169 A81-20828

BOTH, A.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129

BOTHE, H.
In-flight calibration of aircraft antenna radiation patterns
p0173 A81-21025

BOTKIN, M. E.
Shape optimization of plate and shell structures
[AIAA 81-0553] p0302 A81-29403

BOTMAN, M.
Vibration aspects of small turbine engines in aircraft installations
[SAE PAPER 800617] p0062 A81-15337

BOTSCO, R. J.
Advanced ultrasonic testing of aerospace structures
p0557 A81-44329
BOTTOMLEY, D.
New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11025
New tower cab mockup for Philadelphia, Pennsylvania
[AD-A098528] p0440 N81-25060
BOTTOMS, H. S.
High pressure fuel pumps - Their design and evolution /The 13th J. D. North Memorial Lecture/
p0513 A81-42052
BOUBEL, R. W.
USAF Aircraft Engine emission goals, a critical review
[AD-A090282] p0087 N81-12651
BOUCEK, G. P.
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053
BOUCHARD, M. P.
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22085
BOUCHER, K.
Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers
[AD-A098614] p0444 N81-25086
Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087
BOUDREAU, A. H.
Correlation of artificially induced boundary-layer transition data at hypersonic speeds
p0285 A81-27911
BOUGHEY, D. L.
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047
BOURIOT, H.
Analysis of total and static pressure fluctuations in an air intake at high incidence
[AAAF PAPER NT 80-61] p0370 A81-33950
BOURISAW, D. L.
F/A-18's landing, launch and recovery system
p0005 A81-11244
BOURNE, S. M.
Pitch-flap-phase coupling. A preliminary analysis of an evolving concept of helicopter autostabilization
[BU-242] p0434 N81-24109
BOUSMAN, W. G.
An experimental investigation of the effects of aeroelastic couplings on aeromechanical stability of a hingeless rotor helicopter
[AHS 80-25] p0475 A81-40155
BOUSQUET, J.-M.
Propellers for economic flight at high speeds
[AAAF PAPER NT 80-34] p0369 A81-33936
Propellers for economic flight at high speeds
p0464 A81-39698
BOUWER, D. W.
Boeing Commercial Airplane Company engine procurement practices
p0429 N81-24076
BOWEN, B. C.
Helicopter external load acquisition technology investigation
[AD-A094672] p0272 N81-19106
BOWERS, D. L.
Advanced nozzle integration for supersonic strike fighter application
[AIAA PAPER 81-1441] p0504 A81-40875
BOWERS, F. J.
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046
BOWES, M. A.
Development and application of an analytical method for predicting helicopter transmission noise
p0150 A81-20062
BOWLES, R.
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
BOWLES, R. L.
Operational energy conservation strategies in commercial aviation
p0155 A81-20465
BOWMAN, C. L.
Multisensor track file correlation using attributes and kinematics
p0326 A81-30349
BOYCE, L.
Probabilistic analysis of foundation forces for a class of unbalanced rotating machines
p0145 N81-15362
BOYD, W. W.
Image processing design for autonomous acquisition of targets
p0562 A81-44700
BOYER, R.
Road map to adaptive optimal control
p0079 N81-12098
BOYLE, D.
The flying hologram - Latest in head-up display systems
p0123 A81-19500
BOYLES, R. Q.
Advanced materials for agricultural aircraft
[SAE PAPER 800610] p0062 A81-15333
BOYLESS, J. A.
F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
F100 engine diagnostic system status to date
p0599 N81-31210
BOYSAN, F.
Three-dimensional model of spray combustion in gas turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
BOYTOS, J. F.
A compact installation for testing vectored-thrust engines
[AIAA PAPER 81-1392] p0508 A81-40967
BRADLEY, R. S.
The role of flight research vehicles in prop-fan technology development
[ASME PAPER 81-GR-216] p0310 A81-30104
BRADLEY, J. E.
The selection of air radio navigation system for the post-1990 period
p0556 A81-44322
BRADSHAW, P.
Miniature pressure probe for measuring the surface-shear-stress vector in turbulent flow
p0233 A81-25354
BRADY, D. J.
VHF-UHF precipitation-static interference effects on aircraft
p0056 A81-14258
BRAGG, M. B.
An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810
BRAGG, S. L.
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320
BRAMHAM, R. W.
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0118 A81-18758
BRANCH, R.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059
BRANDENBERG, C. F.
F/A-18's landing, launch and recovery system
p0005 A81-11244
BRANDER, J. R. G.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
BRANDON, G. E.
The accident/injury matrix - A tool for aircraft accident investigation
p0018 A81-12241
BRASHEARS, B. C.
Ejection system evolution
p0175 A81-22080
BRAUN, D.
Development of antiresonance force isolators for helicopter vibration reduction
p0467 A81-40091
Developement of antiresonance force isolators for helicopter vibration reduction

[MBB-UD-305/80-OE] p0582 N81-30123

BRAUSCH, J. F.
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle p0245 N81-17999

BRAY, R. S.
A head-up display for low-visibility approach and landing [AIAA PAPER 81-0130] p0161 A81-20623
A head-up display format for transport aircraft approach and landing p0265 N81-19043
An evaluation of head-up displays in civil transport operations p0265 N81-19044

BRAYBROOK, R.
Charting a course for V/STOL p0068 A81-16179
A new lightweight fighter p0410 A81-35025
New roles for the F-15 eagle p0518 A81-42629

BRAYMEN, W. W.
Design, analyses, and model tests of an aeroelastically tailored lifting surface [AIAA PAPER 81-1673] p0566 A81-45974

BREAKWELL, J. V.
The variable-speed tail-chase aerial combat problem p0351 A81-31295

BREDT, M.
Low cost start-up for rigid-pressure airship [AIAA 81-1337] p0457 A81-38541

BREEZE, R. K.
Light transport and general aviation aircraft icing research requirements [NASA-CR-165290] p0269 N81-19079

BREIL, J. F.
Measurements of temperature and pressure fluctuations in the T prime 2 cryogenic wind tunnel [NASA-TM-75408] p0490 N81-26158

BREKHOV, A. F.
Efficiency of cantilever compressor stator blades p0509 A81-41041

BREMER, S. A.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD [AD-A091005] p0096 N81-13545
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development [AD-A089962] p0201 N81-16628

BREMOND, J.
Evaluation of the disturbance caused by aircraft noise by opinion surveys [NASA-TM-76579] p0542 N81-28610

BRENNAN, M. P.
Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs [NASA-CR-152390] p0023 N81-10019

BRENNENSTUHL, U.
Investigations of vortex formation on wings with cropped leading edges [DGLR PAPER 81-046] p0610 A81-47601

BRENNON, R. L.
Investigation of the use of liquid crystal thermography to study flow over turbomachinery blades [AD-A097289] p0391 N81-23089

BRETTES, J.
Electrical bonding in aircraft p0057 A81-14264
The electrical effects of joints and bonds in carbon fiber composites p0199 N81-16153

BREUGELMANS, F. A. E.
Turbine blade cooling research at the von Karman Institute for Fluid Dynamics p0293 A81-29076
Reverse flow, pre-rotation and unsteady inlet flow in centrifugal pumps [VKI-PREPRINT-1979-15] p0085 N81-12433

BREWER, A. C.
Optimization of simulation models for avionics software verification p0615 A81-48373

BREWER, G. D.
Hydrogen-fueled aircraft p0016 A81-11753
Status of the program to develop LH2 for aircraft [SAE PAPER 801153] p0407 A81-34204

BRICKER, R. A.
Design options study. Volume 1: Executive summary [AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results [AD-A089537] p0027 N81-10057
Design options study. Volume 3: Qualitative assessment [AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices [AD-A089539] p0027 N81-10059

BRIDELANCE, J. P.
Analysis of axial fan noise with the help of the Lowson formalism [AAAF PAPER NT 80-54] p0370 A81-33940

BRIDGES, P.
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft [NASA-CR-159382] p0071 N81-12019
Investigation of Flight Test Methods for measuring the performance of general aviation aircraft [NASA-CR-164057] p0333 N81-20065

BRIDSON, D. W.
Wind speed measurement for wind turbine testing p0055 A81-13073

BRIEGER, J. T.
Prediction of helicopter rotor noise from measured blade surface pressure p0577 A81-46509

BRIENZA, D.
CAINS II - An application of standard laser gyro inertial and computer technology for existing naval carrier aircraft p0516 A81-42030

BRIERLEY, D. H.
Shear layer instability noise produced by various jet nozzle configurations [PWR-90018] p0088 N81-12025

BRIMELOW, B.
Engine life development p0430 N81-24001

BRINN, D. J.
Unistructure - A new concept for light weight integrally stiffened skin structures [SAE PAPER 801231] p0405 A81-34233

BRINDLE, J.
Flat panel display technology review p0211 N81-17065

BRINDLE, J. H.
Helmet mounted displays: Design considerations p0213 N81-17073

BRINKS, W. H.
F/A-18 full scale development test p0099 A81-16519

BRISTOL, R. A.
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost [AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement [AD-A097438] p0390 N81-23084

BRISTOW, D. R.
Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations [AIAA PAPER 81-1239] p0454 A81-38096

BRITTLE, C.
Airspace analysis in airport system planning p0111 A81-10052

BRIVIO, A.
Fatigue life evaluation of a helicopter main rotor hub p0180 A81-22631

BROADHEAD, S. L.
INUX - High speed communications bus [SAE PAPER 801146] p0398 A81-34185

BROCARD, Y.
Aerodynamic interaction between a close-coupled canard and a sweptback wing in transonic flow p0189 N81-16013

BROCK, O.
Study of an engine flow diverter system for a

large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096
BROCK, W. H.
Centralized in-place pressure calibration system for multiple turbine engine aerodynamic pressure measurement systems
p0360 A81-32847
BROCKHURST, F. C.
Computerized design and optimization of self-contained airborne high power electrical systems
p0323 A81-30310
BROCKLEHURST, A.
Helicopter tail configurations to survive tail rotor loss
p0003 A81-10768
BROCKMAN, D. M.
A flight test real-time GW-CG computing system
p0361 A81-32860
BROCKMAN, R. A.
Evaluation of bird load models for dynamic analysis of aircraft transparencies
[AD-A092909] p0204 N81-16995
BROOKS, A.
The impact of contingency ratings on advanced turboshaft engine design
p0104 A81-17502
The T700 booster engine
p0105 A81-17506
BROOKS, J. J.
Trace chemical analysis methodology
[AD-A090762] p0083 N81-12191
BROOKS, T. F.
Trailing edge noise prediction from measured surface pressures
p0616 A81-48395
BROOME, K. R.
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122
BROSCH, D.
Considerations concerning an 'information busbar' for distributing on-board measurement and control information
p0233 A81-25375
BROUSSARD, J. R.
Optimal multirate flight control design
p0563 A81-45522
BROWER, G. L.
Advanced graphite composites in the 757/767
[SAE PAPER 801212] p0404 A81-34220
BROWN, A.
Flow transition phenomena and heat transfer over the pressure surfaces of gas turbine blades
[ASME PAPER 81-GT-107] p0315 A81-30012
BROWN, A. F.
Non-destructive testing of adhesive-bonded joints
p0153 A81-20162
BROWN, D.
Design and engineering of solar balloons
p0455 A81-38333
Application of pulse code modulation technology to aircraft dynamics data acquisition
[AIAA PAPER 81-1736] p0528 A81-43173
Correction procedures for aircraft noise data. Volume 5: Propeller aircraft noise
[AD-A091017] p0096 N81-13720
Tactical miniature crystal oscillator
[AD-A098490] p0440 N81-25058
BROWN, D. G.
Airbus Industrie - Past, present and future /26th Mitchell Memorial Lecture/
p0288 A81-27907
BROWN, D. P.
Low-speed wind-tunnel tests of two weathercocking sensors
[NSWL-0171-SR] p0136 N81-14575
BROWN, E. L.
Assessment of risk to Boeing commerical transport aircraft from carbon fibers
[NASA-CR-159211] p0218 N81-17171
BROWN, E. R.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
BROWN, G. L.
A supplementary EMC analysis of the proposed Airport Surface Detection Equipment (ASDE-3) radar
[AD-A092965] p0219 N81-17342
BROWN, G. W.
DAIS controls and displays - A systems approach to avionics subsystem integration
p0325 A81-30336
BROWN, H. S.
Cost benefits of nonmetallic spline couplings
[SAE PAPER 801101] p0513 A81-41777
BROWN, J. L.
Impact of terrain correlation elevation reference data on Boeing's Air Launched Cruise Missile
p0517 A81-42439
BROWN, J. J.
Unsteady three-dimensional subsonic flow in a solid propellant rocket motor including the effect of motor rotation
p0095 N81-13085
BROWN, J. W.
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] p0607 A81-47425
BROWN, L. E., JR.
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34180
BROWN, L. J., JR.
Effect of thermal radiation on the integrity pressurized aircraft evacuation slides and slide materials
[AD-A098179] p0424 N81-24039
BROWN, N. R.
Annual survey of spaceflight safety systems: 11th supplement. Survey period - July 1980-June 1981
[IAF PAPER 81-251] p0607 A81-47425
BROWN, P. W.
Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
BROWN, R.
Static tests of excess ground attenuation at Wallops Flight Center
[NASA-CR-3435] p0491 N81-26846
BROWN, R. J.
F-111 windscreen machining
[Y-2232] p0142 N81-14995
BROWN, S. D.
Feasibility evaluation of advanced multifrequency eddy current technology for use in naval air maintenance environment
[AD-A093314] p0220 N81-17476
BROWN, W. H.
Shock associated noise reduction from inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30900
BROWNE, D. M., JR.
Adaptive features and measurement requirements for advanced surveillance radars
p0617 A81-48544
BROWNE, J. L.
T700 engine integral inlet separator - All weather operational protection
p0469 A81-40100
BROWNIE, R. B.
Recycling of Portland Cement Concrete airport pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141
Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] p0630 N81-32156
BROWNLEE, J. A.
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019
BROWNSTEIN, M.
A simulator to test compressor research facility control system software
p0349 A81-31110
BROZ, V.
Concerning Khristianovich's transformation of a subsonic flow past an airfoil into a low-speed flow
p0349 A81-31045
BRUCE, T. W.
Compound Cycle Turbofan Engine (CCTE). Task 9: Carbon-Slurry Fuel Combustion Evaluation Program
[AD-A089451] p0029 N81-10072
Small turbine engine augmentor. Phase 1: Preliminary design studies of afterburner and duct-burner configurations
[AD-A101595] p0533 N81-30131

BRUCKMAN, F. A.
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021

BRUCKNER, J. M. H.
Flight control strategies for performance computers
p0512 A81-41759

BRUNNER, E. A.
Recommendations for the NASA Avionics program for the 1980's
p0517 A81-42436

BRUNER, G.
SNIAS helicopters
p0119 A81-19342

BRUNER, T. S.
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22045

BRUNETAUD, R.
The present and future applications of titanium alloys in engines
p0417 A81-36666

BRUNSCH, K.
Efficient manufacturing procedures for the production of helicopter rotor blades
[MBB-UD-312-80-OE] p0449 A81-37636
Service experience with GRC helicopter blades (BO-105)
p0041 N81-11146

BRUSSELEERS, M.
Physical and numerical aspects of shock boundary layer interactions
p0256 N81-18324

BRYAN, D. F.
Effect of load spectrum variables on fatigue crack initiation and propagation; Proceedings of the Symposium, San Francisco, Calif., May 21, 1979
p0172 A81-21730

BRYANT, W. H.
Flight test evaluation of a digital controller used in a VTOL automatic approach and landing system
p0179 A81-22549
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142

BRYKINA, I. G.
Laminar boundary layer on swept-back wings of infinite span at an angle of attack
p0107 A81-17656

BRYSON, A. E., JR.
Disturbance estimation for a STOL transport during landing
[AIAA PAPER 81-0018] p0158 A81-20542

BSCHORR, O.
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] p0610 A81-47603

BUBLITZ, P.
Unsteady pressure measurements during stall and buffeting
[ESA-TT-641] p0339 N81-21041
Unsteady airloads on oscillating wings in post-stall condition
[DFVLR-FB-81-16] p0594 N81-31158

BUCCI, G.
Performance evaluation of an interrogation-reply scheduling technique for a discrete address beacon system
p0121 A81-19417

BUCHACKER, E.
Initial experience with methods to evaluate flight test characteristics with operational flight maneuvers
p0017 A81-11782

BUCHELE, D. R.
Surface pyrometry in presence of radiation from other sources with application to turbine blade temperature measurement
[NASA-TP-1754] p0036 N81-11039

BUCHNER, F.
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
p0470 A81-40111
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
[MBB-UD-306/80-OE] p0584 N81-30139

BUCHS, W.
Development of a bearingless helicopter tailrotor
p0465 A81-39097
Development of a bearingless helicopter tail rotor
[MBB-UD-304/80-OE] p0586 N81-30199

BUCK, C. H.
An alternative approach to engine rating structures using monitoring systems
[SAE PAPER 801225] p0405 A81-34228

BUCKINGHAM, S. L.
Digital spectral analysis: A guide based on experience with aircraft vibration
[RAE-TR-81014] p0605 N81-31508

BUCKLEY, F. D.
MATASS/LAMPS MK III
[AIAA 81-1309] p0455 A81-38527

BUDARIN, V. A.
Calculation of the coefficients of head and local drag of bluff bodies
p0466 A81-40023

BUDD, L. D.
An investigation of safety hazards and reliability problems in aerial refueling stores
[AD-A091788] p0127 N81-13938

BUDIANSKY, J. H.
Low cost technology for expendable RPV applications
p0049 A81-12795

BUEHRING, W.
Coherent signal processing in frequency agile pulse radar units
p0152 A81-20097

BUELL, H.
Doppler radar systems for helicopters
p0512 A81-41758

BUEMMERSTEDE, J.
Application of Doppler information to automatic target tracking
p0153 A81-20101

BULDOVSKII, G. S.
Diagnosis-prognosis of intense turbulence, causing aircraft buffeting, on the basis of temperature-wind sounding
p0241 A81-26836

BULL, D. A.
Antenna-to-antenna coupling in aircraft radio systems
p0057 A81-14200

BULL, G.
Investigation of Flight Test Methods for measuring the performance of general aviation aircraft
[NASA-CR-164057] p0333 N81-20065

BULL, J. O.
Advanced ejection seat for high dynamic pressure escape. Wind tunnel test
[AD-A091810] p0127 N81-13940

BULL, J. S.
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042

BULLOCH, C.
Computerized flight management for fuel saving
p0018 A81-12309
Wind shear effects on aircraft - Low-level shear and clear-air turbulence as accident causes
p0067 A81-16136
Electronic displays and computerized NAV systems for commuters and business aircraft
p0407 A81-34330
Alternative aircraft fuels - When will the action start
p0465 A81-39981
Boeing plays safe
p0480 A81-40855

BULYGIN, I. P.
High-temperature strength of alloys for gas turbine engines
p0482 A81-40616

BUNARSKOV, A. O.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-3M-500 jet engine

p0395 A81-34022
BUNDICK, W. T.
Civil aviation applications of Navstar/GPS through differential techniques
p0177 A81-22374
Guidance and control system research for improved terminal area operations
p0264 N81-19038
BUNK, W.
Development in powder metallurgy /PM/ Ti6Al4V technology for aircraft parts
p0511 A81-41640
BUNNELL, J. W.
Flying-qualities criteria for wings-level-turn maneuvering during an air-to-ground weapon delivery task
[NASA-TM-81266] p0342 N81-21083
BUNTON, R. W.
Aeroservoelasticity in the time domain
[AIAA 81-0635] p0306 A81-29489
BURCHAM, F. W.
Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
BURCHAM, F. W., JR.
Flight evaluation of a simplified gross thrust calculation technique using an F100 turbofan engine in an F-15 airplane
[NASA-TP-1782] p0143 N81-15000
BUREEVA, R. R.
Joint-laboratory qualification testing of oils for gas turbine engines
p0103 A81-17375
BURGSMUELLER, W.
From the civil component program 'IFAS': Fundamentals of engine simulation, using turbopowered simulator (TPS) technology in wind tunnel tests
[BMFT-FB-W-80-030] p0541 N81-28111
BURHANS, R. W.
VLF P-static noise reduction in aircraft. Volume 1: Current knowledge
[AD-A098451] p0440 N81-25061
BURKARDT, L. A.
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[NASA-TM-82617] p0443 N81-25081
Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude
[NASA-TM-82663] p0496 N81-27095
BURKE, J. D.
The Gossamer Condor and Albatross: A case study in aircraft design
[AV-R-80/540] p0101 A81-16721
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
BURKHALTER, J. E.
An aerodynamic analysis of deformed wings in subsonic and supersonic flow
[AD-A101675] p0580 N81-30091
BURMAN, Z. I.
Finite element calculation of thin-wall reinforced shells of the fuselage type with account for physical nonlinearity and loss of stability of certain elements
p0235 A81-25679
Calculation of natural vibrations for thin-walled irregular reinforced shells of the helicopter fuselage type using the finite-element work method
p0614 A81-48097
BURMASTER, R. C.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
BURNS, R. R.
Definition, analysis and development of an optical data distribution network for integrated avionics and control systems
[NASA-CR-159370] p0590 N81-30962
BURNSIDE, W. D.
Airborne antenna pattern code: User's manual
[AD-A092316] p0201 N81-16357
BURNSIDES, D. B.
Aircraft engine nacelle fire test simulator. Volume 1: Technical
[AD-A089629] p0030 N81-10081
BURRAGE, R. G.
Microprocessor characteristics and comparative features
p0497 N81-27104
BURRIN, R. H.
Installation effects on propeller noise
[AIAA PAPER 80-0993] p0352 A81-31369
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] p0623 A81-48640
BURROWS, J. W.
Fuel optimal aircraft trajectories with fixed arrival times
[AIAA 81-1749] p0558 A81-44081
BURROWS, L. T.
A survey of propulsion systems' malfunctions/failures resulting in helicopter mishaps
p0105 A81-17513
BURT, E.
Electromagnetic coupling to advanced composite aircraft with application to trade-off and specification determination
p0200 N81-16166
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069
BURTON, R. V.
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093888] p0204 N81-16996
BUSCH, A. C.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
BUSCHER, R. G.
Multiplexing in general aviation aircraft
[SAE PAPER 810570] p0519 A81-42735
BUSHNELL, D. M.
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
Compliant surfaces - Introduction
p0240 A81-26515
BUSLIK, L. E.
Efficiency of cantilever compressor stator blades
p0509 A81-41041
BUTLER, J. H.
High-solids coatings for exterior aircraft
p0169 A81-20861
BUTLER, H. C., JR.
The design, testing, certification and production of an emergency parachute for use in light aircraft
[AIAA PAPER 81-0413] p0168 A81-20817
BUTLER, R. W.
Captive aircraft testing at high angles of attack
[AD-A103108] p0620 N81-32140
BUTTERWORTH, P. J.
Flow measurements in the wake of a wing fitted with a leading-edge root extension (strake)
[RAE-TR-79120] p0022 N81-10015
BUTTRILL, S. E., JR.
Analysis of middle distillate fuels by field ionization mass spectrometry
[AD-A099407] p0491 N81-26209
BUTTS, D. C.
F100 engine diagnostic system status to date
[AIAA PAPER 81-1448] p0515 A81-42199
BUTZEL, L. M.
Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] p0619 A81-48626
YC-14 interior noise measurements program
[NASA-CR-164523] p0492 N81-26849
BUXAUM, O.
Current developments in aircraft fatigue evaluation procedures
[AAAF-NT-79-33] p0086 N81-12464
BUXBAUM, O.
Stress measurements on landing gear for the Airbus A-300 B2
p0119 A81-19299
BUZUKOV, A. A.
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
BYERS, R. H.
A simulator to test compressor research facility

control system software p0349 A81-31110

BYKOV, N. N.
Selection of turbine parameters for steam-hydrogen engine schemes p0509 A81-41028

BYRD, H. R.
High-char-forming composite laminates p0532 A81-43652

BYRNES, J. M.
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems p0632 N81-33142

C

CADWELL, J. D.
Model design and instrumentation for intermittent cryogenic wind tunnels p0037 N81-11058
Calibration of a blowdown-to-atmosphere cryogenic wind tunnel p0038 N81-11060
The control of pressure, temperature and Mach number in a blowdown-to-atmosphere cryogenic wind tunnel p0038 N81-11063
Preliminary user planning for the NASA National Transonic Facility p0593 N81-31145

CADY, F. M.
A solid-state airborne sensing system for remote sensing p0183 A81-23034

CAI, R.-X.
The accuracy of mean-stream-line method in subsonic and transonic regions p0296 A81-29105

CAI, Y.
The matrix analysis of wings p0108 A81-17818

CAIAFA, C.
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803] p0367 A81-33882

CAIAFA, C. A.
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022

CAINE, D. A.
Digital control for helicopter powerplants p0104 A81-17504

CALAPODAS, N. J.
Determination of in-flight helicopter loads p0573 A81-46618

CALCOTE, H. F.
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-28099

CALDWELL, E. W.
Design options study. Volume 3: Qualitative assessment
[AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices
[AD-A089539] p0027 N81-10059

CALHOUN, G. L.
Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733

CALICO, R. A., JR.
Stability characteristics of a forward swept wing aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576

CALISE, A. J.
Application of variable structure system theory to aircraft flight control
[NASA-CR-164321] p0391 N81-23093

CALLAHAN, R.
Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel
[NASA-CR-165751] p0580 N81-30098

CALLANAN, J. E.
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936

CALLINAN, J.
Thermal considerations in the patching of metal sheets with composite overlays p0153 A81-20297

CALLINAN, R. J.
Developments in the analysis and repair of cracked and uncracked structures p0354 A81-31561
Application of BFRP Crack Patching to Mirage III aircraft p0481 A81-40586
Structural design of BFRP patches for Mirage wing repair
[AD-A097195] p0384 N81-23020

CAMARERO, R.
A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh p0387 A81-30717

CAMDEN, R. S.
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050

CAMERON, A. G.
Offensive avionics system /OAS/ design p0321 A81-30259

CAMERON, J. A.
The future role of helicopters in public transport p0466 A81-40078

CAMERUCCI, C.
An observational experiment using a monostatic sodar at the airport of Fiumicino p0282 A81-27548

CAMP, D. W.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation systems
[NASA-CP-2139] p0135 N81-14555
Survey of Workshops on Meteorological and Environmental Inputs to Aviation Systems p0135 N81-14556

CAMPBELL, C. W.
Magnitude and frequency of wind speed shears and associated downdrafts p0267 N81-19055

CAMPBELL, J. A.
Evaluation of RF anechoic chamber fire protection systems
[AD-A092476] p0197 N81-1607

CAMPBELL, J. F.
Vortex-flow aerodynamics - An emerging design capability p0366 A81-33717

CAMPBELL, R.
Saudi Arabia's new Gateway Airports p0115 A81-1809

CAMPBELL, R. L.
Computer analysis of flow perturbations generated by placement of choke bumps in a wind tunnel
[NASA-TP-1892] p0579 N81-3008

CANDELLA, J.
Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development p0559 A81-4439

CANNET, N. G.
Incidents of problems in setting to work on the conceptual design of helicopters p0632 N81-3313

CANNING, T. N.
Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack
[AIAA PAPER 81-0007] p0156 A81-2059

CANSDALE, J. T.
Helicopter rotor ice accretion and protection research p0469 A81-4010

CANSDALE, R.
An evaluation of fatigue procedures for UK military helicopters p0488 N81-2613

CANTRELL, B. H.
Maximum likelihood elevation angle estimates of radar targets using subapertures p0359 A81-3269

CAO, M. N.
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-4

CAPDEVIELLE, J. N.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476
CAPELLE, R. A.
Published results of the program of university research. Transportation research results
[PB81-210130] p0641 N81-30108
CAPONE, F. J.
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0564 A81-40878
Aeropropulsive characteristics of twin nonaxisymmetric vectoring nozzles installed with forward-swept and aft-swept wings
[NASA-TP-1778] p0261 N81-19019
Effect of simulated in-flight thrust reversing on vertical-tail loads of F-18 and F-15 airplane models
[NASA-TP-1890] p0579 N81-30086
CAPRON, W. R.
Evaluation of Microwave Landing System (MLS) effect on the delivery performance of a fixed-path metering and spacing system
[NASA-TP-1844] p0546 N81-29111
CARACENA, F.
Design and preliminary tests of an IR-airborne LLWS remote sensing system
[AIAA PAPER 81-0239] p0163 A81-20694
Clear air turbulence - An airborne alert system
p0562 A81-44640
The microburst: Common factor in recent aircraft accidents
p0136 N81-14571
CARADONNA, F. X.
Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39898
Experimental and analytical studies of a model helicopter rotor in hover
p0468 A81-40097
Experimental and analytical studies of a model helicopter rotor in hover
[AD-A089780] p0035 N81-11033
CARAMASCHI, V.
Evaluation of section properties for hollow composite beams
[PAPER-NR-35] p0031 N81-10454
CARD, M. F.
Graphite-epoxy panel compression strength reduction due to local impact
p0040 N81-11139
CARDEN, H. D.
Aircraft subfloor response to crash loadings
[SAE PAPER 810614] p0522 A81-42770
NASA/FAA general aviation crash dynamics program
p0268 N81-19064
Evaluation of emergency-locator-transmitter performance in real and simulated crash tests
p0268 N81-19070
CARDINALE, V. M.
Experimental verification of turboblading aeromechanics
p0432 N81-24092
CARDRICK, A. W.
The certification of composite airframe structures
p0283 A81-27887
CARDULLO, F. M.
Physiological effects of high-G flight - Their impact on flight simulator design
[AIAA 81-0986] p0416 A81-36573
CAREL, O.
How will it be possible to pass from ILS to MLS
p0059 A81-14473
CARGILL, J. S.
Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901)
[AD-A089524] p0029 N81-10074
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
[AD-A089791] p0036 N81-11041
CARICO, G. D.
A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 N81-46626
CARL, D.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
CARLIN, C. M.
Should we attempt global (inlet engine airframe) control design?
p0079 N81-12087
CARLIN, J. N.
The effects of the direction of control loading on a one-dimensional tracking task
[AD-A092459] p0197 N81-16067
CARLOCK, G. W.
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085
CARLOMAGNO, G. M.
On screeching jets exhausting from an axisymmetric supersonic nozzle
p0008 A81-11616
CARLOS MEIXOSO, J.
New technologies in future commercial aircraft
p0565 A81-45759
CARLSON, D. R.
Tactical navigation system testing
p0544 N81-29066
CARLSON, F. T.
Design to life cycle cost research
p0045 N81-11907
CARLSON, H. W.
Status of knowledge of sonic booms
p0017 A81-11922
The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146
Estimation of wing nonlinear aerodynamic characteristics at supersonic speeds
[NASA-TP-1718] p0021 N81-10004
Supersonic wings with significant leading-edge thrust at cruise
p0244 N81-17990
CARNEIRO, A.
Augmenting ATE with dynamic simulation testing techniques
p0320 A81-30201
CARPENTER, C. G.
Equivalent system analysis of translation rate command systems for hover and low speed flight
[AIAA PAPER 81-1858] p0560 A81-44557
CARPER, C. R., JR.
Combat damage assessment
p0488 N81-26132
CARR, J.
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-A098794] p0486 N81-26121
CARR, M. P.
An investigation into grid patching techniques
p0137 N81-14708
CARR, R. E.
Wallops severe storms measurement capability
p0266 N81-19049
CARRARA, J.-M.
Three years of operation of the ONERA pressurized subsonic wind tunnel
[ONERA, TP NO. 1980-129] p0014 A81-11669
CARRARA, V.
Estimation of aerodynamic forces acting on Earth satellites, application to an experimental satellite
[INPE-1944-RPE/262] p0585 N81-30150
CARRY, C.
Creep properties of single-crystal nickel-based superalloys. II - Creep at medium temperature /760 C/
p0567 A81-46345
CARSON, T. M.
Simple method for prediction of aircraft noise contours
p0050 A81-13217
CART, R. R., JR.
Alternative energy sources for non-highway transportation, appendices
[DOE/CS-05438/T1-VOL-3] p0044 N81-11500
Alternative energy sources for non-highway transportation, volume 1
[DOE/CS-05438/T1-VOL-1] p0044 N81-11513
CARTER, A. L.
Comparison of theoretical predictions of orbiter airloads with wind tunnel and flight test results for a Mach number of 0.52

[NASA-TM-81358] p0387 N81-23066
CARTER, C. R.
Air traffic control and position location by satellite constellation in equatorial orbit
p0173 A81-21912
Satellite constellations for three-dimensional coverage of the Atlantic Ocean
p0323 A81-30291
CARTER, E. S.
Impact of active controls on aircraft design and operations - A helicopter industry perspective
p0285 A81-28294
CARTWRIGHT, D. J.
Simple methods of determining stress intensity factors
p0289 A81-28984
CARUEL, J.
The specification of development tests for the engine of a combat aircraft
p0430 N81-24082
CARUSO, H.
The necessity of 'testing-in' hardware reliability
p0229 A81-24277
CARUTHERS, J. E.
Airplane wing vibrations due to atmospheric turbulence
[NASA-CR-3431] p0438 N81-24679
CARUVANA, A.
Application of water cooling for improved gas turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977
CASALEGNO, L.
Project and experimental fatigue test of the wing of a modern combat aircraft
p0180 A81-22625
CASCI, C.
Development for new laboratories for future testing
p0433 N81-24105
CASEY, D.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059
CASSMEYER, C. C.
Technology pays off on the AV-8B
p0291 A81-29060
CASTELLANI, A.
Prospects for the employment of dirigibles in the 1980s
p0565 A81-45763
CASTINE, J. W.
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099
CASTLE, B.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24041
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042
CASTORE, C.
Simulated A-10 combat environment
[SAE PAPER 801187] p0401 A81-34199
CATHEY, C. H., JR.
The Tactical Air Forces - Outlook for the next decade
[AIAA PAPER 81-0932] p0408 A81-34364
CAUGHEY, D. A.
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
CAVAGE, W. C.
Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair
[AD-A091011] p0094 N81-13062
CAVALCANTI, S. G.
Predictive steering control of dirigibles using the switching curve approach
[AIAA 81-1327] p0456 A81-38535
CAVALLINI, G.
Acoustic fatigue assessment in the design of aerospace vehicles
p0059 A81-14395
Crack growth propagation under variable amplitude loading in aerospace structures
p0181 A81-22632
The fatigue crack growth under variable amplitude loading in built-up structures
[AD-A098417] p0446 N81-25437
Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143
CAVOLI, N. C.
Commercial engine logistics cost projections - A dynamic and flexible approach
[ASME PAPER 81-GT-114] p0315 A81-30018
CAZIER, F. W., JR.
Passive control of wing/store flutter
[NASA-TM-81865] p0125 N81-13922
CENKO, A.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] p0616 A81-40416
CERTAIN, B.
Research into a helicopter rotor's speed and load factor limits
p0471 A81-40124
Research on the functional limits of a helicopter rotor: Speed and load factor
p0545 N81-29078
CHACKSFIELD, J. E.
Advanced technology and the commuter aircraft - A look into the next two decades
p0455 A81-38209
CHAFFEE, D. R.
Investigation of influences on the definition of engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938
CHAFFIN, D. E.
Output predictive algorithmic control - Precision tracking with application to terrain following
p0564 A81-45573
Output predictive algorithmic control - Precision tracking with application to terrain following
p0567 A81-46200
CHAKRABARTTY, S. K.
Aerodynamic characteristics of wings of arbitrary planform
p0461 A81-39267
CHAKRAVARTY, A. J. H.
Application of singular perturbation theory to onboard aircraft trajectory optimization
[AIAA PAPER 81-0019] p0158 A81-20543
CHALK, C. R.
Flying qualities design criteria applicable to supersonic cruise aircraft
p0244 N81-17991
CHALLITA, A.
Validation of a bird substitute for development and qualification of aircraft tranparencies
[AD-A097736] p0424 N81-24036
CHAMBERLAIN, R.
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
CHAMBERLIN, R.
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639
CHAMBERS, D. H.
Silver recovery from aircraft scrap
[PB81-150021] p0392 N81-23269
CHAMBERS, J. R.
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0241 A81-26933
Estimation of dynamic stability parameters from drop model flight tests
p0410 A81-35551
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0591 N81-31112
Estimation of dynamic stability parameters from drop model flight tests
p0591 N81-3111
Applications of dynamic stability parameters to problems in aircraft dynamics
p0592 N81-3111
CHAMBLEE, C. E.
Effectiveness of turbine engine diagnostic systems
p0290 A81-2905

CHAMIS, C. C.
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
Test methods and design allowables for fibrous composites; Proceedings of the Symposium, Dearborn, MI, October 2, 3, 1979
p0611 A81-47801
Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11412
CHAMPION, J. R.
Navstar GPS receiver for satellite applications
p0485 N81-26111
CHAN, J.
Control system design using graphical decomposition techniques
p0410 A81-35567
CHAN, W. Y. F.
Pitch-flap-phase coupling. A preliminary analysis of an evolving concept of helicopter autostabilization
[BU-242] p0434 N81-24109
CHAN, Y. K.
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0154 A81-20448
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0453 A81-37822
CHAN, Y. Y.
Lift effect on transonic wind-tunnel blockage
p0066 A81-15803
Transonic axisymmetric bodies with minimal wave drag
p0102 A81-17048
CHANANI, G. R.
Titanium net shapes by a new technology. II - F-18A parts evaluation
p0511 A81-41650
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636
Advanced aluminum metallic materials and processes for application to naval aircraft structures
p0531 A81-43637
CHANDHOK, V. K.
Progress in P/M superalloy and titanium for aircraft applications
p0181 A81-22641
CHANDRASEKHARAN, R. N.
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 2: Aerodynamic effects
[AD-A093063] p0209 N81-17048
CHANG, A. T.
The influence of gyroscopic forces on the dynamic behavior of rotating blades
p0295 A81-29098
CHANG, C.
Flowfield studies of dump combustors
p0292 A81-29064
CHANG, J. H.
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
CHANG, L. K.
The effect of proplets and bi-blades on the performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757
Factors influencing the predicted performance of advanced propeller designs
[NASA-TM-82676] p0492 N81-27042
The theoretical performance of high efficiency propellers
p0537 N81-28049
CHANG, L.-K.
Factors influencing the predicted performance of advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
CHANG, Q.
Development of an astro-inertial hybrid navigation system and a star tracker
p0420 A81-37343
CHAO, P.
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
CHAPLIN, H. R.
Some dynamic properties of rigid two-bladed fully gimballed tip-jet helicopter rotor with circulation control
[AD-A094031] p0252 N81-18054
CHAPMAN, A. J.
Effects of commercial aircraft operating environment on composite materials
p0182 A81-22681
NASA service experience with composite components
p0529 A81-43607
CHAPMAN, D. C.
Model 250-C30/C28B compressor development
p0219 N81-17466
CHARAVIT, J.-C.
SINTAC and its position-finding performance
p0409 A81-35021
CHARNAY, G.
Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-29110
CHARON, W.
Modeling, acquisition and processing during large displacements
[AAAF-NT-80-16] p0210 N81-17056
CHARVES, E.
Evaluation of powder coatings for application to aircraft component parts
[AD-A094724] p0277 N81-19305
CHASE, W. D.
Low-visibility visual simulation with real fog
[AIAA 81-0982] p0415 A81-36569
CHASSAY, G.
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
p0607 A81-47143
CHATTOT, J. J.
Pressure distribution computation on a nonlifting symmetrical helicopter blade in forward flight
p0447 N81-26010
CHATTOT, J.-J.
Pressure distribution computation on a non-lifting symmetrical helicopter blade in forward flight
p0365 A81-33291
CHAUMETTE, D.
Limiting application of the concept 'damage tolerance' with regard to fighter aircraft
[AAAF-NT-79-32] p0210 N81-17054
CHAUSSEE, D. S.
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566
A diagonal form of an implicit approximate-factorization algorithm
p0300 A81-29363
CHEANEY, E. S.
Application of the epidemiological model in studying human error in aviation
p0265 N81-19046
Information transfer problems in the aviation system
[NASA-TP-1875] p0594 N81-31162
The information transfer problem summary and comments
p0595 N81-31169
CHEKALOV, N. A.
Selection of turbine parameters for steam-hydrogen engine schemes
p0509 A81-41028
CHEN, D.-H.
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067
CHEN, F.
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
CHEN, G. T.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362
CHEN, L.-T.
Higher-accuracy finite-difference schemes for transonic airfoil flowfield calculations
[AIAA PAPER 81-0381] p0166 A81-20794
CHEN, M. K.
From paleoaeronautics to altostratus - A technical history of soaring
[AIAA PAPER 81-1611] p0533 A81-43933
CHEN, N.
New correlations of the two-dimensional turbine

cascade aerodynamic performance
[ASME PAPER 81-GT-128] p0316 A81-30032
Fundamental investigation on jet engine ignition of fuel sprays and its application
p0420 A81-37341

CHEN, N. K.
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891

CHEN, H. T. N.
Kinematic properties of rotary-wing and fixed-wing aircraft in steady coordinated high-g turns
[AIAA PAPER 81-1855] p0560 A81-44554
Influence of sideslip on the kinematics of the helicopter in steady coordinated turns
p0576 A81-46644
Kinematic properties of the helicopter in coordinated turns
[NASA-TP-1773] p0374 N81-22039

CHEN, S.-Z.
Investigation of the squeeze film bearing on two-spool turbo-fan engine
p0295 A81-29093

CHENG, H. K.
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090

CHENG, R. M. H.
The 'light-weight' system - A novel concept for on-board weight and balance measurement using fiber optics
[SAWE PAPER 1336] p0352 A81-31377

CHENG, Y. W.
Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901)
[AD-A089524] p0029 N81-10074
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
[AD-A089791] p0036 N81-11041

CHERNIAEV, N. F.
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168

CHERNIAVSKII, O. F.
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168

CHERNOMORDIK, L. A.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022

CHERNOV, I. A.
An example of the transonic flow past a body with a discontinuity in the contour curvature
p0019 A81-12367

CHERNYSHEV, A. V.
Electric installation work on aircraft
p0577 A81-46794

CHESSER, P.
Regenerative engine for helicopter application
[AHS 80-39] p0477 A81-40156

CHESTA, L.
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974

CHESTERFIELD, B. P.
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials
[AD-A103191] p0636 N81-33175

CHETAIL, P.
Turbine engine tests as seen by an aircraft company
p0430 N81-24080

CHEVALIER, J. P.
Material and structural problems in aircraft engine technology
[AAAF-NT-79-23] p0216 N81-17096

CHEVALIER, R.
Fabrication problems related to the contamination of titanium alloys
p0417 A81-36664

CHEVIS, R. W.
Centrifugal compressors for small aero and automotive gas turbine engines
p0220 N81-17467

CHIANG, D. C.
Computer code for the determination of ejection seat/man aerodynamic parameters
[AD-A092721] p0191 N81-16026

CHIANG, S.-S.
An approach to ramjet trajectory simulation test
p0292 A81-29065

CHIAPPETTA, L. M.
A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767

CHIARELLI, C.
Effect of in-flight thrust reverser deployment on tactical aircraft stability and control
[AIAA PAPER 81-1446] p0504 A81-40879

CHIARINI, P.
Navigation and landing - The prospects of new systems
p0566 A81-45766
Precision DME for microwave landing system
p0578 A81-47125

CHIDANANDA, M. S.
Fresh mixture entrainment in a jet curtain flameholder
p0294 A81-29084

CHIEN, J. C.
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320

CHIEN, R. T.
Optimized computer systems for avionics applications
[AD-A089570] p0028 N81-10063

CHIESA, S.
Comparison of systems of power generation during emergencies /aboard aircraft/
p0177 A81-22203

CHIMA, R. V.
Finite element analysis of inviscid subsonic boattail flow
[NASA-TM-81650] p0140 N81-14977

CHIN, D. O.
Sample data effects of high-pass filters
[NASA-TP-1797] p0193 N81-16040
Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea
[NASA-TM-81305] p0579 N81-30080

CHIN, J. S.
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40887
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891

CHINZEI, N.
A study of air breathing rockets - Subsonic mode combustion
[IAF PAPER 80-F-270] p0115 A81-18371

CHIPMAN, R. R.
Demonstration of a method for determining critical store configurations for wing store flutter
[AD-A092257] p0197 N81-16068

CHIRICI, R.
The development of secondary radar in air traffic control
p0565 A81-45762

CHISHOLM, R.
Life Cycle Cost Analysis (LCCA) in military aircraft procurement
p0045 N81-11903

CHISTIAK, V. G.
The possibility of single-impact riveting of flat-top countersunk-head rivets
p0319 A81-30164

CHIVERS, J. W. H.
System to measure the pressure distribution on fan aerofoil surfaces during flutter conditions
[PNR-90013] p0072 N81-12029

CHMARUK, B. M.
AFCS integration requirements
[SAE PAPER 810580] p0519 A81-42783

CHMIELEWSKI, G. E.
Three-dimensional transonic flow analysis
[AD-A101944] p0593 N81-31153

CHOBAN, I. S.
Investigation of the cooling of the turbine rotor blade of a gas-turbine power system
p0465 A81-40020

CHOPAK, G. A.
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21046

CHOPPING, D.
Survivors on the RPV front
p0577 A81-46725
CHOPRA, I.
Dynamic analysis of a free-tip rotor
[AIAA 81-0618] p0305 A81-29479
Dynamic stability of a rotor blade using finite element analysis
[AIAA 81-0615] p0309 A81-29513
CHORLEY, R. A.
The electro-optical display/visual system interface: Human factors considerations
p0212 N81-17056
CHOW, D. C.
Scale effects on turbulent boundary layer development and flow separation around V/STOL inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
CHOW, R.
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090
CHRISINGER, L. B.
Calculation of airloads for a flexible wing via NASTRAN
[AD-A094770] p0263 N81-19031
CHRIST, R. F.
Advanced production methods for the Dornier 228
p0457 A81-38802
CHRISTENSEN, D. G.
A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test
[NASA-CR-3461-VOL-1] p0595 N81-31171
CHRISTENSEN, G. P.
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936] p0363 A81-32937
CHRISTENSEN, L. S.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
CHRISTENSON, R. E.
An evaluation of statistical methods for the prediction of maximum time-variant inlet total pressure distortion
[AD-A089817] p0036 N81-11040
CHRISTIANA, G. P.
An analysis of the requirements for and the costs and benefits of the National Microwave Landing System (MLS), volume 1
[AD-A099632] p0493 N81-27071
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS), volume 2
[AD-A100018] p0493 N81-27072
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS)
[AD-A100136] p0537 N81-28076
CHRISTIANSEN, R. S.
Numerical and classical analysis of V/STOL aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898
CHRISTOPHEL, R. G.
A-10/TF34 Turbine Engine Monitoring System evaluation and implementation
[AIAA PAPER 81-1447] p0505 A81-40880
CHRISTOPHER, J. P.
Captive aircraft testing at high angles of attack
[AD-A103108] p0620 N81-32140
CHRISTOPHER, R. G.
A-10/TF34 Turbine Engine Monitoring System (TEMS)
p0599 N81-31211
CHU, C.-W.
Modeling of 2D-nozzle plume for IR signature prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107
CHU, J.
Rotary balance data for a single-engine agricultural airplane configuration for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3311] p0125 N81-13923
CHU, Y. Y.
Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061
CHUANG, C. A.
Tent shaped phased array
[AD-A103927] p0640 N81-33393
CHUANG, S. N.
Test and evaluation of foam-in-place fuel tank container
[AD-A095747] p0334 N81-20073
CHUBB, T. W.
Gun harmonisation using the sector acoustic miss distance indicator
p0544 N81-29074
CHUGA, G. M.
Modern techniques of conducting a flight loads survey based on experience gained on the Black Hawk helicopter
p0356 A81-32016
CHUN, R. K.
Advanced flight simulator: Utilization in A-10 conversion and air-to-surface attack training
[AD-A094608] p0254 N81-18066
CHUNG, K.
Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation
[NASA-CR-165141] p0143 N81-15004
CHUSHKIN, P. I.
Review of numerical methods for the problem of the supersonic flow around bodies at angle of attack
p0011 A81-11639
Slightly blunted cone in a supersonic flow at angle of attack
p0225 A81-23908
CHWALCZYK, T.
The PZL-Sokol - New Polish helicopter
p0103 A81-17325
CICON, D. E.
Improved methods for fan sound field determination
[NASA-CR-165188] p0147 N81-15769
CIEPLUCH, C. C.
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
CIGNATTA, J. V.
Overview of aviation energy programs and supply problems
[SAE PAPER 801230] p0405 A81-34232
CIMINERA, M. V.
The development of a twin-turbofan V/STOL aircraft
[AHS 80-8] p0473 A81-40141
CIPOLLA, F. W.
A 7.5-GHz microstrip phased array for aircraft-to-satellite communication
p0347 A81-30776
A 7.5 GHz microstrip phased array for aircraft-to-satellite communication
p0562 A81-44623
CIRONE, R.
Computer evaluation of the on-and-off design of an axial air turbine
[AD-A101102] p0549 N81-29131
CLARK, B. J.
Computer program to predict aircraft noise levels
[NASA-TP-1913] p0641 N81-33947
CLARK, D. R.
Application of an aerodynamic configuration modeling technique to the design and analysis of X-Wing aircraft configurations
p0356 A81-32013
A study of the effect of aft fuselage shape on helicopter drag
p0470 A81-40116
The experimental and analytical definition of helicopter modeling effects
[AHS 80-4] p0473 A81-40139
Wind tunnel tests of large- and small-scale rotor hubs and pylons
[AD-A098510] p0439 N81-25043
CLARK, F. R.
A hybrid composite horizontal stabilizer for the XH-2/CCR Flight Demonstrator Aircraft
[AHS 80-35] p0476 A81-40164
CLARK, G. M.
Light transport and general aviation aircraft icing research requirements
[NASA-CR-165290] p0269 N81-19079
CLARK, J. E.
U.K. development of a rotor de-icing system
p0469 A81-40103

CLARK, K. G.
Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover
[AD-A090049] p0039 N81-11120

CLARK, L. V.
Operational considerations in utilization of microwave landing system approach and landing guidance
p0264 N81-19039
Operational considerations in utilization of microwave landing system approach and landing guidance
[NASA-TM-81945] p0331 N81-20050

CLARK, R.
Application of a Fourier analyzer to the analysis of shimmy test data
[AIAA 81-0533] p0303 A81-29453

CLARK, R. W.
New approach to the solution of large, full matrix equations
p0171 A81-21552

CLARK, S. K.
Current research in aircraft tire design and performance
p0268 N81-19065
Heat generation in aircraft tires under free rolling conditions
[NASA-CR-164273] p0393 N81-23461

CLARK, T. D., JR.
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
p0616 A81-48379

CLARKE, C. A.
Assessment of risk to Boeing commerical transport aircraft from carbon fibers
[NASA-CR-159211] p0218 N81-17171

CLARKE, J.
Design and test of a graphite-epoxy composite A-10 slat
p0006 A81-11339
Application of weldbonding to A-10 production aircraft
p0013 A81-11652

CLARKE, R.
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754

CLARY, J. B.
Reliability validation of systems for life-critical applications
p0617 A81-48559
Validation Methods Research for Fault-Tolerant Avionics and Control Systems Sub-Working Group Meeting. CARE 3 peer review
[NASA-CP-2167] p0146 N81-15702

CLAUSS, J. S., JR.
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021

CLAYPOLE, T. C.
The combustion modelling of swirling flows for gas turbine combustors
p0295 A81-29087

CLAYTON, C. R.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

CLAYTON, K. I.
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] p0638 N81-33196

CLAYTON, R. M.
Two-stage combustion for reducing pollutant emissions from gas turbine combustors
[NASA-CR-163877] p0196 N81-16056

CLEMONS, A.
Quiet Clean Short-haul Experimental Engine (QCSEE); acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet, test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097

CLEWELL, H. J., III
Fuel jettisoning by U.S. Air Force aircraft. Volume 1: Summary and analysis
[AD-A089010] p0032 N81-10580
Fuel jettisoning by U.S. Air Force aircraft. Volume 2: Fuel dump listings
[AD-A089076] p0032 N81-10581

CLIFF, E. M.
Boost-glide range-optimal guidance
[AIAA 81-1781] p0554 A81-44096

CLIFFORD, D. W.
A case for submicrosecond rise-time lightning current pulses for use in aircraft induced-coupling studies
p0057 A81-14267
Evaluation of lightning-induced transients in aircraft using high-voltage shock excitation techniques
p0057 A81-14269

CLINE, J. H.
On the use of active higher harmonic blade pitch control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074

CLINE, J. H.
A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619

CLINE, L. D.
CF6 high pressure compressor and turbine clearance evaluations
p0598 N81-31198

CLYMAN, M.
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base
[AD-A094226] p0252 N81-18050
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report
[AD-A094225] p0252 N81-18051

CHRULSKI, D. D.
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control
[AIAA PAPER 81-2049] p0619 A81-48621

COATS, J. W.
Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81761] p0443 N81-25079

COBB, J. M.
Software survey for the avionics test bed
[NASA-CR-161089] p0629 N81-32143

COCHRAN, J. E., JR.
Stability of aircraft motion in critical cases
[AIAA PAPER 81-1885] p0561 A81-44577

COCHRAN, R. P.
Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material
[NASA-TP-1716] p0078 N81-12089

COCHRANE, J.
QSRA Joint Navy/NASA sea trials
[AIAA PAPER 81-0152] p0161 A81-20633

COCHRANE, J. A.
Quiet propulsive-lift technology ready for civil and military applications
p0359 A81-32521

COCKRELL, D. J.
The measurement of pressure distribution around a parachute canopy
p0067 A81-16019
Preliminary consideration of parameter identification analysis from parachute aerodynamic flight test data
p0067 A81-16020
Effects of drive slots on parachute performance
p0453 A81-38020

COCQUEREZ, J. L.
Laboratory studies of flight mechanics using catapult launched models
[AAAF-NT-80-15] p0210 N81-17055

COE, H. H.
Calculated and experimental data for a 118-mm bore roller bearing to 3 million DN
[ASME PAPER 80-C2/LUB-14] p0117 A81-18668

COE, P. L., JR.
Leading-edge deflection optimization for a highly swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974
Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982

High lift technology
p0593 N81-31147
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] p0639 N81-33210

COFFIN, D. L.
A Matrix Approach to Biological Investigation of Synthetic Fuels
[PB81-183477] p0586 N81-30313

COFFINBERRY, G. A.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194

COGGER, M. K.
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet
[RAE-TM-FS-313] p0084 N81-12320

COHEN, E.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323

COHEN, N.
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22282

COHN, A.
Application of water cooling for improved gas turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977

COHRS, H. L.
Definition of a system concept study for future air traffic guidance
[BMFT-FB-W-80-008] p0425 N81-24046

COLAMOSCA, B.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068

COLBY, S. J.
History and prospects for mini-RPVs and drones
p0049 A81-12797

COLE, G. L.
Simulating study of the interaction between the propulsion and flight control systems of a subsonic lift fan VTOL
[NASA-TM-81239] p0036 N81-11043
Propulsion system mathematical model for a lift/cruise fan V/STOL aircraft
[NASA-TM-81663] p0195 N81-16055

COLE, J. D.
Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367

COLE, R. J.
Aluminized coding study for retrofitting in-service slide materials
[AD-A094170] p0255 N81-18201

COLEBY, J. R.
Transient vibrations of elastic panels due to the impact of shock waves
p0616 A81-48385

COLEMAN, R. G.
A system for aerodynamic design and analysis of supersonic aircraft. Part 2: User's manual
[NASA-CR-3352] p0125 N81-13920
A system for aerodynamic design and analysis of supersonic aircraft. Part 3: Computer program description
[NASA-CR-3353] p0139 N81-14971

COLLARD, D.
Synthesis of test results obtained with Concorde at high incidences
[AAAF-NT-80-26] p0077 N81-12079

COLLARD, M.
Global optimization of a glider
[AAAF PAPER NT 80-36] p0369 A81-33937

COLLIER, K. I.
Military aircraft technology - Needs and trends for the 80's
[AIAA PAPER 81-1691] p0535 A81-43952

COLLIN, G.
The FFCC cockpit of the A310 is practically defined
p0063 A81-15623
A very complete electronic warfare system
p0412 A81-35674
Mirage 2000, a totally multi-purpose aircraft
p0419 A81-37166

COLLINGS, D. J.
Experimental investigation of oscillating subsonic jets
p0360 A81-32777

COLLINS, B. P.
Energy modeling for aviation fuel efficiency
[AIAA PAPER 81-0789] p0368 A81-33883
Analysis of potentially correctable landing delays at Atlanta
[AD-A089408] p0024 N81-10032

COLLINS, F. G.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164

COLLINS, J.
NAS automation equipment operating cost estimates, FY 1978 - 1979
[AD-A102023] p0595 N81-31182

COLLINS, J. R.
A review of current and future components for electronic warfare receivers
p0357 A81-32252

COLLINS, R. L.
Flying safely /Revised and enlarged edition/
p0068 A81-16198

COLLYER, S. C.
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033

COLTMAN, J. W.
Simulation of aircraft seat response to a crash environment
[SAE PAPER 810612] p0522 A81-42768

COLWELL, S. C.
The role of the turboprop in the air transportation system for the 1980's and onward
[SAE PAPER 801197] p0402 A81-34207

COMINSKY, A.
Study of aircraft crashworthiness for fire protection
[NASA-CR-166159] p0424 N81-24035
Manufacturing development of DC-10 advanced rudder
[NASA-CR-159060] p0494 N81-27077

COMPAGNON, M. A.
A new approach to turboshaft engine growth
[AHS 80-41] p0477 A81-40169

CONE, D. M.
Determination of cargo container inventories through logistics simulation
p0616 A81-48380

CONEN, H.
Manufacturing technology for aircraft structural components made of carbon-fiber reinforced plastics
p0449 A81-37637

CONG, N.
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825
The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856

CONKLE, J. P.
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966

CONNER, D. A.
Acoustic performance evaluation of an advanced UH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33952

CONNER, D. W.
Air cargo market outlook and impact via the NASA CLASS project
[NASA-TM-81886] p0073 N81-12039

CONNOLLY, R.
A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] p0632 N81-33135

CONNOLLY, G. P.
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044

CONNOLLY, J. W.
Federal Aviation Administration and National Weather Service Aviation Research and Development
p0135 N81-14558

CONNOR, T. L.
Integrated noise model - The Federal Aviation Administration's computer program for predicting noise exposure around an airport
p0568 A81-46354

CONNOR, T. H.
Evaluation of safety programs with respect to the causes of general aviation accidents. Volume 2:

Appendices
[AD-A089181] p0023 N81-10023
CONRAD, R. W.
Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911
CONSTANT, E. W., II
The origins of the turbojet revolution
p0068 A81-16248

CONTI, D. K.
Model-based scene matching
p0461 A81-39349

CONVERSE, G. L.
Turbine modeling technique to generate off-design performance data for both single and multistage axial-flow turbines
[NASA-CR-165244] p0213 N81-17078
COOK, C. R.
Isothermal forging of fan blades
[AIAA PAPER 81-1405] p0503 A81-40862
COOK, F.
Staring infrared mosaic observation of an F-15 aircraft
p0463 A81-39636

COOK, F. J.
The reconstruction/refiltering approach to Kalman filter evaluation
p0326 A81-30339

COOK, J. P.
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182
COOK, R. S.
Heat pipe avionic cooling
p0326 A81-30343

COOLES, H. D.
Critical research issues and visual system requirements for a V/STOL training research simulator
[AD-A092561] p0198 N81-16072
COOLEY, D. E.
Evaluation of methods for prediction and prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
COOMBS, M. G.
New developments in compact plate-fin heat exchangers
p0613 A81-48062

COONAN, J. R.
Visual confirmation (VICON) of voice take-off clearance of cost-and-deployment analyses and strategies
[AD-A091007] p0091 N81-13038
COONEY, D. E.
Lear fan propulsion system
[SAE PAPER 800699] p0062 A81-15332
COONROD, J.
Flat panel display technology review
p0211 N81-17065

COOPER, G. C.
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320
COOPER, G. K.
A FANSONIC Navier-Stokes solver
[AIAA PAPER 81-1195] p0454 A81-38077
An approximate factorization solution of the Navier-Stokes equations for transonic flow using body-fitted coordinates with application to NACA 64A010 airfoils
p0249 N81-18024

COOPER, L. P.
Supercritical fuel injection system
[NASA-CASE-LEW-12990-1] p0549 N81-29129
COOPER, W. C.
Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance
p0559 A81-44396

COPES, R. E., III
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] p0636 N81-33183
COPLIN, J. F.
The future of civil turbo-fan engines
[PNR-90034] p0130 N81-13964
COPPI, CH.
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design
p0101 A81-16720

COPPS, E. M.
Optimal processing of GPS signals
p0512 A81-41761

CORAZZA, G.
Precision DME for microwave landing system
p0578 A81-47125

CORBETTA, G.
Dynamics and calculations for an aircraft landing gear pneumatic shock absorber system
p0417 A81-36718

CORBIN, J. C., JR.
Electrical/electromagnetic concerns associated with advanced composite materials in aerospace systems
p0530 A81-43630

Observing lightning from ground-based and airborne stations
p0136 N81-14566

CORD, T. J.
IFFC flying qualities simulation
[AIAA 81-1821] p0555 A81-44111
CORDA, S.
Numerical lifting line theory applied to drooped leading-edge wings below and above stall
p0066 A81-15881

CORDELL, T. M.
Fiber-reinforced composites - The future for aeropropulsion
[AIAA PAPER 81-1713] p0527 A81-43164
CORDIE, F.
Design to cost and new technologies
p0120 A81-19347

Design-to-cost and new technologies
p0046 N81-11913

CORDING, R. W.
Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911
CORIAT, H.
Status report - Global Positioning System
p0511 A81-41752

CORKE, T. C.
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
p0239 A81-26508

Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
[NASA-CR-3444] p0587 N81-30392
CORLISS, L. D.
A flight investigation of static stability, control augmentation, and flight director influences on helicopter IFR handling qualities
p0574 A81-46623

A preliminary flight investigation of cross-coupling and lateral damping for nap-of-the-earth helicopter operations
p0574 A81-46626

CORLISS, W. R.
Wind Tunnels of NASA
[NASA-SP-440] p0629 N81-32153
CORMERY, G.
Contribution of technological progress to energy savings and conservation to the design of new aircraft
p0464 A81-39695

CORN, P. B.
Aircraft and environmental factors influencing lightning strike
[AIAA PAPER 81-0084] p0160 A81-20589
CORNETT, J. E.
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-19116
CORNETTE, W. M.
Test facility for the measurement of infrared radiation from jet engine exhaust systems
p0462 A81-39503

CORNEY, J. M.
The development of multiple redundant flight control systems for high integrity applications
p0284 A81-27983

CORONEL, P. D.
The Coronel Transverse Wing Flight system
p0231 A81-24788

CORREA, S. M.
Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370

CORREGE, G.
Quality in design
[SNIAS-802-111-108] p0427 N81-24

CORSIGLIA, V. R.
Full-scale study of the cooling system aerodynamics of an operating piston engine installed in a light aircraft wing panel
[SAE PAPER 810623] p0523 A81-42777
Full-scale aerodynamic characteristics of a propellar installed on a small twin-engine aircraft wing panel
[NASA-TM-81285] p0385 N81-23039

CORT, A.
Flight evaluation of a helmet mounted LED matrix display in a Lynx helicopter
p0472 A81-40129

COSTOLLOE, S. P.
Fatigue life variability in aluminum alloy aircraft structures
[AD-A097198] p0391 N81-23249

COTE, F.
Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers
[AD-A098614] p0444 N81-25086
Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087

COTE, S. M.
Recent developments in Naval aircraft jet engine usage
[AIAA PAPER 81-1366] p0502 A81-40846

COTON, P.
Modeling, acquisition and processing during large displacements
[AAAF-NT-80-16] p0210 N81-17056

COUCHET, G.
Study of a propulsive system
p0366 A81-33673

COUEDON, C.
First results obtained with a rotating construction
[AAAF-NT-80-14] p0218 N81-17109
First results obtained by the AMD-BA Company from the rotary assembly of the AMF Lille
[NASA-TM-75887] p0276 N81-19139

COULOMB, J.
Unsteady wakes downstream from a profile oscillating in incidence
[AAAF-NT-80-10] p0204 N81-16989

COULTER, J. E.
Escape systems testing on the Holloman high speed test track
p0175 A81-22088

COULURIS, G. J.
Airport and airspace delay model description
[AD-A090781] p0074 N81-12049

COUPRY, G.
A new method for modal identification
p0365 A81-33293

COURTNEY, S. J.
Ferrography as a health monitor and a design aid for the development of helicopter gearboxes
p0118 A81-18759

COUSINS, W. T.
Dynamic pressure response with stall on axial flow compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578

COUSTEIX, J.
Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers
[ONERA-NT-1980-4] p0126 N81-13930

COUSTON, M.
Comparison of computed and measured unsteady pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12] p0359 A81-32541
Comparison of Unsteady Pressure Fields Computed and Measured on the ZKP model
[AGARD-R-688] p0033 N81-11019

COUTURE, M. R.
Computer graphics applications
[PB81-215246] p0637 N81-33188

COVAULT, C.
NASA presses fighter gains
p0002 A81-10575

COVERT, E. E.
Separation of laminar boundary layer induced by aerodynamic interference
p0067 A81-15897
Conditions for safe separation of external stores
p0529 A81-43395

Application of superconducting coils to the NASA prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086

COVEY, R. R.
Operational energy conservation strategies in commercial aviation
p0155 A81-20465

COVITT, A. L.
Band sharing - A case study
p0173 A81-21869

COWDIN, K. T.
Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1] p0375 N81-22048

COX, D. V.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323

COX, G. B., JR.
Pattern factor improvement in the F-100 primary combustion system
[ASME PAPER 81-GT-25] p0311 A81-29941

COX, K. E.
Hydrogen - Its technology and implications. Volume 4 - Utilization of hydrogen
p0016 A81-11751

COX, S. H.
Possible online uses of AIDS data in future ATC systems
p0328 N81-20018

CRABILL, N. L.
Air transport flight parameter measurements program - Concepts and benefits
[SAE PAPER 801132] p0396 A81-34163
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048
The NASA digital VGH program, early results
p0268 N81-19069
Thunderstorm hazards flight research: Storm hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062

CRAFA, V. J.
Engine cycle selection for advanced technology engine studies
[ASME PAPER 81-GT-191] p0317 A81-30084

CRAGO, W. A.
Testing model rotorcraft for overwater operations
p0111 A81-18056

CRAIG, J. E.
A study in flow control and screening methods for aircraft laser turrets
[AD-A101723] p0548 N81-29126

CRAIG, S.
Development of handling quality criteria for aircraft with independent control of six degrees of freedom
[AD-A100045] p0498 N81-27117

CRANDALL, R.
Measurement of canard wakes
[AD-A095063] p0263 N81-19029

CRANE, D. F.
Time delays in flight simulator visual displays
p0615 A81-48369

CRANE, R. L.
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049

CRAWFORD, C. R.
The Discrete Address Beacon System/Air Traffic Control Radar Beacon System/ATCRBS IFF Mark 12 system (DABS/ATCRBS/AIMS) performance prediction model
[AD-A089440] p0024 N81-10034

CRAWLEY, E. F.
Measurements of aerodynamic damping in the MIT transonic rotor
[NASA-CR-163988] p0274 N81-19122

CREAMER, P. M.
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach
[AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams
[AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables
[AD-A092744] p0192 N81-16032

CREDEUR, L.
Evaluation of Microwave Landing System (MLS) effect on the delivery performance of a fixed-path metering and spacing system
[NASA-TP-1844] p0546 N81-29111
CREED, S. H.
A six-channel quick-look unit for the aerodynamics division MKI airborne data acquisition package
[AD-A089975] p0043 N81-11364
CREEDON, J. F.
Figure control of flexible structures - Optical surfaces of thin deformable primary mirrors
p0060 A81-14994
Guidance and control system research for improved terminal area operations
p0264 N81-19038
Flight evaluation of a simple total energy-rate system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24058
CREEL, T. R., JR.
A rectangular rod-wall sound shield
[NASA-CASE-LAR-12883-1] p0550 N81-29138
CREMENS, W. S.
Thermal expansion molding process for aircraft composite structures
[SAE PAPER 800612] p0062 A81-15334
CRESAP, W. L.
Design and development of the Model 412 helicopter
[AHS 80-56] p0478 A81-40181
CRESPODASILVA, M. R. M.
Flap-lag-torsional dynamic modelling of rotor blades in hover and in forward flight, including the effect of cubic nonlinearities
[NASA-CR-166194] p0486 N81-26116
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-164475] p0486 N81-26117
CRISPINO, N.
IFFC fire control system mechanization - Firefly III
p0324 A81-30327
CRITCHFIELD, M. O.
Structural response methods and evaluation results for helicopter landing decks on 210- and 270-foot USCCG cutters
[AD-A102420] p0601 N81-31233
CRITCHFIELD, W. J.
Noise control at general aviation airports
p0569 A81-46366
CROCKER, M. J.
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
CRONIN, M. J.
The impact of the All Electric Airplane on production engineering
[AIAA PAPER 81-0848] p0362 A81-32909
The all-electric airplane as an energy efficient transport
[SAE PAPER 801131] p0396 A81-34162
CRONKHITE, J. D.
Crashworthy design concepts for airframe structures of light aircraft
[SAE PAPER 810613] p0522 A81-42769
CROOM, C. C.
Aerodynamic design data for a cruise-matched high performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779
CROOP, H. C.
Advanced structural repair for lower cost
p0558 A81-44393
CROSS, E. J., JR.
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015
CROSSGROVE, A.
Development and applications of MIL-STD-1553
[SAE PAPER 801142] p0398 A81-34172
CROSSLEY, F. A.
Aircraft applications of titanium - A review of the past and potential for the future
[AIAA PAPER 81-0893] p0362 A81-32918
CROSTHWAIT, E. L.
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] p0635 N81-33162
CROTHER, C. A.
Flight-management system - Key to the advanced-technology fighter
p0421 A81-37523
CROUCH, J. G.
BIOCOMAID system (bionic control of acceleration induced dimming)
[AD-A102510] p0601 N81-31234
CROWDER, J. P.
Add fluorescent minitufts to the aerodynamicist's bag of tricks
p0005 A81-11245
CROWELL, R. T.
System for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] p0138 N81-14967
CRUZEN, S.
Carbon/carbon components for advanced gas turbine engines
[ASME PAPER 81-GT-35] p0312 A81-29949
CUESTA ALVAREZ, M.
Commercial airliners - Design and flight operation
p0623 A81-49575
CULLOM, R. R.
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21078
Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude
[NASA-TM-82663] p0496 N81-27095
CUMANI, A.
A frequency-domain technique for aeroelastic mode estimation
p0156 A81-20475
CUMPSTY, N. A.
A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29902
CUNDY, J. M.
Development of test requirements for civil engines
p0430 N81-24079
CUNNINGHAM, E. P.
Single-parameter terrain classification for terrain following
p0066 A81-15082
CUNNINGHAM, H. J.
On the convergence of unsteady generalized aerodynamic forces
[AIAA 81-0647] p0307 A81-29500
CUNNINGHAM, T. B.
Failure management techniques for high survivability
p0042 N81-11272
CUNNINGHAM, W. H.
A compact installation for testing vectored-thrust engines
[AIAA PAPER 81-1592] p0508 A81-40967
CUNNINGTON, G. R., JR.
Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
[SAE PAPER 801155] p0407 A81-34285
CUNY, J.
The joints of aeronautical carbon resin composite structural elements
p0238 A81-26242
CURRIER, F.
The evolution of fiber optics in avionics
[SAE PAPER 801145] p0398 A81-34174
CURRY, A. L.
RAPIDLOADS - A preliminary design loads prediction technique for aircraft
[SAWE PAPER 1366] p0353 A81-31380
CURRY, B. W., JR.
Performance verification of the superjet laminar angular rate sensor
[AD-A091089] p0091 N81-13080
CURRY, C. E.
Engine maintenance cost calculation method
[ASME PAPER 81-GT-34] p0312 A81-29518
CURRY, R. E.
Human Factors of Flight-deck Automation: NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16822
CURTIS, H.
General aviation airplane fuel economy system model
p0372 N81-22011
CURULLA, J. F.
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion

[SAE PAPER 801100] p0512 A81-41776

CUSHINI, A.
Erosion resistant coatings
[NASA-TM-75870] p0377 N81-22098

CUSICK, R.
Avco Lycoming's ALF 502 high bypass fan engire
[SAE PAPER 810618] p0523 A81-42773

CUTCHINS, M. A.
Aeroservoelasticity in the time domain
[AIAA 81-0635] p0306 A81-29489

CUTTER, S.
Design and development of a thermal airship
[AIAA 81-1330] p0456 A81-38537

CUTTS, D. G.
Turbojet engine blade damping
[NASA-CR-165406] p0549 N81-29130

CYRAN, F. B.
Sting interference effects on the static dynamic and base pressure measurements of the standard dynamics model aircraft at Mach numbers 0.3 through 1.3
[AD-A102612] p0627 N81-32124

CYRUS, J. D.
Establishing cruise-engine cycle payoffs for a supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007

CYSTER, D.
Solo navigation in a light aircraft
p0407 A81-34337

D

DABOLD, J. L.
A lightning protection program for the F-16 fly-by-wire system
p0056 A81-14254

DABROWSKA, J.
Angle of attack - Its measurement and usage. I
p0149 A81-19799

DADONE, L.
Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070

DADONE, L. U.
Helicopter icing review
[AD-A098175] p0252 N81-18053

DAGENHART, J. R.
Design considerations of advanced supercritical low drag suction airfoils
p0240 A81-26514

DAHL, G.
Synopsis on aircraft integrated data systems and engine health monitoring and maintenance
[DFVLR-MITT-80-08] p0075 N81-12063
Location of faults in jet engines by calculation of component characteristics
p0382 N81-23012
Reduction of measured data and possibilities for early detection of sensor break-down
p0383 N81-23016

DAHL, H.
Study of oscillatory and flight dynamic behavior of helicopters in atmospheric turbulence
[BMVG-FBWT-80-4] p0342 N81-21074

DAHLEM, V.
Experimental and analytical development of an advanced supersonic fighter concept
[AIAA PAPER 81-1659] p0534 A81-43941
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0535 N81-30159

DAHLIN, J. A.
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30085

DAI, U.
Experimental investigations on shock-associated noise
p0107 A81-17735

DAI, Z.
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732

DAIGUJI, H.
Subsonic cascade flow analysis by a finite element method
p0233 A81-25311

DALE, R.
NASTRAN level 16 programmer's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482

DALE, J.
Regenerative engine analysis program
[AD-A095144] p0274 N81-19123

DALE, J. R.
Advanced technology turboshaft IR suppression
p0106 A81-17519

DALLEMAGNE, G.
Elastomers used in aeronautics industry
[SNIAS-801-551-105] p0031 N81-10160
The resistance of tank protective measures to microorganisms
[SNIAS-801-551-107] p0144 N81-15072

DALY, K. C.
System considerations in the implementation of digital control
[AAS 80-032] p0120 A81-19375

DAMBRA, F.
Impact of modern materials on the development of rotating airfoil equipment
[AAAF-NT-79-43] p0083 N81-12182

DAMBRA, F. H.
An overview of the research conducted in Aerospatiale on internal noise
p0150 A81-20054

DAMONGEOT, A.
Broadband helicopter rotor noise
[AAAF PAPER NT 80-58] p0370 A81-33949

DANAHER, J. W.
Human error in ATC system operations
p0052 A81-13414

DANDEKAR, A. J.
Application of CRT displays to the cockpit of tomorrow
[SAE PAPER 801168] p0399 A81-34183
Impact of EFIS on navigation
p0517 A81-42435

DANFORD, F. O.
DMAHTC's support to National Ocean Survey LORAN-C-charting
[AD-A093748] p0206 N81-17027

DANG VU, B.
Multivariable aircraft control by manoeuvre commands - An application to air-to-ground gunnery
[ONERA, TP NO. 1980-127] p0009 A81-11623

DANHOF, R. H.
Hydroplaning and coefficient of friction in wet runway testing
p0419 A81-37300

DANIEL, H. L.
Standard INS program status
p0511 A81-41753

DANIELS, P. D.
Application of optimal control and estimation to autopilot and autothrottle systems
p0615 A81-48371

DANIELSON, G. L.
Aircraft quality assurance using close-range photogrammetry
p0358 A81-32508

DANIELSSON, S. G.
Review of AIDS development
p0599 N81-31212

DANIS, L.
Carbon/carbon components for advanced gas turbine engines
[ASME PAPER 81-GT-35] p0312 A81-29949

DANNENHOFFER, J. F.
Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-13034

DANNENHOFFER, R. F.
Engine duty cycle estimation for conceptual design aircraft
[AIAA PAPER 81-1368] p0514 A81-42179

DANO, J. M.
AN/TPX-54 interrogator
p0350 A81-32131

DANTONIZZE, A.
Developing test profiles for multiple mission situations
p0570 A81-46483

DANTSIG, A. IA.
Losses of total pressure during mixing of flows in a step diffuser
p0242 A81-26991

DARDANO, R. V.
En route discrete address beacon system/air traffic control (Build 1) technical testing
[AD-A103894] p0636 N81-33183

DARDEN, C. M.
Charts for determining potential minimum sonic-boom overpressures for supersonic cruise aircraft
[NASA-TP-1820] p0337 N81-21016

DAREL, I.
Winglets development at Israel Aircraft Industries p0012 A81-11645

Modification of wing sections to optimize transonic performance p0226 A81-24011

DARGUZHIS, S. A.
Fatigue strength of certain materials used in airframe construction p0285 A81-28108

DARLOW, M. S.
A unified approach to the mass balancing of rotating flexible shafts p0095 N81-13355

DARTS, J.
Development of standardised fatigue test load histories for helicopter rotors: Basic consideration and definition of Helix and Felix p0489 N81-26141

DARYMOV, IU. P.
Automation of air traffic control processes p0623 A81-49462

DAS, D. K.
A digital technique for the analysis of the response of compressor/duct systems in unsteady flow p0294 A81-29078

Performance analysis of a family of planar pulse generators
[AIAA PAPER 81-1590] p0507 A81-40965

DAS, P. K.
An analytical method to calculate misalignment in the journal bearing of a planetary gear system p0004 A81-10839

DAS, T. K.
Plane transonic solution with shock by direct iteration p0231 A81-24814

DASHCUND, D. R.
The development of a theoretical and experimental model for the study of active suppression of wing flutter p0376 N81-22058

DASTIN, S. J.
Experiences with composite aircraft structures p0182 A81-22678

Design and concepts of composite structures p0481 A81-40503

EF-111A graphite/epoxy Horizontal Stabilizer Trailing Edge p0557 A81-44342

DATTA-BARUA, R.
Computer-aided methods for redesigning the stabilized pitch control system of a semi-active thermal homing missile p0051 A81-13250

DAUGHTERY, D. C.
Further investigations of adaptive-wall wind tunnels
[AD-A091774] p0131 N81-13977

DAULERIO, L. A.
Low level, adverse attitude escape using a vertical seeking ejection seat p0176 A81-22094

DAVEY, K. R.
Electromagnetic precipitation and ducting of particles in turbulent boundary layers p0239 A81-26506

DAVID, G.
Characteristics of NAVSTAR user stations p0121 A81-19425

DAVIES, D. E.
Theoretical determination of subsonic oscillatory airforce coefficients for fin-tailplane configurations
[RAE-TR-79125] p0022 N81-10016

DAVIES, R. L.
Progress in materials and structures at Lewis Research Center p0089 N81-12982

DAVIS, C. M.
Evaluation of Microwave Landing System (MLS) effect on the delivery performance of a fixed-path metering and spacing system
[NASA-TP-1844] p0546 N81-29111

DAVIS, E. E.
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882

DAVIS, G. W.
Structural concept trends for commercial supersonic cruise aircraft design p0246 N81-18006

Design considerations for composite fuselage structure of commercial transport aircraft
[NASA-CR-159296] p0378 N81-22419

DAVIS, J.
A survey of computer simulations of digital avionics systems
[AD-A091943] p0195 N81-16049

DAVIS, J. C.
External burning propulsion analysis
[AIAA PAPER 81-1477] p0505 A81-40897

DAVIS, J. W.
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] p0636 N81-33181

DAVIS, M. J.
Application of BFRP Crack Patching to Mirage III aircraft p0481 A81-40586

DAVIS, M. R.
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111

DAVIS, R. H.
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 2: Appendix A. Performance data - GE27/T3 study A1 turboprop
[AD-A089336] p0028 N81-10068

Maritime patrol aircraft engine study. General Electric derivative engines. Volume 3: Appendix B. Performance data - TF34/T7 study A1 turboprop
[AD-A089279] p0028 N81-10069

DAVIS, S.
Adaptive-wall wind-tunnel development for transonic testing p0352 A81-31367

DAVIS, S. O.
Air Force technical objective document FY 1981
[AD-A089709] p0048 N81-12010

DAVIS, S. S.
Experimental studies of scale effects on oscillating airfoils at transonic speeds p0386 N81-2305

DAY, C. F.
A slot allocation model for high-density airports
[AD-A098097] p0438 N81-248

DAY, D. B.
Logistics support of avionic software stored on erasable programmable read only memory p0327 A81-303

DAY, D. L.
Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15425/T1] p0134 N81-1432

DAZZO, J. J.
Design of disturbance-rejection controllers for linear multivariable discrete-time systems using entire eigenstructure assignment p0155 A81-204

DE BELLEVAL, J. F.
New avenues of research in ultrasonic inspection and their applications in the aerospace industry p0052 A81-1333

DE GELAS, B.
The titanium industry and the fabrication of semimanufactures for aeronautics p0416 A81-366

DE GRAAF, E. A. B.
Subsequent proof of damage tolerance for a landing gear component after numerous takeoffs and landings p0006 A81-11

Evaluation and comparison of nondestructive service inspection methods p0153 A81-201

DE HOFF, R. L.
Trajectory generation techniques for multivariable control of aircraft turbine engines
p0240 A81-26609

DE JONGE, J. B.
Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3
p0172 A81-21739

DE OTTO, G. L.
Fatigue design criteria and fleet fatigue life survey at Aeronautica Macchi
p0180 A81-22624

DE PONTE, S.
Aerodynamic design of a ducted propeller - Optimization of efficiency
p0102 A81-17146

DE RIJK, P.
Subsequent proof of damage tolerance for a landing gear component after numerous takeoffs and landings
p0006 A81-11475
Evaluation and comparison of nondestructive service inspection methods
p0153 A81-20135

DE WOLF, W. B.
Jet noise suppression for low bypass engines - Have we reached a dead end
p0291 A81-29063

DEAL, P. L.
Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise
[NASA-TP-1742] p0073 N81-12043
Thunderstorm hazards flight research: Storm hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062

DEAN, J. G.
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] p0635 N81-33173

DEAR, R. G.
Increasing capacity with computer-assisted decision making
p0113 A81-18080
Integration of fuel conservative procedures in the high density terminal area
p0155 A81-20468

DEBELLIS, W. B.
An investigation of the five point restraint system for aviators
[AD-A093065] p0205 N81-16998

DEBOER, W. P.
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118

DEBRA, D. B.
Prediction and experimental verification of transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568

DEBRUGE, L. L.
Determination of aerodynamically adequate fillet geometry in turbocompressor blade rows
[AD-A102170] p0600 N81-31219

DECAMP, R. W.
Mission Adaptive Wing research programme
p0227 A81-24057

DECELLES, J. L.
Flight instrumentation requirements for all-weather approach and landing
p0111 A81-18059

DECKERT, J. C.
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135
F-8 digital fly-by-wire aircraft analytic redundancy management flight test experience
p0405 N81-26109

DECKERT, W.
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Recent progress in V/STOL aircraft technology
p0633 N81-33144

DECKKER, B. E. L.
Three dimensional flow in annular diffusers with two vortex distributions at entry
p0297 A81-29112

DECONINCK, H.
Finite element methods for transonic blade-to-blade calculation in turbomachines
[ASME PAPER 81-GT-5] p0310 A81-29930

DECORSO, S. M.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006

DEDEK, J.
The possibility of improving the lateral-directional characteristics of a twin-engine aircraft by spoilers in the case of sudden engine failure
p0049 A81-12967

DEEL, A.
The role of the research simulator in the systems development of rotorcraft
[NASA-TM-81276] p0272 N81-19101
The role of the research simulator in the systems development of rotorcraft
p0633 N81-33146

DEFERRARI, G.
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974

DEFFENBAUGH, F. D.
Holographic investigation of slender body vortex wakes
[AD-A089496] p0021 N81-10008

DEFRANCES, A. J.
Information requirements for airborne electronic terrain maps
p0325 A81-30334

DEGENER, M.
Model tests for an active rotor isolation system
[MBB-278-79-0] p0016 A81-12095
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
p0467 A81-40087

DEGRAAF, E. A. B.
Damage tolerance of a landing gear component after many takeoffs and landings
[NLR-MP-79039-U] p0596 N81-31189

DEGTIARENKO, L. N.
The indication of the characteristics of aircraft controllability with prediction in dynamic ergatic systems
p0517 A81-42603

DEHNE, H. J.
An automatic isokinetic sampler for particulate emissions from aircraft gas turbine engines
[AD-A090280] p0088 N81-12653

DEHOFF, R. L.
Turbine engine fault detection and isolation program, phase 1. Volume 2: Requirements definition for an integrated engine monitoring system
[AD-A093226] p0215 N81-17088
Turbine engine fault detection and isolation program, phase 1. Volume 1: Requirements definition for an integrated engine monitoring system
[AD-A093225] p0215 N81-17089
Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system
[AD-A093860] p0216 N81-17095

DEHONDT, D.
Analysis of the difficulties in high performance compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107

DEJONGE, J. B.
Additional information about Fighter Aircraft Loading Standard for Fatigue Evaluation (FALSTAFF)
[NLR-TR-79056-U] p0344 N81-21391
Lasting friendship. A review of the F-27 fatigue evaluation program carried out by Fokker-VFW
[NLR-TR-78150-U] p0495 N81-27086

DEL BELLO, R.
A frequency-domain technique for aeroelastic mode estimation
p0156 A81-20875

DEL CORE, A.
Definition of loading sequence for full scale fatigue test

p0180 A81-22626
DELAHAYE, B.
An apparatus for the simulation of an air intake at high angle of attack in a compressor test facility
[ONERA, TP NO. 1981-35] p0460 A81-39238
An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240
DELAMARCHE, A.
Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0042 N81-11290
DELAURIER, J. D.
Airship survivability in atmospheric turbulence
[AIAA 81-1323] p0456 A81-38533
The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-38534
Aerodynamic estimation techniques for aerostats and airships
[AIAA 81-1339] p0457 A81-38542
DELGROSSO, E. J.
Materials and processes for aircraft environmental controls in the 1990's
[SAE PAPER 801181] p0401 A81-34194
DELGUERCIO, L. R. M.
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
DELL, M. R.
Specification requirements for fighter engines
p0429 N81-24073
DELOACH, R.
An airport community noise-impact assessment model
[NASA-TM-80198] p0393 N81-23713
Airport noise impact reduction through operations
[NASA-TM-81970] p0438 N81-24855
DELUCIEN, A. G.
Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046
Study of heliport airspace and real estate requirements
[AD-A091156] p0095 N81-13072
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] p0630 N81-32158
DELVILLE, J.
Analysis of total and static pressure fluctuations in an air intake at high incidence
[AAAF PAPER NT 80-61] p0370 A81-33950
DEMARCHI, J. N.
Design, development, and evaluation of lightweight hydraulic system, phase 1
[AD-A097505] p0388 N81-23075
DEMATTIO, J. R.
Wind shear systems integration plan, VICON (visual confirmation) reliability analysis
[PB80-218233] p0128 N81-13949
DEMBLING, P. G.
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021
DEMEL, H. F.
Samarium cobalt (SMCO) generator/engine integration study
[AD-A092904] p0214 N81-17087
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
DEMIANUSHKO, I. V.
Numerical methods for studying the stress-strain state and service life of aircraft gas-turbine engine disks
p0351 A81-31258
DEMOTT, L. R.
TF41/A7-E engine monitoring system implementation experience
[SAE PAPER 801222] p0404 A81-34226
DEMPSEY, T. K.
Sources, control, and effects of noise from aircraft propellers and rotors
p0269 N81-19073
Sources, control, and effects of noise from aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904
DEN HOLLANDER, J. C.
Status of dynamic flight test technology - Model identification for flight simulation
[SAE PAPER 810597] p0521 A81-42755
DENANCE, G.
SIMCAT - A modular air traffic control simulator
p0364 A81-33149
DENISOV, IU. A.
Iterative method for determining maximum load capacity of aircraft structures
p0235 A81-25683
DENKER, I. I.
Technology for rustproofing aircraft and helicopters
p0529 A81-43520
DENNING, R. M.
V/STOL combat aircraft progress from the powerplant viewpoint
p0469 A81-40105
DENNIS, R. E.
Cost/benefit analysis of advanced materials technology candidates for the 1980's, part 2
[NASA-CR-165176] p0048 N81-11953
Low-cost directionally-solidified turbine blades, volume 2
[NASA-CR-159562] p0078 N81-12088
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27096
DENOVCHEK, J. M.
High altitude launch of the Cruise Missile
p0179 A81-22608
DEPASQUAL, E. J.
High impulse gun airborne demonstration. GAU-13/A weapon, feed system, gun drive and electronic controls
[AD-A101698] p0582 N81-30120
DEPPE, D.
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
DER, J., JR.
Modeling of 2D-nozzle plume for IR signature prediction under static conditions
[AIAA PAPER 81-1108] p0459 A81-39107
DERGACH, A. A.
An experimental study of heat transfer in rotating slots and bends
p0509 A81-41043
DERIJK, P.
Damage tolerance of a landing gear component after many takeoffs and landings
[NLR-MP-79039-U] p0596 N81-31109
DERKACS, T.
Automated Plasma Spray (APS) process feasibility study
[NASA-CR-165418] p0597 N81-31193
DERKACZEW, A.
Analytic determination of the kinematic and energy parameters of aircraft braking during the landing run
p0409 A81-35008
DESALABERRY, B.
Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN
p0485 N81-26102
DESARO, R.
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] p0277 N81-19316
DESIMONE, G.
Preliminary evaluation of RSRA data comparing pure helicopter, auxiliary propulsion and compound helicopter flight characteristics
[AHS 80-10] p0473 A81-40143
DESJARDINS, R. A.
Floor and fuel vibration isolation systems for the Boeing Vertol commercial Chinook
p0356 A81-32016
DESJARDINS, S. P.
Aircraft crash survival design guide. Volume 1: Design criteria and checklists, revision
[AD-A093784] p0204 N81-16997
DESLANDES, R.
Evaluation of aircraft interference effects on external stores at subsonic and transonic speeds
p0187 N81-15997
A theoretical method for the simulation of separation behavior of aircraft external stores
[MBB-FE-122/S/PUB/16] p0203 N81-169
DESMARAIS, R. N.
Prediction of transonic flutter for a supercritical wing by modified strip analysis

and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[NASA-TM-83126] p0445 N81-25432

DESTRIGUER, D.
The influence of beards on the efficiency of aviators' oxygen masks
p0176 A81-22100

DESTUYNDER, R.
Test and analyses of an active flutter suppression system on an FFDL model of YF17
p0082 N81-12118

DEVINE, J.
Ultrasonic cold forming of aircraft sheet materials
[AD-A096351] p0344 N81-21239

DEW, S.
A comparison between electric field strengths similarly generated and measured in the open air, in a shielded enclosure and in a large aircraft hangar, over frequency range 10 to 110 MHz
[RSRE-MEMO-3248] p0084 N81-12353

DEWEY, D. R.
Advanced avionic systems for multi-mission applications
p0321 A81-30258

DEWISPELARE, A. R.
Investigation of landing gear alternatives for high performance aircraft
[AIAA PAPER 81-1639] p0525 A81-43139

DEXTER, H. B.
NASA service experience with composite components
p0529 A81-43607
Composite components on commercial aircraft
p0041 N81-11147

DEYOUNG, J.
Induced drag ideal efficiency factor of arbitrary lateral-vertical wing forms
[NASA-CR-3357] p0072 N81-12022
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067

DHYANCHAND, J.
Digital computer simulation of generalized fault conditions on aircraft electrical power systems
p0322 A81-30285

DI TOMMASO, N.
An observational experiment using a monostatic sodar at the airport of Fiumicino
p0282 A81-27548

DIAMOND, E. D.
The impact on helicopter cockpits of integrated advanced flight controls, avionics and optics
p0574 A81-46624

DIBBERN, J. S.
Soviet military air cushion vehicles - Mechanized amphibious assault
p0577 A81-46714

DICARLO, D. J.
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
Applications of dynamic stability parameters to problems in aircraft dynamics
p0592 N81-31122

DICKERSON, K. H.
The nature of operating flight loads and their effect on propulsion system structures
p0599 N81-31207

DICKINSON, L. V., JR.
Assessment of the impact of advanced air-transport technology
p0247 N81-18015

DIEDRICH, J. H.
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Low-speed aerodynamic performance of 50.8-centimeter-diameter noise-suppressing inlets for the Quiet, Clean, Short-haul Experimental Engine (QCSEE)
[NASA-TP-1178] p0035 N81-11037

DIEHL, L. A.
Advanced technology for controlling pollutant emissions from supersonic cruise aircraft
p0246 N81-18004

DIEKMANN, V. L.
Artificial and natural icing tests production UH-60A helicopter
[AD-A096239] p0340 N81-21063

DIENGER, G.
Electronic engine control for commercial aircraft
p0309 A81-29775
Engine condition monitoring: CF6 family 60's through the 80's
p0600 N81-31215

DIENKE, R.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960

DIESS, R.
Digital data bases for visual and radar simulation
[MBB-UA-549/80-OE] p0585 N81-30143

DIETENBERGER, M. A.
Simulated aircraft takeoff performance with frosted wings
[AIAA PAPER 81-0404] p0167 A81-20011

DIETER, W.
Weapon system evolution of attack helicopters
p0472 A81-40130

DIETRICH, W.
From sponge to powder alternatives in titanium processing
p0511 A81-41647

DIETRICK, C. C.
Engine usage prediction for advanced fighter aircraft
[AIAA PAPER 81-1367] p0514 A81-42178

DIETZ, R. O.
Wind tunnel corrections for high angle of attack models
[AGARD-R-692] p0435 N81-24120

DIETZMANN, H. E.
Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165

DIGHTON, R. D.
Designing the Hornet for improved R and M
[AIAA PAPER 81-0230] p0162 A81-20688
The Hornet's operational mission environment
p0571 A81-46491
The Hornet program: A design to life cycle cost case study
p0046 N81-11910

DIJNS, J. A. A. M.
Fatigue test results of carbon fiber reinforced plastic F28 aircraft component and its structural details
p0040 N81-11135

DIKE, G.
Electromagnetic coupling to advanced composite aircraft with application to trade-off and specification determination
p0200 N81-16166
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069

DILL, H. D.
Effects of fighter attack spectrum on crack growth
p0172 A81-21741

DILLENIUS, M. F. E.
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 2: Users manual for the computer program
[AD-A099391] p0494 N81-27080
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 3: Appendices A and B. Details of program 1
[AD-A099331] p0495 N81-27082
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 4: Appendices C and D. Details of program 2

[AD-A099332] p0495 N81-27083

DILLON, R. D.
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials
[AD-A103191] p0636 N81-33175

DIMARCO, R. J.
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163108] p0498 N81-27113

DIMARZIO, C. A.
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051

DIMENTBERG, F. M.
Vibrations in technical equipment. Volume 3 - Oscillations of machines, structures, and their components
p0511 A81-41725

DISPARTE, C. P.
Design of fault tolerant electronic engine controls
[AIAA PAPER 81-1496] p0566 A81-45894

DITTMAR, J. H.
An evaluation of a simplified near field noise model for supersonic helical tip speed propellers
[NASA-TM-81727] p0380 N81-22836
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838
Additional noise data on the SR-3 propeller
[NASA-TM-81736] p0447 N81-25767

DIXIT, C. S.
Optimum selection of main parameters for the reverse design of a supersonic military aircraft
p0102 A81-17047

DIXON, J. C.
Improving the mechanical load matching of wind energy converters
p0055 A81-13870

DIXON, P. G.
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064

DIXON, P. G. C.
The bearingless main rotor
p0356 A81-32008

DMITRIEV, A. A.
New developments in the field of solar-terrestrial relationships
p0281 A81-27326

DOBBEK, R. J.
Escape from military fighters - A modern perspective
p0176 A81-22096

DOBLE, G. S.
Fabrication process development of boron/aluminum fan blades for high bypass engines
[NASA-CR-165252] p0442 N81-25076

DOBRYNIN, V. M.
Interferometric study of the initial stage of supersonic jets of gases with various specific-heat ratios from conical nozzles
p0068 A81-16231

DOBRZYNSKI, W. M.
Trailing-edge airframe noise source studies on aircraft wings
[AIAA PAPER 80-0976] p0411 A81-35634

DODGE, P. R.
Rotor-tip leakage. I - Basic methodology
[ASME PAPER 81-GT-71] p0313 A81-29980

DODGE, R. N.
Heat generation in aircraft tires under free rolling conditions
[NASA-CR-164273] p0393 N81-23461

DOE, R. A.
Westland WG30
p0466 A81-40082

DOERING, H. VONR.
Application of water cooling for improved gas turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977

DOGGETT, R. V., JR.
Dynamic response of a forward-swept-wing model at angles of attack up to 15 deg at a Mach number of 0.8
[NASA-TM-81863] p0085 N81-12448
Effects of angle of attack and ventral fin on transonic flutter characteristics of an arrow-wing configuration
[NASA-TM-81914] p0145 N81-15397
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12720-1] p0601 N81-31229
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12458-1] p0601 N81-31230

DONKIN, E. I.
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719
Effect of oxygen-containing additives on the antiwear properties of fuels for gas-turbine aircraft engines
p0517 A81-42558

DONATICH, L.
VHF-UHF precipitation-static interference effects on aircraft
p0056 A81-14258

DONDOSHANSKII, V. K.
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33160

DONE, G. T. S.
Use of optimization in helicopter vibration control by structural modification
p0241 A81-26945

DONE, E.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323

DONG, B.-C.
Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098

DONG, C.
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061

DONG, J.
Investigation of Wilcox model 585B very high frequency omnidirectional radio range system, part 2
[AD-A099525] p0494 N81-27073

DONG, Q.
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825

DONHAM, R. E.
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442

DONLEVY, A. L.
Structural applications for titanium castings
p0510 A81-41627

DONLEY, S. T.
Evaluation of several control/display concepts for V/STOL shipboard landing
[SAE PAPER 801205] p0403 A81-34213

DONNELLY, R. P.
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634

DONNELLY, S. F.
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach
[AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams
[AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables
[AD-A092744] p0192 N81-16032

DONNELY, S. F.
Omega station 10.2 kHz signal coverage prediction diagrams
p0512 A81-41760

DOOLEY, L. W.
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-A098794] p0486 N81-26121

DOR, J. B.
Measurements of temperature and pressure fluctuations in the T prime 2 cryogenic wind tunnel
[NASA-TM-75408] p0490 N81-26134

DORSEY, G.
Relationships between impact resistance and fracture toughness in advanced composite materials
p0040 N81-11137
DORSEY, J.
Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35891
DORN, H. C.
The 1H and 13C fourier transform NMR characterization of jet fuels derived from alternate energy sources
[AD-A098305] p0437 N81-24284
DOROFF, S. W.
Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683
DOSANJH, D. S.
Aeroacoustics of a porous plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884
DOTSON, J. G.
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060
DOUGHERTY, S.
A new technique for tracking sequences of digitized images
p0156 A81-20508
DOUGLAS, C. A.
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068
DOVGAL, A. V.
Experimental investigation into the reaction of a boundary layer to external periodic disturbances
p0309 A81-29866
DOVI, A. R.
IPAD applications to the design, analysis, and/or machining of aerospace structures
[AIAA 81-0512] p0301 A81-29388
ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783
DOWELL, E. H.
A simplified theory of oscillating aerofoils in transonic flow - Review and extension
p0060 A81-14945
Flutter of plates and shells in practice
p0282 A81-27611
Linear/nonlinear behavior in unsteady transonic aerodynamics
[AIAA 81-0643] p0306 A81-29496
Non-linear oscillator models in bluff body aeroelasticity
p0348 A81-30786
DOWNING, D. R.
Flight test evaluation of a digital controller used in a VTOL automatic approach and landing system
p0179 A81-22549
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142
DOYLE, R. K.
Airport/environs plan making - Managing the planning process
p0114 A81-18088
DOYLE, V. L.
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999
DRAAN, A. N.
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077373] p0139 N81-14969
DRAGO, V. J.
New major U.S. airports - Capacity considerations
p0111 A81-18060
DRAPER, C. S.
Control, navigation, and guidance
[AIAA PAPER 81-0859] p0362 A81-32910
Origins of inertial navigation
p0567 A81-46276
DREADIN, W. O.
The USAF Armament Division Structural Dynamics Lab
p0347 A81-30689
DREHER, J. F.
Producibility engineering at ASD
p0326 A81-30341
DREHER, R. C.
Studies of some unconventional systems for solving various landing problems
p0268 N81-19067
DRESSER, H. E.
Cybernetic airborne fire control - Issues and potential
p0326 A81-30347
DREVER, J. E.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
DRING, R. P.
Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-13034
DRIVER, C.
Progress in supersonic cruise technology
[AIAA PAPER 81-1687] p0535 A81-43950
DROGIN, E. M.
Airborne countermeasures system AN/ALQ-161
p0049 A81-12793
DROSTE, C. S.
A lightning protection program for the F-16 fly-by-wire system
p0056 A81-14254
A case study on the F-16 fly-by-wire flight control system
p0101 A81-16719
DROUGGE, G.
A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations
[FFA-TN-AU-1410-PT-1] p0022 N81-10013
An investigation of a swept wing-body configuration with drooped leading edge at low and transonic speeds
p0189 N81-16012
DRUMMOND, J. P.
A numerical study of candidate transverse fuel injector configurations in the Langley scramjet engine
p0003 A81-10709
Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659
A parametric study of staged fuel injector configurations for scramjet applications
[AIAA PAPER 81-1468] p0505 A81-40888
DRYDEN, G.
Pulsed laser mapping system for light aircraft
p0223 A81-23671
DU VAL, R. W.
Use of multiblade sensors for on-line rotor tip-path plane estimation
p0356 A81-32010
DU, Q.
A vaporizing combustor with double combustion spaces
p0109 A81-17827
DUBBERLY, M.
US Navy service experience with advanced composites
p0041 N81-11149
DUBELL, T. L.
Exploratory development program to improve combustor dome operating characteristics
[AIAA PAPER 81-1351] p0501 A81-40834
DUBREUIL, J. P.
The consequences of certain operational requirements on the conceptual design of combat helicopters
p0634 N81-33153
DUBS, F.
The aerodynamics of pure subsonic flow /4th revised edition/
p0006 A81-11441
DUE, H. F., JR.
The status of the expendable gasifier program
[SAE PAPER 801151] p0406 A81-34242
DUERR, R. A.
Advanced technology for controlling pollutant emissions from supersonic cruise aircraft
p0246 N81-18004
DUFFY, J. W.
A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test
[NASA-CR-3461-VOL-1] p0595 N81-31171
DUFFY, T. G.
Trace chemical analysis methodology

[AD-A090762] p0083 N81-12191

DUFRESNE, D. A.
The XV-15 - An initial Navy look
[AIAA PAPER 81-0155] p0161 A81-20635

DUGAN, D. C.
The XV-15 tilt rotor research aircraft
p0100 A81-16588
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
The XV-15 tilt rotor research aircraft
[NASA-TM-81244] p0026 N81-10054
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042

DUGAN, J. F.
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156

DUKE, A. A., JR.
Fighter fire control requirements for air battles of the future
p0326 A81-30348

DUKE, D. B.
Applications of new technology in the infrared
p0350 A81-31126

DULIS, E. J.
Progress in P/M superalloy and titanium for aircraft applications
p0181 A81-22641

DULL, P. P.
Wright Field turboprop study
[AIAA PAPER 81-1685] p0526 A81-43157

DUMAS, O.
Light aviation in the United States - September 1980
p0513 A81-41903

DUNAEV, A. V.
Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream
p0060 A81-14959
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957

DUNAVANT, D. A.
Adaptive finite element technology in integrated design and analysis
[NASA-CR-164560] p0543 N81-28810

DUNBAR, D. P., JR.
U.S. Navy/USAF development of Tactical Aircrew Combat Training System/Air Combat Maneuvering Instrumentation /TACTS/ACMI/
[SAE PAPER 801183] p0401 A81-34196

DUNBECK, P. D.
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845

DUNCAN, R. E.
Low-range airspeed sensors
[AD-A096359] p0342 N81-21076

DUNHAM, J.
The static pressure in a vortex core
p0228 A81-24072

DUNKIN, J. A.
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051

DUNLAY, W. J., JR.
Airspace analysis in airport system planning
p0111 A81-18052
Simulation model validation - Airport applications
p0461 A81-39320

DUNN, D. A.
Quality assurance of an epoxy resin prepreg using HPLC
p0531 A81-43642

DUNN, H. J.
An analytical technique for approximating unsteady aerodynamics in the time domain
[NASA-TP-1738] p0043 N81-11422

DUNN, M. G.
Measurement of heat flux and pressure in a turbine stage
[ASME PAPER 81-GT-88] p0314 A81-29995
The predictability of turbine vane convection heat transfer
[AIAA PAPER 81-1435] p0566 A81-45892
Nuclear blast response of airbreathing propulsion systems. Laboratory measurements with an operational J-85-5 turbojet engine
[AD-A092229] p0196 N81-16063

DUNN, P. D.
Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029

DUNNING, B. W., JR.
Silver recovery from aircraft scrap
[PB81-150021] p0392 N81-23269

DUNNING, E. G.
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232

DUPONT, M.
Industrial titanium alloys - Use and characteristics
p0416 A81-36653

DUPUY, C.
The SYDAS flight data processing system
p0383 N81-23018

DURAND, J. P.
The application of UV spectroscopy to the quantitative analysis of nitrogen oxide
p0089 N81-13008

DURBIN, E.
An airspeed vector sensor for V/STOL aircraft
[AIAA 80-1938] p0052 A81-13364

DURHAM, T. A.
B-52 wake investigation
[LOG-C3932] p0072 N81-12020

DURIAU, J.
Titanium forging - Stamping /stamp, screw-press/, circular rolling and isothermal forging
p0416 A81-36657

DURNEY, G. P.
Air Force Geophysics Laboratory aerodynamically tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023

DURNIAK, J. D.
Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165

DURSTON, D. A.
Preliminary aerodynamic characteristics of several advanced VSTOL fighter/attack aircraft concepts
[SAE PAPER 801178] p0400 A81-34191
Lift-enhancing surfaces on several advanced V/STOL fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-43946
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0
[NASA-TM-81286] p0579 N81-30083

DUSKIN, F. E.
Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23050
Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051

DUSTO, A. R.
Aerodynamic modeling of an oscillating wing with external stores
[AIAA 81-0648] p0307 A81-29501
Aerodynamic analysis of a fighter aircraft with a higher order paneling method
[AD-A099404] p0483 N81-26002

DUTOYA, D.
An implicit finite volume method for elliptical flow computation
p0255 N81-182

DUTT, H. N. V.
Design of airfoils in incompressible viscous flows by numerical optimization
p0001 A81-1009

DUTTA, K.
Dynamic simulation of hybrid video compression
p0463 A81-395

DUVAL, D. A.
Evaluation of a subsonic cascade wind tunnel for compressor blade testing
[AD-A093591] p0218 N81-17107

DUVAL, R. W.
Identification of a linear model of rotor-fuselage dynamics from nonlinear simulation data
p0472 A81-40125

DVORNAK, M. E.
Noise control design problems on air cushion vehicles and surface effect ships
p0017 A81-11818

DVORSKY, L. A.
Airport Surface Detection Equipment (ASDE)-3 operational evaluation
[AD-A098480] p0440 N81-25059

DYER, R. D.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] p0616 A81-48416

DZIUK, L. L.
Contaminant increase in aircraft liquid oxygen converters: Analysis of data
[AD-A090975] p0092 N81-13049

DZINAK, W.
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473

DZYGADLO, Z.
Finite element analysis of natural and forced flexural vibrations of rotor systems
p0017 A81-11956
Dynamics of longitudinal motion of a variable-sweepback aeroplane with a deformable control system
p0231 A81-24722
Calculation of shells in aircraft turbine engines
p0285 A81-28078
Finite element analysis of asymmetric, lateral natural vibrations of a deformable aeroplane
p0366 A81-33736
Finite element analysis of self-excited vibrations of helicopter rotor blades
p0395 A81-34120

E

EARL, H. S., JR.
MLS antenna locations for the deHaviland DASH 7 aircraft
[NASA-TM-83195] p0602 N81-31418

EASTEP, F. E.
Analysis of a symmetric transonic aerofoil with the finite element method - A new upwinding technique
p0183 A81-22984
Active control of forward swept wings with divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491

EASTERLING, A. R.
Regenerative engine for helicopter application
[AHS 80-39] p0477 A81-40168

EASTMAN, L. B.
Main rotor six degree-of-freedom isolation system analysis
[NASA-CR-165665] p0444 N81-25090

EATON, R. A.
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] p0639 N81-33214

EAVES, A. V.
Coatings in the aero gas turbine
p0103 A81-17167

EBACHER, J. A.
VCE test bed engine for supersonic cruise research
p0245 N81-17995

EBACKER, J. J.
Aerodynamic/acoustic performance of YJ101/double bypass VCE with coannular plug nozzle
[NASA-CR-159869] p0220 N81-17846

EBERLE, A.
Engine air intake design support by use of computational methods and comparison of theoretically derived pressure distributions with experimental data
p0008 A81-11614

EBERT, H.
New techniques and development trends in the system architecture of EDP systems for radar data processing and airspace control
p0153 A81-20103

EBERT, P. H.
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053

ECCLESTON, A. J.
Cost considerations of engine fuel control systems
p0048 N81-11920

ECKHARDT, W. O.
Model-based scene matching
p0461 A81-39349

EDELMAN, R. B.
Mixing and combustion in high speed air flows
[AD-A090536] p0083 N81-12192
Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3433] p0392 N81-23411
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320

EDELMANN, M. B.
Interpretation of ramjet combustor test data
[AIAA PAPER 81-1433] p0504 A81-40870

EDGE, E. C.
The implications of laboratory accelerated conditioning of carbon fibre composites
p0039 N81-11129

EDSINGER, R. W.
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0154 A81-20448
A correlated random numbers generator and its use to estimate false alarm rates of airplane sensor failure detection algorithms
p0453 A81-37822

EDWARDS, A. V. J.
A computer simulation of turbulent jet flow
p0230 A81-24424

EDWARDS, D. H.
R.A.N. Sea King cabin environment survey. Part 2: Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065

EDWARDS, J. W.
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[AIAA 81-0655] p0308 A81-29507
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[NASA-TM-83132] p0486 N81-26118

EDWARDS, M. G.
An investigation into grid patching techniques
p0137 N81-14708

EDWARDS, R. J. G.
The presentation of static information on air traffic control displays
p0211 N81-17064

EDWARDS, T. M., JR.
Maintenance program analysis for aircraft structures of the 80's - MSG-3
[SAE PAPER 801214] p0404 A81-34222

EDWARDS, V. R.
Helicopter propulsion system development and qualification
p0105 A81-17511

EFKEMAN, A.
Development of an aviator's night vision imaging system /ANVIS/
p0463 A81-39573

EGERDAHL, C. C.
User's manual for flight Simulator Display System (FSDS)
[NASA-CR-164295] p0391 N81-23095

EGGEMEIER, F. T.
Actual versus simulated equipment for aircraft maintenance training: Cost implications of the incremental versus the unique device
[AD-A102388] p0590 N81-31104

EGGERS, A. J., JR.
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021

EGGLESTON, D.
On the design of modern airfoil sections by numerical methods
p0347 A81-30705

EGGLESTON, D. S.
The 17th JANNAF combustion meeting, volume 1

[NASA-TM-82238] p0200 N81-16253

EGOLF, T. A.
Helicopter airflow and wake characteristics for low speed and hovering flight from rocket interference investigations p0572 A81-46608

EHERNBERGER, L. J.
Clear air turbulence: Historical comments p0136 N81-14562
The 1979 clear air turbulence flight test program p0266 N81-19050

EHLER, C. W.
The Discrete Address Beacon System/Air Traffic Control Radar Beacon System/ATCRBS IFF Mark 12 system (DABS/ATCRBS/AIMS) performance prediction model
[AD-A089440] p0024 N81-10034

EHLERS, F. E.
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022

EHLERS, K. K.
HH-65A Dolphin engine condition monitoring system p0575 A81-46636

EHLERS, H.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960

EHRMANNTRAUT, R.
Detection of direction changes of flying targets from position coordinates of the radar data p0152 A81-20099

EICHELMAN, G. E.
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems p0530 A81-43624

EIDINOFF, H. L.
An application of the energy release rate concept to crack growth in attachment lugs
[AIAA 81-0491] p0302 A81-29420

EIGENMANN, M. F.
Axisymmetric approach and landing thrust reversers
[AIAA PAPER 81-1650] p0533 A81-43936

EINHORN, S. J.
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base
[AD-A094226] p0252 N81-18050
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report
[AD-A094225] p0252 N81-18051

EISELE, J. E.
Integrated flight displays p0064 A81-15681
Visual cue requirements in contact flight simulators p0064 A81-15695

EISEMAN, P. R.
Geometric methods in computational fluid dynamics p0256 N81-18331

EKCHIAN, L.
Adaptive features and measurement requirements for advanced surveillance radars p0617 A81-48544

EKIN, W. H.
An objective method of assessing the realism of a simulation of a simple control system p0284 A81-27898

EKVALL, R. A.
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187

EL NAYAH, M. T.
Contribution to the improvement of the classical method of maintenance of aeroengines p0290 A81-29055

EL-DOKANY, I. M.
Accuracy of noise-modulated radio altimeter p0359 A81-32694

EL-HADY, N. M.
HADY-1, a FORTRAN program for the compressible stability analysis of three-dimensional boundary layers p0586 N81-30388
The effect of boundary layer growth on the stability of compressible flows p0587 N81-30389

EL-SAGIR, S. M.
Air traffic control and position location by satellite constellation in equatorial orbit p0173 A81-21912
Satellite constellations for three-dimensional coverage of the Atlantic Ocean p0323 A81-30291

EL-SOUD, S. A.
Accuracy of noise-modulated radio altimeter p0359 A81-32694

ELABADY, M.
Turbo-compressors surge and surge control
[AIAA PAPER 81-0070] p0159 A81-20579

ELBER, W.
A probabilistic analysis of electrical equipment vulnerability to carbon fibers
[NASA-TM-80217] p0038 N81-11113

ELCHURI, V.
Aeroelastic and dynamic finite element analyses of a bladder shrouded disk
[NASA-CR-159728] p0278 N81-19479
Nastran level 16 theoretical manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
NASTRAN level 16 user's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159824] p0279 N81-19481
NASTRAN level 16 demonstration manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159826] p0279 N81-19483

ELDRED, K. M.
Model for airport noise exposure on a national basis - 1960 to 2000 p0568 A81-46363

ELEHWANY, A. A. M.
Film cooling performance by injection through discrete holes p0293 A81-29074

ELFSTROM, G. M.
Extraction of wavedrag from airfoil wake measurements
[AIAA PAPER 81-0291] p0164 A81-20732

ELIAS, J. M.
Kevlar - Thermophysical properties
[AIAA PAPER 81-1104] p0459 A81-39104

ELIRAZ, Y.
Winglets development at Israel Aircraft Industries p0012 A81-11645

ELISHAKOFF, I.
Vibrations of multispan stiffened plates via modified Bolotin method p0241 A81-26954

ELKELISH, M. S.
Application of the Semi-Loof thin shell element to the analysis of aircraft engine structures p0518 A81-42704

ELKINS, R.
Solar Brayton engine/alternator set p0588 N81-30529

ELLIOTT, C. A.
The RB211 engine and its development
[PNR-90043] p0338 N81-21087

ELLIS, J. W.
Development and hardware verification of an aeroelastically tailored forward swept composite wing p0557 A81-44355

ELLIS, M. W.
Integrated sensor control system for RF-5E demonstrator p0462 A81-39430

ELLIS, R.
Dead reckoner navigation project p0372 N81-22010

ELLISON, T. A.
An overview - 1980 generation avionic developments p0111 A81-18061

ELMORE, K. L.
An airport wind shear detection and warning system using Doppler radar: A feasibility study
[NASA-CR-3379] p0202 N81-16401

ELNAAR, M. M. A.
Film cooling performance by injection through discrete holes p0293 A81-29074

ELROD, S. D.
Service evaluation of aluminum-brazed titanium (ABTi)
[NASA-CR-3418] p0378 N81-22128

ELROD, W. C.
Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165

ELSAWAF, A.
Application of the Semi-Loof thin shell element to the analysis of aircraft engine structures
p0518 A81-42704

ELSNER, J. W.
Eddy viscosity in accelerated and retarded cascade-wake flows
p0233 A81-25267

ELY, R.
Definition of investigative areas for human-factor aspects of aircraft accidents
[AD-A101601] p0580 N81-30102

ELZAHABY, A. M.
On the solution of Navier Stokes equations of the flow in turbomachines
p0296 A81-29099

EMERSON, L. D., JR.
Future challenges in helicopter flight/propulsion control integration
p0575 A81-46633

EMMELHAINZ, L. W.
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
p0616 A81-48379

ENDERS, J.
Aviation meteorology research and development: A status report
p0135 N81-14557

ENDERS, J. H.
Special Aviation Fire and Explosion Reduction (SAFER) advisory committee, volume 1
[AD-A092016] p0191 N81-16024
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065

ENENKOV, V. G.
Aircraft thrust augmentors of ejector type
p0289 A81-28760

ENEY, J. A.
Twin-rotor patrol airship flying model
[AIAA 81-1312] p0456 A81-38529
Twin-rotor patrol airship flying model design rationale
[AD-A102575] p0628 N81-32141

ENGELLAND, J. D.
Avionic standardization from a designer's perspective
p0050 A81-13170

ENGLAR, R. J.
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AD-A101309] p0581 N81-30116

ENGLE, R. J., JR.
Aspect ratio variability in part-through crack life analysis
p0001 A81-10355

ENGLER, G.
Improvement of guidance and handling qualities in the vicinity of airports and on landing
[BMFT-FB-W-79-42] p0425 N81-24045

ENGLISH, J. M.
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956

ENSIGN, C. R.
MEGA16 - Computer program for analysis and extrapolation of stress-rupture data
[NASA-TP-1809] p0393 N81-23486
An introduction to NASA's turbine engine hot section technology (HOST) project
p0599 N81-31206

EPIFANOV, V. M.
Comparative efficiency of penetrating steam and air cooling of gas turbine blades
p0509 A81-41003

EPLEY, L. E.
A study of State Feedback Implicit Model following control for VSTOL aircraft
[AD-A093253] p0216 N81-17099

EPPLER, R.
A computer program for the design and analysis of low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921

EPSHTEIN, V. L.
Sound generation by vortex shedding from a profile within a channel
p0054 A81-13570
Generation of vortex noise in flow past a profile in a channel
p0238 A81-26134

EPSTEIN, A. H.
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387

EPSTEIN, N.
CFM56-3 high by-pass technology for single aisle twins
[AIAA PAPER 81-0808] p0358 A81-33889

EPTON, M. A.
Aerodynamic modeling of an oscillating wing with external stores
[AIAA 81-0648] p0307 A81-29501
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022

ERB, L. H.
STOL performance of the tilt rotor
p0467 A81-40085

ERBACHER, H. A.
Experiences with composite aircraft structures
p0182 A81-22678

ERDMANN, F.
An equipment for testing and measuring a Helmet Mounted Sight and Display system with a coupled TV-camera in the flight simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0092 N81-13052
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960

ERDMANN, J. B.
National runway friction measurement program
[AD-A097334] p0391 N81-23097

EREMENKO, V. A.
A finite-span wing in transonic flow
p0053 A81-13741
Wing with finite span in a transonic flow
p0420 A81-37480

ERHART, R. G.
The XV-15 tilt rotor research aircraft
p0100 A81-16588
The XV-15 tilt rotor research aircraft
[NASA-TM-81244] p0026 N81-10054

ERICKSON, J. B.
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053

ERICKSON, J. C., JR.
Numerical simulations of a segmented-plenum, perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640
Further investigations of adaptive-wall wind tunnels
[AD-A091774] p0131 N81-13977
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088

ERICSSON, L. E.
Support interference
p0591 N81-31113
Aeroelasticity, including dynamic effects of separated flow
p0592 N81-31118

ERIKSSON, L.-E.
Optimizing the fixed leading edge shape of a transonic wing to suit the landing high-lift requirements
p0011 A81-11644

ERMILOV, S. A.
Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft
p0281 A81-27364

ERNOULT, M.
The spectral analysis of nonstationary random processes - Applications to aircraft overflight-type noises
p0174 A81-21922
Contribution to the study of non stationary signals emitted by moving jet engine -

Application to special analysis and imaging. I.
p0365 A81-33288
Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II
p0366 A81-33294
Spectral analysis of nonstationary random processes. Application to noise of flyover type
[ESA-TT-639] p0088 N81-12826
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to special analysis and imaging. Part 1
p0447 N81-26006
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to spectral analysis and imaging. Part 2
p0447 N81-26013

ERNST, H.
Cockpit simulation study of use of flight path angle for instrument approaches
[NASA-CR-165708] p0425 N81-24040

EROFEEV, A. I.
Nonstationary method for the direct statistical modeling of rarefied-gas flows
p0069 A81-16454

ERSHOV, V. N.
Efficiency of cantilever compressor stator blades
p0509 A81-41041

ERYOU, N. D.
The development of a lightweight aircraft towing tractor
[SAE PAPER 801237] p0405 A81-34235
Rebuild of aircraft ground support equipment
[SAE PAPER 801238] p0406 A81-34236

ERZBERGER, H.
Application of trajectory optimization principles to minimize aircraft operating costs
p0155 A81-20466

ESCH, P.
Wind tunnel tests to determine the behavior during ejection of exterior stores at high and low speeds
[DLGR-79-096] p0272 N81-19102

ESHBACH, R. E.
The F100 engine
[SAE PAPER 801110] p0395 A81-34151

ESHELBY, M. E.
Assessment of propeller influence on lateral-directional stability of multiengine aircraft
p0411 A81-35632

ESLINGER, M.
Using cost reduction concepts at Messier-Hispano-Bugatti
p0047 N81-11923

ESLINGER, R. C.
QF-100 Full-Scale Aerial Target program
p0179 A81-22612

ESPOSITO, F.
An integrated Omega/satellite radio navigation system
p0566 A81-45767

ESSMAN, D. J.
TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833

ESTES, J. M.
Development of a ground signal processor for digital synthetic array radar data
[NASA-CR-161074] p0602 N81-31421

ETHERINGTON, R. E.
Jet aircraft design
[AIAA PAPER 81-0912] p0362 A81-32930

ETKIN, B.
The turbulent wind and its effect on flight
[UTIAS-REVIEW-44] p0033 N81-11020

ETKIN, V. S.
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734

ETTINGER, R. C.
The implications of current flight control research and development
p0099 A81-16578

ETTLES, C. M. M.
The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-18654

EUBANKS, J. L.
Advanced flight simulator: Utilization in A-10 conversion and air-to-surface attack training
[AD-A094606] p0254 N81-1806

EULER, W. C.
Perspectives on the civil utilization of the Navstar/GPS
p0409 A81-3502

EVANICH, P.
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-2083
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-2504
Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363] p0441 N81-25065

EVANICH, P. L.
Pneumatic boot for helicopter rotor deicing
p0267 N81-19059

EVANS, F. J.
Control system design using graphical decomposition techniques
p0410 A81-35567

EVANS, J. F. C.
Microprocessor system test and monitoring
p0497 N81-27108
Fault trees and system reliability analysis with reference to the control of aircraft engines
p0498 N81-27109

EVANS, J. R.
The Shenandoah flies again - A computer simulation
[AIAA 81-1325] p0456 A81-3853

EVANS, M. C.
Critical considerations in the design of supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1284] p0511 A81-4174

EVANS, M. J.
Helicopter survivability in overwater situations
p0114 A81-18001

EVANS, R. A.
Strake/delta wing interactions at high angles of attack
[NASA-CR-166183] p0483 N81-26072

EVANS, R. B.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555

EVANS, R. H.
The UK Ministry of Defence programme on the electromagnetic properties of carbon fiber composites
p0199 N81-1615

EVANS, R. M.
NDEC - A control concept for helicopter gas turbines
[AHS 80-44] p0477 A81-4017

EVEREST, D. E., JR.
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-311

EVERITT, K. W.
Wind tunnel tests of sailwings for Darrieus rotors
p0518 A81-4267

EVES, J.
Composite Wing/Fuselage Program
p0530 A81-4362

EWALD, B.
Integrated wing-engine system for airliners
p0450 A81-3763
Transonic wing technology for transport aircraft
p0188 N81-160

EWINS, D. J.
Measurements of structural mobility on helicopter structures
p0151 A81-2000

EYLON, D.
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems
p0530 A81-4362

EZEKIEL, E. G.
New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11
New tower cab mockup for Philadelphia, Pennsylvania
[AD-A098528] p0440 N81-25

F

FABER, J. W.
Metallographic analysis techniques used during the Cast Aluminum Structures Technology /CAST/ program
p0531 A81-43650
Cast Aluminum Structures Technology (CAST). Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152

FABRIS, G.
Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3433] p0392 N81-23411

FABUNMI, J. A.
Analytical testing
[NASA-CR-3429] p0393 N81-23407

FACCENDA, A.
A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119

FADDEN, D. M.
Computer generated displays and pilot effectiveness
p0114 A81-18082

FAERY, H. F., JR.
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160

FAETH, G. M.
An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211
Investigation of air solubility in jet A fuel at high pressures
[NASA-CR-3422] p0378 N81-22130

FAGOT, H.
Holographic non-destructive testing of materials using pulsed lasers
p0013 A81-11655
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300

FAHLE, R. K.
JT8D performance improvement to offset rising fuel costs
[SAE PAPER 801117] p0395 A81-34153

FAIN, R. L.
Runway Configuration Management System concepts
p0114 A81-18089

FAIRCHILD, J. E.
A pure direct force/moment control for coaxial counterrotating rotors
p0144 N81-15007

FAIRLIE, B. D.
Transonic wind tunnel measurements of tailplane and elevator effectiveness of the Jindivik 203B target aircraft
[AD-A098180] p0424 N81-24031

FALCIASECCA, G.
Precision DME for microwave landing system
p0578 A81-47125

FALCO, L.
Erosion resistant coatings
[NASA-TM-75870] p0377 N81-22096

FAN, P.
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805

FAN, H.
Airspace analysis in airport system planning
p0111 A81-18052

FANG, B. T.
Geometric dilution of precision in Global Positioning System navigation
p0115 A81-18100

FANG, R.
Helicopter-ship qualification testing
p0232 A81-24941

FANICK, E. R.
Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165

FARASSAT, F.
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] p0631 N81-32966

FARMER, M. G.
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[NASA-TM-83126] p0445 N81-25432

FARMER, R.
Delco Electronics Flight Management System for Air Force C-141 aircraft
p0321 A81-30249

FARRAR, F. A.
An active control system for helicopter vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189

FARRASHKHALVAT, M.
An experimental and theoretical investigation of a twin-entry radial flow turbine under non-steady flow conditions
[SAE PAPER 801136] p0397 A81-34167

FARRELL, A. J.
A six-channel quick-look unit for the aerodynamics division MKI airborne data acquisition package
[AD-A099975] p0043 N81-11364
An improved flight data transcriber
[AD-A091981] p0201 N81-16430

FARRELL, C.
Full potential solution of transonic quasi-3-D flow through a cascade using artificial compressability
[NASA-TM-81637] p0140 N81-14980

FARRELL, P. A.
An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989] p0263 N81-19028

FARRELL, T. G.
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23438

FASANELLA, E. L.
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767

FAULKNER, A.
A method of helicopter low airspeed estimation based on measurement of control parameters
[MBB-UD-276-79-O] p0018 A81-12094

FAULKNER, A. J.
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
p0470 A81-40111
Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters
[MBB-UD-306/80-OE] p0584 N81-30139

FAULL, R.
Handling qualities of the SH-60B Seahawk
p0574 A81-46627

FAUSKA, E.
Recent improvements on generating voltmeters
[DOE/ER-01388/463] p0257 N81-18359

FAVIER, D. J.
Unsteady aerodynamics of an aerofoil at high angle of incidence performing various linear oscillations in a uniform stream
p0357 A81-32017

FAVIN, S.
Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434] p0504 A81-40871

FEATHER, J. B.
Motion-base simulator results of advanced supersonic transport handling qualities with active controls
[AIAA 81-1819] p0555 A81-44109
Advanced supersonic transport fixed-base simulator evaluations at landing approach

p0244 N81-17992

FECHEK, F. J.
A-7 composite outer wing service experience
p0530 A81-43617
Air Force applications and in-service experience with composite structures
p0041 N81-11148

FEDER, E.
Structures, performance, benefit, cost study
[NASA-CR-165313] p0428 N81-24067

FEDOROV, B. N.
A mathematical computer simulation of stationary and nonstationary flow of an ideal incompressible fluid around solid profiles and arrays
p0237 A81-26045
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47962

FEDOSENKO, I. G.
The possibility of single-impact riveting of flat-top countersunk-head rivets
p0319 A81-30164

FEHRENKAMP, L. G.
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077

FEILER, C. E.
Recent developments in aircraft engine noise reduction technology
p0269 N81-19072

FEINREICH, B.
Development and evaluation of automatic landing control laws for power lift STOL aircraft
[NASA-CR-152399] p0253 N81-18060

FELIX, J. M.
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983

FELT, L. R.
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193

FELTZ, E. P.
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079

FENBERT, J. W.
Leading-edge deflection optimization for a highly swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974

FENG, Z.
An aeronautical structural analysis system for static analysis /HAJIF-I/
p0224 A81-23728

FERGUSON, D.
Development of conceptual Navy aircraft Reliability Prediction Models
p0229 A81-24280

FERGUSON, D. R.
Fuel conservation integrated into airline economics
[AIAA PAPER 81-0831] p0368 A81-33804

FERRABOTTO, P.
A six-channel quick-look unit for the aerodynamics division MKI airborne data acquisition package
[AD-A089975] p0043 N81-11364

FERRIS, H.
Safety considerations for helicopter drive systems of the 1980s
p0105 A81-17510

FERRY, J. H.
Nuclear hardness assurance for aeronautical systems
[SAE PAPER 801227] p0405 A81-34230

FETHERHOFF, C. W.
Automated Plasma Spray (APS) process feasibility study
[NASA-CR-165418] p0597 N81-31193

FFOWCS WILLIAMS, J. E.
Sound sources in aerodynamics - Fact and fiction
[AIAA PAPER 81-0056] p0159 A81-20570

FICKEL, A.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129

FIDELL, S.
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862

FIDLER, W. C.
Optimal processing of GPS signals
p0512 A81-41761

FIELD, M.
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems
p0530 A81-43624

FIELDING, J. P.
How do aircraft break down - Some studies of reliability data feedback
p0068 A81-16423
A large executive jet design project
p0513 A81-42051

FIELDS, J. L.
Effects of advances in propulsion technology on missile effectiveness
[AD-A090645] p0081 N81-12106

FIELDS, J. M.
A program to support the full utilization of data from existing social surveys of environmental noise
p0570 A81-46374

FIJITA, H.
Noise generation mechanism of low pressure propeller fans
[AIAA PAPER 81-0090] p0160 A81-20596

FILIPKOWSKI, S.
Influence of hinge line gap on aerodynamic forces acting on a harmonically oscillating thin profile in an incompressible flow. I, II
p0348 A81-30956

FINCI, A.
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17323

FINDLEY, D. P.
Systems costing of hovercraft, hydrofoils and wing-in-ground effect machines. III
p0412 A81-35724

FINE, D. A.
Vanadium trineodecanoate promoter for fiberglass-polyester soil surfacings
[AD-A091785] p0132 N81-14084

FINEBERG, M.
Definition of investigative areas for human-factor aspects of aircraft accidents
[AD-A101601] p0580 N81-30102

FINKELMAN, J. M.
An information-processing interpretation of air traffic control stress
p0053 A81-13816

FINLAY, D. B.
Fountain-jet turbulence
[AD-A098098] p0423 N81-24028

FINLEY, W. B.
A survey of recent atmospheric turbulence measurements from a subsonic aircraft
[AIAA PAPER 81-0298] p0164 A81-20736

FINN, P.
A program to evaluate a control system based on feedback of aerodynamic pressure differentials, part 1
[NASA-CR-164684] p0583 N81-30134
A program to evaluate a control system based on feedback of aerodynamic pressure differentials. Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135

FIORENTINO, A.
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] p0277 N81-19316

FIORENTINO, A. J.
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12608

FIORINI, V.
Overview of all civil aviation engine certification/demonstration requirements and rationale, i.e., FAA, CAA, etcetera
p0429 N81-24073

FIRSCHEIN, O.
Autonomous navigation using passively sensed terrain images
p0110 A81-17977
Airborne ground velocity determination by digital processing of electro-optical line sensor signals
p0338 A81-32486
Passive imagery navigation
[AD-A096245] p0335 N81-21051

FISCHER, B.
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] p0610 A81-47609
FISCHER, D.
Effect of beta flecks on the fatigue behaviour of Ti-6Al-6V-2Sn
p0510 A81-41634
FISCHER, D. L.
Comparison of model testing with computer simulations of an air landing system
[AIAA PAPER 81-1663] p0534 A81-43942
Calibration of an axial fan at various power settings for use on a quarter scale XC-8A air cushion model
[AD-A097043] p0374 N81-22042
FISCHER, M.
Developments at VFW/Rhein-Flugzeugbau GmbH, Moenchengladbach
p0171 A81-21574
FISCHER, H. J.
Horizontal components of the atmospheric electric field. Studies of the atmospheric electric field in view of electrostatically controlled automatic pilot applications
[BMVG-FBWT-80-7] p0345 N81-21677
FISCHER, J. E.
An evaluation of advanced rotorcraft configurations for emerging military applications
p0572 A81-46611
FISCHER, J. P.
Results of a Loran-C flight test using an absolute data reference
p0371 N81-22006
FISCHER, R. W.
Gear meshing action as a source of vibratory excitation
p0150 A81-20061
AN/TPX-54 interrogator
p0350 A81-31131
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] p0637 N81-33191
FISCHLER, J. E.
Opportunities for structural improvements for an advanced supersonic transport vehicle
p0246 N81-18007
FISCHO, E. A.
Pressure distributions for the GA(W)-2 airfoil with 20% aileron, 25% slotted flap and 30% Fowler flap
[NASA-CR-2948] p0262 N81-19023
FISHBACH, L. H.
KONFIG and REKONFIG: Two interactive preprocessing to the Navy/NASA Engine Program (NNEP)
[NASA-TM-82636] p0446 N81-25698
FISHELL, W. G.
Big 'N', little 'c', integrated data annotation and sensor control for long range oblique photography /LOROP/
p0462 A81-39435
FISHER, B. D.
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence
p0266 N81-19048
Thunderstorm hazards flight research: Storm hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062
FISHER, D.
Discrete Address Beacon System (DABS) computer performance/test and evaluation
[AD-A099326] p0484 N81-26088
FISHER, D. F.
Flight experiments with a slender cone at angle of attack
[AIAA PAPER 81-0337] p0165 A81-20761
FISHER, M. J.
Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] p0619 A81-48620
FISHER, S. A.
Air augmentation of rockets for low speed application
p0292 A81-29068
FITTS, J. M.
Precision correlation tracking via optimal weighting functions
p0154 A81-20450
FITZGERALD, P. C.
Advanced transmission component development and test program
p0105 A81-17507
FITZSIMMONS, C.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
FITZSIMMONS, R. D.
Flight and tunnel test results of the MDC mechanical jet noise suppressor nozzle
p0245 N81-18000
FITZWILLIAMS, O. L. L.
A pursuit of the aerial carriage /25th Henson and Stringfellow Memorial Lecture/
p0284 A81-27901
FLACK, R. D.
An experimental and theoretical investigation of pressures in four-lobe bearings
p0004 A81-10040
FLAHERTY, J. I.
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0585 N81-30159
FLANNELLY, W. G.
Analytical testing
[NASA-CR-3429] p0393 N81-23407
FLECHNER, S. G.
Investigation of powered nacelles on a high aspect ratio NASA supercritical wing, phase 2
p0260 N81-19008
Wind-tunnel investigation at Mach numbers from 0.25 to 1.01 of a transport configuration designed to cruise at near-sonic speeds
[NASA-TM-X-2622] p0262 N81-19025
Preliminary wind-tunnel investigation of the effects of engine nacelles on a transport configuration with high lift drag ratios to a Mach number of 1.00
[NASA-TM-82312] p0272 N81-19099
FLEETER, S.
Experimental verification of unsteady aerodynamic models of supersonic unstalled flutter
p0295 A81-29094
FLEISCHER, C. C.
Finite strip analysis of singly curved skin-stringer structures
p0616 A81-48390
FLEMING, G.
Impact of the discrete Address Beacon System (DABS) on Air Traffic Control Radar Beacon System (ATCRBS) performance in selected deployments
[AD-A089611] p0025 N81-10039
FLEMMING, M.
Wing of new technology test specimen - Structural design and method of wing construction
p0450 A81-37639
FLESKES, W.
Evaluation of false alarm information with the ELBA
p0152 A81-20100
FLEURY, C.
Discrete-continuous variable structural synthesis using dual methods
p0066 A81-15094
Dual methods and approximation concepts in structural synthesis
[NASA-CR-3226] p01[illegible]4 N81-14347
FLICK, R. A.
A millimeter wave radar for U.S. Army helicopters in the 80's
p0323 A81-30302
FLORES, F. J.
Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates
[NASA-TP-1768] p0436 N81-24203
FLORSCHUETZ, L. W.
Streamwise flow and heat transfer distributions for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985
FLOWER, J. W.
Lateral flutter of loads towed beneath helicopters and its avoidance
p0470 A81-40114
FLOWER, S.
History of SAE Committee S-7, Flight Deck and

Handling Qualities Standards for Transport Category Aircraft
[SAE PAPER 801165] p0399 A81-34180
FLOWERS, G. L.
Tool force evaluation of lathe machined high explosives
[MHSMP-80-20] p0144 N81-15148
FLOYD, P. H.
The rejuvenation of properties in turbine engine hot section components by hot isostatic pressing
[AD-A097551] p0390 N81-23088
FLUK, H.
Runway and deck temperatures in vertical takeoff/landing operations
[AIAA PAPER 81-1623] p0525 A81-43132
FLYNN, D. J.
An investigation of the linear and angular vibration environments of trials aircraft
p0545 N81-29087
FODOR, G. E.
Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277
FOERSCHING, H.
Some remarks on the unsteady airloads on oscillating control surfaces in subsonic flow
p0386 N81-23055
Aeroelastic buffeting prediction techniques: A general review
[DFVLR-FB-81-15] p0601 N81-31226
FOGEL, P.
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] p0629 N81-32147
FOGG, L. D.
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
FOHRER, W.
The effect of aerodynamic coupling on the dynamics of aircraft in fast rolling motion
p0104 A81-17471
FOKIN, V. G.
Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
p0365 A81-33169
FOLEY, W. H.
Fountain-jet turbulence
[AD-A098098] p0423 N81-24028
FOLKESSON, K.
Computer based in-flight monitoring
p0042 N81-11269
Failure management for the SAAB Viggen JA37 aircraft
p0042 N81-11273
FOMIN, V. M.
The influence of surface roughness on boundary layer flow and separation at transonic speeds
p0413 A81-36468
FOMOV, S. D.
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0418 A81-36940
FONT, S.
High power silver zinc and thermal batteries for missiles and aviation applications
p0235 A81-25612
FOODY, J. J.
The role of the turboprop in the air transportation system for the 1980's and onward
[SAE PAPER 801197] p0402 A81-34207
FORBES, B. C.
A simple combustor system for a small gas turbine engine
p0104 A81-17503
FORD, D. W.
Noise levels and data correction analysis for seven general aviation propeller aircraft
[AD-A091292] p0096 N81-13717
FORD, R. A. J.
Stability analysis of the twin mode model of coupled flexion-torsion vibrations in aeroengine fans
p0613 A81-47966
FORESTER, C. K.
Body-fitted 3-D full-potential flow analysis of complex ducts and inlets
[AIAA PAPER 81-0002] p0156 A81-20527
FORGAS, J. A.
Airport visual approach, guidance and landing systems - Airline pilots viewpoint
p0114 A81-18083
FORMALSKII, A. M.
Roll stabilization of flight vehicles by means of rollerons
p0290 A81-29016
FORREST, R. D.
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[AHS 80-30] p0476 A81-40160
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077
FORSEY, C. R.
An investigation into grid patching techniques
p0137 N81-14708
FORSHAW, S. E.
Sidetone-level considerations in aircraft communication systems
p0605 N81-31475
FORSYTH, G. F.
An introduction to dynamic derivatives (3) methods of oscillating models in pitch and yaw in a 530 by 810 millimetre transonic wind tunnel
[ARL/AERO-NOTE-390] p0021 N81-10087
FORSYTH, J. L. M.
Fatigue Assessment of UK military aeroplanes
p0487 N81-26120
FORSYTH, P. J. E.
The analysis of fatigue failures
p0006 A81-11603
FORTAK, H.
Investigative technical measurements of the planetary boundary layer made onboard an instrumented motorized glider
[REPT-149] p0379 N81-22666
FORTE, I.
Bounds for the additional cost of near-optimal controls
p0170 A81-21075
FORTENBAUGH, R. L.
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 1: Model description application
[NASA-CR-166129-VOL-1] p0538 N81-28084
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 2: Model equations and base aircraft data
[NASA-CR-166129-VOL-2] p0538 N81-28085
A mathematical model for Vertical Attitude Takeoff and Landing (VATOL) aircraft simulation. Volume 3: User's manual for VATOL simulation program
[NASA-CR-166129-VOL-3] p0538 N81-28086
FOSS, W. E., JR.
A computer technique for detailed analysis of mission radius and maneuverability characteristics of fighter aircraft
[NASA-TP-1837] p0329 N81-20026
FOSTER, J. D.
Automatic helical rotorcraft descent and landing using a Microwave Landing System
[AIAA PAPER 81-1857] p0560 A81-44556
FOSTER, J. H.
High temperature strain gage system for application to turbine engine components
[AD-A101713] p0583 N81-30132
FOSTER, J. L.
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
p0622 A81-49047
FOUGHNER, J. T., JR.
Passive control of wing/store flutter
[NASA-TM-81865] p0125 N81-13922
FOULKES, R. H., JR.
Control augmentation for lateral control wheel steering
[NASA-CR-164664] p0549 N81-29132
FOURE, C.
Aircraft engine programs employing cost objectives

p0119 A81-19346
Programmes for military engines with cost objectives
[PNR-90058] p0583 N81-30133
FOURNIER, P. G.
Investigation of powered nacelles on a high aspect ratio NASA supercritical wing, phase 2
p0260 N81-19008
FOUSHEE, H. C.
Guidelines for line-oriented flight training, volume 1
[NASA-CP-2184] p0580 N81-30101
Information transfer within the cockpit: Problems in intracockpit communications
p0595 N81-31167
FOWLER, F. D.
Air traffic control problems - A pilot's view
p0169 A81-20914
FOWLER, R. H.
An investigation of the recovery from an engine failure in a twin engine augmentor wing aircraft using the NAE Airborne Simulator
p0509 A81-41199
FOX, D.
Discrete Address Beacon System (DABS) computer performance/test and evaluation
[AD-A099326] p0484 N81-26088
FOX, D. G.
Lightning threat definition for aircraft electrical power systems
p0322 A81-30284
FOX, D. L.
Aircraft and air pollution
p0288 A81-28698
FOX, H. R.
Integrated strike avionics study, volume 1
[AD-A094705] p0273 N81-19113
FOX, S. R.
Analytical studies on the effects of cooling flows on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741
Flight test evaluation of predicted light aircraft drag, performance, and stability
[NASA-CR-159062] p0494 N81-27078
FOYE, R. L.
Advanced composite airframe program - Preliminary design phase
[AHS 80-45] p0477 A81-40172
Some results from a crash energy absorption test for evaluating composite fuselage construction
p0575 A81-46639
FRADDOSIO, G.
Trends in the future development of air traffic control systems
p0566 A81-45764
FRAIR, L.
Continued research on selected parameters to minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602
FRAME, E. A.
Behavior of fuels at low temperatures
[AD-A100332] p0542 N81-28276
FRANCIOTTI, A.
An observational experiment using a monostatic sodar at the airport of Fiumicino
p0282 A81-27548
FRANCISCUS, L. C.
Turbine bypass engine - A new supersonic cruise propulsion concept
[AIAA PAPER 81-1596] p0508 A81-40971
The supersonic fan engine - An advanced concept in supersonic cruise propulsion
[AIAA PAPER 81-1599] p0508 A81-40973
Turbine bypass engine: A new supersonic cruise propulsion concept
[NASA-TM-82608] p0489 N81-26145
The supersonic fan engine: An advanced concept in supersonic cruise propulsion
[NASA-TM-82657] p0496 N81-27094
FRANCOIS, J.
The annoyance caused by airplane noise in the vicinity of Orly Airport and the reaction of neighboring residents
[NASA-TM-76575] p0379 N81-22590
The relationship between noise and annoyance around Orly
[NASA-TM-76573] p0379 N81-22594
Effect of aircraft noise on the equilibrium of airport residents: Longitudinal study around Roissy, phase 3
[NASA-TM-75906] p0499 N81-27692
Nature of the annoyance and noise annoyance relation around airports
[NASA-TM-75873] p0542 N81-28606
Incidences from modifications of the computational methods of the psophic index
[NASA-TM-76577] p0542 N81-28608
FRANCOIS, R.
The reliability of helicopter reduction gears
p0287 A81-28473
FRANKENBERGER, C. E.
United States Army helicopter icing qualification 1980
[AIAA PAPER 81-0406] p0167 A81-20812
FRANKENBERGER, C. E., JR.
Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045
AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121
FRANKLIN, C. J.
An investigation of a preswirled cooling airflow to a turbine disc by measuring the air temperature in the rotating channels
[ASME PAPER 81-GT-132] p0316 A81-30035
FRANKLIN, J. A.
Flight evaluation of stabilization and command augmentation system concepts and cockpit displays during approach and landing of powered-lift STOL aircraft
[NASA-TP-1551] p0037 N81-11044
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] p0629 N81-32151
FRANKS, H.
Helicopter external load acquisition technology investigation
[AD-A094672] p0272 N81-19106
FRANZ, H. P.
The half-model technique in the wind tunnel and its employment in the development of the Airbus family
[DGLR PAPER 81-118] p0609 A81-47587
FRANZ, T.
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] p0277 N81-19316
FRAREY, J. F.
Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
FRASER, K. F.
Helicopter transmission fatigue life
p0291 A81-29058
FRAY, J. M. J.
A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow
p0188 N81-16006
FRAZIER, J. W.
Evaluation of AFIT/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0249 N81-18034
FRECHETTE, F. J.
Fabrication of injection molded sintered alpha SiC turbine components
[ASME PAPER 81-GT-161] p0317 A81-30060
FREDIANI, A.
Ductile fracture mechanic assessments of 2219-T851, 2024-T3 and 7075-T6 aluminum alloys
p0160 A81-22628
FREDRICKS, D. A.
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
Pole placement with output feedback
p0458 A81-38099
FREEDMAN, H. J.
The new look in reliability - It works
p0229 A81-24260
FREEDY, A.
Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061
FREEMAN, D. C., JR.
Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control

[AIAA PAPER 81-0074] p0159 A81-20582
High Reynolds number research requirements for space vehicle design
p0593 N81-31151
FREEMAN, W. T., JR.
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
FREEZER, D. R.
Design considerations for U.S. Coast Guard search and surveillance Forward Looking Infrared /FLIR/ system
p0463 A81-39647
FREIMAN, IU. I.
The development of low-toxic combustion chambers of transport gas turbine engines
p0060 A81-14787
FRENCH, M. W.
NASA VCE test bed engine aerodynamic performance characteristics and test results
[AIAA PAPER 81-1594] p0508 A81-40969
FRENCH, W. A.
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047
FRESON, J. L.
Tests of large compressors at CE Pr
p0432 N81-24096
FREUND, D. J.
Recommended short-term ATC improvements for helicopters. Volume 2: Recommended helicopter ATC training material
[AD-A089441] p0024 N81-10029
Recommended short-term ATC improvements for helicopters. Volume 3: Operational description of experimental LORAN-C flight following (LOFF) in the Houston area
[AD-A089385] p0024 N81-10030
Proposed ATC system for the Gulf of Mexico: Helicopter operations development program
[AD-A089430] p0025 N81-10036
Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037
Recommendations for short-term simulation of ATC concepts. Helicopter operations development program
[AD-A089435] p0025 N81-10038
Recommended short-term ATC improvements for helicopters. Volume 1: Summary of short term improvements
[AD-A089521] p0025 N81-10041
FREW, J. S.
Electronic control system for a modern turboprop engine
[SAE PAPER 810620] p0523 A81-42775
FREZELL, T. L.
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050
A preliminary human factors flight assessment of a Marconi automatic map
[AD-A092585] p0193 N81-16036
FRIEDLANDER, B.
Adaptive control for electronic countermeasures
p0155 A81-20470
FRIEDMAN, R.
Aviation turbine fuel properties and their trends
[NASA-TM-82603] p0444 N81-25232
FRIEDMANN, P. P.
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight
p0364 A81-33050
Rotor blade aeroelastic stability and response in forward flight
p0467 A81-40089
FRIEDRICH, L. A.
Improving turbine engine compressor performance retention through airfoil coatings
p0598 N81-31203
FRIENDLANDER, M.
Methods of testing aircraft performance under icing conditions and ice tection systems
p0545 N81-29083
FRINGS, G.
Exhaust emissions characteristics and variability for Pratt and Whitney JT8D-7A gas turbine engines subjected to major overhaul and repair
[AD-A091011] p0094 N81-13062
Exhaust emission characteristics and variability for maintained General Electric CF6-50 turbofan engines
[AD-A092291] p0196 N81-16064
FRINK, N. T.
Aerodynamic features of designed strake-wing configurations
[AIAA PAPER 81-1214] p0454 A81-38084
FRINT, H. K.
Advanced transmission component development
p0575 A81-46634
FRISH, G. D.
Low level, adverse attitude escape using a vertical seeking ejection seat
p0176 A81-22094
FRISK, B.
Application of a method for aerodynamic analysis and design of horizontal axis wind turbines, part 1
[FFA-TN-AU-1499-PT-1] p0086 N81-12833
FRITZ, J.
Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35091
FROEHLICH, G. R.
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464
FROES, F. H.
Manufacture of cost-affordable high performance titanium components for advanced Air Force systems
p0530 A81-43628
FROHN, J.
A method for evaluating radio navigation systems for the terminal maneuvering area
[DFVLR-MITT-81-02] p0538 N81-28080
FROMMLET, H.
Development of a bearingless helicopter tailrotor
p0465 A81-39897
Development of a bearingless helicopter tail rotor
[MBB-UD-304/80-OE] p0586 N81-30199
FROST, R. L. L.
Experimental investigations of the base pressures found on a bluff body in ground effect
p0234 A81-25379
FROST, S.
An integrated performance and air data system for helicopters
p0470 A81-40110
FROST, V. S.
Computer generated radar images for navigation
p0049 A81-12793
FROST, W.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
Pilot-aircraft system reponse to wind shear
[NASA-CR-3342] p0031 N81-10636
Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation systems
[NASA-CP-2139] p0135 N81-14555
Survey of Workshops on Meteorological and Environmental Inputs to Aviation Systems
p0135 N81-14556
Airplane wing vibrations due to atmospheric turbulence
[NASA-CR-3431] p0438 N81-24679
FRUEH, J. T.
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost
[AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement
[AD-A097438] p0390 N81-23084
FRUEHAUF, H.-H.
Numerical computation of compressible steady cascade flows
p0296 A81-29100
FRY, C. A.
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050
FU, W.
The method for calculating the fuel concentration field in the downstream positions of the pressure jet atomizer in the high temperature gas-stream

p0224 A81-23731
FUDAKOWSKI, T.
Bilingual air traffic control in Canada
p0169 A81-20915
FUECHTER, H.
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
FUHS, A. E.
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137
FUJII, S.
Suppression of jet noise peak by velocity profile reshaping
p0458 A81-39039
FUJII, T.
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
FUJIMORI, Y.
The effect of the atmospheric turbulence on the rotor blade flap-leadlag motion stability in hovering
[AIAA 81-0610] p0304 A81-29472
FUJITA, T. T.
Microbursts as an aviation wind shear hazard
[AIAA PAPER 81-0386] p0167 A81-20798
FUKANO, T.
Discrete frequency noise due to irregularity in blade row of axial fan rotor
p0002 A81-10633
FUKUDA, T.
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
FUKUSHIGE, K.
Application of the equivalent surface source method to the acoustics of duct systems with non-uniform wall impedance
p0055 A81-13824
FUKUSHIMA, T.
Flap survey test of a combined surface blowing model: Flow measurements at static flow conditions
[NASA-CR-152124] p0423 N81-24023
FULLER, D. E.
Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061
Guide for users of the National Transonic Facility
[NASA-TM-83124] p0550 N81-29139
FULLER, H. C.
The rating of helicopter noise: Development of a proposed impulse correction
[NPL-AC-93] p0138 N81-14792
FULLER, J. B.
A distributed airborne surveillance system
p0180 A81-22618
FULLER, S. G.
Stability characteristics of a forward swept wing aircraft at high angles of attack
[AIAA PAPER 81-1884] p0561 A81-44576
FUNUBO, F.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476
FUNG, K. Y.
Transonic flow studies
[NASA-CR-163965] p0249 N81-18029
FUNKHOUSER, M.
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28094
FURLONG, M. J.
An extremely lightweight fuselage-integrated phased array for airborne applications
p0348 A81-30779
FURST, D. G.
General Aviation Turbine Engine (GATE) study
[NASA-CR-159482] p0274 N81-19117
FURUKAWA, S.
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376
FYFE, J. B.
Development test requirements
p0430 N81-24080

G

GADELMAN, I. J.
Summary of AGARD Lecture Series 100: Methodology for control of life cycle costs for avionics systems
p0047 N81-11924
GADERDIEL, F. G.
Computer analysis of 400 HZ Aircraft electrical generator test data
[AD-A100785] p0552 N81-29354
GABRYS, A.
The status of the expendable gasifier program
[SAE PAPER 801151] p0406 A81-34242
GADE, P. A.
Helicopter electro-optical system display requirements. 1. The effects of CRT display size, system gamma function, and terrain type on pilots required display luminance
[AD-A089755] p0035 N81-11035
GAEVSKII, S. A.
Automation of aircraft gas-turbine power plants
p0020 A81-12782
GAFFNEY, E. F.
Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective
[NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27090
GAJEWSKI, R. B.
Modal analysis for aircraft response to runway surface roughness
[AD-A092057] p0194 N81-16043
GAJEWSKI, T.
Conditions of generation and methods of damping the inlet vortex of a turbojet engine
p0121 A81-19442
GALEAZZI, M.
A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119
GALIBERT, D.
New definition of areas of protection for instrument landing
p0225 A81-23869
GALL, D.
Assessing the behavior of high modulus composite materials in lightning
p0040 N81-11141
A French flight test program on the electromagnetic effects of lightning
p0199 N81-16155
Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current
p0200 N81-16158
Flight tests for studying radioelectric perturbations of an electrostatic origin
p0200 N81-16160
GALLAGHER, J. A.
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] p0618 A81-48613
GALLAGHER, R. K.
Technological forecasting--aircraft design. Citations from the International Aerospace data base
[NASA-CR-163833] p0129 N81-13957
GALLARDO, V. C.
Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective
[NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27090
Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program
[NASA-CR-165373-VOL-3] p0496 N81-27091
GALLINGTON, R. W.
Measurement of canard wakes
[AD-A095063] p0263 N81-19029
GALLO, A. M.
NASTRAN level 16 user's manual updates for aeroelastic analysis of bladed discs

[NASA-CR-159824] p0279 N81-19481
NASTRAN level 16 programmer's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
NASTRAN level 16 demonstration manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159826] p0279 N81-19483

GALLOT, J.
Improvement of the energy efficiency of helicopters
[AAAF PAPER NT 80-33] p0369 A81-33933

GALLOWAY, R. T.
TA-4J spin training through simulation
[AIAA 81-0965] p0414 A81-36556

GALLOWAY, T. L.
Design for supercommuters
p0227 A81-24048
Small transport aircraft technology
p0260 N81-19007
Unpowered aerodynamic characteristics of a 15-percent scale model of a twin-engine commuter aircraft
[NASA-TM-81284] p0537 N81-28055

GALLOWAY, W. J.
Airport noise contour predictions - Improving their accuracy
p0569 A81-46367
Noise abatement technology options for conventional turboprop airplanes
[AD-A101828] p0589 N81-30910

GALLUS, H. E.
The influence of blade number ratio and blade row spacing on axial-flow compressor stator blade dynamic load and stage sound pressure level
[ASME PAPER 81-GT-165] p0317 A81-30064

GALWAY, R. D.
A comparison of methods for calibration and use of multi-component strain gauge wind tunnel balances
[AD-A090484] p0084 N81-12394

GALY, C.
The AIRBUS hydraulic systems
[SNIAS-802-111-111] p0427 N81-24055

GAMBLE, B. B.
Superconducting generator design for airborne applications
p0241 A81-26862

GAMBUCCI, B. J.
Unpowered aerodynamic characteristics of a 15-percent scale model of a twin-engine commuter aircraft
[NASA-TM-81284] p0537 N81-28055

GAMMON, B. E.
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936

GANKIUKAS, V.
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521

GANDELMAN, J.
A pilot training manual for the terminal configured vehicle electronic attitude director indicator
[NASA-CR-159195] p0434 N81-24111

GANGL, R. C.
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 1: Proceedings
[AD-A100575] p0539 N81-28092
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093

GANGLOFF, B.
Helicopter alarms - The use of ALAT incident and accident record cards
p0100 A81-16689

GANGSAAS, D.
Classical and modern control design of a speed-hold system for a STOL airplane
[AIAA PAPER 81-0017] p0157 A81-20541
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology
[AIAA PAPER 81-0021] p0158 A81-20544
Application of optimal control and estimation to autopilot and autothrottle systems
p0615 A81-48371

GANGWANI, S. T.
Prediction of dynamic stall and unsteady airloads for rotor blades
p0571 A81-46604

GANZ, U. W.
Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16653

GANZER, U.
Adaptable wind tunnel walls for 2D and 3D model tests
p0014 A81-11671

GAONKAR, G. H.
Feasibility of a rotor flight-dynamics model with first-order cyclic inflow and multiblade modes
[AIAA 81-0611] p0304 A81-29473

GARAS, E.
Accuracy of noise-modulated radio altimeter
p0359 A81-32694

GARAVAGLIA, A.
Helicopter transmission qualification procedures and tests
p0433 N81-24101

GARCHER, J. D.
DAIS controls and displays - A systems approach to avionics subsystem integration
p0325 A81-30336

GARCIN, R.
General remarks on helicopter reliability
p0287 A81-28472

GARDNER, D. G.
A mobile emissions laboratory for on-line analysis of combustion products from gas turbine engines
p0361 A81-32872

GARDNER, G. F.
Advanced transmission component development and test program
p0105 A81-17507

GARDNER, W. B.
Energy efficient engine, low-pressure turbine boundary layer program
[NASA-CR-165338] p0442 N81-25077
Energy efficient engine, high-pressure turbine cooling model technology report
[NASA-CR-165374] p0496 N81-27093

GARGANESE, U. S., JR.
Reliability and maintainability evaluation of rotor systems
p0576 A81-46645

GARINTHER, G. R.
The background and bases for the proposed military standard on acoustical noise limits in helicopters
[AD-A099814] p0500 N81-27890
The background and bases for the proposed military standard on acoustical noise limits in helicopters
p0604 N81-31459

GARLAND, D. B.
Static tests of the J97 powered, external augmenter V/STOL wind tunnel model
[NASA-CR-152403] p0237 N81-21010
Phase 2 and 3 wind tunnel tests of the J-97 powered, external augmentor V/STOL model
[NASA-CR-152380] p0483 N81-26076

GARNER, H. C.
Experimental flutter at high subsonic speeds and its theoretical prediction, taking into account wing thickness and Reynolds number
p0385 N81-23052

GARNETT, T. S., JR.
'Load snubbing' - A solution to the problem of terrain flying with external cargo
[AHS 80-32] p0476 A81-40162

GARRELTS, W. R.
Evaluation of multi-viscosity oils designed for aircraft reciprocating engines
[SAE PAPER 810572] p0519 A81-42737

GARRETT, G. G.
Failure by fatigue
p0238 A81-26819

GARRETT, S. J.
Optimal tracking design and simulation for a monopulse airborne radar system utilizing a predicted dual beam antenna design
p0323 A81-30233

GARRETT, W. T.
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 N81-20086
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047

GARRICK, I. E.
Historical development of flutter
[AIAA 81-0591] p0302 A81-29819

GARY, B. L.
An airborne sensor for the avoidance of clear air turbulence
[AIAA PAPER 81-0297] p0164 A81-20735
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677
The 1979 clear air turbulence flight test program
p0266 N81-19050
Clear air turbulence studies with microwave radiometers
p0266 N81-19053

GASTEBOIS, P.
Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996

GATINEAU, R. J.
History of flight testing the L-1011 Tristar jet transport. I - The L-1011-1
p0110 A81-17976

GATTINONI, G.
Helicopter transmission qualification procedures and tests
p0433 N81-24101

GATZEN, B. S.
Prop-Fan technical progress leading to technology readiness
[AIAA PAPER 81-0810] p0367 A81-33678

GAUDETTE, R. P.
Service life determination for the UH-60-A (UTTAS) helicopter elastomeric bearings
[AD-A091756] p0134 N81-14324

GAULT, J. W.
Reliability validation of systems for life-critical applications
p0617 A81-48559

GAUME, J. G.
Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051

GAUNTHER, D. J.
An introduction to NASA's turbine engine hot section technology (HOST) project
p0599 N81-31206

GAUNTNER, D. J.
Design and development of the combustor inlet diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033

GAUSE, L. W.
Effect of impact damage on the XFV-12A composite wing box
p0182 A81-22676
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers
p0418 A81-37136

GAY, A.
French Army testing of Forward Looking Infra-Red System /FLIR/ on helicopters /November 1976-June 1977/
p0464 A81-39680

GE, S.
Structural analysis of fuselages with cutouts by finite element method
p0108 A81-17816

GEBARA, J. G.
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22045

GEBMAN, J. R.
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888

GEDDES, J. P.
Boeing plays safe
p0480 A81-40455
The Lear Fan 2100
p0625 A81-49975

GEDGE, M. R.
Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853

GEGERLE, J.
Visual systems at Lufthansa's simulator centre
p0122 A81-19499

GEHLHAAR, U.
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49378

GEIER, G. J.
Optimal processing of GPS signals
p0512 A81-41761

GEISINGER, K. E.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068

GEISSLER, W.
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] p0635 N81-33161

GELFAND, B. E.
Droplet breakup regimes and criteria for their existence
p0614 A81-48079

GENCO, L. V.
Aircraft transparency optical quality: New methods of measurement
[AD-A096183] p0341 N81-21070

GENET, R. M.
A controlled evaluation of the differences between two approaches to reliability investment screening
[AD-A087506] p0031 N81-10446

GENTRY, C. L., JR.
Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982
Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061

GEORGE, A. R.
Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184

GEORGE, W. K.
Cooperative investigation of the noise producing region of an axisymmetric jet
[AD-A089692] p0045 N81-11774

GERADIN, M.
B. M. Fraeijs de Veubeke memorial volume of selected papers
p0232 A81-25174

GERDES, R. M.
A pilot's assessment of helicopter handling-quality factors common to both agility and instrument flying tasks
p0471 A81-40120
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077

GEREN, W. P.
Lightning threat definition for aircraft electrical power systems
p0322 A81-30284

GERHART, P. M.
Finite element analysis of inviscid subsonic boattail flow
[NASA-TM-81650] p0140 N81-14977

GERHARZ, J. J.
Fatigue strength of CFRP under combined flight-by-flight loading and flight-by-flight temperature changes
p0039 N81-11134

GERLACH, J. C.
Wallops severe storms measurement capability
p0266 N81-19049

GERMAN, J.
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] p0629 N81-32147

GERSCH, H. H.
NASA gas turbine stator vane ring
[ASME PAPER 81-GT-208] p0318 A81-30097

GERSHBEIN, E. A.
Laminar boundary layer on swept-back wings of infinite span at an angle of attack
p0107 A81-17656

GERSHTEIN, S. I.
Experimental study of the snap-through oscillations of an empennage

p0299 A81-29313

GERSHZOHN, G.
Air traffic control using a microwave landing system
p0053 A81-13421

GERTH, H. L.
F-111 windscreen machining
[Y-2232] p0142 N81-14995

GERTZ, J. L.
Initial design and experimental implementation of the traffic advisory service of ATARS
[AD-A095462] p0331 N81-20055

GETSOV, L. B.
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168

GEVAERT, G.
Development and evaluation of automatic landing-control laws for power lift STOL aircraft
[NASA-CR-152399] p0253 N81-18060

GHIA, K. N.
Three-dimensional internal flows in turbomachinery, volume 2
[AD-A093130] p0215 N81-17090

GHIA, U.
Three-dimensional internal flows in turbomachinery, volume 2
[AD-A093130] p0215 N81-17090

GIACCHETTO, A.
Philosophy and results of steady and unsteady test techniques on a large scale transport aircraft model in the ONERA transonic tunnel S1 MA. Part 1: Philosophy and results of steady tests. Part 2: Interest of large models in unsteady aerodynamics
p0190 N81-16019

GIAMATI, C. C.
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
[NASA-TM-82658] p0552 N81-29782

GIANI, N.
Study of a crack propagation on the flap rail of a transport aircraft
p0181 A81-22633

GIANSANTE, N.
Determination of in-flight helicopter loads
p0573 A81-46618

GIAVOTTO, V.
Evaluation of section properties for hollow composite beams
[PAPER-NR-35] p0031 N81-10454

GIBB, R. H.
RF-5E tactical reconnaissance standoff photography concept
p0462 A81-39421

GIBBINGS, D.
Development for helicopter flight in icing conditions
p0545 N81-29082

GIBELING, H. J.
Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053

GIBSON, J. S.
The effects of noise on laminar flow control drag reduction systems
p0058 A81-14390

GIESY, D. P.
Multiobjective insensitive design of airplane control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518

GILBERT, E. G.
The improvement of aircraft specific range by periodic control
[AIAA 81-1748] p0553 A81-44080

GILBERT, G. A.
Helicopter navigation in the 80's
p0516 A81-42432

GILBERT, N. E.
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115

GILCHRIST, R. W.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362

GILKEY, R. D.
Design and wind tunnel tests of winglets on a DC-10 wing
[NASA-CR-3119] p0492 N81-27096

GILL, B. J.
A process for protecting gas turbine blade cooling passages against degradation
p0622 A81-49209

GILLFILLAN, W. R.
Southern California aviation system study
[PB80-215544] p0125 N81-13916

GILMER, B. R.
Analysis of stalled airfoils by simultaneous perturbations to viscous and inviscid equations
[AIAA PAPER 81-1239] p0454 A81-38096

GILREATH, H. C.
Airborne antenna pattern calculations
p0532 A81-43708
MLS antenna locations for the deHavilland DASH 7 aircraft
[NASA-TM-83195] p0602 N81-31418

GIMMELFARB, A. L.
Principles of aircraft structural design /2nd revised and enlarged edition/
p0355 A81-31800

GIMMESTAD, D.
Your next ground vibration test doesn't have to cost a million dollars
[AIAA 81-0529] p0303 A81-29450
Aeroelastic tailoring of a composite winglet for KC-135
[AIAA 81-0607] p0304 A81-29478
A preliminary divergence and flutter evaluation of an X-wing aircraft
[AIAA PAPER 81-1671] p0534 A81-43945

GINS, J. D.
Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility
[LA-UR-80-2485] p0135 N81-14550

GINZBURG, A. B.
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33168

GIRI, R. R.
Fiber optic technology for data transmission in the helicopter environment
p0573 A81-46618

GIRICH, G. A.
Efficiency of cantilever compressor stator blades
p0509 A81-41081

GISSENDANNER, D. A.
A strategy for developing the next generation fighter/attack aircraft engine
[AIAA PAPER 81-1478] p0505 A81-40898

GLADYSH, I. S.
Lighting systems for flight support
p0564 A81-45602

GLASER, F. W.
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208] p0168 A81-20030
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48628
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[NASA-TM-81657] p0195 N81-16053

GLASGOW, R. R.
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186

GLASGOW, T. K.
Progress in materials and structures at Lewis Research Center
p0089 N81-12982

GLASIER, J. M.
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost
[AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement
[AD-A097438] p0390 N81-23084

GLASSMAN, A. J.
Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-38166

Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0359 A81-34177
Off-design performance loss model for radial turbines with pivoting, variable-area stators
[NASA-TP-1708] p0036 N81-11038
NASA contributions to radial turbine aerodynamic analyses
[NASA-TM-81644] p0090 N81-13019
GLASSON, D. P.
Robustness properties of a new multirate digital control system
[AIAA PAPER 81-0022] p0158 A81-20545
Optimal multirate flight control design
p0563 A81-45522
Research in multirate estimation and control
[AD-A094070] p0253 N81-18062
GLAZE, L. W.
Investigation of impingement region and wall jets formed by the interaction of high aspect ratio lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
GLEASON, C. C.
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0276 N81-19323
GLENN, J.
System safety program report MK 1 MOD 0 LSO HUD console system
[AD-A095009] p0269 N81-19080
GLIATTI, R. L.
Tri-bar reading correction for oblique imagery
p0178 A81-22495
GLIEBE, P. R.
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639
GLOSS, B. B.
Computation of wind tunnel model deflections
[AIAA 81-0482] p0300 A81-29381
Support interference of wind tunnel models: A selective annotated bibliography
[NASA-TM-81909] p0335 N81-20084
Estimation of fan pressure ratio requirements and operating performance for the National Transonic Facility
[NASA-TM-81802] p0435 N81-24115
Guide for users of the National Transonic Facility
[NASA-TM-83124] p0550 N81-29139
Configuration aerodynamics
p0593 N81-31148
GLOVER, J. R., JR.
The RLU - An advanced remote terminal for avionic systems
p0327 A81-30358
GLOVER, R. D.
Flight experience with flight control redundancy management
p0042 N81-11274
GLUKHOV, V. V.
Aircraft instruments and measuring systems
p0564 A81-45608
GMELIN, B.
DFVLR-dynamic model testing in wind tunnels for active controls research
p0014 A81-11670
Problems of flight mechanics involved in all-weather helicopter operation
p0104 A81-17467
GMELIN, B. L.
Flight test results for task oriented flying qualities evaluation
[AHS 80-29] p0476 A81-40159
The impact of helicopter flight mechanics on mission performance
p0633 N81-33148
GOCLOWSKI, J. C.
Digital Avionics Information System (DAIS): Life Cycle Cost Impact Modeling System (LCCIM). A managerial overview
[AD-A093281] p0211 N81-17062
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost
[AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement
[AD-A097438] p0390 N81-23084
GODBY, L. A.
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079
GODEL, H.
Active control of an explosive wing-store flutter case
p0082 N81-12117
Application of a structural optimization procedure for advanced wings
[AGARD-R-691] p0333 N81-20064
GODFREY, R.
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] p0639 N81-33214
GODSEY, J. D.
Design, fabrication, calibration, application, and testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
GODWIN, D.
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] p0629 N81-32144
GOEBEL, T. P.
A study of wing body blending for an advanced supersonic transport
p0244 N81-17987
GOEDE, E.
Calculation of the flow field around engine-wing-configurations
p0007 A81-11613
GOEDEL, H.
Structural optimization of advanced aircraft structures
p0013 A81-11651
Active control of an explosive wing-store flutter case
[MBB-FE-17/S/PUB/25] p0131 N81-13973
Structural optimization of advanced aircraft structures
[MBB-S/PUB/32] p0582 N81-30122
GOESCH, W. H.
Past and future trends in structures and dynamics
[AIAA PAPER 81-0896] p0362 A81-32921
GOETHERT, B. H.
Noise attenuation and associated thrust increase of turbojet engines through hyper-mixing ejector shrouds
p0291 A81-29062
GOETHERT, W. H.
A direct model pitch measurement with a laser interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
GOFF, H. D.
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049
GOFF, R. C.
Analysis of wind vector components in the lower troposphere Applications to aircraft operations at terminals
[AIAA PAPER 81-0387] p0167 A81-20799
Winds and wind shear in-situ sensors
p0136 N81-14563
GOGLIA, G. L.
Investigation of aerodynamic characteristics of wings having vortex flow using different numerical codes
[NASA-CR-165706] p0384 N81-23034
Wind-tunnel studies of advanced cargo aircraft concepts
[NASA-CR-164833] p0627 N81-32117
GOLDITZ, W. C.
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0138 N81-14964
GOLDAEV, I. P.
Test-stand combustion chamber for the study and development of forced working processes
p0319 A81-30151
Test stand for the experimental study of auxiliary power supplies
p0319 A81-30153

GOLDING, R. J.
Flight simulation at Cranfield Institute of Technology
p0283 A81-27893

GOLDMAN, A.
Numerical analysis of the flow in the connecting passage between the fan section and high pressure section of a turbojet engine
[AD-A090506] p0081 N81-12107

GOLDMAN, L. H.
Southern California aviation system study
[PB80-215544] p0125 N81-13916

GOLDSMITH, D. J.
Airliner maintenance for fuel efficiency
[AIAA PAPER 81-0787] p0367 A81-33877

GOLOVKO, IU. S.
Faults of helicopter hydraulic amplifiers related to loading characteristics
p0319 A81-30156

GOLUB, R. A.
Unsteady fan blade pressure and acoustic radiation from a JT15D-1 turbofan engine at simulated forward speed
[AIAA PAPER 81-0096] p0161 A81-20598

GOLUBINSKII, A. I.
Hypersonic gas flow over a delta wing
p0123 A81-19632

GOLUBKIN, V. N.
Determination of the vorticity of a small-aspect-ratio wing in hypersonic flow
p0054 A81-13544
On the theory of a wing with small aspect ratio in a hypersonic flow
p0309 A81-29860
Determination of the vorticity on a wing of small aspect ratio in a hypersonic stream
p0411 A81-35668

GOLUBOVSKII, E. R.
High-temperature strength of alloys for gas turbine engines
p0482 A81-40616

GONCHARENKO, V. I.
A formulation of the shimmy problem for swiveling wheels
p0607 A81-47268

GONCHAROV, V. V.
Hydrogen engines
p0625 A81-49949

GOOD, W. D.
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936

GOODMAN, J. W.
On certification of composite structures for USAF aircraft
[AIAA PAPER 81-1686] p0527 A81-43158

GOODMAN, S. A.
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20473

GOODWIN, F. K.
Experimental and theoretical study of flow fields and store forces in close proximity to a triple ejection rack at transonic speeds
[AD-A094751] p0263 N81-19030
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 2: Users manual for the computer program
[AD-A099391] p0494 N81-27080
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 3: Appendices A and B. Details of program 1
[AD-A099331] p0495 N81-27082
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 4: Appendices C and D. Details of program 2
[AD-A099332] p0495 N81-27083

GOODWIN, J.
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024

GOODYER, M. J.
The principles and applications of cryogenic wind tunnels
p0037 N81-11049
Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section
[NASA-CR-165685] p0343 N81-21087

GOODYKOONTZ, J.
Effect of a semi-annular thermal acoustic shield on jet exhaust noise
p0178 A81-22532
Effect of a semi-annular thermal acoustic shield on jet exhaust noise
[NASA-TM-81615] p0044 N81-11770

GORDON, M.
Death and injury in aerial spraying - Pre-crash, crash, and post-crash prevention strategies
p0177 A81-22115

GORDON, R.
Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
p0354 A81-31612

GORDON, W. B.
Maximum likelihood elevation angle estimates of radar targets using subapertures
p0359 A81-32691

GORELOV, D. N.
Local approximation of a vortex layer by a system of discrete vortices
p0577 A81-46781

GORENKOV, A. F.
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719
Comparative evaluation of the quality of jet fuels
p0103 A81-17371
Effect of oxygen-containing additives on the antiwear properties of fuels for gas-turbine aircraft engines
p0517 A81-42558

GORHAM, D. A.
An investigation of the liquid impact properties of a GFRP radome material
p0457 A81-38571

GORI, M.
Precision DME for microwave landing system
p0578 A81-47125

GOSSETT, C. R.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

GOSTELOW, J. P.
The present role of high speed cascade testing
[ASME PAPER 81-GT-95] p0314 A81-30002

GOTO, N.
Piloting techniques on the backside - Flight path angle control
p0171 A81-21673

GOULD, R. K.
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-28099

GOURJON, R.
AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329

GOVIL, A. K.
Optimal design of frames with substructuring
p0068 A81-16276

GOVINDAN, T. R.
End wall flows in rotors and stators of a single stage compressor
[NASA-CR-164635] p0540 N81-28097

GOVINDAN, T. R.
Analysis of turbulent boundary layer on cascade and rotor blades of turbomachinery
p0296 A81-29106

GOWADIA, N. S.
Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] p0617 A81-48817

GOWDA, B. H. L.
An experimental investigation of separating flow on a convex surface
p0230 A81-24088

GRABER, E. J.
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
GRABOVSKII, A. M.
Calculation of the coefficients of head and local drag of bluff bodies
p0466 A81-40023
GRACEY, W.
Measurement of aircraft speed and altitude
p0357 A81-32401
GRAEBER, U.
Application of reduced natural longitudinal stability in the Airbus program
[DGLR PAPER 81-062] p0610 A81-47609
GRAF, E. R.
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44681
An aircraft landing system employing observers
p0562 A81-44699
GRAF, W.
Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240
GRAFF, J.
Boron aluminum blades and vanes
[AIAA PAPER 81-1359] p0502 A81-40840
GRAFTON, S. B.
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0241 A81-26933
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0591 N81-31112
GRAGG, C. D.
Escape systems testing on the Holloman high speed test track
p0175 A81-22088
Velocity tolerance of escape systems
[AD-A096881] p0373 N81-22035
GRAHAM, A. B.
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] p0639 N81-33210
GRAHAM, R. W.
Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177
GRAHL, K.
Turbine blade construction of multistage axial-flow compressors
p0309 A81-29850
GRANGIER, M.
Aerial survey photography
p0018 A81-12350
Primary training of military pilots - Changing theories and new trainers
p0122 A81-19498
The ATR 42 - Progress report on a new aircraft
p0480 A81-40456
The new generation of turboshaft and turboprop engines
p0560 A81-44473
GRANT, I.
The development of the secondary wing structure for a rigid wing hang glider
[BU-251] p0375 N81-22046
GRANT, J. R.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
GRANT, P. M.
A review of current and future components for electronic warfare receivers
p0357 A81-32252
GRANT, R. J.
Force and moment coefficients for high deflection cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
GRANTHAM, W. D.
A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise
[NASA-TP-1742] p0073 N81-12043
Development of SCR Aircraft takeoff and landing procedures for community noise abatement and their impact on flight safety
p0245 N81-17994
GRAVELLE, A.
Philosophy and results of steady and unsteady test techniques on a large scale transport aircraft model in the ONERA transonic tunnel S1 MA. Part 1: Philosophy and results of steady tests. Part 2: Interest of large models in unsteady aerodynamics
p0190 N81-16019
GRAY, J.
Army GPS-doppler hybrid navigation system
[AD-A090394] p0075 N81-12062
GRAY, T. D.
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking
p0173 A81-21742
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1331] p0352 A81-31376
GRAY, T. H.
Advanced flight simulator: Utilization in A-10 conversion and air-to-surface attack training
[AD-A094608] p0254 N81-18066
GRAYSON, K.
A new method for estimating transport aircraft direct operating costs
p0046 N81-11915
GRAYSON, R. L.
Potential effects of the introduction of the discrete address beacon system data link on air/ground information transfer problems
[NASA-CR-166165] p0373 N81-22037
Information transfer in the surface component of the system: Coordination problems in air traffic control
p0594 N81-31165
Information transfer between air traffic control and aircraft: Communication problems in flight operations
p0595 N81-31166
GRECO, L.
The Navy PATE program
[ASME PAPER 81-GT-189] p0317 A81-30082
GREEN, D. L.
Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046
GREEN, D. M.
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862
GREEN, H. A.
Maintenance tomorrow and the day after
p0367 A81-33790
GREEN, K. A.
ZDRAFT-A graphite code for VTOL aircraft ground footprint visualization
[AD-A093311] p0208 N81-17042
Prediction and evaluation of thrust augmenting ejector performance at the conceptual design stage
[AD-A093953] p0216 N81-17094
GREEN, W.
The High Performance Auxiliary Power Unit technology demonstrator program
[SAE PAPER 801148] p0406 A81-34240
High performance auxiliary power unit technology demonstrator
[AD-A098618] p0444 N81-25085
GREENBERG, J. B.
Sudden expansion injection for ram-rockets
p0293 A81-29071
GREENBERG, M.
Summary of transponder data, May 1979 - November 1979
[AD-A097569] p0386 N81-23061
GREENE, C. S.
LQG controls for highly maneuverable aircraft
[AIAA PAPER 81-1709] p0527 A81-43163
GREENE, G. C.
Wake vortex alleviation
[AIAA PAPER 81-0798] p0412 A81-35723
Sources, control, and effects of noise from aircraft propellers and rotors
p0269 N81-19073
Sources, control, and effects of noise from aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904
GREENE, R. E.
Airbase induced community noise - Facilitating the

military/civil interface
p0569 A81-46368
GREENE, W.
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
GREENWELL, R. A.
Fiber optic system test results in a tactical military aircraft
p0452 A81-37659
Airborne-fiber optics manufacturing technology, aircraft installation processes
[AD-A093304] p0221 N81-17902
GREGG, V. D.
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943
GREGOREK, G. M.
An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810
GREITZER, E. M.
A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29982
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
GREY, J.
China aims for modern wings
p0227 A81-24050
GRIAZNOV, B. A.
Fatigue strength of gas turbine engine rotor blades in connection with structural changes in service
p0355 A81-31673
GRIBANOV, D. D.
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0418 A81-36940
GRIBETZ, B.
Death and injury in aerial spraying - Pre-crash, crash, and post-crash prevention strategies
p0177 A81-22115
GRIEDER, W. F.
Staring infrared mosaic observation of an F-15 aircraft
p0463 A81-39636
GRIEM, H.
Some aspects of advanced flight management systems and their application to modern transport aircraft
p0154 A81-20353
GRIFFIN, C. F.
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
GRIFFIN, C. R.
Development of a ground signal processor for digital synthetic array radar data
[NASA-CR-161074] p0602 N81-31421
GRIFFIN, G. R.
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31452
GRIFFIN, K. E.
Active control of forward swept wings with divergence and flutter aeroelastic instabilities
[AIAA 81-0637] p0306 A81-29491
GRIFFIN, M. C.
A study of ASRS reports involving general aviation and weather encounters
[NASA-CR-166212] p0493 N81-27063
GRIFFITH, C. D.
Commercial rotorcraft automatic controls - The next generation
p0470 A81-40113
GRIFFITHS, P. J.
Applications of new technology in the infrared
p0350 A81-31126
GRIFFITHS, R. T.
Towing tank tests on model wind turbine rotors
p0055 A81-13860
GRIGULL, U.
Influence of free-stream turbulence intensity on heat transfer in the two-dimensional turbulent boundary layer of an accelerated compressible flow
p0110 A81-17994
GRIMES, G. C.
Fatigue sensitivity of composite structure for fighter aircraft
[AIAA 81-0495] p0300 A81-29383
GROEGER, I.
Increased target resolution and minor lobe reduction with active group antennas
p0152 A81-20090
GROESBECK, D.
Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
p0454 A81-38062
GROESBECK, D. E.
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] p0620 A81-48635
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] p0624 A81-49743
Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
[NASA-TM-81739] p0381 N81-22839
GROKHOLSKII, A. L.
Aircraft instruments and measuring systems
p0564 A81-45608
GROLLIUS, H.
The influence of blade number ratio and blade row spacing on axial-flow compressor stator blade dynamic load and stage sound pressure level
[ASME PAPER 81-GT-165] p0317 A81-30064
GROMMESH, D. J.
Jet aircraft design
[AIAA PAPER 81-0912] p0362 A81-32930
GROSCHE, F. R.
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
GROSS, D.
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
GROSS, J. P.
INUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175
GROSSER, M.
Building the Gossamer Albatross
p0286 A81-28461
GROSSMAN, D. T.
F-15 nose landing gear shimmy, taxi test and correlative analyses
[SAE PAPER 801239] p0406 A81-34237
GROSVELD, F.
Summary of typical parameters that affect sound transmission through general aviation aircraft structures
[SAE PAPER 810562] p0518 A81-42728
GROTH, W.
Advancing Blade Concept (ABC) technology demonstrator
[AD-A100181] p0538 N81-28087
GROTH, H. P.
Modern techniques of conducting a flight loads survey based on experience gained on the Black Hawk helicopter
p0356 A81-32016
GROTTA, H. H.
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10080
GROULX, J. W.
Advanced Attack Helicopter /YAH-64/ - Status report
p0099 A81-16580
GRUBE, K. P.
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment
p0013 A81-11659
GRUNDY, P. A.
Optimal processing of GPS signals
p0512 A81-41761
GRUNWALD, A. J.
Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13958
GRUZDEV, A. A.
Numerical study of stream surface structure near highly loaded wings

p0235 A81-25682
Low-speed wind tunnels with deformable walls
p0299 A81-29304

GRUZDEV, V. N.
Investigation of the influence of active particles on the basic combustion characteristics in turbulent flow
p0242 A81-26986

GU, S.-J.
Application of scaling in afterburner test and development
[ASME PAPER 81-GT-194] p0317 A81-30096

GU, W.
Accuracy and application of a second-order theory for three-dimensicnal supersonic and low hypersonic unsteady flows aroung a thin wing
p0419 A81-37335

GUERRA, G.
Critical analysis and modern approaches to integrated system aircraft
p0227 A81-24059

GUERRISI, E.
Neurotramatological aspects in ejected pilots
p0205 N81-17012

GUEZENNEC, Y.
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
p0239 A81-26508
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
[NASA-CR-3444] p0587 N81-30392

GUGEL, E.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129
Development of high strength silicon carbide materials for gas turbine applications
[BMFT-FB-T-80-025] p0497 N81-27102

GUIGOU, M.
Light aviation in the United States - September 1980
p0513 A81-41903

GUINN, K. F.
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085

GULDEN, W.
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182

GULEVSKII, I. V.
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214

GULIAEV, V. V.
Calculation of the aerodynamic characteristics of aircraft with jet mechanization
p0299 A81-29301

GULLEDGE, T. R.
A cost function for an airframe production program
[AD-A097540] p0394 N81-23967

GUNNESS, R. C.
Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45891

GUNSTON, B.
Propfan progress
p0480 A81-40459

GUNTER, E. J.
Nonlinear analysis of squeeze film dampers applied to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062

GUNTHER, K. P.
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49378

GUPTA, N. C.
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066

GUPTA, N. K.
Frequency-shaped cost functionals - Extension of linear-quadratic-Gaussian design methods
p0116 A81-18578

GUPTA, R. R.
Omega station 10.2 kHz signal coverage prediction diagrams
p0512 A81-41760
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach
[AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams
[AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables
[AD-A092744] p0192 N81-16032

GUPTA, B. S.
Optimum design of axial flow gas turbine stage. I - Formulation and analysis of optimization problem. II - Solution of the optimization problem and numerical results
p0019 A81-12600

GUPTA, S. S.
An analytical method to calculate misalignment in the journal bearing of a planetary gear system
p0004 A81-10839

GURIANOV, A. IA.
Experimental study of the snap-through oscillations of an empennage
p0299 A81-29313

GURMAN, B.
Flat panel display technology review
p0211 N81-17065

GURSON, A. L.
State-of-the-art review of flywheel burst containment
[UCRL-15257] p0085 N81-12427

GURUSWAMY, P.
Flutter analysis fo two-dimensional and two-degree-of-freedom MBB A-3, CAST 7, an TF-8A supercritical airfoils in small-disturbance unsteady transonic flow
[AD-A100334] p0540 N81-28104

GUSEVA, N. I.
The use of carbon-reinforced plastic in the construction of a deflector and a stabilizer
p0299 A81-29310

GUSKOV, V. I.
Comparative efficiency of penetrating steam and air cooling of gas turbine blades
p0509 A81-41003

GUSTAFSON, A. J.
Composite flight service evaluation program for helicopters
[AHS 80-46] p0477 A81-40173

GUSTAFSON, R. A.
Ten years of US Marine Corps Harrier operations
p0632 N81-33140

GUSTAFSSON, A. L.
Application of a method for aerodynamic analysis and design of horizontal axis wind turbines, part 1
[FFA-TN-AU-1499-PT-1] p0086 N81-12633

GUTIERREZ, O. A.
Effect of facility variation on the acoustic characteristics of three single stream nozzles
p0178 A81-22534
Status of noise technology for advanced supersonic cruise aircraft
p0246 N81-18002

GUTMAN, G. N.
Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
p0365 A81-33169

GUTMANN, R. L.
A Single Processor Synchronous Executive derived from the DAIS executive
p0324 A81-30326

GUY, C. R.
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115

GUY, R. W.
Operating characteristics of the Langley Mach 7 Scramjet Test Facility
[NASA-TM-81929] p0335 N81-20083

GUYETT, P. R.
The certification of composite airframe structures
p0283 A81-27887

GUYTON, F. C.
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-49979

H

HAAKE, H. B.
Integrated Flight and Weapon Control for improved tactical combat effectiveness
p0324 A81-30329

HAAS, J. E.
An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168
Reasons for low aerodynamic performance of 13.5-centimeter-tip-diameter aircraft engine starter turbine
[NASA-TP-1810] p0334 N81-20076

HAASZ, A. A.
Aircraft annoyance evaluations using field and laboratory simulation techniques
[UTIAS-248] p0146 N81-15580

HABERCOM, G. E., JR.
Bird strikes and aviation safety. Citations from the NTIS data base
[PB80-812944] p0024 N81-10027
Airfield pavement evaluation. Citations from the NTIS data base
[PB80-812860] p0030 N81-10083
Closed loop control systems: Aircraft. Citations from the NTIS data base
[PB80-813710] p0082 N81-12114
Airport noise. Citations from the NTIS data base
[PB80-813231] p0088 N81-12667
Maneuvering aircraft: Noise pollution and control. Citations from the NTIS data base
[PB80-815566] p0135 N81-14525
Collision avoidance systems. Citations from the NTIS data base
[PB80-815020] p0193 N81-16038
Air traffic control simulation models. Citations from the NTIS data base
[PB81-800104] p0207 N81-17037

HABERKORN, P.
Automatic riveting installation for spherical aircraft parts
p0450 A81-37641

HABERLAND, C.
Calculation of the flow field around engine-wing-configurations
p0007 A81-11613

HACK, R. L.
An exploratory study of soot sample integrity and probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943

HACKETT, J. E.
Vortex drag reduction by aft-mounted diffusing vanes
p0012 A81-11647
Vortex drag reduction by diffusing vanes - Design for the 'Thrush' agricultural aircraft
[SAE PAPER 810605] p0521 A81-42762
A review of the wall pressure signature and other tunnel constraint correction methods for high angle-of-attack tests
p0435 N81-24122

HACKNEY, R. D.
Real-time estimation in advanced turbofan engines
p0564 A81-45553

HADALLER, O. J.
Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18018

HADEL, J. J.
Reliability growth measured by AFM 66-1 data
p0230 A81-24286

HADERMANN, A.
Application of General Technology Applications, Incorporated (GTA) blending process to antimisting fuel additives
[AD-A100692] p0551 N81-29247

HAERTIG, J.
Application of optical methods to the study of jet noise and turbulence
[ISL-CO-201/80] p0147 N81-15819

HAGER, J. B.
Low cost airborne microwave landing system receiver, task 3
[NASA-CR-152409] p0075 N81-12054

HAGFORD, D. E.
TELS - A facility to observe the effect of simulated flight maneuver loads on turbine engines
[AIAA PAPER 81-1591] p0508 A81-40966

HAGIWARA, N.
Resonance of forwards and backwards vibration mode of impeller with gyroscopic effect
[AIAA 81-0524] p0303 A81-29445

HAGLUND, R. A.
Non-heat pipe receiver/p-40 Stirling engine
p0588 N81-30531

HAGNAUER, G. L.
Quality assurance of an epoxy resin prepreg using HPLC
p0531 A81-43642

HAGUE, D.
GASP- General Aviation Synthesis Program. Volume 1: Main program. Part 1: Theoretical development
[NASA-CR-152303-VOL-1-PT-1] p0270 N81-19088
GASP- General Aviation Synthesis Program. Volume 2: Geometry. Part 1: Theoretical development
[NASA-CR-152303-VOL-2-PT-1] p0270 N81-19089
GASP- General Aviation Synthesis Program. Volume 3: Aerodynamics. Part 1: Theoretical development
[NASA-CR-152303-VOL-3-PT-1] p0270 N81-19090
GASP- General Aviation Synthesis Program. Volume 4: Propulsion. Part 1: Theoretical development
[NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091
GASP- General Aviation Synthesis Program. Volume 5: Weights. Part 1: Theoretical development
[NASA-CR-152303-VOL-5-PT-1] p0271 N81-19092
GASP- General Aviation Synthesis Program. Volume 6: Performance. Part 1: Theoretical development
[NASA-CR-152303-VOL-6-PT-1] p0271 N81-19093

HAHN, E. P.
TORNADO: Flight characteristics at high angles of incidence
[MBB-FE-127/S/PUB/23] p0495 N81-27085

HAHN, H.
Development and design of a large wind-turbine blade
[MBB-UD-301/80-OE] p0586 N81-30198

HAIGHT, C. H.
Transonic manouver/cruise airfoil design employing active diffusion control
p0239 A81-26511

HAINES, A. B.
Prospects for exploiting favourable and minimizing adverse aerodynamic interference in external store installations
p0187 N81-15996

HAINES, A. L.
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890
Airport capacity enhancement by innovative use of runway geometry
[AIAA PAPER 81-0801] p0368 A81-33891

HAINES, P. A.
The effect of heavy rain on windshear attributed accidents
[AIAA PAPER 81-0390] p0167 A81-20800

HAINLINE, B. C.
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776

HAJELA, P.
The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400

HALAMISH, E.
Death and injury in aerial spraying - Pre-crash, crash, and post-crash prevention strategies
p0177 A81-22115

HALDEMAN, C. W.
Application of superconducting coils to the NASA prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086

HALENBROOK, R. G.
Design and fabrication of a stringer stiffened discrete-tube actively cooled panel for a hypersonic aircraft
[NASA-CR-3403] p0279 N81-19480

HALEY, J. L.
Crashworthiness versus cost based on a study of severe Army helicopter accidents during 1970 and 1971
p0355 A81-32006

HALFORD, G. R.
Progress in materials and structures at Lewis Research Center
p0089 N81-12983

HALIBURTON, T. A.
Potential use of geotechnical fabric in airfield runway design
[AD-A092686] p0198 N81-16071

HALL, D. S.
A description of the general aviation fixed wing accident
p0408 A81-34696
Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft
[NASA-CR-160036] p0023 N81-10020

HALL, F. L.
Community response to noise from a general aviation airport
p0017 A81-11821

HALL, K.
Investigation of a flight test method for the measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760

HALL, K. R.
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163967] p0251 N81-18046

HALL, N.
Gerry casing treatment
[CUED/A-TURBO/TR-101] p0093 N81-13059

HALL, P. S.
Vibration test level criteria for aircraft equipment
[AD-A098675] p0442 N81-25070

HALL, R. A.
Reliability and maintainability evaluation of rotor systems
p0576 A81-46645

HALL, W. E., JR.
Turbine engine fault detection and isolation program, phase 1. Volume 2: Requirements definition for an integrated engine monitoring system
[AD-A093226] p0215 N81-17088
Turbine engine fault detection and isolation program, phase 1. Volume 1: Requirements definition for an integrated engine monitoring system
[AD-A093225] p0215 N81-17089
Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system
[AD-A093868] p0216 N81-17095
Development of advanced techniques for rotorcraft state estimation and parameter identification
[NASA-CR-159297] p0271 N81-19098

HALLEY, D. H.
ABC development status and design considerations for several military applications
[AHS 80-12] p0474 A81-40145

HALLIDAY, S. G.
An active noise reduction system for aircrew helmets
p0604 N81-31470

HALLION, R. P.
The rise of air and space
p0366 A81-33718

HALOULAKOS, V. E.
Strong pressure waves in air-breathing engines
[AIAA PAPER 81-1475] p0505 A81-40895

HALWES, D. R.
LIVE - Liquid inertia vibration eliminator
[AHS 80-22] p0475 A81-40152
Total main rotor isolation system analysis
[NASA-CR-165667] p0494 N81-27076

HAM, J. A.
A parametric study of the static longitudinal aerodynamic characteristics of parallel lift delta wing configurations at low Reynolds numbers
[AIAA PAPER 81-0409] p0160 A81-20814
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160

HAMAJIMA, M.
A one-dimensional analysis and performance prediction of subsonic radial turbines
p0228 A81-24086

HAMANN, J.
Helicopter blade reliability
p0287 A81-28474

HAMBURG, G.
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A0[illegible]122] p0215 N81-17092

HAMBY, C. W.
Wind shear systems integration plan, VICON (visual confirmation) reliability analysis
[PB80-218233] p0128 N81-13949

HAMED, A.
Particle dynamics of inlet flow fields with swirling vanes
[AIAA PAPER 81-0001] p0156 A81-20526
Improved particle trajectory calculations through turbomachinery affected by coal ash particles
[ASME PAPER 81-GT-53] p0312 A81-29965

HAMED, A. A.
Three dimensional internal flows in turbomachinery, volume 1
[AD-A092737] p0197 N81-16065

HAMEL, P.
Research on mechanical flight problems in aircraft parachute systems
p0065 A81-[illegible]
Problems of flight mechanics involved in all-weather helicopter operation
p0104 A81-17467

HAMEL, P. G.
Determination of aircraft dynamic stability and control parameters from flight testing
p0591 N81-31115

HAMER, L. C., JR.
Prediction of particle paths for flow of a gas/solids suspension through a cascade of flat plates
p0256 N81-18352

HAMERMAN, J. A.
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-16994

HAMILL, P.
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741

HAMILTON, C. W.
Evaluation of safety programs with respect to the causes of general aviation accidents. Volume 2: Appendices
[AD-A089181] p0023 N81-10023

HAMM, J.
Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240

HAMM, R. S.
V/STOL advanced technology rewards and risk
[SAWE PAPER 1385] p0354 A81-31401

HAMMOND, C. E.
A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619
On the use of active higher harmonic blade pitch control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074

HAMPTON, J. R.
Aircraft ground mobility system for the F-16 aircraft
[AIAA PAPER 81-1735] p0536 A81-43960

HANCOCK, G. J.
An introduction to the aerodynamics of spoilers
[PB81-166183] p0487 N81-26122
Application of vortex lattice methods to calculate Lv (rolling moment due to sideslip)
[PB81-166167] p0487 N81-26123
Some qualitative experiments on the local flow about spoilers in unsteady motion at low speeds
[PB81-166159] p0487 N81-26124

HANCOCK, R. N.
Development of specifications from measured environments
p0067 A81-16119

HANFF, E. S.
Dynamic stability parameters at high angles of attack
p0009 A81-11620

Wind tunnel determination of dynamic cross-coupling derivatives - A new approach
p0413 A81-35927
Direct forced-oscillation techniques for the determination of stability derivatives in wind tunnels
p0590 N81-31109
Applications of half-model technique in dynamic stability testing
p0591 N81-31114
HANIN, R.
A method for calculating the aerodynamic forces and moments on external stores of aircraft
p0226 A81-24006
HANING, R. K.
Design, development, and evaluation of lightweight hydraulic system, phase 1
[AD-A097505] p0388 N81-23075
HANISCH, B.
Cockpit simulation study of use of flight path angle for instrument approaches
[NASA-CR-165708] p0425 N81-24040
HANKE, D.
Experimental aircraft of the DFVLR for in-flight simulation and flight control technology
p0452 A81-37654
In-flight handling qualities investigation of A310 Airbus DLC-configurations on landing approach, using the DFVLR-HFB 320 in-flight simulator (variable stability aircraft)
[ESA-TT-630] p0276 N81-19135
HANKINS, G. B., JR.
Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705
HANKS, M. L.
Preliminary airworthiness evaluation OH-58C helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052
Artificial and natural icing tests production UH-60A helicopter
[AD-A096239] p0340 N81-21063
HANNA, R. F.
A cockpit view of advanced airline avionics
p0100 A81-16585
HANNAH, M. J.
Autonomous navigation using passively sensed terrain images
p0110 A81-17977
Passive imagery navigation
[AD-A096245] p0339 N81-21051
HANNAN, D. F.
IFR aircraft handled forecast by air route traffic control center, fiscal years 1980-1991
[AD-A090803] p0074 N81-12048
HANSEN, D.
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270] p0248 N81-18023
HANSEN, K. A.
High peak energy shaped-pulse electromagnetic crack detection
p0611 A81-47785
HANSEN, K. C.
CH-53E emergency flotation system design study
[AD-A101640] p0548 N81-29124
HANSON, D. C.
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053
HANSON, D. L.
Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563
HANSON, G. D.
Effects of displacement and rate saturation on the control of statically unstable aircraft
[AIAA 81-1752] p0554 A81-44082
HANSON, H. W.
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047
HANSON, P. W.
Report of the panel on aeroelasticity and unsteady aerodynamics
p0593 N81-31149
HARASGAMA, S. P.
The influence of blade wakes on the performance of combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856
HARDANGE, J.-P.
Light aviation in the United States - September 1980
p0513 A81-41983
HARDEGEN, H.
Synopsis on aircraft integrated data systems and engine health monitoring and maintenance
[DFVLR-MITT-80-08] p0075 N81-12063
HARDIN, J. C.
The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] p0618 A81-48607
HARDING, K. G.
Techniques for evaluation of aircraft windscreen optical distortion
p0358 A81-32507
Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion
[AD-A097731] p0426 N81-24049
HARDY, B.
Development and demonstration of an automatic control and recovery system for remotely piloted vehicles
p0156 A81-20476
HARDY, G. H.
Flight evaluation of stabilization and command augmentation system concepts and cockpit displays during approach and landing of powered-lift STOL aircraft
[NASA-TP-1551] p0037 N81-11044
Flight investigation of a four-dimensional terminal area guidance system for STOL aircraft
[NASA-TM-81271] p0260 N81-19014
A method for determining landing runway length for a STOL aircraft
p0264 N81-19041
Flight-test evaluation of STOL control and flight director concepts in a powered-lift aircraft flying curved decelerating approaches
[NASA-TP-1641] p0275 N81-19131
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] p0629 N81-32151
HARDY, R.
Mission Adaptive Wing research programme
p0227 A81-24057
HARGROVE, A.
A comparison of actual and simulated horizontal flight paths - RNAV /Area Navigation/ system
p0562 A81-44781
HARIGANE, K.
Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0220 A81-24070
HARKNEY, R. D.
Propulsion controls
p0079 N81-12095
HARMAN, R. T. C.
Gas turbine engineering: Applications, cycles and characteristics
p0309 A81-29680
HARMAN, W. H.
Active BCAS: Design and validation of the surveillance subsystem
[AD-A095089] p0270 N81-19084
HARNEY, P. F.
Diversity techniques for omnidirectional telemetry coverage of the HiMAT research vehicle
[NASA-TP-1830] p0334 N81-20074
HARNEY, R. C.
Infrared airborne radar
p0617 A81-48566
HARPER, C. W.
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021
HARPER, P. W., SR.
Tire/wheel concept
[NASA-CASE-LAR-11695-2] p0437 N81-24443
HARR, H. K.
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047
HARR, M. E.
Non-destructive pavement evaluation
p0111 A81-18062

HARRE, I.
Position-determination accuracies of navigation methods
p0233 A81-25374

HARRINGTON, R.
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069

HARRIS, A. S.
A guidance document on airport noise control
[AD-A092228] p0202 N81-16629
NOISECHECK procedures for measuring noise exposure from aircraft operations
[AD-A093948] p0221 N81-17849

HARRIS, C. D.
Two-dimensional aerodynamic characteristics of the NACA 0012 airfoil in the Langley 8 foot transonic pressure tunnel
[NASA-TM-81927] p0385 N81-23036

HARRIS, C. E.
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051

HARRIS, F. D.
Hover performance methodology at Bell Helicopter Textron
[AHS 80-3] p0473 A81-40138

HARRIS, H. F.
Balanced design: Minimum cost solution
p0047 N81-11919

HARRIS, J. A., JR.
Concept definition: Retirement for cause of F-100 rotor components
[AD-A095584] p0335 N81-20080

HARRIS, J. S.
Techniques for evaluation of aircraft windscreen optical distortion
p0358 A81-32507
Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion
[AD-A097731] p0426 N81-24049

HARRIS, M. J.
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AD-A101309] p0501 N81-30116
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] p0627 N81-32128

HARRIS, R. L., SR.
How a pilot looks at altitude
p0265 N81-19047

HARRIS, R. H.
Increasing capacity at Paris airports
[AIAA PAPER 81-0802] p0368 A81-33890

HARRIS, T.
Optimal design studies on composite wings with static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077

HARRIS, W. D.
The substantiation of the structural integrity of the YAH-64 control actuators with material variations
[AHS 80-51] p0478 A81-40178

HARRIS, W. L.
Numerical solutions of transonic flows by parametric differentiation and integral equation techniques
p0067 A81-15896
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] p0619 A81-48615

HARRISON, F.
A comparison between electric field strengths similarly generated and measured in the open air, in a shielded enclosure and in a large aircraft hangar, over frequency range 10 to 110 MHz
[RSRE-MEMO-3240] p0084 N81-12353

HARRISON, J. E.
Summary of aviation safety program reviews. Cabin safety
[AD-A091938] p0182 N81-16027

HARRISON, J. R.
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A089971] p0033 N81-11022
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A098096] p0424 N81-24038

HARRISON, R. L.
Human Factors of Flight-deck Automation: NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022

HARRISON, W. D.
Ejection experience in F/FB-111 aircraft - 1967-1978
p0176 A81-22098

HARROLD, E. C.
General Electric infrared suppressors for the Black Hawk helicopter
p0106 A81-17520

HARSCH, H.
Experiences with a Flight Data Recording System (FDRS) in a German Airforce fighter bomber wing after field trials
p0302 N81-23009

HARSE, J. H.
Model 206L composite vertical fin
[AHS 80-34] p0478 A81-40175

HARSHA, P. T.
Interpretation of ramjet combustor test data
[AIAA PAPER 81-1433] p0504 A81-40870
Mixing and combustion in high speed air flows
[AD-A090536] p0083 N81-12192
Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3432] p0392 N81-23411
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320

HART-SMITH, L. J.
Adhesive bonding of aircraft primary structures
[SAE PAPER 801209] p0404 A81-34217

HART, S. G.
Evaluation of the potential format and content of a cockpit display of traffic information
p0053 A81-13419

HART, W. G. J. T.
Developments in aircraft structural materials
[NLR-MP-79042-U] p0077 N81-12081

HARTEL, R.
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] p0610 A81-47612

HARTMAN, A. S.
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] p0635 N81-33163

HARTMAN, E. A.
The use of aircraft integrated data system at KLM
p0383 N81-23019

HARTMANN, A.
The optimum design of by-pass engines with jet mixing
[PNR-90017] p0335 N81-20081

HARTMANN, G. L.
LQG controls for highly maneuverable aircraft
[AIAA PAPER 81-1709] p0527 A81-43163
F-8C adaptive control law refinement and software development
[NASA-CR-163093] p0377 N81-22059

HARTZ, R. R.
Airport Surface Detection Equipment (ASDE)-3 operational evaluation
[AD-A098480] p0440 N81-25059

HARTZUIKER, J. P.
The European Transonic Wind tunnel ETW
p0036 N81-11064

HARVEY, D. G.
External burning propulsion analysis
[AIAA PAPER 81-1477] p0505 A81-40897

HARVEY, R.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059

HARVEY, W. D.
Evaluation of flow quality in two large NASA wind tunnels at transonic speeds
[NASA-TP-1737] p0095 N81-13303

HARVIS, D. H.
Long focal length, high altitude standoff reconnaissance; Proceedings of the Seminar, San Diego, CA, July 29, 30, 1980
p0461 A81-39417

HASEL, L. M.
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] p0635 N81-33158

HASHIMOTO, M.
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984

HASINGER, S. H.
Experiments with a supersonic multi-channel radial diffuser
[AD-A094192] p0257 N81-18374

HASKINS, D. E.
Fault-tolerant actuation concept for a research test aircraft
[AD-A093113] p0216 N81-17100

HASSARD, R. S.
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048

HASSELBRACK, S. A.
Textile materials for commercial transportation vehicles
p0532 A81-43653

HASSELROT, A.
Downwash calculation at close range behind a trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925

HATFIELD, J. J.
Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13958

HATTINGH, H. V.
Analysis of a reverse flow, annular combustion chamber
p0294 A81-29081

HAUG, E. J.
Optimal design of frames with substructuring
p0068 A81-16276

HAUPTMANN, MR.
Side lobe suppression with digital signal processing
p0152 A81-20092

HAUSE, A.
Measurement of heat flux and pressure in a turbine stage
[ASME PAPER 81-GT-88] p0314 A81-29995

HAVENER, W. J.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006

HAWES, D. J.
NDEC - A control concept for helicopter gas turbines
[AHS 80-44] p0477 A81-40171
Electronic fuel controls - Who needs them
[SAE PAPER 810619] p0523 A81-42774

HAWKINS, B. C.
Application of CRT displays to new generation aircraft
p0286 A81-28297

HAWKINS, B. J.
Test procedures used in determining aircraft suitability for STAN integral weight and balance system
[SAWE PAPER 1339] p0352 A81-31379

HAWKINS, J. E.
F-16 variable-geometry inlet design and performance
[AIAA PAPER 81-1394] p0514 A81-42184

HAWKINS, R. D.
Development considerations for real-time aircraft/avionic distributed computer control systems
p0616 A81-48376

HAWLEY, K. E.
A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974

HAWTHORNE, W. R.
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387

HAY, J.
Improvement of the imaging of moving acoustic sources by the knowledge of their motion
[ONERA, TP NO. 1981-17] p0359 A81-32534
Contribution to the study of non stationary signals emitted by moving jet engine - Application to special analysis and imaging. I.
p0365 A81-33288
Contribution to the study of non-stationary signals emitted by moving jet engines - Application to spectral analysis and imaging. II
p0366 A81-33290
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to special analysis and imaging. Part 1
p0447 N81-26006
Contribution to the study of nonstationary signals emitted by moving jet engines: Application to spectral analysis and imaging. Part 2
p0447 N81-26013

HAY, N.
Discrete hole film cooling of turbine blades
p0293 A81-29073

HAY, W. H.
Structural response methods and evaluation results for helicopter landing decks on 210- and 270-foot USCCG cutters
[AD-A102420] p0601 N81-31233

HAYASHI, K.
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095

HAYASHI, N.
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376

HAYDUK, R. J.
Aircraft subfloor response to crash loadings
[SAE PAPER 810614] p0522 A81-42770
NASA/FAA general aviation crash dynamics program
p0268 N81-19064

HAYFORD, D. T.
Feasibility evaluation of advanced multifrequency eddy current technology for use in naval air maintenance environment
[AD-A093314] p0220 N81-17476

HAYMAN, C.
A process for protecting gas turbine blade cooling passages against degradation
p0622 A81-49209

HAYMANN-HABER, G.
Comparison of experimental and computational shock structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953

HAYNES, J. H.
Aircraft penetration under cloud cover
p0463 A81-39640

HAYNIE, A. T.
Development of a computer program data base of a navigation aid environment for simulated IFR flight and landing studies
[NASA-TM-80064] p0129 N81-13959

HAYS, A. P.
Optimization of takeoff flight paths with respect to FAR Part 36 noise using dynamic programming
p0569 A81-46371

HAZELL, A. F.
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] p0621 A81-48647

HAZELWOOD, C.
Detection of military aircraft in an Air Traffic Control Radar Beacon System (ATCRBS) environment
[AD-A093427] p0207 N81-17036

HAZEN, D. C.
US military V/STOL: Who needs it? Wants it? Can afford it?
p0634 N81-33156

HE, L.
Accuracy and application of a second-order theory for three-dimensional supersonic and low hypersonic unsteady flows aroung a thin wing
p0419 A81-37335

HEAD, R. E.
Preliminary design of a tip-jet-driven heavy lift helicopter incorporating circulation control
[AD-A099192] p0486 N81-26120

HEATH, W. G.
The contribution of structural testing to total airworthiness
p0068 A81-16420
The changing scene of structural airworthiness
[AAAF-NT-79-24] p0077 N81-12876

HEBEISEN, J. C.
Progress in P/M superalloy and titanium for

aircraft applications
p0181 A81-22641

HEBRARD, P.
A theoretical and experimental study of combustion chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242

HECHT, H. J.
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22085

HECK, J. D.
Evaluation/redesign of the F-105 pitch rate gyro pack
[AD-A092109] p0194 N81-16048

HECKMANN, G.
Finite element method study of wing-fuselage-nacelle interactions of a Falcon 20 type aircraft at Mach = 0.79
p0187 N81-15994.

HEDEL, K. K.
High-density avionic power supply
p0005 A81-11157

HEDGECOCK, R. B. G.
Engine in-flight data collection and analysis in United Kingdom aircraft
p0431 N81-24085

HEDMAN, S.
A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations
[FFA-TN-AU-1418-PT-1] p0022 N81-10013

HEFFERNAN, J. T.
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077

HEFFLEY, R. K.
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook
[AIAA PAPER 81-0302] A81-20739

HEFNER, J. N.
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507

HEGARTY, D. M.
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042

HEGEDUS, C. R.
Development of a water displacing, touch-up paint
[AD-A097125] p0392 N81-23288

HEGELE, R. D.
Aircraft engine nacelle fire test simulator. Volume 1: Technical
[AD-A089629] p0030 N81-10081

HEGNA, H. A.
The numerical solution of incompressible turbulent flow over airfoils
[AIAA PAPER 81-0047] p0150 A81-20563

HEINEMANN, E. H.
Aircraft design then and now
[AIAA PAPER 81-0917] p0363 A81-32933

HEINEN, R.
Prestressed concrete airfield pavements
p0112 A81-18063

HEININGER, K. L.
Abstract interface specifications for the A-7E device interface module
[AD-A092696] p0202 N81-16770

HEINOLD, D.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962] p0201 N81-16628

HEINZ, R. A.
JT8D engine internal exhaust mixer technology program
[AD-A093057] p0215 N81-17091

HEISER, F.
Development of a CFC window frame, using short fiber pressing technology
[BMFT-FB-W-80-032] p0499 N81-27208

HEITEMAN, C. M.
Acoustic spectrum analysis for gyro bearings
[AIAA PAPER 81-1616] p0524 A81-43120

HELDENBRAND, R. W.
Small Transport Aircraft Technology /STAT/ Propulsion Study
[SAE PAPER 801198] p0402 A81-34208

HELLBAUM, R. F.
Flight evaluation of a simple total energy-rate system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24050

HELZER, C. L.
Integrated strike avionics study, volume 1
[AD-A094705] p0273 N81-19113

HELTSLEY, F. L.
Effects of window configuration on model pressure distribution in wind tunnels with perforated walls
[AD-A094213] p0277 N81-19142

HENDERSON, D. W.
Status report - Global Positioning System
p0511 A81-41752

HENDERSON, J. P.
Damping applications in aero-propulsion systems
p0613 A81-47999

HENDERSON, M. L.
Some recent applications of high-lift computational methods at Boeing
[AIAA PAPER 81-1657] p0534 A81-43940

HENDERSON, W. P.
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg
[NASA-TM-83171] p0635 N81-33159

HENDRICKS, C. L.
Evaluation of high-temperature structural adhesives for extended service
p0247 N81-18010

HENDRICKSON, I. G.
High peak energy shaped-pulse electromagnetic crack detection
p0611 A81-47765

HENNESSY, R. T.
Critical research issues and visual system requirements for a V/STOL training research simulator
[AD-A092561] p0198 N81-16072

HENNIG, H.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073

HENRICKS, R. J.
Advanced oxide dispersion strengthened sheet alloys for improved combustor durability
p0598 N81-31204

HENRY, R. A.
Vanadium trineodecanoate promoter for fiberglass-polyester soil surfacings
[AD-A091785] p0132 N81-14084

HENSING, P. C.
Aerodynamic and aeroelastic research on tipvane turbines
[VTH-LR-302] p0540 N81-28100

HENSLER, T.
MLS channel assignment model
[AD-A093445] p0206 N81-17026

HENTSCHEL, W.
Synopsis on aircraft integrated data systems and engine health monitoring and maintenance
[DFVLR-MITT-80-08] p0075 N81-12063

HEPWORTH, H. K.
Rotor-tip leakage. I - Basic methodology
[ASME PAPER 81-GT-71] p0313 A81-29980

HERALD, O.
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050

HERBERT, M. V.
A method of performance prediction for centrifugal compressors. Part 1: Analysis. Part 2: Comparison with experiment
[ARC-R/M-3843] p0031 N81-10436

HERBERT, R. D.
The development of a lightweight aircraft towing tractor
[SAE PAPER 801237] p0405 A81-34235

HERBERT, T.
Dialogue on bridging some gaps in stability and

transition research
p0115 A81-18105
HERDON, J. A.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A098584] p0442 N81-25072
HERING, N.
Mission-dedicated vehicle for passenger rescue from burning aircraft
p0412 A81-35772
HERMAN, J. F.
Wind tunnel investigation of the aerodynamic hysteresis phenomenon on the F-4 aircraft and its effects on aircraft motion
[AD-A089851] p0033 N81-11016
HERMANN, D. R.
Development of retardation and automatic flotation system (R.A.F.T.)
[AD-A096828] p0439 N81-25047
HERMANN, P.
An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168
Reasons for low aerodynamic performance of 13.5-centimeter-tip-diameter aircraft engine starter turbine
[NASA-TP-1810] p0334 N81-20076
HERMES, P.
Aircraft/avionics environmental integration program
p0570 A81-46480
HERNANDEZ, E. G.
An interactive computational aerodynamics analysis program
[AD-A094765] p0263 N81-15033
HERON, K. H.
Acoustic radiation from honeycomb sandwich plates
p0151 A81-20070
The dominant acoustic radiation surfaces of a helicopter cabin
p0468 A81-40102
HERRIN, J. R.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
HERRON, R. L.
Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733
HERSKOVITZ, R.
A synopsis of the Navy A-7 Aircraft Fuel Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949
HERTRICH, H.
A summary of proposals for airflight research by the BMFT
p0118 A81-19298
HERTZ, J.
Development of advanced interceptor substructural material
[AD-A090127] p0038 N81-11116
Development of advanced interceptor substructural material
[AD-A103836] p0640 N81-33241
HESS, R. A.
Analysis of aircraft longitudinal handling qualities
[AIAA 81-1771] p0554 A81-44092
HESS, R. W.
Estimating aircraft depot maintenance costs
[AD-A103623] p0631 N81-33133
HESS, T. E.
Composite fuselage development for Naval aircraft
p0181 A81-22648
HESTER, N.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
HEURTLEY, J. C.
The selection of air radio navigation system for the post-1990 period
p0556 A81-44322
HEWELL, J. G., JR.
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041
HEWETT, M. E.
Light transmission measurements in solid fuel ramjet combustors
p0284 A81-27910
HEWGLEY, R. R.
TELS - A facility to observe the effect of simulated flight maneuver loads on turbine engines
[AIAA PAPER 81-1591] p0508 A81-40966
HEWISH, M.
Air-traffic police steer a new approach
p0061 A81-15167
HEYSON, H. H.
Some wake-related operational limitations of rotorcraft
[NASA-TM-81920] p0186 N81-15985
HIBMA, R. A.
The evolution of a strategic bomber
[AIAA PAPER 81-0919] p0479 A81-40320
HICKEY, D.
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Recent progress in V/STOL aircraft technology
p0633 N81-33144
HICKEY, P. J.
Validation of a two-dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A094615] p0254 N81-18067
HICKMAN, J. W.
Validation of the Wright-Patterson vertical wind tunnel
[AD-A094777] p0277 N81-19165
HICKS, J. E.
Crashworthiness versus cost based on a study of severe Army helicopter accidents during 1970 and 1971
p0355 A81-32006
HICKS, P. A.
The ANK - A four dimensional navigation/flight management system for today
p0160 A81-22615
HICKS, R. M.
Computerized three-dimensional aerodynamic design of a lifting rotor blade
[AHS 80-2] p0473 A81-40137
Transonic wing design using potential-flow codes - Successes and failures
[SAE PAPER 810565] p0518 A81-42730
Overview of advanced wing design
p0260 N81-19012
HIENZ, E.
A look at comprehensive engine/airframe integration for high performance aircraft
p0298 A81-29118
HIERBAUM, F.
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11020
HIGGINS, A.
BIOCONAID system (bionic control of acceleration induced dimming)
[AD-A102510] p0601 N81-31234
HIGGINS, L.
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061
HIGGINS, L. B.
Artificial and natural icing tests production UH-60A helicopter
[AD-A096239] p0340 N81-21063
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461] p0582 N81-30119
HIGHBERGER, W. T.
Titanium net shapes by a new technology. I - F-18A parts evaluation
p0511 A81-41649
Titanium net shapes by a new technology. II - F-18A parts evaluation
p0511 A81-41650
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636
Advanced aluminum metallic materials and processes for application to naval aircraft structures
p0531 A81-43637
HILAIRE, G.
The quality of nonmetallic materials
p0230 A81-26284
The present and future applications of titanium alloys - Airframes, helicopters, missiles
p0417 A81-36665

Evolution of materials and associated technologies in the makeup of aerospace materials, part 1
[AAAF-NT-79-22-PT-1] p0209 N81-17050
Evolution of materials and associated technologies in the makeup of aerospace materials. Part 2: Examples
[AAAF-NT-79-22-PT-2] p0209 N81-17051

HILBIG, R.
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0058 A81-14389
Civil component program Wing Section. Transonic wing development
[BMFT-FB-W-80-021] p0426 N81-24052
Civil component program Wing Section. The design of the transonic airfoil Va 2
[BMFT-FB-W-80-023] p0426 N81-24053

HILDEBRANDT, F.
Detection and location of faults in onboard aircraft systems with the aid of the Automatic Fault Identification System (AFIS)
p0383 N81-23022

HILDRETH, B.
Transition and conversion trim-maps for the AV-8A VTOL aircraft
[AD-A102155] p0596 N81-31188

HILEY, P. E.
Advanced nozzle integration for supersonic strike fighter application
[AIAA PAPER 81-1441] p0504 A81-40875

HILL, E. G.
Laser measurement of angle of attack on wind-tunnel models
p0154 A81-20419

HILL, R. L.
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126

HILL, S. G.
Evaluation of high-temperature structural adhesives for extended service
p0247 N81-18010

HILL, W.
General Aviation Avionics Statistics
[AD-A095148] p0273 N81-19114

HILL, W. G., JR.
VTOL in ground effect flows for closely spaced jets
[NASA-CR-152321] p0271 N81-19095

HILLAN, W. J.
Trace chemical analysis methodology
[AD-A090762] p0083 N81-12191

HILLGER, W.
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] p0609 A81-47565

HILTON, R.
Quantitative thermography in aero-engine research and development
[PNR-90021] p0029 N81-10075

HINADA, H.
Some experimental study on parachute dynamics by utilizing a deceleration system simulator
p0481 A81-40471

HINCHEY, M. J.
Heave instabilities of amphibious air cushion suspension systems
[UTIAS-246] p0144 N81-15156

HINDES, D. K.
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688] p0381 N81-22971
Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689] p0381 N81-22972
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A
[AD-A096690] p0381 N81-22973
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692] p0392 N81-23325
Development of maintenance metrics to forecast resource demands of weapon systems
[AD-A104089] p0632 N81-33136

HINDS, H. S., JR.
Effectiveness of turbine engine diagnostic systems
p0290 A81-29053

HINDSON, W. S.
Flight-test evaluation of STOL control and flight director concepts in a powered-lift aircraft flying curved decelerating approaches
[NASA-TP-1641] p0275 N81-19131

HINES, D. E.
YC-15 interior noise measurements. Technical discussion
[AD-A098788] p0492 N81-26047

HINZ, T.
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements
[ESA-TT-625] p0197 N81-16069

HIPPENSTEELE, S. A.
Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material
[NASA-TP-1716] p0078 N81-12089

HIPPLER, R.
Adiabatic gas flow. Citations from the NTIS data base
[PB80-808546] p0026 N81-10048
Head up displays. Citations from the International Aerospace Abstracts data base
[NASA-CR-163656] p0026 N81-10049
Head up displays. Citations from the NTIS data base
[PB80-809064] p0026 N81-10050
Axial flow compressors. Citations from the Engineering Index data base
[PB80-808611] p0029 N81-10076
Axial flow compressors. Citations from the NTIS data base
[PB80-808603] p0031 N81-10441

HIRAYAMA, N.
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0220 A81-24075

HIRONAKA, M. C.
Recycling of Portland Cement Concrete airport pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141

HIROSE, N.
Research on transonic wings at the National Aerospace Laboratory, Japan
p0011 A81-11640

HIROSE, T.
The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder
p0233 A81-25312

HIROYASU, H.
An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
p0109 A81-17841

HIRSCH, CH.
Finite element methods for transonic blade-to-blade calculation in turbomachines
[ASME PAPER 81-GT-5] p0310 A81-29930

HIRSCH, P.
Study of the vortex conditions of wings with large sweepback by extrapolation of the Jones method
[NASA-TM-75863] p0262 N81-19026

HIRSCH, R.
Examination of the vortex regime for highly swept wings by extrapolation of the Jones method
[AAAF-NT-80-25] p0204 N81-16992

HIRSCHBEIN, M. S.
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22526
Stability of large horizontal-axis axisymmetric wind turbines
[NASA-TM-81623] p0085 N81-12486

HIRSCHEL, E. H.
Local properties of three-dimensional separation lines
[DGLR PAPER 79-063] p0016 A81-11700
Surface-oriented coordinates for boundary-layer calculations in the case of general configurations
[DGLR PAPER 81-014] p0608 A81-47557

HIRSCHKRON, R.
Commuter turboprop propulsion technology
[SAE PAPER 801243] p0406 A81-34239
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 2: Appendix A. Performance data - GE27/T3 study a1 turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 3: Appendix B. Performance data - TF34/T7 study A1 turboprop
[AD-A089279] p0028 N81-10069
Propulsion system study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165330] p0442 N81-25078

HIRVONEN, J. K.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

HIRZEL, E. A.
Real-time microprocessor technology applied to automatic braking systems
[SAE PAPER 801194] p0402 A81-34204

HISCOCKS, R. D.
A case study in aircraft design: The de Havilland family of STOL commuter aircraft
p0101 A81-16717

HITCH, H. P. Y.
Active controls for civil aircraft
p0228 A81-24070

HO, C.-S.
Stability of aircraft motion in critical cases
[AIAA PAPER 81-1865] p0561 A81-44577

HO, P. Y.
The effect of vane-frame design on rotor-stator interaction noise
[AIAA PAPER 81-2034] p0619 A81-48627

HOAD, D. R.
Acoustic performance evaluation of an advanced UH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33952
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by tip modification
[AHS 80-62] p0479 A81-40185

HOBBS, D. E.
Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-13034

HOCH, R. G.
Some thoughts on the effects of flight on jet noise as observed in actual flight and in wind tunnels
p0016 A81-11723

HODDER, B. K.
An investigation of engine influence on inlet performance
[NASA-CR-166136] p0579 N81-30084

HODGE, D. C.
The background and bases for the proposed military standard on acoustical noise limits in helicopters
[AD-A099814] p0500 N81-27090
The background and bases for the proposed military standard on acoustical noise limits in helicopters
p0604 N81-31459

HODGE, R. J.
Design of the new Tehran International Airport
p0114 A81-18084

HODGE, W. F.
Civil aviation applications of Navstar/GPS through differential techniques
p0177 A81-22374

HODGES, D. H.
Free-vibration analysis of rotating beams by a variable-order finite-element method
[AIAA 81-0614] p0305 A81-29476
Stability of nonuniform rotor blades in hover using a mixed formulation
p0467 A81-40088
Stability of nonuniform rotor blades in hover using a mixed formulation
[AD-A090756] p0076 N81-12071

HODGES, G. E.
Final design and fabrication of an active control system for flutter suppression on a supercritical aeroelastic research wing
[NASA-CR-165714] p0498 N81-27110

HODGES, J.
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration
[ARC-R/M-3842-PT-2] p0021 N81-10010

HODGES, N. T.
Effects of commercial aircraft operating environment on composite materials
p0182 A81-22681
Some results from a crash energy absorption test for evaluating composite fuselage construction
p0575 A81-46638

HODGETTS, P. J.
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 2: Reliability evaluation and system definition for detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-10428

HODGKINS, P. D.
Discrete Address Beacon System - The obvious alternative
[SAE PAPER 800625] p0063 A81-15281

HODGKINSON, J.
Equivalent system analysis of translation rate command systems for hover and low speed flight
[AIAA PAPER 81-1858] p0560 A81-44557

HODGSON, D. E.
A solid-state airborne sensing system for remote sensing
p0183 A81-23034

HODGSON, T. H.
Trailing edge noise prediction from measured surface pressures
p0616 A81-48395

HOEKSTRA, T.
Helicopter-ship qualification testing
p0232 A81-24941

HOELLER, G.
AIRCAT 500 ATC systems for Australia and Mexico
p0407 A81-34329

HONNES, J. B.
Versatile and economical real-time simulation for digital flight control systems
[AIAA 81-0974] p0415 A81-36563

HOENLINGER, H.
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
Active suppression of aircraft flutter
p0059 A81-14397
Design and construction of a model which is dynamically similar to the A310 wing
[DGLR PAPER 81-035] p0608 A81-47356
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Active control of an explosive wing-store flutter case
[MBB-FE-17/S/PUB/25] p0131 N81-13973

HOEYMAKERS, A. H. W.
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28409

HOFFMAN, D. J.
Effects of commercial aircraft operating environment on composite materials
p0182 A81-22681
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165649] p0198 N81-16139
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-159362] p0343 N81-21131
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165765] p0550 N81-29165

HOFFMAN, H.
Processing of AIDS flight recorder data for a quick look with the aid of a hybrid computer system
p0304 N81-23023

HOFFMAN, J. D.
Analysis of steady, two-dimensional, chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique
[AIAA PAPER 81-1432] p0504 A81-40069

HOFFMAN, S.
Bibliography of Supersonic Cruise Research (SCR) program from 1977 to mid-1980
[NASA-RP-1063] p0139 N81-14973
HOFFMANN, W.
Some experience with ferrography in monitoring the condition of aircraft engines
p0205 A81-27943
HOFFNER, J. N.
Implementation of target orientation angles in improved Kalman filter based short range radar tracking
p0326 A81-30340
HOFMAN, C. F. G. M.
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
p0544 N81-29072
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] p0630 N81-32164
HOFMANN, L. G.
Integrated Flight and Weapon Control for improved tactical combat effectiveness
p0324 A81-30329
HOFMANN, W.
The collisicn course: Conditions, guidance laws and properties
[DFVLR-FB-80-06] p0127 N81-13942
HOGAN, T. A.
Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection
[AD-A093542] p0208 N81-17046
HOGG, G. W.
Issues regarding Army turboshaft engines diagnostics and condition monitoring
p0105 A81-17514
HOGGATT, J. T.
Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22106
HOGLUND, L. E.
Static source locations for four nozzles mounted on a J-85 engine
[NASA-CR-152401] p0143 N81-14998
HOH, R. H.
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook
[AIAA PAPER 81-0302] A81-20739
Low-order approaches to high-order systems - Problems and promises
[AIAA 81-1774] p0556 A81-44134
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163108] p0498 N81-27113
Development of handling quality criteria for aircraft with independent control of six degrees of freedom
[AD-A100045] p0498 N81-27117
HOLBECHE, T. A.
A novel airborne technique for free-field measurements of aircraft noise above the flight path with application to noise-shielding studies
[AIAA PAPER 81-2028] p0621 A81-48647
HOLBECK, H. J.
Parabolic Dish Solar Thermal Power Annual Program Review Proceedings
[NASA-CR-164696] p0587 N81-30525
HOLBEN, R. D.
An MTI /moving target indicator/ algorithm for passive sensors
p0320 A81-30239
Moving target identification /MTI/ algorithm for passive sensors
p0358 A81-32502
HOLBROOK, G. T.
Basic research in wake vortex alleviation using a variable twist wing
p0267 N81-19058
HOLCOMB, M. L.
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943
HOLDEMAN, J. D.
Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0303] p0164 A81-20740
Tabulations of ambient ozone data obtained by GASP airliners, March 1975 to December 1977
[NASA-TM-81528] p0096 N81-13568
Ozone contamination in aircraft cabins: Results from GASP data and analyses
[NASA-TM-81671] p0191 N81-16021
Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977
[NASA-TP-1807] p0345 N81-21685
HOLDRIDGE, R.
The technical and managerial challenge of integrated flight/fire control
[AIAA PAPER 81-1706] p0527 A81-43162
HOLDRIDGE, R. D.
Design of a lateral stability augmentation system for the F106 to improve lateral handling qualities during tracking
[AD-A091014] p0094 N81-13067
HOLEHOUSE, I.
Sonic fatigue design techniques for graphite-epoxy stiffened-skin panels
[AIAA 81-0633] p0305 A81-29488
HOLGER, D. K.
Prediction of changes in aircraft noise exposure
p0017 A81-11820
HOLLA, V. S.
Effect of rear stagnation point position and trailing edge bluntness on airfoil characteristics
p0170 A81-21013
HOLLENBAUGH, D.
The experimental and analytical definition of helicopter modeling effects
[AHS 80-4] p0473 A81-40139
HOLLEY, W. E.
Control design for reduction of aerodynamic tail forces using quadratic synthesis
p0240 A81-26610
HOLLIFIELD, P. J.
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-A098794] p0486 N81-26121
HOLLISTER, W. M.
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Display concepts for control configured vehicles
p0213 N81-17076
Electronic flight rules: An alternative separation assurance concept
[AD-A097570] p0387 N81-23063
HOLLOW, R. H.
Optical Fiber Illumination System for visual flight simulation
[NASA-CR-3409] p0343 N81-21086
HOLLOWELL, S. J.
Aeroelastic flutter and divergence of graphite/epoxy cantilevered plates with bending-torsion stiffness coupling
[AD-A101726] p0587 N81-30476
HOLLWEGER, D. J.
F/A-18A inlet/engine compatibility flight test results
[AIAA PAPER 81-1393] p0503 A81-40860
HOLMES, B. J.
Aerodynamic design data for a cruise-matched high performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779
Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
HOLMES, J. D.
GPS receiver simulation
p0173 A81-21913
HOLMES, J. E.
Methodology for engine/aircraft selection with life and utilization considerations
[AIAA PAPER 81-1401] p0515 A81-42190
HOLMES, R.
The vibration of a multi-bearing rotor
p0015 A81-11722
HOLMES, T. R.
A millimeter wave radar for U.S. Army helicopters in the 80's
p0323 A81-30302
HOLST, H.
German activities on wind tunnel corrections
p0436 N81-24124
HOLT, A. R., JR.
A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993

HOLT, D. R.
Advanced combat aircraft wing design
p0007 A81-11608
Some particular configuration effects on a thin supercritical variable camber wing
p0188 N81-16005

HOLTZMAN, J. C.
Computer generated radar images for navigation
p0049 A81-12793

HOMICZ, G. F.
Numerical simulations of a segmented-plenum, perforated, adaptive-wall wind tunnel
[AIAA PAPER 81-0160] p0162 A81-20640
Linearized analysis of the three-dimensional compressible flow through a rotating annular blade row
p0234 A81-25446
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088

HOMYAK, L.
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control
[AIAA PAPER 81-2049] p0619 A81-48621

HONAKER, J. D.
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-A098794] p0486 N81-26121

HONEY, M. J.
Developments in aircraft power flying control hydraulics
p0282 A81-27882

HONLINGER, H.
Active control of an explosive wing-store flutter case
p0082 N81-12117

HONN, R.
WR34-8 performance improvement program. The WR34-8 gas turbine compressor test
[AD-A098293] p0429 N81-24069

HOOKER, S.
History of the Pegasus vectored thrust engine
p0411 A81-35630

HOPKIN, V. D.
The measurement of the air traffic controller
p0053 A81-13415
Integration of navigational information in aircraft
p0407 A81-34336

HOPKINS, J.
The Global Positioning System versus gravity disturbance modeling in an inertial navigation system
[AIAA PAPER 81-0087] p0160 A81-20591

HOPPIN, G. S., III
Low-cost directionally-solidified turbine blades, volume 2
[NASA-CR-159562] p0078 N81-12088

HORIE, G.
Effects on inlet technology on cruise speed selection
p0245 N81-17998

HORLOCK, J. H.
Choking effects in the blade rows of turbomachines
p0061 A81-15269

HORN, W.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273

HORNE, C.
Unsteady fan blade pressure and acoustic radiation from a JT15D-1 turbofan engine at simulated forward speed
[AIAA PAPER 81-0096] p0161 A81-20598

HORNER, M. W.
Development of high-temperature turbine subsystem technology to a technology readiness status, phase 2
[PE-1806-72] p0134 N81-14332

HORNING, D. L.
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021

HORONJEFF, R.
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862

HOROWITZ, E.
Aerodynamic study of a hovering rotor
p0468 A81-40098

HOROWITZ, S. J.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] p0624 A81-49736

HOROWITZ, S. M.
An analysis of the requirements for and the costs and benefits of the National Microwave Landing System (MLS), volume 1
[AD-A099632] p0493 N81-27071
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS), volume 2
[AD-A100018] p0493 N81-27072
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS)
[AD-A100136] p0537 N81-28076

HORSTMANN, K. H.
Reduction of profile drag by blowing out through peg holes in areas of streamline separation bubbles
[DGLR PAPER 80-103] p0120 A81-19392

HORTON, G. J.
A microcomputer-based signal data converter for runway visual range measurements
[AD-A097568] p0386 N81-23060

HORTON, P. N.
The stretched C-14 - Cost effective application of structural technology
[AIAA 81-0514] p0302 A81-29427

HORVATH, D.
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design
[NASA-TM-81660] p0588 N81-30562

HOSEK, J. J.
Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953
Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954

HOSENFELD, H. G.
Application of model laws when determining the heat transfer coefficients by experiments on cooled turbine blades
p0089 N81-12998

HOSNY, W. M.
Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation
[NASA-CR-165141] p0143 N81-15004
TF34 engine compression system computer study
[NASA-CR-159889] p0143 N81-15005

HOUCK, J. A.
Operation and evaluation of the Terminal Configured Vehicle Mission Simulator in an automated terminal area metering and spacing ATC environment
p0171 A81-21709
A pilot training manual for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-81959] p0330 N81-20006

HOUGH, G. R.
Viscous flow drag reduction; Symposium, Dallas, Tex., November 7, 8, 1979, Technical Papers
p0238 A81-26501

HOUGHTON, W. W.
Acoustic emission as a NDE technique for determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070

HOUIS, C.
Creep properties of single-crystal nickel-based superalloys. II - Creep at medium temperature /760 C/
p0567 A81-46305

HOUNJET, M. H. L.
An improved potential gradient method to calculate airloads on oscillating supersonic interfering surfaces
[AIAA 81-0646] p0307 A81-29489
A panel method to determine loads on oscillating airfoils in transonic flow with embedded shock waves
[NLR-MP-80005-U] p0330 N81-20039

HOURIGAN, D. T.
Transducer installation for the Sea King MK 50

mathematical model validation flight tests
[AD-A089924] p0043 N81-11365
Sea King mathematical model validation trials.
Flight data channel calibration
[AD-A096587] p0374 N81-22043
HOUSE, E. E.
Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22106
HOUSER, S. J.
Fuel injector characterization studies
[NASA-CR-165200] p0143 N81-15003
HOUSTON, R. S.
Investigation of EMAT base system for the
detection of bolt hole type cracks. Part 1:
Detection of cracks in the inaccessible lower
half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419
HOUWINK, R.
A wind-tunnel study of the flutter characteristics
of a supercritical wing
p0306 A81-29504
HOWARD, F.
Engineering and development program plan
propulsion safety
[AD-A098709] p0444 N81-25088
HOWARD, J. C.
Influence of friction forces on the motion of VTOL
aircraft during landing operations on ships at sea
[NASA-TM-81305] p0579 N81-30080
HOWARD, R. W.
Progress in the use of automatic flight controls
in safety critical applications
p0284 A81-27902
HOWE, M. S.
Aerodynamic sound generated by a slotted trailing
edge
p0066 A81-15798
On the unsteady wake-induced lift on a slotted
airfoil. II - The influence of displacement
thickness fluctuations
p0229 A81-24237
The displacement-thickness theory of trailing edge
noise
p0340 A81-30785
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] p0619 A81-48625
HOWELL, G. A.
Evaluation of pressure and thermal data from a
wind tunnel test of a large-scale, powered, STOL
fighter model
[NASA-CR-166170] p0635 N81-33162
HOWELL, R. R.
A system for model access in tunnels with an
unbreathable test medium
p0015 A81-11672
HOWELL, W. E.
Civil aviation applications of Navstar/GPS through
differential techniques
p0177 A81-22374
HOWELLS, D. A.
Airports and earthquakes - An important subject
often ignored
p0482 A81-40750
HOWES, P.
Pulsed laser mapping system for light aircraft
p0223 A81-23671
HOY, B. E.
An aircraft manufacturer's view of airport R&D needs
[AIAA PAPER 81-0793] p0368 A81-33887
HOYT, J.
Saudi Arabia's new Gateway Airports
p0115 A81-18093
HOYT, J. W.
Drag reduction - Jet breakup correlation with
kerosene-based additives
p0225 A81-23923
HOZUMI, K.
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
HRABAK, R. R.
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials,
part 1
[NASA-CR-164684] p0583 N81-30134
A program to evaluate a control system based on
feedback of aerodynamic pressure differentials.
Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135
HRASTAR, J. A., SR.
Apparatus for and method of compensating dynamic
unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
HRYCAK, P.
Heat transfer from a row of impinging jets to
concave cylindrical surfaces
p0231 A81-24920
Simulation of aeroheating or aerocooling Air Force
stores by arrays of impinging jets
[AD-A095464] p0330 N81-20038
HSIA, E. S.
Sensitivity of turbine blade temperatures to
tolerances of design variables
[ASME PAPER 81-GT-90] p0314 A81-29997
HSIAO, J. K.
Simulation of Microwave Landing System
p0615 A81-48360
HSIEH, T.
Calculation of viscous, sonic flow over
hemisphere-cylinder at 19 deg incidence - The
capturing of nose vortices
[AIAA PAPER 81-0189] p0162 A81-20661
HSIN, C.-C.
Modeling of the terminal area Air Traffic
Management and Control
p0114 A81-18085
HSU, C. F.
Analytically determined fin-tip heat transfer
coefficients
p0234 A81-25585
HSU, D. A.
The evaluation of aircraft collision probabilities
at intersecting air routes
p0174 A81-21967
HSU, L. L.
Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24068
HSU, T. M.
Part-through crack problems in aircraft structures
p0001 A81-10362
HSU, T.-K.
Coupled rotor/airframe vibration analysis by a
combined harmonic-balance, impedance-matching
method
[AHS 80-21] p0474 A81-40151
HU, H.
A preliminary experimental investigation of the
response of a turbojet engine to inlet pressure
distortion
p0108 A81-17824
The measurement and analysis of station parameters
of a turbojet engine
p0109 A81-17825
HUANG, H.
Lifting surface theory and the numerical method of
wings with small angles of sideslip at subsonic
and supersonic speeds
p0224 A81-23851
Grid generation for general three-dimensional
configurations
p0137 N81-14714
HUANG, Z.-Z.
The effect of oxygen concentration distribution on
altitude relighting performance of a turbo-jet
engine combustor
p0295 A81-29089
Some factors affecting altitude relighting
performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962
HUBBARD, R. B., III
An analysis of Air Force management of Turbine
Engine Monitoring Systems (TEMS)
[AD-A089365] p0028 N81-10070
HUBBARD, H. H.
Status of knowledge of sonic booms
p0017 A81-11822
Aircraft noise control in the 1980's
p0567 A81-46352
Acoustic facilities for human factors research at
NASA Langley Research Center: Description and
operational capabilities
[NASA-TM-81975] p0446 N81-25765
HUBBARD, W. L.
Evolutions in business jet fuel systems as seen in
the Falcon Jet series
[SAE PAPER 800621] p0062 A81-15239
HUBER, H.
Helicopter flight characteristics improvement

through swept-tip rotor blades
[MBB-UD-275-79-0] p0018 A81-12097
Development of a bearingless helicopter tailrotor
p0465 A81-39897
Development of a bearingless helicopter tail rotor
[MBB-UD-304/80-OE] p0586 N81-30199

HUBER, H. F.
Compensating linkage for main rotor control
[NASA-CASE-LAR-11797-1] p0270 N81-19087

HUBERSON, S.
Numerical computation of flows with rolled-up vortex sheets
p0255 N81-18256

HUBLER, G. K.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

HUDSON, D. A.
Problems and promises in gas turbine combustor design development
p0236 A81-26007

HUDSON, K. E.
The influence of beards on the efficiency of aviators' oxygen masks
p0176 A81-22100

HUDSON, M. S.
Ceramic applications in turbine engines
[NASA-CR-159865] p0274 N81-19118

HUECK, M.
Fatigue test program and test results
p0489 N81-26142

HUELLEC, R.
The state of the technologies involved in the forming of TA6V titanium alloy
pC416 A81-36659

HUESCHEN, R. M.
Guidance and control system research for improved terminal area operations
p0264 N81-19038
Flight evaluation of a simple total energy-rate system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24058

HUFFMAN, J. K.
Hinged strakes for enhanced maneuverability at high angles of attack
[AIAA PAPRE 81-0357] p0165 A81-20776
Leading-edge deflection optimization for a highly swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974
Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982

HUGHES, A. J.
Liquid crystal displays
p0212 N81-17068

HUGHES, B.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24041

HUGHES, D. L.
Comparison of three thrust calculation methods using in-flight thrust data
[NASA-TM-81360] p0581 N81-30111

HUGHES, P. R.
Aircraft engine nacelle fire test simulator. Volume 1: Technical
[AD-A089629] p0030 N81-10081

HUGUENIN, F. E.
Microcomputer based engine model used in flight simulation applications
[AIAA 81-0973] p0415 A81-36562

HUGUENIN, H.
Study of an experimental probe for the measurement of the acoustic pressure inside an air flow
[ESA-TT-633] p0344 N81-21340

HUI, K. C. K.
Airship survivability in atmospheric turbulence
[AIAA 81-1323] p0456 A81-38533

HUI, W. H.
Unsteady Newton-Busemann flow theory. I - Airfoils
p0234 A81-25512

HUIE, R.
Balanced design: Minimum cost solution
p0047 N81-11919

HUJECEK, Z.
Pressure fluctuations on the surface of a small passenger aircraft. I - Periodic disturbances caused by the rotation of the propeller
p0561 A81-44615
Pressure fluctuations on the surface of a small passenger aircraft. II - The effect of the turbulent boundary layer
p0562 A81-44618

HULIN, P. H.
Computer Generated Imagery (CGI) current technology and cost measures feasibility study
[AD-A091636] p0146 N81-15729

HULING, S. F.
Robust autoregressive models for predicting aircraft motion from noisy data
p0155 A81-20073

HULL, D. G.
Modern control synthesis applied to the longitudinal decoupled motion of an aircraft
[AIAA 81-1839] p0555 A81-44123

HULL, G. G.
High-voltage spark carbon-fiber sticky-tape data analyzer
[NASA-CR-163747] p0087 N81-12646

HULSLANDER, D. D.
Standard INS program status
p0511 A81-41753

HUMBAD, N. G.
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] p0619 A81-48615

HUMMEL, D.
Drag reduction through formation flight
[DGLR PAPER 80-106] p0120 A81-19393
Investigations of vortex formation on wings with cropped leading edges
[DGLR PAPER 81-046] p0610 A81-47601
Experimental investigation of the flow on the suction side of a thin Delta wing
[NASA-TM-75897] p0338 N81-21024

HUMMES, D.
Flight tests and statistical data analysis for flying qualities investigations
p0471 A81-40121

HUMPHREYS, D. A.
Three-dimensional wing boundary layer calculated with eight different methods
p0171 A81-21555

HUNG, C. M.
Thin-layer approximation for three-dimensional supersonic corner flows
p0067 A81-13900

HUNT, B.
Computational fluid mechanics and its impact on the aircraft aerodynamicist
[DGLR PAPER 81-003] p0611 A81-47621

HUNT, B. L.
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878
Effect of in-flight thrust reverser deployment on tactical aircraft stability and control
[AIAA PAPER 81-1446] p05C4 A81-40879
Determination of thrust and throttle-dependent drag for fighter aircraft
[AIAA PAPER 81-1692] p0617 A81-48417
Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft
[NASA-TM-81292] p0428 N81-24066

HUNT, G. H.
Airborne electronic displays
p0364 A81-32999

HUNT, M. S.
Use of composite materials for helicopter rotor blades
[CSIR-ME-1674] p0550 N81-29167

HUNTER, J.
The technical and managerial challenge of integrated flight/fire control
[AIAA PAPER 81-1706] p0527 A81-43162

HUNTER, J. S.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068

HUNTER, L.
Study of an engine flow diverter system for a large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096

HUNTER, L. G., JR.
F-16 variable-geometry inlet design and performance
[AIAA PAPER 81-1394] p0514 A81-42184

HUNTER, P. B.
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260

HUNTING, A. W.
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180

HURD, R.
V/STOL combat aircraft progress from the powerplant viewpoint
p0469 A81-40105

HURLEY, J. F.
Advanced technology turboshaft IR suppression
p0106 A81-17519
Design of an exhaust mixer nozzle for the Avco-Lycoming Quiet Clean General Aviation Turbofan (QCGAT)
[NASA-CR-159426] p0274 N81-19120

HURRASS, K.
The reconstruction of flight paths from AIDS data with the aid of modern filtering methods
p0383 N81-23021

HURRY, M. F.
Engine in-flight data collection and analysis in United Kingdom aircraft
p0431 N81-24085

HURST, L. G.
Low-cost directionally-solidified turbine blades, volume 2
[NASA-CR-159562] p0078 N81-12088
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27098

HURTLE, J. E.
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration
[AIAA PAPER 81-1498] p0506 A81-40910

HUSBANDS, C. R.
An airborne integrated communications network utilizing fiber optics
p0173 A81-21880
The evolution of fiber optics in avionics
[SAE PAPER 801145] p0398 A81-34174

HUSON, G. G.
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AD-A101309] p0581 N81-30116

HUSTED, P.
Advanced technology turboshaft IR suppression
p0106 A81-17519

HUTCHINGS, T. J.
Ring laser gyro
[AD-A090643] p0085 N81-12395

HUTSON, R. M.
UK pavement design and evaluation - A new approach
p0113 A81-18076

HUTTON, P. H.
In-flight fatigue crack monitoring using acoustic emission
p0361 A81-32857

HUTTSELL, L. J.
Evaluation of methods for prediction and prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469

HWANG, C.
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116

HWANG, J. C.
Numerical calculation of jet-induced ground effect in VTOL
[AIAA PAPER 81-0015] p0157 A81-20539

HYDE, R. B.
LPI, short-range communications between aircraft in rendezvous
p0177 A81-22493

HYMAN, A.
Helicopter electro-optical system display requirements. 1. The effects of CRT display size, system gamma function, and terrain type on pilots required display luminance
[AD-A089755] p0035 N81-11035

I

IABLONSKAIA, V. A.
Choice of optimal parameters of a gyrovertical on the basis of a standard program
p0622 A81-48744

IANITSKII, V. E.
Nonstationary method for the direct statistical modeling of rarefied-gas flows
p0069 A81-16454

IANKO, A. K.
Efficiency of the methods and algorithms used for estimating the reliability in aviation techniques
p0365 A81-33173

IANKO, G. K.
Aircraft instruments and measuring systems
p0564 A81-45608

IASNII, P. V.
Laws of unstable crack growth under cyclic loading
p0236 A81-25701

IBOSHI, N.
Experimental substantiation for hovering rotor vertical impedance calculations
p0453 A81-38015

IDE, F.
Research on vortex bursting in compressible flow
p0230 A81-24477

IGNATOV, V. A.
Wire communication systems and equipment at airports
p0289 A81-28745

IGOE, W. B.
Characteristics and status of the US National Transonic Facility
p0030 N81-11065
Description of 0.186-scale model of high-speed duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061

IGRA, O.
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002

IHARA, R.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476

IIDA, H.
Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I
p0229 A81-24090

IIDA, S.
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873

INUI, T.
Self-excited oscillations of supersonic flow in a sudden enlargement of a duct
p0228 A81-24081

ILCHENKO, M. A.
Sound generation by vortex shedding from a profile within a channel
p0054 A81-13570
Generation of vortex noise in flow past a profile in a channel
p0230 A81-26134

ILENKO, V. I.
The problem of the unsteady hypersonic flow past a plane profile
p0231 A81-24730

ILIANNOV, A. I.
Principles of aircraft-engine assembly
p0355 A81-31799

ILIFF, K. W.
Estimation of dynamic stability parameters from drop model flight tests
p0410 A81-35551
Estimation of dynamic stability parameters from drop model flight tests
p0591 N81-31116

ILINSKII, V. V.
Test stand for the experimental study of auxiliary power supplies
p0319 A81-30153

INDRIK, A. P.
A geometrical study of the steady-state spin for a typical low-wing general aviation aircraft
p0454 A81-38023

IMHOF, G. W.
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21048

IMMARIGEON, J. P. A.
The rejuvenation of properties in turbine engine hot section components by hot isostatic pressing
[AD-A097551] p0390 N81-23088

INDEL, I. N.
Evaluation of RF anechoic chamber fire protection systems
[AD-A092478] p0197 N81-16070

INGARD, K. U.
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845

INGEGNERI, J.
A microprocessor based land navigator
p0360 A81-32833

INGELMAN-SUNDBERG, M.
Optimizing the fixed leading edge shape of a transonic wing to suit the landing high-lift requirements
p0011 A81-11644

INN, E. C. Y.
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741

INNIS, R. C.
Flight evaluation of stabilization and command augmentation system concepts and cockpit displays during approach and landing of powered-lift STOL aircraft
[NASA-TP-1551] p0037 N81-11044
Flight-test evaluation of STOL control and flight director concepts in a powered-lift aircraft flying curved decelerating approaches
[NASA-TP-1641] p0275 N81-19131
Flight evaluation of the STOL flare and landing during night operations
[NASA-TM-81312] p0629 N81-32151

INNOCENTI, M.
Pilot-optimal multivariable control synthesis by output feedback
[NASA-CR-163112] p0540 N81-28102

IONESCU, D.
Reduction of the take-off ground run distance to a given set of atmospheric condition
p0010 A81-11634

IRONS, G. S.
Features improved cooling - Turbine blade redesign boosts life
p0227 A81-24046

IRVINE, R. D.
Air augmentation of rockets for low speed application
p0292 A81-29068

IRWIN, W. J.
Microwave system for real time space position measurement
p0545 N81-29089

ISAAC, P. D.
Assessment of scene complexity and cue validity in visual flight simulation
[AD-A100200] p0541 N81-28109

ISAENKO, V. I.
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174

ISAEV, S. A.
Numerical simulation of supersonic flow around solids of revolution with a leading detachment zone
p0231 A81-24757

ISAEV, V. V.
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307

ISBERG, C.
Arts 2 enhancement design alternative study
[AD-A096276] p0339 N81-21049

ISHII, S.
A study of air breathing rockets - Subsonic mode combustion
[IAF PAPER 80-F-270] p0115 A81-18371

ISHIKAWA, T.
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] p0639 N81-3323

ISOGAI, K.
Transonic dip mechanism of flutter of a sweptback wing. II
p0559 A81-4440
Numerical study of transonic flutter of a two dimensional airfoil
[NAL-TR-617T] p0090 N81-1392

ISOM, M. P.
Acoustic shock waves generated by a transonic helicopter blade
[AHS 80-63] p0479 A81-4018

ISQUIERDO, M.
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-4412

ITO, T.
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] p0627 N81-3211

IUDIN, A. I.
Test-stand combustion chamber for the study and development of forced working processes
p0319 A81-3015

IURKOV, A. V.
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-2473

IVANCHUK, N. A.
Detection of moving objects
p0118 A81-1877

IVANOV, A. V.
Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles
p0285 A81-2813

IVANOV, I. A.
Aircraft instruments and measuring systems
p0564 A81-4560

IVANOV, V. A.
An example of the transonic flow past a body with a discontinuity in the contour curvature
p0019 A81-1236

IVANOV, V. I.
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-2021

IVANOV, V. S.
Basic problem of the analytical design of aircraft gas turbine engines. II
p0299 A81-2930

IVANOV, V. V.
Optimization of airplane time to reach a given flight altitude and speed
p0235 A81-2568

IVASHCHENKO, I. A.
Design of production processes for flight-vehicle engines
p0623 A81-4947

IWAI, J.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-1287

IWAMOTO, J.
Three dimensional flow in annular diffusers with two vortex distributions at entry
p0297 A81-2911

IWATSUBO, T.
The balancing of flexible rotors - Theoretical relation of each balancing method and accuracies
p0228 A81-2

IZADPANAH, A. P.
Helicopter trim by periodic shooting with Newton-Raphson iteration
p0573 A81-4462

J

JACKSON, A. C.
Development of graphite-epoxy covers for L-1011 advanced composite vertical fin
p0530 A81-4

JACKSON, T. A.
The evaluation of fuel property effects on air

Force gas turbine engines - Program Genesis
[ASME PAPER 81-GT-1] p0310 A81-29926

JACOB, K.
Experimental investigation of a right angle wing with partially separated flow with and without ground effects
[DGLR PAPER 80-111] p0120 A81-19397

JACOBS, H. P.
Rebuild of aircraft ground support equipment
[SAE PAPER 801238] p0406 A81-34236

JACOBS, P. F.
The NET Horizontal Tails Investigation and the NET Lateral Controls Investigation
p0260 N81-19009

JACOBSON, I. D.
Minimum noise impact aircraft trajectories
[NASA-CR-164719] p0594 N81-31159

JACOBSON, L. J.
Perspectives on the civil utilization of the Navstar/GPS
p0409 A81-35023

JACOBY, J. L.
Holographic investigation of slender body vortex wakes
[AD-A089496] p0021 N81-10008

JACOCKS, J. L.
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-49979
Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106

JACOVITTI, G.
Parameter estimation of an SSR amplitude comparison monopulse extractor
p0571 A81-46537

JACQUOT, B.
Total energy and flight control
[SNIAS-802-111-102] p0434 N81-24110

JAEGER, D.
EMC, lightning and NEMP-protection-new requirements for approved specifications when using CFRP
p0199 N81-16152

JAEKEL, R. F.
Extended frequency turbofan model
[NASA-CR-165261] p0335 N81-20078

JAGO, S.
Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information
[NASA-TM-81171] p0548 N81-29127

JAGO, S. J.
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420

JAIN, R. K.
Computation of pressure distribution on the DFVLR wing-body model by the panel method
[DFVLR-FB-80-02] p0372 N81-22029

JAKOB, H.
Civil component program Wing Section. New calculation methods for subsonic and transonic interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034

JAKUBOWSKI, A. K.
Flow separation in inlets at incidence angles
p0297 A81-29114

JAMES, A. D.
JT8D engine performance retention
p0598 N81-31200

JAMES, D. S.
An X-band power GaAs FET amplifier for military avionics radar applications
p0350 A81-31122

JAMES, L. L.
Omega - An economic Loran A replacement
p0113 A81-18077

JAMES, R. M.
New approach to the solution of large, full matrix equations
p0171 A81-21552

JAMESON, A.
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986

JAMISON, G. S.
Feasibility study for C-141B reduction of wing loads by uprigging the ailerons
[AD-A094634] p0272 N81-19105

JANAKIRAM, D. S.
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] p0628 A81-49732

JANIK, S.
Digital control for helicopter powerplants
p0104 A81-17504

JANK, T.
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[DFVLR-FB-80-01] p0132 N81-14195

JANOVICZ, M. A.
Ceramic applications in turbine engines
[NASA-CR-159865] p0274 N81-19116

JANSEN, B. J., JR.
Flow visualization through the use of the smoke-wire technique
[AIAA PAPER 81-0412] p0160 A81-20816

JANUEL, MR.
Aerodynamic trials with the linear motor-driven platform at the Toulouse Aeronautic Testing Center
[AAAF PAPER NT 80-41] p0369 A81-33943

JANUS, A. S.
JT8D-15/17 high pressure turbine root discharged blade performance improvement
[NASA-CR-165220] p0214 N81-17080

JARMARK, B. S. A.
The variable-speed tail-chase aerial combat problem
p0351 A81-31295

JARRIGE, F.
Light aviation in the United States - September 1980
p0513 A81-41903

JARVIS, C. R.
Ground and flight test experience with a triple redundant digital fly by wire control system
p0259 N81-19006

JAVED, M. A.
Application of vortex lattice methods to calculate Lv (rolling moment due to sideslip)
[PB81-166167] p0487 N81-26123

JAY, A.
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093

JAY, R. L.
The effects of solidity, interblade phase angle and reduced frequency on the time-variant aerodynamic response of a compressor stator
[AD-A090546] p0081 N81-12108

JAYACHANDRAN, T.
Methodology for determining sampling intervals
[AD-A092591] p0202 N81-16825

JEANS, L. L.
Fatigue sensitivity of composite structure for fighter aircraft
[AIAA 81-0495] p0300 A81-29383

JEFFERS, J.
Semi-actuator disk theory for compressor choke flutter
[NASA-CR-3426] p0442 N81-25075

JEFFERY, P. A. E.
Compensating linkage for main rotor control
[NASA-CASE-LAR-11797-1] p0270 N81-19087

JEN, H. F.
Cooling air flow characteristics in gas turbine components
[ASME PAPER 81-GT-76] p0313 A81-29984

JENKINS, D.
Development of an aviator's night vision imaging system /ANVIS/
p0463 A81-39573

JENKINS, J. M.
The effect of thermal stresses on the integrity of three built-up aircraft structures
[NASA-TM-81352] p0075 N81-12064
A comparison of laboratory measured temperatures with predictions for a spar/skin type aircraft structure
[NASA-TM-81359] p0387 N81-23067

JENKINS, M. W. M.
In-flight research - At low cost
p0299 A81-29208

Free flight research at Lockheed-Georgia
[SAE PAPER 810567] p0518 A81-42732
JENKINS, R. C.
VTOL in ground effect flows for closely spaced jets
[NASA-CR-152321] p0271 N81-19095
JENNEY, D. S.
ABC aircraft development status
p0467 A81-40084
JENNINGS, D. M.
U.S. Navy/USAF development of Tactical Aircrew Combat Training System/Air Combat Maneuvering Instrumentation /TACTS/ACMI/
[SAE PAPER 801183] p0401 A81-34196
JENNY, R. J.
Aerodynamic blade excitation in turbocompressors
p0282 A81-27612
JENSEN, R. S.
Methodological approaches to identifying relevant features for visual flight
[AD-A100199] p0541 N81-28108
JERACKI, R. J.
Low and high speed propellers for general aviation - Performance potential and recent wind tunnel test results
p0521 A81-42758
Low and high speed propellers for general aviation: Performance potential and recent wind tunnel test results
[NASA-TM-81745] p0338 N81-21028
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838
Additional noise data on the SR-3 propeller
[NASA-TM-81736] p0447 N81-25767
JESKE, J. A.
Influence of sideslip on the kinematics of the helicopter in steady coordinated turns
p0576 A81-46644
Kinematic properties of the helicopter in coordinated turns
[NASA-TP-1773] p0374 N81-22039
JETT, C. B.
An opto-electronic method for wind tunnel model alignment
p0361 A81-32849
JEWELL, W. F.
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook
[AIAA PAPER 81-0302] A81-20739
JEX, H. R.
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Generic multi-body formulation of heavy lift airship equations of motion
p0563 A81-45539
JIANG, F.
Tests for inlet distortion in a two-spool turbojet engine on the ground test bed
p0419 A81-37340
JIANG, H. K.
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[AIAA PAPER 81-1467] p0505 A81-40887
JIANG, J.
The matrix analysis of wings
p0108 A81-17818
JIANG, Z.
The biparametric cycle count method and the principle of simplification
p0419 A81-37337
JINES, L. A.
SAFEST computer simulation of ejection seat performance
p0175 A81-22089
JOHANSSON, B. C. A.
The velocity induced by the wake of a wind turbine in a shear layer, including ground effect
[FFA-TN-HU-2189-PT-3] p0141 N81-14985
JOHN, A. J.
The rating of helicopter noise: Development of a proposed impulse correction
[NPL-AC-93] p0138 N81-14792
JOHN, L. K.
Fibre reinforced composite applications at De Havilland
[SAE PAPER 810640] p0524 A81-42784

JOHNSON, C. B.
Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel
[AIAA PAPER 81-1062] p0459 A81-39070
JOHNSON, C. D.
A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] p0632 N81-33135
JOHNSON, E. H.
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116
JOHNSON, E. S.
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Flight and tunnel test results of the MDC mechanical jet noise suppressor nozzle
p0245 N81-18000
JOHNSON, F.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
JOHNSON, F. B.
Problems of voice communication in helicopters
p0151 A81-20074
JOHNSON, F. T.
Aerodynamic modeling of an oscillating wing with external stores
[AIAA 81-0648] p0307 A81-29501
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022
JOHNSON, G. L.
Aircraft accident investigation as it relates to life support equipment
p0176 A81-22103
JOHNSON, J. C.
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25671
JOHNSON, J. L., JR.
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
Applications of dynamic stability parameters to problems in aircraft dynamics
p0592 N81-31122
JOHNSON, J. W.
A resin injection technique for the fabrication of aero engine composite components
[PNR-90024] p0131 N81-18004
JOHNSON, K. G.
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518
Pseudosteady-state analysis of nonlinear aircraft maneuvers
[NASA-TP-1758] p0094 N81-13065
JOHNSON, K. L.
A-10A Operational Flight Trainer simulator flight control system and aerodynamics
[AIAA 81-0964] p0414 A81-3655
JOHNSON, P. E.
Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-1801
JOHNSON, R. B.
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23
JOHNSON, R. E.
Automating airborne company communications
p0112 A81-18
JOHNSON, R. L.
Helicopter electro-optical system display requirements. 1. The effects of CRT display size, system gamma function, and terrain type on pilots required display luminance
[AD-A089755] p0035 N81-11
JOHNSON, S. C.
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19
JOHNSON, S. L.
Display motion relationships
p0064 A81-15

JOHNSON, T. D., JR.
Subsonic pitch-up alleviation on a 74 deg delta wing
[NASA-CR-165749] p0584 N81-30137
JOHNSON, T. W.
Electromagnetic scattering by open circular waveguides
[AD-A095554] p0336 N81-20345
JOHNSON, W.
Mini-RPV radar test program
p0180 A81-22619
Comparison of calculated and measured helicopter rotor lateral flapping angles
p0357 A81-32018
Development of a comprehensive analysis for rotorcraft. I - Rotor model and wake analysis
p0465 A81-39896
Helicopter theory
p0513 A81-41823
JOHNSTON, D. E.
Investigation of high-angle-of-attack maneuver-limiting factors. Part 1: Analysis and simulation
[AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack maneuver-limiting factors. Part 2: Piloted simulation assessment of Bihrle departure criteria
[AD-A101647] p0581 N81-30114
Investigation of high-angle-of-attack maneuver-limiting factors. Part 3: Appendices, aerodynamic models
[AD-A101648] p0581 N81-30115
JOHNSTON, G. W.
Sound radiation from a finite length unflanged circular duct with uniform axial flow. I - Theoretical analysis. II - Computed radiation characteristics
p0100 A81-16712
Aircraft annoyance evaluations using field and laboratory simulation techniques
[UTIAS-248] p0146 N81-15580
JOHNSTON, J. F.
Attenuation of propeller related vibration and noise
[AIAA 81-0521] p0303 A81-29442
JOHNSTON, R.
Cockpit simulation study of use of flight path angle for instrument approaches
[NASA-CR-165708] p0425 N81-24040
JOHNSTON, R. H.
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021
JOHNSTON, R. P.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
JONST, E.
New structural technologies for future fighters
p0458 A81-38805
JOLIEN, E. S.
Airspace simulation in airport system planning
p0114 A81-18086
JONES, B. L.
Flight control system analysis and design for a remotely piloted vehicle with thrust vectoring unit
[AD-A100808] p0540 N81-28105
JONES, D. J.
Transonic axisymmetric bodies with minimal wave drag
p0102 A81-17048
Comparison of two methods for the reduction of free decaying data in aircraft flutter tests
[NAE-LTR-HA-43] p0298 A81-29145
On the design of modern airfoil sections by numerical methods
p0347 A81-30705
JONES, E. J.
Summary of AGARD Lecture Series 107: The Application of Design to Cost and Life Cycle Cost to Aircraft Engines
p0047 N81-11926
JONES, G.
The jet engine - Anniversary of a missed opportunity
p0061 A81-15168
JONES, I. P.
Leading-edge separation from a slender rolling wing-body combination
[RAE-TR-80039] p0330 N81-20040
JONES, J. D.
Math model study, runway 16R instrument landing system localizer at Seattle-Tacoma Airport, Washington
[AD-A095076] p0270 N81-19085
JONES, J. E.
Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels
[NASA-CR-152145] p0276 N81-19136
JONES, J. G.
Modelling of gusts and wind shear for aircraft assessment and certification
p0528 A81-43376
JONES, J. M.
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 1
[RAE-TR-79052-VOL-1] p0026 N81-10044
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 2
[RAE-TR-79052-VOL-2] p0026 N81-10045
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 3
[RAE-TR-79052-VOL-3] p0026 N81-10046
Evolution of techniques for LCC analysis
p0045 N81-11909
JONES, R.
Thermal considerations in the patching of metal sheets with composite overlays
p0153 A81-20297
Developments in the analysis and repair of cracked and uncracked structures
p0354 A81-31561
Application of BFRP Crack Patching to Mirage III aircraft
p0481 A81-40586
Determination of in-flight helicopter loads
p0573 A81-46618
Structural design of BFRP patches for Mirage wing repair
[AD-A097195] p0384 N81-23024
Analysis of composite laminates and fiber composite repair schemes
[AD-A099629] p0499 N81-27206
JONES, R. E.
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0101 A81-17044
Airline flight departure procedures - Choosing between noise abatement, minimum fuel consumption and minimum cost
p0420 A81-37416
Selected results from combustion research at the Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859
Selected results from combustion research at the Lewis Research Center
[NASA-TM-82627] p0443 N81-25083
JONES, R. T.
Wing flapping with minimum energy
p0283 A81-27889
JONES, S. P.
Aerodynamic estimation techniques for aerostats and airships
[AIAA 81-1339] p0457 A81-38542
JONES, W. D.
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051
JONES, W. P.
A comparison of two droplet models for gas-turbine combustion chamber flows
p0294 A81-29086
JONES, W. R.
Recommendations for the NASA Avionics program for the 1980's
p0517 A81-42436
A resin injection technique for the fabrication of aero engine composite components
[PNR-90024] p0133 N81-14004
JOPLIN, S. D.
A system for model access in tunnels with an unbreathable test medium
p0015 A81-11672
JORDAN, P. F.
On some methods of supersonic unsteady lifting surface analysis

[AIAA 81-0644] p0307 A81-29497

JORGENSEN, D. S.
The measurement of pressure distribution around a parachute canopy
p0067 A81-16019
Effects of drive slots on parachute performance
p0453 A81-38020

JOSEPH, K. M.
Navstar GPS receiver for satellite applications
p0485 N81-26111

JOSEPHSON, P. D.
National runway friction measurement program
[AD-A097334] p0391 N81-23097

JOSHI, D. S.
Motion-base simulator results of advanced supersonic transport handling qualities with active controls
[AIAA 81-1819] p0555 A81-44109
Lateral-directional flying qualities of transport aircraft
[AIAA PAPER 81-1887] p0561 A81-44579

JOSSE
The annoyance caused by noise around airports
[NASA-TM-75784] p0146 N81-15579

JOST, G. S.
Fatigue life variability in aluminum alloy aircraft structures
[AD-A097190] p0391 N81-23249
A review of Australian investigations on aeronautical fatigue
[AD-A098300] p0426 N81-24051

JOU, W. H.
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986

JOUBERT, F. M.
Analysis of a reverse flow, annular combustion chamber
p0294 A81-29081

JOYCE, G. T.
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 1: Study overview
[NASA-CR-152391-VOL-1] p0384 N81-23030
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 2: Evaluation of prediction methodologies
[NASA-CR-152391-VOL-2] p0384 N81-23031
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 3: Effects of configuration variations from baseline
[NASA-CR-152391-VOL-3] p0384 N81-23032
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 4: RALS R104 aerodynamic characteristics and comparisons with R205 configuration aerodynamic characteristics
[NASA-CR-152391-VOL-4] p0384 N81-23033

JOSWIAK, R.
Test stand for the study of flow systems in wind tunnels
p0409 A81-35009

JUBE, G.
The effect of the in-service environment on composite materials (resume of the April 1980 Athens conference)
p0199 N81-16146

JUPP, J. A.
Interference aspects of the A310 high speed wing configuration
p0188 N81-16001

JUREY, L. F.
Integrated active controls impact on supersonic cruise vehicle structural design
[SAE PAPER 801210] p0404 A81-34218

JUSTICE, R. D.
Function generation techniques
p0614 A81-48329

JUSTICE, R. A.
A versatile microprocessor controller for low cost helicopter applications
[ASME PAPER 81-GT-137] p0316 A81-30039

JUTRAS, R.
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078
Supersonic stall flutter of high speed fans
[NASA-TM-81613] p0140 N81-1497

K

KABELEVSKII, N. G.
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-3316

KADOTA, T.
An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
p0109 A81-170

KADOYA, Y.
On the numerical analysis of stall flutter in turbine cascade
p0613 A81-479

KADUSHIN, I.
Application of variable structure system theory to aircraft flight control
[NASA-CR-164321] p0391 N81-230

KADYSHEV, I. K.
Aircraft instruments and measuring systems
p0564 A81-456

KAEHLER, H.
State-of-the-art review of flywheel burst containment
[UCRL-15257] p0085 N81-124

KAGITOMI, I.
BK 117: A new helicopter through international cooperation
[MBB-UD-274/79-OE] p0582 N81-3012

KAHANEK, V.
Philosophy of safety and reliability
p0561 A81-4461

KAJIYA, J.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-2932

KAKEHI, Y.
Reduction of strut induced rotor blade vibration with the modified stator setting angles
p0295 A81-290

KALBE, H.
Detection and location of faults in onboard aircraft systems with the aid of the Automatic Fault Identification System (AFIS)
p0383 N81-2302

KALBERG, I. V.
Aircraft instruments and measuring systems
p0564 A81-456

KALEMARIS, S. G.
Feasibility of forward-swept wing technology for V/STOL aircraft
[SAE PAPER 801176] p0400 A81-341

KALETKA, J.
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
p0471 A81-4012
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
[MBB-UD-307/80-OE] p0580 N81-301

KALMANASH, M.
High contrast CRT module
[AD-A097727] p0437 N81-243

KALNIN, V. M.
Hydrodynamic modelling of the starting process in liquid-propellant engines
p0351 A81-312

KAMBE, T.
Sound radiation from vortex systems
p0171 A81-215

KAMBER, E.
The practical application of the Wake Blocking Corrections according to Maskell
[DGLR PAPER 80-112] p0121 A81-153

KAMINER, A. A.
Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream
p0060 A81-14
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47

KAMINS, M.
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment

[NASA-CR-152149] p0273 N81-19111
KAMIYA, N.
Research on transonic wings at the National Aerospace Laboratory, Japan
p0011 A81-11640
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] p0627 N81-32118
KAN, H. P.
Fatigue sensitivity of composite structure for fighter aircraft
[AIAA 81-0495] p0300 A81-29383
KANALY, D. B.
Achieving the full benefits of integrated multiplex in the 1980's
[AHS 80-15] p0474 A81-40146
KANDIL, O. A.
A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14398
Numerical prediction of vortex cores of the leading and trailing edges of delta wings
p0059 A81-14475
Development of a nonlinear vortex method
[NASA-CR-164351] p0423 N81-24024
KANWAL, R. P.
Approximations and short cuts based on generalized functions
p0347 A81-30730
KAPLAN, B. P.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-3M-500 jet engine
p0395 A81-34022
KAPLAN, R. L.
Articulating user requirements for the commuter aircraft industry
[AIAA PAPER 81-1733] p0528 A81-43171
KAPRALOV, N. V.
The problem of hoar-frost formation in aircraft fuel tanks
p0319 A81-30159
KARAMCHETI, K.
Partially confined multiple jet mixing
p0234 A81-25513
KARCHER, R. A.
An airborne programmable digital to video converter interface and operation manual
[AD-A096422] p0446 N81-25691
KARCHMER, A.
Core noise measurements from a small, general aviation turbofan engine
p0178 A81-22531
Core noise measurements from a small, general aviation turbofan engine
[NASA-TM-81610] p0044 N81-11769
Conditioned pressure spectra and coherence measurements in the core of a turbofan engine
[NASA-TM-82688] p0509 N81-30907
KARGER, W. J.
Aerodynamic integration of externally mounted engines on a long-range bomber
[AIAA PAPER 81-1653] p0563 A81-44899
KARL, F.
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467
KARMANN, R.
Programmable multipurpose flight test instrumentation system
p0545 N81-29085
KARNS, J. R.
Analysis and design of a ceramic nozzle insert for the Langley 8-foot high temperature structures tunnel
p0060 A81-14996
Ceramic and coating applications in the hostile environment of a high temperature hypersonic wind tunnel
[NASA-TM-81931] p0254 N81-18199
KARPEL, M.
Design for active and passive flutter suppression and gust alleviation
p0252 N81-18063
KARPOVICH, P. A.
Acceptability of shale derived fuel for Navy aircraft propulsion systems
[AIAA PAPER 81-1424] p0503 A81-40860
KARSTEN, P.
Tower Cab Digital Display
[AD-A090616] p0091 N81-13042
KARTASHOV, G. G.
The effect of various factors on the vibration characteristics of composite blades of gas turbine engines
p0524 A81-42793
KASCAK, A. F.
The response of turbine engine rotors to interference rubs
[AD-A090408] p0093 N81-13060
KASDAN, H. L.
Optics in metrology and quality assurance; Proceedings of the Seminar, Los Angeles, Calif., February 6, 7, 1980
p0358 A81-32504
KASEMIR, H. W.
Airborne lightning warning systems: A survey
[AD-A095354] p0331 N81-20045
KASHIWAGI, T.
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10128
KATES, J. C., JR.
Microprocessor-based airborne spectrometer system
p0453 A81-37784
KATO, K.
Experimental substantiation for hovering rotor vertical impedance calculations
p0453 A81-38015
KATOH, H. S.
Wind loads for bar-truss structures
p0259 N81-18997
KATZ, J.
A discrete vortex method for the non-steady separated flow over an airfoil
p0179 A81-22568
Full-scale study of the cooling system aerodynamics of an operating piston engine installed in a light aircraft wing panel
[SAE PAPER 810623] p0523 A81-42777
Full-scale aerodynamic characteristics of a propeller installed on a small twin-engine aircraft wing panel
[NASA-TM-81285] p0385 N81-23039
KAUFFMAN, C. W.
Effect of ambient conditions on the emissions from a gas turbine combustor
[NASA-CR-3355] p0080 N81-12105
KAUL, C. E.
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033
KAUPP, V. H.
Computer generated radar images for navigation
p0049 A81-12793
KAVANAGH, P.
Aerodynamics of advanced axial-flow turbomachinery
[NASA-CR-163995] p0335 N81-20079
KAWACHI, K.
An extension of the local momentum theory to a distorted wake model of a hovering rotor
[NASA-TM-81258] p0329 N81-20030
KAWAGUCHI, J.
Some experimental study on parachute dynamics by utilizing a deceleration system simulator
p0481 A81-40471
KAWAHATA, N.
Model-following system with assignable error dynamics and its application to aircraft
p0116 A81-18577
KAWAI, T.
Study of the secondary flow in the downstream of a moving blade row in an axial flow fan
p0355 A81-31767
KAWCZYNSKI, R.
Methods of fuel conservation in civil aviation. I
p0005 A81-11322
Fuel saving methods in civil aviation. II
p0059 A81-14755
KAY, B. P.
All composite helicopter airframe roof structure
[AHS 80-47] p0477 A81-40178
KAY, H. H.
An update of the Discrete Address Beacon System (DABS) alternatives study
[AD-A096264] p0340 N81-21052
KAYSER, L. D.
Surface pressure measurements on a projectile shape at Mach 0.908
[AD-A098589] p0439 N81-25045

KAZA, K. R. V.
Application of unsteady airfoil theory to rotary wings
p0465 A81-39874

KECK, H. F.
Electronic control system for a modern turboprop engine
[SAE PAPER 810620] p0523 A81-42775

KEE, H.
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061

KEECH, T.
Impact of the discrete Address Beacon System (DABS) on Air Traffic Control Radar Beacon System (ATCRBS) performance in selected deployments
[AD-A089611] p0025 N81-10039

KEENAN, H. K.
COMLINK - A communications/EW analytical and modeling tool
p0617 A81-48547

KEETON, J. R.
Shrinkage-compensating cement for airport pavement. Phase 3: Fibrous concretes. Addendum
[AD-A092945] p0219 N81-17299

KEIM, T. A.
Superconducting generator design for airborne applications
p0241 A81-26862

KEIN, V. M.
Realization of a method of extremal targeting in a problem of aircraft landing control
p0625 A81-49943

KEINATH, W.
Development in powder metallurgy /PM/ Ti6Al4V technology for aircraft parts
p0511 A81-41640

KEITER, I. D.
Impact of advanced propeller technology on aircraft/mission characteristics of several general aviation aircraft
[SAE PAPER 810584] p0520 A81-42745

KEITH, S. E.
A study of the performance of an Olson type active noise controller and the possibility of the reduction of cabin noise
[UTIAS-TN-228] p0552 N81-29924

KEITH, T. G., JR.
Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448

KELLEY, H. J.
Boost-glide range-optimal guidance
[AIAA 81-1781] p0554 A81-44096

KELLEY, W. W.
Pitch attitude stabilization system utilizing engine pressure ratio feedback signals
[NASA-CASE-LAR-12562-1] p0490 N81-26152

KELLIHER, W. C.
Ceramic and coating applications in the hostile environment of a high temperature hypersonic wind tunnel
[NASA-TM-81931] p0254 N81-18199

KELLOGG, R. S.
Simulated A-10 combat environment
[SAE PAPER 801187] p0401 A81-34199

KELLY, C. P.
Precision flight path control in carrier landing approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43956

KELLY, R. J.
Supersonic cruise vehicle research/business jet
p0248 N81-18022

KELLY, W. W.
Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106

KELTO, C. A.
Titanium net shapes by a new technology. II - F-18A parts evaluation
p0511 A81-41650

KEMP, W. B., JR.
Wall interference effects: Status review
p0592 N81-31141

KEMPTON, A. J.
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] p0610 A81-48602

KENDALL, R.
Full-authority digital electronic controls for civil aircraft engines
[ASME PAPER 81-GT-138] p0316 A81-30081

KENNEDY, J. M.
An assessment of buffer strips for improving damage tolerance
p0247 N81-18009

KENNEDY, R. S.
Formats for DABS data link applications
[AD-A089963] p0034 N81-11028

KENNEDY, T. L.
An evaluation of wind tunnel test techniques for aircraft nozzle afterbody testing at transonic Mach numbers
[AD-A091775] p0126 N81-13931

KENNETT, R. J.
Advanced generating system equipment for aircraft
p0420 A81-37418

KENT, H. J.
Engine condition monitoring: CF6 family 60's through the 80's
p0600 N81-31215

KENTON, E.
Search and rescue methods and equipment. A bibliography with abstracts
[PB80-812837] p0023 N81-10026

KENWORTHY, M. J.
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19323

KENYON, R. D.
Army aviation - A perspective into the eighties
[AIAA PAPER 81-0931] p0363 A81-32935

KERELIUK, S.
An investigation of the recovery from an engine failure in a twin engine augmentor wing aircraft using the NAE Airborne Simulator
p0509 A81-41199

KERGOAT, M.
Laser-gyro strapdown inertial navigation
p0225 A81-23860

KERLICK, G. D.
Unsteady transonic small disturbance theory with strong shock waves
[NASA-CR-166157] p0261 N81-19828

KERREBROCK, J. L.
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26885

KERTON, I. M.
A six-channel quick-look unit for the aerodynamics division NRI airborne data acquisition package
[AD-A089975] p0043 N81-11364

KESLER, D. F.
Digital flight control - The generation of the 80's
p0320 A81-30240

KESSEL, U.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129

KESSELRING, J. P.
Proceedings of the 4th Workshop on Catalytic Combustion
[PB81-176067] p0588 N81-30700

KETTLES, J. C.
Helicopters - Help for the all weather terminal
p0112 A81-18065

KEYSER, G. L.
Thunderstorm hazards flight research: Storm hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062

KEYSER, G. L., JR.
A pilot's subjective analysis of a Cockpit Display of Traffic Information (CDTI)
p0264 N81-19037

KHAIMOVICH, I. A.
Radio navigation for aircraft: Handbook
p0116 A81-18599

KHAIRULLIN, A. KH.
Analytical and computer-aided design of automated systems for the testing of aircraft engines
p0578 A81-46850

KHAKIMULLIN, F. SH.
Experimental study of the snap-through oscillations of an empennage

p0299 A81-29313
KHALIULIN, V. I.
Wing analysis by the plate analogy using an integral-difference method
p0235 A81-25680
KHAN, N. R.
Optimality criterion techniques applied to frames having nonlinear cross-sectional properties
[AIAA 81-0552] p0301 A81-29402
KHAN, S. A.
Vector and scalar characteristics of opposing jets discharging normally into a cross-stream
p0110 A81-17997
KHARITONOV, A. M.
The influence of flow disturbances on the laminar-turbulent transition in a supersonic boundary layer
p0124 A81-19643
Some problems of modeling high-speed aerodynamics
p0237 A81-26118
KHARLAMOV, N. P.
An exact solution of the problem of the motion of a gyroscope in a Cardan suspension
p0019 A81-12704
KHOROLSKII, V. M.
Integral methods for solving thermal conductivity problems and their application to evaluating heat exchange in certain gas-turbine elements
p0205 A81-28120
KHOT, N. S.
Optimal design studies on composite wings with static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
KHUN, R. E.
An engineering method for estimating the induced lift on V/STOL aircraft hovering in and out of ground effect
[AD-A090509] p0441 N81-25069
KIDA, T.
Lifting-line theory of oblique wings - Application of the Galerkin method to the lifting-line equation
p0149 A81-19873
A theoretical treatment of lifting surface theory of an elliptic wing
p0347 A81-30653
KIDWELL, G. H., JR.
Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20540
Numerical and classical analysis of V/STOL aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898
Conceptual/preliminary design study of subsonic v/stol and stovl aircraft derivatives of the S-3A
[NASA-TM-81310] p0547 N81-29118
KIENAPPEL, K.
Experimental investigations on a harmonically swinging trail edge flap with a space
[DGLR PAPER 80-029] p0055 A81-13925
Analysis of unsteady pressure measurements on an aerofoil section with an harmonically oscillating, slotted flap
[DFVLR-FB-80-22] p0126 N81-13929
KIERNAN, J. J.
Standardization in military system architecture
p0050 A81-13160
KIHARA, H.
Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0299 A81-29205
KIHN, R. T.
LPI, short-range communications between aircraft in rendezvous
p0177 A81-22493
KIISHI, T. H.
Aerodynamics of advanced axial-flow turbomachinery
[NASA-CR-163995] p0335 N81-20079
KIKTENKO, IU. N.
Wire communication systems and equipment at airports
p0289 A81-28745
KIKUCH, K.
Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I
p0229 A81-24090
KIKUCHI, K.
Resonance of forwards and backwards vibration mode of impeller with gyroscopic effect
[AIAA 81-0524] p0303 A81-29445
KILGORE, R. A.
Model design and instrumentation experiences with continuous-flow cryogenic tunnels
p0037 N81-11057
KIM, B. S.
Control settings for a trimmed, stalled rotor by an automatic feedback system
[AIAA 81-0617] p0305 A81-29478
KIM, F. R.
Integrated strike avionics study, volume 1
[AD-A094705] p0273 N81-19113
KIM, J. C.
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609
KIM, Y. H.
Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184
KIM, Y.-W.
Thermomechanical behavior of a mechanically alloyed Al-4.0Mg powder alloy
p0409 A81-34851
KIMBALL, C. E.
Acoustic structures
p0001 A81-10272
KIMBALL, G., JR.
Simulation comparison of a decoupled longitudinal control system and a velocity vector control wheel steering system during landings in wind shear
[NASA-TP-1734] p0081 N81-12109
KIMBALL, J. C.
Engine health monitoring systems: Tools for improved maintenance management in the 1980's
p0599 N81-31214
KIMBER, R. D.
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579] p0637 N81-33195
KIMSEY, K. D.
Numerical simulation of hydrodynamic ram
p0615 A81-48351
KIMURA, T.
Preliminary study on reheat combustor for advanced gas turbine
[ASME PAPER 81-GT-29] p0311 A81-29944
KING, C. B.
Helicopter transmission fatigue life
p0291 A81-29058
KING, D. M.
Fitment of TAMAN standby attitude indicators to Macchi aircraft
[AD-A089378] p0035 N81-11036
KING, E. A.
Topside weapons release - An analytical study
[AIAA PAPER 81-1655] p0533 A81-43939
KING, J. K.
Potential use of geotechnical fabric in airfield runway design
[AD-A092686] p0198 N81-16071
KING, R. B.
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0118 A81-18750
KING, R. J.
Helicopter noise - Is technology the answer
[SAE PAPER 810591] p0520 A81-42750
KING, S. R.
Forward-looking infrared /FLIR/ sensor for autonomous vehicles
p0357 A81-32490
KING, T.
Feature extraction from forward looking infrared /FLIR/ imagery
p0461 A81-39338
KINNAMAN, D. L.
Integrated strike avionics study, volume 1
[AD-A094705] p0273 N81-19113
KINZLER, J. A.
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077
KIPERSZTOK, O.
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] p0620 A81-48629
KIRALY, R. L.
Manufacturing methods for a composite main rotor blade for the YAH-64 helicopter
p0575 A81-46629

KIRILLOV, A. I.
Investigation of the influence of the radial nonuniformity of initial temperature and energy losses on flow structure in a highly loaded turbine stage
p0465 A81-40019

KIRKHAM, W. R.
Improving the crashworthiness of general aviation aircraft by crash injury investigations
[AD-A103316] p0636 N81-33174

KIROV, B. A.
Automation of air traffic control processes
p0623 A81-49462

KIRSCHNY, G.
Full annular combustor test facility for high pressure/high temperature testing
p0432 N81-24097

KIRSCHNER, C.
An information-processing interpretation of air traffic control stress
p0053 A81-13416

KISHI, F.
Airborne Systems Software Acquisition Engineering Guidebook for software development and support facilities
[AD-A100214] p0543 N81-28789

KISHIMOTO, F.
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095

KISLIAKOV, V. B.
Interferometric study of the initial stage of supersonic jets of gases with various specific-heat ratios from conical nozzles
p0068 A81-16231

KISSLINGER, R. L.
Design and development of the control laws for the F-18 primary flight control system
p0320 A81-30245

KISTER, H.
Integrated cockpit information system with color display equipment
p0450 A81-37643

KISTLER, C. W., JR.
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10080

KITAJIMA, J.
Preliminary study on reheat combustor for advanced gas turbine
[ASME PAPER 81-GT-29] p0311 A81-29944

KITCHENS, P. F.
Aircraft icing instrumentation: Unfilled needs
p0135 N81-14560

KITCHENSIDE, A. W.
Engineering aspects of composite structures for civil aircraft
p0283 A81-27888

KIVKO, V. G.
Automation of air traffic control processes
p0623 A81-49462

KIYA, M.
Numerical study on viscous shear flow past a circular cylinder
p0228 A81-24077
Numerical simulation of gross structure of turbulent plane mixing layer by discrete-vortex model
p0228 A81-24078

KJELGAARD, S. O.
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect
[NASA-TM-80199] p0627 N81-32119

KLAAR, W.
The Bundeswehr Drone Program - Where are we today
p0458 A81-38806

KLASS, P. J.
Solid-state power system use expands
p0122 A81-19491

KLATTE, R. J.
General aviation propeller noise reduction - Penalties and potential
[SAE PAPER 810585] p0520 A81-42746

KLAUDER, L. T.
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] p0641 N81-34109

KLEES, G. W.
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1216] p0458 A81-39006

KLEIN, J. E.
The F-16 Halon tank inerting system
[AIAA PAPER 81-1638] p0525 A81-43128

KLEIN, R. W.
Display concepts for control configured vehicles
p0213 N81-17076

KLEIN, V.
Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756
Determination of model structure and parameters of an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562

KLEINEIDAM, G.
Longitudinal motion of low-flying vehicles in nonlinear flowfields
p0009 A81-11626

KLEITZ, P.
The maintenance of the Airbus from the user's point of view
p0287 A81-28470

KLEMENKOV, G. P.
Some problems of modeling high-speed aerodynamics
p0237 A81-26118

KLEMENTOWSKI, L.
A versatile miniature solid state television camera /CCD/
p0180 A81-22620

KLEVENHUSEN, K. D.
Flow computation around multi-element airfoils in viscous transonic flow
p0011 A81-11601
Civil component program Wing Section. New calculation methods for subsonic and transonic interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034

KLEVENHUSEN, K.-D.
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0056 A81-14389

KLIACHKIN, A. L.
Aircraft thrust augmentors of ejector type
p0289 A81-28760

KLIMAS, P. C.
Recent darrieus Vertical-Axis Wind Turbine aerodynamical experiments at Sandia National Laboratories
[SAND-81-1106C] p0588 N81-30615

KLINCK, D. M.
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16028

KLIUKHO, I. G.
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719

KLIVANS, D. S.
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for composite structures
p0557 A81-44373

KLOCHKOV, O. G.
The design of blowing-cooled aircraft electrical machines
p0002 A81-10474

KLOPFER, G. H.
Basic studies of body vortices at high angles of attack and supersonic speeds
[AD-A102241] p0594 N81-31158

KLOPFSTEIN, A.
Systems integration of automatic flight control, navigational calculations, and visual control (caravelle alia)
p0544 N81-29068

KLOSTER, M.
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
p0471 A81-40123
Relationships for a flight performance computer
p0382 N81-23018
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
[MBB-UD-307/80-OE] p0584 N81-30148

KLUGE, H.
Optimization of barriers
[ESA-TT-648] p0500 N81-27893

KNAPP, L. G.
Multi service applications for advancing blade concept aircraft
[SAE PAPER 801226] p0405 A81-34229
ABC development status and design considerations for several military applications
[AHS 80-12] p0474 A81-40145

KNEAFSEY, J. T.
Economics of technological change - A joint model for the aircraft and airline industries
p0169 A81-21010

KNEPPER, L.
Carrier system simplifies freight handling - A new technical concept for Lufthansa's Frankfurt facility
p0056 A81-14241

KNERR, T. J.
Airborne antenna pattern calculations
p0532 A81-43700
Airborne antenna pattern calculations
[NASA-CR-164350] p0437 N81-24321

KNIAT, J.
An application of redundancy in digital electronic engine control
[SAE PAPER 801200] p0402 A81-34210

KNIGHT, D. A.
Determination of coking rate in jet fuel
p0570 A81-46448

KNIGHT, R. C.
S-3A composite spoilers service experience
p0529 A81-43615

KNIGHT, V. H., JR.
In-flight jet engine noise measurement system
p0410 A81-35553

KNIP, G.
Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067

KNITTEL, J.
Individual jet engine stress load monitoring with the aid of the flight data recording system LEADS 200
p0328 N81-20013

KNOBLOCH, J.
Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue
[NASA-TM-75733] p0376 N81-22054

KNOPP, J. L.
Real time analysis for helicopter flight testing
p0470 A81-40112

KNORR, G.
An analytical study of landing flare
[DFVLR-FB-79-40] p0027 N81-10062

KNOTT, P. R.
Acoustic and aerodynamic performance investigation of inverted velocity profile coannular plug nozzles
[NASA-CR-3149] p0203 N81-16854
Aerodynamic/acoustic performance of YJ101/double bypass VCE with coannular plug nozzle
[NASA-CR-159869] p0220 N81-17046
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle
p0245 N81-17909

KNOX, C. E.
Development of simplified airborne computations for fuel conservative descents in a time-based metered air traffic environment
[SAE PAPER 810642] p0524 A81-42705
Test results of flight guidance for fuel conservative descents in a time-based metered air traffic environment
p0264 N81-19036

KNUTSSON, L.
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521

KO, S.-Y.
Computation of wall temperature and heat flux distributions of the film cooled walls
p0348 A81-30002

KOBIALKA, H. J.
Computer graphics applications
[PB81-215246] p0637 N81-33188

KOCH, C. C.
Stalling pressure rise capability of axial flow compressor stages
[ASME PAPER 81-GT-3] p0310 A81-29920

KOCIAN, D. F.
Helmet mounted displays: Design considerations
p0213 N81-17073

KOCKA, V.
Identification of longitudinal flying characteristics of an aeroplane and the effect of nonstationary aerodynamics
p0010 A81-11627

KOCUREK, J. D.
Hover performance methodology at Bell Helicopter Textron
[AHS 80-3] p0473 A81-40138

KODAMA, K.
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906

KODAMA, Y.
Discrete frequency noise due to irregularity in blade row of axial fan rotor
p0002 A81-10633

KOEBLER, E. G.
Fatigue test program and test results
p0489 N81-26142

KOEGEBOEHN, L. P.
Commercial aviation icing research requirements
[NASA-CR-165336] p0387 N81-23069

KOENIG, K.
Propeller propulsion integration, phase 1
[NASA-CR-163921] p0196 N81-16058

KOENIG, P.
The problems with the interface system of the visual simulator as a cause of Pilot Induced Oscillations (PIO's) in flight simulators
[MBB-UA-528-80-OE] p0276 N81-19140

KOENIG, R.
Procedures to improve flight safety in wind shear conditions
p0014 A81-11666
Takeoff and missed approach under the influence of wind shear
[TUBS/SFB-58-80-05-01] p0620 N81-32131

KOENIG, R. J.
EPA proposed national strategy for further reduction of aviation noise
p0567 A81-46353

KOERNER, H.
High-lift investigations on some small aspect ratio wings
p0011 A81-11643
Improving the economy of subsonic transport aircraft by means of aerodynamic approaches
p0510 A81-41336
Tendencies in the development of subsonic transport-aircraft under special considerations of aerodynamics
[DFVLR-MITT-80-15] p0338 N81-21040
Technical evaluation report on the Fluid Dynamic Panel Symposium on Subsonic/Transonic Configuration/Aerodynamics
[AGARD-AR-146] p0392 N81-23031

KOESTER, H.
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635

KOESTER, K.
Mini-RPV radar test program
p0180 A81-22619

KOFMAN, R. B.
Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source
p0288 A81-28578

KOGAEV, V. P.
Use of carbon composites in aircraft structures
p0577 A81-46813

KOGAN, G. A.
An experimental study of heat transfer in rotating slots and bends
p0509 A81-41089

KOHL, F. J.
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0393 N81-23283

KOHLMAN, D. L.
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil

[AIAA PAPER 81-0405] p0168 A81-20837
An assessment of advanced technologies for
application to general aviation
[SAE PAPER 810630] p0524 A81-42782
A feasibility study for advanced technology
integration for general aviation
[NASA-CR-159361] p0185 N81-15974
Icing tunnel tests of a glycol-exuding porous
leading edge ice protection system on a general
aviation airfoil
[NASA-CR-164377] p0439 N81-25041
Evaluation of a pneumatic boot deicing system on a
general aviation wing model
[NASA-TM-82363] p0441 N81-25065
KOHN, H. H.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
KOHNEN, E.
Ten years activity in the area of flight control
for helicopters at night and in bad weather
[DGLR PAPER 81-064] p0611 A81-47620
KOKUNKO, V. S.
Flight-vehicle antennas /2nd revised and enlarged
edition/
p0281 A81-27534
KOLB, A. W.
Structural Integrity recording System (SIRS) for
U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060
KOLENKIEWICZ, R.
Seasat altimeter height calibration
[NASA-TM-82040] p0279 N81-19526
KOLESNIKOV, K. S.
Vibrations in technical equipment. Volume 3 -
Oscillations of machines, structures, and their
components
p0511 A81-41725
KOLESNIKOVA, T. V.
Possibility of development of an
electron-fractographic method for measuring
stress level produced by fatigue fracture of the
material
p0532 A81-43773
KOLIADA, V. K.
Investigation of asynchronous motors with unstable
power-supply frequency for use on aircraft
p0281 A81-27364
KOLK, J. T. V. D.
Design study for the inner wing of a transonic
wing-body combination of aspect ratio 8
p0190 N81-16015
KOLKMAN, H. J.
Prevention of corrosion and fatigue failure of
helicopter gas turbine compressors
p0469 A81-40107
Prevention of corrosion and fatigue failure of
helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222
KOLOTNIKOV, M. E.
Evaluation of compressor blade endurance limits by
an accelerated method
p0177 A81-22182
KOLSON, J.
Development of conceptual Navy aircraft
Reliability Prediction Models
p0229 A81-24280
KONAKHOVICH, G. F.
Wire communication systems and equipment at airports
p0289 A81-28745
KONCSEK, J. L.
An approach to conformal inlet diffuser design for
integrated propulsion systems
[AIAA PAPER 81-1395] p0514 A81-42185
KONG, S. J.
Bolt bearing strengths of graphite/epoxy laminates
[AIAA 81-0544] p0301 A81-29396
KONIUKHOVA, L. N.
The effect of the skewness of the skin panels on
stresses in conical wings
p0625 A81-49930
KOOI, J. W.
Influence of free-stream Mach number on transonic
shock-wave boundary-layer interaction
[NLR-MP-78013-U] p0256 N81-18325
KOPRIVA, S.
On the use of complex form of the Strouhal number
in the study of nonlinear aeroelasticity
p0231 A81-24723
KOPYLOV, V. E.
The development of low-toxic combustion chambers
of transport gas turbine engines
p0060 A81-14787
KORDULLA, W.
Local properties of three-dimensional separation
lines
[DGLR PAPER 79-063] p0016 A81-11780
KORDZINSKI, W.
Turbopropeller engine PZL-10S
p0103 A81-17324
KORNEV, B. N.
The use of carbon-reinforced plastic in the
construction of a deflector and a stabilizer
p0299 A81-29310
KOROTKOV, V. S.
Aircraft thrust augmentors of ejector type
p0289 A81-28760
KORTAN, J. P.
Atlanta's new central passenger terminal complex
p0003 A81-10719
KORTOV, V. S.
Application of exoelectron emission for quality
control of gas-turbine engine parts
p0171 A81-21367
KORZH, P. I.
Results of thermal tests on the GTA-18 gas turbine
unit with the RD-ZM-500 jet engine
p0395 A81-34022
KOSCHEL, W.
Identification of jet engine damages by engine
trend analysis LEADS 200 data
p0328 N81-20014
Engine parameter trend analysis with LEADS 200:
Possibilities and limitations
p0382 N81-23010
KOSHAR, A.
MLS channel assignment model
[AD-A093449] p0206 N81-17026
KOSMOS, G.
Airborne-fiber optics manufacturing technology,
aircraft installation processes
[AD-A093304] p0221 N81-17982
KOSOWSKY, L.
Mini-RPV radar test program
p0180 A81-22619
KOSSA, L. E.
Autonomous target handoff from an airborne sensor
to a missile seeker
p0358 A81-32898
KOSSOV, O. M.
Droplet breakup regimes and criteria for their
existence
p0614 A81-48079
KOSTURAK, S. E.
Waterjet trimming of cured composites
p0575 A81-46632
KOSYKH, A. P.
Calculation of supersonic flow around a wing with
constant curvature of its leading edges
p0413 A81-35916
KOSZARNY, Z.
The effect of airplane noise on the inhabitants of
areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22593
Aviation noise overload in the immediate proximity
of the Warsaw-Okecie airport
[NASA-TM-75892] p0500 N81-27883
KOTANSKY, D. R.
Investigation of impingement region and wall jets
formed by the interaction of high aspect ratio
lift jets and a ground plane
[NASA-CR-152174] p0261 N81-19017
KOTOV, P. I.
Determination of fatigue life by testing materials
for thermal fatigue
p0532 A81-43774
KOTOVSKII, V. N.
A mathematical computer simulation of stationary
and nonstationary flow of an ideal
incompressible fluid around solid profiles and
arrays
p0237 A81-26045
KOTSARASIS, A.
The DAST-1 remotely piloted research vehicle
development and initial flight testing
[NASA-CR-163105] p0207 N81-17036
KOTTAPALLI, S. B. R.
Rotor blade aeroelastic stability and response in

forward flight
p0467 A81-40089
KOURTIDES, D. A.
Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
Fireworthiness of transport aircraft interior systems
p0267 N81-19061
KOURY, G.
A review of the installation, performance and economic aspects of a high altitude facility for small gas turbines
[SAE PAPER 801121] p0396 A81-34157
KOVAN, IU. I.
Effect of the discharge circuit parameters on the weight, dimensions, and energy characteristics of the power supply source
p0208 A81-28574
KOWALSKI, E. J.
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1218] p0458 A81-39006
KOYAMA, T.
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
KOZEL, K.
Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197
KOZHEVNIKOV, IU. V.
Basic problem of the analytical design of aircraft gas turbine engines. II
p0299 A81-29305
Analytical and computer-aided design of automated systems for the testing of aircraft engines
p0578 A81-46850
KOZLOV, V. V.
Experimental investigation into the reaction of a boundary layer to external periodic disturbances
p0309 A81-29866
KOZMENKO, V. K.
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions
p0417 A81-36737
KRAAN, A. N.
A wind-tunnel study of the flutter characteristics of a supercritical wing
p0308 A81-29504
KRABACHER, W. E.
A dynamic shimmy analysis
[AIAA PAPER 81-1700] p0527 A81-43161
KRAEMER, R. A.
Application of superconducting coils to the NASA prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086
KRAFT, D.
Finite-difference gradients versus error-quadrature gradients in the solution of parameterized optimal control problems
p0421 A81-37568
KRAFT, E. M.
Investigations of free-jet test requirements and techniques with emphasis on the adaptable jet stretcher
[AD-A098710] p0439 N81-25044
KRAFT, G. A.
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
KRAG, B.
OLGA, a gust alleviation system for improvement of passenger comfort of general aviation aircraft
p0008 A81-11620
KRAMER, F.
Application of variable structure system theory to aircraft flight control
[NASA-CR-164321] p0391 N81-23093
KRASILSHCHIKOV, A. P.
Some aerodynamic properties of cones in viscous supersonic flow
p0237 A81-26119
KRASILSHCHIKOVA, E. A.
Unsteady subsonic motion of a wing near a screen
p0225 A81-23809
KRASNJANSKI, D.
Rapid alignment of aircraft strapdown inertial navigation systems using Navstar Global Positioning System (GPS)
p0485 N81-26107

KRAUS, E. F.
Industrial leadership of an aircraft design class
[AIAA PAPER 81-1723] p0528 A81-43166
KRAUS, P. R.
An Interactive Weight Accounting Program /IWAP/
[SAWE PAPER 1345] p0353 A81-31383
KRAUS, W.
Delta canard configuration at high angle of attack
p0154 A81-20351
Computational aerodynamic design tools and techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0120 N81-13950
KRAUSE, F. C.
Ultrasonic cold forming of aircraft sheet materials
[AD-A096351] p0344 N81-21239
KRAUSE, R. J.
Airfield pavement demonstration-validation study
p0003 A81-10718
KRAUSPE, P.
Procedures to improve flight safety in wind shear conditions
p0010 A81-11666
Takeoff and missed approach under the influence of wind shear
[TUBS/SFB-58-80-05-01] p0620 N81-32131
KRAVCHENKO, B. A.
Thermoplastic strengthening of a gas-turbine engine disk lock joint - Determination of the residual stresses
p0365 A81-33169
KREBS, N. G.
The BQM-74C target as a flying computer - Its language and its peripherals
p0179 A81-22611
KREIM, W. J.
Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81761] p0443 N81-25079
KREIN, S. E.
Joint-laboratory qualification testing of oils for gas turbine engines
p0103 A81-17375
KREINDLER, E.
Minimum fuel horizontal flightpaths in the terminal area
[NASA-TM-81313] p0549 N81-29133
KREISSELMEIER, G.
A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622
Application of vector performance optimization to a robust control loop design for a fighter aircraft
[DFVLR-FB-80-14] p0130 N81-13970
KRENZ, G.
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0056 A81-14389
Transonic wing technology for transport aircraft
p0180 N81-16002
KRETSCHMER, D.
Considerations of the use of vitiated preheat
p0150 A81-20023
KRETZ, M.
Active elimination of stall conditions
p0571 A81-46605
KRIDER, E. P.
A case for submicrosecond rise-time lightning current pulses for use in aircraft induced-coupling studies
p0057 A81-14267
KRIEGESMANN, J.
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines
[BMFT-FB-T-79-137] p0275 N81-19128
KRIJN, R.
Navaids calibration evaluation with a computer-controlled avionics data acquisition system
p0383 N81-23020
KRISHNAN, R. V.
Challenges in alloy design - Titanium for the aerospace industry
p0553 A81-43998
KRISHNAN, S.
Performance analysis of primary and secondary systems of a rocket ramjet engine burning

fuel-rich metallized propellants
p0292 A81-29066

KRISHNAN, V.
Stochastic modeling of an aircraft traversing a runway using time series analysis
p0183 A81-23368

KRISTIANSEN, U. R.
Experiments on effective source locations and velocity dependence of the broad band noise from a rotating rod
p0016 A81-11724

KRIUTCHENKO, V. N.
Damping in the problem of natural vibrations of an elastic system with internal resonance
p0236 A81-25696

KROMS, M.-D.
Device for lubricant flow measurement and conservation
p0280 A81-20743

KROO, I. M.
Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results
[NASA-TM-81269] p0423 N81-24025

KROSEL, S. M.
An automated procedure for developing hybrid computer simulations of turbofan engines
[NASA-TM-81605] p0044 N81-11688

KROTHAPALLI, A.
Partially confined multiple jet mixing
p0234 A81-25513

KRUECKER, K.
Improvement of effective minor lobe behavior of radar antennas through signal processing
p0152 A81-20091

KRUTKO, P. D.
Inverse problems of controlled flight dynamics - Longitudinal motion
p0101 A81-16968
Inverse problems of the dynamics of controlled flight - Lateral motion
p0236 A81-25903
Inverse problems of guided-flight dynamics - Longitudinal motion
p0577 A81-46749

KRYSIN, V. N.
Bonded laminated structures in aircraft manufacture
p0366 A81-33700

KRYZHANOVSKII, G. A.
Automation of air traffic control processes
p0623 A81-49462

KSENOFONTOVA, E. N.
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307

KUBASCO, A. J.
Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954

KUDRESKII, A. A.
Choice of optimal parameters of a gyrovertical on the basis of a standard program
p0622 A81-48744

KUBIER, S. J.
Analyst/IAP interface and interactive graphics
p0057 A81-14270

KUBO, S.
On a linear theory of a supersonic flow past a delta wing with subsonic leading edges
p0149 A81-19872

KUBOTA, H.
An experimental investigation of the interaction between a glancing shock wave and a turbulent boundary layer
p0012 A81-11649

KUEBLER, M.
The role of the earth's shape in navigation - An example
p0614 A81-48120

KUEHN, H.
Active control of an explosive wing-store flutter case
[MBB-FE-17/S/PUB/25] p0131 N81-13973

KUEMMERLE, W.
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467

KUENKLER, R.
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor
[PNR-90022] p0275 N81-19126

KUHLMAN, G.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

KUHN, G. D.
Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045

KUHN, J. E.
Detection performance evaluation of the ASDE-3 using fixed frequency and frequencyagile operation
[AD-A099513] p0499 N81-27372

KUHN, H.
Active control of an explosive wing-store flutter case
p0082 N81-12117

KUHN, P. M.
Design and preliminary tests of an IR-airborne LLWS remote sensing system
[AIAA PAPER 81-0239] p0153 A81-2069
Clear air turbulence - An airborne alert system
p0562 A81-44648
The 1979 clear air turbulence flight test program
p0266 N81-19050
Flight tests of a clear-air turbulence alerting system
p0266 N81-19052

KUHN, R. E.
V/STOL capability by modifying CTOL aircraft
[SAE PAPER 801179] p0400 A81-34192
Design concepts for minimizing hot-gas ingestion in V/STOL aircraft
[AIAA PAPER 81-1624] p0525 A81-43133
An engineering method for estimating the lateral/directional characteristics of V/STOL configurations in transition
[AD-A100386] p0540 N81-28103

KUHN, T. E.
Small turbine engine augmentor. Phase 1: Preliminary design studies of afterburner and duct-burner configurations
[AD-A101595] p0583 N81-30131

KUIPERS, J. B.
SPASYN - An electromagnetic relative position and orientation tracking system
p0173 A81-21828

KUKACKA, L. E.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273

KULESH, V. P.
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0410 A81-36940

KULESHOV, V. V.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47962

KULFAN, R. M.
The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
p0243 N81-1798
Prediction of nacelle aerodynamic interference effects at low supersonic Mach numbers
p0244 N81-1798

KULIAEV, O. P.
Substantiation of oil change periods for ship and aircraft turbine engines
p0065 A81-1572

KULKARNI, K. M.
Investigation of shot peening as a forming process for aircraft wing skins
p0454 A81-3904

KULKARNI, S. V.
Coupled bending-torsion vibrations of rotating blades of asymmetric aerofoil cross section with allowance for shear deflection and rotary inertia by use of the Reissner method
p0289 A81-289

KUNAY, E. J.
Avionics Availability Study
[AIAA PAPER 81-1619] p0525 A81-431

KUNG, R. H.
Stability of nonuniform rotor blades in hover

using a mixed formulation
[AD-A090756] p0076 N81-12071
KUNG, R.-H.
Stability of nonuniform rotor blades in hover using a mixed formulation
p0467 A81-40088
KUNINA, E. A.
Composition of sludge formed in B-3V oil
p0103 A81-17373
KUNZ, D. L.
Response characteristics of a linear rotorcraft vibration model
[AIAA 81-0616] p0305 A81-29477
Effects of rotor-body coupling in a linear rotorcraft vibration model
[AHS 80-26] p0475 A81-40156
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] p0629 N81-32154
KUNZ, K. S.
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940
KUNZ, R.
Computational aerodynamic design tools and techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0120 N81-13950
KUO, A. S.
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment
p0013 A81-11659
KUPERMAN, G. G.
Information requirements for airborne electronic terrain maps
p0325 A81-30334
KURANOV, V. N.
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
KURASAKI, S. S.
Thin-layer approximation for three-dimensional supersonic corner flows
p0067 A81-15900
KURIANOV, A. I.
Some characteristics of aircraft motion at large angles of attack
p0414 A81-36473
KURKOV, A. P.
Measurement of aerodynamic work during fan flutter
[NASA-TM-82652] p0443 N81-25080
KURKOWSKI, R.
Design and preliminary tests of an IR-airborne LLWS remote sensing system
[AIAA PAPER 81-0239] p0163 A81-20694
KURKOWSKI, R. L.
Clear air turbulence - An airborne alert system
p0562 A81-44648
The 1979 clear air turbulence flight test program
p0266 N81-19050
Flight tests of a clear-air turbulence alerting system
p0266 N81-19052
KURODA, H.
Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0299 A81-29205
KUROSAKA, M.
Unsteady swirling flows in gas turbines
[AD-A102852] p0629 N81-32150
KUROWSKY, R. V.
Electronic Master Monitor and Advisory Display System
p0573 A81-46615
KURTENBACH, F. J.
Flight evaluation of a simplified gross thrust calculation technique using an F100 turbofan engine in an F-15 airplane
[NASA-TP-1782] p0183 N81-15000
KURTZ, D. W.
Aerodynamic design of electric and hybrid vehicles: A guidebook
[NASA-CR-163744] p0080 N81-12943
KURTZE, W.
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18088
KURZER, S. L.
IPAD applications to the design, analysis, and/or machining of aerospace structures
[AIAA 81-0512] p0301 A81-29380
KURZ, W.
Comparisons of model and flight testing with respect to hot gas reingestion and debris ingestion during thrust reversal
p0297 A81-29113
KUSAKIN, S. I.
Characteristics of the velocity field near a wing-body combination located at an angle of attack to an oncoming supersonic flow
p0119 A81-19337
The coordinate-deformation method in the problem of a supersonic gas flow over an airfoil
p0123 A81-19631
KUTINOV, V. F.
Use of carbon composites in aircraft structures
p0577 A81-46013
KUTKUS, M. J.
The application of interactive graphics to thermal modeling
[AIAA PAPER 81-1180] p0459 A81-39159
KUTLER, P.
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566
KUZMINSKII, V. A.
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities
p0124 A81-19644
KUZNETSOV, A. B.
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
KUZNETSOV, V. G.
Composition of sludge formed in B-3V oil
p0103 A81-17373
KVASHA, A. E.
Flight-vehicle production technology
p0560 A81-45403
KVASHA, V. F.
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122
KVASHNINA, G. A.
Some characteristics of aircraft motion at large angles of attack
p0414 A81-36473
KVATERNIK, R. G.
Application of unsteady airfoil theory to rotary wings
p0465 A81-39874

L

LAANANEN, D. H.
Simulation of aircraft seat response to a crash environment
[SAE PAPER 810612] p0522 A81-42768
Aircraft crash survival design guide. Volume 1: Design criteria and checklists, revision
[AD-A093784] p0208 N81-16987
LABARRERE, M.
Detecting the failure of aircraft sensors using analytical redundancy
p0042 N81-11270
LABELL, R. E.
Aircraft wing weight build-up methodology with modification for materials and construction techniques
[NASA-CR-166173] p0387 N81-23068
LABENDIK, V. V.
Losses of total pressure during mixing of flows in a step diffuser
p0282 A81-24291
LABOIRE, J. P.
The future cockpit of the next generation of civil aircraft
[SNIAS-802-111-113] p0427 N81-24057
System digitization: Its effect in the cockpit
[SNIAS-802-111-115] p0428 N81-24062
LABOR, J. D.
Composite repair concepts for depot level use
p0558 A81-44384
LABORIE, J. P.
The future cockpit of the next generation of civil

aircraft
p0010 A81-11630
New visual displays for the next generation of civil aircraft
p0556 A81-44299
Development of instrumentation for pilots. CRT screens
[SNIAS-802-111-114] p0428 N81-24061
LABRUJERE, T. E.
Integral equation methods for multi-element airfoil analysis and design
[NLR-MP-79020-U] p0338 N81-21038
LABURTHE, C.
Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope
[ESA-TT-634] p0339 N81-21046
LACEY, D. W.
Air combat advantages from reaction control systems
[SAE PAPER 801177] p0400 A81-34190
LACKEY, W. W.
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966
LADNOVA, L. A.
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732
LADSON, C. L.
A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel
[NASA-TP-1752] p0021 N81-10005
LAFON, G.
Sukhoi Su-24 Fencer - The Soviet Tornado
p0625 A81-49974
LAFREY, R. R.
Active BCAS: Design and validation of the surveillance subsystem
[AD-A095049] p0270 N81-19084
LAHOTI, G. D.
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796
LAI, J. C. S.
Instantaneous velocity measurements in a periodically pulsed plane turbulent jet
p0066 A81-15895
Experimental investigation of oscillating subsonic jets
p0360 A81-32777
LAI, S.-K.
Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results
p0293 A81-29072
LAIRD, C.
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DOE/ER-10570/1] p0135 N81-14363
LAITONE, E. V.
Performance prediction for light airplanes
p0622 A81-49374
LAKE, R. A.
The High Performance Auxiliary Power Unit technology demonstrator program
[SAE PAPER 801148] p0406 A81-34240
LAKIN, G. C.
Subcritical flutter and oscillatory pressure testing of a full-scale 727 inboard aileron in a low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
LAKSHMINARAYANA, B.
Structure and decay characteristics of turbulence in the near- and far-wake of a moderately loaded compressor rotor-blade
[ASME PAPER 80-GT-95] p0109 A81-17954
Analysis of turbulent boundary layer on cascade and rotor blades of turbomachinery
p0296 A81-29106
End wall flows in rotors and stators of a single stage compressor
[NASA-CR-164635] p0540 N81-28097
LAKSHMINARAYANAN, R.
Film cooling performance of liner cooling devices
p0293 A81-29075
LALETIN, K. N.
Practical aerodynamics of the helicopter Mi-6A
p0116 A81-1860
LALLMAN, F. J.
Simplified design point performance model of a dry turbofan engine cycle
[NASA-TM-83112] p0490 N81-261
Simplified off-design performance model of a day turbofan engine cycle
[NASA-TM-83204] p0639 N81-33
LAMAR, J. E.
Aerodynamic features of designed strake-wing configurations
[AIAA PAPER 81-1214] p0454 A81-380
LAMAR, W. E.
A review and assessment of system cost reduction activities
p0045 N81-119
LAMB, C. E.
Computer-aided process planning system for aircraft engine rotating parts
p0149 A81-198
LAMB, M.
Wing-alone aerodynamic characteristics at high angles of attack
[AIAA PAPER 81-0008] p0157 A81-205
Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-1497
Wing-alone aerodynamic characteristics for high angles of attack of supersonic speeds
[NASA-TP-1889] p0579 N81-300
LAMB, R.
An investigation of drag associated with the upswept rear fuselage of a helicopter
[BU-257] p0330 N81-280
LAMB, T. R.
AFCS integration requirements
[SAE PAPER 810580] p0519 A81-427
LAMBERT, G. E.
An engineering model for assessing load sequencing effects
p0172 A81-217
LAMBERT, J. P.
Fatigue tests on the total structure of the Gazelle SA 341 helicopter
p0488 N81-261
LAMBERT, M.
Airbus Industrie's heavenly twins - A310 and A300-600
p0010 A81-123
Fighters for the 1990s
p0122 A81-19
F-16 improvement program - Making the digits count
p0241 A81-2693
An operational tilt-rotor this decade
p0309 A81-297
The survivable, affordable fighter - The Aeritalia-Macchi-Embraer AM-X
p0480 A81-40
Mi-26 - The first true heavy lift helicopter
p0559 A81-44
Civil head-up displays - Coming up fast
p0625 A81-49
LAMBERTZ, J.
The influence of blade number ratio and blade row spacing on axial-flow compressor stator blade dynamic load and stage sound pressure level
[ASME PAPER 81-GT-165] p0317 A81-300
LAMICH, D.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-135
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962] p0201 N81-16
LAN, C. E.
A theoretical investigation of ground effects on USB configurations
[NASA-CR-159005] p0262 N81-19
LANCASTER, J. K.
The wear of PTFE-containing dry bearing liners contaminated by fluids
[ASLE PREPRINT 80-LC-6B-3] p0113 A81-10
LANCASTER, L. T. G.
The F100 engine

[SAE PAPER 801110] p0395 A81-34151
LANCIOTT, A.
Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143
LANDES, K. E.
Long-range airplane study: The consumer looks at SST travel
p0247 N81-19014
LANDGREBE, A. J.
Helicopter airflow and wake characteristics for low speed and hovering flight from rocket interference investigations
p0572 A81-46600
LANDIS, T. H.
Advanced Scout Helicopter (ASH) fly-by-wire control system preliminary design. Volume 1: System design and analysis
[AD-A098155] p0434 N81-24108
LANDRUM, E. J.
Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016
LANDY, R. J.
Integrated flight and fire control development and demonstration of an F-15B aircraft
p0327 A81-30359
LANE, J. M.
Cooled radial in-flow turbines for advanced gas turbine engines
[ASME PAPER 81-GT-213] p0310 A81-30102
LANG, J.
Alignment of a navigation and attack system for the alpha jet aircraft
p0544 N81-29079
LANGDELL, P. V.
Design of rotorcraft powerplants - Use of life cycle costing as an aid to design optimisation
p0469 A81-40109
LANGFORD, B. A., JR.
MLS antenna locations for the deHavilland DASH 7 aircraft
[NASA-TM-83195] p0602 N81-31418
LANGFORD, J.
Not all student design projects end on paper - Chronology of the Chrysalis
p0455 A81-38332
LANGHAM, T. F.
Missile motion sensitivity to dynamic stability derivatives
[AD-A089750] p0038 N81-11093
LANGHANS, R. A.
Wind-tunnel investigation at Mach numbers from 0.25 to 1.01 of a transport configuration designed to cruise at near-sonic speeds
[NASA-TM-X-2622] p0262 N81-19025
LANGLEY, D.
Study of an engine flow diverter system for a large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096
LANKENAU, H.
Estimation of relative total cost for aircraft systems
p0047 N81-11922
LANNIELLO, C.
On screeching jets exhausting from an axisymmetric supersonic nozzle
p0008 A81-11616
LANNIS, H. D.
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
LANSON, L. E.
Small turbofan engines - Their impact on general aviation aircraft
[SAE PAPER 810622] p0523 A81-42776
LAPORTE-WEYWADA, H.
Light aviation in the United States - September 1980
p0513 A81-41903
LAPSHIN, K. L.
Calculation of circular flow inhomogeneities downstream of the turbine wheel
p0281 A81-27372
Experimental determination of the circumferential drift of edge wakes of guide vanes in a turbine stage
p0466 A81-40022
LARRABEE, E. E.
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845
LARGE, E.
Minimum fuel paths for a subsonic aircraft
p0411 A81-35636
LARGE, J. P.
A method for estimating the cost of aircraft structural modification
[AD-A099327] p0483 N81-26035
LARGE, R.
A wind tunnel investigation of the aerodynamic characteristics of forward swept wings
p0189 N81-16011
Aerodynamic investigation of C-141 leading edge modifications for cruise drag reduction, test 2
[AD-A099662] p0492 N81-27051
LARGE, R. A.
Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11600
LARIMER, S. J.
A continuously reconfiguring multi-microprocessor flight control system
[AD-A101412] p0584 N81-30138
LARK, R. F.
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0211 A81-29980
Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11412
LAROCHE, P.
Flight tests for studying radioelectric perturbations of an electrostatic origin
p0200 N81-16160
LARSEN, R. E.
Methods for the verification and validation of digital flight control systems
[SAE PAPER 801134] p0397 A81-34165
LARSON, C. R.
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking
p0173 A81-21742
LARSON, H. J.
Methodology for determining sampling intervals
[AD-A092591] p0202 N81-16825
LARSON, R. R.
Flight experience with flight control redundancy management
p0042 N81-11274
LARSON, R. S.
Convective amplification of gas turbine engine internal noise sources
p0171 A81-21595
LARSON, S. W.
Maximum information trajectory for an air to air missile intercept
[AD-A101497] p0565 N81-30160
LARSON, T. J.
Subsonic tests of an all-flush-pressure-orifice air data system
[NASA-TP-1871] p0489 N81-26184
LARSSON, L. O. E.
High temperature metal matrix composites for gas turbines
p0295 A81-29090
LARSSON, S. E.
Buckling of sandwich panels subjected to axial compression, shear forces and lateral pressure. Part 2: Analysis
[SAAB-TN-AE-72-PT-2] p0086 N81-12465
LARUELLE, G.
Investigation of instantaneous distortions in air intakes at high angles of attack
[AAAF PAPER NT 80-38] p0369 A81-33931
An apparatus for the simulation of an air intake at high angle of attack in a compressor test facility
[ONERA, TP NO. 1981-35] p0460 A81-38238
An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-38240
LARUSSA, J. A.
Optical infinity lens development for flight simulator visual displays
p0212 N81-17671

LASHKOV, IU. A.
An experimental investigation of the thrust and discharge characteristics of multinozzle low-head ejectors
p0413 A81-35920

LASSITER, J. O.
Initial development for a flutter analysis of damaged T-38 horizontal stabilators using NASTRAN
[AIAA PAPER 81-0365] p0166 A81-20704

LASTER, M. L.
Wind tunnel corrections for high angle of attack models
[AGARD-R-692] p0435 N81-24120

LATKA, V. IU.
Test-stand combustion chamber for the study and development of forced working processes
p0319 A81-30151

LAU, C.
Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS)
[AD-A092974] p0208 N81-17041

LAUDA, A.
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776

LAUBER, J. K.
An evaluation of head-up displays in civil transport operations
p0265 N81-19044
Guidelines for line-oriented flight training, volume 1
[NASA-CP-2184] p0580 N81-30101

LAUGHLIN, E. P.
US Army design-to-cost experience
p0045 N81-11905

LAUNAY, G.
Aircraft recognition by means of monostatic radar
p0607 A81-47142

LAURIDIA, R. R.
Use of flight simulators in developing design load spectra for new aircraft
[AIAA 81-0513] p0301 A81-29389

LAURIE, R. J.
Demonstration of a method for determining critical store configurations for wing store flutter
[AD-A092257] p0197 N81-16068

LAUTNER, D. E.
Power system control study. Phase 1: Integrated control techniques. Phase 2: Detail design and system modeling
[AD-A099894] p0497 N81-27100

LAUVER, R. W.
Progress in materials and structures at Lewis Research Center
p0089 N81-12982

LAVRINCHUK, V. N.
Dynamic errors of the Kalman filtering of trajectory parameters
p0366 A81-33687

LAW, H. R. P.
The influence of helicopter operating conditions on rotor noise characteristics and measurement repeatability
p0468 A81-40095

LAWDERMILT, L. J.
Adaptive features and measurement requirements for advanced surveillance radars
p0617 A81-48544

LAWING, P. L.
A survey of heating and turbulent boundary layer characteristics of several hypersonic research aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39134
A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel
[NASA-TP-1752] p0021 N81-10005
Cooling system for high speed aircraft
[NASA-CASE-LAR-12406-1] p0485 N81-26114

LAWMASTER, J. D.
Potential use of geotechnical fabric in airfield runway design
[AD-A092686] p0198 N81-16071

LAWRENCE, D. L.
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015

LAWRENCE, D. N.
Groundspeed/airspeed differences as a wind shear indicator and flight evaluation of a DME-derived system to determine groundspeed
[AD-A097566] p0393 N81-23760

LAWRENCE, R. W.
Air Force Geophysics Laboratory aerodynamically tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023

LAWRENCE, T. H.
CH-53E emergency flotation system design study
[AD-A101640] p0548 N81-29124

LAWRENCE, W. S.
The XV-15 - An initial Navy look
[AIAA PAPER 81-0155] p0161 A81-20635

LAWSON, R. J.
A simulation approach to MIL-STD-1553 Multiplex Bus interfacing
[AIAA 81-0971] p0415 A81-36560

LAYCOCK, J.
The electro-optical display/visual system interface: Human factors considerations
p0212 N81-17066

LAYTON, D. M.
Quasi-hybrid airships
[AIAA 81-1333] p0456 A81-38538

LAZARICK, R. T.
Establishing cruise-engine cycle payoffs for a supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007

LAZECKI, S.
New storage medium - Greater safety. II - Testing, fabrication, implementation
p0227 A81-24044

LAZZERI, L.
The fatigue crack growth under variable amplitude loading in built-up structures
[AD-A098417] p0446 N81-25437

LE BALLEUR, J. C.
Calculation of separated viscous flows on wing profiles by a coupling approach
[ONERA, TP NO. 1980-122] p0017 A81-11928

LEACH, B. W.
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116

LEADER, M. E.
An experimental and theoretical investigation of pressures in four-lobe bearings
p0004 A81-10040

LEARY, K.
Study of materials performance model for aircraft interiors
[NASA-CR-152378] p0333 N81-20063

LEAVITT, L. D.
Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg
[NASA-TM-83171] p0635 N81-33159

LEAVY, W. P.
Improved G-Cueing System
[AIAA 81-0987] p0416 A81-36572
Microprocessor software applications for flight training simulators
p0044 N81-11650

LEBACQZ, J. V.
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[AHS 80-30] p0476 A81-40160
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110
A flight investigation of static stability, control augmentation, and flight director influences on helicopter IFR handling qualities
p0574 A81-46623
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[NASA-TM-81188] p0029 N81-10077

LEBDUSKA, J.
Measurement of the aerodynamic forces acting on a harmonically oscillating wing at high subsonic speeds
p0349 A81-31042

LEBEDEV, V. F.
The development of low-toxic combustion chambers of transport gas turbine engines
p0060 A81-14787
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions
p0417 A81-36737

LEBLANC, A. D.
Test results from an analytically designed axial compressor stage of 1.65:1 pressure ratio
[SAE PAPER 800629] p0063 A81-15344

LECLERC, J.
Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN
p0485 N81-26102

LEE-BECHTOLD, S.
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936

LEE, A. G.
P-3 Orion fuel-saving modification wind tunnel study
[AD-A091906] p0194 N81-16044

LEE, B. H. K.
Comparison of two methods for the reduction of free decaying data in aircraft flutter tests
[NAE-LTR-HA-43] p0298 A81-29185
A method for the prediction of wing response to nonstationary buffet loads
[AD-A093037] p0208 N81-17043

LEE, C. S.
Coupling of unsteady lift to acoustic duct modes in an axial flow fan
[AD-A095080] p0274 N81-19124

LEE, D.
High-response measurements of a turbofan engine during nonrecoverable stall
[NASA-TM-81759] p0483 N81-25004

LEE, F. C.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362

LEE, H. Q.
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061

LEE, J. T.
Pulsed Doppler radar detects weather hazards to aviation
[AIAA PAPER 81-0235] p0163 A81-20691

LEE, K. D.
Grid generation for general three-dimensional configurations
p0137 N81-14714

LEE, M. E.
Advanced composite applications in McDonnell Douglas commercial transport aircraft
p0530 A81-43628

LEE, S. C. S.
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin, systems
[NASA-CR-152292] p0218 N81-17175
Development of assembly techniques for fire resistant aircraft interior panels
[NASA-CR-152119] p0254 N81-18097

LEE, S. Y.
Predicting fatigue crack growth on aircraft structures
[SAE PAPER 810593] p0520 A81-42752

LEE, T.
Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0082 N81-11290

LEE, W. S.
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077

LEEK, W. J.
Survivability study of a FLIR equipment fighter on a night penetration of a Soviet army
[AD-A101186] p0587 N81-29120

LEEPER, J. L.
Formats for DABS data link applications
[AD-A089963] p0034 N81-11028

LEFEBVRE, A. H.
Basic ignition research related to altitude relight problems
p0237 A81-26018

LEFFERTS, R. E.
Analytical investigation of time correction in alpha-beta tracking filters with application to en route tracking
[AD-A099218] p0484 N81-26090

LEFFLER, M. F.
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053

LEFFLER, R. J.
Unrepresentative temperatures at a first-order meteorological station Washington National Airport
p0622 A81-48847

LEFORT, R.
Safety - A prime factor in the design of Aerospatiales Super-Puma AS 332
p0572 A81-46609

LEGATE, O.
Light aviation in the United States - September 1980
p0513 A81-41903

LEGRAND, S. H.
The E3 transition
p0240 A81-26617

LEHMAN, C. L.
Engine cycle selection for advanced technology engine studies
[ASME PAPER 81-GT-191] p0317 A81-30084

LEHMAN, L. L.
A hybrid state vector approach to aeroelastic analysis with application to composite lifting surfaces
[AIAA 81-0626] p0308 A81-29512

LEHTINEN, B.
F100 multivariable control synthesis program: A review of full scale engine altitude tests
p0079 N81-12093

LEIDEL, J.
Horizontal components of the atmospheric electric field. Studies of the atmospheric electric field in view of electrostatically controlled automatic pilot applications
[BMVG-FBWT-80-7] p0345 N81-21677

LEIJNSE, C.
Helicopter-ship qualification testing
p0232 A81-24981

LEIMER, G.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129
Development of high strength silicon carbide materials for gas turbine applications
[BMFT-FB-T-80-025] p0497 N81-27182

LEININGER, G. G.
Sensor/actuator failure detection and isolation for airbreathing propulsion systems
p0564 A81-45551
Multivariable nyquist array method with application to turbofan engine control
p0080 N81-12101
Sensor/actuator failure detection for turbofan engines
p0080 N81-12100
Application of the MNA design method to a nonlinear turbofan engine
[NASA-CR-163855] p0143 N81-15001

LEISTNER, R.
Store separation simulation in subsonic wind tunnels
[MBB-FE-123/S/PUB/20] p0203 N81-16988

LEITNER, R. T.
Application of an aerodynamic configuration modeling technique to the design and analysis of X-Wing aircraft configurations
p0356 A81-32013

LEKOUDIS, S. G.
The linear instability due to the compressible crossflow on a swept wing
p0170 A81-21168

LELAND, T. J.
Studies of some unconventional systems for solving various landing problems
p0268 N81-19067

LENOX, T. G.
Digital control makes a commercial debut on the JT9D engine
[ASME PAPER 81-GT-195] p0317 A81-30090

Full Authority Digital Electronic Control turbofan engine demonstration
[SAE PAPER 801199] p0402 A81-34209
Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112

LENSKI, J. W., JR.
Drive system development for the 1980's
p0105 A81-17508
Advanced transmission components investigation program: Bearing and seal development
[AD-A090675] p0076 N81-12075

LENTZ, R. R.
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039

LENZ, W.
The influence of flames on the formation of self-excited combustion chamber oscillations
p0298 A81-29197

LEOCARD, E.
A new airborne nickel cadmium battery concept
p0235 A81-25618

LEONARD, A.
Vortex methods for two- and three-dimensional flow simulations
p0145 N81-15313

LEONARD, J. P.
Computer-aided methods for redesigning the stabilized pitch control system of a semi-active thermal homing missile
p0051 A81-13250

LEONARD, R.
Current and projected use of carbon composites in United States aircraft
p0198 N81-16145

LEONARD, R. G.
Engine identification for adaptive control
p0080 N81-12100

LEPETIUKHA, V. S.
The possibility of single-impact riveting of flat-top countersunk-head rivets
p0319 A81-30164

LEPICOVSKY, J.
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] p0621 A81-48640

LEPORSKII, A. A.
Synthesis of gyrostabilizer state evaluation system under unknown perturbations
p0299 A81-29311

LERCHE, H. D.
Onboard and ground test of an autonomous navigation system based on terrain correlation
p0544 N81-29069

LERENDU, Y.
The future of training for aerial combat
p0060 A81-15118

LESAIN, A.
Cascade design through an inverse method
p0448 N81-26022

LESUEUR, H. E.
Helicopter Fatigue: A civil view
p0488 N81-26134

LETHERT, J. F.
Integration of the F-16 Weapon System Trainer
p0325 A81-30332

LETOQUART, B.
MLS - An example of microprocessor utilization
p0409 A81-35022

LETOURNEAU, J. J.
Pattern factor improvement in the F-100 primary combustion system
[ASME PAPER 81-GT-25] p0311 A81-29941

LETOURNEAU, P.
The High Performance Auxiliary Power Unit technology demonstrator program
[SAE PAPER 801148] p0406 A81-34240

LEVANT, F.
Experimental study of the interaction between the wing of a subsonic aircraft and a nacelle of a high by-pass ratio engine
p0189 N81-16010

LEVASHOV, P. D.
Application of hybrid schemes in analysis of thin-wall structures by the displacement method
p0235 A81-25681

LEVCHENKO, V. IA.
Experimental investigation into the reaction of a boundary layer to external periodic disturbances
p0309 A81-29066

LEVEK, R.
Aircraft hydraulic systems dynamic analysis. Volume 6: Steady state flow analysis SSFAN computer program technical description
[AD-A089240] p0026 N81-10055

LEVEK, R. J.
Digital computer simulation of aircraft hydraulic systems
[SAE PAPER 801193] p0402 A81-34203

LEVERTON, J. W.
Helicopter internal noise - An overview
p0150 A81-20055
Reduction of helicopter noise by use of a quiet tail rotor
p0468 A81-40096

LEVIN, D.
A vortex-lattice method for calculating longitudinal dynamic stability derivatives of oscillating delta wings
[AIAA PAPER 81-1876] p0561 A81-44570

LEVINE, D. M.
Lightning electric field measurements which correlate with strikes to the NASA F-106B aircraft, 22 July 1980
[NASA-TM-82142] p0491 N81-26603

LEVINE, L. S.
Reducing the cost impact of helicopter internal noise control
[AHS 80-59] p0478 A81-40103

LEVISON, W. H.
Closed-loop criteria for assessing longitudinal-axis handling qualities of transports in final approach
[AIAA 81-1773] p0556 A81-44133

LEVIT, N. E.
Principles of aircraft-engine assembly
p0355 A81-31799

LEVY, D.
The state of the art of general aviation autopilots
[NASA-CR-159371] p0197 N81-16066

LEVY, D. W.
A program to evaluate a control system based on feedback of aerodynamic pressure differentials, part 1
[NASA-CR-164684] p0583 N81-30134
A program to evaluate a control system based on feedback of aerodynamic pressure differentials. Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135

LEVY, J. S.
Evaluation of Discrete Address Beacon System (DABS) EMC
[PB81-154387] p0441 N81-25062

LEVY, L. L., JR.
Predicted and experimental steady and unsteady transonic flows about a biconvex airfoil
[NASA-TM-81262] p0258 N81-18782

LEVY, M.
A practical method for predicting flight-by-flight crack growth in fighter type aircraft for damage tolerance assessment
p0013 A81-11659

LEW, H. G.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006

LEWIS, B. L.
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0310 A81-30093

LEWIS, D.
An alternative approach to engine rating structures using monitoring systems
[SAE PAPER 801225] p0405 A81-34228

LEWIS, D. W.
Two-stage combustion for reducing pollutant emissions from gas turbine combustors
[NASA-CR-163877] p0196 N81-16056

LEWIS, G. R.
Image stabilisation techniques for long range reconnaissance camera
p0462 A81-39436

LEWIS, R. B., II
US Army design-to-cost experience
p0045 N81-11905

LEWIS, W.
  Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
  [AD-A090111] p0042 N81-11290

LEWIS, W. J.
  A comparison of propulsion systems for V/STOL supersonic combat aircraft
  [SAE PAPER 801141] p0398 A81-34171
  Multi-mission V/STOL with vectored thrust engines
  [AIAA PAPER 81-1363] p0502 A81-40843
  Multi-mission STOVL with vectored thrust engines p0633 N81-33149

LEYMAN, C. S.
  Concorde aerodynamics and associated systems development p0101 A81-16718
  Concorde with the airlines p0247 N81-18013

LEYNAERT, J.
  Tests of air inlets at Reynolds numbers comparable to flight in the ONERA F1 and S1MA wind tunnels
  [ONERA, TP NO. 1981-36] p0460 A81-39239

LEZNIAK, T. W.
  Program Navigate - A simulation computer program to verify OAS navigation capability p0322 A81-30289

LI, C.-H.
  On the steady state and dynamic performance characteristics of floating ring bearings
  [ASME PAPER 80-C2/LUB-17] p0117 A81-18671

LI, K. H.
  Supercritical flow past symmetrical airfoils
  [AD-A093300] p0203 N81-16984

LI, L.
  On the application of self-adaptive flight control system based on energy balance theory p0224 A81-23733

LI, M.-H.
  A new method for torsion of shaft with variable diameter using non-orthogonal curvilinear coordinates and its application
  [AIAA 81-0477] p0300 A81-29378

LI, P.
  Experimental investigations on shock-associated noise p0107 A81-17735

LI, W.
  A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion p0108 A81-17824
  The digital simulation of stability for multi-stage axial compressor p0225 A81-23856

LI, W.-H.
  Investigation of the squeeze film bearing on two-spool turbo-fan engine p0295 A81-29093

LI, X.-Y.
  Application of scaling in afterburner test and development
  [ASME PAPER 81-GT-194] p0317 A81-30086

LI, Y.-Y.
  Preliminary experimental study of combustion in the solid rocket-ramjet p0292 A81-29067

LIANGO-FU, H.
  A brief analysis and its experiment of the hydraulic-electric loading servosystem
  [NASA-TM-76458] p0276 N81-19132

LIAPINA, G. A.
  Experimental investigation of orographic waves and vertical motions in the Krasnovodsk airport area p0121 A81-19441

LIARD, F.
  General remarks on helicopter reliability p0287 A81-28472
  New materials and helicopter certification
  [AAAF-NT-79-26] p0210 N81-17052

LIBEER, J. P.
  The development of the AS 355 Ecureuil 2/Twinstar p0466 A81-40083

LIBERTY, S. R.
  Design of multivariable feedback control systems via spectral assignment
  [NASA-CR-164109] p0345 N81-21066

LICHT, L.
  Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports
  [ASME PAPER 80-C2/LUB-35] p0117 A81-18683

LICHTY, D. W.
  Control characteristics of a Buoyant Quad-Rotor Research Aircraft
  [AIAA 81-1838] p0555 A81-44122

LIDEN, S.
  V/STOL AND digital avionics system for UH-1H
  [NASA-CR-152179] p0273 N81-19112
  V/STOLAND digital avionics system for XV-15 tilt rotor
  [NASA-CR-152320] p0375 N81-22047

LIEBERMAN, M.
  Effect of refining variables on the properties and composition of JP-5
  [AD-A093842] p0219 N81-17291

LIEBST, B. S.
  Optimized pitch controller for load alleviation on wind turbines
  [FFA-TN-HU-2109-PT-1] p0087 N81-12634

LIFSHITS, IU. B.
  Transonic flow past a wing profile in channels with permeable walls p0054 A81-13533

LIGRANI, P.
  Turbine blade cooling research at the von Karman Institute for Fluid Dynamics p0293 A81-29076

LIJEWSKI, L. E.
  Application of aerodynamic jump prediction theory to supersonic, high fineness ratio, cruciform finned bodies
  [AIAA PAPER 81-0222] p0162 A81-20685

LILLEY, D. G.
  Prediction of swirling reacting flow in ramjet combustors
  [AIAA PAPER 81-1485] p0506 A81-40903

LILLEY, R. W.
  Microcomputer processing for Loran-C p0371 N81-22007
  VLF P-static noise reduction in aircraft. Volume 1: Current knowledge
  [AD-A098451] p0440 N81-25061
  VLF P-static noise reduction in aircraft. Volume 2: Recommended action
  [AD-A099130] p0491 N81-26394

LIMAGE, C. R.
  Effects of advances in propulsion technology on missile effectiveness
  [AD-A090645] p0081 N81-12106

LIN, C.
  Second order approximation theory of an arbitrary aerofoil in incompressible potential flow p0108 A81-17803
  Aerodynamic calculations and design of subcritical aerofoils p0108 A81-17804

LIN, C. F.
  Optimum maneuvers of supersonic aircraft, volumes 1 and 2 p0332 N81-20060

LIN, Q.
  A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion p0108 A81-17824
  The measurement and analysis of station parameters of a turbojet engine p0109 A81-17825

LINCOLN, J. W.
  On certification of composite structures for USAF aircraft
  [AIAA PAPER 81-1686] p0527 A81-43158
  Application of fracture mechanics to US Air Force aircraft structural integrity requirements
  [AAAF-NT-79-25] p0086 N81-12463
  Method for computation of structural failure probability for an aircraft
  [AD-A098294] p0426 N81-24050
  Development of an aircraft maneuver load spectrum based on VGH data
  [AD-A102750] p0628 N81-32142

LIND, G. W.
  V/STOL technology requirements for future fighter aircraft
  [AIAA PAPER 81-1360] p0502 A81-40841

LINDAHL, C. E.
  The evolution of real-time digital simulation of aircraft for training applications

p0615 A81-48358
LINDBURG, A. W.
Electronic voice communications improvements for Army aircraft
p0603 N81-31454
LINDEN, A. W.
An ABC status report
p0572 A81-46610
Advancing blade concept helicopter mission capabilities
p0634 N81-33151
LINDENBAUM, S. P.
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041
LINDNER, H.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129
LINEBERRY, E. C.
Image processing design for autonomous acquisition of targets
p0562 A81-44700
LININGSTON, W. W.
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019
LINTERN, G.
Visual cue augmentation in contact flight simulation
p0064 A81-15696
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033
LINTON, R. C.
The Passive Optical Sample Assembly (POSA) on STS-1
[NASA-TM-82407] p0337 N81-20868
LIPP, A.
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines
[BMFT-FB-T-79-137] p0275 N81-19128
LISSAMAN, P. B. S.
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492
LITTLE, B. H., JR.
The role of flight research vehicles in prop-fan technology development
[ASME PAPER 81-GT-216] p0318 A81-30104
Propulsion system installation design for high-speed prop-fans
[AIAA PAPER 81-1649] p0526 A81-43144
LITTLE, L. J.
A microprocessor based land navigator
p0360 A81-32833
Field evaluation of the LN80 land navigation system
[AD-A091885] p0193 N81-16035
LITTLEFIELD, J. A.
An analysis of the adaptability of Loran-C to air navigation
p0371 N81-22003
The P/PCD project: Programmable/Pilot Oriented Display
p0371 N81-22004
LITWINCZYK, M.
Flow phenomena along fuselages and wing-fuselage systems of gliders
[NASA-TM-75401] p0186 N81-15983
Discussion of test results in the design of laminar airfoils for competition gliders
[NASA-TM-75402] p0186 N81-15984
LIU, C.
An optimum design procedure of total-temperature thermocouple probes
p0108 A81-17807
LIU, C. Y.
Forecast of future aviation fuels: The model
[NASA-CR-165486] p0631 N81-32956
LIU, H. W.
A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032
LIU, G.
Variational principles and generalized variational principles for the hybrid aerodynamic problem of airfoil cascades on an arbitrary stream sheet of revolution
p0107 A81-17741
LIU, G.-E.
Application of scaling in afterburner test and development
[ASME PAPER 81-GT-154] p0317 A81-30086
LIU, J.
An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826
LIU, S.
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825
LIU, Y.
An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826
LIVINGSTON, D.
Characterizing cross-track error distributions for continental jet routes
p0174 A81-21969
Computer graphics applications
[PB81-215246] p0637 N81-33183
LLEWELLYN, E.
A new technique for tracking sequences of digitized images
p0156 A81-20588
LLOYD, A. J. P.
Avionics thermal integration for the Boeing 767 airplane
p0570 A81-46470
LLOYD, A. T.
More fight for the Fighting Falcon
p0622 A81-49075
LLOYD, E. A.
Non-destructive testing of adhesive-bonded joints
p0153 A81-20162
LLOYD, G. F. H.
Helicopter cockpit design for night goggle compatibility
p0472 A81-40128
LLOYD, T.
Is it safe - The safety assessment of aircraft systems. III - The use of probability methods
p0290 A81-29029
Is it safe - The safety assessment of aircraft systems. IV - Methods, techniques, and organisation
p0366 A81-33709
Is it safe - The safety assessment of aircraft systems. V - Some particular techniques
p0454 A81-38174
LO, C. M.
Forward looking infrared /FLIR/ image enhancement for the automatic target cuer system
p0461 A81-39335
LOBAS, L. G.
The influence of structural parameters and velocity on the shimmy of self-aligned wheels
p0556 A81-44260
Self-oscillations of a self-aligned landing gear strut in the case of classical nonholonomic rolling constraints
p0563 A81-45315
Self-oscillations of a wheel on a self-aligning landing gear strut with a nonlinear damper
A81-4684
A formulation of the shimmy problem for swiveling wheels
p0607 A81-4728
LOCKENOUR, J. L.
Digital flight control - The generation of the 80's
p0320 A81-3024
LODGE, K. J.
The electrical effects of joints and bonds in carbon fiber composites
p0199 N81-161
LOBERT, G.
Spanwise lift distribution of forward-and aft-swept wings in comparison to the optimum distribution form

p0453 A81-38017
LONCHELT, H.
Components in hybrid- and fiber technology for commercial aircraft of the Airbus family /flap support, spoiler, and window frame/
p0450 A81-37644
LOEFFLER, I. J.
Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine
[NASA-TM-81761] p0443 N81-25079
LOHER, R.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960
LOEWENSTEIN, P.
Plasma arc improves PM process - Tungsten free Ti powder
p0227 A81-24045
LOEWENSTERN, R.
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099
LOEWY, R. G.
Composite structural materials
[NASA-CR-163946] p0207 N81-17039
Composite structural materials
[NASA-CR-164634] p0541 N81-28176
LOGAN, A. H.
The experimental and analytical definition of helicopter modeling effects
[AHS 80-4] p0473 A81-40139
Wind tunnel tests of large- and small-scale rotor hubs and pylons
[AD-A098510] p0439 N81-25043
LOH, R.
Analysis of helicopter operations and the use of MLS in the offshore environment
p0512 A81-41764
LOHMANN, D.
Prediction method for aeroacoustic loads on under the wing blown flaps
[AIAA PAPER 81-2038] p0621 A81-48644
Optimization of barriers
[ESA-TT-640] p0500 N81-27893
LOKTEV, B. E.
Computer simulation of unsteady flow past lifting rotors of coaxial configuration
p0230 A81-24389
LONDON, S. A.
Toxicity of synthetic high density and conventional hydrocarbon jet fuels to a soil bacterium
[AD-A089527] p0041 N81-11233
LONG, B. H.
Augmenting ATE with dynamic simulation testing techniques
p0320 A81-30241
LONG, G.
An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989] p0263 N81-19028
LOOMIS, J. P.
An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108
LOOMIS, L. L.
Evaluation of the potential format and content of a cockpit display of traffic information
p0053 A81-13419
LORDI, J. A.
Linearized analysis of the three-dimensional compressible flow through a rotating annular blade row
p0234 A81-25446
LORENTE ARCAS, A.
Project Promet
p0565 A81-45760
LORENZ-MEYER, W.
Developments in the area of cryo-wind tunnel technology by the DFVLR
p0065 A81-15702
LORENZETTI, R. C.
Wright Field turboprop study
[AIAA PAPER 81-1685] p0526 A81-43157
LORES, M. E.
Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11604
LORINCZ, D. J.
Effect of in-flight thrust reverser deployment on tactical aircraft stability and control
[AIAA PAPER 81-1446] p0504 A81-40879
LOTTATI, I.
Three-dimensional oscillatory piecewise continuous-kernel function method. I - Basic problems. II - Geometrically continuous wings. III - Wings with geometrical discontinuities
p0411 A81-35631
LOTZE, A.
Active suppression of aircraft flutter
p0059 A81-14397
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13976
LOUBET, R.
Aging study of the Caravelle 38
p0061 A81-15119
LOVE, W. D.
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A098195] p0250 N81-18039
LOVELL, D. A.
Some experiences with numerical optimisation in aircraft specification and preliminary design studies
p0007 A81-11609
LOVELL, W. A.
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-31184
LOWREY, R. G.
Evolution of transport wings - From C-130, C-141, and C-5 to C-XX
p0510 A81-41333
LOWRY, H. E.
Development of a helicopter water quality monitoring/sampling system
[PB81-168734] p0499 N81-27714
LOWRY, R. B.
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
p0632 N81-33142
LOZOWSKI, E. P.
Computer simulation of airfoil icing without runback
[AIAA PAPER 81-0402] p0167 A81-20809
LU, H. Y.
Effect of excitation on coaxial jet noise as observed by an elliptic mirror
[AIAA PAPER 81-2044] p0621 A81-48651
LU, H. T.
Simulation of a third-order vertical channel mechanization
p0322 A81-30290
LUCAS, E. J.
Evaluation of wind tunnel nozzle afterbody test techniques utilizing a modern twin engine fighter geometry at Mach numbers from 0.6 to 1.2
[AD-A091545] p0126 N81-13932
LUCCHI, G. A.
New airborne weather radar systems
[AIAA PAPER 81-0237] p0163 A81-20692
LUCID, V. J.
Handbook on bird management and control
[AD-A089009] p0023 N81-10028
LUDLOFF, A.
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20094
LUDWIG, L. P.
Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
LUERS, J. K.
The effect of heavy rain on windshear attributed accidents
[AIAA PAPER 81-0390] p0167 A81-20800

LUIDEN, R. W.
Scale effects on turbulent boundary layer development and flow separation around V/STOL inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
LUIDENS, R. W.
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Flow separation in inlets at incidence angles
p0297 A81-29114
LUKIC, D. R.
A long range research programme of noise abatement at the airport of Beograd and its practical results
p0570 A81-46373
LUMMUS, J. R.
Aerodynamic characteristics of two VSTOL fighter configurations
[AIAA PAPER 81-1292] p0454 A81-38119
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTCL fighter/attack aircraft. Volume 1: Study overview
[NASA-CR-152391-VOL-1] p0384 N81-23030
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 2: Evaluation of prediction methodologies
[NASA-CR-152391-VOL-2] p0384 N81-23031
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 3: Effects of configuration variations from baseline
[NASA-CR-152391-VOL-3] p0384 N81-23032
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTCL fighter/attack aircraft. Volume 4: RALS R104 aerodynamic characteristics and comparisons with R205 configuration aerodynamic characteristics
[NASA-CR-152391-VOL-4] p0384 N81-23033
The criticality of engine exhaust simulations on VSTOL model-measured ground effects
p0486 N81-26115
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0
[NASA-TM-81286] p0579 N81-30083
LUNDGREN, S.
Application of a method for aerodynamic analysis and design of horizontal axis wind turbines, part 1
[FFA-TN-AU-1499-PT-1] p0086 N81-12633
LUNDRY, J. L.
A system for aerodynamic design and analysis of supersonic aircraft. Part 2: User's manual
[NASA-CR-3352] p0125 N81-13920
A system for aerodynamic design and analysis of supersonic aircraft. Part 1: General description and theoretical development
[NASA-CR-3351] p0139 N81-14970
A system for aerodynamic design and analysis of supersonic aircraft. Part 3: Computer program description
[NASA-CR-3353] p0139 N81-14971
A system for aerodynamic design and analysis of supersonic aircraft. Part 4: Test cases
[NASA-CR-3354] p0185 N81-15977
LUNDSAGER, P.
Static deflection and eigenfrequency analysis of the Nibe wind turbine rotors. Theoretical background
[RISOE-M-2199] p0279 N81-19497
LUNDY, R. B.
Microprocessor-based digital air data computer for flight test
p0361 A81-32858
LUNN, K.
Real time analysis for helicopter flight testing
p0470 A81-40112
LUNTZ, A.
Modification of wing sections to optimize transonic performance
p0226 A81-24011
LUO, S.
Finite difference computation of the steady transonic potential flow around airplanes
p0107 A81-17802
LUTHER, J.
Compact and highly sensitive fluorescence lidar for oceanographic measurements
p0623 A81-49378
LUTHER, R. E.
A higher-order trapezoidal vector vortex panel for subsonic flow
[AD-A094775] p0263 N81-19032
LUTIN, J. M.
Computer graphics applications
[PB81-215246] p0637 N81-33188
LUTTINGER, M.
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10080
LUTZE, F. H.
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0241 A81-26933
Boost-glide range-optimal guidance
[AIAA 81-1781] p0554 A81-44096
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0591 N81-31112
LY, U.
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology
[AIAA PAPER 81-0021] p0158 A81-20544
LYMAN, E. G.
ATC contingency operations in the en-route flight regime
[NASA-CR-166231] p0546 N81-29110
LYNN, R. R.
Requirements and possibilities - Rotorcraft powerplants /The 15th Halford Memorial Lecture/
p0226 A81-23999
LYON, T. F.
CF6-50 engine emissions testing with traverse probe
[AD-A102159] p0600 N81-31218
LYONS, B.
IFFC fire control system mechanization - Firefly III
p0324 A81-30327
LYONS, D. T.
The improvement of aircraft specific range by periodic control
[AIAA 81-1748] p0553 A81-44080
Improved aircraft cruise by periodic control
p0034 N81-11030
LYONS, J. W.
A theoretical and practical design investigation of the future military cockpit
p0010 A81-11631
The influence of visual requirements on the design of military cockpits
p0213 N81-17075
LYONS, P. F.
Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953
Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954
LYSAK, M. V.
Forced vibrations of a nonlinear system excited by a centrifugal oscillator with a sloping engine characteristic
p0002 A81-10439
LYTWYN, R. T.
Aeroelastic stability analysis of hingeless rotor helicopters in forward flight using blade and airframe normal modes
[AHS 80-24] p0475 A81-40154

M

MA, D.
Experimental investigations on shock-associated

noise
p0107 A81-17735
MA, Z.
The optimum design of non-moment laminated composite plate - According to static failure strength condition
p0480 A81-40449
MAARSINGH, R. A.
Evaluation of Levinsky's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033
A review of research at NLR on wind-tunnel corrections for high angle of attack models
p0436 N81-24125
Evaluation of Ting's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-80078-U] p0594 N81-31157
MAASS, D. P.
Developing design allowables for composite helicopter structures
p0611 A81-47811
MABEY, D. G.
The resonance frequencies of ventilated wind tunnels
[ARC-R/M-3841] p0144 N81-15009
Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels
p0386 N81-23056
MABSON, G.
Study of the crashworthiness of light aircraft structures
[AIAA 81-0574] p0302 A81-29407
MACCALLUM, N. R. L.
Further studies of the influence of thermal effects on the predicted acceleration of gas turbines
[ASME PAPER 81-GT-21] p0311 A81-29938
MACCHI, E.
Efficiency prediction for axial-flow turbines operating with nonconventional fluids
[ASME PAPER 81-GT-15] p0310 A81-29937
MACCREADY, P. B.
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
MACDIARMID, I. P.
Aircraft manufacturers approach to the E.M.C./Avionics problems associated with the use of composite materials
p0200 N81-16156
MACDOUGALL, A. C.
The 'light-weight' system - A novel concept for on-board weight and balance measurement using fiber optics
[SAWE PAPER 1336] p0352 A81-31377
MACE, B. R.
Periodically stiffened fluid-loaded plates. I - Response to convected harmonic pressure and free wave propagation. II - Response to line and point forces
p0102 A81-17067
MACE, J.
A perspective on developing new inlet distortion measurement and predictive methods
[AIAA PAPER 81-1589] p0507 A81-40964
MACGLASHAN, W. F.
Power control for hot gas engines
[NASA-CASE-NPO-14220-1] p0133 N81-14318
MACH, E.
Classification of operating conditions of turbomachines from solid borne sound
p0382 N81-23015
MACHIELSE, L.
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
MACHUZAK, R. J.
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44681
MACIOCE, L. E.
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
MACIOLEK, J. R.
The impact on helicopter cockpits of integrated advanced flight controls, avionics and optics
p0574 A81-46624
MACK, J.
Drive system technology advancements
p0356 A81-32015
MACK, J. C.
Drive system development for the 1980's
p0105 A81-17508
Experience with advanced high performance gear steel
[ASME PAPER 80-C2/DET-77] p0117 A81-18648
MACK, L. M.
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840
MACK, R. J.
Estimation of wing nonlinear aerodynamic characteristics at supersonic speeds
[NASA-TP-1718] p0021 N81-10004
Supersonic wings with significant leading-edge thrust at cruise
p0244 N81-17990
MACKENZIE, R. B.
On-line wind shear generation for flight simulator applications
[AIAA 81-0970] p0418 A81-36559
MACKIE, D. B.
Identification of a linear model of rotor-fuselage dynamics from nonlinear simulation data
p0472 A81-40125
MACKIERNAN, D.
A new technology - Piezoelectric polyvinylidene fluoride communications transducers
p0176 A81-22099
MACLENNAN, J. R.
National runway friction measurement program
[AD-A097334] p0391 N81-23097
MACLEOD, N.
New NDT techniques used for aircraft maintenance
p0153 A81-20168
MACLEOD, N. I.
Low-speed wind-tunnel tests of two weathercocking sensors
[WSRL-0171-TE] p0136 N81-14575
MACNAUGHTON, M. G.
Environmental chemistry and management of hydrazine
p0240 A81-26770
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
MACOTTE, J. C., JR.
Optimization of strategic airlift in flight refueling
[AD-A101137] p0539 N81-28090
MACPHERSON, C. A.
Image processing design for autonomous acquisition of targets
p0562 A81-44700
MACPHERSON, P. B.
Water content of helicopter gear oils
[ASME PAPER 80-C2/DET-12] p0116 A81-18640
The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-18654
MACRINO, J. A.
Advancing blade concept /ABC/ high speed development
p0470 A81-40182
MADDALON, D. V.
US and USSR Military Aircraft and Missile Aerodynamics 1970-1980. A selected, annotated bibliography, volume 1
[NASA-TM-81951] p0587 N81-29119
MADDOX, A. R.
Store separation trajectory analysis
p0050 A81-13216
MAEDA, T.
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24679
MAERTINS, H. F.
Cost/benefit analysis of advanced materials technology candidates for the 1980's, part 2
[NASA-CR-165176] p0048 N81-11953
MAESTRELLO, L.
Effects of nozzle design on the noise from supersonic jets
p0246 N81-18001
MAGE, D. T.
The RAPS (Regional Air Pollution Study) helicopter

air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555

MAGENHEIM, B.
Impact of low altitude coverage requirements on air-ground communications
[AD-A101642] p0586 N81-30338

MAGLIERI, D. J.
Status of knowledge of sonic booms
p0017 A81-11822

MAGNAN, A.
Bird flight and airplane flight
[NASA-TM-75777] p0138 N81-14962

MAGNUS, A. E.
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022

MAGRE, P.
A theoretical and experimental study of combustion chambers with recirculation
[ONERA, TP NO. 1981-39] p0460 A81-39242

MAGUIRE, J.
LR-80 flight test report
[AD-A090284] p0075 N81-12058

MAHER, F.
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688] p0381 N81-22971
Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689] p0381 N81-22972
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A
[AD-A096690] p0381 N81-22973
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692] p0392 N81-23325

MAHER, S. L.
A continuously reconfiguring multi-microprocessor flight control system
[AD-A101812] p0584 N81-30130

MAHON, J.
Development of large-area damage repair procedures for the F-14A horizontal stabilizer. Phase I - Repair development
p0559 A81-44395

MAHONEY, J.
NOISECHECK procedures for measuring noise exposure from aircraft operations
[AD-A093948] p0221 N81-17849

MAHONEY, J. H.
A guidance document on airport noise control
[AD-A092228] p0202 N81-16629

MAIDMENT, L. J.
An evaluation of vacuum centrifuged titanium castings for helicopter components
p0510 A81-41516

MAIER, R. V.
Advancements in dimensional inspection of helicopter gearboxes and transmission cases
[AHS 80-36] p0476 A81-40165

MAIO, D.
Performance evaluation of an interrogation-reply scheduling technique for a discrete address beacon system
p0121 A81-19417

MAJJIGI, R. K.
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999

MAJUS, J.
A method for evaluating radio navigation systems for the terminal maneuvering area
[DFVLR-MITT-81-02] p0538 N81-28080

MAKAROV, IU. V.
On the inter-relationship of the basic parameters and characteristics of various flight vehicles
p0236 A81-25694

MAKOVETSKAIA, I. A.
Fatigue strength of gas turbine engine rotor blades in connection with structural changes in service
p0355 A81-31673

MALARIK, R. N.
Adhesive bonding of avionic structures
p0181 A81-22646

MALASHENKOV, S. P.
Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures
p0516 A81-42356

MALCOLM, G. N.
Impact of high-alpha aerodynamics on dynamic stability parameters of aircraft and missiles
p0590 N81-31107
Rotary and Magnus balances
p0591 N81-31111

MALIKOV, L. M.
Aircraft instruments and measuring systems
p0564 A81-45600

MALINSKI, N.
Head-up displays. III
p0005 A81-11320

MALIUTIN, A. A.
Investigation of asynchronous motors with unstable power-supply frequency for use on aircraft
p0281 A81-27364

MALLETT, W. E.
A synopsis of the Navy A-7 Aircraft Fuel Conservation program
[AIAA PAPER 81-1681] p0535 A81-43949

MALLINSON, R. D.
Probe protection in camera/model visual systems
p0615 A81-48359

MALLON, P. J.
Validation of a two dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A092138] p0196 N81-16066
Validation of a two-dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A094615] p0254 N81-18067

MALMUTH, N. D.
Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0183 A81-23367

MALONE, J. B.
An optimal-surface-transpiration subsonic panel-method for iterative design of complex aircraft configurations
[AIAA PAPER 81-1254] p0458 A81-38012
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] p0629 N81-32154

MALPANI, J. K.
Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901)
[AD-A089524] p0029 N81-10074
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
[AD-A089791] p0036 N81-11081

MALTBY, R. L.
A review of some topics of UK research on helicopters
p0466 A81-40000

MALTHOUSE, N. S.
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039

MALYSHEV, V. V.
Formation of solid phase during the heating of jet fuels
p0103 A81-17372

MANCINI, J. H.
Helicopter gearbox testing
p0488 N81-26137

MANDIGO, A. N.
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137

MANDT, G. A.
Aircraft brake systems testing handbook
[AD-A101516] p0548 N81-29123

MANESS, S. G.
Helicopter emergency underwater escape
p0176 A81-22101

MANGIAROTTY, R. A.
Effect of engine noise on aircraft wing laminar boundary-layer stability
p0510 A81-41255

MANGIONE, P. J.
Helicopter transmission testing
p0433 A81-24102

MANGOLD, P.
Possibilities for the valuation of different combat aircraft configurations with respect to flight mechanics
p0007 A81-11607
MANIE, F.
Study of a variable sweep wing in sub or transonic flow
[ONERA, TP NO. 1978-106] p0058 A81-14391
MANITA, S. L.
The problem of hoar-frost formation in aircraft fuel tanks
p0319 A81-30159
MANNHEIMER, R. J.
Degradation and characterization of antimisting kerosene /AMK/
[AIAA PAPER 81-1423] p0503 A81-40867
MANNO, A.
Review of Navy composite repair program
p0558 A81-44383
US Navy service experience with advanced composites
p0041 N81-11149
MANOS, K. L.
Information transfer within the cockpit: Problems in intracockpit communications
p0595 N81-31167
MANRO, M. E.
The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
p0243 N81-17984
MANSKE, R. A.
Fighter fire control requirements for air battles of the future
p0326 A81-30348
MANTEL, C. R.
Toxicity of synthetic high density and conventional hydrocarbon jet fuels to a soil bacterium
[AD-A089527] p0041 N81-11233
MANUSHIN, E. A.
Thermodynamic comparison of the efficiencies of semiclosed- and open-loop air cooling systems of gas turbine engines
p0509 A81-41029
MANZ, HR.
Measurement of radar in radio service aircraft
p0151 A81-20079
MARCHNARO, F. A.
Computerized gear grinding system development
[AMS 80-48] p0476 A81-40163
MARCHAND, M.
Investigation of landing flare in the presence of wind shear
[ESA-TT-631] p0077 N81-12000
System identification for controlled aircraft
p0631 N81-33132
MARCHMAN, J. F., III
The aerodynamics of inverted leading edge flaps on delta wings
[AIAA PAPER 81-0356] p0165 A81-20775
Effectiveness of leading-edge vortex flaps on 60 and 75 degree delta wings
p0352 A81-31368
Effects of yaw on leading edge vortex flap aerodynamics
[AIAA PAPER 81-1660] p0526 A81-43147
MARCINIAK, M.
Reduction of energy consumption in the vibrational shot peening of axial compressor vanes
p0005 A81-11321
MARCONI, F.
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] p0637 N81-33192
MAREK, A. J.
Power system control study. Phase 1: Integrated control techniques. Phase 2: Detail design and system modeling
[AD-A099894] p0497 N81-27100
MAREK, C. J.
Supercritical fuel injection system
[NASA-CASE-LEW-12990-1] p0549 N81-29129
MARESCA, C. A.
Unsteady aerodynamics of an aerofoil at high angle of incidence performing various linear oscillations in a uniform stream
p0357 A81-32817
MAREVTSEVA, N. A.
Flow past a slender profile in a channel with permeable walls
p0004 A81-10916
MARGASON, R. J.
High lift technology
p0593 N81-31147
MARGETSON, J.
Tensile stress/strain characterization of non-linear materials
p0348 A81-30915
MARICIC, N. L.
Calculation of critical flutter speeds on an aircraft in subsonic flow
p0068 A81-16301
MARK, A.
Computational design of large-scale blast simulators
[AIAA PAPER 81-0159] p0162 A81-20639
MARK, W. D.
Gear meshing action as a source of vibratory excitation
p0150 A81-20061
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] p0637 N81-33191
MARKOS, A. T.
A learning guide for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-83128] p0484 N81-26083
MARKOV, A. B.
On-line wind shear generation for flight simulator applications
[AIAA 81-0970] p0414 A81-36559
MARKOW, E. J.
Runway rehabilitation, Washington National Airport
p0112 A81-18066
MARKS, K. E.
Estimating aircraft depot maintenance costs
[AD-A103623] p0631 N81-33133
MARKS, P. A.
Design for economy
p0290 A81-29038
MARKS, R.
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044
MARR, R. L.
In-flight structural dynamic characteristics of the XV-15 tilt rotor research aircraft
[AIAA 81-0612] p0304 A81-29478
MARSCHALL, K.
Improvement of guidance and handling qualities in the vicinity of airports and on landing
[BMFT-FB-W-79-42] p0425 N81-24085
MARSDEN, J.
Boeing 767 - The new fuel saver
p0553 A81-44042
MARSH, A. H.
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 3: Tables of atmospheric absorption losses
[AD-A093144] p0221 N81-17848
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 2: Computer program
[AD-A093267] p0221 N81-17853
MARSH, D. P.
Design considerations for future turboprop transports
[SAWE PAPER 1340] p0352 A81-31380
MARSH, J. E.
Analysis of a symmetric transonic aerofoil with the finite element method - A new upwinding technique
p0183 A81-22984
MARSHALL, R. L.
Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836
MARTEL, C. R.
Static charge in aircraft fuel tanks
[AD-A093552] p0208 N81-17045
MARTENEY, P. J.
Determination of coking rate in jet fuel
p0570 A81-46448
Experimental study of the stability of aircraft fuels at elevated temperatures

[NASA-CR-165165] p0084 N81-12255
MARTIN, B. W.
Flow transition phenomena and heat transfer over the pressure surfaces of gas turbine blades
[ASME PAPER 81-GT-107] p0315 A81-30012
MARTIN, C. F.
Seasat altimeter height calibration
[NASA-TM-82040] p0279 N81-19526
MARTIN, C. L.
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966
MARTIN, D. L.
YC-14 digital flight control experience
p0320 A81-30246
MARTIN, E. L.
Training effectiveness of platform motion: Review of motion research involving the advanced simulator for pilot training and the simulator for air-to-air combat
[AD-A095930] p0343 N81-21089
MARTIN, G. L.
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-31184
MARTIN, G. W., SR.
Matrix load analysis method for flexible aircraft structures
[PAPER 810610] p0522 A81-42766
MARTIN, J. F.
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 2: Reliability evaluation and system definition for detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18420
MARTIN, J. L.
Shipboard trials of the Quiet Short-Haul Research Aircraft /QSRA/
p0099 A81-16581
MARTIN, R. L.
The nature of operating flight loads and their effect on propulsion system structures
p0599 N81-31207
MARTIN, R. M.
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] p0631 N81-32966
MARTIN, S., JR.
STOL performance of the tilt rotor
p0467 A81-40085
MARTIN, T. A.
Investigation of plume induced separation on a full-size missile at supersonic velocities
[AD-A094742] p0277 N81-19212
MARTINEZ, S. A.
Engine requirements for the T-37 trainer aircraft - A simulation study and analysis
p0616 A81-48379
MARTONE, J. A.
USAF Aircraft Engine emission goals, a critical review
[AD-A090282] p0087 N81-12651
MARTORELLA, P.
Precision flight path control in carrier landing approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43956
MARTYNOV, A. K.
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0418 A81-36940
MARUSII, O. I.
Fatigue strength of gas turbine engine rotor blades in connection with structural changes in service
p0355 A81-31673
MARUTHI, V.
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
MARVIN, I. E.
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-1911
MARZE, H. J.
An overview of the research conducted in Aerospatiale on internal noise
p0150 A81-200
MASCHETTI, G. J.
Operational energy conservation strategies in commercial aviation
p0155 A81-20
MASEEV, E. M.
A method for measuring the velocity field in a stalled flow
p0287 A81-28523
MASEK, R. L.
Transonic maneuver/cruise airfoil design employing active diffusion control
p0239 A81-26511
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control
p0239 A81-26512
Low drag airfoil design utilizing passive laminar flow and coupled diffusion control techniques
[AD-A090778] p0072 N81-1202
MASLENNIKOV, V. G.
Interferometric study of the initial stage of supersonic jets of gases with various specific-heat ratios from conical nozzles
p0068 A81-16231
MASON, J. R.
Extended frequency turbofan model
[NASA-CR-165261] p0335 N81-2007
MASON, R. C.
Avionic architectural standardization - Logistic support perspective
p0050 A81-13171
MASON, W. H.
Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016
MASSARO, C.
Rig investigation of a two stage single shaft low cost turbine
p0432 N81-24099
MASSIMINO, M.
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-1102
MASSON, A.
Three years of operation of the ONERA pressurized subsonic wind tunnel
[ONERA, TP NO. 1980-129] p0014 A81-1166
MASUYA, G.
A study of air breathing rockets - Subsonic mode combustion
[IAF PAPER 80-F-270] p0115 A81-18371
MATAY, I. M.
Automated Plasma Spray (APS) process feasibility study
[NASA-CR-165418] p0597 N81-3119
MATHASON, J. L.
A mobile emissions laboratory for on-line analysis of combustion products from gas turbine engines
p0361 A81-328
MATHER, R. L.
LPI, short-range communications between aircraft in rendezvous
p0177 A81-224
MATHEWS, B.
Charge-coupled device /CCD/ camera/memory optimization for expendable autonomous vehicles
p0357 A81-3249
MATHEWS, D. C.
Improved methods for fan sound field determination
[NASA-CR-165188] p0147 N81-1576
MATHIAS, D. B.
Weight optimization of wing structures according to the gradient method
p0012 A81-11650
MATHIEU, J.
Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-291
MATIASH, A. I.
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-2930

MATOS, R.
New tower cab mockup for Philadelphia, Pennsylvania
[AD-A098528] p0440 N81-25060
MATSUMIYA, H.
The performance of slotted blades in cascade
p0002 A81-10632
MATSUMOTO, H.
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906
MATSUO, H.
Some experimental study on parachute dynamics by utilizing a deceleration system simulator
p0481 A81-40471
MATSUO, K.
Investigation of the starting process of a supersonic wind tunnel
p0228 A81-24080
Self-excited oscillations of supersonic flow in a sudden enlargement of a duct
p0228 A81-24081
MATSUO, R. H.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
MATSUSHITA, H.
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095
MATSUYAMA, G. T.
An assessment of advanced technologies for application to general aviation
[SAE PAPER 810630] p0524 A81-42782
A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974
A feasibility study for advanced technology integration for general aviation
[AD-A092437] p0185 N81-15975
MATSUZAKI, T.
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
MATTER, J. A.
Long-range airplane study: The consumer looks at SST travel
p0247 N81-18014
MATTHEWSON, N. J.
An investigation of the liquid impact properties of a GFRP radome material
p0457 A81-38571
MATUSEVICH, G. S.
The problem of hoar-frost formation in aircraft fuel tanks
p0319 A81-30159
MATUSZEWSKI, H. R.
Helicopter rotor blade effects on mast-mounted sensor images
p0350 A81-31114
MATWEY, R. D.
Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952
MATZ, R. J.
Investigations of free-jet test requirements and techniques with emphasis on the adaptable jet stretcher
[AD-A098710] p0439 N81-25044
MAUK, S. C.
Remotely piloted vehicles. Citations from the International Aerospace abstracts data base
[NASA-CR-163864] p0142 N81-14996
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857] p0146 N81-15648
Clean air turbulence. Citations from the International Aerospace Abstracts data base
[NASA-CR-163863] p0146 N81-15649
MAUREAU, C.
Head up displays
p0286 A81-28296
MAURER, F.
Developments in the area of cryo-wind tunnel technology by the DFVLR
p0065 A81-15702
MAURER, J. J.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24081
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24082
MAURICE, F.
Battle of the 15 tonne fans
p0480 A81-40457
Fire-proof fuel
p0480 A81-40458
MAURO, F. R.
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044
MAUS, J. R.
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] p0618 A81-48606
MAVLIUTOV, R. R.
Stress concentration in elements of aircraft structures
p0623 A81-49471
MAX, H.
Influence of zero-lift downwash on the relation between minimum-drag center-of-gravity position and inherent stability boundary
p0235 A81-25648
Aerodynamic efficiency of the wing of new technology, a comparison of design expectation and flight test result
p0450 A81-37645
MAXWELL, R. L.
Assessment of the impact of advanced air-transport technology
p0247 N81-18015
MAY, R. J., JR.
Investigation of influences on the definition of engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938
MAYBANKS, A.
Using microprocessors in fault monitoring of aircraft electronics
[ASME PAPER 81-GT-138] p0316 A81-30040
MAYER, N. S.
Electronic voice communications improvements for Army aircraft
p0603 N81-31454
MAYOR, R. A.
Optimal tracking design and simulation for a monopulse airborne radar system utilizing a predicted dual beam antenna design
p0323 A81-30293
MAYS, R. A.
Boeing Commercial Airplane Company engine procurement practices
p0429 N81-24076
MAZAIKA, P. K.
Orientation of measurement sensors for optimum end-of-life performance
p0360 A81-32697
MAZIARSKA, S.
The effect of airplane noise on the inhabitants of areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22583
Aviation noise overload in the immediate proximity of the Warsaw-Okecie airport
[NASA-TM-75892] p0500 N81-27083
MAZUMDAR, J.
Transient vibrations of elastic panels due to the impact of shock waves
p0616 A81-48385
MAZZA, L. T.
Advanced composite airframe program - Preliminary design phase
[AHS 80-45] p0477 A81-40172
MCARDLE, J. G.
Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control
[AIAA PAPER 81-2049] p0619 A81-48621
MCAULAY, J. E.
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152
MCBRAYER, P.
RF compatibility-environment to component part
p0056 A81-14260
MCCABE, L. E.
The importance of 'Interim Standard Microwave Landing System' for small community airports
p0114 A81-18087
MCCALL, D. L.
Microcomputer processing for Loran-C
p0371 N81-22007

MCCANN, R. F.
Measuring dynamic stresses on helicopter transmission gear teeth utilizing telemetry
p0361 A81-32859

MCCARTHY, J.
Doctor Fujita's microburst analysis at Chicago
p0136 N81-14572
An airport wind shear detection and warning system using Doppler radar: A feasibility study
[NASA-CR-3379] p0202 N81-16601
Aircraft sensor quality in SESAME 1979: Results of tower fly-bys and aircraft intercomparisons
[PB81-176596] p0552 N81-29722

MCCARTHY, J. F., JR.
Aerospace in the future
[NASA-TM-82664] p0543 N81-29063

MCCARTHY, J. L.
Current research in aircraft tire design and performance
p0268 N81-19065

MCCARTHY, R. N.
ORLA - An assessment of risks
p0229 A81-24257

MCCARTY, J. L.
Static and yawed-rolling mechanical properties of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24471

MCCARTY, J. R.
Operational responses to aft empty C.G.
[SAWE PAPER 1338] p0352 A81-31378

MCCARTY, P. E.
Development of a noninterference compressor blade stress measurement system
p0361 A81-32874
Performance evaluation of a prototype noninterference technique for measurement of turbine engines compressor blade stress
[AD-A090566] p0094 N81-13061

MCCARTY, R. E.
Computer analysis of bird-resistant aircraft transparencies
p0175 A81-22087
Finite element analysis of a bird-resistant monolithic stretched acrylic canopy design for the F-16A aircraft
[AIAA PAPER 81-1640] p0525 A81-43140
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies
[AD-A091051] p0091 N81-13039

MCCLINTON, C. R.
Flameholding characteristics of a swept-strut H2 fuel-injector for scramjet applications
p0003 A81-10711

MCCLOUD, J. L., II
A full-scale wind tunnel investigation of a helicopter bearingless main rotor
[NASA-TM-81321] p0628 N81-32137

MCCLOUD, J., III
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor
p0573 A81-46620

MCCLOY, D.
An objective method of assessing the realism of a simulation of a simple control system
p0284 A81-27898

MCCOLLUM, P. E.
High current power controller
[AD-A101643] p0552 N81-29536

MCCOMBER, P.
Calculation of the impingement of cloud droplets in a cylinder by the finite-element method
p0533 A81-43890

MCCONKEY, E. D.
Evaluation of LORAN-C for non-precision approach applications
p0512 A81-41763

MCCORMICK, B. W.
Equilibrium spinning of a typical single-engine low-wing light aircraft
p0354 A81-31598
The prediction of normal force and rolling moment coefficients for a spinning wing
[NASA-CR-165680] p0333 N81-20068

MCCREARY, T. R.
BIT/FIT maturity before first flight
p0324 A81-30320

MCCROSKEY, W. J.
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AIAA PAPER 81-0051] p0159 A81-20567
The challenge of unsteady separating flows
p0411 A81-35607
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AD-A093970] p0203 N81-16083
The phenomenon of dynamic stall
[NASA-TM-81264] p0329 N81-20029

MCCULLOH, T. A.
Model-based scene matching
p0461 A81-39340

MCCUNE, J. E.
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387

MCCUTCHEON, R.
Advancing Blade Concept (ABC) technology demonstrator
[AD-A100181] p0538 N81-28007

MCDANIEL, P.
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28004

MCDEDE, J. R.
Development of a computer program data base of a navigation aid environment for simulated IFR flight and landing studies
[NASA-TM-80064] p0129 N81-13038

MCDERMOTT, J. M.
The methodology of fatigue analysis and testing: Main rotor blades and hub, Hughes YAH-64 advanced attack helicopter
p0488 N81-26133

MCDONALD, L. B.
CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617

MCDONOUGH, C.
Pulsed laser mapping system for light aircraft
p0223 A81-23071

MCDOUGAL, R. L.
The stretched C-14 - Cost effective application of structural technology
[AIAA 81-0514] p0302 A81-29827

MCELMAN, J. A.
State-of-the-art review on flywheel burst containment
[UCRL-15257] p0005 N81-12827

MCFADDEN, P. D.
Investigation into the vibration of the starter gearbox of an aircraft turbine engine
p0291 A81-29850

MCFADDEN, R.
Microwave Landing System (MLS) clearance format assessment tests
[AD-A093553] p0206 N81-17020

MCFARLAND, E. R.
Solution of plane cascade flow using improved surface singularity methods
[NASA-TM-81589] p0140 N81-14979

MCFARLAND, R. H.
Application of endfire arrays at contemporary glide-slope problem sites
p0360 A81-32695
Engineering approaches for cost savings with ILS glide-slope installations
p0516 A81-42031
Investigation of air transportation technology at Ohio University, 1980
p0371 N81-22085

MCGEE, J. P.
Subsystem status monitor
[AHS 80-17] p0474 A81-40108

MCGEE, L. A.
Automatic helical rotorcraft descent and landing using a Microwave Landing System
[AIAA PAPER 81-1857] p0560 A81-44356

MCGEER, T.
An airspeed vector sensor for V/STOL aircraft
[AIAA 80-1938] p0052 A81-13386

MCGEHEE, C. R.
Final design and fabrication of an active control system for flutter suppression on a supercritical aeroelastic research wing
[NASA-CR-165714] p0498 N81-27118

MCGEHEE, J. R.
Studies of some unconventional systems for solving various landing problems
p0268 N81-19067

MCGHEE, R. J.
Low-speed aerodynamic characteristics of a 13 percent thick medium speed airfoil designed for general aviation applications
[NASA-TP-1498] p0071 N81-12015
MCGILLICUDDY, C. F., JR.
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
p0632 N81-33141
MCGINN, J. H.
US Navy service experience with advanced composites
p0081 N81-11169
MCGLONE, M.
Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087
MCGLONE, M. E.
Development of an integrated fault tolerant engine control
[AIAA PAPER 81-1365] p0502 A81-40845
MCGRATH, J. D.
The new look in reliability - It works
p0229 A81-24268
MCGUIGAN, R. J.
Helicopter component fatigue life determination
p0488 N81-26135
MCGUIRK, J. J.
A comparison of two droplet models for gas-turbine combustion chamber flows
p0294 A81-29086
MCINTOSH, S. C., JR.
Aeroelastic optimization with multiple constraints
[AD-A090775] p0085 N81-12451
MCKAY, G.
High-solids coatings for exterior aircraft
p0169 A81-20861
MCKAY, R. A.
Experimental verification of turboblading aeromechanics
p0432 N81-28092
MCKEE, G. T.
Real-time estimation in advanced turbofan engines
p0564 A81-45553
MCKELVEY, R. E.
Commuter aircraft design
[AIAA PAPER 81-0913] p0363 A81-32931
MCKENNEY, R.
An assessment of technical factors influencing the potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16087
MCKINLAY, W. H.
Evolution of tactical and map displays for high performance aircraft
p0212 N81-17072
MCKINLEY, J. L.
Aircraft electricity and electronics /3rd edition/
p0624 A81-49877
MCKINLEY, R. L.
Voice communication research and evaluation system
p0603 N81-31450
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
Voice communication capability of selected inflight headgear devices
p0604 N81-31467
MCKINNEY, R. O.
Evaluation of turbulence reduction devices for the Langley 8-foot Transonic Pressure Tunnel
[NASA-TM-81792] p0434 N81-29114
MCKINNON, R. A.
Flight and tunnel test results of the MDC mechanical jet noise suppressor nozzle
p0245 N81-18006
MCLANE, R. C.
Electronic Master Monitor and Advisory Display System
p0573 A81-46615
MCLAUGHLIN, D. K.
Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets
[AIAA PAPER 81-2041] p0618 A81-48613
Diagnostic experiments on supersonic jet noise
[NASA-CR-164348] p0438 N81-28856
MCLAUGHLIN, P.
A technique for the implementation of nonlinear models as real-time digital simulations
p0618 A81-48323
MCLEAN, D.
A structural load alleviation control system for a large transport aircraft
[TT-8002] p0541 N81-28106
MCMANUS, B. L.
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
Advanced Scout Helicopter (ASH) fly-by-wire control system preliminary design. Volume 1: System design and analysis
[AD-A098155] p0434 N81-24108
MCMASTERS, J. H.
From paleoaeronautics to altostratus - A technical history of soaring
[AIAA PAPER 81-1611] p0533 A81-43933
Some recent applications of high-lift computational methods at Boeing
[AIAA PAPER 81-1657] p0534 A81-43940
MCMILLAN, J. D.
Catalog of sea state and wind speed in the South Atlantic Bight
[NASA-CR-156872] p0137 N81-14601
MCMILLAN, O. J.
Data base for the prediction of inlet external drag
p0190 N81-16018
Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045
MCMILLEN, J. L.
Multisite testing of the Discrete Address Beacon System (DABS)
[AD-A103575] p0636 N81-33181
MCMULDROCH, C. G.
VTOL control for shipboard landing in high sea states
p0155 A81-20471
MCMURTRY, T. C.
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193
MCNALLY, W. G.
The role of advanced technology of turbine engine life cycle cost
p0047 N81-11927
MCRAE, D. S.
Flight experiments with a slender cone at angle of attack
[AIAA PAPER 81-0337] p0165 A81-20761
MCSHARRY, M. R.
Contention information transfer systems analysis
p0322 A81-38274
MCVEA, G. G.
The analytical ferrograph - Some factors affecting deposit formation
p0293 A81-29077
MCVEIGH, M. A.
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
MCVEY, J. B.
A model for the analysis of premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
MCWHORTER, J.
Propeller propulsion integration, phase 1
[NASA-CR-163921] p0196 N81-16856
MEAD, D. J.
Sandwich structures with high transmission loss
p0151 A81-20069
MEAD, L. R.
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design
p0101 A81-16120
MEAUZE, G.
Cascade design through an inverse method
p0448 A81-26022
MEDIRATTA, O. P.
Producibility engineering at ASD
p0326 A81-38341
MEDVEDEV, D. E.
Flight-vehicle production technology
p0564 A81-45603

MEDYNSKI, D.
Experimental study of multiple paths by a bistatic method of synthetic aperture
p0412 A81-35891
MEECHAM, W. C.
Discussion of the pressure-source aerosonic theory and of Doak's criticism
p0238 A81-26189
MEEK, S.
Development of conceptual Navy aircraft Reliability Prediction Models
p0229 A81-24280
MEEKS, H. J.
A microcomputer-based signal data converter for runway visual range measurements
[AD-A097568] p0386 N81-23060
MEHALIC, C. M.
Performance deterioration of commercial high-bypass ratio turbofan engines
[SAE PAPER 801118] p0396 A81-34154
MEHLHOSE, R.
Model tests for an active rotor isolation system
[MBB-278-79-O] p0018 A81-12095
MEHROTRA, S. C.
Computation of wind tunnel model deflections
[AIAA 81-0482] p0300 A81-29381
MEIERHOFER, B.
An investigation of a preswirled cooling airflow to a turbine disc by measuring the air temperature in the rotating channels
[ASME PAPER 81-GT-132] p0316 A81-30035
MEIRI, A. Z.
Nonlinear estimation of generalized vector shot processes
p0529 A81-43583
MEITNER, P. L.
Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-34166
Off-design performance loss model for radial turbines with pivoting, variable-area stators
[NASA-TP-1708] p0036 N81-11038
MELCHER, J. R.
Electromagnetic precipitation and ducting of particles in turbulent boundary layers
p0239 A81-26506
MELEASON, E. T.
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
MELINAND, J. P.
Effects of Coriolis on the turbulent field inside centrifugal impellers
p0297 A81-29110
MELLER, N. A.
Subsonic gas flow past a wing profile
p0349 A81-31034
MELLOR, A. M.
Semi-empirical correlations for gas turbine emissions, ignition, and flame stabilization
p0171 A81-21505
MELNICK, W.
Flat panel display technology review
p0211 N81-17065
MELNIK, R. E.
Turbulent interactions on airfoils at transonic speeds: Recent developments
p0483 N81-26047
MELTON, R. G.
Minimum noise impact aircraft trajectories
[NASA-CR-164719] p0594 N81-31159
MELUZOV, IU. V.
Basic problem of the analytical design of aircraft gas turbine engines. II
p0299 A81-29305
Analytical and computer-aided design of automated systems for the testing of aircraft engines
p0578 A81-46850
MENDENHALL, M. R.
A computer program to calculate the longitudinal aerodynamic characteristics of upper-surface-blown wing-flap configurations
[NASA-CR-3005] p0071 N81-12014
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
MENG, P. R.
Experimental analysis of IMEP in a rotary combustion engine
[NASA-TM-81662] p0195 N81-16054
MENG, S. Y.
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090
MENGELKAMP, R. A.
The new aviation multiviscosity oil, SAE 20W-50 for general aviation
[SAE PAPER 810573] p0519 A81-42738
MENU, J. P.
A new system for the study of visual information presentation in aeronautics - GIBI
p0100 A81-16688
MERARI, A.
Aircraft performance optimization by forced singular perturbation
p0014 A81-11667
MERCER, J. E.
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
Application of transonic potential calculations to aircraft and wind tunnel configurations
p0186 N81-15992
MERCER, S.
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
MERCKEL, G.
A simple model of the threshold voltage of short and narrow channel MOSFETs
p0051 A81-13285
MEREDITH, P. T.
A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974
MERKULOV, V. I.
Damping of aircraft wing vibrations by automatically controlled internal forces
p0170 A81-21060
Automatic damping of vibrations of an airplane wing by internal control forces
p0577 A81-46783
MERL, R.
Airborne emergency hospital
p0299 A81-29207
MERRICK, V. K.
Simulation study of two VTOL control/display systems in IMC approach and landing
[NASA-TM-81295] p0584 N81-30136
MERRILL, D. K.
Results of a simulator investigation of control system and display variations for an attack helicopter mission
[AHS 80-28] p0475 A81-40158
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110
A piloted simulation of the backup control system engagement for the YAH-64
p0576 A81-46646
MERRILL, W. C.
Multivariable identification using centralized fixed modes
p0079 N81-12091
MERRITT, P.
High frequency angular vibration measurements in vehicles
[AAS PAPER 81-024] p0361 A81-32886
MERSCH, S. H.
Techniques for evaluation of aircraft windscreen optical distortion
p0358 A81-32507
MERWIN, J. T.
Southern California aviation system study
[PB80-215544] p0125 N81-13916
MERZ, A. W.
The variable-speed tail-chase aerial combat problem
p0351 A81-31295
MERZLIAKOV, V. A.
Fluctuation of gas parameters behind the combustion chamber of gas turbine engines
p0466 A81-40029
MESSLER, R. W., JR.
Sliding-seal electron beam slot welding of an aircraft wing closure beam
p0614 A81-48143
METCALFE, A. G.
Isothermal rolling of aircraft parts - Versatile

process saves costly materials
p0227 A81-24047

METCALFE, R. P.
Jet wing interference for an overwing engine
configuration
p0188 N81-16008

METOCHIANAKIS, M.
An investigation of the combustion behavior of
solid fuel ramjets
[AD-A098481]
p0045 N81-25240

METTAM, P. J.
Civil markets for buoyant heavy-lift vehicles
[NASA-TM-81270]
p0248 N81-18023

METZE, W.
The problems with the interface system of the
visual simulator as a cause of Pilot Induced
Oscillations (PIO's) in flight simulators
[MBB-UA-528-80-OE]
p0276 N81-19140

METZGER, D. E.
Streamwise flow and heat transfer distributions
for jet array impingement with crossflow
[ASME PAPER 81-GT-77]
p0313 A81-29985
Fundamental heat transfer research for gas turbine
engines
[NASA-CP-2178]
p0420 N81-24063

METZGER, F. B.
Strategies for aircraft interior noise reduction
in existing and future propeller aircraft
[SAE PAPER 810560]
p0518 A81-42726

MEURZEC, J. L.
Comparison of computed and measured unsteady
pressure fields on a supercritical wing
[ONERA, TP NO. 1981-12]
p0359 A81-32541

MEURZEC, J. P.
Comparison of Unsteady Pressure Fields Computed
and Measured on the ZKP model
[AGARD-R-688]
p0033 N81-11019

MEVEL, J.-Y.
Aircraft recognition by means of monostatic radar
p0607 A81-47142

MEYER, B.
Investigation of aerodynamic stall alleviation on
a swept planform wing using leading edge
modifications
[AD-A101239]
p0548 N81-29122

MEYER, D. W.
IFFC fire control system mechanization - Firefly III
p0324 A81-30327

MEYER, K.
Airborne Systems Software Acquisition Engineering
Guidebook for supportable airborne software
[AD-A100213]
p0543 N81-28708

MEYER, R. C.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654]
p0616 A81-48416

MEYER, W. L.
Prediction of sound radiated from different
practical jet engine inlets
[NASA-CR-163824]
p0137 N81-14789
Prediction of sound radiation from different
practical jet engine inlets
[NASA-CR-164620]
p0500 N81-27886
Development of an analytical technique for the
optimization of jet engine and duct acoustic
liners
[NASA-CR-164872]
p0639 N81-33205

MEYERS, R. H.
CAINS II - An application of standard laser gyro
inertial and computer technology for existing
naval carrier aircraft
p0516 A81-42434

MIAO, W.
An active control system for helicopter vibration
reduction by higher harmonic pitch
[AHS 80-71]
p0479 A81-40189

MIAO, W.-L.
Nonlinear dynamic characteristics of the rotor
bifilar absorber
p0574 A81-46522

MICHALKE, A.
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025]
p0618 A81-48610

MICHARD, P. J.
An implicit finite volume method for elliptical
flow computation
p0255 N81-18248

MICHAS, R. D.
Flight evaluation of the concept of the stage A
Peripheral Vision Horizon Device (PVHD) using
the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096970]
p0375 N81-22050

MICHEL, J. P.
Large area gas discharge displays
p0212 N81-17070

MICHEL, U.
The influence of the airspeed on jet turbulence
and the consequencus for the jet noise
[DGLR PAPER 81-021]
p0609 A81-47595
Prediction of flyover jet noise spectra
[AIAA PAPER 81-2025]
p0618 A81-48610

MICKLOW, J.
Semi-actuator disk theory for compressor choke
flutter
[NASL-CR-3426]
p0442 N81-25075

MIDDLETON, W. D.
A system for aerodynamic design and analysis of
supersonic aircraft. Part 2: User's manual
[NASA-CR-3352]
p0125 N81-13920
A system for aerodynamic design and analysis of
supersonic aircraft. Part 1: General
description and theoretical development
[NASA-CR-3351]
p0139 N81-14970
A system for aerodynamic design and analysis of
supersonic aircraft. Part 3: Computer program
description
[NASA-CR-3353]
p0139 N81-14971
A system for aerodynamic design and analysis of
supersonic aircraft. Part 4: Test cases
[NASA-CR-3354]
p0105 N81-15977
Wind tunnel test results of a new leading edge
flap design for highly swept wings, a vortex flap
p0243 N81-17986

MIELKE, R. R.
Airborne antenna pattern calculations
p0532 A81-43708
Design of multivariable feedback control systems
via spectral assignment
[NASA-CR-164189]
p0345 N81-21064
Airborne antenna pattern calculations
[NASA-CR-164350]
p0437 N81-24321

MIGDAL, D.
VTOL in ground effect flows for closely spaced jets
[NASA-CR-152321]
p0271 N81-19095

MIHALOEW, J.
Future challenges in V/STOL flight propulsion
control integration
[SAE PAPER 801140]
p0397 A81-34170

MIHALOEW, J. R.
A nonlinear propulsion system simulation technique
for piloted simulators
p0454 A81-38064
A nonlinear propulsion system simulation tehnique
for piloted simulators
[NASA-TM-82600]
p0390 N81-23085

MIKHALEV, I. A.
Principle for the design of hybrid control systems
for passenger transport systems
p0107 A81-17577

MIKHEICHEV, P. A.
Substantiation of oil change periods for ship and
aircraft turbine engines
p0065 A81-15720

MIKI, S.
Preliminary study on reheat combustor for advanced
gas turbine
[ASME PAPER 81-GT-29]
p0311 A81-29984

MIKOLOWSKY, W. T.
Design options study. Volume 1: Executive summary
[AD-A089536]
p0027 N81-10056
Design options study. Volume 2: Approach and
summary results
[AD-A089537]
p0027 N81-10057
Design options study. Volume 3: Qualitative
assessment
[AD-A089538]
p0027 N81-10058
Design options study. Volume 4: Detailed
analyses supporting appendices
[AD-A089539]
p0027 N81-10059

MIKULLA, V.
The calculation of transonic blade tip flow at
helicopter rotors
[DGLR PAPER 81-025]
p0608 A81-47554

MILELLI, R. J.
CH-53 Helicoptur Night Vision System simulation
experiments
p0573 A81-46617

MILES, J. H.
Analysis of pressure spectra measurements in a

ducted combustion system
[NASA-TM-81583] p0146 N81-15768

MILES, R. B.
Laser beacon collision avoidance systems
p0372 N81-22009

MILEY, S. J.
Investigation of a flight test method for the measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
Propeller propulsion integration, phase 1
[NASA-CR-163921] p0196 N81-16058
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163967] p0251 N81-18046
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015

MILGRAM, D. L.
Passive imagery navigation
[AD-A096245] p0339 N81-21051

MILITSKII, IU. A.
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734

MILLER, B. A.
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
Limb restraint F-18 style
p0567 A81-46325
The propeller tip vortex. A possible contributor to aircraft cabin noise
[NASA-TM-81768] p0380 N81-22838

MILLER, C. J.
The effect of proplets and bi-blades on the performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757
Aeronautical systems technology needs: Escape, rescue and survival and test facilities and test equipment
[AD-A097827] p0423 N81-24020

MILLER, D. S.
The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146
Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016

MILLER, G. K., JR.
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] p0639 N81-33211

MILLER, J. T.
Cost benefits of nonmetallic spline couplings
[SAE PAPER 801101] p0513 A81-41777

MILLER, L. D.
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Effects on inlet technology on cruise speed selection
p0245 N81-17998
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079

MILLER, L. S.
Investigation of a flight test method for the measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760

MILLER, N. E.
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093888] p0204 N81-16996

MILLER, R. A.
Development of retardation and automatic flotation system (R.A.F.T.)
[AD-A096828] p0439 N81-25047

MILLER, R. D.
Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431

MILLER, R. J.
Future challenges in V/STOL flight propulsion control integration
[SAE PAPER 801140] p0397 A81-34176
Full Authority Digital Electronic Control turbofan engine demonstration
[SAE PAPER 801199] p0402 A81-34209
Development of an integrated fault tolerant engine control
[AIAA PAPER 81-1365] p0502 A81-40045
Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112

MILLER, R. L.
Nonhoneycomb composite skin stabilization - A solution to high costs of maintenance
p0559 A81-44396
Optimizing complex runway use programs for airport noise abatement
p0569 A81-46369
A guidance document on airport noise control
[AD-A092228] p0202 N81-16620

MILLER, W. R.
Flap noise characteristics measured by pressure cross correlation techniques
p0259 N81-18080

MILLMAN, M.
Dynamic simulation of hybrid video compression
p0463 A81-39555

MILLS, G. R.
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116

MILLS, H. L.
Supplemental calibration of the AEDC-PWT 16 ft transonic tunnel aerodynamic test section
[AD-A102384] p0630 N81-32156

MILLS, R. G.
The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies 7 and 8
[AD-A100551] p0539 N81-28088

MILLS, R. S.
Wind loading and response of a high-rise building
[CONF-810104-1] p0256 N81-18259

MILOSEVIC, L.
SINTAC and its position-finding performance
p0409 A81-35021

MILTON, O.
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C] p0630 N81-33200

MINAILOS, A. N.
Calculation of supersonic gas flows about wings
p0170 A81-21201
Calculation of supersonic flow past interfering wings
p0413 A81-36056

MINDERHOUD, P.
A fatigue study and an investigation on mechanically fastened joints for the development of a flap
p0481 A81-40501

MINECCI, J. J.
Composite fuselage development for Naval aircraft
p0181 A81-22600

MINECK, R. E.
Wind-tunnel test of an articulated helicopter rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13910

MINKARAH, I.
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14102

MINKER, S.
Target detection and parameter estimation in surveillance radars using MTI-FFT processing
p0152 A81-20096

MINNICK, W.
Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System
[AD-A104150] p0636 N81-33188

MINOTA, T.
Sound radiation from vortex systems
p0171 A81-21591

MINTZ, M.
Robust autoregressive models for predicting aircraft motion from noisy data

p0155 A81-20473

MIRANDA, L. R.
A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796

MIRICK, P. H.
Wind tunnel evaluation of aeroelastically conformable rotors
[AHS 80-23] p0475 A81-40153

MIROVSKII, V. G.
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734

MISHEV, D. N.
Comparative efficiency of aircraft and satellites in the remote sensing of earth resources
p0412 A81-35739

MISRA, S. S.
Transient three-dimensional flow along a porous plate
p0231 A81-24815

MISSUN, J.
Multifunctional color displays for cockpits
p0451 A81-37646

MISTRY, H.
An investigation of drag associated with the upswept rear fuselage of a helicopter
[BU-257] p0330 N81-20043

MITCHELL, D. G.
Low-order approaches to high-order systems - Problems and promises
[AIAA 81-1774] p0556 A81-44134
Investigation of high-angle-of-attack maneuver-limiting factors. Part 1: Analysis and simulation
[AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack maneuver-limiting factors. Part 2: Piloted simulation assessment of Bihrle departure criteria
[AD-A101647] p0581 N81-30114
Investigation of high-angle-of-attack maneuver-limiting factors. Part 3: Appendices, aerodynamic models
[AD-A101648] p0581 N81-30115

MITCHELL, G. A.
Low and high speed propellers for general aviation - Performance potential and recent wind tunnel test results
p0521 A81-42758
Low and high speed propellers for general aviation: Performance potential and recent wind tunnel test results
[NASA-TM-81745] p0338 N81-21028

MITCHELL, S. C.
Manufacturing technology for low temperature composite engine frames
[AIAA PAPER 81-1355] p0501 A81-40837
Design concepts for low-cost composite turbofan engine frame
[NASA-CR-165217] p0376 N81-22053

MITCHELL, W. A.
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068

MITNIK, S. B.
Development requirements for integrated aircraft power systems
[SAE PAPER 801149] p0406 A81-34241
Progress toward a long-range propulsion plan
[AIAA PAPER 81-1503] p0566 A81-45091

MITON, H.
Semi-inverse method of computation in inviscid transonic flows - Application to the design of turbomachines blades profiles
[ASME PAPER 81-GT-206] p0318 A81-30096

MITRA, A. K.
Feasibility of a rotor flight-dynamics model with first-order cyclic inflow and multiblade modes
[AIAA 81-0611] p0304 A81-29473

MITRIAEV, I. B.
Investigation of the cooling of the turbine rotor blade of a gas-turbine power system
p0465 A81-40020

MITTMANN, J.
Damage recognition and localization by means of differential modal analysis
[DGLR PAPER 81-056] p0610 A81-47603

MIURA, S.
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318

MIXSON, J. S.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618
Sources, control, and effects of noise from aircraft propellers and rotors
p0269 N81-19073
Sources, control, and effects of noise from aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904

MIYAMOTO, T.
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1480] p0506 A81-40906

MIYASHITA, M.
Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports
p0228 A81-24089

MKHITAROV, R. A.
Influence of boundary-layer suction on the emission spectrum on a thin plate performing oscillations under the action of pressure pulsations
p0054 A81-13573
Influence of boundary-layer suction on the spectrum of radiation from a thin plate vibrating under the action of pressure fluctuations
p0238 A81-26137

MOAVENI, M. K.
Rotating blades radio interference in a helicopter-borne CW Doppler radar
p0224 A81-23813

MOAVENZADEH, F.
Runway rehabilitation, Washington National Airport
p0112 A81-18066

MOBARAK, A.
Turbo-compressors surge and surge control
[AIAA PAPER 81-0070] p0159 A81-20579

MOBLEY, R. D.
Impact of terrain correlation elevation reference data on Boeing's Air Launched Cruise Missile
p0517 A81-42439

MOCHIZUKI, H.
Investigation of the starting process of a supersonic wind tunnel
p0228 A81-24080
Self-excited oscillations of supersonic flow in a sudden enlargement of a duct
p0228 A81-24081

MOEN, G. C.
Effect of display size on utilization of traffic situation display for self-spacing task
[NASA-TP-1885] p0546 N81-29109

MOFFATT, D. L.
Electromagnetic scattering by open circular waveguides
[AD-A095554] p0336 N81-20345

MOFFITT, T. P.
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center
[SAE PAPER 801122] p0396 A81-34158
Cold-air investigation of first stage of 4-1/2-stage, fan drive turbine with average stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050

MOGA, N. J.
Optimal bodies for minimum total drag at supersonic speeds
[AD-A091235] p0091 N81-13036

MOHN, J. H.
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33860
Improved capabilities to detect incipient bearing failures
[AD-A091687] p0134 N81-14325

MOHR, F.
The optical-fiber interferometer gyroscope for aviation navigation
p0451 A81-37650

MOHR, R.
Development in powder metallurgy /PM/ Ti6Al4V

technology for aircraft parts
p0511 A81-41640

MOISEEV, V. S.
Analytical and computer-aided design of automated systems for the testing of aircraft engines
p0578 A81-46850

MOKRY, M.
Canadian studies of wind tunnel corrections for high angle of attack models
p0435 N81-24121

MOLCHO, A.
Materials and processes for a small remotely piloted vehicle
p0532 A81-43663

MOLL, J. H.
Progress in P/M superalloy and titanium for aircraft applications
p0181 A81-22641

MOLL, T. E.
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972

MOLUSIS, J. A.
A unified approach to the optimal design of adaptive and gain scheduled controllers to achieve minimum helicopter rotor vibration
p0573 A81-46619

MOM, A. J. A.
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
p0469 A81-40107
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222

MOMENO, W. J.
Design and development of the control laws for the F-18 primary flight control system
p0320 A81-30245

MOMENTHY, A. M.
Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18018

MONAGAN, S. J.
Head-Up-Display flight tests
p0099 A81-16582

MONAGHAN, R. C.
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193
Description of the HiMAT Tailored composite structure and laboratory measured vehicle shape under load
[NASA-TM-81354] p0251 N81-18047

MONAHAN, A.
Porous portland cement concrete: The state of the art
[AD-A098177] p0436 N81-24187

MONEY, K. E.
Aural communication in aviation
[AGARD-CP-311] p0603 N81-31449

MONGIA, H. C.
Compound Cycle Turbofan Engine (CCTE). Task 9: Carbon-Slurry Fuel Combustion Evaluation Program
[AD-A089451] p0029 N81-10072
Small turbine engine augmentor. Phase 1: Preliminary design studies of afterburner and duct-burner configurations
[AD-A101595] p0583 N81-30131

MONNETT, J. T.
Design of low powered aircraft, a philosophy for future personal sport aircraft
[AIAA PAPER 81-0905] p0362 A81-32926

MONOPOLI, R. V.
Model following control of gas turbine engines
p0624 A81-49900

MONTANA, P. S.
Lift-propulsion system weight variation for very heavy lift helicopters
[AD-A099169] p0490 N81-26151

MONTGOMERY, J. F.
Development test requirements
p0430 N81-24080

MONTHULET, A.
Braking of an aircraft tyre
p0412 A81-35892

MONTOYA, L. C.
Skin friction measuring device for aircraft
[NASA-CASE-FRC-11029-1] p0210 N81-17057

KC-135 winglet flight results
p0260 N81-19011

MOODY, I. W.
Aircraft multi-bus electrical system using a Hall-effect sensing device
[SAE PAPER 810569] p0519 A81-42730

MOOIJ, H. A.
Flying qualities criteria for advanced control technology transports
p0008 A81-11610
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118

MOON, D. A.
Air traffic management enhancement through new avionics /4-D/
p0099 A81-16583

MOORADIAN, G. C.
LPI, short-range communications between aircraft in rendezvous
p0177 A81-22093

MOORE, C. J.
Shear layer instability noise produced by various jet nozzle configurations
[PNR-90018] p0088 N81-12825

MOORE, I. D.
A low cost multiple drone command and tracking system
p0179 A81-22613

MOORE, J. P.
IMUX - High speed communications bus
[SAE PAPER 801146] p0398 A81-34175

MOORE, M. T.
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA Ames 40 by 80 foot wind tunnel: Acoustic data report
[NASA-CR-152329] p0250 N81-18798

MOORE, O. E.
Airport catchment areas and air passenger demand
p0571 A81-46575

MOORE, S.
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522

MOORE, T. J.
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
Voice communication capability of selected inflight headgear devices
p0604 N81-31467

MOOREHOUSE, D. J.
Atmospheric disturbance models and requirements for the flying qualities Military Standard and Handbook
[AIAA PAPER 81-0302] A81-20739
Development of a generic airplane response simulation
[AIAA 81-0980] p0415 A81-36568

MOOZ, W. E.
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111

MORAN, J. F.
A method for determining landing runway length for a STOL aircraft
p0264 N81-19001

MORELAND, S.
US Army working group on aircraft noise
p0150 A81-20053

MORELLO, S. A.
Application of trajectory optimization principles to minimize aircraft operating costs
p0155 A81-20066
Flight test experience using advanced airborne equipment in a time-based metered traffic environment
[SAE PAPER 801207] p0403 A81-34215
Pilot guidance and display considerations for energy efficient flight profiles
p0513 A81-41930
Experiments using electronic display information
p0213 N81-17077

MORENO, V.
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
MORFEY, C. L.
A computer simulation of turbulent jet flow
p0230 A81-24424
MORGAN, D. G.
Unpowered aerodynamic characteristics of a 15-percent scale model of a twin-engine commuter aircraft
[NASA-TM-81284] p0537 N81-28055
MORGAN, H. G.
Aircraft noise control in the 1980's
p0567 A81-46352
MORGAN, P. H.
Back to basics - The philosophy adopted for the flight testing of the Panavia Tornado avionics system in back aircraft
p0282 A81-27881
MORGAN, W. R.
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
MORI, K.
Preliminary study on reheat combustor for advanced gas turbine
[ASME PAPER 81-GT-29] p0311 A81-29944
MORIKAWA, H.
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318
MORIMOTO, S.
Aeronautical-Maritime Engineering Satellite /AMES/ program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318
MORISSET, J.
Mirage 2000, a totally multi-purpose aircraft
p0419 A81-37166
MORITA, Y.
An assessment of technical factors influencing the potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16047
MORIZUMI, N.
Piloting techniques on the backside - Flight path angle control
p0171 A81-21673
MORKOVIN, M. V.
Dialogue on bridging some gaps in stability and transition research
p0115 A81-18105
MORLAN, S.
Pyrotechnics serving safety
p0120 A81-19340
Applications of pyrotechniques in aviation
[SNIAS-792-422-103] p0023 N81-10025
MORONEY, W. F.
Energy maneuverability displays for air combat training
[SAE PAPER 801185] p0401 A81-34198
Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS)
[AD-A092974] p0208 N81-17041
MOROZOV, F. N.
Automation of aircraft gas-turbine power plants
p0020 A81-12782
MORRIS, C. E. K., JR.
A flight investigation of performance and loads for a helicopter with NC-SC2 main-rotor blade sections
[NASA-TM-81898] p0186 N81-15982
Analytical study of the cruise performance of a class of remotely piloted, microwave-powered, high-altitude airplane platforms
[NASA-TM-81969] p0374 N81-22040
MORRIS, D. J.
Basic research in wake vortex alleviation using a variable twist wing
p0267 N81-19058
MORRIS, F. H.
NAVTOLAND microwave scanning beam tests at NOSC. Three landing guidance systems tested in a specular multipath environment
[AD-A099298] p0484 N81-26086
MORRIS, G.
EC-135 modernization program
p0325 A81-30337
MORRIS, G. G.
Development and evaluation of a prototype in-flight instrument flight rules (IFR) procedures trainer
[NASA-TM-73292] p0490 N81-26156
MORRIS, G. J.
Air transport flight parameter measurements program - Concepts and benefits
[SAE PAPER 801132] p0396 A81-34163
The NASA digital VGH program, early results
p0268 N81-19069
MORRIS, P. B.
Omega station 10.2 kHz signal coverage prediction diagrams
p0512 A81-41760
MORRIS, P. H.
Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045
JUH-1H ice phobic coating icing tests
[AD-A096361] p0340 N81-21062
MORRIS, S. J.
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
MORRISON, G. L.
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-164214] p0380 N81-22833
MORRISON, J. D.
Vertical lift capabilities for the 80's and 90's
p0632 N81-33139
MORRISON, R.
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search
[AD-A094154] p0253 N81-18057
MORROW, J. J.
CH-53E combat survivability assessment and survivability enhancement program
[SAWE PAPER 1384] p0354 A81-31400
MORSE, T.
Cygnet - A canard configuration powered ultralight aircraft
p0231 A81-24746
MORTON, T. G.
The digital control system as part of an integrated accessory fit for future engines
p0104 A81-17505
MOSES, C. A.
Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277
MOSES, L. T.
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
MOSES, N. N.
Empirical method for the prediction of business executive jet cabin noise levels
p0224 A81-23844
MOSHER, M.
Acoustics of rotors utilizing circulation control
[AIAA PAPER 81-0092] p0160 A81-20896
MOSIER, S. A.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
MOSKO, J. D.
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31852
Clear speech: A strategem for improving radio communications and automatic speech recognition in noise
p0603 N81-31853
MOSS, D. G.
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059
MOSS, J. E.
Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions
[NASA-TM-81656] p0342 N81-21070
MOSS, R. J.
Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159531] p0142 N81-14994
MOSSER, S. A.
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754

MOTORNENKO, A. P.
Interaction of a gas jet from a jet engine with the destroyed surface of a multiphase disperse medium
p0319 A81-30152

MOTYKA, P. R.
Failure detection and isolation for tactical aircraft using the generalized likelihood test
p0321 A81-30261

MOUILLE, R.
Design-to-cost applied to the AS350 helicopter
p0046 N81-11916

MOURAKIS, T.
Nonlinear dynamic characteristics of the rotor bifilar absorber
p0574 A81-46622

MOWERY, G. W.
CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617

MOZZHEROVA, N. A.
Crack propagation in panels of pressurized fuselages upon simultaneous action of cyclic loading by pressurization and high-frequency vibrations
p0054 A81-13612

MROTEK, S.
Map-type displays
p0121 A81-19443

MUEHLBAUER, G.
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635

MUEHLBAUER, J. C.
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041

MUELLER, A. W.
A comparison of the three methods used to obtain acoustic measurements for the NASA Flight Effects Program
[NASA-TM-81906] p0088 N81-12822
Flight test of a pure-tone acoustic source
[NASA-TP-1890] p0641 N81-33945

MUELLER, B.
Individual jet engine stress load monitoring with the aid of the flight data recording system LEADS 200
p0328 N81-20013

MUELLER, H.-O.
New BBC high-efficiency gas turbines
p0017 A81-11797

MUELLER, G. E.
Testing of composite structures
[AAAF-NT-79-41] p0083 N81-12181

MUELLER, J. N.
Operating characteristics of the Langley Mach 7 Scramjet Test Facility
[NASA-TM-81929] p0335 N81-20083

MUELLER, R.
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467

MUELLER, W.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129

MUELLER, R.
Design and experimental verification of a transonic wing for a transonic aircraft
p0188 N81-16003

MUENSCHER, D.
Research on mechanical flight problems in aircraft parachute systems
p0065 A81-15706
A contribution to stabilization of flight vehicle parachute systems
[DFVLR-MITT-80-05] p0126 N81-13926

MUKHOPADHYAY, V.
A method for obtaining reduced-order control laws for high-order systems using optimization techniques
[NASA-TP-1876] p0589 N81-30851

MULARZ, E. J.
Variable geometry, lean, premixed, prevaporized fuel combustor conceptual design study
[ASME PAPER 80-GT-16] p0019 A81-12609

MULCARE, D. B.
Versatile and economical real-time simulation for digital flight control systems
[AIAA 81-0974] p0415 A81-36563

MULCAY, W. J.
Rotary balance data for a single engine general aviation design having a high aspect-ratio canard for an angle-of-attack range of 30 deg to 90 deg
[NASA-CR-3170] p0090 N81-13922
Rotary balance data for a single-engine agricultural airplane configuration for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3311] p0125 N81-13923

MULDER, J. A.
Status of dynamic flight test technology - Model identification for flight simulation
[SAE PAPER 810597] p0521 A81-42755

MULLEN, J., JR.
Continued development and correlation of analytically based weight estimation codes for wings and fuselages
[NASA-CR-152331] p0251 N81-18044
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 2: Users manual for the computer program
[AD-A099391] p0494 N81-27080
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 3: Appendices A and B. Details of program 1
[AD-A099331] p0495 N81-27082
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 4: Appendices C and D. Details of program 2
[AD-A099332] p0495 N81-27083

MULLEY, W.
Flat panel display technology review
p0211 N81-17065

MULVILLE, D. R.
Current and projected use of carbon composites in United States aircraft
p0196 N81-16145

MUNDIE, D. L.
Transonic axisymmetric bodies with minimal wave drag
p0102 A81-17048

MUNDRA, A. D.
Discrete Address Beacon System (DABS) data link capacity utilization
[AD-A098173] p0425 N81-24044
Discrete address beacon system data link capacity requirements
[AD-A101731] p0581 N81-30107

MUNDT, H.-H.
Advanced production methods for the Dornier 228
p0457 A81-38002

MUNEVAR, E.
Fuel efficiency improvements to the T56 turboprop engine
[SAE PAPER 801158] p0399 A81-34178

MUNGER, F.
RB.199 - Compact Tornado power
p0567 A81-46338

MUNRO, D. H.
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26045

MUNSER, H. J.
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] p0609 A81-47500

MUNSON, H. E.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

MURMAN, E. M.
Application of transonic potential calculations to aircraft and wind tunnel configurations
p0186 N81-15992

MURPHY, A. C.
Transonic flutter and gust-response tests and

analyses of a wind-tunnel model of a
torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
Experimental and analytical study on the flutter
and gust response characteristics of a
torsion-free-wing airplane model
[NASA-CR-159283] p0340 N81-21059
Transonic flutter and gust-response tests and
analyses of a wind-tunnel model of a torsion
free wing airplane
[NASA-TM-81961] p0388 N81-23072
MURPHY, G. C.
Processing for an improved impact resistant
composite blade
[AIAA PAPER 81-1356] p0501 A81-40838
MURPHY, J. A.
Helicopter propulsion system reliability and
engine monitoring assessments
p0599 N81-31213
An overview of SAE ARP 1587: Aircraft gas turbine
engine monitoring system guide
p0600 N81-31217
MURPHY, L. D.
Southern California aviation system study
[PB80-215544] p0125 N81-13916
MURPHY, R. A. D.
Scarf joints in unidirectional carbon fiber
reinforced plastics
[BU-258] p0336 N81-20193
MURPHY, P. C.
Determination of model structure and parameters of
an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1066] p0560 A81-44562
MURPHY, R. E.
Staring infrared mosaic observation of an F-15
aircraft
p0463 A81-39636
MURPHY, W. J.
Integrated Flight/Weapon Control system concepts
p0324 A81-30328
MURRAY, J.
Tailoring software logic to the needs of the pilot
- A software designer's nightmare
p0325 A81-30335
A simulation approach to MIL-STD-1553 Multiplex
Bus interfacing
[AIAA 81-0971] p0415 A81-36560
MURRILL, R. J.
Wind tunnel evaluation of aeroelastically
conformable rotors
[AHS 80-23] p0475 A81-40153
MURROW, H. N.
Status and future plans of the Drones for
Aerodynamic and Structural Testing (DAST) program
p0259 N81-19003
MURTHY, H. S.
A half-model free-oscillation rig for
pitch-damping measurements in high speed wind
tunnels
p0461 A81-39263
MURTHY, S. N. B.
Model for axial compressors operating with water
ingestion
p0297 A81-29111
MUSSI, F.
Evaluation of section properties for hollow
composite beams
[PAPER-NR-35] p0031 N81-10854
MUSZYNSKI, F.
Civil aviation - Onboard electronic equipment and
fuel savings
p0464 A81-39699
MUTO, P. T.
A simple radar for navigation accuracy measurements
p0612 A81-47844
MUYLAERT, J.
Research on vortex bursting in compressible flow
p0230 A81-24477
MUYLAERT, J. M.
Vortex bursting on slender delta wings in
transonic flow and its influence on missile
aerodynamic characteristics
[DGLR PAPER 81-047] p0611 A81-47622
MUZAFAROV, R. N.
Effect of the discharge circuit parameters on the
weight, dimensions, and energy characteristics
of the power supply source
p0288 A81-28574
MYERS, A. F.
Qualification of HiMAT flight systems
p0179 A81-22603
MYERS, A. W.
Reduction of helicopter vibration through control
of hub-impedance
p0356 A81-32009
Design and development of the Model 412 helicopter
[AHS 80-56] p0478 A81-40161
MYERS, R. D.
Community participation in airport planning
p0112 A81-18067
MYERS, L.
Flight test of a full authority Digital Electronic
Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
MYERS, T. R.
A new frequency parameter for unsteady aerodynamics
[AIAA 81-0649] p0307 A81-29502
MYERS, T. T.
Development of handling quality criteria for
aircraft with independent control of six degrees
of freedom
[AD-A100045] p0498 N81-27117
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 1: Analysis
and simulation
[AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack
maneuver-limiting factors. Part 3: Appendices,
aerodynamic models
[AD-A101648] p0581 N81-30115
MYHRE, S. H.
Advanced composite repair - Recent developments
and some problems
p0558 A81-44385
MYRONUK, D. J.
Dynamic, hot surface ignition of aircraft fuels
and hydraulic fluids
[NASA-CR-163979] p0254 N81-18139

N

NAEGELI, D. W.
Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277
NAFF, T.
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333
NAGABHUSHAN, B. L.
Dynamics and control of a Heavy Lift Airship in
cross wind hover
[AIAA 81-1334] p0456 A81-38539
Control characteristics of a Buoyant Quad-Rotor
Research Aircraft
[AIAA 81-1838] p0555 A81-44122
NAGANO, S.
Reduction of strut induced rotor blade vibration
with the modified stator setting angles
p0295 A81-29097
NAGAO, N.
Gust response of rotary wing aircraft and its
alleviation
p0465 A81-39900
Gust response of rotary wing and its alleviation
p0473 A81-40135
NAGAOKA, S.
A simple radar for navigation accuracy measurements
p0612 A81-47844
NAGARAJA, K. S.
Subcritical flutter and oscillatory pressure
testing of a full-scale 727 inboard aileron in a
low-speed wind-tunnel
[AIAA 81-0656] p0308 A81-29508
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43947
Some ejector characteristics
[AIAA PAPER 81-1679] p0534 A81-43948
NAGASHIMA, T.
Inlet distortion and blade vibration in
turbomachines
p0421 A81-37631
Experimental substantiation for hovering rotor
vertical impedance calculations
p0453 A81-38015
NAGEL, A. L.
Comments on Reynolds number effects and the role
of NTF in the development of air vehicles
p0592 N81-31142

NAGEL, G.
Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110

NAGEL, J.
Computer-aided design and manufacture in aircraft production /CAD/CAM/
p0451 A81-37647

NAGIB, H. M.
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
p0239 A81-26508
Cooperative investigation of the noise producing region of an axisymmetric jet
[AD-A089692] p0045 N81-11774
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
[NASA-CR-3444] p0587 N81-30392

NAGLE-ESHLEMAN, J.
The Shock and Vibration Digest, volume 12, number 11
[AD-A092384] p0257 N81-18403

NAGY, M. J.
Analytical testing
[NASA-CR-3429] p0393 N81-23487

NAKAMURA, K.
Development of a shadow mask type high-resolution color picture tube for cockpit display
p0183 A81-23095

NAKAMURA, M.
A method for obtaining shockless transonic flows past two-dimensional airfoils whose profiles are partially modified from a given arbitrary profile
p0298 A81-29201
A method for obtaining shockless transonic flows past airfoils, partially modified from a given arbitrary airfoil
[NAL-TR-602T] p0141 N81-14983

NAKHMAN, IU. V.
Calculation of circular flow inhomogeneities downstream of the turbine wheel
p0281 A81-27372

NAMBA, M.
Application of the equivalent surface source method to the acoustics of duct systems with non-uniform wall impedance
p0055 A81-13824

NANDA, V. P.
Analytic determination of interference thresholds for microwave landing system equipment and TACAN/DME equipment
[AD-A093448] p0206 N81-17025

NANDURI, V. G.
Application of fracture mechanics in designing lower wing skin of transport aircraft
p0102 A81-17049

NANYARO, A. P.
Study of the crashworthiness of light aircraft structures
[AIAA 81-0574] p0302 A81-29407

NAPPI, A.
Crack propagation in lugs
p0180 A81-22629

NARAYANA, P. A. A.
An experimental investigation of separating flow on a convex surface
p0230 A81-24488

NARENDRA, P. M.
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
Real-time feasibility for generation of nonlinear textured terrain
[AD-A095070] p0277 N81-19141

NASH, J. M.
Cybernetic airborne fire control - Issues and potential
p0326 A81-30347

NASON, S. D.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068

NASTASE, A.
New concepts for design of fully-optimized configurations for future supersonic aircraft
p0007 A81-11606

NASTASI, R.
Precision flight path control in carrier landing approach - A case for integrated system design
[AIAA PAPER 81-1710] p0535 A81-43956

NASTENKO, N. IA.
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957

NASTROM, G. D.
Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20780
Tabulations of ambient ozone data obtained by GASP airliners, March 1975 to December 1977
[NASA-TM-81528] p0096 N81-13560
Ozone contamination in aircraft cabins: Results from GASP data and analyses
[NASA-TM-81671] p0191 N81-16021
Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977
[NASA-TP-1807] p0345 N81-21685

NATALE, O.
Rig investigation of a two stage single shaft low cost turbine
p0432 N81-24099

NATANZON, M. S.
Droplet breakup regimes and criteria for their existence
p0614 A81-48079

NATARAJAN, K.
Use of Loran-C for general aviation aircraft navigation
p0371 N81-22002

NATARAJAN, R.
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066

NATHMAN, J. K.
Unsteady aerodynamic propulsion
[AIAA 81-0645] p0307 A81-29490

NAUCK, J.
Sarsat - A rescue system for ships and aircraft
p0100 A81-16084

NAUDASCHER, E.
Practical experiences with flow-induced vibrations; Proceedings of the Symposium, Universitaet Karlsruhe, Karlsruhe, West Germany, September 3-6, 1979
p0282 A81-27610

NAUGLE, D. F.
Aircraft and air pollution
p0288 A81-28690

NAUMENKO, V. I.
The design of blowing-cooled aircraft electrical machines
p0002 A81-10470

NAVANEETHAN, R.
Summary of typical parameters that affect sound transmission through general aviation aircraft structures
[SAE PAPER 810562] p0510 A81-42720
Study of noise reduction characteristics of multilayered panels and dual pane windows with Helmholtz resonators
[NASA-CR-164370] p0438 N81-24057

NAVEVICZ, J. E.
Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33200

NAY, C. B.
Noise control at general aviation airports
p0569 A81-46366

NAYLER, A. W. L.
LTA developments in Great Britain
[AIAA 81-1321] p0456 A81-38537

NEDERVEEN, A.
Effect of gust load alleviation on fatigue and crack growth in ALCLAD 2024-T3
p0172 A81-21739

NEEDLES, C. R.
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047

NEGRE, Y.
Generalized active control - Its potential and directions of research
[AAAF PAPER NT 80-29] p0369 A81-33920
Generalities on active control. Potentials and research trends
[SNIAS-802-111-112] p0427 N81-24056

NEGVESKY, R. L.
The application of interactive graphics to thermal modeling
[AIAA PAPER 81-1180] p0459 A81-39159

NEISE, W.
Noise and noise abatement in fans and blowers: A review
[DFVLR-FB-80-16] p0138 N81-14796

NEJEDLY, V.
Damage tolerance concept for transport aircraft structures
p0050 A81-12970

NEKRASOVA, N. N.
Some characteristics of subsonic flow over the root area of a sweptback wing
p0123 A81-19633

NELMS, W. P.
Preliminary aerodynamic characteristics of several advanced VSTOL fighter/attack aircraft concepts
[SAE PAPER 801178] p0400 A81-34191
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 0.4 to 1.4
[NASA-TM-81234] p0140 N81-14981
Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft
[NASA-TM-81292] p0428 N81-24066
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0
[NASA-TM-81286] p0579 N81-30083

NELSON, D. P.
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions
[NASA-CR-159818] p0093 N81-13057
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 1: Design layouts
[NASA-CR-159819-VOL-1] p0214 N81-17081
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aeroynamic data book 1
[NASA-CR-159819-VOL-2-BK-1] p0214 N81-17082
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 2
[NASA-CR-159819-VOL-2-BK-2] p0214 N81-17083
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 3
[NASA-CR-159819-VOL-2-BK-3] p0214 N81-17084
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 1
[NASA-CR-159819-VOL-3-BK-1] p0214 N81-17085
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 2
[NASA-CR-159819-VOL-3-BK-2] p0214 N81-17086

NELSON, H. K.
Development and testing of a new technology weight and balance indicator
[SAWE PAPER 1341] p0353 A81-31381

NELSON, J. R.
Aircraft turbine engine monitoring experience. An overview and lessons learned from selected case studies
[AD-A089752] p0036 N81-11042

NELSON, R.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24041
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042

NELSON, R. C.
The influence of a wake splitter plate on the aerodynamic characteristics of a two-dimensional cylinder
p0226 A81-23949

NELSON, W. S.
Modern techniques of conducting a flight loads survey based on experience gained on the Black Hawk helicopter
p0356 A81-32014

NELVING, H. G.
First phase testing of solar thermal engine at United Stirling
p0588 N81-30530

NEPPERT, H.
Drag estimations for stream-line and cylindrical contour distortions on aircraft fuselages and train cars
[DGLR PAPER 80-116] p0121 A81-19389

NERI, L. M.
Engineering and development program plan aircraft crashworthiness
[AD-A089431] p0023 N81-10022

NERON, M.
Calculation of separated viscous flows on wing profiles by a coupling approach
[ONERA, TP NO. 1980-122] p0017 A81-11920

NETZEL, D. A.
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260

NETZER, D. W.
Light transmission measurements in solid fuel ramjet combustors
p0284 A81-27910
Validation of a two-dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A094615] p0256 N81-18067

NEUHART, D. H.
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30085

NEUMAN, D. B.
Band sharing - A case study
p0173 A81-21869

NEUMAN, F.
Flight investigation of a four-dimensional terminal area guidance system for STOL aircraft
[NASA-TM-81271] p0260 N81-19014
Minimum fuel horizontal flightpaths in the terminal area
[NASA-TM-81313] p0549 N81-29133

NEUMANN, F. D.
A family of supersonic airplanes: Technical and economic feasibility
p0248 N81-18017

NEUWERTH, G.
Onboard procedure for the measurement of wind shear gradients
[DGLR PAPER 81-060] p0610 A81-47612

NEVATIA, R.
Model-based scene matching
p0461 A81-39349

NEVINSKII, V. V.
Numerical solution of the direct one-dimensional problem of a critical flow in nozzles
p0288 A81-28578

NEWBY, C. F.
The Z8000 provides the basis for a powerful new airborne computer
p0321 A81-30252

NEWIRTH, D. M.
Flight test reliability demonstration of electronic engine controls
[SAE PAPER 801201] p0403 A81-34211

NEWMAN, J. C., JR.
A crack-closure model for predicting fatigue-crack growth under aircraft spectrum loading
[NASA-TM-81941] p0257 N81-18412

NEWMAN, J. R.
Structural applications for titanium castings
p0510 A81-41637

NEWMAN, J. S.
The need for airport noise monitoring systems. Their uses, and value in promoting civil aviation
[AD-A092240] p0201 N81-16627
Helicopter noise contour development techniques and directivity analysis

[AD-A093426] p0221 N81-17851
Correlation of helicopter noise levels with physical and performance characteristics
[AD-A093420] p0221 N81-17852
Helicopter noise exposure level data: Variations with test target. Indicated airspeed, distance, main rotor RPM and takeoff power
[AD-A100691] p0552 N81-29661
NEWMAN, P. A.
Wall interference effects: Status review
p0592 N81-31141
NEWMAN, R. L.
Operational problems associated with head-up displays during instrument flight
[AD-A092992] p0210 N81-17058
NEWMAN, T. E.
Dispersed flight control computer systems
p0321 A81-30250
NEWSOM, J.
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
NEWSOM, J. R.
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
Langley Research Center contributions in advancing active control technology
p0259 N81-19002
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[NASA-TM-83143] p0499 N81-27548
Some experiences with active control of aeroelastic response
[NASA-TM-83179] p0587 N81-30469
A method for obtaining reduced-order control laws for high-order systems using optimization techniques
[NASA-TP-1876] p0589 N81-30851
NEWTON, A. G.
The future of civil turbo-fan engines
[PNR-90034] p0130 N81-13964
NI, A. L.
Transonic flows of a multireacting gas mixture through a Laval nozzle
p0225 A81-23909
NICHOLAS, E. B.
Effect of thermal radiation on the integrity pressurized aircraft evacuation slides and slide materials
[AD-A098179] p0424 N81-24039
NICHOLS, G. H.
Aircraft canopy lock
[NASA-CASE-FRC-11065-1] p0426 N81-24047
NICHOLS, J. H., JR.
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AIAA PAPER 81-0151] p0161 A81-20632
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AD-A101309] p0581 N81-30116
NICHOLS, M. R.
Bibliography on aerodynamics of airframe/engine integration of high-speed turbine-powered aircraft, volume 1
[NASA-TM-81814] p0035 N81-11032
NICKEL, U.
Increased target resolution and minor lobe reduction with active group antennas
p0152 A81-20090
NICOLET, M.
The aircraft in the stratosphere
p0002 A81-10499
NIEBERDING, W. C.
High temperature electronic requirements in aeropropulsion systems
p0359 A81-32547
High temperature electronic requirements in aeropropulsion systems
[NASA-TM-81682] p0201 N81-16388
NIELD, G. C.
A model-following technique for insensitive aircraft control systems
[AIAA PAPER 81-1867] p0560 A81-44563
NIELD, G. C., IV
A model-following technique for insensitive aircraft control systems
p0600 N81-31223
NIELSEN, J. N.
Experimental study of the influence of supports on the aerodynamic loads on an ogive cylinder at high angles of attack
[AIAA PAPER 81-0007] p0156 A81-20531
Experimental and theoretical study of flow fields and store forces in close proximity to a triple ejection rack at transonic speeds
[AD-A094751] p0263 N81-19030
Basic studies of body vortices at high angles of attack and supersonic speeds
[AD-A102241] p0594 N81-31154
NIELSEN, J. P.
Recent developments in NDT techniques
p0113 A81-10078
NIEMANN, J. R.
Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046
NIEWALD, R. J.
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936] p0363 A81-32937
NIGRO, D. N.
Gas turbine engines and transmissions for bus demonstration programs
[COO-4867-07] p0134 N81-14329
NIKITINA, N. V.
The influence of structural parameters and velocity on the shimmy of self-aligned wheels
p0556 A81-44268
A formulation of the shimmy problem for swiveling wheels
p0607 A81-47269
NIKOLAJSEN, J. L.
The vibration of a multi-bearing rotor
p0015 A81-11722
NIKOLSKII, A. A.
Plane vortex gas flows
p0123 A81-19634
NIKULIN, G. Z.
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles
p0004 A81-10913
NILSON, E. N.
Integrated CAD/CAM for the 1980s
[SAE PAPER 801170] p0400 A81-34105
NIMMER, R. P.
Transient, nonlinear response analysis of soft bodied impact on flat plates including interactive load determination
[AIAA 81-0621] p0305 A81-29482
NISHINOMIYA, G.
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376
NISHIWAKI, N.
Suppression of jet noise peak by velocity profile reshaping
p0458 A81-39839
NISHT, M. I.
Nonlinear aerodynamic characteristics of a thin airfoil of arbitrary plane configuration
p0123 A81-19629
A mathematical computer simulation of stationary and nonstationary flow of an ideal incompressible fluid around solid profiles and arrays
p0237 A81-26005
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47968
NISSIM, E.
Three-dimensional oscillatory piecewise continuous-kernel function method. I - Basic problems. II - Geometrically continuous wings. III - Wings with geometrical discontinuities
p0411 A81-35677
Active controls for flutter suppression and gust alleviation in supersonic aircraft

[NASA-CR-163934] p0216 N81-17097
NITSCH, F.
Predictability of moisture absorption in graphite/epoxy sandwich panels
p0039 N81-11131
NIVERT, L. J.
Coast Guard airship development
[AIAA 81-1311] p0455 A81-38528
NIXON, C. W.
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
Voice communication capability of selected inflight headgear devices
p0604 N81-31467
NIXON, D.
On the derivation of universal indicial functions
[AIAA PAPER 81-0328] p0165 A81-20753
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986
Unsteady transonic small disturbance theory with strong shock waves
[NASA-CR-166157] p0261 N81-19020
NIXON, W. B.
Investigation of the stalling characteristics of a general aviation aircraft
p0014 A81-11665
NIYOGI, P.
Plane transonic solution with shock by direct iteration
p0231 A81-24814
Recent developments in integral equation method in transonic flow
p0234 A81-25384
NOBACK, R.
State of the art and statistical aspects of helicopter fatigue substantiation procedures
p0487 N81-26127
State of the art and statistical aspects of helicopter fatigue substantiation procedures
[NLR-MP-80025-U] p0496 N81-27087
NOCHUMSON, D.
Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility
[LA-UR-80-2405] p0135 N81-14550
NOGGLE, L. W.
Design options study. Volume 1: Executive summary
[AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results
[AD-A089537] p0027 N81-10057
NOGGLE, P.
CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617
NOLL, T.
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
NOLL, T. E.
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116
NONAMI, K.
Problem of rotor passing through critical speed with gyroscopic effect. III - Case of rotating shaft on flexible supports
p0228 A81-24089
NONNAKER, D. O.
A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993
NORDSTROM, D. C.
Boeing Commercial Airplane Company engine procurement practices
p0429 N81-24076
NORED, D. L.
Advanced subsonic transport propulsion
[NASA-TM-82696] p0597 N81-31195
NORGREN, C. T.
Small gas-turbine combustor study - Fuel injector evaluation
[AIAA PAPER 81-1360] p0502 A81-40857
Small gas-turbine combustor study: Fuel injector evaluation
[NASA-TM-82641] p0490 N81-26146
NORMAN, D. C.
Practical gust load alleviation and flutter suppression control laws based on a LQG methodology
[AIAA PAPER 81-0021] p0158 A81-20544
NORMAN, L. W.
Development requirements for integrated aircraft power systems
[SAE PAPER 801149] p0406 A81-34241
NORRIS, D.
The mechanical testing of compressors and turbines for aircraft gas turbine engines
p0433 N81-24100
NORRIS, H.
The use of bonded crack-stoppers in pressure cabins
p0233 A81-25378
NORTH, D. M.
F-106s set to become target drones
p0614 A81-48067
NORTH, R. J.
The European Transonic Wind tunnel ETW
p0038 N81-11064
NORTHAM, G. B.
Flameholding characteristics of a swept-strut H2 fuel-injector for scramjet applications
p0003 A81-10711
NORTMANN, U.
Employment of development simulation for the realization of direct side force control in the case of an attack aircraft
[DGLR PAPER 81-063] p0609 A81-47580
NORTON, F. H.
Planning for and evaluating the potential of a land based aircraft for carrier operations
p0122 A81-19470
NORUM, T. D.
Effects of nozzle design on the noise from supersonic jets
p0246 N81-18001
NORVELL, J. R.
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13087
NOSOV, V. V.
Some aerodynamic properties of cones in viscous supersonic flow
p0237 A81-26119
Gas dynamic characteristics of the nozzle diaphragms of partial supersonic turbines
p0281 A81-27374
NOTARDONATO, J.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
NOTON, B. R.
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424
ICAM 'Manufacturing Cost/Design Guide' /MC/DG/
[AIAA PAPER 81-0855] p0408 A81-34353
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for composite structures
p0557 A81-44373
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for metallic structures
p0558 A81-44374
The ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for Avionics
p0558 A81-44375
NOVACKI, S. M., III
Microcomputer processing for Loran-C
p0371 N81-22007
NOVAD, A. A.
Concerning the motion of a piloted aircraft
p0299 A81-29312
NOVAK, L. M.
Radar target detection and map-matching algorithm studies
p0005 A81-11158
NOVAKOFF, A. K.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24082
NOVICK, A. S.
TF41/Lamilloy Accelerated Mission Test

[AIAA PAPER 81-1349] p0501 A81-40833
NOVIKOV, S. V.
Wire communication systems and equipment at airports
p0289 A81-28745
NOVOSARTOV, G. T.
Substantiation of oil change periods for ship and aircraft turbine engines
p0065 A81-15720
Composition of sludge formed in B-3V oil
p0103 A81-17373
Joint-laboratory qualification testing of oils for gas turbine engines
p0103 A81-17375
NOVOTNOI, R. J.
Engine life methodologies for conceptual design
[AIAA PAPER 81-1398] p0515 A81-42188
NOVOTNY, A.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129
NOWACK, C. J.
Acceptability of shale derived fuel for Navy aircraft propulsion systems
[AIAA PAPER 81-1424] p0503 A81-40868
NOWAK, H.
Influence of hinge line gap on aerodynamic forces acting on a harmonically oscillating thin profile in an incompressible flow. I, II
p0348 A81-30956
NOWLAN, F. S.
Reliability-centered maintenance
p0047 N81-11917
NUTTER, J.
Leading-edge separation from a thick, conical, slender wing at small angles of incidence
p0355 A81-31687
NYBERG, S. E.
A review of some investigations on wind tunnel wall interference carried out in Sweden in recent years
p0436 N81-24126
NYSSEN, C.
Nonlinear incremental analysis up to failure of aeronautical structures
p0068 A81-16307
NYSTROM, D.
Estimation of fan pressure ratio requirements and operating performance for the National Transonic Facility
[NASA-TM-81802] p0435 N81-24115
Guide for users of the National Transonic Facility
[NASA-TM-83124] p0550 N81-29139

O

OATES, G. C.
A survey on airbreathing propulsion education
p0063 A81-15375
OBERMAYER, H.
Model tests for an active rotor isolation system
[MBB-278-79-0] p0018 A81-12095
OBRAZTSOV, I. F.
The method of superelements in the dynamics of complex structures
p0101 A81-16969
OBRIEN, P. J.
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
OBRIEN, W. F., JR.
Dynamic pressure response with stall on axial flow compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578
A model for dynamic loss response in axial-flow compressors
[ASME PAPER 81-GT-154] p0317 A81-30053
OCCHIATO, J.
Preliminary evaluation of RSRA data comparing pure helicopter, auxiliary propulsion and compound helicopter flight characteristics
[AHS 80-10] p0473 A81-40143
OCH, F.
Application of damage tolerance concepts for the helicopters
p0487 N81-26130
Fatigue testing of composite rotor blades
p0489 N81-26140
Application of damage tolerance concepts for MBB helicopters
[MBB-UD-309/80-OE] p0580 N81-30105
Fatigue testing of composite rotor blades
[MBB-UD-308/80-OE] p0587 N81-30485
OCONNOR, S.
Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information
[NASA-TM-81171] p0548 N81-29127
OCONNOR, S. L.
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
ODGERS, J.
Considerations of the use of vitiated preheat
p0150 A81-20022
Factors limiting turbine inlet temperatures
p0294 A81-29083
ODONNELL, F. E.
Application of an in-line contamination monitoring unit to the AMT-64 Hydraulic Test Stand
[AD-A100696] p0550 N81-29140
ODORICO, J.
Nondestructive evaluation of composite structures
p0013 A81-11650
OEBERG, S.
Buckling of sandwich panels subjected to axial compression, shear forces and lateral pressure. Part 2: Analysis
[SAAB-TN-AE-72-PT-2] p0086 N81-12465
OFFI, D. L.
Test and evaluation of the Airport Surveillance Radar (ASR)-8 wind shear detection system (phase 2), revision
[AD-A090111] p0042 N81-11290
OGATA, T.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12876
OGG, J. S.
Pattern factor improvement in the F-100 primary combustion system
[ASME PAPER 81-GT-25] p0311 A81-29941
OGIMOTO, K.
Sound radiation from a finite length unflanged circular duct with uniform axial flow. I - Theoretical analysis. II - Computed radiation characteristics
p0100 A81-16712
OHLHABER, J. I.
Integrated multiplex for the Agusta A-129 attack helicopter
p0472 A81-40131
OHNSORG, R. W.
Fabrication of injection molded sintered alpha SiC turbine components
[ASME PAPER 81-GT-161] p0317 A81-30060
OHTA, I.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12876
OKADA, T.
Sensitivity reduction in aircraft control systems by double Perfect Model Following
p0299 A81-29203
OKAMOTO, S.
The effect of sound on the vortex-shedding from a circular cylinder - Acoustical vibrations directed along axis of cylinder
p0233 A81-25312
OKEEFFE, R. S.
INTERSCAN - The development and international acceptance of a new microwave landing system for civil aviation
p0418 A81-37114
OKEN, S.
Graphite thermoplastic YC-14 outboard elevator
p0530 A81-43631
Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22166
OKORNOV, B. N.
Principle for the design of hybrid control systems for passenger transport systems
p0107 A81-17577
OKUDA, H.
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376

OLEARY, C. O.
Wind-tunnel measurement of aerodynamic derivatives using flexible-sting rigs
p0591 N81-31110
OLEINIKOV, S. IU.
Investigation of the influence of the radial nonuniformity of initial temperature and energy losses on flow structure in a highly loaded turbine stage
p0465 A81-40019
OLESKIW, M. M.
Computer simulation of airfoil icing without runback
[AIAA PAPER 81-0402] p0167 A81-20809
OLIN, K. E.
Model-based scene matching
p0461 A81-39349
OLIVER, R. C.
Environmental aspects of aircraft emissions - A review and current assessment
p0290 A81-29056
OLIVER, R. J.
L-1011 Flight Management System design considerations
p0113 A81-18074
OLKHOVSKII, G. G.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022
OLKIN, S. I.
Relationship between creep characteristics and fracture resistance under the combined effect of fatigue and creep
p0414 A81-36474
OLLER, T. L.
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19323
OLSEN, J. J.
Past and future trends in structures and dynamics
[AIAA PAPER 81-0896] p0362 A81-32921
OLSEN, W.
Survey of aircraft icing simulation test facilities in North America
[NASA-TM-81707] p0269 N81-19078
OLSHANSKII, V. IU.
Two methods for calculating the load on the surface of a slender body executing axisymmetric vibrations in a sonic gas flow
p0004 A81-10920
OLSON, D. B.
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-28099
OLSSON, W. J.
JT9D jet engine diagnostics program
p0598 N81-31199
OLSTAD, W. B.
NASA aeronautics R&T - A resource for aircraft design
[AIAA PAPER 81-0925] p0408 A81-34363
OMALLEY, C. D.
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 1: Study overview
[NASA-CR-152391-VOL-1] p0384 N81-23030
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 2: Evaluation of prediction methodologies
[NASA-CR-152391-VOL-2] p0384 N81-23031
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 3: Effects of configuration variations from baseline
[NASA-CR-152391-VOL-3] p0384 N81-23032
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 4: RALS R104 aerodynamic characteristics and comparisons with R205 configuration aerodynamic characteristics
[NASA-CR-152391-VOL-4] p0384 N81-23033
OMASSEY, R. C.
Longitudinal instability in braked landing gear
[ASME PAPER 80-WA/DSC-12] p0170 A81-21083
ONEILL, R. A.
Antennas-avionics systems relationship
[SAE PAPER 810579] p0519 A81-42742
OMELICHUK, V. B.
Roll stabilization of flight vehicles by means of rollerons
p0290 A81-29
ONKEN, R.
Experimental aircraft of the DFVLR for in-flight simulation and flight control technology
p0452 A81-37
ONO, Y.
Aircraft noise identification system - Application for inflight position detector
p0570 A81-4
ONO, K.
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17
OPDYKE, G., JR.
A simple combustor system for a small gas turbine engine
p0104 A81-17
OPYD, W. G.
Evaluation of flight data from a mosaic sensor
p0452 A81-37
ORDONEZ, G. W.
Axisymmetric & non-axisymmetric exhaust jet induced-effects on a V/STOL vehicle design. Part 1: Data presentation
[NASA-CR-166146] p0441 N81-250
ORSANIC, V. J.
An airborne programmable digital to video converter interface and operation manual
[AD-A096422] p0446 N81-256
ORITZ, P.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-311
ORLANDO, V. A.
Active Beacon Collision Avoidance System (BCAS) functional overview
[AD-A094177] p0250 N81-18
ORLIK-RUECKEMANN, J.
Wind tunnel determination of dynamic cross-coupling derivatives - A new approach
p0413 A81-359
ORLIK-RUECKEMANN, K. J.
Dynamic stability parameters at high angles of attack
p0009 A81-116
Review of techniques for determination of dynamic stability parameters in wind tunnels
p0590 N81-311
Sensitivity of aircraft motion to cross coupling and acceleration derivatives
p0592 N81-311
ORLOV, A. A.
Laser-optic method for investigating the trajectories and bending-torsional deformations of lifting propeller blade models
p0418 A81-369
ORLOVSKAIA, Z. KH.
The influence of surface roughness on boundary layer flow and separation at transonic speeds
p0413 A81-364
ORON, M.
Analysis, design and simulation of line scan aerial surveillance systems
p0357 A81-324
Airborne ground velocity determination by digital processing of electro-optical line sensor signals
p0358 A81-324
ORSINO, A. J.
MS9001E - A new 100 MW gas turbine
[ASME PAPER 81-GT-31] p0312 A81-299
ORY, E.
Improvements in the determination of convective transfers from infrared thermography
p0255 N81-1825
OSDER, S. S.
Flight control and display computation - A 25-year perspective
[AIAA PAPER 81-0865] p0408 A81-343
OSIPOV, A. A.
Propagation of three-dimensional acoustic perturbations in channels of variable cross-sectional area at frequencies close to cutoff frequency
p0119 A81-193
OSHER, J.
Engine life methodologies for conceptual design

[AIAA PAPER 81-1398] p0515 A81-42188
OSMER, J. G.
Engine life and usage methodologies for conceptual design
[AIAA PAPER 81-1651] p0533 A81-43937
OSORGIN, V. D.
The use of direct lift control of an aircraft in a guided landing run
p0624 A81-49928
OSTAPKOWICZ, M.
Impact damage of aircraft gas turbine engines with axial compressors
p0005 A81-11324
OSTHEIMER, A. J.
Goals of flight management system integration for a forward-swept-wing demonstrator aircraft
p0421 A81-37524
OSTOWARI, C.
Effects of design variables on spoiler control effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581
Summary of high-lift and control surface research on NASA general aviation airfoils
[SAE PAPER 810629] p0524 A81-42781
OSTROFF, A. J.
Figure control of flexible structures - Optical surfaces of thin deformable primary mirrors
p0060 A81-14994
Flight evaluation of a simple total energy-rate system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24058
OSTROWSKI, J.
Flow phenomena along fuselages and wing-fuselage systems of gliders
[NASA-TM-75401] p0186 N81-15983
Discussion of test results in the design of laminar airfoils for competition gliders
[NASA-TM-75402] p0186 N81-15984
OTA, H.
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24079
OTOOLE, J.
GPS Navstar, the universal positioning system of the future
p0349 A81-30975
OTTEN, L. J.
A survey of recent atmospheric turbulence measurements from a subsonic aircraft
[AIAA PAPER 81-0298] p0164 A81-20736
OTTERBERG, R.
Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers
[AD-A098614] p0444 N81-25086
Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087
OTTO, H.
Roll and spin measurements in the low speed wind tunnel at Braunschweig
p0065 A81-15704
OTTOMEYER, D.
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061
OTTOMEYER, J. D.
AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461] p0582 N81-30119
OWEN, B.
GPS Navstar, the universal positioning system of the future
p0349 A81-30975
OWEN, D. H.
Methodological approaches to identifying relevant features for visual flight
[AD-A100199] p0541 N81-28108
OWEN, F. K.
Measurements of flow quality in the Ames 2 x 2ft transonic wind tunnel
[AIAA PAPER 81-0156] p0161 A81-20636
Evaluation of flow quality in two large NASA wind tunnels at transonic speeds
[NASA-TP-1737] p0095 N81-13303
OWEN, W. H.
Business aircraft APU's
[SAE PAPER 800608] p0061 A81-1533
OWENS, J. K.
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015
OWENS, W. J.
The development of a lightweight aircraft towing tractor
[SAE PAPER 801237] p0405 A81-34335

P

PAARMANN, L. D.
Evaluation of RF anechoic chamber fire protection systems
[AD-A092478] p0197 N81-16070
PACKER, L. L.
Bearing wear detection using radioactive iron-55 tagging
[ASLE PREPRINT 81-AM-6A-3] p0367 A81-33860
Improved capabilities to detect incipient bearing failures
[AD-A091687] p0134 N81-14325
PACKMAN, A. B.
A successful step toward an advanced supersonic transport engine - Acoustic and emission results from the Pratt and Whitney Aircraft Variable Cycle Engine Program
[AIAA PAPER 81-1593] p0508 A81-40968
PADFIELD, G. D.
Piloted simulation studies of helicopter agility
p0003 A81-10767
On the use of approximate models in helicopter flight mechanics
p0471 A81-40122
PADIYAR, K. S.
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066
PADMANABHAN, R.
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
PADOVA, C.
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088
PADULA, S. L.
NASA progress in aircraft noise prediction
p0269 N81-19074
PAGAN, G.
Generalized dynamic stability for linearized yawing motion
[RMCS-80002] p0601 N81-31225
PAGE, D. N.
Airline navigation planning
p0174 A81-21966
PAGE, G. S.
Analytic development of improved supersonic cruise aircraft based on wind tunnel data
p0240 N81-17989
PAGE, M.
A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14394
PAGEL, L. L.
Cooling system for high speed aircraft
[NASA-CASE-LAR-12406-1] p0485 N81-26114
PAI, B. R.
Film cooling performance of liner cooling devices
p0293 A81-29075
PAILHAS, G.
Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers
[ONERA-NT-1980-4] p0126 N81-13930
PAIRMAN, D.
A solid-state airborne sensing system for remote sensing
p0183 A81-23034

PALAZOTTO, A. N.
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29805
PALEZZI, E. G.
Aircraft equipment /2nd revised and enlarged edition/
p0355 A81-31823
PALLADINO, J. A.
High bypass turbofan component development, modification 2
[AD-A093156] p0215 N81-17093
PALLETT, E. H. J.
Aircraft instruments - Principles and applications /2nd edition/
p0513 A81-41799
PALMER, E.
Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information
[NASA-TM-81171] p0548 N81-29127
PALMER, E. A.
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
PALMER, R. E.
Method for predicting the jet-induced aerodynamics of V/STOL configurations in transition
[AD-A097356] p0385 N81-23043
PALMIERI, S.
An observational experiment using a monostatic sodar at the airport of Fiumicino
p0202 A81-27548
PAN, C. H. T.
Rotor-bearing dynamics technology design guide. Part 6: Status of gas bearing technology applicable to aero propulsion machinery
[AD-A094167] p0257 N81-18394
PAN, Z.
Three-dimensional model of spray combustion in gas turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751
PANDA, D. P.
Advanced techniques for airborne target screener
p0320 A81-30230
Advanced target tracking by dynamic scene analysis
p0358 A81-32499
PANDIT, P.
General Aviation Avionics Statistics
[AD-A095148] p0273 N81-19114
PANDOLFI, M.
Numerical experiments on unsteady flows through vibrating cascades
p0613 A81-47961
PANDYA, A.
End wall flows in rotors and stators of a single stage compressor
[NASA-CR-164635] p0540 N81-28097
PANELLA, R. F.
The role of advanced technology of turbine engine life cycle cost
p0047 N81-11927
PANISSET, D.
New technology applied to an IFF diversity transponder
p0350 A81-31133
PAPIN, J. P.
Helicopter alarms - The use of ALAT incident and accident record cards
p0100 A81-16609
PARAMOUR, M. D.
Specification and requirements rationale for military and civil helicopter engines
p0429 N81-24075
PARANJPE, P. A.
International Symposium on Air Breathing Engines, 5th, Bangalore, India, February 16-22, 1981, Proceedings
p0290 A81-29051
PARIKOV, A. N.
Realization of a method of extremal targeting in a problem of aircraft landing control
p0625 A81-49943
PARIS, P. C.
A practical probabilistic method for evaluating the fail-safeness of structures that may fail due to fatigue
p0612 A81-47888
PARK, J. W.
Extended frequency turbofan model
[NASA-CR-165261] p0335 N81-20076
PARKER, J. A.
Fireworthiness of transport aircraft interior systems
[AIAA PAPER 81-1142] p0459 A81-39131
Fireworthiness of transport aircraft interior systems
p0267 N81-19061
PARKER, J. F., JR.
A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test
[NASA-CR-3461-VOL-1] p0595 N81-31171
PARKER, K. O.
New developments in compact plate-fin heat exchangers
p0613 A81-48062
PARKER, L. W.
Airborne lightning warning systems: A survey
[AD-A095354] p0331 N81-20045
PARKER, R. A.
Abstract interface specifications for the A-7E device interface module
[AD-A092696] p0202 N81-16770
PARKER, R. E.
Flight control systems go digital - More than a binary mechanization of analog predecessors
[SAE PAPER 801166] p0399 A81-38181
PARKER, R. J.
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672
Lubrication of rolling element bearings
p0118 A81-18738
PARKER, R. L.
Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106
PARKHOMENKO, N. E.
Classification of links of assembly units with respect to the character of their connections, and calculation of the accuracy of their execution
p0319 A81-30160
PARKHOMOVSKII, IA. M.
Concerning one self-similarity property in flutter analysis
p0413 A81-36464
PARKS, J. L., JR.
Automated pilot advisory system test and evaluation at Manassas Municipal Airport
p0264 N81-19040
PARLETT, L. P.
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
PARMLEY, R. T.
Aerodynamic surface cooling for laminar flow control for hydrogen-fueled subsonic aircraft
[SAE PAPER 801155] p0407 A81-34245
PARNAS, D. L.
Abstract interface specifications for the A-7E device interface module
[AD-A092696] p0202 N81-16770
PARNESS, M. A.
Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165
PARR, F.
Current aircraft survey (approach speeds, gross weights, and Dimensions)
[PB80-225691] p0129 N81-13956
PARR, J. E.
ATTACK vs SCAN: A comparison of endgame aircraft survivability computer programs
[AD-A097663] p0388 N81-23076
PARRIOTT, L.
Airborne Systems software Acquisition Engineering Guidebook for application and use of the guidebooks (series overview)
[AD-A100216] p0543 N81-28787
PARRIOTT, L. D.
Avionic architectural standardization - Logistic support perspective
p0050 A81-13171

PARRISH, B.
Acoustic emission techniques for in-flight structural monitoring
[SAE PAPER 801211] p0404 A81-34219

PARRISH, R. V.
The effects of various fidelity factors on simulated helicopter hover
[AD-A102028] p0601 N81-31232

PARTHASARATHY, S. P.
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2010] p0624 A81-49731

PASHINTSEV, V. T.
The problem of the minimum-time turn of a maneuverable aircraft velocity vector to a specified course angle
p0413 A81-36472

PASTEL, R. L.
Airplane wing vibrations due to atmospheric turbulence
[NASA-CR-3431] p0438 N81-24679

PASZTOR, B.
Analysis of the operation of air turborefrigeration plants and their use for on-the-ground air-conditioning of aircraft
p0614 A81-48196

PATE, D. P.
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180

PATEL, K. V.
Research on a high work axial gas generator turbine
[SAE PAPER 800618] p0062 A81-15338

PATEL, T. S.
Optimum selection of main parameters for the reverse design of a supersonic military aircraft
p0102 A81-17047

PATRICK, R. P.
Nuclear hardness assurance for aeronautical systems
[SAE PAPER 801227] p0405 A81-34230
Optimal nuclear radiation criteria for aeronautical systems
[AD-A101651] p0548 N81-29125

PATT, R. F.
Energy efficient engine flight propulsion system: Aircraft/engine integration evaluation
[NASA-CR-159584] p0375 N81-22051

PATTERSON, A. R.
Air Force Integration Support Facilities - Their total utility
p0320 A81-30240

PATTERSON, C. R.
Simulation techniques for new generation aircraft maintenance training devices
p0324 A81-30331

PATTERSON, D. J.
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search
[AD-A094154] p0253 N81-18057

PATTERSON, J. C., JR.
Investigation of powered nacelles on a high aspect ratio NASA supercritical wing, phase 2
p0260 N81-19008
Wingtip vortex turbine
[NASA-CASE-LAR-12544-1] p0496 N81-27096

PATTERSON, J. L.
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566

PATTON, J. M., JR.
A status report on NASA general aviation stall/spin flight testing
p0122 A81-19471

PAUK, S. M.
Wire communication systems and equipment at airports
p0289 A81-28745

PAULON, J.
Analysis of the difficulties in high performance compressor data reduction
[ONERA, TP NO. 1981-7] p0296 A81-29107

PAULSON, J. A.
Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
p0243 N81-17986

PAULSON, J. W., JR.
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect
[NASA-TM-80199] p0627 N81-32119

PAUSDER, H. J.
The impact of helicopter flight mechanics on mission performance
p0633 N81-33148

PAUSDER, H.-J.
Flight tests and statistical data analysis for flying qualities investigations
p0471 A81-40121
Flight test results for task oriented flying qualities evaluation
[AHS 80-29] p0476 A81-40159

PAUZAT, J.-P.
Computer aided compilation of an electrical drawing file
p0007 A81-11611

PAVEL, A. L.
A survey of recent atmospheric turbulence measurements from a subsonic aircraft
[AIAA PAPER 81-0298] p0164 A81-20736

PAVLOV, V. A.
Experimental study of the snap-through oscillations of an empennage
p0299 A81-29313
Geometrically nonlinear theory for calculating thin rods of a wing profile
p0625 A81-49935

PAVLOV, V. G.
The use of direct lift control of an aircraft in a guided landing run
p0624 A81-49920

PAWELETZ, H.
An evaluation of vacuum centrifuged titanium castings for helicopter components
p0510 A81-41516

PAYNE, B. W.
Experimental flutter at high subsonic speeds and its theoretical prediction, taking into account wing thickness and Reynolds number
p0385 N81-23052

PAYNE, G.
Environmental control systems for executive jet aircraft
[SAE PAPER 800607] p0061 A81-15330

PCHELKIN, IU. M.
The development of low-toxic combustion chambers of transport gas turbine engines
p0060 A81-14787

PCHELKINA, L. V.
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles
p0004 A81-10913

PEACH, I. L., JR.
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180

PEACH, L. L.
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19082
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061

PEACOCK, A. T.
Fuel/engine/airframe trade off study
[AD-A097391] p0308 N81-23073

PEACOCK, R. E.
A digital technique for the analysis of the response of compressor/duct systems in unsteady flow
p0294 A81-29076
Performance analysis of a family of planar pulse generators
[AIAA PAPER 81-1590] p0507 A81-40965

PEAKE, D. J.
Flight experiments with a slender cone at angle of attack
[AIAA PAPER 81-0337] p0165 A81-20761
Topology of three-dimensional separated flows
[NASA-TM-81294] p0385 N81-23037

PEAL, R. A.
The 767's flight-management system - A new generation of airborne avionics
p0005 A81-11202
757/767 flight management system
[SAE PAPER 801169] p0399 A81-34184

PEARCE, C. M.
Some propeller developments in the United Kingdom
[AIAA PAPER 81-1566] p0507 A81-40949

PEARLMAN, R. A.
Lightning near fields generated by return stroke current
p0056 A81-14257

PEARSONS, K. S.
Handbook of aircraft noise metrics
[NASA-CR-3406] p0345 N81-21071

PEBEREAU, P.
ATR 42 - A regional transport aircraft designed to save energy
p0464 A81-39696

PECHON, A.
Auto-adaptive piloting
[GA-380] p0217 N81-17102

PECZKOWSKI, J. L.
Multivariable synthesis with transfer functions
p0080 N81-12102

PEDRIANI, C.
Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection
[AD-A093542] p0208 N81-17046

PEEK, D.
High-char-forming composite laminates
p0532 A81-43652

PEEL, C. J.
The analysis of fatigue failures
p0006 A81-11603

PEELE, E. L.
A digital program for calculating the interaction between flexible structures, unsteady aerodynamics and active controls
[NASA-TM-80040] p0498 N81-27115

PEERY, K. M.
Numerical simulation for the design of a supersonic cruise nozzle with a fluid noise shield
[AIAA PAPER 81-1218] p0458 A81-39006

PEI-QING, H.
Development of the self-temperature compensated resistance strain gage used up to 700 C
[ASME PAPER 81-GT-118] p0316 A81-30022

PEIGIN, S. V.
Laminar boundary layer on swept-back wings of infinite span at an angle of attack
p0107 A81-17656

PELLONE, C.
Study of the characteristics of a base-vented wing in nonlinear theory
[AAAF PAPER NT 80-40] p0369 A81-33927

PENDER, C. W., JR.
Microcomputer system for controlling an infrared scanning camera
p0453 A81-37749

PENROSE, C. J.
The requirements for and evolution of a test rig for exhaust gas recirculation studies of V/STOL aircraft
p0469 A81-40106

PENTEK, W.
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A093122] p0215 N81-17092

PERACCHIO, A. A.
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2046] p0620 A81-48637
Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853

PERBET, M.
Laser-gyro strapdown inertial navigation
p0225 A81-23868

PERCIVAL, W.
First phase testing of solar thermal engine at United Stirling
p0588 N81-30530

PERDICHIZZI, A.
Efficiency prediction for axial-flow turbines operating with nonconventional fluids
[ASME PAPER 81-GT-15] p0310 A81-29937

PERELMAN, R. G.
Erosion strength of aircraft engine and power plant parts
p0578 A81-46848

PERIN, R.
Wind-tunnel tests of engine-equipped models - Comparison of two jet wash simulation methods
[ONERA, TP NO. 1981-42] p0460 A81-39245

PERKINS, E. W.
Data base for the prediction of inlet external drag
p0190 N81-16018
Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045

PERKINS, J. N.
Power system control study. Phase 1: Integrated control techniques. Phase 2: Detail design and system modeling
[AD-A099894] p0497 N81-27100

PERKINS, S. C., JR.
Data base for the prediction of inlet external drag
p0190 N81-16018
Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045

PERKS, M. P.
The digital control system as part of an integrated accessory fit for future engines
p0104 A81-17505

PERNICA, Z.
Harmonically oscillating airfoil in transonic stream of air
p0054 A81-13753

PERRIER, P.
An acquisition and analysis system for the dynamic testing of air intakes
[ONERA, TP NO. 1981-37] p0460 A81-39240

PERRY, B., III
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[AIAA 81-0567] p0306 A81-29494
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[NASA-TM-83144] p0491 N81-26496

PERSHIN, A. P.
Test-stand combustion chamber for the study and development of forced working processes
p0319 A81-30151

PERSON, L. H., JR.
Test results of flight guidance for fuel conservative descents in a time-based metered air traffic environment
p0264 N81-19036

PERSOON, A. J.
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969

PETARD, P.
Fatigue tests on the total structure of the Gazelle SA 341 helicopter
p0488 N81-26136

PETERS, D. A.
Feasibility of a rotor flight-dynamics model with first-order cyclic inflow and multiblade modes
[AIAA 81-0611] p0304 A81-29473
Control settings for a trimmed, stalled rotor by an automatic feedback system
[AIAA 81-0617] p0305 A81-29478
Coupled rotor/airframe vibration analysis by a combined harmonic-balance, impedance-matching method
[AHS 80-21] p0474 A81-40151
Helicopter trim by periodic shooting with Newton-Raphson iteration
p0573 A81-46621

PETERS, J. M.
Extension of ejection seat capability for high speed conditions
p0176 A81-22097

PETERS, W. L.
Comparison of computational and experimental jet effects
[AIAA PAPER 81-1492] p0626 A81-49979

PETERSEN, J. C.
A computer-based laser Doppler velocimeter
[DFVLR-MITT-79-14] p0133 N81-14289

PETERSEN, R. A.
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] p0623 A81-49729

PETERSEN, S.
Time-constrained maximum-energy turns

[AD-A094733] p0273 N81-19107
PETERSEN, S. B.
Time-constrained maximum-energy turns
[AIAA PAPER 81-1886] p0561 A81-44578
PETERSEN, T. L.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323
PETERSON, A. A.
Helicopter icing review
[AD-A094175] p0252 N81-18053
Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070
PETERSON, L. J.
Optimized computer systems for avionics applications
[AD-A089570] p0028 N81-10063
PETERSON, R. L.
Navstar field test results
p0484 N81-26100
PETIAU, C.
A conversational, topological grid method and optimization of structural calculations involving finite elements
[AAAF-NT-79-30] p0210 N81-17053
PETIT, G.
General considerations on the importance of reliability studies for helicopters
p0287 A81-28471
Impact of modern materials on the development of rotating airfoil equipment
[AAAF-NT-79-43] p0083 N81-12182
PETRIE, A. M.
An experimental investigation of jet screech by air jet impingement on solid boundaries
p0005 A81-11302
PETRIE, W. B.
Reliability of commercial helicopters
p0472 A81-40126
PETRIN, C. L.
On certification of composite structures for USAF aircraft
[AIAA PAPER 81-1686] p0527 A81-43158
PETROV, B. N.
Inverse problems of controlled flight dynamics - Longitudinal motion
p0101 A81-16968
Inverse problems of the dynamics of controlled flight - Lateral motion
p0236 A81-25903
Inverse problems of guided-flight dynamics - Longitudinal motion
p0577 A81-46749
PETTIGREW, J. L.
Who needs engine monitoring?
p0599 N81-31209
PETYT, M.
Finite strip analysis of singly curved skin-stringer structures
p0616 A81-48390
PETZENHAUSER, I.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129
PEYRONEL, S.
Study of a crack propagation on the flap rail of a transport aircraft
p0181 A81-22633
PEYRONY, M.
Mirage 2000 and Mirage 4000 fiber structures
[AAAF-NT-79-44] p0083 N81-12183
PFEIFFER, N. J.
A computational model for low speed flows past airfoils with spoilers
[AIAA PAPER 81-0253] p0163 A81-20702
An analytic model of subsonic flow around an airflow with a spoiler
p0138 N81-14966
PFENNINGER, W.
Design considerations of advanced supercritical low drag suction airfoils
p0240 A81-26514
Program of research in laminar flow control in the JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121
PFLEIDERER, K.
Helicopter technologies of the future
[MBB-UD-314/80-OE] p0583 N81-30125
PHEENY, H. T.
A study of factors affecting aircrew survivability following emergency escape over water
p0409 A81-34697
PHELPS, A.
The experimental and analytical definition of helicopter modeling effects
[AHS 80-4] p0473 A81-40130
PHEY, S. W.
Application of superconducting coils to the NASA prototype magnetic balance
[NASA-CR-165660] p0336 N81-20066
PHIL, P. D.
Free-jet testing of powerplants for aircraft and missiles
p0431 N81-24089
PHILIPPE, J. J.
Pressure distribution computation on a nonlifting symmetrical helicopter blade in forward flight
p0447 N81-26018
PHILIPPE, J.-J.
Pressure distribution computation on a non-lifting symmetrical helicopter blade in forward flight
p0365 A81-33291
PHILLIPS, C. L.
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44681
An aircraft landing system employing observers
p0562 A81-44699
PHILLIPS, E. P.
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate
p0418 A81-37137
PHILLIPS, J. D.
Navigation errors encountered using weather-mapping radar for helicopter IFR guidance to oil rigs
[AHS 80-16] p0474 A81-40147
A mathematical model of the CH-53 helicopter
[NASA-TM-81238] p0075 N81-12065
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042
PHILLIPS, W. H.
Solar powered aircraft
[NASA-CASE-LAR-12615-1] p0628 N81-32138
PHILLIPS, W. R. C.
On a generalization of Kaden's problem
p0288 A81-28676
PIATT, M.
Forced vortices near a wall
[AIAA PAPER 81-0256] p0163 A81-20708
An experimental investigation of a large delta P settling chamber for a supersonic pilot quiet tunnel
[NASA-CR-3436] p0434 N81-24112
PICASSO, B. D., III
AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121
PICKERELL, D. J.
Rolls-Royce RB 211-535 power plant
[AIAA PAPER 81-0807] p0368 A81-33086
PIERCE, G. A.
Two-dimensional dynamic stall as simulated in a varying freestream
[NASA-CR-164829] p0629 N81-32154
PIERETT, S.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
PIETRUCHA, J.
A new method of airfoil flutter control
p0367 A81-33084
PIFKO, A. B.
Theory and application of finite element analysis to structural crash simulation
p0416 A81-36614
PILCHER, C. D.
F/A-18A Initial Sea Trials
p0458 A81-38857
PILLERA, A. J.
Utilization in industry of ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for metallic structures
p0558 A81-44374

PILSCH, T. D.
C-X - A case for scenario-oriented requirements
[AIAA PAPER 81-1690] p0527 A81-43159

PINN, J. H.
A-7 composite outer wing service experience
p0530 A81-43617

PINDER, J. T.
Performance retention of the RB211 powerplant in service
p0598 N81-31201

PINEAU, A.
Low cycle fatigue of Rene 77 at elevated temperatures
p0289 A81-28989

PINEL, S. I.
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672

PINES, S.
Terminal area automatic navigation, guidance, and control 1: Automatic rollout, turnoff, and taxis
[NASA-CR-3451] p0600 N81-31224

PINO, J.
Discrete Address Beacon System (DABS) computer performance/test and evaluation
[AD-A099326] p0484 N81-26088

PINSKER, W. J. G.
The flying qualities of aircraft with actively augmented pitch and yaw stability
[ARC-R/M-3848] p0082 N81-12113

PINSON, L. J.
Evaluation of image processing for man-in-loop target acquisition
p0461 A81-39337

PINTER, R. S.
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187

PIRAS, G.
Inspection methods for various critical steel parts for airframes
p0052 A81-13331

PIRUMOV, U. G.
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles
p0004 A81-10913

PISANO, A. D.
Failure Indication and Corrective Action for turboshaft engines
p0106 A81-17515

PISARENKO, G. S.
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957

PISCHOFF, D. E.
Longitudinal equivalent systems analysis of Navy tactical aircraft
[AIAA 81-1775] p0554 A81-44094

PISCOPO, P. F.
Establishing cruise-engine cycle payoffs for a supersonic VSTOL aircraft
[ASME PAPER 81-GT-100] p0315 A81-30007
A design analysis technique for evaluating size and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402

PISMENNYI, I. L.
Excitation of surging type oscillations due to aperiodic external effects
p0509 A81-41032

PISSO, G. P.
Helicopter fatigue qualification
p0180 A81-22623

PITTMAN, J. L.
Experimental and theoretical aerodynamic characteristics of two hypersonic cruise aircraft concepts at Mach numbers of 2.96, 3.96, and 4.63
[NASA-TP-1767] p0072 N81-12021
Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63
[NASA-TM-81937] p0329 N81-20025

PITTS, F. L.
Electromagnetic measurement of lightning strikes to aircraft
[AIAA PAPER 81-0083] p0160 A81-20588
In flight direct strike lightning research
p0259 N81-19005
In-flight direct-strike lightning research
p0266 N81-19054

PIWONKA, T. S.
Use of segmented mold process to produce large superalloy engine castings
[AIAA PAPER 81-1404] p0503 A81-40861

PIXLEY, J. I.
Developing an emergency medical disaster plan for an airport
p0053 A81-13513

PLAETSCHKE, E.
Design of optimal inputs for the identification of characteristics of aircraft flights
p0631 N81-33131

PLAKHTIENKO, N. P.
Forced vibrations of a nonlinear system excited by a centrifugal oscillator with a sloping engine characteristic
p0002 A81-10439

PLANT, T.
Study of an engine flow diverter system for a large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096

PLATNER, E. R.
Airport/environs plan making - Managing the planning process
p0114 A81-18088

PLATZER, M. F.
Experimental investigation of oscillating subsonic jets
p0360 A81-32777

PLEASANTS, W. A., III
Status of improved autorotative landing capability research
[AD-A090431] p0076 N81-12072

PLENCNER, R. M.
Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067

PLEWS, L. D.
Aircraft brake systems testing handbook
[AD-A101516] p0548 N81-29123

PLOUFF, W.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059

PLUMBLEE, H. E., JR.
Installation effects on propeller noise
[AIAA PAPER 80-0993] p0352 A81-31369

PLUMER, J. A.
A design guide for lightning protection of aircraft
p0056 A81-14259

PLUVIOSE, M.
Flow in bent pipes
[CETIM-14-F-091] p0256 N81-18322

POBEREZNY, P. H.
The art of designing experimental aircraft - An overview
[AIAA PAPER 81-0944] p0363 A81-32939

POCHUEV, V. P.
An experimental study of heat transfer on turbine rotor blades
p0509 A81-41033

POCOCK, C. L.
Turbulence: From a pilot's viewpoint
p0136 N81-14361

POCOCK, G.
Ferrography as a health monitor and a design aid for the development of helicopter gearboxes
p0118 A81-18759

PODMAZOV, A. V.
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122

PODOLSKII, S. L.
Roll length of an annular underexpanded jet formed by a sonic nozzle with cylindrical rod on its axis
p0309 A81-29667

PODSYPANINA, N. A.
Asymmetric flow of subsonic and sonic jets over an infinite wedge
p0004 A81-10919
Attainability of an attached flow in a nozzle with heavily curved walls
p0054 A81-13548

POE, C. C., JR.
An assessment of buffer strips for improving damage tolerance

p0247 N81-18009
POE, D. W.
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] p0637 N81-33194
POESTKOKE, R.
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969
POETZ, F.
New BBC high-efficiency gas turbines
p0017 A81-11797
POKROVSKII, V. V.
Laws of unstable crack growth under cyclic loading
p0236 A81-25701
POLASEK, J.
Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197
POLHAMUS, E. C.
Research related to variable sweep aircraft development
[NASA-TM-83121] p0441 N81-25067
Configuration aerodynamics
p0593 N81-31148
POLHEMUS, N. W.
Characterizing cross-track error distributions for continental jet routes
p0174 A81-21969
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
Computer graphics applications
[PB81-215246] p0637 N81-33188
POLHEMUS, W. L.
Evaluation of Loran-C for enroute navigation and non-precision approach within the state of Vermont
p0516 A81-42433
POLIAKHOV, N. N.
Steady flow past a rectangular wing with circulation that is variable along the span
p0099 A81-16551
POLIANSKII, A. F.
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732
POLISHCHUK, V. G.
Comparative efficiency of penetrating steam and air cooling of gas turbine blades
p0509 A81-41003
POLITOVICH, M. K.
Measurement of natural aircraft icing conditions
[AIAA PAPER 81-1646] p0526 A81-43143
POLIVANOV, V. P.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022
POLL, D. I. A.
Three-dimensional boundary layer transition via the mechanisms of 'attachment line contamination' and 'cross flow instability'
p0115 A81-18122
POLLARD, J. S.
Helicopter internal noise - An overview
p0150 A81-20055
POLLOCK, N.
A simple laser interferometer for wind tunnel flow visualisation
p0018 A81-12078
POLLOCK, S. J.
Evaluation of methods for prediction and prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
POLZ, G.
The calculation of separated flow at helicopter bodies
[DGLR PAPER 81-026] p0608 A81-47555
POND, C. R.
Laser measurement of angle of attack on wind-tunnel models
p0154 A81-20419
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
POND, F. H.
JT8D engine internal exhaust mixer technology program
[AD-A093057] p0215 N81-17091
PONOMAREV, B. V.
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122
PONOMAREV, B. N.
Losses of total pressure during mixing of flows in a step diffuser
p0242 A81-26991
PONTELANDOLFO, C.
CH-53 Helicopter Night Vision System simulation experiments
p0573 A81-46617
PONTIKOS, N.
Miniature pressure probe for measuring the surface-shear-stress vector in turbulent flow
p0233 A81-25354
POOL, A.
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29088
POOLE, R.
The electrical effects of joints and bonds in carbon fiber composites
p0199 N81-16153
POOLE, R. J. D.
Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740
POON, C. C.
An exploratory study of soot sample integrity and probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943
POOPAKA, S.
An analytical pilot rating method for highly elastic aircraft
[AIAA 81-1772] p0554 A81-44093
Handling qualities of large flexible aircraft
p0538 N81-28081
POPE, L. D.
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models
[NASA-CR-159363] p0258 N81-10799
POPELKA, D. A.
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047
POPOV, IU. G.
Iterative method for determining maximum load capacity of aircraft structures
p0235 A81-25603
POPOV, L. S.
Concerning one self-similarity property in flutter analysis
p0413 A81-36464
PORAT, B.
Effect of acceleration switching during INS in-flight alignment
p0458 A81-38097
Nonlinear estimation of generalized vector shot processes
p0529 A81-43503
PORTALATIN, A. I.
A-10A Operational Flight Trainer simulator flight control system and aerodynamics
[AIAA 81-0964] p0414 A81-36555
PORTER, D. R.
The evolution of fiber optics in avionics
[SAE PAPER 801145] p0398 A81-34174
PORTER, J. L.
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43987
PORTER, R. F.
A review of in-flight emergencies in the ASRS data base
[NASA-CR-166166] p0372 N81-22031
An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0546 N81-29108
Information transfer during contingency operations: Emergency air-ground communications
p0595 N81-31168
PORTERFIELD, J. D.
Helicopter External Gondola System
p0576 A81-46683
POSSON, C. W.
Developing a Fighter Engine Derivative of the

B-1/F101 engine
[SAE PAPER 801156] p0407 A81-34246

POTASH, M. L.
40 years of helicopter ice protection experience at Sikorsky Aircraft
[AIAA PAPER 81-0407] p0168 A81-20813

POTEKHINA, E. A.
The problem of the unsteady hypersonic flow past a plane profile
p0231 A81-24730

POTH, G. E.
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878

POTOTZKY, A. S.
Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495

POTTER, J. M.
Effect of load spectrum variables on fatigue crack initiation and propagation; Proceedings of the Symposium, San Francisco, Calif., May 21, 1979
p0172 A81-21730
Effects of fighter attack spectrum on crack growth
p0172 A81-21741

POTTHAST, A. J.
X-wing stability and control development and wind tunnel demonstration tests - Helicopter, conversion, and fixed wing flight
[AHS 80-27] p0475 A81-40157

POTTS, D. W.
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digital 2 aircraft
[AD-A100794] p0549 N81-29136

POUAGARE, M.
End wall flows in rotors and stators of a single stage compressor
[NASA-CR-164635] p0540 N81-28097

POURADIER, J. M.
Design and tests of an helicopter rotor blade with evolutive profile
[ONERA, TP NO. 1980-125] p0011 A81-11638
Aerodynamic study of a hovering rotor
p0468 A81-40098

POURBAIX, E.
Numerical investigation of a model of turbulent combustion of hydrocarbons
[AIAA PAPER 81-0039] p0158 A81-20559

POURSARTIP, A.
Gerry casing treatment
[CUED/A-TURBO/TR-101] p0093 N81-13059

POVINELLI, L. A.
Factors which influence the behavior of turbofan forced mixer nozzles
[AIAA PAPER 81-0274] p0359 A81-32549

POVOLOTSKII, L. V.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-3M-500 jet engine
p0395 A81-34022

POWELL, C.
Hyperbolic origins
p0612 A81-47842

POWELL, C. A.
Subjective field study of response to impulsive helicopter noise
[NASA-TP-1833] p0345 N81-21873
Acoustic facilities for human factors research at NASA Langley Research Center: Description and operational capabilities
[NASA-TM-81975] p0446 N81-25765

POWELL, J.
Aircraft radio systems
p0513 A81-41871

POWELL, J. A.
High temperature electronic requirements in aeropropulsion systems
p0359 A81-32547
High temperature electronic requirements in aeropropulsion systems
[NASA-TM-81682] p0201 N81-16388

POWELL, J. D.
A model-following technique for insensitive aircraft control systems
[AIAA PAPER 81-1867] p0560 A81-44563

POWELL, R. W.
Application of a tip-fin controller to the Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20502

POWERS, S. A.
Critical field length calculations for preliminary design
p0183 A81-23366

POZESKY, M. T.
An update of the Discrete Address Beacon System (DABS) alternatives study
[AD-A096264] p0340 N81-21052

PRADOUX, J. P.
Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN
p0485 N81-26102

PRASAD, N. A.
The role of simulation in automatic flight control systems research
p0283 A81-27894
A structural load alleviation control system for a large transport aircraft
[TT-8002] p0541 N81-29106

PRATHER, D. C.
Simulated A-10 combat environment
[SAE PAPER 801167] p0401 A81-34199

PRATT-BARLOW, C. R.
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[NASA-TM-81962] p0388 N81-23071

PRATT, D.
Mini-RPV radar test program
p0180 A81-22619

PRATT, R. L.
An automated multiple choice intelligibility testing system
p0604 N81-31468

PRATT, R. M.
Evaluation of Discrete Address Beacon System (DABS) EMC
[PB81-154387] p0441 N81-25062

PREISSER, J. S.
Unsteady fan blade pressure and acoustic radiation from a JT15D-1 turbofan engine at simulated forward speed
[AIAA PAPER 81-0096] p0161 A81-20598
Flight test of a pure-tone acoustic source
[NASA-TP-1898] p0641 N81-33945

PREMJI, K.
Evaluation of explosafe. Explosion suppression system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17047

PRESTON, R. E.
Manufacturing cost/design guide /MC/DG/ for metallic and composite structures
[AIAA 81-0518] p0302 A81-29424

PRICE, H.
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333

PRICE, H. E.
Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046

PRICE, J. E.
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-31184

PRICE, L. L.
Laser-Raman/Rayleigh flow diagnostic techniques applied to subsonic flow
[AD-A091695] p0133 N81-14275
Laser scattering applications development test in AEDC tunnel B at Mach number 8
[AD-A093929] p0217 N81-17105

PRICE, W. J.
The apparent ignoring of pilot fatigue by the NTSB in airline crashes
p0177 A81-22104

PRIDE, R. A.
Large-scale carbon fiber tests
[NASA-TM-80218] p0198 N81-16137

PRIGODA, B. A.
Flight-vehicle antennas /2nd revised and enlarged edition/
p0281 A81-27534
PRIKHODKO, V. E.
Flight-vehicle production technology
p0564 A81-45603
PRINCE, M. D.
Integrated displays and controls design factors for the 1990's transport aircraft
p0325 A81-30338
PRISER, D. B.
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25071
PRITCHETT, C.
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
PRITULO, M. F.
The coordinate-deformation method in the problem of a supersonic gas flow over an airfoil
p0123 A81-19631
PRIVARNIKOV, O. A.
An analytical study of nonlinear stabilization during ballistic descent
p0237 A81-26028
Choice of the optimal angular velocity of the twist of a flight vehicle
p0625 A81-49946
PROBERT, B.
Advanced combat aircraft wing design
p0007 A81-11608
Some particular configuration effects on a thin supercritical variable camber wing
p0188 N81-16005
PROK, G. M.
Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates
[NASA-TP-1768] p0436 N81-24283
PROKOPENKO, A. V.
Experimental determination of the stress intensity factor for cracks with a curvilinear front in complex parts /gas turbine blades/
p0351 A81-31264
Estimated service life of gas turbine engine compressor blades
p0417 A81-36680
PROULX, P.
Bilingual air traffic control in Canada
p0169 A81-20915
PROUTY, R. W.
Wind tunnel tests of large- and small-scale rotor hubs and pylons
[AD-A098510] p0439 N81-25043
PRUITT, V. R.
Energy maneuverability displays for air combat training
[SAE PAPER 801185] p0401 A81-34198
Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS)
[AD-A092974] p0208 N81-17041
PRUSSING, J. E.
Orthogonal multiblade coordinates
p0453 A81-38021
PRZIREMBE, C. E. G.
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0585 N81-30159
PUCCI, S. L.
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AIAA PAPER 81-0051] p0159 A81-20567
Viscous-inviscid interaction on oscillating airfoils in subsonic flow
[AD-A093970] p0203 N81-16983
PUCCINELLI, L.
Evaluation of section properties for hollow composite beams
[PAPER-NR-35] p0031 N81-10454
PULCINI, A.
An observational experiment using a monostatic sodar at the airport of Fiumicino
p0282 A81-27548
PULLIAM, T. H.
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566
A diagonal form of an implicit approximate-factorization algorithm
p0300 A81-29363
PULLIN, D. I.
On a generalization of Kaden's problem
p0208 A81-28676
PURSEL, R.
Flight test investigation of LORAN-C for en route navigation in the Gulf of Mexico
[AD-A091637] p0128 N81-13965
PURSEL, R. H.
Flight test investigation of LORAN-C for civil aviation applications
p0512 A81-41762
PURVIS, J. W.
Aeroservoelasticity in the time domain
[AIAA 81-0635] p0306 A81-29405
PUSKAS, E.
Development of the first ram air emergency parachute for personnel applications
p0174 A81-22078
PUSTER, R. L.
Analysis and design of a ceramic nozzle insert for the Langley 8-foot high temperature structures tunnel
p0060 A81-14996
Ceramic and coating applications in the hostile environment of a high temperature hypersonic wind tunnel
[NASA-TM-81931] p0254 N81-18199
PUTT, C. W.
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
[NASA-TM-82658] p0552 N81-29702
PUZYREWSKI, R.
Some aspects of optimizing the aerodynamics of turbine stages
p0119 A81-19323

Q

QI, X.-Y.
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067
QIAN, H.
Finite difference computation of the steady transonic potential flow around airplanes
p0107 A81-17082
QIANG, F.
Accuracy and application of a second-order theory for three-dimensional supersonic and low hypersonic unsteady flows aroung a thin wing
p0419 A81-37335
QIANG, K.
New correlations of the two-dimensional turbine cascade aerodynamic performance
[ASME PAPER 81-GT-128] p0316 A81-30032
QIN, S.
Development of an astro-inertial hybrid navigation system and a star tracker
p0420 A81-37343
QUACKENBUSH, T. R.
Testing and evaluation of a stall-flutter-suppression system for helicopter rotors using individual-blade-control
[NASA-CR-166233] p0549 N81-29135
QUAM, D. L.
Aircraft lateral parameter estimation from flight data with unsteady aerodynamic modelling
[AIAA PAPER 81-0221] p0162 A81-20601
BIOCCMAID system (bionic control of acceleration induced dimming)
[AD-A102510] p0601 N81-31239
QUAM, R. A.
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
QUAST, A.
Reduction of profile drag by blowing out through peg holes in areas of streamline separation bubbles
[DGLR PAPER 80-103] p0120 A81-19382
Laminar-airfoils for transport aircraft
[DFVLR-MITT-80-07] p0129 N81-13952
QUEEN, F. D.
Results of a feasibility study for determining the yaw angle of a landing aircraft
[AD-A099765] p0495 N81-27000

QUEEN, S.
QSRA Joint Navy/NASA sea trials
[AIAA PAPER 81-0152] p0161 A81-20633
QUEEN, S. J.
Quiet propulsive-lift technology ready for civil and military applications
p0359 A81-32521
QUINBY, G. F.
An assessment of General Aviation utilization of advanced avionics technology
[NASA-CR-159328] p0127 N81-13941

R

RABE, D. C.
Effects of downstream distance on turbulence decay for the compressor research facility low conditioning system
[AD-A091543] p0133 N81-14276
RABINOVICH, B. I.
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
RABINOWITZ, C.
Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers
[AD-A098614] p0444 N81-25086
RABOTNOV, IU. N.
Use of carbon composites in aircraft structures
p0577 A81-46813
RADER, C. E.
Time-constrained maximum-energy turns
[AIAA PAPER 81-1886] p0561 A81-44578
RADFORD, R. C.
Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969
An experimental investigation of VTOL flying qualities requirements or shipboard landings
[AD-A104137] p0638 N81-33199
RABINOWITZ, C.
Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087
RADOMSKI, M. A.
CF6 high pressure compressor and turbine clearance evaluations
p0598 N81-31198
RADOVCICH, N.
Integrated active controls impact on supersonic cruise vehicle structural design
[SAE PAPER 801210] p0404 A81-34218
RAGAN, D. B.
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions
[AD-A095634] p0334 N81-20072
RAGHUNATH, B. J.
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
RAGHUNATHAN, S.
A study of multiple jets
p0110 A81-18024
RAGULIN, N. F.
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities
p0124 A81-19644
RAHNEMA, M. A.
Alleviation of helicopter fuselage-induced rotor unsteady loads through deterministic variation of the individual blade pitch
[NASA-CR-166234] p0549 N81-29134
RAIKIN, L. I.
Investigation and improvement of an elbow-type gas outlet of a turboprop engine
p0509 A81-41048
RAITCH, F. D.
The experimental and analytical definition of helicopter modeling effects
[AHS 80-4] p0473 A81-40139
RAJ, P.
A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796
RAJ, R.
Transpiration air cooled turbine blade - A technology for future generation aircraft and industrial gas turbine engines using coal or coal derived fuels
p0297 A81-29115
RAJALA, S. A.
A study of real-time computer graphic display technology for aeronautical applications
[NASA-CR-164221] p0300 N81-22727
RAJPAUL, V. K.
ECS integration for fuel efficient/low life cycle cost design
p0015 A81-11676
RAJU, P. K.
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
RAKIB, Z.
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002
RAKOWSKI, J.
Runway surface loading during aircraft landings
p0149 A81-19800
RAMACHANDRA, K.
Photoelastic investigation of stress distribution around inclined cut-outs in gas-turbine components subjected to in-plane and bending loads
p0295 A81-29091
RAMACHANDRA, N. S.
International Symposium on Air Breathing Engines, 5th, Bangalore, India, February 16-22, 1981, Proceedings
p0290 A81-29051
RAMACHANDRA, S. M.
Optimal flight vehicle design and linear vector spaces
p0014 A81-11668
RAMACHANDRAN, S.
TA-4J spin training through simulation
[AIAA 81-0965] p0414 A81-36556
Improved G-Cueing System
[AIAA 81-0987] p0416 A81-36572
RAMAMURTI, V.
Coriolis effect on the vibration of flat rotating low aspect ratio cantilever plates
p0348 A81-30914
RAMANATHAN, R.
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362
RAMANUJACHARI, V.
Performance analysis of primary and secondary systems of a rocket ramjet engine burning fuel-rich metallized propellants
p0292 A81-29066
RAMETTE, P.
Tests of large compressors at CE Pr
p0432 N81-24096
RAMJEE, V.
Effect of contraction on screen-generated turbulence
p0284 A81-27900
RAMPINI, F. B.
Neurotraumatological aspects in ejected pilots
p0205 N81-17012
RAND, J. L.
The development of a substitute bird model
[ASME PAPER 81-GT-23] p0311 A81-29939
RANDALL, C. C.
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041
RANDLE, R. J., JR.
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-16994
RANDOLF, T. H.
Combined environment reliability testing /CERT/ as applied to engine mounted electronic controls
[AIAA PAPER 81-1500] p0516 A81-42204
RANEY, J. P.
NASA progress in aircraft noise prediction
p0269 N81-19074
RANG, E. R.
The use of finite-state machines for describing and validating flight control systems
p0322 A81-30265
RANGACHARYULU, M. A. V.
Use of optimization in helicopter vibration control by structural modification

p0241 A81-26945
RANGANATH, H. S.
Automatic handoff cf multiple targets
[AD-A093483] p0217 N81-17101
RANSLEM, G. R.
Firebrand ramjet propulsion system development
[AIAA PAPER 81-1486] p0506 A81-40904
RAO, D. M.
Leading-edge 'Vortex Flaps' for enhanced subsonic aerodynamics of slender wings
p0012 A81-11648
Hinged strakes for enhanced maneuverability at high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14968
Exploratory subsonic investigation of vortex-flap concept on arrow wing configuration
p0243 N81-17985
Leading edge vortex flaps for drag reduction
[NASA-CASE-LAR-12750-1] p0261 N81-19016
Subsonic pitch-up alleviation on a 74 deg delta wing
[NASA-CR-165749] p0584 N81-30137
Wind-tunnel studies of advanced cargo aircraft concepts
[NASA-CR-164833] p0627 N81-32117
RAO, J. S.
Coupled bending-torsion vibrations of rotating blades of asymmetric aerofoil cross section with allowance for shear deflection and rotary inertia by use of the Reissner method
p0289 A81-28942
RAO, K. P.
A half-model free-oscillation rig for pitch-damping measurements in high speed wind tunnels
p0461 A81-39263
RAO, S. S.
Optimum design of axial flow gas turbine stage. I - Formulation and analysis of optimization problem. II - Solution of the optimization problem and numerical results
p0019 A81-12608
RAOUS, M.
A periodic problem in viscoelasticity with variable coefficients
p0419 A81-37143
RAPHAEL, D. E.
Aviation assumptions in the eighties
p0112 A81-18068
RAPPOLD, R. A.
An investigation of two safe escape from base flight profiles
[AD-A096571] p0373 N81-22034
RAPSON, R. L.
Advanced composites - Evolution of manufacturing technology
[AIAA PAPER 81-0895] p0362 A81-32920
RASHED, M. I. I.
Particulate flow in centrifugal compressors used in helicopters
p0297 A81-29109
RASKIN, D.
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] p0641 N81-34109
RASMUSSEN, P. G.
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials
[AD-A103191] p0636 N81-33175
RASSOKHA, A. A.
Use of speckle-holographic interferometry to study the strain-strain state of a gas-turbine engine disk close to the blade root fixing
p0170 A81-21366
RAT, C.
The interface arrangement of digibas systems
p0545 N81-29084
RATLIFF, A. W.
Hyperbolic/parabolic development for the GIN-STAR code
[NASA-CR-3369] p0201 N81-16416
RATTERREE, B. L.
Fully bonded concrete overlay for an airport runway
p0113 A81-18075
RAUCH, H. W.
Improved ceramic heat exchanger materials
[NASA-CR-159678] p0132 N81-14082
RAULT, A.
Parameter identification and discriminant analysis for jet engine mechanical state diagnosis
p0156 A81-20474
RAUSCHELBACH, P.
Future trends in automatic flight control systems
[SAE PAPER 800627] p0063 A81-15343
RAUSCHER, E.
Structural flight load testing, calibration and analysis
p0013 A81-11656
RAVINDRA, H.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323
RAVINDRANATH, A.
Structure and decay characteristics of turbulence in the near- and far-wake of a moderately loaded compressor rotor-blade
[ASME PAPER 80-GT-95] p0109 A81-17954
RAWLINGS, R. C.
The flight assessment and applications of DME/DME. I, II
p0174 A81-21968
RAY, C. J.
High-solids coatings for exterior aircraft
p0169 A81-20861
RAY, G. K.
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14182
RAY, M. G.
T700 engine integral inlet separator - All weather operational protection
p0469 A81-40108
RAYMOND, E. T.
Secondary power system options for future military aircraft
[SAE PAPER 801192] p0401 A81-34202
RAYMOND, J.
Parameter identification and discriminant analysis for jet engine mechanical state diagnosis
p0156 A81-20474
RAZDOBARIN, A. M.
Aerodynamic load distribution along the span of an asymmetric wing
p0413 A81-35915
RE, R. J.
Investigation of convergent-divergent nozzles applicable to reduced-power supersonic cruise aircraft
[NASA-TP-1766] p0139 N81-14972
READER, D. C.
An inflatable seat for aircraft passengers
p0175 A81-22091
READETT, G. G.
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] p0638 N81-33208
REBBECHI, B.
R.A.N. Sea King cabin environment survey. Part 2: Measurement of temperature and humidty
[AD-A096329] p0341 N81-21068
An analysis of thermal balance in the cooled cabin of a Sea King Helicopter
[AD-A097199] p0389 N81-23077
REBONT, J. B.
Unsteady aerodynamics of an aerofoil at high angle of incidence performing various linear oscillations in a uniform stream
p0357 A81-32017
RECH, J.
Concorde aerodynamics and associated systems development
p0101 A81-16718
Contribution of technological progress to energy savings and conservation to the design of new aircraft
p0464 A81-39695
RECK, G. M.
Advanced fuel system technology for utilizing broadened property aircraft fuels
p0007 A81-11612
REDDICK, H. C.
An analysis of the requirements for and the costs and benefits of the National Microwave Landing System (MLS), volume 1
[AD-A099632] p0493 N81-27071

An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS), volume 2
[AD-A100018] p0493 N81-27072
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS)
[AD-A100136] p0537 N81-28076

REDDY, A. D.
Behavior of continuous filament advanced composite isogrid structure
p0377 N81-22095

REDDY, C. S.
Effect of leading-edge vortex flaps on aerodynamic performance of delta wings
p0559 A81-44424
Investigation of aerodynamic characteristics of wings having vortex flow using different numerical codes
[NASA-CR-165706] p0384 N81-23034

REDEKER, G.
Design and experimental verification of a transonic wing for a transonic aircraft
p0188 N81-16003
Computation of pressure distribution on the DFVLR wing-body model by the panel method
[DFVLR-FB-80-02] p0372 N81-22029

REDFORD, J.
Flat panel display technology review
p0211 N81-17065

REDIN, P. C.
Application of a performance modeling technique to an airplane with variable sweep wings
[NASA-TP-1855] p0426 N81-24048

REED, H. L.
Design considerations of advanced supercritical low drag suction airfoils
p0240 A81-26514

REED, T. D.
Industrial leadership of an aircraft design class
[AIAA PAPER 81-1723] p0528 A81-43166

REED, W. E.
Microwave landing systems. Citations from the Engineering Index data base
[PB80-814643] p0128 N81-13947
Microwave landing systems. Citations from the NTIS data base
[PB80-814635] p0128 N81-13948

REED, W. H., III
Historical development of flutter
[AIAA 81-0591] p0302 A81-29419
Passive control of wing/store flutter
[NASA-TM-81865] p0125 N81-13922

REEMSNYDER, D. C.
Reverse thrust performance of the QCSEE variable pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206

REES, J. W., II
Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029

REEVES, J.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059

REEVES, J. M. L.
Systems costing of hovercraft, hydrofoils and wing-in-ground effect machines. III
p0412 A81-35724

REGARD, D.
O.N.E.R.A. ramjet test facilities
p0365 A81-33285

REGNAULT, D.
Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN
p0485 N81-26102

REHBACH, C.
Study of a variable sweep wing in sub or transonic flow
[ONERA, TP NO. 1978-106] p0058 A81-14391

REHDER, J. J.
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882

REHMANN, A. J.
Crosstalk levels of speech plus data in Remote Communication Air-Ground (RCAG)
[AD-A103351] p0636 N81-33182

REHRIG, R. S.
An analysis of the requirements for and the costs and benefits of the National Microwave Landing System (MLS), volume 1
[AD-A099632] p0493 N81-27071
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS), volume 2
[AD-A100018] p0493 N81-27072
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS)
[AD-A100136] p0537 N81-28076

REICHERT, G.
Hingeless tailrotor in fiber composite construction and vibration-isolation systems /ARIS, ASIS/ for helicopters
[MBB-UD-311-80-0] p0119 A81-19300
Helicopter vibration control - A survey
p0364 A81-33047

REID, I. N.
A study of multiple jets
p0110 A81-18024

REID, J. G.
Output predictive algorithmic control - Precision tracking with application to terrain following
p0564 A81-45573
Output predictive algorithmic control - Precision tracking with application to terrain following
p0567 A81-46280

REID, L. D.
On-line wind shear generation for flight simulator applications
[AIAA 81-0970] p0414 A81-36559

REIFSNIDER, K. L.
Fatigue damage mechanisms in composite materials - A review
p0003 A81-10747

REILLY, R. A.
Integrated avionics studies target future technologies
p0223 A81-23499
Synergistic benefits of fully integrating JTIDS and GPS
p0323 A81-30311

REILLY, R. S.
Exploratory development program to improve combustor dome operating characteristics
[AIAA PAPER 81-1351] p0501 A81-40834

REINECKE, M.
Voice warning systems: Some experimental evidence concerning application
p0603 N81-31458

REINHART, T. J.
Future applications of adhesive bonding in the U.S. Air Force
p0558 A81-44378

REINMUTH, K.
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines
[BMFT-FB-T-79-137] p0275 N81-19128

REISING, J.
Tailoring software logic to the needs of the pilot - A software designer's nightmare
p0325 A81-30335

REISING, J. M.
Evaluation of factors unique to multifunction controls/displays devices
[AD-A094227] p0258 N81-18733

REITZ, S. D.
Methodology for engine/aircraft selection with life and utilization considerations
[AIAA PAPER 81-1401] p0515 A81-42190
Investigation of influences on the definition of engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938

REK, B.
The 146 emerges from the shadows
p0560 A81-44474

REMBOLD, J. P.
Flight test of a full authority Digital Electronic Engine Control system in an F-15 aircraft
[AIAA PAPER 81-1501] p0507 A81-40912

REMINGTON, R. W.
Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
p0603 N81-31452

REMONDINO, M.
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search
[AD-A094154] p0253 N81-18057
RENSKI, R.
The ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for Avionics
p0558 A81-44375
REN, X.-A.
A new method for torsion of shaft with variable diameter using non-orthogonal curvilinear coordinates and its application
[AIAA 81-0477] p0300 A81-29378
RENIRIE, L. T.
Helicopter-ship qualification testing
p0232 A81-24941
RENNISON, D. C.
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models
[NASA-CR-159363] p0258 N81-18799
RENTZ, P. E.
NOISECHECK procedures for measuring noise exposure from aircraft operations
[AD-A093948] p0221 N81-17849
RENZ, R. R. L.
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754
RENZE, P. P.
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] p0637 N81-33190
REPPERGER, D. W.
Evaluation of AFIT/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0249 N81-18034
REPUKHOV, V. M.
Computer calculation of the characteristics of a hybrid system for the cooling of gas turbine blades
p0459 A81-39217
RESHOTKO, M.
Core noise measurements from a small, general aviation turbofan engine
p0179 A81-22531
Core noise measurements from a small, general aviation turbofan engine
[NASA-TM-81610] p0044 N81-11769
RESTALL, J. E.
A process for protecting gas turbine blade cooling passages against degradation
p0622 A81-49209
RETTIE, I. H.
Theoretical and Experimental studies of aerodynamic interference effects
p0190 N81-16017
REUKAUF, P. J.
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044
REVELL, P. S.
Wind tunnel tests of sailwings for Darrieus rotors
p0518 A81-42676
REX, J. D.
Design characteristics of Michelson interferometers used on the AFGL NKC-135 infrared flying laboratory
p0463 A81-39505
REYNARD, W. D.
Dimensions of the information transfer problem
p0594 N81-31163
REYNOLDS, C. N.
Turboprop engine propulsion for the 1990's
[AIAA PAPER 81-1648] p0533 A81-43935
REZNIK, B. G.
Efficiency of cantilever compressor stator blades
p0509 A81-41041
RHODE, D. L.
Prediction of swirling reacting flow in ramjet combustors
[AIAA PAPER 81-1485] p0506 A81-40903
RHODES, J. E.
Effect of post buckling on the fatigue of composite structures
p0418 A81-37127
Post-buckling and membrane structural capability of composite shell structures
p0482 A81-40602
RHODES, M. D.
Concepts for improving the damage tolerance of composite compression panels
p0360 A81-32825
Graphite-epoxy panel compression strength reduction due to local impact
p0040 N81-11139
RIABINKOV, G. M.
Some optimization problems of internal aerodynamics
p0237 A81-26120
RIABOV, A. N.
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
RIBBLE, G. H., JR.
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design
[NASA-TM-81660] p0588 N81-30562
RIBNER, H. S.
Perspectives on jet noise
[AIAA PAPER 81-0428] p0168 A81-20029
Shielding concepts for jet noise
[AIAA PAPER 81-2020] p0623 A81-49730
RICARD, G. L.
The effects of various fidelity factors on simulated helicopter hover
[AD-A102028] p0601 N81-31232
RICCI, R. J.
The CADAM system for aircraft structural design
[SAE PAPER 801208] p0403 A81-34216
RICE, P. F.
A concept for dynamic control of RPV information system parameters
p0049 A81-12796
RICE, W. J.
Experimental analysis of IMEP in a rotary combustion engine
[NASA-TM-81662] p0195 N81-16054
RICH, M. J.
Design, fabrication and test of a complex helicopter airframe section
[SAE PAPER 801213] p0404 A81-34221
All composite helicopter airframe roof structure
[AHS 80-47] p0477 A81-40174
Developing design allowables for composite helicopter structures
p0611 A81-47011
RICHARDS, D.
F/A-18A Initial Sea Trials
p0458 A81-38857
RICHARDS, F. H.
A study of factors affecting aircrew survivability following emergency escape over water
p0409 A81-34697
RICHARDS, P. J.
Generalized dynamic stability for linearized yawing motion
[RMCS-80002] p0601 N81-31225
RICHARDSON, A., III
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966
RICHARZ, W. G.
Shielding concepts for jet noise
[AIAA PAPER 81-2020] p0623 A81-49730
RICHEY, G. K.
Military aircraft technology - Needs and trends for the 80's
[AIAA PAPER 81-1691] p0535 A81-43952
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
p0632 N81-33142
RICHTER, E.
Samarium cobalt (SMCO) generator/engine integration study
[AD-A092904] p0214 N81-17087
RICHTER, E. D.
Death and injury in aerial spraying - Pre-crash, crash, and post-crash prevention strategies
p0177 A81-22115
RICKARD, J. R.
Digital controls in a large engine test facility
p0532 A81-43715

RICKARD, W. W.
Closed-loop criteria for assessing longitudinal-axis handling qualities of transports in final approach
[AIAA 81-1773] p0556 A81-44133
Lateral-directional flying qualities of transport aircraft
[AIAA PAPER 81-1887] p0561 A81-44579

RICKETTS, R. A.
Effects of angle of attack and ventral fin on transonic flutter characteristics of an arrow-wing configuration
[NASA-TM-81914] p0145 N81-15397

RICKETTS, R. H.
Dynamic response of a forward-swept-wing model at angles of attack up to 15 deg at a Mach number of 0.8
[NASA-TM-81863] p0085 N81-12448
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12720-1] p0601 N81-31229
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12458-1] p0601 N81-31230

RICKLEY, E. J.
Noise levels and data correction analysis for seven general aviation propeller aircraft
[AD-A091292] p0096 N81-13717
Helicopter noise analysis: Round-robin test
[AD-A103724] p0641 N81-33948

RIDDLEBAUGH, S. M.
Small gas-turbine combustor study - Fuel injector evaluation
[AIAA PAPER 81-1388] p0502 A81-40857
Small gas-turbine combustor study: Fuel injector evaluation
[NASA-TM-82641] p0490 N81-26146

RIDENOUR, R. W.
Computer aided technology interface with weights engineering
[SAWE PAPER 1346] p0353 A81-31384

RIEBE, G. D.
Experimental and theoretical aerodynamic characteristics of two hypersonic cruise aircraft concepts at Mach numbers of 2.96, 3.96, and 4.63
[NASA-TP-1767] p0072 N81-12021
Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63
[NASA-TM-81937] p0329 N81-20025

RIECKHOF, H.-J.
Automatization of the adhesion process for supporting airframe parts in light contour systems
p0118 A81-19297

RIEDEL, S. A.
Practical optimal flight control system design for helicopter aircraft. Volume 2: Software user's guide
[NASA-CR-152306] p0081 N81-12110

RIEDER, P. F.
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059

RIFFEL, H.
Weapon system evolution of attack helicopters
p0472 A81-40130

RIFFEL, R. E.
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade
[NASA-CR-165166] p0140 N81-14976

RIGGS, S. G., JR.
Helicopter External Gondola System
p0576 A81-46642

RILEY, K. M.
Sensitivity of optimum solutions to problem parameters
[AIAA 81-0548] p0301 A81-29399

RIMALI, P. W.
A-10A Operational Flight Trainer simulator flight control system and aerodynamics
[AIAA 81-0964] p0414 A81-36555

RINGLAND, R. F.
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Generic multi-body formulation of heavy lift airship equations of motion
p0563 A81-45539
Development of handling quality criteria for aircraft with independent control of six degrees of freedom
[AD-A100045] p0498 N81-27117

RIO, R. A.
Improved jet engine maintenance through automated vibration diagnostic systems
[ASME PAPER 81-GT-62] p0313 A81-29972

RIPPL, K. H.
EMC, lightning and NEMP-protection-new requirements for approved specifications when using CFRP
p0199 N81-16152

RISCH, H.
Air data computer for the measurement and evaluation of data of flight physics
p0451 A81-37648

RITCHEY, V. S.
Analytical methods for store separation flight test
p0177 A81-22344

RIVERA, J. M.
Theoretical study of network design methodologies for the aerial relay system
[NASA-CR-159365] p0249 N81-18033

RIX, O.
System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
[DFVLR-MITT-79-16] p0130 N81-13971

RIZK, M. H.
Aerodynamic effects of nearly uniform slipstreams on thin wings in the transonic regime
[NASA-CR-152351] p0249 N81-18027

ROACH, D. B.
A study of ASRS reports involving general aviation and weather encounters
[NASA-CR-166212] p0493 N81-27063

ROBB, J. D.
VHF-UHF precipitation-static interference effects on aircraft
p0056 A81-14258

ROBBINS, K.
Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853

ROBERT, M.
Crack growth model for flight-type loading
p0460 A81-39247

ROBERTS, A.
Charge-coupled device /CCD/ camera/memory optimization for expendable autonomous vehicles
p0357 A81-32491

ROBERTS, C. A.
A technique for recovering nonsynchronized data from a digital flight data recorder
p0328 N81-20020

ROBERTS, D. L.
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039

ROBERTS, D. W.
The effect of impeller tip design on the performance of a mixed flow turbocharger compressor
[ASME PAPER 81-GT-7] p0310 A81-29932

ROBERTS, E. W.
Application of an in-line contamination monitoring unit to the AHT-64 Hydraulic Test Stand
[AD-A100696] p0550 N81-29140

ROBERTS, L.
Recent progress in V/STOL aircraft technology
[NASA-TM-81281] p0333 N81-20066
Recent progress in V/STOL aircraft technology
p0633 N81-33144

ROBERTS, M. L.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194

ROBERTS, P. B.
Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954

ROBERTSON, J. B.
Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13950

ROBINS, A. W.
Supersonic wings with significant leading-edge thrust at cruise

p0244 N81-17990
ROBINSON, C. A., JR.
Industry proposes supersonic V/STOL
p0122 A81-19490
ROBINSON, C. W.
The use of power-adaptive and power-reversible flight control actuation systems to achieve hydraulic power and system weight savings
[SAE PAPER 801190] p0401 A81-34201
ROBINSON, D. A.
A study of wing body blending for an advanced supersonic transport
p0244 N81-17987
ROBINSON, D. W.
The rating of helicopter noise: Development of a proposed impulse correction
[NPL-AC-93] p0138 N81-14792
ROBINSON, F.
The engine usage monitoring system: An heuristic approach to cost effective data monitoring and analysis
p0382 N81-23013
ROBINSON, J. C.
Analysis and design of a ceramic nozzle insert for the Langley 8-foot high temperature structures tunnel
p0060 A81-14996
ROBINSON, M. R.
Coming challenge - Integrating the technologies for forward-swept-wing fighters
p0420 A81-37522
ROCHE, J. P.
The relationship between noise and annoyance around Orly
[NASA-TM-76573] p0379 N81-22594
ROCHTE, L. S.
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Supersonic market and economic analyses
p0248 N81-18020
ROCK, S.
Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system
[AD-A093868] p0216 N81-17095
ROCK, S. M.
Prediction and experimental verification of transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568
Trajectory generation techniques for multivariable control of aircraft turbine engines
p0240 A81-26609
ROCKETT, J. A.
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10128
ROCKMORE, A. J.
Adaptive control for electronic countermeasures
p0155 A81-20470
ROCKWELL, D.
Practical experiences with flow-induced vibrations; Proceedings of the Symposium, Universitaet Karlsruhe, Karlsruhe, West Germany, September 3-6, 1979
p0282 A81-27610
ROCKWELL, T. H.
A study of ASRS reports involving general aviation and weather encounters
[NASA-CR-166212] p0493 N81-27063
ROCKWOOD, F. A.
Ceramic applications in turbine engines
[NASA-CR-159865] p0274 N81-19118
RODD, J. L.
Structural response methods and evaluation results for helicopter landing decks on 210- and 270-foot USCCG cutters
[AD-A102420] p0601 N81-31233
RODGERS, D. B.
Evaluation of AFIT/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0249 N81-18034
RODGERS, D. H.
Chromatographic separation of conventional and experimental fuels
[AD-A101673] p0586 N81-30282
RODGERS, J.
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522
RODI, F.
Low pressure turbine testing
p0432 N81-24096
RODIN, K. G.
Gas dynamic characteristics of the nozzle diaphragms of partial supersonic turbines
p0281 A81-27374
RODITI, S.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042
RODRIGUEZ, J. M.
Coming challenge - Integrating the technologies for forward-swept-wing fighters
p0420 A81-37522
ROE, G.
The influence of visual requirements on the design of military cockpits
p0213 N81-17075
ROE, M. H.
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
ROEHRLE, H.
Weight optimization of wing structures according to the gradient method
p0012 A81-11650
ROELKE, R. J.
An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168
Reasons for low aerodynamic performance of 13.5-centimeter-tip-diameter aircraft engine starter turbine
[NASA-TP-1810] p0334 N81-20076
ROENSCH, R. L.
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
Analytic development of improved supersonic cruise aircraft based on wind tunnel data
p0244 N81-17989
ROESCH, P.
Aerodynamic design of the Aerospatiale SA 365 N Dauphin 2 helicopter
p0468 A81-40099
New designs for improved aerodynamic stability on recent Aerospatiale helicopters
p0574 A81-46635
ROESSLER, W. U.
Operational energy conservation strategies in commercial aviation
p0155 A81-20465
ROGERS, D. B.
BIOCONAID system (bionic control of acceleration induced dimming)
[AD-A102510] p0601 N81-31234
ROGERS, E. O.
Recent progress in performance prediction of high advance ratio circulation controlled rotors
p0468 A81-40100
Optimization theory applied to higher harmonic control of circulation controlled rotors
p0571 A81-46606
ROGERS, W. A.
Design, analyses, and model tests of an aeroelastically tailored lifting surface
[AIAA PAPER 81-1673] p0566 A81-45974
ROGINSKY, M. L.
Microprocessor-based digital air data computer for flight test
p0361 A81-32858
ROHDE, J. E.
The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176
The E3 combustors: Status and challenges
[NASA-TM-82684] p0539 N81-28893
ROHDE, S. M.
On the steady state and dynamic performance characteristics of floating ring bearings
[ASME PAPER 80-C2/LUB-17] p0117 A81-18671
ROHLF, D.
OLGA, a gust alleviation system for improvement of passenger comfort of general aviation aircraft
p0008 A81-11620
ROHRBACH, C.
Aerodynamic characteristics of an advanced technology propeller for commuter aircraft

[AIAA PAPER 81-1565] p0507 A81-40948

ROITSCH, P. A.
New directions in cockpit alerting
p0286 A81-28298

ROKICKI, G. J.
Commercial engine logistics cost projections - A dynamic and flexible approach
[ASME PAPER 81-GT-114] p0315 A81-30018

ROM, J.
Transonic viscous-inviscid interaction over airfoils for separated laminar or turbulent flows
p0354 A81-31612

ROMAN, I.
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17488

ROMANIN, A. L.
The GTCP331 Auxiliary Power Unit for the next generation commercial transports
[SAE PAPER 801147] p0398 A81-34176
Development of test requirements for civil and military auxiliary power units
p0430 N81-24083

ROMANOFF, S.
Airport Noise Control and Land Use Compatibility Studies A U.S. case
p0570 A81-46372

ROME, H. J.
Synergistic benefits of fully integrating JTIDS and GPS
p0323 A81-30311

ROMER, T.
A method for calculating the aerodynamic forces and moments on external stores of aircraft
p0226 A81-24006

RONSIN, M.
SINTAC and its position-finding performance
p0409 A81-35021

ROOD, G. M.
Flying helmet attenuation, and the measurement, with particular reference to the Mk 4 helmet
p0604 N81-31473

ROOKE, D. P.
Simple methods of determining stress intensity factors
p0289 A81-28984

ROONEY, R. H.
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
Flight control system design through constrained output feedback
p0321 A81-30264
Pole placement with output feedback
p0450 A81-38899

ROOS, R.
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969
Unsteady airloads on a harmonically pitching wing with external store
[NLR-MP-80004-U] p0330 N81-20030

ROPARS, S.
Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996

ROPELEWSKI, R. R.
Soviets display heavy-lift helicopter
p0455 A81-38195
SR-71 impressive in high-speed regime
p0565 A81-45747

ROSA, E.
Low cycle fatigue of Rene 77 at elevated temperatures
p0289 A81-28989

ROSBOROUGH, S. B.
Fuel consumption aspects of some noise abatement procedures
p0154 A81-20350

ROSCH, H.
Flow computation around multi-element airfoils in viscous transonic flow
p0011 A81-11641

ROSCOE, S. N.
Integrated flight displays
p0064 A81-15681
Rate-field displays
p0064 A81-15682
Display motion relationships
p0064 A81-15683
Display-control synthesis
p0064 A81-15684
Time-compressed displays for target detection
p0064 A81-15686
Transfer and cost effectiveness of ground-based flight trainers
p0064 A81-15693
Visual cue requirements in contact flight simulators
p0064 A81-15695
Visual cue augmentation in contact flight simulation
p0064 A81-15696
The evolution of operational systems
p0064 A81-15699

ROSE, H.
Rotary balance data for a single engine general aviation design having a high aspect-ratio canard for an angle-of-attack range of 30 deg to 90 deg
[NASA-CR-3170] p0090 N81-13022

ROSE, R. S.
Application of water cooling for improved gas turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977

ROSE, W. C.
A survey of recent atmospheric turbulence measurements from a subsonic aircraft
[AIAA PAPER 81-0298] p0164 A81-20736

ROSEN, K. M.
40 years of helicopter ice protection experience at Sikorsky Aircraft
[AIAA PAPER 81-0407] p0168 A81-20813
Advanced transmission component development
p0575 A81-46634

ROSENAU, G.
Experiences with flight recorders obtained by analyzing aircraft accidents
p0328 N81-20019

ROSENFELD, M. S.
Effect of impact damage on the XFV-12A composite wing box
p0182 A81-22676
Compression fatigue behavior of graphite/epoxy in the presence of stress raisers
p0418 A81-37136

ROSENSTEIN, H. J.
Computer aided helicopter design
p0572 A81-46613

ROSENZWEIG, R. L.
S-3A composite spoilers service experience
p0529 A81-43615

ROSETTI, C.
Satellites to aid flight safety
[IAF PAPER 80-IAA-17] p0115 A81-18410

ROSKAM, J.
Forward swept wings and business airplanes
[SAE PAPER 800605] p0061 A81-15328
The impact of active controls on general aviation airplanes of the late 1980s
p0285 A81-28295
Summary of typical parameters that affect sound transmission through general aviation aircraft structures
[SAE PAPER 810562] p0518 A81-42728
The state of the art of general aviation autopilots - Now and in the future
[SAE PAPER 810582] p0520 A81-42744
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754
Comparison of selected lift and sideslip characteristics of the Ayres Thrush S2R-800, winglets off and winglets on, to full-scale wind-tunnel data
[NASA-CR-165710] p0423 N81-24026
A program to evaluate a control system based on feedback of aerodynamic pressure differentials, part 1
[NASA-CR-164684] p0583 N81-30134
A program to evaluate a control system based on feedback of aerodynamic pressure differentials. Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135

ROSLIAKOV, G. S.
Investigation of lateral forces and moments in the case of asymmetric gas flows in nozzles

p0004 A81-10913
ROSNER, D. E.
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0391 N81-23243
ROSS, A. J.
Control derivatives
p0592 N81-31119
ROSS, R.
Use of similitude in analyzing aircraft windshield anti-icing performance
[AIAA PAPER 79-1822] p0051 A81-13218
ROSS, V. L.
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
A piloted simulation of the backup control system engagement for the YAH-64
p0576 A81-46646
Flight tests of IFR landing approach systems for helicopters
p0265 N81-19042
ROSS, W. D.
Trace chemical analysis methodology
[AD-A090762] p0083 N81-12191
ROTH, S. P.
Future challenges in V/STOL flight propulsion control integration
[SAE PAPER 801140] p0397 A81-34170
ROTHROCK, M. D.
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade
[NASA-CR-165166] p0140 N81-14976
ROTHSCHILD, S. I.
The future ATC system as influenced by advanced avionics
p0100 A81-16586
ROTONDO, G.
The medical use of the helicopter in the field of air rescue
p0409 A81-34870
ROUCHON, J.
Assessing the behavior of high modulus composite materials in lightning
p0040 N81-11141
ROUND, D.
Experimental investigations on a harmonically swinging trail edge flap with a space
[DGLR PAPER 80-029] p0055 A81-13925
ROUND, D. F.
Analysis of unsteady pressure measurements on an aerofoil section with an harmonically oscillating, slotted flap
[DFVLR-FB-80-22] p0126 N81-13929
ROUNDS, E. M.
Feature extraction from forward looking infrared /FLIR/ imagery
p0461 A81-39338
ROUSSOS, L. A.
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618
ROUX, J. A.
Microcomputer system for controlling an infrared scanning camera
p0453 A81-37749
ROVELLOTTI, R.
Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143
ROWE, A.
Study of the characteristics of a base-vented wing in nonlinear theory
[AAAF PAPER NT 80-40] p0369 A81-33927
ROWE, R.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation, volume 1
[AD-A097756] p0425 N81-24041
ROWE, W. S.
On the convergence of unsteady generalized aerodynamic forces
[AIAA 81-0647] p0307 A81-29500
ROWE, W. T.
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Technology development status at McDonnell Douglas
p0248 N81-18019
ROWELL, W. R.
Design to cost and the F-16 multirole fighter
p0046 N81-11911
ROWSE, J. H.
Small Transport Aircraft Technology /STAT/ Propulsion Study
[SAE PAPER 801198] p0402 A81-34200
ROZNER, T.
Empirical method for the prediction of business executive jet cabin noise levels
p0224 A81-23814
ROY, S. D.
The digital core avionics system
p0472 A81-40132
ROZENBLIUM, V. I.
Numerical solution of the direct one-dimensional problem of a critical flow in nozzles
p0288 A81-28570
ROZHDESTVENSKII, K. V.
Determination of the effect of transverse cutouts on the hydrodynamic characteristics of a finite-span wing in the case of steady and unsteady motion near a wall
p0119 A81-19335
RUBBERT, P. E.
Grid generation for general three-dimensional configurations
p0137 N81-14714
A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19822
RUBEN, H. D.
Description of the British Civil Aviation Airworthiness Data Recording Programme (CAADRP)
p0363 N81-23017
RUBIO, R.
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126
RUBLEE, J.
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22282
RUCIGAY, J. C.
MS9001E - A new 100 MW gas turbine
[ASME PAPER 81-GT-31] p0312 A81-29946
RUCK, R. C.
KS-127A long range oblique reconnaissance camera for RF-4 aircraft
p0462 A81-39819
RUD, R. C.
Flight evaluation of the concept of the stage A Peripheral Vision Horizon Device (PVHD) using the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870] p0375 N81-22050
RUDD, J. L.
Part-through crack problems in aircraft structures
p0001 A81-10362
RUDD, M. J.
Laser Doppler airspeed and altitude sensor
[AD-A096980] p0375 N81-22089
RUDDELL, A. J.
Advancing blade concept /ABC/ high speed development
p0478 A81-40162
An ABC status report
p0572 A81-46616
Advancing Blade Concept (ABC) technology demonstrator
[AD-A100181] p0538 N81-20087
RUDENKO, A. N.
Sound generation by vortex shedding from a profile within a channel
p0054 A81-13570
Generation of vortex noise in flow past a profile in a channel
p0238 A81-24134
RUDISILL, C. S.
Optimization of fiber reinforced structures to satisfy aeroelastic requirements
[NASA-CR-164536] p0499 N81-27208
RUDNITSKII, D. M.
Gas turbine engine transient testing
p0431 N81-24091
RUDOLPH, R.
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-23063

RUEDGER, W. H.
Feasibility of collision warning, precision approach and landing using GPS, volume 1
[NASA-CR-165675] p0537 N81-28070
RUEDINGER, K.
Effect of beta flecks on the fatigue behaviour of Ti-6Al-6V-2Sn
p0510 A81-41638
RUEHR, W. C.
Curved centerline air intake for a gas turbine engine
[NASA-CASE-LEW-13201-1] p0143 N81-14999
RUHLIN, C. L.
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[NASA-TM-81962] p0388 N81-23071
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion free wing airplane
[NASA-TM-81961] p0388 N81-23072
RUIJGROK, G. J. J.
Experiments on the validity of ground effect predictions for static noise testing of propeller aircraft
p0054 A81-13811
RULE, J. A.
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047
RUMMER, D.
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754
RUNYAN, L. J.
Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0238 A81-26503
Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
p0243 N81-17986
RUPP, A.
New ways in antenna technology for optimal adjustment of the background clutter
p0151 A81-20084
RUPP, E.
Application of weldbonding to A-10 production aircraft
p0013 A81-11652
RUPPE, J. P.
Today and the future in aircraft wheel and brake development
p0102 A81-17046
RUPPRECHT, S. D.
Investigation of air solubility in jet A fuel at high pressures
[NASA-CR-3422] p0378 N81-22130
RUSSEL, B. J.
Airships - Transport of the future
p0355 A81-31699
RUSSELL, J. G.
The M.45SD-02 variable pitch geared fan engine demonstrator test and evaluation experience
p0283 A81-27897
RUSSO, A.
Fatigue life evaluation of a helicopter main rotor hub
p0180 A81-22631
RUSTENBURG, J. W.
Comparison of flight load measurements obtained from calibrated strain gages and pressure transducers
[AD-A093758] p0208 N81-17044
RUTHARDT, E.
From sponge to powder alternatives in titanium processing
p0511 A81-41647
RUTKOWSKI, M. J.
Free-vibration analysis of rotating beams by a variable-order finite-element method
[AIAA 81-0614] p0305 A81-29476
RUZE, E. L.
Modeling of ramjet combustors using simple reactor theory
[AIAA PAPER 81-1429] p0515 A81-42196
RYAN, R. J., JR.
A new perspective in aviation systems planning
p0112 A81-18069
RYNASKI, E. G.
Adaptive multivariable model following
p0504 A81-45540
RYZHOV, O. S.
A finite-span wing in transonic flow
p0054 A81-13781
Transonic flows of a multireacting gas mixture through a Laval nozzle
p0225 A81-23909
Wing with finite span in a transonic flow
p0420 A81-37480
RZONCA, L.
Omega transmitter outages, January to December 1979
[AD-A093425] p0207 N81-17035

S

SADELKIN, V. P.
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33174
SABLA, P. E.
Design and development of the combustor inlet diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
SABOL, A. P.
Operating characteristics of the Langley Mach 7 Scramjet Test Facility
[NASA-TM-81929] p0335 N81-20083
SABRY, E. I.
Satellite constellations for three-dimensional coverage of the Atlantic Ocean
p0323 A81-30291
SACHER, P.
Computational aerodynamic design tools and techniques used at fighter development
[MBB-FE-122/S/PUB/13] p0128 N81-13950
SACHS, G.
The effect of aerodynamic coupling on the dynamics of aircraft in fast rolling motion
p0104 A81-17471
Influence of zero-lift downwash on the relation between minimum-drag center-of-gravity position and inherent stability boundary
p0235 A81-25648
SADOVNICHII, V. N.
Calculation of circular flow inhomogeneities downstream of the turbine wheel
p0281 A81-27372
Experimental determination of the circumferential drift of edge wakes of guide vanes in a turbine stage
p0466 A81-40022
SADOWSKY, J. S.
Flight control strategies for performance computers
p0512 A81-41759
SAELMAN, B.
Structural concept trends for commercial supersonic cruise aircraft design
p0246 N81-18006
SAFARIEV, M. S.
Wing analysis by the plate analogy using an integral-difference method
p0235 A81-25680
SAFF, C. R.
Effects of fighter attack spectrum on crack growth
p0172 A81-21741
Environment-load interaction effects on crack growth in landing gear steels
[AD-A093803] p0218 N81-17242
SAFFORD, E. L., JR.
Modern radar: Theory, operation and maintenance /2nd edition/
p0223 A81-23372
SAGADEEV, R. G.
Determination of the thickness of blades of open wheels of radial-axial turbines
p0242 A81-26994
SAGENDORPH, F.
Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program
[NASA-CR-165373-VOL-3] p0496 N81-27091

SAGERSER, D. A.
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
SAHGAL, R. K.
Real-time estimation in advanced turbofan engines
p0564 A81-45553
SAHM, K.-F.
New structural technologies for future fighters
p0458 A81-38805
SAILLARD, J.
An original method for the analysis of the power diffraction pattern of a radar target for shape recognition purposes
p0607 A81-47143
SAIN, M. K.
Alternatives for jet engine control
p0080 N81-12103
SAINT JOHN, R. S.
A design analysis technique for evaluating size and weight of V/STOL lift fans
[SAWE PAPER 1386] p0354 A81-31402
SAINT-CYR, G. J.
A computer code for the calculation of aircraft trailing vortices
p0347 A81-30710
SAITO, S.
Gust response of rotary wing aircraft and its alleviation
p0465 A81-39900
Gust response of rotary wing and its alleviation
p0473 A81-40135
SAKA, N.
Prevention of spline wear by soft metallic coatings
[AD-A091861] p0132 N81-14064
SAKAGUCHI, D. K.
Air traffic simulation as a validation tool
p0172 A81-21718
SAKAT, I. F.
Structural concept trends for commercial supersonic cruise aircraft design
p0246 N81-18006
SAKATA, I. F.
Design considerations for composite fuselage structure of commercial transport aircraft
[NASA-CR-159296] p0378 N81-22419
SALATINO, N. J.
BIT/FIT maturity before first flight
p0324 A81-30320
SALEMANN, V.
Static test of a fan-powered chin nozzle for V/STOl applications
[NASA-CR-165361] p0546 N81-29093
SALEMME, C.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
SALIARIS, C.
Subsonic parachute design, performance, and similarity laws /scale effects/ - A review of the Institute's activities during the last years
p0060 A81-14799
A contribution to stabilization of flight vehicle parachute systems
[DFVLR-MITT-80-05] p0126 N81-13926
SALMIRS, S.
Avionics and displays in a future airspace system
p0112 A81-18070
SALMON, R. F.
Wing spillage tests using antimisting fuel
[AD-A096326] p0344 N81-21215
SALMOND, D. J.
Evaluation of two-dimensional subsonic oscillatory airforce coefficients and loading distributions
p0617 A81-48480
SALVETTI, A.
The fatigue crack growth under variable amplitude loading in built-up structures
[AD-A098417] p0446 N81-25437
SALZER, M. L. M.
Modelling techniques for the reduction of noise and vibration in gearboxes
p0151 A81-20063
SAMANICH, N. E.
Reverse thrust performance of the QCSEE variable pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206
SAMBELL, K. W.
The relevance of the Flex-Hub Prop-Fan for fuel-efficient airliners
p0006 A81-11605
STOL performance of the tilt rotor
p0467 A81-40085
SAMMONDS, R. I.
Flying-qualities criteria for wings-level-turn maneuvering during an air-to-ground weapon delivery task
[NASA-TM-81266] p0382 N81-21083
SAMMONS, J.
Derivation and correlation of accelerated mission endurance testing
p0431 N81-24088
SAMMS, K. H.
Pilot guidance and display considerations for energy efficient flight profiles
p0513 A81-41324
SAMPATH, P.
Dynamics of a helicopter-slung load system
p0092 N81-13051
SAMPLES, J. W.
Prediction of swirling reacting flow in ramjet combustors
[AIAA PAPER 81-1485] p0506 A81-40303
SAMUELS, M. F.
Structural weight comparison of a joined wing and a conventional wing
[AIAA PAPER 81-0366] p0166 A81-20785
SAMUELSEN, G. S.
An exploratory study of soot sample integrity and probe perturbation in a swirl-stabilized combustor
[ASME PAPER 81-GT-27] p0311 A81-29943
SAMUELSON, L.-A.
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521
SAND, W. R.
Measurement of natural aircraft icing conditions
[AIAA PAPER 81-1646] p0526 A81-43143
SANDER, D. L.
Information requirements for airborne electronic terrain maps
p0325 A81-30336
SANDERS, A. L., JR.
Advanced structural repair for lower cost
p0558 A81-44393
SANDERS, K.
Flight tests and statistical data analysis for flying qualities investigations
p0471 A81-40121
SANDERS, K. L.
The structural weight fraction - Revisited for fighter/attack type aircraft
[SAWE PAPER 1365] p0353 A81-31387
SANDERS, N. E.
An evaluation of statistical methods for the prediction of maximum time-variant inlet total pressure distortion
[AD-A089817] p0036 N81-11040
SANDERSON, A. R.
Projected power and specific fuel consumption development of the Rolls Royce Gem engine
p0575 A81-46637
SANDERSON, B. D.
A multiplexed digital voice intercommunications system for military applications
[SAE PAPER 801144] p0398 A81-34173
A multiplexed digital voice intercommunications system compatible with future voice conversion techniques
p0605 N81-31478
SANDFORD, J. W.
The domain of the turboprop airplane
[SAE PAPER 801242] p0406 A81-34238
The turboprop aircraft role in the 1980s
[AIAA PAPER 81-1730] p0528 A81-43169
SANDHOLM, R. G.
Radar Beacon Transponder (RBX) functional description
[AD-A100665] p0547 N81-29112
Radar Beacon Transponder (RBX) installation and siting criteria
[AD-A100666] p0547 N81-29113
SANDLIN, D. R.
Flight evaluation of the terminal guidance system
[NASA-CR-163859] p0142 N81-14991
SANDUSKY, G. T.
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639

SANDI, J. M., III
Ground moving target radar signal simulation
p0323 A81-30304
SANFORD, G. G.
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] p0640 N81-33390
SANKEWITSCH, V.
Floor and fuel vibration isolation systems for the Boeing Vertol commercial Chinook
p0356 A81-32016
Total main rotor isolation system analysis
[NASA-CR-165666] p0329 N81-20027
SANO, M.
Acoustic fatigue strength of fiber-reinforced plastic panels
p0169 A81-20873
SANTMAN, D. M.
Effects on inlet technology on cruise speed selection
p0245 N81-17996
SANTUCCI, G. F.
A new system for the study of visual information presentation in aeronautics - GIBI
p0100 A81-16688
SAOULLIS, S. L. A.
The role of simulation in automatic flight control systems research
p0283 A81-27890
SAPOWITH, A. D.
State-of-the-art review of flywheel burst containment
[UCRL-15257] p0085 N81-12427
SARIN, S. L.
Jet noise suppression for low bypass engines - Have we reached a dead end
p0291 A81-29063
SARMA, G. R.
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] p0638 N81-33203
SAROHIA, V.
Fundamental studies of antimisting fuels
[AIAA PAPER 81-1422] p0515 A81-42195
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] p0623 A81-49728
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] p0623 A81-49729
SASAGUCHI, K.
Investigation of the starting process of a supersonic wind tunnel
p0228 A81-24080
SASAKI, F.
Aircraft noise identification system - Application for inflight position detector
p0570 A81-46376
SASHIKUMA, H.
Study of the secondary flow in the downstream of a moving blade row in an axial flow fan
p0355 A81-31767
SATTERFIELD, R.
A survey of computer simulations of digital avionics systems
[AD-A091943] p0195 N81-16049
SATTLER, D. E.
An investigation of the recovery from an engine failure in a twin engine augmentor wing aircraft using the NAE Airborne Simulator
p0509 A81-41199
SATYANARAYANA, B.
Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367
SAUER, G.
Calculation of the flow field around engine-wing-configurations
p0007 A81-11613
SAULAS, CH.
The optimal lift-drag ratio of a civil aircraft
[AAAF PAPER NT 80-35] p0369 A81-33923
SAUNDERS, A. A., JR.
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-19116
SAUNDERS, N. T.
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
SAVA, P. G.
The Dalembertometer
[ISL-CO-220/79] p0133 N81-14292
Application of optical methods to the study of jet noise and turbulence
[ISL-CO-201/80] p0147 N81-15819
SAVAGE, J. C.
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
SAVAGE, J. S.
The use of airspace - One way to save fuel
p0364 A81-33150
SAVAGE, R.
Arts 2 enhancement design alternative study
[AD-A096276] p0339 N81-21049
SAVELEV, A. I.
Numerical solution of the direct one-dimensional problem of a critical flow in nozzles
p0288 A81-28576
SAVISAAR, A.
Development of avionics installation interface standards
[AD-A101423] p0583 N81-30120
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] p0629 N81-32144
SAWADA, H.
Wind tunnel wall interference in a test section with ventilated walls
p0015 A81-11673
SAWADA, T.
On the utilization of hydrogen as a fuel for gas turbine. I - On the utilization of low temperature exergy of liquid hydrogen
p0055 A81-14075
SAWOROTNOW, I.
Digital flight control - The generation of the 80's
p0320 A81-30240
SAWYER, R. A.
Jet wing interference for an overwing engine configuration
p0188 N81-16008
SAXENA, V. K.
Effect of surface roughness over the blade in compressor cascade
p0060 A81-14924
SAYER, S.
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach
[AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams
[AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables
[AD-A092744] p0192 N81-16032
SCALISE, T. R.
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS)
[AD-A094169] p0250 N81-18036
SCANLAN, L. A.
Time-compressed displays for target detection
p0064 A81-15606
SCANLON, J.
The problems of helicopter ditching
p0112 A81-18071
SCARICH, G. V.
Advanced titanium metallic materials and processes for application to naval aircraft structures
p0531 A81-43636
Advanced aluminum metallic materials and processes for application to naval aircraft structures
p0531 A81-43637
SCHAEFER, J. W.
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
SCHAEFER, R. K., JR.
Future strike aircraft design synthesis
[AIAA PAPER 81-0371] p0421 A81-37571
SCHAEUFELE, H.
Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability
p0471 A81-40123
Parameter identification of a hingeless rotor helicopter in flight conditions with increased

instability
[MBB-UD-307/80-OE] p0584 N81-30140
SCHAFER, R. H.
Alternatives for jet engine control
p0080 N81-12103
SCHAFFNER, P. R.
Airborne antenna pattern calculations
p0532 A81-43708
SCHAFRANEK, D.
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[DFVLR-FB-80-07] p0131 N81-13975
SCHAIRER, E.
Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367
SCHAK, H.
The state-of-the-art in avionics
p0451 A81-37649
SCHAMEL, W.
Contribution to the determination of the drag coefficient for air breathing flight vehicles on the basis of wind tunnel measurements
[DGLR PAPER 81-036] p0610 A81-47604
SCHEIDT, D. C.
Engine isolation for structural-borne interior noise reduction in a general aviation aircraft
[NASA-CR-3427] p0446 N81-25766
SCHEIMAN, J.
Evaluation of turbulence reduction devices for the Langley 8-foot Transonic Pressure Tunnel
[NASA-TM-81792] p0434 N81-24114
Considerations for the installation of honeycomb and screens to reduce wind-tunnel turbulence
[NASA-TM-81868] p0550 N81-29137
SCHENKER, H.
Device for lubricant flow measurement and conservation
p0288 A81-28743
SCHER, R. B.
Passive location finding with a multiwavelength two element interferometer
p0350 A81-31125
SCHETZ, J. A.
Scramjet combustor wall boundary layer analysis
[AIAA PAPER 81-1434] p0504 A81-40871
SCHEY, J. A.
Investigation of shot peening as a forming process for aircraft wing skins
p0458 A81-39046
SCHIAVELLO, B.
Reverse flow, pre-rotation and unsteady inlet flow in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433
SCHIAVO, A.
Fuel conservation in the air transportation industry - General and operational aspects
p0102 A81-17143
SCHIFF, L. B.
Aerodynamic mathematical modeling - basic concepts
p0590 N81-31106
Some applications of aerodynamic formulations to problems in aircraft dynamics
p0592 N81-31121
SCHIJVE, I. J.
Research on fatigue at the Department of Aerospace Engineering of the Delft University
p0232 A81-24939
SCHIJVE, J.
Prediction methods for fatigue crack growth in aircraft material
p0118 A81-18777
Trouble shooting in aeronautics and the usefulness of microscopes
[VTH-LR-305] p0537 N81-28069
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489
Fatigue crack growth in 7475-T7651 material under flight simulation loading. Information from a Douglas report
[VTH-M-392] p0542 N81-28493
SCHIMMEL, W.
Carbon/carbon components for advanced gas turbine engines
[ASME PAPER 81-GT-35] p0312 A81-29949
SCHIZAS, C.
Control system design using graphical decomposition techniques
p0410 A81-35567
SCHLAM, E.
Flat panel display technology review
p0211 N81-17066
SCHLEGEL, R. G.
Helicopter manufacturers economic impact assessment of FAA proposed helicopter certification noise rules /NPRM 79-13/
p0576 A81-46647
SCHLEMPER, B.
The optical-fiber interferometer gyroscope for aviation navigation
p0451 A81-37650
SCHLIEKELMANN, R. J.
Operational durability of airframe structures
p0014 A81-11662
Structural aspects in applications of adhesive bonding
[FOK-BO-1238] p0514 A81-42139
Thirty years experience with primary adhesive bonded structures
[FOK-BO-1240] p0541 N81-28189
Nondestructive testing of adhesive bonded joints
[FOK-BO-1241] p0542 N81-28190
Operational experience with adhesive bonded structures
[FOK-BO-1235] p0582 N81-30124
SCHLINKER, R. H.
Development of a large-scale wind tunnel for the simulation of turbomachinery airfoil boundary layers
[ASME PAPER 81-GT-6] p0310 A81-29931
SCHMAHL, W.
The automated transport process management system of INTERFLUG /PRIKAS/
p0288 A81-28744
SCHMID, C. J.
Development of airframe structural design loads prediction techniques for flexible military aircraft - Theoretical development
[AIAA PAPER 81-1696] p0535 A81-43953
Development of airframe structural design loads prediction techniques for flexible military aircraft - Applications
[AIAA PAPER 81-1697] p0535 A81-43954
SCHMID, T. E.
Graphite/polyimide augmentor and nozzle components
[AIAA PAPER 81-1358] p0625 A81-49976
SCHMIDT, D.
A fault tolerant multiprocessor system with reconfiguration suitable for multiaxial flight stabilization and trimming
p0118 A81-19286
SCHMIDT, D. K.
Multivariable closed-loop analysis and flight control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11096
Pilot-optimal multivariable control synthesis by output feedback
[NASA-CR-163112] p0540 N81-28102
SCHMIDT, E.
Testing stand for the measurement of nonsteady aerodynamic forces in the transonic wind tunnel at Goettingen
p0065 A81-15703
SCHMIDT, G. T.
Cruise-missile-carrier navigation requirements
p0116 A81-18570
SCHMIDT, H. W.
The use of AntiMisting Kerosene (AMK) in turbojet engines
p0267 N81-19063
SCHMIDT, J. E.
Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18018
SCHMIDT, K.
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
SCHMIDT, R.
Design and experimental verification of a transonic wing for a transonic aircraft
p0188 N81-16083
SCHMIDT, W.
Design and analysis of slat systems in transonic flow
p0050 A81-14392

Aerodynamic subsonic/transonic aircraft design
studies by numerical methods
p0187 N81-15999
SCHMIT, L. A.
Discrete-continuous variable structural synthesis
using dual methods
p0066 A81-15894
Structural synthesis - Its genesis and development
p0622 A81-49076
SCHMIT, L. A., JR.
Dual methods and approximation concepts in
structural synthesis
[NASA-CR-3226] p0134 N81-14347
SCHMITT, G. F., JR.
Captive carry and free flight rain erosion
considerations for reinforced ablative
fluorocarbon radome materials
p0103 A81-17453
SCHMITT, R. W.
Survivability study of a FLIR equipment fighter on
a night penetration of a Soviet army
[AD-A101186] p0547 N81-29120
SCHMITT, V.
Study of a variable sweep wing in sub or transonic
flow
[ONERA, TP NO. 1978-106] p0058 A81-14391
Aerodynamic interaction between a close-coupled
canard and a sweptback wing in transonic flow
p0189 N81-16013
SCHMITZ, D. M.
Engine air intake design support by use of
computational methods and comparison of
theoretically derived pressure distributions
with experimental data
p0008 A81-11614
SCHMITZ, F. H.
Transonic rotor noise - Theoretical and
experimental comparisons
p0364 A81-33049
Transonic rotor noise - theoretical and
experimental comparisons
[AD-A090806] p0088 N81-12824
SCHNEBLY, F. D.
Technology growth in mini-RPV systems
[AIAA PAPER 81-0936] p0363 A81-32937
SCHNEIDER, C. P.
Analytical determination of dynamic stability
parameters
p0592 N81-31117
SCHNEIDER, C. W.
Composites - A solution to aluminum honeycomb
maintenance costs
p0529 A81-43606
SCHNEIDER, E. M.
Transverse Voice Radio Link for Stratospheric
Balloons
[INPE-1992-RPE/285] p0586 N81-30331
SCHNEIDER, G.
Structural optimization of advanced aircraft
structures
p0013 A81-11651
Application of a structural optimization procedure
for advanced wings
[AGARD-R-691] p0333 N81-20064
Structural optimization of advanced aircraft
structures
[MBB-S/PUB/32] p0582 N81-30122
SCHNEIDER, J. J.
The developing technology and economics of large
helicopters
p0466 A81-40079
SCHNEIDER, S. D.
Lightning protection considerations for
graphite/epoxy aircraft structure
p0040 N81-11142
SCHNEIDER, W. F.
Small turbofan engines - Their impact on general
aviation aircraft
[SAE PAPER 810622] p0523 A81-42776
SCHNELL, W. C.
Axisymmetric & non-axisymmetric exhaust jet
induced-effects on a V/STOL vehicle design.
Part 1: Data presentation
[NASA-CR-166146] p0441 N81-25064
SCHNIPPERS, P.
Transonic wind tunnel tests on an oscillating wing
with external store. Part 4: The wing with
underwing: Store
[AD-A077370] p0139 N81-14969
SCHOCK, H. J.
Experimental analysis of IMEP in a rotary
combustion engine
[NASA-TM-81662] p0195 N81-16054
SCH[illegible], H. L.
An aircraft manufacturer's view of airport R&D needs
[AIAA PAPER 81-0793] p0368 A81-33887
SCHOEBE, G.
New technology for the NDB system and its
reliability. II
p0230 A81-24524
New technology for the NDB system and its
reliability. III
p0231 A81-24525
SCHOENHEIT, A. E.
Aerodynamic integration of externally mounted
engines on a long-range bomber
[AIAA PAPER 81-1693] p0563 A81-44899
SCHOENSTER, J. A.
Unsteady fan blade pressure and acoustic radiation
from a JT15D-1 turbofan engine at simulated
forward speed
[AIAA PAPER 81-0096] p0161 A81-20598
SCHOFIELD, J. E.
Aircrew compliance with standard operating
procedures as a component of airline safety
[AD-A092443] p0191 N81-16023
SCHOFIELD, W. H.
Factors affecting afterbody drag
p0292 A81-29069
SCHOLAERT, H. S. B.
A study of the performance of an Olson type active
noise controller and the possibility of the
reduction of cabin noise
[UTIAS-TN-228] p0552 N81-29924
SCHOMER, P. D.
Community reaction to impulse noise: Initial Army
survey
[AD-A101674] p0588 N81-30659
SCHONBERGER, J. E.
Flow control for an airborne laser turret
[AIAA PAPER 81-1637] p0525 A81-43137
Flow control about an airborne laser turret
[AD-A100110] p0537 N81-28060
SCHOONOVER, W. E., JR.
Overview of the Langley subsonic research effort
on SCR configuration
p0243 N81-17982
SCHRADER, J. W.
A new high bypass fan for general aviation
[SAE PAPER 800602] p0061 A81-15327
SCHRAGE, D. P.
Synopsis of Specialists' Meeting on Helicopter
Fatigue Methodology
p0487 N81-26129
SCHREIBER, H.-A.
Evaluation of blade element performance of
compressor rotor blade cascades in transonic and
low supersonic flow range
p0296 A81-29102
SCHREIBER, W.
A look at comprehensive engine/airframe
integration for high performance aircraft
p0298 A81-29118
SCHROEDER, W.
European transonic wind tunnel ETW - Status of the
project at the end of the predesign phase
[DGLR PAPER 81-027] p0609 A81-47563
Analytical estimation on nonlinear longitudinal
characteristics of wings with small and moderate
aspect ratio by the vortex lattice method in
incompressible flow
[ESA-TT-585] p0022 N81-10018
SCHROERS, L. G.
The XV-15 tilt rotor research aircraft
p0100 A81-16588
The XV-15 tilt rotor research aircraft
[NASA-TM-81244] p0026 N81-10054
SCHUBERT, H.
Applicated techniques for the control of approach
traffic
[DFVLR-MITT-79-20] p0142 N81-14992
Applied techniques for the control of approach
traffic
[ESA-TT-668] p0538 N81-28079
SCHUETZ, D.
Fatigue strength of CFRP under combined
flight-by-flight loading and flight-by-flight
temperature changes

p0039 N81-11134
Development of standardised fatigue test load histories for helicopter rotors: Basic consideration and definition of Helix and Felix
p0489 N81-26141
Fatigue test program and test results
p0489 N81-26142
SCHUETZ, W.
Fatigue test program and test results
p0489 N81-26142
SCHUETZE, R.
Recognizing defects in carbon-fiber-reinforced plastics
[DGLR PAPER 81-057] p0609 A81-47565
SCHULLER, F. T.
Calculated and experimental data for a 118-mm bore roller bearing to 3 million DN
[ASME PAPER 80-C2/LUB-14] p0117 A81-18668
SCHULTE, R. H.
Multiple-component lightning high-current testing
p0056 A81-14255
SCHULTEN, J. B. H. M.
A lifting surface theory for the sound generated by the interaction of velocity disturbances with a leaned vane stator
[AIAA PAPER 81-0091] p0160 A81-20595
SCHULTZ, R. S.
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base
[AD-A094226] p0252 N81-18050
SCHULZ, D.
Development of the A300 fin in modern composite fibre construction
p0013 A81-11653
Airbus - Rudder unit in carbon fiber technology
p0451 A81-37651
Development of the carbon fiber-reinforced side rudder for the Airbus
[DGLR PAPER 81-055] p0607 A81-47551
SCHUMMERS, J. H.
Design characteristics of Michelson interferometers used on the AFGL NKC-135 infrared flying laboratory
p0463 A81-39505
SCHUPPAN, K. L.
Engine usage prediction for advanced fighter aircraft
[AIAA PAPER 81-1367] p0514 A81-42178
SCHUR, P.
Application of low frequency eddy-current for inspection of civil aircraft
p0153 A81-20110
SCHUTTER, K. J.
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16020
Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23058
Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051
SCHUTZ, D.
Current developments in aircraft fatigue evaluation procedures
[AAAF-NT-79-33] p0086 N81-12464
SCHWAAR, P.
Regenerative engine analysis program
[AD-A095144] p0274 N81-19123
SCHWAB, D. J.
Determination of wind stress from water level fluctuations
N81-30774
SCHWAB, J.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
SCHWAGER, K. N.
Survey population response to airplane noise, part 1
[NASA-TM-75790] p0031 N81-10576
SCHWARMANN, L.
Measures for increasing the service life of riveted, aircraft-relevant joints
[DGLR PAPER 81-052] p0609 A81-47564
SCHWARTZ, M.
High 'Q' ejection protection device
p0175 A81-22093
Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] p0636 N81-33171
SCHWARZ, W.
A mobile computer-aided detection and tracking system for low-flying attack aircraft
p0152 A81-20003
SCHWEIBOLD, F. J.
Development and operational flight test of the model 250-C28B gas turbine engine
p0105 A81-17512
SCHWEIKERT, W.
New method for cast superalloy frames - Segmented mold and HIP utilized
p0408 A81-34693
SCHWEIKHARD, W. G.
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20837
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-25081
Evaluation of a pneumatic boot deicing system on a general aviation wing model
[NASA-TM-82363] p0441 N81-25085
SCHWENK, J. C.
General Aviation Avionics Statistics
[AD-A095148] p0273 N81-19114
General Aviation Activity and Avionics Survey
[AD-A097604] p0389 N81-23081
SCHWETZ, K. A.
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines
[BMFT-FB-T-79-137] p0275 N81-19128
SCHY, A. A.
Multiobjective insensitive design of airplane control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45510
Pseudosteady-state analysis of nonlinear aircraft maneuvers
[NASA-TP-1758] p0094 N81-13085
SCHYMANIETZ, K. F. H.
The impact of operational requirements on the compromise of desired features in rotorcraft design
p0634 N81-33155
SCOTT, B. C.
A head-up display for low-visibility approach and landing
[AIAA PAPER 81-0130] p0161 A81-20623
A head-up display format for transport aircraft approach and landing
p0265 N81-19083
An evaluation of head-up displays in civil transport operations
p0265 N81-19084
SCOTT, H. A., JR.
The implications of alternative aviation fuels on airbase air quality
[AD-A090283] p0067 N81-12652
SCOTT, H. C.
NaPC gyroscopic moment test facility
[AIAA PAPER 81-1480] p0506 A81-40500
SCOTT, I. G.
Acoustic emission and corrosion
p0153 A81-20211
SCOTT, W. E.
An investigation of the reacting and non-reacting flow characteristics of solid ramjets
[AD-A094567] p0253 N81-18059
SCRUGGS, B. W.
Investigation of performance, noise and detectability characteristics of small-scale remotely piloted vehicle /RPV/ propellers
[AIAA PAPER 81-2005] p0624 A81-49732
SEARLE, N.
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16001
SEDIN, Y. C.-J.
Qualitative calculations of transonic drag-rise characteristics using the equivalence rule
p0058 A81-14393

SEDLOCK, D.
A perspective on developing new inlet distortion measurement and predictive methods
[AIAA PAPER 81-1589] p0507 A81-40964
SEE, M. J.
The state of the art of general aviation autopilots - Now and in the future
[SAE PAPER 810582] p0520 A81-42744
The state of the art of general aviation autopilots
[NASA-CR-159371] p0197 N81-16066
SEEBASS, A. R.
Adaptive airfoils and wings for efficient transonic flight
p0153 A81-20349
A cost-effective method for shock-free supercritical wing design
[AIAA PAPER 81-0383] p0166 A81-20796
Transonic flow studies
[NASA-CR-163965] p0249 N81-18029
SEETHARAM, H. C.
Effects of design variables on spoiler control effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581
SEGAL, H.
The influence of aircraft operations on air quality at airports
p0553 A81-44074
SEGAL, H. M.
Aircraft pollution in the vicinity of airports
[AIAA PAPER 81-0309] p0164 A81-20743
SEIBERT, A.
Structure and lifetime attestation of TORNADO
[MBB-FUB-P-0001] p0251 N81-18048
SEIDEL, B. S.
Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952
SEIDEL, H.
Estimation of kinetic quantities of flight mechanics with a nonlinear observer
[DGLR PAPER 81-067] p0608 A81-47562
SEIDL, T.
Repair of adhesive bonded structure on commercial aircraft
p0559 A81-44394
SEILER, K., III
ATARS implementation tradeoff
[AD-A089977] p0034 N81-11026
SEINER, J. M.
Effects of nozzle design on the noise from supersonic jets
p0246 N81-18001
SEITH, W.
The DME-aided Azimuth System - DAS
p0452 A81-37653
SEKAS, N. J.
Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954
SEKIOKA, M.
Helicopter-borne radiosonde system and its experimental uses
p0231 A81-24870
SELDNER, K.
Performance seeking controls
p0079 N81-12092
SELF, H. C.
Potential of optical Fourier analysis for measuring windscreen distortion
[AD-A094127] p0259 N81-18853
SELIKHOV, A. F.
The use of acoustic emission for detecting and evaluating of fatigue cracks severity during static and cyclic loading of structure elements
p0153 A81-20214
SELLERS, D. F.
Power system control study. Phase 1: Integrated control techniques. Phase 2: Detail design and system modeling
[AD-A099894] p0497 N81-27100
SELLERS, J. F.
Propulsion system mathematical model for a lift/cruise fan V/STOL aircraft
[NASA-TM-81663] p0195 N81-16055
SELTZER, S. M.
Application of the parameter space method to aerospace vehicle digital control system design
p0359 A81-32642
SEMAKOV, L. A.
The use of direct lift control of an aircraft in a guided landing run
p0624 A81-49928
SEMPLE, W. G.
An economic and versatile panel method for aircraft and aircraft/store configurations. An outline of the principal features of the mathematical modeling and numerical implementation of the British Aerospace (Warton) Mk II Panel Method
p0144 N81-15311
SEN, M.
Inlet flow in centrifugal pumps at partial deliveries
[VKI-PREPRINT-1979-16] p0031 N81-10437
Reverse flow, pre-rotation and unsteady inlet flow in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433
SENDER, F.
The use of satellite systems for communication
p0051 A81-13310
SENG, G. T.
Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates
[NASA-TP-1768] p0436 N81-24283
SENGUPTA, D. L.
Inflight aircraft vibration modes and their effect on aircraft radar cross section
p0352 A81-31370
SENGUPTA, G.
Flight test of the 747-JT9D for airframe and jet-flap interaction noise
[AIAA PAPER 81-2037] p0620 A81-46629
SENSBURG, O.
Active flutter suppression design and test - A joint U.S.-F.R.G. program
p0009 A81-11621
Structural optimization of advanced aircraft structures
p0013 A81-11651
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47552
Active control of an explosive wing-store flutter case
p0082 N81-12117
Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces
[MBB-FE-17/S/PUB/24] p0131 N81-13972
Active control of an explosive wing-store flutter case
[MBB-FE-17/S/PUB/25] p0131 N81-13973
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974
Structural optimization of advanced aircraft structures
[MBB-S/PUB/32] p0582 N81-30122
SENSEN, K.
General aviation considerations on bad weather approaches at regional airports
p0052 A81-13315
SENTOVICH, E. F.
Aircraft penetration under cloud cover
p0463 A81-39640
SENYGIN, E. P.
Fuel economy and extension of the service life of aircraft gas turbine engines
p0065 A81-15719
SERFATI, D.
Doppler aided low accuracy strapdown inertial navigation system
[AIAA 81-1798] p0555 A81-44101
SERGEEV, A. D.
Flight-vehicle production technology
p0564 A81-45603
SERGEEV, N. A.
Choice of optimal parameters of a gyrovertical on the basis of a standard program
p0622 A81-48740
SEROVY, G. K.
Aerodynamics of advanced axial-flow turbomachinery
[NASA-CR-163995] p0335 N81-20079
SERTOUR, G.
Evolution of materials and associated technologies in the makeup of aerospace materials, part 1

[AAAF-NT-79-22-PT-1] p0209 N81-17050
Evolution of materials and associated technologies in the makeup of aerospace materials. Part 2: Examples
[AAAF-NT-79-22-PT-2] p0209 N81-17051
SETTERLUND, R. H.
Cruise-missile-carrier navigation requirements
p0116 A81-18576
SEVCIK, F.
Current and future concepts in FMEA
p0229 A81-24283
SEVEROV, L. A.
Gyrostabilizers for inertial control systems
p0017 A81-12024
SEVESTRE, C.
La Recherche Aerospatiale, Bimonthly Bulletin no. 1980-2, March - April 1980
[ESA-TT-652] p0255 N81-18244
SEVICK, G. L.
B-52 Offensive Avionics System /OAS/ control and display design, using a Dynamic Mockup
p0327 A81-30354
SEWALL, W. G.
Description of recent changes in the Langley 6- by 28-inch transonic tunnel
[NASA-TM-81947] p0391 N81-23096
SEWELL, C.
Circulation Control Wing /CCW/ flight tests
p0122 A81-19469
SEXTON, M. R.
Dynamic pressure response with stall on axial flow compressor rotor blades
[AIAA PAPER 81-0069] p0159 A81-20578
A model for dynamic loss response in axial-flow compressors
[ASME PAPER 81-GT-154] p0317 A81-30053
An investigation of the dynamic stalling characteristics of rotating axial-flow compressor blades
p0093 N81-13054
SEYFRIED, A.
Applicated techniques for the control of approach traffic
[DFVLR-MITT-79-20] p0142 N81-14992
Applied techniques for the control of approach traffic
[ESA-TT-668] p0538 N81-28079
SEYMOUR, W. L.
Evolution of an optical control system for aircraft hydraulics
[SAE PAPER 801195] p0402 A81-34205
SEYMOUR, T. J.
New techniques for the measurement of natural and simulated lightning phenomena
p0057 A81-14266
SHAALAN, M. R.
Comparative performance of two centrifugal fan impellers differing in blade section
p0001 A81-10162
SHAFER, F.
General Aviation Avionics Statistics
[AD-A095148] p0273 N81-19114
SHAGENA, J. L., JR.
A new generation IFF - The AN/APX-100/V/ transponder
p0350 A81-31132
SHAKINA, N. P.
Evaluation of the effect of horizontal and vertical stratification on the stability of air flows
p0241 A81-26839
SHALIN, R. E.
High-temperature strength of alloys for gas turbine engines
p0482 A81-40616
SHAMES, A.
Application of weldbonding to A-10 production aircraft
p0013 A81-11652
SHAMROTH, S. J.
Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053
SHANG, J. S.
Numerical simulation of wing-fuselage interference
[AIAA PAPER 81-0048] p0158 A81-20564
SHANKAR, V.
Transonic flow calculations over two-dimensional canard-wing systems
[AIAA PAPER 79-1565] p0163 A81-23367
SHANKS, D. R.
Performance of aircraft pneumatic tyres in soft soil
p0226 A81-24000
SHANNON, R. H.
Delayed ejection
p0175 A81-22102
SHAPIRO, A. A.
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
SHAPIRO, E. Y.
Suboptimal constant output feedback and its application to modern flight control system design
p0288 A81-28740
Flight control system design through constrained output feedback
p0321 A81-30260
Pole placement with output feedback
p0458 A81-38899
SHAPIRO, N.
Remaining problems in the prediction, measurement, evaluation, and control of aircraft noise
p0568 A81-46356
SHARKOV, E. A.
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35738
SHARMA, R. S.
Drag reduction of an oscillating flat plate with an interface film
p0239 A81-26500
SHARMA, V. P.
Transient three-dimensional flow along a porous plate
p0231 A81-24815
SHARPLES, T.
Applications of carbon fibre composites to military aircraft structures
p0283 A81-27885
Application of carbon fibre composites to military aircraft structures
p0199 N81-16147
SHASH, Y.
Turbo-compressors surge and surge control
[AIAA PAPER 81-0070] p0159 A81-20579
SHATAEV, V. G.
Strength calculation of thin-wall rods of significant taper
p0625 A81-49937
SHATALOV, I. K.
Change of static pressure on the rotating blades of an axial-flow compressor during surging
p0509 A81-41039
SHAUL, J. T.
A new generation IFF - The AN/APX-100/V/ transponder
p0350 A81-31132
SHAW, J.
Active control of the helicopter rotor for vibration reduction
[AHS 30-68] p0479 A81-40108
SHAW, L. M.
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208] p0168 A81-20830
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[NASA-TM-81657] p0195 N81-16053
Rotor wake characteristics relevant to rotor-stator interaction noise generation
[NASA-TM-82703] p0583 N81-30130
SHAW, R. J.
An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810
SHAWVER, W. R.
Determination of aircraft structural inspection intervals
p0230 A81-24285
SHAYESON, M. W.
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19333
SHCHEDRIN, A. I.
Hypersonic gas flow over a delta wing
p0123 A81-19632
SHCHERBAKOV, V. F.
An experimental study of heat transfer on turbine rotor blades

p0509 A81-41033

SHCHIPELEV, S. A.
Optimization of finishing conditions
p0319 A81-30163

SHEARIN, J. G.
Airframe noise of a small model transport aircraft and scaling effects
[NASA-TP-1858] p0380 N81-22032

SHEETS, S. G.
Qualification of HiMAT flight systems
p0179 A81-22603

SHEFFLER, M.
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor
p0573 A81-46620

SHELTON, E. M.
Aviation turbine fuels 1980
[DOE/BETC/PPS-81/2] p0445 N81-25255

SHEN, G.
Development of an astro-inertial hybrid navigation system and a star tracker
p0420 A81-37343

SHEN, H.
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061

SHEN, I. C.
Unsteady pressure distributions on airfoils in cascade
[AD-A091173] p0090 N81-13033

SHEPPARD, D. D.
Radio direction finding on high frequency short duration signals
[AD-A092136] p0192 N81-16029

SHEN, L.
High frequency angular vibration measurements in vehicles
[AAS PAPER 81-024] p0361 A81-32886

SHER, L. D.
Flight simulator: Use of spacegraph display in an instructor/operator station
[AD-A101951] p0602 N81-31235

SHEREDA, D. E.
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0585 N81-30159

SHERMAN, C. L.
An analytical study of the longitudinal response of airplanes to positive wind shear
[NASA-TP-1765] p0335 N81-20082

SHERSTIANNIKOV, V. A.
Hydrodynamic modelling of the starting process in liquid-propellant engines
p0351 A81-31267

SHERYSHEV, V. A.
Interaction of a gas jet from a jet engine with the destroyed surface of a multiphase disperse medium
p0319 A81-30152

SHESTERNINA, Z. N.
Steady flow past a rectangular wing with circulation that is variable along the span
p0099 A81-16551

SHESTOPALOV, V. P.
Excitation of a circular array of cylinders with longitudinal slits
p0019 A81-12619

SHI, R.
A vehicle attitude control system forming the error signal by way of the optimal rotation axis
p0224 A81-23732

SHIBL, A. M.
Comparative performance of two centrifugal fan impellers differing in blade section
p0001 A81-10162

SHIEN, L. S.
Computer-aided methods for redesigning the stabilized pitch control system of a semi-active thermal homing missile
p0051 A81-13250

SHIFRIN, E. G.
Asymmetric flow of subsonic and sonic jets over an infinite wedge
p0004 A81-10919

Attainability of an attached flow in a nozzle with heavily curved walls
p0054 A81-13548

SHIGEMI, M.
A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012

SHIINOKI, K.
Resonance of forwards and backwards vibration mode of impeller with gyroscopic effect
[AIAA 81-0524] p0303 A81-29445

SHINAR, J.
Aircraft performance optimization by forced singular perturbation
p0014 A81-11667

SHIRAHATA, H.
Subsonic cascade flow analysis by a finite element method
p0233 A81-25311

SHIRAKURA, M.
The performance of slotted blades in cascade
p0002 A81-10632

SHIRK, M. H.
Design, analyses, and model tests of an aeroelastically tailored lifting surface
[AIAA PAPER 81-1673] p0566 A81-45974

SHIRLEY, R. E.
Application of a Fourier analyzer to the analysis of shimmy test data
[AIAA 81-0533] p0303 A81-29453

SHIVAMOGGI, B. K.
Oscillating airfoils in shock-free transonic flows
p0410 A81-35026

SHIVASHANKARA, B. N.
Noise characteristics of two parallel jets with unequal flow
[AIAA PAPER 80-0168] p0354 A81-31601

High bypass ratio engine noise component separation by coherence technique
[AIAA PAPER 81-2054] p0621 A81-48653

SHMIGLEVSKII, IU. D.
Variational problems of gas dynamics
p0069 A81-16455

SHOEMAKER, W. W.
Life cycle cost before, during and after the design of aircraft propulsion systems
[ASME PAPER 81-GT-111] p0315 A81-30016

SHOLLENBERGER, C. A.
Analytical study of STOL Aircraft in ground effect. Part 1: Nonplanar, nonlinear wing/jet lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096

Analytical study of STOL Aircraft in ground effect. Part 2: Nonplanar, nonlinear method applicable to three dimensional jets of finite thickness
[NASA-CR-152088-PT-2] p0271 N81-19097

SHOPE, F. L.
Digital simulation for energy conservation in a large wind tunnel plant system
p0613 A81-48003

SHORE, J. E.
Abstract interface specifications for the A-7E device interface module
[AD-A092696] p0202 N81-16770

SHORIN, V. P.
Elimination of vibrations in aircraft piping systems
p0116 A81-18497

SHORIN, V. V.
Application of exoelectron emission for quality control of gas-turbine engine parts
p0171 A81-21367

SHOTTER, B. A.
Gear unit noise and transmission errors
p0150 A81-20060

SHOWALTER, D.
RF compatibility-environment to component part
p0056 A81-14260

SHOWALTER, T. W.
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-16994

SHOWERS, R. G.
AV-8B operational features for rapid deployment
[SAE PAPER 801228] p0405 A81-34231

SHREEVE, R. P.
A survey on airbreathing propulsion education
p0063 A81-15375

SHRIVASTAVA, K. D.
Effect of surface roughness over the blade in compressor cascade
p0060 A81-14924

SHU, W.-Y.
Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results
p0293 A81-29072

SHUFORD, R. J.
Acoustic emission as a NDE technique for determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070

SHULAKOV, N. A.
Attainability of an attached flow in a nozzle with heavily curved walls
p0054 A81-13548

SHULMAN, M. G.
Assessment of scene complexity and cue validity in visual flight simulation
[AD-A100200] p0541 N81-28109

SHULTZ, E. S.
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report
[AD-A094225] p0252 N81-18051

SHUMILKINA, E. A.
An experimental investigation of the thrust and discharge characteristics of multinozzle low-head ejectors
p0413 A81-35920

SHUNIN, O. A.
Input impedance of a resonator-slot ring antenna on a spherical layer
p0420 A81-37433

SHURYGIN, V. A.
Linear vortex theories of a profile and wing with air intake
p0019 A81-12703

SHUSTER, J. S.
Multiple arrested synthetic aperture radar
[AD-A101143] p0551 N81-29317

SHUVALOV, V. A.
Finite element calculation of thin-wall reinforced shells of the fuselage type with account for physical nonlinearity and loss of stability of certain elements
p0235 A81-25679

SHVALEV, IU. G.
Wall cooling and the laminar-turbulent boundary layer transition at supersonic flow velocities
p0124 A81-19644

SHVETS, I. T.
Computer calculation of the characteristics of a hybrid system for the cooling of gas turbine blades
p0459 A81-39217

SHYUR, T.
The sweep finite element method for calculating the flow field and performance of supersonic ejector nozzles
p0291 A81-29061

SICLARI, M. J.
Analysis and design of supersonic aircraft based on inviscid nonlinear Eulerian equations. Part 1: Rotational Euler solutions with explicit shock fitting
[AD-A103434] p0637 N81-33192

SIDANA, R. L.
Analysis of vibration related failures in aero turbo-shaft engines
p0291 A81-29057

SIDDALINGAPPA, S. R.
An introduction to the aerodynamics of spoilers
[PB81-166183] p0487 N81-26122
Some qualitative experiments on the local flow about spoilers in unsteady motion at low speeds
[PB81-166159] p0487 N81-26124

SIDENSTICK, J. E.
Turbine blade technology - Present and future
[ASME PAPER 80-C2/AERO-10] p0116 A81-18639

SIDOROV, O. P.
Calculation of flow with variable specific heat around a profile
p0235 A81-25689

SIEBERT, C. M.
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969

SIEBERT, D.
Improved secondary radar antennas for flight safety installations
p0151 A81-20083

SIEBERT, F. E.
Structural integration as a means of cost reduction
p0046 N81-11912

SIEFERT, J. W.
Flight data recording and data processing for light airplanes and gliders
p0328 N81-20008

SIEGEL, M. A.
Material shortages - Effect on the aircraft engine industry
[AIAA 81-0509] p0301 A81-29387

SIEMERS, P. M., III
Subsonic tests of an all-flush-pressure-orifice air data system
[NASA-TP-1871] p0489 N81-26104

SIETH, H. H.
Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23050

SIGALLA, A.
Overview of Boeing supersonic transport efforts, 1971 - 1979
p0247 N81-18016

SIGMAN, R. K.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] p0624 A81-49736

SIGNER, H. R.
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672

SIGNORE, T. L.
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039

SIGNORI, B.
Engine performance monitoring systems expansion on Alitalia aircraft
p0290 A81-29054

SIKA, Z. K.
Brushless cryogenic ac motors
p0002 A81-10468

SILVA, J. M. M.
Measurements of structural mobility on helicopter structures
p0151 A81-20064

SILVERIO, F. J.
Microprocessor control of lamps MK III /Seahawk/ helicopter sonobuoy launcher system
[AHS 80-20] p0474 A81-48150

SILVERTHORN, J. T.
Output predictive algorithmic control - Precision tracking with application to terrain following
p0564 A81-45573
Output predictive algorithmic control - Precision tracking with application to terrain following
p0567 A81-46280

SIM, A. G.
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193

SIMMONS, J. M.
Instantaneous velocity measurements in a periodically pulsed plane turbulent jet
p0066 A81-15885
Experimental investigation of oscillating subsonic jets
p0360 A81-32777

SIMONOVA, G. SH.
Iterative method for determining maximum load capacity of aircraft structures
p0235 A81-25683

SIMONS, J. L.
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29008

SIMPKIN, P.
A comparison of propulsion systems for V/STOL supersonic combat aircraft
[SAE PAPER 801141] p0398 A81-34177
Multi-mission V/STOL with vectored thrust engines
[AIAA PAPER 81-1363] p0502 A81-40083

SIMPLIN, P.
Multi-mission STOVL with vectored thrust engines
p0633 N81-33109

SIMPSON, A.
Lateral flutter of loads towed beneath helicopters and its avoidance

p0470 A81-40114
SIMPSON, L. T.
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940
SIMPSON, R. W.
Theoretical study of network design methodologies for the aerial relay system
[NASA-CR-159365] p0249 N81-18033
Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches
[AD-A094073] p0251 N81-18042
Investigation of air transportation technology at Massachusetts Institute of Technology, 1980
p0371 N81-22000
SIMS, D. L.
Concept definition: Retirement for cause of F-100 rotor components
[AD-A095584] p0335 N81-20080
SIMS, G. S.
Aluminized coding study for retrofitting in-service slide materials
[AD-A094170] p0255 N81-18201
SIMS, J. R.
Standardization in military system architecture
p0050 A81-13168
SIMS, R. L.
Comparison of theoretical predictions of orbiter airloads with wind tunnel and flight test results for a Mach number of 0.52
[NASA-TM-81358] p0387 N81-23066
User's manual for FSLIP-3, FLEXSTAB loads integration program
[NASA-TM-81364] p0589 N81-30815
SIN, H. C.
Prevention of spline wear by soft metallic coatings
[AD-A091861] p0132 N81-14064
SINCLAIR, D. W.
Laser-Raman/Rayleigh flow diagnostic techniques applied to subsonic flow
[AD-A091695] p0133 N81-14275
Evaluation of the acoustic and aerodynamic characteristics of several slot-baffle configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106
SINCLAIR, J. H.
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11412
SINCLAIR, M.
An investigation of the recovery from an engine failure in a twin engine augmentor wing aircraft using the NAE Airborne Simulator
p0509 A81-41199
SINCLAIR, R. G.
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10086
SINGER, I.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466
SINGH, P.
Transient three-dimensional flow along a porous plate
p0231 A81-24815
SINGLEY, G. T., III
U.S. Army crashworthiness program
[SAE PAPER 810615] p0522 A81-42771
Aircraft crash survival design guide. Volume 1: Design criteria and checklists, revision
[AD-A093784] p0204 N81-16997
Test and evaluation of improved aircrew restraint systems for combat helicopers
p0205 N81-17017
SINHA, A. N.
Runway Configuration Management System concepts
p0114 A81-18089
Airport capacity enhancement by innovative use of runway geometry
[AIAA PAPER 81-0801] p0368 A81-33891
SIOURIS, G. M.
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros
p0484 N81-26092
SIPLE, G.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
SIPPEL, K. O.
Constant-amplitude and flight-by-flight tests on CFRP specimens
p0039 N81-11133
Constant-amplitude and flight-by-flight tests on CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006
SIPUKHIN, I. G.
Evaluation of compressor blade endurance limits by an accelerated method
p0177 A81-22762
SIRAZETDINOV, T. K.
Optimization of airplane time to reach a given flight altitude and speed
p0235 A81-25605
Analytic design of regulators with limitations
p0235 A81-25608
SIRONI, V. A.
Neurotraumatological aspects in ejected pilots
p0205 N81-17012
SISSON, G.
Measurement of canard wakes
[AD-A095063] p0263 N81-19029
SISTO, F.
The influence of gyroscopic forces on the dynamic behavior of rotating blades
p0295 A81-29098
Overview: NASA/AF/Navy Symposium on Aeroelasticity of Turbine Engines
[NASA-CR-164415] p0444 N81-25089
SITTLER, R. W.
ATARS implementation tradeoff
[AD-A089977] p0034 N81-11026
SIVANERI, N. T.
Numerical solutions of transonic flows by parametric differentiation and integral equation techniques
p0067 A81-15896
Dynamic stability of a rotor blade using finite element analysis
[AIAA 81-0615] p0309 A81-29513
SIVARAMAKRISHNAN, A. R.
Influence of landing gear flexibility on aircraft performance during ground roll
p0622 A81-49375
SIX, L.
Solar Brayton engine/alternator set
p0580 N81-30529
SJOBLOM, B.
Factors limiting turbine inlet temperatures
p0294 A81-29083
SJOBLOM, B. G. A.
Premixing and flash vaporization in a two-stage combustor
[ASME PAPER 81-GT-41] p0312 A81-29955
SKODA, Z.
Mathematical model of the linear unsteady aerodynamics of the entire aircraft
p0349 A81-31039
SKONIECZNY, J.
Handling qualities of the SH-60B Seahawk
p0574 A81-46627
SKORPIK, J. R.
In-flight fatigue crack monitoring using acoustic emission
p0361 A81-32857
SKOVORCHEVSKII, E. A.
Test stand for the experimental study of auxiliary power supplies
p0319 A81-30153
SKOYLES, D. J.
New Navy programs for development of integrated inertial sensors
p0485 N81-26108
SKRATT, J.
Study of materials performance model for aircraft interiors
[NASA-CR-152378] p0333 N81-20063
SKRZYNSKI, S.
Discussion of test results in the design of laminar airfoils for competition gliders
[NASA-TM-75402] p0106 N81-15984
SKRZYPCZAK, J.-M.
MLS - An example of microprocessor utilization

p0409 A81-35022
SKUPIN, W.
Concepts and state of the art of the precision DME of the microwave landing system
p0233 A81-25376
SKURIN, L. I.
Characteristics of nonequilibrium flow with ionization in a region perturbed by a thin blunt body
p0231 A81-24732
SKVIRSKII, I. B.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022
SKVORCHEVSKII, E. A.
Driving dynamics of a high-speed positive-displacement pump and gas-turbine drive during startup
p0319 A81-30155
SLACK, L. L.
Acousto-optic deflection applied to a laser tracker
p0463 A81-39526
SLACK, R. L.
Avionics thermal integration for the Boeing 767 airplane
p0570 A81-46478
SLACK, R. S.
Handbook on bird management and control
[AD-A089009] p0023 N81-10024
SLADE, D.
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059
SLAGER, D.
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
SLAVICEK, J. C.
Standard Avionics Testbeds
[AIAA PAPER 81-1734] p0528 A81-43172
SLAZAK, M.
Response of stiffened sandwich panels
[AIAA 81-0557] p0303 A81-29455
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618
SLESAREV, A. I.
Application of exoelectron emission for quality control of gas-turbine engine parts
p0171 A81-21367
SLEZAK, K. D.
Microcomputer array processor system
p0044 N81-11673
SLIWA, S. M.
Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968
Use of constrained optimization in the conceptual design of a medium-range subsonic transport
[NASA-TP-1762] p0193 N81-16039
SLOOFF, J. W.
A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow
p0188 N81-16006
SLOPSEMA, T.
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search
[AD-A094154] p0253 N81-18057
SLOTER, L. E., II
Determination of aircraft structural inspection intervals
p0230 A81-24285
SMEAD, F. W.
Integrated avionics studies target future technologies
p0223 A81-23499
SMELTZER, D. B.
Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft
[NASA-TM-81292] p0428 N81-24066
SMETANA, F. O.
Analytical studies on the effects of cooling flows on light aircraft drag
[SAE PAPER 810577] p0519 A81-42741
Flight test evaluation of predicted light aircraft drag, performance, and stability
[NASA-CR-159062] p0494 N81-27078
SMIGIELSKI, P.
Holographic non-destructive testing of materials using pulsed lasers
p0013 A81-11655
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
The Dalembertometer
[ISL-CO-220/79] p0133 N81-14292
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300
SMIRNOV, A. I.
Aeroelastic stability of aircraft
p0281 A81-27531
SMIRNOV, S. V.
Analytic design of regulators with limitations
p0235 A81-25600
SMITH, A. F., III
Conflict monitoring analysis of parallel route spacing in the high altitude airspace, volume 2
[AD-A094152] p0250 N81-18038
Conflict monitoring analysis of parallel route spacing in the high altitude conus airspace, volume 1
[AD-A094071] p0250 N81-18041
SMITH, B. L.
Predicting fatigue crack growth on aircraft structures
[SAE PAPER 810593] p0520 A81-42752
SMITH, C. D.
A jet engine monitor /JEM/ for the TA-7C
[AIAA PAPER 81-1562] p0507 A81-40941
SMITH, C. E.
Exploratory development program to improve combustor dome operating characteristics
[AIAA PAPER 81-1351] p0501 A81-40838
Propulsion system study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165330] p0442 N81-25078
SMITH, D. G.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962] p0201 N81-16420
SMITH, D. M.
Analysis and design of a ceramic nozzle insert for the Langley 8-foot high temperature structures tunnel
p0060 A81-14996
SMITH, D. P.
Application of water cooling for improved gas turbine fuel flexibility and availability
[ASME PAPER 81-GT-68] p0313 A81-29977
SMITH, E. D.
Curved centerline air intake for a gas turbine engine
[NASA-CASE-LEW-13201-1] p0143 N81-14939
SMITH, E. G.
Behavior of aircraft antiskid braking systems on dry and wet runway surfaces: Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112
SMITH, E. H.
An empirical prediction method for helicopter performance in low speed level flight and in vertical and forward flight climbs
p0471 A81-40113
SMITH, F. D.
Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13086
Study of heliport airspace and real estate requirements
[AD-A091156] p0095 N81-13072
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] p0630 N81-32150

SMITH, G. C. C.
Aeroelastic and dynamic finite element analyses of a bladder shrouded disk
[NASA-CR-159728] p0278 N81-19479
Nastran level 16 theoretical manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
SMITH, G. M.
Electro-magnetic compatibility: The determination of safety for critical systems
p0545 N81-29079
SMITH, G. T.
Composite containment systems for jet engine fan blades
[NASA-TM-81675] p0220 N81-17480
SMITH, H. C.
Method for reducing the tangential velocities in aircraft trailing vortices
p0066 A81-15880
SMITH, H. E.
High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400
SMITH, J. M.
Computer techniques for ultrasonic inspection
[AD-A095285] p0337 N81-20447
SMITH, K. E.
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
SMITH, L. A.
Advanced avionic systems for multi-mission applications
p0321 A81-30258
Contention information transfer systems analysis
p0322 A81-30274
SMITH, L. R.
Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165
SMITH, M.
Definition of investigative areas for human-factor aspects of aircraft accidents
[AD-A101601] p0580 N81-30102
SMITH, M. C.
An analysis of opportunistic maintenance policy for the F100PW100 aircraft engine
[AD-A097548] p0384 N81-23025
SMITH, M. G.
Ray-theory predictions of the sound radiated from realistic engine intakes
[AIAA PAPER 81-1982] p0618 A81-48602
SMITH, M. H.
A prediction procedure for propeller aircraft flyover noise based on empirical data
[SAE PAPER 810604] p0521 A81-42761
SMITH, M. J. T.
The impact and future direction of aircraft noise certification
p0570 A81-46377
SMITH, N. K.
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936
SMITH, O. J.
KS-127A long range oblique reconnaissance camera for RF-4 aircraft
p0462 A81-39419
SMITH, P. M.
A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise
[NASA-TP-1742] p0073 N81-12043
Development of SCR Aircraft takeoff and landing procedures for community noise abatement and their impact on flight safety
p0245 N81-17994
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067
SMITH, P. R.
Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11604
SMITH, R.
Landing flying qualities evaluation criteria for augmented aircraft
[NASA-CR-163097] p0130 N81-13969
SMITH, R. C.
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193
Transonic swept wings studied by the lifting-line theory
p0509 A81-41090
Advanced turboprop installation aerodynamics
p0260 N81-19013
SMITH, R. E.
Head-Up-Display flight tests
p0099 A81-16502
Future strike aircraft design synthesis
[AIAA PAPER 81-0371] p0421 A81-37571
SMITH, R. H.
A multivariate approach to handling qualities rating scale development
[AD-A089825] p0037 N81-11047
SMITH, R. R.
Experimental and analytical development of an advanced supersonic fighter concept
[AIAA PAPER 81-1659] p0534 A81-43941
SMITH, S. C.
Lift-enhancing surfaces on several advanced V/STOL fighter/attack aircraft concepts
[AIAA PAPER 81-1675] p0534 A81-43946
SMITH, S. E.
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093
SMITH, T. R.
PARAM - A new weight sizing routine
[SAWE PAPER 1367] p0353 A81-31389
SMITHERS, B. W.
Antenna-to-antenna coupling in aircraft radio systems
p0057 A81-14280
SMITHMEYER, J.
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21048
SMOOTS, C. W.
Evaluation of RF anechoic chamber fire protection systems
[AD-A092478] p0197 N81-16070
SMULLIN, J. I.
Gearbox isolation for reducing gear tooth noise in single rotor helicopter
p0151 A81-20073
SMUROV, M. IU.
Realization of a method of extremal targeting in a problem of aircraft landing control
p0625 A81-49943
SMYTH, D. N.
Analytical study of STOL Aircraft in ground effect. Part 1: Nonplanar, nonlinear wing/jet lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096
SMYTH, R.
Application of advanced technology for improving the integration of engine and airframe for future transport aircraft
p0058 A81-14309
SMYTH, R. K.
Development and certification of the Gulfstream III
p0100 A81-16587
SMYTH, S. J.
The CADAM system for aircraft structural design
[SAE PAPER 801208] p0403 A81-34216
CAD - The designers' new tool
[AIAA PAPER 81-0850] p0407 A81-34352
SNELLING, R.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13535
SNIDER, J. J.
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
SNIDER, M.
A simulator to test compressor research facility control system software
p0349 A81-31110
SNOW, D. B.
Can advanced technology improve future commuter

aircraft
[AIAA PAPER 81-1729] p0536 A81-43959
SNOW, J. D.
Isothermal forging of fan blades
[AIAA PAPER 81-1405] p0503 A81-40862
SNOW, P. B.
F/A-18 horizontal situation display
p0327 A81-30353
SNYDER, F. B.
Fiber optic technology for data transmission in the helicopter environment
p0573 A81-46614
SNYDER, R.
Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] p0628 N81-32130
SNYDER, R. G.
Human factors aspects of emergency egress from a business jet
[SAE PAPER 810617] p0523 A81-42772
General aviation aircraft rear-seated occupant protection - Shoulder restraints in rear seats
[AIAA PAPER 81-1669] p0534 A81-43944
SOBANIK, J. B.
Cooling air flow characteristics in gas turbine components
[ASME PAPER 81-GT-76] p0313 A81-29984
SOBEL, K. M.
Model reference adaptive control for multi-input multi-output systems
p0258 N81-18698
SOBEY, A. J.
Helicopter vibration reduction through structural manipulation
p0467 A81-40090
SOBIECZKY, H.
Adaptive airfoils and wings for efficient transonic flight
p0153 A81-20349
Design of advanced technology transonic airfoils and wings
p0187 N81-16000
SOBIERAJ, W.
Finite element analysis of self-excited vibrations of helicopter rotor blades
p0395 A81-34120
SOBIESZCZANSKI-SOBIESKI, J.
Sensitivity of optimum solutions to problem parameters
[AIAA 81-0548] p0301 A81-29399
The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
SOEDER, J. F.
F100 multivariable control synthesis program: A review of full scale engine altitude tests
p0079 N81-12093
SOEDER, R. H.
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[NASA-TM-82617] p0443 N81-25081
SOFIA, T.
Pulsed laser mapping system for light aircraft
p0223 A81-23671
SOFIEV, E. I.
Experimental investigation of orographic waves and vertical motions in the Krasnovodsk airport area
p0121 A81-19441
SOFRIN, T. G.
Some modal-frequency spectra of fan noise
[AIAA PAPER 81-1990] p0620 A81-48636
Improved methods for fan sound field determination
[NASA-CR-165186] p0147 N81-15769
SOKOLOV, N. L.
The use of direct lift control of an aircraft in a guided landing run
p0624 A81-49928
SOKOLOWSKI, D. E.
Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836
The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176
The E3 combustors: Status and challenges
[NASA-TM-82684] p0539 N81-20055
SOKOLOWSKI, S. J., II
LR-80 flight test report
[AD-A090284] p0075 N81-12050
SOLAND, D.
Real-time feasibility for generation of nonlinear textured terrain
[AD-A095070] p0277 N81-19191
SOLAT, N.
Discrete Address Beacon System
p0350 A81-31130
SOLIGNAC, J. L.
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0255 N81-18257
SOLIGNAC, J.-L.
Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body
p0365 A81-33201
SOLIMAN, A. H.
Airport catchment areas and air passenger demand
p0571 A81-46575
SOLODIANKIN, S. N.
Increasing the strength properties of sheet parts by explosive forming of them with optimization of the production parameters
p0365 A81-33178
SOLODUKHIN, V. A.
Automation of air traffic control processes
p0623 A81-49463
SOLT, J. C.
Energy conservation through cogeneration
p0055 A81-14228
SOLTAN, P.
Flat panel display technology review
p0211 N81-17065
SOMMERS, D. M.
A computer program for the design and analysis of low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921
Design and experimental results for a natural-laminar-flow airfoil for general aviation applications
[NASA-TP-1861] p0423 N81-24022
SOMMERS, S.
The role of the earth's shape in navigation - An example
p0614 A81-48120
SONOROFF, A.
US Navy service experience with advanced composites
p0041 N81-11140
SONG, J.
The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835
SONNLEITNER, W.
The determination of the induced drag on slim wings with high lift systems in the transonic region
[MBB-FE122] p0121 A81-19460
SOODIK, M. W.
Weights information systems using minicomputers
[SAWE PAPER 1347] p0353 A81-31305
SORENSEN, J. A.
Application of trajectory optimization principles to minimize aircraft operating costs
p0155 A81-20466
Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31227
Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem
p0563 A81-41515
Generation of optimum vertical profiles for an advanced flight management system
[NASA-CR-165674] p0331 N81-28051
SORIA SILLA, C.
The roles of airline engineering and maintenance in 1981
p0565 A81-45796
SORRENTINO, C.
Rig investigation of a two stage single shaft low cost turbine

p0432 N81-24099
SOSNOVSKII, A. A.
Radio navigation for aircraft: Handbook
p0116 A81-10599
SOTOMAYER, W. A.
Evaluation of methods for prediction and
prevention of wing/store flutter
[AIAA 81-0606] p0304 A81-29469
Aerodynamic modeling of an oscillating wing with
external stores
[AIAA 81-0648] p0307 A81-29501
SOURDON, A.
Applications of composite materials for the
construction of military helicopters
p0633 N81-33147
SOUTH, J. C., JR.
Report of the panel on theoretical aerodynamics
p0593 N81-31152
SOUTHERN, I. S.
Exhaust noise in flight: The role of acoustic
installation effects
[PNR-90029] p0138 N81-14793
SPADACCINI, L. J.
Autoignition characteristics of aircraft-type fuels
p0562 A81-44666
SPADEA, R. J., JR.
Multisite testing of the Discrete Address Beacon
System (DABS)
[AD-A103575] p0636 N81-33181
SPADY, A. A., JR.
How a pilot looks at altitude
p0265 N81-19047
SPAID, F. W.
Three-dimensional transonic flow analysis
[AD-A101944] p0593 N81-31153
SPALDING, D. B.
Computer modeling of internal combustion engines:
Combustion and related processes
[HTS/79/3] p0587 N81-30454
SPALVINS, T.
Sputtering and ion plating for aerospace
applications
[NASA-TM-81726] p0337 N81-20424
SPANER, T.
An engineering model for assessing load sequencing
effects
p0172 A81-21737
SPANG, H. A., III
Apparatus for sensor failure detection and
correction in a gas turbine engine control system
[NASA-CASE-LEW-12907-2] p0273 N81-19115
SPANIER, G.
Consolidated car display: A summary report of the
process and the results of the consolidation of
critical and supplementary terminal area air
traffic control information for display
presentation
[AD-A092450] p0193 N81-16034
SPARBO, J. D.
Rapport tactical self protection systems design
p0349 A81-31113
SPARROW, E. M.
Analytically determined fin-tip heat transfer
coefficients
p0234 A81-25585
SPEAKMAN, J. D.
NOISEMAP: The USAF'S computer program for
predicting noise exposure around an airport
[AD-A094264] p0446 N81-25570
Effect of propagation distance on aircraft flyover
sound duration
[AD-A099694] p0500 N81-27889
SPEARMAN, M. L.
Historical trend in the research and development
of aircraft
[AIAA PAPER 81-1613] p0533 A81-43934
SPEIGHT, J. J.
DMAHTC's support to National Ocean Survey
LORAN-C-charting
[AD-A093740] p0206 N81-17027
SPEIR, D. W.
Development of exhaust nozzle internal performance
prediction techniques for advanced aircraft
applications
[AIAA PAPER 81-1490] p0506 A81-40908
SPENCER, F. A.
Transport jet aircraft noise abatement in foreign
countries: Growth, structure, impact. Volume
1: Europe, July 1980
[NASA-CR-152356] p0220 N81-17623
Transport jet aircraft noise abatement in foreign
countries: Growth, structure, impact. Volume
2: Pacific basin, August 1980
[NASA-CR-152357-VOL-2] p0220 N81-17624
SPENCER, N. A.
Results of an active beacon collision avoidance
experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
SPENCER, R. H.
A study of the economic impact of noise limits on
new design and current production helicopters
[AHS 80-64] p0479 A81-40187
Impact of prediction accuracy on costs - noise
technology applications in helicopters
[AD-A101768] p0589 N81-30911
SPENCER, R. L.
The engineering basis for the application of life
cycle cost or supportability criteria to gas
turbine engines
p0298 A81-29119
SPERANSKAIA, A. A.
A method for measuring the velocity field in a
stalled flow
p0287 A81-28523
SPEYER, J. L.
Modern control synthesis applied to the
longitudinal decoupled motion of an aircraft
[AIAA 81-1839] p0555 A81-44123
SPIEGEL, K. H.
Optimization of barriers
[ESA-TT-648] p0500 N81-27893
SPIKES, H. A.
Water content of helicopter gear oils
[ASME PAPER 80-C2/DET-12] p0116 A81-10640
SPITZER, C. R.
Recommendations for the NASA Avionics program for
the 1980's
p0517 A81-42436
SPONHOLZ, R.
Improvement of guidance and handling qualities in
the vicinity of airports and on landing
[BMFT-FB-W-79-42] p0425 N81-24085
SPRADLEY, L. W.
Hyperbolic/parabolic development for the GIM-STAR
code
[NASA-CR-3369] p0201 N81-16416
SPRADLIN, R. H.
Boeing 757 and 767 Flight Management System
p0286 A81-28299
SPRING, F. E.
US Army design-to-cost experience
p0045 N81-11905
SPRINGER, R. J.
Study of an engine flow diverter system for a
large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096
SPRINGSTON, P. S.
Fiberglass-reinforced rigid polyurethane expedient
pavement subject to simulated F-4 aircraft traffic
[AD-A089266] p0030 N81-10079
SQUIRE, L. C.
Measured pressure distributions and shock shapes
on a simple delta wing
p0617 A81-48479
Measured pressure distributions and shock shapes
on a Butler wing
[CUED/A-AERO/TR-9] p0090 N81-13026
SQUYERS, R. A.
An overview of ejector theory
[AIAA PAPER 81-1678] p0534 A81-43947
SREEKANTH, A. K.
Design of airfoils in incompressible viscous flows
by numerical optimization
p0001 A81-10096
SREENIVASAMURTHY, S.
Coriolis effect on the vibration of flat rotating
low aspect ratio cantilever plates
p0348 A81-30914
SRIDHAR, K.
Turbojet engine blade damping
[NASA-CR-165406] p0549 N81-29130
SRIDHARA, K.
Fresh mixture entrainment in a jet curtain
flameholder
p0294 A81-29084
SRINIVASA, K.
Analysis of vibration related failures in aero
turbo-shaft engines

p0291 A81-29057
SRINIVASAN, A. V.
Turbojet engine blade damping
[NASA-CR-165406] p0549 N81-29130
STABE, R. G.
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center
[SAE PAPER 801122] p0396 A81-34158
STABRYLLA, R. G.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
STACHER, G. W.
Concurrent superplastic forming/diffusion bonding of titanium airframe components
p0531 A81-43638
STACK S. H.
A computer-aided design system geared toward conceptual design in a research environment
[AIAA PAPER 81-0372] p0166 A81-20789
STAGER, P.
Bilingual air traffic control in Canada
p0169 A81-20915
STAGER, R. P.
Investigation of landing gear alternatives for high performance aircraft
[AIAA PAPER 81-1639] p0525 A81-43139
STAHARA, S. S.
Study of transonic flow fields about aircraft: Application to external stores
p0187 N81-15998
STAHL, H.
The calculation of transonic blade tip flow at helicopter rotors
[DGLR PAPER 81-025] p0608 A81-47554
STAID, P. S.
Acoustic and aerodynamic performance investigation of inverted velocity profile coannular plug nozzles
[NASA-CR-3149] p0203 N81-16854
STAINBACK, P. C.
Evaluation of flow quality in two large NASA wind tunnels at transcnic speeds
[NASA-TP-1737] p0095 N81-13303
STAKOLICH, E. G.
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093
JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1588] p0507 A81-40963
JT9D performance deterioration results from a simulated aerodynamic load test
[NASA-TM-82640] p0443 N81-25082
STALEY, J.
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor
p0573 A81-46620
STALLARD, D. V.
Autopilot design via improved discrete modal control
[AIAA 81-1777] p0554 A81-44095
STALLINGS, D. W.
Wind tunnel testing of a windshield material or supersonic aircraft
[AD-A103383] p0635 N81-33163
STALLINGS, R. L.
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83168] p0635 N81-33158
STALLINGS, R. L., JR.
Wing-alone aerodynamic characteristics at high angles of attack
[AIAA PAPER 81-0008] p0157 A81-20532
Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975
Wing-alone aerodynamic characteristics for high angles of attack of supersonic speeds
[NASA-TP-1889] p0579 N81-30087
STALLONE, M. J.
Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective
[NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27090
STALNAKER, J. F.
Hyperbolic/parabolic development for the GIM-STAR code
[NASA-CR-3369] p0201 N81-16416
STANDEN, N. M.
Fuel consumption aspects of some noise abatement procedures
p0154 A81-20350
STANEWSKY, E.
Development and wind tunnel investigation of three supercritical airfoil profiles for transport aircraft
[NASA-TM-75840] p0249 N81-18030
STANKUNAS, T. N.
Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839
STANSBARGER, D. L.
Skin-stabilized horizontal stabilizer for the T-38 aircraft
p0559 A81-44390
STANSBY, P. K.
A numerical study of vortex shedding from one and two circular cylinders
p0233 A81-25355
STANZIONE, K. A.
Computer aided helicopter design
p0572 A81-46613
STANZIONE, T.
Tri-bar reading correction for oblique imagery
p0178 A81-22495
STAPLEFORD, R. L.
Velocity command/position hold - A new flight control concept for hovering VTOL aircraft
[SAE PAPER 801206] p0403 A81-34210
STAPLETON, B. F.
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059
STAR, L. D.
Mobilization of trauma teams for aircraft disasters
p0053 A81-13514
Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison
p0054 A81-13515
STARK, C.
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] p0641 N81-30109
STARK, W. J. R.
Measurement of derivatives for an oscillating airfoil with flap
p0411 A81-35635
STARKE, J.
The axial velocity density ratio and the axial velocity density distribution in axial flow compressors and cascades
p0296 A81-29101
STARKEN, H.
Evaluation of blade element performance of compressor rotor blade cascades in transonic and low supersonic flow range
p0296 A81-29102
STARKS, S. A.
Three edge-point estimation schemes for tracking airborne targets
p0562 A81-44681
An aircraft landing system employing observers
p0562 A81-44699
STASZEK, J.
Subsonic and transonic flow on a wing at different sweep angles. I
p0351 A81-31249
Subsonic and transonic flow on a wing at different sweep angles. II
p0351 A81-31250
STATLER, I. C.
The role of the research simulator in the systems development of rotorcraft
[NASA-TM-81276] p0272 N81-19101
Characteristics of flight simulator visual systems
[NASA-TM-81278] p0340 N81-21060
The role of the research simulator in the systems development of rotorcraft
p0633 N81-33166
STAUDACHER, W.
Influence of jet location on the efficiency of spanwise blowing
p0154 A81-20352

Interference effects of concentrated blowing and vortices on a typical fighter configuration
p0180 N81-16009

STAUDE, R.
New features in the design of axial-flow compressors with tandem blades
[ASME PAPER 81-GT-113] p0315 A81-30017

STAUFENBIEL, R.
Longitudinal motion of low-flying vehicles in nonlinear flowfields
p0009 A81-11626
On the flight mechanics of remotely piloted vehicles
[BMVG-FBWT-79-28] p0209 N81-17049

STAUFFER, T. B.
Environmental chemistry and management of hydrazine
p0240 A81-26770

STEARMAN, R. O.
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955

STEARNS, C. A.
Combustion system processes leading to corrosive deposits
[NASA-TM-81752] p0391 N81-23243

STEARNS, E.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194

STEARNS, L. P.
Clear air turbulence - An airborne alert system
p0562 A81-44640
The 1979 clear air turbulence flight test program
p0266 N81-19050
Flight tests of a clear-air turbulence alerting system
p0266 N81-19052

STEEB, R.
Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061

STEELE-PERKINS, A.
The evolution of the helicopter seat pan mounted Personal Survival Pack (PSP)
p0205 N81-17016

STEELE, D. S.
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187

STEENKEN, W. G.
Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation
[NASA-CR-165141] p0143 N81-15004
TF34 engine compression system computer study
[NASA-CR-159889] p0143 N81-15005

STEERS, L. L.
Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0230 A81-26503
Natural laminar flow flight experiment
p0260 N81-19010

STEFANKI, J. X.
Passenger survival in wide-bodied jet aircraft accidents vs. other aircraft - A comparison
p0054 A81-13515

STEFFY, D.
Feature extraction from forward looking infrared /FLIR/ imagery
p0461 A81-39338

STEGER, J. L.
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566

STEIN, G.
VTOL control for shipboard landing in high sea states
p0155 A81-20471
LQG controls for highly maneuverable aircraft
[AIAA PAPER 81-1709] p0527 A81-43163
F-8C adaptive control law refinement and software development
[NASA-CR-163093] p0377 N81-22059

STEIN, H.
Analysis of the function principle and operational assessment of an onboard glidepath guidance system for visual approaches (Visual Approach Monitor (VAM)
[DFVLR-FB-79-30] p0025 N81-10043
Functional analysis and operational assessment of an onboard glide path guidance system for visual approaches (visual approach monitor VAM)
[ESA-TT-655] p0373 N81-22038

STEINBACH, D.
The aerodynamics of airfoil boats
p0065 A81-15705

STEINBERG, A. M.
Bounds for the additional cost of near-optimal controls
p0170 A81-21075

STEINBERG, R.
Aircraft operating efficiency on the North Atlantic, a challenge for the 1980's
p0267 N81-19060

STEINHAUSER, R.
A stability augmentation system which covers the complete flight envelope for a F-4c aircraft without gain scheduling
p0009 A81-11622
Application of vector performance optimization to a robust control loop design for a fighter aircraft
[DFVLR-FB-80-14] p0130 N81-13970

STEINMANN, D.
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129

STELMAKH, A. L.
Aerodamping of turbine blade vibrations under conditions of flow separation by an inhomogeneous stream
p0060 A81-14959
Damping of turbomachine blade variations by subsonic flow
p0612 A81-47957

STEMMER, G.
Development of a CFC window frame, using short fiber pressing technology
[BMFT-FB-W-80-032] p0499 N81-27200

STENGEL, R. F.
Investigation of the stalling characteristics of a general aviation aircraft
p0014 A81-11665
Effects of displacement and rate saturation on the control of statically unstable aircraft
[AIAA 81-1752] p0554 A81-44082
A unifying framework for longitudinal flying qualities criteria
[AIAA PAPER 81-1889] p0561 A81-44580
Investigation of air transportation technology at Princeton University, 1980
p0371 N81-22008

STENGER, R. E.
The use of engine operating experience in the preliminary design of aircraft gas turbine combustion systems
[AIAA PAPER 81-1399] p0515 A81-42189

STEPANOV, G. N.
Laminar boundary layer on an oscillating wedge
p0309 A81-29864

STEPANOV, G. U.
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47962

STEPHAN, H.
From sponge to powder alternatives in titanium processing
p0511 A81-41647

STEPHENS, A. B.
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017

STEPHENS, J. E.
Cost/benefit analysis of advanced materials technologies for future aircraft turbine engines
[NASA-CR-165225] p0144 N81-15006

STEPHENS, J. R.
NASA's activities in the conservation of strategic aerospace materials
p0179 A81-22535
NASA's activities in the conservation of strategic aerospace materials
[NASA-TM-81677] p0550 N81-29205
Cobalt: A vital element in the aircraft engine industry
[NASA-TM-82662] p0551 N81-29206
Conservation of Strategic Aerospace Materials (COSAM)

p0599 N81-31208
STEPHENS, W. D.
Stability of nonuniform rotor blades in hover using a mixed formulation
p0467 A81-40088
Stability of nonuniform rotor blades in hover using a mixed formulation
[AD-A090756] p0076 N81-12071
STEPKA, F. S.
Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169
Thermal and flow analysis of a convection air-cooled ceramic coated porous metal concept for turbine vanes
[NASA-TM-81749] p0376 N81-22056
STERK, F. J.
Nederlandse Vereniging voor Luchtvaarttechniek, Yearbook 1979
p0232 A81-24938
STERLIN, V. A.
Evaluation of the influence of local disturbances of flow past trailing and leading flaps from wind tunnel data on a rectangular wing section
p0299 A81-29307
STERNBERG, A.
Vibrations of multispan stiffened plates via modified Bolotin method
p0241 A81-26954
STERNBERGER, E. L.
The Modular Life Cycle Cost Model for advanced aircraft systems - An overview
[SAWE PAPER 1351] p0353 A81-31386
STERNFELD, H., JR.
A study of the effect of terrain on helicopter noise propagation by acoustical modeling
[AD-A097626] p0394 N81-23864
Impact of prediction accuracy on costs - noise technology applications in helicopters
[AD-A101768] p0589 N81-30911
STERRETT, T. L.
High-char-forming composite laminates
p0532 A81-43652
STETSON, A. R.
Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24068
STEVANS, W.
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078
STEVENS, D. D.
A flight investigation of performance and loads for a helicopter with RC-SC2 main-rotor blade sections
[NASA-TM-81898] p0186 N81-15982
STEVENS, M. C.
Multipath and interference effects in secondary surveillance radar systems
p0183 A81-23359
STEVENS, S. J.
The influence of blade wakes on the performance of combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856
STEVENS, W.
Supersonic stall flutter of high speed fans
[NASA-TM-81613] p0140 N81-14978
STEVENS, W. A.
A review of the wall pressure signature and other tunnel constraint correction methods for high angle-of-attack tests
p0435 N81-24122
STEVENSON, J. R.
Proposed aeroelastic and flutter tests for the National Transonic Facility
p0593 N81-31144
STEWART, E. C.
Simple method for prediction of aircraft noise contours
p0050 A81-13217
STEWART, V. R.
A study of a VTOL thrusting ejector in low speed flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017
A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018
STEWART, W. L.
The future of aeronautical propulsion
p0290 A81-29052
NASA research in aeropropulsion
[ASME PAPER 81-GT-96] p0314 A81-30083
NASA Research in aeropropulsion
p0089 N81-12900
NASA Research in aeropropulsion
[NASA-TM-81633] p0093 N81-13056
STICKLE, J. W.
The 1980 Aircraft Safety and Operating Problems, part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
The 1980 Aircraft Safety and Operating Problems, part 2
[NASA-CP-2170-PT-2] p0267 N81-19056
STIEVENARD, G.
Fatigue analysis of composite materials using the fail-safe concept
p0487 N81-26131
STILES, R. J.
Analysis of steady, two-dimensional, chemically reacting nonequilibrium flow by an unsteady, asymptotically consistent technique
[AIAA PAPER 81-1432] p0504 A81-40869
STIMPERT, D. L.
Quiet Clean Short-haul Experimental Engine (QCSEE); acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet, test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097
STIMPFLING, A.
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
p0182 A81-22692
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300
STINCHCOMB, W. W.
Fatigue damage mechanisms in composite materials - A review
p0003 A81-10787
STINTON, D.
The anatomy of the aeroplane
p0309 A81-29670
STOCK, H. W.
Separation behavior of boundary layers on three-dimensional wings
[NASA-TM-75877] p0262 N81-19023
STOCKHAM, J. D.
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796
STOCKMAN, N. O.
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Scale effects on turbulent boundary layer development and flow separation around V/STOL inlets at high incidence
[AIAA PAPER 81-0018] p0157 A81-20530
Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
STOECKLIN, R. L.
Commercial composite component service experience
p0530 A81-43616
STONEMAN, P.
Tactical miniature crystal oscillator
[AD-A098490] p0440 N81-25058
STOFFER, L. J.
Design concepts for low-cost composite turbofan engine frame
[NASA-CR-165217] p0376 N81-22053
STOLIAROV, A. A.
Characteristics of thermal energy separation in a gas ejector
p0281 A81-27371
STOLIAROV, G. I.
Some characteristics of aircraft motion at large angles of attack
p0414 A81-36473
STOLIAROVA, L. I.
Method for evaluating the resistance of gas-turbine installation disks to thermal cycling
p0364 A81-33160
STOLLERY, J. L.
An experimental investigation of the interaction between a glancing shock wave and a turbulent

boundary layer
p0012 A81-11649

STOLTZA, L.
Boron aluminum blades and vanes
[AIAA PAPER 81-1359] p0502 A81-40840

STONE, D. A.
Environmental chemistry and management of hydrazine
p0240 A81-26770

STONE, F. E., JR.
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041

STONE, J. R.
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] p0624 A81-49743
Status of noise technology for advanced supersonic cruise aircraft
p0246 N81-18002
Recent developments in aircraft engine noise reduction technology
p0269 N81-19072

STONE, R. H.
Development of repair procedures for graphite/epoxy structures on commercial transports
p0531 A81-43645

STONE, R. L.
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232

STOPPEL, J.
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
p0467 A81-40087

STORAASLI, O. O.
IPAD applications to the design, analysis, and/or machining of aerospace structures
[AIAA 81-0512] p0301 A81-29388

STORACE, A. S.
Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0495 N81-27090
Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program
[NASA-CR-165373-VOL-3] p0496 N81-27091

STORM, R. S.
Fabrication of injection molded sintered alpha SiC turbine components
[ASME PAPER 81-GT-161] p0317 A81-30060

STOTEN, R. D.
The PW100 commuter powerplant
[AIAA PAPER 81-1731] p0528 A81-43170

STOTLER, C. L.
Development program for a graphite/PMR 15 polyimide duct for the F404 engine
p0181 A81-22647

STOTTS, L. B.
LPI, short-range communications between aircraft in rendezvous
p0177 A81-22493

STOUT, R. J.
Manufacturing the F-16 composite horizontal tail
p0531 A81-43646

STRACENER, J.
Development of conceptual Navy aircraft Reliability Prediction Models
p0229 A81-24280

STRACENER, J. T.
Determination of aircraft structural inspection intervals
p0230 A81-24285

STRACK, W. C.
An overview of general aviation propulsion research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-42778
Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067
An overview of general aviation propulsion research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16052

STRAHLE, W. C.
Noise from gas turbine combustors
p0236 A81-26008

STRAKOSCH, J.
The Grumman Aerospace and Gulfstream American Gulfstream III case study in aircraft design
p0101 A81-16720

STRAUB, H.
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] p0629 N81-32144

STRAUB, F. K.
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight
p0364 A81-33050
Application of the finite element method to rotary wing aeroelasticity
p0251 N81-18043

STRAUB, J.
Influence of free-stream turbulence intensity on heat transfer in the two-dimensional turbulent boundary layer of an accelerated compressible flow
p0110 A81-17994

STRAUSS, K. H.
Future U.S. jet fuels - A refiner's viewpoint
[AIAA PAPER 81-0770] p0367 A81-33876

STREATNER, R. A.
The stick-fixed lateral dynamic stability of the CSIR SARA II autogyro
[NIAST-80/52] p0434 N81-24107
Preliminary calibration of the transonic test section of the NIAST trisonic tunnel
[NIAST-80/19] p0435 N81-24116

STREHEL, P. R.
Experimental investigations to fully map the flow field around a wind tunnel model of a transport airplane
[SAE PAPER 800630] p0063 A81-15345

STRICKLAND, P. B.
Shipboard trials of the Quiet Short-Haul Research Aircraft /QSRA/
p0099 A81-16581

STRICKLAND, S. H.
Some implementation considerations for numerically stable flight filters
p0156 A81-20485

STRICKLIN, R.
CF 6 engine diagnostics
p0597 N81-31197

STRIKE, W. T.
Laser scattering applications development test in AEDC tunnel B at Mach number 8
[AD-A093929] p0217 N81-17105

STRIZ, A. G.
Flutter analysis fo two-dimensional and two-degree-of-freedom MBB A-3, CAST 7, an TF-8A supercritical airfoils in small-disturbance unsteady transonic flow
[AD-A100334] p0540 N81-28104

STROMBERG, W. J.
JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1588] p0507 A81-40963
Performance deterioration based on simulated aerodynamic loads test, JT9D jet engine diagnostics program
[NASA-CR-165297] p0390 N81-23086
JT9D performance deterioration results from a simulated aerodynamic load test
[NASA-TM-82640] p0443 N81-25082
JT9D jet engine diagnostics program
p0598 N81-31199

STRONG, R. E.
Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15332/T1] p0145 N81-15414

STROUD, J. F.
Propulsion system testing requirements for a commercial transport
p0430 N81-24077

STROZIER, J. K.
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160

STRUCK, H.
Civil component program Wing Section. New calculation methods for subsonic and transonic interference with planer and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034

STRUDEL, J. L.
Creep properties of single-crystal nickel-based superalloys. II - Creep at medium temperature /760 C/

p0567 A81-46345

STRUMIA, A.
The application of computers to navigation - New developments employing microprocessors
p0565 A81-45761

STRUNKIN, V. A.
Determination of the thickness of blades of open wheels of radial-axial turbines
p0242 A81-26994

STUBBS, S. M.
Review of antiskid and brake dynamics research
p0268 N81-19066
Static and yawed-rolling mechanical properties of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24471
Behavior of aircraft antiskid braking systems on dry and wet runway surfaces: Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112

STUCKAS, K. J.
Advanced Technology Spark-Ignition Aircraft Piston Engine Design Study
[NASA-CR-165162] p0130 N81-13963

STUCKENBERG, N.
A fail-operational duplex sensor concept for flight control systems on the basis of analytical redundancy
[DGLR PAPER 81-066] p0610 A81-47616

STUEBLEN, D.
Classification of operating conditions of turbomachines from solid borne sound
p0382 N81-23015

STUFF, R.
Analytical characteristics methods: Applications
[VKI-PREPRINT-1980-10] p0021 N81-10011

STUMBO, R. P.
Investigation of influences on the definition of engine usage for future systems
[AIAA PAPER 81-1652] p0533 A81-43938

STURGEON, M. E.
The array processor - A real-time simulator
p0614 A81-48328

STURGEON, W. R.
Development and demonstration of an automatic control and recovery system for remotely piloted vehicles
p0156 A81-20476
A mathematical model of the CH-53 helicopter
[NASA-TM-81238] p0075 N81-12065

STYLES, A. C.
Cyclone combustors in low emission gas turbine applications
p0294 A81-29082

SUAREZ, J. A.
Design and fabrication of stabilized organic matrix composites
p0005 A81-11338
EF-111A graphite/epoxy Horizontal Stabilizer Trailing Edge
p0557 A81-44342
Cost-effective mechanical property characterization
p0612 A81-47813

SUBRAHMANYAM, K. B.
Coupled bending-torsion vibrations of rotating blades of asymmetric aerofoil cross section with allowance for shear deflection and rotary inertia by use of the Reissner method
p0289 A81-28942

SUBRT, J.
Signal processing for a six-component strain-gage wind tunnel balance
p0049 A81-12968

SUCCI, G. P.
Noise and performance of general aviation aircraft - A review of the MIT study
[SAE PAPER 810586] p0520 A81-42747
Prediction of helicopter rotor noise from measured blade surface pressure
p0577 A81-46649
Validation of helicopter noise prediction techniques
[NASA-CR-165715] p0447 N81-25768
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845

SUCHOMEL, C. F.
Development of a generic airplane response simulation
[AIAA 81-0980] p0415 A81-36568

SUESS, F.
Definition of a system concept study for future air traffic guidance
[BMFT-FB-W-80-008] p0425 N81-20046

SUGAMA, T.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273

SUH, N. P.
Prevention of spline wear by soft metallic coatings
[AD-A091861] p0132 N81-14064

SULIMA, A. M.
Application of exoelectron emission for quality control of gas-turbine engine parts
p0171 A81-21367

SULIMENKOV, V. V.
Use of carbon composites in aircraft structures
p0577 A81-46813

SULLIVAN, D. C.
Effect of mixed phosphate ester fluids on aircraft hydraulic servo valve erosion
[SAE PAPER 801100] p0512 A81-41776

SULLIVAN, D. J.
Critical research issues and visual system requirements for a V/STOL training research simulator
[AD-A092561] p0198 N81-16072

SULLIVAN, J. P.
The effect of proplets and bi-blades on the performance and noise of propellers
[SAE PAPER 810600] p0521 A81-42757

SULLIVAN, N.
Development of avionics installation interface standards
[AD-A101423] p0583 N81-30128

SULLIVAN, T. L.
Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448

SULTAN, S. M.
Traffic forecasting for the NRIA
p0114 A81-18090

SUMINSKI, L. T., JR.
Computer Generated Imagery (CGI) current technology and cost measures feasibility study
[AD-A091636] p0146 N81-15729

SUMMITT, R.
PACER LIME: An environmental corrosion severity classification system, part 1
[AD-A100496] p0539 N81-28089

SUN, C.
Structural analysis of fuselages with cutouts by finite element method
p0108 A81-17816

SUN, Y.-B.
Investigation of the squeeze film bearing on two-spool turbo-fan engine
p0295 A81-29093

SUN, Z.-Z.
Preliminary experimental study of combustion in the solid rocket-ramjet
p0292 A81-29067

SUNDARAM, C. V.
An acoustic source modelling technique to predict the near sound field of axisymmetric turbulent jets
[AIAA PAPER 81-2022] p0618 A81-48606

SUNDBACK, U.
Investigation of the physical working environment for cabin attendants within Scandinavian Airlines System /SAS/
p0568 A81-46357

SUNDBERG, D. V.
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27090

SUPRUN, V. K.
Aircraft thrust augmentors of ejector type
p0289 A81-28780

SURBER, L. E.
Experimental investigation of a high-aspect-ratio supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42107

SUTHERLAND, L. C.
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 1: Methods, procedures, results
[EPA-550/9-79-313-1] p0087 N81-12044
Noise exposure of civil aircarrier airplanes through the year 2000. Volume 2: Appendices A

through F
[EPA-550/9-70-313-2] p0087 N81-12645
Correction procedures for aircraft noise data. Volume 3: Filter effects
[AD-A091016] p0096 N81-13719
Correction procedures for aircraft noise data. Volume 5: Propeller aircraft noise
[AD-A091017] p0096 N81-13720
Static tests of excess ground attenuation at Wallops Flight Center
[NASA-CR-3435] p0491 N81-26846

SUTTON, S. J.
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21048

SUZUKI, K.
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] p0627 N81-32118

SVIRIDENKO, N. F.
Complex computation of flywheel power systems for flight vehicles
p0319 A81-30158

SWAIM, R. L.
An analytical pilot rating method for highly elastic aircraft
[AIAA 81-1772] p0554 A81-44093

SWANSON, E. E.
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013

SWARTZENDRUBER, L.
Rate-field displays
p0064 A81-15682

SWECKER, G. A.
An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS)
[AD-A089365] p0028 N81-10070

SWEDISH, W. J.
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] p0639 N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] p0639 N81-33217

SWEET, C.
KC-135 modernization program
p0325 A81-30337

SWEET, L.
Dead reckoner navigation project
p0372 N81-22010
General aviation airplane fuel economy system model
p0372 N81-22011

SWEET, L. H.
Laser beacon collision avoidance systems
p0372 N81-22009

SWIKAR, S. J., JR.
Challenge for operational experience feedback in aircraft design: An aircraft design example
[AD-A096088] p0341 N81-21067

SWINNEY, A. J.
Airport Surface Detection Equipment (ASDE)-3 operational evaluation
[AD-A098480] p0440 N81-25059

SWITHENBANK, J.
Three-dimensional model of spray combustion in gas turbine combustors
[AIAA PAPER 81-0324] p0165 A81-20751

SWOLINSKY, M.
Wind shear detection from PCM-recorded MLS-flight data
p0015 A81-11675

SYBERG, J.
Experimental investigation of a high-aspect-ratio supersonic inlet
[AIAA PAPER 81-1397] p0515 A81-42187

SYRED, N.
Cyclone combustors in low emission gas turbine applications
p0294 A81-29082
The combustion modelling of swirling flows for gas turbine combustors
p0295 A81-29087

SZABO, B. A.
Adaptive finite element technology in integrated design and analysis
[NASA-CR-164560] p0543 N81-28810

SZABO, K.
Design verification by emulation
[AIAA 81-0975] p0415 A81-36564

SZALAI, K. J.
Flight experience with flight control redundancy management
p0042 N81-11274
Ground and flight test experience with a triple redundant digital fly by wire control system
p0259 N81-19006

SZATA, W.
The effect of airplane noise on the inhabitants of areas near Okecie Airport in Warsaw
[NASA-TM-75879] p0379 N81-22593

SZEGO, A.
Evaluation of explosafe. Explosion suppression system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17047

SZENDZIELORZ, C.
Dynamics of longitudinal motion of a variable-sweepback aeroplane with a deformable control system
p0231 A81-24722

SZEWCZYK, Z.
A new method of airfoil flutter control
p0367 A81-33844

SZODRUCH, J.
Experimental study of supersonic viscous leeside flow over a slender delta wing
[NASA-TM-81248] p0133 N81-14265

SZUCH, J. R.
An automated procedure for developing hybrid computer simulations of turbofan engines
[NASA-TM-81605] p0044 N81-11680

T

TABAKOFF, W.
Non-isoenergetic turbulent jet mixing in a constant area duct
[AIAA PAPER 81-0347] p0165 A81-20768
Effects of solid particles suspended in fluid flow through an axial flow compressor stage
p0297 A81-29108
Improved particle trajectory calculations through turbomachinery affected by coal ash particles
[ASME PAPER 81-GT-53] p0312 A81-29965

TACINA, R. R.
Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465

TAFEL, R. W., JR.
Rapid alignment of aircraft strapdown inertial navigation systems using Navstar Global Positioning System (GPS)
p0485 N81-26107

TAHA, M. M. A.
The rigidity and performance of a simple spiral bevel helicopter gearbox
[ASME PAPER 80-C2/DET-103] p0117 A81-18654

TAI, T. C.
Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20540

TAILLET, J.
Ground testing of aircraft antistatic protection
[ONERA, TP NO. 1980-126] p0015 A81-11674

TAKAHARA, S.
On the numerical analysis of stall flutter in turbine cascade
p0613 A81-47963

TAKAHASHI, Y.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476

TAKAMATSU, Y.
Discrete frequency noise due to irregularity in blade row of axial fan rotor
p0002 A81-10633

TAKECHI, H.
Investigation of the starting process of a supersonic wind tunnel
p0228 A81-24080

TAKEDA, K.
Suppression of jet noise peak by velocity profile reshaping
p0458 A81-39039

TALANTOV, A. V.
Investigation of the influence of active particles on the basic combustion characteristics in turbulent flow
p0242 A81-26986

TALBOT, R. J.
The flight assessment and applications of DME/DME. I, II
p0174 A81-21968

TALCOTT, N. A., JR.
A computer graphics display technique for the examination of aircraft design data
[AIAA PAPER 81-0370] p0166 A81-20788
The use of interpractive graphic displays for interpretation of surface design parameters
[NASA-TM-81963] p0581 N81-30110

TALYZIN, V. A.
Basic problem of the analytical design of aircraft gas turbine engines. II
p0299 A81-29305

TAM, C. K. W.
Shock associated noise reduction from inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30908

TAMPLIN, G.
V/STOL technology requirements for future fighter aircraft
[AIAA PAPER 81-1360] p0502 A81-40841

TAMURA, A.
Coupled torsional-flexural vibration of a shaft in a geared system of rotors. I
p0229 A81-24090

TAMURA, H.
Numerical study on viscous shear flow past a circular cylinder
p0228 A81-24077

TAN-ATICHAT, J.
Effects of axisymmetric contractions on turbulence of various scales
p0093 N81-13055

TAN, C. S.
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387

TANEJA, N. K.
Economics of technological change - A joint model for the aircraft and airline industries
p0169 A81-21010

TANG, D.
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
The digital simulation of stability for multi-stage axial compressor
p0225 A81-23856

TANG, D.-H.
Determining the natural frequency of the combinative system of the helicopter rotor and elastic fuselage with mechanical impedance technique
[AIAA 81-0613] p0305 A81-29475

TANG, H.
A vaporizing combustor with double combustion spaces
p0109 A81-17827

TANG, V. Q.
The effect of jet non-uniformity on the lift of an augmentor wing
p0298 A81-29144

TANG, X.
Structural analysis of fuselages with cutouts by finite element method
p0108 A81-17816

TANIDA, Y.
Inlet distortion and blade vibration in turbomachines
p0421 A81-37631

TANIOKA, T.
An experimental study on air intake performance for a rocket/ramjet engine
[AIAA PAPER 81-1488] p0506 A81-40906

TANNA, H. K.
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-28943
Installation effects on propeller noise
[AIAA PAPER 80-0993] p0352 A81-31369
Shock associated noise reduction from inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30908

TANNER, A. E.
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041

TANNER, J. A.
Current research in aircraft tire design and performance
p0268 N81-19065
Review of antiskid and brake dynamics research
p0268 N81-19066
Static and yawed-rolling mechanical properties of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24471
Behavior of aircraft antiskid braking systems on dry and wet runway surfaces: Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112

TANNER, T. A.
The use of total simulator training in transitioning air-carrier pilots: A field evaluation
[NASA-TM-81250] p0204 N81-16994

TANRIKUT, S.
Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836

TAPAVICZA, H. V.
Application of damage tolerance concepts for the helicopters
p0487 N81-26130

TARQUINIO, J. J.
Control of particulate emissions from turbine engine test cells by cooling water injection
p0453 A81-37796

TARRICONE, N.
US Navy service experience with advanced composites
p0041 N81-11149

TASHKER, M.
Arts 2 enhancement design alternative study
[AD-A096276] p0339 N81-21085

TASK, H. L.
Helmet mounted displays: Design considerations
p0213 N81-17073
Aircraft transparency optical quality: New methods of measurement
[AD-A096183] p0341 N81-21070

TASKETT, J. N.
Image processing design for autonomous acquisition of targets
p0562 A81-44700

TASSINARI, E.
The design-to-cost of aircraft
p0119 A81-15304

TASSINARI, R.
Organizing a design-to-cost program
p0046 N81-11916

TATE, J. L.
Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331] p0142 N81-14994

TATE, J. T.
Inlet-engine compatability testing techniques in ground test facilities
p0431 N81-24090

TAUBER, M. E.
Computerized three-dimensional aerodynamic design of a lifting rotor blade
[AHS 80-2] p0473 A81-40137

TAUBER, T.
Full-flow debris monitoring in gas turbine engines
[ASME PAPER 81-GT-60] p0313 A81-29970
Advanced debris monitoring systems for helicopters
p0472 A81-40127

TAVGER, M. D.
Investigation of the influence of active particles on the basic combustion characteristics in turbulent flow
p0242 A81-26986

TAVORA, C. J.
The RLU - An advanced remote terminal for avionic systems
p0327 A81-30350

TAYLOR, B.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545

Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962] p0201 N81-16628

TAYLOR, D. L.
Some applications of the turbulence amplifier to airborne systems
p0514 A81-42173

TAYLOR, F. R.
National icing facilities requirements investigation
[AD-A102520] p0602 N81-31230

TAYLOR, G. R.
Delta electrical load analysis C-141B JACC/CP Aircraft
[AD-A095659] p0334 N81-20071

TAYLOR, J. H.
General describing function method for systems with many nonlinearities, with application to aircraft performance
p0564 A81-45588

TAYLOR, J. J.
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923

TAYLOR, J. L.
Image processing design for autonomous acquisition of targets
p0562 A81-44700

TAYLOR, J. R.
Design and development of the combustor inlet diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
Improved combustor domes designed for hot streak reduction
[AIAA PAPER 81-1352] p0501 A81-40835

TAYLOR, L. R.
Hydrogen fueled catalytic combustion for low thrust expendable turbojet engine
[AIAA PAPER 81-1715] p0527 A81-43165

TAYLOR, L. W., JR.
Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756

TAYLOR, M. J.
Flight testing and instrumentation of aircraft navigation systems
p0544 N81-29067

TAYLOR, P.
Helicopter tail configurations to survive tail rotor loss
p0003 A81-10760

TAYLOR, P. J.
Cabin pressure control systems for general aviation aircraft
[SAE PAPER 800606] p0061 A81-15329

TAYLOR, R. B.
An active control system for helicopter vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189
Helicopter airflow and wake characteristics for low speed and hovering flight from rocket interference investigations
p0572 A81-46608

TAYLOR, R. S.
The requirements for efficient small turbine engines taking up the challenge
[AHS 80-42] p0477 A81-40170

TAYLOR, S. M.
Community response to noise from a general aviation airport
p0017 A81-11821

TAYLOR, W. F.
Effect of refining variables on the properties and composition of JP-5
[AD-A093842] p0219 N81-17281

TEDESCHI, A.
A new approach to low speed-low height testing and flight manual data presentation
p0471 A81-40119

TEEGEN, U.
System simulation applied to the evaluation of displays for guidance and control
[DFVLR-MITT-79-10] p0028 N81-10064

TEELI[illegible], P.
Airfoils for light transport aircraft
[SAE PAPER 810576] p0519 A81-42740

TE[illegible]ELLER, S.
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862

TEICHMAN, H.
Study of the crashworthiness of light aircraft structures
[AIAA 81-0574] p0302 A81-29407

TEMIS, IU. M.
Numerical methods for studying the stress-strain state and service life of aircraft gas-turbine engine disks
p0351 A81-31258

TENHAVE, J. M.
The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2
[NLR-MP-79038-U] p0332 N81-20059

TENNYSON, R. C.
Study of the crashworthiness of light aircraft structures
[AIAA 81-0574] p0302 A81-29407
Effect of various environmental conditions on polymer matrix composites
p0039 N81-11130

TEPER, G. L.
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163108] p0498 N81-27113
Investigation of high-angle-of-attack maneuver-limiting factors. Part 3: Appendices, aerodynamic models
[AD-A101648] p0581 N81-30115

TERHUNE, G.
Flight instrumentation requirements for all-weather approach and landing
p0111 A81-18059

TERRACCIANO, G.
Definition of loading sequence for full scale fatigue test
p0180 A81-22626

TERRY, J. E.
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] p0637 N81-33190

TERSKIKH, V. P.
The method of superelements in the dynamics of complex structures
p0101 A81-16969

TESSITORE, F. A.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] p0616 A81-48416

TESTER, B. J.
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-28943
Engine noise source breakdown - Theory, simulation and results
[AIAA PAPER 81-2040] p0619 A81-48620

TETELMAN, A. S.
The effect of cyclic loading on the apparent cleavage fracture toughness of 1Cr-Mo-V rotor steel
p0104 A81-17488

TEVELDE, J. A.
Autoignition characteristics of aircraft-type fuels
p0562 A81-44666

TEWARI, S. N.
Directionally solidified Soviet superalloy - ZHS6-K
p0532 A81-43770

THAMES, F. C.
Report of the panel on theoretical aerodynamics
p0593 N81-31152

THELANDER, H. A.
Application of computer colour raster displays in the cockpit in research flight simulation
[AD-A096542] p0377 N81-22063

THER, D. T.
Advanced ejection seat for high dynamic pressure escape. Wind tunnel test
[AD-A091810] p0127 N81-13940

THERON, G.
performance control and qualification tests of civil aviation turbine engines in tests conducted by airframe manufacturers
p0430 N81-24078

THIBERT, J. J.
Design and tests of an helicopter rotor blade with evolutive profile
[ONERA, TP NO. 1980-125] p0011 A81-11630

The elaboration of a new family of helicopter
blade profiles
[NASA-TM-75907] p0330 N81-20031
THIERY, J.
Quality control of precision castings for turbojet
engine parts
p0052 A81-13330
THIERS, H. J.
Analysis of calculated three-dimensional inviscid
flow fields with embedded shock waves
(presentation of a field solution), part 1
[ESA-TT-558] p0022 N81-10017
THOMAS, D.
Experimental-programme - Transonic wing-TST
p0457 A81-38804
THOMAS, D. D.
Improvements required in air traffic control to
meet increasing general aviation turbine powered
aircraft operations
[SAE PAPER 800614] p0062 A81-15335
THOMAS, F.
Experimental aircraft of the DFVLR for in-flight
simulation and flight control technology
p0452 A81-37654
THOMAS, F. R.
KC-10A refueling boom control system
p0322 A81-30266
THOMAS, J.
Analysis of the function principle and operational
assessment of an onboard glidepath guidance
system for visual approaches (Visual Approach
Monitor (VAM)
[DFVLR-FB-79-38] p0025 N81-10043
Functional analysis and operational assessment of
an onboard glide path guidance system for visual
approaches (visual approach monitor VAM)
[ESA-TT-655] p0373 N81-22038
Active beacon collision avoidance logic
evaluation. Volume 1: Mode C equipped (ATCRBS)
threat phase
[AD-A102163] p0595 N81-31181
THOMAS, J. D.
Overview of the Langley subsonic research effort
on SCR configuration
p0243 N81-17982
THOMAS, J. M.
Theoretical and experimental studies of crack
propagation
[SNIAS-802-111-107] p0437 N81-24482
THOMAS, K.
The influence of the compressibility in simulating
the conduct of exterior loads of a carrier
[MBB-FE-122/S/PUB/17] p0220 N81-17483
THOMAS, M. E.
In-flight direct-strike lightning research
p0266 N81-19054
THOMAS, R. C.
Reliability assurance of electronic engine controls
[AIAA PAPER 81-1499] p0506 A81-40911
THOMAS, R. H.
Effects of yaw on leading edge vortex flap
aerodynamics
[AIAA PAPER 81-1660] p0526 A81-43147
THOMAS, R. H. P.
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936
THOMAS, R. W.
An investigation of the impact of aerodynamic lags
on dynamic flight characteristics
[AIAA PAPER 81-1892] p0561 A81-44581
THOMAS, T. P.
The Hornet's operational mission environment
p0571 A81-46491
THOMET, M. A.
Traffic forecasting for the NRIA
p0114 A81-18090
THOMPKINS, W. T., JR.
Comparison of experimental and computational shock
structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953
Inverse or design calculations for non-potential
flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29986
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
THOMPSON, A. D.
MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059
THOMPSON, C. E.
3-D viscous analysis of ducts and flow splitters
[AIAA PAPER 81-0277] p0163 A81-20720
The design and development of a mixer compound
exhaust system for a quiet clean general
aviation turbofan
[AIAA PAPER 81-1494] p0566 A81-45093
QCGAT mixer compound exhaust system design and
static rig model test report
[NASA-CR-135386] p0274 N81-19119
THOMPSON, J. F.
A TRANSONIC Navier-Stokes solver
[AIAA PAPER 81-1195] p0454 A81-38077
THOMPSON, J. W., JR.
Development of a noninterference compressor blade
stress measurement system
p0361 A81-32878
Performance evaluation of a prototype
noninterference technique for measurement of
turbine engines compressor blade stress
[AD-A090566] p0094 N81-13064
THOMPSON, R. B.
Investigation of EMAT base system for the
detection of bolt hole type cracks. Part 1:
Detection of cracks in the inaccessible lower
half wing lap joints using EMATs
[AD-A094349] p0257 N81-18819
Investigation of EMAT base system for the
detection of bolt hole type cracks. Part 2:
Reliability evaluation and system definition for
detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18820
THOMPSON, V. S.
Composite applications on Boeing commercial aircraft
p0557 A81-44341
THOMSON, J. R.
The RAE research and development program on EMC
for aircraft and flight weapons systems
p0056 A81-14263
The UK Ministry of Defence programme on the
electromagnetic properties of carbon fiber
composites
p0199 N81-16154
THOMSON, R. G.
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803] p0367 A81-33882
NASA/FAA general aviation crash dynamics program
p0268 N81-19060
THOMSON, R. K.
Investigation of an improved flutter speed
prediction technique for damaged T-38 horizontal
stabilators using NASTRAN
[AD-A094769] p0273 N81-19109
THORENSEN, B.
Navstar GPS receiver for satellite applications
p0485 N81-26111
THORNBER, G. R.
Impact of maintainability of life cycle costs
p0047 N81-11931
THORNELL, D. V.
Avionics computer system support at Ogden ALC
p0320 A81-30243
THORNQUIST, L.
The tale of two wings
p0188 N81-16008
THORNTON, J. B.
Sealing joints and cracks, thin resurfacing, and
locating voids under concrete slab.
[PB80-215635] p0132 N81-14102
THORTON, M. G.
Scarf joints in unidirectional carbon fiber
reinforced plastics
[BU-258] p0336 N81-20118
THRALL, E. W., JR.
Prospects for bonding primary aircraft structure
in the 80's
p0182 A81-22670
THRESHER, R. W.
Definitive generic study for the effect of high
lift airfoils on wind turbine effectiveness,
executive summary
[SERI/TR-98003-2] p0043 N81-11492
THRONDSON, L.
Combat survivability with advanced aircraft
propulsion development
[AIAA PAPER 81-1506] p0507 A81-40913
THURSTON, D. B.
Design for safety
p0455 A81-38089

TIJDEMAN, H.
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969
TIKHOMIROV, IU. P.
Automation of aircraft gas-turbine power plants
p0020 A81-12782
TIKHOMIROV, V. A.
The use of carbon-reinforced plastic in the construction of a deflector and a stabiliser
p0299 A81-29310
TIKHONOV, A. P.
Aircraft radar equipment and its operation
p0289 A81-28759
TILLER, A. R.
Pattern factor improvement in the F-100 primary combustion system
[ASME PAPER 81-GT-25] p0311 A81-29941
TIMNAT, Y. M.
Sudden expansion injection for ram-rockets
p0293 A81-29071
TIMOSHENKO, B. P.
X-ray pulse method for investigation of the internal structure of a fuel jet
p0059 A81-14592
TIMOSHENKO, V. I.
Calculation of the boundary of a supersonic inviscid jet flowing into a submerged space or a supersonic wake
p0229 A81-24172
TINGVALL, B.
Investigation of the physical working environment for cabin attendants within Scandinavian Airlines System /SAS/
p0568 A81-46357
TINKLER, J.
The effect of jet non-uniformity on the lift of an augmentor wing
p0298 A81-29144
TINLING, B. E.
Simulating study of the interaction between the propulsion and flight control systems of a subsonic lift fan VTCL
[NASA-TM-81239] p0036 N81-11043
Propulsion system mathematical model for a lift/cruise fan V/STCL aircraft
[NASA-TM-81663] p0095 N81-16055
TIPNIS, V. A.
Computer-aided process planning system for aircraft engine rotating parts
p0149 A81-19836
TIPTON, A. G.
Weapon bay cavity noise environments, data correlation and prediction for the B-1 aircraft
[AD-A089770] p0045 N81-11778
TISCHLER, M. B.
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Generic multi-body formulation of heavy lift airship equations of motion
p0563 A81-45539
TISDALE, G. E.
Autonomous target handoff from an airborne sensor to a missile seeker
p0358 A81-32498
TISDALE, H. F., SR.
Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106
TISSRAN, R.
Wind tunnel model support, controlled by four microprocessors
[ONERA, TP NO. 1980-149] p0174 A81-21917
TJONNELAND, E.
Development and validation of computational flow analysis for design of inlets and nozzles
p0298 A81-29117
TOBAK, M.
Unsteady Newton-Busemann flow theory. I - Airfoils
p0234 A81-25512
Topology of three-dimensional separated flows
[NASA-TM-81294] p0385 N81-23037
Aerodynamic mathematical modeling - basic concepts
p0590 N81-31106
Some applications of aerodynamic formulations to problems in aircraft dynamics
p0592 N81-31121
TOBIAS, L.
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
TOBIN, R. J.
Pilatus porter: Provision of revised take-off and landing performance data
[AD-A089964] p0076 N81-12068
TODA, A.
Approximation of gear transmission error by standard gear errors
[ASME PAPER 80-C2/DET-71] p0117 A81-18646
TOENSKOETTER, H.
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor
[PNR-90022] p0273 N81-19126
Some effects of compressor fouling on the behavior of a turbojet engine
p0328 N81-20015
Investigations into local fault detection on turbojet engines
p0382 N81-23011
TOKEN, K. H.
Heat pipe avionic cooling
p0326 A81-30343
TOLL, T. A.
Research related to variable sweep aircraft development
[NASA-TM-83121] p0441 N81-25067
TOMAINE, R. L.
A flight investigation of performance and loads for a helicopter with RC-SC2 main-rotor blade sections
[NASA-TM-81898] p0186 N81-15982
TOMAT, R.
Low pressure turbine testing
p0432 N81-24098
TOMEN, H.
Laser beacon collision avoidance systems
p0372 N81-22009
TOMLINSON, B. N.
Piloted simulation studies of helicopter agility
p0003 A81-10767
TOMLINSON, J. G.
TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833
TOMLINSON, L. O.
Economics of heavy fuels in gas turbines and combined cycles
[ASME PAPER 81-GT-45] p0312 A81-29959
TOMLINSON, N. P.
Dynamics and control of a Heavy Lift Airship in cross wind hover
[AIAA 81-1334] p0456 A81-38539
Control characteristics of a Buoyant Quad-Rotor Research Aircraft
[AIAA 81-1838] p0555 A81-48122
TOMSIC, G. W.
Flight management systems - Central ingredient of the 1980's avionics shipset
[SAE PAPER 800626] p0063 A81-15302
TONG, S. S.
Inverse or design calculations for non-potential flow in turbomachinery blade passages
[ASME PAPER 81-GT-78] p0314 A81-29986
TOON, O. B.
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741
TOOT, L.
Cruise missile engine program contract data requirements list sequence number 95. Qualification test report. Volume 39: Vibration and mission simulation testing on engine 828. XF-107-WR-400 cruise missile engine
[AD-A102257] p0600 N81-31220
TOOT, P. D.
Full authority digital electronic control application to a variable cycle engine
[SAE PAPER 801203] p0403 A81-34212
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration
[AIAA PAPER 81-1498] p0506 A81-40910
TORDION, G. V.
Approximation of gear transmission error by standard gear errors
[ASME PAPER 80-C2/DET-71] p0117 A81-18646

TORENBEEK, E.
Fundamentals of conceptual design optimization of subsonic transport aircraft
[VTH-LR-292] p0128 N81-13951

TORGERSON, W. S.
A multivariate approach to handling qualities rating scale development
[AD-A089825] p0037 N81-11047

TORNESE, R. A.
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039

TORNGREN, L.
The tale of two wings
p0188 N81-16004

TORRENCE, M. G.
Operating characteristics of the Langley Mach 7 Scramjet Test Facility
[NASA-TM-81929] p0335 N81-20083

TORRES, M.
Composite helicopter rotor blades - Design, development, and operational performance
p0481 A81-40588
Development of composite material helicopter structures
p0576 A81-46641
Erosion and impacts on composite helicopter blades
p0040 N81-11138

TORVIK, P. J.
Damping applications for vibration control; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980
p0613 A81-47993

TOTH, F.
The possibilities of improving the efficiency of gas turbines
p0288 A81-28614

TOUZOT, G.
Calculation of the impingement of cloud droplets in a cylinder by the finite-element method
p0533 A81-43890

TOWNSEND, J. C.
Pressure and force data for a flat wing and a warped conical wing having a shockless recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016

TOYODA, S.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12476

TRABOLD, E. L.
Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23058

TRAVERSA, F.
Engine performance monitoring systems expansion on Alitalia aircraft
p0290 A81-29054

TREADGOLD, D.
Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014

TREBBLE, W. J. G.
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634

TRECA, M.
Nondestructive evaluation of composite structures
p0013 A81-11654

TREMAIN, D. E.
Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240

TREMPLER, M.
New technology for the NDB system and its reliability. II
p0230 A81-24524
New technology for the NDB system and its reliability. III
p0231 A81-24525

TRENDLER, F. R. H.
Cold-forming of internal threads
p0551 N81-29294

TREXLER, C. A.
Flameholding characteristics of a swept-strut H2 fuel-injector for scramjet applications
p0003 A81-10711

TRIEBEL, C. F.
Samarium cobalt (SMCO) generator/engine integration study
[AD-A092904] p0214 N81-17087

TRIFONOV-BOGDANOV, P. I.
Aircraft instruments and measuring systems
p0564 A81-45608

TRIJONIS, J.
Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility
[LA-UR-80-2485] p0135 N81-14550

TRIPPE, J. C.
Application of General Technology Applications, Incorporated (GTA) blending process to antimisting fuel additives
[AD-A100692] p0551 N81-29247

TRISTRANT, D.
Some new research approaches to aircraft spin studies
[AAAF-NT-80-12] p0082 N81-12112

TRIVEDI, K. S.
Reliability validation of systems for life-critical applications
p0617 A81-48559
Validation Methods Research for Fault-Tolerant Avionics and Control Systems Sub-Working Group Meeting. CARE 3 peer review
[NASA-CP-2167] p0146 N81-15702

TROFIMCHUK, E. G.
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14581

TROSHCHENKO, V. T.
Laws of unstable crack growth under cyclic loading
p0235 A81-25701

TROTH, D. L.
Fuel character effects on the TF41 engine combustion system
[AIAA PAPER 81-1391] p0503 A81-40850
Fuel character effects on current, high pressure ratio, can-type turbine combustion systems
[AD-A089182] p0029 N81-10073

TRUAX, R. L.
Dielectric electrostatic charge reduction
[SAE PAPER 810571] p0519 A81-42736

TRUCKENBRODT, E.
How to improve the performance of transport aircraft by variation of wing aspect-ratio and twist /12th Daniel and Florence Guggenheim International Memorial Lecture/
p0006 A81-11602

TRUDELL, B. J.
Electronic search and rescue aids
p0286 A81-28308

TRUMAN, C. R.
Streamwise flow and heat transfer distributions for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985

TRUNK, G. V.
Maximum likelihood elevation angle estimates of radar targets using subapertures
p0359 A81-32691

TSAI, H. J.
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163967] p0251 N81-18046

TSAI, H.-J.
Investigation of a flight test method for the measurement of propeller thrust
[SAE PAPER 810603] p0521 A81-42760

TSAPARAS, G.
Flat panel display technology review
p0211 N81-17065

TSENA, J.
Materials and processes for aircraft environmental controls in the 1990's
[SAE PAPER 801181] p0401 A81-34194

TSENG, D. Y.
Model-based scene matching
p0461 A81-39302

TSIBIZOV, M. I.
Electric installation work on aircraft

p0577 A81-46794

TSITSILONIS, L.
The role of simulation in automatic flight control systems research
p0283 A81-27894

TSOU, F. K.
Numerical calculation of jet-induced ground effect in VTOL
[AIAA PAPER 81-0015] p0157 A81-20539

TSUCHIYA, T.
Model for axial compressors operating with water ingestion
p0297 A81-29111

TSUI, K. S.
A low-level wind shear detection system
p0223 A81-23514

TSUJIKAWA, Y.
On the utilization of hydrogen as a fuel for gas turbine. I - On the utilization of low temperature exergy of liquid hydrogen
p0055 A81-14075

TSUKAMOTO, S.
Some experimental study on parachute dynamics by utilizing a deceleration system simulator
p0481 A81-40471

TSVETKOV, L. G.
Calculation of the aerodynamic characteristics of a deformable wing, moving near a screen
p0625 A81-49940

TUCHELMANN, Y.
New developments of data processing in computer-controlled manufacturing systems /DNC, FMS/
p0149 A81-19845

TUCK, E. O.
Steady flow and static stability of airfoils in extreme ground effect
p0355 A81-31606

TUCKER, W. T.
Canada's national aviation forecasting models
p0112 A81-18072

TUJAKA, S.
Collisions between aircraft and birds
p0122 A81-19445

TULAPURKARA, E. G.
Studies on Thwaites' method for wind tunnel contraction
p0282 A81-27884
Effect of contraction on screen-generated turbulence
p0284 A81-27900

TULLOCH, J. S.
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061
AH-1S(Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121

TUMANOVSKII, A. G.
Results of thermal tests on the GTA-18 gas turbine unit with the RD-ZM-500 jet engine
p0395 A81-34022

TUNBACK, E.
Dynamically tunable, dry gyroscope in aeronautics and astronautics
p0452 A81-37655

TUMLINSON, R. R.
Spin research on a twin-engine aircraft
[AIAA PAPER 81-1667] p0534 A81-43943

TUNG, C.
Experimental and analytical studies of a model helicopter rotor in hover
p0465 A81-39898
Experimental and analytical studies of a model helicopter rotor in hover
p0468 A81-40097
Experimental and analytical studies of a model helicopter rotor in hover
[AD-A089780] p0035 N81-11033

TUNG, L. J.
Design of multivariable feedback control systems via spectral assignment
[NASA-CR-164189] p0345 N81-21068

TUOMELA, C. H.
Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs
[NASA-CR-152390] p0023 N81-10019

TUPOLEV, A. A.
Use of carbon composites in aircraft structures
p0577 A81-46813

TURCO, R. P.
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741

TURCZENIUK, B.
Exhaust gas reingestion measurements
p0106 A81-17521

TURIAN, V. A.
Aircraft assembly
p0355 A81-31072

TURK, M.
Experimental investigation of a right angle wing with partially separated flow with and without ground effects
[DGLR PAPER 80-111] p0120 A81-19397

TURKEL, B. S.
Pilot-aircraft system reponse to wind shear
[NASA-CR-3342] p0031 N81-10636

TURKEL, E.
Radiation boundary conditions for wave-like equations
p0153 A81-20223

TURKINA, A. I.
Analysis of the influence of atmospheric turbulence on alternating bending stress level in helicopter main rotor blades
p0236 A81-25690

TURKOWSKI, L.
Flow phenomena along fuselages and wing-fuselage systems of gliders
[NASA-TM-75401] p0186 N81-15903

TURNER, A. W.
Maintenance tomorrow and the day after
p0367 A81-33750

TURNER, C. D.
A study of the effect of store aerodynamics of wing/store flutter
[AIAA 81-0604] p0304 A81-29467
A study of the effects of store aerodynamic on wing/store flutter
p0490 N81-26153

TURNER, M. R.
Wind tunnel tests on a fighter aircraft wing/store flutter suppression system: The B.Ae control law
p0083 N81-12119

TURRIZIANI, R. V.
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013

TUTKA, J.
Manufacturing methods for a composite main rotor blade for the YAH-64 helicopter
p0575 A81-46629

TUTTLE, M. H.
Support interference of wind tunnel models: A selective annotated bibliography
[NASA-TM-81909] p0335 N81-20084
US and USSR Military Aircraft and Missile Aerodynamics 1970-1980. A selected, annotated bibliography, volume 1
[NASA-TM-81951] p0547 N81-29119

TUTTLE, R. P.
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047

TWIGGS, T. H.
757/767 design considerations for improved productivity
p0100 A81-16584

TWOMEY, W. J.
Review of engine/airframe/drive train dynamic interface development problems
p0106 A81-17516

TYBURSKI, J. J.
Low level, adverse attitude escape using a vertical seeking ejection seat
p0176 A81-22094

TYE, W.
Civil aviation safety. III - Prospects of improvement
p0017 A81-11900
Civil aviation safety. IV - Accident severity
p0068 A81-16422
Is it safe - The safety assessment of aircraft systems. III - The use of probability methods
p0290 A81-29029

Is it safe - The safety assessment of aircraft
systems. IV - Methods, techniques, and
organisation
p0366 A81-33789
Civil aircraft design for fuel reduction
p0420 A81-37415
Is it safe - The safety assessment of aircraft
systems. V - Some particular techniques
p0454 A81-38174
TYLER, H. C.
Structural Integrity Recording System (SIR) for
U.S. Army AH-1G Helicopters
[AD-A097203] p0393 N81-23438
TYMCZYSZYN, J. J.
Wake vortex attenuation flight tests: A status
report
p0267 N81-19057

U

UHLHORN, R. W.
Fiber optic system test results in a tactical
military aircraft
p0452 A81-37659
UHUAD, G. C.
A wind tunnel investigation of the aerodynamic
characteristics of forward swept wings
p0189 N81-16011
UMAN, M. A.
A case for submicrosecond rise-time lightning
current pulses for use in aircraft
induced-coupling studies
p0057 A81-14267
UMMEL, B. R.
Analysis of ejection seat stability using easy
program, volume 1
[AD-A096597] p0373 N81-22033
UNDERWOOD, A. J.
An investigation into the possible reduction of
aerodynamic drag of a fuel economy vehicle
[BU-248] p0338 N81-21039
UNRUH, J. F.
Procedure for evaluation of engine isolators for
reduced structure-borne interior noise
transmission
[AIAA PAPER 81-1570] p0618 A81-48608
Engine isolation for structural-borne interior
noise reduction in a general aviation aircraft
[NASA-CR-3427] p0446 N81-25766
URAM, J., JR.
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
URBAN, L. J.
Promoting rational standardization
p0050 A81-13172
URLING, H. R.
Flight control systems go digital - More than a
binary mechanization of analog predecessors
[SAE PAPER 801166] p0399 A81-34181
URNES, J. M.
Design and development of the control laws for the
F-18 primary flight control system
p0320 A81-30245
URNETTE, K. B.
Flat panel display technology review
p0211 N81-17065
URSELL, C. R.
Design, fabrication, calibration, application, and
testing of advanced aircraft weighing systems
[SAWE PAPER 1383] p0353 A81-31399
UTAH, D. A.
Crack growth modeling in an advanced powder
metallurgy alloy
[AD-A093992] p0218 N81-17235
UYGUR, E. M.
Nondestructive dynamic testing
p0124 A81-19657

V

VACCARINO, C. A.
A case study - Real time simulation and structured
design
p0172 A81-21721
VAGNERS, J.
Some implementation considerations for numerically
stable flight filters
p0156 A81-20485
Application of singular perturbation theory to
onboard aircraft trajectory optimization
[AIAA PAPER 81-0019] p0158 A81-20503
VAICAITIS, R.
Response of stiffened sandwich panels
[AIAA 81-0557] p0303 A81-29455
VAICAITISZ, R.
Laboratory study of efficient add-on treatments
for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618
VAKHITOV, M. B.
Wing analysis by the plate analogy using an
integral-difference method
p0235 A81-25680
Application of hybrid schemes in analysis of
thin-wall structures by the displacement method
p0235 A81-25681
The effect of the skewness of the skin panels on
stresses in conical wings
p0625 A81-49930
VALCIK, L.
Shielded enclosure test bed requirement
[AD-A092589] p0198 N81-16873
VALENTE, E.
European cooperation in the tactical transport
helicopter
p0466 A81-40881
VALOT, C. L.
A new system for the study of visual information
presentation in aeronautics - GIBI
p0100 A81-16688
VAN ALLEN, J. A.
An analytical solution of the two star sight
problem of celestial navigation
p0614 A81-48121
VAN BATEN, T. J.
Vibrations of multispan stiffened plates via
modified Bolotin method
p0241 A81-26334
VAN DAM, C. P.
Effects of wingtip modifications on handling
qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
VAN DEN BERG, B.
Role of laminar separation bubbles in airfoil
leading-edge stalls
p0354 A81-31613
VAN DER HOEVEN, A. J. M.
Prediction method for the overall performance of
turbofan engines
[AIAA PAPER 81-0367] p0166 A81-20786
VAN DER LAARSE, J.
Landing gear shock absorber design criteria and
the assessment of tire/wheel configurations
p0232 A81-24900
VAN GESTEL, G. F. J. A.
Subsequent proof of damage tolerance for a landing
gear component after numerous takeoffs and
landings
p0006 A81-1147
Prevention of corrosion and fatigue failure of
helicopter gas turbine compressors
p0469 A81-401
VAN INGEN, J. L.
Low-speed airfoil section research at Delft
University of Technology
p0010 A81-118
VAN KEUK, G.
The state of development and design of target data
processing of the ELRA system
p0152 A81-20
VAN ROOYEN, R. S.
Assessment of propeller influence on
lateral-directional stability of multiengine
aircraft
p0411 A81-356
VAN WYFFELEN, J. P.
Characteristics of NAVSTAR user stations
p0121 A81-196
VAN VLIET, B. W.
AFTI/F-16 advanced multimode control system design
for task-tailored operations
[AIAA PAPER 81-1707] p0535 A81-43
VAN WIE, D. M.
Numerical lifting line theory applied to drooped
leading-edge wings below and above stall
p0066 A81-15
VANDUSSEL, G. J. N.
Aerodynamic and aeroelastic research on tipvane

turbines
[VTH-LR-302] p0540 N81-28100
VANCLEAVE, J. E.
Low cost airborne microwave landing system receiver, task 3
[NASA-CR-152409] p0075 N81-12054
VANDAM, C. P.
Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012
VANDENBERG, B.
Boundary layer measurements on a two-dimensional wing with flap
[NLR-TR-79009-U] p0022 N81-10014
On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042
VANDERHOEVEN, W.
Developments in aircraft structural materials
[NLR-MP-79042-U] p0077 N81-12081
VANDERPLAATS, G. N.
Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20540
Structural optimization - Past, present and future
[AIAA PAPER 81-0897] p0362 A81-32922
VANGAASBEEK, J. R.
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-A098794] p0486 N81-26121
VANGESTEL, G. F. J. A.
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489
Damage tolerance of a landing gear component after many takeoffs and landings
[NLR-MP-79039-U] p0596 N81-31129
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222
VANGOOL, M. F. C.
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118
VANGUNST, R. W.
Investigation of aerodynamic stall alleviation on a swept planform wing using leading edge modifications
[AD-A101239] p0548 N81-29122
VANIS, A. G.
Aerial surveying of small areas from a small remotely controlled drone
p0107 A81-17525
VANKUIK, G. A. M.
Aerodynamic and aeroelastic research on tipvane turbines
[VTH-LR-302] p0540 N81-28100
VANLIPZIG, H. T. M.
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28489
VANMANSART, E.
Some new research approaches to aircraft spin studies
[AAAF-NT-80-12] p0082 N81-12112
VANNUNEN, J. W. G.
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N81-14969
VANPATTEN, R. E.
Evaluation of AFIT/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0249 N81-18034
VANT RIET, R.
KC-10A refueling boom control system
p0322 A81-30266
VANTHOFF, J.
Minimum ignition energy of F40 aircraft fuel/air mixtures
[PML-1978-22] p0436 N81-24213
VARETTI, M.
Low pressure turbine testing
p0432 N81-24098
VARLEY, R. J.
Centrifugal compressors for small aero and automotive gas turbine engines
p0220 N81-17467
VARSHAVSKII, I. L.
Hydrogen engines
p0625 A81-49949
VASEL, A.
Experimental investigations on a harmonically swinging trail edge flap with a space
[DGLR PAPER 80-029] p0055 A81-13925
VASHUNIN, A. I.
Determination of fatigue life by testing materials for thermal fatigue
p0532 A81-43774
VASILE, C. V.
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 1: Detection of cracks in the inaccessible lower half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419
VASILOPOULOS, D.
Adaptive finite element technology in integrated design and analysis
[NASA-CR-164560] p0543 N81-28810
VASQUEZ, P.
Ceramic and coating applications in the hostile environment of a high temperature hypersonic wind tunnel
[NASA-TM-81931] p0254 N81-18199
VATALARO, F.
Characteristics of a digital filter for a precision DME system in microwave landing systems
[FUB-43-1980] p0620 N81-32136
VATSA, V. N.
Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705
Analysis of laminar and turbulent symmetric blunt trailing-edge flows
[AD-A098703] p0439 N81-25046
VAUCHERET, X.
Model vibrations beyond low-speed stall
[ONERA, TP NO. 1980-154] p0123 A81-19552
Expected improvements on high angle of attack model testing
p0436 N81-24123
Model vibrations below low speed stall
p0447 N81-26017
VAUGHAN, W. W.
Aeronautical concerns and National Aeronautics and Space Administration atmospheric electricity projects
p0136 N81-14567
VAUGHN, R. E., JR.
An aerodynamic analysis of deformed wings in subsonic and supersonic flow
[AD-A101675] p0580 N81-30091
VAUNOIS, J.-P.
Aerodynamic trials with the linear motor-driven platform at the Toulouse Aeronautic Testing Center
[AAAF PAPER NT 80-41] p0369 A81-33943
VAVRINCOVA, M.
Numerical solution of transonic flow through a cascade with slender profiles
p0170 A81-21197
VDOVIAK, J. W.
Aerodynamic/acoustic performance of YJ101/double bypass VCE with coannular plug nozzle
[NASA-CR-159869] p0220 N81-17846
VCE test bed engine for supersonic cruise research
p0245 N81-17995
VECELLIO, J. G.
The ICAM 'Manufacturing Cost/Design Guide' /MC/DG/ for Avionics
p0558 A81-44375
VEERASAMY, V.
Fluid-dynamic and aeroacoustic investigations of shrouded jets
p0256 N81-18318
VEINOT, D. E.
X-ray fluorescence spectrometric analysis of wear metals in used lubricating oils
[AD-A097552] p0390 N81-23067
VELIEV, E. I.
Excitation of a circular array of cylinders with longitudinal slits
p0019 A81-12615
VELUPILLAI, D.
CFM56 rejuvenates the DC-8
p0455 A81-38196

VENCE, R. L., JR.
Omega station 10.2 kHz signal coverage prediction diagrams
p0512 A81-41760
VENKATESAN, C.
Stochastic modeling of an aircraft traversing a runway using time series analysis
p0183 A81-23368
VENKAYYA, V. B.
Optimal design studies on composite wings with static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
VERBRUGGE, R.
A rotating, wind tunnel balance and associated experimental techniques
[AAAF-NT-80-13] p0218 N81-17108
Rotative balance of the I.M.F. Lille and associated experimental techniques
[NASA-TM-75886] p0276 N81-19137
VERDI, J. S.
High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191
VERDON, J. M.
Analysis of laminar and turbulent symmetric blunt trailing-edge flows
[AD-A098703] p0439 N81-25046
VERDOUW, A. J.
Fuel character effects on current, high pressure ratio, can-type turbine combustion systems
[AD-A089182] p0029 N81-10073
VERKAMP, F.
Fuel efficiency improverents to the T56 turboprop engine
[SAE PAPER 801158] p0399 A81-34178
VERMES, G.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
VERMEULEN, H. C.
Current and future use of an AIDS integrated EMS
[SAE PAPER 801219] p0404 A81-34225
Review of AIDS development
p0599 N81-31212
VERNON, J.
Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087
VERNOOY, C.
Development, production, calculation and testing of a carbon/Kevlar fibre reinforced flap
p0481 A81-40585
VEROMAN, V. IU.
Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles
p0285 A81-28134
VERONA, R. W.
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25071
VERRIERE, J.
Unsteady wakes downstream from a profile oscillating in incidence
[AAAF-NT-80-10] p0204 N81-16989
VESELOV, V. A.
Experimental method for determining the parameters of onboard microwave-radiometer antennas
p0412 A81-35734
VEST, G. D.
Plans for control of the noise exposure produced by military aircraft in the 1980's - Aircraft noise
p0568 A81-46364
VESTERGREN, P.
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521
VESTEWIG, R. E.
Actual versus simulated equipment for aircraft maintenance training: Cost implications of the incremental versus the unique device
[AD-A102388] p0590 N81-31104
VETTES, B.
Ergonometric study of ejection through a breakable canopy
p0205 N81-17011
VIARS, P. R.
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401
VICARS-HARRIS, M.
A versatile miniature solid state television camera /CCD/
p0180 A81-22420
VICKERS, T. K.
Maximizing the capacity of a single-runway airport
p0177 A81-22193
Some design and procedural aspects of in-flight collision avoidance
[AIAA PAPER 81-0805] p0368 A81-33805
Recommended short-term ATC improvements for helicopters. Volume 2: Recommended helicopter ATC training material
[AD-A089441] p0024 N81-10029
Recommended short-term ATC improvements for helicopters. Volume 3: Operational description of experimental LORAN-C flight following (LOFF) in the Houston area
[AD-A089385] p0024 N81-10030
Proposed ATC system for the Gulf of Mexico: Helicopter operations development program
[AD-A089430] p0025 N81-10036
Preliminary test plans of ATC concepts for longer term improvement helicopter development program
[AD-A089407] p0025 N81-10037
Recommendations for short-term simulation of ATC concepts. Helicopter operations development program
[AD-A089435] p0025 N81-10038
Recommended short-term ATC improvements for helicopters. Volume 1: Summary of short term improvements
[AD-A089521] p0025 N81-10041
VIEHWEGER, G.
Developments in the area of cryo-wind tunnel technology by the DFVLR
p0065 A81-15702
VIERSMA, T. J.
Development and application of a moving base visual flight simulator including the design of hydraulic actuators with hydrostatic bearings
p0010 A81-11633
VIETS, H.
Forced vortices near a wall
[AIAA PAPER 81-0256] p0163 A81-20704
VIGO, P.
On screeching jets exhausting from an axisymmetric supersonic nozzle
p0008 A81-11616
VIJAYARAGHAVAN, A.
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] p0624 A81-49731
VILENKIN, A. V.
Substantiation of oil change periods for ship and aircraft turbine engines
p0065 A81-15720
VILLHART, V.
Instability of short stiffened and composite cylindrical shells acting under pure bending moments considering prebuckling displacements
[AIAA 81-0571] p0302 A81-29405
VINCENT, J. H.
Development of advanced techniques for rotorcraft state estimation and parameter identification
[NASA-CR-159297] p0271 N81-19090
VINING, R. E., JR.
Effect of impact damage on the XFV-12A composite wing box
p0182 A81-22676
VINT, A.
Jet wing interaction to give improved combat performance
p0188 N81-16007
VISWANATHAN, S. P.
Reduction of helicopter vibration through control of hub-impedance
p0356 A81-32009
VITALE, U.
Neurotraumatological aspects in ejected pilots
p0205 N81-17012
VITERNA, L. A.
Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11440
VIZEL, E. P.
The effect of the aspect ratio of delta wings on the structure of the near vortex wake
p0413 A81-35467

VIZZINI, R. W.
Full Authority Digital Electronic Control turbofan engine demonstration
[SAE PAPER 801199] p0402 A81-34209
Full authority digital electronic control application to a variable cycle engine
[SAE PAPER 801203] p0403 A81-34212
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration
[AIAA PAPER 81-1498] p0506 A81-40910
The packaging of electronic engine control units and related subcomponents
p0497 N81-27105
Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112
VLIEGER, H.
Application of fracture mechanics to built-up structures
[NLR-MP-79044-U] p0086 N81-12475
VOELCKERS, U.
Applicated techniques for the control of approach traffic
[DFVLR-MITT-79-20] p0142 N81-14992
Applied techniques for the control of approach traffic
[ESA-TT-668] p0538 N81-28079
VOELKER, H.
New techniques for the monopulse-radar tracking of high-maneuverability aircraft
p0153 A81-20102
VOELTZEL, J.
Quality control of precision castings for turbojet engine parts
p0052 A81-13330
VOERSMANN, P.
Wind shear detection from PCM-recorded MLS-flight data
p0015 A81-11675
VOEVODZINSKII, V. A.
Lighting systems for flight support
p0564 A81-45602
VOGEL, H.
The DME-aided Azimuth System - DAS
p0452 A81-37653
VOGEL, R. E.
TF41/Lamilloy Accelerated Mission Test
[AIAA PAPER 81-1349] p0501 A81-40833
Fuel character effects on the TF41 engine combustion system
[AIAA PAPER 81-1391] p0503 A81-40858
Fuel character effects on current, high pressure ratio, can-type turbine combustion systems
[AD-A089182] p0029 N81-10073
VOGEL, S. A.
Computer-aided process planning system for aircraft engine rotating parts
p0149 A81-19336
VOLCHKOV, E. P.
Effectiveness of a gas curtain in Laval nozzles under nonrated flow conditions
p0417 A81-36737
VOLKOEDOV, A. P.
Aircraft equipment /2nd revised and enlarged edition/
p0355 A81-31828
VOLLAND, K. F., JR.
Transonic cascade wind tunnel modification and initial tests
[AD-A091080] p0090 N81-13031
VOLLERNER, N. F.
Dynamic errors of the Kalman filtering of trajectory parameters
p0366 A81-33687
VOLMIR, A. S.
The method of superelements in the dynamics of complex structures
p0101 A81-16969
Computer-aided investigation of turbomachine aerodynamics and aeroelasticity
p0613 A81-47962
VOLOSATOV, V. A.
Increased fatigue resistance for blades of stationary gas-turbine engines by ultrasonic hardening with spherical particles
p0205 A81-20134
VON GLAHN, U.
New interpretations of shock-associated noise with and without screech
p0178 A81-22527
Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
p0454 A81-38062
VON GLAHN, U. H.
Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] p0620 A81-48635
VONGLAHN, U.
New interpretations of shock-associated noise with and without screech
[NASA-TM-81590] p0032 N81-10807
Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
[NASA-TM-81739] p0381 N81-22839
VONRETH, R. D.
Controls and displays for all-weather operation of helicopters
p0633 N81-33145
VONSCHWERDTNER, O. A.
Application of model laws when determining the heat transfer coefficients by experiments on cooled turbine blades
p0089 N81-12998
VONSTRUENSEE, D.
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines
[BMFT-FB-T-79-137] p0275 N81-19126
VONTAPAVICZA, S.
Application of damage tolerance concepts for MBB helicopters
[MBB-UD-309/80-OE] p0580 N81-30105
VOOGT, N.
Design study for the inner wing of a transonic wing-body combination of aspect ratio 8
p0190 N81-16015
VOROBEV, V. G.
Aircraft instruments and measuring systems
p0564 A81-45608
VOSKRESENSKY, G. P.
Review of numerical methods for the problem of the supersonic flow around bodies at angle of attack
p0011 A81-11639
VOSS, R.
Calculation of plane transonic flows using the integral equation method and shock fitting
p0016 A81-11779
VOTH, H.
Real-time feasibility for generation of nonlinear textured terrain
[AD-A095070] p0277 N81-19141
VOVKIANKO, A. G.
Selection of notch geometry and notching technique for studying the fracture toughness of materials and full-scale structures
p0516 A81-42356
VRANOS, A.
Determination of coking rate in jet fuel
p0570 A81-46448
Experimental study of the stability of aircraft fuels at elevated temperatures
[NASA-CR-165165] p0084 N81-12255
VUCKOVIC, N. R.
A long range research programme of noise abatement at the airport of Beograd and its practical results
p0570 A81-46373
VUILLE, H.
Analyst/IAP interface and interactive graphics
p0057 A81-14270
VUILLET, A.
Aerodynamic design of engine air intakes for improved performance
p0470 A81-40117
New designs for improved aerodynamic stability on recent Aerospatiale helicopters
p0574 A81-46625
VUKELICH, S. R.
Wing-body carryover at supersonic speeds with finite afterbodies
p0354 A81-31622
VYRCHIKOV, IU. S.
Integral methods for solving thermal conductivity problems and their application to evaluating heat exchange in certain gas-turbine elements
p0285 A81-20128

W

WACKERLE, P.
Development of wind tunnel fan blade made of composite materials
[MBB-UD-277-79-0]   p0018 A81-12096
WADHWANI, D. S.
Non-destructive testing of adhesive-bonded joints
p0153 A81-20162
WADIA, A. R.
Rotor-tip leakage. II - Design optimization through viscous analysis and experiment
[ASME PAPER 81-GT-72]   p0313 A81-29981
A pure direct force/moment control for coaxial counterrotating rotors
p0144 N81-15007
WAFFORD, J.
Aircraft/avionics environmental integration program
p0570 A81-46480
WAGDI, M. N.
Control strategy for tracking a maneuverable model
[AIAA PAPER 81-0089]   p0160 A81-20593
A mode decomposition control logic for system performance enhancement
[AIAA 81-1753]   p0554 A81-44083
WAGNER, B.
Simplified vortex models for slender lifting surfaces with leading edge separation
p0016 A81-11777
WAGNER, J. H.
Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378]   p0091 N81-13034
WAGNER, O.
The supercritical profile of the supercritical wing
p0107 A81-17522
The supercritical profile of the supercritical wing
[NASA-TM-76605]   p0494 N81-27075
WAGNER, R.
Full annular combustor test facility for high pressure/high temperature testing
p0432 N81-24097
WAGNER, W. W.
Exploratory development program to improve combustor dome operating characteristics
[AIAA PAPER 81-1351]   p0501 A81-40834
Improved combustor domes designed for hot streak reduction
[AIAA PAPER 81-1352]   p0501 A81-40835
WAINAUSKI, H. S.
Aerodynamic characteristics of an advanced technology propeller for commuter aircraft
[AIAA PAPER 81-1565]   p0507 A81-40948
WAINLAND, D. M.
A microcomputer-based signal data converter for runway visual range measurements
[AD-A097568]   p0386 N81-23060
WALDEN, S.
Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope
[ESA-TT-634]   p0339 N81-21046
WALDMAN, J. J.
Aircraft fire and overheat detection and extinguishment
[SAE PAPER 800622]   p0063 A81-15340
WALEN, D. B.
MLS: Airplane system modeling
[NASA-CR-165700]   p0386 N81-23059
WALKER, C. L.
Component research for future propulsion systems
p0454 A81-38058
Component research for future propulsion systems
[NASA-TM-82613]   p0376 N81-22055
WALKER, G. A.
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688]   p0381 N81-22971
Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689]   p0381 N81-22972
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A
[AD-A096690]   p0381 N81-22973
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692]   p0392 N81-23325
Weapons system support resources demand parameters - logistics
[AD-A097517]   p0394 N81-23937
Development of maintenance metrics to forecast resource demands of weapon systems
[AD-A104089]   p0632 N81-33136
WALKER, J. R.
A case study on the F-16 fly-by-wire flight control system
p0101 A81-16719
WALKER, R. F.
Design characteristics of Michelson interferometers used on the AFGL NKC-135 infrared flying laboratory
p0463 A81-39505
WALKER, S. N.
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2]   p0043 N81-11492
WALKER, W. R.
Experimental application of a vibration reduction technique
p0004 A81-10770
WALKLEY, K. B.
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768]   p0596 N81-31108
WALKO, L. C.
New techniques for the measurement of natural and simulated lightning phenomena
p0057 A81-14260
WALL, R. L.
Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331]   p0142 N81-14994
WALLACE, F. B.
Business aircraft turbofan technology progress in the 1970's, challenges in the 1980's
[SAE PAPER 800601]   p0061 A81-15326
WALLACE, J. H.
A controlled evaluation of the differences between two approaches to reliability investment screening
[AD-A087506]   p0031 N81-10046
WALLACE, M. R.
Integrated strike avionics study, volume 1
[AD-A094705]   p0273 N81-19113
WALLACE, W.
The rejuvenation of properties in turbine engine hot section components by hot isostatic pressing
[AD-A097551]   p0390 N81-23088
WALLENBERG, R.
Electromagnetic coupling to advanced composite aircraft with application to trade-off and specification determination
p0200 N81-16166
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291]   p0341 N81-21069
WALLENBERG, R. F.
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1278C]   p0638 N81-33200
WALLER, R. A.
Environmental aspects of airport planning
p0115 A81-18091
WALLIS, D. E.
Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/
p0517 A81-42037
Low-frequency radio navigation system
[NASA-CASE-NPO-15264-1]   p0373 N81-22036
WALSH, D.
Bilingual air traffic control in Canada
p0169 A81-20915
WALSH, M. J.
Drag characteristics of V-groove and transverse curvature riblets
p0239 A81-26518
WALTERS, M. M.
Method for predicting the jet-induced aerodynamics of V/STOL configurations in transition
[AD-A097356]   p0385 N81-23083

Validation study of the V/STOL aerodynamics and stability and control manual
[AD-A099236] p0486 N81-26119

WALTERS, S. A.
An economical approach to automated flight test data reduction
p0576 A81-46643

WALTHOUR, L.
A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993

WALTON, G. S.
Applications of new technology in the infrared
p0350 A81-31126

WALTRUP, P. J.
Critical considerations in the design of supersonic combustion ramjet /scramjet/ engines
[AIAA PAPER 80-1284] p0511 A81-41748

WALWORTH, M.
Reliability advancement for electronic engine controllers. Volume 2: Guide to development of high reliability electronic engine controllers
[AD-A098614] p0444 N81-25086
Reliability advancement for electronic engine controllers, volume 1
[AD-A098623] p0444 N81-25087

WALWYN, P. R.
The role of flight simulation in the design and development of the Sea Harrier Nav-Attack System
p0010 A81-11635

WANG, D.
Finite difference computation of the steady transonic potential flow around airplanes
p0107 A81-17802

WANG, E.
Experimental investigations on shock-associated noise
p0107 A81-17735

WANG, K.-F.
On St. Venant flexure and torsion problem for symmetrical airfoil sections
p0366 A81-33245

WANG, S.
Conforming element with out-element nodes
p0225 A81-23855

WANG, S.-M.
The effect of oxygen concentration distribution on altitude relighting performance of a turbo-jet engine combustor
p0295 A81-29089

WANG, X.
A penalty function method for structural optimum design with aeroelastic constraints
p0223 A81-23727

WANG, Y. F.
Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

WANG, Y. S.
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0610 A81-40612

WANG, Y.-Z.
The effect of oxygen concentration distribution on altitude relighting performance of a turbo-jet engine combustor
p0295 A81-29089
Some factors affecting altitude relighting performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962

WANG, Z.
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825

WANG, Z.-C.
Aerodynamic calculation of turbine stator cascades with curvilinear leaned blades and some experimental results
p0293 A81-29072

WANGBERG, K.-G.
Stability and ultimate strength of carbon fiber reinforced plastic panels
p0481 A81-40521

WANGER, R. P.
Full authority digital electronic control /FADEC/ - Variable cycle engine demonstration
[AIAA PAPER 81-1498] p0506 A81-40910
Apparatus for sensor failure detection and correction in a gas turbine engine control system
[NASA-CASE-LEW-12907-2] p0273 N81-19115

WANHILL, R. J. H.
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminium
p0013 A81-11637
Comparison of 2024 and 7475 aluminum alloy sheet for tension-critical aircraft structures
p0232 A81-24942
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
p0469 A81-40107
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminium
[NLR-MP-80003-U] p0043 N81-11415
Developments in aircraft structural materials
[NLR-MP-79042-U] p0077 N81-12081
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminium
[NLR-MP-80003-U] p0086 N81-12477
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222

WARD, C. R.
Integrated avionics studies target future technologies
p0223 A81-23499
Synergistic benefits of fully integrating JTIDS and GPS
p0323 A81-30311

WARD, R. D.
Soviet practice in designing and procuring military aircraft
p0567 A81-46340

WARD, W. C.
Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025

WARMBRODT, W.
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor
p0573 A81-46620
A full-scale wind tunnel investigation of a helicopter bearingless main rotor
[NASA-TM-81321] p0628 N81-32137

WARNER, D. R.
Design of fault tolerant electronic engine controls
[AIAA PAPER 81-1496] p0566 A81-45894

WARNER, D. F., JR.
A method for determining landing runway length for a STOL aircraft
p0264 N81-19041

WARNER, H. D.
Advanced flight simulator: Utilization in A-10 conversion and air-to-surface attack training
[AD-A094608] p0254 N81-18066

WARNIX, J. L.
YC-15 interior noise measurements. Technical discussion
[AD-A098788] p0492 N81-26887

WARNOCK, W. E.
Flatbed - The universal transport airplane
[SAWE PAPER 1343] p0353 A81-31302

WARREN, E. L.
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design
[NASA-TM-81660] p0580 N81-30562

WARREN, J.
Flight tests of the microwave landing system multimode digital processor
[AD-A095449] p0332 N81-20056

WARREN, R. E.
Commuter turboprop propulsion technology
[SAE PAPER 801243] p0406 A81-34239
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 2: Appendix A. Performance data - GE27/T1 study of turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General Electric derivative engines. Volume 3: Appendix B. Performance data - TF34/T7 study A1 turboprop
[AD-A089279] p0028 N81-10069

Propulsion system study for Small Transport
Aircraft Technology (STAT)
[NASA-CR-165330] p0442 N81-25078
WARUSZEWSKI, H. L.
Effects of sunlight on display filters
p0326 A81-30352
WARWICK, G.
Fly-by-wire Jaguar
p0614 A81-48064
WARWICK, T.
Overview of ARP 1587 aircraft gas turbine Engine
Monitoring System guide
[SAE PAPER 801218] p0404 A81-34224
WASHBURN, G. F.
Preliminary design characteristics of a subsonic
business jet concept employing an aspect ratio
25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
A study of high-altitude manned research aircraft
employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067
Design and analysis of a fuel-efficient
single-engine, turboprop-powered, business
airplane
[NASA-CR-165768] p0596 N81-31184
WASHINGTON, E. S.
Wind tunnel investigation of the aerodynamic
hysteresis phenomenon on the F-4 aircraft and
its effects on aircraft motion
[AD-A089851] p0033 N81-11016
WASKIEWICZ, J. D.
A new approach to weapon separation aerodynamics
[AIAA PAPER 81-1654] p0616 A81-48416
WASSELL, A. B.
A UK view on future fuels
[ASME PAPER 81-GT-87] p0314 A81-29994
A United Kingdom view on future fuels
[PNR-90068] p0602 N81-31398
WAT, J.
Flight effects on supersonic convergent-divergent
nozzle jet noise
[AIAA PAPER 81-2027] p0623 A81-49728
WATANABE, Y.
Aeronautical-Maritime Engineering Satellite /AMES/
program of Japan
[IAF PAPER 80-D-171] p0115 A81-18318
WATERMAN, T. E.
Evaluation of RF anechoic chamber fire protection
systems
[AD-A092478] p0197 N81-16070
WATERS, M. H.
Airborne method to minimize fuel with fixed
time-of-arrival constraints
p0351 A81-31297
Practical solutions to the aircraft minimum fuel,
fixed-range, fixed time-of-arrival trajectory
optimization problem
p0563 A81-45515
Generation of optimum vertical profiles for an
advanced flight management system
[NASA-CR-165674] p0331 N81-20051
WATERS, P.
Application of General Technology Applications,
Incorporated (GTA) blending process to
antimisting fuel additives
[AD-A100692] p0551 N81-29247
WATKINS, M. L.
An advanced electronic cockpit instrumentation
system: The coordinated cockpit display
p0213 N81-17074
WATSON, D. M.
A method for determining landing runway length for
a STOL aircraft
p0264 N81-19041
WATSON, J.
A survey of computer simulations of digital
avionics systems
[AD-A091943] p0195 N81-16049
WATSON, J. C.
AV-8B composite fuselage design
[AIAA PAPER 81-0232] p0162 A81-20690
WATSON, W. R.
Noise suppression characteristics of peripherally
segmented duct liners
[NASA-TP-1904] p0641 N81-33946
WATTS, A. C.
A single gimbal/strapdown inertial navigation
system for use on spin stabilized flight test
vehicles
[SAND-80-2479C] p0193 N81-16037
WATTS, D. J.
Advanced composite applications in McDonnell
Dougals commercial transport aircraft
p0530 A81-43628
WATTS, E.
Cygnet - A canard configuration powered ultralight
aircraft
p0231 A81-24746
WAUGH, C. E.
Kevlar - Thermophysical properties
[AIAA PAPER 81-1104] p0459 A81-39104
WEAVER, E. A.
The 1979 clear air turbulence flight test program
p0266 N81-19050
Pulsed Doppler lidar for the detection of
turbulence in clear air
p0266 N81-19051
WEBB, A. C.
Medical coordination in airport disasters
p0053 A81-13512
WEBB, R. C.
Samarium cobalt (SMCO) generator/engine
integration study
[AD-A092904] p0214 N81-17087
WEBB, W. L.
A forward look at gas turbine testing facilities
[SAE PAPER 801124] p0396 A81-34159
WEBER, G.
Improvement of guidance and handling qualities in
the vicinity of airports and on landing
[BMFT-FB-W-79-42] p0425 N81-24045
WEBER, J.
Flight companies present new aircraft - Boeing
737-200 advanced
p0171 A81-21575
WEBER, J. M.
A flight investigation of static stability,
control augmentation, and flight director
influences on helicopter IFR handling qualities
p0574 A81-46623
WEBER, O.
Midair and near midair collisions on two- and
three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944
Experiences with flight recorders obtained by
analyzing aircraft accidents
p0328 N81-20019
Evaluation of the visual acquisition range of
en-route air traffic from cockpit observations
[DFVLR-MITT-80-14] p0332 N81-20058
WEBER, R.
Flight tests for studying radioelectric
perturbations of an electrostatic origin
p0200 N81-16160
WEBER, R. J.
NASA research in aeropropulsion
[ASME PAPER 81-GT-96] p0314 A81-30003
NASA Research in aeropropulsion
[NASA-TM-81633] p0093 N81-13056
WEBSTER, D. J.
Helicopter accidents
[SAE PAPER 810592] p0520 A81-42751
WEBSTER, L. D.
Sidelooking laser altimeter for a flight simulator
[NASA-CASE-ARC-11312-1] p0278 N81-19439
WECK, M.
New developments of data processing in
computer-controlled manufacturing systems /DNC,
FMS/
p0149 A81-19845
WEDAN, B. W.
Topside weapons release - An analytical study
[AIAA PAPER 81-1655] p0533 A81-43939
WEDAN, R. W.
Measuring weather for aviation safety in the 1980's
p0136 N81-14568
WEDDERSPOON, J. R.
High lift research and its application to aircraft
design
p0011 A81-11642
WEDEKIND, G.
Calculation of the lift dependent drag polar of
cambered fighter plane configurations with
deflected maneuver flaps in the subsonic region
by means of a modified procedure according to
Lamar
[DGLR PAPER 80-109] p0120 A81-19395

Procedures for optimal drag design of camber and flap deflection in supersonic regions with consideration to geometric limits
[DGLR PAPER 80-110] p0120 A81-19396

WEDEN, G. J.
Component research for future propulsion systems
p0454 A81-38058
Component research for future propulsion systems
[NASA-TM-82613] p0376 N81-22055

WEDGE, R. H.
Coatings in the aero gas turbine
p0103 A81-17167

WEEKS, D. J.
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration
[ARC-R/M-3842-PT-2] p0021 N81-10010

WEEKS, R. A.
The Northrop F/A-18L Mission Simulator
[AIAA 81-0960] p0414 A81-36557

WEEKS, T. M.
A wind tunnel investigation of the aerodynamic characteristics of forward swept wings
p0189 N81-16011

WEENER, E. F.
Computer generated displays and pilot effectiveness
p0114 A81-18082

WEGER, D.
Study of oscillatory and flight dynamic behavior of helicopters in atmospheric turbulence
[BMVG-FBWT-80-4] p0342 N81-21074

WEGNER, E. D.
The evolution of a strategic bomber
[AIAA PAPER 81-0919] p0479 A81-40324

WEI, F. S.
Multicyclic controllable twist rotor data analysis
[NASA-CR-152251] p0249 N81-18028

WEI, R. P.
On understanding environment-enhanced fatigue crack growth - A fundamental approach
p0003 A81-10749

WEI, S. Y.
Control design for reduction of aerodynamic tail forces using quadratic synthesis
p0240 A81-26610
Application of linear quadratic control in reduction of aerodynamic forces on aircraft
p0332 N81-20061

WEI, Y.-S.
Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098

WEIDNER, E. H.
Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659
A parametric study of staged fuel injector configurations for scramjet applications
[AIAA PAPER 81-1468] p0505 A81-40888

WEIL, J.
Correlation of predicted and flight derived stability and control derivatives with particular application to tailless delta wing configurations
[NASA-TM-81361] p0490 N81-26154

WEILAND, C.
A contribution to the computation of transonic supersonic flows over blunt bodies
p0230 A81-24423
Analysis of calculated three-dimensional inviscid flow fields with embedded shock waves (presentation of a field solution), part 1
[ESA-TT-553] p0022 N81-10017

WEILAND, E.
BK 117: A new helicopter through international cooperation
[MBB-UD-274/79-OE] p0582 N81-30121

WEILER, W.
New technologies for compressors of aviation engines
p0452 A81-37656

WEINERT, W.
Calibration of the high speed wind tunnel TVM 150 in the supersonic range
p0016 A81-11770

WEINRICH, H.-L.
One-dimensional considerations concerning the stability behavior of inlet diffusers for supersonic aircraft
p0107 A81-17548

WEINSTEIN, L. M.
Large-eddy breakup scheme for turbulent viscous drag reduction
p0239 A81-26507
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26313

WEINSTOCK, G. L.
Electromagnetic integration of composite structure in aircraft
p0200 N81-16159

WEISBRICH, A. L.
Multicyclic controllable twist rotor data analysis
[NASA-CR-152351] p0249 N81-18028

WEISE, D. A.
High temperature strain gage system for application to turbine engine components
[AD-A101713] p0583 N81-30132

WEISEL, D. R.
JT8D engine performance retention
p0596 N81-31200

WEISGERBER, D.
Constant-amplitude and flight-by-flight tests on CFRP specimens
p0039 N81-11133
Constant-amplitude and flight-by-flight tests on CFRP specimens
[MBB-FE-2/S/PUB/26] p0131 N81-14006

WEISLOGEL, S.
Operational problems experienced by single pilots in instrument meteorological conditions
[NASA-CR-166236] p0581 N81-30106

WEISS, D. M.
Evaluation of the A-7 requirements document by analysis of change data
[AD-A094888] p0272 N81-19103

WEISS, F.
Active gust- and maneuver load control concepts, taking into account, as example, the Airbus A300. I - Design of a controller in the temporal domain for the alleviation of gust loads and the control of the effectiveness for stochastic gusts
[DGLR PAPER 81-065A] p0608 A81-47552

WEISS, H.
Development of wind tunnel fan blade made of composite materials
[MBB-UD-277-79-O] p0018 A81-12096

WEISS, R. O.
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126

WEISSHAAR, T. A.
Wind tunnel experiments on the divergence of swept wings with composite structures
[AIAA PAPER 81-1670] p0526 A81-43152

WEITZ, P.
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059

WELCH, J. D.
Active Beacon Collision Avoidance System (BCAS) functional overview
[AD-A094177] p0250 N81-18040
Active BCAS: Design and validation of the surveillance subsystem
[AD-A095049] p0270 N81-19084

WELGE, H. R.
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30085

WELLER, W. H.
Analysis and application of compliant rotor technology
p0467 A81-40086

WELLERN, W.
Improvement of guidance and handling qualities in the vicinity of airports and on landing
[BMFT-FB-W-79-42] p0425 N81-24045

WELLS, G.
Propeller propulsion integration, phase 1
[NASA-CR-163521] p0196 N81-16058

WELLS, R. D.
The effects of various fidelity factors on

simulated helicopter hover
[AD-A102028] p0601 N81-31232

WELLS, R. E.
The GTCP331 Auxiliary Power Unit for the next generation commercial transports
[SAE PAPER 801147] p0398 A81-34176

WELLS, W. R.
Aircraft lateral parameter estimation from flight data with unsteady aerodynamic modelling
[AIAA PAPER 81-0221] p0162 A81-20684
Data analysis for aircraft parameter estimates
[AIAA PAPER 81-1864] p0560 A81-44561

WENCK, H. C.
National runway friction measurement program
[AD-A097334] p0391 N81-23097

WENSINK, G. J. H.
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29088

WENTZ, W. H., JR.
Effects of design variables on spoiler control effectiveness, hinge moments, and wake turbulence
[AIAA PAPER 81-0072] p0159 A81-20581
Summary of high-lift and control surface research on NASA general aviation airfoils
[SAE PAPER 810629] p0524 A81-42781
Pressure distributions for the GA(W)-2 airfoil with 20% aileron, 25% slotted flap and 30% Fowler flap
[NASA-CR-2948] p0262 N81-19023

WERGENI, G.
Operator training systems/simulators
p0349 A81-31109

WERLE, H.
Structures of flow separations over swept wings
p0255 N81-18246

WERLE, M. J.
Solutions for slightly over- or under-expanded hot supersonic jets exhausting into cold subsonic mainstreams
[AIAA PAPER 81-0257] p0163 A81-20705
Analysis of laminar and turbulent symmetric blunt trailing-edge flows
[AD-A098703] p0439 N81-25046

WERNER, C.
Remote sensing methods for the determination of slant range visibility
[ESA-TT-627] p0086 N81-12536

WERNER, J. V.
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021

WERNICKE, K. G.
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
[AHS 80-11] p0474 A81-40144
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
p0634 N81-33150

WERNICKE, R. K.
Prediction of tilt rotor outwash
[AIAA PAPER 81-0013] p0157 A81-20537
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
[AHS 80-11] p0474 A81-40144
An evaluation of advanced rotorcraft configurations for emerging military applications
p0572 A81-46611

WERSCHULZ, A. G.
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017

WESLER, J. E.
The federal role in airport noise control planning
p0113 A81-18073
Federal policies affecting airport noise compatibility programs
[AIAA PAPER 81-0829] p0367 A81-33879
Airport noise control in the 1980s - FAA's plans and policies
p0568 A81-46355

WESLEY, A. C.
Integration of sensors with displays
p0212 N81-17067

WESSE, I.
Auto-adaptive piloting
[GA-380] p0217 N81-17102

WEST, D. S.
Evaluation of bird load models for dynamic analysis of aircraft transparencies
[AD-A092909] p0204 N81-16995
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] p0638 N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] p0638 N81-33197

WEST, C. L.
Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033

WESTERMARK, H.
Standardisation - An alternative approach to ATC automation
p0177 A81-22192

WESTKAEMPER, J. C.
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 2: Aerodynamic effects
[AD-A093063] p0209 N81-17086

WESTMORELAND, J. S.
A successful step toward an advanced supersonic transport engine - Acoustic and emission results from the Pratt and Whitney Aircraft Variable Cycle Engine Program
[AIAA PAPER 81-1593] p0508 A81-40960
Progress with variable cycle engines
p0245 N81-17991

WESTON, R. P.
Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982

WESTOVER, D.
Advanced target tracking by dynamic scene analysis
p0358 A81-32099

WEVERS, L. J.
Experimental analysis and methods to determine the dynamic behavior of propulsion shafting systems
p0145 N81-15401

WHEALE, J. L.
The speed of response to synthesized voice messages
p0603 N81-31456

WHEELER, J. B.
Fatigue of fibrous composite materials; Proceedings of the Symposium, San Francisco, Calif., May 22, 23, 1979
p0418 A81-37126

WHEELER, P. D.
An active noise reduction system for aircrew helmets
p0604 N81-31470

WHITAKER, R.
Ferranti mission managers
p0553 A81-44043

WHITE, D. J.
Evaluating spectrum effects in U.S. Air Force attack/fighter/trainer individual aircraft tracking
p0173 A81-21762
Determination of aircraft structural inspection intervals
p0230 A81-24285
Use of flight simulators in developing design load spectra for new aircraft
[AIAA 81-0513] p0301 A81-29300
Implementing Aircraft Structural Life Management to reduce structural cost of ownership
[SAWE PAPER 1331] p0352 A81-31376

WHITE, D. L.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A098584] p0442 N81-25072

WHITE, E. J.
Recent programs toward predicting aircraft ground handling performance
p0268 N81-19066
Recent progress towards predicting aircraft ground handling performance
[NASA-TM-81952] p0339 N81-21046

WHITE, E. E.
TriStar engine monitoring in British Airways
[SAE PAPER 801224] p0405 A81-34227
Uses of AIDS data in airlines engine maintenance
p0328 N81-20816

WHITE, F. C.
The role of aircraft separation assurance in the

cockpit
p0115 A81-10092

WHITE, G.
A low height 2300 kW helicopter transmission with an enclosed planetary gear
[ASME PAPER 80-C2/DET-17] p0116 A81-10682

WHITE, G. T., III
Status of improved autorotative landing capability research
[AD-A090431] p0076 N81-12072

WHITE, J. R.
Modern control synthesis applied to the longitudinal decoupled motion of an aircraft
[AIAA 81-1839] p0555 A81-44123

WHITE, J. M.
A slot allocation model for high-density airports
[AD-A098097] p0438 N81-28846

WHITE, J. W.
A general mapping procedure for variable area duct acoustics
[AIAA PAPER 81-0094] p0160 A81-20597
Late 80's advanced rotary wing aircraft potential based on ATDE, ACAP, and ITR
p0580 A81-46612

WHITE, H. L.
MM&T: Low cost production/installation of urethane leading edge guards on rotor blades
[AD-A101603] p0582 N81-30117

WHITE, R. E.
Technology advances allow multiple role radar design for the F/A-18
[SAE PAPER 801163] p0399 A81-34179

WHITE, R. P., JR.
The status of rotor noise technology
p0019 A81-12737

WHITE, W. F.
Operational considerations in utilization of microwave landing system approach and landing guidance
p0264 N81-19039
Operational considerations in utilization of microwave landing system approach and landing guidance
[NASA-TM-81945] p0331 N81-20050

WHITEHEAD, D. S.
Force and moment coefficients for high deflection cascades
[CUED/A-TURBO/TR-98] p0090 N81-13021
Gerry casing treatment
[CUED/A-TURBO/TR-101] p0093 N81-13059

WHITELAW, J. H.
Vector and scalar characteristics of opposing jets discharging normally into a cross-stream
p0110 A81-17997

WHITFIELD, A.
The effect of impeller tip design on the performance of a mixed flow turbocharger compressor
[ASME PAPER 81-GT-7] p0310 A81-29932

WHITFIELD, H. L.
Published results of the program of university research. Transportation research results
[PB81-210130] p0641 N81-34108

WHITING, J. M.
Military aircraft avionics in the 1980's
p0050 A81-13169

WHITNEY, W. J.
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center
[SAE PAPER 801122] p0396 A81-34158
Cold-air investigation of first stage of 4-1/2-stage, fan drive turbine with average stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050

WHITTEN, J. W.
A family of supersonic airplanes: Technical and economic feasibility
p0248 N81-18017

WHITTEN, R. C.
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741

WHITTLEY, D. C.
V/STOL aircraft technology in Canada
p0634 N81-33152

WHYTE, T. R.
Use of atmospheric electric fields for vertical stabilization and terrain avoidance
[AIAA 81-1848] p0556 A81-44126

WIBERLEY, S. E.
Composite structural materials
[NASA-CR-163946] p0207 N81-17039
Composite structural materials
[NASA-CR-164634] p0541 N81-28176

WICHMANN, S.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059

WICKEL, E.
Design to cost and systems, LCC
p0047 N81-11920

WICKENHEISER, T. J.
Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067

WIDING, E.
A study of the air inlet efficiency of a combat aircraft concept with dorsal inlet
p0008 A81-11615

WIDMANN, L.
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069

WIDNER, N.
Analyst/IAP interface and interactive graphics
p0057 A81-14270

WIENER, E. L.
Midair collisions - The accidents, the systems, and the Realpolitik
p0052 A81-13413
Human Factors of Flight-deck Automation: NASA/Industry Workshop
[NASA-TM-81260] p0191 N81-16022

WILBECK, J. S.
The development of a substitute bird model
[ASME PAPER 81-GT-23] p0311 A81-29939

WILBY, E. G.
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models
[NASA-CR-159363] p0258 N81-18799

WILBY, J. F.
Noise abatement technology options for conventional turboprop airplanes
[AD-A101828] p0589 N81-30910

WILBY, P. G.
The aerodynamic characteristics of some new RAE blade sections, and their potential influence on rotor performance
p0004 A81-10769

WILCOX, R. T.
Real-time fluoroscopic imaging system for honeycomb bond structures
p0529 A81-43563

WILCZYNSKI, J.
Eddy viscosity in accelerated and retarded cascade-wake flows
p0233 A81-25267

WILDERMUTH, E.
A new helicopter map display device BKG-5
p0418 A81-36967

WILDGOOSE, P.
Metallurgical aspects of materials processing and manufacturing for aero-engine components
[PNR-90019] p0084 N81-12209

WILES, J. A.
Air-to-air gunnery systems test and evaluation
p0544 N81-29073

WILHELM, K.
DFVLR-dynamic model testing in wind tunnels for active controls research
p0014 A81-11670
An analytical study of landing flare
[DFVLR-FB-79-40] p0027 N81-10062
Investigation of landing flare in the presence of wind shear
[ESA-TT-631] p0077 N81-12080

WILHITE, A. W.
The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475

WILKINSON, S. P.
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513

WILLEKENS, A. J. L.
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29088
WILLETT, F. M., JR.
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[NASA-TM-81301] p0492 N81-27061
WILLIAMS, B. R.
The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12038
WILLIAMS, D. L.
Testing model rotorcraft for overwater operations
p0111 A81-18058
WILLIAMS, E. A.
Structural applications for titanium castings
p0510 A81-41637
WILLIAMS, J.
The influence of helicopter operating conditions on rotor noise characteristics and measurement repeatability
p0468 A81-40095
Comparative acoustic wind-tunnel measurements and theoretical correlations on subsonic aircraft propellers at full-scale and model-scale
[AIAA PAPER 81-2004] p0620 A81-48634
WILLIAMS, J. E., JR.
Wing-body carryover at supersonic speeds with finite afterbodies
p0354 A81-31622
WILLIAMS, J. G.
Concepts for improving the damage tolerance of composite compression panels
p0360 A81-32825
Application of BFRP Crack Patching to Mirage III aircraft
p0481 A81-40586
Structural tests on space shuttle thermal protection system constructed with nondensified and densified Li 900 and LI 2200 tile
[NASA-TM-81903] p0257 N81-18410
WILLIAMS, J. W.
Improving surface current injection techniques via one- and two-dimensional models
p0149 A81-19940
WILLIAMS, K. E.
Coast Guard airship development
[AIAA 81-1311] p0455 A81-38528
WILLIAMS, L. J.
Design for supercommuters
p0227 A81-24048
Can advanced technology improve future commuter aircraft
[AIAA PAPER 81-1729] p0536 A81-43959
WILLIAMS, M.
Comparison of selected lift and sideslip characteristics of the Ayres Thrush S2R-800, winglets off and winglets on, to full-scale wind-tunnel data
[NASA-CR-165710] p0423 N81-24026
WILLIAMS, M. H.
Linear/nonlinear behavior in unsteady transonic aerodynamics
[AIAA 81-0643] p0306 A81-29496
WILLIAMS, M. J.
ASW helicopter/sonar dynamics mathematical model
p0470 A81-40115
WILLIAMS, M. S.
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
WILLIAMS, R. C.
Low-speed aerodynamic performance of 50.8-centimeter-diameter noise-suppressing inlets for the Quiet, Clean, Short-haul Experimental Engine (QCSEE)
[NASA-TP-1178] p0035 N81-11037
WILLIAMS, S. M.
Issues of commonality. Volume 2: Issue analysis
[AD-A095416] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047
WILLIAMS, T. L.
Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft
[NASA-TM-81292] p0428 N81-24066
WILLIAMS, W. D.
Laser-Raman/Rayleigh flow diagnostic techniques applied to subsonic flow
[AD-A091695] p0133 N81-142
WILLIAMS, W. J.
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A095617] p0334 N81-200
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 31 December 1980
[AD-A102495] p0596 N81-311
WILLIAMSON, K. D., JR.
Hydrogen - Its technology and implications. Volum
4 - Utilization of hydrogen
p0016 A81-117
WILLIGES, R. C.
Display motion relationships
p0064 A81-15
WILLIS, E. A.
An overview of general aviation propulsion research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-427
An overview of general aviation propulsion research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16
WILLIS, P. J.
A modular low-cost raster-scan colour visual syste
p0203 A81-27
WILLIS, W. S.
Advanced technology engine studies /ATES/ - A status report
[AIAA PAPER 81-1502] p0516 A81-4
Design of a V/STOL propulsion system for a large-scale fighter model
[NASA-CR-166162] p0442 N81-25
WILLSHIRE, W. L., JR.
Ground effects on aircraft noise for a wide-bo
commercial airplane
[AIAA PAPER 81-1988] p0620 A8
Assessment of ground effects on the propagation of aircraft noise: The T-38A flight experiment
[NASA-TP-1747] p0137 N81-14
Lateral attenuation of high-by-pass ratio engined aircraft noise
[NASA-TM-81968] p0394 N81-23
WILSDEN, D. J.
A review of the wall pressure signature and other tunnel constraint correction methods for high angle-of-attack tests
p0435 N81-24
WILSON, C.
Design of an exhaust mixer nozzle for the Avco-Lycoming Quiet Clean General Aviation Turbofan (QCGAT)
[NASA-CR-159426] p0274 N81-191
Design and evaluation of an integrated Quiet, Clean General Aviation Turbofan (QCGAT) engine and aircraft propulsion system
[NASA-CR-165185] p0629 N81-32
WILSON, D. G.
Design analysis of high-efficiency low-stress ceramic gas turbines
[ASME PAPER 81-GT-130] p0316 A81-30
WILSON, D. M.
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688] p0381 N81-22
Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689] p0381 N81-22
Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision
[AD-A096690] p0381 N81-22
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692] p0392 N81-23
Development of maintenance metrics to forecast resource demands of weapon systems
[AD-A104089] p0632 N81-3
WILSON, D. S.
Compressor blade monitoring system for a VA1
(Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17

WILSON, F.
A study of the effect of aft fuselage shape on helicopter drag
p0470 A81-40116

WILSON, F. R.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068

WILSON, F. W.
Operational characteristics comparison /ACV and SES/
[AIAA PAPER 81-2064] p0616 A81-48401

WILSON, G. W.
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046

WILSON, K. H.
Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014

WILSON, N.
Supersonic V/STOL prospects brighten
p0288 A81-28599

WILSON, R.
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068

WILSON, R. E.
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492

WILSON, R. F.
An aircraft landing system employing observers
p0562 A81-44699

WILSON, R. G.
Maintenance program analysis for aircraft structures of the 80's - MSG-3
[SAE PAPER 801214] p0404 A81-34222

WILSON, R. J.
The manufacture of composite rotor blades
p0283 A81-27886

WILSON, S. B., III
Numerical and classical analysis of V/STOL aircraft using selected propulsion systems
[AIAA PAPER 81-1676] p0563 A81-44898

WILSON, V. E.
Superplastic formed and diffusion bonded titanium landing gear component feasibility study
[AD-A092788] p0200 N81-16213

WINDECK, T.
Wind tunnel tests to determine the behavior during ejection of exterior stores at high and low speeds
[DLGR-79-096] p0272 N81-19102

WINDLE, J.
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase
[AD-A102163] p0595 N81-31181

WINGERT, A. L.
Material shortages - Effect on the commercial aircraft industry
[AIAA 81-0508] p0300 A81-29386

WINICK, A. B.
RTCA looks at DABS avionics
p0286 A81-28301

WINIGER, R. T.
Trace chemical analysis methodology
[AD-A090762] p0083 N81-12191

WINSTANLEY, D. K.
The predictability of turbine vane convection heat transfer
[AIAA PAPER 81-1435] p0566 A81-45092

WINSTON, M. M.
Air cargo market outlook and impact via the NASA CLASS project
[NASA-TM-81886] p0073 N81-12039

WINTER, H.
Contribution of the DFVLR to the DAS program
p0452 A81-37657

WINTER, R.
Theory and application of finite element analysis to structural crash simulation
p0416 A81-36614

WINTERHALTER, J. J.
Navstar GPS receiver for satellite applications
p0485 N81-26111

WINTERNUTE, G. E.
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048

WISANDER, D. W.
Effects of geometric variables on rub characteristics of Ti-6Al-4V
[NASA-TP-1835] p0336 N81-20245

WISLER, D. C.
Core compressor exit stage study. Volume 3: Data and performance report for screening test configurations
[NASA-CR-159499] p0078 N81-12086
Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051

WISOTSKY, S.
Pulsed laser mapping system for light aircraft
p0223 A81-23671

WITCOFSKI, R. D.
Rating hydrogen as a potential aviation fuel
[SAE PAPER 80-1152] p0406 A81-34243

WISSMAN, P. L.
Automatic clustering of synthetic aperture radar /SAR/ targets
p0323 A81-30303

WITMER, E. A.
State-of-the-art review of flywheel burst containment
[UCRL-15257] p0085 N81-12427

WITT, R. H.
Titanium net shapes by a new technology. I - F-14A parts evaluation
p0511 A81-41649

WITTE, H. C.
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] p0635 N81-33162

WITTLIFF, C. E.
Further investigations of adaptive-wall wind tunnels
[AD-A091774] p0131 N81-13977
Adaptive-wall wind-tunnel investigations
[AD-A096325] p0343 N81-21088

WITTMEYER, E. E.
Aerodynamic effects of body slots on a guided projectile with cruciform surfaces
[AIAA PAPER 79-1658] p0066 A81-15887

WOELFEL, J.
Definition of investigative areas for human-factor aspects of aircraft accidents
[AD-A101601] p0580 N81-30102

WOELFER, G.
Protection against wing icing for Airbus A300 and A310
[NASA-TM-76504] p0494 N81-27079

WOIKE, O. G.
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194

WOLAK, J.
Effects of geometric variables on rub characteristics of Ti-6Al-4V
[NASA-TP-1835] p0336 N81-20245

WOLF, D. S.
Stress analysis of first turbine vane using a 3-dimensional model with non linear material behavior subjected to transient temperatures
[AIAA PAPER 81-1437] p0504 A81-40873

WOLF, R. R.
High-solids coatings for exterior aircraft
p0169 A81-20861

WOLF, S. W. D.
Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section
[NASA-CR-165685] p0343 N81-21087

WOLFF, E. G.
Microcracking in graphite-epoxy composites
[AD-A089894] p0030 N81-11118

WOLFSHTEIN, M.
Numerical solution of a supersonic ejector pump
p0413 A81-35939

WOLKOVITCH, J.
Application of the joined wing to cruise missiles
[AD-A096450] p0441 N81-25068

WOLVERTON, R. W.
Airborne Systems Software Acquisition Engineering Guidebook for software cost analysis and estimating
[AD-A100215] p0543 N81-28785

WOMER, N. K.
A cost function for military airframes
[AD-A097538] p0394 N81-23966
A cost function for an airframe production program
[AD-A097540] p0394 N81-23967
WONG, R.
Laser beacon collision avoidance systems
p0372 N81-22009
WONG, G. A.
Simulation model to evaluate maintenance strategies for large network of fielded systems
p0613 A81-48009
WONG, R. L. M.
Shielding concepts for jet noise
[AIAA PAPER 81-2020] p0623 A81-49730
WOOD, D.
Battle of the 15 tonne fans
p0480 A81-40457
The 146 emerges from the shadows
p0560 A81-44474
The Lear Fan 2100
p0625 A81-49975
WOOD, E. C.
Special Aviation Fire and Explosion Reduction (SAFER) advisory committee, volume 1
[AD-A092016] p0191 N81-16024
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065
WOOD, H. A.
Part-through crack problems in aircraft structures
p0001 A81-10362
WOOD, J. C.
Test results of the Chrysler upgraded automotive gas turbine engine: Initial design
[NASA-TM-81660] p0588 N81-30562
WOOD, L.
Design analysis of high-efficiency low-stress ceramic gas turbines
[ASME PAPER 81-GT-130] p0316 A81-30034
WOOD, M. E.
Results of oscillatory pitch and ramp tests on the NACA 0012 blade section
[ARA-MEMO-220] p0090 N81-13024
WOOD, M. L.
Active BCAS: Design and validation of the surveillance subsystem
[AD-A095049] p0270 N81-19084
WOOD, R. H.
ATES activity and status at Detroit Diesel Allison
[AIAA PAPER 81-1504] p0516 A81-42206
WOODCOCK, S.
Cathode ray tubes and plasma panels as display devices for aircraft displays
p0212 N81-17069
WOODMAN, A. L.
Vanadium trineodecanoate promoter for fiberglass-polyester soil surfacings
[AD-A091785] p0132 N81-14084
WOODWARD, C. C.
High 'Q' ejection protection device
p0175 A81-22093
WOODWARD, D. E.
Bulkheads in airships
[AIAA 81-1328] p0456 A81-38536
WOODWARD, R. P.
Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48628
WOOLLARD, H. G.
Towing tank tests on model wind turbine rotors
p0055 A81-13860
WOOLLETT, R. R.
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186
WORATSCHEK, R.
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061
Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045
JUH-1H ice phobic coating icing tests
[AD-A096361] p0340 N81-21062
WORRELL, C. L.
Production of LORAN-C reliability diagrams at the Defense Mapping Agency
[AD-A093749] p0206 N81-17026
WORTHY, J. G. B.
The design development and operation of gas turbine radio telemetry systems
[BIR-00733] p0077 N81-12082
WORTMANN, F. X.
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
WOZUMI, J. T.
An engineering model for assessing load sequencing effects
p0172 A81-21737
WRAY, G. L.
An investigation of the linear and angular vibration environments of trials aircraft
p0545 N81-29087
WRAY, P.
The influence of blade wakes on the performance of combustor pre-diffusers
[AIAA PAPER 81-1387] p0502 A81-40856
WRENN, G.
Supersonic cruise research aircraft structural studies: Methods and results
p0246 N81-18008
WRIGHT, C. D.
Aircraft collision avoidance and separation assurance
[SAE PAPER 800616] p0062 A81-15336
WRIGHT, F. F.
L-1011 Flight Management System design considerations
p0113 A81-18076
WRIGHT, G. H.
The M.45SD-02 variable pitch geared fan engine demonstrator test and evaluation experience
p0283 A81-27097
WRIGHT, W. H., JR.
Inspection of turbine blades using computer aided laser technology
[SAE PAPER 801173] p0400 A81-34187
WRONG, C. B.
Turbine engine design
[AIAA PAPER 81-0915] p0408 A81-34362
WU, G. Y.
Recycling of Portland Cement Concrete airport pavements: A state-of-the-art study
[AD-A101482] p0554 N81-30101
WU, J. J.
Jet-diffuser ejector - Attached nozzle design
[NASA-CR-152361] p0278 N81-19012
A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064
WU, S. S.
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891
WU, X.
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825
WU, Y.-F.
The effect of oxygen concentration distribution on altitude relighting performance of a turbo-jet engine combustor
p0295 A81-29859
WU, Z.-Q.
Investigation of the squeeze film bearing on two-spool turbo-fan engine
p0295 A81-29863
WUNDERG, L.
Consolidated Cab Display (CCD) System, Project Planning Document (PPD)
[AD-A098651] p0440 N81-25056
WUENNENBERG, H.
Possibilities for the valuation of different combat aircraft configurations with respect to flight mechanics
p0007 A81-11687
OLGA, a gust alleviation system for improvement of passenger comfort of general aviation aircraft

p0008 A81-11620

WULF, R. H.
Engine diagnostics program: CF6-50 engine performance deterioration
[NASA-CR-159867] p0078 N81-12085

WURSTER, D.
New navigation systems for helicopters
p0177 A81-22167

WYATT, J. C.
Fiber optic technology for data transmission in the helicopter environment
p0573 A81-46610

WYNNE, E. C.
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[NASA-TM-83126] p0445 N81-25432

X

XENAKIS, G.
Automatic helical rotorcraft descent and landing using a Microwave Landing System
[AIAA PAPER 81-1857] p0560 A81-44556

XIE, K.
Analysis and synthesis of the digital attitude control system of the aerospace vehicle
p0224 A81-23837

XIONG, T.-Y.
Some factors affecting altitude relighting performance of turbojet engine combustor
[ASME PAPER 81-GT-49] p0312 A81-29962

XU, S.
Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
p0224 A81-23730

XU, Y.
The matrix analysis of wings
p0108 A81-17818

Y

YAGER, T. J.
Recent progress toward predicting aircraft ground handling performance
p0268 N81-19060
Recent progress towards predicting aircraft ground handling performance
[NASA-TM-81952] p0329 N81-21044

YAKHOT, A.
A new approach to the solution of the boundary layer equations of an ideal compressible flow over a flat plate
p0226 A81-24002

YAMAGISHI, K.
Experimental substantiation for hovering rotor vertical impedance calculations
p0453 A81-38015

YAMAGUCHI, H.
Fundamental studies on the control of turbulent boundary layers. I Theoretical and experimental analyses of velocity profiles and parameters with and without adverse pressure gradient, with uniform suction through a porous flat plate
p0228 A81-24079

YAMANE, T.
Experimental substantiation for hovering rotor vertical impedance calculations
p0453 A81-38015

YAMARTINO, R.
The influence of aircraft operations on air quality at airports
p0553 A81-44079

YAMARTINO, R. J.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses, and submodel development
[AD-A089962] p0201 N81-16628

YANAGITA, T.
The emulsion chamber experiment on super-sonic Concorde /Echos/
p0019 A81-12876

YANG, J. N.
Statistical crack growth in durability and damage tolerant analyses
[AIAA 81-0492] p0300 A81-29382

YANG, L. C.
High-voltage spark carbon-fiber sticky-tape data analyzer
[NASA-CR-163747] p0057 N81-12646

YANG, M.-L.
Application of scaling in afterburner test and development
[ASME PAPER 81-GT-194] p0317 A81-30086

YANG, C.
The automatic matrix force method and techniques for handling more complex computations with given computer capacity
p0108 A81-17815

YANG, T. Y.
Flutter analysis fo two-dimensional and two-degree-of-freedom MBB A-3, CAST 7, an TF-8A supercritical airfoils in small-disturbance unsteady transonic flow
[AD-A100334] p0540 N81-28104

YANG, Z.-J.
Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703

YANGOS, J. P.
Spin - Angles and inertial moments
p0567 A81-46023

YANGOS, P. J.
Spin - Angles and inertial moments
p0567 A81-46023

YAP, B. K.
Staring infrared mosaic observation of an F-15 aircraft
p0463 A81-39636

YARGER, E. B.
Effects of sunlight on display filters
p0326 A81-36352

YATES, E. C., JR.
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[NASA-TM-83126] p0445 N81-25432

YATES, R. E.
Computer-aided methods for redesigning the stabilized pitch control system of a semi-active thermal homing missile
p0051 A81-13250

YAZIFEHDOOST, H.
Rotating blades radio interference in a helicopter-borne CW Doppler radar
p0224 A81-23813

YBARRA, A. H.
Turbulence modeling for application to V/STOL propulsion induced effects: Two dimensional formulation
[AD-A090331] p0072 N81-12026
Additional testing of the inlets designed for a tandem fan V/STOL nacelle
[NASA-CR-165310] p0483 N81-26075

YE, Z.
Structural analysis of fuselages with cutouts by finite element method
p0108 A81-17816

YEAGER, W. T., JR.
Wind tunnel evaluation of aeroelastically conformable rotors
[AHS 80-23] p0475 A81-40153

YEE, J. S.
An extremely lightweight fuselage-integrated phased array for airborne applications
p0348 A81-30779

YEH, L.
High intensity acoustic testing to determine structural fatigue life and to improve reliability in nuclear reactor and aerospace structures

p0455 A81-38372

YEN, J. G.
Analysis and application of compliant rotor technology
p0467 A81-40086

YEN, K. T.
An analytical solution of lift loss for a round planform with a central lifting jet
[AIAA PAPER 81-0011] p0157 A81-20535
Vertical momentum of the fountain produced by multijet vertical impingement on a flat ground plane
p0529 A81-43396

YENNI, K. R.
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142

YETTER, J. A.
Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976

YIN, X.
An approximate analytical method for vortex-lift and centre of pressure on the slender wing
p0223 A81-23726

YIP, L. P.
Results of a low-speed wind tunnel test of the SDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983

YOCHUM, E. H.
The new aviation multiviscosity oil, SAE 20W-50 for general aviation
[SAE PAPER 810573] p0519 A81-42738

YOKOI, S.
Reduction of strut induced rotor blade vibration with the modified stator setting angles
p0295 A81-29097

YORK, P.
Aircraft wing weight build-up methodology with modification for materials and construction techniques
[NASA-CR-166173] p0387 N81-23068

YOSHINAKA, T.
Test results from an analytically designed axial compressor stage of 1.65:1 pressure ratio
[SAE PAPER 800629] p0063 A81-15344

YOSHIOKA, N.
A simple radar for navigation accuracy measurements
p0612 A81-47844

YOSHIZAWA, A.
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14964

YOSO, J.
An experimental study on kerosene-hydrogen hybrid combustion in a gas turbine combustor
p0109 A81-17841

YOST, S. R.
DC-to-DC power supply for light aircraft flight testing
[NASA-CR-163850] p0141 N81-14989

YOU, S.
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825

YOUNG, A. D.
Wind tunnel corrections for high angles of attack: A brief review of recent UK work
p0436 N81-24127

YOUNG, B.
Aircraft hydraulic systems dynamic analysis. Volume 6: Steady state flow analysis SSFAN computer program technical description
[AD-A089240] p0026 N81-10055

YOUNG, C.
An investigation into the possible reduction of aerodynamic drag of a fuel economy vehicle
[BU-240] p0338 N81-21039

YOUNG, C. G.
Gyrocompasses. Citations from the International Aerospace Abstracts data base
[NASA-CR-163675] p0028 N81-10065

YOUNG, D. A.
Avionics system design requirements for the United States Coast Guard HH-65A Dolphin
p0472 A81-40133

YOUNG, J. C.
Guidance and control system research for improved terminal area operations
p0264 N81-19838

YOUNG, J. D.
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021

YOUNG, J. W.
Pseudosteady-state analysis of nonlinear aircraft maneuvers
[NASA-TP-1758] p0094 N81-13065

YOUNG, M. I.
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22536
Stability of large horizontal-axis axisymmetric wind turbines
[NASA-TM-81623] p0085 N81-12046

YOUNG, W. H., JR.
Fluid mechanics mechanisms in the stall process of airfoils for helicopters
p0360 A81-32779
Fluid mechanics mechanisms in the stall process of helicopters
[NASA-TM-81956] p0338 N81-21027

YOUNGBERG, J.
Noise suppression methods for robust speech processing
[AD-A100629] p0551 N81-29323

YOUNGHANS, J. L.
Curved centerline air intake for a gas turbine engine
[NASA-CASE-LEW-13201-1] p0143 N81-14999

YOUNIS, M. E.
A time marching finite volume method for blade-to-blade flows using a body-fitted curvilinear mesh
p0347 A81-30717

YU, J.
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
The distributed parameter system theory of the autopilot design of the slender vehicle
p0224 A81-23835

YU, J. C.
Mean-flow and turbulence measurements in the vicinity of the trailing edge of an NACA (63 sub 1)-012 airfoil
[NASA-TP-1845] p0392 N81-23410

YU, N. J.
Grid generation for general three-dimensional configurations
p0137 N81-14718

YU, Y. H.
Transonic rotor noise - Theoretical and experimental comparisons
p0364 A81-33089
Transonic rotor noise - theoretical and experimental comparisons
[AD-A090806] p0088 N81-12024

YUE, Z.
Supermatrix method for multi-substructure analysis
p0225 A81-23854

YUNIS, M.
A generalized mathematical model to estimate gas turbine starting characteristics
[ASME PAPER 81-GT-202] p0318 A81-30092

YURCZYK, R. F.
Advanced ejection seat for high dynamic pressure escape. Wind tunnel test
[AD-A091810] p0127 N81-13940
Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033

Z

ZABABAKHIN, E. I.
Stationary displacement of a body by a shock wave
p0107 A81-17622

ZABABAKHIN, N. E.
Stationary displacement of a body by a shock wave
p0107 A81-17622

ZABIEREK, D. W.
Blade tip ceramic outer air seal for long life turbine engines
[AIAA PAPER 81-1440] p0500 A81-40874

ZADNIK, M.
Calculation of the flow pattern behind an aircraft

wing
p0349 A81-31041

ZAHEDI, A.
In-flight structural dynamic characteristics of the XV-15 tilt rotor research aircraft
[AIAA 81-0612] p0304 A81-29474

ZAJAC, T.
Materials and processes for aircraft environmental controls in the 1990's
[SAE PAPER 801181] p0401 A81-34194

ZAKHAROV, A. N.
Investigation and improvement of an elbow-type gas outlet of a turboprop engine
p0509 A81-41048

ZAMAN, B. E.
Fiber optics study technology for military aircraft
p0178 A81-22503

ZANDBERGEN, T.
Evaluation of Levinsky's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033

ZANINE, J. J.
ZDRAFT-A graphite code for VTOL aircraft ground footprint visualization
[AD-A093311] p0208 N81-17042

ZANSON, D. F.
A new approach to thick-film resistors
p0232 A81-24960

ZAMERIN, A. G.
Calculation of flow past wings with supersonic sharp edges
p0418 A81-36944

ZATSEPIN, A. G.
A method for measuring the velocity field in a stalled flow
p0287 A81-28523

ZATZ, I. J.
An application of the energy release rate concept to crack growth in attachment lugs
[AIAA 81-0491] p0302 A81-29420

ZEHNER, E.
TORNADO: Flight characteristics at high angles of incidence
[MBB-FE-127/S/PUB/23] p0495 N81-27085

ZEIDLER, V.
Performance assessment of an advanced reheated turbo fan engine
p0432 N81-24094

ZEISEL, X. S.
Evaluation of lightning-induced transients in aircraft using high-voltage shock excitation techniques
p0057 A81-14269

ZEITLER, R. T.
A lightning protection program for the F-16 fly-by-wire system
p0056 A81-14254

ZEITLIN, A. D.
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039

ZELENOV, S. N.
Investigation and improvement of an elbow-type gas outlet of a turboprop engine
p0509 A81-41048

ZELLER, J. R.
Propulsion control and control theory: A new research focus
p0080 N81-12099

ZELLWEGER, A. G.
Availability requirements of the future ATC system
p0617 A81-48556

ZENTSOVA, G. V.
Investigation of transient processes in the perforated working section of a wind tunnel
p0237 A81-26122

ZENNER, K.
New developments of data processing in computer-controlled manufacturing systems /DNC, FMS/
p0149 A81-19845

ZENOBI, T. J.
Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
[AD-A092292] p0191 N81-16025
MPES negative G restraint strap design options
[AD-A098030] p0424 N81-24037

ZHANG, C.
An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826

ZHANG, G.-X.
Experimental investigation of a low hub-to-tip ratio single stage transonic fan
[ASME PAPER 81-GT-209] p0318 A81-30098

ZHANG, S.
Aiming computation for fighter weapon aiming system
p0480 A81-40448

ZHANG, W.
An experimental investigation of the rotating stall, surge, and wake behind the rotor for a single stage axial compressor
p0109 A81-17826

ZHAO, J.
An optimum design procedure of total-temperature thermocouple probes
p0108 A81-17807
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
p0108 A81-17824
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825

ZHAO, Q. S.
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891

ZHAO, Y. N.
Effect of oxygen addition of low pressure ignition performance of aero gas turbine engine at simulated altitude facility
[AIAA PAPER 81-1471] p0505 A81-40891

ZHARKOVA, G. M.
The application of liquid crystals in experimental aerodynamics
p0238 A81-26123

ZHBANOV, IU. K.
Exact solutions of the equations of motion of a gyro horizon compass
p0290 A81-29001

ZHEN, Y.
Finite difference computation of the steady transonic potential flow around airplanes
p0107 A81-17802

ZHENG, L.
The measurement and analysis of station parameters of a turbojet engine
p0109 A81-17825

ZHI-QI, W.
Development of the self-temperature compensated resistance strain gage used up to 700 C
[ASME PAPER 81-GT-118] p0316 A81-30022

ZHIGULEV, V. N.
Thin minimum-drag airfoils
p0123 A81-19630

ZHILIN, IU. L.
The sonic boom from an aircraft flying along an arbitrary path in a stratified atmosphere in the presence of a three-component wind
p0123 A81-19636

ZHOU, D.
Development of an astro-inertial hybrid navigation system and a star tracker
p0420 A81-37383

ZHOU, M.
The calculation of lift and drag characteristics of subsonic wings with winglets
p0480 A81-40442

ZHOU, S.
Calculation of internal and external flow field and cowl pressure drag in the supersonic axisymmetric nose inlets
p0224 A81-23730

ZHOU, X.
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805

ZHU, F.
An aerodynamic design method for transonic axial flow compressor stage
p0108 A81-17805

ZHU, G.
The distributed parameter system theory of the

autopilot design of the slender vehicle
p0224 A81-23835

ZHU, H.
A vaporizing combustor with double combustion spaces
p0109 A81-17827

ZHU, R.
The matrix analysis of wings
p0108 A81-17818

ZHULINA, IU. V.
Detection of moving objects
p0118 A81-18773

ZIEGLER, D. E.
Aircraft sensor quality in SESAME 1979: Results of tower fly-bys and aircraft intercomparison
[PB81-176596] p0552 N81-29722

ZIEMIANSKI, J. A.
Performance deterioration of commercial high-bypass ratio turbofan engines
[SAE PAPER 801118] p0396 A81-34154
Investigation of performance deterioration of the CF6/JT9D high bypass ratio turbofan engines
p0431 N81-24086

ZIESENISS, C.-H.
Energy-saving ramp lighting with high-pressure sodium lamps
p0056 A81-14243

ZIMAN, IA. L.
Comparative efficiency of aircraft and satellites in the remote sensing of earth resources
p0412 A81-35739

ZIMMER, H.
Design, construction and testing of an improved aircraft propeller
p0449 A81-37635
Development and wind tunnel investigation of three supercritical airfoil profiles for transport aircraft
[NASA-TM-75840] p0249 N81-18030
The high lift characteristics in the case of the v-wing concept
[NASA-TM-75872] p0253 N81-18061

ZIMMER, J. A.
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845

ZIMMERMAN, D. K.
Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431

ZIMMERMAN, W. F.
Heat pipe solar receiver with thermal energy storage
p0588 N81-30532

ZINBERG, H.
A low-cost forward fairing for the Bell Long Ranger Helicopter
p0531 A81-43644

ZINCHENKO, V. I.
Solution of nonautomodeled problems of boundary-layer theory taking into account nonstationary conjugate heat exchange and blowing
p0059 A81-14581

ZINCONE, R.
Helicopter gearbox testing
p0488 N81-26137
Advancing blade concept helicopter mission capabilities
p0634 N81-33151

ZINN, B. T.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets
[AIAA PAPER 81-1981] p0624 A81-49736
Prediction of sound radiated from different practical jet engine inlets
[NASA-CR-163824] p0137 N81-14789
Prediction of sound radiation from different practical jet engine inlets
[NASA-CR-164620] p0500 N81-27886
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-164872] p0639 N81-33205

ZIRIN, L. I.
High bypass turbofan component development, modification 2
[AD-A093156] p0215 N81-17093

ZITO, F. P.
Visual confirmation of voice takeoff clearance (VICON) operational evaluation. Volume 2: Operations and maintenance manual
[AD-A098093] p0425 N81-24042

ZITO, F.
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024

ZIV, A.
Numerical solution of a supersonic ejector pump
p0413 A81-35939

ZOLA, C. L.
An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] p0624 A81-49703

ZOLLARS, C. F.
Aircraft maintenance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0859/3] p0125 N81-13917
Technological forecasting--aircraft design. Citations from the International Aerospace data base
[NASA-CR-163033] p0129 N81-13957

ZORIC, D. L.
A long range research programme of noise abatement at the airport of Beograd and its practical results
p0570 A81-46373

ZORUMSKI, W. E.
NASA progress in aircraft noise prediction
p0269 N81-19074

ZRNIC, D. S.
Pulsed Doppler radar detects weather hazards to aviation
[AIAA PAPER 81-0235] p0163 A81-20691

ZUK, J.
Component research for future propulsion systems
p0454 A81-38058
Component research for future propulsion systems
[NASA-TM-82613] p0376 N81-22055

ZUMWALT, G. W.
A computational model for low speed flows past airfoils with spoilers
[AIAA PAPER 81-0253] p0163 A81-20702

ZURINSKAS, T. E.
Proceedings of the 1979 Seminar on Air Traffic Control. Terminal Radar Approach Control (TRACON) facility supervisory desk complex
[AD-A089914] p0034 N81-11024
New terminal radar approach control in tower cab concept for Love Field, Dallas, Texas
[AD-A089996] p0034 N81-11025

ZWAAN, R. J.
A wind-tunnel study of the flutter characteristics of a supercritical wing
p0308 A81-29504

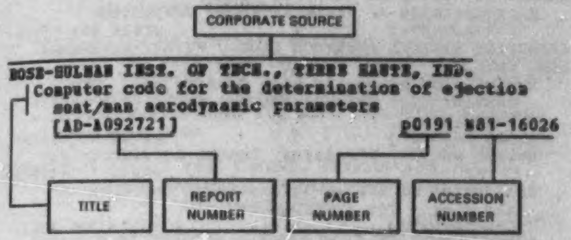
ZWICKE, P. E.
Helicopter gust alleviation - An optimal sampled-data approach
[AHS 80-31] p0476 A81-40161

ZWIEBACK, E. L.
Noise reduction test facilities at Douglas Aircraft
p0570 A81-46375

CORPORATE SOURCE INDEX

1981 Cumulative Index

Typical Corporate Source Index Listing


CORPORATE SOURCE
ROSE-HULMAN INST. OF TECH., TERRE HAUTE, IND.
Computer code for the determination of ejection seat/man aerodynamic parameters
[AD-A092721] p0191 N81-16026
TITLE
REPORT NUMBER
PAGE NUMBER
ACCESSION NUMBER

The title of the document is used to provide a brief description of the subject matter. The page number and NASA accession number are included in each entry to assist the user in locating the abstract.

A

ACUREX CORP., MOUNTAIN VIEW, CALIF.
An automatic isokinetic sampler for particulate emissions from aircraft gas turbine engines
[AD-A090280] p0088 N81-12653
Proceedings of the 4th Workshop on Catalytic Combustion
[PB81-176067] p0588 N81-36700

ADMINISTRATIVE SCIENCES CORP., FALLS CHURCH, VA.
Naval aircraft operating and support cost-estimating model: FY78 revision
[AD-A090044] p0071 N81-12013

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
Comparison of Unsteady Pressure Fields Computed and Measured on the ZKP model
[AGARD-R-688] p0033 N81-11019
Effect of service environment on composite materials
[AGARD-CP-288] p0039 N81-11128
Design to Cost and Life Cycle Cost
[AGARD-CP-289] p0045 N81-11902
A review and assessment of system cost reduction activities
p0045 N81-11906
Report on a cooperative programme on Active Flutter Suppression
[AGARD-R-689] p0082 N81-12115
Advancement on visualization techniques
[AGARD-AG-255] p0211 N81-17063
Application of a structural optimization procedure for advanced wings
[AGARD-R-691] p0333 N81-20064
Visual system Technology: Status and problems
p0336 N81-20099
Structures and Materials Panel
[AD-A089019] p0378 N81-22820
Technical evaluation report on the Fluid Dynamic Panel Symposium on Subsonic/Transonic Configuration/Aerodynamics
[AGARD-AR-146] p0392 N81-23831
Turbine Engine Testing
[AGARD-CP-293] p0429 N81-24071
Wind tunnel corrections for high angle of attack models
[AGARD-R-692] p0435 N81-24120
Precision Positioning and Inertial Guidance Sensors: Technology and Operational Aspects
[AGARD-CP-298] p0484 N81-26091
Helicopter Fatigue Life Assessment
[AGARD-CP-297] p0487 N81-26126
Microcomputer Applications in Power and Propulsion Systems
[AGARD-LS-113] p0497 N81-27103
Characteristics of flight simulator visual systems
[AGARD-AR-164] p0541 N81-28107
Research on the functional limits of a helicopter rotor: Speed and load factor
p0545 N81-29078
Dynamic Stability Parameters
[AGARD-LS-114] p0590 N81-31105
Factors of safety related to structural integrity. A review of data from military airworthiness authorities
[AGARD-R-677] p0596 N81-31186
Aural communication in aviation
[AGARD-CP-311] p0603 N81-31449
The Impact of Military Applications on Rotorcraft and V/STOL Aircraft Design
[AGARD-CP-313] p0632 N81-33137
Investigation of unsteady airloads on wings with oscillating control for active control purposes
[AGARD-R-699] p0635 N81-33161
Manual on the fatigue of structures. 2: Causes and prevention of damage. 7: Mechanical surface damage
[AGARD-MAN-10(ENG)] p0640 N81-33503

AERITALIA S.P.A., TORINO (ITALY).
Effects of nonlinearities on wing store flutter
[MBB-FE-17/S/PUB/27] p0131 N81-13974
Fuel system testing and test instrumentation
p0544 N81-29076

AEROCHEM RESEARCH LABS., INC., PRINCETON, N. J.
Correlation of soot formation in turbojet engines and in laboratory flames
[AD-A100525] p0540 N81-29089

AERODYNAMISCHE VERSUCHSANSTALT, GOETTINGEN (WEST GERMANY).
German activities on wind tunnel corrections
p0436 N81-24124

AERONAUTICAL CONSULTANT ASSOCIATES, RANCHO PALOS VERDES, CALIF.
Application of the joined wing to cruise missiles
[AD-A096450] p0441 N81-25068

AERONAUTICAL RESEARCH INST. OF SWEDEN, BROMMA.
An investigation of a swept wing-body configuration with drooped leading edge at low and transonic speeds
p0189 N81-16012
A review of some investigations on wind tunnel wall interference carried out in Sweden in recent years
p0436 N81-24126

AERONAUTICAL RESEARCH INST. OF SWEDEN, STOCKHOLM.
A comprehensive evaluation and analysis of transonic flow calculations on three related wing-body configurations
[FFA-TN-AU-1418-PT-1] p0022 N81-10013
Application of a method for aerodynamic analysis and design of horizontal axis wind turbines, part 1
[FFA-TN-AU-1499-PT-1] p0096 N81-12633
Downwash calculation at close range behind a trapezoidal wing in supersonic flow
[FFA-TN-AU-1661] p0125 N81-13925
The velocity induced by the wake of a wind turbine in a shear layer, including ground effect
[FFA-TN-AU-2189-PT-3] p0141 N81-14985

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
An introduction to dynamic derivatives (3) methods of oscillating models in pitch and yaw in a 530 by 810 millimetre transonic wind tunnel
[ARL/AERO-NOTE-390] p0021 N81-10007
A six-channel quick-look unit for the aerodynamics division MKI airborne data

acquisition package
[AD-A089975] p0043 N81-11364
Transducer installation for the Sea King MK 50 mathematical model validation flight tests
[AD-A089924] p0043 N81-11365
An experimental investigation of the effects of trailing-edge strips on the unsteady aerodynamic forces on tabs
[AD-A094989] p0263 N81-19028
R.A.N. Sea King cabin environment survey. Part 2: Measurement of temperature and humidty
[AD-A096329] p0341 N81-21065
Sea King mathematical model validation trials. Flight data channel calibration
[AD-A096587] p0374 N81-22043
Application of computer colour raster displays in the cockpit in research flight simulation
[AD-A096542] p0377 N81-22063
Structural design of BFRP patches for Mirage wing repair
[AD-A097195] p0384 N81-23024
An analysis of thermal balance in the cooled cabin of a Sea King Helicopter
[AD-A097199] p0389 N81-23077
Fatigue life variability in aluminum alloy aircraft structures
[AD-A097198] p0391 N81-23249
Transonic wind tunnel measurements of tailplane and elevator effectiveness of the Jindivik 203B target aircraft
[AD-A098180] p0424 N81-24031
A review of Australian investigations on aeronautical fatigue
[AD-A098300] p0426 N81-24051
Analysis of composite laminates and fiber composite repair schemes
[AD-A099629] p0499 N81-27206

AERONAUTICAL RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
An improved flight data transcriber
[AD-A091981] p0201 N81-16430
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 1: Proceedings
[AD-A100575] p0539 N81-28092
AFSC Standarization Conference, 1553, 1589, 1750, 1760, Ada. Volume 2: Proceedings standards
[AD-A100577] p0539 N81-28093

AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AFB, OHIO.
Observing lightning from ground-based and airborne stations
p0136 N81-14566
Comparison of flight load measurements obtained from calibrated strain gages and pressure transducers
[AD-A093758] p0208 N81-17084
Aeronautical systems technology needs: Escape, rescue and survival and test facilities and test equipment
[AD-A097827] p0423 N81-24020
Method for computation of structural failure probability for an aircraft
[AD-A098294] p0426 N81-24050
Prediction of future test needs, test facilities and procedures
p0433 N81-24104
Development of an aircraft maneuver load spectrum based on VGH data
[AD-A102750] p0628 N81-32142

AEROPHYSICS RESEARCH CORP., BELLEVUE, WASH.
GASP- General Aviation Synthesis Program. Volume 1: Main program. Part 1: Theoretical development
[NASA-CR-152303-VOL-1-PT-1] p0270 N81-19088
GASP- General Aviation Synthesis Program. Volume 2: Geometry. Part 1: Theoretical development
[NASA-CR-152303-VOL-2-PT-1] p0270 N81-19089
GASP- General Aviation Synthesis Program. Volume 3: Aerodynamics. Part 1: Theoretical development
[NASA-CR-152303-VOL-3-PT-1] p0270 N81-19090
GASP- General Aviation Synthesis Program. Volume 4: Propulsion. Part 1: Theoretical development
[NASA-CR-152303-VOL-4-PT-1] p0271 N81-19091
GASP- General Aviation Synthesis Program. Volume 5: Weights. Part 1: Theoretical development
[NASA-CR-152303-VOL-5-PT-1] p0271 N81-19092
GASP- General Aviation Synthesis Program. Volume 6: Performance. Part 1: Theoretical development
[NASA-CR-152303-VOL-6-PT-1] p0271 N81-19093
GASP- General Aviation Synthesis Program. Volume 7: Economics. Part 1: Theoretical development
[NASA-CR-152303-VOL-7-PT-1] p0271 N81-19094

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT, BOSCOMBE DOWN (ENGLAND).
Electro-magnetic compatibility: The determination of safety for critical systems
p0545 N81-29079

AEROSPACE CORP., EL SEGUNDO, CALIF.
Microcracking in graphite-epoxy composites
[AD-A089894] p0038 N81-11116

AEROSPACE MEDICAL RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
Toxicity of synthetic high density and conventional hydrocarbon jet fuels to a soil bacterium
[AD-A089527] p0041 N81-11233
Helmet mounted displays: Design considerations
p0213 N81-17073
Evaluation of AFIT/F-16 restraint concepts in the + or - 2Gy environment
[AD-A094323] p0249 N81-18034
Potential of optical Fourier analysis for measuring windscreen distortion
[AD-A094127] p0259 N81-18053
Aircraft transparency optical quality: New methods of measurement
[AD-A096183] p0341 N81-21070
NOISEMAP: The USAF'S computer program for predicting noise exposure around an airport
[AD-A094264] p0446 N81-25570
Effect of propagation distance on aircraft flyover sound duration
[AD-A099694] p0500 N81-27889
The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies 7 and 8
[AD-A100551] p0539 N81-28088
Voice communication research and evaluation system
p0603 N81-31450
Comparative intelligibility of speech materials processed by standard Air Force voice communication systems in the presence of simulated cockpit noise
p0604 N81-31462
Voice communication capability of selected inflight headgear devices
p0604 N81-31467

AEROVIRONMENT, INC., PASADENA, CALIF.
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
Definitive generic study for the effect of high lift airfoils on wind turbine effectiveness, executive summary
[SERI/TR-98003-2] p0043 N81-11492

AIR CRUISERS CO., BELMAR, N.J.
Development of retardation and automatic flotation system (R.A.F.T.)
[AD-A096828] p0439 N81-25047

AIR FORCE ACADEMY, COLO.
B-52 wake investigation
[LOG-C3932] p0072 N81-12020
Modal analysis for aircraft response to runway surface roughness
[AD-A092057] p0194 N81-16043
Measurement of canard wakes
[AD-A095063] p0263 N81-19029
An investigation of two safe escape from base flight profiles
[AD-A096571] p0373 N81-22034

AIR FORCE ARMAMENT LAB., EGLIN AFB, FLA.
Velocity tolerance of escape systems
[AD-A096881] p0373 N81-22035

AIR FORCE ENGINEERING AND SERVICES CENTER, TYNDAL AFB, FLA.
Fuel jettisoning by U.S. Air Force aircraft. Volume 1: Summary and analysis
[AD-A089010] p0032 N81-10580
Fuel jettisoning by U.S. Air Force aircraft. Volume 2: Fuel dump listings
[AD-A089076] p0032 N81-10581
USAF Aircraft Engine emission goals, a critical review

[AD-A090282] p0087 N81-12651
The implications of alternative aviation fuels on airbase air quality
[AD-A090283] p0087 N81-12652

AIR FORCE FLIGHT DYNAMICS LAB., WRIGHT-PATTERSON AFB, OHIO.
Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11604
Optimal design studies on composite wings with static and dynamic constraints
[AAAF-NT-79-29] p0077 N81-12077
Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116
Application of fracture mechanics to US Air Force aircraft structural integrity requirements
[AAAF-NT-79-25] p0086 N81-12463
Evaluation of the impact computer program as a linear design tool for bird resistant aircraft transparencies
[AD-A091051] p0091 N81-13039

AIR FORCE FLIGHT TEST CENTER, EDWARDS AFB, CALIF.
Flight test handbook: Flying qualities theory and flight test techniques
[AD-A090525] p0076 N81-12073
Air-to-air gunnery systems test and evaluation
p0544 N81-29073
Aircraft brake systems testing handbook
[AD-A101516] p0548 N81-29123

AIR FORCE HUMAN RESOURCES LAB., BROOKS AFB, TEX.
Advanced flight simulator: Utilization in A-10 conversion and air-to-surface attack training
[AD-A094606] p0254 N81-18066
Training effectiveness of platform motion: Review of motion research involving the advanced simulator for pilot training and the simulator for air-to-air combat
[AD-A095930] p0343 N81-21089
Actual versus simulated equipment for aircraft maintenance training: Cost implications of the incremental versus the unique device
[AD-A102388] p0590 N81-31104

AIR FORCE HUMAN RESOURCES LAB., WRIGHT-PATTERSON AFB, OHIO.
Optical infinity lens development for flight simulator visual displays
p0212 N81-17071

AIR FORCE INST. OF AVIATION MEDICINE, FUERSTENFELDBRUCK (WEST GERMANY).
The effects of ear protectors and hearing losses on sentence intelligibility in aircraft noise
p0604 N81-31464

AIR FORCE INST. OF AVIATION MEDICINE, MANCHING (WEST GERMANY).
Voice warning systems: Some experimental evidence concerning application
p0603 N81-31458

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
An analysis of Air Force management of Turbine Engine Monitoring Systems (TEMS)
[AD-A089365] p0028 N81-10070
A controlled evaluation of the differences between two approaches to reliability investment screening
[AD-A087506] p0031 N81-10446
Time dependent Navier-Stokes solution of a turbulent gas jet ejected from a rectangular orifice into a high-subsonic crossflow
p0136 N81-14964
A feasibility study for advanced technology integration for general aviation
[AD-A092437] p0185 N81-15975
Aircrew compliance with standard operating procedures as a component of airline safety
[AD-A092443] p0191 N81-16023
The effects of the direction of control loading on a one-dimensional tracking task
[AD-A092459] p0197 N81-16067
Application of scheduling heuristics on the aircraft maintenance depot
[AD-A094815] p0261 N81-19015
Calculation of airloads for a flexible wing via NASTRAN
[AD-A094770] p0263 N81-19031
A higher-order trapezoidal vector vortex panel for subsonic flow
[AD-A094775] p0263 N81-19032
An interactive computational aerodynamics analysis program
[AD-A094765] p0263 N81-19033
Time-constrained maximum-energy turns
[AD-A094733] p0273 N81-19107
Investigation of an improved flutter speed prediction technique for damaged T-38 horizontal stabilators using NASTRAN
[AD-A094769] p0273 N81-19109
Validation of the Wright-Patterson vertical wind tunnel
[AD-A094777] p0277 N81-19143
Optimization of strategic airlift in flight refueling
[AD-A101137] p0539 N81-28090
Quantifying reactive maneuvers
[AD-A101136] p0539 N81-28091
Flight control system analysis and design for a remotely piloted vehicle with thrust vectoring unit
[AD-A100808] p0540 N81-28105
Survivability study of a FLIR equipment fighter on a night penetration of a Soviet army
[AD-A101186] p0547 N81-29120
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digital 2 aircraft
[AD-A100794] p0549 N81-29136
Multiple arrested synthetic aperture radar
[AD-A101143] p0551 N81-29317
Computer analysis of 400 HZ Aircraft electrical generator test data
[AD-A100785] p0552 N81-29354
Maximum information trajectory for an air to air missile intercept
[AD-A101497] p0585 N81-30160
A study of the factors affecting productivity at the Naval Air Rework Facilities
[AD-A103783] p0631 N81-33134
A prescriptive model for resource allocation at the intermediate level engine facility
[AD-A103785] p0632 N81-33135

AIR FORCE MATERIALS LAB., WRIGHT-PATTERSON AFB, OHIO.
Air Force technical objective document FY 1981
[AD-A089709] p0048 N81-12010

AIR FORCE PACKAGING EVALUATION AGENCY, WRIGHT-PATTERSON AFB, OHIO.
Evaluation/redesign of the F-105 pitch rate gyro pack
[AD-A092109] p0194 N81-16048
Test and evaluation of foam-in-place fuel tank container
[AD-A095747] p0334 N81-20073

AIR FORCE SPACE DIV., LOS ANGELES, CALIF.
Navstar field test results
p0484 N81-26100

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Investigation of a strapdown attitude and heading reference system utilizing ring laser gyros
p0484 N81-26092
Who needs engine monitoring?
p0599 N81-31209
F100 engine diagnostic system status to date
p0599 N81-31210

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0150 A81-20566
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878
Air Force applications and in-service experience with composite structures
p0041 N81-11148
The role of advanced technology of turbine engine life cycle cost
p0047 N81-11927
Design of a lateral stability augmentation system for the F106 to improve lateral handling qualities during tracking
[AD-A091014] p0094 N81-13067
Effects of downstream distance on turbulence decay for the compressor research facility low

conditioning system
[AD-A091543] p0133 N81-14276
A wind tunnel investigation of the aerodynamic characteristics of forward swept wings
p0189 N81-16011
Flame tube and ballistic evaluation of Explosafe aluminum foil for aircraft fuel tank explosion protection
[AD-A093542] p0208 N81-17046
Experiments with a supersonic multi-channel radial diffuser
[AD-A094192] p0257 N81-18374
Estimation and statistical averaging applied to redundant strapped down inertial sensors for navigation and flight control
[AD-A094465] p0276 N81-19133
Calibration of an axial fan at various power settings for use on a quarter scale XC-8A air cushion model
[AD-A097043] p0374 N81-22042
Vibration test level criteria for aircraft equipment
[AD-A098675] p0442 N81-25070
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260
A continuously reconfiguring multi-microprocessor flight control system
[AD-A101412] p0584 N81-30138
High angle of attack missile aerodynamic at Mach numbers 0.30 to 1.5
[AD-A010210] p0585 N81-30159
Determination of aerodynamically adequate fillet geometry in turbocompressor blade rows
[AD-A102170] p0600 N81-31219
Views on V/STOL tactical fighter aircraft: Technology needs and relationships to the runway denial problems
p0632 N81-33142

AIR FRANCE, PARIS.
Turbine engine tests as seen by an aircraft company
p0430 N81-24084

AIRCRAFT RESEARCH AND DEVELOPMENT UNIT, EDINBURG (AUSTRALIA).
Fitment of TAMAM standby attitude indicators to Macchi aircraft
[AD-A089378] p0035 N81-11036
Pilatus porter: Provision of revised take-off and landing performance data
[AD-A089964] p0076 N81-12068
Development of an instrument for the accurate measurement of aircraft airspeed and altitude
[AD-A103421] p0638 N81-33204

AIRCRAFT RESEARCH ASSOCIATION LTD., BEDFORD (ENGLAND).
Results of oscillatory pitch and ramp tests on the NACA 0012 blade section
[ARA-MEMO-220] p0090 N81-13024
An investigation into grid patching techniques
p0137 N81-14708
Prospects for exploiting favourable and minimizing adverse aerodynamic interference in external store installations
p0187 N81-15996

AIRESEARCH MFG. CO., PHOENIX, ARIZ.
Small Transport Aircraft Technology /STAT/ Propulsion Study
[SAE PAPER 801198] p0402 A81-34208
Compound Cycle Turbofan Engine (CCTE). Task 9: Carbon-Slurry Fuel Combustion Evaluation Program
[AD-A089451] p0029 N81-10072
Cost/benefit analysis of advanced materials technology candidates for the 1980's, part 2
[NASA-CR-165176] p0048 N81-11953
Low-cost directionally-solidified turbine blades, volume 2
[NASA-CR-159562] p0078 N81-12088
General Aviation Turbine Engine (GATE) study
[NASA-CR-159482] p0274 N81-19117
QCGAT mixer compound exhaust system design and static big model test report
[NASA-CR-135386] p0274 N81-19119
Development of test requirements for civil and military auxiliary power units
p0430 N81-24083
Abradable compressor and turbine seals, volume 2
[NASA-CR-159662] p0497 N81-27098

AIRESEARCH MFG. CO., TORRANCE, CALIF.
Crash survivable flight data recording system study
[AD-A101503] p0583 N81-30127

AKRON UNIV., OHIO.
Nonlinear rotor dynamics analysis
p0257 N81-18405

ALABAMA UNIV., UNIVERSITY.
Prediction of particle paths for flow of a gas/solids suspension through a cascade of flat plates
p0256 N81-18352

ALFA ROMEO S.P.A., NAPLES (ITALY).
Rig investigation of a two stage single shaft low cost turbine
p0432 N81-24099

ALLEN CLARK RESEARCH CENTRE, TOWCESTER (ENGLAND).
The electrical effects of joints and bonds in carbon fiber composites
p0199 N81-16153

AMAF INDUSTRIES, COLUMBIA, MD.
Impact of low altitude coverage requirements on air-ground communications
[AD-A101642] p0586 N81-30338

AMERICAN AIRLINES, INC., TULSA, OKLA.
A new method for estimating transport aircraft direct operating costs
p0046 N81-11935

AMERICAN ELECTRONIC LABS., INC., LANSDALE, PA.
Low cost airborne microwave landing system receiver, task 3
[NASA-CR-152409] p0075 N81-12054

ANALYTIC SCIENCES CORP., READING, MASS.
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 1: Technical approach
[AD-A092741] p0192 N81-16030
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 2: Individual station diagrams
[AD-A092742] p0192 N81-16031
Omega signal coverage prediction diagrams for 10.2 kHz. Volume 4: Bearing angle tables
[AD-A092744] p0192 N81-15032
Research in multirate estimation and control
[AD-A096070] p0253 N81-18062

ANALYTICAL MECHANICS ASSOCIATES, INC., HAMPTON, VA.
Guidance and control system research for improved terminal area operations
p0264 N81-19038
Terminal area automatic navigation, guidance, and control 1: Automatic rollout, turnoff, and taxis
[NASA-CR-3451] p0600 N81-31224

ANALYTICAL MECHANICS ASSOCIATES, INC., MOUNTAIN VIEW, CALIF.
Application of trajectory optimization principles to minimize aircraft operating costs
p0155 A81-20466
Airborne method to minimize fuel with fixed time-of-arrival constraints
p0351 A81-31297
Practical solutions to the aircraft minimum fuel, fixed-range, fixed time-of-arrival trajectory optimization problem
p0563 A81-45515
Generation of optimum vertical profiles for an advanced flight management system
[NASA-CR-165674] p0331 N81-20051

ANNAWERK KERAMISCHE BETRIEBE G.M.B.H., RODENTAL (WEST GERMANY).
Development of gas turbine components, using silicon nitride
[BMFT-FB-T-79-152] p0275 N81-19129
Development of high strength silicon carbide materials for gas turbine applications
[BMFT-FB-T-80-025] p0497 N81-27102

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
The 17th JANNAF combustion meeting, volume 1
[NASA-TM-82238] p0200 N81-16253

ARGONNE NATIONAL LAB., ILL.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 1: Recent airport measurement programs, data analyses,

and submodel development
[AD-A089962] p0201 N81-16628
ARINC RESEARCH CORP., ANNAPOLIS, MD.
Aircraft modification management evaluation
[AD-A096458] p0381 N81-22974
Development of avionics installation interface standards
[AD-A101423] p0503 N81-30128
Cost benefit and failure criticality analyses of the Standard Avionics Integrated Control System (SAICS) concept
[AD-A102197] p0629 N81-32144
ARIZONA STATE UNIV., TEMPE.
Streamwise flow and heat transfer distributions for jet array impingement with crossflow
[ASME PAPER 81-GT-77] p0313 A81-29985
ARIZONA UNIV., TUCSON.
Transonic flow studies
[NASA-CR-163965] p0249 N81-18029
ARMAMENT DEVELOPMENT AND TEST CENTER, EGLIN AFB, FLA.
Tactical navigation system testing
p0544 N81-29066
ARMY AEROMEDICAL RESEARCH LAB., FORT RUCKER, ALA.
Vibration in a Helmet Mounted Sight (HMS) using mechanical linkage
[AD-A098533] p0442 N81-25071
ARMY AVIATION CENTER, FORT RUCKER, ALA.
Fielding of an advanced helicopter. The UH-60A Black Hawk: Initial operational experience
p0632 N81-33141
ARMY AVIATION DEVELOPMENT TEST ACTIVITY, FORT RUCKER, ALA.
Functional testing airborne navigation equipment
[AD-A097115] p0387 N81-23062
Functional testing airborne radars
[AD-A097562] p0392 N81-23358
ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
Preliminary airworthiness evaluation AH-1S helicopter with ogee tip shape rotor blades
[AD-A089625] p0027 N81-10061
Preliminary airworthiness evaluation AH-1S (PROD) helicopter equipped with a substitute straight exhaust pipe
[AD-A092614] p0194 N81-16045
Preliminary Airworthiness Evaluation (PAE 1) of the YCH-47D helicopter
[AD-A092633] p0194 N81-16046
Preliminary airworthiness evaluation OH-58C helicopter configured with a mast mounted sight
[AD-A094172] p0252 N81-18052
JUH-1H ice phobic coating icing tests
[AD-A096361] p0340 N81-21062
Artificial and natural icing tests production UH-60A helicopter
[AD-A096239] p0340 N81-21063
AH-1S (Prod) airworthiness and flight characteristics for instrument flight
[AD-A100946] p0548 N81-29121
AH-1 lightweight airborne launcher jettison evaluation
[AD-A101461] p0582 N81-30119
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, CLEVELAND, OHIO.
An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168
Effects of geometric variables on rub characteristics of Ti-6Al-4V
[NASA-TP-1835] p0336 N81-20245
Component research for future propulsion systems
[NASA-TM-82613] p0376 N81-22055
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, FORT EUSTIS, VA.
Test and evaluation of improved aircrew restraint systems for combat helicopers
p0205 N81-17017
Combat damage assessment
p0488 N81-26132
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, HAMPTON, VA.
Wind-tunnel test of an articulated helicopter rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13918
A flight investigation of performance and loads for a helicopter with NC-SC2 main-rotor blade sections
[NASA-TM-81898] p0186 N81-15982
Fluid mechanics mechanisms in the stall process of helicopters
[NASA-TM-81956] p0338 N81-21027
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, MOFFETT FIELD, CALIF.
The role of the research simulator in the systems development of rotorcraft
[NASA-TM-81276] p0272 N81-19101
The role of the research simulator in the systems development of rotorcraft
p0633 N81-33146
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, ST. LOUIS, MO.
The XV-15 tilt rotor research aircraft
[NASA-TM-81244] p0026 N81-10054
US Army design-to-cost experience
p0045 N81-11905
LR-80 flight test report
[AD-A090284] p0075 N81-12050
An airborne programmable digital to video converter interface and operation manual
[AD-A096422] p0446 N81-25691
Synopsis of Specialists' Meeting on Helicopter Fatigue Methodology
p0487 N81-26129
ARMY AVIONICS RESEARCH AND DEVELOPMENT ACTIVITY, FORT MONMOUTH, N. J.
Army GPS-doppler hybrid navigation system
[AD-A090394] p0075 N81-12062
Electronic voice communications improvements for Army aircraft
p0603 N81-31454
ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
Fabric installation to minimize reflection crack on taxiways at Thule Airbase, Greenland
[AD-A103737] p0639 N81-33214
ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
Community reaction to impulse noise: Initial Army survey
[AD-A101674] p0580 N81-30659
ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Porous portland cement concrete: The state of the art
[AD-A098177] p0436 N81-24187
ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Acoustic emission as a NDE technique for determining composite rotor blade reliability
[AD-A090440] p0076 N81-12070
Computer techniques for ultrasonic inspection
[AD-A095285] p0337 N81-20447
ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
Field evaluation of the LR80 land navigation system
[AD-A091885] p0193 N81-16035
Investigation of plume induced separation on a full-size missile at supersonic velocities
[AD-A094742] p0277 N81-19212
ARMY PROPULSION LAB., CLEVELAND, OHIO.
Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-34166
Component research for future propulsion systems
p0454 A81-38058
Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-43842
The response of turbine engine rotors to interference rubs
[AD-A090408] p0093 N81-13060
ARMY RESEARCH AND TECHNOLOGY LABS., FORT EUSTIS, VA.
Status of improved autorotative landing capability research
[AD-A090431] p0076 N81-12072
On the use of active higher harmonic blade pitch control for helicopter vibration reduction
[AD-A090398] p0076 N81-12074
ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
The XV-15 tilt rotor research aircraft
p0100 A81-16588
The challenge of unsteady separating flows
p0417 A81-35647

Development of a comprehensive analysis for
rotorcraft. I - Rotor model and wake analysis
p0465 A81-39896
Investigation of control, display, and
crew-loading requirements for helicopter
instrument approach
[AIAA 81-1820] p0555 A81-44110
A flight investigation of static stability,
control augmentation, and flight director
influences on helicopter IFR handling qualities
p0574 A81-46623
A piloted simulation of the backup control
system engagement for the YAH-64
p0576 A81-46646
Experimental and analytical studies of a model
helicopter rotor in hover
[AD-A089780] p0035 N81-11033
Stability of nonuniform rotor blades in hover
using a mixed formulation
[AD-A090756] p0076 N81-12071
Transonic rotor noise - theoretical and
experimental comparisons
[AD-A090806] p0088 N81-12824
Viscous-inviscid interaction on oscillating
airfoils in subsonic flow
[AD-A093970] p0203 N81-16983
Characteristics of flight simulator visual systems
[NASA-TM-81278] p0340 N81-21060
ARMY RESEARCH INST. FOR THE BEHAVIORAL AND SOCIAL
SCIENCES, ALEXANDRIA, VA.
Helicopter electro-optical system display
requirements. 1. The effects of CRT display
size, system gamma function, and terrain type
on pilots required display luminance
[AD-A089755] p0035 N81-11035
ARMY STRUCTURES LAB., HAMPTON, VA.
Effects of commercial aircraft operating
environment on composite materials
p0182 A81-22681
ARMY TEST AND EVALUATION COMMAND, ABERDEEN PROVING
GROUND, MD.
Aircraft icing instrumentation: Unfilled needs
p0135 N81-14560
Functional testing communication equipment
(avionics)
[AD-A092825] p0201 N81-16375
Testing aircraft instruments
[AD-A095680] p0334 N81-20075
ARO, INC., ARNOLD AIR FORCE STATION, TENN.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
Wind tunnel investigation of the aerodynamic
hysteresis phenomenon on the F-4 aircraft and
its effects on aircraft motion
[AD-A089851] p0033 N81-11016
An evaluation of statistical methods for the
prediction of maximum time-variant inlet total
pressure distortion
[AD-A089817] p0036 N81-11040
Missile motion sensitivity to dynamic stability
derivatives
[AD-A089750] p0038 N81-11093
Performance evaluation of a prototype
noninterference technique for measurement of
turbine engines compressor blade stress
[AD-A090566] p0094 N81-13061
A direct model pitch measurement with a laser
interferometer using retroreflectors
[AD-A090722] p0094 N81-13068
An evaluation of wind tunnel test techniques for
aircraft nozzle afterbody testing at transonic
Mach numbers
[AD-A091775] p0126 N81-13931
Evaluation of wind tunnel nozzle afterbody test
techniques utilizing a modern twin engine
fighter geometry at Mach numbers from 0.6 to 1.2
[AD-A091545] p0126 N81-13932
Laser-Raman/Rayleigh flow diagnostic techniques
applied to subsonic flow
[AD-A091695] p0133 N81-14275
Laser scattering applications development test
in AEDC tunnel B at Mach number 8
[AD-A093929] p0217 N81-17105
Evaluation of the acoustic and aerodynamic
characteristics of several slot-baffle
configurations for transonic wind tunnel walls
[AD-A093957] p0217 N81-17106
Effects of window configuration on model
pressure distribution in wind tunnels with
perforated walls
[AD-A094213] p0277 N81-19142
Inlet-engine compatability testing techniques in
ground test facilities
p0431 N81-24090
Investigations of free-jet test requirements and
techniques with emphasis on the adaptable jet
stretcher
[AD-A098710] p0439 N81-25044
Sting interference effects on the static dynamic
and base pressure measurements of the standard
dynamics model aircraft at Mach numbers 0.3
through 1.3
[AD-A102612] p0627 N81-32124
Captive aircraft testing at high angles of attack
[AD-A103108] p0628 N81-32140
Supplemental calibration of the AEDC-PWT 16 ft
transonic tunnel aerodynamic test section
[AD-A102384] p0630 N81-32155
Wind tunnel testing of a windshield material or
supersonic aircraft
[AD-A103383] p0635 N81-33163
ASSOCIATION AERONAUTIQUE ET ASTRONAUTIQUE DE
FRANCE, PARIS.
Examination of the vortex regime for highly
swept wings by extrapolation of the Jones method
[AAAF-NT-80-25] p0204 N81-16992
ATLANTIC RESEARCH CORP., GAINESVILLE, VA.
Effects of advances in propulsion technology on
missile effectiveness
[AD-A090645] p0081 N81-12106
ATOMIC ENERGY COMMISSION RESEARCH ESTABLISHMENT,
RISO (DENMARK).
Static deflection and eigenfrequency analysis of
the Nibe wind turbine rotors. Theoretical
background
[RISO-M-2199] p0279 N81-19497
AUBURN UNIV., ALA.
Automatic handoff of multiple targets
[AD-A093483] p0217 N81-17101
An aerodynamic analysis of deformed wings in
subsonic and supersonic flow
[AD-A101675] p0580 N81-30091
AUTOMATION INDUSTRIES, INC., SILVER SPRING, MD.
Recommended short-term ATC improvements for
helicopters. Volume 2: Recommended
helicopter ATC training material
[AD-A089441] p0024 N81-10029
Recommended short-term ATC improvements for
helicopters. Volume 3: Operational
description of experimental LORAN-C flight
following (LOFF) in the Houston area
[AD-A089385] p0024 N81-10030
Proposed ATC system for the Gulf of Mexico:
Helicopter operations development program
[AD-A089430] p0025 N81-10036
Preliminary test plans of ATC concepts for
longer term improvement helicopter development
program
[AD-A089407] p0025 N81-10037
Recommendations for short-term simulation of ATC
concepts. Helicopter operations development
program
[AD-A089435] p0025 N81-10038
Recommended short-term ATC improvements for
helicopters. Volume 1: Summary of short term
improvements
[AD-A089521] p0025 N81-10041
Wind shear systems integration plan, VICON
(visual confirmation) reliability analysis
[PB80-218233] p0128 N81-13949
Wind shear systems implementation plan,
benefit/cost study
[AD-A094168] p0253 N81-18055
AVCO LYCOMING DIV., STRATFORD, CONN.
Design of an exhaust mixer nozzle for the
Avco-Lycoming Quiet Clean General Aviation
Turbofan (QCGAT)
[NASA-CR-159426] p0274 N81-19120
Regenerative engine analysis program
[AD-A095144] p0274 N81-19123
High performance auxiliary power unit technology
demonstrator
[AD-A098618] p0444 N81-25085
Design and evaluation of an integrated Quiet,
Clean General Aviation Turbofan (QCGAT) engine
and aircraft propulsion system
[NASA-CR-165185] p0629 N81-32147

AVCO SYSTEMS DIV., WILMINGTON, MASS.
State-of-the-art review of flywheel burst containment
[UCRL-15257] p0085 N81-12427
AVIONS MARCEL DASSAULT, SAINT-CLOUD (FRANCE).
Design-to-cost and new technologies
p0046 N81-11913
Finite element method study of wing-fuselage-nacelle interactions of a Falcon 20 type aircraft at Mach = 0.75
p0187 N81-15994
AVIONS MARCEL DASSAULT-BREGUET AVIATION, SAINT-CLOUD (FRANCE).
Mirage 2000 and Mirage 4000 fiber structures
[AAAF-NT-79-44] p0083 N81-12103
A conversational, topological grid method and optimization of structural calculations involving finite elements
[AAAF-NT-79-30] p0210 N81-17053
Limiting application of the concept 'damage tolerance' with regard to fighter aircraft
[AAAF-NT-79-32] p0210 N81-17054
First results obtained with a rotating construction
[AAAF-NT-80-14] p0218 N81-17109

B

BAISCH ENGINEERING PROPRIETARY LTD. (SOUTH AFRICA).
Metalspinning, shear- and flowforming
p0551 N81-29281
BALL AEROSPACE SYSTEMS DIV., BOULDER, COLO.
Advanced microstrip antenna development. Volume 1: Technology studies for aircraft phased arrays
[AD-A103837] p0640 N81-33390
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Surface pressure measurements on a projectile shape at Mach 0.908
[AD-A098589] p0439 N81-25045
BARNA (P. STEPHEN), CONSULTANT, NORFOLK, VA.
Experimental investigations on the V/STOL tunnel at NASA/Langley Research Center
[NASA-CR-165655] p0329 N81-20028
BATTELLE COLUMBUS LABS., MOUNTAIN VIEW, CALIF.
NASA Aviation Safety Reporting System
[NASA-TM-81225] p0023 N81-10021
A review of in-flight emergencies in the ASRS data base
[NASA-CR-166166] p0372 N81-22031
Potential effects of the introduction of the discrete address beacon system data link on air/ground information transfer problems
[NASA-CR-166165] p0373 N81-22037
Operational problems experienced by single pilots in instrument meteorological conditions
[NASA-CR-166236] p0581 N81-30106
BATTELLE COLUMBUS LABS., OHIO.
Computer-aided roll pass design in rolling of airfoil shapes
p0065 A81-15796
Evaluation of safety programs with respect to the causes of general aviation accidents. Volume 2: Appendices
[AD-A089181] p0023 N81-10023
Polymer research in rapid runway repair materials
[AD-A089606] p0030 N81-10080
Mechanical property improvement of protective coatings for turbine engines using coal-derived fuels
[DOE/ET-12293/T1] p0094 N81-13064
Feasibility evaluation of advanced multifrequency eddy current technology for use in naval air maintenance environment
[AD-A093314] p0220 N81-17476
AIRCL: A programmed system for generating NC tapes for airplane models. User's manual
[NASA-CR-165687] p0340 N81-21050
A study of ASRS reports involving general aviation and weather encounters
[NASA-CR-166212] p0493 N81-27063
An investigation of reports of Controlled Flight Toward Terrain (CFTT)
[NASA-CR-166230] p0586 N81-29100
ATC contingency operations in the en-route flight regime
[NASA-CR-166231] p0586 N81-29110
BDM CORP., MCLEAN, VA.
Definition of investigative areas for human-factor aspects of aircraft accidents
[AD-A101601] p0580 N81-30102
BEAM ENGINEERING, INC., SUNNYVALE, CALIF.
Static source locations for four nozzles mounted on a J-85 engine
[NASA-CR-152401] p0143 N81-14998
BEECH AIRCRAFT CORP., WICHITA, KANS.
Application of advanced technologies to derivatives of current small transport aircraft
[NASA-CR-166197] p0637 N81-33190
BELL AEROSPACE CO., BUFFALO, N. Y.
Design and fabrication of a stringer stiffened discrete-tube actively cooled panel for a hypersonic aircraft
[NASA-CR-3403] p0279 N81-19404
BELL HELICOPTER CO., FORT WORTH, TEX.
Experimental installation of mast mounted sight on an OH-58C helicopter
[AD-A091074] p0092 N81-13047
Fault-tolerant actuation concept for a research test aircraft
[AD-A093113] p0216 N81-17100
Helicopter external load acquisition technology investigation
[AD-A094672] p0272 N81-19106
BENDIX CORP., BALTIMORE, MD.
Tactical miniature crystal oscillator
[AD-A098490] p0440 N81-25056
BENDIX CORP., DETROIT, MICH.
Multivariable synthesis with transfer functions
p0080 N81-12102
BENDIX CORP., TETERBORO, N. J.
Cockpit simulation study of use of flight path angle for instrument approaches
[NASA-CR-165708] p0425 N81-24040
BIHRLE APPLIED RESEARCH, INC., JERICHO, N. Y.
Rotary balance data for a single engine general aviation design having a high aspect-ratio canard for an angle-of-attack range of 30 deg to 90 deg
[NASA-CR-3170] p0090 N81-13022
Rotary balance data for a single-engine agricultural airplane configuration for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3311] p0125 N81-13923
BIOTECHNOLOGY, INC., FALLS CHURCH, VA.
A flight investigation of simulated data-link communications during single-pilot IFR flight. Volume 1: Experimental design and initial test
[NASA-CR-3461-VOL-1] p0595 N81-31171
BLANCHARD (W. S., JR.), HAMPTON, VA.
A flight investigation of the ultra-deep-stall descent and spin recovery characteristics of a 1/6 scale radiocontrolled model of the Piper PA38 Tomahawk
[NASA-CR-156871] p0343 N81-21004
BLUME (JOHN A.) AND ASSOCIATES RESEARCH DIV., SAN FRANCISCO, CALIF.
Wind loading and response of a high-rise building
[COMP-810104-1] p0256 N81-18259
BODENSEEWERK GERAETETECHNIK G.M.B.H., UEBERLINGEN (WEST GERMANY).
Improvement of guidance and handling qualities in the vicinity of airports and on landing
[BMFT-FB-W-79-42] p0425 N81-24045
BOEING AEROSPACE CO., SEATTLE, WASH.
Design to life cycle cost research
p0045 N81-11907
Design, fabrication and test of graphite/polyimide composite joints and attachments for advanced aerospace vehicles
[NASA-CR-159112] p0134 N81-16042
Airborne-fiber optics manufacturing technology, aircraft installation processes
[AD-A093304] p0221 N81-17902
Evaluation of high-temperature structural adhesives for extended service
p0247 N81-18010
Development of maintenance METRICS to forecast resource demands of weapon systems (parameter polarization), revision A
[AD-A097692] p0392 N81-23325
Weapons system support resources demand parameters - logistics
[AD-A097517] p0394 N81-23937
Development of maintenance metrics to forecast resource demands of weapon systems

[AD-A104089] p0632 N81-33136

BOEING CO., SEATTLE, WASH.

New approach to the solution of large, full matrix equations
p0171 A81-21552

An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882

Prediction of jet exhaust noise on airframe surfaces during flight
[AIAA PAPER 81-2035] p0619 A81-48626

Lightning protection considerations for graphite/epoxy aircraft structure
p0040 N81-11142

Grid generation for general three-dimensional configurations
p0137 N81-14714

A system for aerodynamic design and analysis of supersonic aircraft. Part 4: Test cases
[NASA-CR-3354] p0185 N81-15977

Guidance and control system research for improved terminal area operations
p0264 N81-19038

Advanced fiber reinforced thermoplastic structures
[AD-A096759] p0377 N81-22106

Service evaluation of aluminum-brazed titanium (ABTi)
[NASA-CR-3418] p0378 N81-22129

Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and evaluation, revision A
[AD-A096688] p0381 N81-22971

Development of maintenance metrics to forecast resource demands of weapon system. Maintenance metrics and weightings, revision A
[AD-A096689] p0381 N81-22972

Development of maintenance metrics to forecast resource demands of weapon systems. Analysis and results of metrics and weightings, revision A
[AD-A096690] p0381 N81-22973

Microwave system for real time space position measurement
p054[illegible]81-29089

BOEING COMMERCIAL AIRPLANE CO., RENTON, WASH.

Effects of commercial aircraft operating environment on composite materials
p0182 A81-22681

On the convergence of unsteady generalized aerodynamic forces
[AIAA 81-0647] p0307 A81-29500

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.

Classical and modern control design of a speed-hold system for a STOL airplane
[AIAA PAPER 81-0017] p0157 A81-20541

Practical gust load alleviation and flutter suppression control laws based on a LQG methodology
[AIAA PAPER 81-0021] p0158 A81-20544

Boundary layer stability analysis of a natural laminar flow glove on the F-111 TACT airplane
p0238 A81-26503

Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506

Assessment of variable camber for application to transport aircraft
[NASA-CR-158930] p0071 N81-12016

Aircraft surface coatings study: Energy efficient transport program
[NASA-CR-158954] p0084 N81-12225

Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053

A system for aerodynamic design and analysis of supersonic aircraft. Part 2: User's manual
[NASA-CR-3352] p0125 N81-13920

A system for aerodynamic design and analysis of supersonic aircraft. Part 1: General description and theoretical development
[NASA-CR-3351] p0139 N81-14970

A system for aerodynamic design and analysis of supersonic aircraft. Part 3: Computer program description
[NASA-CR-3353] p0139 N81-14971

Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165649] p0198 N81-16139

Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853

Assessment of risk to Boeing commerical transport aircraft from carbon fibers
[NASA-CR-159211] p0218 N81-17171

The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin
p0243 N81-17984

Wind tunnel test results of a new leading edge flap design for highly swept wings, a vortex flap
p0243 N81-17986

Prediction of nacelle aerodynamic interference effects at low supersonic Mach numbers
p0244 N81-17988

Long-range airplane study: The consumer looks at SST travel
p0247 N81-18014

Overview of Boeing supersonic transport efforts, 1971 - 1979
p0247 N81-18016

A family of supersonic airplanes: Technical and economic feasibility
p0248 N81-18017

Impact of changing fuel characteristics on supersonic cruise airplane
p0248 N81-18018

A higher order panel method for linearized supersonic flow
[NASA-CR-3062] p0262 N81-19022

Integrated Application of Active Controls (IAAC) technology to an advanced subsonic transport: Project plan
[NASA-CR-3305] p0332 N81-20062

The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-159362] p0343 N81-21131

MLS: Airplane system modeling
[NASA-CR-165700] p0386 N81-23059

Boeing Commercial Airplane Company engine procurement practices
p0429 N81-24076

Tire/wheel concept
[NASA-CASE-LAR-11695-2] p0437 N81-24443

YC-14 interior noise measurements program
[NASA-CR-164523] p0492 N81-26889

The 747 primary flight control systems reliability and maintenance study
[NASA-CR-159010] p0498 N81-27116

Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-165765] p0550 N81-29165

An investigation of engine influence on inlet performance
[NASA-CR-166136] p0579 N81-30088

Comments on Reynolds number effects and the role of NTF in the development of air vehicles
p0592 N81-31182

The nature of operating flight loads and their effect on propulsion system structures
p0599 N81-31207

BOEING ENGINEERING AND CONSTRUCTION, SEATTLE, WASH.

Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431

BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.

Cast Aluminum Structures Technology (CAST). Technology transfer (phase 6)
[AD-A087492] p0030 N81-10152

Should we attempt global (inlet engine airframe) control design?
p0079 N81-12097

Advanced ejection seat for high dynamic pressure escape. Wind tunnel test
[AD-A091810] p0127 N81-13940

Theoretical and Experimental studies of aerodynamic interference effects
p0190 N81-16017

Integrated strike avionics study, volume 1
[AD-A094705] p0273 N81-19113

Analysis of ejection seat stability using easy program, volume 1
[AD-A096597] p0373 N81-22033

Aerodynamic analysis of a fighter aircraft with a higher order paneling method
[AD-A099404] p0483 N81-26082

Advances in landing gear systems
p0545 N81-29077

Static test of a fan-powered chin nozzle for V/STOL applications

[NASA-CR-165361] p0546 N81-29093
BOEING MILITARY AIRPLANE DEVELOPMENT, WICHITA, KANS.
Final design and fabrication of an active control system for flutter suppression on a supercritical aeroelastic research wing
[NASA-CR-165718] p0498 N81-27114
BOEING VERTOL CO., PHILADELPHIA, PA.
Full-scale wind-tunnel test of the aeroelastic stability of a bearingless main rotor
p0573 A81-46620
Full scale wind tunnel investigation of a bearingless main helicopter rotor
[NASA-CR-152373] p0033 N81-11014
Advanced transmission components investigation program: Bearing and seal development
[AD-A090675] p0076 N81-12075
Helicopter icing review
[AD-A094175] p0252 N81-18053
Total main rotor isolation system analysis
[NASA-CR-165666] p0329 N81-20027
Crashworthiness design parameter sensitivity analysis
[AD-A096550] p0374 N81-22041
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 1: Engineering studies
[NASA-CR-152336-1] p0387 N81-23064
Preliminary design study of advanced composite blade and hub and nonmechanical control system for the tilt-rotor aircraft. Volume 2: Project planning data
[NASA-CR-152336-2] p0387 N81-23065
Rotorcraft aviation icing research requirements: Research review and recommendations
[NASA-CR-165344] p0388 N81-23070
A study of the effect of terrain on helicopter noise propagation by acoustical modeling
[AD-A097626] p0394 N81-23864
Flap survey test of a combined surface blowing model: Flow measurements at static flow conditions
[NASA-CR-152128] p0423 N81-24023
Advanced Scout Helicopter (ASH) fly-by-wire control system preliminary design. Volume 1: System design and analysis
[AD-A098155] p0434 N81-24108
Impact of prediction accuracy on costs - noise technology applications in helicopters
[AD-A101768] p0589 N81-30911
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
Gear meshing action as a source of vibratory excitation
p0150 A81-20061
Noise and performance of general aviation aircraft - A review of the MIT study
[SAE PAPER 810586] p0520 A81-42747
Contributions to the theory of side edge flap noise
[AIAA PAPER 81-2036] p0619 A81-48625
A guidance document on airport noise control
[AD-A092228] p0202 N81-16629
NOISECHECK procedures for measuring noise exposure from aircraft operations
[AD-A093988] p0221 N81-17049
Laser Doppler airspeed and altitude sensor
[AD-A096900] p0375 N81-22049
Temporal integration in low frequency auditory detection
[AD-A098161] p0438 N81-24862
Validation of helicopter noise prediction techniques
[NASA-CR-165715] p0447 N81-25768
Flight simulator: Use of spacegraph display in an instructor/operator station
[AD-A101951] p0602 N81-31235
Statistics of some atmospheric turbulence records relevant to aircraft response calculations
[NASA-CR-3464] p0627 N81-33191
BOLT, BERANEK, AND NEWMAN, INC., CANOGA PARK, CALIF.
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 1: Development and validation of preliminary analytical models
[NASA-CR-159363] p0258 N81-18799
Handbook of aircraft noise metrics
[NASA-CR-3406] p0345 N81-21871
Noise abatement technology options for conventional turboprop airplanes
[AD-A101828] p0589 N81-30910
BRISTOL UNIV. (ENGLAND).
An investigation of drag associated with the upswept rear fuselage of a helicopter
[BU-257] p0330 N81-20043
Scarf joints in unidirectional carbon fiber reinforced plastics
[BU-258] p0336 N81-20193
An investigation into the possible reduction of aerodynamic drag of a fuel economy vehicle
[BU-248] p0338 N81-21039
The development of the secondary wing structure for a rigid wing hang glider
[BU-251] p0375 N81-22046
Pitch-flap-phase coupling. A preliminary analysis of an evolving concept of helicopter autostabilisation
[BU-242] p0434 N81-24109
BRITISH AEROSPACE AIRCRAFT GROUP, BRISTOL (ENGLAND).
Wind tunnel tests on a fighter aircraft wing/store flutter suppression system: The B.Ae control law
p0083 N81-12119
Concorde with the airlines
p0247 N81-18013
BRITISH AEROSPACE AIRCRAFT GROUP, BROUGH (ENGLAND).
Some particular configuration effects on a thin supercritical variable camber wing
p0188 N81-16005
The influence of visual requirements on the design of military cockpits
p0213 N81-17075
BRITISH AEROSPACE AIRCRAFT GROUP, HERTFORDSHIRE (ENGLAND).
Interference aspects of the A310 high speed wing configuration
p0188 N81-16001
BRITISH AEROSPACE AIRCRAFT GROUP, PRESTON (ENGLAND).
The implications of laboratory accelerated conditioning of carbon fibre composites
p0039 N81-11129
Life Cycle Cost Analysis (LCCA) in military aircraft procurement
p0045 N81-11903
Evolution of techniques for LCC analysis
p0045 N81-11909
Some engineering aspects of life cycle costing
p0047 N81-11918
Impact of maintainability of life cycle costs
p0047 N81-11921
An economic and versatile panel method for aircraft and aircraft/store configurations. An outline of the principal features of the mathematical modeling and numerical implementation of the British Aerospace (Warton) Mk II Panel Method
p0144 N81-15311
Application of carbon fibre composites to military aircraft structures
p0199 N81-16147
BRITISH AEROSPACE AIRCRAFT GROUP, WARTON (ENGLAND).
Jet wing interaction to give improved combat performance
p0189 N81-16007
BRITISH AEROSPACE AIRCRAFT GROUP, WEYBRIDGE (ENGLAND).
The changing scene of structural airworthiness
[AAAF-NT-79-24] p0077 N81-12076
BRITISH AEROSPACE AIRCRAFT GROUP, WOODFORD (ENGLAND).
Flight testing and instrumentation of aircraft navigation systems
p0544 N81-29067
BRITISH AIRWAYS, MIDDLESEX (ENGLAND).
Uses of AIDS data in airlines engine maintenance
p0326 N81-20016
BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[AD-A102873] p0630 N81-32273
BUNDESAMT FUER WEHRTECHNIK UND BESCHAFFUNG, MUNICH (WEST GERMANY).
Certification procedure for military engines in Germany
p0429 N81-24074
BUNKER-RAMO CORP., WESTLAKE VILLAGE, CALIF.
Evaluation of factors unique to multifunction controls/displays devices

[AD-A094227] p0258 N81-18733
BUREAU OF MINES, ALBANY, OREG.
Silver recovery from aircraft scrap [PB81-150021] p0392 N81-23269

C

CALIFORNIA POLYTECHNIC STATE UNIV., SAN LUIS OBISPO.
Flight evaluation of the terminal guidance system [NASA-CR-163859] p0142 N81-14991
CALIFORNIA UNIV., BERKELEY.
Supercritical flow past symmetrical airfoils [AD-A093300] p0203 N81-16984
CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
State-of-the-art review of flywheel burst containment [UCRL-15257] p0085 N81-12427
CALIFORNIA UNIV., LOS ANGELES.
Discrete-continuous variable structural synthesis using dual methods p0066 A81-15894
A Galerkin type finite element method for rotary-wing aeroelasticity in hover and forward flight p0364 A81-33050
Rotor blade aeroelastic stability and response in forward flight p0467 A81-40089
Structural synthesis - Its genesis and development p0622 A81-49076
Dual methods and approximation concepts in structural synthesis [NASA-CR-3226] p0134 N81-14347
Application of the finite element method to rotary wing aeroelasticity p0251 N81-18043
Flap noise characteristics measured by pressure cross correlation techniques p0259 N81-18808
Forecast of future aviation fuels: The model [NASA-CR-165486] p0631 N81-32956
CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
Landing flying qualities evaluation criteria for augmented aircraft [NASA-CR-163097] p0130 N81-13969
Nuclear blast response of airbreathing propulsion systems. Laboratory measurements with an operational J-85-5 turbojet engine [AD-A092229] p0196 N81-16063
Flying qualities design criteria applicable to supersonic cruise aircraft p0244 N81-17991
Adaptive-wall wind-tunnel investigations [AD-A096325] p0343 N81-21088
CALSPAN CORP., BUFFALO, N. Y.
Further investigations of adaptive-wall wind tunnels [AD-A091774] p0131 N81-13977
An experimental investigation of VTOL flying qualities requirements or shipboard landings [AD-A104137] p0638 N81-33199
CAMBRIDGE UNIV. (ENGLAND).
A simple model for compressor stall cell propagation [ASME PAPER 81-GT-73] p0313 A81-29982
Force and moment coefficients for high deflection cascades [CUED/A-TURBO/TR-98] p0090 N81-13021
Measured pressure distributions and shock shapes on a Butler wing [CUED/A-AERO/TR-9] p0090 N81-13026
Gerry casing treatment [CUED/A-TURBO/TR-101] p0093 N81-13059
CANYON RESEARCH GROUP, INC., WESTLAKE VILLAGE, CALIF.
Critical research issues and visual system requirements for a V/STOL training research simulator [AD-A092561] p0198 N81-16072
CARBORUNDUM CO., NIAGARA FALLS, N. Y.
Fabrication of injection molded sintered alpha SiC turbine components [ASME PAPER 81-GT-161] p0317 A81-30060
CENTRE D'ESSAIS AERONAUTIQUE TOULOUSE (FRANCE).
Assessing the behavior of high modulus composite materials in lightning p0040 N81-11141
Tension induced in the cables inside closed metal structures and in carbon epoxy submitted to a lightning-type impulse current p0200 N81-16158
Unsteady wakes downstream from a profile oscillating in incidence [AAAF-NT-80-10] p0204 N81-16989
CENTRE D'ESSAIS DE PROPULSEURS, SACLAY (FRANCE).
Studying the exhaust gas from a post combustion turbojet engine p0089 N81-12996
CENTRE D'ESSAIS DES PROPULSEURS, ORSAY (FRANCE).
Tests of large compressors at CE Pr p0432 N81-24096
CENTRE D'ESSAIS EN VOL, BRETIGNY-AIR (FRANCE).
Ergonometric study of ejection through a breakable canopy p0205 N81-17011
CENTRE D'ESSAIS EN VOL, BRETIGNY-SUR-ORGE (FRANCE).
Evaluation of a hybrid navigation system with laser gyroscopes: SEXTAN p0485 N81-26102
Systems integration of automatic flight control, navigational calculations, and visual control (caravelle alis) p0544 N81-29068
Methods of testing aircraft performance under icing conditions and ice tection systems p0545 N81-29083
The interface arrangement of digibus systems p0545 N81-29084
CENTRE D'ESSAIS EN VOL, ISTRES (FRANCE).
Flight tests of the engines of combat aircraft: Validation methods used by CEV p0432 N81-24095
CENTRE TECHNIQUE DES INDUSTRIES MECANIQUES, SENLIS (FRANCE).
Flow in bent pipes [CETIM-14-F-091] p0256 N81-18322
CHAMPLAIN TECHNOLOGY INDUSTRIES, PALO ALTO, CALIF.
Evaluation of the performance of the Remote Area Precision Positioning System (RAPPS) [AD-A094169] p0250 N81-18036
CHICAGO UNIV., ILL.
Microbursts as an aviation wind shear hazard [AIAA PAPER 81-0386] p0167 A81-20798
CINCINNATI UNIV., OHIO.
Effects of solid particles suspended in fluid flow through an axial flow compressor stage p0297 A81-29168
Effect of ambient conditions on the emissions from a gas turbine combustor [NASA-CR-3355] p0080 N81-12105
Three dimensional internal flows in turbomachinery, volume 1 [AD-A092737] p0197 N81-16065
Three-dimensional internal flows in turbomachinery, volume 2 [AD-A093130] p0215 N81-17090
Flap-lag-torsional dynamic modelling of rotor blades in hover and in forward flight, including the effect of cubic nonlinearities [NASA-CR-166194] p0486 N81-26116
Flag-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight [NASA-CR-164475] p0486 N81-26117
CIVIL AEROMEDICAL INST., OKLAHOMA CITY, OKLA.
Improving the crashworthiness of general aviation aircraft by crash injury investigations [AD-A103316] p0636 N81-33174
CIVIL AERONAUTICS BOARD, WASHINGTON, D.C.
Airport activity statistics of certificated route air carriers, calendar year 1979 [AD-A089748] p0034 N81-11023
Airport activity statistics of certificated route air carriers [AD-A102355] p0602 N81-31236
CIVIL AVIATION AUTHORITY, REDHILL (ENGLAND).
Helicopter Fatigue: A civil view p0488 N81-26134
CLEMSON UNIV., S.C.
A cost function for military airframes [AD-A097538] p0394 N81-239[illegible]6
A cost function for an airframe production program [AD-A097540] p0394 N81-23967
Optimization of fiber reinforced structures to satisfy aeroelastic requirements [NASA-CR-164536] p0499 N81-27200
Dynamic simulation of airborne high power systems [AD-A101316] p0552 N81-29362

COLUMBIA UNIV., NEW YORK.
Response of stiffened sandwich panels
[AIAA 81-0557] p0303 A81-29455
Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
Aviation safety
[GPO-68-717] p0073 N81-12040
Airport and airway system development act of 1981
[GPO-75-804] p0601 N81-31231

COMMITTEE ON GOVERNMENT OPERATIONS (U. S. HOUSE).
Aviation safety: Hazardous materials handling
[GPO-69-199] p0439 N81-25049

COMMITTEE ON POST OFFICE AND CIVIL SERVICE (U. S. HOUSE).
Air traffic controllers and flight service station specialists
[GPO-51-381] p0075 N81-12055

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION (U. S. HOUSE).
Aviation safety and noise abatement
[GPO-50-923] p0032 N81-10578
Aviation safety: Interior compartment materials
[GPO-50-388] p0126 N81-13933
Testimony of Elwood T. Driver, Vice Chairman, National Transportation Safety Board, accompanied by Gerrit J. Walhout, Chief, Human Factors Division, and Matthew H. McCormick, Senior Air Safety Investigator, Human Factors Division
p0126 N81-13934
Testimony of James J. Kramer, Associate Administrator for Aeronautics and Space Technology, National Aeronautics and Space Administration, accompanied by John H. Enders, Project Manager, Aviation Safety Technology Office, John A. Parker, Chemical Research Projects Office, NASA-Ames Research Center, and Demitrius A. Kourtides, Chemical Research Projects Office, NASA-AMES Research Center
p0127 N81-13935
Testimony of Richard W. Taylor, Vice President and Special Assistant to the President, and Eugene A. Bara, Chief Engineer, Payloads Systems, Boeing Commercial Airplane Company
p0127 N81-13936
Testimony of a panel consisting of: Lloyd E. Frisbee, Vice President, Engineering and Operations, Lockheed California Company; Lyle A. Wright, Director, Powerplant Engineering, Douglas Aircraft Company, accompanied by Doctor H. C. Schjelderup, Chief Technology Engineer, Materials and Process Engineering, and F. E. Duskin, Senior Design Engineer, Interiors Engineering, Douglas Aircraft Company
p0127 N81-13937

COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Aircraft collision avoidance
[GPO-50-158] p0091 N81-13081
Design analysis of wide-body aircraft
[GPO-60-652] p0092 N81-13085
Posture hearings (NASA and FAA)
[GPO-65-265] p0203 N81-16952
NASA authorization, 1981
[GPO-71-290] p0203 N81-16953
Spin recovery training
[GPO-67-439] p0216 N81-17098
NASA authorization, 1982, volume 4
[GPO-79-432-VOL-4] p0590 N81-31030

COMMITTEE ON WAYS AND MEANS (U. S. HOUSE).
Commuter airport safety
[GPO-60-512] p0073 N81-12041

COMPTROLLER GENERAL OF THE UNITED STATES, WASHINGTON, D.C.
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0490 N81-26149

COMPUTER SCIENCES CORP., MOUNTAIN VIEW, CALIF.
Optical Fiber Illumination System for visual flight simulation
[NASA-CR-3409] p0343 N81-21086

COMPUTER SCIENCES CORP., ORLANDO, FLA.
Computer Generated Imagery (CGI) current technology and cost measures feasibility study
[AD-A091636] p0146 N81-13729

COMPUTER SCIENCES CORP., SILVER SPRING, MD.
Geometric dilution of precision in Global Positioning System navigation
p0115 A81-18100

CONSIS CORP., MOUNTAIN VIEW, CALIF.
Arts 2 enhancement design alternative study
[AD-A096276] p0339 N81-21049

CONTROL DATA CORP., HAMPTON, VA.
Learning guide for the terminal configured vehicle advanced guidance and control system mode select panel
[NASA-CR-165751] p0580 N81-30098

CONTROL DATA CORP., MINNEAPOLIS, MINN.
Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20740

CORNELL UNIV., ITHACA, N. Y.
Trailing edge noise from hovering rotors
[AHS 80-60] p0479 A81-40184

COSTRUZIONI AERONAUTICHE GIOVANNI AGUSTA S.P.A., GALLARATE (ITALY).
Helicopter transmission qualification procedures and tests
p0433 N81-24101

COSTRUZIONI AERONAUTICHE GIOVANNI AGUSTA S.P.A., VARESE (ITALY).
Design for maximum effectiveness in the Navy role
p0634 N81-33154

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
The stick-fixed lateral dynamic stability of the CSIR SARA II autogyro
[NIAST-80/52] p0434 N81-24107
Preliminary calibration of the transonic test section of the NIAST trisonic tunnel
[NIAST-80/19] p0435 N81-24116
Cold-forming of internal threads
p0551 N81-29294

CRANFIELD INST. OF TECH., BEDFORDSHIRE (ENGLAND).
The presentation of static information on air traffic control displays
p0211 N81-17064

CRASH RESEARCH INST., TEMPE, ARIZ.
A description of the general aviation fixed wing accident
p0408 A81-34696
Systems analysis of the installation, mounting, and activation of emergency locator transmitters in general aviation aircraft
[NASA-CR-160036] p0023 N81-10020

CREW SYSTEMS CONSULTANTS, YELLOW SPRINGS, OHIO.
Operational problems associated with head-up displays during instrument flight
[AD-A092992] p0210 N81-17058

D

DAYTON UNIV., OHIO.
The effect of heavy rain on windshear attributed accidents
[AIAA PAPER 81-0390] p0167 A81-20800
Simulated aircraft takeoff performance with frosted wings
[AIAA PAPER 81-0404] p0167 A81-20811
Evaluation of bird load models for dynamic analysis of aircraft transparencies
[AD-A092909] p0204 N81-16995
Structural flight loads simulation capability, volume 1
[AD-A096572] p0374 N81-22044
Structural flight loads simulation capability. Volume 2: Structural analysis computer program user's manual
[AD-A096594] p0375 N81-22045
Maximum likelihood identification of aircraft lateral parameters with unsteady aerodynamic modelling
p0376 N81-22057
Validation of a bird substitute for development and qualification of aircraft transparencies
[AD-A097736] p0424 N81-24036
Study and evaluation of existing techniques for measuring aircraft windscreen optical quality: Development of new techniques for measuring aircraft windscreen optical distortion
[AD-A097731] p0426 N81-24049
The results of AFAMRL Remotely Piloted Vehicle (RPV) simulation studies 7 and 8
[AD-A100551] p0539 N81-28088
BIOCONAID system (bionic control of acceleration induced dimming)

[AD-A102510] p0601 N81-31234
Alternate T-38 transparency development. Part 1: Initial analysis and design
[AD-A103261] p0638 N81-33196
Alternate T-38 transparency development. Part 2: Baseline birdstrike testing
[AD-A103262] p0638 N81-33197

DE HAVILLAND AIRCRAFT CO. OF CANADA LTD., DOWNSVIEW (ONTARIO).
Static tests of the J97 powered, external augmenter V/STOL wind tunnel model
[NASA-CR-152403] p0337 N81-21010
Phase 2 and 3 wind tunnel tests of the J-97 powered, external augmentor V/STOL model
[NASA-CR-152380] p0483 N81-26076
V/STOL aircraft technology in Canada
p0634 N81-33152

DEFENCE AND CIVIL INST. OF ENVIRONMENTAL MEDICINE, DOWNSVIEW (ONTARIO).
Flight evaluation of the concept of the stage A Peripheral Vision Horizon Device (PVHD) using the CH 135 aircraft of 403 Squadron - CFB Gagetown
[AD-A096870] p0375 N81-22050
Sidetone-level considerations in aircraft communication systems
p0605 N81-31475

DEFENCE RESEARCH ESTABLISHMENT ATLANTIC, DARTMOUTH (NOVA SCOTIA).
X-ray fluorescence spectrometric analysis of wear metals in used lubricating oils
[AD-A097552] p0390 N81-23087

DEFENSE MAPPING AGENCY HYDROGRAPHIC AND TOPOGRAPHIC CENTER, WASHINGTON, D.C.
DMAHTC's support to National Ocean Survey LORAN-C-charting
[AD-A093748] p0206 N81-17027
Production of LORAN-C reliability diagrams at the Defense Mapping Agency
[AD-A093749] p0206 N81-17028
Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029

DELAWARE UNIV., NEWARK.
Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22526

DEPARTEMENT D'ETUDES ET DE RECHERCHES EN TECHNOLOGIE SPATIALE, TOULOUSE (FRANCE).
Detecting the failure of aircraft sensors using analytical redundancy
p0042 N81-11270

DEPARTMENT OF DEFENSE, WASHINGTON, D. C.
Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy
[AD-A093774] p0206 N81-17030
Federal Radionavigation Plan. Volume 2: Requirements
[AD-A093775] p0207 N81-17031
Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics
[AD-A093776] p0207 N81-17032
Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development
[AD-A093777] p0207 N81-17033

DEPARTMENT OF ENERGY, BARTLESVILLE, OKLA.
Thermodynamics of organic compounds
[AD-A093087] p0222 N81-17936
Aviation turbine fuels 1980
[DOE/BETC/PPS-81/2] p0445 N81-25255

DEPARTMENT OF ENERGY, LARAMIE, WYO.
Hydrocarbon type analysis of jet fuels by H-1 and C-13 NMR
[DOE/LETC/RI-81/1] p0551 N81-29260

DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Automotive technology development program
[DOE/CS-0069/1] p0278 N81-19464

DEPARTMENT OF THE ARMY, WASHINGTON, D. C.
Helicopter theory
p0513 A81-41823

DEPARTMENT OF TRANSPORTATION, WASHINGTON, D. C.
Federal Radionavigation Plan. Volume 1: Radionavigation plans and policy
[AD-A093774] p0206 N81-17030
Federal Radionavigation Plan. Volume 2: Requirements
[AD-A093775] p0207 N81-17031
Federal Radionavigation Plan. Volume 3: Radionavigation system characteristics
[AD-A093776] p0207 N81-17032
Federal Radionavigation Plan. Volume 4: Radionavigation research, engineering and development
[AD-A093777] p0207 N81-17033
General Aviation Avionics Statistics
[AD-A095140] p0273 N81-19110
Published results of the program of university research. Transportation research results
[PB81-210130] p0641 N81-34100

DETROIT DIESEL ALLISON, INDIANAPOLIS, IND.
Fuel character effects on current, high pressure ratio, can-type turbine combustion systems
[AD-A089182] p0029 N81-10071
Road map to adaptive optimal control
p0079 N81-12098
Gas turbine engines and transmissions for bus demonstration programs
[COO-4867-07] p0134 N81-14329
Experimental determination of unsteady blade element aerodynamics in cascades. Volume 2: Translation mode cascade
[NASA-CR-165166] p0140 N81-10976
Model 250-C30/C28B compressor development
p0219 N81-17466
Ceramic applications in turbine engines
[NASA-CR-159865] p0274 N81-19116

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Analysis of the function principle and operational assessment of an onboard glidepath guidance system for visual approaches (Visual Approach Monitor (VAM)
[DFVLR-FB-79-38] p0025 N81-10043
An analytical study of landing flare
[DFVLR-FB-79-40] p0027 N81-10062
System simulation applied to the evaluation of displays for guidance and control
[DFVLR-MITT-79-10] p0028 N81-10064
Flight test results of the HFB 320 model following control system for the in-flight simulation of Airbus A 130
[DFVLR-MITT-79-13] p0030 N81-10078
Predictability of moisture absorption in graphite/epoxy sandwich panels
p0039 N81-11131
Synopsis on aircraft integrated data systems and engine health monitoring and maintenance
[DFVLR-MITT-80-08] p0075 N81-12063
An equipment for testing and measuring a Helmet Mounted Sight and Display system with a coupled TV-camera in the flight simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0092 N81-13052
A contribution to stabilization of flight vehicle parachute systems
[DFVLR-MITT-80-05] p0126 N81-13926
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[DFVLR-FB-80-13] p0128 N81-13944
Laminar-airfoils for transport aircraft
[DFVLR-MITT-80-07] p0129 N81-13952
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable television camera in the flight-simulator for research of the DFVLR
[DFVLR-MITT-80-04] p0129 N81-13960
System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
[DFVLR-MITT-79-16] p0130 N81-13971
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[DFVLR-FB-80-07] p0131 N81-13975
Applicated techniques for the control of approach traffic
[DFVLR-MITT-79-20] p0142 N81-14092
Experiences with flight recorders obtained by analyzing aircraft accidents
p0328 N81-20019
A quick-look system for the processing of flight data recordings
p0329 N81-20021

Evaluation of the visual acquisition range of en-route air traffic from cockpit observations
[DFVLR-MITT-80-14] p0332 N81-20058
Tendencies in the development of subsonic transport-aircraft under special considerations of aerodynamics
[DFVLR-MITT-80-15] p0338 N81-21040
Computation of pressure distribution on the DFVLR wing-body model by the panel method
[DFVLR-FB-80-02] p0372 N81-22029
Programmable multipurpose flight test instrumentation system
p0545 N81-29085
Determination of aircraft dynamic stability and control parameters from flight testing
p0591 N81-31115
Design of optimal inputs for the identification of characteristics of aircraft flights
p0631 N81-33131
System identification for controlled aircraft
p0631 N81-33132

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
Definition of a system concept study for future air traffic guidance
[BMFT-FB-W-80-008] p0425 N81-24046
A method for evaluating radio navigation systems for the terminal maneuvering area
[DFVLR-MITT-81-02] p0538 N81-28080

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, GOETTINGEN (WEST GERMANY).
Analysis of unsteady pressure measurements on an aerofoil section with an harmonically oscillating, slotted flap
[DFVLR-FB-80-22] p0126 N81-13929
A computer-based laser Doppler velocimeter
[DFVLR-MITT-79-14] p0133 N81-14289
Noise and noise abatement in fans and blowers: A review
[DFVLR-FB-80-16] p0138 N81-14796
Some remarks on the unsteady airloads on oscillating control surfaces in subsonic flow
p0386 N81-23055
Unsteady airloads on oscillating wings in post-stall condition
[DFVLR-FB-81-16] p0594 N81-31158
Aeroelastic buffeting prediction techniques: A general review
[DFVLR-FB-81-15] p0601 N81-31226

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).
Robust control system design
p0042 N81-11275
The collision course: Conditions, guidance laws and properties
[DFVLR-FB-80-06] p0127 N81-13942
Application of vector performance optimization to a robust control loop design for a fighter aircraft
[DFVLR-FB-80-14] p0130 N81-13970
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[DFVLR-FB-80-01] p0132 N81-14195

DEUTSCHE FORSCHUNGSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Design and experimental verification of a transonic wing for a transonic aircraft
p0188 N81-16003

DEUTSCHER WETTERDIENST, OFFENBACH AM MAIN (WEST GERMANY).
Investigative technical measurements of the planetary boundary layer made onboard an instrumented motorized glider
[REPT-149] p0379 N81-22666

DIRECTORATE OF NUCLEAR SAFETY, KIRTLAND AFB, N.MEX.
Safety study: Prime Nuclear Airlift Force (PNAF) missions involving the use of C-130 and C-141 aircraft
[AD-A103282] p0635 N81-33173

DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).
Aerodynamic subsonic/transonic aircraft design studies by numerical methods
p0187 N81-15999
Wind tunnel tests to determine the behavior during ejection of exterior stores at high and low speeds
[DLGR-79-096] p0272 N81-19102
Individual jet engine stress load monitoring with the aid of the flight data recording system LEADS 200
p0328 N81-20013

DORNIER-WERKE G.M.B.H., OBERPFAFFENHOFEN (WEST GERMANY).
Alignment of a navigation and attack system for the alpha jet aircraft
p0544 N81-29070

DOUGLAS AIRCRAFT CO., INC., LONG BEACH, CALIF.
New approach to the solution of large, full matrix equations
p0171 A81-21552
Advanced supersonic transport propulsion and configuration technology improvements
[AIAA PAPER 81-1595] p0508 A81-40970
Motion-base simulator results of advanced supersonic transport handling qualities with active controls
[AIAA 81-1819] p0555 A81-44109
Model design and instrumentation for intermittent cryogenic wind tunnels
p0037 N81-11058
Calibration of a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11060
The control of pressure, temperature and Mach number in a blowdown-to-atmosphere cryogenic wind tunnel
p0038 N81-11063
Cabin fire simulator lavatory tests
[NASA-CR-160909] p0190 N81-16020
Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration
p0243 N81-17983
Analytic development of improved supersonic cruise aircraft based on wind tunnel data
p0244 N81-17989
Advanced supersonic transport fixed-base simulator evaluations at landing approach
p0244 N81-17992
Flight and tunnel test results of the MDC mechanical jet noise suppressor nozzle
p0245 N81-18000
Opportunities for structural improvements for an advanced supersonic transport vehicle
p0246 N81-18007
Analytical study of STOL Aircraft in ground effect. Part 1: Nonplanar, nonlinear wing/jet lifting surface method
[NASA-CR-152087-PT-1] p0271 N81-19096
Analytical study of STOL Aircraft in ground effect. Part 2: Nonplanar, nonlinear method applicable to three dimensional jets of finite thickness
[NASA-CR-152088-PT-2] p0271 N81-19097
Study to develop improved fire resistant aircraft passenger seat materials
[NASA-CR-152408] p0386 N81-23050
Commercial aviation icing research requirements
[NASA-CR-165336] p0387 N81-23069
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
Study of aircraft crashworthiness for fire protection
[NASA-CR-166159] p0424 N81-24035
Testing of aircraft passenger seat cushion material, full scale. Data, volume 2
[NASA-CR-160963] p0440 N81-25050
Testing of aircraft passenger seat cushion materials. Full scale, test description and results, volume 1
[NASA-CR-160995-VOL-1] p0440 N81-25051
YC-15 interior noise measurements. Technical discussion
[AD-A098788] p0492 N81-26047
Manufacturing development of DC-10 advanced rudder
[NASA-CR-159060] p0494 N81-27077
Analysis of Mach number 0.8 turboprop slipstream wing/nacelle interactions
[NASA-CR-166214] p0579 N81-30005
Preliminary user planning for the NASA National Transonic Facility
p0593 N81-31145

DOUGLAS AIRCRAFT CO., INC., SANTA MONICA, CALIF.
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053

DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
Flight test results for the F-8 digital fly-by-wire aircraft control sensor analytic redundancy management technique
[AIAA 81-1796] p0556 A81-44135
F-8 digital fly-by-wire aircraft analytic redundancy management flight test experience
p0485 N81-26109
DREXEL UNIV., PHILADELPHIA, PA.
Application of variable structure system theory to aircraft flight control
[NASA-CR-164321] p0391 N81-23093
DUKE UNIV., DURHAM, N. C.
Reliability validation of systems for life-critical applications
p0617 A81-48559
Validation Methods Research for Fault-Tolerant Avionics and Control Systems Sub-Working Group Meeting. CARE 3 peer review
[NASA-CP-2167] p0146 N81-15702
DYNAMICS RESEARCH CORP., WILMINGTON, MASS.
Digital Avionics Information System (DAIS): Life Cycle Cost Impact Modeling System (LCCIM). A managerial overview
[AD-A093281] p0211 N81-17062
Digital Avionics Information System (DAIS). Volume 1: Impact of DAIS concept on life cycle cost
[AD-A097339] p0389 N81-23083
Digital Avionics Information System (DAIS). Volume 2: Impact of DAIS concept on life cycle cost. Supplement
[AD-A097438] p0390 N81-23084
DYTEC ENGINEERING, INC., LONG BEACH, CALIF.
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 3: Tables of atmospheric absorption losses
[AD-A093144] p0221 N81-17848
Evaluation of alternative procedures for atmospheric absorption adjustments during noise certification. Volume 2: Computer program
[AD-A093267] p0221 N81-17853

E

ECON, INC., SAN JOSE, CALIF.
Study of materials performance model for aircraft interiors
[NASA-CR-152378] p0333 N81-20063
EG AND G WASHINGTON ANALYTICAL SERVICES CENTER, INC., POCOMOKE CITY, MD.
Catalog of sea state and wind speed in the South Atlantic Bight
[NASA-CR-156872] p0137 N81-14601
ELECTROMAGNETIC COMPATIBILITY ANALYSIS CENTER, ANNAPOLIS, MD.
The susceptibility of representative TACAN and DME equipments to a proposed, MLS L-band precision DME signal format
[AD-A096265] p0339 N81-21048
ELEKTROSCHMELZWERK KEMPTEN G.M.B.H., MUNICH (WEST GERMANY).
Development and fabrication of refractory silicon carbide bodies, especially for gas turbine engines
[BMFT-FB-T-79-137] p0275 N81-19128
EMBRY-RIDDLE AERONAUTICAL UNIV., DAYTONA BEACH, FLA.
A pilot training manual for the terminal configured vehicle electronic attitude director indicator
[NASA-CR-159195] p0434 N81-24111
ENERGY AND MINERALS RESEARCH CO., EXTON, PA.
Ultrasonic dispersion of particulate high density fuels
[AD-A102771] p0630 N81-32290
ENGINEERING SCIENCES DATA UNIT, LONDON (ENGLAND).
Drag increment due to rear fuselage upsweep
[ESDU-80006] p0021 N81-10001
The use of data items on aircraft performance measurement
[ESDU-80009] p0026 N81-10053
ENGINS MATRA, VELIZY (FRANCE).
Auto-adaptive piloting
[GA-380] p0217 N81-17102
ENVIRONMENTAL MONITORING AND SUPPORT LAB., LAS VEGAS, NEV.
Development of a helicopter water quality monitoring/sampling system
[PB81-168734] p0499 N81-27714
ENVIRONMENTAL PROTECTION AGENCY, LAS VEGAS, NEV.
The RAPS (Regional Air Pollution Study) helicopter air pollution measurement program, St. Louis, Missouri
[PB80-213119] p0096 N81-13555
ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
Impact of aircraft emissions on air quality in the vicinity of airports. Volume 2: An updated model assessment of aircraft generated air pollution at LAX, JFK and ORD
[AD-A091005] p0096 N81-13545
ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
An assessment of technical factors influencing the potential use of RPVS for minefield detection
[AD-A092682] p0194 N81-16047
EUROCONTROL AGENCY, BRUSSELS (BELGIUM).
Possible online uses of AIDS data in future ATC systems
p0328 N81-20018
EUROPEAN SPACE AGENCY, PARIS (FRANCE).
Analysis of calculated three-dimensional inviscid flow fields with embedded shock waves (presentation of a field solution), part 1
[ESA-TT-558] p0022 N81-10017
Analytical estimation on nonlinear longitudinal characteristics of wings with small and moderate aspect ratio by the vortex lattice method in incompressible flow
[ESA-TT-585] p0022 N81-10018
Investigation of landing flare in the presence of wind shear
[ESA-TT-631] p0077 N81-12080
Remote sensing methods for the determination of slant range visibility
[ESA-TT-627] p0086 N81-12536
Spectral analysis of nonstationary random processes. Application to noise of flyover type
[ESA-TT-639] p0088 N81-12826
Gravimetric investigation of the particle number density distribution function in the high speed cascade wind tunnel for laser anemometry measurements
[ESA-TT-625] p0197 N81-16069
In-flight handling qualities investigation of A310 Airbus DLC-configurations on landing approach, using the DFVLR-HFB 320 in-flight simulator (variable stability aircraft)
[ESA-TT-630] p0276 N81-19135
Unsteady pressure measurements during stall and buffeting
[ESA-TT-641] p0339 N81-21041
Flight safety of Rogallo hang gliders. Theoretical and experimental study of the flight envelope
[ESA-TT-634] p0339 N81-21046
Study of an experimental probe for the measurement of the acoustic pressure inside an air flow
[ESA-TT-633] p0344 N81-21380
Functional analysis and operational assessment of an onboard glide path guidance system for visual approaches (visual approach monitor VAM)
[ESA-TT-655] p0373 N81-22038
Contributions to the 9th Symposium on aircraft integrated data systems
[ESA-TT-532] p0382 N81-23008
Experiences with a Flight Data Recording System (FDRS) in a German Airforce fighter bomber wing after field trials
p0382 N81-23009
Engine parameter trend analysis with LEADS 200: Possibilities and limitations
p0382 N81-23010
Investigations into local fault detection on turbojet engines
p0382 N81-23011
Location of faults in jet engines by calculation of component characteristics
p0382 N81-23012
The engine usage monitoring system: An heuristic approach to cost effective data monitoring and analysis
p0382 N81-23013
Relationships for a flight performance computer
p0382 N81-23014

Classification of operating conditions of
turbomachines from solid borne sound
p0382 N81-23015
Reduction of measured data and possibilities for
early detection of sensor break-down
p0383 N81-23016
Description of the British Civil Aviation
Airworthiness Data Recording Programme (CAADRP)
p0383 N81-23017
The SYDAS flight data processing system
p0383 N81-23018
The use of aircraft integrated data system at KLM
p0383 N81-23019
Navaids calibration evaluation with a
computer-controlled avionics data acquisition
system
p0383 N81-23020
The reconstruction of flight paths from AIDS
data with the aid of modern filtering methods
p0383 N81-23021
Detection and location of faults in onboard
aircraft systems with the aid of the Automatic
Fault Identification System (AFIS)
p0383 N81-23022
Processing of AIDS flight recorder data for a
quick look with the aid of a hybrid computer
system
p0384 N81-23023
Optimization of barriers
[ESA-TT-648]
p0500 N81-27893
Applied techniques for the control of approach
traffic
[ESA-TT-668]
p0538 N81-28079

EXECUTIVE OFFICE OF THE PRESIDENT, WASHINGTON, D. C.
Aeronautics and Space Report of the President,
1979 activities
p0089 N81-12956
Carbon/graphite composite material study
[AR-3]
p0585 N81-30188

EXXON RESEARCH AND ENGINEERING CO., LINDEN, N.J.
Alternative energy sources for non-highway
transportation, appendices
[DOE/CS-05438/T1-VOL-3]
p0044 N81-11500
Alternative energy sources for non-highway
transportation, volume 1
[DOE/CS-05438/T1-VOL-1]
p0044 N81-11513
Effect of refining variables on the properties
and composition of JP-5
[AD-A093842]
p0219 N81-17281

F

FAIRCHILD STRATOS CORP., MANHATTAN BEACH, CALIF.
Non-heat pipe receiver/p-40 Stirling engine
p0588 N81-30531

FARRAND OPTICAL CO., INC., VALHALLA, N.Y.
Optical infinity lens development for flight
simulator visual displays
p0212 N81-17071

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803]
p0367 A81-33882
Engineering and development program plan
aircraft crashworthiness
[AD-A089431]
p0023 N81-10022
Summary of Federal Aviation Administration
responses to National Transportation Safety
Board safety recommendations
[AD-A089971]
p0033 N81-11022
Proceedings of the 1979 Seminar on Air Traffic
Control. Terminal Radar Approach Control
(TRACON) facility supervisory desk complex
[AD-A089914]
p0034 N81-11024
New terminal radar approach control in tower cab
concept for Love Field, Dallas, Texas
[AD-A089996]
p0034 N81-11025
ATARS implementation tradeoff
[AD-A089977]
p0034 N81-11026
Test and evaluation of the Airport Surveillance
Radar (ASR)-8 wind shear detection system
(phase 2), revision
[AD-A090111]
p0042 N81-11290
Tower Cab Digital Display
[AD-A090616]
p0091 N81-13042
Exhaust emissions characteristics and
variability for Pratt and Whitney JT8D-7A gas
turbine engines subjected to major overhaul
and repair
[AD-A091011]
p0094 N81-13062
Flight test investigation of LORAN-C for en
route navigation in the Gulf of Mexico
[AD-A091637]
p0128 N81-13945
Winds and wind shear in-situ sensors
p0136 N81-14563
Consolidated cab display: A summary report of
the process and the results of the
consolidation of critical and supplementary
terminal area air traffic control information
for display presentation
[AD-A092450]
p0193 N81-16034
Exhaust emission characteristics and variability
for maintained General Electric CF6-50
turbofan engines
[AD-A092291]
p0196 N81-16064
Microwave Landing System (MLS) clearance format
assessment tests
[AD-A093553]
p0206 N81-17024
Omega transmitter outages, January to December
1979
[AD-A093425]
p0207 N81-17035
Detection of military aircraft in an Air Traffic
Control Radar Beacon System (ATCRBS) environment
[AD-A093427]
p0207 N81-17036
Math model study, runway 16R instrument landing
system localizer at Seattle-Tacoma Airport,
Washington
[AD-A095076]
p0270 N81-19085
Flight tests of the microwave landing system
multimode digital processor
[AD-A095449]
p0332 N81-20056
Wing spillage tests using antimisting fuel
[AD-A096326]
p0344 N81-21215
A microcomputer-based signal data converter for
runway visual range measurements
[AD-A097568]
p0386 N81-23060
Summary of transponder data, May 1979 - November
1979
[AD-A097569]
p0386 N81-23061
Groundspeed/airspeed differences as a wind shear
indicator and flight evaluation of a
DME-derived system to determine groundspeed
[AD-A097566]
p0393 N81-23768
Effect of thermal radiation on the integrity
pressurized aircraft evacuation slides and
slide materials
[AD-A098179]
p0424 N81-24039
Visual confirmation of voice takeoff clearance
(VICON) operational evaluation, volume 1
[AD-A097756]
p0425 N81-24041
Visual confirmation of voice takeoff clearance
•(VICON) operational evaluation. Volume 2:
Operations and maintenance manual
[AD-A098093]
p0425 N81-24042
Airport Surface Detection Equipment (ASDE)-3
operational evaluation
[AD-A098480]
p0440 N81-25059
New tower cab mockup for Philadelphia,
Pennsylvania
[AD-A098528]
p0440 N81-25060
Engineering and development program plan
propulsion safety
[AD-A098709]
p0444 N81-25088
Discrete Address Beacon System (DABS) computer
performance/test and evaluation
[AD-A099326]
p0484 N81-26088
Analytical investigation of time correction in
alpha-beta tracking filters with application
to en route tracking
[AD-A099218]
p0484 N81-26090
Investigation of Wilcox model 585B very high
frequency omnidirectional radio range system,
part 2
[AD-A099525]
p0494 N81-27073
Aircraft Research and Technology for Antimisting
Kerosene Conference
[AD-A101347]
p0580 N81-30103
A compendium of aircraft cockpit vision surveys,
1950 through 1980, volume 1
[AD-A101473]
p0580 N81-30104
Multisite testing of the Discrete Address Beacon
System (DABS)
[AD-A103575]
p0636 N81-33181
Crosstalk levels of speech plus data in Remote
Communication Air-Ground (RCAG)
[AD-A103351]
p0636 N81-33182
En route discrete address beacon system/air
traffic control (Build 1) technical testing
[AD-A103894]
p0636 N81-33183

FEDERAL AVIATION ADMINISTRATION, LOS ANGELES, CALIF.
Wade vortex attenuation flight tests: A status report
p0267 N81-19057

FEDERAL AVIATION ADMINISTRATION, MOFFETT FIELD, CALIF.
A head-up display for low-visibility approach and landing
[AIAA PAPER 81-0130] p0161 A81-26623
A piloted simulator investigation of static stability and stability/control augmentation effects on helicopter handling qualities for instrument approach
[AHS 80-30] p0476 A81-40160
Investigation of control, display, and crew-loading requirements for helicopter instrument approach
[AIAA 81-1820] p0555 A81-44110

FEDERAL AVIATION ADMINISTRATION, OKLAHOMA CITY, OKLA.
NASA/FAA flight-test investigation of helicopter microwave landing system approaches
[AHS 80-55] p0478 A81-40180
Current aircraft survey (approach speeds, gross weights, and Dimensions)
[PB80-225691] p0129 N81-13956

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Hourly airport activity profiles: 30 Airports by user, 3 airports by user and equipment type, selected days in June, July and August, 1978
[AD-A089450] p0024 N81-10031
Airport activity statistics of certificated route air carriers, calendar year 1979
[AD-A089748] p0034 N81-11023
IFR aircraft handled forecast by air route traffic control center, fiscal years 1980-1991
[AD-A090803] p0074 N81-12048
Airport Crash/Fire/Rescue CFR service cost and benefit analysis. Volume 2: Appendixes
[AD-A091155] p0094 N81-13069
Noise levels and data correction analysis for seven general aviation propeller aircraft
[AD-A091292] p0096 N81-13717
Measuring weather for aviation safety in the 1980's
p0136 N81-14568
Special Aviation Fire and Explosion Reduction (SAFER) advisory committee, volume 1
[AD-A092016] p0191 N81-16024
Summary of aviation safety program resumes. Cabin safety
[AD-A091938] p0192 N81-16027
Helicopter noise contour development techniques and directivity analysis
[AD-A093426] p0221 N81-17851
Correlation of helicopter noise levels with physical and performance characteristics
[AD-A093428] p0221 N81-17852
SRDS Technical Program document. Fiscal year 1981. Research and Development approved projects
[AD-A096293] p0339 N81-21050
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A098096] p0424 N81-24038
High speed exit taxiways
[AD-A098178] p0435 N81-24118
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2B
[AD-A099176] p0493 N81-27064
Special Aviation Fire and Explosion Reduction (SAFER) Advisory Committee, volume 2A
[AD-A099147] p0493 N81-27065
An analysis of the requirements for and the costs and benefits of the National Microwave Landing System (MLS), volume 1
[AD-A099632] p0493 N81-27071
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS), volume 2
[AD-A100018] p0493 N81-27072
An analysis of the requirements for, and the benefits and costs of the National Microwave Landing System (MLS)
[AD-A100136] p0537 N81-28076
The FAA plans and programs for the future airport and air traffic control system
[AD-A100370] p0537 N81-28077
NAS automation equipment operating cost estimates, FY 1978 - 1979
[AD-A102023] p0595 N81-31182
Airport activity statistics of certificated route air carriers
[AD-A102355] p0602 N81-31236
Emergency cabin lighting installations: An analysis of ceiling- versus lower cabin-mounted lighting during evacuation trials
[AD-A103191] p0636 N81-33175
Operation free flight: An operational evaluation of direct route flight plan filing in today's National Aerospace System
[AD-A104150] p0636 N81-33184

FEDERAL AVIATION AGENCY, ATLANTIC CITY, N.J.
Discrete Address Beacon System (DABS) receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS processor subsystem tests
[AD-A094124] p0250 N81-18037
Active beacon collision avoidance logic evaluation. Volume 1: Mode C equipped (ATCRBS) threat phase
[AD-A102163] p0595 N81-31181

FEDERAL AVIATION AGENCY, WASHINGTON, D.C.
The need for airport noise monitoring systems. Their uses, and value in promoting civil aviation
[AD-A092240] p0201 N81-16627
Helicopter noise exposure level data: Variations with test target. Indicated airspeed, distance. main rotor RPM and takeoff power
[AD-A100691] p0552 N81-29661

FERRANTI LTD., EDINBURGH (SCOTLAND).
Integration of sensors with displays
p0212 N81-17067
Evolution of tactical and map displays for high performance aircraft
p0212 N81-17072

FIAT AVIAZIONE S.P.A., TURIN (ITALY).
Low pressure turbine testing
p0432 N81-24098

FIBER SCIENCE, INC., SALT LAKE CITY, UTAH.
Helicopter external cargo sling apex fitting: Development and testing
[AD-A093515] p0252 N81-18049

FLIGHT DYNAMICS RESEARCH CORP., VAN NUYS, CALIF.
Jet-diffuser ejector - Attached nozzle design
[NASA-CR-152361] p0278 N81-19412
A Jet-diffuser ejector for a V/STOL fighter
[NASA-CR-166161] p0428 N81-24064

FLORIDA UNIV., GAINESVILLE.
A unified approach to the mass balancing of rotating flexible shafts
p0095 N81-13355

FLOW RESEARCH, INC., KENT, WASH.
Application of transonic potential calculations to aircraft and wind tunnel configurations
p0186 N81-15992
Aerodynamic effects of nearly uniform slipstreams on thin wings in the transonic regime
[NASA-CR-152351] p0249 N81-18027

FLOW RESEARCH, INC., LOS ANGELES, CALIF.
Development of finite-volume methods for three-dimensional transonic flows
[AD-A090829] p0141 N81-14986

FLOW SIMULATIONS, INC., SUNNYVILLE, CALIF.
A diagonal form of an implicit approximate-factorization algorithm
p0300 A81-29363

FONDAZIONE UGO BORDONI, ROME (ITALY).
Characteristics of a digital filter for a precision DME system in microwave landing systems
[FUB-43-1980] p0628 N81-32136

FORSCHUNGSINSTITUT FUER FUNK UND MATHEMATIK, WERTHOVEN (WEST GERMANY).
Formation tracking. Part 2: Tracking and control procedures
[FFM-279-PT-2] p0218 N81-17110

FRAUNHOFER-INST. FUER BETRIEBSFESTIGKEIT, DARMSTADT (WEST GERMANY).
Fatigue test program and test results
p0489 N81-26142

FRENCH ARMY, VILLACOUBLAY-AIR (FRANCE).
Incidents of problems in setting to work on the conceptual design of helicopters
p0632 N81-33130

FWG ASSOCIATES, INC., TULLAHOMA, TENN.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
Pilot-aircraft system reponse to wind shear
[NASA-CR-3342] p0031 N81-10636

G

GABELMAN (IRVING J.) TECHNICAL ASSOCIATES, ROME, N.Y.
Summary of AGARD Lecture Series 100: Methodology for control of life cycle costs for avionics systems
p0047 N81-11924
GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.
Small turbine engine augmentor. Phase 1: Preliminary design studies of afterburner and duct-burner configurations
[AD-A101595] p0583 N81-30131
Solar Brayton engine/alternator set
p0588 N81-30529
GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Are management problems in the acquisition of aircraft gas turbine engines being corrected
[AD-A090520] p0008 N81-12928
The F/A-18 Naval Strike Fighter: Progress has been made but problems and concerns continue
[AD-A095287] p0333 N81-20069
A look at NASA's Aircraft Energy Efficiency program
[PSAD-80-50] p0334 N81-20077
Review of Air Force's next generation trainer aircraft program Department of Defense
[AD-A096238] p0341 N81-21071
Air Force and Navy plans to acquire trainer aircraft
[AD-A096237] p0342 N81-21072
DOD's use of remotely piloted vehicle technology offers opportunities for saving lives and dollars
[AD-A097419] p0388 N81-23074
F-16 integrated logistics support: Still time to consider economical alternatives
[PB81-137473] p0389 N81-23079
Operational and support costs of the Navy's F/A-18 can be substantially reduced
[PB81-160814] p0467 N81-26125
GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
Development of advanced interceptor substructural material
[AD-A090127] p0038 N81-11116
Development of advanced interceptor substructural material
[AD-A103836] p0640 N81-33241
GENERAL DYNAMICS CORP., FORT WORTH, TEX.
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 1: Study overview
[NASA-CR-152391-VOL-1] p0384 N81-23030
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 2: Evaluation of prediction methodologies
[NASA-CR-152391-VOL-2] p0384 N81-23031
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 3: Effects of configuration variations from baseline
[NASA-CR-152391-VOL-3] p0384 N81-23032
Analysis of wind tunnel test results for a 9.39-per cent scale model of a VSTOL fighter/attack aircraft. Volume 4: RALS R104 aerodynamic characteristics and comparisons with R205 configuration aerodynamic characteristics
[NASA-CR-152391-VOL-4] p0384 N81-23033
Fountain-jet turbulence
[AD-A098098] p0423 N81-24028
Study of an engine flow diverter system for a large scale ejector powered aircraft model
[NASA-CR-166163] p0540 N81-28096
Evaluation of pressure and thermal data from a wind tunnel test of a large-scale, powered, STOL fighter model
[NASA-CR-166170] p0635 N81-33162
GENERAL DYNAMICS/FORT WORTH, TEX.
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
Design to cost and the F-16 multirole fighter
p0046 N81-11911
Experimental and analytical study on the flutter and gust response characteristics of a torsion-free-wing airplane model
[NASA-CR-159283] p0340 N81-21059
GENERAL ELECTRIC CO., BURLINGTON, VT.
High impulse gun airborne demonstration. GAU-13/A weapon, feed system, gun drive and electronic controls
[AD-A101698] p0582 N81-30120
GENERAL ELECTRIC CO., CINCINNATI, OHIO.
Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-40639
Core compressor exit stage study. Volume 3: Data and performance report for screening test configurations
[NASA-CR-159499] p0070 N81-12086
Curved centerline air intake for a gas turbine engine
[NASA-CASE-LEW-13201-1] p0143 N81-14999
Aerodynamic stability analysis of NASA J85-13/planar pressure pulse generator installation
[NASA-CR-165141] p0143 N81-15004
TF34 engine compression system computer study
[NASA-CR-159889] p0143 N81-15005
Core compressor exit stage study. Volume 2: Data and performance report for the baseline configuration
[NASA-CR-159498] p0195 N81-16051
Acoustic and aerodynamic performance investigation of inverted velocity profile coannular plug nozzles
[NASA-CR-3149] p0203 N81-16854
Turbine modeling technique to generate off-design performance data for both single and multistage axial-flow turbines
[NASA-CR-165244] p0213 N81-17070
Samarium cobalt (SMCO) generator/engine integration study
[AD-A092904] p0214 N81-17087
Crack growth modeling in an advanced powder metallurgy alloy
[AD-A093992] p0210 N81-17235
Aerodynamic/acoustic performance of YJ101/double bypass VCE with coannular plug nozzle
[NASA-CR-159869] p0220 N81-17846
VCE early acoustic test results of General Electric's high-radius ratio coannular plug nozzle
p0245 N81-17999
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA Ames 40 by 80 foot wind tunnel: Acoustic data report
[NASA-CR-152329] p0258 N81-18798
Apparatus for sensor failure detection and correction in a gas turbine engine control system
[NASA-CASE-LEW-12907-2] p0273 N81-19115
Integrated control system for a gas turbine engine
[NASA-CASE-LEW-12594-2] p0274 N81-19116
Evaluation of fuel character effects J79 smokeless combustor
[AD-A095057] p0278 N81-19323
Energy efficient engine flight propulsion system: Aircraft/engine integration evaluation
[NASA-CR-159584] p0375 N81-22051
Engine life development
p0430 N81-24081
Design of a V/STOL propulsion system for a large-scale fighter model
[NASA-CR-166162] p0442 N81-25074
Blade loss transient dynamics analysis, volume 1. Task 1: Survey and perspective
[NASA-CR-165373-VOL-1] p0496 N81-27089
Blade loss transient dynamics analysis, volume 2. Task 2: Theoretical and analytical development. Task 3: Experimental verification
[NASA-CR-165373-VOL-2] p0496 N81-27090
Blade loss transient dynamics analysis. Volume 3: User's manual for TETRA program
[NASA-CR-165373-VOL-3] p0496 N81-27091
Quiet Clean Short-haul Experimental Engine (QCSEE); acoustic performance of a 50.8-cm (20 inch) diameter variable pitch fan and inlet,

test results and analysis, volume 1
[NASA-CR-135117] p0497 N81-27097
High temperature strain gage system for
application to turbine engine components
[AD-A101713] p0583 N81-30132
Structures performance, benefit, cost-study
[NASA-CR-165456] p0597 N81-31194
CF6-50 engine emissions testing with traverse
probe
[AD-A102159] p0600 N81-31218
GENERAL ELECTRIC CO., EVENDALE, OHIO.
Design and development of the combustor inlet
diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078
Engine diagnostics program: CF6-50 engine
performance deterioration
[NASA-CR-159867] p0078 N81-12085
Design concepts for low-cost composite turbofan
engine frame
[NASA-CR-165217] p0376 N81-22053
Heat pipe solar receiver with thermal energy
storage
p0588 N81-30532
GENERAL ELECTRIC CO., LYNN, MASS.
Comparison of experimental and computational
shock structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953
NASA VCE test bed engine aerodynamic performance
characteristics and test results
[AIAA PAPER 81-1594] p0508 A81-40969
Maritime patrol aircraft engine study. General
Electric derivative engines. Volume 2:
Appendix A. Performance data - GE27/T3 study
A1 turboprop
[AD-A089336] p0028 N81-10068
Maritime patrol aircraft engine study. General
Electric derivative engines. Volume 3:
Appendix B. Performance data - TF34/T7 study
A1 turboprop
[AD-A089279] p0028 N81-10069
High bypass turbofan component development,
modification 2
[AD-A093156] p0215 N81-17093
VCE test bed engine for supersonic cruise research
p0245 N81-17995
Quiet Clean General Aviation Turbofan (QCGAT)
technology study, volume 1
[NASA-CR-164222] p0376 N81-22052
Experimental verification of turboblading
aeromechanics
p0432 N81-24092
Propulsion system study for Small Transport
Aircraft Technology (STAT)
[NASA-CR-165330] p0442 N81-25078
GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Improved ceramic heat exchanger materials
[NASA-CR-159678] p0132 N81-14082
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Development of high-temperature turbine
subsystem technology to a technology readiness
status, phase 2
[FE-1806-72] p0134 N81-14332
CF 6 engine diagnostics
p0597 N81-31197
CF6 high pressure compressor and turbine
clearance evaluations
p0598 N81-31198
Engine condition monitoring: CF6 family 60's
through the 80's
p0600 N81-31215
GENERAL MOTORS CORP., INDIANAPOLIS, IND.
The effects of solidity, interblade phase angle
and reduced frequency on the time-variant
aerodynamic response of a compressor stator
[AD-A090546] p0081 N81-12108
GENERAL TECHNOLOGY APPLICATIONS, INC., ARLINGTON, VA.
Application of General Technology Applications,
Incorporated (GTA) blending process to
antimisting fuel additives
[AD-A100692] p0551 N81-29247
GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
Program of research in laminar flow control in
the JIAFS at NASA Langley Research Center
[NASA-CR-164843] p0627 N81-32121
GEORGIA INST. OF TECH., ATLANTA.
An iterative finite element-integral technique
for predicting sound radiation from turbofan
inlets
[AIAA PAPER 81-1981] p0624 A81-49736
Prediction of sound radiated from different
practical jet engine inlets
[NASA-CR-163824] p0137 N81-14789
Behavior of continuous filament advanced
composite isogrid structure
p0377 N81-22095
Prediction of sound radiation from different
practical jet engine inlets
[NASA-CR-164620] p0500 N81-27886
Two-dimensional dynamic stall as simulated in a
varying freestream
[NASA-CR-164829] p0629 N81-32154
Development of an analytical technique for the
optimization of jet engine and duct acoustic
liners
[NASA-CR-164872] p0639 N81-33205
GJERDING (D. K.) SIMULATION ELECTRONICS, SEATTLE,
WASH.
User's manual for flight Simulator Display
System (FSDS)
[NASA-CR-164295] p0391 N81-23095
GOODRICH (B. F.) CO., AKRON, OHIO.
Aluminized coding study for retrofitting
in-service slide materials
[AD-A094170] p0255 N81-18201
GOODYEAR AEROSPACE CORP., AKRON, OHIO.
Microprocessor software applications for flight
training simulators
p0044 N81-11658
Microcomputer array processor system
p0044 N81-11673
GOODYEAR AEROSPACE CORP., LITCHFIELD PARK, ARIZ.
Superhard transparent coating optimization program
[AD-A091083] p0092 N81-13048
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Transonic swept wings studied by the
lifting-line theory
p0509 A81-41090
Complex configuration analysis at transonic speeds
p0190 N81-16016
Demonstration of a method for determining
critical store configurations for wing store
flutter
[AD-A092257] p0197 N81-16068
Display concepts for control configured vehicles
p0213 N81-17076
VTOL in ground effect flows for closely spaced
jets
[NASA-CR-152321] p0271 N81-19095
Aircraft wing weight build-up methodology with
modification for materials and construction
techniques
[NASA-CR-166173] p0387 N81-23068
Axisymmetric & non-axisymmetric exhaust jet
induced-effects on a V/STOL vehicle design.
Part 1: Data presentation
[NASA-CR-166146] p0441 N81-25068
Turbulent interactions on airfoils at transonic
speeds: Recent developments
p0483 N81-26047
Analysis and design of supersonic aircraft based
on inviscid nonlinear Eulerian equations.
Part 1: Rotational Euler solutions with
explicit shock fitting
[AD-A103434] p0637 N81-33192

H

HAMILTON STANDARD, WINDSOR LOCKS, CONN.
Reliability advancement for electronic engine
controllers. Volume 2: Guide to development
of high reliability electronic engine
controllers
[AD-A098614] p0444 N81-25086
Reliability advancement for electronic engine
controllers, volume 1
[AD-A098623] p0444 N81-25087
HARRIS CORP., MELBOURNE, FLA.
Tent shaped phased array
[AD-A103927] p0640 N81-33393
HERCULES, INC., CUMBERLAND, MD.
Interactive multi-mode blade impact analysis
[ASME PAPER 81-GT-79] p0314 A81-29987
HICKOK (EUGENE A.) AND ASSOCIATES, WAYZATA, MINN.
National runway friction measurement program
[AD-A097334] p0391 N81-23097

HITCO, GARDENA, CALIF.
Fabrication and physical testing of graphite composite panels utilizing woven graphite fabric with current and advanced state-of-the-art resin systems
[NASA-CR-152292] p0218 N81-17175
Development of assembly techniques for fire resistant aircraft interior panels
[NASA-CR-152119] p0254 N81-18097

HONEYWELL, INC., MINNEAPOLIS, MINN.
Demonstration Advanced Avionics System (DAAS) functional description
[NASA-CR-152405] p0389 N81-23080

HONEYWELL SYSTEMS AND RESEARCH CENTER, MINNEAPOLIS, MINN.
Failure management techniques for high survivability
p0042 N81-11272
Two-axis, fluidically controlled thrust vector control system for an ejection seat
[AD-A093888] p0204 N81-16996
Real-time feasibility for generation of nonlinear textured terrain
[AD-A095070] p0277 N81-19141
F-8C adaptive control law refinement and software development
[NASA-CR-163093] p0377 N81-22059

HUGHES HELICOPTERS, CULVER CITY, CALIF.
Ultrasonic cold forming of aircraft sheet materials
[AD-A096351] p0344 N81-21239
Wind tunnel tests of large- and small-scale rotor hubs and pylons
[AD-A098510] p0439 N81-25043
Preliminary design of a tip-jet-driven heavy lift helicopter incorporating circulation control
[AD-A099192] p0486 N81-26120
The methodology of fatigue analysis and testing: Main rotor blades and hub, Hughes YAH-64 advanced attack helicopter
p0488 N81-26139

HUGHES RESEARCH LABS., MALIBU, CALIF.
Definition, analysis and development of an optical data distribution network for integrated avionics and control systems
[NASA-CR-159370] p0590 N81-30962

HUMAN ENGINEERING LABS., ABERDEEN PROVING GROUND, MD.
Helicopter In-flight Validation System (HELIVALS)
[AD-A091129] p0092 N81-13050
A preliminary human factors flight assessment of a Marconi automatic map
[AD-A092585] p0193 N81-16036
An investigation of the five point restraint system for aviators
[AD-A093065] p0205 N81-16998
The background and bases for the proposed military standard on acoustical noise limits in helicopters
[AD-A099814] p0500 N81-27890
The background and bases for the proposed military standard on acoustical noise limits in helicopters
p0604 N81-31459

HUMAN RESOURCES RESEARCH ORGANIZATION, ALEXANDRIA, VA.
Civil helicopter wire strike assessment study. Volume 2: Accident analysis briefs
[NASA-CR-152390] p0023 N81-10019

I

IIT RESEARCH INST., ANNAPOLIS, MD.
The Discrete Address Beacon System/Air Traffic Control Radar Beacon System/ATCRBS IFF Mark 12 system (DABS/ATCRBS/AIMS) performance prediction model
[AD-A089440] p0024 N81-10034
Analytic determination of interference thresholds for microwave landing system equipment and TACAN/DME equipment
[AD-A093448] p0206 N81-17025
MLS channel assignment model
[AD-A093449] p0206 N81-17026
A supplementary EMC analysis of the proposed Airport Surface Detection Equipment (ASDE-3) radar
[AD-A092965] p0219 N81-17342

IIT RESEARCH INST., CHICAGO, ILL.
Impact of the discrete Address Beacon System (DABS) on Air Traffic Control Radar Beacon System (ATCRBS) performance in selected deployments
[AD-A089611] p0025 N81-10039
Evaluation of RF anechoic chamber fire protection systems
[AD-A092478] p0197 N81-16070
Shielded enclosure test bed requirement
[AD-A092509] p0198 N81-16073

ILC INDUSTRIES, INC., FREDERICA, DEL.
Air Force Geophysics Laboratory aerodynamically tethered balloon, 45,000 cubic feet
[AD-A096758] p0372 N81-22023

ILLINOIS INST. OF TECH., CHICAGO.
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
p0239 A81-26508
Effects of axisymmetric contractions on turbulence of various scales
p0093 N81-13055
Modification in drag of turbulent boundary layers resulting from manipulation of large-scale structures
[NASA-CR-3444] p0507 N81-30392

ILLINOIS UNIV. AT URBANA-CHAMPAIGN.
Optimized computer systems for avionics applications
[AD-A089570] p0028 N81-10063

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Computer modeling of internal combustion engines: Combustion and related processes
[HTS/79/3] p0587 N81-30454

INDIAN INST. OF TECH., BOMBAY.
Influence of landing gear flexibility on aircraft performance during ground roll
p0622 A81-49375

INDUSTRIAL TECTONICS, INC., COMPTON, CALIF.
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-10] p0117 A81-10672

INDUSTRIEANLAGEN-BETRIEBSGESELLSCHAFT M.B.H., OTTOBRUNN (WEST GERMANY).
Design to cost and systems, LCC
p0047 N81-11920

INFORMATION AND CONTROL SYSTEMS, INC., HAMPTON, VA.
Guidance and control system research for improved terminal area operations
p0264 N81-19038

INFORMATION SPECTRUM, INC., WARMINSTER, PA.
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 2: Abstract data base
[AD-A094226] p0252 N81-18050
Compilation of energy efficient concepts in advanced aircraft design and operations. Volume 1: Technical report
[AD-A094225] p0252 N81-18051

INSTITUT FRANCO-ALLEMAND DE RECHERCHES, ST. LOUIS (FRANCE).
The Dalembertometer
[ISL-CO-220/79] p0133 N81-14292
Controls of aeronautical structures under fatigue testing by holographic pulsed lasers interferometry
[ISL-CO-218/79] p0133 N81-14300
Application of optical methods to the study of jet noise and turbulence
[ISL-CO-201/80] p0147 N81-15819

INSTITUT FUER FLUGMECHANIK, BRUNSWICK (WEST GERMANY).
The impact of helicopter flight mechanics on mission performance
p0633 N81-33148

INSTITUT FUER THEORETISCHE STROEMUNGSMECHANIK, GOETTINGEN (WEST GERMANY).
Design of advanced technology transonic airfoils and wings
p0187 N81-16000

INSTITUTE OF AVIATION MEDICINE, FARNBOROUGH (ENGLAND).
The evolution of the helicopter seat pan mounted Personal Survival Pack (PSP)
p0205 N81-17016

INSTITUTE OF AVIATION MEDICINE, OSLO (NORWAY).
Second language speech comprehension in noise: A hazard to aviation safety

p0604 N81-31463

INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Estimation of aerodynamic forces acting on Earth satellites, application to an experimental satellite
[INPE-1944-RPE/262] p0505 N81-30158
Transverse Voice Radio Link for Stratospheric Balloons
[INPE-1992-RPE/265] p0586 N81-30331

INSTITUUT TNO VOOR WERKTUIGKUNDIGE CONSTRUCTIES, DELFT (NETHERLANDS).
Experimental analysis and methods to determine the dynamic behavior of propulsion shafting systems
p0145 N81-15401

IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
Design of turbine cascades with transitional profile boundary layers
p0278 N81-19456
Aerodynamics of advanced axial-flow turbomachinery
[NASA-CR-163995] p0335 N81-20079

J

JENKINS (GUILYN) AND PARTNERS LTD., LANCASTER (ENGLAND).
An economic and versatile panel method for aircraft and aircraft/store configurations. An outline of the principal features of the mathematical modeling and numerical implementation of the British Aerospace (Warton) Mk II Panel Method
p0144 N81-15311

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
A concept for dynamic control of RPV information system parameters
p0049 A81-12796
An airborne sensor for the avoidance of clear air turbulence
[AIAA PAPER 81-0297] p0164 A81-20735
Compressible boundary-layer stability calculations for sweptback wings with suction
[AIAA PAPER 81-0196] p0169 A81-20840
Sun powered aircraft design
[AIAA PAPER 81-0916] p0363 A81-32932
Fundamental studies of antimisting fuels
[AIAA PAPER 81-1422] p0515 A81-42195
Low-frequency radio navigation for the Army's Mobile Automated Field Instrumentation System /MAFIS/
p0517 A81-42437
Flight effects on supersonic convergent-divergent nozzle jet noise
[AIAA PAPER 81-2027] p0623 A81-45728
Noise radiated from inverted velocity profile jets under simulated flight
[AIAA PAPER 81-2026] p0623 A81-45729
Noise shielding by a hot subsonic jet
[AIAA PAPER 81-2018] p0624 A81-45731
High-voltage spark carbon-fiber sticky-tape data analyzer
[NASA-CR-163747] p0087 N81-12646
Aerodynamic design of electric and hybrid vehicles: A guidebook
[NASA-CR-163744] p0088 N81-12943
Power control for hot gas engines
[NASA-CASE-NPO-14220-1] p0133 N81-14318
Two-stage combustion for reducing pollutant emissions from gas turbine combustors
[NASA-CR-163877] p0196 N81-16056
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677
Wind loads for bar-truss structures
p0259 N81-18997
The 1979 clear air turbulence flight test program
p0266 N81-19050
Clear air turbulence studies with microwave radiometers
p0266 N81-19053
Low-frequency radio navigation system
[NASA-CASE-NPO-15264-1] p0373 N81-22036
Wind loads on flat plate photovoltaic array fields
[NASA-CR-164454] p0445 N81-25431
Parabolic Dish Solar Thermal Power Annual Program Review Proceedings
[NASA-CR-164696] p0587 N81-30525

JOINT INST. FOR ADVANCEMENT OF FLIGHT SCIENCES, HAMPTON, VA.
Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756
Determination of model structure and parameters of an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562

JOINT TECHNICAL COORDINATING GROUP FOR AIRCRAFT SURVIVABILITY, WASHINGTON, D.C.
Directory of aircraft survivability specialists and their affiliations
[AD-A096259] p0341 N81-21066

K

KAMAN AEROSPACE CORP., BLOOMFIELD, CONN.
Multicyclic controllable twist rotor data analysis
[NASA-CR-152251] p0249 N81-18028
Analytical testing
[NASA-CR-3429] p0393 N81-23407
MM&T: Low cost production/installation of urethane leading edge guards on rotor blades
[AD-A101603] p0582 N81-30117

KANSAS UNIV., LAWRENCE.
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20837
Summary of typical parameters that affect sound transmission through general aviation aircraft structures
[SAE PAPER 810562] p0518 A81-42728
The state of the art of general aviation autopilots - Now and in the future
[SAE PAPER 810582] p0520 A81-42744
Development of a simple, self-contained flight test data acquisition system
[SAE PAPER 810596] p0520 A81-42754
Effects of wingtip modifications on handling qualities of agricultural aircraft
[SAE PAPER 810606] p0522 A81-42763
A feasibility study for advanced technology integration for general aviation
[NASA-CR-159381] p0185 N81-15974
Comparison of selected lift and sideslip characteristics of the Ayres Thrush S2R-800, winglets off and winglets on, to full-scale wind-tunnel data
[NASA-CR-165710] p0423 N81-24026
Study of noise reduction characteristics of multilayered panels and dual pane windows with Helmholtz resonators
[NASA-CR-164370] p0438 N81-24857
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-164377] p0439 N81-25041

KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
The state of the art of general aviation autopilots
[NASA-CR-159371] p0197 N81-16066
The DAST-1 remotely piloted research vehicle development and initial flight testing
[NASA-CR-163105] p0207 N81-17038
A theoretical investigation of ground effects on USB configurations
[NASA-CR-159005] p0262 N81-19021
A program to evaluate a control system based on feedback of aerodynamic pressure differentials, part 1
[NASA-CR-164684] p0583 N81-30134
A program to evaluate a control system based on feedback of aerodynamic pressure differentials. Part 2: Data report for phase 1 wind tunnel test
[NASA-CR-164685] p0584 N81-30135

KENTRON INTERNATIONAL, INC., HAMPTON, VA.
Graphite polyimide fabrication research for supersonic cruise aircraft
p0182 A81-22665
IPAD applications to the design, analysis, and/or machining of aerospace structures
[AIAA 81-0512] p0301 A81-29388
Sensitivity of optimum solutions to problem parameters
[AIAA 81-0548] p0301 A81-29399

Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
Multiobjective insensitive design of airplane control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45518
Preliminary design characteristics of a subsonic business jet concept employing an aspect ratio 25 strut braced wing
[NASA-CR-159361] p0032 N81-11013
Induced drag ideal efficiency factor of arbitrary lateral-vertical wing forms
[NASA-CR-3357] p0072 N81-12022
A study of high-altitude manned research aircraft employing strut-braced wings of high-aspect-ratio
[NASA-CR-159262] p0333 N81-20067
ISSYS: An integrated synergistic Synthesis System
[NASA-CR-159221] p0543 N81-28783
Design and analysis of a fuel-efficient single-engine, turboprop-powered, business airplane
[NASA-CR-165768] p0596 N81-31184

KING RADIO CORP., OLATHE, KANS.
Demonstration Advanced Avionics System (DAAS) functional description
[NASA-CR-152405] p0389 N81-23080

KLM ROYAL DUTCH AIRLINES, AMSTERDAM (NETHERLANDS).
Review of AIDS development
p0599 N81-31212

KRAFTWERK UNION A.G., MUELHEIM (WEST GERMANY).
Application of model laws when determining the heat transfer coefficients by experiments on cooled turbine blades
p0089 N81-12998

KUHN (RICHARD E.), NEWPORT NEWS, VA.
An engineering method for estimating the induced lift on V/STOL aircraft hovering in and out of ground effect
[AD-A098509] p0441 N81-25069
An engineering method for estimating the lateral/directional characteristics of V/STOL configurations in transition
[AD-A100386] p0540 N81-28103

L

LABORATORIUM FUER BETRIEBSFESTIGKEIT, DARMSTADT (WEST GERMANY).
Fatigue strength of CFRP under combined flight-by-flight loading and flight-by-flight temperature changes
p0039 N81-11134
Current developments in aircraft fatigue evaluation procedures
[AAAF-NT-79-33] p0086 N81-12464

LEAR SIEGLER, INC., GRAND RAPIDS, MICH.
Requirements, technology and configuration evaluation for Crash Survivable Flight Data Recording (CSFDR) system
[AD-A097863] p0427 N81-24059

LEAR SIEGLER, INC., SANTA MONICA, CALIF.
Development and evaluation of automatic landing control laws for power lift STOL aircraft
[NASA-CR-152399] p0253 N81-18060

LILLE UNIV. (FRANCE).
Laboratory studies of flight mechanics using catapult launched models
[AAAF-NT-80-15] p0210 N81-17055
Modeling, acquisition and processing during large displacements
[AAAF-NT-80-16] p0210 N81-17056
A rotating, wind tunnel balance and associated experimental techniques
[AAAF-NT-80-13] p0218 N81-17108

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Formats for DABS data link applications
[AD-A089963] p0034 N81-11028
Active Beacon Collision Avoidance System (BCAS) functional overview
[AD-A094177] p0250 N81-18040
Electronic flight rules: An alternative separation assurance concept
[AD-A097570] p0387 N81-23063
Radar Beacon Transponder (RBX) functional description
[AD-A100665] p0547 N81-29112
Radar Beacon Transponder (RBX) installation and siting criteria
[AD-A100666] p0547 N81-29113

LITTON SYSTEMS, INC., WOODLAND HILLS, CALIF.
Ring laser gyro
[AD-A090643] p0085 N81-12395

LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
Aircraft alerting systems standardization study
[AD-A090834] p0093 N81-13053

LOCKHEED AIRCRAFT SERVICE CO., PASADENA, CALIF.
Turbulence: From a pilot's viewpoint
p0136 N81-14561

LOCKHEED-CALIFORNIA CO., BURBANK.
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[AIAA PAPER 81-1597] p0508 A81-40972
Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186
Development of repair procedures for graphite/epoxy structures on commercial transports
p0531 A81-43645
YF-12 cooperative airframe/propulsion control system program, volume 1
[NASA-CR-163099] p0092 N81-13044
Simulator investigation of arrow-wing low-speed handling qualities
p0244 N81-17993
Effects on inlet technology on cruise speed selection
p0245 N81-17998
Structural concept trends for commercial supersonic cruise aircraft design
p0246 N81-18006
The impact of materials technology and operational constraints on the economics of cruise speed selection
p0248 N81-18021
Advanced composite aileron for L-1011 transport aircraft, task 1
[NASA-CR-145370] p0277 N81-19232
Aerodynamic and acoustic behavior of a YF-12 inlet at static conditions
[NASA-CR-163106] p0342 N81-21079
Design considerations for composite fuselage structure of commercial transport aircraft
[NASA-CR-159296] p0370 N81-22419
Aircraft crash dynamics: Some major considerations
p0378 N81-22437
Propulsion system testing requirements for a commercial transport
p0430 N81-24077

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.
Software survey for the avionics test bed
[NASA-CR-161089] p0629 N81-32143

LOCKHEED-GEORGIA CO., MARIETTA.
Numerical optimization - An assessment of its role in transport aircraft aerodynamic design through a case study
p0006 A81-11604
An experimental study of transmission, reflection and scattering of sound in a free jet flight simulation facility and comparison with theory
p0289 A81-20943
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
Acoustic and turbulence measurements of a tone-excited jet with and without flight simulation
[AIAA PAPER 81-2007] p0621 A81-48640
Design options study. Volume 1: Executive summary
[AD-A089536] p0027 N81-10056
Design options study. Volume 2: Approach and summary results
[AD-A089537] p0027 N81-10057
Design options study. Volume 3: Qualitative assessment
[AD-A089538] p0027 N81-10058
Design options study. Volume 4: Detailed analyses supporting appendices
[AD-A089539] p0027 N81-10059

Component-adaptive grid embedding
p0137 N81-14697
A survey of new technology for cockpit application to 1990's transport aircraft simulators
[NASA-CR-159330] p0142 N81-14993
Advanced flight deck/crew station simulator functional requirements
[NASA-CR-159331] p0142 N81-14994
Turboprop Cargo Aircraft Systems study, phase 1
[NASA-CR-159355] p0193 N81-16041
Feasibility study for C-141B reduction of wing loads by uprigging the ailerons
[AD-A094634] p0272 N81-19105
Issues of commonality. Volume 2: Issue analysis
[AD-A095418] p0331 N81-20046
Issues of commonality. Volume 1: Executive summary
[AD-A095417] p0331 N81-20047
High frequency drive mechanism for an active controls systems aircraft control surface
p0378 N81-22400
A review of the wall pressure signature and other tunnel constraint correction methods for high angle-of-attack tests
p0435 N81-24122
Aerodynamic investigation of C-141 leading edge modifications for cruise drag reduction, test 2
[AD-A099662] p0492 N81-27051
Shock associated noise reduction from inverted-velocity-profile coannular jets
[NASA-CR-3454] p0589 N81-30908

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Hyperbolic/parabolic development for the GIM-STAR code
[NASA-CR-3369] p0201 N81-16416

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Passive imagery navigation
[AD-A096245] p0339 N81-21051

LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.
Support interference
p0591 N81-31113
Aeroelasticity, including dynamic effects of separated flow
p0592 N81-31118

LORD KINEMATICS, ERIE, PA.
Service life determination for the UH-60-A (UTTAS) helicopter elastomeric bearings
[AD-A091756] p0134 N81-14324

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Statistical relationship between median visibility and conditions of worstcase manmade impact on visibility
[LA-UR-80-2485] p0135 N81-14550

LOUGHBOROUGH UNIV. OF TECHNOLOGY (ENGLAND).
A structural load alleviation control system for a large transport aircraft
[TT-8002] p0541 N81-28106

LUCAS AEROSPACE LTD., BIRMINGHAM (ENGLAND).
Cost considerations of engine fuel control systems
p0048 N81-11928
Microprocessor characteristics and comparative features
p0497 N81-27104

M

MAGNAVOX CO., TORRANCE, CALIF.
Navstar GPS receiver for satellite applications
p0485 N81-26111

MARINE CORPS, WASHINGTON, D. C.
Ten years of US Marine Corps Harrier operations
p0632 N81-33140

MARTIN MARIETTA AEROSPACE, BETHESDA, MD.
Vertical lift capabilities for the 80's and 90's
p0632 N81-33139

MARTIN MARIETTA CORP., BALTIMORE, MD.
Container Life Adapter-Helicopter (CLAH) operational prototype (preproduction) militarized units for flight evaluation and operational testing
[AD-A089794] p0035 N81-11034

MARTIN MARIETTA CORP., ORLANDO, FLA.
Performance verification of the superjet laminar angular rate sensor
[AD-A091089] p0091 N81-13040

MARYLAND UNIV., COLLEGE PARK.
Numerical lifting line theory applied to drooped leading-edge wings below and above stall
p0066 A81-15081
Dynamics of a helicopter-slung load system
p0092 N81-13051

MASON AND HANGER-SILAS MASON CO., INC., AMARILLO, TEX.
Tool force evaluation of lathe machined high explosives
[MHSMP-80-20] p0144 N81-15148

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Numerical solutions of transonic flows by parametric differentiation and integral equation techniques
p0067 A81-15896
Comparison of experimental and computational shock structure in a transonic compressor rotor
[ASME PAPER 80-GT-81] p0109 A81-17953
VTOL control for shipboard landing in high sea states
p0155 A81-20471
Economics of technological change - A joint model for the aircraft and airline industries
p0169 A81-21010
Electromagnetic precipitation and ducting of particles in turbulent boundary layers
p0239 A81-26506
A simple model for compressor stall cell propagation
[ASME PAPER 81-GT-73] p0313 A81-29982
Tip geometry effects on the model helicopter rotor low frequency broadband noise
[AIAA PAPER 81-2003] p0619 A81-48615
Optimized pitch controller for load alleviation on wind turbines
[FFA-TN-HU-2189-PT-1] p0087 N81-12634
Prevention of spline wear by soft metallic coatings
[AD-A091861] p0132 N81-14064
Display concepts for control configured vehicles
p0213 N81-17076
Current problems in turbomachinery fluid dynamics
[AD-A093375] p0219 N81-17387
A scheduling model for the aerial relay system
[NASA-CR-159387] p0249 N81-18032
Theoretical study of network design methodologies for the aerial relay system
[NASA-CR-159365] p0249 N81-18033
Definition of the problems associated with air traffic control of closely spaced helicopter traffic performing decelerated instrument approaches
[AD-A094073] p0251 N81-18042
Active BCAS: Design and validation of the surveillance subsystem
[AD-A095049] p0270 N81-19084
Measurements of aerodynamic damping in the MIT transonic rotor
[NASA-CR-163988] p0274 N81-19122
Initial design and experimental implementation of the traffic advisory service of ATARS
[AD-A095462] p0331 N81-20055
Application of superconducting coils to the NASA prototype magnetic balance
[NASA-CR-165660] p0336 N81-20086
Investigation of air transportation technology at Massachusetts Institute of Technology, 1980
p0371 N81-22000
MIT Annotated Bibliography
p0371 N81-22001
Use of Loran-C for general aviation aircraft navigation
p0371 N81-22002
An analysis of the adaptability of Loran-C to air navigation
p0371 N81-22003
The P/POD project: Programmable/Pilot Oriented Display
p0371 N81-22004
An asymptotic unsteady lifting-line theory with energetics and optimum motion of thrust-producing lifting surfaces
[NASA-CR-165679] p0385 N81-23035
Noise and performance of propellers for light aircraft
[NASA-CR-165732] p0491 N81-26845
Alleviation of helicopter fuselage-induced rotor unsteady loads through deterministic variation of the individual blade pitch
[NASA-CR-166234] p0549 N81-29134

- Testing and evaluation of a stall-flutter-suppression system for helicopter rotors using individual-blade-control [NASA-CR-166233] p0549 N81-29135
- Aeroelastic flutter and divergence of graphite/epoxy cantilevered plates with bending-torsion stiffness coupling [AD-A101726] p0587 N81-30476
- Predicting the impacts of new technology aircraft on international air transportation demand [NASA-CR-165654] p0594 N81-31160

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
- Aircraft hydraulic systems dynamic analysis. Volume 6: Steady state flow analysis SSFAN computer program technical description [AD-A089240] p0026 N81-10055
- The Hornet program: A design to life cycle cost case study p0046 N81-11910
- Electromagnetic integration of composite structure in aircraft p0200 N81-16159
- Environmental burn-in effectiveness [AD-A093307] p0211 N81-17060
- Environment-load interaction effects on crack growth in landing gear steels [AD-A093803] p0218 N81-17242
- Investigation of impingement region and wall jets formed by the interaction of high aspect ratio lift jets and a ground plane [NASA-CR-152174] p0261 N81-19017
- Cooling system for high speed aircraft [NASA-CASE-LAR-12406-1] p0485 N81-26114

MCDONNELL-DOUGLAS CORP., LONG BEACH, CALIF.
- Technology development status at McDonnell Douglas p0248 N81-18019
- Supersonic market and economic analyses p0248 N81-18020
- Design and wind tunnel tests of winglets on a DC-10 wing [NASA-CR-3119] p0492 N81-27046

MCDONNELL-DOUGLAS RESEARCH LABS., ST. LOUIS, MO.
- Three-dimensional transonic flow analysis [AD-A101944] p0593 N81-31153

MCS, INC., BOULDER, COLO.
- An airport wind shear detection and warning system using Doppler radar: A feasibility study [NASA-CR-3379] p0202 N81-16681

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
- Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control [AD-A093122] p0215 N81-17092

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., HAMBURG (WEST GERMANY).
- Development of a CFC window frame, using short fiber pressing technology [BMFT-FB-W-80-032] p0499 N81-27208

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., MUNICH (WEST GERMANY).
- Constant-amplitude and flight-by-flight tests on CFRP specimens p0039 N81-11133
- Service experience with GRC helicopter blades (BO-105) p0041 N81-11146
- Structural integration as a means of cost reduction p0046 N81-11912
- Evaluation of aircraft interference effects on external stores at subsonic and transonic speeds p0187 N81-15997
- Interference effects of concentrated blowing and vortices on a typical fighter configuration p0188 N81-16009
- Application of damage tolerance concepts for the helicopters p0487 N81-26130
- Fatigue testing of composite rotor blades p0489 N81-26140
- Analytical determination of dynamic stability parameters p0592 N81-31137
- The impact of operational requirements on the compromise of desired features in rotorcraft design p0634 N81-33155

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
- Computational aerodynamic design tools and techniques used at fighter development [MBB-FE-122/S/PUB/13] p0128 N81-13536
- Active flutter suppression on an F-4F aircraft with external stores using already existing control surfaces [MBB-FE-17/S/PUB/24] p0131 N81-13972
- Active control of an explosive wing-store flutter case [MBB-FE-17/S/PUB/25] p0131 N81-13973
- Effects of nonlinearities on wing store flutter [MBB-FE-17/S/PUB/27] p0131 N81-13974
- Constant-amplitude and flight-by-flight tests on CFRP specimens [MBB-FE-2/S/PUB/26] p0131 N81-14006
- EMC, lightning and NEMP-protection-new requirements for approved specifications when using CFRP p0199 N81-16152
- The influence of the compressibility in simulating the conduct of exterior loads of a carrier [MBB-FE-122/S/PUB/17] p0220 N81-17483
- Structure and lifetime attestation of TORNADO [MBB-PUB-F-0001] p0251 N81-18048
- The problems with the interface system of the visual simulator as a cause of Pilot Induced Oscillations (PIO's) in flight simulators [MBB-UA-528-80-OE] p0276 N81-19140
- Performance assessment of an advanced reheated turbo fan engine p0432 N81-24094
- TORNADO: Flight characteristics at high angles of incidence [MBB-FE-127/S/PUB/23] p0495 N81-27085
- Application of damage tolerance concepts for MBB helicopters [MBB-UD-309/80-OE] p0580 N81-30105
- BK 117: A new helicopter through international cooperation [MBB-UD-274/79-OE] p0582 N81-30121
- Structural optimization of advanced aircraft structures [MBB-S/PUB/32] p0582 N81-30122
- Developement of antiresonance force isolators for helicopter vibration reduction [MBB-UD-305/80-OE] p0582 N81-30123
- Helicopter technologies of the future [MBB-UD-314/80-OE] p0583 N81-30125
- Flight investigations of a helicopter low airspeed estimation system based on measurement of control parameters [MBB-UD-306/80-OE] p0584 N81-30139
- Parameter identification of a hingeless rotor helicopter in flight conditions with increased instability [MBB-UD-307/80-OE] p0584 N81-30140
- Digital data bases for visual and radar simulation [MBB-UA-549/80-OE] p0585 N81-30143
- Development and design of a large wind-turbine blade [MBB-UD-301/80-OE] p0586 N81-30198
- Development of a bearingless helicopter tail rotor [MBB-UD-304/80-OE] p0586 N81-30199
- Fatigue testing of composite rotor blades [MBB-UD-308/80-OE] p0587 N81-30485

MESSERSCHMIDT-BOELKOW G.M.B.H., MUNICH (WEST GERMANY).
- Active control of an explosive wing-store flutter case p0082 N81-12117
- Study of oscillatory and flight dynamic behavior of helicopters in atmospheric turbulence [BMVG-FBWT-80-4] p0342 N81-21074
- Controls and displays for all-weather operation of helicopters p0633 N81-33195

MESSERSCHMIDT-BOELKOW G.M.B.H., OTTOBRUNN (WEST GERMANY).
- A theoretical method for the simulation of separation behavior of aircraft external stores [MBB-FE-122/S/PUB/16] p0203 N81-16987
- Store separation simulation in subsonic wind tunnels [MBB-FE-123/S/PUB/20] p0203 N81-16988

MESSIER-HISPANO-BUGATTI S.A., MONTROUGE (FRANCE).
- Using cost reduction concepts at

Messier-Hispano-Bugatti
p0047 N81-11923

METROPOLITAN TRANSPORTATION AUTHORITY, INC., NEW YORK.
Dual-powered Gas Turbine/Electric (GT/E) computer commuter rail cars: Test, evaluation and economics
[PB81-211757] p0641 N81-34109

MIAMI UNIV., CORAL GABLES, FLA.
Midair collisions - The accidents, the systems, and the Realpolitik
p0052 A81-13413

MICHIGAN STATE UNIV., EAST LANSING.
PACER LIME: An environmental corrosion severity classification system, part 1
[AD-A100496] p0539 N81-28089

MICHIGAN UNIV., ANN ARBOR.
Improved aircraft cruise by periodic control
p0034 N81-11030
Light aircraft engines, the potential and problems for use of automotive fuels. Phase 1: Literature search
[AD-A094154] p0253 N81-18057
Optimum maneuvers of supersonic aircraft, volumes 1 and 2
p0332 N81-20060
Heat generation in aircraft tires under free rolling conditions
[NASA-CR-164273] p0393 N81-23461
Investigation of aerodynamic stall alleviation on a swept planform wing using leading edge modifications
[AD-A101239] p0548 N81-29122
Determination of wind stress from water level fluctuations
N81-30774

MILAN UNIV. (ITALY).
Neurotramatological aspects in ejected pilots
p0205 N81-17012

MILITARY ACADEMY, WEST POINT, N. Y.
Prediction of swirling reacting flow in ramjet combustors
[AIAA PAPER 81-1485] p0506 A81-40903
Experimental and theoretical study of three interacting, closely-spaced, sharp-edged 60 deg delta wings at low speeds
[NASA-CR-3460] p0635 N81-33160

MINISTRY OF DEFENCE, LONDON (ENGLAND).
Summary of AGARD Lecture Series 107: The Application of Design to Cost and Life Cycle Cost to Aircraft Engines
p0047 N81-11926
Specification and requirements rationale for military and civil helicopter engines
p0429 N81-24075
Engine in-flight data collection and analysis in United Kingdom aircraft
p0431 N81-24085

MISSION RESEARCH CORP., ALBUQUERQUE, N. MEX.
Aircraft EMP isolation study
[AD-A093772] p0219 N81-17333

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
A PANSONIC Navier-Stokes solver
[AIAA PAPER 81-1195] p0454 A81-38077
Full scale visualization of the wing tip vortices generated by a typical agricultural aircraft
[NASA-CR-159382] p0071 N81-12019
Propeller propulsion integration, phase 1
[NASA-CR-163921] p0196 N81-16058
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163967] p0251 N81-18046
Investigation of Flight Test Methods for measuring the performance of general aviation aircraft
[NASA-CR-164057] p0333 N81-20065
An experimental investigation of the aerodynamics and cooling of a horizontally-opposed air-cooled aircraft engine installation
[NASA-CR-3405] p0372 N81-22015

MISSISSIPPI STATE UNIV., STATE COLLEGE.
An approximate factorization solution of the Navier-Stokes equations for transonic flow using body-fitted coordinates with application to NACA 64A010 airfoils
p0249 N81-18024

MISSISSIPPI UNIV., UNIVERSITY.
An application of wake survey rakes to the experimental determination of thrust for a propeller driven aircraft
[NASA-CR-163920] p0186 N81-15986

MISSOURI UNIV. -COLUMBIA.
An analysis of opportunistic maintenance policy for the F100PW100 aircraft engine
[AD-A097548] p0384 N81-23025

MITRE CORP., MCLEAN, VA.
Analysis of potentially correctable landing delays at Atlanta
[AD-A089408] p0024 N81-10032
Conflict monitoring analysis of parallel route spacing in the high altitude airspace, volume 2
[AD-A094152] p0250 N81-18038
Automatic Traffic Advisory and Resolution Service (ATARS) multi-site, algorithms, revision 1
[AD-A094195] p0250 N81-18039
Conflict monitoring analysis of parallel route spacing in the high altitude conus airspace, volume 1
[AD-A094071] p0250 N81-18041
An update of the Discrete Address Beacon System (DABS) alternatives study
[AD-A096264] p0340 N81-21052
Results of an active beacon collision avoidance experiment conducted in the Los Angeles airspace
[AD-A096285] p0340 N81-21053
Discrete Address Beacon System (DABS) data link capacity utilization
[AD-A098173] p0425 N81-24044
Consolidated Cab Display (CCD) System, Project Planning Document (PPD)
[AD-A098651] p0440 N81-25056
Discrete address beacon system data link capacity requirements
[AD-A101731] p0581 N81-30107
Upgraded FAA Airfield Capacity Model. Volume 1: Supplemental user's guide
[AD-A104154] p0639 N81-33216
Upgraded FAA Airfield Capacity Model. Volume 2: Technical description of revisions
[AD-A104155] p0639 N81-33217

MONSANTO RESEARCH CORP., DAYTON, OHIO.
Trace chemical analysis methodology
[AD-A090762] p0083 N81-12191

MOTOREN- UND TURBINEN-UNION MUENCHEN G.M.B.H. (WEST GERMANY).
Full annular combustor test facility for high pressure/high temperature testing
p0432 N81-24097

N

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Improving aircraft safety
[PB81-114886] p0270 N81-19083
NASA's aeronautics research and technology base
[NASA-CR-164195] p0381 N81-22969
An evaluation of NASA's program for advancing rotorcraft technology
[PB81-144180] p0389 N81-23078
NASA's aeronautics program: Systems technology and experimental program
[NASA-CR-164642] p0543 N81-29034
US military V/STOL: Who needs it? Wants it? Can afford it?
p0634 N81-33156

NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA (ONTARIO).
Wind tunnel determination of dynamic cross-coupling derivatives - A new approach
p0413 A81-35927
A method for the prediction of wing response to nonstationary buffet loads
[AD-A093037] p0208 N81-17083
The rejuvenation of properties in turbine engine hot section components by hot isostatic pressing
[AD-A097551] p0390 N81-23088
Canadian studies of wind tunnel corrections for high angle of attack models
p0435 N81-24121
A Kalman filter approach to navigation on the NAE Convair 580 aeromagnetics research aircraft
[AD-A100836] p0547 N81-29116

Review of techniques for determination of dynamic stability parameters in wind tunnels p0590 N81-31108
Direct forced-oscillation techniques for the determination of stability derivatives in wind tunnels p0590 N81-31109
Applications of half-model technique in dynamic stability testing p0591 N81-31114
Sensitivity of aircraft motion to cross coupling and acceleration derivatives p0592 N81-31120

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.

NASA aeronautics R&T - A resource for aircraft design [AIAA PAPER 81-0925] p0408 A81-34363
Development of simplified airborne computations for fuel conservative descents in a time-based metered air traffic environment [SAE PAPER 810682] p0524 A81-42785
Survey population response to airplane noise, part 1 [NASA-TM-75790] p0031 N81-10576
Annoyance from light aircraft investigation carried out around four airports near Paris [NASA-TM-75823] p0032 N81-10577
Productivity in aerospace research and development [NASA-TM-82388] p0097 N81-13804
Bird flight and airplane flight [NASA-TM-75777] p0138 N81-14962
The annoyance caused by noise around airports [NASA-TM-75784] p0146 N81-15579
The high-speed airfoil program p0185 N81-15970
Transonic wind tunnel development (1940 - 1950) p0185 N81-15971
The high-speed propeller program p0185 N81-15972
High-speed cowlings, air inlets and outlets, and internal-flow systems p0185 N81-15973
Flow phenomena along fuselages and wing-fuselage systems of gliders [NASA-TM-75401] p0186 N81-15983
Discussion of test results in the design of laminar airfoils for competition gliders [NASA-TM-75402] p0186 N81-15984
Annual report to the NASA Administrator by the Aerospace Safety Advisory Panel on the space shuttle program. Part 2: Summary of information developed in the panel's fact-finding activities [NASA-TM-82252] p0198 N81-16114
Development and wind tunnel investigation of three supercritical airfoil profiles for transport aircraft [NASA-TM-75840] p0249 N81-18030
The high lift characteristics in the case of the V-wing concept [NASA-TM-75872] p0253 N81-18061
Study of the vortex conditions of wings with large sweepback by extrapolation of the Jones method [NASA-TM-75863] p0262 N81-19026
Separation behavior of boundary layers on three-dimensional wings [NASA-TM-75877] p0262 N81-19027
A brief analysis and its experiment of the hydraulic-electric loading servosystem [NASA-TM-76458] p0276 N81-19132
Rotative balance of the I.M.F. Lille and associated experimental techniques [NASA-TM-75886] p0276 N81-19137
First results obtained by the AMD-BA Company from the rotary assembly of the IMF Lille [NASA-TM-75887] p0276 N81-19139
The elaboration of a new family of helicopter blade profiles [NASA-TM-75907] p0330 N81-20031
Experimental investigation of the flow on the suction side of a thin Delta wing [NASA-TM-75897] p0338 N81-21024
Procedure for pressure contact on high-power semiconductor devices free of thermal fatigue [NASA-TM-75733] p0376 N81-22054
A digital-analog hybrid system and its application to the automatic flight control system simulation research [NASA-TM-76457] p0377 N81-22060
Erosion resistant coatings [NASA-TM-75870] p0377 N81-22098
Annoyance caused by light aircraft noise [NASA-TM-76533] p0379 N81-22589
The annoyance caused by airplane noise in the vicinity of Orly Airport and the reaction of neighboring residents [NASA-TM-76575] p0379 N81-22590
The effect of airplane noise on the inhabitants of areas near Okecie Airport in Warsaw [NASA-TM-75879] p0379 N81-22593
The relationship between noise and annoyance around Orly [NASA-TM-76573] p0379 N81-22594
Aircraft Energy Efficiency program: Laminar flow control technology [NASA-TM-82352] p0437 N81-24389
Measurements of temperature and pressure fluctuations in the T prime 2 cryogenic wind tunnel [NASA-TM-75408] p0490 N81-26150
Energy absorption studied to reduce aircraft crash forces [NASA-NEWS-RELEASE-81-96] p0492 N81-27060
The supercritical profile of the supercritical wing [NASA-TM-76605] p0494 N81-27075
Protection against wing icing for Airbus A300 and A310 [NASA-TM-76584] p0494 N81-27079
Effect of aircraft noise on the equilibrium of airport residents: Longitudinal study around Roissy, phase 3 [NASA-TM-75906] p0499 N81-27692
Aviation noise overload in the immediate proximity of the Warsaw-Okecie airport [NASA-TM-75892] p0500 N81-27883
Aircraft energy efficiency. Overview [NASA-FACTS-96/9-80] p0538 N81-28083
Nature of the annoyance and noise annoyance relation around airports [NASA-TM-75873] p0542 N81-28606
Incidences from modifications of the computational methods of the psophic index [NASA-TM-76577] p0542 N81-28608
Evaluation of the disturbance caused by aircraft noise by opinion surveys [NASA-TM-76579] p0542 N81-28610
Wind Tunnels of NASA [NASA-SP-440] p0629 N81-32153

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.

Simple method for prediction of aircraft noise contours p0050 A81-13217
Perception of horizontal aircraft separation on a cockpit display of traffic information p0053 A81-13420
Thin-layer approximation for three-dimensional supersonic corner flows p0067 A81-15900
Shipboard trials of the Quiet Short-Haul Research Aircraft /QSRA/ p0099 A81-16581
The XV-15 tilt rotor research aircraft p0100 A81-16588
Application of trajectory optimization principles to minimize aircraft operating costs p0155 A81-20466
Numerical optimization of circulation control airfoils [AIAA PAPER 81-0016] p0157 A81-20540
A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack [AIAA PAPER 81-0050] p0158 A81-20566
Acoustics of rotors utilizing circulation control [AIAA PAPER 81-0092] p0160 A81-20596
Unsteady fan blade pressure and acoustic radiation from a JT15D-1 turbofan engine at simulated forward speed [AIAA PAPER 81-0096] p0161 A81-20598
A head-up display for low-visibility approach and landing [AIAA PAPER 81-0130] p0161 A81-20623
QSRA Joint Navy/NASA sea trials [AIAA PAPER 81-0152] p0161 A81-20633

Design and preliminary tests of an IR-airborne
  LLWS remote sensing system
  [AIAA PAPER 81-0239] p0163 A81-20694
Aircraft NO/x/ emissions and stratospheric ozone
  reductions - Another look
  [AIAA PAPER 81-0306] p0164 A81-20741
A discrete vortex method for the non-steady
  separated flow over an airfoil
  p0179 A81-22560
Drag reduction - Jet breakup correlation with
  kerosene-based additives
  p0225 A81-23923
Design for supercomputers
  p0227 A81-24048
Unsteady Newton-Busemann flow theory. I - Airfoils
  p0234 A81-25512
Wing flapping with minimum energy
  p0283 A81-27889
A diagonal form of an implicit
  approximate-factorization algorithm
  p0300 A81-29363
Adaptive-wall wind-tunnel development for
  transonic testing
  p0352 A81-31367
Use of multiblade sensors for on-line rotor
  tip-path plane estimation
  p0356 A81-32010
Quiet propulsive-lift technology ready for civil
  and military applications
  p0359 A81-32521
Preliminary aerodynamic characteristics of
  several advanced VSTOL fighter/attack aircraft
  concepts
  [SAE PAPER 801178] p0400 A81-34191
AD-1 oblique wing aircraft program
  [SAE PAPER 801180] p0400 A81-34193
The challenge of unsteady separating flows
  p0411 A81-35647
Low-visibility visual simulation with real fog
  [AIAA 81-0982] p0415 A81-36569
Component research for future propulsion systems
  p0454 A81-38050
Fireworthiness of transport aircraft interior
  systems
  [AIAA PAPER 81-1142] p0459 A81-39131
Development of a comprehensive analysis for
  rotorcraft. I - Rotor model and wake analysis
  p0465 A81-35896
A pilot's assessment of helicopter
  handling-quality factors common to both
  agility and instrument flying tasks
  p0471 A81-40120
Identification of a linear model of
  rotor-fuselage dynamics from nonlinear
  simulation data
  p0472 A81-40125
Computerized three-dimensional aerodynamic
  design of a lifting rotor blade
  [AHS 80-2] p0473 A81-40137
Navigation errors encountered using
  weather-mapping radar for helicopter IFR
  guidance to oil rigs
  [AHS 80-16] p0474 A81-40147
A piloted simulator investigation of static
  stability and stability/control augmentation
  effects on helicopter handling qualities for
  instrument approach
  [AHS 80-30] p0476 A81-40160
NASA/FAA flight-test investigation of helicopter
  microwave landing system approaches
  [AHS 80-55] p0478 A81-40180
Transonic swept wings studied by the
  lifting-line theory
  p0509 A81-41090
Helicopter theory
  p0513 A81-41823
Transonic wing design using potential-flow codes
  - Successes and failures
  [SAE PAPER 810565] p0518 A81-42730
Full-scale study of the cooling system
  aerodynamics of an operating piston engine
  installed in a light aircraft wing panel
  [SAE PAPER 810623] p0523 A81-42777
Lift-enhancing surfaces on several advanced
  V/STOL fighter/attack aircraft concepts
  [AIAA PAPER 81-1675] p0534 A81-43946
Analysis of aircraft longitudinal handling
  qualities
  [AIAA 81-1771] p0554 A81-44092
Investigation of control, display, and
  crew-loading requirements for helicopter
  instrument approach
  [AIAA 81-1820] p0555 A81-44110
Kinematic properties of rotary-wing and
  fixed-wing aircraft in steady coordinated
  high-g turns
  [AIAA PAPER 81-1855] p0560 A81-44554
Automatic helical rotorcraft descent and landing
  using a Microwave Landing System
  [AIAA PAPER 81-1857] p0560 A81-44556
A vortex-lattice method for calculating
  longitudinal dynamic stability derivatives of
  oscillating delta wings
  [AIAA PAPER 81-1876] p0561 A81-44570
Clear air turbulence - An airborne alert system
  p0562 A81-44648
Numerical and classical analysis of V/STOL
  aircraft using selected propulsion systems
  [AIAA PAPER 81-1676] p0563 A81-44898
Full-scale wind-tunnel test of the aeroelastic
  stability of a bearingless main rotor
  p0573 A81-46620
A flight investigation of static stability,
  control augmentation, and flight director
  influences on helicopter IFR handling qualities
  p0574 A81-46623
Influence of sideslip on the kinematics of the
  helicopter in steady coordinated turns
  p0576 A81-46646
A piloted simulation of the backup control
  system engagement for the YAH-64
  p0576 A81-46686
Time delays in flight simulator visual displays
  p0615 A81-48369
NASA Aviation Safety Reporting System
  [NASA-TM-81225] p0023 N81-10021
The XV-15 tilt rotor research aircraft
  [NASA-TM-81244] p0026 N81-10054
A piloted simulator investigation of static
  stability and stability/control augmentation
  effects on helicopter handling qualities for
  instrument approach
  [NASA-TM-81188] p0029 N81-10077
Simulating study of the interaction between the
  propulsion and flight control systems of a
  subsonic lift fan VTOL
  [NASA-TM-81239] p0036 N81-11043
Flight evaluation of stabilization and command
  augmentation system concepts and cockpit
  displays during approach and landing of
  powered-lift STOL aircraft
  [NASA-TP-1551] p0037 N81-11044
A mathematical model of the CH-53 helicopter
  [NASA-TM-81238] p0075 N81-12065
Experimental study of supersonic viscous leeside
  flow over a slender delta wing
  [NASA-TM-81248] p0133 N81-14265
Experimental aerodynamic characteristics of two
  V/STOL fighter/attack aircraft configurations
  at Mach numbers from 0.4 to 1.4
  [NASA-TM-81234] p0140 N81-14981
Vortex methods for two- and three-dimensional
  flow simulations
  p0145 N81-15313
Human Factors of Flight-deck Automation:
  NASA/Industry Workshop
  [NASA-TM-81260] p0191 N81-16022
Sample data effects of high-pass filters
  [NASA-TP-1797] p0193 N81-16040
The use of total simulator training in
  transitioning air-carrier pilots: A field
  evaluation
  [NASA-TM-81250] p0204 N81-16994
An advanced electronic cockpit instrumentation
  system: The coordinated cockpit display
  p0213 N81-17074
Civil markets for buoyant heavy-lift vehicles
  [NASA-TM-81270] p0248 N81-19023
Predicted and experimental steady and unsteady
  transonic flows about a biconvex airfoil
  [NASA-TM-81262] p0258 N81-18742
Small transport aircraft technology
  p0260 N81-19007
Overview of advanced wing design
  p0260 N81-19012
Advanced turboprop installation aerodynamics
  p0260 N81-19013

Flight investigation of a four-dimensional terminal area guidance system for STOL aircraft [NASA-TM-81271] p0260 N81-19014
Unsteady transonic small disturbance theory with strong shock waves [NASA-CR-166157] p0261 N81-19020
A method for determining landing runway length for a STOL aircraft p0264 N81-19041
Flight tests of IFR landing approach systems for helicopters p0265 N81-19042
A head-up display format for transport aircraft approach and landing p0265 N81-19043
An evaluation of head-up displays in civil transport operations p0265 N81-19044
Application of the epidemiological model in studying human error in aviation p0265 N81-19046
The 1979 clear air turbulence flight test program p0266 N81-19050
Flight tests of a clear-air turbulence alerting system p0266 N81-19052
Fireworthiness of transport aircraft interior systems p0267 N81-19061
Historical overview of V/STOL aircraft technology [NASA-TM-81280] p0272 N81-19100
The role of the research simulator in the systems development of rotorcraft [NASA-TM-81276] p0272 N81-19101
Flight-test evaluation of STOL control and flight director concepts in a powered-lift aircraft flying curved decelerating approaches [NASA-TP-1641] p0275 N81-19131
Sidelooking laser altimeter for a flight simulator [NASA-CASE-ARC-11312-1] p0278 N81-19439
The phenomenon of dynamic stall [NASA-TM-81264] p0329 N81-20029
An extension of the local momentum theory to a distorted wake model of a hovering rotor [NASA-TM-81258] p0329 N81-20030
Recent progress in V/STOL aircraft technology [NASA-TM-81281] p0333 N81-20066
Characteristics of flight simulator visual systems [NASA-TM-81278] p0340 N81-21060
Flying-qualities criteria for wings-level-turn maneuvering during an air-to-ground weapon delivery task [NASA-TM-81266] p0342 N81-21083
Kinematic properties of the helicopter in coordinated turns [NASA-TP-1773] p0374 N81-22039
Component research for future propulsion systems [NASA-TM-82613] p0376 N81-22055
Topology of three-dimensional separated flows [NASA-TM-81294] p0385 N81-23037
Full-scale aerodynamic characteristics of a propeller installed on a small twin-engine aircraft wing panel [NASA-TM-81285] p0385 N81-23039
Experimental studies of scale effects on oscillating airfoils at transonic speeds p0386 N81-23054
Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results [NASA-TM-81269] p0423 N81-24025
Top-mounted inlet system feasibility for transonic-supersonic fighter aircraft [NASA-TM-81292] p0428 N81-24066
ATC simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI [NASA-TM-81301] p0492 N81-27061
Unpowered aerodynamic characteristics of a 15-percent scale model of a twin-engine commuter aircraft [NASA-TM-81284] p0537 N81-28055
Conceptual/preliminary design study of subsonic v/stol and stovl aircraft derivatives of the S-3A [NASA-TM-81310] p0547 N81-29118
Effect of display update interval, update type, and background on perception of aircraft separation on a cockpit display on traffic information [NASA-TM-81171] p0548 N81-29127
Minimum fuel horizontal flightpaths in the terminal area [NASA-TM-81313] p0549 N81-29133
Influence of friction forces on the motion of VTOL aircraft during landing operations on ships at sea [NASA-TM-81305] p0579 N81-30080
Experimental aerodynamic characteristics of two V/STOL fighter/attack aircraft configurations at Mach numbers from 1.6 to 2.0 [NASA-TM-81286] p0579 N81-30083
Guidelines for line-oriented flight training, volume 1 [NASA-CP-2184] p0580 N81-30101
Simulation study of two VTOL control/display systems in IMC approach and landing [NASA-TM-81295] p0584 N81-30136
Aerodynamic mathematical modeling - basic concepts p0590 N81-31106
Impact of high-alpha aerodynamics on dynamic stability parameters of aircraft and missiles p0590 N81-31107
Rotary and Magnus balances p0591 N81-31111
Some applications of aerodynamic formulations to problems in aircraft dynamics p0592 N81-31121
Information transfer problems in the aviation system [NASA-TP-1875] p0594 N81-31162
Dimensions of the information transfer problem p0594 N81-31163
Information transfer in the surface component of the system: Coordination problems in air traffic control p0594 N81-31165
Information transfer between air traffic control and aircraft: Communication problems in flight operations p0595 N81-31166
Information transfer within the cockpit: Problems in intracockpit communications p0595 N81-31167
Information transfer during contingency operations: Emergency air-ground communications p0595 N81-31168
The information transfer problem summary and comments p0595 N81-31169
Vehicle concepts and technology requirements for buoyant heavy-lift systems [NASA-TP-1921] p0596 N81-31185
A full-scale wind tunnel investigation of a helicopter bearingless main rotor [NASA-TM-81321] p0628 N81-32137
Flight evaluation of the STOL flare and landing during night operations [NASA-TM-81312] p0629 N81-32151
Historical overview of V/STOL aircraft technology p0633 N81-33143
Recent progress in V/STOL aircraft technology p0633 N81-33144
The role of the research simulator in the systems development of rotorcraft p0633 N81-33146
Ames Research Center publications: A continuing bibliography, 1980 [NASA-TM-81308] p0641 N81-34138

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
Flight experience with flight control redundancy management p0042 N81-11274
The effect of thermal stresses on the integrity of three built-up aircraft structures [NASA-TM-81352] p0075 N81-12064
Clear air turbulence: Historical comments p0136 N81-14562
Flight evaluation of a simplified gross thrust calculation technique using an F100 turbofan engine in an F-15 airplane [NASA-TP-1782] p0143 N81-15000
Skin friction measuring device for aircraft [NASA-CASE-FRC-11029-1] p0210 N81-17057
Description of the HiMAT Tailored composite structure and laboratory measured vehicle shape under load [NASA-TM-81354] p0251 N81-18047

Ground and flight test experience with a triple
redundant digital fly by wire control system
p0259 N81-19006
Natural laminar flow flight experiment
p0260 N81-19010
KC-135 winglet flight results
p0260 N81-19011
Wake vortex attenuation flight tests: A status
report
p0267 N81-19057
Diversity techniques for omnidirectional
telemetry coverage of the HiMAT research vehicle
[NASA-TP-1830] p0334 N81-20074
Aircraft body-axis rotation measurement system
[NASA-CASE-FRC-11043-1] p0375 N81-22048
Comparison of theoretical predictions of orbiter
airloads with wind tunnel and flight test
results for a Mach number of 0.52
[NASA-TM-81358] p0387 N81-23066
A comparison of laboratory measured temperatures
with predictions for a spar/skin type aircraft
structure
[NASA-TM-81359] p0387 N81-23067
Aircraft canopy lock
[NASA-CASE-FRC-11065-1] p0426 N81-24047
Application of a performance modeling technique
to an airplane with variable sweep wings
[NASA-TP-1855] p0426 N81-24040
Subsonic tests of an all-flush-pressure-orifice
air data system
[NASA-TP-1871] p0489 N81-26144
Correlation of predicted and flight derived
stability and control derivatives with
particular application to tailless delta wing
configurations
[NASA-TM-81361] p0490 N81-26154
Practical aspects of instrumentation
installation in support of subsystem testing
p0546 N81-29090
Comparison of three thrust calculation methods
using in-flight thrust data
[NASA-TM-81360] p0581 N81-30111
User's manual for FSLIP-3, FLEXSTAB loads
integration program
[NASA-TM-81364] p0589 N81-30815

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
FLIGHT RESEARCH CENTER, EDWARDS, CALIF.**
Flight experiments with a slender cone at angle
of attack
[AIAA PAPER 81-0337] p0165 A81-20761
Qualification of HiMAT flight systems
p0179 A81-22603
Boundary layer stability analysis of a natural
laminar flow glove on the F-111 TACT airplane
p0238 A81-26503
AD-1 oblique wing aircraft program
[SAE PAPER 801180] p0400 A81-34193
Estimation of dynamic stability parameters from
drop model flight tests
p0410 A81-35551
Flight test of a full authority Digital
Electronic Engine Control system in an F-15
aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
Flying qualities criteria and flight control
design
[AIAA 81-1823] p0556 A81-44127

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.**
Electronic search and rescue aids
p0286 A81-28300
Seasat altimeter height calibration
[NASA-TM-82040] p0279 N81-19526
Apparatus for and method of compensating dynamic
unbalance
[NASA-CASE-GSC-12550-1] p0378 N81-22358
Lightning electric field measurements which
correlate with strikes to the NASA F-106B
aircraft, 22 July 1980
[NASA-TM-82142] p0491 N81-26643

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.**
Annual survey of spaceflight safety systems:
11th supplement. Survey period - July
1980-June 1981
[IAF PAPER 81-251] p0607 A81-47425
Surface finishing
[NASA-CASE-MSC-12631-3] p0132 N81-14077

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN
F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.**
System for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] p0138 N81-14967

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
LANGLEY RESEARCH CENTER, HAMPTON, VA.**
A numerical study of candidate transverse fuel
injector configurations in the Langley
scramjet engine
p0003 A81-10709
Flameholding characteristics of a swept-strut H2
fuel-injector for scramjet applications
p0003 A81-10711
A system for model access in tunnels with an
unbreathable test medium
p0015 A81-11672
Status of knowledge of sonic booms
p0017 A81-11822
Figure control of flexible structures - Optical
surfaces of thin deformable primary mirrors
p0060 A81-14994
Analysis and design of a ceramic nozzle insert
for the Langley 8-foot high temperature
structures tunnel
p0060 A81-14996
Avionics and displays in a future airspace system
p0112 A81-18070
A status report on NASA general aviation
stall/spin flight testing
p0122 A81-19471
Radiation boundary conditions for wave-like
equations
p0153 A81-20223
Application of trajectory optimization
principles to minimize aircraft operating costs
p0155 A81-20466
Wing-alone aerodynamic characteristics at high
angles of attack
[AIAA PAPER 81-0008] p0157 A81-20532
Application of a tip-fin controller to the
Shuttle Orbiter for improved yaw control
[AIAA PAPER 81-0074] p0159 A81-20582
Electromagnetic measurement of lightning strikes
to aircraft
[AIAA PAPER 81-0083] p0160 A81-20588
Unsteady fan blade pressure and acoustic
radiation from a JT15D-1 turbofan engine at
simulated forward speed
[AIAA PAPER 81-0096] p0161 A81-20598
Numerical study of a scramjet engine flow field
[AIAA PAPER 81-0186] p0162 A81-20659
Hinged strakes for enhanced maneuverability at
high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
A computer graphics display technique for the
examination of aircraft design data
[AIAA PAPER 81-0370] p0166 A81-20788
A computer-aided design system geared toward
conceptual design in a research environment
[AIAA PAPER 81-0372] p0166 A81-20789
Perspectives on jet noise
[AIAA PAPER 81-0428] p0168 A81-20829
Operation and evaluation of the Terminal
Configured Vehicle Mission Simulator in an
automated terminal area metering and spacing
ATC environment
p0171 A81-21709
Civil aviation applications of Navstar/GPS
through differential techniques
p0177 A81-22374
Flight test evaluation of a digital controller
used in a VTOL automatic approach and landing
system
p0179 A81-22549
Graphite polyimide fabrication research for
supersonic cruise aircraft
p0182 A81-22665
Effects of commercial aircraft operating
environment on composite materials
p0182 A81-22681
Design for supercommuters
p0227 A81-24048
The Aerospace Vehicle Interactive Design system
[AIAA PAPER 81-0233] p0234 A81-25475
Large-eddy breakup scheme for turbulent viscous
drag reduction
p0239 A81-26507
Drag characteristics of V-groove and transverse
curvature riblets

p0239 A81-26510
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513
Design considerations of advanced supercritical low drag suction airfoils
p0240 A81-26514
Compliant surfaces - Introduction
p0240 A81-26515
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0241 A81-26933
Computation of wind tunnel model deflections
[AIAA 81-0482] p0300 A81-29381
IPAD applications to the design, analysis, and/or machining of aerospace structures
[AIAA 81-0512] p0301 A81-29388
Sensitivity of optimum solutions to problem parameters
[AIAA 81-0548] p0301 A81-29399
The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400
Historical development of flutter
[AIAA 81-0591] p0302 A81-29419
Prediction of transonic flutter for a supercritical wing by modified strip analysis and comparison with experiment
[AIAA 81-0609] p0304 A81-29471
Wind-tunnel evaluation of NASA developed control laws for flutter suppression on a DC-10 derivative wing
[AIAA 81-0639] p0306 A81-29493
Qualitative comparison of calculated turbulence responses with wind-tunnel measurements for a DC-10 derivative wing with an active control system
[AIAA 81-0567] p0306 A81-29494
Comparison of analysis and flight test data for a drone aircraft with active flutter suppression
[AIAA 81-0640] p0306 A81-29495
Linear/nonlinear behavior in unsteady transonic aerodynamics
[AIAA 81-0643] p0306 A81-29496
On the convergence of unsteady generalized aerodynamic forces
[AIAA 81-0647] p0307 A81-29500
Transonic flutter and gust-response tests and analyses of a wind-tunnel model of a torsion-free-wing fighter airplane
[AIAA 81-0650] p0307 A81-29503
Transonic flutter study of a wind-tunnel model of an arrow-wing supersonic transport
[AIAA 81-0654] p0308 A81-29506
Flight test results of an active flutter suppression system installed on a remotely piloted research vehicle
[AIAA 81-0655] p0308 A81-29507
Application of a flight test and data analysis technique to flutter of a drone aircraft
[AIAA 81-0652] p0308 A81-29511
Fluid mechanics mechanisms in the stall process of airfoils for helicopters
p0360 A81-32779
Concepts for improving the damage tolerance of composite compression panels
p0360 A81-32825
Vortex-flow aerodynamics - An emerging design capability
p0366 A81-33717
Designing for aircraft structural crashworthiness
[AIAA PAPER 81-0803] p0367 A81-33882
Acoustic performance evaluation of an advanced UH-1 helicopter main rotor system
[AHS PAPER 81-58] p0370 A81-33952
Air transport flight parameter measurements program - Concepts and benefits
[SAE PAPER 801132] p0396 A81-34163
Flight test experience using advanced airborne equipment in a time-based metered traffic environment
[SAE PAPER 801207] p0403 A81-34215
Rating hydrogen as a potential aviation fuel
[SAE PAPER 80-1152] p0406 A81-34243
Estimation of dynamic stability parameters from drop model flight tests
p0410 A81-35551
Applications of dynamic stability parameters to problems in aircraft dynamics
p0410 A81-35552
In-flight jet engine noise measurement system
p0410 A81-35553
Wake vortex alleviation
[AIAA PAPER 81-0798] p0412 A81-35723
Effects of truncation of a predominantly compression load spectrum on the life of a notched graphite/epoxy laminate
p0418 A81-37137
Aerodynamic features of designed strake-wing configurations
[AIAA PAPER 81-1214] p0458 A81-38080
Measurement of recovery temperature on an airfoil in the Langley 0.3-m transonic cryogenic tunnel
[AIAA PAPER 81-1062] p0459 A81-39074
A survey of heating and turbulent boundary layer characteristics of several hypersonic research aircraft configurations
[AIAA PAPER 81-1145] p0459 A81-39130
Application of unsteady airfoil theory to rotary wings
p0465 A81-39874
Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model
[AIAA PAPER 81-1445] p0504 A81-40878
An integrated transportation and operations comparison of space and ground based OTV's
[AIAA PAPER 81-1456] p0505 A81-40882
A parametric study of staged fuel injector configurations for scramjet applications
[AIAA PAPER 81-1468] p0505 A81-40888
Pilot guidance and display considerations for energy efficient flight profiles
p0513 A81-41924
Recommendations for the NASA Avionics program for the 1980's
p0517 A81-42436
Analytical techniques for the analysis of stall/spin flight test data
[SAE PAPER 810599] p0521 A81-42756
Determination of crash test pulses and their application to aircraft seat analysis
[SAE PAPER 810611] p0522 A81-42767
Aircraft subfloor response to crash loadings
[SAE PAPER 810614] p0522 A81-42770
Aerodynamic design data for a cruise-matched high performance single-engine airplane
[SAE PAPER 810625] p0523 A81-42779
Flight test evaluation of advanced symbology for general aviation approach to landing displays
[AIAA PAPER 81-1643] p0526 A81-43142
The influence of leading-edge thrust on twisted and cambered wing design for supersonic cruise
[AIAA PAPER 81-1656] p0526 A81-43146
Advanced turboprop cargo aircraft systems study
[AIAA PAPER 81-1684] p0526 A81-43156
NASA service experience with composite components
p0529 A81-43607
Airborne antenna pattern calculations
p0532 A81-43708
Historical trend in the research and development of aircraft
[AIAA PAPER 81-1613] p0533 A81-43934
Progress in supersonic cruise technology
[AIAA PAPER 81-1687] p0535 A81-43950
Can advanced technology improve future commuter aircraft
[AIAA PAPER 81-1729] p0536 A81-43959
Multiobjective insensitive design of airplane control systems with uncertain parameters
[AIAA 81-1818] p0555 A81-44108
Determination of model structure and parameters of an airplane from pre- and post-stall flight data
[AIAA PAPER 81-1866] p0560 A81-44562
Pareto-optimal multi-objective design of airplane control systems
p0563 A81-45510
Aircraft noise control in the 1980's
p0567 A81-46352
A program to support the full utilization of data from existing social surveys of environmental noise
p0570 A81-46374

Trailing edge noise prediction from measured surface pressures
p0616 A81-48395

The role of the helical jet mode in aerodynamic noise generation
[AIAA PAPER 81-1963] p0618 A81-48607

Laboratory study of efficient add-on treatments for interior noise control in light aircraft
[AIAA PAPER 81-1969] p0619 A81-48618

Ground effects on aircraft noise for a wide-body commercial airplane
[AIAA PAPER 81-1988] p0620 A81-48638

Influence of landing gear flexibility on aircraft performance during ground roll
p0622 A81-49375

Estimation of wing nonlinear aerodynamic characteristics at supersonic speeds
[NASA-TP-1718] p0021 N81-10004

A fan pressure ratio correlation in terms of Mach number and Reynolds number for the Langley 0.3 meter transonic cryogenic tunnel
[NASA-TP-1752] p0021 N81-10005

Bibliography on aerodynamics of airframe/engine integration of high-speed turbine-powered aircraft, volume 1
[NASA-TM-81814] p0035 N81-11032

Model design and instrumentation experiences with continuous-flow cryogenic tunnels
p0037 N81-11057

Characteristics and status of the US National Transonic Facility
p0038 N81-11065

A probabilistic analysis of electrical equipment vulnerability to carbon fibers
[NASA-TM-80217] p0038 N81-11113

Graphite-epoxy panel compression strength reduction due to local impact
p0040 N81-11139

The potential for damage from the accidental release of conductive carbon fibers from aircraft composites
p0041 N81-11143

Composite components on commercial aircraft
p0041 N81-11147

An analytical technique for approximating unsteady aerodynamics in the time domain
[NASA-TP-1738] p0043 N81-11422

Flight evaluation of the effect of winglets on performance and handling qualities of a single-engine general aviation airplane
[NASA-TM-81892] p0071 N81-12012

Low-speed aerodynamic characteristics of a 13 percent thick medium speed airfoil designed for general aviation applications
[NASA-TP-1498] p0071 N81-12015

Experimental and theoretical aerodynamic characteristics of two hypersonic cruise aircraft concepts at Mach numbers of 2.96, 3.96, and 4.63
[NASA-TP-1767] p0072 N81-12021

Air cargo market outlook and impact via the NASA CLASS project
[NASA-TM-81886] p0073 N81-12039

A simulator study for the development and evaluation of operating procedures on a supersonic cruise research transport to minimize airport-community noise
[NASA-TP-1742] p0073 N81-12043

Simulation comparison of a decoupled longitudinal control system and a velocity vector control wheel steering system during landings in wind shear
[NASA-TP-1734] p0081 N81-12109

Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort
p0082 N81-12116

Dynamic response of a forward-swept-wing model at angles of attack up to 15 deg at a Mach number of 0.8
[NASA-TM-81863] p0085 N81-12448

A comparison of the three methods used to obtain acoustic measurements for the NASA Flight Effects Program
[NASA-TM-81906] p0088 N81-12822

Research and technology of the Langley Research Center
[NASA-TM-81910] p0089 N81-12977

Pseudosteady-state analysis of nonlinear aircraft maneuvers
[NASA-TP-1758] p0094 N81-13065

Evaluation of flow quality in two large NASA wind tunnels at transonic speeds
[NASA-TP-1737] p0095 N81-13103

Wind-tunnel test of an articulated helicopter rotor model with several tip shapes
[NASA-TM-80080] p0125 N81-13918

A computer program for the design and analysis of low-speed airfoils, supplement
[NASA-TM-81862] p0125 N81-13921

Passive control of wing/store flutter
[NASA-TM-81865] p0125 N81-13922

Evaluation of a computer-generated perspective tunnel display for flight path following
[NASA-TP-1736] p0129 N81-13958

Development of a computer program data base of a navigation aid environment for simulated IFR flight and landing studies
[NASA-TM-80064] p0129 N81-13959

Economic evaluation of flying-qualities design criteria for a transport configured with relaxed static stability
[NASA-TP-1760] p0130 N81-13968

Assessment of ground effects on the propagation of aircraft noise: The T-38A flight experiment
[NASA-TP-1747] p0137 N81-14788

Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14968

Investigation of convergent-divergent nozzles applicable to reduced-power supersonic cruise aircraft
[NASA-TP-1766] p0139 N81-14972

Bibliography of Supersonic Cruise Research (SCR) program from 1977 to mid-1980
[NASA-RP-1063] p0139 N81-14973

Leading-edge deflection optimization for a highly swept arrow wing configuration
[NASA-TP-1777] p0139 N81-14974

Wind-tunnel measurements and comparison with flight of the boundary layer and heat transfer on a hollow cylinder at Mach 3
[NASA-TP-1789] p0140 N81-14975

Simulator study of conventional general aviation instrument displays in path-following tasks with emphasis on pilot-induced oscillations
[NASA-TP-1776] p0142 N81-14997

Effects of angle of attack and ventral fin on transonic flutter characteristics of an arrow-wing configuration
[NASA-TM-81914] p0145 N81-15397

Effects of sidewall geometry on the installed performance of nonaxisymmetric convergent-divergent exhaust nozzles
[NASA-TP-1771] p0185 N81-15976

Effect of wing location and strakes on stability and control characteristics of a monoplanar circular missile with low-profile tail fins at supersonic speeds
[NASA-TM-81878] p0186 N81-15978

A flight investigation of performance and loads for a helicopter with RC-SC2 main-rotor blade sections
[NASA-TM-81898] p0186 N81-15982

Some wake-related operational limitations of rotorcraft
[NASA-TM-81920] p0186 N81-15985

Use of constrained optimization in the conceptual design of a medium-range subsonic transport
[NASA-TP-1762] p0193 N81-16039

Large-scale carbon fiber tests
[NASA-TM-80218] p0198 N81-16137

Current and projected use of carbon composites in United States aircraft
p0198 N81-16145

The 17th JANNAF combustion meeting, volume 1
[NASA-TM-82238] p0200 N81-16253

Experiments using electronic display information
p0213 N81-17077

Supersonic Cruise Research 1979, part 1
[NASA-CP-2108-PT-1] p0243 N81-17981

Overview of the Langley subsonic research effort on SCR configuration
p0243 N81-17982

Results of a low-speed wind tunnel test of the MDC 2.2M supersonic cruise aircraft configuration

p0243 N81-17983
The prediction of pressure distributions on an arrow-wing configuration including the effect of camber, twist, and a wing fin

p0243 N81-17984
Supersonic wings with significant leading-edge thrust at cruise

p0244 N81-17990
Development of SCR Aircraft takeoff and landing procedures for community noise abatement and their impact on flight safety

p0245 N81-17998
Effects of nozzle design on the noise from supersonic jets

p0246 N81-18001
Supersonic Cruise Research 1979, part 2
[NASA-CP-2108-PT-2] p0246 N81-18005
Supersonic cruise research aircraft structural studies: Methods and results

p0246 N81-18008
An assessment of buffer strips for improving damage tolerance

p0247 N81-18009
Risk to the public from carbon fibers released in civil aircraft accidents
[NASA-SP-448] p0254 N81-18096
Ceramic and coating applications in the hostile environment of a high temperature hypersonic wind tunnel
[NASA-TM-81931] p0254 N81-18199
Geometric methods in computational fluid dynamics
p0256 N81-18331
Structural tests on space shuttle thermal protection system constructed with nondensified and densified LI 900 and LI 2200 tile
[NASA-TM-81903] p0257 N81-18410
A crack-closure model for predicting fatigue-crack growth under aircraft spectrum loading
[NASA-TM-81941] p0257 N81-18412
Advanced aerodynamics and active controls. Selected NASA research
[NASA-CP-2172] p0259 N81-19001
Langley Research Center contributions in advancing active control technology

p0259 N81-19002
Status and future plans of the Drones for Aerodynamic and Structural Testing (DAST) program

p0259 N81-19003
In flight direct strike lightning research
p0259 N81-19005
Investigation of powered nacelles on a high aspect ratio NASA supercritical wing, phase 2
p0260 N81-19008
The EET Horizontal Tails Investigation and the EET Lateral Controls Investigation

p0260 N81-19009
Leading edge vortex flaps for drag reduction
[NASA-CASE-LAR-12750-1] p0261 N81-19016
Aeropropulsive characteristics of twin nonaxisymmetric vectoring nozzles installed with forward-swept and aft-swept wings
[NASA-TP-1778] p0261 N81-19019
Effect of wing-transition location and slotted and unslotted flaps on aerodynamic characteristics of a fighter model at high subsonic speeds
[NASA-TM-X-1849] p0262 N81-19024
Wind-tunnel investigation at Mach numbers from 0.25 to 1.01 of a transport configuration designed to cruise at near-sonic speeds
[NASA-TM-X-2622] p0262 N81-19025
The 1980 Aircraft Safety and Operating Problems, part 1
[NASA-CP-2170-PT-1] p0264 N81-19035
Test results of flight guidance for fuel conservative descents in a time-based metered air traffic environment

p0264 N81-19036
A pilot's subjective analysis of a Cockpit Display of Traffic Information (CDTI)

p0264 N81-19037
Guidance and control system research for improved terminal area operations

p0264 N81-19038
Operational considerations in utilization of microwave landing system approach and landing guidance

p0264 N81-19039
General aviation single pilot IFR autopilot study
p0265 N81-19045
How a pilot looks at altitude

p0265 N81-19047
Summary of flight tests of an airborne lighting locator system and comparison with ground-based measurements of precipitation and turbulence

p0266 N81-19048
In-flight direct-strike lightning research
p0266 N81-19054
The 1980 Aircraft Safety and Operating Problems, part 2
[NASA-CP-2170-PT-2] p0267 N81-19056
Basic research in wake vortex alleviation using a variable twist wing

p0267 N81-19058
NASA/FAA general aviation crash dynamics program
p0268 N81-19064
Current research in aircraft tire design and performance

p0268 N81-19065
Review of antiskid and brake dynamics research
p0268 N81-19066
Studies of some unconventional systems for solving various landing problems

p0268 N81-19067
Recent progress toward predicting aircraft ground handling performance

p0268 N81-19068
The NASA digital VGH program, early results
p0268 N81-19069
Evaluation of emergency-locator-transmitter performance in real and simulated crash tests
p0268 N81-19070
Sources, control, and effects of noise from aircraft propellers and rotors

p0269 N81-19073
NASA progress in aircraft noise prediction
p0269 N81-19074
Compensating linkage for main rotor control
[NASA-CASE-LAR-11797-1] p0270 N81-19087
Preliminary wind-tunnel investigation of the effects of engine nacelles on a transport configuration with high lift drag ratios to a Mach number of 1.00
[NASA-TM-82312] p0272 N81-19099
Thrust augmented spin recovery device
[NASA-CASE-LAR-11970-2] p0275 N81-19130
Scientific and Technical Information Output of the Langley Research Center, for calendar year 1976
[NASA-TM-82310] p0279 N81-19964
Aerodynamic characteristics of a hypersonic cruise aircraft concept with wing-mounted propulsion systems at Mach numbers of 2.96, 3.96 and 4.63
[NASA-TM-81937] p0329 N81-20025
A computer technique for detailed analysis of mission radius and maneuverability characteristics of fighter aircraft
[NASA-TP-1837] p0329 N81-20026
A pilot training manual for the terminal configured vehicle electronic horizontal situation indicator
[NASA-TM-81959] p0330 N81-20044
Operational considerations in utilization of microwave landing system approach and landing guidance
[NASA-TM-81945] p0331 N81-20050
An analytical study of the longitudinal response of airplanes to positive wind shear
[NASA-TP-1765] p0335 N81-20082
Operating characteristics of the Langley Mach 7 Scramjet Test Facility
[NASA-TM-81929] p0335 N81-20083
Support interference of wind tunnel models: A selective annotated bibliography
[NASA-TM-81909] p0335 N81-20084
Comments on settling chamber design for quiet, blowdown wind tunnels
[NASA-TM-81948] p0335 N81-20085
Charts for determining potential minimum sonic-boom overpressures for supersonic cruise aircraft
[NASA-TP-1820] p0337 N81-21016

Fluid mechanics mechanisms in the stall process
of helicopters
[NASA-TM-81956] p0338 N81-21027
Recent progress towards predicting aircraft
ground handling performance
[NASA-TM-81952] p0339 N81-21044
Subjective field study of response to impulsive
helicopter noise
[NASA-TP-1833] p0345 N81-21873
Sources, control, and effects of noise from
aircraft propellers and rotors
[NASA-TM-81971] p0345 N81-21904
Pressure and force data for a flat wing and a
warped conical wing having a shockless
recompression at Mach 1.62
[NASA-TP-1759] p0372 N81-22016
Analytical study of the cruise performance of a
class of remotely piloted, microwave-powered,
high-altitude airplane platforms
[NASA-TM-81969] p0374 N81-22040
Description of 0.186-scale model of high-speed
duct of national transonic facility
[NASA-TM-81949] p0377 N81-22061
Airframe noise of a small model transport
aircraft and scaling effects
[NASA-TP-1858] p0380 N81-22832
Two-dimensional aerodynamic characteristics of
the NACA 0012 airfoil in the Langley 8 foot
transonic pressure tunnel
[NASA-TM-81927] p0385 N81-23036
Transonic flutter study of a wind-tunnel model
of an arrow-wing supersonic transport
[NASA-TM-81962] p0388 N81-23071
Transonic flutter and gust-response tests and
analyses of a wind-tunnel model of a torsion
free wing airplane
[NASA-TM-81961] p0388 N81-23072
Description of recent changes in the Langley 6-
by 28-inch transonic tunnel
[NASA-TM-81947] p0391 N81-23096
Mean-flow and turbulence measurements in the
vicinity of the trailing edge of an NACA (63
sub 1)-012 airfoil
[NASA-TP-1845] p0392 N81-23410
An airport community noise-impact assessment model
[NASA-TM-80198] p0393 N81-23713
Lateral attenuation of high-by-pass ratio
engined aircraft noise
[NASA-TM-81968] p0394 N81-23862
Design and experimental results for a
natural-laminar-flow airfoil for general
aviation applications
[NASA-TP-1861] p0423 N81-24022
Flight evaluation of a simple total energy-rate
system with potential wind-shear application
[NASA-TP-1854] p0427 N81-24058
Velocity vector control system augmented with
direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106
Evaluation of turbulence reduction devices for
the Langley 8-foot Transonic Pressure Tunnel
[NASA-TM-81792] p0434 N81-24114
Estimation of fan pressure ratio requirements
and operating performance for the National
Transonic Facility
[NASA-TM-81802] p0435 N81-24115
Tire/wheel concept
[NASA-CASE-LAR-11695-2] p0437 N81-24443
Static and yawed-rolling mechanical properties
of two type 7 aircraft tires
[NASA-TP-1863] p0437 N81-24471
Airport noise impact reduction through operations
[NASA-TM-81970] p0438 N81-24855
Application of a flight test and data analysis
technique to flutter of a drone aircraft
[NASA-TM-83136] p0441 N81-25066
Research related to variable sweep aircraft
development
[NASA-TM-83121] p0441 N81-25067
Prediction of transonic flutter for a
supercritical wing by modified strip analysis
and comparison with experiment
[NASA-TM-83126] p0445 N81-25432
Acoustic facilities for human factors research
at NASA Langley Research Center: Description
and operational capabilities
[NASA-TM-81975] p0446 N81-25765
A procedure for designing forebodies with
constraints on cross-section shape and axial
area distribution
[NASA-TP-1881] p0483 N81-26078
A learning guide for the terminal configured
vehicle electronic horizontal situation
indicator
[NASA-TM-83128] p0484 N81-26083
Cooling system for high speed aircraft
[NASA-CASE-LAR-12406-1] p0485 N81-26114
Flight test results of an active flutter
suppression system installed on a remotely
piloted research vehicle
[NASA-TM-83132] p0486 N81-26118
Simplified design point performance model of a
dry turbofan engine cycle
[NASA-TM-83112] p0490 N81-26148
Pitch attitude stabilization system utilizing
engine pressure ratio feedback signals
[NASA-CASE-LAR-12562-1] p0490 N81-26152
Qualitative comparison of calculated turbulence
responses with wind-tunnel measurements for a
DC-10 derivative wing with an active control
system
[NASA-TM-83144] p0491 N81-26496
Structures and Dynamics Division research and
technology plans, fiscal year, 1981
[NASA-TM-83137] p0491 N81-26497
Thunderstorm hazards flight research: Storm
hazards 1980 overview
[NASA-TM-81974] p0493 N81-27062
Wingtip vortex turbine
[NASA-CASE-LAR-12544-1] p0496 N81-27096
A digital program for calculating the
interaction between flexible structures,
unsteady aerodynamics and active controls
[NASA-TM-80040] p0498 N81-27115
Wind-tunnel evaluation of NASA developed control
laws for flutter suppression on a DC-10
derivative wing
[NASA-TM-83143] p0499 N81-27548
Explosively activated egress area
[NASA-CASE-LAR-12624-1] p0546 N81-29107
Effect of display size on utilization of traffic
situation display for self-spacing task
[NASA-TP-1885] p0546 N81-29109
Evaluation of Microwave Landing System (MLS)
effect on the delivery performance of a
fixed-path metering and spacing system
[NASA-TP-1844] p0546 N81-29111
US and USSR Military Aircraft and Missile
Aerodynamics 1970-1980. A selected, annotated
bibliography, volume 1
[NASA-TM-81951] p0547 N81-29119
Considerations for the installation of honeycomb
and screens to reduce wind-tunnel turbulence
[NASA-TM-81868] p0550 N81-29137
A rectangular rod-wall sound shield
[NASA-CASE-LAR-12883-1] p0550 N81-29138
Guide for users of the National Transonic Facility
[NASA-TM-83124] p0550 N81-29139
Effect of simulated in-flight thrust reversing
on vertical-tail loads of F-18 and F-15
airplane models
[NASA-TP-1890] p0579 N81-30086
Wing-alone aerodynamic characteristics for high
angles of attack of supersonic speeds
[NASA-TP-1889] p0579 N81-30087
Computer analysis of flow perturbations
generated by placement of choke bumps in a
wind tunnel
[NASA-TP-1892] p0579 N81-30088
The use of interpractive graphic displays for
interpretation of surface design parameters
[NASA-TM-81963] p0581 N81-30110
Behavior of aircraft antiskid braking systems on
dry and wet runway surfaces:
Hydromechanically controlled system
[NASA-TP-1877] p0581 N81-30112
Carbon/graphite composite material study. 3:
Agency program activities. National
Aeronautics and Space Administration (NASA)
p0585 N81-30189
Carbon/graphite composite material study,
appendix A and appendix B
p0585 N81-30190
Some experiences with active control of
aeroelastic response
[NASA-TM-83179] p0587 N81-30469
A method for obtaining reduced-order control
laws for high-order systems using optimization

techniques
[NASA-TP-1876] p0589 N81-30851
Curved-flow, rolling-flow, and oscillatory pure-yawing wind-tunnel test methods for determination of dynamic stability derivatives
p0591 N81-31112
Estimation of dynamic stability parameters from drop model flight tests
p0591 N81-31116
Applications of dynamic stability parameters to problems in aircraft dynamics
p0592 N81-31122
Wall interference effects: Status review
p0592 N81-31141
Report of the panel on fluid dynamics
p0593 N81-31146
High lift technology
p0593 N81-31147
Configuration aerodynamics
p0593 N81-31148
Report of the panel on aeroelasticity and unsteady aerodynamics
p0593 N81-31149
Report of the wind tunnel/flight correlation panel
p0593 N81-31150
High Reynolds number research requirements for space vehicle design
p0593 N81-31151
Report of the panel on theoretical aerodynamics
p0593 N81-31152
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12720-1] p0601 N81-31229
Aeroelastic instability stoppers for wind-tunnel models
[NASA-CASE-LAR-12450-1] p0601 N81-31230
MLS antenna locations for the deHavilland DASH 7 aircraft
[NASA-TM-83195] p0602 N81-31418
Effect of sweep and aspect ratio on the longitudinal aerodynamics of a spanloader wing in and out of ground effect
[NASA-TM-80199] p0627 N81-32119
Solar powered aircraft
[NASA-CASE-LAR-12615-1] p0628 N81-32130
User's manual for a computer program to calculate discrete frequency noise of conventional and advanced propellers
[NASA-TM-83135] p0631 N81-32966
Analysis of the performance of the drive system and diffuser of the Langley unitary plan wind tunnel
[NASA-TM-83160] p0635 N81-33158
Stability and control characteristics of a three-surface advanced fighter configuration at angles of attack up to 45 deg
[NASA-TM-83171] p0635 N81-33159
Simulator evaluation of separation of display parameters in path-following tasks
[NASA-TP-1915] p0638 N81-33203
Simplified off-design performance model of a dry turbofan engine cycle
[NASA-TM-83204] p0639 N81-33206
Propulsive lateral control nozzle
[NASA-CASE-LAR-12136-1] p0639 N81-33210
Simulator evaluation of the effects of reduced spoiler and thrust authority on a decoupled longitudinal control system during landings in wind shear
[NASA-TM-83188] p0639 N81-33211
Flight test of a pure-tone acoustic source
[NASA-TP-1898] p0641 N81-33905
Noise suppression characteristics of peripherally segmented duct liners
[NASA-TP-1904] p0641 N81-33906

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Advanced fuel system technology for utilizing broadened property aircraft fuels
p0007 A81-11612
Optimum subsonic, high-angle-of-attack nacelles
p0012 A81-11646
Inlet flow distortion in turbomachinery
[ASME PAPER 80-GT-20] p0109 A81-17952
Calculated and experimental data for a 118-mm bore roller bearing to 3 million DN
[ASME PAPER 80-C2/LUB-14] p0117 A81-18668
Performance of computer-optimized tapered-roller bearings to 2.4 million DN
[ASME PAPER 80-C2/LUB-18] p0117 A81-18672
Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports
[ASME PAPER 80-C2/LUB-35] p0117 A81-18683
Lubrication of rolling element bearings
p0118 A81-18736
Scale effects on turbulent boundary layer development and flow separation around V/STOL inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20530
Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
Ozone contamination in aircraft cabins - Results from GASP data and analyses
[AIAA PAPER 81-0305] p0164 A81-20740
An analytical approach to airfoil icing
[AIAA PAPER 81-0403] p0167 A81-20810
Mean rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan
[AIAA PAPER 81-0208] p0168 A81-20830
Icing tunnel tests of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[AIAA PAPER 81-0405] p0168 A81-20837
Numerical techniques in linear duct acoustics - A status report
[ASME PAPER 80-WA/NC-2] p0170 A81-21120
Stability of large horizontal-axis axisymmetric wind turbines
p0178 A81-22526
New interpretations of shock-associated noise with and without screech
p0178 A81-22527
Core noise measurements from a small, general aviation turbofan engine
p0178 A81-22531
Effect of a semi-annular thermal acoustic shield on jet exhaust noise
p0178 A81-22532
Effect of facility variation on the acoustic characteristics of three single stream nozzles
p0178 A81-22534
NASA's activities in the conservation of strategic aerospace materials
p0179 A81-22535
The future of aeronautical propulsion
p0290 A81-29052
Flow separation in inlets at incidence angles
p0297 A81-29114
Superhybrid composite blade impact studies
[ASME PAPER 81-GT-24] p0311 A81-29940
Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954
NASA research in aeropropulsion
[ASME PAPER 81-GT-96] p0314 A81-30003
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
Design and development of the combustor inlet diffuser for the NASA/GE energy efficient engine
[ASME PAPER 81-GT-129] p0316 A81-30033
Supersonic stall flutter of high-speed fans
[ASME PAPER 81-GT-184] p0317 A81-30078
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093
High temperature electronic requirements in aeropropulsion systems
p0359 A81-32547
Factors which influence the behavior of turbofan forced mixer nozzles
[AIAA PAPER 81-0274] p0359 A81-32549
Improved components for engine fuel savings
[SAE PAPER 801116] p0395 A81-34152
Performance deterioration of commercial high-bypass ratio turbofan engines
[SAE PAPER 801118] p0396 A81-34154
A status report on the Energy Efficient Engine Project
[SAE PAPER 801119] p0396 A81-34155
The NASA high-speed turboprop program
[SAE PAPER 801120] p0396 A81-34156
Description of the warm core turbine facility and the warm annular cascade facility recently installed at NASA Lewis Research Center
[SAE PAPER 801122] p0396 A81-34158

Loss model for off-design performance analysis of radial turbines with pivoting-vane, variable-area stators
[SAE PAPER 801135] p0397 A81-34166

An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168

Composite wall concept for high-temperature turbine shrouds - Heat transfer analysis
[SAE PAPER 801138] p0397 A81-34169

Future challenges in V/STOL flight propulsion control integration
[SAE PAPER 801140] p0397 A81-34170

Some advantages of methane in an aircraft gas turbine
[SAE PAPER 801154] p0398 A81-34177

Reverse thrust performance of the QCSEE variable pitch turbofan engine
[SAE PAPER 801196] p0402 A81-34206

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements
p0454 A81-38062

A nonlinear propulsion system simulation technique for piloted simulators
p0454 A81-38064

Application of unsteady airfoil theory to rotary wings
p0465 A81-35874

Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836

Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine
[AIAA PAPER 81-1362] p0502 A81-40842

Small gas-turbine combustor study - Fuel injector evaluation
[AIAA PAPER 81-1388] p0502 A81-40857

Selected results from combustion research at the Lewis Research Center
[AIAA PAPER 81-1392] p0503 A81-40859

JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1588] p0507 A81-40963

Turbine bypass engine - A new supersonic cruise propulsion concept
[AIAA PAPER 81-1596] p0508 A81-40971

The supersonic fan engine - An advanced concept in supersonic cruise propulsion
[AIAA PAPER 81-1599] p0508 A81-40973

The E3 combustors - Status and challenges
[AIAA PAPER 81-1353] p0514 A81-42176

Zero-length inlets for subsonic V/STOL aircraft
[AIAA PAPER 81-1396] p0515 A81-42186

Factors influencing the predicted performance of advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210

Low and high speed propellers for general aviation - Performance potential and recent wind tunnel test results
p0521 A81-42758

An overview of general aviation propulsion research programs at NASA-Lewis Research Center
[SAE PAPER 810624] p0523 A81-42778

Turbomachinery noise studies of the AiResearch QCGAT engine with inflow control
[AIAA PAPER 81-2049] p0619 A81-48621

Effects of blade-vane ratio and rotor-stator spacing on fan noise with forward velocity
[AIAA PAPER 81-2032] p0620 A81-48628

Comparison of predicted engine core noise with current and proposed aircraft noise certification requirements
[AIAA PAPER 81-2053] p0620 A81-48635

Mixer nozzle aeroacoustic characteristics for the energy efficient engine
[AIAA PAPER 81-1994] p0621 A81-48639

An improved prediction method for noise generated by conventional profile coaxial jets
[AIAA PAPER 81-1991] p0624 A81-45743

Comparisons of four alternative powerplant types for future general aviation aircraft
[NASA-TM-81584] p0028 N81-10067

New interpretations of shock-associated noise with and without screech
[NASA-TM-81590] p0032 N81-10807

Low-speed aerodynamic performance of 50.8-centimeter-diameter noise-suppressing inlets for the Quiet, Clean, Short-haul Experimental Engine (QCSEE)
[NASA-TP-1178] p0035 N81-11037

Off-design performance loss model for radial turbines with pivoting, variable-area stators
[NASA-TP-1708] p0036 N81-11038

Surface pyrometry in presence of radiation from other sources with application to turbine blade temperature measurement
[NASA-TP-1754] p0036 N81-11039

Superhybrid composite blade impact studies
[NASA-TM-81597] p0043 N81-11432

Performance of a steel spar wind turbine blade on the Mod-0 100 kW experimental wind turbine
[NASA-TM-81588] p0043 N81-11448

An automated procedure for developing hybrid computer simulations of turbofan engines
[NASA-TM-81605] p0044 N81-11688

Core noise measurements from a small, general aviation turbofan engine
[NASA-TM-81610] p0044 N81-11769

Effect of a semi-annular thermal acoustic shield on jet exhaust noise
[NASA-TM-81615] p0044 N81-11770

Effect of hole geometry and Electric-Discharge Machining (EDM) on airflow rates through small diameter holes in turbine blade material
[NASA-TP-1716] p0078 N81-12089

Propulsion Controls, 1979
[NASA-CP-2137] p0078 N81-12090

Multivariable identification using centralized fixed modes
p0079 N81-12091

Performance seeking controls
p0079 N81-12092

F100 multivariable control synthesis program: A review of full scale engine altitude tests
p0079 N81-12093

Propulsion control and control theory: A new research focus
p0080 N81-12099

Stability of large horizontal-axis axisymmetric wind turbines
[NASA-TM-81623] p0085 N81-12446

NASA Research in aeropropulsion
p0089 N81-12980

Progress in materials and structures at Lewis Research Center
p0089 N81-12982

NASA contributions to radial turbine aerodynamic analyses
[NASA-TM-81644] p0090 N81-13019

NASA Research in aeropropulsion
[NASA-TM-81633] p0093 N81-13056

Ignition of lean fuel-air mixtures in a premixing-prevaporizing duct at temperatures up to 1000 K
[NASA-TM-81645] p0095 N81-13465

Tabulations of ambient ozone data obtained by GASP airliners, March 1975 to December 1977
[NASA-TM-81528] p0096 N81-13568

Finite element analysis of inviscid subsonic boattail flow
[NASA-TM-81650] p0140 N81-14977

Supersonic stall flutter of high speed fans
[NASA-TM-81613] p0140 N81-14978

Solution of plane cascade flow using improved surface singularity methods
[NASA-TM-81589] p0140 N81-14979

Full potential solution of transonic quasi-3-D flow through a cascade using artificial compressability
[NASA-TM-81637] p0140 N81-14980

Curved centerline air intake for a gas turbine engine
[NASA-CASE-LEW-13201-1] p0143 N81-14999

Analysis of pressure spectra measurements in a ducted combustion system
[NASA-TM-81583] p0146 N81-15768

Ozone contamination in aircraft cabins: Results from GASP data and analyses
[NASA-TM-81671] p0191 N81-16021

Cold-air investigation of first stage of 4-1/2-stage, fan drive turbine with average stage-loading factor of 4.66
[NASA-TP-1780] p0195 N81-16050

An overview of general aviation propulsion research programs at NASA Lewis Research Center
[NASA-TM-81666] p0195 N81-16052

Near rotor wake characteristics of an aerodynamically loaded 0.5 m diameter fan [NASA-TM-81657] p0195 N81-16053

Experimental analysis of IMEP in a rotary combustion engine [NASA-TM-81662] p0195 N81-16054

Propulsion system mathematical model for a lift/cruise fan V/STOL aircraft [NASA-TM-81663] p0195 N81-16055

High temperature electronic requirements in aeropropulsion systems [NASA-TM-81682] p0201 N81-16388

Composite containment systems for jet engine fan blades [NASA-TM-81675] p0220 N81-17480

Status of noise technology for advanced supersonic cruise aircraft p0246 N81-18002

Advanced technology for controlling pollutant emissions from supersonic cruise aircraft p0246 N81-18004

Pneumatic boot for helicopter rotor deicing p0267 N81-19059

Aircraft operating efficiency on the North Atlantic, a challenge for the 1980's p0267 N81-19060

The use of AntiMisting Kerosene (AMK) in turbojet engines p0267 N81-19063

Recent developments in aircraft engine noise reduction technology p0269 N81-19072

Survey of aircraft icing simulation test facilities in North America [NASA-TM-81707] p0269 N81-19078

Apparatus for sensor failure detection and correction in a gas turbine engine control system [NASA-CASE-LEW-12907-2] p0273 N81-19115

Integrated control system for a gas turbine engine [NASA-CASE-LEW-12594-2] p0274 N81-19116

Reasons for low aerodynamic performance of 13.5-centimeter-tip-diameter aircraft engine starter turbine [NASA-TP-1810] p0334 N81-20076

Effects of geometric variables on rub characteristics of Ti-6Al-4V [NASA-TP-1835] p0336 N81-20245

Sputtering and ion plating for aerospace applications [NASA-TM-81726] p0337 N81-20424

Low and high speed propellers for general aviation: Performance potential and recent wind tunnel test results [NASA-TM-81745] p0338 N81-21028

Exhaust emission survey of an F100 afterburning turbofan engine at simulated altitude flight conditions [NASA-TM-81656] p0342 N81-21078

Analysis of atmospheric ozone levels at commercial airplane cruise altitudes in winter and spring, 1976 - 1977 [NASA-TP-1807] p0345 N81-21685

An approach to real-time simulation using parallel processing [NASA-TM-81731] p0345 N81-21803

Component research for future propulsion systems [NASA-TM-82613] p0376 N81-22055

Thermal and flow analysis of a convection air-cooled ceramic coated porous metal concept for turbine vanes [NASA-TM-81749] p0376 N81-22056

An evaluation of a simplified near field noise model for supersonic helical tip speed propellers [NASA-TM-81727] p0380 N81-22836

The propeller tip vortex. A possible contributor to aircraft cabin noise [NASA-TM-81768] p0380 N81-22838

Comparison of predicted engine core noise with proposed FAA helicopter noise certification requirements [NASA-TM-81739] p0381 N81-22839

A nonlinear propulsion system simulation tehnique for piloted simulators [NASA-TM-82600] p0390 N81-23085

Combustion system processes leading to corrosive deposits [NASA-TM-81752] p0391 N81-23243

MEGA16 - Computer program for analysis and extrapolation of stress-rupture data [NASA-TP-1809] p0393 N81-23486

Fundamental heat transfer research for gas turbine engines [NASA-CP-2178] p0428 N81-24063

Investigation of performance deterioration of the CF6/JT9D high bypass ratio turbofan engines p0431 N81-24086

Effect of hydroprocessing severity on characteristics of jet fuel from OSCO 2 and Paraho distillates [NASA-TP-1768] p0436 N81-24283

Evaluation of a pneumatic boot deicing system on a general aviation wing model [NASA-TM-82363] p0441 N81-25065

Comparison of NASA and contractor results from aeroacoustic tests of QCSEE OTW engine [NASA-TM-81761] p0443 N81-25079

Measurement of aerodynamic work during fan flutter [NASA-TM-82652] p0443 N81-25080

Effect of a part-span variable inlet guide vane on the performance of a high-bypass turbofan engine [NASA-TM-82617] p0443 N81-25081

JT9D performance deterioration results from a simulated aerodynamic load test [NASA-TM-82640] p0443 N81-25082

Selected results from combustion research at the Lewis Research Center [NASA-TM-82627] p0443 N81-25083

High-response measurements of a turbofan engine during nonrecoverable stall [NASA-TM-81759] p0443 N81-25084

Aviation turbine fuel properties and their trends [NASA-TM-82603] p0444 N81-25232

KONFIG and NEKONFIG: Two interactive preprocessing to the Navy/NASA Engine Program (NNEP) [NASA-TM-82636] p0446 N81-25698

Additional noise data on the SR-3 propeller [NASA-TM-81736] p0447 N81-25767

Turbine bypass engine: A new supersonic cruise propulsion concept [NASA-TM-82608] p0489 N81-26145

Small gas-turbine combustor study: Fuel injector evaluation [NASA-TM-82641] p0490 N81-26146

Factors influencing the predicted performance of advanced propeller designs [NASA-TM-82676] p0492 N81-27082

The supersonic fan engine: An advanced concept in supersonic cruise propulsion [NASA-TM-82657] p0496 N81-27094

Mixing effectiveness test of an exhaust gas mixer in a high bypass turbofan at altitude [NASA-TM-82663] p0496 N81-27095

The E3 combustors: Status and challenges [NASA-TM-82684] p0539 N81-28095

Aerospace in the future [NASA-TM-82664] p0543 N81-29063

Supercritical fuel injection system [NASA-CASE-LEW-12990-1] p0549 N81-29129

NASA's activities in the conservation of strategic aerospace materials [NASA-TM-81617] p0550 N81-29205

Cobalt: A vital element in the aircraft engine industry [NASA-TM-82662] p0551 N81-29206

Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data [NASA-TM-82658] p0552 N81-29782

Rotor wake characteristics relevant to rotor-stator interaction noise generation [NASA-TM-82703] p0583 N81-30130

Test results of the Chrysler upgraded automotive gas turbine engine: Initial design [NASA-TM-81660] p0588 N81-30562

Conditioned pressure spectra and coherence measurements in the core of a turbofan engine [NASA-TM-82688] p0589 N81-30907

Fiber optics for aircraft engine/inlet control [NASA-TM-82654] p0597 N81-31190

Advanced subsonic transport propulsion [NASA-TM-82696] p0597 N81-31195

Aircraft Engine Diagnostics [NASA-CP-2190] p0597 N81-31196

An introduction to NASA's turbine engine hot section technology (HOST) project
p0599 N81-31206
Conservation of Strategic Aerospace Materials (COSAM)
p0599 N81-31208
Computer program to predict aircraft noise levels
[NASA-TP-1913] p0641 N81-33947
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2139] p0135 N81-14555
Survey of Workshops on Meteorological and Environmental Inputs to Aviation Systems
p0135 N81-14556
Aviation meteorology research and development: A status report
p0135 N81-14557
Federal Aviation Administration and National Weather Service Aviation Research and Development
p0135 N81-14558
Aeronautical concerns and National Aeronautics and Space Administration atmospheric electricity projects
p0136 N81-14567
The 1979 clear air turbulence flight test program
p0266 N81-19050
Pulsed Doppler lidar for the detection of turbulence in clear air
p0266 N81-19051
Magnitude and frequency of wind speed shears and associated downdrafts
p0267 N81-19055
The Passive Optical Sample Assembly (POSA) on STS-1
[NASA-TM-82407] p0337 N81-20868
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Power control for hot gas engines
[NASA-CASE-NPO-14220-1] p0133 N81-14318
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] p0202 N81-16677
Low-frequency radio navigation system
[NASA-CASE-NPO-15264-1] p0373 N81-22036
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WALLOPS FLIGHT CENTER, WALLOPS ISLAND, VA.
Automated pilot advisory system test and evaluation at Manassas Municipal Airport
p0264 N81-19040
Wallops severe storms measurement capability
p0266 N81-19049
Development and evaluation of a prototype in-flight instrument flight rules (IFR) procedures trainer
[NASA-TM-73292] p0490 N81-26156
NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).
In-flight measurement of aerodynamic loads on captive stores. Equipment and results
[NLR-MP-79013-U] p0022 N81-10012
Boundary layer measurements on a two-dimensional wing with flap
[NLR-TR-79009-U] p0022 N81-10014
The European Transonic Wind tunnel ETW
p0038 N81-11064
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum
[NLR-MP-80003-U] p0043 N81-11415
Evaluation of Levinsky's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-77104-U] p0073 N81-12033
Developments in aircraft structural materials
[NLR-MP-79042-U] p0077 N81-12081
Application of fracture mechanics to built-up structures
[NLR-MP-79044-U] p0086 N81-12475
Flight simulation environmental fatigue crack propagation in 2024-T3 and 7475-T761 aluminum
[NLR-MP-80003-U] p0086 N81-12477
Transonic wind tunnel tests on an oscillating wing with external store. Part 4: The wing with underwing: Store
[AD-A077370] p0139 N8.-14969
A constrained inverse method for the aerodynamic design of thick wings with given pressure distribution in subsonic flow
p0188 N81-16006
Influence of free-stream Mach number on transonic shock-wave boundary-layer interaction
[NLR-MP-78013-U] p0256 N81-18325
Unsteady airloads on a harmonically pitching wing with external store
[NLR-MP-80004-U] p0330 N81-20038
A panel method to determine loads on oscillating airfoils in transonic flow with embedded shock waves
[NLR-MP-80005-U] p0330 N81-20039
The semi-operational evaluation of the trajectory prediction method for Signal Automatic Radar Processing (SARP) 2
[NLR-MP-79038-U] p0332 N81-20059
Integral equation methods for multi-element airfoil analysis and design
[NLR-MP-79020-U] p0338 N81-21030
On the role of laminar separation bubbles in airfoil leading edge stalls
[NLR-MP-80010-U] p0339 N81-21042
Additional information about Fighter Aircraft Loading Standard for Fatigue Evaluation (FALSTAFF)
[NLR-TR-79056-U] p0344 N81-21391
A review of research at NLR on wind-tunnel corrections for high angle of attack models
p0436 N81-24125
Lasting friendship. A review of the F-27 fatigue evaluation program carried out by Fokker-VFW
[NLR-TR-78150-U] p0495 N81-27086
State of the art and statistical aspects of helicopter fatigue substantiation procedures
[NLR-MP-80025-U] p0496 N81-27087
Determination of low-speed longitudinal maneuvering criteria for transport aircraft with advanced flight control systems
[NLR-TR-79127-U] p0498 N81-27118
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
p0544 N81-29072
A method for measuring take-off and landing performance of aircraft, using an inertial sensing system
p0545 N81-29080
Evaluation of Ting's method for the calculation of the lift distribution on a wing in propulsive jets
[NLR-TR-80078-U] p0594 N81-31157
Damage tolerance of a landing gear component after many takeoffs and landings
[NLR-MP-79039-U] p0596 N81-31189
Prevention of corrosion and fatigue failure of helicopter gas turbine compressors
[NLR-MP-80024-U] p0600 N81-31222
Data acquisition and analysis system as a training device for simulated conventional weapon delivery
[NLR-MP-80027-U] p0630 N81-32164
NATIONAL AEROSPACE LAB., EMMELOORD (NETHERLANDS).
State of the art and statistical aspects of helicopter fatigue substantiation procedures
p0487 N81-26127
NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
Numerical study of transonic flutter of a two dimensional airfoil
[NAL-TR-617T] p0090 N81-13023
A method for obtaining shockless transonic flows past airfoils, partially modified from a given arbitrary airfoil
[NAL-TR-602T] p0141 N81-14983
An investigation of support-interference effects
[NAL-TR-622] p0141 N81-14984
A design of multi-element aerofoils for high lift
[NAL-TR-631] p0337 N81-21012
On the spanwise uniformity of wind tunnel test data of transonic airfoils
[NAL-TR-665] p0627 N81-32118
Anti-symmetric elastic properties of composite plates of satin weave cloth
[NAL-TR-649T] p0639 N81-33238
NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Ignition of a liquid fuel
[AD-A089295] p0030 N81-10120

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
  Doctor Fujita's microburst analysis at Chicago
    p0136 N81-14572
NATIONAL GAS TURBINE ESTABLISHMENT, FARNBOROUGH (ENGLAND).
  A method of performance prediction for centrifugal compressors. Part 1: Analysis. Part 2: Comparison with experiment
    [ARC-R/M-3843] p0031 N81-10436
  Free-jet testing of powerplants for aircraft and missiles
    p0431 N81-24089
NATIONAL MECHANICAL ENGINEERING RESEARCH INST., PRETORIA (SOUTH AFRICA).
  Use of composite materials for helicopter rotor blades
    [CSIR-ME-1674] p0550 N81-29167
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
  Design and preliminary tests of an IR-airborne LLWS remote sensing system
    [AIAA PAPER 81-0239] p0163 A81-20694
  Clear air turbulence - An airborne alert system
    p0562 A81-44648
  The microburst: Common factor in recent aircraft accidents
    p0136 N81-14571
  Aircraft sensor quality in SESAME 1979: Results of tower fly-bys and aircraft intercomparison
    [PB81-176596] p0552 N81-29722
NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).
  The rating of helicopter noise: Development of a proposed impulse correction
    [NPL-AC-93] p0138 N81-14792
NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).
  A comparison of methods for calibration and use of multi-component strain gauge wind tunnel balances
    [AD-A090484] p0084 N81-12394
  The tale of two wings
    p0188 N81-16004
  Gas turbine engine transient testing
    p0431 N81-24091
NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VA.
  Search and rescue methods and equipment. A bibliography with abstracts
    [PB80-812837] p0023 N81-10026
  Bird strikes and aviation safety. Citations from the NTIS data base
    [PB80-812944] p0024 N81-10027
  Airfield pavement evaluation. Citations from the NTIS data base
    [PB80-812860] p0030 N81-10083
  Closed loop control systems: Aircraft. Citations from the NTIS data base
    [PB80-813710] p0082 N81-12114
  Airport noise. Citations from the NTIS data base
    [PB80-813231] p0088 N81-12667
  Microwave landing systems. Citations from the Engineering Index data base
    [PB80-814643] p0128 N81-13947
  Microwave landing systems. Citations from the NTIS data base
    [PB80-814635] p0128 N81-13948
  Maneuvering aircraft: Noise pollution and control. Citations from the NTIS data base
    [PB80-815566] p0135 N81-14525
  Collision avoidance systems. Citations from the NTIS data base
    [PB80-815020] p0193 N81-16038
  Air traffic control simulation models. Citations from the NTIS data base
    [PB81-800104] p0207 N81-17037
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
  Evaluation of Discrete Address Beacon System (DABS) EMC
    [PB81-154387] p0441 N81-25062
NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
  Annual review of aircraft accident data, U.S. General aviation calendar year 1978
    [PB80-201916] p0024 N81-10028
  AEROMEXICO DC-10-30, XA-DUH, over Luxembourg, Europe
    [NTSB-AAR-80-10] p0073 N81-12042
  Aircraft accident report: Allegheny Airlines, Inc., Nord 262, Mohawk/Frakes 298, N29824, Benedum Airport, Clarksburg, West Virginia, February 12, 1979
    [NTSB-AAR-79-12] p0073 N81-12044
  Aircraft accident report: New York Airways, Inc., Sikorsky S61-L, N618PA Newark, New Jersey, April 18, 1979
    [NTSB-AAR-79-14] p0074 N81-12045
  Aircraft accident report: Champion Home Builders company, Gates Learjet 25B, N999HG, Sanford, North Carolina, September 8, 1977
    [NTSB-AAR-79-15] p0074 N81-12046
  Aircraft accident reports. Brief format, US civil aviation: Issue no. 11, 1979 accidents
    [NTSB-BA-80-8] p0075 N81-12053
  Briefs of accidents involving commuter air carriers and on-demand air taxi operations, U.S. General Aviation 1978
    [PB81-101701] p0141 N81-14987
  Commuter airline safety
    [PB81-104267] p0141 N81-14988
  Briefs of fatal accidents involving weather as a cause/factor, US General Aviation, 1978
    [PB81-110827] p0192 N81-16028
  Listing of accidents/incidents by aircraft make and model, United States Civil Aviation, 1978
    [PB81-110280] p0205 N81-16999
  Aircraft Accident Report: Air Pennsylvania 501, Piper PA-31-350, N5HS Philadelphia, Pennsylvania, July 25, 1980
    [PB81-910401] p0269 N81-19077
  A technique for recovering nonsynchronized data from a digital flight data recorder
    p0328 N81-20020
  Safety report: The status of general aviation aircraft crashworthiness
    [PB81-160798] p0484 N81-26084
NAVAL AEROSPACE MEDICAL RESEARCH LAB., PENSACOLA, FLA.
  Energy maneuverability display for the Air Combat Maneuvering Range/Tactical Training System (ACMR/TACTS)
    [AD-A092974] p0208 N81-17041
  Phonological variants in medial stop consonants under simulated operational environments: Implications for voice activated controls in aircraft
    p0603 N81-31452
  Clear speech: A strategem for improving radio communications and automatic speech recognition in noise
    p0603 N81-31453
NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
  Compatibility of aircraft operational fluids with a graphite/epoxy composite: Development of an exterior coating system and remover
    [AD-A090049] p0039 N81-11120
  Design, fabrication, and testing of the Maximum Performance Ejection System (MPES) seat structure
    [AD-A092292] p0191 N81-16025
  EDRAFT-A graphite code for VTOL aircraft ground footprint visualization
    [AD-A093311] p0208 N81-17042
  Flat panel display technology review
    p0211 N81-17065
  Helmet mounted displays: Design considerations
    p0213 N81-17073
  Prediction and evaluation of thrust augmenting ejector performance at the conceptual design stage
    [AD-A093953] p0216 N81-17094
  Evaluation of powder coatings for application to aircraft component parts
    [AD-A094724] p0277 N81-19305
  Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
    [AD-A095617] p0334 N81-20070
  Method for predicting the jet-induced aerodynamics of V/STOL configurations in transition
    [AD-A097356] p0385 N81-23043
  Development of a water displacing, touch-up paint
    [AD-A097125] p0392 N81-23208
  MPES negative G restraint strap design options
    [AD-A098030] p0424 N81-24037
  Flight test results of an advanced development model Ring Laser Gyro Navigator (RLGN)

p0485 N81-26103

Rapid alignment of aircraft strapdown inertial navigation systems using Navstar Global Positioning System (GPS)
p0485 N81-26107

New Navy programs for development of integrated inertial sensors
p0485 N81-26108

Validation study of the V/STOL aerodynamics and stability and control manual
[AD-A099236] p0486 N81-26119

Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 31 December 1980
[AD-A102495] p0596 N81-31187

High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191

Procedural handbook for escape system/accident investigation helmet usage aspects, including failure analysis
[AD-A102803] p0628 N81-32130

Twin-rotor patrol airship flying model design rationale
[AD-A102575] p0628 N81-32141

The control anticipation parameter for augmented aircraft
[AD-A102626] p0629 N81-32152

Test and evaluation of an experimental feasibility prototype passive seat mounted limb restraint system
[AD-A104161] p0636 N81-33177

NAVAL AIR ENGINEERING CENTER, LAKEHURST, N.J.

System safety program report MK 1 MOD 0 LSO HUD console system
[AD-A095009] p0269 N81-19080

NAVAL AIR PROPULSION TEST CENTER, TRENTON, N.J.

Specification requirements for fighter engines
p0429 N81-24073

Helicopter transmission testing
p0433 N81-24102

The packaging of electronic engine control units and related subcomponents
p0497 N81-27105

Full authority digital electronic control turbofan engine demonstration
p0498 N81-27112

NAVAL AIR SYSTEMS COMMAND, WASHINGTON, D. C.

US Navy service experience with advanced composites
p0041 N81-11149

NAVAIR Avionics Master Plan
[AD-A097522] p0389 N81-23082

Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 31 December 1980
[AD-A102495] p0596 N81-31187

High speed multiplex bus protocol study
[AD-A102113] p0597 N81-31191

NAVAL AIR TEST CENTER, PATUXENT RIVER, MD.

Shipboard trials of the Quiet Short-Haul Research Aircraft /QSRA/
p0099 A81-16581

QSRA Joint Navy/NASA sea trials
[AIAA PAPER 81-0152] p0161 A81-20633

Quiet propulsive-lift technology ready for civil and military applications
p0359 A81-32521

NAVAL AVIONICS CENTER, INDIANAPOLIS, IND.

A multiplexed digital voice intercommunications system compatible with future voice conversion techniques
p0605 N81-31474

NAVAL CIVIL ENGINEERING LAB., PORT HUENEME, CALIF.

Shrinkage-compensating cement for airport pavement. Phase 3: Fibrous concretes. Addendum
[AD-A092945] p0219 N81-17299

Recycling of Portland Cement Concrete airport pavements: A state-of-the-art study
[AD-A101482] p0584 N81-30141

Lime-stabilized native soil as base course for light aircraft pavement
[AD-A102196] p0630 N81-32156

NAVAL CONSTRUCTION BATTALION CENTER, PORT HUENEME, CALIF.

Fiberglass-reinforced rigid polyurethane expedient pavement subject to simulated F-4 aircraft traffic
[AD-A089266] p0030 N81-10079

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.

NAVTOLAND microwave scanning beam tests at NOSC. Three landing guidance systems tested in a specular multipath environment
[AD-A099298] p0484 N81-26086

NAVAL OCEANOGRAPHIC OFFICE, BAY ST. LOUIS, MISS.

Hydrographic applications of the global positioning system
[AD-A093750] p0206 N81-17029

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.

Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20540

The use of parametric cost estimating relationships as they pertain to aircraft airframes: A new perspective
[AD-A089525] p0027 N81-10060

Transonic cascade wind tunnel modification and initial tests
[AD-A091080] p0090 N81-13031

Radio direction finding on high frequency short duration signals
[AD-A092136] p0192 N81-16029

Validation of a two dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A092138] p0196 N81-16060

Methodology for determining sampling intervals
[AD-A092591] p0202 N81-16825

A study of State Feedback Implicit Model following control for VSTOL aircraft
[AD-A093253] p0216 N81-17099

Evaluation of a subsonic cascade wind tunnel for compressor blade testing
[AD-A093591] p0218 N81-17107

An investigation of the reacting and non-reacting flow characteristics of solid ramjets
[AD-A094567] p0253 N81-18059

Validation of a two-dimensional primitive variable computer code for flow fields in jet engine test cells
[AD-A094615] p0254 N81-18067

Challenge for operational experience feedback in aircraft design: An aircraft design example
[AD-A096088] p0341 N81-21067

Low-range airspeed sensors
[AD-A096359] p0342 N81-21076

ATTACK vs SCAN: A comparison of endgame aircraft survivability computer programs
[AD-A097663] p0388 N81-23076

Investigation of the use of liquid crystal thermography to study flow over turbomachinery blades
[AD-A097289] p0391 N81-23089

An investigation of the combustion behavior of solid fuel ramjets
[AD-A098481] p0445 N81-25240

Flow control about an airborne laser turret
[AD-A100110] p0537 N81-28060

Computer evaluation of the on-and-off design of an axial air turbine
[AD-A101102] p0549 N81-29131

NAVAL RESEARCH LAB., WASHINGTON, D. C.

Abstract interface specifications for the A-7E device interface module
[AD-A092696] p0202 N81-16770

Evaluation of the A-7 requirements document by analysis of change data
[AD-A094888] p0272 N81-19103

Application of ion implantation for the improvement of localized corrosion resistance of M50 steel bearings
[AD-A097230] p0393 N81-23466

Results of a feasibility study for determining the yaw angle of a landing aircraft
[AD-A099765] p0495 N81-27084

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.

Structural response methods and evaluation results for helicopter landing decks on 210- and 270-foot USCCG cutters
[AD-A102420] p0601 N81-31233

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.

Numerical optimization of circulation control airfoils
[AIAA PAPER 81-0016] p0157 A81-20540

P-3 Orion fuel-saving modification wind tunnel study
[AD-A091906] p0194 N81-16084
Some dynamic properties of rigid two-bladed fully gimballed tip-jet helicopter rotor with circulation control
[AD-A094031] p0252 N81-18054
Lift-propulsion system weight variation for very heavy lift helicopters
[AD-A099169] p0490 N81-26151
Experimental development of an advanced circulation control wing system for Navy STOL aircraft
[AD-A101309] p0581 N81-30116
Investigation of the circulation control wing/upper surface blowing high-lift system on a low aspect ratio semispan model
[AD-A103090] p0627 N81-32128
Design of a slot height distribution for increased hover control power on a circulation control rotor
[AD-A103535] p0637 N81-33194

NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.
Fiber release from impacted graphite reinforced epoxy composites
[NASA-CR-163684] p0038 N81-11117
Optimal bodies for minimum total drag at supersonic speeds
[AD-A091235] p0091 N81-13036

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
A comparison of Newton-like methods for the transonic small disturbance equation
[AD-A090270] p0033 N81-11017

NAVAL TRAINING EQUIPMENT CENTER, ORLANDO, FLA.
Glideslope descent-rate cuing to aid carrier landings
[AD-A092193] p0192 N81-16033
The effects of various fidelity factors on simulated helicopter hover
[AD-A102028] p0601 N81-31232

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.
An investigation of safety hazards and reliability problems in aerial refueling stores
[AD-A091788] p0127 N81-13938
Vanadium trineodecanoate promoter for fiberglass-polyester soil surfacings
[AD-A091785] p0132 N81-14084

NEILSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
Continued development and correlation of analytically based weight estimation codes for wings and fuselages
[NASA-CR-152331] p0251 N81-18044
Data base for the prediction of airframe/propulsion system interference effects
[NASA-CR-152316] p0251 N81-18045

NETWORK ANALYSIS CORP., VIENNA, VA.
Communications support for National Flight Data Center information system
[AD-A093095] p0219 N81-17327
Computer B (NAS-NAS) communications support
[AD-A104145] p0640 N81-33392

NEW ENGLAND RESEARCH APPLICATION CENTER, STORRS, CONN.
Adiabatic gas flow. Citations from the NTIS data base
[PB80-808546] p0026 N81-10048
Head up displays. Citations from the International Aerospace Abstracts data base
[NASA-CR-163656] p0026 N81-10049
Head up displays. Citations from the NTIS data base
[PB80-809064] p0026 N81-10050
Gyrocompasses. Citations from the International Aerospace Abstracts data base
[NASA-CR-163675] p0028 N81-10065
Axial flow compressors. Citations from the Engineering Index data base
[PB80-808611] p0029 N81-10076
Axial flow compressors. Citations from the NTIS data base
[PB80-808603] p0031 N81-10441

NEW JERSEY INST. OF TECH., NEWARK.
Heat transfer from a row of impinging jets to concave cylindrical surfaces
p0231 A81-24924
Simulation of aeroheating or aerocooling Air Force stores by arrays of impinging jets
[AD-A095464] p0330 N81-20034

NEW MEXICO UNIV., ALBUQUERQUE.
Scale effects on turbulent boundary layer development and flow separation around V/STOL inlets at high incidence
[AIAA PAPER 81-0014] p0157 A81-20538
Three-dimensional turbulent boundary layer development and separation in V/STOL engine inlets at incidence with small-cross flow and curvature influences
[AIAA PAPER 81-0254] p0163 A81-20703
Aircraft maintenance. Citations from the International Aerospace Abstracts data base
[NTIS/PS-79/0859/3] p0125 N81-13917
Technological forecasting--aircraft design. Citations from the International Aerospace data base
[NASA-CR-163833] p0129 N81-13957
Remotely piloted vehicles. Citations from the International Aerospace abstracts data base
[NASA-CR-163864] p0142 N81-14996
Lightning. Citations from the International Aerospace abstracts data base
[NASA-CR-163857] p0146 N81-15648
Clean air turbulence. Citations from the International Aerospace Abstracts data base
[NASA-CR-163863] p0146 N81-15649

NEW YORK UNIV., N. Y.
Radiation boundary conditions for wave-like equations
p0153 A81-20223

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
A computer program to calculate the longitudinal aerodynamic characteristics of upper-surface-blown wing-flap configurations
[NASA-CR-3005] p0071 N81-12014
Aeroelastic optimization with multiple constraints
[AD-A090775] p0085 N81-12451
Study of transonic flow fields about aircraft: Application to external stores
p0187 N81-15998
Data base for the prediction of inlet external drag
p0190 N81-16018
Theoretical analysis of an augmentor wing for a VTOL fighter
[NASA-CR-152254] p0261 N81-19018
Experimental and theoretical study of flow fields and store forces in close proximity to a triple ejection rack at transonic speeds
[AD-A094751] p0263 N81-19030
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 2: Users manual for the computer program
[AD-A099391] p0494 N81-27080
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 1: Theoretical methods and comparisons with experiment
[AD-A099330] p0495 N81-27081
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 3: Appendices A and B. Details of program 1
[AD-A099331] p0495 N81-27082
Prediction of supersonic store separation characteristics including fuselage and stores of noncircular cross section. Volume 4: Appendices C and D. Details of program 2
[AD-A099332] p0495 N81-27083
Basic studies of body vortices at high angles of attack and supersonic speeds
[AD-A102241] p0594 N81-31154

NOAH (J. WATSON) ASSOCIATES, INC., FALLS CHURCH, VA.
A slot allocation model for high-density airports
[AD-A098097] p0430 N81-24846

NOEL PENNY TURBINES LTD., TOLL BAR END (ENGLAND).
Centrifugal compressors for small aero and automotive gas turbine engines
p0220 N81-17467

NORDEN SYSTEMS, INC., NORWALK, CONN.
High contrast CRT module
[AD-A097727] p0437 N81-24360

NORTH ATLANTIC TREATY ORGANIZATION, BODO (NORWAY).
Seat pack for fighter aircraft operating on the NATO Northern Flank
p0205 N81-17010

- NORTH CAROLINA STATE UNIV., RALEIGH.
  - Trailing edge noise prediction from measured surface pressures p0616 A81-48395
  - Reliability validation of systems for life-critical applications p0617 A81-48559
  - A study of real-time computer graphic display technology for aeronautical applications [NASA-CR-164221] p0380 N81-22727
  - Flight test evaluation of predicted light aircraft drag, performance, and stability [NASA-CR-159062] p0494 N81-27078
- NORTHROP CORP., HAWTHORNE, CALIF.
  - Subsonic/supersonic nonvectored aeropropulsive characteristics of nonaxisymmetric nozzles installed on an F-18 model [AIAA PAPER 81-1445] p0504 A81-40878
  - Balanced design: Minimum cost solution p0047 N81-11919
  - Wind tunnel test of a fighter aircraft wing/store flutter suppression system: An international effort p0082 N81-12116
- NORTHROP SERVICES, INC., MOFFETT FIELD, CALIF.
  - Clear air turbulence - An airborne alert system p0562 A81-44648
- NORTHWESTERN UNIV., EVANSTON, ILL.
  - Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 1: Europe, July 1980 [NASA-CR-152356] p0220 N81-17623
  - Transport jet aircraft noise abatement in foreign countries: Growth, structure, impact. Volume 2: Pacific basin, August 1980 [NASA-CR-152357-VOL-2] p0220 N81-17624
- NOTRE DAME UNIV., IND.
  - Alternatives for jet engine control p0080 N81-12103

O

- OAK RIDGE NATIONAL LAB., TENN.
  - A Matrix Approach to Biological Investigation of Synthetic Fuels [PB81-183477] p0586 N81-30313
- OAK RIDGE Y-12 PLANT, TENN.
  - F-111 windscreen machining [Y-2232] p0142 N81-14995
- OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, LECLERC (FRANCE).
  - Test and analyses of an active flutter suppression system on an FFDL model of YF17 p0082 N81-12118
- OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).
  - Review of theoretical and experimental results on three dimensional turbulent wakes and boundary layers [ONERA-NT-1980-4] p0126 N81-13930
  - Experimental study of the interaction between the wing of a subsonic aircraft and a nacelle of a high by-pass ratio engine p0189 N81-16010
  - Aerodynamic interaction between a close-coupled canard and a sweptback wing in transonic flow p0189 N81-16013
  - A French flight test program on the electromagnetic effects of lightning p0199 N81-16155
  - Flight tests for studying radioelectric perturbations of an electrostatic origin p0200 N81-16160
  - La Recherche Aerospatiale, Bimonthly Bulletin no. 1980-2, March - April 1980 [ESA-TT-652] p0255 N81-18244
  - Structures of flow separations over swept wings p0255 N81-18246
  - An implicit finite volume method for elliptical flow computation p0255 N81-18248
  - Numerical computation of flows with rolled-up vortex sheets p0255 N81-18256
  - Experimental study of the separation at the trailing edge of an axisymmetrical contoured after-body p0255 N81-18257
  - Improvements in the determination of convective transfers from infrared thermography p0255 N81-18258
  - Expected improvements on high angle of attack model testing p0436 N81-24123
  - Contribution to the study of nonstationary signals emitted by moving jet engines: Application to special analysis and imaging. Part 1 p0447 N81-26006
  - Pressure distribution computation on a nonlifting symmetrical helicopter blade in forward flight p0447 N81-26010
  - Contribution to the study of nonstationary signals emitted by moving jet engines: Application to spectral analysis and imaging. Part 2 p0447 N81-26013
  - Model vibrations below low speed stall p0447 N81-26017
  - Cascade design through an inverse method p0448 N81-26022
- OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, D. C.
  - Aeronautics and Space Report of the President, 1979 activities p0089 N81-12956
- OFFICE OF NAVAL RESEARCH, ARLINGTON, VA.
  - Dynamic characteristics of a high-speed rotor with radial and axial foil-bearing supports [ASME PAPER 80-C2/LUB-35] p0117 A81-10683
- OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D. C.
  - Assessment of the impact of advanced air-transport technology p0247 N81-18015
- OHIO STATE UNIV., COLUMBUS.
  - An analytical approach to airfoil icing [AIAA PAPER 81-0403] p0167 A81-20810
  - Airborne antenna pattern code: User's manual [AD-A092316] p0201 N81-16357
  - Vibrations of turbine engine blades by shell analysis p0257 N81-18404
  - Electromagnetic scattering by open circular waveguides [AD-A095554] p0336 N81-20345
  - Methodological approaches to identifying relevant features for visual flight [AD-A100199] p0541 N81-28108
  - Assessment of scene complexity and cue validity in visual flight simulation [AD-A100200] p0541 N81-28109
- OHIO UNIV., ATHENS.
  - DC-to-DC power supply for light aircraft flight testing [NASA-CR-163850] p0141 N81-14989
  - Investigation of air transportation technology at Ohio University, 1980 p0371 N81-22005
  - Results of a Loran-C flight test using an absolute data reference p0371 N81-22006
  - Microcomputer processing for Loran-C p0371 N81-22007
  - VLF P-static noise reduction in aircraft. Volume 1: Current knowledge [AD-A098451] p0440 N81-25061
  - VLF P-static noise reduction in aircraft. Volume 2: Recommended action [AD-A099130] p0491 N81-26394
- OKLAHOMA STATE UNIV., STILLWATER.
  - Prediction of swirling reacting flow in ramjet combustors [AIAA PAPER 81-1485] p0506 A81-40983
  - An analytical pilot rating method for highly elastic aircraft [AIAA 81-1772] p0554 A81-44093
  - Experiments on the nonlinear characteristics of noise propagation from low and moderate Reynolds number supersonic jets [AIAA PAPER 81-2041] p0618 A81-48613
  - Potential use of geotechnical fabric in airfield runway design [AD-A092686] p0198 N81-16071
  - Diagnostic experiments on supersonic jet noise [NASA-CR-164348] p0438 N81-24856
  - Handling qualities of large flexible aircraft p0538 N81-28081

OLD DOMINION UNIV., NORFOLK, VA.
A nonlinear, discrete-vortex-perturbation method for unsteady lifting-surface problems with edge separations
p0058 A81-14394
Numerical prediction of vortex cores of the leading and trailing edges of delta wings
p0059 A81-14475
Hybrid suction surface for turbulent boundary layer flow
p0240 A81-26513
Airborne antenna pattern calculations
p0532 A81-43708
Effect of leading-edge vortex flaps on aerodynamic performance of delta wings
p0559 A81-44424
Effects of boundary-layer treatment on cryogenic wind-tunnel controls
[NASA-CR-159372] p0083 N81-12120
Aerodynamic side-force alleviator means
[NASA-CASE-LAR-12326-1] p0139 N81-14968
Exploratory subsonic investigation of vortex-flap concept on arrow wing configuration
p0243 N81-17985
Leading edge vortex flaps for drag reduction
[NASA-CASE-LAR-12750-1] p0261 N81-19016
Design of multivariable feedback control systems via spectral assignment
[NASA-CR-164189] p0345 N81-21864
Antenna design and development for the microwave subsystem experiments for the terminal configured vehicle project
[NASA-CR-164220] p0378 N81-22282
Investigation of aerodynamic characteristics of wings having vortex flow using different numerical codes
[NASA-CR-165706] p0384 N81-23034
Development of a nonlinear vortex method
[NASA-CR-164351] p0423 N81-24024
Airborne antenna pattern calculations
[NASA-CR-164350] p0437 N81-24321
HADY-1, a FORTRAN program for the compressible stability analysis of three-dimensional boundary layers
p0586 N81-30388
The effect of boundary layer growth on the stability of compressible flows
p0587 N81-30389
Wind-tunnel studies of advanced cargo aircraft concepts
[NASA-CR-164833] p0627 N81-32117

OREGON STATE UNIV., CORVALLIS.
Application of linear quadratic control in reduction of aerodynamic forces on aircraft
p0332 N81-20061

OXFORD UNIV. (ENGLAND).
A discussion document on the thermal design of force balances for cryogenic wind tunnels
[OUEL-1321/80] p0435 N81-24119

P

PACER SYSTEMS, INC., ARLINGTON, VA.
Study of heliport airspace and real estate requirements
[AD-A091156] p0095 N81-13072
Development of a heliport classification method and an analysis of heliport real estate and airspace requirements
[AD-A102521] p0630 N81-32158

PACER SYSTEMS, INC., BURLINGTON, MASS.
Study of helicopter performance and terminal instrument procedures
[AD-A090052] p0092 N81-13046

PAN AMERICAN WORLD AIRWAYS, INC., JAMAICA, N. Y.
Performance deterioration: An airline perspective
p0598 N81-31202

PARKER (LEE H.), INC., CONCORD, MASS.
Airborne lightning warning systems: A survey
[AD-A095354] p0331 N81-20045

PEAT, MARWICK, MITCHELL AND CO., SAN FRANCISCO, CALIF.
Aircraft towing feasibility study
[DOE/CS-50069/1] p0074 N81-12051
Responses to comments of Air Transport Association of America on aircraft towing feasibility study
[DE81-029834] p0638 N81-33201

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Structure and decay characteristics of turbulence in the near- and far-wake of a moderately loaded compressor rotor-blade
[ASME PAPER 80-GT-95] p0109 A81-17954
Coupling of unsteady lift to acoustic duct modes in an axial flow fan
[AD-A095080] p0274 N81-19124
The prediction of normal force and rolling moment coefficients for a spinning wing
[NASA-CR-165680] p0333 N81-20060
An investigation of air solubility in Jet A fuel at high pressures
[NASA-CR-154170] p0344 N81-21211
Investigation of air solubility in jet A fuel at high pressures
[NASA-CR-3422] p0378 N81-22130
End wall flows in rotors and stators of a single stage compressor
[NASA-CR-164635] p0540 N81-28097

PENNSYLVANIA TRANSPORTATION INST., UNIVERSITY PARK.
Analysis of turbulent boundary layer on cascade and rotor blades of turbomachinery
p0296 A81-29106
Unsteady pressure distributions on airfoils in cascade
[AD-A091173] p0090 N81-13033

PENNSYLVANIA UNIV., PHILADELPHIA.
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DOE/ER-10570/1] p0135 N81-14363

PERCEPTRONICS, INC., WOODLAND HILLS, CALIF.
Analysis and modeling of information handling tasks in supervisory control of advanced aircraft
[AD-A092906] p0211 N81-17061

PISA UNIV. (ITALY).
The fatigue crack growth under variable amplitude loading in built-up structures
[AD-A098417] p0446 N81-25437
Fatigue behavior of helicopter dynamic components under constant amplitude and spectrum loading
p0489 N81-26143

POITIERS UNIV. (FRANCE).
The application of UV spectroscopy to the quantitative analysis of nitrogen oxide
p0089 N81-13008

POLITECNICO DI MILANO (ITALY).
Evaluation of section properties for hollow composite beams
[PAPER-EE-35] p0031 N81-10454
Development for new laboratories for future testing
p0433 N81-24105

PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.
Progress with variable cycle engines
p0245 N81-17997

PRATT AND WHITNEY AIRCRAFT, WEST PALM BEACH, FLA.
Disk residual life studies. Part 2: TF30 10th-stage compressor disk (INCOLOY 901)
[AD-A089524] p0029 N81-10074
Disk residual life studies. Part 1: F100 1st-stage turbine disk (IN100)
[AD-A089791] p0036 N81-11041
Advanced industrial gas turbine techology readiness demonstration
[DOE/ON-05035/T1] p0085 N81-12426
Compressor configuration and design optimization for the high reliability gas turbine
[DOE/ET-15425/T1] p0134 N81-14327
Extended frequency turbofan model
[NASA-CR-165261] p0335 N81-20078
Development test requirements
p0430 N81-24080
Derivation and correlation of accelerated mission endurance testing
p0431 N81-24088

PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.
Improved combustor durability - Segmented approach with advanced cooling techniques
[AIAA PAPER 81-1354] p0501 A81-40836
JT9D performance deterioration results from a simulated aerodynamic load test
[AIAA PAPER 81-1588] p0507 A81-40963
Assessment of inflow control structure effectiveness and design system development
[AIAA PAPER 81-2048] p0620 A81-48637

Rotor redesign for a highly loaded 1800 ft/sec tip speed fan, 2
[NASA-CR-159879] p0078 N81-12087
Design of a multivariable integrated control for a supersonic propulsion system
p0079 N81-12094
Propulsion controls
p0079 N81-12095
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions
[NASA-CR-159818] p0093 N81-13057
Cost/benefit analysis of advanced materials technologies for future aircraft turbine engines
[NASA-CR-165225] p0184 N81-15006
Improved methods for fan sound field determination
[NASA-CR-165188] p0147 N81-15769
Studies on proper simulation during static testing of forward speed effects on fan noise
[NASA-CR-165626] p0202 N81-16853
Combustor liner durability analysis
[NASA-CR-165250] p0213 N81-17079
JT8D-15/17 high pressure turbine root discharged blade performance improvement
[NASA-CR-165220] p0214 N81-17080
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 1: Design layouts
[NASA-CR-159819-VOL-1] p0214 N81-17081
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aeroynamic data book 1
[NASA-CR-159819-VOL-2-BK-1] p0214 N81-17082
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 2
[NASA-CR-159819-VOL-2-BK-2] p0214 N81-17083
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 2: Tabulated aerodynamic data book 3
[NASA-CR-159819-VOL-2-BK-3] p0214 N81-17084
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 1
[NASA-CR-159819-VOL-3-BK-1] p0214 N81-17085
Model aerodynamic test results for two variable cycle engine coannular exhaust systems at simulated takeoff and cruise conditions. Comprehensive data report. Volume 3: Graphical data book 2
[NASA-CR-159819-VOL-3-BK-2] p0214 N81-17086
JT8D engine internal exhaust mixer technology program
[AD-A093057] p0215 N81-17091
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] p0277 N81-19316
Fuel/engine/airframe trade off study
[AD-A097391] p0388 N81-23073
Structures, performance, benefit, cost study
[NASA-CR-165313] p0428 N81-24067
Energy efficient engine, low-pressure turbine boundary layer program
[NASA-CR-165338] p0442 N81-25077
Energy efficient engine, high-pressure turbine cooling model technology report
[NASA-CR-165374] p0496 N81-27093
JT9D jet engine diagnostics program
p0598 N81-31199
JT8D engine performance retention
p0598 N81-31200
Improving turbine engine compressor performance retention through airfoil coatings
p0598 N81-31203
Advanced oxide dispersion strengthened sheet alloys for improved combustor durability
p0598 N81-31204
Engine health monitoring systems: Tools for improved maintenance management in the 1980's
p0599 N81-31214

PRATT AND WHITNEY AIRCRAFT GROUP, MIDDLETOWN, CONN.
Design, durability and low cost processing technology for composite fan exit guide vanes
p0182 A81-22664
Composite fan exit guide vanes for high bypass ratio gas turbine engines
[AIAA PAPER 81-1357] p0501 A81-40839

PRATT AND WHITNEY AIRCRAFT GROUP, WEST PALM BEACH, FLA.
Future challenges in V/STOL flight propulsion control integration
[SAE PAPER 801140] p0397 A81-34170
Supercritical airfoil technology program wake experiments and modeling for fore and aft loaded compressor cascades
[AD-A091378] p0091 N81-12034
Improved capabilities to detect incipient bearing failures
[AD-A091687] p0134 N81-14325
Concept definition: Retirement for cause of F-100 rotor components
[AD-A095584] p0335 N81-20080
Semi-actuator disk theory for compressor choke flutter
[NASA-CR-3426] p0442 N81-25075
Coating for prevention of titanium combustion
[NASA-CR-165360] p0539 N81-28094

PRINCETON UNIV., N. J.
A simplified theory of oscillating aerofoils in transonic flow - Review and extension
p0060 A81-14945
Linear/nonlinear behavior in unsteady transonic aerodynamics
[AIAA 81-0643] p0306 A81-29436
Effects of displacement and rate saturation on the control of statically unstable aircraft
[AIAA 81-1752] p0554 A81-43082
Wind tunnel wall interference
[AD-A093301] p0217 N81-17104
Investigation of air transportation technology at Princeton University, 1980
p0371 N81-22008
Laser beacon collision avoidance systems
p0372 N81-22009
Dead reckoner navigation project
p0372 N81-22010
General aviation airplane fuel economy system model
p0372 N81-22011
The development of a theoretical and experimental model for the study of active suppression of wing flutter
p0376 N81-22050
Transition and conversion trim-maps for the AV-8A VTOL aircraft
[AD-A102155] p0596 N81-31108

PRINS MAURITS LAB. TNO, RIJSWIJK (NETHERLANDS).
Minimum ignition energy of F40 aircraft fuel/air mixtures
[PML-1978-22] p0436 N81-24213

PURDUE UNIV., LAFAYETTE, IND.
Factors influencing the predicted performance of advanced propeller designs
[AIAA PAPER 81-1564] p0516 A81-42210
Sensor/actuator failure detection and isolation for airbreathing propulsion systems
p0564 A81-45551
Theoretical and experimental evaluation of transmission loss of cylinders
[AIAA PAPER 81-1971] p0618 A81-48612
Multivariable closed-loop analysis and flight control synthesis for air-to-air tracking
[AD-A090050] p0037 N81-11046
Multivarable nyquist array method with application to turbofan engine control
p0080 N81-12101
Unsteady three-dimensional subsonic flow in a solid propellant rocket motor including the effect of motor rotation
p0095 N81-13085
Application of the MNA design method to a nonlinear turbofan engine
[NASA-CR-163855] p0143 N81-15001
The theoretical performance of high efficiency propellers
p0537 N81-28049
Pilot-optimal multivariable control synthesis by output feedback

[NASA-CR-163112] p0540 N81-28102
Flutter analysis fo two-dimensional and two-degree-of-freedom MBB A-3, CAST 7, an TF-8A supercritical airfoils in small-disturbance unsteady transonic flow
[AD-A100334] p0540 N81-28104

Q

QUANTA SYSTEMS CORP., ROCKVILLE, MD.
Study of pilot visual information requirements for Navy vertical take-off and landing capability development
[AD-A096074] p0341 N81-21068
QUEEN MARY COLL., LONDON (ENGLAND).
Wind tunnel corrections for high angles of attack: A brief review of recent UK work
p0436 N81-24127
An introduction to the aerodynamics of spoilers
[PB81-166183] p0487 N81-26122
Application of vortex lattice methods to calculate Lv (rolling moment due to sideslip)
[PB81-166167] p0487 N81-26123
Some qualitative experiments on the local flow about spoilers in unsteady motion at low speeds
[PB81-166159] p0487 N81-26124
QUINBY (GILBERT F.), PORT WASHINGTON, PA.
An assessment of General Aviation utilization of advanced avionics technology
[NASA-CR-159328] p0127 N81-13941
Proceedings of the Public Workshop on Alternative Separation Concepts: Presentations, Discussions and Recommendations
[AD-A102519] p0596 N81-31183

R

R AND D ASSOCIATES, MARINA DEL REY, CALIF.
Aircraft NO/x/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-26741
RADIAN CORP., AUSTIN, TEX.
Chromatographic separation of conventional and experimental fuels
[AD-A101673] p0586 N81-30282
RADIO TECHNICAL COMMISSION FOR AERONAUTICS, WASHINGTON, D. C.
Minimum operational performance standards for airborne radar approach and beacon systems for helicopters
[RTCA/DO-172] p0336 N81-20322
Minimum operational performance standards for airborne weather and ground mapping pulsed radars
[RTCA/DO-173] p0336 N81-20323
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0595 N81-31180
Minimum operational performance standards for Microwave Landing System (MLS) airborne receiving equipment
[RTCA/DO-177] p0628 N81-32133
RAND CORP., SANTA MONICA, CALIF.
Aircraft turbine engine monitoring experience. An overview and lessons learned from selected case studies
[AD-A089752] p0036 N81-11042
Predicting cost/reliability/maintainability of advanced general aviation avionics equipment
[NASA-CR-152149] p0273 N81-19111
A method for estimating the cost of aircraft structural modification
[AD-A099327] p0483 N81-26035
Estimating aircraft depot maintenance costs
[AD-A103623] p0631 N81-33133
RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
Flight termination receiver/decoders design, performance and certification
[AD-A089746] p0037 N81-11045
Noncoherent C-band transponder standards
[AD-A091282] p0095 N81-13251
RANN, INC., PALO ALTO, CALIF.
Exploratory study of hazard mitigation and research in the air transport system
[AD-A089204] p0033 N81-11021
REGISTRO AERONAUTICO ITALIANO, ROME.
Overview of all civil aviation engine certification/demonstration requirements and rationale, i.e., FAA, CAA, etcetera
p0429 N81-24072
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Composite structural materials
[NASA-CR-163946] p0207 N81-17039
Model reference adaptive control for multi-input multi-output systems
p0258 N81-18693
Composite structural materials
[NASA-CR-164634] p0541 N81-28176
RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N. C.
Reliability validation of systems for life-critical applications
p0617 A81-48559
Feasibility of collision warning, precision approach and landing using GPS, volume 1
[NASA-CR-165675] p0537 N81-28070
ROCKWELL INTERNATIONAL CORP., ANAHEIM, CALIF.
High current power controller
[AD-A101643] p0552 N81-29536
ROCKWELL INTERNATIONAL CORP., CEDAR RAPIDS, IOWA.
Delta electrical load analysis C-141B JACC/CP Aircraft
[AD-A095659] p0334 N81-20071
ROCKWELL INTERNATIONAL CORP., COLUMBUS, OHIO.
A study of a VTOL thrusting ejector in low speed flight, volume 1
[NASA-CR-166137-VOL-1] p0337 N81-21017
A study of a VTOL thrusting ejector in low speed flight, volume 2
[NASA-CR-166137-VOL-2] p0337 N81-21018
Design, development, and evaluation of lightweight hydraulic system, phase 1
[AD-A097505] p0388 N81-23075
ROCKWELL INTERNATIONAL CORP., DALLAS, TEX.
Stress analysis of aircraft modifications (C-141B Aircraft). Joint Airborne Communications Center/Command Post (JACC/CP) provisions
[AD-A095634] p0334 N81-20072
ROCKWELL INTERNATIONAL CORP., EL SEGUNDO, CALIF.
Weapon bay cavity noise environments, data correlation and prediction for the B-1 aircraft
[AD-A089770] p0045 N81-11778
Superplastic formed and diffusion bonded titanium landing gear component feasibility study
[AD-A092788] p0290 N81-16213
ROCKWELL INTERNATIONAL CORP., LOS ANGELES, CALIF.
HiMAT systems development results and projections
[SAE PAPER 801175] p0400 A81-34188
Supersonic cruise vehicle research/business jet
p0248 N81-18022
Light transport and general aviation aircraft icing research requirements
[NASA-CR-165290] p0269 N81-19079
Aircraft design using the National Transonic Facility
p0593 N81-31143
Proposed aeroelastic and flutter tests for the National Transonic Facility
p0593 N81-31144
ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.
A study of wing body blending for an advanced supersonic transport
p0244 N81-17987
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 1: Detection of cracks in the inaccessible lower half wing lap joints using EMATs
[AD-A094349] p0257 N81-18419
Investigation of EMAT base system for the detection of bolt hole type cracks. Part 2: Reliability evaluation and system definition for detection of cracks under fasteners by EMATs
[AD-A094350] p0258 N81-18420
ROLLS-ROYCE LTD., BRISTOL (ENGLAND).
Metallurgical aspects of materials processing and manufacturing for aero-engine components
[PNR-90019] p0084 N81-12209
Bench testing of a vectored thrust engine
p0432 N81-24093
Multi-mission STOVL with vectored thrust engines
p0633 N81-33149
ROLLS-ROYCE LTD., DERBY (ENGLAND).
Quantitative thermography in aero-engine research and development

[PNR-90021] p0029 N81-10075
System to measure the pressure distribution on fan aerofoil surfaces during flutter conditions
[PNR-90013] p0072 N81-12029
The design development and operation of gas turbine radio telemetry systems
[EIR-00733] p0077 N81-12082
The development of the composite material engine nacelle
[AAAF-NT-79-38] p0083 N81-12180
Shear layer instability noise produced by various jet nozzle configurations
[PNR-90018] p0088 N81-12825
The future of civil turbo-fan engines
[PNR-90034] p0130 N81-13964
A resin injection technique for the fabrication of aero engine composite components
[PNR-90024] p0131 N81-14004
Exhaust noise in flight: The role of acoustic installation effects
[PNR-90029] p0138 N81-14793
The measurement of aero gas turbine noise
[PNR-90032] p0138 N81-14795
On the influence of steady state temperature and pressure distortion on the flow characteristics in an installed multistage jet engine compressor
[PNR-90022] p0275 N81-19126
The calculation of quasi-three-dimensional frictionless compressible flow in axial turbomachines
[PNR-90047] p0275 N81-19127
The optimum design of by-pass engines with jet mixing
[PNR-90017] p0335 N81-20081
The RB211 engine and its development
[PNR-90043] p0338 N81-21037
Development of test requirements for civil engines
p0430 N81-24079
The mechanical testing of compressors and turbines for aircraft gas turbine engines
p0433 N81-24100
Programmes for military engines with cost objectives
[PNR-90058] p0583 N81-30133
A United Kingdom view on future fuels
[PNR-90068] p0602 N81-31398

ROLLS-ROYCE LTD., LONDON (ENGLAND).
Performance retention of the RB211 powerplant in service
p0598 N81-31201

ROSE-HULMAN INST. OF TECH., TERRE HAUTE, IND.
Computer code for the determination of ejection seat/man aerodynamic parameters
[AD-A092721] p0151 N81-16026

ROYAL AIR FORCE INST. OF AVIATION MEDICINE, FARNBOROUGH (ENGLAND).
The speed of response to synthesized voice messages
p0603 N81-31456
An automated multiple choice intelligibility testing system
p0604 N81-31468

ROYAL AIRCRAFT ESTABLISHMENT, BEDFORD (ENGLAND).
The flying qualities of aircraft with actively augmented pitch and yaw stability
[ARC-R/M-3848] p0082 N81-12113
Oscillatory flows from shock induced separations on biconvex aerofoils of varying thickness in ventilated wind tunnels
p0386 N81-23056
Wind-tunnel measurement of aerodynamic derivatives using flexible-sting rigs
p0591 N81-31110

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
An investigation of scale effects on the transonic flow over swept wings. Part 2: Measurements on a model of a variable-sweep strike-fighter configuration
[ARC-R/M-3842-PT-2] p0021 N81-10010
Flow measurements in the wake of a wing fitted with a leading-edge root extension (strake)
[RAE-TR-79120] p0022 N81-10015
Theoretical determination of subsonic oscillatory airforce coefficients for fin-tailplane configurations
[RAE-TR-79125] p0022 N81-10016
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 1
[RAE-TR-79052-VOL-1] p0026 N81-10044
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 2
[RAE-TR-79052-VOL-2] p0026 N81-10045
Contributions to the United Kingdom microwave landing system research and development program, 1974 to 1978. Volume 3
[RAE-TR-79052-VOL-3] p0026 N81-10046
Relationships between impact resistance and fracture toughness in advanced composite materials
p0040 N81-11137
The prediction of the bursting of laminar separation bubbles in the design of two dimensional high-lift aerofoils
[RAE-TR-80060] p0073 N81-12038
The intelligibility of speech presented over the telephones of the Mk 4 flying helmet
[RAE-TM-FS-313] p0084 N81-12320
The resonance frequencies of ventilated wind tunnels
[ARC-R/M-3841] p0144 N81-15009
Some aerodynamic interference effects that influence the transonic performance of combat aircraft
p0189 N81-16014
The UK Ministry of Defence programme on the electromagnetic properties of carbon fiber composites
p0199 N81-16154
The electro-optical display/visual system interface: Human factors considerations
p0212 N81-17066
Leading-edge separation from a slender rolling wing-body combination
[RAE-TR-80039] p0330 N81-20040
Experimental flutter at high subsonic speeds and its theoretical prediction, taking into account wing thickness and Reynolds number
p0385 N81-23052
Fatigue Assessment of UK military aeroplanes
p0487 N81-26128
An evaluation of fatigue procedures for UK military helicopters
p0488 N81-26133
Development of standardised fatigue test load histories for helicopter rotors: Basic consideration and definition of Helix and Felix
p0489 N81-26141
Gun harmonisation using the sector acoustic miss distance indicator
p0544 N81-29074
An investigation of the linear and angular vibration environments of trials aircraft
p0545 N81-29087
Control derivatives
p0592 N81-31119
Flying helmet attenuation, and the measurement, with particular reference to the Mk 4 helmet
p0604 N81-31473
Digital spectral analysis: A guide based on experience with aircraft vibration
[RAE-TR-81014] p0605 N81-31588

ROYAL MILITARY COLL. OF SCIENCE, SHRIVENHAM (ENGLAND).
Generalized dynamic stability for linearized yawing motion
[RMCS-80002] p0601 N81-31225

ROYAL NETHERLANDS AIRCRAFT FACTORIES FOKKER, RIJSWIJK.
Fatigue test results of carbon fiber reinforced plastic F28 aircraft component and its structural details
p0040 N81-11135

ROYAL NETHERLANDS AIRCRAFT FACTORIES FOKKER, SCHIPHOL-OOST.
Design study for the inner wing of a transonic wing-body combination of aspect ratio 8
p0190 N81-16015
Thirty years experience with primary adhesive bonded structures
[FOK-BO-1240] p0541 N81-28189
Nondestructive testing of adhesive bonded joints
[FCK-BO-1241] p0542 N81-28190
Operational experience with adhesive bonded structures
[FCK-BO-1235] p0582 N81-30124

ROYAL SIGNALS AND RADAR ESTABLISHMENT, MALVERN (ENGLAND).
A comparison between electric field strengths similarly generated and measured in the open air, in a shielded enclosure and in a large aircraft hangar, over frequency range 10 to 110 MHz
[RSRE-MEMO-3248] p0084 N81-12353
Liquid crystal displays
p0212 N81-17068
RUTGERS - THE STATE UNIV., PISCATAWAY, N. J.
Drag reduction - Jet breakup correlation with kerosene-based additives
p0225 A81-23923

S

SAAB-SCANIA, GOTEBORG (SWEDEN).
Buckling of sandwich panels subjected to axial compression, shear forces and lateral pressure. Part 2: Analysis
[SAAB-TN-AB-72-PT-2] p0086 N81-12465
SAAB-SCANIA, LINKOPING (SWEDEN).
Computer based in-flight monitoring
p0042 N81-11269
Failure management for the SAAB Viggen JA37 aircraft
p0042 N81-11273
SACRAMENTO AIR MATERIEL AREA, MCCLELLAN AFB, CALIF.
The use of acoustic emission for detection of active corrosion and degraded adhesive bonding in aircraft structure
[AD-A102923] p0631 N81-32522
SALFORD UNIV. (ENGLAND).
Jet wing interference for an overwing engine configuration
p0188 N81-16008
SAN ANTONIO AIR LOGISTICS CENTER, KELLY AFB., TEX.
Contaminant increase in aircraft liquid oxygen converters: Analysis of data
[AD-A090975] p0092 N81-13049
A-10/TF34 Turbine Engine Monitoring System (TEMS)
p0599 N81-31211
SAN JOSE STATE COLL., CALIF.
Dynamic, hot surface ignition of aircraft fuels and hydraulic fluids
[NASA-CR-163979] p0254 N81-18139
SAN JOSE STATE UNIV., CALIF.
Perception of horizontal aircraft separation on a cockpit display of traffic information
p0053 A81-13420
SANDERS AND THOMAS, INC., POTTSTOWN, PA.
Application of an in-line contamination monitoring unit to the AHT-64 Hydraulic Test Stand
[AD-A100696] p0550 N81-29140
SANDIA LABS., ALBUQUERQUE, N. MEX.
A single gimbal/strapdown inertial navigation system for use on spin stabilized flight test vehicles
[SAND-80-2479C] p0193 N81-16037
Recent darrieus Vertical-Axis Wind Turbine aerodynamical experiments at Sandia National Laboratories
[SAND-81-1108C] p0588 N81-30615
Advanced composite aircraft electromagnetic design and synthesis
[SAND-81-1270C] p0638 N81-33200
SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
Organic compounds in the exhaust of a J85-5 turbine engine
[AD-A091712] p0130 N81-13966
SCIENCE APPLICATIONS, INC., CANOGA PARK, CALIF.
Mixing and combustion in high speed air flows
[AD-A090536] p0083 N81-12192
Multiple-scale turbulence modeling of boundary layer flows for scramjet applications
[NASA-CR-3433] p0392 N81-23411
Combustion in high speed air flows
[AD-A102336] p0602 N81-31320
SCIENTIFIC RESEARCH ASSOCIATES, INC., GLASTONBURY, CONN.
Analysis of turbulent flow about an isolated airfoil using a time dependent Navier-Stokes procedure
p0385 N81-23053
SHAKER RESEARCH CORP., BALLSTON LAKE, N. Y.
Compressor blade monitoring system for a VA1310 (Allis Chalmers) Wind Tunnel Compressor
[AD-A092920] p0217 N81-17103
Rotor-bearing dynamics technology design guide. Part 6: Status of gas bearing technology applicable to aero propulsion machinery
[AD-A094167] p0257 N81-18394
SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and Vibration Digest, volume 12, number 11
[AD-A092384] p0257 N81-18403
SIKORSKY AIRCRAFT, STRATFORD, CONN.
An active control system for helicopter vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40189
An ABC status report
p0572 A81-46610
Main rotor six degree-of-freedom isolation system analysis
[NASA-CR-165665] p0444 N81-25090
Helicopter gearbox testing
p0488 N81-26137
Advancing Blade Concept (ABC) technology demonstrator
[AD-A100181] p0538 N81-28087
Advancing blade concept helicopter mission capabilities
p0634 N81-33151
SIMMONDS PRECISION PRODUCTS, INC., VERGENNES, VERMONT.
Effects on anti-static additives on aircraft capacitance fuel gaging systems
[AD-A092907] p0211 N81-17059
SIMULA, INC., TEMPE, ARIZ.
Aircraft crash survival design guide. Volume 1: Design criteria and checklists, revision
[AD-A093784] p0204 N81-16997
SMITHS INDUSTRIES LTD., BASINGSTOKE (ENGLAND).
Microprocessor system test and monitoring
p0497 N81-27108
Fault trees and system reliability analysis with reference to the control of aircraft engines
p0498 N81-27109
SOCIETE MICROTURBO, TOULOUSE (FRANCE).
Development tests of an engine with limited life
p0433 N81-24103
SOCIETE NATIONALE D'ETUDES ET DE CONSTRUCTION DE MOTEURS D'AVIATION, MOISSY-CRAMAYEL (FRANCE).
Studying the exhaust gas from a post combustion turbojet engine
p0089 N81-12996
The specification of development tests for the engine of a combat aircraft
p0430 N81-24082
Design development, and certification of a CFM56 engine: Resistance to the ingestion of foreign bodies
p0431 N81-24087
SOCIETE NATIONALE D'ETUDE ET DE CONSTRUCTION DE MOTEURS D'AVIATION, SURESNES (FRANCE).
Material and structural problems in aircraft engine technology
[AAAF-NT-79-23] p0216 N81-17096
SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, CANNES (FRANCE).
Evolution of materials and associated technologies in the makeup of aerospace materials, part 1
[AAAF-NT-79-22-PT-1] p0209 N81-17050
Evolution of materials and associated technologies in the makeup of aerospace materials. Part 2: Examples
[AAAF-NT-79-22-PT-2] p0209 N81-17051
SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, LES MUREAUX (FRANCE).
Applications of pyrotechniques in aviation
[SNIAS-792-422-103] p0023 N81-10025
SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, MARIGNANE (FRANCE.)
Erosion and impacts on composite helicopter blades
p0040 N81-11138
Design-to-cost applied to the AS350 helicopter
p0046 N81-11916
Impact of modern materials on the development of rotating airfoil equipment
[AAAF-NT-79-43] p0083 N81-12182
New materials and helicopter certification
[AAAF-NT-79-26] p0210 N81-17052
Fatigue analysis of composite materials using the fail-safe concept

p0487 N81-26131

Fatigue tests on the total structure of the Gazelle SA 341 helicopter
p0488 N81-26136

Applications of composite materials for the construction of military helicopters
p0633 N81-33147

The consequences of certain operational requirements on the conceptual design of combat helicopters
p0634 N81-33153

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, PARIS (FRANCE).

Organizing a design-to-cost program
p0046 N81-11914

The effect of the in-service environment on composite materials (resume of the April 1980 Athens conference)
p0199 N81-16146

Quality in design
[SNIAS-802-111-108] p0427 N81-24054

The AIRBUS hydraulic systems
[SNIAS-802-111-111] p0427 N81-24055

Generalities on active control. Potentials and research trends
[SNIAS-802-111-112] p0427 N81-24056

Development of instrumentation for pilots. CRT screens
[SNIAS-802-111-114] p0428 N81-24061

System digitization: Its effect in the cockpit
[SNIAS-802-111-115] p0428 N81-24062

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, SURESNES (FRANCE).

Elastomers used in aeronautics industry
[SNIAS-801-551-105] p0031 N81-10168

Tests on the fire resistance behavior of materials inside civil aircraft
[SNIAS-801-551-101] p0074 N81-12052

The resistance of tank protective measures to microorganisms
[SNIAS-801-551-107] p0144 N81-15072

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, TOULOUSE (FRANCE).

Synthesis of test results obtained with Concorde at high incidences
[AAAF-NT-80-26] p0077 N81-12079

The future cockpit of the next generation of civil aircraft
[SNIAS-802-111-113] p0427 N81-24057

performance control and qualification tests of civil aviation turbine engines in tests conducted by airframe manufacturers
p0430 N81-24078

Total energy and flight control
[SNIAS-802-111-102] p0434 N81-24110

Theoretical and experimental studies of crack propagation
[SNIAS-802-111-107] p0437 N81-24482

SOLAR TURBINES INTERNATIONAL, SAN DIEGO, CALIF.

Development of a low NO/x/ lean premixed annular combustor
[ASME PAPER 81-GT-40] p0312 A81-29954

Internal coating of air-cooled gas turbine blades
[NASA-CR-165337] p0429 N81-24068

SONOBOND CORP., WESTCHESTER, PA.

Ultrasonic cold forming of aircraft sheet materials
[AD-A096351] p0344 N81-21239

SOUTHAMPTON UNIV. (ENGLAND).

The principles and applications of cryogenic wind tunnels
p0037 N81-11049

Static charge in aircraft fuel tanks
[AD-A093552] p0208 N81-17045

Model and boundary aerodynamic data from high blockage two-dimensional airfoil tests in a shallow unstreamlined transonic flexible walled test section
[NASA-CR-165685] p0343 N81-21087

An active noise reduction system for aircrew helmets
p0604 N81-31470

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, LOS ANGELES

Southern California aviation system study
[PB80-215544] p0125 N81-13916

SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.

Analytical procedures for characterizing unregulated emissions from vehicles using middle-distillate fuels
[PB81-136186] p0344 N81-21165

Engine isolation for structural-borne interior noise reduction in a general aviation aircraft
[NASA-CR-3427] p0446 N81-25766

Behavior of fuels at low temperatures
[AD-A100332] p0542 N81-28276

Fuel microemulsions for jet engine smoke reduction
[AD-A100489] p0542 N81-28277

SPECTRON DEVELOPMENT LABS., INC., COSTA MESA, CALIF.

Fuel injector characterization studies
[NASA-CR-165200] p0143 N81-15003

A study in flow control and screening methods for aircraft laser turrets
[AD-A101723] p0548 N81-29126

SPERRY FLIGHT SYSTEMS, PHOENIX, ARIZ.

V/STOL AND digital avionics system for UH-1H
[NASA-CR-152179] p0273 N81-19112

V/STOLAND digital avionics system for XV-15 tilt rotor
[NASA-CR-152320] p0375 N81-22047

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.

Airport and airspace delay model description
[AD-A090781] p0074 N81-12049

Analysis of middle distillate fuels by field ionization mass spectrometry
[AD-A099407] p0491 N81-26209

Engineering effects of advanced composite materials on avionics
[AD-A104015] p0640 N81-33240

STANFORD UNIV., CALIF.

Disturbance estimation for a STOL transport during landing
[AIAA PAPER 81-0018] p0158 A81-20542

A numerical simulation of hypersonic viscous flow over arbitrary geometries at angle of attack
[AIAA PAPER 81-0050] p0158 A81-20566

Prediction and experimental verification of transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568

Partially confined multiple jet mixing
p0234 A81-25513

The controlled growth method - A tool for structural optimization
[AIAA 81-0549] p0301 A81-29400

Dynamic analysis of a free-tip rotor
[AIAA 81-0618] p0305 A81-29479

A hybrid state vector approach to aeroelastic analysis with application to composite lifting surfaces
[AIAA 81-0626] p0308 A81-29512

Dynamic stability of a rotor blade using finite element analysis
[AIAA 81-0615] p0309 A81-29513

Adaptive-wall wind-tunnel development for transonic testing
p0352 A81-31367

On making things the best - Aeronautical uses of optimization /Wright Bros. lecture/
[AIAA PAPER 81-1738] p0528 A81-43175

Design for active and passive flutter suppression and gust alleviation
p0253 N81-18063

Application of holography to the study of helicopter rotor flow fields
[NASA-CR-164293] p0392 N81-23433

Aerodynamics, aeroelasticity, and stability of hang gliders. Experimental results
[NASA-TM-81269] p0423 N81-24025

Strake/delta wing interactions at high angles of attack
[NASA-CR-166183] p0483 N81-26072

A model-following technique for insensitive aircraft control systems
p0600 N81-31223

STATE UNIV. OF NEW YORK AT BUFFALO, AMHERST.

Cooperative investigation of the noise producing region of an axisymmetric jet
[AD-A089692] p0045 N81-11774

STEVENS INST. OF TECH., HOBOKEN, N. J.

The influence of gyroscopic forces on the dynamic behavior of rotating blades
p0295 A81-29090

Overview: NASA/AF/Navy Symposium on Aeroelasticity of Turbine Engines
[NASA-CR-164419] p0444 N81-25089

STRATEGIC AIR COMMAND, OFFUTT AFB, NEBR.

Optimal nuclear radiation criteria for

aeronautical systems
[AD-A101651] p0540 N81-29125

STUTTGART UNIV. (WEST GERMANY).
Rotor model for verification of computation methods
[ISD-262] p0145 N81-15467

SUNDSTRAND CORP., ROCKFORD, ILL.
An experimental evaluation of the performance deficit of an aircraft engine starter turbine
[SAE PAPER 801137] p0397 A81-34168

SYRACUSE RESEARCH CORP., N. Y.
Electromagnetic coupling to advanced composite aircraft with application to trade-off and specification determination
p0200 N81-16166
Advanced composite aircraft electromagnetic design and synthesis
[AD-A096291] p0341 N81-21069

SYRACUSE UNIV., N. Y.
Aeroacoustics of a porous plug jet noise suppressor
[NASA-CR-164549] p0500 N81-27884

SYSTEM DEVELOPMENT CORP., SANTA MONICA, CALIF.
Testing of composite structures
[AAAF-NT-79-41] p0083 N81-12181

SYSTEMS AND APPLIED SCIENCES CORP., HAMPTON, VA.
Aircraft NO/X/ emissions and stratospheric ozone reductions - Another look
[AIAA PAPER 81-0306] p0164 A81-20741
An experimental investigation of a large delta P settling chamber for a supersonic pilot quiet tunnel
[NASA-CR-3436] p0434 N81-24112

SYSTEMS AND APPLIED SCIENCES CORP., RIVERDALE, MD.
A survey of computer simulations of digital avionics systems
[AD-A091943] p0195 N81-16649

SYSTEMS CONTROL, INC., PALO ALTO, CALIF.
Prediction and experimental verification of transient airfoil motion in a small wind tunnel
[AIAA PAPER 81-0052] p0159 A81-20568
Turbine engine fault detection and isolation program, phase 1. Volume 2: Requirements definition for an integrated engine monitoring system
[AD-A093226] p0215 N81-17088
Turbine engine fault detection and isolation program, phase 1. Volume 1: Requirements definition for an integrated engine monitoring system
[AD-A093225] p0215 N81-17089
Multivariable control synthesis program: Control aspects of the F100 altitude demonstration of the multivariable control system
[AD-A093868] p0216 N81-17095
Development of advanced techniques for rotorcraft state estimation and parameter identification
[NASA-CR-159297] p0271 N81-19098
Simulation and control engineering studies of NASA-Ames 40 foot by 80 foot/80 foot by 120 foot wind tunnels
[NASA-CR-152145] p0276 N81-19136
DEKFIS user's guide: Discrete Extended Kalman Filter/Smoother program for aircraft and rotorcraft data consistency
[NASA-CR-159081] p0379 N81-22722
SCI Identification (SCIDNT) program user's guide
[NASA-CR-159082] p0379 N81-22723
MLSCIDNT user's guide maximum likehood parameter identification computer program with nonlinear rotorcraft model
[NASA-CR-159083] p0380 N81-22724
SCI model structure determination program (OSR) user's guide
[NASA-CR-159084] p0380 N81-22725
INDES User's guide multistep input design with nonlinear rotorcraft modeling
[NASA-CR-159085] p0380 N81-22726

SYSTEMS CONTROL, INC., WEST PALM BEACH, FLA.
Candidate CDTI procedures study
[NASA-CR-165673] p0373 N81-22032
National icing facilities requirements investigation
[AD-A102520] p0602 N81-31238

SYSTEMS RESEARCH LABS., INC., DAYTON, OHIO.
Aircraft engine nacelle fire test simulator. Volume 1: Technical
[AD-A089629] p0030 N81-10081
A multivariate approach to handling qualities rating scale development
[AD-A089825] p0037 N81-11047
The stress behavior of three advanced nickel base superalloys during high temperature low cycle fatigue
[AD-A091694] p0131 N81-14061

SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Simulation of Heavy Lift Airship dynamics over large ranges of incidence and speed
[AIAA 81-1335] p0457 A81-38540
Generic multi-body formulation of heavy lift airship equations of motion
p0563 A81-45539
Practical optimal flight control system design for helicopter aircraft. Volume 2: Software user's guide
[NASA-CR-152306] p0081 N81-12110
Analyses of shuttle orbiter approach and landing conditions
[NASA-CR-163108] p0498 N81-27113
Development of handling quality criteria for aircraft with independent control of six degrees of freedom
[AD-A100045] p0498 N81-27117
Investigation of high-angle-of-attack maneuver-limiting factors. Part 1: Analysis and simulation
[AD-A101646] p0581 N81-30113
Investigation of high-angle-of-attack maneuver-limiting factors. Part 2: Piloted simulation assessment of Bihrle departure criteria
[AD-A101647] p0581 N81-30114
Investigation of high-angle-of-attack maneuver-limiting factors. Part 3: Appendices, aerodynamic models
[AD-A101648] p0581 N81-30115

T

TECHNION - ISRAEL INST. OF TECH., HAIFA.
Active controls for flutter suppression and gust alleviation in supersonic aircraft
[NASA-CR-163930] p0216 N81-17097

TECHNISCHE HOCHSCHULE, AACHEN (WEST GERMANY).
On the flight mechanics of remotely piloted vehicles
[BMVG-FBWT-79-28] p0209 N81-17049
Identification of jet engine damages by engine trend analysis LEADS 200 data
p0328 N81-20014
Some effects of compressor fouling on the behavior of a turbojet engine
p0328 N81-20015

TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).
Fundamentals of conceptual design optimisation of subsonic transport aircraft
[VTH-LR-292] p0128 N81-13951
Trouble shooting in aeronautics and the usefulness of microscopes
[VTH-LR-305] p0537 N81-26069
Aerodynamic and aeroelastic research on tipvane turbines
[VTH-LR-302] p0540 N81-28100
Fatigue properties of adhesive-bonded laminated sheet material of aluminum alloys
[VTH-LR-276] p0542 N81-28409
Fatigue crack growth in 7475-T7651 material under flight simulation loading. Information from a Douglas report
[VTH-B-392] p0542 N81-28493

TECHNISCHE UNIVERSITAET, BRUNSWICK (WEST GERMANY).
Takeoff and missed approach under the influence of wind shear
[TUBS/SFB-58-80-05-01] p0628 N81-32131

TECHNISCHE UNIVERSITAET, MUNICH (WEST GERMANY).
Flight data recording and data processing for light airplanes and gliders
p0326 N81-20008

TECHNOLOGY, INC., DAYTON, OHIO.
Structural Integrity Recording System (SIR) for U.S. Army AH-1G Helicopters
[AD-A097283] p0393 N81-23430
Structural Integrity recording System (SIRS) for U.S. Army AH-1S helicopters
[AD-A098236] p0427 N81-24060

TEL-AVIV UNIV. (ISRAEL).
Radiation boundary conditions for wave-like equations
p0153 A81-20223
TELEDYNE CAE, TOLEDO, OHIO.
Effect of time-dependent flight loads on turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093
Multi-plane high speed balancing techniques and the use of a high specific stiffness Ti-Borsic material for vibration control
[AD-A093122] p0215 N81-17092
TELEDYNE CONTINENTAL MOTORS, MOBILE, ALA.
Advanced Technology Spark-Ignition Aircraft Piston Engine Design Study
[NASA-CR-165162] p0130 N81-13963
TENNESSEE UNIV., KNOXVILLE.
A general mapping procedure for variable area duct acoustics
[AIAA PAPER 81-0094] p0160 A81-20597
Fluid-dynamic and aeroacoustic investigations of shrouded jets
p0256 N81-18318
TENNESSEE UNIV., TULLAHOMA.
Fog dispersion
[SAE PAPER 801133] p0397 A81-34164
TENNESSEE UNIV. SPACE INST., TULLAHOMA.
Proceedings: Fourth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2139] p0135 N81-14555
Airplane wing vibrations due to atmospheric turbulence
[NASA-CR-3431] p0438 N81-24679
Unsteady swirling flows in gas turbines
[AD-A102852] p0629 N81-32150
A flight test evaluation of the Ball-Bartoe jetwing propulsive lift concept
[AD-A103579] p0637 N81-33195
TERRESTRIAL ENVIRONMENTAL SPECIALIST, INC., PHOENIX, N.Y.
Handbook on bird management and control
[AD-A089009] p0023 N81-10024
TEXAS A&M UNIV., COLLEGE STATION.
Electromagnetic precipitation and ducting of particles in turbulent boundary layers
p0239 A81-26506
Probabilistic analysis of foundation forces for a class of unbalanced rotating machines
p0145 N81-15362
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-164214] p0380 N81-22833
TEXAS TECHNOLOGICAL UNIV., LUBBOCK.
Numerical analysis of the flow in the connecting passage between the fan section and high pressure section of a turbojet engine
[AD-A090506] p0081 N81-12107
TEXAS UNIV. AT ARLINGTON.
A pure direct force/moment control for coaxial counterrotating rotors
p0144 N81-15007
The criticality of engine exhaust simulations on VSTOL model-measured ground effects
p0486 N81-26115
Development of a ground signal processor for digital synthetic array radar data
[NASA-CR-161074] p0602 N81-31421
TEXAS UNIV. AT AUSTIN.
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 1: Aeroelastic effects
[AD-A091674] p0129 N81-13955
The effects of warhead-induced damage on the aeroelastic characteristics of lifting surfaces. Volume 2: Aerodynamic effects
[AD-A093063] p0209 N81-17048
TEXTRON BELL AEROSPACE CO., BUFFALO, N. Y.
Aeroelastic and dynamic finite element analyses of a bladder shrouded disk
[NASA-CR-159728] p0278 N81-19479
Nastran level 16 theoretical manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159823] p0279 N81-19480
NASTRAN level 16 user's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159824] p0279 N81-19481
NASTRAN level 16 programmer's manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159825] p0279 N81-19482
NASTRAN level 16 demonstration manual updates for aeroelastic analysis of bladed discs
[NASA-CR-159826] p0279 N81-19483
TEXTRON BELL HELICOPTER, FORT WORTH, TEX.
The XV-15 tilt rotor research aircraft
p0100 A81-16508
In-flight structural dynamic characteristics of the XV-15 tilt rotor research aircraft
[AIAA 81-0612] p0304 A81-29474
A low-cost forward fairing for the Bell Long Ranger Helicopter
p0531 A81-43644
Fly-by-wire versus dual mechanical controls for the Advanced Scout Helicopter: Quantitative comparison
[AD-A096089] p0343 N81-21085
Flight test evaluation of a nonlinear hub spring on a UH-1H helicopter
[AD-A098794] p0486 N81-26121
Helicopter component fatigue life determination
p0488 N81-26135
Total main rotor isolation system analysis
[NASA-CR-165667] p0494 N81-27076
Helicopter propulsion system reliability and engine monitoring assessments
p0599 N81-31213
An overview of SAE ARP 1587: Aircraft gas turbine engine monitoring system guide
p0600 N81-31217
Mission potential of derivatives of the XV-15 tilt rotor research aircraft
p0634 N81-33150
THOMSON-CSF, PARIS (FRANCE).
Large area gas discharge displays
p0212 N81-17070
THORN-BRIMAR LTD., CHADDERTON (ENGLAND).
Cathode ray tubes and plasma panels as display devices for aircraft displays
p0212 N81-17069
THREE-D FLOWS DJP, INC., MOFFETT FIELD, CALIF.
Flight experiments with a slender cone at angle of attack
[AIAA PAPER 81-0337] p0165 A81-20761
TISDALE (HENRY F., SR.), TREASURE ISLAND, FLA.
Velocity vector control system augmented with direct lift control
[NASA-CASE-LAR-12268-1] p0433 N81-24106
TOLEDO UNIV., OHIO.
Application of unsteady airfoil theory to rotary wings
p0465 A81-39874
Sensor/actuator failure detection and isolation for airbreathing propulsion systems
p0564 A81-45551
Sensor/actuator failure detection for turbofan engines
p0080 N81-12104
TORONTO UNIV., DOWNSVIEW (ONTARIO).
Perspectives on jet noise
[AIAA PAPER 81-0428] p0168 A81-20829
Effect of various environmental conditions on polymer matrix composites
p0039 N81-11130
Heave instabilities of amphibious air cushion suspension systems
[UTIAS-246] p0144 N81-15156
Aircraft annoyance evaluations using field and laboratory simulation techniques
[UTIAS-248] p0146 N81-15580
A study of the performance of an Olson type active noise controller and the possibility of the reduction of cabin noise
[UTIAS-TN-228] p0552 N81-29924
TORONTO UNIV. (ONTARIO).
The turbulent wind and its effect on flight
[UTIAS-REVIEW-44] p0033 N81-11020
TRANSPORTATION RESEARCH BOARD, WASHINGTON, D.C.
Sealing joints and cracks, thin resurfacing, and locating voids under concrete slabs
[PB80-215635] p0132 N81-14102
Aviation forecasting and systems analyses
[PB81-174252] p0493 N81-27068
Computer graphics applications
[PB81-215246] p0637 N81-33188
TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.
Visual confirmation (VICON) of voice take-off clearance of cost-and-deployment analyses and strategies

[AD-A091007] p0091 N81-13036
General Aviation Activity and Avionics Survey
[AD-A097604] p0389 N81-23081
Detection performance evaluation of the ASDF-3
using fixed frequency and frequencyagile
operation
[AD-A099513] p0499 N81-27372
Helicopter noise analysis: Round-robin test
[AD-A103724] p0641 N81-33940
TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH,
CALIF.
Airborne Systems Software Acquisition
Engineering Guidebook for software cost
analysis and estimating
[AD-A100215] p0543 N81-28785
Airborne Systems Software Acquisition
Engineering Guidebook for contracting for
software acquisition
[AD-A100217] p0543 N81-28786
Airborne Systems software Acquisition
Engineering Guidebook for application and use
of the guidebooks (series overview)
[AD-A100216] p0543 N81-28787
Airborne Systems Software Acquisition
Engineering Guidebook for supportable airborne
software
[AD-A100213] p0543 N81-28788
Airborne Systems Software Acquisition
Engineering Guidebook for software development
and support facilities
[AD-A100214] p0543 N81-28789
TRW, INC., CLEVELAND, OHIO.
Fabrication process development of
boron/aluminum fan blades for high bypass
engines
[NASA-CR-165252] p0442 N81-25076
Automated Plasma Spray (APS) process feasibility
study
[NASA-CR-165418] p0597 N81-31193
TRW SYSTEMS AND ENERGY, REDONDO BEACH, CALIF.
Holographic investigation of slender body vortex
wakes
[AD-A089496] p0021 N81-10008
TUEBINGEN UNIV. (WEST GERMANY).
Horizontal components of the atmospheric
electric field. Studies of the atmospheric
electric field in view of electrostatically
controlled automatic pilot applications
[BMVG-FBWT-80-7] p0345 N81-21677
TUFTS UNIV., MEDFORD, MASS.
Evaluation of the potential format and content
of a cockpit display of traffic information
p0053 A81-13419

U

UNION OIL CO. OF CALIFORNIA, LOS ANGELES.
Fuel/engine/airframe trade off study
[AD-A097391] p0380 N81-23073
UNITED AIR LINES, INC., SAN FRANCISCO, CALIF.
Reliability-centered maintenance
p0047 N81-11917
UNITED AIRCRAFT CORP., STRATFORD, CONN.
Compensating linkage for main rotor control
[NASA-CASE-LAR-11797-1] p0270 N81-19087
UNITED STERLING, INC. ALEXANDRIA, VA.
First phase testing of solar thermal engine at
United Stirling
p0588 N81-30530
UNITED TECHNOLOGIES CORP., EAST HARTFORD, CONN.
Effect of time-dependent flight loads on
turbofan engine performance deterioration
[ASME PAPER 81-GT-203] p0318 A81-30093
Experimental study of the stability of aircraft
fuels at elevated temperatures
[NASA-CR-165165] p0084 N81-12255
Performance deterioration based on simulated
aerodynamic loads test, JT9D jet engine
diagnostics program
[NASA-CR-165297] p0390 N81-23086
UNITED TECHNOLOGIES CORP., SOUTH WINDSOR, CONN.
Compressor configuration and design optimization
for the high reliability gas turbine
[DOE/ET-15425/T1] p0134 N81-14327
UNITED TECHNOLOGIES CORP., STRATFORD, CONN.
Design, fabrication and test of a complex
helicopter airframe section
[SAE PAPER 801213] p0408 A81-34221
CH-53E emergency flotation system design study
[AD-A101640] p0548 N81-29124
UNITED TECHNOLOGIES CORP., WEST PALM BEACH, FLA.
Flight test of a full authority Digital
Electronic Engine Control system in an F-15
aircraft
[AIAA PAPER 81-1501] p0507 A81-40912
UNITED TECHNOLOGIES CORP., WINDSOR LOCKS, CONN.
Requirements, technology and configuration
evaluation for Crash Survivable Flight Data
Recording (CSFDR) system
[AD-A098584] p0442 N81-25072
UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD,
CONN.
A model for the analysis of
premixing-prevaporizing fuel-air mixing passages
[AIAA PAPER 81-0345] p0165 A81-20767
An active control system for helicopter
vibration reduction by higher harmonic pitch
[AHS 80-71] p0479 A81-40109
Autoignition characteristics of aircraft-type
fuels
p0562 A81-44666
Analysis of laminar and turbulent symmetric
blunt trailing-edge flows
[AD-A098703] p0439 N81-25046
Turbojet engine blade damping
[NASA-CR-165406] p0549 N81-29130
UNIVERSITE DES SCIENCES ET TECHNIQUES DE LILLE
(FRANCE).
Influence of light aircraft architecture on its
spin characteristics
[AAAF-NT-80-11] p0081 N81-12111
Some new research approaches to aircraft spin
studies
[AAAF-NT-80-12] p0082 N81-12112
UNIVERSITY OF SOUTH FLORIDA, TAMPA.
Investigation of low level aircraft nonavionic
nonlinear interference
[AD-A098794] p0491 N81-26349
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Transonic swept wings studied by the
lifting-line theory
p0509 A81-41090
UTAH UNIV., SALT LAKE CITY.
Noise suppression methods for robust speech
processing
[AD-A100629] p0551 N81-29323

V

VEREINIGTE FLUGTECHNISCHE WERKE-FOKKER G.M.B.H.,
BREMEN (WEST GERMANY).
Civil component program Wing Section. New
calculation methods for subsonic and transonic
interference with planar and spatial flows
[BMFT-FB-W-80-022] p0424 N81-24034
Civil component program Wing Section. Transonic
wing development
[BMFT-FB-W-80-021] p0426 N81-24052
Civil component program Wing Section. The
design of the transonic airfoil Va 2
[BMFT-FB-W-80-023] p0426 N81-24053
From the civil component program 'IFAS':
Fundamentals of engine simulation, using
turbopowered simulator (TPS) technology in
wind tunnel tests
[BMFT-FB-W-80-030] p0541 N81-28111
VEREINIGTE FLUGTECHNISCHE WERKE G.M.B.H., BREMEN
(WEST GERMANY).
Estimation of relative total cost for aircraft
systems
p0047 N81-11922
Transonic wing technology for transport aircraft
p0188 N81-16002
Philosophy and results of steady and unsteady
test techniques on a large scale transport
aircraft model in the ONERA transonic tunnel
S1 MA. Part 1: Philosophy and results of
steady tests. Part 2: Interest of large
models in unsteady aerodynamics
p0190 N81-16019
Onboard and ground test of an autonomous
navigation system based on terrain correlation
p0544 N81-29069
VIGYAN RESEARCH ASSOCIATES, INC., HAMPTON, VA.
Leading-edge 'Vortex Flaps' for enhanced
subsonic aerodynamics of slender wings
p0012 A81-11640

Hinged strakes for enhanced maneuverability at
high angles of attack
[AIAA PAPER 81-0357] p0165 A81-20776
Computation of wind tunnel model deflections
[AIAA 81-0482] p0300 A81-29381
Subsonic pitch-up alleviation on a 74 deg delta
wing
[NASA-CR-165749] p0584 N81-30137
**VIRGINIA POLYTECHNIC INST. AND STATE UNIV.,
BLACKSBURG.**
Curved-flow, rolling-flow, and oscillatory
pure-yawing wind-tunnel test methods for
determination of dynamic stability derivatives
p0241 A81-26933
Flow separation in inlets at incidence angles
p0297 A81-29114
Effectiveness of leading-edge vortex flaps on 60
and 75 degree delta wings
p0352 A81-31368
Engine identification for adaptive control
p0080 N81-12100
An investigation of the dynamic stalling
characteristics of rotating axial-flow
compressor blades
p0093 N81-13054
The 1H and 13C fourier transform NMR
characterization of jet fuels derived from
alternate energy sources
[AD-A098305] p0437 N81-24284
Continued research on selected parameters to
minimize community annoyance from airplane noise
[NASA-CR-164299] p0438 N81-24602
A study of the effects of store aerodynamic on
wing/store flutter
p0490 N81-26153
Dynamic simulation of airborne high power systems
[AD-A101316] p0552 N81-29362
VIRGINIA UNIV., CHARLOTTESVILLE.
Nonlinear analysis of squeeze film dampers
applied to gas turbine helicopter engines
[AD-A091905] p0196 N81-16062
Minimum noise impact aircraft trajectories
[NASA-CR-164719] p0594 N81-31159
**VON KARMAN INST. FOR FLUID DYNAMICS,
RHODE-SAINT-GENESE (BELGIUM).**
Analytical characteristics methods: Applications
[VKI-PREPRINT-1980-10] p0021 N81-10011
Inlet flow in centrifugal pumps at partial
deliveries
[VKI-PREPRINT-1979-16] p0031 N81-10437
Reverse flow, pre-rotation and unsteady inlet
flow in centrifugal pumps
[VKI-PREPRINT-1979-15] p0085 N81-12433
Computational Fluid Dynamics, volume 2
[VKI-LS-1980-5-VOL-2] p0144 N81-15310
Physical and numerical aspects of shock boundary
layer interactions
p0256 N81-18324
VOUGHT CORP., DALLAS, TEX.
Additional testing of the inlets designed for a
tandem fan V/STOL nacelle
[NASA-CR-165310] p0483 N81-26075
Power system control study. Phase 1:
Integrated control techniques. Phase 2:
Detail design and system modeling
[AD-A099894] p0497 N81-27100
A mathematical model for Vertical Attitude
Takeoff and Landing (VATOL) aircraft
simulation. Volume 1: Model description
application
[NASA-CR-166129-VOL-1] p0538 N81-28084
A mathematical model for Vertical Attitude
Takeoff and Landing (VATOL) aircraft
simulation. Volume 2: Model equations and
base aircraft data
[NASA-CR-166129-VOL-2] p0538 N81-28085
A mathematical model for Vertical Attitude
Takeoff and Landing (VATOL) aircraft
simulation. Volume 3: User's manual for
VATOL simulation program
[NASA-CR-166129-VOL-3] p0538 N81-28086
**VOUGHT CORP. ADVANCED TECHNOLOGY CENTER, INC.,
DALLAS, TEX.**
Low drag airfoil design utilizing passive
laminar flow and coupled diffusion control
techniques
[AD-A090778] p0072 N81-12024
Turbulence modeling for application to V/STOL
propulsion induced effects: Two dimensional
formulation
[AD-A090331] p0072 N81-12026
VULCAN INDUSTRIAL PACKAGING LTD., REXDALE (ONTARIO).
Evaluation of explosafe. Explosion suppression
system for aircraft fuel tank protection
[AD-A093125] p0209 N81-17047

W

WASHINGTON UNIV., SEATTLE.
Disturbance estimation for a STOL transport
during landing
[AIAA PAPER 81-0018] p0158 A81-20542
Recent improvements on generating voltmeters
[DOE/ER-0136./463] p0257 N81-18359
WASHINGTON UNIV., ST. LOUIS, MO.
Adaptive finite element technology in integrated
design and analysis
[NASA-CR-164560] p0543 N81-28810
WEAPONS SYSTEMS RESEARCH LAB., ADELAIDE (AUSTRALIA).
Low-speed wind-tunnel tests of two
weathercocking sensors
[WSRL-0171-TN] p0136 N81-14575
WEATHER WING (5TH), LANGLEY AFB, VA.
Terminal Forecast Reference Notebook (TFRN) for
George AFB, California
[AD-A098438] p0446 N81-25637
Terminal Forecast Reference Notebook (TFRN) for
Luke AFB, Arizona
[AD-A098443] p0446 N81-25638
WESTINGHOUSE ELECTRIC CORP., CONCORDVILLE, PA.
Compressor configuration and design optimization
for the high reliability gas turbine
[DOE/ET-15332/T1] p0145 N81-15414
WESTINGHOUSE ELECTRIC CORP., MADISON, PA.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Low NO/x/ and fuel flexible gas turbine combustors
[ASME PAPER 81-GT-99] p0315 A81-30006
WESTLAND HELICOPTERS LTD., YEOVIL (ENGLAND).
Fatigue and damage propagation in composite
rotor blades
p0041 N81-11145
Aircraft manufacturers approach to the
E.M.C./Avionics problems associated with the
use of composite materials
p0200 N81-16156
Fatigue testing of helicopter gearboxes
p0488 N81-26138
Development for helicopter flight in icing
conditions
p0545 N81-29082
WICHITA STATE UNIV., KANS.
Summary of high-lift and control surface
research on NASA general aviation airfoils
[SAE PAPER 810629] p0524 A81-42761
An analytic model of subsonic flow around an
airflow with a spoiler
p0138 N81-14966
Pressure distributions for the GA(W)-2 airfoil
with 20% aileron, 25% slotted flap and 30%
Fowler flap
[NASA-CR-2948] p0262 N81-19023
WILLIAMS RESEARCH CORP., WALLED LAKE, MICH.
WR34-8 performance improvement program. The
WR34-8 gas turbine compressor test
[AD-A098293] p0429 N81-24069
Cruise missile engine program contract data
requirements list sequence number 95.
Qualification test report. Volume 39:
Vibration and mission simulation testing on
engine 828. XF-107-WR-400 cruise missile engine
[AD-A102257] p0600 N81-31220
WYLE LABS., INC., EL SEGUNDO, CALIF.
Noise exposure of civil aircarrier airplanes
through the year 2000. Volume 1: Methods,
procedures, results
[EPA-550/9-79-313-1] p0087 N81-12644
Noise exposure of civil aircarrier airplanes
through the year 2000. Volume 2: Appendices
A through F
[EPA-550/9-70-313-2] p0087 N81-12645
Correction procedures for aircraft noise data.
Volume 3: Filter effects
[AD-A091016] p0096 N81-13719
Correction procedures for aircraft noise data.
Volume 5: Propeller aircraft noise
[AD-A091017] p0096 N81-13720

Static tests of excess ground attenuation at
Wallops Flight Center
[NASA-CR-3435] p0491 N81-26846

Y

YOUNGSTOWN STATE UNIV., OHIO.
Control augmentation for lateral control wheel
steering
[NASA-CR-164664] p0549 N81-29132

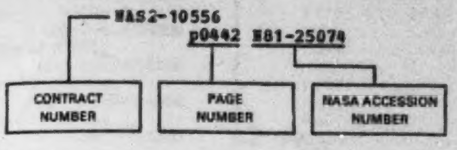
CONTRACT NUMBER INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography*

1981 Cumulative Index

JANUARY 1982

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. Preceding the accession number is the page number where the citation may be found.

AF PROJ. 649E
p0024 N81-10034
AF PROJ. 666A
p0276 N81-19133
AF PROJ. 1123
p0254 N81-18066
p0343 N81-21089
AF PROJ. 1209
p0219 N81-17333
AF PROJ. 1367
p0492 N81-26847
p0492 N81-26849
AF PROJ. 1471
p0492 N81-26849
AF PROJ. 1710
p0590 N81-31104
AF PROJ. 1900
p0032 N81-10580
p0032 N81-10581
p0087 N81-12651
p0088 N81-12653
p0540 N81-28099
AF PROJ. 1926
p0638 N81-33196
AF PROJ. 1958
p0277 N81-19141
AF PROJ. 1962
p0638 N81-33197
AF PROJ. 2003
p0028 N81-10063
p0195 N81-16049
AF PROJ. 2049
p0258 N81-18733
AF PROJ. 2051
p0211 N81-17062
p0389 N81-23083
p0390 N81-23084
AF PROJ. 2103
p0087 N81-12652
AF PROJ. 2104
p0194 N81-16043
AF PROJ. 2202
p0204 N81-16995
p0638 N81-33196
p0638 N81-33197
AF PROJ. 2238
p0543 N81-28785
p0543 N81-28786
p0543 N81-28787
p0543 N81-28788
p0543 N81-28789
AF PROJ. 2257
p0583 N81-30128
p0629 N81-32144
AF PROJ. 2301
p0129 N81-13955
p0208 N81-17045
p0209 N81-17048
AF PROJ. 2303
p0586 N81-30282
AF PROJ. 2304
p0384 N81-23025
AF PROJ. 2305
p0375 N81-22049
p0551 N81-29317
AF PROJ. 2307
p0021 N81-10008
p0081 N81-12107
p0081 N81-12108
p0085 N81-12451
p0191 N81-16026
p0197 N81-16065
p0198 N81-16071
p0203 N81-16984
p0215 N81-17090
p0217 N81-17104
p0219 N81-17387
p0257 N81-18374
p0335 N81-20079
p0423 N81-24028
p0540 N81-28104
p0593 N81-31153
p0600 N81-31219
p0629 N81-32150
p0630 N81-32273
AF PROJ. 2308
p0030 N81-10128
p0083 N81-12192
p0222 N81-17936
p0602 N81-31320
AF PROJ. 2313
p0037 N81-11046
p0037 N81-11047
p0211 N81-17061
p0539 N81-28088
p0541 N81-28108
p0541 N81-28109
AF PROJ. 2338
p0491 N81-26349
AF PROJ. 2348
p0444 N81-25085
AF PROJ. 2401
p0045 N81-11778
p0377 N81-22106
p0492 N81-26849
AF PROJ. 2402
p0091 N81-13039
p0127 N81-13940
p0200 N81-16213
p0204 N81-16996
p0211 N81-17060
p0330 N81-20034
p0373 N81-22033
p0374 N81-22042
p0374 N81-22044
p0424 N81-24036
p0442 N81-25070
AF PROJ. 2403
p0094 N81-13067
p0258 N81-18733
p0494 N81-27080
p0495 N81-27081
p0495 N81-27082
p0495 N81-27083
p0498 N81-27117
p0540 N81-28105
p0581 N81-30113
p0581 N81-30114
p0581 N81-30115
p0584 N81-30138
AF PROJ. 2404
p0483 N81-26082
p0492 N81-27051
p0585 N81-30159
p0637 N81-33192
AF PROJ. 2414
p0217 N81-17103
AF PROJ. 2420
p0218 N81-17235
AF PROJ. 2787
p0580 N81-30102
AF PROJ. 3048
p0029 N81-10073
p0030 N81-10081
p0134 N81-14325
p0208 N81-17045
p0208 N81-17046
p0209 N81-17047
p0211 N81-17059
p0254 N81-18139
p0257 N81-18394
p0278 N81-19323
p0388 N81-23073
p0630 N81-32290
AF PROJ. 3066
p0133 N81-14276
p0215 N81-17088
p0215 N81-17092
p0215 N81-17093
p0216 N81-17095
p0444 N81-25086
p0444 N81-25087
p0583 N81-30131
p0583 N81-30132
AF PROJ. 3145
p0214 N81-17087
p0497 N81-27100
p0552 N81-29362
AF PROJ. 3146
p0552 N81-29536
AF PROJ. 3930
p0539 N81-28089
AF PROJ. 4519
p0201 N81-16357
AF PROJ. 4600
p0640 N81-33393
AF PROJ. 6114
p0601 N81-31234
p0602 N81-31235
AF PROJ. 6302
p0041 N81-11233
AF PROJ. 6665
p0372 N81-22023
AF PROJ. 7184
p0210 N81-17058
p0259 N81-18853
p0341 N81-21070
p0426 N81-24049
AF PROJ. 7231
p0221 N81-17849
p0249 N81-18034
p0500 N81-27889
AF PROJ. 7351
p0029 N81-10074
p0036 N81-11041
p0131 N81-14061
p0257 N81-18419
p0258 N81-18420
p0335 N81-20080
AF PROJ. 7930
p0130 N81-13966
AF PROJ. 9993
p0373 N81-22035
AF PROJECT 2418
p0613 A81-47999
AF PROJECT 7351
p0311 A81-29939
AF TASK 735106
p0311 A81-29939
AF-AFOSR-75-2808B
p0623 A81-49730
AF-AFOSR-76-2881
p0153 A81-20223
AF-AFOSR-76-2952
p0289 A81-28989
AF-AFOSR-77-3158
p0553 A81-44080
AF-AFOSR-77-3263
p0308 A81-29512
AF-AFOSR-77-3299
p0226 A81-23949
AF-AFOSR-77-3308
p0017 A81-11820
AF-AFOSR-78-3525
p0163 A81-20704
AF-AFOSR-79-0061
p0528 A81-43175
AF-AFOSR-80-0013
p0527 A81-43163
AF-AFOSR-80-0174
p0165 A81-20751
AF-AFOSR-0006-79
p0030 N81-10128
AF-AFOSR-0042-79
p0037 N81-11046
AF-AFOSR-0087-79
p0198 N81-16071
AF-AFOSR-0102-80
p0384 N81-23025
AF-AFOSR-0147-80
p0191 N81-16026
AF-AFOSR-0230-80
p0203 N81-16984
AF-AFOSR-3233-77
p0139 N81-14969
p0330 N81-20038
AF-AFOSR-3260-78
p0213 N81-17076
AF-AFOSR-3337-77
p0217 N81-17104
AF-AFOSR-3373-77
p0208 N81-17045
AF-AFOSR-3523-78
p0540 N81-28104
AF-AFOSR-3561-78
p0081 N81-12107
AF-AFOSR-3569-78
p0129 N81-13955
p0209 N81-17048
AFOSR ISSA 80-0004
p0222 N81-17936
AFOSR ISSA 80-00027
p0630 N81-32273
AFOSR MIPR FY 1455-77
p0254 N81-18139
AFPEA PROJ. 80-F7-21
p0194 N81-16048
AGARD-OTAN-DPP-80-11007
p0256 N81-18331
ARGC-F77/15026
p0066 A81-15895
ARPA ORDER 3301
p0551 N81-29323
ARPA ORDER 3608
p0339 N81-21051
AT(49-25)-1004
p0163 A81-20691
AT/2057/072/XR/AERO
p0435 N81-24119
BMFT-ET-4086-A
p0145 N81-15467
BMFT-LFK-7539
p0450 A81-37645
BMFT-LFK-7831
p0449 A81-37635
BMVG-T/R-421/70005/72403
p0058 A81-14392
BMVG-T/RF-41/80030/81429
p0016 A81-11777
DA PROJ. 1F2-62209-AH-76
p0393 N81-23438
DA PROJ. 1F2-63211-D-157
p0538 N81-28087
DA PROJ. 1L1-61102-AH-43
p0439 N81-25045
DA PROJ. 1L1-62209-AH-76
p0035 N81-11034
p0076 N81-12075
p0092 N81-13048
p0208 N81-17046

p0272 N81-19106
p0274 N81-19123
p0374 N81-22041
p0438 N81-24862
DA PROJ. 1L1-62209-AH-79
p0204 N81-16997
DA PROJ. 1L1-62705-AH-94
p0440 N81-25058
DA PROJ. 1L2-26220-AH-85
p0251 N81-18042
DA PROJ. 1L2-62209-AH-76
p0252 N81-18049
p0439 N81-25043
p0486 N81-26121
p0546 N81-29109
DA PROJ. 1L2-63206-D-043
p0092 N81-13047
DA PROJ. 1L2-63742-DF-32
p0437 N81-24360
DA PROJ. 1T1-61102-BH-57
p0446 N81-25437
DA PROJ. 1W1-62113-A-661
p0038 N81-11116
p0640 N81-33241
DA PROJ. 1X4-64203-D-281
p0343 N81-21085
p0434 N81-24108
DA PROJ. 2Q1-62722-A-765
p0035 N81-11035
DA PROJ. 3E1-62777-A-878
p0442 N81-25071
DA PROJ. 4A7-62720-A-896
p0588 N81-30659
DA PROJ. 4K0-78012-AAH-1
p0639 N81-33214
DA-ERO-78-G-107
p0446 N81-25437
DAAA09-76-C-2001
p0066 A81-15887
DAAB07-76-C-0843
p0180 A81-22619
DAAB07-78-C-2990
p0440 N81-25058
DAAG29-76-G-0035
p0479 A81-40186
DAAG29-77-C-0009
p0196 N81-16062
DAAG29-77-G-0103
p0305 A81-29478
p0474 A81-40151
p0573 A81-46621
DAAG29-77-0075
p0049 A81-12793
DAAG29-78-C-0002
p0394 N81-23864
DAAG29-78-G-0036
p0166 A81-20783
p0580 N81-30091
DAAG29-78-G-0039
p0453 A81-38021
DAAG29-79-C-0178
p0051 A81-13250
DAAG29-80-C-0092
p0573 A81-46621
DAAG46-78-C-0030
p0134 N81-14324
DAAG46-78-C-0056
p0038 N81-11116
DAAG46-79-C-0001
p0344 N81-21239
DAAG46-79-C-0081
p0640 N81-33241
DAAG53-76-C-0154
p0049 A81-12793
DAAH01-80-C-0258
p0217 N81-17101
DAAH01-80-C-0323
p0051 A81-13250
DAAJ02-72-C-0020
p0538 N81-28087
DAAJ02-75-C-0009
p0538 N81-28087
DAAJ02-75-C-0050
p0393 N81-23438
DAAJ02-76-C-0045
p0076 N81-12075
DAAJ02-77-C-0021
p0204 N81-16997
DAAJ02-77-C-0026
p0252 N81-18049
DAAJ02-77-C-0037
p0106 A81-17516
DAAJ02-77-C-0055
p0439 N81-25043
DAAJ02-77-C-0064
p0486 N81-26121
DAAJ02-77-C-0079
p0427 N81-24060
DAAK10-78-C-0115
p0092 N81-13047
DAAK10-79-C-0267
p0582 N81-30120
DAAK20-79-C-0290
p0437 N81-24360
DAAK40-75-C-0417
p0452 A81-37681
DAAK40-78-C-0226
p0359 A81-32642
DAAK40-79-D-0017
p0091 N81-13040
DAAK51-78-C-0026
p0035 N81-11034
DAAK51-79-C-0007
p0343 N81-21085
DAAK51-79-C-0008
p0434 N81-24108
DAAK51-79-C-0024
p0582 N81-30117
DAAK51-79-C-0042
p0374 N81-22041
DAAK51-79-C-0047
p0092 N81-13048
DAAK51-79-C-0056
p0274 N81-19123
DAAK51-79-C-0058
p0272 N81-19106
DAAK51-80-C-0001
p0574 A81-46628
DAAK51-80-C-0008
p0438 N81-24862
DAAK70-78-C-0198
p0194 N81-16047
DAAK70-79-C-0150
p0358 A81-32499
DAAK70-80-C-0001
p0542 N81-28276
DAAK70-80-C-0129
p0429 N81-24069
DAAK80-79-C-0270
p0573 A81-46615
DAAK80-79-C-0282
p0251 N81-18042
DAAK80-80-C-0806
p0640 N81-33240
DACA89-79-C-0004
p0167 A81-20809
DAHC04-69-C-0016
p0165 A81-20768
DARPA ORDER 2828
p0257 N81-18419
p0258 N81-18420
DE-AC01-79CS-50069
p0074 N81-12051
p0638 N81-33201
DE-AC02-78CS-54867
p0134 N81-14329
DE-AC02-80ER-10570
p0135 N81-14363
DE-AC03-78ET-12293
p0094 N81-13064
DE-AC03-79ET-15332
p0145 N81-15414
DE-AC03-79ET-15425
p0134 N81-14327
DE-AC04-76DP-00487
p0144 N81-15148
DE-AC04-76DP-00789
p0588 N81-30615
p0638 N81-33200
DE-AC05-76ET-15343
p0085 N81-12426
DE-AC05-76OR-05035
p0085 N81-12426
DE-AC05-77CS-05438
p0044 N81-11500
DE-AC05-77CS-55438
p0044 N81-11513
DE-AC06-76RR-01388
p0257 N81-18359
DE-AC08-76DP-00099
p0256 N81-18259
DE-AI01-77CS-51040
p0095 N81-13465
p0132 N81-14082
p0588 N81-30562
DE-AI01-78CS-54209
p0088 N81-12943
DE-AT04-81AL-16228
p0587 N81-30525
DEN3-17
p0274 N81-19118
DEN3-146
p0315 A81-30006
DEN3-167
p0317 A81-30060
DEN3-168
p0317 A81-30060
DEPARTMENT OF ENERGY DEN3-17
p0317 A81-30060
DFG-SFB-38
p0275 N81-19126
DITC-9ST79-00058
p0477 A81-40171
DNA001-79-C-0155
p0196 N81-16063
DNA001-79-C-0205
p0198 N81-16073
DOT-CG-951480-A
p0192 N81-16030
p0192 N81-16032
DOT-FA01-80-C-10080
p0630 N81-32158
DOT-FA01-80-Y-10535
p0441 N81-25062
DOT-FA01-81-C-0001
p0368 A81-33891
DOT-FA01-81-C-10001
p0440 N81-25056
DOT-FA03-80-C-00098
p0522 A81-42768
DOT-FA03-81-R-50006
p0526 A81-43143
DOT-FA70WAI-175
p0024 N81-10034
p0339 N81-21048
DOT-FA72NA-741
p0174 A81-21967
DOT-FA72WAI-261
p0331 N81-20055
p0387 N81-23063
DOT-FA72WAI-817
p0250 N81-18040
p0270 N81-19084
DOT-FA75WA-3662
p0250 N81-18036
DOT-FA76WAI-612
p0206 N81-17025
p0206 N81-17026
DOT-FA77WA-4033
p0074 N81-12049
DOT-FA77WAI-704
p0584 N81-30141
DOT-FA77WAI-736
p0096 N81-13545
p0201 N81-16628
DOT-FA77WAI-778
p0219 N81-17342
DOT-FA77WAI-808
p0163 A81-20691
DOT-FA77WAI-817
p0547 N81-29112
p0547 N81-29113
DOT-FA78WA-4075
p0340 N81-21052
DOT-FA78WA-4105
p0202 N81-16629
DOT-FA78WA-4121
p0221 N81-17848
DOT-FA78WA-4143
p0096 N81-13719
p0096 N81-13720
DOT-FA78WA-4159
p0023 N81-10023
DOT-FA78WA-4161
p0589 N81-30911
DOT-FA78WA-4242
p0391 N81-23097
DOT-FA78WA-4258
p0252 N81-18053
DOT-FA78WAI-830
p0586 N81-30338
DOT-FA78WAI-834
p0630 N81-32156
DOT-FA78WAI-893
p0164 A81-20740
p0096 N81-13568
p0345 N81-21685
DOT-FA78WAI-895
p0034 N81-11028
DOT-FA78WAI-4190
p0589 N81-30910
DOT-FA79NA-6010
p0600 N81-31218
DOT-FA79NA-6065
p0255 N81-18201
DOT-FA79NA-6083
p0253 N81-18057
DOT-FA79WA-4184
p0114 A81-18089
DOT-FA79WA-4268
p0093 N81-13053
DOT-FA79WA-4279
p0024 N81-10029
p0024 N81-10030
p0025 N81-10036
p0025 N81-10037
p0025 N81-10038
p0025 N81-10041
p0128 N81-13949
p0253 N81-18055
DOT-FA79WA-4302
p0440 N81-25061
DOT-FA79WA-4310
p0503 A81-40867
DOT-FA79WA-4320
p0491 N81-26394
DOT-FA79WA-4334
p0438 N81-24846
DOT-FA79WA-4335
p0640 N81-33392
DOT-FA79WA-4355
p0219 N81-17327
DOT-FA79WAI-019
p0092 N81-13046
p0095 N81-13072
DOT-FA79WAI-131
p0436 N81-24187
DOT-FA80WA-4370
p0512 A81-41764
p0613 A81-48089
p0024 N81-10032
p0250 N81-18038
p0250 N81-18039
p0250 N81-18041
p0425 N81-24044
DOT-FA80WAI-4370
p0581 N81-30107
DOT-FA021R-0119
p0091 N81-13030
DOT-RS57-80-C-00103
p0368 A81-33883
DOT-TSC-1397
p0640 N81-33390
DOT-TSC-1750
p0273 N81-19113
DRET-78-490
p0369 A81-33927
DRET-79-515
p0370 A81-33950
DSA900-77-C-3840
p0197 N81-16070
DSS-2SU-76-00253
p0057 A81-14270
DT-FA01-81-C-10001
p0639 N81-33216
p0639 N81-33217
DTFA-01-80-Y-10510
p0339 N81-21049
DTFA-03-80-C-00070
p0551 N81-29247
DTFA01-80-C-10080
p0602 N81-31238
DTFA03-80-C-00082
p0596 N81-31187
DTOS59-80-C-00028
p0270 N81-19083
E(49-18)-2465
p0312 A81-29965
EC-77-A-31-1011
p0132 N81-14082
EC-77-A-31-1040
p0274 N81-19118

EF-76-S-01-2479
p0004 A81-10840
EF-77-A-01-2593
p0391 N81-23243
EG-77-C-01-4042
p0043 N81-11492
EPA-68-01-3514
p0087 N81-12644
EPA-68-02-2497
p0344 N81-21165
EPA-68-02-3122
p0588 N81-30700
ET-78-C-01-3391
p0527 A81-43163
EX-76-C-01-1806
p0134 N81-14332
EX-76-I-01-1028
p0043 N81-11448
FAA PROJ. 022-242-830
p0042 N81-11290
FAA PROJ. 034-241-510
p0636 N81-33181
FAA PROJ. 043-311-520
p0207 N81-17035
FAA PROJ. 045-390-130
p0128 N81-13945
FAA PROJ. 052-241-320
p0595 N81-31181
FAA PROJ. 054-241-04
p0270 N81-19084
FAA PROJ. 122-115-540
p0636 N81-33183
FAA PROJ. 143-102-540
p0440 N81-25059
FAA PROJ. 143-152-400
p0425 N81-24041
p0425 N81-24042
FAA PROJ. 154-451-180
p0393 N81-23768
FAA PROJ. 161-350-320
p0255 N81-18201
FAA PROJ. 181-350-320
p0424 N81-24039
FAA PROJ. 181-520-100
p0344 N81-21215
FAA PROJ. 201-521-100
p0094 N81-13062
p0196 N81-16064
FAA PROJ. 219-151-140
p0034 N81-11024
FAA PROJ. 219-151-200
p0386 N81-23060
FEV-P-AU-1283
p0171 A81-21555
FEV-P-AU-1379
p0171 A81-21555
FHV-P-K-80123-78-017-21-001
p0125 N81-13925
FHV-P-K-82223-76-001-21-001
p0022 N81-10013
F04600-79-C-0001
p0186 N81-15992
F04606-79-G-0082
p0583 N81-30128
p0629 N81-32144
F04701-77-C-0107
p0463 A81-39640
F04701-78-C-0021
p0173 A81-21913
F04701-79-C-0080
p0038 N81-11110
F08603-80-C-0602
p0334 N81-20072
F08635-77-C-0377
p0023 N81-10024
F08635-78-C-0027
p0306 A81-29489
F08635-79-C-0040
p0030 N81-10080
F08635-79-C-0119
p0156 A81-20531
F08635-79-C-0158
p0311 A81-29943
F08635-79-C-0213
p0542 N81-28277
F09603-80-C-0602
p0334 N81-20071
F09603-80-G-0417
p0272 N81-19105
F19628-73-C-0155
p0372 N81-22023
F19628-77-C-0232
p0352 A81-31370
F19628-78-C-0006
p0024 N81-10034
p0025 N81-10039
p0206 N81-17025
p0206 N81-17026
p0219 N81-17342
p0339 N81-21048
F19628-79-C-0001
p0173 A81-21880
F19628-79-C-0161
p0331 N81-20045
F19628-79-C-0173
p0640 N81-33393
F19628-80-C-0002
p0034 N81-11028
p0270 N81-19084
p0331 N81-20055
p0387 N81-23063
p0547 N81-29112
p0547 N81-29113
F29601-78-C-0082
p0219 N81-17333
F29601-80-C-0022
p0548 N81-29126
F30602-78-C-0120
p0491 N81-26349
F30602-78-C-0329
p0347 A81-30776
p0562 A81-44623
F30602-79-C-0068
p0201 N81-16357
F30602-79-C-0152
p0617 A81-48544
F33515-76-C-3072
p0581 N81-30113
F33615-C-74-3010
p0535 A81-43953
p0535 A81-43954
F33615-C-75-3131
p0535 A81-43953
p0535 A81-43954
F33615-C-77-3030
p0535 A81-43953
p0535 A81-43954
F33615-C-5084
p0503 A81-40861
F33615-73-C-2046
p0234 A81-25446
F33615-73-C-5027
p0311 A81-29939
F33615-74-C-2016
p0026 N81-10055
F33615-74-C-2017
p0313 A81-29980
F33615-74-C-5180
p0257 N81-18419
p0258 N81-18420
F33615-75-C-1130
p0083 N81-12191
F33615-75-C-2053
p0216 N81-17095
F33615-75-C-3112
p0172 A81-21741
F33615-75-C-5218
p0211 N81-17062
p0389 N81-23083
p0390 N81-23084
F33615-76-C-2036
p0163 A81-20705
F33615-76-C-2038
p0257 N81-18394
F33615-76-C-2075
p0583 N81-30132
F33615-76-C-2084
p0030 N81-10081
F33615-76-C-2167
p0241 A81-26062
F33615-76-C-3048
p0377 N81-22106
F33615-76-C-3070
p0204 N81-16996
F33615-76-C-3072
p0581 N81-30114
p0581 N81-30115
F33615-76-C-3077
p0494 N81-27080
p0495 N81-27081
p0495 N81-27082
p0495 N81-27083
F33615-76-C-3103
p0204 N81-16995
p0638 N81-33196
p0638 N81-33197
F33615-76-C-3111
p0531 A81-43650
p0030 N81-10152
F33615-76-C-3116
p0172 A81-21738
F33615-76-C-3135
p0374 N81-22044
p0375 N81-22045
F33615-76-C-5172
p0029 N81-10074
p0335 N81-20080
F33615-76-C-5191
p0131 N81-14061
F33615-76-C-5311
p0005 A81-11338
F33615-77-C-0073
p0277 N81-19141
F33615-77-C-0075
p0381 N81-22971
p0381 N81-22972
p0381 N81-22973
p0392 N81-23325
p0632 N81-33136
F33615-77-C-0080
p0601 N81-31234
F33615-77-C-0514
p0221 N81-17849
F33615-77-C-0520
p0539 N81-28080
F33615-77-C-1227
p0461 A81-39349
F33615-77-C-1252
p0321 A81-30258
F33615-77-C-2015
p0444 N81-25085
F33615-77-C-2018
p0214 N81-17087
F33615-77-C-2055
p0444 N81-25086
p0444 N81-25087
F33615-77-C-2062
p0504 A81-40870
F33615-77-C-2069
p0171 A81-21505
F33615-77-C-2096
p0240 A81-26609
F33615-77-C-3035
p0619 A81-40626
F33615-77-C-3041
p0321 A81-30250
F33615-77-C-3051
p0483 N81-26082
F33615-77-C-3115
p0209 N81-17047
F33615-77-C-3123
p0300 A81-29382
F33615-77-C-3126
p0637 N81-33192
F33615-77-C-5005
p0511 A81-41650
F33615-77-C-5082
p0218 N81-17235
F33615-77-C-5172
p0036 N81-11041
F33615-77-C-5188
p0400 A81-34187
F33615-77-C-5221
p0305 A81-29482
F33615-78-C-0115
p0331 N81-20046
p0331 N81-20047
F33615-78-C-0122
p0027 N81-10056
p0027 N81-10057
p0027 N81-10058
p0027 N81-10059
F33615-78-C-0501
p0426 N81-24049
F33615-78-C-1489
p0324 A81-30327
F33615-78-C-1496
p0350 A81-31125
F33615-78-C-1559
p0028 N81-10063
F33615-78-C-1563
p0116 A81-18576
p0321 A81-30261
F33615-78-C-1612
p0339 N81-21051
F33615-78-C-1634
p0327 A81-30358
F33615-78-C-2001
p0380 N81-23073
F33615-78-C-2006
p0029 N81-10073
F33615-78-C-2008
p0367 A81-33868
p0134 N81-14325
F33615-78-C-2018
p0497 N81-27100
F33615-78-C-2043
p0297 A81-29111
F33615-78-C-2060
p0215 N81-17093
F33615-78-C-2062
p0215 N81-17089
F33615-78-C-2162
p0215 N81-17088
F33615-78-C-2202
p0552 N81-29536
F33615-78-C-3014
p0006 A81-11604
p0190 N81-16016
F33615-78-C-3028
p0021 N81-10008
F33615-78-C-3402
p0424 N81-24036
F33615-78-C-3602
p0244 N81-17991
F33615-78-C-3614
p0258 N81-18733
F33615-78-C-3616
p0498 N81-27117
F33615-78-C-5108
p0559 A81-44396
F33615-78-C-5224
p0539 N81-28089
F33615-78-C-5234
p0557 A81-44342
p0612 A81-47813
F33615-79-C-0013
p0602 N81-31235
F33615-79-C-0521
p0210 N81-17058
F33615-79-C-0608
p0580 N81-30102
F33615-79-C-1739
p0615 A81-48373
F33615-79-C-1870
p0195 N81-16049
F33615-79-C-1932
p0273 N81-19113
F33615-79-C-1939
p0326 A81-30347
F33615-79-C-2002
p0566 A81-45894
F33615-79-C-2006
p0322 A81-30280
F33615-79-C-2018
p0215 N81-17092
F33615-79-C-2033
p0278 N81-19323
F33615-79-C-2047
p0552 N81-29362
F33615-79-C-2065
p0504 A81-40869
F33615-79-C-2075
p0314 A81-29995
F33615-79-C-2083
p0586 N81-30282
F33615-79-C-2090
p0630 N81-32290
F33615-79-C-3001
p0158 A81-20566
F33615-79-C-3019
p0217 N81-17103
F33615-79-C-3030
p0307 A81-29497
F33615-79-C-3208
p0045 N81-11778
F33615-79-C-3217
p0558 A81-44305
F33615-79-C-3401
p0200 N81-16213
F33615-79-C-3406
p0127 N81-13940
F33615-79-C-3407
p0373 N81-22033

F33615-79-C-3411
p0211 N81-17060
F33615-79-C-3417
p0330 N81-20034
F33615-79-C-3604
p0324 A81-30328
F33615-79-C-3622
p0324 A81-30329
F33615-79-C-5152
p0530 A81-43624
F33615-80-C-0117
p0427 N81-24059
F33615-80-C-0135
p0583 N81-30127
F33615-80-C-2001
p0583 N81-30131
F33615-80-C-3205
p0301 A81-29389
F33615-80-C-3401
p0638 N81-33196
p0638 N81-33197
F33615-80-C-3604
p0556 A81-44134
F33615-80-C-5102
p0381 N81-22974
F33615-80-R-0134
p0442 N81-25072
F33657-70-C-800
p0479 A81-40324
F33657-72-C-089
p0619 A81-48626
F33657-72-C-0829
p0492 N81-26849
F33657-72-C-0833
p0492 N81-26847
F33657-75-C-0529
p0403 A81-34212
F33657-76-C-0500
p0056 A81-14258
F33657-76-C-0677
p0543 N81-28785
p0543 N81-28786
p0543 N81-28787
p0543 N81-28788
p0543 N81-28789
F33657-77-C-0391
p0029 N81-10072
F33657-78-C-0473
p0116 A81-18576
F33657-78-C-0500
p0327 A81-30354
F33657-79-C-0378
p0211 N81-17059
F33700-78-C-0001
p0172 A81-21738
F34601-77-A-0176-SA47
p0559 A81-44396
F40600-77-C-0009
p0618 A81-48606
F40600-78-C-0003
p0131 N81-13977
F44620-75-C-0047
p0187 N81-15998
F44620-76-C-0096
p0593 N81-31153
F49520-78-C-0041
p0215 N81-17090
F49620-76-C-0014
p0612 A81-47959
F49620-77-C-013
p0115 A81-18105
F49620-77-C-0023
p0036 N81-11042
p0483 N81-26035
F49620-77-C-0029
p0540 N81-28099
F49620-77-C-0044
p0083 N81-12192
F49620-77-C-0066
p0137 N81-14789
F49620-78-C-0023
p0375 N81-22049
F49620-78-C-0041
p0197 N81-16065
F49620-78-C-0045
p0629 N81-32150
F49620-78-C-0047
p0045 N81-11774
F49620-78-C-0070
p0081 N81-12108
F49620-78-C-0084
p0314 A81-29986
p0219 N81-17387
F49620-78-C-0105
p0085 N81-12451
F49620-78-G-0064
p0310 A81-29931
F49620-79-C-0002
p0335 N81-20079
F49620-79-C-0054
p0165 A81-20753
F49620-79-C-0070
p0541 N81-28108
p0541 N81-28109
F49620-79-C-0130
p0211 N81-17061
F49620-79-C-0158
p0037 N81-11047
F49620-80-C-0003
p0423 N81-24028
F49620-80-C-0082
p0504 A81-40870
p0602 N81-31320
F744620-76-C0044
p0183 A81-23367
JPL-954833
p0445 N81-25431
MD-77,93304,00
p0156 A81-20474
MDA903-77-C-0107
p0631 N81-33133
MIPR-FY1455-80-00621
p0551 N81-29260
MIPR-FY3592-80-10039
p0548 N81-29126
MIPR-Z-70099-6-65439
p0601 N81-31233
MOD-AT/2170/065/XR
p0502 A81-40856
MOD-2026/019XR/EP
p0067 A81-16019
NAG1-3 p0333 N81-20065
NAG1-10
p0618 A81-48613
p0438 N81-24856
NAG1-70
p0146 N81-15702
NAG1-88
p0549 N81-29132
NAG1-112
p0380 N81-22833
NAG1-129
p0500 N81-27884
NAG1-133
p0639 N81-33205
NAG2-8 p0391 N81-23093
NAG2-38
p0486 N81-26116
p0486 N81-26117
NAG2-45
p0392 N81-23433
NAG3-18
p0160 A81-20597
NAG3-28
p0167 A81-20810
NAG3-36
p0257 N81-18404
NAG3-67
p0137 N81-14789
p0500 N81-27886
NAG3-71
p0439 N81-25041
NAG3-74
p0506 A81-40903
NAG4-1 p0540 N81-28102
NAG4-5 p0583 N81-30134
p0584 N81-30135
NASA ORDER A-70215-B
p0261 N81-19020
NASA ORDER A-77455-B
p0261 N81-19020
NASA ORDER L-11593
p0127 N81-13941
NASA ORDER L-12343-B
p0329 N81-20028
NASA ORDER L-13435-B
p0333 N81-20068
NASA ORDER P-74271
p0343 N81-21084
NASW-2342
p0381 N81-22969
p0389 N81-23078
p0543 N81-29034
NASW-2797
p0337 N81-21010
p0483 N81-26076
NASW-3079
p0413 A81-35927
NASW-3198
p0146 N81-15579
p0249 N81-18030
p0253 N81-18061
p0338 N81-21024
p0377 N81-22060
p0377 N81-22098
p0379 N81-22589
p0379 N81-22593
p0379 N81-22594
p0494 N81-27075
p0494 N81-27079
p0499 N81-27692
p0542 N81-28606
p0542 N81-28608
NASW-3199
p0031 N81-10576
p0032 N81-10577
p0138 N81-14962
p0262 N81-19026
p0262 N81-19027
p0276 N81-19132
p0276 N81-19137
p0276 N81-19139
p0330 N81-20031
p0376 N81-22054
p0379 N81-22590
p0490 N81-26158
p0500 N81-27883
p0542 N81-28610
NAS1-4141
p0243 N81-17984
NAS1-11668
p0343 N81-21131
NAS1-12806
p0279 N81-19484
NAS1-12875
p0243 N81-17984
NAS1-13479
p0404 A81-34221
NAS1-13500
p0543 N81-28783
NAS1-13681
p0378 N81-22129
NAS1-14101
p0153 A81-20223
NAS1-14549
p0271 N81-19098
p0379 N81-22722
p0379 N81-22723
p0380 N81-22724
p0380 N81-22725
p0380 N81-22726
NAS1-14611
p0345 N81-21871
NAS1-14621
p0244 N81-17989
NAS1-14675
p0498 N81-27114
NAS1-14724
p0494 N81-27077
NAS1-14732
p0190 N81-16016
NAS1-14742
p0084 N81-12225
p0332 N81-20062
p0498 N81-27116
NAS1-14743
p0492 N81-27046
NAS1-14837
p0637 N81-33191
NAS1-14849
p0090 N81-13022
p0125 N81-13923
NAS1-14861
p0446 N81-25766
NAS1-14889
p0386 N81-23059
NAS1-14892
p0171 A81-21552
NAS1-14962
p0243 N81-17984
NAS1-15069
p0277 N81-19232
NAS1-15085
p0620 A81-48637
p0202 N81-16853
NAS1-15090
p0340 N81-21056
NAS1-15116
p0600 N81-31224
NAS1-15148
p0198 N81-16139
p0550 N81-29165
NAS1-15154
p0520 A81-42747
p0491 N81-26845
NAS1-15214
p0385 N81-23053
NAS1-15231
p0071 N81-12016
NAS1-15268
p0249 N81-18032
p0249 N81-18033
p0594 N81-31160
NAS1-15269
p0531 A81-43645
NAS1-15325
p0158 A81-20544
p0332 N81-20062
NAS1-15412
p0340 N81-21059
NAS1-15414
p0393 N81-23467
NAS1-15497
p0351 A81-31297
p0563 A81-45515
p0331 N81-20051
NAS1-15510
p0218 N81-17171
NAS1-15534
p0125 N81-13920
p0139 N81-14970
p0139 N81-14971
p0185 N81-15977
NAS1-15546
p0142 N81-14993
p0142 N81-14994
NAS1-15605
p0247 N81-18010
NAS1-15644
p0194 N81-16042
NAS1-15673
p0580 N81-30098
NAS1-15678
p0243 N81-17984
NAS1-15708
p0193 N81-16041
NAS1-15720
p0244 N81-17987
NAS1-15724
p0434 N81-24111
NAS1-15740
p0447 N81-25768
NAS1-15770
p0185 N81-15974
NAS1-15782
p0258 N81-18799
NAS1-15783
p0201 N81-16416
NAS1-15795
p0201 N81-16416
NAS1-15810
p0256 N81-18331
NAS1-15829
p0590 N81-30963
NAS1-15833
p0617 A81-48559
p0537 N81-28070
NAS1-15845
p0491 N81-26846
NAS1-15949
p0378 N81-22415
NAS1-15971
p0589 N81-30900
NAS1-15980
p0392 N81-23411
NAS1-16000
p0032 N81-11013
p0072 N81-12022
p0333 N81-20067
p0596 N81-31188
NAS1-16037
p0595 N81-31171

NAS1-16088
p0505 A81-40882
NAS1-16096
p0434 N81-24112
NAS1-16114
p0300 A81-29381
NAS1-16144
p0425 N81-24040
NAS1-16147
p0508 A81-40970
p0555 A81-44109
NAS1-16168
p0444 N81-25090
NAS1-16176
p0329 N81-20027
NAS1-16211
p0494 N81-27076
NAS1-16247
p0373 N81-22032
NAS1-16255
p0520 A81-42744
p0197 N81-16066
NAS1-16259
p0584 N81-30137
NAS2-7306
p0273 N81-19112
NAS2-7729
p0262 N81-19022
NAS2-7800
p0304 A81-29474
NAS2-8558
p0251 N81-18044
NAS2-8675
p0258 N81-18798
NAS2-8726
p0249 N81-18028
NAS2-8874
p0190 N81-16018
NAS2-9081
p0157 A81-20541
NAS2-9153
p0254 N81-18097
NAS2-9319
p0271 N81-19096
p0271 N81-19097
NAS2-9328
p0619 A81-48626
NAS2-9332
p0075 N81-12054
NAS2-9337
p0386 N81-23058
NAS2-9352
p0270 N81-19088
p0270 N81-19089
p0270 N81-19090
p0271 N81-19091
p0271 N81-19092
p0271 N81-19093
p0271 N81-19094
NAS2-9399
p0143 N81-14998
NAS2-9434
p0391 N81-23095
NAS2-9450
p0273 N81-19111
NAS2-9513
p0190 N81-16018
p0251 N81-18045
NAS2-9605
p0261 N81-19018
NAS2-9646
p0261 N81-19017
NAS2-9665
p0276 N81-19136
NAS2-9693
p0423 N81-24023
NAS2-9741
p0343 N81-21086
NAS2-9805
p0387 N81-23068
NAS2-9881
p0164 A81-20741
NAS2-9883
p0435 N81-24122
NAS2-9887
p0441 N81-25064
NAS2-9913
p0249 N81-18027
NAS2-9946
p0081 N81-12116
NAS2-9977
p0218 N81-17175
NAS2-06017
p0579 N81-30084
NAS2-10021
p0389 N81-23080
NAS2-10059
p0278 N81-19412
NAS2-10060
p0372 N81-22031
p0373 N81-22037
p0493 N81-27063
p0546 N81-29108
p0546 N81-29110
p0581 N81-30106
NAS2-10097
p0271 N81-19095
NAS2-10160
p0387 N81-23064
p0387 N81-23065
NAS2-10294
p0538 N81-28084
p0538 N81-28085
p0538 N81-28086
NAS2-10324
p0253 N81-18060
NAS2-10326
p0375 N81-22047
NAS2-10330
p0457 A81-38540
p0563 A81-45539
NAS2-10333
p0033 N81-11014
NAS2-10344
p0384 N81-23030
p0384 N81-23031
p0384 N81-23032
p0384 N81-23033
NAS2-10352
p0161 A81-20636
NAS2-10373
p0428 N81-24064
NAS2-10494
p0337 N81-21017
p0337 N81-21018
NAS2-10505
p0023 N81-10019
NAS2-10515
p0333 N81-20063
NAS2-10556
p0442 N81-25074
NAS2-10571
p0637 N81-33190
NAS2-10578
p0165 A81-20761
NAS2-10583
p0424 N81-24035
NAS2-10649
p0635 N81-33162
NAS2-10680
p0540 N81-28096
NAS2-10722
p0599 N81-31213
NAS2-10881
p0579 N81-30085
NAS2-101211
p0479 A81-40189
NAS3-71
p0441 N81-25065
NAS3-11175
p0231 A81-24924
NAS3-18021
p0497 N81-27097
NAS3-19429
p0376 N81-22052
NAS3-19698
p0132 N81-14082
NAS3-19777
p0203 N81-16854
NAS3-20048
p0245 N81-17997
NAS3-20050
p0289 A81-28943
NAS3-20055
p0140 N81-14976
NAS3-20060
p0442 N81-25075
NAS3-20061
p0093 N81-13057
p0214 N81-17081
p0214 N81-17082
p0214 N81-17083
p0214 N81-17084
p0214 N81-17085
p0214 N81-17086
p0245 N81-17997
NAS3-20066
p0562 A81-44666
NAS3-20070
p0078 N81-12086
p0195 N81-16051
NAS3-20072
p0144 N81-15006
p0590 N81-31204
NAS3-20073
p0048 N81-11953
p0078 N81-12088
p0497 N81-27098
NAS3-20091
p0314 A81-29987
NAS3-20112
p0597 N81-31193
NAS3-20115
p0442 N81-25076
NAS3-20380
p0065 A81-15796
NAS3-20382
p0278 N81-19479
p0279 N81-19480
p0279 N81-19481
p0279 N81-19482
p0279 N81-19483
NAS3-20582
p0220 N81-17046
p0245 N81-17999
NAS3-20584
p0274 N81-19120
p0629 N81-32147
NAS3-20585
p0274 N81-19119
NAS3-20591
p0078 N81-12087
NAS3-20599
p0143 N81-15005
NAS3-20602
p0245 N81-17997
NAS3-20630
p0214 N81-17080
NAS3-20631
p0078 N81-12085
NAS3-20632
p0318 A81-30093
p0390 N81-23086
p0598 N81-31199
NAS3-20643
p0316 A81-30033
p0375 N81-22051
NAS3-20646
p0442 N81-25077
p0496 N81-27093
NAS3-20755
p0274 N81-19117
NAS3-21037
p0182 A81-22664
NAS3-21259
p0143 N81-15004
NAS3-21269
p0165 A81-20767
NAS3-21272
p0130 N81-13963
NAS3-21288
p0143 N81-15003
NAS3-21391
p0147 N81-15769
NAS3-21461
p0515 A81-42106
NAS3-21468
p0483 N81-26075
NAS3-21593
p0084 N81-12255
NAS3-21607
p0335 N81-20070
NAS3-21608
p0245 N81-17999
NAS3-21708
p0549 N81-29130
NAS3-21815
p0539 N81-28094
NAS3-21836
p0213 N81-17079
NAS3-21987
p0621 A81-48640
NAS3-21996
p0442 N81-25078
NAS3-21997
p0402 A81-34208
NAS3-21999
p0213 N81-17078
NAS3-22045
p0277 N81-19316
NAS3-22049
p0597 N81-31194
NAS3-22050
p0428 N81-24067
NAS3-22053
p0496 N81-27089
p0496 N81-27090
p0496 N81-27091
NAS3-22117
p0256 N81-18331
NAS3-22160
p0376 N81-22053
NAS3-22165
p0546 N81-29093
NAS3-22186
p0269 N81-19079
NAS3-22361
p0387 N81-23069
NAS3-22384
p0388 N81-23076
NAS3-28142
p0429 N81-24068
NAS3-210376
p0501 A81-40839
NAS4-2344
p0377 N81-22059
NAS4-2534
p0130 N81-13969
NAS4-2581
p0498 N81-27113
NAS4-2675
p0556 A81-44135
p0485 N81-26109
NAS5-24300
p0115 A81-18100
NAS5-25444
p0023 N81-10020
NAS6-2639
p0137 N81-14601
NAS7-100
p0169 A81-20840
p0623 A81-49729
p0624 A81-49731
p0087 N81-12646
p0088 N81-12943
p0196 N81-16056
p0202 N81-16677
p0373 N81-22036
p0587 N81-30525
NAS8-32692
p0135 N81-14555
p0438 N81-24679
NAS8-33369
p0167 A81-20811
NAS8-33458
p0031 N81-10636
p0202 N81-16681
NAS8-33541
p0397 A81-34164
NAS9-15591
p0190 N81-16020
NAS9-15800
p0629 N81-32143
NAS9-16062
p0440 N81-25050
p0440 N81-25051
NAS9-16104
p0602 N81-31421
NAVY TASK LTV-79-12
p0230 A81-24285
NCA2-OR-730-601
p0509 A81-41090
NCC1-6 p0518 A81-42728
p0438 N81-24857
NCC1-9 p0627 N81-32117
NCC2-13
p0209 A81-29513
NCC2-55
p0483 N81-26072
NCR-530-501
p0509 A81-41090
NR-5061-012
p0086 N81-12633

NE-5061-013
p0087 N81-12634
p0141 N81-14985
NERDDC-9240
p0288 A81-28676
NGL-05-020-243
p0301 A81-29400
p0308 A81-29512
p0528 A81-43175
NGL-05-046-002
p0053 A81-13421
NGL-22-009-124
p0155 A81-20471
NGL-22-009-383
p0109 A81-17953
NGL-22-009-640
p0371 N81-22002
NGL-33-018-003
p0207 N81-17039
p0541 N81-28176
NGR-05-020-019
p0158 A81-20542
NGR-11-002-185
p0629 N81-32154
NGR-14-001-008
p0167 A81-20798
NGR-22-009-818
p0385 N81-23035
NGR-25-001-005
p0454 A81-38077
NGR-36-009-017
p0371 N81-22003
NGR-39-009-017
p0141 N81-14989
NIVE-1068
p0073 N81-12033
NIVR-1745
p0498 N81-27118
NIVR-1768
p0594 N81-31157
NIVR-1812
p0022 N81-10014
NIVR-1819
p0338 N81-21038
NOAA-NA-80AAD0001
p0167 A81-20798
NR PROJ. 047-202
p0394 N81-23966
p0394 N81-23967
NR PROJ. 094-391
p0444 N81-25089
NR PROJ. 215-262
p0596 N81-31188
NR PROJECT 036-097
p0003 A81-10749
NSERC-A-7945
p0100 A81-16712
NSERC-A-9185
p0302 A81-29407
NSF ATM-79-21260
p0167 A81-20798
NSF CME-79-16933
p0348 A81-30786
NSF 75-18141
p0234 A81-25585
NSG-1077
p0494 N81-27078
NSG-1083
p0372 N81-22015
NSG-1139
p0262 N81-19021
NSG-1165
p0262 N81-19023
NSG-1219
p0067 A81-15896
NSG-1262
p0058 A81-14394
NSG-1315
p0243 N81-17985
NSG-1331
p0379 N81-22282
NSG-1355
p0380 N81-22727
NSG-1356
p0336 N81-20086
NSG-1377
p0616 A81-48395
NSG-1402
p0196 N81-16058
NSG-1411
p0499 N81-27200
NSG-1450
p0303 A81-29455
NSG-1453
p0239 A81-26506
NSG-1454
p0186 N81-15986
p0251 N81-18046
NSG-1490
p0066 A81-15894
p0134 N81-14347
NSG-1503
p0083 N81-12120
NSG-1509
p0594 N81-31159
NSG-1511
p0071 N81-12019
NSG-1560
p0059 A81-14475
p0423 N81-24024
NSG-1561
p0559 A81-44424
p0384 N81-23034
NSG-1570
p0066 A81-15881
NSG-1574
p0423 N81-24026
NSG-1578
p0364 A81-33050
p0467 A81-40089
NSG-1583
p0619 A81-48615
NSG-1585
p0627 N81-32121
NSG-1587
p0554 A81-44082
NSG-1591
p0239 A81-26508
p0587 N81-30392
NSG-1633
p0522 A81-42763
NSG-1640
p0543 N81-28810
NSG-1650
p0345 N81-21864
NSG-1655
p0532 A81-43708
p0437 N81-24321
NSG-1958
p0438 N81-24602
NSG-2112
p0249 N81-18029
NSG-2129
p0169 A81-21010
NSG-2156
p0053 A81-13419
NSG-2165
p0254 N81-18139
NSG-2194
p0060 A81-14945
NSG-2219
p0254 N81-18139
NSG-2266
p0549 N81-29134
p0549 N81-29135
NSG-2269
p0053 A81-13421
NSG-2328
p0220 N81-17623
NSG-3012
p0109 A81-17954
NSG-3036
p0624 A81-49736
NSG-3045
p0080 N81-12105
NSG-3048
p0080 N81-12103
NSG-3073
p0297 A81-29114
NSG-3075
p0313 A81-29985
NSG-3079
p0274 N81-19122
NSG-3084
p0564 A81-45551
NSG-3116
p0631 N81-32956
NSG-3119
p0080 N81-12100
NSG-3171
p0143 N81-15001
NSG-3189
p0109 A81-17952
NSG-3208
p0313 A81-29982
NSG-3212
p0540 N81-28097
NSG-3218
p0297 A81-29108
NSG-3238
p0220 N81-17624
NSG-3266
p0296 A81-29106
NSG-3306
p0344 N81-21211
p0378 N81-22130
NSG-4002
p0159 A81-20568
NSG-4017
p0207 N81-17038
NSG-4018
p0554 A81-44093
NSG-4019
p0520 A81-42754
NSG-4022
p0142 N81-14991
NSG-7172
p0343 N81-21087
NSG-7373
p0216 N81-17097
N00014-75-C-0432
p0564 A81-45588
N00014-75-C-0451
p0394 N81-23966
p0394 N81-23967
N00014-75-C-0520
p0509 A81-41090
N00014-75-C-0543
p0003 A81-10749
N00014-76-C-0068
p0132 N81-14064
N00014-76-C-0260
p0168 A81-20818
N00014-77-C-0052
p0343 N81-21088
N00014-77-C-0180
p0071 N81-12013
N00014-77-C-0247
p0116 A81-18578
N00014-77-C-0662
p0570 A81-46483
N00014-78-C-0049
p0336 N81-20345
N00014-78-C-0079
p0141 N81-14986
p0186 N81-15992
N00014-78-C-0381
p0596 N81-31188
N00014-78-C-0490
p0594 N81-31154
N00014-78-C-0590
p0156 A81-20526
N00014-78-C-0673
p0341 N81-21069
N00014-79-C-0431
p0563 A81-45522
p0253 N81-18062
N00014-79-C-0765
p0444 N81-25089
N00014-79-C-0953
p0441 N81-25068
N00014-80-C-0053
p0550 N81-29140
N00019-75-C-0521
p0403 A81-34212
N00019-76-C-0423
p0403 A81-34212
p0506 A81-40910
N00019-76-C-0666
p0452 A81-37659
N00019-78-C-0206
p0600 N81-31220
N00019-79-C-0062
p0197 N81-16068
N00019-79-C-0136
p0072 N81-12026
N00019-79-C-0172
p0341 N81-21069
N00019-79-C-0229
p0091 N81-13034
N00019-79-C-0435
p0400 A81-34189
N00019-80-C-0057
p0439 N81-25046
N00019-80-C-0126
p0637 N81-33195
N00019-80-C-0226
p0566 A81-45891
N00019-80-C-0227
p0516 A81-42205
N00024-18-C-5384
p0066 A81-15082
N00024-78-C-5384
p0511 A81-41749
p0200 N81-16253
N00024-79-C-6043
p0090 N81-13033
p0274 N81-19134
N00039-79-C-0124
p0155 A81-20470
N00123-75-C-1075
p0088 N81-12653
N00123-78-C-0193
p0221 N81-17962
N00140-76-C-1491
p0219 N81-17281
N00167-80-C-0058
p0548 N81-29122
N00167-80-C-0066
p0486 N81-26120
N00173-70-C-0045
p0551 N81-29323
N00173-79-C-0462
p0491 N81-26209
N60530-79-C-0169
p0263 N81-19030
N60921-77-C-0117
p0149 A81-19940
N61339-76-C-0086
p0615 A81-48359
N61339-78-C-0076
p0198 N81-16072
N61339-79-D-0008
p0146 N81-15729
N62269-76-C-0293
p0439 N81-25047
N62269-76-C-0318
p0239 A81-26511
N62269-77-C-0442
p0239 A81-26512
p0072 N81-12024
N62269-78-C-0043
p0638 N81-33199
N62269-78-C-0363
p0388 N81-23075
N62269-78-C-0379
p0207 N81-16357
N62269-78-C-0414
p0028 N81-10048
N62269-79-C-0275
p0218 N81-17242
N62269-79-C-0277
p0239 A81-26512
p0072 N81-12024
N62269-79-C-0292
p0216 N81-17100
N62269-80-C-0200
p0252 N81-18050
p0252 N81-18051
N62269-80-C-0210
p0548 N81-29124
N62269-80-C-0232
p0558 A81-44384
N62269-80-C-0366
p0441 N81-25069
p0540 N81-28103
N62269-80-C-0720
p0561 A81-44500
N68335-78-C-1121
p0220 N81-17476
N68335-79-C-2055
p0157 A81-20539
PROJ. AFS-560-79-17
p0129 N81-13956
RB-RLD-1977-1.3.1
p0498 N81-27118
RB-RLD-1978-1.3
p0498 N81-27118
RB-RLD-77017
p0498 N81-27118
RB-RLD-77017/1
p0498 N81-27118

CONTRACT NUMBER INDEX

RB-RLD-78017
p0498 N81-27118
RB-RLD-78017/1
p0498 N81-27118
RB-RLD/78011
p0495 N81-27086
RR0140941
p0272 N81-19103
RR0141104
p0594 N81-31154
RR0220844
p0393 N81-23466
SF32392591
p0091 N81-13036
SRC-GR/A/21344
p0541 N81-28106
SRI PROJ. PYU-8903
p0491 N81-26209
SRI PROJ. 6824
p0074 N81-12049
TC-01SU-T800-7-7536
p0302 A81-29407
W-7405-ENG-26
p0142 N81-14995
W-7405-ENG-36
p0135 N81-14550
W-7405-ENG-48
p0085 N81-12427
WF41400
p0441 N81-25069
WF4140100
p0393 N81-23466
WF21200000
p0597 N81-31191
WF41400000
p0216 N81-17094
p0218 N81-17242
p0385 N81-23043
p0486 N81-26119
WF41421000
p0581 N81-30116
p0627 N81-32128
WF41421091
p0486 N81-26120
WF41461400
p0550 N81-29140
WF60532000
p0439 N81-25047
WF61562001
p0392 N81-23288
WF212421091
p0597 N81-31191
ZF21232061
p0495 N81-27084
ZF53536091
p0030 N81-10079
ZF21242001
p0202 N81-16770
ZF32300000
p0263 N81-19030
ZF54502001
p0039 N81-11120
ZF66412001
p0252 N81-18054
p0490 N81-26151
075-725-470
p0206 N81-17024
201-521-160
p0600 N81-31213
219-151-120
p0193 N81-16034
304-90-00
p0378 N81-22130
500-32-12
p0552 N81-29782
501-31-33-05
p0125 N81-13921
503-03-13-02
p0567 N81-29119
505-01-12
p0429 N81-24068
505-01-13-02
p0186 N81-15985
505-04 p0036 N81-11039
p0078 N81-12089
505-04-13-57
p0546 N81-29109
505-04-82
p0140 N81-14977
505-05 p0035 N81-11037
505-05-92
p0446 N81-25698
505-06-13-02
p0262 N81-19021
505-06-33-10
p0071 N81-12015
p0262 N81-19023
505-06-53-01
p0384 N81-23034
505-06-64
p0130 N81-13969
505-07-33-04
p0498 N81-27115
505-10-13-01
p0494 N81-27078
505-10-13-16
p0125 N81-13923
505-15-01-01
p0262 N81-19025
505-23-6A
p0496 N81-27095
505-31-11-05-00-21
p0258 N81-18742
505-31-23-04
p0335 N81-20085
p0434 N81-24112
505-31-33-04
p0385 N81-23036
p0391 N81-23096
505-31-33-05
p0423 N81-24022
505-31-43-01
p0021 N81-10004
p0372 N81-22016
505-31-43-02
p0434 N81-24114
p0550 N81-29137
505-31-53-01
p0021 N81-10005
p0343 N81-21087
505-31-63-01
p0377 N81-22061
p0435 N81-24115
505-31-63-04
p0550 N81-29139
505-31-73-01
p0072 N81-12021
p0329 N81-20025
p0581 N81-30110
505-32 p0140 N81-14980
p0195 N81-16050
505-32-6A
p0443 N81-25084
505-32-02
p0195 N81-16053
p0583 N81-30130
p0589 N81-30907
p0641 N81-33947
505-32-03-01
p0137 N81-14788
505-32-03-04
p0088 N81-12822
p0641 N81-33945
505-32-03-05
p0392 N81-23410
505-32-03-06
p0380 N81-22832
p0641 N81-33946
505-32-13-01
p0139 N81-14972
505-32-32
p0443 N81-25083
p0490 N81-26146
505-32-42
p0336 N81-20245
505-32-62
p0597 N81-31190
505-32-62
p0443 N81-25080
505-32-72
p0631 N81-32956
505-32-82
p0201 N81-16388
505-32-92
p0496 N81-27094
505-32-93-01
p0335 N81-20083
505-33-23-02
p0257 N81-18412
505-33-52
p0496 N81-27089
p0496 N81-27091
505-33-53-01
p0125 N81-13922
p0340 N81-21059
p0388 N81-23072
505-33-53-03
p0345 N81-21904
505-33-53-07
p0441 N81-25066
p0445 N81-25432
p0486 N81-26118
505-33-54
p0589 N81-30815
505-33-63-02
p0134 N81-14347
p0491 N81-26496
p0499 N81-27548
p0587 N81-30469
505-34-11
p0492 N81-27061
505-34-13-02
p0602 N81-31418
505-34-23-01
p0129 N81-13958
505-34-33-01
p0427 N81-24058
505-34-33-02
p0043 N81-11422
p0490 N81-26148
505-34-33-05
p0130 N81-13968
p0193 N81-16039
505-34-33-06
p0081 N81-12109
505-34-43-05
p0146 N81-15702
505-35-13-01
p0345 N81-21873
p0393 N81-23713
p0438 N81-24855
p0446 N81-25765
505-35-21
p0191 N81-16022
p0548 N81-29127
505-35-21-01-00
p0580 N81-30101
505-35-31
p0204 N81-16994
p0579 N81-30080
505-35-41
p0372 N81-22031
p0373 N81-22037
p0546 N81-29108
p0546 N81-29110
p0581 N81-30106
p0594 N81-31162
505-36-31
p0193 N81-16040
505-41-13-01
p0372 N81-22015
505-41-13-03
p0094 N81-13065
505-41-13-06
p0090 N81-13022
p0333 N81-20068
505-41-22
p0195 N81-16052
p0195 N81-16054
505-41-43-01
p0491 N81-26845
p0631 N81-32966
505-41-52
p0338 N81-21028
505-41-73-01
p0129 N81-13959
p0142 N81-14997
505-41-73-04
p0638 N81-33203
505-42-13-08
p0338 N81-21027
505-42-21
p0029 N81-10077
p0329 N81-20030
p0374 N81-22039
p0549 N81-29134
p0549 N81-29135
505-42-62
p0443 N81-25079
p0443 N81-25081
p0483 N81-26075
p0546 N81-29093
505-42-71
p0036 N81-11043
p0140 N81-14981
p0272 N81-19100
p0441 N81-25064
p0547 N81-29118
p0584 N81-30136
505-43-14
p0540 N81-28102
505-43-23-01
p0035 N81-11032
p0261 N81-19019
p0579 N81-30086
p0635 N81-33159
505-43-23-02
p0140 N81-14975
p0186 N81-15978
p0579 N81-30087
p0635 N81-33158
505-43-23-04
p0627 N81-32119
505-43-23-06
p0579 N81-30088
505-43-24
p0426 N81-24048
505-43-31
p0342 N81-21083
505-43-33-01
p0085 N81-12448
505-43-33-05
p0441 N81-25067
505-43-71
p0579 N81-30083
505-44-12
p0269 N81-19078
p0269 N81-19079
p0388 N81-23070
505-44-13-01
p0493 N81-27062
505-44-22
p0277 N81-19316
p0345 N81-21685
505-44-23-01
p0335 N81-20082
505-44-23-03
p0264 N81-19035
p0267 N81-19056
505-44-33-01
p0339 N81-21044
p0437 N81-24471
p0581 N81-30112
505-51-11
p0133 N81-14265
506-51-34
p0143 N81-15000
p0489 N81-26144
506-53-12
p0337 N81-20424
506-53-31
p0385 N81-23037
506-53-63-05
p0254 N81-18199
506-53-64
p0075 N81-12064
p0387 N81-23067
506-63-40
p0498 N81-27113
506-89-01-01
p0257 N81-18410
510-55-02
p0442 N81-25075
510-56-01-00
p0254 N81-18097
512-55-11
p0023 N81-10021
530-01-13-01
p0071 N81-12012
p0185 N81-15974
p0423 N81-24026
530-01-13-02
p0374 N81-22040
p0596 N81-31184
530-02-11
p0248 N81-18023
530-03-13-02
p0329 N81-20026
530-03-13-03
p0185 N81-15976
530-04-11
p0385 N81-23039
p0537 N81-28055

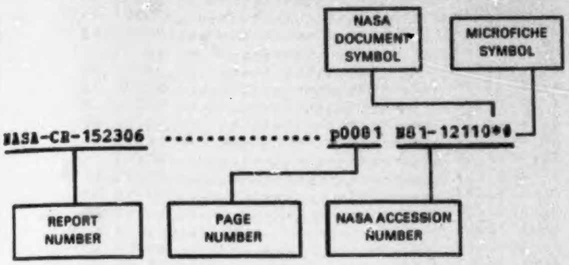
- 530-04-13
  - p0594 N81-31160
- 530-04-13-01
  - p0032 N81-11013
  - p0072 N81-12022
  - p0073 N81-12039
- 530-05-12
  - p0093 N81-13056
  - p0469 N81-26145
- 532-01-11
  - p0075 N81-12054
- 532-02-11
  - p0037 N81-11044
  - p0275 N81-19131
- 532-04-11
  - p0026 N81-10054
- 532-05-11
  - p0428 N81-24064
  - p0483 N81-26076
- 532-05-12
  - p0195 N81-16055
- 533-01-13-07
  - p0145 N81-15397
  - p0388 N81-23071
- 533-01-43-01
  - p0139 N81-14973
  - p0186 N81-15982
  - p0243 N81-17981
- 533-01-43-02
  - p0139 N81-14974
- 533-03-14
  - p0251 N81-18047
  - p0334 N81-20074
- 533-01043-81
  - p0246 N81-18005
- 534-01-13-14
  - p0095 N81-13303
- 534-02-13-01
  - p0259 N81-19001
- 534-02-14
  - p0581 N81-30111
- 534-03-23-01
  - p0038 N81-11113
  - p0198 N81-16137
  - p0218 N81-17171
- 534-04-13-51
  - p0546 N81-29111
- 534-04-13-55
  - p0484 N81-26083
- 534-13-55
  - p0580 N81-30098
- 535-01-12
  - p0539 N81-28095
  - p0597 N81-31195
- 535-02-12
  - p0093 N81-13057
- 535-03-12
  - p0380 N81-22836
  - p0380 N81-22838
  - p0447 N81-25767
  - p0492 N81-27042
- 535-04-12
  - p0443 N81-25082
- 554-04-13-55
  - p0330 N81-20044
- 720-01-00-18-23
  - p0262 N81-19024
- 734-10-11
  - p0218 N81-17175
- 776-81-63
  - p0587 N81-30525
- 778-32-01
  - p0095 N81-13465
  - p0588 N81-30562
- 989-13-22
  - p0438 N81-24679
- 992-21-01-90-01
  - p0340 N81-21060

REPORT/ACCESSION NUMBER INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography* JANUARY 1982

1981 Cumulative Index

Typical Report/Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The issue and page number indicate the actual Supplement and page where the citation may be located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-7968	p0037	N81-11044*#
A-8022	p0596	N81-31185*#
A-8070	p0548	N81-29127*#
A-8125	p0029	N81-10077*#
A-8190	p0275	N81-19131*#
A-8311	p0023	N81-10021*#
A-8338	p0140	N81-14581*#
A-8343	p0026	N81-10054*#
A-8345	p0075	N81-12065*#
A-8346	p0036	N81-11043*#
A-8361	p0193	N81-16040*#
A-8399	p0374	N81-22039*#
A-8408	p0133	N81-14265*#
A-8411	p0204	N81-16994*#
A-8432	p0191	N81-16022*#
A-8436	p0329	N81-20030*#
A-8457	p0258	N81-18742*#
A-8464	p0329	N81-20029*#
A-8474	p0340	N81-21060*#
A-8478	p0385	N81-23039*#
A-8481	p0342	N81-21083*#
A-8491	p0260	N81-19014*#
A-8511	p0272	N81-19100*#
A-8512	p0333	N81-20066*#
A-8552	p0537	N81-28055*#
A-8554	p0385	N81-23037*#
A-8559	p0579	N81-30083*#
A-8567	p0594	N81-31162*#
A-8575	p0428	N81-24066*#
A-8585-VOL-1	p0580	N81-30101*#
A-8592	p0584	N81-30136*#
A-8606	p0492	N81-27061*#
A-8641	p0579	N81-30080*#
A-8655	p0641	N81-34138*#
A-8665	p0547	N81-29118*#
A-8676	p0549	N81-29133*#
A-8696	p0628	N81-32137*#
A-8704	p0629	N81-32151*#
AAAF PAPER NT 80-29	p0369	A81-33928 #
AAAF PAPER NT 80-33	p0369	A81-33933 #
AAAF PAPER NT 80-34	p0369	A81-33936 #
AAAF PAPER NT 80-35	p0369	A81-33923 #
AAAF PAPER NT 80-36	p0369	A81-33937 #
AAAF PAPER NT 80-38	p0369	A81-33931 #
AAAF PAPER NT 80-40	p0369	A81-33927 #
AAAF PAPER NT 80-41	p0369	A81-33943 #
AAAF PAPER NT 80-54	p0370	A81-33948
AAAF PAPER NT 80-58	p0370	A81-33949
AAAF PAPER NT 80-61	p0370	A81-33950
AAAF-NT-79-22-PT-1	p0209	N81-17050 #
AAAF-NT-79-22-PT-2	p0209	N81-17051 #
AAAF-NT-79-23	p0216	N81-17096 #
AAAF-NT-79-24	p0077	N81-12076 #
AAAF-NT-79-25	p0086	N81-12463 #
AAAF-NT-79-26	p0210	N81-17052 #
AAAF-NT-79-29	p0077	N81-12077 #
AAAF-NT-79-30	p0210	N81-17053 #
AAAF-NT-79-32	p0210	N81-17054 #
AAAF-NT-79-33	p0086	N81-12464 #
AAAF-NT-79-38	p0083	N81-12180 #
AAAF-NT-79-41	p0083	N81-12181 #
AAAF-NT-79-43	p0083	N81-12182 #
AAAF-NT-79-44	p0083	N81-12183 #
AAAF-NT-80-10	p0204	N81-16989 #
AAAF-NT-80-11	p0081	N81-12111 #
AAAF-NT-80-12	p0082	N81-12112 #
AAAF-NT-80-13	p0218	N81-17108 #
AAAF-NT-80-14	p0218	N81-17109 #
AAAF-NT-80-15	p0210	N81-17055 #
AAAF-NT-80-16	p0210	N81-17056 #
AAAF-NT-80-25	p0204	N81-16992 #
AAAF-NT-80-26	p0077	N81-12079 #
AAS PAPER 81-024	p0361	A81-32886 #
AAS 80-032	p0120	A81-19375
ACEE-25-FR-1564	p0579	N81-30085*#
ACUREX-78-315	p0088	N81-12653 #
AD-A010210	p0585	N81-30159 #
AD-A077370	p0139	N81-14969 #
AD-A087492	p0030	N81-10152 #
AD-A087506	p0031	N81-10446 #
AD-A089009	p0023	N81-10024 #
AD-A089010	p0032	N81-10580 #
AD-A089019	p0378	N81-22420 #
AD-A089076	p0032	N81-10581 #
AD-A089181	p0023	N81-10023 #
AD-A089182	p0029	N81-10073 #
AD-A089204	p0033	N81-11021 #
AD-A089240	p0026	N81-10055 #
AD-A089266	p0030	N81-10079 #
AD-A089279	p0028	N81-10069 #
AD-A089295	p0030	N81-10128 #
AD-A089336	p0028	N81-10068 #
AD-A089365	p0028	N81-10070 #
AD-A089378	p0035	N81-11036 #
AD-A089385	p0024	N81-10030 #
AD-A089407	p0025	N81-10037 #
AD-A089408	p0024	N81-10032 #
AD-A089430	p0025	N81-10036 #
AD-A089431	p0023	N81-10022 #
AD-A089435	p0025	N81-10038 #
AD-A089440	p0024	N81-10034 #
AD-A089441	p0024	N81-10029 #
AD-A089450	p0024	N81-10031 #
AD-A089451	p0029	N81-10072 #
AD-A089496	p0021	N81-10008 #
AD-A089521	p0025	N81-10041 #
AD-A089524	p0029	N81-10074 #
AD-A089525	p0027	N81-10060 #
AD-A089527	p0041	N81-11233 #
AD-A089536	p0027	N81-10056 #
AD-A089537	p0027	N81-10057 #
AD-A089538	p0027	N81-10058 #
AD-A089539	p0027	N81-10059 #
AD-A089570	p0028	N81-10063 #
AD-A089606	p0030	N81-10080 #
AD-A089611	p0025	N81-10039 #
AD-A089625	p0027	N81-10061 #
AD-A089629	p0030	N81-10081 #
AD-A089692	p0045	N81-11774 #
AD-A089709	p0048	N81-12010 #
AD-A089746	p0037	N81-11045 #

AD-A089748 .... p0034 N81-11023 #
AD-A089750 .... p0038 N81-11093 #
AD-A089752 .... p0036 N81-11042 #
AD-A089755 .... p0035 N81-11035 #
AD-A089770 .... p0045 N81-11778 #
AD-A089780 .... p0035 N81-11033 #
AD-A089791 .... p0036 N81-11041 #
AD-A089794 .... p0035 N81-11034 #
AD-A089817 .... p0036 N81-11040 #
AD-A089825 .... p0037 N81-11047 #
AD-A089851 .... p0033 N81-11016 #
AD-A089894 .... p0038 N81-11118 #
AD-A089914 .... p0034 N81-11024 #
AD-A089924 .... p0043 N81-11365 #
AD-A089962 .... p0201 N81-16628 #
AD-A089963 .... p0034 N81-11028 #
AD-A089964 .... p0076 N81-12068 #
AD-A089971 .... p0033 N81-11022 #
AD-A089975 .... p0043 N81-11364 #
AD-A089977 .... p0034 N81-11026 #
AD-A089996 .... p0034 N81-11025 #
AD-A090044 .... p0071 N81-12013 #
AD-A090049 .... p0039 N81-11120 #
AD-A090050 .... p0037 N81-11046 #
AD-A090052 .... p0092 N81-13046 #
AD-A090111 .... p0042 N81-11290 #
AD-A090112 .... p0038 N81-11117*#
AD-A090127 .... p0038 N81-11116 #
AD-A090270 .... p0033 N81-11017 #
AD-A090280 .... p0088 N81-12653 #
AD-A090282 .... p0087 N81-12651 #
AD-A090283 .... p0087 N81-12652 #
AD-A090284 .... p0075 N81-12058 #
AD-A090331 .... p0072 N81-12026 #
AD-A090394 .... p0075 N81-12062 #
AD-A090398 .... p0076 N81-12074 #
AD-A090408 .... p0093 N81-13060 #
AD-A090431 .... p0076 N81-12072 #
AD-A090440 .... p0076 N81-12070 #
AD-A090484 .... p0084 N81-12394 #
AD-A090506 .... p0081 N81-12107 #
AD-A090520 .... p0088 N81-12928 #
AD-A090525 .... p0076 N81-12073 #
AD-A090536 .... p0083 N81-12192 #
AD-A090546 .... p0081 N81-12108 #
AD-A090566 .... p0094 N81-13061 #
AD-A090616 .... p0091 N81-13042 #
AD-A090643 .... p0085 N81-12395 #
AD-A090645 .... p0081 N81-12106 #
AD-A090675 .... p0076 N81-12075 #
AD-A090722 .... p0094 N81-13068 #
AD-A090756 .... p0076 N81-12071 #
AD-A090762 .... p0083 N81-12191 #
AD-A090775 .... p0085 N81-12451 #
AD-A090778 .... p0072 N81-12024 #
AD-A090781 .... p0074 N81-12049 #
AD-A090803 .... p0074 N81-12048 #
AD-A090806 .... p0088 N81-12824 #
AD-A090829 .... p0141 N81-14986 #
AD-A090834 .... p0093 N81-13053 #
AD-A090975 .... p0092 N81-13049 #
AD-A091005 .... p0096 N81-13545 #
AD-A091007 .... p0091 N81-13038 #
AD-A091011 .... p0094 N81-13062 #
AD-A091014 .... p0094 N81-13067 #
AD-A091016 .... p0096 N81-13719 #
AD-A091017 .... p0096 N81-13720 #
AD-A091051 .... p0091 N81-13039 #
AD-A091074 .... p0092 N81-13047 #
AD-A091080 .... p0090 N81-13031 #
AD-A091083 .... p0092 N81-13048 #
AD-A091089 .... p0091 N81-13040 #
AD-A091129 .... p0092 N81-13050 #
AD-A091155 .... p0094 N81-13069 #
AD-A091156 .... p0095 N81-13072 #
AD-A091173 .... p0090 N81-13033 #
AD-A091235 .... p0091 N81-13036 #
AD-A091282 .... p0095 N81-13251 #
AD-A091292 .... p0096 N81-13717 #
AD-A091378 .... p0091 N81-13034 #
AD-A091543 .... p0133 N81-14276 #
AD-A091545 .... p0126 N81-13932 #
AD-A091636 .... p0146 N81-15729 #
AD-A091637 .... p0128 N81-13945 #
AD-A091674 .... p0129 N81-13955 #
AD-A091687 .... p0134 N81-14325 #
AD-A091694 .... p0131 N81-14061 #
AD-A091695 .... p0133 N81-14275 #
AD-A091712 .... p0130 N81-13966 #
AD-A091756 .... p0134 N81-14324 #
AD-A091774 .... p0131 N81-13977 #
AD-A091775 .... p0126 N81-13931 #
AD-A091785 .... p0132 N81-14084 #
AD-A091788 .... p0127 N81-13938 #
AD-A091810 .... p0127 N81-13940 #
AD-A091861 .... p0132 N81-14064 #
AD-A091885 .... p0193 N81-16035 #
AD-A091905 .... p0196 N81-16062 #
AD-A091906 .... p0194 N81-16044 #
AD-A091938 .... p0192 N81-16027 #
AD-A091943 .... p0195 N81-16049 #
AD-A091981 .... p0201 N81-16430 #
AD-A092016 .... p0191 N81-16024 #
AD-A092057 .... p0194 N81-16043 #
AD-A092109 .... p0194 N81-16048 #
AD-A092136 .... p0192 N81-16029 #
AD-A092138 .... p0196 N81-16060 #
AD-A092193 .... p0192 N81-16033 #
AD-A092228 .... p0202 N81-16629 #
AD-A092229 .... p0196 N81-16063 #
AD-A092240 .... p0201 N81-16627 #
AD-A092257 .... p0197 N81-16068 #
AD-A092291 .... p0196 N81-16064 #
AD-A092292 .... p0191 N81-16025 #
AD-A092316 .... p0201 N81-16357 #
AD-A092384 .... p0257 N81-18403
AD-A092437 .... p0185 N81-15975 #
AD-A092443 .... p0191 N81-16023 #
AD-A092450 .... p0193 N81-16034 #
AD-A092459 .... p0197 N81-16067 #
AD-A092478 .... p0197 N81-16070 #
AD-A092561 .... p0198 N81-16072 #
AD-A092585 .... p0193 N81-16036 #
AD-A092589 .... p0198 N81-16073 #
AD-A092591 .... p0202 N81-16825 #
AD-A092614 .... p0194 N81-16045 #
AD-A092633 .... p0194 N81-16046 #
AD-A092682 .... p0194 N81-16047 #
AD-A092686 .... p0198 N81-16071 #
AD-A092696 .... p0202 N81-16770 #
AD-A092721 .... p0191 N81-16026 #
AD-A092737 .... p0197 N81-16065 #
AD-A092741 .... p0192 N81-16030 #
AD-A092742 .... p0192 N81-16031 #
AD-A092744 .... p0192 N81-16032 #
AD-A092788 .... p0200 N81-16213 #
AD-A092825 .... p0201 N81-16375 #
AD-A092904 .... p0214 N81-17087 #
AD-A092906 .... p0211 N81-17061 #
AD-A092907 .... p0211 N81-17059*#
AD-A092909 .... p0204 N81-16995 #
AD-A092920 .... p0217 N81-17103 #
AD-A092945 .... p0219 N81-17299 #
AD-A092965 .... p0219 N81-17342 #
AD-A092974 .... p0208 N81-17041 #
AD-A092992 .... p0210 N81-17058 #
AD-A093037 .... p0208 N81-17043 #
AD-A093057 .... p0215 N81-17091 #
AD-A093063 .... p0209 N81-17048 #
AD-A093065 .... p0205 N81-16998 #
AD-A093087 .... p0222 N81-17936 #
AD-A093095 .... p0219 N81-17327 #
AD-A093113 .... p0216 N81-17100 #
AD-A093122 .... p0215 N81-17092 #
AD-A093125 .... p0209 N81-17047 #
AD-A093130 .... p0215 N81-17090 #
AD-A093144 .... p0221 N81-17848 #
AD-A093156 .... p0215 N81-17093 #
AD-A093225 .... p0215 N81-17089 #
AD-A093226 .... p0215 N81-17088 #
AD-A093253 .... p0216 N81-17099 #
AD-A093267 .... p0221 N81-17853 #
AD-A093281 .... p0211 N81-17062 #
AD-A093300 .... p0203 N81-16984 #
AD-A093301 .... p0217 N81-17104 #
AD-A093304 .... p0221 N81-17902 #
AD-A093307 .... p0211 N81-17060 #
AD-A093311 .... p0208 N81-17042 #
AD-A093314 .... p0220 N81-17476 #
AD-A093375 .... p0219 N81-17387 #
AD-A093425 .... p0207 N81-17035 #
AD-A093426 .... p0221 N81-17851 #
AD-A093427 .... p0207 N81-17036 #
AD-A093428 .... p0221 N81-17852 #
AD-A093448 .... p0206 N81-17025 #
AD-A093449 .... p0206 N81-17026 #
AD-A093483 .... p0217 N81-17101 #
AD-A093515 .... p0252 N81-18049 #

AD-A093542 .... p0208 N81-17046 #
AD-A093552 .... p0208 N81-17045 #
AD-A093553 .... p0206 N81-17024 #
AD-A093591 .... p0218 N81-17107 #
AD-A093748 .... p0206 N81-17027 #
AD-A093749 .... p0206 N81-17028 #
AD-A093750 .... p0206 N81-17029 #
AD-A093758 .... p0208 N81-17044 #
AD-A093772 .... p0219 N81-17333 #
AD-A093774 .... p0206 N81-17030 #
AD-A093775 .... p0207 N81-17031 #
AD-A093776 .... p0207 N81-17032 #
AD-A093777 .... p0207 N81-17033 #
AD-A093784 .... p0204 N81-16997 #
AD-A093803 .... p0218 N81-17242 #
AD-A093842 .... p0219 N81-17281 #
AD-A093868 .... p0216 N81-17095 #
AD-A093888 .... p0204 N81-16996 #
AD-A093929 .... p0217 N81-17105 #
AD-A093948 .... p0221 N81-17649 #
AD-A093953 .... p0216 N81-17094 #
AD-A093957 .... p0217 N81-17106 #
AD-A093970 .... p0203 N81-16983 #
AD-A093992 .... p0218 N81-17235 #
AD-A094031 .... p0252 N81-18054 #
AD-A094070 .... p0253 N81-18062 #
AD-A094071 .... p0250 N81-18041 #
AD-A094073 .... p0251 N81-18042 #
AD-A094124 .... p0250 N81-18037 #
AD-A094127 .... p0259 N81-18853 #
AD-A094152 .... p0250 N81-18038 #
AD-A094154 .... p0253 N81-18057 #
AD-A094167 .... p0257 N81-18394 #
AD-A094168 .... p0253 N81-18055 #
AD-A094169 .... p0250 N81-18036 #
AD-A094170 .... p0255 N81-18201 #
AD-A094172 .... p0252 N81-18052 #
AD-A094175 .... p0252 N81-18053 #
AD-A094177 .... p0250 N81-18040 #
AD-A094192 .... p0257 N81-18374 #
AD-A094195 .... p0250 N81-18039 #
AD-A094213 .... p0277 N81-19142 #
AD-A094225 .... p0252 N81-18051 #
AD-A094226 .... p0252 N81-18050 #
AD-A094227 .... p0258 N81-18733 #
AD-A094264 .... p0446 N81-25578 #
AD-A094323 .... p0249 N81-18034 #
AD-A094349 .... p0257 N81-18419 #
AD-A094350 .... p0258 N81-18420 #
AD-A094382 .... p0254 N81-18139*#
AD-A094465 .... p0276 N81-19133 #
AD-A094567 .... p0253 N81-18059 #
AD-A094608 .... p0254 N81-18066 #
AD-A094615 .... p0254 N81-18067 #
AD-A094634 .... p0272 N81-19105 #
AD-A094672 .... p0272 N81-19106 #
AD-A094705 .... p0273 N81-19113 #
AD-A094724 .... p0277 N81-19305 #
AD-A094733 .... p0273 N81-19107 #
AD-A094742 .... p0277 N81-19212 #
AD-A094751 .... p0263 N81-19030 #
AD-A094765 .... p0263 N81-19033 #
AD-A094769 .... p0273 N81-19109 #
AD-A094770 .... p0263 N81-19031 #
AD-A094775 .... p0263 N81-19032 #
AD-A094777 .... p0277 N81-19143 #
AD-A094815 .... p0261 N81-19015 #
AD-A094820 .... p0200 N81-16253*
AD-A094888 .... p0272 N81-19103 #
AD-A094989 .... p0263 N81-19028 #
AD-A095009 .... p0269 N81-19080 #
AD-A095049 .... p0270 N81-19084 #
AD-A095057 .... p0278 N81-19323 #
AD-A095063 .... p0263 N81-19029 #
AD-A095070 .... p0277 N81-19141 #
AD-A095076 .... p0270 N81-19085 #
AD-A095080 .... p0274 N81-19124 #
AD-A095144 .... p0274 N81-19123 #
AD-A095148 .... p0273 N81-19114 #
AD-A095285 .... p0337 N81-20447 #
AD-A095287 .... p0333 N81-20069 #
AD-A095354 .... p0331 N81-20045 #
AD-A095417 .... p0331 N81-20047 #
AD-A095418 .... p0331 N81-20046 #
AD-A095449 .... p0332 N81-20056 #
AD-A095462 .... p0331 N81-20055 #
AD-A095464 .... p0330 N81-20034 #
AD-A095554 .... p0336 N81-20345 #
AD-A095584 .... p0335 N81-20080 #
AD-A095617 .... p0334 N81-20070 #
AD-A095634 .... p0334 N81-20072 #
AD-A095659 .... p0334 N81-20071 #
AD-A095680 .... p0334 N81-20075 #
AD-A095705 .... p0335 N81-20079*#
AD-A095747 .... p0334 N81-20073 #
AD-A095930 .... p0343 N81-21089 #
AD-A096074 .... p0341 N81-21068 #
AD-A096088 .... p0341 N81-21067 #
AD-A096089 .... p0343 N81-21005 #
AD-A096183 .... p0341 N81-21070 #
AD-A096237 .... p0342 N81-21072 #
AD-A096238 .... p0341 N81-21071 #
AD-A096239 .... p0340 N81-21063 #
AD-A096245 .... p0339 N81-21051 #
AD-A096259 .... p0341 N81-21066 #
AD-A096264 .... p0340 N81-21052 #
AD-A096265 .... p0339 N81-21048 #
AD-A096276 .... p0339 N81-21049 #
AD-A096285 .... p0340 N81-21053 #
AD-A096291 .... p0341 N81-21069 #
AD-A096293 .... p0339 N81-21050 #
AD-A096325 .... p0343 N81-21088 #
AD-A096326 .... p0344 N81-21215 #
AD-A096329 .... p0341 N81-21065 #
AD-A096351 .... p0344 N81-21239 #
AD-A096359 .... p0342 N81-21076 #
AD-A096361 .... p0340 N81-21062 #
AD-A096422 .... p0446 N81-25691 #
AD-A096450 .... p0441 N81-25068 #
AD-A096458 .... p0381 N81-22974 #
AD-A096542 .... p0377 N81-22063 #
AD-A096550 .... p0374 N81-22041 #
AD-A096571 .... p0373 N81-22034 #
AD-A096572 .... p0374 N81-22044 #
AD-A096587 .... p0374 N81-22043 #
AD-A096594 .... p0375 N81-22045 #
AD-A096597 .... p0373 N81-22033 #
AD-A096688 .... p0381 N81-22971 #
AD-A096689 .... p0381 N81-22972 #
AD-A096690 .... p0381 N81-22973 #
AD-A096758 .... p0372 N81-22023 #
AD-A096755 .... p0377 N81-22106 #
AD-A096828 .... p0439 N81-25047 #
AD-A096870 .... p0375 N81-22050 #
AD-A096881 .... p0373 N81-22035 #
AD-A096980 .... p0375 N81-22049 #
AD-A097043 .... p0374 N81-22042 #
AD-A097115 .... p0387 N81-23062 #
AD-A097125 .... p0392 N81-23288 #
AD-A097155 .... p0384 N81-23024 #
AD-A097158 .... p0391 N81-23249 #
AD-A097199 .... p0389 N81-23077 #
AD-A097230 .... p0393 N81-23466 #
AD-A097283 .... p0393 N81-23438 #
AD-A097289 .... p0391 N81-23089 #
AD-A097334 .... p0391 N81-23097 #
AD-A097339 .... p0389 N81-23083 #
AD-A097356 .... p0385 N81-23043 #
AD-A097391 .... p0388 N81-23073 #
AD-A097419 .... p0388 N81-23074 #
AD-A097438 .... p0390 N81-23084 #
AD-A097505 .... p0388 N81-23075 #
AD-A097517 .... p0394 N81-23937 #
AD-A097522 .... p0389 N81-23082 #
AD-A097538 .... p0394 N81-23966 #
AD-A097540 .... p0394 N81-23967 #
AD-A097548 .... p0384 N81-23025 #
AD-A097551 .... p0390 N81-23088 #
AD-A097552 .... p0390 N81-23087 #
AD-A097562 .... p0392 N81-23358 #
AD-A097566 .... p0393 N81-23768 #
AD-A097568 .... p0386 N81-23060 #
AD-A097569 .... p0386 N81-23061 #
AD-A097570 .... p0387 N81-23063 #
AD-A097604 .... p0389 N81-23081 #
AD-A097626 .... p0394 N81-23864 #
AD-A097663 .... p0388 N81-23076 #
AD-A097692 .... p0392 N81-23325 #
AD-A097727 .... p0437 N81-24360 #
AD-A097731 .... p0426 N81-24049 #
AD-A097736 .... p0424 N81-24036 #
AD-A097756 .... p0425 N81-24041 #
AD-A097827 .... p0423 N81-24020 #
AD-A097863 .... p0427 N81-24059 #
AD-A098030 .... p0424 N81-24037 #
AD-A098093 .... p0425 N81-24042 #
AD-A098096 .... p0424 N81-24038 #
AD-A098097 .... p0438 N81-24846 #

AD-A098098 .... p0423 N81-24028 #
AD-A098155 .... p0434 N81-24108 #
AD-A098161 .... p0438 N81-24662 #
AD-A098173 .... p0425 N81-24044 #
AD-A098177 .... p0436 N81-24187 #
AD-A098178 .... p0435 N81-24118 #
AD-A098179 .... p0424 N81-24039 #
AD-A098180 .... p0424 N81-24031 #
AD-A098236 .... p0427 N81-24060 #
AD-A098293 .... p0429 N81-24069 #
AD-A098294 .... p0426 N81-24050 #
AD-A098300 .... p0426 N81-24051 #
AD-A098305 .... p0437 N81-24284 #
AD-A098414 .... p0444 N81-25089*#
AD-A098417 .... p0446 N81-25437 #
AD-A098438 .... p0446 N81-25637 #
AD-A098445 .... p0446 N81-25638 #
AD-A098451 .... p0440 N81-25061 #
AD-A098480 .... p0440 N81-25059 #
AD-A098481 .... p0445 N81-25240 #
AD-A098490 .... p0440 N81-25058 #
AD-A098509 .... p0441 N81-25069 #
AD-A098510 .... p0439 N81-25043 #
AD-A098528 .... p0440 N81-25060 #
AD-A098533 .... p0442 N81-25071 #
AD-A098584 .... p0442 N81-25072 #
AD-A098589 .... p0439 N81-25045 #
AD-A098614 .... p0444 N81-25086 #
AD-A098618 .... p0444 N81-25085 #
AD-A098623 .... p0444 N81-25087 #
AD-A098651 .... p0440 N81-25056 #
AD-A098675 .... p0442 N81-25070 #
AD-A098703 .... p0439 N81-25046 #
AD-A098709 .... p0444 N81-25088 #
AD-A098710 .... p0439 N81-25044 #
AD-A098784 .... p0491 N81-26349 #
AD-A098788 .... p0492 N81-26647 #
AD-A098794 .... p0486 N81-26121 #
AD-A098799 .... p0492 N81-26649*#
AD-A099130 .... p0491 N81-26394 #
AD-A099147 .... p0493 N81-27065 #
AD-A099169 .... p0490 N81-26151 #
AD-A099176 .... p0493 N81-27064 #
AD-A099192 .... p0486 N81-26120*#
AD-A099218 .... p0484 N81-26090 #
AD-A099236 .... p0486 N81-26119 #
AD-A099298 .... p0484 N81-26086 #
AD-A099326 .... p0484 N81-26088 #
AD-A099327 .... p0483 N81-26035 #
AD-A099330 .... p0495 N81-27081 #
AD-A099331 .... p0495 N81-27082 #
AD-A099332 .... p0495 N81-27083 #
AD-A099391 .... p0494 N81-27080 #
AD-A099404 .... p0483 N81-26082 #
AD-A099407 .... p0491 N81-26209 #
AD-A099513 .... p0499 N81-27372 #
AD-A099525 .... p0494 N81-27073 #
AD-A099629 .... p0499 N81-27206 #
AD-A099632 .... p0493 N81-27071 #
AD-A099662 .... p0492 N81-27051 #
AD-A099694 .... p0500 N81-27889 #
AD-A099765 .... p0495 N81-27084 #
AD-A099814 .... p0500 N81-27890 #
AD-A099894 .... p0497 N81-27100 #
AD-A100018 .... p0493 N81-27072 #
AD-A100045 .... p0498 N81-27117 #
AD-A100110 .... p0537 N81-28060 #
AD-A100136 .... p0537 N81-28076 #
AD-A100181 .... p0538 N81-28087 #
AD-A100199 .... p0541 N81-28108 #
AD-A100200 .... p0541 N81-28109 #
AD-A100213 .... p0543 N81-28788 #
AD-A100214 .... p0543 N81-28789 #
AD-A100215 .... p0543 N81-28785 #
AD-A100216 .... p0543 N81-28787 #
AD-A100217 .... p0543 N81-28786 #
AD-A100332 .... p0542 N81-28276 #
AD-A100334 .... p0540 N81-28104 #
AD-A100370 .... p0537 N81-28077 #
AD-A100386 .... p0540 N81-28103 #
AD-A100489 .... p0542 N81-28277 #
AD-A100496 .... p0539 N81-28089 #
AD-A100525 .... p0540 N81-28099 #
AD-A100551 .... p0539 N81-28088 #
AD-A100575 .... p0539 N81-28092 #
AD-A100577 .... p0539 N81-28093 #
AD-A100629 .... p0551 N81-29323 #
AD-A100665 .... p0547 N81-29112 #
AD-A100666 .... p0547 N81-29113 #
AD-A100691 .... p0552 N81-29661 #
AD-A100692 .... p0551 N81-29247 #
AD-A100696 .... p0550 N81-29140 #
AD-A100785 .... p0552 N81-29354 #
AD-A100794 .... p0549 N81-29136 #
AD-A100808 .... p0540 N81-28105 #
AD-A100836 .... p0547 N81-29116 #
AD-A100946 .... p0548 N81-29121 #
AD-A101102 .... p0549 N81-29131 #
AD-A101136 .... p0539 N81-28091 #
AD-A101137 .... p0539 N81-28090 #
AD-A101143 .... p0551 N81-29317 #
AD-A101186 .... p0547 N81-29120 #
AD-A101239 .... p0548 N81-29122 #
AD-A101309 .... p0581 N81-30116 #
AD-A101316 .... p0552 N81-29362 #
AD-A101347 .... p0580 N81-30103 #
AD-A101412 .... p0584 N81-30138*#
AD-A101423 .... p0583 N81-30128 #
AD-A101461 .... p0582 N81-30119 #
AD-A101473 .... p0580 N81-30104 #
AD-A101482 .... p0584 N81-30141 #
AD-A101457 .... p0585 N81-30160 #
AD-A101503 .... p0583 N81-30127 #
AD-A101516 .... p0548 N81-29123 #
AD-A101595 .... p0583 N81-30131 #
AD-A101601 .... p0580 N81-30102 #
AD-A101603 .... p0582 N81-30117 #
AD-A101640 .... p0548 N81-29124 #
AD-A101642 .... p0586 N81-30338 #
AD-A101643 .... p0552 N81-29536 #
AD-A101646 .... p0581 N81-30113 #
AD-A101647 .... p0581 N81-30114 #
AD-A101648 .... p0581 N81-30115 #
AD-A101651 .... p0548 N81-29125 #
AD-A101673 .... p0586 N81-30282 #
AD-A101674 .... p0588 N81-30659 #
AD-A101675 .... p0580 N81-30091 #
AD-A101698 .... p0582 N81-30120 #
AD-A101713 .... p0583 N81-30132 #
AD-A101723 .... p0548 N81-29126 #
AD-A101726 .... p0587 N81-30476 #
AD-A101731 .... p0581 N81-30107 #
AD-A101768 .... p0589 N81-30911 #
AD-A101828 .... p0589 N81-30910 #
AD-A101944 .... p0593 N81-31153 #
AD-A101951 .... p0602 N81-31235 #
AD-A102023 .... p0595 N81-31182 #
AD-A102028 .... p0601 N81-31232 #
AD-A102113 .... p0597 N81-31191 #
AD-A102155 .... p0596 N81-31188 #
AD-A102159 .... p0600 N81-31218 #
AD-A102163 .... p0595 N81-31181 #
AD-A102170 .... p0600 N81-31219 #
AD-A102196 .... p0630 N81-32156 #
AD-A102197 .... p0629 N81-32144 #
AD-A102241 .... p0594 N81-31154 #
AD-A102257 .... p0600 N81-31220 #
AD-A102336 .... p0602 N81-31320 #
AD-A102355 .... p0602 N81-31236 #
AD-A102384 .... p0630 N81-32155 #
AD-A102388 .... p0590 N81-31104 #
AD-A102420 .... p0601 N81-31233 #
AD-A102495 .... p0596 N81-31187 #
AD-A102510 .... p0601 N81-31234 #
AD-A102519 .... p0596 N81-31183 #
AD-A102520 .... p0602 N81-31238 #
AD-A102521 .... p0630 N81-32158 #
AD-A102575 .... p0628 N81-32141 #
AD-A102612 .... p0627 N81-32124 #
AD-A102626 .... p0629 N81-32152 #
AD-A102750 .... p0628 N81-32142 #
AD-A102771 .... p0630 N81-32290 #
AD-A102803 .... p0628 N81-32130 #
AD-A102852 .... p0629 N81-32150 #
AD-A102873 .... p0630 N81-32273 #
AD-A102923 .... p0631 N81-32522 #
AD-A103090 .... p0627 N81-32128 #
AD-A103108 .... p0628 N81-32140 #
AD-A103191 .... p0636 N81-33175 #
AD-A103261 .... p0638 N81-33196 #
AD-A103262 .... p0635 N81-33197 #
AD-A103282 .... p0635 N81-33173 #
AD-A103316 .... p0636 N81-33174 #
AD-A103351 .... p0636 N81-33182 #
AD-A103383 .... p0635 N81-33163 #
AD-A103421 .... p0638 N81-33204 #
AD-A103434 .... p0637 N81-33192 #
AD-A103535 .... p0637 N81-33193 #

AD-A103575 .... p0636 N81-33181 #
AD-A103579 .... p0637 N81-33195 #
AD-A103623 .... p0631 N81-33133 #
AD-A103724 .... p0641 N81-33548 #
AD-A103737 .... p0639 N81-33214 #
AD-A103783 .... p0631 N81-33134 #
AD-A103785 .... p0632 N81-33135 #
AD-A103836 .... p0640 N81-33241 #
AD-A103837 .... p0640 N81-33390 #
AD-A103894 .... p0636 N81-33183 #
AD-A103927 .... p0640 N81-33393 #
AD-A104015 .... p0640 N81-33240 #
AD-A104089 .... p0632 N81-33136 #
AD-A104137 .... p0638 N81-33199 #
AD-A104145 .... p0640 N81-33392 #
AD-A104150 .... p0636 N81-33184 #
AD-A104154 .... p0639 N81-33216 #
AD-A104155 .... p0639 N81-33217 #
AD-A104161 .... p0636 N81-33177 #

AD-E200630 .... p0219 N81-17333 #
AD-E430597 .... p0439 N81-25045 #
AD-E800237 .... p0373 N81-22035 #
AD-E850038 .... p0446 N81-25637 #
AD-E850039 .... p0446 N81-25638 #
AD-E900008 .... p0132 N81-14084 #
AD-E900014 .... p0127 N81-13938 #
AD-E900032 .... p0197 N81-16070 #
AD-E900055 .... p0263 N81-19030 #
AD-E950035 .... p0193 N81-16035 #
AD-E950071 .... p0217 N81-17101 #
AD-E950082 .... p0277 N81-19212 #

AD-TR-80-59 .... p0373 N81-22035 #

ADCR-80-1 .... p0197 N81-16068 #

AEDC-TR-79-59 .... p0217 N81-17106 #
AEDC-TR-79-63 .... p0126 N81-13932 #
AEDC-TR-79-77 .... p0036 N81-11040 #
AEDC-TR-79-87 .... p0094 N81-13068 #
AEDC-TR-80-1 .... p0277 N81-19142 #
AEDC-TR-80-5 .... p0094 N81-13061 #
AEDC-TR-80-8 .... p0126 N81-13931 #
AEDC-TR-80-10 .... p0033 N81-11016 #
AEDC-TR-80-11 .... p0038 N81-11093 #
AEDC-TR-80-20 .... p0133 N81-14275 #
AEDC-TR-80-32 .... p0630 N81-32155 #
AEDC-TR-80-34 .... p0131 N81-13977 #
AEDC-TR-80-35 .... p0439 N81-25084 #
AEDC-TR-80-60 .... p0628 N81-32140 #
AEDC-TR-81-3 .... p0627 N81-32124 #

AEDC-TSR-80-V16 .... p0217 N81-17105 #
AEDC-TSR-81-V18 .... p0635 N81-33163 #

AEM-200 .... p0034 N81-11026 #

AERO-454.017/80 .... p0434 N81-24110 #

AEROCHEM-TP-407 .... p0540 N81-28099 #

AESO-161-01-80 .... p0088 N81-12653 #

AFAL-TR-79-1235 .... p0028 N81-10063 #

AFAMRL-TR-80-98 .... p0539 N81-28088 #
AFAMRL-TR-80-104 .... p0259 N81-18853 #
AFAMRL-TR-80-105 .... p0041 N81-11233 #
AFAMRL-TR-80-116 .... p0210 N81-17058 #
AFAMRL-TR-80-128 .... p0446 N81-25570 #
AFAMRL-TR-80-130 .... p0249 N81-18034 #
AFAMRL-TR-81-21 .... p0341 N81-21070 #
AFAMRL-TR-81-25 .... p0426 N81-24049 #
AFAMRL-TR-81-28 .... p0500 N81-27889 #

AFAPL-TR-76-43-VOL-6 .... p0026 N81-10055 #
AFAPL-TR-78-6-PT-6 .... p0257 N81-18394 #
AFAPL-TR-79-2072 .... p0029 N81-10073 #
AFAPL-TR-79-2095 .... p0254 N81-18139*#

AFESC/ESL-TR-79-29 .... p0029 N81-10073 #
AFESC/ESL-TR-79-30 .... p0087 N81-12651 #
AFESC/ESL-TR-79-43 .... p0030 N81-10080 #
AFESC/ESL-TR-80-1 .... p0023 N81-10024 #
AFESC/ESL-TR-80-08 .... p0088 N81-12653 #
AFESC/ESL-TR-80-17-VOL-1 .... p0032 N81-10580 #
AFESC/ESL-TR-80-17-VOL-2 .... p0032 N81-10581 #
AFESC/ESL-TR-80-25 .... p0542 N81-28277 #
AFESC/ESL-TR-80-32 .... p0194 N81-16043 #
AFESC/ESL-TR-80-38 .... p0087 N81-12652 #
AFESC/ESL-TR-80-46 .... p0278 N81-19323 #
AFESC/ESL-TR-81-09 .... p0540 N81-28099 #

AFFDL-TR-76-140 .... p0492 N81-26847 #
AFFDL-TR-77-123 .... p0492 N81-26849*#
AFFDL-TR-78-194-PT-4 .... p0139 N81-14969 #
AFFDL-TR-79-3103 .... p0091 N81-13039 #

AFFTC-TIH-77-1-VOL-1 .... p0076 N81-12073 #
AFFTC-TIH-77-1-VOL-2 .... p0076 N81-12073 #
AFFTC-TIH-79-2 .... p0076 N81-12073 #
AFFTC-TIH-81-1 .... p0548 N81-29123 #

AFGL-TR-80-0226 .... p0331 N81-20045 #
AFGL-TR-80-0367 .... p0372 N81-22023 #

AFHRL-TP-81-17 .... p0590 N81-31104 #

AFHRL-TR-79-8 .... p0211 N81-17062 #
AFHRL-TR-79-27 .... p0277 N81-19141 #
AFHRL-TR-79-51 .... p0343 N81-21089 #
AFHRL-TR-80-20 .... p0254 N81-18066 #
AFHRL-TR-80-60 .... p0602 N81-31235 #
AFHRL-TR-81-3 .... p0601 N81-31234 #
AFHRL-TR-81-4-1-VOL-1 .... p0389 N81-23083 #
AFHRL-TR-81-4-1-VOL-1 .... p0390 N81-23084 #

AFISC-TR-81-001 .... p0635 N81-33173 #

AFIT-CI-80-10T .... p0197 N81-16067 #
AFIT-CI-80-22D .... p0185 N81-15975 #
AFIT-CI-80-30D .... p0191 N81-16023 #
AFIT-CI-80-67T .... p0587 N81-30476 #
AFIT-CI-80-68T .... p0585 N81-30160 #

AFIT-LSSR-10-81 .... p0631 N81-33134 #
AFIT-LSSR-26-81 .... p0632 N81-33135 #
AFIT-LSSR-36-80 .... p0031 N81-10446 #
AFIT-LSSR-68-80 .... p0028 N81-10070 #

AFIT/DS/EE/81-1 .... p0551 N81-29317 #
AFIT/GAE/AA/80D-2 .... p0263 N81-19031 #
AFIT/GAE/AA/80D-9 .... p0263 N81-19033 #
AFIT/GAE/AA/80D-10 .... p0277 N81-19143 #
AFIT/GAE/AA/80D-12 .... p0540 N81-28105 #
AFIT/GAE/AA/80D-14 .... p0263 N81-19032 #
AFIT/GAE/AA/80D-17 .... p0273 N81-19107 #
AFIT/GAE/AA/80D-21 .... p0273 N81-19109 #
AFIT/GCS/EE/80-1 .... p0552 N81-29354 #
AFIT/GE/EE/80D-36 .... p0549 N81-29136 #
AFIT/GOR/OS/80D-1 .... p0261 N81-19015 #
AFIT/GST/OS/81M-1 .... p0539 N81-28091 #
AFIT/GST/OS/81M-3 .... p0539 N81-28090 #
AFIT/GST/OS/81M-9 .... p0547 N81-29120 #

AFLRL-138 .... p0542 N81-28276 #

AFML-TR-78-195 .... p0048 N81-12010 #
AFML-TR-79-4173-PT-1 .... p0036 N81-11041 #
AFML-TR-79-4173-PT-2 .... p0029 N81-10074 #
AFML-TR-79-4222 .... p0048 N81-12010 #

AFOSR-80-0476TR .... p0030 N81-10128 #
AFOSR-80-0754TR .... p0045 N81-11774 #
AFOSR-80-0755TR .... p0081 N81-12107 #
AFOSR-80-0876TR .... p0037 N81-11047 #
AFOSR-80-0961TR .... p0037 N81-11046 #
AFOSR-80-1005TR .... p0083 N81-12192 #
AFOSR-80-1039TR .... p0129 N81-13955 #
AFOSR-80-1040TR .... p0209 N81-17048 #
AFOSR-80-1041TR .... p0081 N81-12108 #
AFOSR-80-1070TR .... p0085 N81-12451 #
AFOSR-80-1190TR .... p0211 N81-17061 #
AFOSR-80-1192TR .... p0196 N81-16077 #
AFOSR-80-1214TR .... p0197 N81-16065 #
AFOSR-80-1215TR .... p0215 N81-17090 #
AFOSR-80-1254TR .... p0191 N81-16026 #
AFOSR-80-1355TR .... p0219 N81-17387 #
AFOSR-80-1357TR .... p0203 N81-16984 #
AFOSR-80-1359TR .... p0217 N81-17104 #
AFOSR-81-0109TR .... p0335 N81-20079*#
AFOSR-81-0286TR .... p0423 N81-24028 #
AFOSR-81-0309TR .... p0375 N81-22049 #
AFOSR-81-0313TR .... p0384 N81-23025 #
AFOSR-81-0479TR .... p0541 N81-28108 #
AFOSR-81-0480TR .... p0541 N81-28109 #
AFOSR-81-0572TR .... p0593 N81-31153 #

AFOSR-81-0589TR	p0630	N81-32273 #
AFOSR-81-0594TR	p0602	N81-31320 #
AFOSR-81-0608TR	p0629	N81-32150 #
AFWAL-TR-80-2	p0209	N81-17047 #
AFWAL-TR-80-1057	p0195	N81-16049 #
AFWAL-TR-80-1088	p0276	N81-19133 #
AFWAL-TR-80-1145-VOL-1	p0273	N81-19113 #
AFWAL-TR-80-2010	p0216	N81-17095 #
AFWAL-TR-80-2022	p0214	N81-17087 #
AFWAL-TR-80-2023	p0133	N81-14276 #
AFWAL-TR-80-2031	p0208	N81-17046 #
AFWAL-TR-80-2032	p0215	N81-17093 #
AFWAL-TR-80-2035	p0029	N81-10072 #
AFWAL-TR-80-2038	p0388	N81-23073 #
AFWAL-TR-80-2049	p0208	N81-17045 #
AFWAL-TR-80-2053-VOL-1	p0215	N81-17089 #
AFWAL-TR-80-2053-VOL-2	p0215	N81-17088 #
AFWAL-TR-80-2055-VOL-1	p0030	N81-10081 #
AFWAL-TR-80-2056	p0215	N81-17092 #
AFWAL-TR-80-2057	p0134	N81-14325 #
AFWAL-TR-80-2058	p0211	N81-17059*#
AFWAL-TR-80-2063-VOL-1	p0444	N81-25087 #
AFWAL-TR-80-2063-VOL-2	p0444	N81-25086 #
AFWAL-TR-80-2092	p0278	N81-19323 #
AFWAL-TR-80-2098	p0566	N81-30282 #
AFWAL-TR-80-2100	p0444	N81-25085 #
AFWAL-TR-80-2115	p0552	N81-29362 #
AFWAL-TR-80-2126	p0583	N81-30132 #
AFWAL-TR-80-2129	p0457	N81-27100 #
AFWAL-TR-80-3014-VOL-1	p0373	N81-22033 #
AFWAL-TR-80-3015	p0094	N81-13067 #
AFWAL-TR-80-3020	p0030	N81-10152 #
AFWAL-TR-80-3023	p0377	N81-22106 #
AFWAL-TR-80-3029	p0257	N81-18374 #
AFWAL-TR-80-3032-VOL-1	p0495	N81-27081 #
AFWAL-TR-80-3032-VOL-2	p0494	N81-27080 #
AFWAL-TR-80-3032-VOL-3	p0495	N81-27082 #
AFWAL-TR-80-3032-VOL-4	p0495	N81-27083 #
AFWAL-TR-80-3050	p0045	N81-11778 #
AFWAL-TR-80-3061	p0021	N81-10008 #
AFWAL-TR-80-3070	p0565	N81-30159 #
AFWAL-TR-80-3072	p0217	N81-17103 #
AFWAL-TR-80-3080	p0204	N81-16996 #
AFWAL-TR-80-3084	p0127	N81-13940 #
AFWAL-TR-80-3086	p0211	N81-17060 #
AFWAL-TR-80-3092	p0204	N81-16995 #
AFWAL-TR-80-3094	p0374	N81-22042 #
AFWAL-TR-80-3105	p0330	N81-20034 #
AFWAL-TR-80-3110-PT-1	p0637	N81-33192 #
AFWAL-TR-80-3115	p0463	N81-26082 #
AFWAL-TR-80-3118-VOL-1	p0374	N81-22044 #
AFWAL-TR-80-3118-VOL-2	p0375	N81-22045 #
AFWAL-TR-80-3119	p0442	N81-25070 #
AFWAL-TR-80-3131	p0258	N81-18733 #
AFWAL-TR-80-3132-PT-1	p0638	N81-33196 #
AFWAL-TR-80-3132-PT-2	p0638	N81-33197 #
AFWAL-TR-80-3141-PT-1	p0581	N81-30113 #
AFWAL-TR-80-3141-PT-2	p0581	N81-30114 #
AFWAL-TR-80-3141-PT-3	p0581	N81-30115 #
AFWAL-TR-80-4075	p0131	N81-14061 #
AFWAL-TR-80-4081-PT-1	p0257	N81-18419 #
AFWAL-TR-80-4081-PT-2	p0258	N81-18420 #
AFWAL-TR-80-4098	p0218	N81-17235 #
AFWAL-TR-80-4102-PT-1	p0539	N81-28089 #
AFWAL-TR-80-4118	p0335	N81-20680 #
AFWAL-TR-81-1044	p0339	N81-21051 #
AFWAL-TR-81-2008	p0583	N81-30131 #
AFWAL-TR-81-2016	p0552	N81-29536 #
AFWAL-TR-81-2020	p0600	N81-31219 #
AFWAL-TR-81-2033	p0630	N81-32290 #
AFWAL-TR-81-3004	p0540	N81-28104 #
AFWAL-TR-81-3027	p0498	N81-27117 #
AFWAL-TR-81-3032	p0492	N81-27051 #
AFWAL-TR-81-3070	p0564	N81-30138*#
AFWL-TR-79-156	p0219	N81-17333 #
AFWL-TR-80-119	p0548	N81-29126 #
AGARD-AG-255	p0211	N81-17063 #
AGARD-AR-146	p0392	N81-23431 #
AGARD-AR-164	p0541	N81-28107 #
AGARD-CP-288	p0039	N81-11128 #
AGARD-CP-289	p0045	N81-11902 #
AGARD-CP-293	p0429	N81-24071 #
AGARD-CP-297	p0487	N81-26126 #
AGARD-CP-298	p0484	N8.-26091 #
AGARD-CP-311	p0603	N81-31449 #
AGARD-CP-313	p0632	N81-33137 #
AGARD-LS-107	p0583	N81-30133 #
AGARD-LS-113	p0497	N81-27103 #
AGARD-LS-114	p0590	N81-31105 #
AGARD-MAN-10(ENG)	p0640	N81-33503 #
AGARD-R-677	p0596	N81-31186 #
AGARD-R-688	p0033	N81-11019 #
AGARD-R-689	p0082	N81-12115 #
AGARD-R-691	p0333	N81-20064 #
AGARD-R-692	p0435	N81-24120 #
AGARD-R-699	p0635	N81-33161 #
AGARDOGRAPH-255	p0211	N81-17063 #
AHS PAPER 81-58	p0370	A81-33952*#
AHS 80-2	p0473	A81-40137*#
AHS 80-3	p0473	A81-40138
AHS 80-4	p0473	A81-40139
AHS 80-8	p0473	A81-40141
AHS 80-10	p0473	A81-40143
AHS 80-11	p0474	A81-40144
AHS 80-12	p0474	A81-40145
AHS 80-15	p0474	A81-40146
AHS 80-16	p0474	A81-40147*#
AHS 80-17	p0474	A81-40148
AHS 80-18	p0474	A81-40149 #
AHS 80-20	p0474	A81-40150
AHS 80-21	p0474	A81-40151
AHS 80-22	p0475	A81-40152
AHS 80-23	p0475	A81-40153
AHS 80-24	p0475	A81-40154
AHS 80-25	p0475	A81-40155 #
AHS 80-26	p0475	A81-40156 #
AHS 80-27	p0475	A81-40157
AHS 80-28	p0475	A81-40158 #
AHS 80-29	p0476	A81-40159
AHS 80-30	p0476	A81-40160*#
AHS 80-31	p0476	A81-40161
AHS 80-32	p0476	A81-40162
AHS 80-34	p0478	A81-40175
AHS 80-35	p0476	A81-40164
AHS 80-36	p0476	A81-40165
AHS 80-38	p0477	A81-40167
AHS 80-39	p0477	A81-40168
AHS 80-41	p0477	A81-40169
AHS 80-42	p0477	A81-40170
AHS 80-44	p0477	A81-40171
AHS 80-45	p0477	A81-40172 #
AHS 80-46	p0477	A81-40173
AHS 80-47	p0477	A81-40174
AHS 80-48	p0476	A81-40163
AHS 80-51	p0478	A81-40178
AHS 80-55	p0478	A81-40180*#
AHS 80-56	p0478	A81-40181
AHS 80-59	p0478	A81-40183
AHS 80-60	p0479	A81-40184*
AHS 80-62	p0479	A81-40185
AHS 80-63	p0479	A81-40186
AHS 80-64	p0479	A81-40187
AHS 80-68	p0479	A81-40188
AHS 80-71	p0479	A81-40189*
AIAA PAPER 79-1565	p0183	A81-23367 #
AIAA PAPER 79-1658	p0066	A81-15887 #
AIAA PAPER 79-1822	p0051	A81-13218 #
AIAA PAPER 79-1879	p0169	A81-21011 #
AIAA PAPER 80-0168	p0354	A81-31601 #
AIAA PAPER 80-0976	p0411	A81-35634 #
AIAA PAPER 80-0993	p0352	A81-31369 #
AIAA PAPER 80-1006	p0057	A81-14300 #
AIAA PAPER 80-1284	p0511	A81-41748 #
AIAA PAPER 81-0001	p0156	A81-20526 #
AIAA PAPER 81-0002	p0156	A81-20527 #
AIAA PAPER 81-0007	p0156	A81-20531 #
AIAA PAPER 81-0008	p0157	A81-20532*#
AIAA PAPER 81-0011	p0157	A81-20535 #
AIAA PAPER 81-0013	p0157	A81-20537 #
AIAA PAPER 81-0014	p0157	A81-20538*#
AIAA PAPER 81-0015	p0157	A81-20539 #
AIAA PAPER 81-0016	p0157	A81-20540*#
AIAA PAPER 81-0017	p0157	A81-20541*#
AIAA PAPER 81-0018	p0158	A81-20542*#
AIAA PAPER 81-0019	p0158	A81-20543 #
AIAA PAPER 81-0021	p0158	A81-20544*#
AIAA PAPER 81-0022	p0158	A81-20545 #

AIAA PAPER 81-0039 .... p0158 A81-20559 #
AIAA PAPER 81-0047 .... p0158 A81-20563 #
AIAA PAPER 81-0048 .... p0158 A81-20564 #
AIAA PAPER 81-0050 .... p0158 A81-20566*#
AIAA PAPER 81-0051 .... p0159 A81-20567 #
AIAA PAPER 81-0052 .... p0159 A81-20568*#
AIAA PAPER 81-0056 .... p0159 A81-20570 #
AIAA PAPER 81-0069 .... p0159 A81-20578 #
AIAA PAPER 81-0070 .... p0159 A81-20579 #
AIAA PAPER 81-0072 .... p0159 A81-20581 #
AIAA PAPER 81-0074 .... p0159 A81-20582*#
AIAA PAPER 81-0083 .... p0160 A81-20588*#
AIAA PAPER 81-0084 .... p0160 A81-20589 #
AIAA PAPER 81-0087 .... p0160 A81-20591 #
AIAA PAPER 81-0089 .... p0160 A81-20593 #
AIAA PAPER 81-0090 .... p0160 A81-20594 #
AIAA PAPER 81-0091 .... p0160 A81-20595 #
AIAA PAPER 81-0092 .... p0160 A81-20596*#
AIAA PAPER 81-0094 .... p0160 A81-20597*#
AIAA PAPER 81-0096 .... p0161 A81-20598*#
AIAA PAPER 81-0130 .... p0161 A81-20623*#
AIAA PAPER 81-0151 .... p0161 A81-20632 #
AIAA PAPER 81-0152 .... p0161 A81-20633*#
AIAA PAPER 81-0155 .... p0161 A81-20635 #
AIAA PAPER 81-0156 .... p0161 A81-20636*#
AIAA PAPER 81-0158 .... p0161 A81-20638 #
AIAA PAPER 81-0159 .... p0162 A81-20639 #
AIAA PAPER 81-0160 .... p0162 A81-20640 #
AIAA PAPER 81-0186 .... p0162 A81-20659*#
AIAA PAPER 81-0189 .... p0162 A81-20661 #
AIAA PAPER 81-0196 .... p0169 A81-20840*#
AIAA PAPER 81-0208 .... p0168 A81-20830*#
AIAA PAPER 81-0221 .... p0162 A81-20684 #
AIAA PAPER 81-0222 .... p0162 A81-20685 #
AIAA PAPER 81-0230 .... p0162 A81-20688 #
AIAA PAPER 81-0232 .... p0162 A81-20690 #
AIAA PAPER 81-0233 .... p0234 A81-25475*#
AIAA PAPER 81-0235 .... p0163 A81-20691 #
AIAA PAPER 81-0237 .... p0163 A81-20692 #
AIAA PAPER 81-0239 .... p0163 A81-20694*#
AIAA PAPER 81-0253 .... p0163 A81-20702 #
AIAA PAPER 81-0254 .... p0163 A81-20703*#
AIAA PAPER 81-0256 .... p0163 A81-20704 #
AIAA PAPER 81-0257 .... p0163 A81-20705 #
AIAA PAPER 81-0274 .... p0359 A81-32549*#
AIAA PAPER 81-0277 .... p0163 A81-20720 #
AIAA PAPER 81-0291 .... p0164 A81-20732 #
AIAA PAPER 81-0297 .... p0164 A81-20735*#
AIAA PAPER 81-0298 .... p0164 A81-20736 #
AIAA PAPER 81-0302 .... A81-20739 #
AIAA PAPER 81-0305 .... p0164 A81-20740*#
AIAA PAPER 81-0306 .... p0164 A81-20741*#
AIAA PAPER 81-0309 .... p0164 A81-20743 #
AIAA PAPER 81-0324 .... p0165 A81-20751 #
AIAA PAPER 81-0328 .... p0165 A81-20753 #
AIAA PAPER 81-0337 .... p0165 A81-20761*#
AIAA PAPER 81-0345 .... p0165 A81-20767*#
AIAA PAPER 81-0347 .... p0165 A81-20768 #
AIAA PAPER 81-0356 .... p0165 A81-20775 #
AIAA PAPER 81-0357 .... p0165 A81-20776*#
AIAA PAPER 81-0364 .... p0166 A81-20783 #
AIAA PAPER 81-0365 .... p0166 A81-20784 #
AIAA PAPER 81-0366 .... p0166 A81-20785 #
AIAA PAPER 81-0367 .... p0166 A81-20786 #
AIAA PAPER 81-0370 .... p0166 A81-20788*#
AIAA PAPER 81-0371 .... p0421 A81-37571 #
AIAA PAPER 81-0372 .... p0166 A81-20789*#
AIAA PAPER 81-0381 .... p0166 A81-20794 #
AIAA PAPER 81-0383 .... p0166 A81-20796 #
AIAA PAPER 81-0386 .... p0167 A81-20798*#
AIAA PAPER 81-0387 .... p0167 A81-20799 #
AIAA PAPER 81-0390 .... p0167 A81-20800*#
AIAA PAPER 81-0391 .... p0167 A81-20801 #
AIAA PAPER 81-0402 .... p0167 A81-20809 #
AIAA PAPER 81-0403 .... p0167 A81-20810*#
AIAA PAPER 81-0404 .... p0167 A81-20811*#
AIAA PAPER 81-0405 .... p0168 A81-20837*#
AIAA PAPER 81-0406 .... p0167 A81-20812 #
AIAA PAPER 81-0407 .... p0168 A81-20813 #
AIAA PAPER 81-0409 .... p0168 A81-20814 #
AIAA PAPER 81-0410 .... p0169 A81-20838 #
AIAA PAPER 81-0412 .... p0168 A81-20816 #
AIAA PAPER 81-0413 .... p0168 A81-20817 #
AIAA PAPER 81-0415 .... p0168 A81-20818 #
AIAA PAPER 81-0428 .... p0168 A81-20829*#
AIAA PAPER 81-0770 .... p0367 A81-33876 #
AIAA PAPER 81-0787 .... p0367 A81-33877 #
AIAA PAPER 81-0789 .... p0368 A81-33883 #
AIAA PAPER 81-0793 .... p0368 A81-33887 #
AIAA PAPER 81-0798 .... p0412 A81-35723*#
AIAA PAPER 81-0801 .... p0368 A81-33891 #
AIAA PAPER 81-0802 .... p0368 A81-33890 #
AIAA PAPER 81-0803 .... p0367 A81-33882*#
AIAA PAPER 81-0805 .... p0368 A81-33885 #
AIAA PAPER 81-0807 .... p0368 A81-33886 #
AIAA PAPER 81-0808 .... p0368 A81-33889 #
AIAA PAPER 81-0810 .... p0367 A81-33878 #
AIAA PAPER 81-0829 .... p0367 A81-33879 #
AIAA PAPER 81-0831 .... p0368 A81-33884 #
AIAA PAPER 81-0848 .... p0362 A81-32909 #
AIAA PAPER 81-0850 .... p0407 A81-34352 #
AIAA PAPER 81-0855 .... p0408 A81-34353 #
AIAA PAPER 81-0859 .... p0362 A81-32910 #
AIAA PAPER 81-0865 .... p0408 A81-34354 #
AIAA PAPER 81-0893 .... p0362 A81-32918 #
AIAA PAPER 81-0895 .... p0362 A81-32920 #
AIAA PAPER 81-0896 .... p0362 A81-32921 #
AIAA PAPER 81-0897 .... p0362 A81-32922 #
AIAA PAPER 81-0905 .... p0362 A81-32926 #
AIAA PAPER 81-0912 .... p0362 A81-32930 #
AIAA PAPER 81-0913 .... p0363 A81-32931 #
AIAA PAPER 81-0914 .... p0408 A81-34361 #
AIAA PAPER 81-0915 .... p0408 A81-34362 #
AIAA PAPER 81-0916 .... p0363 A81-32932*#
AIAA PAPER 81-0917 .... p0363 A81-32933 #
AIAA PAPER 81-0919 .... p0479 A81-40324 #
AIAA PAPER 81-0925 .... p0408 A81-34363*#
AIAA PAPER 81-0926 .... p0363 A81-32934 #
AIAA PAPER 81-0931 .... p0363 A81-32935 #
AIAA PAPER 81-0932 .... p0408 A81-34364 #
AIAA PAPER 81-0936 .... p0363 A81-32937 #
AIAA PAPER 81-0944 .... p0363 A81-32939 #
AIAA PAPER 81-1062 .... p0459 A81-39074*#
AIAA PAPER 81-1104 .... p0459 A81-39104 #
AIAA PAPER 81-1108 .... p0459 A81-39107 #
AIAA PAPER 81-1142 .... p0459 A81-39131*#
AIAA PAPER 81-1145 .... p0459 A81-39134*#
AIAA PAPER 81-1180 .... p0459 A81-39159 #
AIAA PAPER 81-1195 .... p0454 A81-38077*#
AIAA PAPER 81-1214 .... p0454 A81-38084*#
AIAA PAPER 81-1218 .... p0458 A81-39006 #
AIAA PAPER 81-1239 .... p0454 A81-38096 #
AIAA PAPER 81-1254 .... p0458 A81-39012 #
AIAA PAPER 81-1292 .... p0454 A81-38119 #
AIAA PAPER 81-1349 .... p0501 A81-40833 #
AIAA PAPER 81-1351 .... p0501 A81-40834 #
AIAA PAPER 81-1352 .... p0501 A81-40835 #
AIAA PAPER 81-1353 .... p0514 A81-42176*#
AIAA PAPER 81-1354 .... p0501 A81-40836*#
AIAA PAPER 81-1355 .... p0501 A81-40837 #
AIAA PAPER 81-1356 .... p0501 A81-40838 #
AIAA PAPER 81-1357 .... p0501 A81-40839*#
AIAA PAPER 81-1358 .... p0625 A81-49976 #
AIAA PAPER 81-1359 .... p0502 A81-40840 #
AIAA PAPER 81-1360 .... p0502 A81-40841 #
AIAA PAPER 81-1362 .... p0502 A81-40842*#
AIAA PAPER 81-1363 .... p0502 A81-40843 #
AIAA PAPER 81-1365 .... p0502 A81-40845 #
AIAA PAPER 81-1366 .... p0502 A81-40846 #
AIAA PAPER 81-1367 .... p0514 A81-42178 #
AIAA PAPER 81-1368 .... p0514 A81-42179 #
AIAA PAPER 81-1387 .... p0502 A81-40856 #
AIAA PAPER 81-1388 .... p0502 A81-40857*#
AIAA PAPER 81-1391 .... p0503 A81-40858 #
AIAA PAPER 81-1392 .... p0503 A81-40859*#
AIAA PAPER 81-1393 .... p0503 A81-40860 #
AIAA PAPER 81-1394 .... p0514 A81-42184 #
AIAA PAPER 81-1395 .... p0514 A81-42185 #
AIAA PAPER 81-1396 .... p0515 A81-42186*#
AIAA PAPER 81-1397 .... p0515 A81-42187 #
AIAA PAPER 81-1398 .... p0515 A81-42188 #
AIAA PAPER 81-1399 .... p0515 A81-42189 #
AIAA PAPER 81-1401 .... p0515 A81-42190 #
AIAA PAPER 81-1404 .... p0503 A81-40861 #
AIAA PAPER 81-1405 .... p0503 A81-40862 #
AIAA PAPER 81-1422 .... p0515 A81-42195*#
AIAA PAPER 81-1423 .... p0503 A81-40867 #
AIAA PAPER 81-1424 .... p0503 A81-40868 #
AIAA PAPER 81-1429 .... p0515 A81-4219[illegible] #
AIAA PAPER 81-1432 .... p0504 A81-40869 #
AIAA PAPER 81-1433 .... p0504 A81-40870 #
AIAA PAPER 81-1434 .... p0504 A81-40871 #
AIAA PAPER 81-1435 .... p0566 A81-45892 #
AIAA PAPER 81-1437 .... p0504 A81-40873 #
AIAA PAPER 81-1440 .... p0504 A81-40874 #
AIAA PAPER 81-1441 .... p0504 A81-40875 #
AIAA PAPER 81-1445 .... p0504 A81-40878*#
AIAA PAPER 81-1446 .... p0504 A81-40879 #

AIAA PAPER 81-1447 .... p0505 A81-40880 #
AIAA PAPER 81-1448 .... p0515 A81-42199 #
AIAA PAPER 81-1456 .... p0505 A81-40882*#
AIAA PAPER 81-1467 .... p0505 A81-40887 #
AIAA PAPER 81-1468 .... p0505 A81-40888*#
AIAA PAPER 81-1471 .... p0505 A81-40891 #
AIAA PAPER 81-1475 .... p0505 A81-40895 #
AIAA PAPER 81-1477 .... p0505 A81-40897 #
AIAA PAPER 81-1478 .... p0505 A81-40898 #
AIAA PAPER 81-1480 .... p0506 A81-40900 #
AIAA PAPER 81-1485 .... p0506 A81-40903*#
AIAA PAPER 81-1486 .... p0506 A81-40904 #
AIAA PAPER 81-1488 .... p0506 A81-40906 #
AIAA PAPER 81-1490 .... p0506 A81-40908 #
AIAA PAPER 81-1492 .... p0626 A81-49979 #
AIAA PAPER 81-1494 .... p0566 A81-45893*#
AIAA PAPER 81-1496 .... p0566 A81-45894 #
AIAA PAPER 81-1498 .... p0506 A81-40910 #
AIAA PAPER 81-1499 .... p0506 A81-40911 #
AIAA PAPER 81-1500 .... p0516 A81-42204 #
AIAA PAPER 81-1501 .... p0507 A81-40912*#
AIAA PAPER 81-1502 .... p0516 A81-42205 #
AIAA PAPER 81-1503 .... p0566 A81-45891 #
AIAA PAPER 81-1504 .... p0516 A81-42206 #
AIAA PAPER 81-1506 .... p0507 A81-40913 #
AIAA PAPER 81-1562 .... p0507 A81-40947 #
AIAA PAPER 81-1564 .... p0516 A81-42210*#
AIAA PAPER 81-1565 .... p0507 A81-40948 #
AIAA PAPER 81-1566 .... p0507 A81-40949 #
AIAA PAPER 81-1588 .... p0507 A81-40963*#
AIAA PAPER 81-1589 .... p0507 A81-40964 #
AIAA PAPER 81-1590 .... p0507 A81-40965 #
AIAA PAPER 81-1591 .... p0508 A81-40966 #
AIAA PAPER 81-1592 .... p0508 A81-40967 #
AIAA PAPER 81-1593 .... p0508 A81-40968 #
AIAA PAPER 81-1594 .... p0508 A81-40969*#
AIAA PAPER 81-1595 .... p0508 A81-40970*#
AIAA PAPER 81-1596 .... p0508 A81-40971*#
AIAA PAPER 81-1597 .... p0508 A81-40972*#
AIAA PAPER 81-1599 .... p0508 A81-40973*#
AIAA PAPER 81-1611 .... p0533 A81-43933 #
AIAA PAPER 81-1613 .... p0533 A81-43934*#
AIAA PAPER 81-1616 .... p0524 A81-43128 #
AIAA PAPER 81-1619 .... p0525 A81-43129 #
AIAA PAPER 81-1620 .... p0525 A81-43130 #
AIAA PAPER 81-1623 .... p0525 A81-43132 #
AIAA PAPER 81-1624 .... p0525 A81-43133 #
AIAA PAPER 81-1637 .... p0525 A81-43137 #
AIAA PAPER 81-1638 .... p0525 A81-43138 #
AIAA PAPER 81-1639 .... p0525 A81-43139 #
AIAA PAPER 81-1640 .... p0525 A81-43140 #
AIAA PAPER 81-1642 .... p0525 A81-43141 #
AIAA PAPER 81-1643 .... p0526 A81-43142*#
AIAA PAPER 81-1646 .... p0526 A81-43143 #
AIAA PAPER 81-1648 .... p0533 A81-43935 #
AIAA PAPER 81-1649 .... p0526 A81-43144 #
AIAA PAPER 81-1650 .... p0533 A81-43936 #
AIAA PAPER 81-1651 .... p0533 A81-43937 #
AIAA PAPER 81-1652 .... p0533 A81-43938 #
AIAA PAPER 81-1654 .... p0616 A81-48416 #
AIAA PAPER 81-1655 .... p0533 A81-43939 #
AIAA PAPER 81-1656 .... p0526 A81-43146*#
AIAA PAPER 81-1657 .... p0534 A81-43940 #
AIAA PAPER 81-1659 .... p0534 A81-43941 #
AIAA PAPER 81-1660 .... p0526 A81-43147 #
AIAA PAPER 81-1663 .... p0534 A81-43942 #
AIAA PAPER 81-1667 .... p0534 A81-43943 #
AIAA PAPER 81-1669 .... p0534 A81-43944 #
AIAA PAPER 81-1670 .... p0526 A81-43152 #
AIAA PAPER 81-1671 .... p0534 A81-43945 #
AIAA PAPER 81-1673 .... p0566 A81-45974 #
AIAA PAPER 81-1675 .... p0534 A81-43946*#
AIAA PAPER 81-1676 .... p0563 A81-44898*#
AIAA PAPER 81-1678 .... p0534 A81-43947 #
AIAA PAPER 81-1679 .... p0534 A81-43948 #
AIAA PAPER 81-1681 .... p0535 A81-43949 #
AIAA PAPER 81-1684 .... p0526 A81-43156*#
AIAA PAPER 81-1685 .... p0526 A81-43157 #
AIAA PAPER 81-1686 .... p0527 A81-43158 #
AIAA PAPER 81-1687 .... p0535 A81-43950*#
AIAA PAPER 81-1690 .... p0527 A81-43159 #
AIAA PAPER 81-1691 .... p0535 A81-43952 #
AIAA PAPER 81-1692 .... p0617 A81-48417 #
AIAA PAPER 81-1693 .... p0563 A81-44899 #
AIAA PAPER 81-1696 .... p0535 A81-43953 #
AIAA PAPER 81-1697 .... p0535 A81-43954 #
AIAA PAPER 81-1700 .... p0527 A81-43161 #
AIAA PAPER 81-1706 .... p0527 A81-43162 #
AIAA PAPER 81-1707 .... p0535 A81-43955 #
AIAA PAPER 81-1709 .... p0527 A81-43163 #
AIAA PAPER 81-1710 .... p0535 A81-43956 #
AIAA PAPER 81-1713 .... p0527 A81-43164 #
AIAA PAPER 81-1715 .... p0527 A81-43165 #
AIAA PAPER 81-1723 .... p0528 A81-43166 #
AIAA PAPER 81-1729 .... p0536 A81-43959*#
AIAA PAPER 81-1730 .... p0528 A81-43169 #
AIAA PAPER 81-1731 .... p0528 A81-43170 #
AIAA PAPER 81-1733 .... p0528 A81-43171 #
AIAA PAPER 81-1734 .... p0528 A81-43172 #
AIAA PAPER 81-1735 .... p0536 A81-43960 #
AIAA PAPER 81-1736 .... p0528 A81-43173 #
AIAA PAPER 81-1738 .... p0528 A81-43175*#
AIAA PAPER 81-1855 .... p0560 A81-44554*#
AIAA PAPER 81-1857 .... p0560 A81-44556*#
AIAA PAPER 81-1858 .... p0560 A81-44557 #
AIAA PAPER 81-1864 .... p0560 A81-44561 #
AIAA PAPER 81-1866 .... p0560 A81-44562*#
AIAA PAPER 81-1867 .... p0560 A81-44563 #
AIAA PAPER 81-1876 .... p0561 A81-44570*#
AIAA PAPER 81-1884 .... p0561 A81-44576 #
AIAA PAPER 81-1885 .... p0561 A81-44577 #
AIAA PAPER 81-1886 .... p0561 A81-44578 #
AIAA PAPER 81-1887 .... p0561 A81-44579 #
AIAA PAPER 81-1889 .... p0561 A81-44580 #
AIAA PAPER 81-1892 .... p0561 A81-44581 #
AIAA PAPER 81-1963 .... p0618 A81-48607*#
AIAA PAPER 81-1969 .... p0619 A81-48618*#
AIAA PAPER 81-1970 .... p0618 A81-48608 #
AIAA PAPER 81-1971 .... p0618 A81-48612*#
AIAA PAPER 81-1981 .... p0624 A81-49736*#
AIAA PAPER 81-1982 .... p0618 A81-48602 #
AIAA PAPER 81-1988 .... p0620 A81-48638*#
AIAA PAPER 81-1990 .... p0620 A81-48636 #
AIAA PAPER 81-1991 .... p0624 A81-49743*#
AIAA PAPER 81-1994 .... p0621 A81-48639*#
AIAA PAPER 81-2003 .... p0619 A81-48615*#
AIAA PAPER 81-2004 .... p0620 A81-48634 #
AIAA PAPER 81-2005 .... p0624 A81-49732 #
AIAA PAPER 81-2007 .... p0621 A81-48640*#
AIAA PAPER 81-2018 .... p0624 A81-49731*#
AIAA PAPER 81-2020 .... p0623 A81-49730 #
AIAA PAPER 81-2022 .... p0618 A81-48606 #
AIAA PAPER 81-2025 .... p0618 A81-48610 #
AIAA PAPER 81-2026 .... p0623 A81-49729*#
AIAA PAPER 81-2027 .... p0623 A81-49728*#
AIAA PAPER 81-2028 .... p0621 A81-48647 #
AIAA PAPER 81-2029 .... p0623 A81-49727 #
AIAA PAPER 81-2032 .... p0620 A81-48628*#
AIAA PAPER 81-2034 .... p0619 A81-48627 #
AIAA PAPER 81-2035 .... p0619 A81-48626*#
AIAA PAPER 81-2036 .... p0619 A81-48625*#
AIAA PAPER 81-2037 .... p0620 A81-48629 #
AIAA PAPER 81-2038 .... p0621 A81-48644 #
AIAA PAPER 81-2040 .... p0619 A81-48620 #
AIAA PAPER 81-2041 .... p0618 A81-48613*#
AIAA PAPER 81-2044 .... p0621 A81-48651 #
AIAA PAPER 81-2048 .... p0620 A81-48637*#
AIAA PAPER 81-2049 .... p0619 A81-48621*#
AIAA PAPER 81-2053 .... p0620 A81-48635*#
AIAA PAPER 81-2054 .... p0621 A81-48653 #
AIAA PAPER 81-2064 .... p0616 A81-48401 #
AIAA 80-1938 .... p0052 A81-13364 #
AIAA 81-0477 .... p0300 A81-29378 #
AIAA 81-0482 .... p0300 A81-29381*#
AIAA 81-0491 .... p0302 A81-29420 #
AIAA 81-0492 .... p0300 A81-29382 #
AIAA 81-0495 .... p0300 A81-29383 #
AIAA 81-0508 .... p0300 A81-29386 #
AIAA 81-0509 .... p0301 A81-29387 #
AIAA 81-0512 .... p0301 A81-29388*#
AIAA 81-0513 .... p0301 A81-29389 #
AIAA 81-0514 .... p0302 A81-29427 #
AIAA 81-0518 .... p0302 A81-29426 #
AIAA 81-0521 .... p0303 A81-29442 #
AIAA 81-0524 .... p0303 A81-29445 #
AIAA 81-0529 .... p0303 A81-29450 #
AIAA 81-0533 .... p0303 A81-29453 #
AIAA 81-0544 .... p0301 A81-29396 #
AIAA 81-0548 .... p0301 A81-29399*#
AIAA 81-0549 .... p0301 A81-29400*#
AIAA 81-0552 .... p0301 A81-29402 #
AIAA 81-0553 .... p0302 A81-29403 #
AIAA 81-0557 .... p0303 A81-29455*#
AIAA 81-0567 .... p0306 A81-29494*#
AIAA 81-0571 .... p0302 A81-29405 #
AIAA 81-0574 .... p0302 A81-29407 #
AIAA 81-0591 .... p0302 A81-29419*#
AIAA 81-0604 .... p0304 A81-29467 #

AIAA 81-0606 .... p0304 A81-29469 #
AIAA 81-0607 .... p0304 A81-29470 #
AIAA 81-0609 .... p0304 A81-29471*#
AIAA 81-0610 .... p0304 A81-29472 #
AIAA 81-0611 .... p0304 A81-29473 #
AIAA 81-0612 .... p0304 A81-29474*#
AIAA 81-0613 .... p0305 A81-29475 #
AIAA 81-0614 .... p0305 A81-29476 #
AIAA 81-0615 .... p0309 A81-29513*#
AIAA 81-0616 .... p0305 A81-29477 #
AIAA 81-0617 .... p0305 A81-29478 #
AIAA 81-0618 .... p0305 A81-29479*#
AIAA 81-0621 .... p0305 A81-29482 #
AIAA 81-0626 .... p0308 A81-29512*#
AIAA 81-0633 .... p0305 A81-29488 #
AIAA 81-0635 .... p0306 A81-29489 #
AIAA 81-0637 .... p0306 A81-29491 #
AIAA 81-0639 .... p0306 A81-29493*#
AIAA 81-0640 .... p0306 A81-29495*#
AIAA 81-0643 .... p0306 A81-29496*#
AIAA 81-0644 .... p0307 A81-29497 #
AIAA 81-0645 .... p0307 A81-29498 #
AIAA 81-0646 .... p0307 A81-29499 #
AIAA 81-0647 .... p0307 A81-29500*#
AIAA 81-0648 .... p0307 A81-29501 #
AIAA 81-0649 .... p0307 A81-29502 #
AIAA 81-0650 .... p0307 A81-29503*#
AIAA 81-0652 .... p0308 A81-29511*#
AIAA 81-0654 .... p0308 A81-29506*#
AIAA 81-0655 .... p0308 A81-29507*#
AIAA 81-0656 .... p0308 A81-29508 #
AIAA 81-0964 .... p0414 A81-36555 #
AIAA 81-0965 .... p0414 A81-36556 #
AIAA 81-0968 .... p0414 A81-36557 #
AIAA 81-0970 .... p0414 A81-36559 #
AIAA 81-0971 .... p0415 A81-36560 #
AIAA 81-0973 .... p0415 A81-36562 #
AIAA 81-0974 .... p0415 A81-36563 #
AIAA 81-0975 .... p0415 A81-36564 #
AIAA 81-0978 .... p0415 A81-36566 #
AIAA 81-0980 .... p0415 A81-36568 #
AIAA 81-0982 .... p0415 A81-36569*#
AIAA 81-0986 .... p0416 A81-36573 #
AIAA 81-0987 .... p0416 A81-36572 #
AIAA 81-1309 .... p0455 A81-38527 #
AIAA 81-1311 .... p0455 A81-38528 #
AIAA 81-1312 .... p0456 A81-38529 #
AIAA 81-1321 .... p0456 A81-38532 #
AIAA 81-1323 .... p0456 A81-38533 #
AIAA 81-1325 .... p0456 A81-38534 #
AIAA 81-1327 .... p0456 A81-38535 #
AIAA 81-1328 .... p0456 A81-38536 #
AIAA 81-1330 .... p0456 A81-38537 #
AIAA 81-1333 .... p0456 A81-38538 #
AIAA 81-1334 .... p0456 A81-38539 #
AIAA 81-1335 .... p0457 A81-38540*#
AIAA 81-1337 .... p0457 A81-38541 #
AIAA 81-1339 .... p0457 A81-38542 #
AIAA 81-1748 .... p0553 A81-44080 #
AIAA 81-1749 .... p0554 A81-44081 #
AIAA 81-1752 .... p0554 A81-44082*#
AIAA 81-1753 .... p0554 A81-44083 #
AIAA 81-1771 .... p0554 A81-44092*#
AIAA 81-1772 .... p0554 A81-44093*#
AIAA 81-1773 .... p0556 A81-44133 #
AIAA 81-1774 .... p0556 A81-44134 #
AIAA 81-1775 .... p0554 A81-44094 #
AIAA 81-1777 .... p0554 A81-44095 #
AIAA 81-1781 .... p0554 A81-44096 #
AIAA 81-1796 .... p0556 A81-44135*#
AIAA 81-1798 .... p0555 A81-44101 #
AIAA 81-1818 .... p0555 A81-44108*#
AIAA 81-1819 .... p0555 A81-44109*#
AIAA 81-1820 .... p0555 A81-44110*#
AIAA 81-1821 .... p0555 A81-44111 #
AIAA 81-1823 .... p0556 A81-44127*#
AIAA 81-1838 .... p0555 A81-44122 #
AIAA 81-1839 .... p0555 A81-44123 #
AIAA 81-1848 .... p0556 A81-44126 #

AIAA-PAPER-81-0151 .... p0581 N81-30116 #
AIAA-PAPER-81-0639 .... p0499 N81-27548*#
AIAA-PAPER-81-1564 .... p0492 N81-27042*#
AIAA-PAPER-81-2052 .... p0589 N81-30907*#

AIAA-81-0051 .... p0203 N81-16983 #
AIAA-81-0567 .... p0491 N81-26496*#

AIME PAPER F79-10 .... p0059 A81-14770 #

AIRESEARCH-21-2861 .... p0274 N81-19119*#
AIRESEARCH-21-2953-2-VOL-2 .... p0078 N81-12088*#
AIRESEARCH-21-2997 .... p0274 N81-19117*#
AIRESEARCH-21-3213-2 .... p0497 N81-27098*#
AIRESEARCH-21-3663-PT-2 .... p0048 N81-11953*#

AMA-30-1 .... p0600 N81-31224*#

AMMRC-TR-80-25 .... p0134 N81-14324 #
AMMRC-TR-80-44 .... p0038 N81-11116 #
AMMRC-TR-80-57 .... p0337 N81-20447 #
AMMRC-TR-81-1 .... p0344 N81-21239 #
AMMRC-TR-81-32 .... p0640 N81-33241 #

APR-79-021 .... p0134 N81-14324 #

AR-2 .... p0278 N81-19464 #
AR-3 .... p0585 N81-30188 #
AR-6 .... p0343 N81-21131*#
AR-76-3 .... p0262 N81-19023*#
AR-001-724 .... p0021 N81-10007 #
AR-001-777 .... p0341 N81-21065 #
AR-001-798 .... p0377 N81-22063 #
AR-001-806 .... p0043 N81-11365 #
AR-001-808 .... p0263 N81-19028 #
AR-001-811 .... p0389 N81-23077 #
AR-002-036 .... p0136 N81-14575 #
AR-002-236 .... p0499 N81-27206 #

ARA-MEMO-220 .... p0090 N81-13024 #

ARBRL-MR-03079 .... p0439 N81-25045 #

ARC-R/M-3841 .... p0144 N81-15009 #
ARC-R/M-3842-PT-2 .... p0021 N81-10010 #
ARC-R/M-3843 .... p0031 N81-10436 #
ARC-R/M-3848 .... p0082 N81-12113 #

ARC-37815 .... p0021 N81-10010 #
ARC-37974 .... p0144 N81-15009 #
ARC-38052 .... p0031 N81-10436 #
ARC-38053 .... p0031 N81-10436 #
ARC-38234 .... p0082 N81-12113 #

ARD-443 .... p0339 N81-21050 #
ARD-500 .... p0435 N81-24118 #

ARDU-TI-466 .... p0638 N81-33204 #
ARDU-TI-658 .... p0076 N81-12068 #

ARI-TR-441 .... p0035 N81-11035 #

ARL-TR-81-21 .... p0602 N81-31421*#

ARL/AERO-NOTE-390 .... p0021 N81-10007 #
ARL/AERO-NOTE-400 .... p0424 N81-24031 #
ARL/AERO-TM-318 .... p0201 N81-16430 #
ARL/AERO-TM-319 .... p0043 N81-11364 #
ARL/AERO-TM-322 .... p0043 N81-11365 #
ARL/AERO-TM-325 .... p0374 N81-22043 #
ARL/MECH-ENG-NOTE-377 .... p0341 N81-21065 #
ARL/MECH-ENG-NOTE-378 .... p0389 N81-23077 #
ARL/PSU/TM-80-45 .... p0090 N81-13033 #
ARL/PSU/TM-80-188 .... p0274 N81-19124 #
ARL/STRUC-NOTE-459 .... p0263 N81-19028 #
ARL/STRUC-NOTE-461 .... p0384 N81-23024 #
ARL/STRUC-NOTE-465 .... p0499 N81-27206 #
ARL/STRUC-TM-327 .... p0426 N81-24051 #
ARL/STRUC-381 .... p0391 N81-23249 #
ARL/SYS-71 .... p0377 N81-22063 #

ARO-14100.1-E .... p0196 N81-16062 #
ARO-14795.1-E .... p0394 N81-23064 #
ARO-15666.4-A-E .... p0580 N81-30091 #

ASC-R-126 .... p0071 N81-12013 #

ASD-TR-80-5010 .... p0423 N81-24020 #
ASD-TR-80-5011 .... p0423 N81-24020 #
ASD-TR-80-5024 .... p0543 N81-28786 #
ASD-TR-80-5025 .... p0543 N81-28785 #
ASD-TR-80-5026 .... p0543 N81-28788 #
ASD-TR-80-5027 .... p0543 N81-28789 #
ASD-TR-80-5028 .... p0543 N81-28787 #
ASD-TR-80-5035 .... p0426 N81-24050 #
ASD-TR-80-5037 .... p0628 N81-32142 #
ASD-TR-80-5038 .... p0208 N81-17044 #
ASD-TR-80-5050-VOL-1 .... p0539 N81-28092 #

ASD-TR-80-5050-VOL-2 .... p0539 N81-28093 #
ASD-TR-81-5008 .... p0423 N81-24020 #
ASD-TR-81-5009 .... p0427 N81-24059 #
ASD-TR-81-5010 .... p0442 N81-25072 #
ASD-TR-5011 .... p0583 N81-30127 #

ASD-81-6-1 .... p0466 N81-26116*#

ASF-300 .... p0033 N81-11022 #

ASLE PREPRINT 80-LC-6B-3 .... p0118 A81-18758
ASLE PREPRINT 80-LC-8A-6 .... p0118 A81-18748
ASLE PREPRINT 81-AM-6A-3 .... p0367 A81-33868

ASME PAPER 80-C2/AERO-10 .... p0116 A81-18639 #
ASME PAPER 80-C2/DET-12 .... p0116 A81-18640 #
ASME PAPER 80-C2/DET-17 .... p0116 A81-18642 #
ASME PAPER 80-C2/DET-71 .... p0117 A81-18646 #
ASME PAPER 80-C2/DET-77 .... p0117 A81-18648 #
ASME PAPER 80-C2/DET-103 .... p0117 A81-18654 #
ASME PAPER 80-C2/LUB-14 .... p0117 A81-18668*#
ASME PAPER 80-C2/LUB-17 .... p0117 A81-18671 #
ASME PAPER 80-C2/LUB-18 .... p0117 A81-18672*#
ASME PAPER 80-C2/LUB-35 .... p0117 A81-18683*#
ASME PAPER 80-GT-16 .... p0019 A81-12609 #
ASME PAPER 80-GT-20 .... p0109 A81-17952*#
ASME PAPER 80-GT-81 .... p0109 A81-17953*#
ASME PAPER 80-GT-95 .... p0109 A81-17954*#
ASME PAPER 80-WA/DSC-12 .... p0170 A81-21083 #
ASME PAPER 80-WA/MC-2 .... p0170 A81-21120*#
ASME PAPER 81-GE-216 .... p0318 A81-30104 #
ASME PAPER 81-GT-1 .... p0310 A81-29926 #
ASME PAPER 81-GT-2 .... p0310 A81-29927 #
ASME PAPER 81-GT-3 .... p0310 A81-29928 #
ASME PAPER 81-GT-5 .... p0310 A81-29930 #
ASME PAPER 81-GT-6 .... p0310 A81-29931 #
ASME PAPER 81-GT-7 .... p0310 A81-29932 #
ASME PAPER 81-GT-15 .... p0310 A81-29937 #
ASME PAPER 81-GT-21 .... p0311 A81-29938 #
ASME PAPER 81-GT-23 .... p0311 A81-29939 #
ASME PAPER 81-GT-24 .... p0311 A81-29940*#
ASME PAPER 81-GT-25 .... p0311 A81-29941 #
ASME PAPER 81-GT-26 .... p0311 A81-29942 #
ASME PAPER 81-GT-27 .... p0311 A81-29943 #
ASME PAPER 81-GT-29 .... p0311 A81-29944 #
ASME PAPER 81-GT-31 .... p0312 A81-29946 #
ASME PAPER 81-GT-34 .... p0312 A81-29948 #
ASME PAPER 81-GT-35 .... p0312 A81-29949 #
ASME PAPER 81-GT-40 .... p0312 A81-29954*#
ASME PAPER 81-GT-41 .... p0312 A81-29955 #
ASME PAPER 81-GT-45 .... p0312 A81-29959 #
ASME PAPER 81-GT-49 .... p0312 A81-29962 #
ASME PAPER 81-GT-53 .... p0312 A81-29965 #
ASME PAPER 81-GT-60 .... p0313 A81-29970 #
ASME PAPER 81-GT-62 .... p0313 A81-29972 #
ASME PAPER 81-GT-68 .... p0313 A81-29977 #
ASME PAPER 81-GT-71 .... p0313 A81-29980 #
ASME PAPER 81-GT-72 .... p0313 A81-29981 #
ASME PAPER 81-GT-73 .... p0313 A81-29982*#
ASME PAPER 81-GT-76 .... p0313 A81-29984 #
ASME PAPER 81-GT-77 .... p0313 A81-29985*#
ASME PAPER 81-GT-78 .... p0314 A81-29986 #
ASME PAPER 81-GT-79 .... p0314 A81-29987*#
ASME PAPER 81-GT-87 .... p0314 A81-29994 #
ASME PAPER 81-GT-88 .... p0314 A81-29995 #
ASME PAPER 81-GT-90 .... p0314 A81-29997 #
ASME PAPER 81-GT-95 .... p0314 A81-30002 #
ASME PAPER 81-GT-96 .... p0314 A81-30003*#
ASME PAPER 81-GT-99 .... p0315 A81-30006*#
ASME PAPER 81-GT-100 .... p0315 A81-30007 #
ASME PAPER 81-GT-103 .... p0315 A81-30009 #
ASME PAPER 81-GT-105 .... p0315 A81-30010 #
ASME PAPER 81-GT-107 .... p0315 A81-30012 #
ASME PAPER 81-GT-111 .... p0315 A81-30016 #
ASME PAPER 81-GT-113 .... p0315 A81-30017 #
ASME PAPER 81-GT-114 .... p0315 A81-30018 #
ASME PAPER 81-GT-118 .... p0316 A81-30022 #
ASME PAPER 81-GT-128 .... p0316 A81-30032 #
ASME PAPER 81-GT-129 .... p0316 A81-30033*#
ASME PAPER 81-GT-130 .... p0316 A81-30034 #
ASME PAPER 81-GT-132 .... p0316 A81-30035 #
ASME PAPER 81-GT-137 .... p0316 A81-30039 #
ASME PAPER 81-GT-138 .... p0316 A81-30040 #
ASME PAPER 81-GT-138 .... p0316 A81-30041 #
ASME PAPER 81-GT-154 .... p0317 A81-30053 #
ASME PAPER 81-GT-161 .... p0317 A81-30060*#
ASME PAPER 81-GT-165 .... p0317 A81-30064 #
ASME PAPER 81-GT-184 .... p0317 A81-30078*#
ASME PAPER 81-GT-189 .... p0317 A81-30082 #
ASME PAPER 81-GT-191 .... p0317 A81-30084 #
ASME PAPER 81-GT-194 .... p0317 A81-30086 #
ASME PAPER 81-GT-199 .... p0317 A81-30090 #
ASME PAPER 81-GT-202 .... p0318 A81-30092 #
ASME PAPER 81-GT-203 .... p0318 A81-30093*#
ASME PAPER 81-GT-206 .... p0318 A81-30096 #
ASME PAPER 81-GT-208 .... p0318 A81-30097*#
ASME PAPER 81-GT-209 .... p0318 A81-30098 #
ASME PAPER 81-GT-213 .... p0318 A81-30102 #

ASRL-TR-196-2 .... p0549 N81-29134*#
ASRL-TR-196-3 .... p0549 N81-29135*#

ATC-R-91000/9CR-66 .... p0072 N81-12026 #
ATC-R-91100/9CR-71 .... p0072 N81-12024 #

ATC-93 .... p0387 N81-23063 #
ATC-96 .... p0034 N81-11028 #
ATC-101 .... p0331 N81-20055 #
ATC-102 .... p0250 N81-18040 #
ATC-103 .... p0270 N81-19084 #
ATC-104 .... p0547 N81-29112 #
ATC-106 .... p0547 N81-29113 #

ATR-2 .... p0446 N81-25437 #

AV-R-80/540 .... p0101 A81-16721 #

AVRADCOM-TM-81-B-1 .... p0186 N81-15982*#

AVRADCOM-TR-79-49 .... p0125 N81-13918*#
AVRADCOM-TR-80-A-15 .... p0026 N81-10054*#
AVRADCOM-TR-80-C-13 .... p0036 N81-11038*#
AVRADCOM-TR-80-C-17 .... p0334 N81-20076*#
AVRADCOM-TR-80-C-19 .... p0336 N81-20245*#
AVRADCOM-TR-80-D-27 .... p0486 N81-26121 #
AVRADCOM-TR-80-E-4 .... p0446 N81-25691 #
AVRADCOM-TR-81-B-4 .... p0546 N81-29109*#
AVRADCOM-TR-81-C-10 .... p0443 N81-25081*#
AVRADCOM-TR-81-C-12 .... p0376 N81-22055*#
AVRADCOM-TR-81-C-24 .... p0496 N81-27095*#

AVSD-0154-80-RR .... p0085 N81-12427 #

BBN-3869 .... p0221 N81-17849 #
BBN-4220 .... p0589 N81-30910 #
BBN-4420 .... p0258 N81-18799*#
BBN-4435 .... p0438 N81-24862 #
BBN-10667-10676 .... p0202 N81-16629 #

BDM/W-79-733-TR .... p0580 N81-30102 #

BFG-80-31-023 .... p0255 N81-18231 #

BM-RI-8477 .... p0392 N81-23269 #

BMFT-FB-T-78-02 .... p0376 N81-22054*#
BMFT-FB-T-79-137 .... p0275 N81-19128 #
BMFT-FB-T-79-152 .... p0275 N81-19129 #
BMFT-FB-T-80-025 .... p0497 N81-27102 #

BMFT-FB-W-79-42 .... p0425 N81-24045 #
BMFT-FB-W-80-008 .... p0425 N81-24046 #
BMFT-FB-W-80-021 .... p0426 N81-24052 #
BMFT-FB-W-80-022 .... p0424 N81-24034 #
BMFT-FB-W-80-023 .... p0426 N81-24053 #
BMFT-FB-W-80-030 .... p0541 N81-28111 #
BMFT-FB-W-80-032 .... p0499 N81-27208 #

BMFT-01ZA005/NTS1003 .... p0497 N81-27102 #

BMVG-FBWT-79-28 .... p0209 N81-17049 #
BMVG-FBWT-80-4 .... p0342 N81-21074 #
BMVG-FBWT-80-7 .... p0345 N81-21677 #

BNL-51390 .... p0630 N81-32273 #

BR72779 .... p0022 N81-10015 #
BR73151 .... p0031 N81-10436 #
BR73152 .... p0021 N81-10010 #
BR73155 .... p0026 N81-10044 #
BR73233 .... p0144 N81-15009 #
BR73471 .... p0084 N81-12353 #
BR73977 .... p0084 N81-12320 #
BR74711 .... p0330 N81-20040 #
BR74909 .... p0073 N81-12038 #
BR78387 .... p0605 N81-31588 #
BR78592 .... p0601 N81-31225 #
BR79052 .... p0026 N81-10045 #

BR79052 .... p0026 N81-10046 #
BR79125 .... p0022 N81-10016 #

BU-242 .... p0434 N81-24109 #
BU-248 .... p0338 N81-21039 #
BU-251 .... p0375 N81-22046 #
BU-257 .... p0330 N81-20043 #
BU-258 .... p0336 N81-20193 #

CALSPAN-RK-6040-[illegible]-2 .... p0343 N81-21080 #

CALSPAN-6286-F-1 .... p0638 N81-33199 #
CALSPAN-6339-F-3 .... p0130 N81-13969*#
CALSPAN-6374-[illegible]-1 .... p0131 N81-13977 #
CALSPAN-6486-A-1 .... p0196 N81-16063 #

CASS-MV-80-2 .... p0339 N81-21049 #

CEL-TN-1566-ADD .... p0219 N81-17299 #
CEL-TN-1578 .... p0030 N81-10079 #

CERL-TR-[illegible]-100 .... p0588 N81-30659 #

CETIM-[illegible]-F-091 .... p0256 N81-18322 #

CMEP-5-4120-VOL-39 .... p0600 N81-31220 #

CN-ISSN-0082-5247 .... p0033 N81-11020 #

CONF-801114-1 .... p0135 N81-14550 #
CONF-801211-1 .... p0193 N81-16037 #
CONF-810104-1 .... p0256 N81-18259 #
CONF-810226-5 .... p0588 N81-30615 #
CONF-810816-1 .... p0638 N81-33200 #

COO-4867-07 .... p0134 N81-14329 #

CPIA-PUBL-329-VOL-1 .... p0200 N81-16253*

CRI-7846-14 .... p0023 N81-10020*#

CRINC/FRL-281-3 .... p0262 N81-19021*#

CRREL-SR-81-10 .... p0639 N81-33214 #

CSC/TR-80/6008 .... p0146 N81-15729 #

CSIR-ME-1674 .... p0550 N81-29167 #

CUED/A-AERO/TR-9 .... p0090 N81-13026 #
CUED/A-TURBO/TR-98 .... p0090 N81-13021 #
CUED/A-TURBO/TR-101 .... p0093 N81-13059 #

C80-904/201 .... p0552 N81-29536 #

D-210-11788-1 .... p0329 N81-20027*#

DARCOM-R-310-6 .... p0367 N81-23062 #
DARCOM-R-310-6 .... p0392 N81-23358 #

DCIEM-TC-80-C-66 .... p0375 N81-22050 #

DDA-EDR-9762 .... p0029 N81-10073 #
DDA-EDR-10339 .... p0081 N81-12108 #

DELET-TR-78-2990-3 .... p0440 N81-25058 #
DELET-TR-79-0290-1 .... p0437 N81-24360 #

DE81-029834 .... p0638 N81-33201 #

DFVLR-FB-78-09 .... p0022 N81-10017 #
DFVLR-FB-78-26 .... p0022 N81-10018 #
DFVLR-FB-79-12 .... p0197 N81-16069 #
DFVLR-FB-79-14 .... p0086 N81-12536 #
DFVLR-FB-79-18 .... p0276 N81-19135 #
DFVLR-FB-79-20 .... p0077 N81-12080 #
DFVLR-FB-79-29 .... p0500 N81-27893 #
DFVLR-FB-79-30 .... p0025 N81-10043 #
DFVLR-FB-79-38 .... p0373 N81-22038 #
DFVLR-FB-79-40 .... p0027 N81-10062 #
DFVLR-FB-80-01 .... p0132 N81-14195 #
DFVLR-FB-80-02 .... p0372 N81-22029 #
DFVLR-FB-80-06 .... p0127 N81-13942 #
DFVLR-FB-80-07 .... p0131 N81-13975 #
DFVLR-FB-80-13 .... p0128 N81-13944 #
DFVLR-FB-80-14 .... p0130 N81-13970 #
DFVLR-FB-80-16 .... p0138 N81-14796 #
DFVLR-FB-80-22 .... p0126 N81-13929 #
DFVLR-FB-81-15 .... p0601 N81-31226 #

DFVLR-FB-81-16 .... p0594 N81-31158 #

DFVLR-MITT-79-03 .... p0382 N81-23008 #
DFVLR-MITT-79-09 .... p0339 N81-21041 #
DFVLR-MITT-79-10 .... p0028 N81-10064 #
DFVLR-MITT-79-13 .... p0030 N81-10078 #
DFVLR-MITT-79-14 .... p0133 N81-14289 #
DFVLR-MITT-79-16 .... p0130 N81-13971 #
DFVLR-MITT-79-20 .... p0142 N81-14992 #
DFVLR-MITT-79-20 .... p0538 N81-28079 #
DFVLR-MITT-80-04 .... p0092 N81-13052 #
DFVLR-MITT-80-04 .... p0129 N81-13960 #
DFVLR-MITT-80-05 .... p0126 N81-13926 #
DFVLR-MITT-80-07 .... p0129 N81-13952 #
DFVLR-MITT-80-08 .... p0075 N81-12063 #
DFVLR-MITT-80-14 .... p0332 N81-20058 #
DFVLR-MITT-80-15 .... p0338 N81-21040 #
DFVLR-MITT-81-02 .... p0538 N81-28080 #

DGLR PAPER 79-063 .... p0016 A81-11780
DGLR PAPER 80-029 .... p0055 A81-13925 #
DGLR PAPER 80-103 .... p0120 A81-19392 #
DGLR PAPER 80-106 .... p0120 A81-19393 #
DGLR PAPER 80-109 .... p0120 A81-19395 #
DGLR PAPER 80-110 .... p0120 A81-19396 #
DGLR PAPER 80-111 .... p0120 A81-19397 #
DGLR PAPER 80-112 .... p0121 A81-19398 #
DGLR PAPER 80-116 .... p0121 A81-19399 #
DGLR PAPER 81-003 .... p0611 A81-47621 #
DGLR PAPER 81-014 .... p0608 A81-47557
DGLR PAPER 81-021 .... p0609 A81-47595 #
DGLR PAPER 81-025 .... p0608 A81-47554 #
DGLR PAPER 81-026 .... p0608 A81-47555 #
DGLR PAPER 81-027 .... p0609 A81-47563 #
DGLR PAPER 81-034 .... p0609 A81-47585 #
DGLR PAPER 81-035 .... p0608 A81-47556
DGLR PAPER 81-036 .... p0610 A81-47604 #
DGLR PAPER 81-046 .... p0610 A81-47601 #
DGLR PAPER 81-047 .... p0611 A81-47622 #
DGLR PAPER 81-052 .... p0609 A81-47564 #
DGLR PAPER 81-055 .... p0607 A81-47551 #
DGLR PAPER 81-056 .... p0610 A81-47603 #
DGLR PAPER 81-057 .... p0609 A81-47565 #
DGLR PAPER 81-060 .... p0610 A81-47612 #
DGLR PAPER 81-062 .... p0610 A81-47609 #
DGLR PAPER 81-063 .... p0609 A81-47580 #
DGLR PAPER 81-064 .... p0611 A81-47620 #
DGLR PAPER 81-065A p0608 A81-47552
DGLR PAPER 81-065B p0608 A81-47553
DGLR PAPER 81-066 .... p0610 A81-47616 #
DGLR PAPER 81-067 .... p0608 A81-47562 #
DGLR PAPER 81-118 .... p0609 A81-47587 #

DGLR-79-091 .... p0203 N81-16987 #
DGLR-79-094 .... p0220 N81-17483 #
DGLR-79-098 .... p0203 N81-16988 #

DGRST/CSTD-63-FR-138 .... p0146 N81-15579*#

DHC-DND-77-4 .... p0337 N81-21010*#
DHC-DND-80-1 .... p0483 N81-26076*#

DLGR-79-096 .... p0272 N81-19102 #

DNA-5268F .... p0196 N81-16063 #
DNA-5341F .... p0198 N81-16073 #

DOD-4650.4-P-VOL-1 .... p0206 N81-17030 #
DOD-4650.4-P-VOL-2 .... p0207 N81-17031 #
DOD-4650.4-P-VOL-3 .... p0207 N81-17032 #
DOD-4650.4-P-VOL-4 .... p0207 N81-17033 #

DOE/BETC/PPS-81/2 .... p0445 N81-25255 #
DOE/CS-0069/1 .... p0278 N81-19468 #
DOE/CS-05438/T1-VOL-1 .... p0044 N81-11513 #
DOE/CS-05438/T1-VOL-3 .... p0044 N81-11500 #
DOE/CS-50069/T1 .... p0638 N81-33201 #
DOE/CS-50069/1 .... p0074 N81-12051 #
DOE/ER-01388/463 .... p0257 N81-18359 #
DOE/ER-10570/1 .... p0135 N81-14353 #
DOE/ET-12293/T1 .... p0094 N81-13064 #
DOE/ET-15332/T1 .... p0145 N81-15414 #
DOE/ET-15425/T1 .... p0134 N81-14327 #
DOE/JPL-1060-46 .... p0587 N81-30525*#
DOE/JPL-954833-81/3 .... p0445 N81-25431*#
DOE/LETC/RI-81/1 .... p0551 N81-29260 #
DOE/NASA/1028-27 .... p0043 N81-11448*#
DOE/NASA/2593-27 .... p0391 N81-23203*#
DOE/NASA/9698-2 .... p0132 N81-14082*#

DOE/NASA/51040-19 .... p0095 N81-13465*#
DOE/NASA/51040-22 .... p0588 N81-30562*#
DOE/OR-05035/T1 .... p0085 N81-12426 #

DOT-TSC-FAA-81-8 .... p0499 N81-27372 #

DOT-TSC-RSPA-80-16-VOL-1 .... p0206 N81-17030 #
DOT-TSC-RSPA-80-16-VCL-2 .... p0207 N81-17031 #
DOT-TSC-RSPA-80-16-VOL-3 .... p0207 N81-17032 #
DOT-TSC-RSPA-80-16-VCL-4 .... p0207 N81-17033 #

DOUGLAS PAPER-6975 .... p0322 A81-31380

DREA-TM-80/J .... p0390 N81-23087 #

DRSMI/RD-80-12-TR .... p0277 N81-19212 #
DRSMI/RG-80-22 .... p0193 N81-16035 #

DRSTE-RP-702-105 .... p0387 N81-23062 #
DRSTE-RP-702-105 .... p0392 N81-23358 #

DTNSRDC-81/009 .... p0601 N81-31233 #
DTNSRDC-81/045 .... p0581 N81-30116 #

DTNSRDC/AERO-1272 .... p0581 N81-30116 #
DTNSRDC/ASED-80/14 .... p0194 N81-16044 #
DTNSRDC/ASED-80/24 .... p0637 N81-33194 #
DTNSRDC/ASED-80/25 .... p0490 N81-26151 #
DTNSRDC/ASED-81/07 .... p0486 N81-26120*#
DTNSRDC/ASED-81/10 .... p0627 N81-32128 #
DTNSRDC/TM-80/16 .... p0252 N81-18054 #

DYTEC-7927-VOL-2 .... p0221 N81-17653 #
DYTEC-7928 .... p0221 N81-17648 #

D3-11536-1 .... p0498 N81-27114*#
D6-41840-1 .... p0139 N81-14970*#
D6-41840-2 .... p0125 N81-13920*#
D6-41840-3 .... p0139 N81-14571*#
D6-41840-4 .... p0185 N81-15977*#
D6-44815-9 .... p0198 N81-16139*#
D6-44815-10 .... p0550 N81-29165*#
D6-46350 .... p0498 N81-27116*#
D6-46691 .... p0332 N81-20062*#
D6-46699 .... p0084 N81-12225*#
D6-48058 .... p0262 N81-19022*#
D6-48609 .... p0378 N81-22129*#
D6-48724 .... p0386 N81-23059*#
D6-48855 .... p0218 N81-17171*#
D6-49228 .... p0579 N81-30084*#
D6-49273 .... p0093 N81-13053 #
D94-10089-2-REV-A .... p0392 N81-23325 #
D180-25725-1 .... p0030 N81-10152 #
D180-26023-1 .... p0273 N81-19113 #
D180-26446-1 .... p0546 N81-29093*#
D194-10074-2 .... p0394 N81-23937 #
D194-10089-1 .... p0381 N81-22971 #
D194-10089-3 .... p0381 N81-22972 #
D194-10089-4 .... p0381 N81-22973 #
D194-10089-5 .... p0632 N81-33136 #
D210-11560-1-VOL-1 .... p0434 N81-24108 #
D210-11569-1-VOL-1 .... p0387 N81-23064*#
D210-11569-2-VOL-2 .... p0387 N81-23065*#
D210-11583-1 .... p0252 N81-18053 #
D210-11591-1 .... p0076 N81-12075 #
D210-11659-1 .... p0033 N81-11014*#
D210-11662-1 .... p0388 N81-23070*#
D210-11676-1 .... p0374 N81-22041 #
D748-10113-4 .... p0492 N81-26849*#
D2536-941001 .... p0278 N81-19479*#
D2536-941002 .... p0279 N81-19480*#
D2536-941003 .... p0279 N81-19481*#
D2536-941004 .... p0279 N81-19482*#
D2536-941005 .... p0279 N81-19483*#

E-396 .... p0036 N81-11039*#
E-417 .... p0078 N81-12089*#
E-449 .... p0336 N81-20245*#
E-455 .... p0036 N81-11038*#
E-461 .... p0155 N81-16050*#
E-468 .... p0345 N81-21685*#
E-477 .... p0078 N81-12090*#
E-481 .... p0096 N81-13568*#
E-495 .... p0393 N81-23486*#
E-540 .... p0334 N81-20076*#
E-558 .... p0146 N81-15768*#
E-561 .... p0028 N81-10067*#
E-567 .... p0043 N81-11448*#
E-568 .... p0140 N8[illegible]979*#
E-569 .... p0032 N81-10807*#
E-574 .... p0140 N81-14980*#
E-575 .... p0543 N81-29063*#
E-580 .... p0043 N81-11412*#
E-598 .... p0044 N81-11688*#
E-607 .... p0044 N81-11769*#
E-612 .... p0140 N81-14978*#
E-616 .... p0044 N81-11770*#
E-617 .... p0436 N81-24283*#
E-623 .... p0550 N81-29205*#
E-633 .... p0085 N81-12446*#
E-645 .... p0093 N81-13056*#
E-651 .... p0140 N81-14977*#
E-666 .... p0[illegible]28 N81-24063*#
E-673 .... p0342 N81-21078*
E-674 .... p0195 N81-16053*#
E-676 .... p058[illegible] N81-30562*#
E-680 .... p0195 N81-16054*#
E-681 .... p0195 N81-16055*#
E-686 .... p0195 N81-16052*#
E-693 .... p0191 N81-16021*#
E-700 .... p0220 N81-17480*#
E-708 .... p0201 N81-16388*#
E-733 .... p0641 N81-33947*#
E-736 .... p0269 N81-19078*#
E-744 .... p0391 N81-[illegible]3243*#
E-760 .... p0380 N81-[illegible]836*#
E-778 .... p0337 N81-2[illegible]24*#
E-787 .... p0345 N81-21[illegible]03*#
E-791 .... p0381 N81-22[illegible]9*#
E-799 .... p0338 N81-210[illegible]*#
E-804 .... p0447 N81-2576[illegible]*#
E-815 .... p0376 N81-22056
E-821 .... p0380 N81-22838
E-822 .... p0443 N81-25084*
E-824 .... p0443 N81-25079*#
E-845 .... p0597 N81-31196*#
E-847 .... p0390 N81-23085*#
E-851 .... p0464 N81-25232*#
E-855 .... p0489 N81-26145*#
E-869 .... p0443 N81-25081*#
E-880 .... p0443 N81-25083*#
E-889 .... p0446 N81-25698*#
E-891 .... p0490 N81-26146*#
E-895 .... p0443 N81-25082*#
E-904 .... p0539 N81-28095*#
E-911 .... p0443 N81-25080*#
E-917 .... p0597 N81-31190*#
E-923 .... p0496 N81-27094*#
E-926 .... p0552 N81-29782*#
E-934 .... p0551 N81-29206*#
E-938 .... p0496 N81-27095*#
E-942 .... p0492 N81-27042*#
E-970 .... p0589 N81-30907*#
E-979 .... p0597 N81-31195*#
E-984 .... p0583 N81-30130*#
E-2239 .... p0211 N81-17059*#
E-9356-1 .... p0090 N81-13019*#
E-9356-3 .... p0095 N81-13465*#
E-9542 .... p0035 N81-11037*#

ECAC-CR-79-127 .... p0025 N81-10039 #
ECAC-CR-80-044 .... p0219 N81-17342 #

ECAC-PR-77-031 .... p0339 N81-21048 #
ECAC-PR-77-061 .... p0024 N81-10036 #
ECAC-PR-80-008 .... p0206 N81-17025 #
ECAC-PR-80-012 .... p0206 N81-17026 #

EDM-984 .... p0439 N81-25047 #

EDR-010-047 .... p0209 N81-17047 #
EDR-10156 .... p0274 N81-19118*#
EDR-10361-VOL-2 .... p0140 N81-14976*#

EER-48-1 .... p0440 N81-25061 #
EER-48-2 .... p0491 N81-26394 #

EIR-00733 .... p0077 N81-12082

EMW-00432 .... p0033 N81-11021 #

ENDEAVOR-302 .... p0144 N81-15148 #

EPA-550/9-70-313-2 .... p0087 N81-12645 #
EPA-550/9-79-313-1 .... p0087 N81-12644 #
EPA-600/2-80-068 .... p0344 N81-21165 #
EPA-600/4-79-078 .... p0096 N81-13555 #
EPA-600/4-81-005 .... p0499 N81-27714 #

EPA-600/9-80-035	p0588	N81-30700 #
EPA-600/9-81-009	p0586	N81-30313 #
ER-8174-F	p0442	N81-25076*#
ER-15047	p0035	N81-11034 #
ERIM-138300-57-T	p0194	N81-16047 #
ESA-TT-532	p0382	N81-23008 #
ESA-TT-558	p0022	N81-10017 #
ESA-TT-585	p0022	N81-10018 #
ESA-TT-625	p0197	N81-16069 #
ESA-TT-627	p0086	N81-12536 #
ESA-TT-630	p0276	N81-19135 #
ESA-TT-631	p0077	N81-12080 #
ESA-TT-633	p0344	N81-21340 #
ESA-TT-634	p0339	N81-21046 #
ESA-TT-639	p0088	N81-12826 #
ESA-TT-641	p0339	N81-21041 #
ESA-TT-648	p0500	N81-27893 #
ESA-TT-652	p0255	N81-18244 #
ESA-TT-655	p0373	N81-22038 #
ESA-TT-668	p0538	N81-28079 #
ESA-TT-680	p0129	N81-13952 #
ESDU-75017	p0026	N81-10053
ESDU-80006	p0021	N81-10001
ESDU-80009	p0026	N81-10053
ESL-710816-9	p0336	N81-20345 #
ESL-711679-2	p0201	N81-16357 #
ESP-8111	p0442	N81-25072 #
EXXON/RL.2PE.80	p0219	N81-17281 #
FAA-AAS-80-1	p0391	N81-23097 #
FAA-AEE-80-34	p0552	N81-29661 #
FAA-AEE-81-13	p0641	N81-33548 #
FAA-AFO-500-20	p0129	N81-13956 #
FAA-AM-81-7	p0636	N81-33175 #
FAA-AM-81-10	p0636	N81-33174 #
FAA-APO-80-13	p0438	N81-24846 #
FAA-APO-81-6	p0555	N81-31182 #
FAA-AS-80-2-VOL-2	p0094	N81-13069 #
FAA-ASP-80-2	p0033	N81-11022 #
FAA-ASP-80-3	p0192	N81-16027 #
FAA-ASP-80-4-VOL-1	p0191	N81-16024 #
FAA-ASP-80-4-VOL-2A	p0493	N81-27065 #
FAA-ASP-80-4-VOL-2B	p0493	N81-27064 #
FAA-ASP-81-1	p0424	N81-24038 #
FAA-ASP-80-2A	p0023	N81-10023 #
FAA-AT-81-1	p0636	N81-33184 #
FAA-AVP-79-11	p0074	N81-12049 #
FAA-AVP-80-4	p0074	N81-12048 #
FAA-AVP-80-7	p0024	N81-10031 #
FAA-CT-79-53	p0094	N81-13062 #
FAA-CT-80-11	p0250	N81-18037 #
FAA-CT-80-17-A-REV	p0042	N81-11290 #
FAA-CT-80-18	p0128	N81-13945 #
FAA-CT-80-19	p0332	N81-20056 #
FAA-CT-80-20	p0193	N81-16034 #
FAA-CT-80-29	p0393	N81-23768 #
FAA-CT-80-30	p0636	N81-33183 #
FAA-CT-80-31	p0091	N81-13042 #
FAA-CT-80-36	p0196	N81-16064 #
FAA-CT-80-37	p0207	N81-17036 #
FAA-CT-80-38	p0636	N81-33182 #
FAA-CT-80-40	p0034	N81-11025 #
FAA-CT-80-43	p0386	N81-23060 #
FAA-CT-80-45-PT-2	p0494	N81-27073 #
FAA-CT-80-46	p0206	N81-17024 #
FAA-CT-80-47	p0484	N81-26090 #
FAA-CT-80-51-1	p0555	N81-31181 #
FAA-CT-80-60-1-VOL-1	p0425	N81-24041 #
FAA-CT-80-60-2-VOL-2	p0425	N81-24042 #
FAA-CT-80-61	p0270	N81-19085 #
FAA-CT-80-166	p0023	N81-10022 #
FAA-CT-80-170	p0034	N81-11024 #
FAA-CT-80-196	p0207	N81-17035 #
FAA-CT-80-210	p0252	N81-18053 #
FAA-CT-81-5	p0386	N81-23061 #
FAA-CT-81-6	p0440	N81-25059 #
FAA-CT-81-7	p0484	N81-26088 #
FAA-CT-81-9	p0636	N81-33181 #
FAA-CT-81-11	p0344	N81-21215 #
FAA-CT-81-12	p0440	N81-25060 #
FAA-CT-81-18	p0600	N81-31218 #
FAA-CT-81-28	p0424	N81-24039 #
FAA-CT-81-35	p0602	N81-31238 #
FAA-CT-81-40-VOL-1	p0580	N81-30104 #
FAA-CT-81-51	p0551	N81-29247 #
FAA-CT-81-150	p0253	N81-18057 #
FAA-CT-81-151	p0255	N81-18201 #
FAA-CT-81-157	p0444	N81-25088 #
FAA-CT-81-181	p0580	N81-30103 #
FAA-ED-18-5A	p0444	N81-25088 #
FAA-ED-18-6	p0023	N81-10022 #
FAA-EE-43	p0096	N81-13560*#
FAA-EE-80-1-VOL-3	p0096	N81-13719 #
FAA-EE-80-1-VOL-5	p0096	N81-13720 #
FAA-EE-80-09A	p0201	N81-16628 #
FAA-EE-80-09B-VOL-2	p0096	N81-13545 #
FAA-EE-80-19	p0589	N81-30910 #
FAA-EE-80-26	p0096	N81-13717 #
FAA-EE-80-37	p0202	N81-16629 #
FAA-EE-80-40	p0201	N81-16627 #
FAA-EE-80-41	p0221	N81-17851 #
FAA-EE-80-42	p0221	N81-17852 #
FAA-EE-80-46-VOL-2	p0221	N81-17853 #
FAA-EE-80-46-VOL-3	p0221	N81-17848 #
FAA-EE-81-1	p0345	N81-21685*#
FAA-EM-79-23	p0024	N81-10032 #
FAA-EM-80-7	p0537	N81-28076 #
FAA-EM-80-7-VOL-1	p0493	N81-27071 #
FAA-EM-80-7-VOL-2	p0493	N81-27072 #
FAA-EM-80-10	p0034	N81-11026 #
FAA-EM-80-11-VOL-1	p0640	N81-33390 #
FAA-EM-80-16-VOL-1	p0250	N81-18041 #
FAA-EM-80-16-VOL-2	p0250	N81-18038 #
FAA-EM-81-1-VOL-1	p0639	N81-33216 #
FAA-EM-81-1-VOL-2	p0639	N81-33217 #
FAA-EM-81-7	p0596	N81-31183 #
FAA-MS-80-7	p0273	N81-19114 #
FAA-MS-81-3	p0389	N81-23081 #
FAA-RD-78-121	p0340	N81-21052 #
FAA-RD-79-11-ADD	p0219	N81-17299 #
FAA-RD-79-88	p0024	N81-10034 #
FAA-RD-80-2	p0387	N81-23063 #
FAA-RD-80-3-REV-1	p0250	N81-18039 #
FAA-RD-80-7	p0340	N81-21053 #
FAA-RD-80-21-A-REV	p0042	N81-11290 #
FAA-RD-80-47	p0128	N81-13945 #
FAA-RD-80-58	p0092	N81-13046 #
FAA-RD-80-61	p0128	N81-13949 #
FAA-RD-80-64	p0029	N81-10077*#
FAA-RD-80-67	p0135	N81-14555*#
FAA-RD-80-68	p0093	N81-13053 #
FAA-RD-80-69	p0215	N81-17091 #
FAA-RD-80-73	p0193	N81-16034 #
FAA-RD-80-75	p0250	N81-18037 #
FAA-RD-80-79	p0034	N81-11025 #
FAA-RD-80-81	p0034	N81-11028 #
FAA-RD-80-85	p0025	N81-10036 #
FAA-RD-80-86	p0025	N81-10038 #
FAA-RD-80-87	p0025	N81-10037 #
FAA-RD-80-88-VOL-2	p0024	N81-10029 #
FAA-RD-80-88-VOL-3	p0024	N81-10030 #
FAA-RD-80-88-1	p0025	N81-10041 #
FAA-RD-80-89	p0206	N81-17025 #
FAA-RD-80-91	p0206	N81-17026 #
FAA-RD-80-93	p0025	N81-10039 #
FAA-RD-80-101	p0091	N81-13042 #
FAA-RD-80-103	p0253	N81-18055 #
FAA-RD-80-105	p0034	N81-11024 #
FAA-RD-80-107	p0095	N81-13072 #
FAA-RD-80-108	p0091	N81-13038 #
FAA-RD-80-110	p0436	N81-24187 #
FAA-RD-80-112	p0630	N81-32156 #
FAA-RD-80-113	p0207	N81-17035 #
FAA-RD-80-114-1-VOL-1	p0425	N81-24041 #
FAA-RD-80-114-2-VOL-2	p0425	N81-24042 #
FAA-RD-80-116	p0219	N81-17327 #

FAA-RD-80-117 p0331 N81-20055 #
FAA-RD-80-120 p0250 N81-18036 #
FAA-RD-80-123 p0219 N81-17342 #
FAA-RD-80-124-PT-2 p0494 N81-27073 #
FAA-RD-80-125-1 p0595 N81-31181 #
FAA-RD-80-127 p0250 N81-18040 #
FAA-RD-80-134 p0270 N81-19084 #
FAA-RD-80-137-1 p0440 N81-25061 #
FAA-RD-80-137-2 p0491 N81-26394 #
FAA-RD-80-141 p0440 N81-25060 #
FAA-RD-81-1 p0393 N81-23768 #
FAA-RD-81-2 p0440 N81-25059 #
FAA-RD-81-5 p0584 N81-30141 #
FAA-RD-81-6 p0440 N81-25056 #
FAA-RD-81-7 p0339 N81-21049 #
FAA-RD-81-9 p0586 N81-30338 #
FAA-RD-81-12 p0484 N81-26088 #
FAA-RD-81-14 p0425 N81-24044 #
FAA-RD-81-16 p0435 N81-24118 #
FAA-RD-81-31 p0636 N81-33183 #
FAA-RD-81-35 p0630 N81-32158 #
FAA-RD-81-41 p0499 N81-27372 #
FAA-RD-81-49 p0636 N81-33181 #
FAA-RD-81-56 p0581 N81-30107 #
FAA-RD-81-68 p0640 N81-33392 #

FAA/EE-81-10 p0589 N81-30911 #
FAA/RD-81-3 p0339 N81-21050 #

FE-1806-72 p0134 N81-14332 #

FFA-TN-AU-1418-PT-1 p0022 N81-10013 #
FFA-TN-AU-1499-PT-1 p0086 N81-12633 #
FFA-TN-AU-1661 p0125 N81-13925 #

FFA-TN-HU-2189-PT-1 p0087 N81-12634 #
FFA-TN-HU-2189-PT-3 p0141 N81-14585 #

FFA-133 p0141 N81-14585 #

FFM-279-PT-2 p0218 N81-17110 #

FLOW-RR-166 p0141 N81-14966 #

FO-1533 p0121 A81-19398 #

FOK-BO-1235 p0582 N81-30124 #
FOK-BO-1238 p0514 A81-42139
FOK-BO-1240 p0541 N81-28189 #
FOK-BO-1241 p0542 N81-28190 #

FR-MTRD(CA)-80-13-VOL-2 p0023 N81-10019*#

FR-12976 p0442 N81-25075*#
FR-13019 p0085 N81-12426 #
FR-13370 p0539 N81-28094*#
FR-13983 p0335 N81-20078*#

FRA/RD-80/135 p0547 N81-29112 #

FSC-24235 p0429 N81-24069 #

FSD-7511-81-06 p0425 N81-24040*#

FSI-1140 p0252 N81-18049 #

FTL-R79-10 p0249 N81-18032*#
FTL-R80-10 p0249 N81-18033*#
FTL-R80-11 p0594 N81-31160*#

FUB-43-1980 p0628 N81-32136 #

GA-380 p0217 N81-17102 #

GACIAC-SR-80-02 p0197 N81-16070 #

GAO/MASAD-81-2 p0341 N81-21071 #
GAO/MASAD-81-3 p0333 N81-20069 #
GAO/MASAD-81-11 p0342 N81-21072 #
GAO/MASAD-81-20 p0388 N81-23074 #
GAO/PSAD-80-72 p0088 N81-12928 #

GERA-2448 p0092 N81-13048 #

GPO-50-158 p0091 N81-13041 #
GPO-50-388 p0126 N81-13533 #
GPO-50-923 p0032 N81-10578 #
GPO-51-381 p0075 N81-12055 #
GPO-60-512 p0073 N81-12041 #
GPO-60-652 p0092 N81-13045 #
GPO-65-265 p0203 N81-16952 #
GPO-67-439 p0216 N81-17098 #
GPO-68-717 p0073 N81-12040 #
GPO-69-199 p0439 N81-25049 #
GPO-71-290 p0203 N81-16953 #
GPO-75-804 p0601 N81-31231 #
GPO-79-432-VOL-4 p0590 N81-31030 #

GTL-157 p0274 N81-19122*#

GTR-2136 p0134 N81-14327 #

H-1118 p0143 N81-15000*#
H-1122 p0489 N81-26144*#
H-1131 p0426 N81-24048*#
H-1133 p0334 N81-20074*#
H-1136 p0092 N81-13044*#
H-1138 p0075 N81-12064*#
H-1141 p0581 N81-30111*#
H-1144 p0251 N81-18047*#
H-1158 p0589 N81-30815*#

HEL-TM-5-81 p0500 N81-27890 #
HEL-TM-17-80 p0092 N81-13050 #
HEL-TM-21-80 p0205 N81-16998 #

HEL-TN-14-80 p0193 N81-16036 #

HE242-311/80 p0494 N81-27079*#

HH-80-15 p0439 N81-25043 #
HH-80-466 p0486 N81-26120*#

HK-80071 p0276 N81-19132*#
HK-80072 p0377 N81-22060*#

HONEYWELL-77SRC53 p0377 N81-22059*#
HONEYWELL-80SRC22 p0204 N81-16996 #

HSER-7667 p0444 N81-25087 #
HSER-7668-VOL-2 p0444 N81-25086 #

HTR-5-78 p0254 N81-18097*#

HTS/79/3 p0587 N81-30454 #

IAF PAPER 80-D-171 p0115 A81-18318
IAF PAPER 80-F-270 p0115 A81-18371
IAF PAPER 80-IAA-17 p0115 A81-18410
IAF PAPER 81-251 p0607 A81-47425*

ICAF-1168 p0043 N81-11415 #

ICAS-80-8.2 p0427 N81-24057 #
ICAS-80-19.1 p0437 N81-24482 #

IERL-RTP-1077 p0588 N81-30700 #

INPE-1944-RPE/262 p0585 N81-30158 #
INPE-1992-RPE/285 p0586 N81-30331 #

IRIG-STANDARD-115-80 p0095 N81-13251 #

ISBN-0-309-03062-5 p0132 N81-14182 #
ISBN-0-309-03091-9 p0270 N81-19083 #
ISBN-0-309-03112-5 p0493 N81-27068 #
ISBN-0-309-03201-6 p0637 N81-33188 #
ISBN-0-7988-1470-5 p0550 N81-29167 #
ISBN-0-85679-290-X p0021 N81-10001
ISPN-0-85679-292-6 p0026 N81-10053
ISBN-2-7170-0569-2 p0209 N81-17050 #
ISBN-2-7170-0570-6 p0209 N81-17051 #
ISBN-2-7170-0571-4 p0216 N81-17096 #
ISBN-2-7170-0572-2 p0077 N81-12076 #
ISBN-2-7170-0573-0 p0086 N81-12463 #
ISBN-2-7170-0574-9 p0210 N81-17052 #
ISBN-2-7170-0577-3 p0077 N81-12077 #
ISBN-2-7170-0578-1 p0210 N81-17053 #
ISBN-2-7170-0580-3 p0210 N81-17054 #
ISBN-2-7170-0581-1 p0086 N81-12464 #
ISBN-2-7170-0586-2 p0083 N81-12180 #
ISBN-2-7170-0589-7 p0083 N81-12181 #
ISBN-2-7170-0591-9 p0083 N81-12182 #
ISBN-2-7170-0592-7 p0083 N81-12183 #
ISBN-2-7170-0606-0 p0204 N81-16989 #
ISBN-2-7170-0607-9 p0081 N81-12111 #
ISBN-2-7170-0608-7 p0082 N81-12112 #
ISBN-2-7170-0609-5 p0218 N81-17198 #

ISBN-2-7170-0610-9 .... p0218 N81-17109 #
ISBN-2-7170-0611-7 .... p0210 N81-17055 #
ISBN-2-7170-0612-5 .... p0210 N81-17056 #
ISBN-2-7170-0621-4 .... p0204 N81-16992 #
ISBN-2-7170-0622-2 .... p0077 N81-12079 #
ISBN-3-88149-174-5 .... p0379 N81-22666 #
ISBN-87-550-0627-2 .... p0279 N81-19497 #
ISBN-92-835-0268-X .... p0045 N81-11902 #
ISBN-92-835-0270-2 .... p0082 N81-12115 #
ISBN-92-835-0273-6 .... p0039 N81-11128 #
ISBN-92-835-0282-5 .... p0429 N81-24071 #
ISBN-92-835-0283-3 .... p0435 N81-24120 #
ISBN-92-835-0287-6 .... p0484 N81-26091 #
ISBN-92-835-0289-2 .... p0487 N81-26126 #
ISBN-92-835-0294-9 .... p0632 N81-33137 #
ISBN-92-835-1379-7 .... p0333 N81-20064 #
ISBN-92-835-1380-0 .... p0392 N81-23431 #
ISBN-92-835-1381-9 .... p0497 N81-27103 #
ISBN-92-835-1385-1 .... p0590 N81-31105 #
ISBN-92-835-1386-X .... p0541 N81-28107 #
ISBN-92-835-1388-6 .... p0603 N81-31449 #
ISBN-92-835-1389-4 .... p0640 N81-33503 #
ISBN-92-835-1390-8 .... p0596 N81-31186 #
ISBN-92-835-1392-2 .... p0635 N81-33161 #
ISBN-92-835-2107-2 .... p0033 N81-11019 #
ISBN-920-835-1371-1 .... p0211 N81-17063 #

ISD-262 .... p0145 N81-15467 #

ISL-CO-201/80 .... p0147 N81-15819*#
ISL-CO-218/79 .... p0133 N81-14300 #
ISL-CO-220/79 .... p0133 N81-14292 #

ISSN-SW-0081-5640 .... p0125 N81-13925 #

ISSN-0072-4130 .... p0379 N81-22666 #
ISSN-0078-3781 .... p0126 N81-13930 #
ISSN-0081-5640 .... p0141 N81-14585 #
ISSN-0082-5255 .... p0144 N81-15156 #
ISSN-0082-5255 .... p0146 N81-15580 #
ISSN-0082-5263 .... p0552 N81-29524 #
ISSN-0143-7143 .... p0138 N81-14792 #
ISSN-0170-1339 .... p0424 N81-24034 #
ISSN-0170-1339 .... p0425 N81-24045 #
ISSN-0170-1339 .... p0425 N81-24046 #
ISSN-0170-1339 .... p0426 N81-24052 #
ISSN-0170-1339 .... p0426 N81-24053 #
ISSN-0170-1339 .... p0499 N81-27208 #
ISSN-0170-1339 .... p0541 N81-28111 #
ISSN-0170-6071 .... p0145 N81-15467 #
ISSN-0309-6521 .... p0090 N81-13021 #
ISSN-0340-7608 .... p0275 N81-19128 #
ISSN-0340-7608 .... p0275 N81-19129 #
ISSN-0340-7608 .... p0497 N81-27102 #
ISSN-0361-1981 .... p0493 N81-27068 #
ISSN-0361-1981 .... p0637 N81-33188 #
ISSN-0389-4010 .... p0627 N81-32118 #
ISSN-0389-4010 .... p0639 N81-33038 #
ISSN-0418-6435 .... p0279 N81-19497 #

ISU-ERI-AMES-81104 .... p0335 N81-20079*#

JPL-PUB-80-55 .... p0087 N81-12646*#
JPL-PUB-80-63 .... p0196 N81-16056*#
JPL-PUB-80-69 .... p0088 N81-12543*#
JPL-PUB-81-44 .... p0587 N81-30525*#

JPL-5105-83 .... p0587 N81-30525*#

JSC-17490 .... p0629 N81-32143*#

KU-FRL-399-3 .... p0423 N81-24026*#
KU-FRL-414-1 .... p0185 N81-15974*#
KU-FRL-417-16 .... p0438 N81-24657*#
KU-FRL-464-1 .... p0439 N81-25041*#
KU-FRL-464-2 .... p0441 N81-25065*#
KU-FRL-490-1-PT-1 .... p0583 N81-30134*#
KU-FRL-490-1-PT-2 .... p0584 N81-30135*#

L-6613 .... p0262 N81-19024*#
L-8226 .... p0262 N81-19025*#
L-12774 .... p0125 N81-13518*#
L-12976 .... p0071 N81-12015*#
L-13251-VOL-1 .... p0035 N81-11032*#
L-13253 .... p0129 N81-13958*#
L-13255 .... p0043 N81-11422*#
L-13385-PT-1 .... p0243 N81-17921*#
L-13385-PT-2 .... p0246 N81-18005*#
L-13448 .... p0055 N81-13303*#
L-13523 .... p0377 N81-22061*#
L-13589 .... p0021 N81-10004*#
L-13609 .... p0391 N81-23096*#
L-13623 .... p0335 N81-20082*#
L-13713 .... p0021 N81-10005*#
L-13738 .... p0081 N81-12109*#
L-13743 .... p0094 N81-13065*#
L-13764 .... p0139 N81-14973*#
L-13765 .... p0137 N81-14788*#
L-13785 .... p0142 N81-14997*#
L-13820 .... p0139 N81-14974*#
L-13826 .... p0185 N81-15976*#
L-13852 .... p0186 N81-15978*#
L-13856 .... p0372 N81-22016*#
L-13868 .... p0072 N81-12021*#
L-13872 .... p0085 N81-12448*#
L-13881 .... p0073 N81-12043*#
L-13902 .... p0261 N81-19019*#
L-13944 .... p0130 N81-13968*#
L-13946 .... p0193 N81-16039*#
L-13959 .... p0392 N81-23410*#
L-13960 .... p0071 N81-12012*#
L-13974 .... p0139 N81-14972*#
L-14010 .... p0125 N81-13922*#
L-14044 .... p0140 N81-14975*#
L-14069 .... p0546 N81-29111*#
L-14077 .... p0550 N81-29139*#
L-14108 .... p0434 N81-24114*#
L-14109 .... p0550 N81-29137*#
L-14112 .... p0581 N81-30110*#
L-14114 .... p0145 N81-15397*#
L-14117 .... p0423 N81-24022*#
L-14125 .... p0437 N81-24471*#
L-14168 .... p0329 N81-20025*#
L-14174 .... p0335 N81-20083*#
L-14190 .... p0337 N81-21016*#
L-14198 .... p0335 N81-20084*#
L-14205 .... p0345 N81-21873*#
L-14209 .... p0427 N81-24058*#
L-14213 .... p0329 N81-20026*#
L-14215 .... p0146 N81-15702*#
L-14254 .... p0264 N81-19035*#
L-14254 .... p0267 N81-19056*#
L-14257 .... p0380 N81-22832*#
L-14278 .... p0259 N81-19001*#
L-14330 .... p0331 N81-20050*#
L-14344 .... p0435 N81-24115*#
L-14354 .... p0339 N81-21044*#
L-14355 .... p0589 N81-30851*#
L-14374 .... p0631 N81-32966*#
L-14392 .... p0547 N81-29119*#
L-14395 .... p0446 N81-25765*#
L-14415 .... p0579 N81-30098*#
L-14418 .... p0546 N81-29109*#
L-14433 .... p0635 N81-33159*#
L-14468 .... p0345 N81-21904*#
L-14516 .... p0483 N81-26078*#
L-14521 .... p0641 N81-33946*#
L-14531 .... p0579 N81-30086*#
L-14543 .... p0635 N81-33158*#
L-14546 .... p0579 N81-30087*#
L-14549 .... p0581 N81-30112*#
L-14590 .... p0638 N81-33203*#
L-14600 .... p0641 N81-33945*#
L-14652 .... p0639 N81-33211*#

LA-UR-80-2465 .... p0135 N81-14550 #

LC-80-23303 .... p0132 N81-14182 #
LC-80-82605 .... p0270 N81-19083 #
LC-80-6000205 .... p0336 N81-20323 #
LC-80-6000206 .... p0336 N81-20322 #
LC-81-9570 .... p0637 N81-33188 #

LCD-80-65 .... p0487 N81-26125 #
LCD-80-89 .... p0389 N81-23079 #

LEMSCO-16941 .... p0629 N81-32143*#

LG80ER0006-VOL-1 .... p0027 N81-10056 #
LG80ER0007-VOL-2 .... p0027 N81-10057 #
LG80ER0008-VOL-3 .... p0027 N81-10058 #
LG80ER0009-VOL-4 .... p0027 N81-10059 #
LG80ER0013-VOL-1 .... p0331 N81-20047 #
LG80ER0013-VOL-2 .... p0331 N81-20046 #
LG80ER0035 .... p0142 N81-14994*#
LG80ER0112 .... p0193 N81-16041*#
LG80ER0140 .... p0272 N81-19105 #
LG81ER0074 .... p0142 N81-14993*#

LG81ER0162 .... p0589 N81-30908*#

LMSC-D767313 .... p0339 N81-21051 #

LMSC-HREC-TR-D697882 .... p0201 N81-16416*#

LOG-C3932 .... p0072 N81-12020 #

LR-28568 .... p0277 N81-19232*#
LR-29540 .... p0378 N81-22419*#
LR-29623 .... p0342 N81-21079*#

LWP-939 .... p0272 N81-19099*#

LYC-78-36 .... p0274 N81-19120*#
LYC-80-27 .... p0629 N81-32147*#
LYC-80-55 .... p0444 N81-25085 #
LYC-80-73 .... p0274 N81-19123 #

MAZ-1466 .... p0596 N81-31188 #

MBB-FE-2/S/PUB/26 .... p0131 N81-14606 #
MBB-FE-17/S/PUB/24 .... p0131 N81-13972 #
MBB-FE-17/S/PUB/25 .... p0131 N81-13973 #
MBB-FE-17/S/PUB/27 .... p0131 N81-13974 #
MBB-FE-17/S/PUB/42 .... p0608 A81-47556
MBB-FE-122/S/PUB/13 .... p0128 N81-13950 #
MBB-FE-122/S/PUB/16 .... p0203 N81-16587 #
MBB-FE-122/S/PUB/17 .... p0220 N81-17483 #
MBB-FE-122/S/PUB/41 .... p0608 A81-47557
MBB-FE-123/S/PUB/20 .... p0203 N81-16588 #
MBB-FE-127/S/PUB/23 .... p0495 N81-27085 #
MBB-FE-172/S/PUB/39 .... p0608 A81-47552

MBB-FE122 .... p0121 A81-19400 #

MBB-PUB-P-0001 .... p0251 N81-18048 #

MBB-S/PUB/32 .... p0582 N81-30122 #

MBB-UA-528-80-OE .... p0276 N81-19140 #
MBB-UA-549/80-OE .... p0585 N81-30143 #

MBB-UD-274/79-OE .... p0582 N81-30121 #
MBB-UD-275-79-0 .... p0018 A81-12097
MBB-UD-276-79-0 .... p0018 A81-12094
MBB-UD-277-79-0 .... p0018 A81-12096
MBB-UD-301/80-OE .... p0586 N81-30198 #
MBB-UD-304/80-OE .... p0586 N81-30199 #
MBB-UD-305/80-OE .... p0582 N81-30123 #
MBB-UD-306/80-OE .... p0564 N81-30139 #
MBB-UD-307/80-OE .... p0564 N81-30140 #
MBB-UD-308/80-OE .... p0587 N81-30485 #
MBB-UD-309/80-OE .... p0580 N81-30105 #
MBB-UD-311-80-0 .... p0119 A81-19300 #
MBB-UD-312-80-OE .... p0449 A81-37636 #
MBB-UD-314/80-OE .... p0583 N81-30125 #
MBB-UD-320-81-OE .... p0608 A81-47554 #
MBB-UD-321-81-OE .... p0608 A81-47555 #

MBB-UT-07-81 .... p0607 A81-47551 #
MBB-UT-08-81 .... p0608 A81-47553

MBB-278-79-0 .... p0018 A81-12095

MDC-J4649 .... p0190 N81-16020*#
MDC-J4665 .... p0386 N81-23058*#
MDC-J4673-VOL-2 .... p0440 N81-25050*#
MDC-J7191 .... p0492 N81-26847 #

MDC-Q0722 .... p0593 N81-31153 #

ME-RT-81003 .... p0444 N81-25089*#

MHSMP-80-20 .... p0144 N81-15148 #

MIT-TR-207 .... p0336 N81-20586*#

MIT/LMP/TRB-80-2 .... p0132 N81-14064 #

MRC-DA-934 .... p0083 N81-12191 #

MSSU-EIRS-ASE-81-3 .... p0186 N81-15986*#
MSSU-EIRS-ASE-81-3 .... p0251 N81-18046*#
MSSU-EIRS-ASE-81-4 .... p0196 N81-16038*#

MTP-6-3-024 .... p0201 N81-16375 #
MTP-6-3-025 .... p0201 N81-16375 #

MTR-79W00158 .... p0340 N81-21053 #
MTR-79W00235-VOL-1 .... p0250 N81-18041 #
MTR-79W00235-VOL-2 .... p0250 N81-18038 #
MTR-79W00415 .... p0024 N81-10032 #
MTR-80W301 .... p0425 N81-24044 #
MTR-80W302 .... p0581 N81-30107 #
MTR-80W00100-REV-1 .... p0250 N81-18059 #
MTR-81W16-VOL-1 .... p0639 N81-33216 #
MTR-81W16-VOL-2 .... p0639 N81-33217 #
MTR-81W49 .... p0440 N81-25056 #

N78-75 .... p0340 N81-21052 #

NA-80-247 .... p0045 N81-11770 #
NA-80-333 .... p0200 N81-16213 #
NA-81-119 .... p0269 N81-19079*#

NAC/FR-303F/01 .... p0640 N81-33392 #
NAC/FR-3030/01 .... p0219 N81-17327 #

NADC-13920-2 .... p0334 N81-20070 #
NADC-13920-2 .... p0596 N81-31187 #
NADC-75353-60 .... p0439 N81-25047 #
NADC-77108-30 .... p0388 N81-23075 #
NADC-77318-60 .... p0638 N81-33199 #
NADC-79095-60 .... p0218 N81-17242 #
NADC-79119-60 .... p0072 N81-12024 #
NADC-79125-60 .... p0216 N81-17100 #
NADC-79133-60-VOL-2 .... p0028 N81-10068 #
NADC-79133-60-VOL-3 .... p0028 N81-10069 #
NADC-79199-60 .... p0277 N81-19305 #
NADC-79239-60-VOL-1 .... p0252 N81-18051 #
NADC-79239-60-VOL-2 .... p0252 N81-18050 #
NADC-79256-60 .... p0548 N81-29124 #
NADC-80046-60 .... p0039 N81-11120 #
NADC-80081-60 .... p0091 N81-13040 #
NADC-80094-60 .... p0216 N81-17094 #
NADC-80109-60 .... p0208 N81-17042 #
NADC-80205-60 .... p0385 N81-23043 #
NADC-80207-60 .... p0392 N81-23288 #
NADC-80208-60 .... p0191 N81-16025 #
NADC-80232-60 .... p0424 N81-24037 #
NADC-80246-60 .... p0441 N81-25069 #
NADC-81031-60 .... p0540 N81-28103 #
NADC-81049-50 .... p0597 N81-31191 #
NADC-81051-60 .... p0486 N81-26119 #
NADC-81065-60 .... p0636 N81-33177 #
NADC-81066-60 .... p0628 N81-32130 #
NADC-81165-60 .... p0628 N81-32141 #
NADC-81186-60 .... p0629 N81-32152 #

NAE-LR-600 .... p0084 N81-12394 #
NAE-LR-601 .... p0208 N81-17043 #
NAE-LR-604 .... p0547 N81-29116 #
NAE-LR-605 .... p0390 N81-23088 #

NAE-LTR-HA-43 .... p0298 A81-29145 #

NAEC-MISC-91-OR019 .... p0341 N81-21068 #

NAEC-91-7983 .... p0269 N81-19080 #
NAEC-92-143 .... p0220 N81-17476 #
NAEC-92-146 .... p0550 N81-29140 #

NAL-TR-602T .... p0141 N81-14983 #
NAL-TR-617T .... p0090 N81-13023 #
NAL-TR-622 .... p0141 N81-14984 #
NAL-TR-631 .... p0337 N81-21012 #
NAL-TR-649T .... p0639 N81-33238 #
NAL-TR-665 .... p0627 N81-32118 #

NAMRL-SR-80-4 .... p0208 N81-17041 #

NASA-CASE-ARC-11312-1 .... p0278 N81-19439*#

NASA-CASE-FRC-11029-1 .... p0210 N81-17057*
NASA-CASE-FRC-11043-1 .... p0375 N81-22048*#
NASA-CASE-FRC-11065-1 .... p0426 N81-24047*#

NASA-CASE-GSC-12550-1 .... p0378 N81-22358*#

NASA-CASE-KSC-11042-1 .... p0138 N81-14967*

NASA-CASE-LAR-11695-2 .... p0437 N81-24443*
NASA-CASE-LAR-11797-1 .... p0270 N81-19087*
NASA-CASE-LAR-11970-2 .... p0275 N81-19130*
NASA-CASE-LAR-12136-1 .... p0639 N81-33210*#
NASA-CASE-LAR-12268-1 .... p0433 N81-24106*

NASA-CASE-LAR-12326-1 .... p0139 N81-14960*
NASA-CASE-LAR-12466-1 .... p0485 N81-26114*
NASA-CASE-LAR-12458-1 .... p0601 N81-31230*#
NASA-CASE-LAR-12544-1 .... p0496 N81-27096*#
NASA-CASE-LAR-12562-1 .... p0490 N81-26152*
NASA-CASE-LAR-12615-1 .... p0628 N81-32138*#
NASA-CASE-LAR-12624-1 .... p0546 N81-29107*#
NASA-CASE-LAR-12720-1 .... p0601 N81-31229*#
NASA-CASE-LAR-12750-1 .... p0261 N81-19016*#
NASA-CASE-LAR-12883-1 .... p0550 N81-29138*#

NASA-CASE-LEW-12594-2 .... p0274 N81-19116*
NASA-CASE-LEW-12907-2 .... p0273 N81-19115*
NASA-CASE-LEW-12990-1 .... p0549 N81-29129*
NASA-CASE-LEW-13201-1 .... p0143 N81-14999*

NASA-CASE-MSC-12631-3 .... p0132 N81-14077*

NASA-CASE-NPO-14220-1 .... p0133 N81-14318*
NASA-CASE-NPO-15264-1 .... p0373 N81-22036*#
NASA-CASE-NPO-15351-1 .... p0202 N81-16677*#

NASA-CP-2108-PT-1 .... p0243 N81-17981*#
NASA-CP-2108-PT-2 .... p0246 N81-18005*#
NASA-CP-2137 .... p0078 N81-12090*#
NASA-CP-2139 .... p0135 N81-14555*#
NASA-CP-2167 .... p0146 N81-15702*#
NASA-CP-2170-PT-1 .... p0264 N81-19035*#
NASA-CP-2170-PT-2 .... p0267 N81-19056*#
NASA-CP-2172 .... p0259 N81-19001*#
NASA-CP-2178 .... p0428 N81-24063*#
NASA-CP-2184 .... p0580 N81-30101*#
NASA-CP-2190 .... p0597 N81-31196*#

NASA-CR-2948 .... p0262 N81-19023*#
NASA-CR-3005 .... p0071 N81-12014*#
NASA-CR-3062 .... p0262 N81-19022*#
NASA-CR-3119 .... p0492 N81-27046*#
NASA-CR-3149 .... p0203 N81-16854*#
NASA-CR-3170 .... p0090 N81-13022*#
NASA-CR-3226 .... p0134 N81-14347*#
NASA-CR-3305 .... p0332 N81-20062*#
NASA-CR-3311 .... p0125 N81-13923*#
NASA-CR-3342 .... p0031 N81-10636*#
NASA-CR-3351 .... p0139 N81-14970*#
NASA-CR-3352 .... p0125 N81-13920*#
NASA-CR-3353 .... p0139 N81-14971*#
NASA-CR-3354 .... p0185 N81-15977*#
NASA-CR-3355 .... p0080 N81-12105*#
NASA-CR-3357 .... p0072 N81-12022*#
NASA-CR-3369 .... p0201 N81-16416*#
NASA-CR-3379 .... p0202 N81-16681*#
NASA-CR-3403 .... p0279 N81-19484*#
NASA-CR-3405 .... p0372 N81-22015*#
NASA-CR-3406 .... p0345 N81-21871*#
NASA-CR-3409 .... p0343 N81-21086*#
NASA-CR-3418 .... p0378 N81-22129*#
NASA-CR-3422 .... p0378 N81-22130*#
NASA-CR-3426 .... p0442 N81-25075*#
NASA-CR-3427 .... p0446 N81-25766*#
NASA-CR-3429 .... p0393 N81-23487*#
NASA-CR-3431 .... p0430 N81-24679*#
NASA-CR-3433 .... p0392 N81-23411*#
NASA-CR-3435 .... p0491 N81-26846*#
NASA-CR-3436 .... p0434 N81-24112*#
NASA-CR-3444 .... p0587 N81-30392*#
NASA-CR-3451 .... p0600 N81-31224*#
NASA-CR-3454 .... p0589 N81-30908*#
NASA-CR-3460 .... p0635 N81-33160*#
NASA-CR-3461-VOL-1 .... p0595 N81-31171*#
NASA-CR-3464 .... p0637 N81-33191*#
NASA-CR-135117 .... p0497 N81-27097*#
NASA-CR-135386 .... p0274 N81-19119*#
NASA-CR-145370 .... p0277 N81-19232*#
NASA-CR-152087-PT-1 .... p0271 N81-19096*#
NASA-CR-152088-PT-2 .... p0271 N81-19097*#
NASA-CR-152119 .... p0254 N81-18097*#
NASA-CR-152124 .... p0423 N81-24023*#
NASA-CR-152145 .... p0276 N81-19136*#
NASA-CR-152149 .... p0273 N81-19111*#
NASA-CR-152174 .... p0261 N81-19017*#
NASA-CR-152179 .... p0273 N81-19112*#
NASA-CR-152251 .... p0249 N81-18028*#
NASA-CR-152254 .... p0261 N81-19018*#
NASA-CR-152292 .... p0218 N81-17175*#
NASA-CR-152303-VOL-1-PT-1 .... p0270 N81-19088*#
NASA-CR-152303-VOL-2-PT-1 .... p0270 N81-19089*#
NASA-CR-152303-VOL-3-PT-1 .... p0270 N81-19090*#
NASA-CR-152303-VOL-4-PT-1 .... p0271 N81-19091*#
NASA-CR-152303-VOL-5-PT-1 .... p0271 N81-19092*#
NASA-CR-152303-VOL-6-PT-1 .... p0271 N81-19093*#
NASA-CR-152303-VOL-7-PT-1 .... p0271 N81-19094*#
NASA-CR-152306 .... p0081 N81-12110*#
NASA-CR-152316 .... p0251 N81-18045*#
NASA-CR-152320 .... p0375 N81-22047*#
NASA-CR-152321 .... p0271 N81-19095*#
NASA-CR-152329 .... p0258 N81-18798*#
NASA-CR-152331 .... p0251 N81-18044*#
NASA-CR-152336-1 .... p0387 N81-23064*#
NASA-CR-152336-2 .... p0387 N81-23065*#
NASA-CR-152351 .... p0249 N81-18027*#
NASA-CR-152356 .... p0220 N81-17623*#
NASA-CR-152357-VOL-2 .... p0220 N81-17624*#
NASA-CR-152361 .... p0278 N81-19412*#
NASA-CR-152373 .... p0033 N81-11014*#
NASA-CR-152378 .... p0333 N81-20063*#
NASA-CR-152380 .... p0483 N81-26076*#
NASA-CR-152390 .... p0023 N81-10019*#
NASA-CR-152391-VOL-1 .... p0384 N81-23030*#
NASA-CR-152391-VOL-2 .... p0384 N81-23031*#
NASA-CR-152391-VOL-3 .... p0384 N81-23032*#
NASA-CR-152391-VOL-4 .... p0384 N81-23033*#
NASA-CR-152399 .... p0253 N81-18060*#
NASA-CR-152401 .... p0143 N81-14998*
NASA-CR-152403 .... p0337 N81-21010*#
NASA-CR-152405 .... p0389 N81-23080*#
NASA-CR-152408 .... p0386 N81-23058*#
NASA-CR-152409 .... p0075 N81-12054*#
NASA-CR-154170 .... p0344 N81-21211*#
NASA-CR-156871 .... p0343 N81-21084*#
NASA-CR-156872 .... p0137 N81-14601*#
NASA-CR-158930 .... p0071 N81-12016*#
NASA-CR-158954 .... p0084 N81-12225*#
NASA-CR-159005 .... p0262 N81-19021*#
NASA-CR-159010 .... p0498 N81-27116*#
NASA-CR-159060 .... p0494 N81-27077*#
NASA-CR-159062 .... p0494 N81-27078*#
NASA-CR-159081 .... p0379 N81-22722*#
NASA-CR-159082 .... p0379 N81-22723*#
NASA-CR-159083 .... p0380 N81-22724*#
NASA-CR-159084 .... p0380 N81-22725*#
NASA-CR-159085 .... p0380 N81-22726*#
NASA-CR-159112 .... p0194 N81-16042*#
NASA-CR-159195 .... p0434 N81-24111*#
NASA-CR-159211 .... p0218 N81-17171*#
NASA-CR-159221 .... p0543 N81-28763*#
NASA-CR-159262 .... p0333 N81-20067*#
NASA-CR-159283 .... p0340 N81-21059*#
NASA-CR-159296 .... p0378 N81-22419*#
NASA-CR-159297 .... p0271 N81-19098*#
NASA-CR-159328 .... p0127 N81-13941*#
NASA-CR-159330 .... p0142 N81-14993*#
NASA-CR-159331 .... p0142 N81-14994*#
NASA-CR-159355 .... p0193 N81-16041*#
NASA-CR-159361 .... p0032 N81-11013*#
NASA-CR-159362 .... p0343 N81-21131*#
NASA-CR-159363 .... p0258 N81-18799*#
NASA-CR-159365 .... p0249 N81-18033*#
NASA-CR-159370 .... p0590 N81-30962*#
NASA-CR-159371 .... p0197 N81-16066*#
NASA-CR-159372 .... p0083 N81-12120*#
NASA-CR-159381 .... p0185 N81-15974*#
NASA-CR-159382 .... p0071 N81-12019*#
NASA-CR-159387 .... p0249 N81-18032*#
NASA-CR-159426 .... p0274 N81-19120*#
NASA-CR-159482 .... p0274 N81-19117*#
NASA-CR-159498 .... p0195 N81-16051*#
NASA-CR-159499 .... p0078 N81-12086*#
NASA-CR-159562 .... p0078 N81-12088*#
NASA-CR-159584 .... p0375 N81-22051*#
NASA-CR-159662 .... p0497 N81-27098*#
NASA-CR-159678 .... p0132 N81-14082*#
NASA-CR-159728 .... p0278 N81-19479*#
NASA-CR-159818 .... p0093 N81-13057*#
NASA-CR-159819-VOL-1 .... p0214 N81-17081*#
NASA-CR-159819-VOL-2-BK-1 .... p0214 N81-17082*#
NASA-CR-159819-VOL-2-BK-2 .... p0214 N81-17083*#
NASA-CR-159819-VOL-2-BK-3 .... p0214 N81-17084*#
NASA-CR-159819-VOL-3-BK-1 .... p0214 N81-17085*#
NASA-CR-159819-VOL-3-BK-2 .... p0214 N81-17086*#
NASA-CR-159823 .... p0279 N81-19480*#
NASA-CR-159824 .... p0279 N81-19481*#
NASA-CR-159825 .... p0279 N81-19482*#
NASA-CR-159826 .... p0279 N81-19483*#
NASA-CR-159865 .... p0274 N81-19118*#
NASA-CR-159867 .... p0078 N81-12085*#
NASA-CR-159869 .... p0220 N81-17846*#
NASA-CR-159879 .... p0078 N81-12087*#

NASA-CR-159880 .... p0143 N81-15005*#
NASA-CR-160036 .... p0023 N81-10020*#
NASA-CR-160909 .... p0190 N81-16020*#
NASA-CR-160963 .... p0440 N81-25050*#
NASA-CR-160995-VOL-1 .... p0440 N81-25051*#
NASA-CR-161074 .... p0602 N81-31421*#
NASA-CR-161089 .... p0629 N81-32143*#
NASA-CR-163093 .... p0377 N81-22059*#
NASA-CR-163097 .... p0130 N81-13969*#
NASA-CR-163099 .... p0092 N81-13044*#
NASA-CR-163105 .... p0207 N81-17038*#
NASA-CR-163106 .... p0342 N81-21079*#
NASA-CR-163108 .... p0498 N81-27113*#
NASA-CR-163112 .... p0540 N81-28102*#
NASA-CR-163656 .... p0026 N81-10049*#
NASA-CR-163675 .... p0028 N81-10065*#
NASA-CR-163684 .... p0038 N81-11117*#
NASA-CR-163744 .... p0088 N81-12943*#
NASA-CR-163747 .... p0087 N81-12646*#
NASA-CR-163824 .... p0137 N81-14789*#
NASA-CR-163833 .... p0129 N81-13957*#
NASA-CR-163833 .... p0129 N81-13957*#
NASA-CR-163837 .... p0125 N81-13917*#
NASA-CR-163850 .... p0141 N81-14589*#
NASA-CR-163855 .... p0143 N81-15001*#
NASA-CR-163857 .... p0146 N81-15648*#
NASA-CR-163859 .... p0142 N81-14991*#
NASA-CR-163863 .... p0146 N81-15649*#
NASA-CR-163864 .... p0142 N81-14996*#
NASA-CR-163877 .... p0196 N81-16056*#
NASA-CR-163920 .... p0186 N81-15986*#
NASA-CR-163921 .... p0196 N81-16058*#
NASA-CR-163934 .... p0216 N81-17097*#
NASA-CR-163946 .... p0207 N81-17039*#
NASA-CR-163965 .... p0249 N81-18029*#
NASA-CR-163967 .... p0251 N81-18046*#
NASA-CR-163979 .... p0254 N81-18139*#
NASA-CR-163988 .... p0274 N81-19122*#
NASA-CR-163995 .... p0335 N81-20079*#
NASA-CR-164057 .... p0333 N81-20065*#
NASA-CR-164189 .... p0345 N81-21864*#
NASA-CR-164195 .... p0381 N81-22969*#
NASA-CR-164214 .... p0380 N81-22833*#
NASA-CR-164220 .... p0378 N81-22282*#
NASA-CR-164221 .... p0380 N81-22727*#
NASA-CR-164222 .... p0376 N81-22052*#
NASA-CR-164273 .... p0393 N81-23461*#
NASA-CR-164293 .... p0392 N81-23433*#
NASA-CR-164295 .... p0391 N81-23095*#
NASA-CR-164299 .... p0438 N81-24602*#
NASA-CR-164321 .... p0391 N81-23093*#
NASA-CR-164348 .... p0438 N81-24856*#
NASA-CR-164350 .... p0437 N81-24321*#
NASA-CR-164351 .... p0423 N81-24024*#
NASA-CR-164370 .... p0438 N81-24857*#
NASA-CR-164377 .... p0439 N81-25041*#
NASA-CR-164419 .... p0444 N81-25089*#
NASA-CR-164454 .... p0445 N81-25431*#
NASA-CR-164475 .... p0486 N81-26117*#
NASA-CR-164523 .... p0492 N81-26849*#
NASA-CR-164536 .... p0499 N81-27200*#
NASA-CR-164549 .... p0500 N81-27684*#
NASA-CR-164560 .... p0543 N81-28810*#
NASA-CR-164620 .... p0500 N81-27886*#
NASA-CR-164634 .... p0541 N81-28176*#
NASA-CR-164635 .... p0540 N81-28097*#
NASA-CR-164642 .... p0543 N81-29034*#
NASA-CR-164664 .... p0549 N81-29132*#
NASA-CR-164684 .... p0583 N81-30134*#
NASA-CR-164685 .... p0584 N81-30135*#
NASA-CR-164696 .... p0587 N81-30525*#
NASA-CR-164719 .... p0594 N81-31159*#
NASA-CR-164829 .... p0629 N81-32154*#
NASA-CR-164833 .... p0627 N81-32117*#
NASA-CR-164843 .... p0627 N81-32121*#
NASA-CR-164872 .... p0639 N81-33205*#
NASA-CR-165141 .... p0143 N81-15004*#
NASA-CR-165162 .... p0130 N81-13963*#
NASA-CR-165165 .... p0034 N81-12255*#
NASA-CR-165166 .... p0140 N81-14576*#
NASA-CR-165176 .... p0048 N81-11553*#
NASA-CR-165185 .... p0629 N81-32147*#
NASA-CR-165188 .... p0147 N81-15769*#
NASA-CR-165200 .... p0143 N81-15003*#
NASA-CR-165217 .... p0376 N81-22053*#
NASA-CR-165220 .... p0214 N81-17080*#
NASA-CR-165225 .... p0144 N81-15006*#
NASA-CR-165244 .... p0213 N81-17078*#
NASA-CR-165250 .... p0213 N81-17079*#
NASA-CR-165252 .... p0442 N81-25076*#
NASA-CR-165258 .... p0277 N81-19316*#
NASA-CR-165261 .... p0335 N81-20078*#
NASA-CR-165290 .... p0269 N81-19079*#
NASA-CR-165297 .... p0390 N81-23086*#
NASA-CR-165310 .... p0483 N81-26075*#
NASA-CR-165313 .... p0428 N81-24067*#
NASA-CR-165330 .... p0442 N81-25078*#
NASA-CR-165336 .... p0387 N81-23069*#
NASA-CR-165337 .... p0429 N81-24068*#
NASA-CR-165338 .... p0442 N81-25077*#
NASA-CR-165344 .... p0388 N81-23070*#
NASA-CR-165360 .... p0539 N81-28094*#
NASA-CR-165361 .... p0546 N81-29093*#
NASA-CR-165373-VOL-1 .... p0496 N81-27089*#
NASA-CR-165373-VOL-2 .... p0496 N81-27090*#
NASA-CR-165373-VOL-3 .... p0496 N81-27091*#
NASA-CR-165374 .... p0496 N81-27093*#
NASA-CR-165406 .... p0549 N81-29130*#
NASA-CR-165418 .... p0597 N81-31193*#
NASA-CR-165456 .... p0597 N81-31194*#
NASA-CR-165486 .... p0631 N81-32956*#
NASA-CR-165626 .... p0202 N81-16853*#
NASA-CR-165649 .... p0198 N81-16139*#
NASA-CR-165654 .... p0594 N81-31160*#
NASA-CR-165655 .... p0329 N81-20028*#
NASA-CR-165660 .... p0336 N81-20086*#
NASA-CR-165665 .... p0444 N81-25090*#
NASA-CR-165666 .... p0329 N81-20027*#
NASA-CR-165667 .... p0494 N81-27076*#
NASA-CR-165673 .... p0373 N81-22032*#
NASA-CR-165674 .... p0331 N81-20051*#
NASA-CR-165675 .... p0537 N81-28070*#
NASA-CR-165679 .... p0385 N81-23035*#
NASA-CR-165680 .... p0333 N81-20068*#
NASA-CR-165685 .... p0343 N81-21087*#
NASA-CR-165687 .... p0340 N81-21058*#
NASA-CR-165700 .... p0386 N81-23059*#
NASA-CR-165706 .... p0384 N81-23034*#
NASA-CR-165708 .... p0425 N81-24040*#
NASA-CR-165710 .... p0423 N81-24026*#
NASA-CR-165714 .... p0498 N81-27114*#
NASA-CR-165715 .... p0447 N81-25768*#
NASA-CR-165732 .... p0491 N81-26845*#
NASA-CR-165749 .... p0584 N81-30137*#
NASA-CR-165751 .... p0580 N81-30098*#
NASA-CR-165765 .... p0550 N81-29165*#
NASA-CR-165768 .... p0596 N81-31184*#
NASA-CR-166129-VOL-1 .... p0538 N81-28084*#
NASA-CR-166129-VOL-2 .... p0538 N81-28085*#
NASA-CR-166129-VOL-3 .... p0538 N81-28086*#
NASA-CR-166136 .... p0579 N81-30084*#
NASA-CR-166137-VOL-1 .... p0337 N81-21017*#
NASA-CR-166137-VOL-2 .... p0337 N81-21018*#
NASA-CR-166146 .... p0441 N81-25064*#
NASA-CR-166157 .... p0261 N81-19020*#
NASA-CR-166159 .... p0424 N81-24035*#
NASA-CR-166161 .... p0428 N81-24064*#
NASA-CR-166162 .... p0442 N81-25074*#
NASA-CR-166163 .... p0540 N81-28096*#
NASA-CR-166165 .... p0373 N81-22037*#
NASA-CR-166166 .... p0372 N81-22031*#
NASA-CR-166170 .... p0635 N81-33162*#
NASA-CR-166173 .... p0387 N81-23068*#
NASA-CR-166183 .... p0483 N81-26072*#
NASA-CR-166194 .... p0486 N81-26116*#
NASA-CR-166197 .... p0637 N81-33190*#
NASA-CR-166212 .... p0493 N81-27063*#
NASA-CR-166214 .... p0579 N81-30085*#
NASA-CR-166230 .... p0546 N81-29108*#
NASA-CR-166231 .... p0546 N81-29110*#
NASA-CR-166233 .... p0549 N81-29135*#
NASA-CR-166234 .... p0549 N81-29134*#
NASA-CR-166236 .... p0581 N81-30106*#

NASA-FACTS-96/9-80 .... p0538 N81-28083*#

NASA-NEWS-RELEASE-81-96 .... p0492 N81-2700[illegible]

NASA-RP-1063 .... p0139 N81-14973*#

NASA-SP-440 .... p0629 N81-32153*#
NASA-SP-448 .... p0254 N81-18096*#

NASA-TM-X-1849 .... p0262 N81-19024*#
NASA-TM-X-2622 .... p0262 N81-19025*#

NASA-TM-72837 .... p0445 N81-25432*#
NASA-TM-73292 .... p0490 N81-26156*#

NASA-TM-75401	p0186	N81-15583*#
NASA-TM-75402	p0186	N81-15584*#
NASA-TM-75408	p0490	N81-26158*#
NASA-TM-75733	p0376	N81-22054*#
NASA-TM-75777	p0138	N81-14962*#
NASA-TM-75784	p0146	N81-15579*#
NASA-TM-75790	p0031	N81-10576*#
NASA-TM-75823	p0032	N81-10577*#
NASA-TM-75840	p0249	N81-18030*#
NASA-TM-75863	p0262	N81-19026*#
NASA-TM-75870	p0377	N81-22058*#
NASA-TM-75872	p0253	N81-18061*#
NASA-TM-75873	p0542	N81-28606*#
NASA-TM-75877	p0262	N81-19027*#
NASA-TM-75879	p0379	N81-22593*#
NASA-TM-75886	p0276	N81-19137*#
NASA-TM-75887	p0276	N81-19139*#
NASA-TM-75892	p0500	N81-27683*#
NASA-TM-75897	p0338	N81-21024*#
NASA-TM-75906	p0499	N81-27692*#
NASA-TM-75907	p0330	N81-20031*#
NASA-TM-76457	p0377	N81-22060*#
NASA-TM-76458	p0276	N81-19132*#
NASA-TM-76533	p0379	N81-22589*#
NASA-TM-76573	p0379	N81-22594*#
NASA-TM-76575	p0379	N81-22590*#
NASA-TM-76577	p0542	N81-28608*#
NASA-TM-76579	p0542	N81-28610*#
NASA-TM-76584	p0494	N81-27079*#
NASA-TM-76605	p0494	N81-27075*#
NASA-TM-80040	p0498	N81-27115*#
NASA-TM-80064	p0129	N81-13959*#
NASA-TM-80080	p0125	N81-13918*#
NASA-TM-80198	p0393	N81-23713*#
NASA-TM-80199	p0627	N81-32119*#
NASA-TM-80217	p0030	N81-11113*#
NASA-TM-80218	p0198	N81-16137*#
NASA-TM-80454	p0538	N81-28083*#
NASA-TM-81171	p0548	N81-29127*#
NASA-TM-81188	p0029	N81-10077*#
NASA-TM-81225	p0023	N81-10021*#
NASA-TM-81234	p0140	N81-14981*#
NASA-TM-81238	p0075	N81-12065*#
NASA-TM-81239	p0036	N81-11043*#
NASA-TM-81244	p0026	N81-10054*#
NASA-TM-81248	p0133	N81-14265*#
NASA-TM-81250	p0204	N81-16994*#
NASA-TM-81258	p0329	N81-20030*#
NASA-TM-81260	p0191	N81-16022*#
NASA-TM-81262	p0258	N81-18742*#
NASA-TM-81264	p0329	N81-20029*#
NASA-TM-81266	p0342	N81-21083*#
NASA-TM-81269	p0423	N81-24025*#
NASA-TM-81270	p0248	N81-18023*#
NASA-TM-81271	p0260	N81-19014*#
NASA-TM-81276	p0272	N81-19101*#
NASA-TM-81278	p0340	N81-21060*#
NASA-TM-81280	p0272	N81-19100*#
NASA-TM-81281	p0333	N81-20066*#
NASA-TM-81284	p0537	N81-28055*#
NASA-TM-81285	p0385	N81-23039*#
NASA-TM-81286	p0579	N81-30083*#
NASA-TM-81292	p0428	N81-24066*#
NASA-TM-81294	p0385	N81-23037*#
NASA-TM-81295	p0584	N81-30136*#
NASA-TM-81301	p0492	N81-27061*#
NASA-TM-81305	p0579	N81-30080*#
NASA-TM-81308	p0641	N81-34138*#
NASA-TM-81310	p0547	N81-29118*#
NASA-TM-81312	p0629	N81-32151*#
NASA-TM-81313	p0549	N81-29133*#
NASA-TM-81321	p0628	N81-32137*#
NASA-TM-81352	p0075	N81-12064*#
NASA-TM-81354	p0251	N81-18047*#
NASA-TM-81358	p0387	N81-23066*#
NASA-TM-81359	p0387	N81-23067*#
NASA-TM-81360	p0581	N81-30111*#
NASA-TM-81361	p0490	N81-26154*#
NASA-TM-81364	p0589	N81-30615*#
NASA-TM-81520	p0096	N81-13568*#
NASA-TM-81583	p0186	N81-15768*#
NASA-TM-81584	p0028	N81-10057*#
NASA-TM-81588	p0043	N81-11448*#
NASA-TM-81589	p0140	N81-14979*#
NASA-TM-81590	p0032	N81-10807*#
NASA-TM-81597	p0043	N81-11412*#
NASA-TM-81605	p0044	N81-11688*#
NASA-TM-81610	p0044	N81-11769*#
NASA-TM-81613	p0140	N81-14978*#
NASA-TM-81615	p0044	N81-11770*#
NASA-TM-81617	p0550	N81-29205*#
NASA-TM-81623	p0085	N81-12446*#
NASA-TM-81633	p0093	N81-13056*#
NASA-TM-81637	p0140	N81-14980*#
NASA-TM-81644	p0090	N81-13019*#
NASA-TM-81645	p0095	N81-13465*#
NASA-TM-81650	p0140	N81-14977*#
NASA-TM-81656	p0342	N81-21078*
NASA-TM-81657	p0195	N81-16053*#
NASA-TM-81660	p0588	N81-30562*#
NASA-TM-81662	p0195	N81-16054*#
NASA-TM-81663	p0195	N81-16055*#
NASA-TM-81666	p0195	N81-16052*#
NASA-TM-81671	p0191	N81-16021*#
NASA-TM-81675	p0220	N81-17483*#
NASA-TM-81682	p0201	N81-16388*#
NASA-TM-81707	p0269	N81-19078*#
NASA-TM-81726	p0337	N81-20424*#
NASA-TM-81727	p0380	N81-22836*#
NASA-TM-81731	p0345	N81-21803*#
NASA-TM-81736	p0447	N81-25767*#
NASA-TM-81739	p0381	N81-22839*#
NASA-TM-81745	p0338	N81-21028*#
NASA-TM-81749	p0376	N81-22056*#
NASA-TM-81752	p0391	N81-23243*#
NASA-TM-81759	p0443	N81-25084*#
NASA-TM-81761	p0443	N81-25079*#
NASA-TM-81766	p0380	N81-22838*#
NASA-TM-81792	p0434	N81-24[illegible]
NASA-TM-81802	p0435	N81-24115*#
NASA-TM-81814	p0035	N81-11032*#
NASA-TM-81862	p0125	N81-13921*#
NASA-TM-81863	p0085	N81-12448*#
NASA-TM-81865	p0125	N81-13922*#
NASA-TM-81868	p0550	N81-29137*#
NASA-TM-81878	p0186	N81-15978*#
NASA-TM-81886	p0073	N81-12039*#
NASA-TM-81892	p0071	N81-12012*#
NASA-TM-81898	p0186	N81-15982*#
NASA-TM-81903	p0257	N81-18410*#
NASA-TM-81906	p0088	N81-12822*#
NASA-TM-81909	p0335	N81-20084*#
NASA-TM-81910	p0089	N81-12977*#
NASA-TM-81914	p0145	N81-15397*#
NASA-TM-81920	p0186	N81-15985*#
NASA-TM-81927	p0385	N81-23036*#
NASA-TM-81929	p0335	N81-20083*#
NASA-TM-81931	p0254	N81-18199*#
NASA-TM-81937	p0329	N81-20025*#
NASA-TM-81941	p0257	N81-18412*#
NASA-TM-81945	p0331	N81-20050*#
NASA-TM-81947	p0391	N81-23096*#
NASA-TM-81948	p0335	N81-20085*#
NASA-TM-81949	p0377	N81-22061*#
NASA-TM-81951	p0547	N81-29119*#
NASA-TM-81952	p0339	N81-21044*#
NASA-TM-81956	p0338	N81-21027*#
NASA-TM-81959	p0330	N81-20044*#
NASA-TM-81961	p0388	N81-23072*#
NASA-TM-81962	p0388	N81-23071*#
NASA-TM-81963	p0581	N81-30110*#
NASA-TM-81968	p0394	N81-23862*#
NASA-TM-81969	p0374	N81-22040*#
NASA-TM-81970	p0438	N81-24855*#
NASA-TM-81971	p0345	N81-21904*#
NASA-TM-81974	p0493	N81-27062*#
NASA-TM-81975	p0446	N81-25765*#
NASA-TM-82040	p0279	N81-19526*#
NASA-TM-82142	p0491	N81-26643*#
NASA-TM-82238	p0200	N81-16253*
NASA-TM-82252	p0198	N81-16114*#
NASA-TM-82310	p0279	N81-19964*#
NASA-TM-82312	p0272	N81-19099*#
NASA-TM-82352	p0437	N81-24389*#
NASA-TM-82363	p0441	N81-25065*#
NASA-TM-82388	p0097	N81-13804*#
NASA-TM-82407	p0337	N81-20868*#
NASA-TM-82600	p0390	N81-23085*#
NASA-TM-82603	p0444	N81-25232*#
NASA-TM-82608	p0489	N81-26145*#
NASA-TM-82613	p0376	N81-22055*#
NASA-TM-82617	p0443	N81-25081*#
NASA-TM-82627	p0443	N81-25083*#
NASA-TM-82636	p0446	N81-25098*#
NASA-TM-82640	p0443	N81-25082*#
NASA-TM-82641	p0490	N81-26146*#
NASA-TM-82652	p0443	N81-25080*#
NASA-TM-82654	p0597	N81-31190*#

NASA-TM-82657 p0496 N81-27094*#
NASA-TM-82658 p0552 N81-29782*#
NASA-TM-82662 p0551 N81-29206*#
NASA-TM-82663 p0496 N81-27095*#
NASA-TM-82664 p0543 N81-29063*#
NASA-TM-82676 p0492 N81-27042*#
NASA-TM-82684 p0539 N81-28095*#
NASA-TM-82688 p0589 N81-30907*#
NASA-TM-82696 p0597 N81-31195*#
NASA-TM-82703 p0583 N81-30130*#
NASA-TM-83112 p0490 N81-26148*#
NASA-TM-83121 p0441 N81-25067*#
NASA-TM-83124 p0550 N81-29139*#
NASA-TM-83126 p0445 N81-25432*#
NASA-TM-83128 p0484 N81-26083*#
NASA-TM-83132 p0486 N81-26118*#
NASA-TM-83135 p0631 N81-32966*#
NASA-TM-83136 p0441 N81-25066*#
NASA-TM-83137 p0491 N81-26497*#
NASA-TM-83143 p0499 N81-27548*#
NASA-TM-83144 p0491 N81-26496*#
NASA-TM-83168 p0635 N81-33158*#
NASA-TM-83171 p0635 N81-33159*#
NASA-TM-83179 p0587 N81-30469*#
NASA-TM-83188 p0639 N81-33211*#
NASA-TM-83195 p0602 N81-31418*#
NASA-TM-83204 p0639 N81-33206*#

NASA-TP-1178 p0035 N81-11037*#
NASA-TP-1498 p0071 N81-12015*#
NASA-TP-1551 p0037 N81-11044*#
NASA-TP-1641 p0275 N81-19131*#
NASA-TP-1708 p0036 N81-11038*#
NASA-TP-1716 p0078 N81-12089*#
NASA-TP-1718 p0021 N81-10004*#
NASA-TP-1734 p0081 N81-12109*#
NASA-TP-1736 p0129 N81-13958*#
NASA-TP-1737 p0095 N81-13303*#
NASA-TP-1738 p0043 N81-11422*#
NASA-TP-1742 p0073 N81-12043*#
NASA-TP-1747 p0137 N81-14788*#
NASA-TP-1752 p0021 N81-10005*#
NASA-TP-1754 p0036 N81-11039*#
NASA-TP-1758 p0094 N81-13065*#
NASA-TP-1759 p0372 N81-22016*#
NASA-TP-1760 p0130 N81-13968*#
NASA-TP-1762 p0193 N81-16039*#
NASA-TP-1765 p0335 N81-20082*#
NASA-TP-1766 p0139 N81-14972*#
NASA-TP-1767 p0072 N81-12021*#
NASA-TP-1768 p0436 N81-24283*#
NASA-TP-1771 p0165 N81-15976*#
NASA-TP-1773 p0374 N81-22039*#
NASA-TP-1776 p0142 N81-14997*#
NASA-TP-1777 p0139 N81-14974*#
NASA-TP-1778 p0261 N81-19019*#
NASA-TP-1780 p0195 N81-16050*#
NASA-TP-1782 p0143 N81-15000*#
NASA-TP-1789 p0140 N81-14975*#
NASA-TP-1797 p0193 N81-16040*#
NASA-TP-1807 p0345 N81-21685*#
NASA-TP-1809 p0393 N81-23486*#
NASA-TP-1810 p0334 N81-20076*#
NASA-TP-1820 p0337 N81-21016*#
NASA-TP-1830 p0334 N81-20074*#
NASA-TP-1833 p0345 N81-21673*#
NASA-TP-1835 p0336 N81-20245*#
NASA-TP-1837 p0329 N81-20026*#
NASA-TP-1844 p0546 N81-29111*#
NASA-TP-1845 p0392 N81-23410*#
NASA-TP-1854 p0427 N81-24058*#
NASA-TP-1855 p0426 N81-24048*#
NASA-TP-1858 p0380 N81-22832*#
NASA-TP-1861 p0423 N81-24022*#
NASA-TP-1863 p0437 N81-24471*#
NASA-TP-1871 p0489 N81-26144*#
NASA-TP-1875 p0594 N81-31162*#
NASA-TP-1876 p0589 N81-30851*#
NASA-TP-1877 p0581 N81-30112*#
NASA-TP-1881 p0483 N81-26078*#
NASA-TP-1885 p0546 N81-29109*#
NASA-TP-1889 p0579 N81-30087*#
NASA-TP-1890 p0579 N81-30086*#
NASA-TP-1892 p0579 N81-30088*#
NASA-TP-1898 p0641 N81-33945*#
NASA-TP-1904 p0641 N81-33946*#
NASA-TP-1913 p0641 N81-33947*#
NASA-TP-1915 p0638 N81-33203*#
NASA-TP-1921 p0596 N81-31185*#

NAVAIR-510-1 p0341 N81-21069 #

NAVTRAEQUIPC-IH-321 p0601 N81-31232 #
NAVTRAEQUIPC-IH-322 p0192 N81-16033 #

NAVTRAEQUIPC-78-C-0076-1 p0198 N81-16072 #

NEAR-TR-156 p0071 N81-12014*#
NEAR-TR-161 p0251 N81-18044*#
NEAR-TR-183 p0261 N81-19018*#
NEAR-TR-187 p0251 N81-18045*#
NEAR-TR-210-VOL-1 p0495 N81-27081 #
NEAR-TR-210-VOL-2 p0494 N81-27080 #
NEAR-TR-210-VOL-3 p0495 N81-27082 #
NEAR-TR-210-VOL-4 p0495 N81-27083 #
NEAR-TR-222 p0263 N81-19030 #
NEAR-TR-226 p0594 N81-31154 #
NEAR-TR-228 p0085 N81-12451 #
NEAR-TR-230 p0261 N81-19020*#

NP-06/8-79 p0437 N81-24309*#

NGTE-M78029 p0031 N81-10436 #
NGTE-M78031 p0031 N81-10436 #

NIAST-80/19 p0435 N81-24116 #
NIAST-80/52 p0434 N81-24107 #

NLR-MP-78013-U p0256 N81-18325 #
NLR-MP-79013-U p0022 N81-10012 #
NLR-MP-79020-U p0338 N81-21038 #
NLR-MP-79038-U p0332 N81-20059 #
NLR-MP-79039-U p0596 N81-31189 #
NLR-MP-79042-U p0077 N81-12081 #
NLR-MP-79044-U p0086 N81-12475 #
NLR-MP-80003-U p0043 N81-11415 #
NLR-MP-80003-U p0086 N81-12477 #
NLR-MP-80004-U p0330 N81-20038 #
NLR-MP-80005-U p0330 N81-20039 #
NLR-MP-80010-U p0339 N81-21042 #
NLR-MP-80024-U p0600 N81-31222 #
NLR-MP-80025-U p0496 N81-27087 #
NLR-MP-80027-U p0630 N81-32164 #

NLR-TR-77104-U p0073 N81-12033 #
NLR-TR-78106-U p0139 N81-14969 #
NLR-TR-78150-U p0495 N81-27086 #
NLR-TR-79009-U p0022 N81-10014 #
NLR-TR-79056-U p0344 N81-21391 #
NLR-TR-79127-U p0498 N81-27118 #
NLR-TR-80078-U p0594 N81-31157 #

NOAA-81020304 p0552 N81-29722 #

NOSC/TR-591 p0221 N81-17902 #
NOSC/TR-646 p0484 N81-26086 #

NPL-AC-93 p0136 N81-14792 #

NPS53-81-001 p0202 N81-16825 #
NPS54-79-019 p0341 N81-21067 #
NPS67-80-014 p0254 N81-18067 #
NPS67-80-018 p0537 N81-28060 #

NRC-18227 p0084 N81-12394 #
NRC-18629 p0208 N81-17043 #
NRC-19164 p0390 N81-23088 #
NRC-19271 p0547 N81-29116 #

NRL-MR-4385 p0202 N81-16776 #
NRL-MR-4481 p0393 N81-23466 #

NRL-8445 p0272 N81-19103 #
NRL-8480 p0495 N81-27084 #

NR80H-102-VOL-1 p0337 N81-21017*#
NR80H-102-VOL-2 p0337 N81-21019*#
NR81H-2 p0388 N81-23075 #

NSWC/TR-80-208 p0091 N81-13036 #
NSWC/TR-80-216 p0038 N81-11117*#
NSWC/TR-80-271 p0033 N81-11017 #

NTIA/REPT-80-53 p0441 N81-25062 #

NTIS/PS-78/0539 p0023 N81-10026 #
NTIS/PS-78/0685 p0030 N81-10083 #
NTIS/PS-78/0694 p0024 N81-10027 #

NTIS/PS-78/0731 .... p0128 N81-13948 #
NTIS/PS-78/0732 .... p0128 N81-13947 #
NTIS/PS-78/0788 .... p0207 N81-17037 #
NTIS/PS-78/0807 .... p0088 N81-12667 #
NTIS/PS-78/0809 .... p0082 N81-12114 #
NTIS/PS-78/0883 .... p0193 N81-16038 #
NTIS/PS-78/0930 .... p0135 N81-14525 #
NTIS/PS-79/0649 .... p0023 N81-10026 #
NTIS/PS-79/0753 .... p0024 N81-10027 #
NTIS/PS-79/0754 .... p0030 N81-10083 #
NTIS/PS-79/0777 .... p0128 N81-13948 #
NTIS/PS-79/0778 .... p0128 N81-13947 #
NTIS/PS-79/0799 .... p0207 N81-17037 #
NTIS/PS-79/0856/5 .... p0146 N81-15649*#
NTIS/PS-79/0859/3 .... p0125 N81-13917*#
NTIS/PS-79/0875/9 .... p0142 N81-14596*#
NTIS/PS-79/0878 .... p0088 N81-12667 #
NTIS/PS-79/0904 .... p0082 N81-12114 #
NTIS/PS-79/0960 .... p0193 N81-16038 #
NTIS/PS-79/0973 .... p0135 N81-14525 #
NTIS/PS-79/1017 .... p0129 N81-13957*#

NTSB-AAR-79-12 .... p0073 N81-12044 #
NTSB-AAR-79-14 .... p0074 N81-12045 #
NTSB-AAR-79-15 .... p0074 N81-12046 #
NTSB-AAR-80-10 .... p0073 N81-12042 #
NTSB-AAR-81-1 .... p0269 N81-19077 #

NTSB-AAS-80-1 .... p0141 N81-14988 #

NTSB-AMM-80-1 .... p0205 N81-16999 #
NTSB-AMM-80-5 .... p0192 N81-16028 #
NTSB-AMM-80-11 .... p0141 N81-14987 #

NTSB-ARG-80-1 .... p0024 N81-10028 #

NTSB-BA-80-8 .... p0075 N81-12053 #

NTSB-SR-80-2 .... p0484 N81-26084 #

NWC-TP-6184 .... p0132 N81-14084 #
NWC-TP-6210 .... p0263 N81-19030 #
NWC-TP-6211 .... p0197 N81-16070 #
NWC-TP-6218 .... p0127 N81-13938 #

N122 .... p0394 N81-23966 #
N125 .... p0394 N81-23967 #

ONERA-NT-1979-4 .... p0088 N81-12826 #
ONERA-NT-1979-5 .... p0344 N81-21340 #
ONERA-NT-1979-8 .... p0339 N81-21046 #
ONERA-NT-1980-4 .... p0126 N81-13930 #

ONERA, TP NO. 1978-106 .... p0058 A81-14391 #
ONERA, TP NO. 1980-122 .... p0017 A81-11520 #
ONERA, TP NO. 1980-125 .... p0011 A81-11638
ONERA, TP NO. 1980-126 .... p0015 A81-11674
ONERA, TP NO. 1980-127 .... p0009 A81-11623
ONERA, TP NO. 1980-129 .... p0014 A81-11669
ONERA, TP NO. 1980-149 .... p0174 A81-21517 #
ONERA, TP NO. 1980-154 .... p0123 A81-19552 #
ONERA, TP NO. 1981-4 .... p0158 A81-20559 #
ONERA, TP NO. 1981-7 .... p0256 A81-29107 #
ONERA, TP NO. 1981-12 .... p0359 A81-32541 #
ONERA, TP NO. 1981-17 .... p0359 A81-32534 #
ONERA, TP NO. 1981-31 .... p0351 A81-31285
ONERA, TP NO. 1981-35 .... p0460 A81-39238 #
ONERA, TP NO. 1981-36 .... p0460 A81-39239 #
ONERA, TP NO. 1981-37 .... p0460 A81-39240 #
ONERA, TP NO. 1981-39 .... p0460 A81-39242 #
ONERA, TP NO. 1981-42 .... p0460 A81-39245 #

ONR-CR-212-266-1 .... p0441 N81-25060 #
ONR-CR-215-262-1F .... p0596 N81-31188 #

OR-16127 .... p0091 N81-13040 #

OUEL-1321/80 .... p0435 N81-24119 #

PAPER 810610 .... p0522 A81-42766

PAPER-NR-35 .... p0031 N81-10454 #

PAPER-14 .... p0621 N81-32522 #

PAR-018-81 .... p0630 N81-32158 #
PAR-037-80 .... p0095 N81-13072 #

PATR-1080-80-6 .... p0211 N81-17061 #

PB80-201916 .... p0024 N81-10028 #
PB80-213119 .... p0096 N81-13555 #
PB80-215544 .... p0125 N81-13916 #
PB80-215635 .... p0132 N81-14182 #
PB80-218233 .... p0128 N81-13949 #
PB80-225691 .... p0129 N81-13956 #
PB80-808546 .... p0026 N81-10048 #
PB80-808603 .... p0031 N81-10441 #
PB80-808611 .... p0029 N81-10076 #
PB80-809023 .... p0026 N81-10065*#
PB80-809064 .... p0026 N81-10050 #
PB80-809072 .... p0026 N81-10049*#
PB80-812837 .... p0023 N81-10026 #
PB80-812860 .... p0030 N81-10083 #
PB80-812944 .... p0024 N81-10027 #
PB80-813231 .... p0088 N81-12667 #
PB80-813710 .... p0082 N81-12114 #
PB80-814635 .... p0128 N81-13948 #
PB80-814643 .... p0128 N81-13947 #
PB80-815020 .... p0193 N81-16036 #
PB80-815566 .... p0135 N81-14525 #
PB80-815889 .... p0146 N81-15649*#
PB80-815921 .... p0142 N81-14996*#
PB80-815947 .... p0146 N81-15648*#
PB81-101701 .... p0141 N81-14987 #
PB81-104267 .... p0141 N81-14988 #
PB81-110280 .... p0205 N81-16999 #
PB81-110827 .... p0192 N81-16028 #
PB81-114886 .... p0270 N81-19083 #
PB81-134686 .... p0381 N81-22969*#
PB81-136186 .... p0344 N81-21165 #
PB81-137473 .... p0389 N81-23079 #
PB81-144180 .... p0389 N81-23078 #
PB81-150021 .... p0392 N81-23269 #
PB81-154387 .... p0441 N81-25062 #
PB81-160798 .... p0484 N81-26084 #
PB81-160814 .... p0487 N81-26125 #
PB81-166159 .... p0487 N81-26124 #
PB81-166167 .... p0487 N81-26123 #
PB81-166183 .... p0487 N81-26122 #
PB81-168734 .... p0499 N81-27714 #
PB81-174252 .... p0493 N81-27068 #
PB81-176067 .... p0588 N81-30700 #
PB81-176596 .... p0552 N81-29722 #
PB81-183477 .... p0586 N81-30313 #
PB81-210130 .... p0641 N81-34108 #
PB81-211757 .... p0641 N81-34109 #
PB81-215246 .... p0637 N81-33188 #
PB81-800104 .... p0207 N81-17037 #
PB81-910401 .... p0269 N81-19077 #

PCBP-2 .... p0497 N81-27098*#

PE-TRADE-2B-0012 .... p0146 N81-15729 #

PML-1978-22 .... p0436 N81-24213 #

PNR-90013 .... p0072 N81-12029 #
PNR-90017 .... p0335 N81-20081 #
PNR-90018 .... p0080 N81-12825 #
PNR-90019 .... p0084 N81-12209
PNR-90021 .... p0029 N81-10075 #
PNR-90022 .... p0275 N81-19126 #
PNR-90024 .... p0131 N81-14004 #
PNR-90029 .... p0130 N81-14793 #
PNR-90032 .... p0130 N81-14795 #
PNR-90034 .... p0130 N81-13964 #
PNR-90043 .... p0338 N81-21037 #
PNR-90047 .... p0275 N81-19127 #
PNR-90058 .... p0583 N81-30133 #
PNR-90068 .... p0602 N81-31398 #

PSAD-80-50 .... p0334 N81-20077
PSAD-80-50 .... p0490 N81-26149 #

PSU/TURBO-R81-7 .... p0540 N81-28097*#

PTPD-80-22 .... p0334 N81-20073 #

PTPT-80-16 .... p0194 N81-16048 #

PTR-81-7 .... p0378 N81-22282*#

PWA-FR-11878-PT-2 .... p0029 N81-10074 #
PWA-FR-11878-VOL-1 .... p0036 N81-11041 #
PWA-FR-13036A .... p0134 N81-14325 #
PWA-FR-13144 .... p0335 N81-20080 #
PWA-FR-13514 .... p0091 N81-13034 #

PWA-5512-75 .... p0390 N81-23086*#
PWA-5515-138 .... p0214 N81-17080*#
PWA-5523-92 .... p0078 N81-12087*#
PWA-5550-5-VOL-2-BK-3 .... p0214 N81-17084*#
PWA-5550-37 .... p0093 N81-13057*#
PWA-5550-50-VOL-1 .... p0214 N81-17081*#
PWA-5550-50-VOL-2-BK-1 .... p0214 N81-17082*#
PWA-5550-50-VOL-2-BK-2 .... p0214 N81-17083*#
PWA-5550-50-VOL-3-BK-1 .... p0214 N81-17085*#
PWA-5550-50-VOL-3-BK-2 .... p0214 N81-17086*#
PWA-5584-33 .... p0215 N81-17091 #
PWA-5594-141 .... p0442 N81-25077*#
PWA-5594-159 .... p0496 N81-27093*#
PWA-5635-43 .... p0147 N81-15769*#
PWA-5684-19 .... p0213 N81-17079*#
PWA-5697-29 .... p0277 N81-19316*#
PWA-5706-16 .... p0428 N81-24067*#
PWA-5755 .... p0144 N81-15006*#

P81-10097 .... p0492 N81-27050*

QMC/EP-1034 .... p0487 N81-26122 #
QMC/EP-1035 .... p0487 N81-26124 #
QMC/EP-1038 .... p0487 N81-26123 #

QPR-10 .... p0550 N81-29165*#

QR-11 .... p0023 N81-10021*#

QTPR-5 .... p0194 N81-16042*#
QTPR-9 .... p0198 N81-16139*#
QTPR-12 .... p0085 N81-12426 #

R-SAI-03/81-03 .... p0434 N81-24112*#

R-1562 .... p0249 N81-18028*#
R-1614 .... p0393 N81-23487*#
R-1627A .... p0582 N81-30117 #

RAD-219-030-03 .... p0586 N81-30282 #

RADC-TR-80-302 .... p0201 N81-16357 #
RADC-TR-81-26 .... p0491 N81-26349 #
RADC-TR-81-116 .... p0640 N81-33393 #

RAE-AERO-3464 .... p0022 N81-10015 #
RAE-AERO-3476 .... p0330 N81-20040 #
RAE-AERO-3479 .... p0073 N81-12038 #

RAE-FS-140 .... p0605 N81-31588 #

RAE-RAD-NAV-VOL-1 .... p0026 N81-10044 #

RAE-STRUCT-BF/B/0794 .... p0022 N81-10016 #

RAE-TM-FS-313 .... p0064 N81-12320 #

RAE-TR-77184 .... p0021 N81-10010 #
RAE-TR-78038 .... p0144 N81-15009 #
RAE-TR-79029 .... p0082 N81-12113 #
RAE-TR-79052-VOL-1 .... p0026 N81-10044 #
RAE-TR-79052-VOL-2 .... p0026 N81-10045 #
RAE-TR-79052-VOL-3 .... p0026 N81-10046 #
RAE-TR-79120 .... p0022 N81-10015 #
RAE-TR-79125 .... p0022 N81-10016 #
RAE-TR-80039 .... p0330 N81-20040 #
RAE-TR-80060 .... p0073 N81-12038 #
RAE-TR-81014 .... p0605 N81-31588 #

RAND/R-2440-AF .... p0036 N81-11042 #
RAND/R-2565-AF .... p0483 N81-26035 #
RAND/R-2731-PA/E .... p0631 N81-33133 #
RAND/WN-10233-NASA .... p0273 N81-19111*#

RE-623-PT-1 .... p0637 N81-33192 #

REPT-D-19 .... p0031 N81-10576*#

REPT-N81-91441031 .... p0549 N81-29130*#

REPT-5WW/TFRN-80/001 .... p0446 N81-25637 #
REPT-5WW/TFRN-80/002 .... p0446 N81-25638 #
REPT-21-3365-A .... p0029 N81-10072 #
REPT-21-3805(01) .... p0583 N81-30131 #
REPT-22 .... p0088 N81-12824 #
REPT-25 .... p0035 N81-11033 #
REPT-81-17693 .... p0583 N81-30127 #
REPT-81APR521 .... p0582 N81-30120 #

REPT-149 .... p0379 N81-22666 #
REPT-0747-81-PT-1 .... p0441 N81-25064*#
REPT-1310-E-0020 .... p0437 N81-24360 #
REPT-2258-02-1-2439 .... p0629 N81-32144 #
REPT-2258-03-2-2477 .... p0583 N81-30128 #
REPT-4215 .... p0345 N81-21871*#
REPT-7430-927001 .... p0279 N81-19484*#

RISOE-M-2199 .... p0279 N81-19497 #

RMCS-80002 .... p0601 N81-31225 #

RR-80-8 .... p0344 N81-21239 #

RSG-313-72 .... p0037 N81-11045 #
RSG-313-80 .... p0037 N81-11045 #

RSRE-MEMO-3248 .... p0084 N81-12353 #

RTCA/DO-134 .... p0336 N81-20323 #
RTCA/DO-172 .... p0336 N81-20322 #
RTCA/DO-173 .... p0336 N81-20323 #
RTCA/DO-177 .... p0595 N81-31180 #
RTCA/DO-177 .... p0628 N81-32133 #

RTN-0180 .... p0198 N81-16072 #

RTI/1825/01-01F .... p0537 N81-28070*#

R75AEG026-VOL-1 .... p0376 N81-22052*#
R77AEG229-VOL-1 .... p0497 N81-27097*#
R78AEG612 .... p0143 N81-15005*#
R79AEG052-VOL-2 .... p0028 N81-10068 #
R79AEG052-VOL-3 .... p0028 N81-10069 #
R79AEG123 .... p0214 N81-17087 #
R79AEG274 .... p0375 N81-22051*#
R79AEG386 .... p0203 N81-16854*#
R80-954440-17 .... p0084 N81-12255*#
R80AEG068 .... p0442 N81-25078*#
R80AEG312-VOL-2 .... p0195 N81-16051*#
R80AEG313-VOL-3 .... p0078 N81-12086*#
R80AEG365 .... p0220 N81-17846*#
R80AEG388 .... p0583 N81-30132 #
R80AEG429 .... p0143 N81-15004*#
R80AEG618 .... p0278 N81-19323 #
R81AEG213 .... p0600 N81-31218 #
R81AEG219 .... p0213 N81-17078*#
R81AEG257 .... p0442 N81-25074*#
R81AEG311 .... p0376 N81-22053*#
R81AEG381-VOL-1 .... p0496 N81-27089*#
R81AEG381-VOL-2 .... p0496 N81-27090*#
R81AEG381-VOL-3 .... p0496 N81-27091*#
R81AEG393 .... p0597 N81-31194*#

SAAB-TN-AE-72-PT-2 .... p0086 N81-12465 #

SAALC/SFQ-TR-80-1 .... p0092 N81-13049 #

SAC/LGME-S-110 .... p0548 N81-29125 #

SAE PAPER 80-1152 .... p0406 A81-34243*
SAE PAPER 800601 .... p0061 A81-15326
SAE PAPER 800602 .... p0061 A81-15327
SAE PAPER 800605 .... p0061 A81-15328
SAE PAPER 800606 .... p0061 A81-15329
SAE PAPER 800607 .... p0061 A81-15330
SAE PAPER 800608 .... p0061 A81-15331
SAE PAPER 800609 .... p0062 A81-15332
SAE PAPER 800610 .... p0062 A81-15333
SAE PAPER 800612 .... p0062 A81-15334
SAE PAPER 800614 .... p0062 A81-15335
SAE PAPER 800616 .... p0062 A81-15336
SAE PAPER 800617 .... p0062 A81-15337
SAE PAPER 800618 .... p0062 A81-15338
SAE PAPER 800621 .... p0062 A81-15339
SAE PAPER 800622 .... p0063 A81-15340
SAE PAPER 800625 .... p0063 A81-15341
SAE PAPER 800626 .... p0063 A81-15342
SAE PAPER 800627 .... p0063 A81-15343
SAE PAPER 800629 .... p0063 A81-15344
SAE PAPER 800630 .... p0063 A81-15345
SAE PAPER 801100 .... p0512 A81-41776
SAE PAPER 801101 .... p0513 A81-41777
SAE PAPER 801110 .... p0395 A81-34151
SAE PAPER 801116 .... p0395 A81-34152*
SAE PAPER 801117 .... p0395 A81-34153
SAE PAPER 801118 .... p0396 A81-34154*
SAE PAPER 801119 .... p0396 A81-34155*
SAE PAPER 801120 .... p0396 A81-34156*

SAE PAPER 801121 .... p0396 A81-34157
SAE PAPER 801122 .... p0396 A81-34158*
SAE PAPER 801124 .... p0396 A81-34159
SAE PAPER 801131 .... p0396 A81-34162
SAE PAPER 801132 .... p0396 A81-34163*
SAE PAPER 801133 .... p0397 A81-34164*
SAE PAPER 801134 .... p0397 A81-34165
SAE PAPER 801135 .... p0397 A81-34166*
SAE PAPER 801136 .... p0397 A81-34167
SAE PAPER 801137 .... p0397 A81-34168*
SAE PAPER 801138 .... p0397 A81-34169*
SAE PAPER 801140 .... p0397 A81-34170*
SAE PAPER 801141 .... p0398 A81-34171
SAE PAPER 801142 .... p0398 A81-34172
SAE PAPER 801144 .... p0398 A81-34173
SAE PAPER 801145 .... p0398 A81-34174
SAE PAPER 801146 .... p0398 A81-34175
SAE PAPER 801147 .... p0398 A81-34176
SAE PAPER 801148 .... p0406 A81-34240
SAE PAPER 801149 .... p0406 A81-34241
SAE PAPER 801151 .... p0406 A81-34242
SAE PAPER 801153 .... p0407 A81-34244
SAE PAPER 801154 .... p0398 A81-34177*
SAE PAPER 801155 .... p0407 A81-34245
SAE PAPER 801156 .... p0407 A81-34246
SAE PAPER 801158 .... p0399 A81-34178
SAE PAPER 801163 .... p0399 A81-34179
SAE PAPER 801165 .... p0399 A81-34180
SAE PAPER 801166 .... p0399 A81-34181
SAE PAPER 801167 .... p0399 A81-34182
SAE PAPER 801168 .... p0399 A81-34183
SAE PAPER 801169 .... p0399 A81-34184
SAE PAPER 801170 .... p0400 A81-34185
SAE PAPER 801173 .... p0400 A81-34187
SAE PAPER 801175 .... p0400 A81-34188*
SAE PAPER 801176 .... p0400 A81-34189
SAE PAPER 801177 .... p0400 A81-34190
SAE PAPER 801178 .... p0400 A81-34191*
SAE PAPER 801179 .... p0400 A81-34192
SAE PAPER 801180 .... p0400 A81-34193*
SAE PAPER 801181 .... p0401 A81-34194
SAE PAPER 801183 .... p0401 A81-34196
SAE PAPER 801185 .... p0401 A81-34198
SAE PAPER 801187 .... p0401 A81-34199
SAE PAPER 801188 .... p0401 A81-34200
SAE PAPER 801190 .... p0401 A81-34201
SAE PAPER 801192 .... p0401 A81-34202
SAE PAPER 801193 .... p0402 A81-34203
SAE PAPER 801194 .... p0402 A81-34204
SAE PAPER 801195 .... p0402 A81-34205
SAE PAPER 801196 .... p0402 A81-34206*
SAE PAPER 801197 .... p0402 A81-34207
SAE PAPER 801198 .... p0402 A81-34208*
SAE PAPER 801199 .... p0402 A81-34209
SAE PAPER 801200 .... p0402 A81-34210
SAE PAPER 801201 .... p0403 A81-34211
SAE PAPER 801203 .... p0403 A81-34212
SAE PAPER 801205 .... p0403 A81-34213
SAE PAPER 801206 .... p0403 A81-34214
SAE PAPER 801207 .... p0403 A81-34215*
SAE PAPER 801208 .... p0403 A81-34216
SAE PAPER 801209 .... p0404 A81-34217
SAE PAPER 801210 .... p0404 A81-34218
SAE PAPER 801211 .... p0404 A81-34219
SAE PAPER 801212 .... p0404 A81-34220
SAE PAPER 801213 .... p0404 A81-34221*
SAE PAPER 801214 .... p0404 A81-34222
SAE PAPER 801218 .... p0404 A81-34224
SAE PAPER 801219 .... p0404 A81-34225
SAE PAPER 801222 .... p0404 A81-34226
SAE PAPER 801224 .... p0405 A81-34227
SAE PAPER 801225 .... p0405 A81-34228
SAE PAPER 801226 .... p0405 A81-34229
SAE PAPER 801227 .... p0405 A81-34230
SAE PAPER 801228 .... p0405 A81-34231
SAE PAPER 801230 .... p0405 A81-34232
SAE PAPER 801231 .... p0405 A81-34233
SAE PAPER 801237 .... p0405 A81-34235
SAE PAPER 801238 .... p0406 A81-34236
SAE PAPER 801239 .... p0406 A81-34237
SAE PAPER 801242 .... p0406 A81-34238
SAE PAPER 801243 .... p0406 A81-34239
SAE PAPER 810560 .... p0518 A81-42726
SAE PAPER 810562 .... p0518 A81-42728*
SAE PAPER 810565 .... p0518 A81-42730*
SAE PAPER 810567 .... p0518 A81-42732
SAE PAPER 810569 .... p0519 A81-42734
SAE PAPER 810570 .... p0519 A81-42735
SAE PAPER 810571 .... p0519 A81-42736
SAE PAPER 810572 .... p0519 A81-42737
SAE PAPER 810573 .... p0519 A81-42738
SAE PAPER 810576 .... p0519 A81-42740
SAE PAPER 810577 .... p0519 A81-42741
SAE PAPER 810579 .... p0519 A81-42742
SAE PAPER 810580 .... p0519 A81-42743
SAE PAPER 810582 .... p0520 A81-42744*
SAE PAPER 810584 .... p0520 A81-42745
SAE PAPER 810585 .... p0520 A81-42746
SAE PAPER 810586 .... p0520 A81-42747*
SAE PAPER 810591 .... p0520 A81-42750
SAE PAPER 810592 .... p0520 A81-42751
SAE PAPER 810593 .... p0520 A81-42752
SAE PAPER 810596 .... p0520 A81-42754*
SAE PAPER 810597 .... p0521 A81-42755
SAE PAPER 810599 .... p0521 A81-42756*
SAE PAPER 810600 .... p0521 A81-42757
SAE PAPER 810602 .... p0521 A81-42759
SAE PAPER 810603 .... p0521 A81-42760
SAE PAPER 810604 .... p0521 A81-42761
SAE PAPER 810605 .... p0521 A81-42762
SAE PAPER 810606 .... p0522 A81-42763*
SAE PAPER 810608 .... p0522 A81-42765
SAE PAPER 810611 .... p0522 A81-42767*
SAE PAPER 810612 .... p0522 A81-42768
SAE PAPER 810613 .... p0522 A81-42769
SAE PAPER 810614 .... p0522 A81-42770*
SAE PAPER 810615 .... p0522 A81-42771
SAE PAPER 810617 .... p0523 A81-42772
SAE PAPER 810618 .... p0523 A81-42773
SAE PAPER 810619 .... p0523 A81-42774
SAE PAPER 810620 .... p0523 A81-42775
SAE PAPER 810622 .... p0523 A81-42776
SAE PAPER 810623 .... p0523 A81-42777*
SAE PAPER 810624 .... p0523 A81-42778*
SAE PAPER 810625 .... p0523 A81-42779*
SAE PAPER 810628 .... p0524 A81-42780
SAE PAPER 810629 .... p0524 A81-42781*
SAE PAPER 810630 .... p0524 A81-42782
SAE PAPER 810640 .... p0524 A81-42784
SAE PAPER 810642 .... p0524 A81-42785*

SAI-80-020-CP .... p0083 N81-12192 #
SAI-80-022-CP .... p0392 N81-23411*#
SAI-81-030-CP .... p0602 N81-31320 #

SAM-TR-80-29 .... p0130 N81-13966 #
SAM-TR-80-48 .... p0580 N81-30102 #

SAND-80-2479C .... p0193 N81-16037 #
SAND-81-1108C .... p0508 N81-30615 #
SAND-81-1278C .... p0638 N81-33200 #

SAPR-39 .... p0207 N81-17039*#

SAR-40 .... p0541 N81-28176*#

SASR-1 .... p0500 N81-27884*#
SASR-3 .... p0344 N81-21211*#

SAWE PAPER 1331 .... p0352 A81-31376
SAWE PAPER 1336 .... p0352 A81-31377
SAWE PAPER 1338 .... p0352 A81-31378
SAWE PAPER 1339 .... p0352 A81-31379
SAWE PAPER 1340 .... p0352 A81-31380
SAWE PAPER 1341 .... p0353 A81-31381
SAWE PAPER 1343 .... p0353 A81-31382
SAWE PAPER 1345 .... p0353 A81-31383
SAWE PAPER 1346 .... p0353 A81-31384
SAWE PAPER 1347 .... p0353 A81-31385
SAWE PAPER 1351 .... p0353 A81-31386
SAWE PAPER 1365 .... p0353 A81-31387
SAWE PAPER 1366 .... p0353 A81-31388
SAWE PAPER 1367 .... p0353 A81-31389
SAWE PAPER 1383 .... p0353 A81-31399
SAWE PAPER 1384 .... p0354 A81-31400
SAWE PAPER 1385 .... p0354 A81-31401
SAWE PAPER 1386 .... p0354 A81-31402

SC595.44C5A .... p0257 N81-1841[illegible] #
SC595.65IR .... p0258 N81-18420 #

SD-TR-80-65 .... p0038 N81-11110 #

SDL-80-2122-13P .... p0143 N81-15003*#

SER-13452 .... p0540 N81-29124 #
SER-69065 .... p0530 N81-28087 #
SER-70471 .... p0444 N81-25090*#

SERI/TR-98003-2 .... p0043 N81-11492 #

SNIAS-792-422-103 .... p0023 N81-10025 #
SNIAS-801-551-101 .... p0074 N81-12052 #
SNIAS-801-551-105 .... p0031 N81-10168
SNIAS-801-551-107 .... p0144 N81-15072 #
SNIAS-802-111-102 .... p0434 N81-24110 #
SNIAS-802-111-107 .... p0437 N81-24482 #
SNIAS-802-111-108 .... p0427 N81-24054 #
SNIAS-802-111-111 .... p0427 N81-24055 #
SNIAS-802-111-112 .... p0427 N81-24056 #
SNIAS-802-111-113 .... p0427 N81-24057 #
SNIAS-802-111-114 .... p0428 N81-24061 #
SNIAS-802-111-115 .... p0428 N81-24062 #

SP-5317 .... p0092 N81-13044*#

SRBI-R-4828-16 .... p0429 N81-24068*#

SRC-TR-81-1170 .... p0638 N81-33200 #

SRC-80-TR-57-PT-6 .... p0257 N81-18394 #

SRL-9799 .... p0131 N81-14061 #

STI-TR-1081-1-PT-1 .... p0581 N81-30113 #
STI-TR-1081-1-PT-2 .... p0581 N81-30114 #
STI-TR-1081-1-PT-3 .... p0581 N81-30115 #
STI-TR-1135-1 .... p0498 N81-27117 #

SU-JIAA-TR-30 .... p0483 N81-26072*#

SWRI-MED118 .... p0542 N81-28277 #

SWRI-02-4860 .... p0446 N81-25766*#

TASC-TR-1356-1 .... p0253 N81-18062 #
TASC-TR-3077-2-VOL-1 .... p0192 N81-16030 #
TASC-TR-3077-2-VOL-2 .... p0192 N81-16031 #
TASC-TR-3077-2-VOL-4 .... p0192 N81-16032 #

TCAE-1701 .... p0215 N81-17092 #

TCRL-17 .... p0335 N81-20079*#

TFD-81-01 .... p0249 N81-18029*#

TI-683 .... p0035 N81-11036 #

TM-76 .... p0141 N81-14989*#

TOP-6-3-013 .... p0334 N81-20075 #
TOP-6-3-025 .... p0201 N81-16375 #
TOP-6-3-205 .... p0387 N81-23062 #
TOP-6-3-223 .... p0392 N81-23358 #

TR-2-53020/IR-52726 .... p0483 N81-26075*#
TR-80-4102-PT-1 .... p0539 N81-28089 #
TR-0080(5950-01)-1 .... p0038 N81-11118 #
TR-1127-1-VOL-2 .... p0081 N81-12110*#
TR-1137-1 .... p0498 N81-27113*#
TR-7927 .... p0204 N81-16597 #

TRANS-15028 .... p0335 N81-20081 #
TRANS-15068 .... p0275 N81-19126 #
TRANS-15261 .... p0583 N81-30133 #
TRANS-15292 .... p0275 N81-19127 #

TRB/TRR-752 .... p0132 N81-14182 #
TRB/TRR-768 .... p0493 N81-27068 #
TRB/TRR-787 .... p0637 N81-33188 #

TRW-ER-8019-F .... p0557 N81-31193*#

TRW-30323-6003-TU-00 .... p0543 N81-28787 #
TRW-30323-6007-TU-00 .... p0543 N81-28786 #
TRW-30323-6012-TU-00 .... p0543 N81-28785 #
TRW-30323-6015-TU-00 .... p0543 N81-28788 #
TRW-30323-6019-TU-00 .... p0543 N81-28789 #
TRW-32399-6002-UT-00 .... p0021 N81-10008 #

TSC-FAA-80-15-VOL-1 .... p0640 N81-33390 #
TSC-FAA-80-16 .... p0091 N81-13038 #
TSC-FAA-80-25 .... p0273 N81-19114 #
TSC-FAA-81-1 .... p0389 N81-23081 #
TSC-FAA-81-13 .... p0641 N81-33948 #

TT-677 .... p0132 N81-14195 #

TT-8002 .... p0541 N81-28106 #

TUDS/SFE-58-80-05-01 .... p0628 N81-32131 #

UCLA-ENG-8037 .... p0631 N81-32956*#

UCRL-15257 .... p0085 N81-12427 #

UDR-TR-80-59 .... p0204 N81-16995 #
UDR-TR-80-61-PT-2 .... p0638 N81-33197 #
UDR-TR-80-69 .... p0424 N81-24036 #
UDR-TR-80-73-VOL-1 .... p0374 N81-22044 #
UDR-TR-80-73-VOL-2 .... p0375 N81-22045 #
UDR-TR-80-91-PT-1 .... p0638 N81-33196 #

UMICH-018209-3-F .... p0548 N81-29122 #

UMTA-NY-06-0005-80-1 .... p0641 N81-34109 #

US-PATENT-APPL-SN-006952 .... p0132 N81-14077*
US-PATENT-APPL-SN-008210 .... p0485 N81-26114*
US-PATENT-APPL-SN-015995 .... p0490 N81-26152*
US-PATENT-APPL-SN-015996 .... p0433 N81-24106*
US-PATENT-APPL-SN-019541 .... p0139 N81-14968*
US-PATENT-APPL-SN-034104 .... p0275 N81-19130*
US-PATENT-APPL-SN-038980 .... p0143 N81-14999*
US-PATENT-APPL-SN-103836 .... p0437 N81-24443*
US-PATENT-APPL-SN-164617 .... p0210 N81-17057*
US-PATENT-APPL-SN-208093 .... p0639 N81-33210*#
US-PATENT-APPL-SN-210491 .... p0261 N81-19016*#
US-PATENT-APPL-SN-224231 .... p0202 N81-16677*#
US-PATENT-APPL-SN-234244 .... p0278 N81-19439*#
US-PATENT-APPL-SN-238886 .... p0378 N81-22358*#
US-PATENT-APPL-SN-241154 .... p0373 N81-22036*#
US-PATENT-APPL-SN-242790 .... p0375 N81-22048*#
US-PATENT-APPL-SN-243685 .... p0496 N81-27096*#
US-PATENT-APPL-SN-248744 .... p0426 N81-24047*#
US-PATENT-APPL-SN-259209 .... p0546 N81-29107*#
US-PATENT-APPL-SN-263829 .... p0628 N81-32138*#
US-PATENT-APPL-SN-267935 .... p0550 N81-29138*#
US-PATENT-APPL-SN-274705 .... p0601 N81-31230*#
US-PATENT-APPL-SN-274706 .... p0601 N81-31229*#
US-PATENT-APPL-SN-568541 .... p0132 N81-14077*
US-PATENT-APPL-SN-727503 .... p0275 N81-19130*
US-PATENT-APPL-SN-741056 .... p0274 N81-19116*
US-PATENT-APPL-SN-752050 .... p0273 N81-19115*
US-PATENT-APPL-SN-785279 .... p0132 N81-14077*
US-PATENT-APPL-SN-862878 .... p0138 N81-14967*
US-PATENT-APPL-SN-893865 .... p0437 N81-24443*
US-PATENT-APPL-SN-907421 .... p0133 N81-14318*
US-PATENT-APPL-SN-909235 .... p0273 N81-19115*
US-PATENT-APPL-SN-909608 .... p0274 N81-19116*
US-PATENT-APPL-SN-916654 .... p0549 N81-29129*
US-PATENT-APPL-SN-964755 .... p0270 N81-19087*

US-PATENT-CLASS-60-39.06 .... p0549 N81-29129*
US-PATENT-CLASS-60-39.24 .... p0273 N81-19115*
US-PATENT-CLASS-60-226R p0274 N81-19116*
US-PATENT-CLASS-60-236 .... p0274 N81-19116*
US-PATENT-CLASS-60-238 .... p0274 N81-19116*
US-PATENT-CLASS-60-239 .... p0274 N81-19116*
US-PATENT-CLASS-60-259 .... p0485 N81-26114*
US-PATENT-CLASS-60-267 .... p0485 N81-26114*
US-PATENT-CLASS-60-518 .... p0133 N81-14318*
US-PATENT-CLASS-60-726 .... p0549 N81-29129*
US-PATENT-CLASS-60-730 .... p0485 N81-26114*
US-PATENT-CLASS-60-737 .... p0549 N81-29129*
US-PATENT-CLASS-62-DIG.5 .... p0485 N81-26114*
US-PATENT-CLASS-68-3R p0138 N81-14967*
US-PATENT-CLASS-73-147 .... p0210 N81-17057*
US-PATENT-CLASS-73-170R p0210 N81-17057*
US-PATENT-CLASS-74-417 .... p0133 N81-14318*
US-PATENT-CLASS-74-519 .... p0270 N81-19087*
US-PATENT-CLASS-102-56R p0139 N81-14968*
US-PATENT-CLASS-102-92.1 .... p0139 N81-14968*
US-PATENT-CLASS-137-15.1 .... p0143 N81-14999*
US-PATENT-CLASS-152-330RF p0437 N81-24443*
US-PATENT-CLASS-152-353G p0437 N81-24443*
US-PATENT-CLASS-152-353R p0437 N81-24443*
US-PATENT-CLASS-152-379.4 .... p0437 N81-24443*
US-PATENT-CLASS-156-154 .... p0132 N81-14077*
US-PATENT-CLASS-156-160 .... p0132 N81-14077*
US-PATENT-CLASS-156-163 .... p0132 N81-14077*
US-PATENT-CLASS-156-212 .... p0132 N81-14077*
US-PATENT-CLASS-156-267 .... p0132 N81-14077*
US-PATENT-CLASS-156-295 .... p0132 N81-14077*
US-PATENT-CLASS-156-323 .... p0132 N81-14077*
US-PATENT-CLASS-156-331 .... p0132 N81-14077*
US-PATENT-CLASS-165-104.14 .... p0485 N81-26114*

US-PATENT-CLASS-181-214 .... p0143 N81-14999*
US-PATENT-CLASS-244-12.5 .... p0275 N81-19130*
US-PATENT-CLASS-244-17.25 .... p0270 N81-19087*
US-PATENT-CLASS-244-52 .... p0275 N81-19130*
US-PATENT-CLASS-244-87 .... p0275 N81-19130*
US-PATENT-CLASS-244-103R p0437 N81-24443*
US-PATENT-CLASS-244-117A p0485 N81-26114*
US-PATENT-CLASS-244-119 .... p0139 N81-14568*
US-PATENT-CLASS-244-130 .... p0139 N81-14568*
US-PATENT-CLASS-244-130 .... p0437 N81-24443*
US-PATENT-CLASS-244-163 .... p0485 N81-26114*
US-PATENT-CLASS-244-181 .... p0433 N81-24106*
US-PATENT-CLASS-244-181 .... p0490 N81-26152*
US-PATENT-CLASS-244-182 .... p0490 N81-26152*
US-PATENT-CLASS-244-155 .... p0433 N81-24106*
US-PATENT-CLASS-261-28 .... p0549 N81-29129*
US-PATENT-CLASS-318-584 .... p0433 N81-24106*
US-PATENT-CLASS-364-106 .... p0273 N81-19115*
US-PATENT-CLASS-364-431 .... p0273 N81-19115*
US-PATENT-CLASS-364-434 .... p0433 N81-24106*
US-PATENT-CLASS-416-114 .... p0270 N81-19087*
US-PATENT-CLASS-416-500 .... p0270 N81-19087*
US-PATENT-CLASS-431-2 .... p0549 N81-29129*

US-PATENT-4,032,089 .... p0132 N81-14077*
US-PATENT-4,189,914 .... p0549 N81-29129*
US-PATENT-4,220,171 .... p0143 N81-14999*
US-PATENT-4,224,810 .... p0138 N81-14567*
US-PATENT-4,225,102 .... p0139 N81-14568*
US-PATENT-4,225,372 .... p0132 N81-14077*
US-PATENT-4,228,656 .... p0133 N81-14318*
US-PATENT-4,236,684 .... p0275 N81-19130*
US-PATENT-4,240,290 .... p0210 N81-17057*
US-PATENT-4,242,864 .... p0274 N81-19116*
US-PATENT-4,245,956 .... p0270 N81-19087*
US-PATENT-4,249,238 .... p0273 N81-19115*
US-PATENT-4,261,537 .... p0433 N81-24106*
US-PATENT-4,266,743 .... p0490 N81-26152*
US-PATENT-4,267,992 .... p0437 N81-24443*
US-PATENT-4,273,304 .... p0485 N81-26114*

USAAEFA-77-25 .... p0027 N81-10061 #
USAAEFA-78-09 .... p0252 N81-18052 #
USAAEFA-79-02 .... p0340 N81-21062 #
USAAEFA-79-03 .... p0582 N81-30119 #
USAAEFA-79-06 .... p0194 N81-16046 #
USAAEFA-79-08 .... p0548 N81-29121 #
USAAEFA-79-09 .... p0194 N81-16045 #
USAAEFA-79-19 .... p0340 N81-21063 #

USAARL-81-3 .... p0442 N81-25071 #

USAAVRADCOM-TR-79-F-0282 .... p0251 N81-18042 #
USAAVRADCOM-TR-80-D-10 .... p0343 N81-21085 #
USAAVRADCOM-TR-80-D-15 .... p0393 N81-23438 #
USAAVRADCOM-TR-80-D-19 .... p0076 N81-12075 #
USAAVRADCOM-TR-80-D-20 .... p0035 N81-11034 #
USAAVRADCOM-TR-80-D-21 .... p0439 N81-25043 #
USAAVRADCOM-TR-80-D-22 .... p0252 N81-18049 #
USAAVRADCOM-TR-80-D-25 .... p0092 N81-13047 #
USAAVRADCOM-TR-80-D-28 .... p0272 N81-19106 #
USAAVRADCOM-TR-80-D-31 .... p0374 N81-22041 #
USAAVRADCOM-TR-80-F-2 .... p0075 N81-12058 #
USAAVRADCOM-TR-80-F-9 .... p0134 N81-14324 #
USAAVRADCOM-TR-81-A-7 .... p0272 N81-19101*#
USAAVRADCOM-TR-81-B-1 .... p0338 N81-21027*#
USAAVRADCOM-TR-81-D-5 .... p0538 N81-28087 #
USAAVRADCOM-TR-81-D-6 .... p0427 N81-24060 #
USAAVRADCOM-TR-81-D-8 .... p0438 N81-24862 #
USAAVRADCOM-TR-81-D-9A .... p0434 N81-24108 #
USAAVRADCOM-TR-81-D-10 .... p0582 N81-30117 #
USAAVRADCOM-TR-81-F-3 .... p0344 N81-21239 #

USAAVRADCOM-80-0806-F .... p0640 N81-33240 #

USAFA-TN-81-1 .... p0263 N81-19029 #

USAFA-TR-80-17 .... p0263 N81-19029 #
USAFA-TR-81-3 .... p0373 N81-22034 #

USARTL-TR-79-22A .... p0204 N81-16997 #

UTEC-CSC-81-020 .... p0551 N81-29323 #

UTIAS-REVIEW-44 .... p0033 N81-11020 #

UTIAS-TN-228 .... p0552 N81-29924 #

UTIAS-246 .... p0144 N81-15156 #

UTIAS-248 .... p0146 N81-15580 #

UTRC/R81-914986-5 .... p0439 N81-25046 #

UTSI-81-1 .... p0637 N81-33195 #

UVA/528166/MAE81/101 .... p0594 N81-31159*#

VITRO/JOB-03021-03540 .... p0128 N81-13949 #

VKI-LS-1980-5-VOL-2 .... p0144 N81-15310 #

VKI-PREPRINT-1979-15 .... p0085 N81-12433 #
VKI-PREPRINT-1979-16 .... p0031 N81-10437 #
VKI-PREPRINT-1980-10 .... p0021 N81-10011 #

VTH-LR-276 .... p0542 N81-28489 #
VTH-LR-292 .... p0128 N81-13951 #
VTH-LR-302 .... p0540 N81-28100 #
VTH-LR-305 .... p0537 N81-28069 #

VTH-M-392 .... p0542 N81-28493 #

WR-78-11-VOL-1 .... p0087 N81-12644 #
WR-78-11-VOL-2 .... p0087 N81-12645 #
WR-79-9-VOL-3 .... p0096 N81-13719 #
WR-79-9-VOL-5 .... p0096 N81-13720 #
WR-80-32 .... p0491 N81-26846*#

WRC-79-106-39 .... p0600 N81-31220 #

WRDC0129-TR-81-1 .... p0429 N81-24069 #

WSRL-0171-TM .... p0136 N81-14575 #

WU/CCM-81/1 .... p0543 N81-28810*#

Y-2232 .... p0142 N81-14995 #

AERONAUTICAL ENGINEERING

A Continuing Bibliography

Abstracts
January - December 1981

TABLE OF CONTENTS

SP-7037 Supplement	Page
132	1
133	49
134	99
135	149
136	223
137	281
138	347
139	395
140	449
141	501
142	555
143	607

*U.S. GOVERNMENT PRINTING OFFICE: 1982 539-007/3 1-3

1. Report No. NASA SP-7037 (144)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle AERONAUTICAL ENGINEERING A Cumulative Index to the 1981 Issues		5. Report Date January 1982
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, DC 20546		11. Contract or Grant No.
		13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography is a cumulative index to the abstracts contained in NASA SP-7037 (132) through NASA SP-7037 (143) of Aeronautical Engineering: A Continuing Bibliography. NASA SP-7037 and its supplements have been compiled through the cooperative efforts of the American Institute of Aeronautics and Astronautics (AIAA) and the National Aeronautics and Space Administration (NASA). This cumulative index includes subject, personal author, corporate source, contract, and report number indexes.

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified-Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	738	$10.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA SP-7037(145)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 145)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in January 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB/141/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 326 reports, journal articles, and other documents originally announced in January 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche(1) of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

- Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-1/	-2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	87.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

N01	30.00	45.00

TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) 1

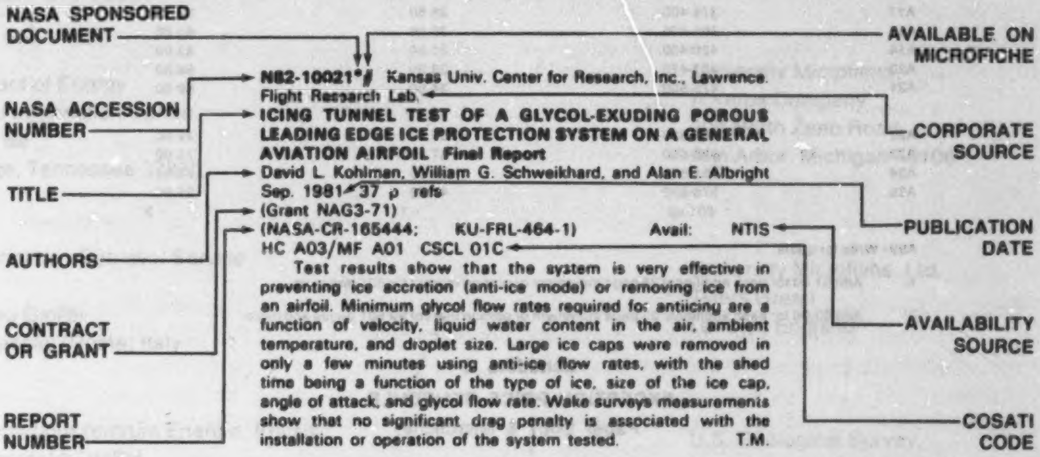
STAR ENTRIES (N82-10000) 25

Subject Index A-1

Personal Author Index B-1

Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*

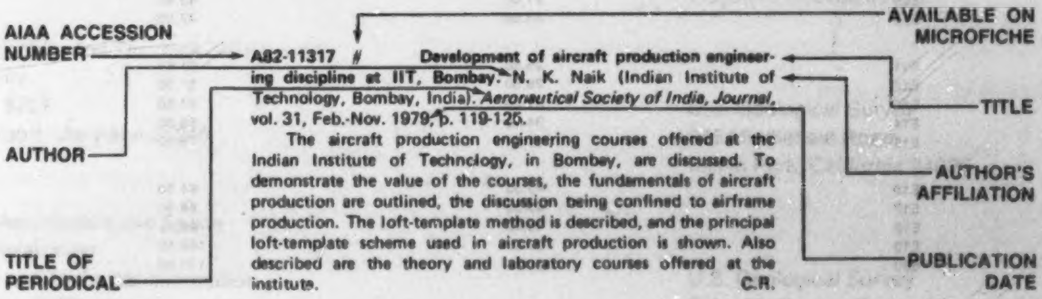


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHORS
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AUTHOR
TITLE OF PERIODICAL
AVAILABLE ON MICROFICHE
TITLE
AUTHOR'S AFFILIATION
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING *A Continuing Bibliography (Suppl. 145)*

FEBRUARY 1982

IAA ENTRIES

A82-10049 **Three navigation systems and their costs of acquiring remote sensing data.** D. L. Hawley (EG & G, Inc., Las Vegas, NV). In: American Society of Photogrammetry, Annual Meeting, 46th, St. Louis, MO, March 9-14, 1980, ASP Technical Papers. Falls Church, VA, American Society of Photogrammetry, 1980, p. 426-431.

Three types of navigational systems have been analyzed and evaluated as to their capabilities for data acquisition. Two basic systems, visual navigation and strobe-aided navigation, are useful for daylight photographic flights. One additional system, more technical, is the microwave ranging system, crucial to the acquisition of multiple nighttime scanner data flights. These systems have been analyzed as to their capabilities and costs. A table of mission requirements and navigation techniques is presented. These types of studies are not unique, however in this paper, the information is presented in a comparison unique to the equipment involved. This comparison is presented relating the cost of the navigation systems and the costs of their use. The result is a time and dollar comparison of these navigation systems. (Author)

A82-10081 # **KC-135 Avionics Modernization Hot Bench.** J. L. Archdeacon and C. E. Wilent (TRW Defense and Space Systems Group, Dayton, OH). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 32-40. 10 refs. Contract No. F33600-80-C-0473. (AIAA 81-2105)

The U.S. Air Force has embarked upon an avionics update program for the KC-135 Stratotanker fleet. An overview is provided of the KC-135 Avionics Modernization Hot Bench (AMHB). The objective of the AMHB is to support conceptual definition of a representative KC-135 modernized avionics system. The KC-135 AMHB consists of the Modernization Avionics Suite (MAS), Environmental Systems Simulation (ESS), and the Hot Bench Monitor (HBM). Attention is given to actual avionics hardware, simulated avionic subsystems, avionic application tasks, system control, cockpit device management, guidance and performance management, flight plan management, backup control, and hot bench performance monitoring. The navigation system is also considered. TACAN, Doppler, and Digital Scan Converter data are preprocessed and compared with INS data. G.R.

A82-10082 * # **HiMAT onboard flight computer system architecture and qualification.** A. F. Myers, M. R. Earls (NASA, Flight Research Center, Edwards, CA), and L. A. Callizo (Rockwell International Corp., Los Angeles, CA). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 41-54. (AIAA 81-2107)

Two highly maneuverable aircraft technology (HiMAT) remotely piloted research vehicles (RPRV's) are being flight tested at NASA Dryden Flight Research Center, Edwards, California, to demonstrate and evaluate a number of technological advances applicable to future fighter aircraft. Closed-loop primary flight control is performed from a ground-based cockpit utilizing a digital computer and up/down telemetry links. A backup flight control system for emergency operation resides in one of two onboard computers. Other functions of the onboard computer system are uplink processing, downlink processing, engine control, failure detection, and redundancy management. This paper describes the architecture, functions, and flight qualification of the HiMAT onboard flight computer systems. (Author)

A82-10083 # **Synchronous fault-tolerant flight control systems.** T. B. Smith (Charles Stark Draper Laboratory, Inc., Cambridge, MA). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 55-60. 5 refs. (AIAA 81-2109)

Synchronous fault-tolerant systems have some unique advantages over asynchronous systems, particularly as the flight control task becomes more complex. One of the advantages is related to channel fault-detection. Asynchronous systems must rely upon setting fault thresholds for detecting computational failure within a channel. The design of the threshold can be a difficult problem. There is a rule that a fault must be present for a number of frames to be significant. These problems are largely avoided with synchronous systems, outputs are identical, and a single test of exact agreement is a perfect test. Noisy and skew effects which plague asynchronous fault detection have no effect. Other advantages of synchronous fault-tolerant systems are related to sensor fault-detection and multimode operation. Attention is given to the reasons for the present preponderance of asynchronous designs, and the use of tightly synchronized processing. G.R.

A82-10096 # **Integration of computer graphics design with analytical models.** R. J. Ricci (Lockheed-California Co., Burbank, CA). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 144-149. (AIAA 81-2134)

The development of Computer-Augmented Design and Manufacturing (CADAM), an interactive computer graphics system is discussed. The system is used throughout the design process from conceptual design through product support. In the conceptual design phase, basic three-view general arrangement drawings are developed. These can be quickly and accurately converted into a three-dimensional mathematical surface definition. From this information, analysis data models are generated semi-automatically for input to batch computing programs. Major areas where analysis modelers have been developed include: parametric mission analysis, aerodynamic drag modelers, structural finite element modelers, 1 g load and mass distribution modelers, fuel tank and volume analyzers, and weight and balance modelers. (Author)

A82-10100 # **The Space Shuttle vehicle checkout involving flight avionics software.** J. T. B. Mayer (Intermetrics, Inc., Cambridge, MA). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 173-178. (AIAA 81-2141)

A description is presented of the process employed in generating a vehicle test using the flight avionics software. The three types of onboard software available to the verification engineer include flight avionics software, vehicle utility software, and dynamic integrated test software. In most cases the flight software was modified to perform the desired functions in a manner devised by the test engineer. Attention is given to vehicle test development, test verification, vehicle test execution, and vehicle test considerations. The reported investigation shows that it should be possible in future systems to control the cost of verification and checkout by designing the verification process in conjunction with the operational software. There are operational tradeoffs that can greatly reduce the costs of verification, which in the long run can reduce the total program cost. G.R.

A82-10101 # **Bridging the gap from aircraft to space computers.** P. Mitchell and C. Vicek (Itek Corp., Applied Technology Div., Sunnyvale, CA). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 179-186. 7 refs. (AIAA 81-2142)

This paper investigates the design problems associated with avionics and space computers, and identifies those which are common to both, versus those which are unique to a specific application. Based on historical developments and predictions of future needs, a plan is presented which resolves many of these problems and supports real-time technology insertion in a low cost, rapid deployment approach. A computer development program is described which utilizes a modular family of functional elements, allowing a wide variety of space and aircraft requirements to be met using common hardware. Continuing development activities have expanded this system architecture into a highly fault tolerant and flexible family of computers with incremental design steps depending heavily on existing qualified hardware and software elements. (Author)

A82-10104 # **Airborne associative processor /ASPRO/.** T. DiGiacinto (Goodyear Aerospace Corp., Digital Technology Dept., Akron, OH). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 202-205. (AIAA 81-2145)

The ASPRO associative processor is designed for an airborne early warning radar surveillance, command and control application. It augments the existing data processors aboard a surveillance aircraft. The functional requirements of ASPRO call for extraordinary processing capacity for its volume, weight and power constraints (less than 1/2 cubic foot). ASPRO development was made feasible by designing the architecture to make use of available LSI components for arithmetic operations, addressing, program and interrupt control. The memory and parallel processing sections of ASPRO required development of two special components, a multichip memory package, and a custom 32-PE chip for the parallel processor. (Author)

A82-10116 # **Controlling the software/hardware interface for the validation of avionics systems.** T. G. Lahn and E. R. Rang (Honeywell, Inc., Minneapolis, MN). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 283-287. (AIAA 81-2159)

A methodology is outlined for designing critical embedded avionics by exposing the hardware/software interface during the design and validation of the system. The proposed approach involves the development of a finite-state machine representation for the control of flow of the system's functions and implementation of the finite-state machine by hardware and software. This produces a complete structure that is easy to review and validate. The approach is demonstrated for a triply-redundant flight augmentation system. V.L.

A82-10120 # **Automated Paint and Process Line /APPL/.** N. E. Manion (Lockheed-Georgia Co., Marietta, GA). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 319, 321, 323 (3 ff.). (AIAA 81-2166)

In an effort to control costs, the military and industry are pursuing ways to improve production efficiency by increasing the degree of automation of factory operated chemical processing and painting facilities used in the fabrication of aircraft parts. These parts, and especially those of major weapon systems, are not, however, easily amenable to automation. Critical operations are automated by a five-level control hierarchy developed for a new Automated Paint and Process Line with advanced software which provides operating flexibility. A variety of part sizes and shapes are transformed into uniform handling units by special part holders. The chemical processing computer is programmed to handle ten loads of work simultaneously. A painting robot is programmed by painting a selected target with a spray gun attached to the arm of the manipulator with the robot in a 'teach' mode. Systems will be added later to automatically track shop orders and control chemical solutions. J.F.

A82-10125 # **Use of Space Shuttle technology in conventional aircraft.** W. A. Ragsdale (Intermetrics, Inc., Houston, TX). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 358-361. 7 refs. (AIAA 81-2176)

A number of advances in the state-of-the-art for aircraft systems and procedures have been implemented in the Space Shuttle. Much of the new technology used would benefit conventional aircraft, especially airliners. Automatic systems management as employed for the Shuttle would simplify the task of flying an airliner. The pilot is given by the computer only the information he needs to know. The area navigation (RNAV) system used by the Space Shuttle is three-dimensional RNAV. It steers the Space Shuttle not only to a latitude and longitude, but to a specific altitude. The use of a four-dimensional RNAV, including also the monitoring of time, would provide additional advantages. A use of RNAV systems in aircraft makes possible savings in the consumption of fuel and leads to simplifications in air traffic control. Further reduction in fuel consumption can be obtained with the aid of energy management approaches. Additional advantages for aircraft operations can be obtained by the employment of the Microwave Landing System and digital fly-by-wire flight controls. G.R.

A82-10126 # **A microprocessor-based data acquisition system for stall/spin research.** M. Sri-Jayantha and R. F. Stengel (Princeton University, Princeton, NJ). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 362-372. 25 refs. Research supported by the Shultz Foundation. (AIAA 81-2177)

Accurate data are necessary for the identification of aerodynamic parameters at high angle of attack and in spinning flight. Modern sensors and microelectronic devices are employed in a stall/spin data acquisition system that will be tested in a Schweizer 2-32 sailplane. This instrumentation package will use a quaternion-based 'strapdown IMU' algorithm to derive vehicle attitude from angular rate data, and it will use fault-detection logic to identify in-flight sensor failures. Details of the system and flight test program are presented, together with results of pre-flight digital simulation analysis. (Author)

A82-10127 # **Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft.** C.-F. Lin (Applied Dynamics International, Ann Arbor, MI). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 373-381. (AIAA 81-2178)

This paper discusses real-time simulation of automatic guidance and control computer system of a supersonic fighter including a complete simulation of the mission computer and the flight control computer before connecting them as hardware in the loop. In this simulation the mission computer generates real-time, on-line optimal trajectories. These trajectories include maximum range glide and minimum time zoom climb. They are then tracked by the flight control computer. For this kind of simulation it is essential that the computational speed be very fast, thus a very fast computer with real-time, on-line capabilities is used for the simulation. Results of the simulation show that the mission computer is capable of generating online optimal trajectories much faster than real time, and that the flight control computer is capable of following very closely these trajectories at the same speed. (Author)

A82-10140 # **Performance analysis of enroute air traffic control computers in the National Airspace System.** J. Press (FAA, Systems Research and Develooment Service, Atlantic City, NJ). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers.
New York, American Institute of Aeronautics and Astronautics, 1981, p. 485-495. 12 refs. (AIAA 81-2203)

This paper describes a computer performance analysis recently completed at the Federal Aviation Administration Technical Center for all twenty enroute air traffic control centers in the National Airspace System. Based on linear regression, the analysis relied on field data collected nationwide in order to quantify the performance of the central computer complex operating at each facility. The data was recorded every minute for several days while the computers were supporting air traffic control operations. Graphs and tables summarize the study's results which will serve as a basis for management plans concerning future system acquisition. As a major conclusion, the methodology developed in this study applies consistently to all enroute traffic control centers. (Author)

A82-10143 # **Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems.** E. G. Ries (System Development Corp., McLean, VA) and R. C. Bjorklund (USAF, Tactical Air Command, Langley AFB, VA). In: Computers in Aerospace Conference, 3rd, San Diego, CA, October 26-28, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 513-520. 8 refs. (AIAA 81-2205)

The testing of complex, real-time C3I systems by conventional methods requires considerable resources, time, and realistic operational conditions. The decentralization of systems among diverse locations imposes further demands. Tactical Air Command is developing the Simulation, Monitoring, and Analysis, Reduction, and Test System (SMARTS) to provide a controlled test environment for C3I systems, a design incorporating an operations-scenario generator for efficient test design and analysis. SMARTS is a flexible test platform for Air Force and Joint interoperability testing, configuration management, system testing, and software maintenance. The design of SMARTS provides intercommunications between geographically separated test nodes, test control, recording, analysis, and simulation of radar and data communications for a synchronized test environment. (Author)

A82-10214 * **Downbursts and microbursts - An aviation hazard.** T. T. Fujita (Chicago, University, Chicago, IL). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 94-101. 12 refs. NSF Grant No. ATM-78-01074; Grants No. NOAA-04-4-158-1; No. NGR-14-001-008.

Downburst and microburst phenomena occurring since 1975 are studied, based on meteorological analyses of aircraft accidents, aerial surveys of wind effects left behind downbursts, and studies of sub-mesoscale wind systems. It is concluded that microbursts beneath small, air mass thunderstorms are unpredictable in terms of weather forecast. Most aircraft incidents, however, were found to have occurred in the summer months, June through August. An intense microburst could produce 150 mph horizontal winds as well as 60 fps downflows at the tree-top level. The largest contributing factor to aircraft difficulties seemed to be a combination of the headwind decrease and the downflow. Anemometers and/or pressure sensors placed near runways were found effective for detecting gust fronts, but not for detecting downbursts. It is recommended that new detection systems placed on the ground or airborne, be developed, and that pilots be trained for simulated landing and go-around through microbursts. J.F.

A82-10215 **Applications of conventional and Doppler radars for aviation safety.** J. T. Lee and K. E. Wilk (NOAA, National Severe Storms Laboratory, Norman, OK). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 102-109. 24 refs.

Past and present efforts at the National Severe Storms Laboratory to help provide improved operational procedures for aviation support are summarized. Quantitative data presentation and information assimilation now have greater importance, since Doppler radar is evolving toward operational use by weather services. Wind shear, vortices, and turbulence, which constitute weather hazards to aviation, must be identified and measured, and effective ways to disseminate information on the location, intensity, and movement of these hazards to the forecaster and pilot must be found. Despite the progress made thus far, research is still required to better validate radar signatures which identify storm hazards uniquely; even greater advances are needed in the design of displays and types of data parameterizations which will present significant information efficiently to the interpreter. It is suggested that user requirements be included in the designs of future radar systems at an early stage to reduce irrelevant information which complicates displays. J.F.

A82-10217 **Description of the meteorological research radar system aboard NOAA/Research Facilities Center WP-3D aircraft.** J. D. DuGranrut (NOAA, Environmental Research Laboratories, Miami, FL). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints.
Boston, MA, American Meteorological Society, 1980, p. 115-117.

The radar system developed for the Research Facilities Center's WP-3D airborne research platform provides data from three radar sets recorded on computer-compatible media: the nose radar scans horizontally over the range + or - 120 deg from the aircraft, heading at tilt angles of + or - 20 deg from the horizon. It operates at C-band frequency (5445 MHz) and has a processed range of 100 nautical miles. The lower fuselage radar scans a full 360 deg horizontally at tilt angles of + or - 10 deg from the horizon; it also operates at C-band frequency (5370 MHz) and has a processed range of 200 nautical miles. The tail radar scans a plane perpendicular to the longitude axis of the aircraft; it operates at X-band frequency (9315 MHz) and has a processed range of 50 nautical miles. The data processing equipment of the radar data system is controlled by video integrator processors, scan converter display units, and magnetic tape units. The radars may be operated without the data system for display of weather avoidance and navigation information when data processing and recording are not required. A more detailed description is given of the receiver/transmitters, the antennas and antenna control units, the video integrator processors, the recording system, and the real-time display system. J.F.

A82-10219 **Airborne weather radar and severe weather penetration.** J. I. Metcalf (Georgia Institute of Technology, Atlanta, GA). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 125-129. 6 refs.

The effect of rain on airborne weather radar performance and its practical implications are examined. It is shown that whenever the actual reflectivity is greater than 45 dBZ (rainfall rate in excess of 25 mm/hr), significant attenuation (greater than 0.5 dB/km one way) can be expected, leading to major distortions of the reflectivity pattern observed with a 3-cm radar. Examples discussed illustrate the need for aircrews to obtain additional weather information including data from ground-based weather radars at any time when the on-board radar shows weather echoes near the projected flight path, particularly when weather penetration is contemplated. V.L.

A82-10220 * **An airport wind shear detection and warning system using Doppler radar.** J. McCarthy (National Center for Atmospheric Research, Boulder, CO), W. Frost, B. Terkel (Tennessee, University, Tullahoma, TN), R. J. Doviak (NOAA, National Severe Storms Laboratory, Norman, OK), D. W. Camp (NASA, Marshall Space Flight Center, Huntsville, AL), E. F. Blick, and K. L. Elmore (Oklahoma, University, Norman, OK). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 135-142. 7 refs. NSF Grants No. ATM-74-03406-A02; No. ATM-78-12401; Contracts No. NAS8-31377; No. NAS8-33458.

Two numerical models of aircraft performance are developed to relate atmospheric wind signals in wind-shear situations to aircraft response. Both models produce time histories of pitch angle, airspeed, height above the ground, and other parameters for simulating aircraft making precision approaches along a 3-deg glide slope to the runway. Simulations conducted using thunderstorm environment wind data indicate that the horizontal wind component is at least as important as the vertical component in determining aircraft response to wind shear. Obtaining quantitative measurements of aircraft approach or departure quality is found to depend on several factors, including the knowledge of winds along the expected flight track, clear-air detection in a quasi-horizontal path, and a near continuous estimate of approach deterioration due to shear conditions. D.L.G.

A82-10221 * **Instrumented aircraft verification of clear-air radar detection of low-level wind shear.** J. McCarthy (National Center for Atmospheric Research, Boulder, CO), K. L. Elmore (Oklahoma, University, Norman, OK), R. J. Doviak, and D. S. Zrnic (NOAA, Severe Storms Laboratory, Norman, OK). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 143-149. NSF Grants No. ATM-74-03406-A02; No. ATM-78-12401; Contracts No. NAS8-31377; No. NAS8-33458.

A technique is described in which the longitudinal wind component at airports, measured by Doppler radar, is put through a Fourier transformation to produce an energy density spectrum. The result is multiplied by the aircraft response characteristics to produce quantitative data on aircraft performance in a wind shear situation. The Doppler radar measurements are made along the intended flight path. Two case studies, along a 3 deg approach path, are described from measurements in two modes: Lagrangian, where predictions were computed one range gate ahead of the plane, and Eulerian, where samples were measured instantaneously along the flight path. Wind data obtained every second were interpolated to fit a numerical model by using a cubic spline. Eulerian data were superior to Lagrangian data in terms of ranging, and nearly equal for wind speeds. Improvements in current 75% accuracy are noted to be possible with shrouded antennas to reduce sidelobes and use of Doppler radar with higher resolution to eliminate effects of small scale disturbances within the pulse volume. M.S.K.

A82-10222 **Detection and display of wind shear and turbulence.** J. Wilson, R. Carbone, and R. Serafin (National Center for Atmospheric Research, Boulder, CO). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 150-156. 9 refs.

Displays of wind shear are given which are obtained by a method for certain cases collected by NCAR 5 cm wavelength radars. A Doppler radar located at an airport or in an aircraft measures the wind shear along flight paths on scales critical to aircraft operations. The magnitude of the shear on the desired scale is then obtained by measuring the wind shear over a distance of one-half the aircraft phugoid wavelength. Four cases classified as severe storms show that significant wind changes occur within 0.5 to 3.0 km, which includes the phugoid wavelength of modern aircraft. It is suggested that a practical solution for the detection of hazardous wind shear is to locate a scanning Doppler at an airport so that quantitative displays of wind changes at the phugoid wavelength can be generated. D.L.G.

A82-10223 **Gust front structure observed by Doppler radar.** R. J. Donaldson, Jr. and C. L. Bjerkaas (USAF, Geophysics Laboratory, Bedford, MA). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 157-161. 6 refs.

Two gust fronts (April 30 and May 2, 1978) are discussed as representative samples of operational data taken during the Joint Doppler Operational Project of 1977-1979. Readings from the 10 cm Doppler radar at Norman, OK, during continuous recording at five or six elevation angles were color coded and displayed for speeds in m/s, range marked at one km intervals, and dated, with time of day indicated. Charts provided show wind direction changes with the passage of a gust front and windspeeds at 0.3 km altitude to be double that of surface wind speeds, a factor considered important for aviators. Extreme wind shears within the fronts were taken as evidence for severe vertical shears, which were not sensed by horizontally scanning radar. The effectiveness of the Doppler radar in identifying and ranging gust fronts commends it to airport use, where shears invisible to the pilot's eye can be hazardous during takeoff and approach maneuvers at low altitudes. M.S.K.

A82-10225 **The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT.** J. F. Clark (RCA, Princeton, NJ). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 169-175. 5 refs.

REACT (Rain Echo Attenuation Compensation Technique) is a new digital system that compensates for precipitation attenuation in each small-range increment of each sweep by adaptively increasing the radar receiver sensitivity for the next range increment by an amount equal to the two-way attenuation through the original range increment. A Probable Ground Track and Weather Radar Plot of the Apr. 4, 1977 storm near New Hope, GA was published and used as the ground truth in plotting rainfall data. The storm was first depicted by conventional X-band and C-band radar, and the resolution and range of these bands are compared. REACT was then used with the PriMUS 708 solid-state radar; the plotted result of precipitation attenuation was shown to agree well with the assumed ground truth. The PriMUS 708 airborne radar, compensated with REACT, combines the X-band advantage of higher resolution and antenna gain with an accurate rainfall rate calibration. J.F.

A82-10292 **Multiple Doppler radar observations of PBL structure.** P. H. Hildebrand (National Center for Atmospheric Research, Boulder, CO). In: Conference on Radar Meteorology, 19th, Miami Beach, FL, April 15-18, 1980, Preprints. Boston, MA, American Meteorological Society, 1980, p. 656-661. NSF Grant No. ATM-76-24236.

It is noted that during May and June of 1977, multiple Doppler radars, aircraft and other instrumentation were used to observe the characteristics of the convectively growing planetary boundary layer (PBL) in Central Oklahoma. The observations were made between midmorning and afternoon when the PBL was growing quickly. A preliminary analysis of the data from one of the days is given. It is found that data collected using such a large radar separation appear to be usable to describe large scale PBL kinematics. C.R.

A82-10304 **Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine.** D. Lewis (Rolls-Royce, Ltd., Watford, Herts., England). *Aeronautical Journal,* vol. 85, Sept. 1981, p. 313-319.

A description is presented of the design features incorporated by the Rolls-Royce Gem helicopter engine in light of the following criteria: (1) high structural strength, to withstand low frequency vibration and maneuvering loads; (2) optimization of low altitude performance; (3) operation over a wide power range; (4) high fuel efficiency at part load power; (5) fast and surge-free acceleration and deceleration; (6) insensitivity to intake pressure disturbances; (7) resistance to contaminated intake air; and (8) stability of control. It is observed that in general, the complexities introduced into helicopter engines of the last design generation to improve fuel consumption will be diminished in the next generation of engines for the sake of cost reduction. In addition to the Gem, these engines include the GE T700 and U.S. Army ATDE. O.C.

A82-10305 **The application of improved aluminium alloys and steels in aircraft structures.** C. J. Peel and D. S. McDarmaid (Royal Aircraft Establishment, Materials Dept., Farnborough, Hants., England). *(Royal Aeronautical Society, Symposium on Developments in Structures and Manufacturing Techniques, London, England, Apr. 14, 1981.) Aeronautical Journal,* vol. 85, Sept. 1981, p. 320-326. 16 refs.

It is shown that development efforts in aircraft aluminum alloys and steels over the last 20 years have generally sought to overcome such problems as a lack of resistance to fatigue and stress corrosion cracking rather than achieve increases in specific strength. Significant improvements in fracture toughness and stress corrosion resistance have been achieved, and improved surface treatments are appearing for steel products. Attention is given to new aluminum alloys resulting from the addition of up to 3 wt % Li to Al-Mg, Al-Cu, and Al-Cu-Mg systems, yielding increased stiffness and reduced density. Improvements to 2000- and 7000-series aluminum alloys, rapid solidification production techniques, and corrosion protection for aircraft steels are also covered. O.C.

A82-10306 **Design aspects of non rigid airship envelopes.** J. A. I. Reid (Airship Industries, Ltd., London, England). *(Royal Aeronautical Society, Symposium on Developments in Structures and Manufacturing Techniques, London, England, Apr. 14, 1981.) Aeronautical Journal,* vol. 85, Sept. 1981, p. 327, 328.

The design requirements of nonrigid airship envelopes are addressed in light of recent advances in both (1) the estimation of airship hull loadings under maneuvering and gusts and (2) high-strength fabrics for airship construction woven from polyamide, polyester, and Kevlar fibers. Attention is given to the degree of permeability by helium of hull and ballonet materials. When determining safety factors for use with such nonmetallic materials, a factor characterizing the degradation of material strength with age must be added to those normally associated with strength calculations. O.C.

A82-10307 **Some possibilities for composite light aircraft construction.** J. H. Webb (Cranfield Institute of Technology, Cranfield, Beds., England). *(Royal Aeronautical Society, Symposium on Developments in Structures and Manufacturing Techniques, London, England, Apr. 14, 1981.) Aeronautical Journal,* vol. 85, Sept. 1981, p. 328-331.

Alternative methods for the design and construction of light aircraft and remotely piloted vehicles with composite materials are described, with attention to the minimization of tooling, materials and construction man-hour costs. A four-seat, single-engine light aircraft is assumed for comparison of conventional metal and glass-reinforced plastic composite wing structure construction costs. Weight comparisons are also presented for three novel wing structure design concepts: (1) a tubular spar with plastic foam core and fiberglass-reinforced skin; (2) a similar arrangement incorporating a metal spar; and (3) fiberglass-reinforced plastic foam sandwich skins with a metal spar. The mixed metal/plastic composite structure is incorporated into the Machan RPV, and has proven to be satisfactory in recent flight trials. O.C.

A82-10308 **Light aircraft structural design in non-metallics - Use of composite honeycomb for light aircraft.** G. E. Woodley (Ciba-Geigy Plastics and Additives Co., Duxford, Cambs., England). *(Royal Aeronautical Society, Symposium on Developments in Structures and Manufacturing Techniques, London, England, Apr. 14, 1981.) Aeronautical Journal,* vol. 85, Sept. 1981, p. 332, 333.

Recommendations are made toward the application of high-technology prepreg composite systems for the production of nonmetallic honeycomb light aircraft structures. Attention is given to design and assembly methods for wings and control surfaces, with emphasis on the reduction of production costs rather than weight saving. It is shown that the designer's aim should cut down the honeycomb panel piece parts required, thereby reducing the man-hours cost of production, and that the use of composite honeycomb materials results in a more damage-tolerant surface than conventional light aircraft structures, with a more accurate overall shape and reductions of both corrosion and fatigue. O.C.

A82-10309 **Sophisticated aircraft structure developments - Combat aeroplanes.** R. J. Sellars and G. Terry (British Aerospace Public, Ltd., Co., Warton Div., Preston, Lancs., England). *(Royal Aeronautical Society, Symposium on Developments in Structures and Manufacturing Techniques, London, England, Apr. 14, 1981.) Aeronautical Journal,* vol. 85, Sept. 1981, p. 334-342. Research supported by the Ministry of Defence (Procurement Executive).

Comparisons of the structural materials and fabrication processes currently under development and assessment in Britain for future combat aircraft construction are presented, with attention to the demonstration of carbon fiber reinforced composites (CFC) and superplastic forming/diffusion bonding of titanium alloy (SPF/DB) in existing aircraft. CFC and SPF/DB structures are compared with respect to specific tensile and compressive strengths and moduli, specific shear strength and modulus, buckling, and ultimate design strengths and design criteria in the application of the materials to the stabilized skins of combat-aircraft surfaces. Emphasis is put on the possibility of aeroelastic tailoring that is introduced by the application of CFC to wing structures. O.C.

A82-10310 **Optimal flight paths for winged, supersonic flight vehicles - Extension to the casc where thrust can be vectored.** E. Large (Marconi Space and Defence Systems, Ltd., Stanmore, Middx., England). *Aeronautical Journal,* vol. 85, Sept. 1981, p. 343-348. 5 refs.

A method for determining the optimal trajectory and thrust program of an aircraft or rocket employing vectored thrust is derived, for the practical cases in which the entire thrusting phase is supersonic. It is shown that finding the burning program which gives the Hamiltonian function a zero value automatically satisfies the optimal flight path conditions and makes the final fuel consumption independent of time. It is found that the optimal burning program is not, except in special cases, one that employs constant thrust, the general optimum instead being a linear rate of thrust increase with time. O.C.

A82-10362 # **The use of the Weber method for minicomputer-assisted numerical analysis of airfoils (Zastosowanie metody Webera do numerycznej analizy aerodynamicznej profili na minikomputerach).** K. Czyzewski and M. Lukaszewicz. *Instytut Lotnictwa, Prace,* no. 85, 1981, p. 9-21. 21 refs. In Polish.

A numerical version of the Weber method is developed for calculating pressure distribution over an airfoil in subsonic flow. The method is based on the fact that singularities representing the flow at the airfoil surface are distributed chordwise, and a correction coefficient is introduced, with allowance for airfoil thickness. If the airfoil shape is approximately represented by spline functions, numerical analysis is simplified considerably and the accuracy is improved. The present numerical results are compared with other numerical results for subcritical and supercritical flow conditions, and with wind-tunnel-test results. In addition, an iteration method for determining the critical Mach number has been developed. B.J.

A82-10363 # **Experimental study of subsonic and transonic flows past a wing (Eksperymentalne badania pod- i przydzwiekowego oplywu skrzydla).** W. Kania and A. Krzysiak. *Instytut Lotnictwa, Prace,* no. 85, 1981, p. 23-44. 10 refs. In Polish.

The paper reports aerodynamic balance measurements of aerodynamic characteristics and flow visualization tests on a plane trapezoidal uniform-section wing with a small sweepback angle. Tests were performed in a transonic wind tunnel for Mach numbers ranging from 0.3 to 0.96 under conditions of fixed boundary layer transition. Lift, drag, and pitching moment were determined, with attention given to the effect of Mach number. Shock wave formation on the wing is examined, and flow separation and drag rise are determined. Four types of flow separation, depending on Mach number, are revealed; it is found that there is a correlation between the type of flow separation and the value of the lift coefficient at the onset of separation, which depends on the Mach number. B.J.

A82-10364 # **Analytical determination of undercarriage retraction kinematics (Analityczne okreslanie kinematyki chowania podwozia).** R. Stanczak. *Instytut Lotnictwa, Prace,* no. 85, 1981, p. 45-53. In Polish.

An analytical method is developed for calculating the kinematics of undercarriage retraction. The method is particularly suitable for the design of high-wing and mid-wing monoplanes, the undercarriages of which cannot be attached to the wing. Attention is given to undercarriages with one and two rotation axes. B.J.

A82-10396 **FAA developing new collision avoidance, data acquisition and transmission systems.** A. C. Schwartz. *Airport Forum,* vol. 11, Aug. 1981, p. 93, 94, 96, 97.

The U.S. Federal Aviation Agency (FAA) is concerned with the development of an aircraft collision avoidance system which, it is hoped, will be universally accepted as an aviation standard system. The Discrete Address Beacon System (DABS) contains advanced flight and data link equipment. According to the FAA program, DABS is to become the basis for a ground-based collision avoidance system called the Automatic Traffic Advisory and Resolution Service (ATARS). However, it was recently decided to review the DABS ground station program before a final decision is made regarding the ground installations. Another decision is concerned with the implementation of an airborne collision avoidance system called Threat Alert and Collision Avoidance System (TCAS). The TCAS is to take the place of the Beacon Collision Avoidance System (BCAS). TCAS will operate independently of ground stations and use a highly directional transmitting antenna. To provide better information for en route air traffic controllers when the main radar system fails, FAA is installing the Direct Access Radar Channel (DARC) at its 20 centers in the continental U.S. G.R.

A82-10401 * # The balloon and the airship technological heritage. N. J. Mayer (NASA, Washington, DC). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1912.* 8 p. 7 refs.

The balloon and the airship are discussed with emphasis on the identification of commonalities and distinctions. The aerostat technology behind the shape and structure of the vehicles is reviewed, including a discussion of structural weight, internal pressure, buckling, and the development of a stable tethered balloon system. Proper materials for the envelope are considered, taking elongation and stress into account, and flight operation and future developments are reviewed. Airships and tethered balloons which are designed to carry high operating pressure with low gas loss characteristics are found to share similar problems in low speed flight operations, while possessing interchangeable technologies. D.L.G.

A82-10403 # Air bag impact attenuation system for the AQM-34V remote piloted vehicle. C. T. Turner (Teledyne Ryan Aeronautical, San Diego, CA) and L. A. Girard, Jr. (Goodyear Aerospace Corp., Akron, OH). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1917.* 8 p.

This paper describes the air bag impact attenuation system (ABIAS) for the AQM-34V remote piloted vehicle. The developed hardware, consisting of the main bag, tail bag, and inflation systems, is described. Operation of the system from electrical initiation, through cover deployment, main and tail bag inflation, and ground impact is discussed. Development ground drop tests, environmental tests, structural tests, and the contractor flight tests are summarized. Test results substantiated system performance. (Author)

A82-10404 # Limiting payload deceleration during ground impact. A. Mironer (Analytical Systems Engineering Corp., Burlington; Lowell, University, Lowell, MA), R. Urquhart (Analytical Systems Engineering Corp., Burlington, MA), and R. Walters (USAF, Geophysics Laboratory, Bedford, MA). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1918.* 7 p.

This paper considers the problem of limiting the deceleration of balloon and sounding-rocket instrument payloads during ground impact by adding energy-dissipating, deformable structures. The basic physics of the two-step deceleration/energy-dissipation process is analyzed and simple force and energy-balance relationships are developed. The pertinent equations are organized in a form that is conducive for computer computation. Two example problems, one of a sounding-rocket payload and the other of a balloon payload are calculated and the results presented in the form of a performance map. (Author)

A82-10405 # Aerodynamics and performance of cruciform parachute canopies. D. S. Jorgensen and D. J. Cockrell (Leicester, University, Leicester, England). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1919.* 10 p. 8 refs. Research supported by the Ministry of Defence (Procurement Executive).

Effects of changing the ratio of the arm length and width (the 'arm ratio') on the aerodynamics of cruciform (cross-shaped) parachute canopies are described. Forces and moments were determined from measurements made when fabric canopies were towed under water in a ship tank as well as from integrated pressure distributions determined by using specially-designed pressure transducers fixed in fabric wind tunnel models. Using both techniques, the existence of stochastic variations in aerodynamic behavior was investigated. Experimental results will be analysed using an appropriate computer performance model and the variation of dynamic performance characteristics thus determined as a function of the arm ratio. (Author)

A82-10406 # Experimental determination of parachute apparent mass and its significance in predicting dynamic stability. T. Yavuz and D. J. Cockrell (Leicester, University, Leicester, England). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloonn Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1920.* 9 p. 6 refs. Research supported by the Ministry of Defence (Procurement Executive) and Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt.

Experimental techniques to measure the components of the apparent mass tensor for parachutes are descrbed. They are evaluated by force and moment measurement during relative motion of parachutes submerged in water in a ship tank. Results show that the components depend on canopy shape, angle of attack and acceleration modulus and, except at high values of the latter, can be considerably in excess of potential flow evaluations. The effect of these results on the dynamic stability of descending parachutes is demonstrated by reference to an appropriate computer model. General conclusions are drawn relevant to canopies whose shapes differ from those tested. (Author)

A82-10407 # Development of new lifting parachute designs with increased trim angle. W. R. Bolton (Sandia Laboratories, Livermore, CA) and I. T. Holt (Sandia Laboratories, Albuquerque, NM). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1921.* 12 p. Research supported by the U.S. Department of Energy.

A development program is being conducted by Sandia National Laboratories on a lifting parachute system which allows aircraft delivery of a payload at high speed from low altitude. Candidate lifting parachute designs, which included ram air inflated leading edge chambers and flow-directing side vents, were evaluated in small and full-scale wind tunnel tests, in whirl tower flight tests, and in aircraft flight tests. The results of these testing activities will be discussed along with the method of using test results to predict system performance. (Author)

A82-10408 # The effects of flexibility on the steady-state performance of small ribbon parachute models. T. Weber (McDonnell Aircraft Co., St. Louis, MO) and W. L. Garrard (Minnesota, University, Minneapolis, MN). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1923.* 7 p. 5 refs. Research supported by the U.S. Department of Energy.

Small textile ribbon parachute models were shown to exhibit steady-state aerodynamic coefficients similar to those of rigid parachute models. Since no detailed study of the effects of model flexibility on the steady-state aerodynamic performance of a parachute model has been reported, several ribbon parachute models of varying flexibility and equal geometric porosity were constructed and tested in the wind tunnel. No correlation was found between model flexibility and measured aerodynamic performance. (Author)

A82-10409 # Comparison of simulation and experimental data for a gliding parachute in dynamic flight. T. F. Goodrick (U.S. Army, Natick Research and Development Laboratories, Natick, MA). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1924.* 5 p.

Comparisons are presented of descent rate, total airspeed, horizontal airspeed, yaw rate, pitch rate and roll rate between computer simulation in 6 DOF and flight data for a 200 square foot Parafoil of aspect ratio 2.0 carrying a 350-pound stabilized payload. The payload is specially designed to measure and record all essential parameters of dynamic flight independent of atmospheric wind. The comparison indicates a high degree of agreement in high-rate turns varying greatly from steady-state conditions. Thus, the 6 DOF simulation has been validated. (Author)

A82-10410 # Theoretical analysis of parachute inflation including fluid kinetics. J. W. Purvis (Sandia Laboratories, Albuquerque, NM). *American Institute of Aeronautics and Astronautics,* *Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1925.* 12 p. 25 refs. Research supported by the U.S. Department of Energy.

An analysis is presented for predicting parachute inflation. Equations of motion for the complete system are developed from first principles, and are solved with no experimental inputs. Ballistic equations of motion are derived for the canopy, payload, and suspension line masses. However, the enclosed fluid mass is not lumped with the canopy as an apparent mass term. Instead, the fluid conservation equations for a deforming, accelerating control volume are solved to determine the behavior of the captured fluid and its interaction with the canopy. Only first order effects are included, and the analysis is limited to inviscid, incompressible flow. Results for both porous and nonporous canopies are compared with experimental data. (Author)

A82-10411 * # **A new thermal and trajectory model for high altitude balloons.** L. A. Carlson and W. J. Horn (Texas A & M University, College Station, TX). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1926.* 10 p. 17 refs. Contract No. NAS6-3072.

A new computer model for the prediction of the trajectory and thermal behavior of high altitude balloons has been developed. In accord with flight data, the model permits radiative emission and absorption of the lifting gas and daytime gas temperatures above that of the balloon film. It also includes ballasting, venting, and valving. Predictions obtained with the model are compared with flight data and newly discovered features are discussed. (Author)

A82-10412 # **The net-skirt to a parachute canopy as a device to prevent inversion.** G. W. H. Stevens. *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1927.* 8 p. 7 refs.

The paper gives a historical account of the circumstances which led to the invention of the net-skirt extension as a device to eliminate parachute canopy inversions, in particular, partial inversions known as 'Blown Peripheries'. Because previous papers do not give a precise account of the mechanism causing the phenomenon it is reanalysed. The paper also records the trends of thought which led to the invention. The phenomenon has been completely eliminated in parachutes modified in this way. Whereas the net-skirt extension solved the difficulties with the Airborne Forces' parachuting system it does not appear to be essential for all deployment systems if adequate line tension can be maintained. Because of the paper's historical nature, Imperial units are used throughout. (Author)

A82-10413 # **The constricted rigging line trials technique for assessing the opening characteristics of parachutes.** S. A. Birch (Irvin Great Britain, Ltd., Letchworth, Herts., England). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1932.* 8 p. 7 refs.

Constricted rigging line trials of a parachute in which the relationship between the inflation time and the effective line length can be established in drop tests from an aircraft or captive kite balloon, present a simple, quick, cost effective test technique for assessing the performance of a parachute against the known performance of a similar parachute. The technique is being used by Irvin Great Britain Limited as a routine test method for man-carrying and other parachute applications. This paper describes the method of test and gives examples of applications of the technique and the results obtained. (Author)

A82-10414 # **A modular asymmetric parachute for wind tunnel testing.** P. C. Klimas, H. E. Widdows, and R. H. Croll (Sandia Laboratories, Albuquerque, NM). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1933.* 9 p. Contract No. DE-Ac04-76DP-00789.

The construction of a series of asymmetrical wind tunnel model parachutes designed to a modular concept is described. The static force, inflation force, and dynamic force and motion time history wind tunnel testing of up to 123 different configurations is discussed. (Author)

A82-10417 # **Reductions in parachute drag due to forebody wake effects.** C. W. Peterson and D. W. Johnson (Sandia Laboratories, Albuquerque, NM). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1939.* 11 p. 10 refs. Research supported by the U.S. Department of Energy.

The paper evaluates approximate analytic methods for predicting reduction in parachute drag due to forebody wake effects. Velocity distributions are measured behind realistic forebody configurations, and are compared to three turbulent wake velocity models. The velocities are integrated to determine the average effective dynamic pressure acting on the parachute, and comparisons are made of drag loss data and effective dynamic pressure ratios. Predictions are also made for no-fin and finned forebodies with 0 deg, 10 deg, and 20 deg angles of attack. The ratio of measured parachute drag behind a forebody divided by the wake free drag is found to equal the ratio of the average dynamic pressure acting on the parachute divided by the freestream dynamic pressure. Good agreement is found between wake velocity data and theoretical predictions, and the maximum angle of attack providing accurate predictions is determined. D.L.G.

A82-10420 # **Stress measurements in a ribbon parachute canopy during inflation and at steady state.** T. A. Konicke and W. L. Garrard (Minnesota, University, Minneapolis, MN). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1944.* 10 p. 9 refs. Research supported by the U.S. Department of Energy.

This paper describes the results of an experimental study of canopy stresses in a model ribbon parachute. The distribution of circumferential stress was measured during inflation and at steady state for different values of dynamic pressure. Testing was performed in the wind tunnel at the infininite mass condition. Omega sensors were used to measure stresses and were mounted in different ribbons along the gore centerline. It was found that the steady state stress had two maxima of about equal value. One maxima was near the skirt, the other half-way between the vent and skirt. The distribution of maximum stress during inflation was similar to the steady state distribution and the ratio of maximum stress during inflation to steady state stress ranged from 1.25 to 1.75 and was essentially independent of dynamic pressure. The spectral density of the steady state stress measured at several points on the canopy. (Author)

A82-10421 # **Stress measurements in bias constructed parachute canopies during inflation and at steady-state.** W. L. Garrard and T. A. Konicke (Minnesota University, Minneapolis, MN). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1945.* 10 p. 8 refs. Research supported by the U.S. Department of Energy.

This paper describes the results of an experimental study of canopy stresses in bias constructed solid flat parachutes. Stresses were measured in the warp and fill directions during inflation and at steady state for different values of dynamic pressure. Omega sensors were used to measure stress. These sensors were mounted along the gore center lines so that the warp and fill stress distributions could be determined as a function of distance from the vent. It was found that stresses in the fill direction were substantially larger than stresses in the warp direction. (Author)

A82-10425 # **Aeroballistic characteristics of sonobuoy parachute decelerators limited to a length of three feet.** C. T. Calianno (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1950.* 6 p.

Air drop and wind tunnel tests were conducted to verify the stability of sonobuoys with decelerators limited to a total length of 3 feet. This limitation was established for safety reasons. Existing decelerator systems are configured to a length of 5 to 12 feet, with cross-type canopies varying in area from 1.5 to 3.5 square feet.

Sonobuoys are blunt nose right circular cylinders, 4-7/8 inches in diameter, 36 inches long ranging in weight from 12 to 39 pounds. Testing established that 3-foot long decelerators are suitable replacements for the existing configurations. Drag coefficient, opening load, high altitude air descent characteristics, and stability data were determined for different types of decelerators with various area and length. (Author)

A82-10427 # **Development of a nylon-Kevlar recovery system for the CL-289 /AN/USD 502/ surveillance drone.** D. B. Webb and L. Palm (Irvin Industries Canada, Ltd., Fort Erie, Ontario, Canada). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1952.* 12 p.

An innovative optimized system has been developed for the automatic recovery of a small (500 lb.) high speed surveillance drone along a precise trajectory. The system requires the use of advanced materials and techniques in order to meet stringent system weight, volume and performance limitations and consists of a two stage highly pressure packed unitized parachute package plus dual landing bags. The specification weight and volume constraints made the maximum use of Kevlar material mandatory for the entire system. Other innovative techniques required included stretch fabric orifices for the landing bags and main parachute opening control features; i.e., continuously variable geometric porosity and use of a special type of auxiliary parachute (Webb chute) positioned in the mouth of the canopy. (Author)

A82-10428 # **Inflatable system for fast deployment of parachutes at low altitudes from slow moving aircraft or stationary supports.** H. O. Bucker. *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1953.* 6 p. 5 refs.

A preinflated system has been developed for fast expansion and deployment of emergency parachute canopies from buildings or slow-moving aircraft. The model is based on the concept of a quick shape recovery of restrained folded inflated flexible tubing and is tested using modified conventional circular canopies. Three suspension lines are used on buildings at altitudes as low as 25 m, with a 55 kg load. Canopies achieve full deployment at 11 m at normal landing speeds of 4.6 m/sec with a frame expansion time of 0.35 sec. Prototypes tested for slow aircraft achieve a speed of 50 km/hr, with a frame pressure of 4.3 kg/sq cm, and a deployment time of 2 sec. Results indicate that fast expansion and subsequent deployment of canopies operated with portable gas sources can be useful in such sports as hang gliding, or as emergency equipment for firemen in rescue operations. D.L.G.

A82-10455 * # **Helicopter rotor trailing edge noise.** R. H. Schlinker and R. K. Amiet (United Technologies Research Center, East Hartford, CT). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2001.* 26 p. 44 refs. Contract No. NAS1-15730.

An experimental and theoretical study was conducted to assess the importance of trailing edge noise as a helicopter main rotor broadband noise source. The noise mechanism was isolated by testing a rotor blade segment in an open jet acoustic wind tunnel at close to full scale Reynolds numbers. Boundary layer data and acoustic data were used to develop scaling laws and assess a first principles trailing edge noise theory. Conclusions from the isolated blade study were analytically transformed to the rotating frame coordinate system to develop a generalized rotor noise prediction. Trailing edge noise was found to contribute significantly to the total helicopter noise spectrum at high frequencies. (Author)

A82-10456 * # **Rotor wake characteristics relevant to rotor-stator interaction noise generation.** L. M. Shaw and J. R. Balombin (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2031.* 24 p. 23 refs.

Mean and turbulence wake properties at three axial locations behind the rotor of an aerodynamically loaded 1.2 pressure ratio fan were measured using a stationary cross film anemometer in an anechoic wind tunnel. Wake characteristics at four radial immersions across the duct at four different fan speeds were determined utilizing a signal enhancement technique. The shapes of the waveforms of the mean rotor relative and mean upwash velocities were shown to change significantly across the span of the blades. In addition, an increase in fan rotational speed caused an increase in the maximum wake turbulence intensity levels near the hub and tip. Spectral analysis was used to describe the complex nature of the rotor wake. (Author)

A82-10457 * # **Effects of vane/blade ratio and spacing on fan noise.** R. A. Kantola (General Electric Co., Power Generation Group, Lynn, MA) and P. R. Gliebe (General Electric Co., Aircraft Engine Group, Cincinnati, OH). *American Institute of Aeronautics and Astronautics, Aeroacoustics Conference, 7th, Palo Alto, CA, Oct. 5-7, 1981, Paper 81-2033.* 16 p. 11 refs. Contract No. NAS3-22062.

The effects of vane/blade ratio and spacing on fan noise are investigated to develop a fan noise prediction scheme which is calibrated against experimental data. A 44 blade, 0.504 diameter fan is used to demonstrate the production of fan noise data free from excess noise caused by rotor turbulence interaction. Two stator sets consisting of a cut-off set with 86 vanes, and a cut-on set of 48 vanes are used, with a total range of spacing from 0.5 to 2.3 rotor chords. The model includes viscous wake interaction noise and the potential field interactions of both the rotor and stator. A free-field acoustic environment is achieved by covering the walls, ceiling and floor with 0.7 m polyurethane foam wedges, providing less than + or - 1 dB standing wave ratio at 200 Hz. Only a 3 dB drop in tone level occurs as the spacing is increased from 0.5 to 2.3 rotor chords, and results indicate that the rotor wakes impinging on the stator vanes are the principal noise source for subsonic rotor speeds. D.L.G.

A82-10462 * # **Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion.** R. E. Bailey and R. E. Smith (Calspan Advanced Technology Center, Buffalo, NY). *American Institute of Aeronautics and Astronautics, Guidance and Control Conference, Albuquerque, NM, Aug. 19-21, 1981, Paper 81-1776.* 26 p. 9 refs. USAF-NASA-supported research.

The Neal-Smith criterion is examined for possible applications in the evaluation of augmented fighter aircraft flying qualities. Longitudinal and lateral flying qualities are addressed. Based on the application of several longitudinal flying qualities data bases, revisions are proposed to the original criterion. Examples are given which show the revised criterion to be a good discriminator of pitch flying qualities. Initial results of lateral flying qualities evaluation through application of the Neal-Smith criterion are poor. Lateral aircraft configurations whose flying qualities are degraded by roll ratcheting effects map into the Level 1 region of the criterion. A third dimension of the criterion for flying qualities specification is evident. Additional criteria are proposed to incorporate this dimension into the criterion structure for flying qualities analysis. (Author)

A82-10463 # **How large should a commuter transport be.** R. D. FitzSimmons, J. Seif, and S. C. Nelson (Douglas Aircraft Co., Long Beach, CA). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Conference, Dayton, OH, Aug. 11-13, 1981, Paper 81-1732.* 12 p. 11 refs.

Definitions of a commuter transport are examined from the viewpoint of a major airframe manufacturer. Selected milestones in commuter air service are reviewed. The impact of deregulation is creating new opportunities for commuter airlines to expand services, resulting in new economic and operating problems. Problems of acquisition and operating costs are discussed. Considerations for commuter transport capacity include number of passengers, frequency of service, airport facilities, and community compatibility. Capacity variations are explored in the 1980s and the 1990s. Some conceptual commuter transport candidates for the future are presented. (Author)

A82-10465 # **Design considerations for duty cycle, life and reliability of small limited life engines.** D. A. Gries (Williams International Corp., Walled Lake, MI). *AIAA, SAE, and ASME, Joint Propulsion Conference, 17th, Colorado Springs, CO, July 27-29, 1981, AIAA Paper 81-1402.* 4 p.

Design requirements, design criteria and verification methods related to preliminary design and program planning for small limited life turbine engines have significant differences from other engine technologies. Design operating life of components is defined by development test requirements, rather than mission life requirements. Interpolation between operating mission limits is required to demonstrate operating life for limited life engines rather than extrapolation of accelerated testing required for long life. Storage life requirements are very stringent. The correlation of reliability prediction versus accelerated verification testing for engines requiring extended dormant storage is being validated. (Author)

A82-10466 * # **Propfan installation aerodynamics of a supercritical swept wing transport configuration.** R. C. Smith and A. D. Levin (NASA, Ames Research Center, Moffett Field, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 17th, Colorado Springs, CO, July 27-29, 1981, AIAA Paper 81-1563.* 14 p. 6 refs.

A semispan model with a powered propeller has been tested to provide data on the installation drag penalty of advanced propfan-powered transports designed to cruise at a Mach number of 0.8. These tests, conducted in 14-foot and 11-foot transonic wind tunnels, are a part of a NASA program to develop efficient, high-speed propellers for more fuel-efficient commercial transports for the 1990s and beyond. The model is instrumented for measuring propeller forces, wing/nacelle forces and moments, and pressure distributions over the wing and nacelle. The body in these tests was nonmetric, being connected to the wing by an RTV seal at the wing/body juncture. Tests were run at angles of attack from -3 to +5 deg over the Mach number range 0.6 to 0.85 at a Reynolds number of about 9,000,000. Results of these tests indicate that the nacelle interference drag can be quite large relative to an uninstalled nacelle. However, the losses due to the nacelle were reduced to acceptable levels by changes to the wing leading edge and nacelle intersection. The propeller slipstream causes substantial changes in the wing span load distribution indicating that twist modifications are needed to recover a more favorable span load distribution. (Author)

A82-10495 # **Characteristics and trends of energy consumption in transport missions with aircraft and surface vehicles (Caratteristiche e tendenze del consumo energetico nelle missioni di trasporto con aeroplani e con veicoli di superficie).** G. Gabrielli. *Ingegneria,* July-Aug. 1981, p. 193-198. 6 refs. In Italian.

A nondimensional factor is defined which characterizes energy consumption in transport missions. Values of this energy utilization factor are given for a number of aircraft and surface vehicles (e.g., automobiles, buses, and trains). Particular attention is given to the energy utilization factor of turbofan and turbojet aircraft. B.J.

A82-10496 # **The possibility of using deformable rubber components in landing gear (Possibilità di impiego di elementi deformabili in gomma in carrelli di atterraggio).** C. Caprile and L. Salvioni (Milano, Politecnico, Milan, Italy). *Ingegneria,* July-Aug. 1981, p. 201-212. In Italian.

A test program was devised to evaluate the use of precompressed rubber components as vibration dampers in landing gear for light aircraft. The test program is described, and dynamic and static test results are presented. A dissipationless model is developed which is shown to satisfactorily describe the behavior of the rubber components. B.J.

A82-10497 # **Problems relating to the classical rate-gyro (Problematiche relative al rate-gyro di tipo classico).** L. Borello (Torino, Politecnico, Turin, Italy). *Ingegneria,* July-Aug. 1981, p. 225-229. In Italian.

A mathematical model is developed for evaluating the accuracy of classical rate-gyros. An analysis is presented of the influence of secondary input signals associated with the angular velocity components of the platform. Ways to minimize the effects of these secondary signals are examined. B.J.

A82-10500 **Test Pilots' Aviation Safety Workshop, U.S. Naval Postgraduate School, Monterey, CA, February 25-28, 1981, Proceedings.** Workshop sponsored by the Society of Experimental Test Pilots and American Institute of Aeronautics and Astronautics. Edited by C. Tuomela (California Agricultural Aircraft Association, Sacramento, CA). New York, American Institute of Aeronautics and Astronautics, 1981. 100 p. Members, $12.50; nonmembers, $15.

Results are presented of discussions concerning existing and proposed training, equipment and methods for supplying the forecast demand for airline pilots for the period 1985-2000 from the cadre of general aviation. Areas covered include aeromedical education, training and equipment, the air traffic control system, the training and safety aspects associated with cockpit design analysis, pilot and maintenance personnel training accomplished by the fixed base operator, the effects of differences in flying qualities and performances between aircraft on safety and training effectiveness, pilot operating handbooks, regulatory aspects of pilot training and equipment, training and flight simulation programs for commercial pilots, and pilot weather knowledge. A.L.W.

A82-10545 **Implementation of AVRADCOM MM&T.** G. A. Gorline (U.S. Army, Aviation Research and Development Command, St. Louis, MO). *ManTech Journal,* vol. 6, no. 1, 1981, p. 3-6.

The general implementation plan of the Army Aviation Research and Development Command's (AVRADCOM) efforts in manufacturing methods and technology (MM&T) programs is described. A flowchart of the implementation procedure is presented, and attention is given to several examples of implementation, including a compressor casing, a titanium casting, and aluminum PM parts. B.J.

A82-10547 **Composite main rotor tubular braided.** M. White (Kaman Aerospace Corp., Bloomfield, CT). *ManTech Journal,* vol. 6, no. 1, 1981, p. 14-16. Army-supported research.

Mechanical tubular braiding has been demonstrated to be a viable blade spar manufacturing process after the completion of a program that included preliminary design of an improved main rotor blade for the OH-58 helicopter. The blade incorporates an advanced aerodynamic shape and has as its primary structural member a Kevlar 49/epoxy spar fabricated by braiding. The achievement of an analytically acceptable blade and spar design satisfying critical structural and dynamic requirements was not hindered by braiding process constraints. B.J.

A82-10646 **Navigation task partitioning in distributed-processing avionics systems.** J. L. Center (JAYCOR, Woburn, MA). *(Institute of Navigation, National Aerospace Meeting, Warminster, Pa., Apr. 8-10, 1981.) Navigation,* vol. 28, Summer 1981, p. 93-100. 10 refs. Contract No. N62269-80-C-0146.

An approach is presented for allocating navigation tasks among multiple processors prior to detailed design and implementation. The method is based on applying rate-distortion techniques from communication theory to navigation system design. All navigation activities are broken down into elementary functions, and rate-distortion methods are used to access the impact on rms position and velocity errors of limiting communication bandwidths among elementary functions. Groups of functions that require high-bandwidth communication are assigned to the same microprocessor, while those that can perform effectively with lower-bandwidth links are separated. The method is illustrated for aircraft motion and sensor errors in the north channel. J.F.

A82-10649 * **Improving the MLS through enhanced cockpit displays.** R. S. Jensen (Ohio State University, Columbus, OH). *(Institute of Navigation, National Aerospace Meeting, Warminster, Pa., Apr. 8-10, 1981.) Navigation,* vol. 28, Summer 1981, p. 138-146. 8 refs. NASA-sponsored research.

A simulator investigation of various prediction and quickening algorithms in computer-generated forward-looking displays is presented; the algorithms are used to improve manual aircraft control on curved microwave landing system approaches. The experimental facility consisted of a Link GAT-2 simulator, a PDP 11/40 minicomputer, a high-speed graphic display, a TV camera, and a CRT monitor. Results indicate that second- and third-order predictor displays provide the best lateral performance and that intermediate levels of prediction and quickening provide the best vertical control. Prediction/quickening algorithms of increasing computational order were found to significantly reduce aileron, rudder, and elevator control responses. The conventional crosspointer displays yielded an average 2-sigma lateral error of + or - 200 over all wind conditions at 500 m from touchdown, and was therefore unable to meet FAA requirements (+ or - 22.9 m); the pictorial-preview display yielded much better results: an average 2-sigma lateral error of + or - 27 m. Neither display was able to approach the FAA specified accuracy requirement in the vertical dimension (+ or - 3.7 m). J.F.

A82-10650 **Discrete address beacon, navigation and landing system.** R. P. Crow. *(Institute of Navigation, National Aerospace Meeting, Warminster, Pa., Apr. 8-10, 1981.) Navigation,* vol. 28, Summer 1981, p. 147-162.

The Discrete Address Beacon, Navigation and Landing System (DABNLS) is an integrated system which will provide not only air traffic control surveillance data and a two-way data link of the FAA's developmental Discrete Address Beacon System, but will provide precision area navigation and versatile landing guidance with a full Category IIIc capability. The DABNLS will utilize a single pair of L-band frequencies for the discretely addressed up-link interrogations and down-link replies. A ground facility will make precise azimuth and range measurements on the bi-phase coded reply pulses, as well as digitally process the reported altitude data to obtain the aircraft's latitude/longitude and other parameters. The data will be used for navigation, collision avoidance and ATC purposes. Multiple channels would be used in terminal areas, each having elevation facilities for landing guidance. Block diagrams of the DABNLS ground subsystem and air-borne transponders are given. J.F.

A82-10816 † **Optimization of the principal design parameters of a passenger aircraft (Optimizatsiia osnovnikh proektnikh parametriv pasazhirskogo litaka).** V. S. Mikalevich, G. M. Iun, and V. M. Kuz'menko. *Akademiia Nauk Ukrain'skoi RSR, Visnik,* vol. 45, Aug. 1981, p. 39-43. 7 refs. In Ukrainian.

A82-10321 # **Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils.** J. C. Le Balleur (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), no. 3, 1981, p. 21-45. 46 refs. Research supported by the Direction des Recherches, Etudes et Techniques.

A method is presented for computing two-dimensional lifting steady viscous flows with wakes and possibly separations inside the viscous layer. A transonic potential calculation is used, which strongly interacts with a defect integral method. A mathematical model is also presented for matching the viscous model for averaged mean velocities with reverse flow, and for turbulent closure in nonequilibrium layers. Numerical coupling is reached through an iterative relaxation technique, and the wake geometry is calculated. The viscous mean flow is determined, and examples of applications to subsonic or supercritical airfoils are given. D.L.G.

A82-10822 # **Electrical ground testing of aircraft antistatic protection.** A. Bruere (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), no. 3, 1981, p. 47-56. 5 refs.

After a review of the methods suggested to ensure aircraft protection regarding electrostatic spurious phenomena, one describes one of the two devices developed at ONERA for ground testing of this protection. These methods give the external surface of the aircraft a conductivity sufficient enough to enable on the one hand the measurement of the surface resistivity of the protected parts even if they are coated with a finishing layer of paint, and, on the other hand, to check the good electrical continuity of each structure element and the aircraft potential reference point. (Author)

A82-10851 **Fluid power technology for the '80s.** Warrendale, PA, Society of Automotive Engineers, Inc. (SAE Proceedings P-85), 1980. 38 p. $8.00.

Aspects of energy conservation with variable displacement pumps and motors are examined, taking into account approaches for hydraulic power generation, friction loads, elastic loads, regenerative braking, gravity loads, inertia loads, variable displacement pump characteristics, integrated actuator packages, a servopump analysis, a valve analysis, and the computation of pump and motor parameters. High-efficiency hydraulic power transfer units for multisystem aircraft are discussed along with basic approaches for reducing hydraulic system noise in aircraft. A description of developments in boundary layer thrust vector control is also provided. G.R.

A82-10853 **High-efficiency hydraulic power transfer units for multisystem aircraft.** W. E. Boehringer (Douglas Aircraft Co., Long Beach, CA). In: Fluid power technology for the '80s. Warrendale, PA, Society of Automotive Engineers, Inc., 1980, p. 15-20.

Multiple pumps are generally employed to provide fully powered aircraft flight controls with a redundant power source. The prime hydraulic source is, in most cases, a pump driven directly by one of the aircraft's engines. This approach provides the most efficient method of converting engine horsepower to hydraulic horsepower. The secondary hydraulic power source is generally not as efficient. Investigations were conducted with the objective to find sources of alternate hydraulic power with improved efficiency. The reasons for the inefficiency of current secondary hydraulic power sources were explored to obtain a basis for the design of systems with a better performance. A unit consisting basically of two hydraulic cylinders mounted back to back was designed and manufactured. The design of this unit was subsequently further improved. It is pointed out that the new hydraulic power transfer units obtained have a comparatively high running efficiency. G.R.

A82-10854 **'Quiet please'.** S. J. Skaistis (Sperry Corp., Sperry Vickers Div., Troy, MI). In: Fluid power technology for the '80s. Warrendale, PA, Society of Automotive Engineers, Inc., 1980, p. 21-26.

The considered investigation has the objective to indicate that noise control is the product of good engineering. It does not depend on learning a whole new discipline nor does it depend on invention. Because of the increasing use of hydraulics and the growth of noise sensitivity in aircraft, it was felt that aircraft hydraulic engineers should be aware of the desirability of noise control. A booklet was written for the general practitioner in aerospace hydraulics engineering. The first principle of quieting is that the most favorable cost-effectiveness ratio is achieved when noise control engineering is part of the original design effort. The second principle of quieting is that the loudest noise component must be reduced before appreciable quieting can be achieved. G.R.

A82-10855 **Developments in boundary layer Thrust Vector Control.** R. E. Fitzgerald and R. F. Kampe (Chandler Evans, Inc., West Hartford, CT). In: Fluid power technology for the '80s. Warrendale, PA, Society of Automotive Engineers, Inc., 1980, p. 27-35. 7 refs.

Thrust Vector Control (TVC) is commonly employed on a vehicle to provide larger magnitude steering forces during low velocity flight than can be obtained with aerodynamic fins. A method of thrust vectoring called boundary layer thrust vector control (BLTVC) is considered. BLTVC involves a variation of the secondary injection procedure. The limited deflection and flow ratio is amplified by means of an approach including an injection into a highly overexpanded nozzle. Deflections of 15 degrees are possible and ambient air is used as the injectant. Attention is given to the principles of BLTVC operation, a breakthrough in reducing nozzle size, and a scheme for producing roll control. Rocket applications of BLTVC cover a range in size from microthruster to remote piloted vehicle booster. BLTVC can be used on aircraft gas turbines also. Drawbacks of BLTVC are related to the necessity to employ very large nozzles for high-altitude applications. These drawbacks can be overcome with the aid of Confined Jet Thrust Vector Control. G.R.

A82-10889 # **A new APU for medium place aircraft environmental control systems.** C. Rodgers (Solar Turbines International, Turbomach Div., San Diego, CA). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-1.* 7 p. Members, $2.00; nonmember, $4.00.

New small auxiliary power units (APU) are sought to provide aircraft pneumatic power for environmental control and start systems. A new small gas turbine APU in the 20-50 hp class has been developed to meet the smaller aircraft secondary power requirements. The Gemini APU utilizes a single-stage radial compressor and a single-stage radial turbine wheel; it incorporates a single-can combustor with a unique spinning cup fuel atomizer. The electrical control provides for shutdown in case of malfunctions and also has an automatic bleed load control system. The load control valve permits greater operational flexibility by modulating flow to maintain rated turbine exhaust temperature under varying electrical loads. The engine is available in two configurations: one for combined bleed/shp applications and the other for shaftpower applications. Silent power versions of the Gemini military ground generator sets have been developed which produce an overall noise level as low as 60 dB, and fuel and oil requirements for the Gemini are compatible with those of most main propulsion gas turbines. Successful starting has been demonstrated by the APU from -65 F through 125 F, as well as through 2000 start-stop cycles. J.F.

A82-10890 # **Closed loop environmental control systems for fighter aircraft.** G. S. Tsujikawa and V. K. Rajpaul (Boeing Military Airplane Co., Seattle, WA). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-2.* 6 p. Members, $2.00; nonmembers, $4.00. USAF-sponsored research.

A favorable thermal environment for aircraft avionics implemented in an energy efficient manner is an important factor in reducing aircraft life cycle costs through improved avionic reliability. This paper discusses the application of closed loop environmental control systems (CECS) to a tactical mission aircraft. The specific objective was to determine CECS configurations which would provide significant savings in fuel consumption and life cycle costs while maintaining stable, low temperature, clean and dry environment for avionics equipment. Preliminary designs were developed for a positive displacement rotary vaned air cycle machine system, hybrid air/vapor cycle system, centrifugal Freon compressor vapor cycle system and a turbo-machinery air cycle machine system. System characteristics, details of design, performance and life cycle cost data were compared with an existing open loop air cycle system. The study showed that closed loop system configurations and close avionic temperature control resulted in substantial life cycle cost savings. (Author)

A82-10892 # **Towards minimum power for environmental control in transport aircraft.** D. Pierrepont (British Aerospace Public, Ltd., Co., Weybridge, Surrey, England). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-4.* 7 p. Members, $2.00; nonmembers, $4.00.

The minimization of the power consumed by the pneumatically powered environmental control system (ECS) on board transport aircraft, primarily the air conditioning system, is considered. It is noted that the development of a low-bleed ECS with subzero air cycle machine exit temperatures, condensing heat exchangers and recirculation leading to the doubling of the temperature difference between the fresh air supply and passenger and crew compartments has resulted in the halving of the fuel penalty associated with the ECS, (from 4% to 2%) while an additional halving of the penalty is possible by further reducing air flow or using a shaft-driven centrifugal compressor to provide the fresh air supply. Relative fuel savings to be had from air bleed reduction are shown to be significant with respect to those to be obtained in the areas of engines, aerodynamics and structures. The minimum fresh air flow required for the efficient operation of air supply systems within limits of passenger health and comfort is considered, and pneumatic and electrical means for the transmission of shaft power to the ECS are compared. The operating principles of air- and vapor-cycle cooling systems are then reviewed with respect to their performances, and advantages of the air cycle in the areas of complexity, maintenance and weight are noted. Consideration is also given to alternatives to bleed for anti-icing applications. A.L.W.

A82-10893 # **Design analysis of high temperature transparent windshields for high performance aircraft.** V. E. Wilson, A. J. Bockstahler (Rockwell International Corp., North American Aircraft Div., Los Angeles, CA), and C. A. Babish, III (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-5.* 11 p. 10 refs. Members, $2.00; nonmembers, $4.00. Contract No. F33615-68-C-3421.

Design criteria and analysis methods that are required to extend the thermal performance capabilities of lightweight, large field-of-view transparent windshield systems of Air Force aircraft into the Mach 2.5 to 3.5 speed regime are developed and demonstrated. Windshield system design requirements are established and designs are developed, analyzed, and revised in an iterative process until visual, structural, thermal, weight, and cost analyses show that the design requirements are satisfied. Design details on two windshield systems are presented. Because a successful windshield design for high speed aircraft depends, to a great extent, on the ability of the windshield to withstand the high temperatures associated with supersonic flight, the aerothermodynamic analysis method and results are emphasized. (Author)

A82-10894 # **Design challenges of high performance aircraft POD EOCM cooling systems.** R. D. Buckingham (Fairchild Industries, Inc., Fairchild Stratos Div., Manhattan Beach, CA). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-6.* 7 p. Members, $2.00; nonmembers, $4.00.

Modern high performance aircraft and associated Electro-Optical/Countermeasure (EOCM) pods have introduced very complex, high heat density electronics and avionics equipment, which requires mechanically refrigerated cooling to reject large amounts of heat from relatively small confined areas because of: insufficient/no cooling air from the host aircraft; miniaturization/high heat density of electronics; high temperature heat sink of high performance fighter-type aircraft, precluding ram air cooling; need for increased electronics/avionics reliability through lower operating temperature ranges. Electrically driven vapor compression systems are most effective for the EOCM-type pod missions, operating well at high and low altitudes, as well as at high and low flight speeds. Vapor cycle systems provide full ground cooling performance capability. (Author)

A82-10895 # **Air supply system bite for Boeing 767 airplane.** J. P. Patrick and G. F. Atkinson (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-7.* 7 p. Members, $2.00; nonmembers, $4.00.

Modern airplane air supply systems regulate the temperature and pressure of engine bleed air extracted for cabin pressurization, air conditioning, anti-icing, cross-engine starting, air-driven hydraulic pumps and other pneumatic demands. The air supply system for the Boeing Model 767 airplane consists of a set of equipment for each of the airplane's two engines and a remotely located built-in-test-equipment (BITE) module. The air supply BITE system isolates over 95 percent of all failures to the line replaceable unit (LRU) level. The BITE system achieves this fault isolation via a modern digital electronic BITE module that continuously monitors inputs on a time-shared basis from dedicated BITE elements which are integrally contained in the air supply system LRUs. The operation of the all-pneumatic bleed air supply system is unaffected by the BITE system. Faults detected during bleed air system operation are stored in the BITE module nonvolatile memory for interrogation by the ground crew. Provisions are also made to allow BITE detected faults to be used as inputs to aircraft airborne integrated data systems (AIDS). (Author)

A82-10896 # **Air-film cooling returns to ramjets.** W. E. Roberts and S. Wasserberg (Marquardt Co., Van Nuys, CA). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-8.* 6 p. Members, $2.00; nonmembers, $4.00.

A ramjet engine was configured for the Navy Firebrand program to propel an antiship target missile. After years of using insulation to thermally protect engine combustor/nozzle assemblies, air-film cooling was used in the Firebrand engine. A combustor liner causes a layer of cool air to be injected between the combustion gas and combustor/nozzle structural shell. As this film flows downstream, mixing and reaction with combustion gas causes its cooling effectiveness to deteriorate. A satisfactory structural design requires shell temperature prediction. Using three film cooling correlations, a method of defining the Firebrand film cooling effectiveness is shown. Thermal models are presented which utilize this effectiveness and provide shell temperature predictions under ground test conditions. This analytical method is shown to be sufficient when predicted temperatures are compared with shell temperatures measured during these ground tests. (Author)

A82-10901 # **In-situ calibration of flight heat transfer instrumentation.** H. W. Kipp and E. A. Elswirth (McDonnell Douglas

Astronautics Co., St. Louis, MO). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-13.* 5 p. 8 refs. Members, $2.00; nonmembers, $4.00.

In-situ calibration offers a promising approach for economically minimizing errors in surface heating rates obtained from subsurface, transient, temperature measurements. Experience has shown that surface heat flux solutions are sensitive to inaccuracies in variables such as thermocouple location, temperature measurements, model thermal properties and joint conductances. It is the purpose of in-situ calibration to determine the values of finite difference thermal model parameters which result in the least square error solution. A calibration heat flux is imposed on the surface surrounding a thermocouple installation and the thermal response is recorded. The temperature history is used in an inverse solution to obtain the surface heat flux which is then compared with the calibration pulse. Repetitive values of surface heat flux are obtained by systematically varying model parameters until the calculated and calibration fluxes agree within a prescribed tolerance. The concept is illustrated with a numerical example. (Author)

A82-10920 # **Air-freon integrated environmental conditioning system for trainer subsonic aircraft.** M. Andriano, A. Mannini, and V. Marchis (Microtecnica-Torino, Turin, Italy). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Francisco, CA, July 13-15, 1981, Paper 81-ENAs-33.* 7 p. Members, $2.00; nonmembers, $4.00.

Development studies of a cabin environmental control system (ECS) for a new trainer subsonic aircraft are presented. The new vapor cycle cooling system is energy efficient for engines sensitive to bleed air extraction. The hybrid air-freon ECS is composed of four subsystems: the recirculation loop, the bleed air line, the ram air line, and the supplementary cooling assembly (SCA). The air system emergency control law and the SCA system emergency control law are shown schematically in flow charts: if the sensor in the recirculating loop duct measures a temperature higher than 100 C, the bypass valve is immediately closed; it is only opened if the duct temperature decreases below 70 C. The compressor in the SCA system is switched off in cases where the pressure is above 2.5 MPa and lower than 0.3 MPa. Performance tests correlated well with predicted ones, and the system overall weight was optimized at 30 kg. The ECS was compared with the bootstrap air system and found to have a substantially better bleed air flow rate (ECS = 1.70 kg/min; bootstrap = 7.0 kg/min). J.F.

A82-10934 * # **Multiple-scale turbulence modeling of free turbulent flows.** G. Fabris and P. T. Harsha (Science Applications, Inc., Combustion Dynamics and Propulsion Technology Div., Canoga Park, CA). *American Society of Mechanical Engineers and American Society of Civil Engineers, Joint Applied Mechanics, Fluids Engineering, and Bioengineering Conference, University of Colorado, Boulder, CO, June 22-27, 1981, ASME Paper 81-FE-20.* 11 p. 28 refs. Members, $2.00; nonmembers, $4.00. Contract No. NAS1-15988.

As part of an investigation into the application of turbulence models to the computation of flows in advanced scramjet combustors, the multiple-scale turbulence model has been applied to a variety of flowfield predictions. The model appears to have a potential for improved predictions in a variety of areas relevant to combustor problems. This potential exists because of the partition of the turbulence energy spectrum that is the major feature of the model and which allows the turbulence energy dissipation rate to be out of phase with turbulent energy production. To establish the general reliability of the approach, it has been tested through comparison of predictions with experimental data. An appreciable overall improvement in the generality of the predictions is observed, as compared to those of the basic two-equation turbulence model. A Mach number-related correction is found to be necessary to satisfactorily predict the spreading rate of the supersonic jet and mixing layer. (Author)

A82-10952 * # **Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes.** F. S. Stepka (NASA, Lewis Research Center, Cleveland, OH). *American Society of Mechanical Engineers and American Institute of Chemical Engineers, National Heat Transfer Conference, 20th, Milwaukee, WI, Aug. 2-5, 1981, ASME Paper 81-HT-48.* 7 p. 9 refs. Members, $2.00; nonmembers, $4.00.

Analysis was made of the heat transfer and pressure drop through turbine vanes made of a sintered, porous metal coated with a thin layer of ceramic and convection cooled by spanwise flow of cooling air. The analysis was made to determine the feasibility of using this concept for cooling very small turbines, primarily for short duration applications such as in missile engines. The analysis was made for gas conditions of approximately 10 and 40 atm and 1644 K and with turbine vanes made of felt-type porous metals with relative densities from 0.2 and 0.6 and ceramic coating thicknesses of 0.076 to 0.254 mm. (Author)

A82-10965 # **Fuel for future transport aircraft.** G. D. Brewer (Lockheed-California Co., Burbank, CA). *American Society of Mechanical Engineers and American Institute of Chemical Engineers, National Heat Transfer Conference, 20th, Milwaukee, WI, Aug. 2-5, 1981, ASME Paper 81-HT-80.* 8 p. 6 refs. Members, $2.00; nonmembers, $4.00.

Despite attempts at conservation and the development of synthetic aviation-grade kerosene from alternative fossil fuel materials, it is widely recognized that alternatives to conventional petroleum-base aircraft fuels must become available in the near future. The present paper discusses the prospects for liquid hydrogen as a future fuel for transport aircraft. Advantages of liquid hydrogen over synthetic fuels and liquid methane as alternative fuels in the areas of availability, safety, pollution, relative energy efficiency as a function of trip length and aircraft weight, overall costs and airport compatibility are considered. The possible requirements for a development program aimed at preparing liquid hydrogen for use in operational aircraft are examined, and the probable time characteristics of fuel use during the transition to liquid hydrogen, which may significantly replace synthetic fuels by the year 2000, are considered. A comprehensive plan for liquid hydrogen fuels R&D is then presented which is currently being considered for implementation on an international basis. A.L.W.

A82-10986 # **Control laws for adaptive wind tunnels.** E. H. Dowell (Princeton University, Princeton, NJ). *AIAA Journal,* vol. 19, Nov. 1981, p. 1486-1488. 5 refs. Research supported by Princeton University.

A control law is developed which will permit the systematic modification of wind tunnel wall conditions, in order to minimize the interference about a model. The approach is valid for both three-dimensional and lifting flows and, subject to the assumption of linearity, is not dependent on any particular theoretical description of the fluid. In addition, unlike previous control schemes, the present method does not require an iterative approach. O.C.

A82-10987 # **Wind tunnel tests on airfoils in tandem cascade.** S. Raghunathan (Belfast, Queen's University, Belfast, Northern Ireland), C. P. Tan, and N. A. J. Wells. *AIAA Journal,* vol. 19, Nov. 1981, p.1490-1492.

Wind tunnel tests on airfoils in tandem cascade, of the type found on the Wells-type turbine, were conducted in a low-speed tunnel with a maximum air velocity of 35 m/sec. Airfoils tested had a chord of 85 mm and a span of 100 mm and included the NACA 0012, 0018 and 0021 profiles. The freestream dynamic pressure was measured upstream of the cascade by a Pitot tube, as well as the tangential and normal forces on the blades. Tests were performed for several cascade solidities and at angles of incidence varying from zero to 90 deg, with Reynolds numbers of about 100,000. O.C.

A82-11020 **Tangential sensitivity of EW receivers.** J. Tsui (USAF, Avionics Laboratory, Wright-Patterson AFB, OH). *Microwave Journal,* vol. 24, Oct. 1981, p. 99-102. 8 refs.

A systematic approach to the determination of the tangential sensitivity of a receiver is presented, and calculated results are compared with experimental data. Particular consideration is given to the following topics: the practical determination of the effective noise bandwidth to be used in the sensitivity calculations of an EW receiver; the influence of the RF gain in the receiver on the sensitivity; and the influence of the RF bandwidth and the video bandwidth on the sensitivity. B.J.

A82-11031 **Relationships between naval aviation safety and pilot flight experience.** M. S. Borowsky (U.S. Naval Safety

Center, Norfolk, VA). *Aviation, Space, and Environmental Medicine,* vol. 52, Oct. 1981, p. 608-610.

Flight activity of all aviators flying naval aircraft and aircraft accident data were analyzed to determine if statistical relationships among lifetime and recent experience variables and accident liability exist. The results demonstrate that accident potential, though not statistically related to flight hours in 30-d periods, is correlated with lifetime flight experience with the higher liability associated with minimal amounts of flight hours and with transitioning into new aircraft. (Author)

A82-11149 **Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure.** C. D. Bailey and W. M. Pless (Lockheed-Georgia Co., Marietta, GA). *Materials Evaluation,* vol. 39, Oct. 1981, p. 1045-1050. 12 refs.

Guidelines for the design of a dedicated acoustic emission (AE) system for aircraft fleet installations are discussed. It is shown that the successful development of an on-board AE crack detection system depends on the existence of an integrated body of technology combining AE detection technology, structural and crack growth characteristics, noise and EMI discrimination or rejection, and fleet maintenance practices. These technologies must be fully integrated through the development and deployment of the system to achieve cost-effective results. V.L.

A82-11177 * **Rheological behavior of progressively shear-thickening solutions.** S. T. J. Peng and R. F. Landel (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *Journal of Applied Physics,* vol. 52, Oct. 1981, p. 5988-5993. 13 refs. Contract No. NAS7-100.

The rheological behavior of the recently developed polymer FM-9 in Jet A fuel and JP 8 fuel is reported. In aqueous solution, FM 9 is found to exhibit strong time-dependent shear thickening behavior. Induction time necessary for the onset of thickening is found to depend on shear rate, solvent, concentration, and molecular weight. Altering the nature of the solvent results in effects similar to those obtained by changing the concentration or molecular weight. A critical shear rate is derived, and is inversely proportional to the zero shear rate viscosity of the solution for the temperature and concentrations observed. The onset of shear thickening behavior appears to be related to the onset of viscoelastic response, and thus the time scale follows reduced variable behavior. D.L.G.

A82-11222 **Development of the Triflex rotor head.** A. Cassier (Société Nationale Industrielle Aérospatiale, Marignane, Bouches-du-Rhône, France). *American Helicopter Society, Journal,* vol. 26, July 1981, p. 25-31.

This paper reviews the development of a new hingeless rotor hub named Triflex. This hub is made of composite materials and features flexible arms that provide blade retention, flap/lag/pitch degrees of freedom through structural deflection, and lag damping. A large part of the Triflex hub design effort has been devoted to determination of the flexible arm characteristics, since these strongly affect the behavior of the rotor in flight. The Triflex hub dynamic characteristics were carefully checked during laboratory and whirl stand tests and found to be in agreement with theoretical predictions. Flight tests of the Triflex rotor on a Gazelle helicopter were successful in demonstrating the feasibility of the concept. Though rotor lag damping was found to be weak, no insurmountable stability problems were encountered, and the flying qualities of the Gazelle helicopter fitted with the Triflex hub were good. The next phase of the Triflex hub development will be aimed at improving the hub's structural damping characteristics and at optimizing the manufacturing process. (Author)

A82-11224 **Fatigue substantiation of non-linear structures.** B. P. W. Stocker (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *(American Helicopter Society, Midwest Region Helicopter Fatigue Methodology Specialists Meeting, St. Louis, MO, Mar. 1980.) American Helicopter Society, Journal,* vol. 26, July 1981, p. 51-55.

Structures such as preloaded joints and lugs frequently exhibit non-linear load/stress relationships at critical locations. This paper presents some examples of such structures, including typical attachment lugs and preloaded threaded attachments, to illustrate the importance of test load level selection and determination of load vs stress relationships at fracture origins. The possibility that accelerated fatigue testing may sometime fail to reveal critical design weaknesses or result in unrepresentative modes of fracture is explored, and simple ways of avoiding this problem are discussed. (Author)

A82-11225 **On computing Floquet transition matrices of rotorcraft.** G. H. Gaonkar, D. Sastry (Indian Institute of Science, Bangalore, India), and D. S. S. Prasad (National Aeronautical Laboratory, Bangalore, India). *American Helicopter Society, Journal,* vol. 26, July 1981, p. 56-61. 23 refs.

There are conflicting claims concerning the efficiency of different schemes of computing the Floquet transition matrices of rotorcraft. In this paper, computer-generated data are presented on the comparative efficiency of four classes of methods: (1) Runge-Kutta one-step; (2) Hamming's predictor-corrector multistep; (3) Bulirsch-Stoer extrapolation; and (4) hybrid or variable order. Data pertain to single-pass and N-pass schemes for four flap-lag stability models. It is found that Hamming's fourth-order predictor-corrector method in single pass is the most economical with respect to three-significant-figure accuracy. The analytical formulation confirms the advantage of the single-pass approach over the N-pass, provides useful approximations to machine-time data, and is a feasible economical approach to comparing different methods with respect to machine time. B.J.

A82-11300 **Model helicopter rotor impulsive noise.** J. E. Hubbard, Jr. and W. L. Harris (MIT, Cambridge, MA). *Journal of Sound and Vibration,* vol. 78, Oct. 8, 1981, p. 425-437. 18 refs. Contract No. DAAG29-C-027.

An investigation of helicopter rotor blade slap was performed on a 1.27 m diameter model rotor. The rotor blades were a NACA 0012 section with a -8 deg linear twist. The experiments were conducted in the MIT Anechoic Wind Tunnel. The effects of number of blades, blade pitch, advance ratio, and shaft angle on the generation and intensity of blade slap have been investigated. The effect of each parameter was determined by varying the parameter of interest while keeping the others constant. The rotor tip speeds of the tests performed in this study were limited to approximately Mach 0.4. The directivity associated with the blade slap signature was measured. The results of this investigation are based on a subjective definition of blade slap. (Author)

A82-11302 # **Ideal and simulated performance of an aircraft in the terrain following mission.** U. R. Prasad (Indian Institute of Science, Bangalore, India) and B. S. Subrahmanyam. *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 13-19. 6 refs.

A new synthesis method of terrain following system design to realize closely the ideal performance obtainable from an aircraft in the mission is presented. Ideal performance analysis and division of the mission into Avoid and Follow modes of flight leads to natural template constructions imbedding the aircraft climb performance and human pilot tolerance limits to accelerations. Simulation of aircraft flight in the mission complements the analysis in fixing the configuration and parameters of the system. Step terrains are used in the design iterations of the system because of their worst-case character. (Author)

A82-11314 # **Dynamic response of aircraft structure to gun shock loads.** P. N. Raju and V. P. Rangaiah (Hindustan Aeronautics, Ltd., Bangalore, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 103-105. 5 refs.

The dynamic response of a fighter aircraft to gun firing is assessed, the vibration levels on the airframe being measured by flight tests of the aircraft in the development phase. The aircraft is instrumented for measuring the vibration levels at various points on the aircraft structure, for example, the wing tip, fuselage, tail plane, and aileron and elevator. The flight vibration data thus obtained is analyzed using standard methods available in the literature. The analyzed data is plotted to ascertain whether the vibration levels fall below the upper bounds of the envelope drawn from the previous flight-test data for the aircraft of the same class. C.R.

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

A82-11359 **Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack.** P. Zhu, W. Shou (China Aeronautical Establishment, Institute of Computing Technology, Xi'an, Shaanxi, People's Republic of China), and S. Luo (Northwestern Polytechnical University, Xi'an, Shaanxi, People's Republic of China). *Computer Methods in Applied Mechanics and Engineering*, vol. 26, June 1981, p. 305-319. 6 refs.

This paper predicts numerically the nonlinear aerodynamic loads on wings and bodies at high angles of attack in subsonic flow separating along certain known lines. It is assumed that the separation vortices are symmetric and unbursting. The wing mean surfaces and body surfaces are simulated by bound vortex lattices, and the separation vortex surfaces by free vortex lines. The vortex system satisfies boundary conditions on wing and body surfaces, separation conditions, and the condition that free vortex lines are tangent to local velocity. The velocity induced by a vortex is computed by the Biot-Savart law with Göthert transformation for subsonic small perturbation flows. The vortex strengths and the free vortex locations are solved by relaxation method. Then the aerodynamic loads on wings and bodies are computed. They agree well with experimental tests. (Author)

A82-11400 **A note on fatal aircraft accidents involving metal fatigue.** G. S. Campbell (National Aeronautical Establishment, Ottawa, Canada). *International Journal of Fatigue*, vol. 3, Oct. 1981, p. 181-185. 6 refs.

A world-wide survey of aircraft accidents was taken to determine the extent to which metal fatigue is responsible for the incidents. A total of 306 fatal accidents since 1934 were found to be either wholly or partially due to metal fatigue; these accidents resulted in 1803 deaths. Two-thirds of the accidents involved fixed-wing iarcraft, with wing failure (88 accidents) being the most common cause, followed by engine failure (56 accidents). Of the 90 fatal helicopter accidents, about a third were due to failure of the main-rotor system, and a quarter were due to tail-rotor failure. Over the last four years there has been an average of 18 fatal accidents per year resulting from metal fatigue; about 11 have been for fixed-wing aircraft and seven have been for helicopters. Thirteen accidents were attributed to a failure to increase the inspection frequency required for aircraft used in a role for which they were not originally designed. J.F.

A82-11406 **A mathematical model of an over-sea airborne UHF radio link.** T. Slator. *Marconi Review*, vol. 44, 2nd Quarter, 1981, p. 101-118. 9 refs.

A mathematical model is described which enables the performance of an over-the-sea airborne UHF radio link to be estimated as a function of terminal height and separation distance taking account statistically of variations of signal level caused by such factors as irregular antenna radiation patterns and a rough sea surface. (Author)

A82-11407 **Optical sensors for displacement measurement.** S. M. McGlade. *Marconi Review*, vol. 44, 2nd Quarter, 1981, p. 119-136. 7 refs.

A measurement system consists of sensors which are connected to a control center. The use of fiber optics as the communications link has a number of advantages. Two of the most important are immunity from electromagnetic interference and the elimination of the danger of electrical sparking in explosive environments. These advantages are reduced by the necessity to use electrical devices in the sensors. If the sensors were wholly optical then the advantages of fiber optics would apply to the entire system outside the control center. Optical sensors will be difficult to develop. Initially, at least, they are only justified in applications where such methods are becoming essential. One such area is in military aircraft. An optical displacement transducer can be obtained by using the displacement to alter the transmission aperture of a light beam. Attention is also given to strain measurement using two beam interferometry, Fabry-Pérot interferometry displacement measurement, and strain induced birefringence. G.R.

A82-11434 **End losses in turbine cascades with porous cooling.** V. M. Epifanov and V. I. Gus'kov. *(Aviatsionnaia Tekhnika*, no. 3, 1980, p. 46-49.) *Soviet Aeronautics*, vol. 23, no. 3, 1980, p. 38-41. 7 refs. Translation.

Experimental results on porous-cooled turbine blades are presented and discussed. Exit losses in the blades are found to depend on coolant flowrate and the degree of roughness of the porous surface. B.J.

A82-11444 **Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine.** Z. V. Akhtiamov and M. Sh. Giliazov. *(Aviatsionnaia Tekhnika*, no. 3, 1980, p. 101-103.) *Soviet Aeronautics*, vol. 23, no. 3, 1980, p. 87-89. Translation.

A82-11446 **Results of experimental study of heat transfer to turbine blades with porous cooling.** S. G. Dezider'ev, A. G. Karimova, and V. I. Lokai. *(Aviatsionnaia Tekhnika*, no. 3, 1980, p. 109-112.) *Soviet Aeronautics*, vol. 23, no. 3, 1980, p. 97-99. 8 refs. Translation.

A82-11448 **One reason for the onset of high-frequency self-excited oscillations.** V. P. Pavlovskii. *(Aviatsionnaia Tekhnika*, no. 3, 1980, p. 116-118.) *Soviet Aeronautics*, vol. 23, no. 3, 1980, p. 104-106. 5 refs. Translation.

Experiments have been carried out to investigate generation mechanisms of high-frequency auto-oscillations resulting from an increase in the pressure differential across the combustion chamber injectors of a flight vehicle engine. It is found that a possible reason for the onset of the high-frequency auto-oscillations is breakdown of the annular gas cavity in the oxidizer injector nozzle which initiates unstable combustion due to the vapor phase removal. V.L.

A82-11459 **Calculation of aerodynamic characteristics of jet flapped airplane.** V. G. Akent'ev and V. V. Guliaev. *(Aviatsionnaia Tekhnika*, no. 4, 1980, p. 3-6.) *Soviet Aeronautics*, vol. 23, no. 4, 1980, p. 1-4. Translation.

A numerical method is developed for calculating the steady-state aerodynamic characteristics of an aircraft with jet flaps. The flow past the aircraft and the jet are modeled as a system of oblique horseshoe-shaped vortices, and the problem is solved in the linear formulation for an incompressible medium. B.J.

A82-11462 **On low-speed wind tunnels with deformable boundaries.** A. A. Gruzdev. *(Aviatsionnaia Tekhnika*, no. 4, 1980, p. 23-26.) *Soviet Aeronautics*, vol. 23, no. 4, 1980, p. 18-20. 7 refs. Translation.

Attention is given to the development of self-streamlining or self-correcting wind tunnels. Linear theory under the assumption of potential flow is used to study the shape of streamline surfaces near a wing of finite aspect ratio moving near a screen. The characteristics of flow macrostructure in the wake are analyzed; and it is shown that, in contrast to the case of two-dimensional flow, it is not possible to streamline the walls of the tunnel in the absence of a vortex wake in the case of three-dimensional flow. B.J.

A82-11463 **Basic problem of aircraft gasturbine engine analytic design. II.** Iu. V. Kozhevnikov, V. O. Borovik, V. S. Ivanov, V. A. Talyzin, I. N. Agliullin, and Iu. V. Meluzov. *(Aviatsionnaia Tekhnika*, no. 4, 1980, p. 27-32.) *Soviet Aeronautics*, vol. 23, no. 4, 1980, p. 21-24. Translation.

The paper presents results of the analytical optimization of the basic thermogasdynamic parameters of the cycle and the characteristic areas of the air path of a turbojet bypass engine; the optimization criterion is minimum engine-mass and minimum fuel required for a given flight distance. The multimode character of engine operation is analyzed. B.J.

A82-11464 **Formation of triangular-element stiffness matrix using sliding interpolation.** P. D. Levashov. *(Aviatsionnaia Tekhnika*, no. 4, 1980, p. 33-37.) *Soviet Aeronautics*, vol. 23, no. 4, 1980, p. 25-28. Translation.

The paper examines the use of sliding interpolation to construct the stiffness matrix of triangular elements of flat rib-stiffened panels. This approach makes it possible to raise the order of the displacement field by employing computational parameters from adjacent elements without increasing the total number of unknowns. A computational example is discussed. B.J.

A82-11465 **On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment.** A. I. Matiazh, V. A. Sterlin, A. B. Kuznetsov, V. V. Isaev, A. A. Shapiro, and E. M. Ksenofontova. *(Aviatsionnaia Tekhnika,* no. 4, 1980, p. 38-42.) *Soviet Aeronautics,* vol. 23, no. 4, 1980, p. 29-32. 5 refs. Translation.

Equipment for the suspension and control of leading and trailing flaps was tested in a low-speed wind tunnel. The influence of the control mechanisms, and, of their positions along the wing span and in the cross section, on the integral aerodynamic characteristics of a rectangular wing was evaluated. It is found that local disturbances of flow past leading and trailing flaps produce a significant reduction of lift and an increase of drag. B.J.

A82-11468 **On the use of carbon composites in slat and stabilizer construction.** B. N. Kornev, R. I. Guseva, and V. A. Tikhomirov. *(Aviatsionnaia Tekhnika,* no. 4, 1980, p. 72-74.) *Soviet Aeronautics,* vol. 23, no. 4, 1980, p. 59, 60. Translation.

Glass-graphite-plastic composite materials were used in the construction of aircraft deflectors and stabilizers. This paper reviews the details of construction, and examines static-load testing results for both deflector and stabilizer. B.J.

A82-11469 **Synthesis of system for evaluating gyrostabilizer state with unknown disturbances.** A. A. Leporskii. *(Aviatsionnaia Tekhnika,* no. 4, 1980, p. 74-76.) *Soviet Aeronautics,* vol. 23, no. 4, 1980, p. 61-63. Translation.

A82-11470 **On the question of trailing airplane motion.** A. A. Novad. *(Aviatsionnaia Tekhnika,* no. 4, 1980, p. 79-81.) *Soviet Aeronautics,* vol. 23, no. 4, 1980, p. 67, 68. Translation.

Equations are derived for the three-dimensional motion of an aircraft and are solved analytically for the initiation of banking flight. The solution describes the effect of the specific wing load on the normal acceleration overloading of the aircraft. It is noted that the danger of a spin increases with increasing specific load. B.J.

A82-11471 **Experimental study of empennage snap-through vibrations.** V. A. Pavlov, F. Sh. Khakimullin, A. Ia. Gur'ianov, and M. I. Gershtein. *(Aviatsionnaia Tekhnika,* no. 4, 1980, p. 81-84.) *Soviet Aeronautics,* vol. 23, no. 4, 1980, p. 69-71. 5 refs. Translation.

The snap-through oscillations of a rectangular-planform empennage model were studied in a subsonic wind tunnel. The aim of the study was to isolate the snap-through oscillations from all other possible oscillations in the flow. An analysis of changes of the normal and frontal curvatures of the control surface demonstrate the occurrence of snap-through oscillations. The frontal curvature falls to practically zero in the case of static snap-through. B.J.

A82-11686 **Fatigue life of lugs under service loading - Test results and predictions.** A. Buch and A. Berkovits (Technion - Israel Institute of Technology, Haifa, Israel). *Materialprüfung,* vol. 23, Oct. 1981, p. 344-348. 27 refs.

Aircraft pin-lug joints with and without interference fit were tested in maneuver loading programs with random loading sequence in order to investigate the effect of design load, lug material and interference fit on the spectrum fatigue life. An interference fit of 0.3% had a strong beneficial effect on the fatigue life for all loading programs, even when local tensile stress peaks exceeded the material yield stress. The spectrum fatigue life of 2024-T351 lug specimens was longer than that of 7075-T7351 specimens, except under the most severe loading program. Test results were compared with predictions based on the Miner's rule, the relative Miner rule, and the Neuber-Topper notch analysis method. The relative Miner rule was superior to the conventional rule in predicting the spectrum fatigue life of aircraft lugs; the Neuber-Topper notch analysis method was shown to have some application for the prediction of the effect of design load on the fatigue life of lugs with interference fit, but for the case of lugs without interference fit, predicted and test results disagreed completely. The disagreement is explained by the effect of fretting. J.F.

A82-11715 # **New separators for battery systems.** J. Lee and V. D'Agostino (RAI Research Corp., Hauppauge, NY). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1 New York, American Society of Mechanical Engineers, 1981, p. 111-116.

The reported study takes into consideration separators for miniature cells, such as silver/zinc button cells, and separators for aircraft nickel/cadmium batteries. It is pointed out that separators for energy systems having an aqueous electrolyte, either acid or basic, can be prepared by selective modification of radiation grafting parameters. A new family of separators, known as the 'SC' series, has been developed. The SC separators have very uniform electrolytic resistance, excellent mechanical strength, and lower cost. General improvements in battery service life could be observed as a result of the introduction of the grafted separators. The cycle life of vented aircraft Ni/Cd batteries could be extended three to four times. G.R.

A82-11716 # **Sealed lead-acid batteries for aircraft applications.** K. L. Senderak and A. W. Goodman (U.S. Navy, Naval Weapons Support Center, Crane, IN). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 117-122.

In the 1970's, an important advance in lead-acid battery technology occurred with the introduction of sealed, no-maintenance, lead-acid batteries. A description is given of a wide variety of studies and tests conducted to evaluate the suitability of the new batteries for employment in Navy aircraft. The results show that the sealed lead-acid (SLA) cells can be successfully used in a potentially large number of aircraft applications, where very high-rate discharge performance is not required. The Navy is actively pursuing the SLA battery for these applications to substantially reduce the Navy's overall battery procurement and maintenance costs, and to improve reliability. G.R.

A82-11717 # **Applications of finite element method in aerospace power systems design.** E. U. A. Siddiqui. In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 123-126.

Complex power systems are needed to satisfy the exacting power requirements of current avionic systems. A suitable tool for the design of such power systems is finite element analysis, based on the principle of minimization of total potential energy. This technique is being successfully used to eliminate excess weight and to accurately predict stresses and resonant frequencies. The new method was used to conduct an analysis in connection with a problem related to the occurrence of severe vibrations in a 30,000 rpm generator. The analysis had the objective to determine the effects of modifications made to the generator frame. It was found that the resonant frequency could be raised above the operational speed of the generator by introducing suitable modifications to the design of the frame. G.R.

A82-11718 # **Advanced aircraft electric power system.** J. D. Segrest (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 127-129.

The Advanced Aircraft Electric Power System is to increase fuel efficiency and reduce life cycle costs. The system includes 270 volt DC generators, solid state regulation, flat bus distribution, solid state switching, digital multiplex control and protection of power distribution through a system algorithm, and switching regulator power conditioning. A description is presented of the system concept, the hardware development, and the status of the Navy program. A high voltage DC power system development had been initiated by the Navy to exploit the advantages of high-voltage DC operation for future aircraft. G.R.

A82-11719 # **Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership.** R. V. Hildebrant and R. C. VanNocker (General Electric Co., Aircraft Equipment Div., Binghamton, NY). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 130-135. 5 refs.

The methodology employed in the development of the electrical generating system for the F/A-18 aircraft is considered. This system was the first production application in which the cycloconverter electronics were packaged with the generator and mounted directly to the accessory gearbox. Being the first production system of this type, a detailed and comprehensive analysis and evaluation program was undertaken to provide assurance that the design could operate with a high degree of reliability in this generally hostile environment. A primary maintainability design objective was related to the design and the selection of parts and materials which would last for the life of the unit without scheduled maintenance. Attention is given to maintenance cost experience and life cycle costs. G.R.

A82-11720 # **A hidden advantage of permanent magnet electrical generating systems.** J. J. O'Neill (General Electric Co., Binghamton, NY). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 136-139. 7 refs. USAF-supported research.

The development of permanent magnet aircraft electrical generating systems heralds the beginning of a new era. This technique brings many advantages to the user in terms of size, weight and reliability. However, the most significant of these advantages is the extremely high efficiency which is characteristic of these systems. This paper examines the effect of the higher system efficiency on the user, specifically in the area of aircraft fuel consumption. Driven by rising fuel costs, engine and aircraft manufacturers are striving for more efficient performance to minimize life cycle costs. The results of a study which examines the effect of several permanent magnet ratings on different aircraft sizes are presented. (Author)

A82-11721 # **60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics.** R. C. Webb (General Electric Co., Binghamton, NY). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 140-145. Contracts No. F33615-78-C-2200; No. F33615-74-C-2037.

A description is presented of a Variable Speed Constant Frequency (VSCF) system, which consists of a cycloconverter with a synchronous generator that uses samarium cobalt magnets for its excitation. As part of its normal operation, the converter regulates each output wave in frequency and in voltage providing the necessary voltage regulation for a permanent magnet (PM) generator. The cycloconverter is capable of reverse power flow and the PM generator has the necessary excitation at standstill to make it possible to run the system as a brushless starter. Attention is given to the phases of the development program, system operation, start mode operation, and test results. It is pointed out that the PM VSCF system offers a significant improvement in electrical generating system efficiency over presently used systems. G.R.

A82-11725 # **Unsolved problems of nickel cadmium batteries.** S. Gross (Boeing Aerospace Co., Seattle, WA). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 177-181. 8 refs.

A number of problems occurring with nickel cadmium battery systems are primarily important for aerospace applications, where reliable, long life is essential. Some of the problems are related to the design of plaques to obtain a large capacity and a long operational life. Other subjects investigated are nickel electrode morphology changes, nickel electrode cycling degradation, and the effects of cadmium migration. It is found that more work is needed for a better understanding of the various factors involved. The development of a computerized mathematical model of the nickel cadmium cell is suggested. The effects produced by electrode additives are also discussed. G.R.

A82-11740 # **High voltage surge and partial discharge test to evaluate aerospace equipment parts.** W. G. Dunbar (Boeing Aerospace Co., Seattle, WA) and D. Schweickart (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: Intersociety Energy Conversion Engineering Conference, 16th, Atlanta, GA, August 9-14, 1981, Proceedings. Volume 1. New York, American Society of Mechanical Engineers, 1981, p. 250-254.

Eight test articles were selected for high voltage evaluation to verify the specifications. The test articles represent critical components of a high-voltage, high-power airborne system. A description is presented of the findings of these tests in the case of the capacitors. Each capacitor was given preliminary tests to determine insulation resistance at 100 volts dc, and the capacity using a standard ASTM capacitance bridge at low voltage. It was found that the insulation resistance and capacitance test methods and parameters are acceptable. The partial discharge and dielectric withstanding voltage and surge test methods are acceptable, but the test parameters for airborne capacitors must be lower than those specified for commercial capacitors. G.R.

A82-11890 **Increasing the lift:drag ratio of a flat delta wing.** A. A. Mattick and J. L. Stollery (Cranfield Institute of Technology, Cranfield, Beds., England). *Aeronautical Journal,* vol. 85, Oct. 1981, p. 379-386.

Increases in the lift/drag (L/D) ratio attained by placing flaps on the upper surface of a flat, 60 deg, small aspect ratio delta wing are reported. The flaps were positioned along a ray from the vertex of the wing; their height, increasing from the vertex to the trailing edge, was a percentage of the semispan, and they were hinged at the lower edge. Position and heights were varied and lift and drag forces were measured over a range of angles of attack. The flaps were found to cause a lift force to act on themselves, up to a height of 6.1% of the semispan, by causing air from the primary vortex core to separate and form a vortex on the outboard side of the flaps. A maximum increase of 33% in the L/D was determined and it is noted that all the vertical flaps tested produced a positive thrust force. Graphs are provided of the derived aerodynamic ratios. M.S.K.

A82-11927 # **Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems.** P. Lloret, X. Lagarde, and G. Lavoipierre (Société d'Applications Générales d'Electricité et de Mécanique, Paris, France). In: Symposium Gyro Technology 1980; Proceedings of the Symposium, Stuttgart, West Germany, September 24, 25, 1980. Düsseldorf, Deutsche Gesellschaft für Ortung und Navigation, 1981, p. 1.0-1.25.

Results of verification tests to determine if gyrocompass mechanization can be used to find true headings within 0.5 deg in less than two minutes for helicopter navigation are presented. A strapdown inertial-Doppler navigation system which uses a pair of two-axis tuned rotor gyroscopes is described. The high accuracy of mechancial gyroscopes is attributed to the repeatability of the thermal behavior of tuned rotor gyroscopes. The gyros were temperature measured externally and in the instrument block, and correlations were sought between temperatures and drift patterns. Although true correlations were necessarily synthetic, drift rates of 15 deg/hr were reduced to 0.5 deg/hr peak residual drifts, confirming the potential use of 0.5 deg accuracy, two minute true heading mechanical gyroscopes as a complement to magnetic headings. M.S.K.

A82-11932 # **Design and development of a low cost servoed rate gyro for unmanned aircraft.** D. R. McKenzie (Smiths Industries Aerospace and Defence Systems Co., Cheltenham, Glos., England). In: Symposium Gyro Technology 1980; Proceedings of the Symposium, Stuttgart, West Germany, September 24, 25, 1980. Düsseldorf, Deutsche Gesellschaft für Ortung und Navigation, 1981, p. 14.0-14.56.

The development of a low cost rate gyro for use in unmanned vehicles is presented. The design parameters for the low weight gyro, which has an input range of plus or minus 50 deg/sec and can operate from a low voltage dc power source are outlined. A conventional design, comprising a spinning rotor on a gimbal with torque restraint and dynamic damping, was chosen to minimize cost and time; a feedback approach was adopted to maintain performance stability. A rotational speed of 10,000 rpm with a polar moment of inertia of 20 g/sq cm was selected. The pick-off, torque motor, servoamplifier, and plastic molding are discussed and performance figures for 25 gyros are presented. A pulsed motor circuit was developed to maintain motor speed within 7% of the set value over the operating temperature range; elimination of a wheel speed control improved nonlinearity and reduced costs. Circuitry diagrams and schematics are provided. M.S.K.

A82-11933 # **Design considerations for the direct digital control of dry-tuned gyroscope.** S. N. Puri (Indian Space Research Organization, Vikram Sarabhai Space Centre, Trivandrum, India). In: Symposium Gyro Technology 1980; Proceedings of the Symposium, Stuttgart, West Germany, September 24, 25, 1980. Düsseldorf, Deutsche Gesellschaft für Ortung und Navigation, 1981, p. 15.0-15.25.

The use of direct digital processor control of dry-tuned gyros is examined. Direct control is implemented because of a finite processing time lag between input and output, and is aided by minimizing the computation time by compensating for the effects of rounding coefficients in the control algorithm. The minimum settling time is discussed analytically and a design is developed that reduces complexity in the control function, offers lower torque demands, and has acceptably small steady state error. A retarded response is mentioned, and the use of a digital processor is found to add delays in the rebalance loops, requiring specific positioning of zeroes in the determinant of the pulse transfer function. An example is given, noting that pick-off noise at the spin frequency or its harmonics can be eliminated by use of a notch filter. Finally, a compromise is viewed as possible if slightly increased overshoot and settling time are found acceptable with a prescribed computing delay. M.S.K.

A82-11934 **Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980.** Symposium sponsored by the Royal Aeronautical Society and Institution of Electrical Engineers. London, Royal Aeronautical Society, 1981. 72 p.

Papers presented at the symposium provide an overview of the current status of digital avionic systems with emphasis on the practical experience in operating these systems, achievements and problems, and advanced technologies available. Topics discussed include: the influence of digital techniques on system architecture, certification of digital systems, the all digital military aircraft, and an airline's experience in the field. V.L.

A82-11937 # **The all digital military aircraft.** D. Roughton (British Aerospace Public, Ltd., Co., Brough, England). In: Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980. London, Royal Aeronautical Society, 1981. 14 p.

Developments in avionic systems over the past two decades are reviewed. The main factor that emerges is the conflict between the increasing complexity required to meet operational demands and the need for simplicity of operation to ease the workload of the reduced aircrew. In future aircraft, as the number and type of systems continue to grow, system integration and system automation are essential to ensure that the pilot workload is kept at an acceptable level. V.L.

A82-11938 # **The digital civil aircraft.** J. F. Moore (British Aerospace Public, Ltd., Co., Aircraft Group Div., Bristol, England). In: Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980. London, Royal Aeronautical Society, 1981. 16 p.

The development of digital avionics is reviewed with particular reference to application in civil aircraft. Examples of in-service systems in which digital technology has been already implemented are examined, including inertial navigation systems, aircraft integrated data systems/accident data recording, multiplexing systems, and the air intake control system of Concorde. Attention is given to the potential benefits of new applications, current developments, practical aspects, and implications of functional integration. Finally, future applications are discussed such as full digital engine control and flight controls (fly-by-wire system). V.L.

A82-11940 # **The certification of digital systems.** D. J. Hawkes (Civil Aviation Authority, London, England). In: Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980. London, Royal Aeronautical Society, 1981. 12 p. 9 refs.

The present situation in the field of airworthiness certification of digital systems is reviewed and the future certification task is examined with emphasis on safety-critical applications. It is shown that the existing certification requirements are adequate for the new generation of digital systems. For the foreseeable future, the certification task will be very similar to that currently undertaken and will involve performance verification, environmental testing, and safety analyses. The certification task will be refined and judgement will be improved as the weaknesses and peculiarities of digital systems are exposed. V.L.

A82-11941 # **Digital avionics systems - The RAF experience.** B. J. Hunter (RAF, London, England). In: Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980. London, Royal Aeronautical Society, 1981. 6 p.

The RAF's practical experience in operating digital avionic systems is reviewed with reference to a computer-based navigation and attack system that forms part of a pilot/aircraft control loop for navigation, weapon aiming, and flight direction installed on Jaguar aircraft. The system has proved to be flexible and reliable; modifications of the system can now be accomplished by a software, rather than hardware, change; and the first and second line testing has been reduced. The software maintenance practice and management are discussed in detail. V.L.

A82-11942 # **Digital avionics: Promise and practice - An airlines experience in the field.** J. E. Mills (British Airways, Hounslow, Middx., England). In: Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980. London, Royal Aeronautical Society, 1981. 4 p.

The British Airways experience with digital avionic systems is reviewed with regard to the initial expectations, achievements, and maintenance and engineering problems encountered. It is shown that the introduction of digital systems into civil aviation did not produce the promised increase in reliability, the self test results being particularly disappointing. However, no maintenance problems of any great significance have been encountered. It is expected that the use of custom LSI and microprocessors will diminish problems previously associated with hardware and will provide improved reliability and more competent self test and monitoring, leading to improved first line servicing. V.L.

A82-11997 # **The CIVIC - A concept in vortex induced combustion.** H. J. R. Shekleton (Solar Turbines International, Turbomach Div., San Diego, CA). *(American Society of Mechanical Engineers, International Gas Turbine Conference, Houston, TX, Mar. 8-12, 1981, Paper 81-GT-12.) ASME Transactions, Journal of Engineering for Power*, vol. 103, Oct. 1981, p. 708-717. 34 refs.

The development of vortex induced combustion is reviewed, noting that the modelling is based on convective processes in unequally heated adjacent air masses. The aerodynamics of vortex flow are analytically examined, and reaction criteria in gas turbine and reciprocating engine vortex combustors are presented. Buoyant mixing to achieve fast, near constant volume combustion in diesel engines is described for two cases. Use of a rotating cup fuel injector in a 10 kW gas turbine to provide good atomization with viscous fluids, even in arctic conditions, is discussed, including a new design feature which avoids injecting the fuel mist into the swirl air. Test results and schematics are presented of various applications, stressing the ability of vortex induced combustion to display efficiencies with standard liquid fuels usually obtained only with natural gas. M.S.K.

A82-11999 * # **Thermal expansion accommodation in a jet engine frame.** M. H. Schneider (General Electric Co., Cincinnati, OH). *(American Society of Mechanical Engineers, Gas Turbine Conference and Products Show, Houston, TX, Mar. 9-12, 1981.) ASME Transactions, Journal of Engineering for Power*, vol. 103, Oct. 1981, p. 776-780. Contract No. NAS3-20643.

Design advancements to enhance stress accommodation in gas turbine engine frames are described. Consideration is given to mechanical stiffness to maintain an adequate spring rate, and to thermal stresses in both ambient and transient modes. Noting that thermal stresses occur due to differing temperatures at different parts of the frame, the matching of the thermal expansion rates of different structural materials is emphasized. Adequate stiffness is necessary to avoid dynamic reactions leading to case cracking as a result of normal imbalances of moving parts. Stress and deflection analysis of a total frame concept using a three-dimensional finite element stress analysis computer program, with modelling of all frame components, is presented, and illustrations are provided. M.S.K.

A82-12021 † **Jet fuel from carbon (Reaktivnoe toplivo iz uglia).** A. A. Krichko, M. K. Iulin, A. C. Arifulin, T. C. Nikiforova, and V. A. Puchkov (Akademiia Nauk SSSR, Institut Goriuchikh Iskopaemykh, Moscow, USSR). *Khimiia i Tekhnologiia Topliv i Masel,* no. 9, 1981, p. 3-5. 8 refs. In Russian.

A jet fuel of the T-8V type has been obtained by isomerization and hydrogenation at 4 MPa of the hydrorefined 180-320 C fraction of a liquid-phase carbon hydrogenation product. The flow scheme and the material balance of the process are presented. V.L.

A82-12022 † **A protective additive for jet fuels (Zashchitnaia prisadka k reaktivnym toplivam).** O. P. Lykov, G. I. Shor, V. P. Lapin, V. V. Sashevskii, and L. I. Mosina (Moskovskii Institut Neftekhimicheskoi i Gazovoi Promyshlennosti, Moscow, USSR). *Khimiia i Tekhnologiia Topliv i Masel,* no. 10, 1981, p. 37-40. 6 refs. In Russian.

A study has been carried out to investigate the protective action of an additive to jet fuels which consists of a mixture of dimers and trimers of synthetic fat acids. Results indicate that there exists a correlation between changes in the protective properties of the fuel as a function of the additive content, on the one hand, and changes in certain electrophysical characteristics of the fuel (e.g., conductivity, contact potential difference change, and electrifiability), on the other hand. V.L.

A82-12025 * **Design predictions for noise control in the cryogenic National Transonic Facility.** W. S. Lassiter (NASA, Langley Research Center, Hampton, VA). *Noise Control Engineering,* vol. 17, Sept.-Oct. 1981, p. 76-84. 6 refs.

Noise control in the National Transonic Facility - a cryogenic wind tunnel - has been examined in terms of acoustical design criteria, drive-fan noise and exhaust system noise. A duct lining with two layers of perforated sheeting and a gas-filled honeycomb core was selected for attenuating drive-fan noise. With the exception of attenuation peaks, attenuation of the lining was found to experimentally agree with predicted values at 20 C air temperatures. Exhaust system noise will be attenuated with a large muffler used in conjunction with a 6.1-m high acoustical enclosure. Fan noise from the fan-ejector system will be attenuated by fan silencers and the acoustic enclosure. S.C.S.

A82-12026 **Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980.** Conference sponsored by the American Society of Mechanical Engineers. Edited by J. R. Vinson (Delaware, University, Newark, DE). New York, American Society of Mechanical Engineers, 1980. 333 p. $20.

Topics discussed include the emerging technologies in composite materials structures, in materials, and in structural dynamics, shock and impact. Particular attention is given to impact-initiated damage thresholds, adhesively bonded joints in composites, stress concentrations in bonded multilayer stiffened strips and base plates, and the fatigue life of coldworked holes. Consideration is also given to the response of nonlinear aircraft structural panels to high intensity noise, the dynamic numerical analysis of crack initiation, fast crack propagation and crack arrest, and the energy release rate of a penny-shaped crack at the fiber-end of a composite. J.F.

A82-12028 * # **Impact-initiated damage thresholds in composites.** A. V. Sharma (North Carolina Agricultural and Technical State University, Greensboro, NC). In: Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980. New York, American Society of Mechanical Engineers, 1980, p. 11-26. 10 refs. Grant No. NsG-1296.

An experimental investigation was conducted to study the effect of low velocity projectile impact on the sandwich-type structural components. The materials used in the fabrication of the impact surface were graphite-, Kevlar-, and boron-fibers with appropriate epoxy matrices. The testing of the specimens was performed at moderately low- and high-temperatures as well as at room temperature to assess the impact-initiated strength degradation of the laminates. Eleven laminates with different stacking sequences, orientations, and thicknesses were tested. The low energy projectile impact is considered to simulate the damage caused by runway debris, dropping of the hand tools during servicing, etc., on the secondary aircraft structures fabricated with the composite materials. The results show the preload and the impact energy combinations necessary to cause catastrophic failures in the laminates tested. A set of faired curves indicating the failure thresholds is shown separately for the tension- and compression-loaded laminates. The specific-strengths and -moduli for the various laminates tested are also given. (Author)

A82-12039 # **Coupled fluid/structure response predictions for soft body impact of airfoil configurations.** J. J. Engblom (United Technologies Corp., Government Products Div., West Palm Beach, FL). In: Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980. New York, American Society of Mechanical Engineers, 1980, p. 209-223. 8 refs. Research supported by the United Technologies Corp.

Jet engine overhaul costs related to foreign object damages (FOD) are a significant concern in aircraft operations. Present FOD design systems, however, are not applicable to advanced airfoil configurations. An analytical design tool has therefore been developed to improve the FOD response prediction capability for the soft body impact of metal or composite fan blades, and is implemented by a finite element computer code. The basic approach involves coupling a fluid loading model with a structural model for the blade. Iterative effects are included in the solution, i.e., applied loads are a function of the structural response. Solutions include the effects of large displacement (geometric) and material (inelastic) nonlinearities. The code is also modified to treat the response of hybrid composite materials, demonstrating its capability to meet impact response predictions for complex metal or composite airfoil configurations. It is concluded that the analysis can be used to support the design of future high tip speed FOD-tolerant fan blades. J.F.

A82-12041 # **Response of nonlinear aircraft structural panels to high intensity noise.** C. Mei (Old Dominion University, Norfolk, VA). In: Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980. New York, American Society of Mechanical Engineers, 1980, p. 245-272. 17 refs. Contract No. F49620-79-C-0169.

Design methods and design criteria for sonic fatigue prevention have been developed based on analytical and experimental techniques. This paper presents an analytical method for predicting the response of rectangular nonlinear structural panels subjected to broadband random acoustic excitation. The formulation is based on the Karman-Herrmann large deflection plate equations, a single-mode Galerkin approximation, the equivalent linearization method, and an iterative procedure. Both simply-supported and clamped-support conditions with immovable or movable inplane edges are considered. Panel mean-square deflection, maximum mean-square stress, and equivalent linear frequency at various acoustic loadings are determined and presented in graphical form. The results obtained were shown to agree well with experimental ones, and suggestions for further research are given. J.F.

A82-12043 # **Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra.** E. J. Ferko (Lockheed-Georgia Co., Marietta, GA). In: Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980. New York, American Society of Mechanical Engineers, 1980, p. 285-294. 6 refs.

The random and independent nature of shear and axial stresses due to gust sources poses a complex problem for the structural analysis of cracks emanating from fastener holes in spanwise and beam-web splices of a transport aircraft wing. A practical engineering solution to the shear/axial stress interaction problem was developed for the C-5A wing, and a box beam test program was conducted to evaluate the solution. The evaluation was accomplished by comparing crack propagation rates generated by testing flight measured real time histories (RTH) with the engineering solution (referred to as the Equivalent Analytical Representation spectra). The baseline RTH spectra consisted of loads data recorded during dynamic response flight testing. The EAR spectra was derived from the aforementioned RTH data and was analytically developed utilizing peak counting methods and the empirical shear/axial stress interaction solution. Fractographic correlation of numerous cracks indicated that the EAR spectra adequately simulated the random nature of shear and axial stresses in the RTH data. (Author)

A82-12045 # **Numerical treatment of helicopter rotor stability problems.** R. Vepa and T. S. Balasubramanian (National Aeronautical Laboratory, Bangalore, India). In: Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980. New York, American Society of Mechanical Engineers, 1980, p. 307-319. 14 refs. Research supported by the Ministry of Defence.

The problem of calculating the Floquet transition matrix for parametric stability problems is considered. A new method of calculating the transition matrix with a minimum number of time steps is described. The method is shown to be extremely efficient for a wide class of helicopter stability problems, including flapping stability of a helicopter rotor, helicopter ground resonance with a nonisotropic rotor and pitch-flap-bending stability of a helicopter rotor in forward flight. The relationship of the method to the classical method of averaging is pointed out. (Author)

A82-12048 **ACMA - Fact or fantasy.** W. T. Mikolowsky and W. A. Garrett (Lockheed-Georgia Co., Marietta, GA). *Lockheed Horizons,* Fall 1981, p. 2-12.

The feasibility of the advanced civilian/military aircraft (ACMA) for use as both an advanced military airlift vehicle and a commercial airfreighter is discussed. A partnership in development between government and industry is expressed as necessary to reduce costs through larger production quantities, to increase emergency airlift capabilities in the Civil Reserve Air Fleet, and commercial maintenance of military aircraft. Design options and requirements are presented along with timetables, showing production delivery to commence in 1994. Topics such as commercial need, energy use, engine design, and financial planning are examined, with emphasis on system features that enhance the commercial attractiveness of the vehicle. A preliminary configuration shows a payload capability of 390,000 lbs with a fuel efficiency 50% better than that of the 747-200F. M.S.K.

A82-12049 **History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1.** R. J. Gatineau (Lockheed-California Co., Palmdale, CA). *Lockheed Horizons,* Fall 1981, p. 14-29.

A82-12087 # **Considerations and applications for the use of fluidics in aerospace controls.** T. G. Sutton (AiResearch Manufacturing Company of Arizona, Phoenix, AZ). In: 20th Anniversary of Fluidics Symposium, Chicago, IL, November 16-21, 1980, Proceedings. New York, American Society of Mechanical Engineers, 1980, p. 73-79. 6 refs.

Fluidics technology has been considered for use in controls in aerospace environments in order to obtain reliable and cost-effective systems. While many applications involving fluidics have been in production for several years, there have been a number of failures while attempting to apply fluidics technology to aerospace applications. Because of this, fluidic techniques must be very carefully evaluated for any application before being considered as the most desirable technology to be used. An overview is given of design parameters which must be given due consideration by the fluidic system designer. Included are the interfacing of the technology with other system components. Case histories of three fluidic control applications are cited. C.R.

A82-12100 **Quantification of the thermal environment for externally carried aircraft stores and ordnance.** H. Schafer and I. Barbe (U.S. Naval Weapons Center, China Lake, CA). *Journal of Environmental Sciences,* vol. 24, Sept.-Oct. 1981, p. 23-26.

Thermal testing procedures for aircraft external stores and ordnance are discussed, noting the importance of considering the entire range of possible thermal environments for each tested component. A method is proposed in which necessary parameters of environmental variables such as aircraft speed, altitude, air temperature, and amount of fuel available are considered in terms of percentiles. A Gaussian distribution is assumed for each environmental range, enabling for example, the elimination of extreme high and low flight speeds from average environment estimates. Use of the Arnold Research and Development Center standard atmosphere was found to be preferrable for engineering considerations because of inherent biasing errors in the MIL-STD-210 hot and cold data atmosphere. Techniques of cross-correlating environmental percentiles are defined, and it is emphasized that thermal gradients cause the greatest hardware performance degradation. M.S.K.

A82-12107 # **The dispersion of drop sizes in gas turbine fuel nozzle sprays.** D. L. Markham (Ex-Cell-O Corp., Walled Lake, MI). In: Fluid mechanics of combustion systems; Proceedings of the Fluids Engineering Conference, Boulder, CO, June 22, 23, 1981. New York, American Society of Mechanical Engineers, 1981, p. 95-100. 6 refs.

The dispersion of drop sizes in sprays as produced by gas turbine fuel nozzles was studied by conducting a large number of tests on several fuel nozzle sprays using a Malvern ST1800 Particle and Droplet Size Distribution Analyzer. It is found that the size dispersion of a spray depends on the location where the spray cloud is sampled, nozzle type, and nozzle operating condition. It is concluded that to fully specify the drop size characteristics of a gas turbine fuel nozzle spray, not only must the mean drop size of the drop size distribution be reported, but also the drop size dispersion. P.T.H.

A82-12118 # **Application of numerical modeling to gas turbine combustor development problems.** G. J. Sturgess, S. A. Syed, and D. Sepulveda (United Technologies Corp., Commercial Products Div., East Hartford, CT). In: Fluid mechanics of combustion systems; Proceedings of the Fluids Engineering Conference, Boulder, CO, June 22, 23, 1981. New York, American Society of Mechanical Engineers, 1981, p. 241-250. 23 refs.

The effects of dome cooling air changes in an experimental combustor for a large, turbofan gas turbine engine are investigated by means of perturbation studies carried out with numerical modeling. Two geometrical configurations are examined at high engine power levels, and calculated changes in the flow fields are compared with evidence obtained from experimental engines. Changes in dome and liner pressure drops are observed with severe dome distress in one of the configurations. It is concluded that the combustor simulations are qualitatively correct and have satisfactory quantitative agreement without requiring exact geometrical representations. D.L.G.

A82-12120 * # **On the prediction of swirling flowfields found in axisymmetric combustor geometries.** D. L. Rhode, D. G. Lilley, and D. K. McLaughlin (Oklahoma State University, Stillwater, OK). In: Fluid mechanics of combustion systems; Proceedings of the Fluids Engineering Conference, Boulder, CO, June 22, 23, 1981. New York, American Society of Mechanical Engineers, 1981, p. 257-266. 32 refs. Grant No. NAG3-74.

The paper reports research restricted to steady turbulence flow in axisymmetric geometries under low speed and nonreacting conditions. Numerical computations are performed for a basic two-dimensional axisymmetrical flow field similar to that found in a conventional gas turbine combustor. Calculations include a stairstep boundary representation of the expansion flow, a conventional k-epsilon turbulence model and realistic accomodation of swirl effects. A preliminary evaluation of the accuracy of computed flowfields is accomplished by comparisons with flow visualizations using neutrally-buoyant helium-filled soap bubbles as tracer particles.

Comparisons of calculated results show good agreement, and it is found that a problem in swirling flows is the accuracy with which the sizes and shapes of the recirculation zones may be predicted, which may be attributed to the quality of the turbulence model. D.L.G.

A82-12149 **Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity.** R. M. Welch (Mainz, Universität, Mainz, West Germany), S. K. Cox (Colorado State University, Fort Collins, CO), and K. Ia. Kondrat'ev (Glavnaia Geofizicheskaia Observatoriia, Leningrad, USSR). *Journal of Geophysical Research*, vol. 86, Oct. 20, 1981, p. 9795-9800. 28 refs. NSF Grants No. ATM-78-05743; No. ATM-77-22384.

A82-12170 † **Control of electromechanical actuator elements for flight vehicles (Upravlenie ispolnitel'nymi elementami sledsshchikh elektroprivodov letatel'nykh apparatov).** B. I. Petrov, V. V. Bal'bukh, N. P. Pappe, V. P. Pappe, V. A. Serdiuk, and V. G. Stebletsov. Moscow, Izdatel'stvo Mashinostroenie, 1981. 222 p. 40 refs. In Russian.

The control theory of electromechanical actuator elements is developed with particular reference to application in electrical flight control systems (e.g., for tactical missiles). Attention is given to the use of ac motors and dc motors in such systems, and to digital actuator systems. The limiting dynamic possibilities and energetic characteristics of electromechanical actuators are considered. B.J.

A82-12222 † **The enhancement of heat exchange in channels /2nd revised and enlarged edition/ (Intensifikatsiia teploobmena v kanalakh /2nd revised and enlarged edition/).** E. K. Kalinin, G. A. Dreitser, and S. A. Iarkho. Moscow, Izdatel'stvo Mashinostroenie, 1981. 208 p. 199 refs. In Russian.

An analysis is presented of various means for the enhancement of heat exchange in the heat exchange channels of flight vehicles. The factors governing the selection of heat exchange enhancement method are considered, and specific methods applicable to right channels and longitudinal flow around a bundle of tubes, and curved channels are indicated. Attention is then given to the methods and mechanisms of heat exchange enhancement in pipes, around pipe bundles and in circular channels, in two-dimensional and triangular channels, taking into account the effects of hydraulic resistance and the effectiveness of the various methods is evaluated. The enhancement of heat exchange in the presence of film boiling on the one hand and condensation on the other in channels is also examined. A.L.W.

A82-12267 # **Validation studies of turbulence and combustion models for aircraft gas turbine combustors.** S. A. Syed and G. J. Sturgess (United Technologies Corp., Commercial Products Div., East Hartford, CT). In: Momentum and heat transfer processes in recirculating flows; Proceedings of the Winter Annual Meeting, Chicago, IL, November 16-21, 1980. New York, American Society of Mechanical Engineers, 1980, p. 71-89. 29 refs.

The paper describes work performed as part of a continuing program to explore computational fluid dynamics procedures and related turbulence and combustion models for application to the design, understanding, and development of aircraft gas turbine combustors. Validation studies were conducted using a finite difference procedure (TEACH) to solve the relevant steady, two-dimensional, elliptic transport equations for turbulent flow. The familiar two equation (k-epsilon) turbulence model was used. The combustion model was based on the dissipation rate of oxidant, fuel, and product containing eddies. It was concluded that for confined, nonreacting flows with reasonably well defined boundary conditions, the turbulence model predicts mean flow quantities to an accuracy of about 85 percent in regions of parabolic flow. The size of the recirculation zone is underpredicted by about 15-20 percent, and its strength is underpredicted by 20-25 percent. (Author)

A82-12318 **Extending the limits of reliability theory.** H. Goldberg. New York, Wiley-Interscience, 1981. 275 p. 15 refs. $32.50.

Aspects of probability and statistics are examined, taking into account the objective view of probability, the binomial distribution, the use of probability for prediction, the meaning of the reliability (survivor) function, questions of discrete and continuous distribution, time-to-failure distributions, and distributions found in the reliability literature. Attention is given to the determination of the time-to-failure distribution of a component, the sources of component failure data, the real world of electronic component procurement, the time to first failure for new systems, and system survivor functions for certain component distributions. Redundancy and survivor functions of systems are considered along with questions related to renewal theory and mean time between failures, a Monte Carlo investigation of systems based on normal distributions, and subjects related to precision, confidence, and numbers tested. G.R.

A82-12323 **Antenna theory and design.** W. L. Stutzman (Virginia Polytechnic Institute and State University, Blacksburg, VA) and G. A. Thiele (Dayton, University, Dayton, OH). New York, John Wiley and Sons, 1981. 608 p. 158 refs. $30.95.

Antenna fundamentals and definitions are examined, taking into account electromagnetic fundamentals, the solution of Maxwell's equations for radiation problems, the ideal dipole, the radiation pattern, directivity and gain, reciprocity and antenna pattern measurements, antenna impedance and radiation efficiency, antenna polarization, antennas in communication links and radar, and the receiving properties of antennas. Some simple radiating systems are considered along with arrays, line sources, wire antennas, broadband antennas, moment methods, and aperture antennas. High-frequency methods and aspects of antenna synthesis are discussed, giving attention to geometrical optics, physical optics, wedge diffraction theory, the ray-fixed coordinate system, the cylindrical parabolic antenna, and linear array methods. G.R.

A82-12449 **Commercial EMS considerations for small gas turbine engines.** R. Halliday (Pratt and Whitney of Canada, Ltd., Longueuil, Quebec, Canada). In: Aircraft gas turbine engine monitoring systems; Proceedings of the Aerospace Congress and Exposition, Los Angeles, CA, October 13-16, 1980. Congress and Exposition sponsored by the Society of Automotive Engineers. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 23-26.

It is shown that electronic automated engine monitoring systems (EMS) offer advantages over manual methods for power assurance, trend and limit exceedance monitoring, and low cycle fatigue and creep life recording. System cost, which is the main constraint on EMS for small gas turbines, is proportional to the number of parameters measured. Although EMS cost may preclude a full diagnostic capability, it may be reduced by 'piggy backing' with other systems, such as those for fuel control or flight monitoring. Future EMS are predicted to be part of modular, fully integrated systems employing multiplexing techniques. It is concluded that ARP 1587 is needed for that level of integration to be achieved. Among the parameters monitored by an EMS are turbine temperature, gas generator speed, free turbine speed, output torque, pressure altitude, and outside air temperature. O.C.

A82-12450 **Further application and development of an engine usage/life monitoring system for military services.** R. Holl. In: Aircraft gas turbine engine monitoring systems; Proceedings of the Aerospace Congress and Exposition, Los Angeles, CA, October 13-16, 1980. Congress and Exposition sponsored by the Society of Automotive Engineers. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 27-30.

The Engine Usage Monitoring System (EUMS) which determines the rate and extent to which major and critical components of military engines are being consumed. Rapid development and limited funding constraints led to the production of the Mk I EUMS, which incorporates a Phillips-type magnetic tape cassette as the recording medium and serial digital data formatting and has shown good performance point recording accuracy and reliability. The Mk II development of the EUMS incorporates a microprocessor, a solid state memory, and associated large scale electronics miniaturization and integration. With the addition of a visual display unit, onboard computing/display facility requirements are also satisfied. A civil aviation application of the EUMS is projected on the strength of its basic simplicity and low cost. O.C.

A82-12495 **Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1.** Shrewsbury, Salop, England, MPR Publishing Services, Ltd., 1980. 237 p.

The conference focused on the latest advances in the powder metallurgy of superalloys, including developments in powder production, consolidation, and shape-making techniques, and applications. Papers are presented on the novel aspects for high-quality metal powder production equipment, oxide dispersion strengthened materials by mechanical alloying, potential for PM superalloys in aero engine application, HIP systems for superalloys, and electron-beam welding of PM nickel-base superalloys. V.L.

A82-12496 **Superclean superalloy powders by the rotating electrode process.** P. Loewenstein (Nuclear Metals, Inc., Concord, MA). In: Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1. Shrewsbury, Salop, England, MPR Publishing Services, Ltd., 1980, p. 7, 7-1 to 7-28. 18 refs.

A REP (rotating electrode process) powder system with inert gas handling has been developed for the manufacture of 'superclean' superalloy powders for fatigue-critical turbine applications. The system employs a noncontaminating plasma arc source and input electrodes in the form of precision ground bars that are free from nonmetallic inclusions. The production capability of the superalloy powder facility is approximately 500,000 kg per year. V.L.

A82-12497 **Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet.** J. Coyne, W. H. Couts, C. Chen, and R. P. Roehm (Wyman-Gordon Co., North Grafton and Worcester, MA). In: Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1.
Shrewsbury, Salop, England, MPR Publishing Services, Ltd., 1980, p. 11, 11-1 to 11-31.

Identical parts of superalloys IN-100, René 95, MERL-76, AF-115, and Astroloy, which are being considered for turbine engine applications, have been produced by three different powder metallurgy techniques: as-HIP, HIP plus Isoforge, and gatorizing of extrusion-consolidated billet. The mechanical properties of parts produced by the different processes are found to be equivalent. Thus, the choice of a process should be based on factors other than the currently expected mechanical properties; namely, materials utilization, inspectability, and economics. V.L.

A82-12499 **Superalloy powder engine components; controls employed to assure high quality hardware.** J. E. Coyne, W. H. Everett, and S. C. Jain (Wyman-Gordon Co., North Grafton and Worcester, MA). In: Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1.
Shrewsbury, Salop, England, MPR Publishing Services, Ltd., 1980, p. 24, 24-1 to 24-27.

A program involving the production of several hundred turbine engine components from René 95 alloy is reviewed. Consideration is given to powder transportation and handling, development of stock acceptance tests and quality assurance program, precautions taken to avoid powder contamination in the process of handling prior to HIP'ing, and final testing. Examples of crack initiating defects and their effect on mechanical properties are included. V.L.

A82-12560 # **Lineup of the IM-series aircraft-derivative gas turbines.** *Ishikawajima-Harima Engineering Review,* vol. 21, July 1981, p. 279-285. 13 refs. In Japanese, with abstract in English.

In order to establish the reliability of the power turbines to be developed by IHI, extensive investigations are carried out, in particular, on the rotor assemblies. With engine test runs using actual IM5000 gas turbines, confirmation of the power turbine blade vibratory stress is carried out through the whole operating range. The measured stress levels reveal that they are far below the critical limits and that no detrimental resonance is to be expected. The same procedure is used with the IM2500 power turbine. In addition to analyses of the rotating parts, the various stationary parts are tested, especially the transient behavior of the casing for quick thermal response at the time of starting, stopping and emergency shutdown of the engine. C.R.

A82-12563 **Fuel conservation - DC-9 series 20/30/40.** *Society of Flight Test Engineers, Journal,* vol. 3, Sept. 1981, p. 2-17.

Operational performance penalties and approximate fuel costs associated with the aerodynamics, flight operations, fuel gage system and performance analysis aspects of the DC-9 Series 20, 30 and 40 aircraft are presented. Degradations in aerodynamic cleanness, caused by the gradual deterioration of various seals, rigging adjustments and skin surface smoothness, are shown to lead to drag increases of less than 0.5%, which, however, represents a significant cost in view of the amount of fuel consumed. Flying off-optimum altitude or Mach number may result in excess fuel expenditures greater than those due to degraded aerodynamic cleanness. Other operational factors with substantial influence on fuel use include fuel or aircraft weight, center of gravity, flight time, the use of automatic flight control systems, APU operation, engine starting times, takeoff procedures, climb speed, en route profile, descent profile, and approach maneuvers. The DC-9 fuel gage system has been designed to be as accurate as possible in all phases, in order to minimize the necessity of carrying excess fuel for a given flight. Finally, investigations of aircraft performance may be used to identify areas requiring correction through the comparison of the indicated performance level against a reference, the assessment of engine and airframe contributions, and the investigation of the most likely areas for correction - the external control surfaces and internal systems. S.C.S.

A82-12564 **Procedures and analysis techniques for determining static air minimum control speeds.** E. N. Bradfield (USAF, Flight Test Center, Edwards AFB, CA). *Society of Flight Test Engineers, Journal,* vol. 3, Sept. 1981, p. 18-48. 6 refs.

A method is presented which can be used to establish the minimum air speed required for the static lateral and directional control of a multiengined aircraft following the failure of one or more engines. Equations for the thrust moment and rudder pedal force coefficient in an asymmetrical force condition are derived from minimum directional control speed theory, and applied to the analysis of data obtained in climbs of the B-57 aircraft through a significant altitude band at minimum directional control speed with wings level and banked at various angles, and with a rudder power assist system both operational and inoperative. An analysis procedure is also presented for aircraft for which minimum control is defined by the lack of lateral, rather than directional control, such as STOL and powered-lift aircraft. These methods allow minimum control speed testing to be accomplished safely, without the necessity of flying at extreme low altitudes with an engine shut down, and permit extrapolation to off-standard-day conditions and various gross weights. S.C.S.

A82-12626 **National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings.** Meeting sponsored by the Institute of Navigation. Washington, DC, Institute of Navigation, 1981. 190 p.

Papers are presented on such topics as all-digital GPS receiver mechanization, worldwide coverage of the Phase II Navstar satellite constellation, real-time missile tracking with GPS, navigation task partitioning in distributed-processing avionics systems, and memory requirements for future aerospace navigation systems. Consideration is also given to the simulation study of a hybrid strapdown attitude and heading reference system, a comparative study of strapdown algorithms, ring laser gyro navigator flight test results, and size effects in strapdown navigators. P.T.H.

A82-12630 # **Satellite geometry considerations for low cost GPS user equipment.** Y. Rosenthal (Intermetrics, Inc., Cambridge, MA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 30-32. FAA-supported research.

The paper evaluates the geometrical properties of various GPS satellite configurations as seen by a low-cost user equipment designed for use by general aviation (GA). The GA user is equipped with one antenna which covers an 86-deg cone perpendicular to the plane of the aircraft. Therefore, when the aircraft banks, satellites which are above the horizon may be shadowed. Through a nominal turn at a bank angle of 25 deg, the identity of the visible satellites is changing rapidly. Hence, preselection of the best four satellites is impossible. Criteria for comparing 24 satellites from the GA user point of view is presented, as well as some preliminary results which indicate the different results provided by different constellations. Results show that as far as GA is concerned, the coverage provided by various 24 satellite constellations is not of equal value. P.T.H.

A82-12634 # **A solution to the static geometry problem for JTIDS relative navigation.** R. Weiss (Intermetrics, Inc., Cambridge, MA) and P. Asher (USAF, Joint Program Office, Bedford, MA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 62-64.

The current JTIDS (Joint Technical Information Distribution System) relative navigation algorithm restricts the use of relative position data in order to maintain stability. In a static geometry situation, the position quality will be degraded. This paper proposes a solution to the static geometry problem which involves a second source that maintains a high position quality by constraining its covariance matrix. There are several ways to implement this situation, each of which must be evaluated in a simulation environment for scenarios involving transitions from static geometry to normal mode. P.T.H.

A82-12636 # **Hard limited approaches to correlation velocity sensing.** T. J. Lund, R. E. Chapman, and G. A. Murdock (Teledyne, Inc., Teledyne Ryan Electronics, San Diego, CA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 79-83. 6 refs.

Correlation velocity sensors determine velocity by measuring the time delay required for best correlation between signals gathered by two downward looking radar receiver antennas having known separation along the velocity axis being measured. This paper discusses a variation of this basic technique in which the received signals are hard limited such that correlation is only performed on the phase of the signal. The hard limiting approach avoids the need for AGC and allows the receiver outputs to be applied directly to a digital processor. Comparisons of correlation functions are presented for linear correlations on the total signal (phase and amplitude), amplitude only and phase only. It is shown that the correlation properties of hard limited signals are well suited to correlation velocity sensing. The results of simulations of the correlation velocity sensing process, which included a realistic terrain scattering model, are presented for various flight conditions and terrain types. The implementation of a hard limited correlation velocity sensor is discussed. (Author)

A82-12637 # **Memory requirements for future navigation systems.** R. Fedorak (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) and B. A. Zempolich (U.S. Navy, Naval Air Systems Command, Washington, DC). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 84-89.

The paper examines current problems concerning memories used in aerospace navigation systems, identifies technical management concerns relative to various aspects of current use of specific memory technologies, and discusses memory requirements for future aerospace navigation systems. Particular attention is given to such aspects as nonvolatility, electrical reprogrammable memories, commonality of memory hardware between platforms, packaging, and memory capacity. MNOS EEPROM, MNOS 8K BORAM, MNOS EAROM, and bubble memories are considered. P.T.H.

A82-12638 # **Omega station 10.2 kHz signal selection made easy.** R. R. Gupta and R. S. Warren (Analytic Sciences Corp., Reading, MA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 90-103. 7 refs.

Recently developed Omega station signal coverage prediction diagrams for 10.2 kHz at eight representative diurnal and seasonal global times of the year provide the most complete presentation of Omega station signal coverage ever available to Omega users. This paper presents minimum and maximum coverage extremes characterized by the coverage diagrams for the eight representative coverage times of the year for two signal selection criteria. A simplified algorithm which yields a conservative determination of the coverage is obtained by using the maximum coverage boundary. The range and bearing coordinates of minimum and maximum SNR boundaries for -20 dB and -30 dB are provided in tabular form for each Omega station. P.T.H.

A82-12639 # **FAA acceptance tests on the NAVSTAR GPS Z-Set receiver.** R. J. Esposito (FAA, Technical Center, Atlantic City, NJ). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 104-107.

This paper describes FAA acceptance tests on the NAVSTAR GPS Z-Set receiver which were conducted in a USAF System Command C-141 aircraft over the instrumented range located at the Yuma Proving Ground. The Yuma laser tracking system computed a reference trajectory against which the GPS receiver solution was compared. Data from five flights, totalling over six hours, are presented with the objective of assessing Z-Set capabilities to meet civil aviation requirements for non-precision approaches. (Author)

A82-12640 # **A navigation systems planning model.** H. L. Solomon and A. R. Stephenson (Systems Control, Inc., Palo Alto, CA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 108-119.

The advent of Navstar/GPS has directed the attention of government decision-makers to the possibility of ultimately replacing or supplementing existing navigation systems with one or more alternative systems. To assist these decision-makers in evaluating these and other navigation policy alternatives, a navigation system cost/benefit model is being developed. A comprehensive data base is also being developed from which the appropriate information can be extracted by the model in response to navigation system implementation/decommissioning scenarios, as defined by the model users. The model will predict the user's annualized response to a stipulated scenario in terms of receiver purchases, thereby permitting navigation planners not only to consider operator costs but also the expected costs and benefits on either an individual or combined user group basis. The model's outputs will also be useful to individual user groups in assessing their position vis-a-vis navigation system policy alternatives. P.T.H.

A82-12641 # **Simulation study of a hybrid strapdown attitude and heading reference system.** D. B. Reid, B. N. McWilliam (Philip A. Lapp, Ltd., Toronto, Canada), and D. F. Liang (Defence Research Establishment, Ottawa, Canada). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 139-147. 13 refs.

The aircraft attitude and heading reference system (AHRS) considered in this paper comprises a low-accuracy strapdown inertial measurement unit (IMU), a strapdown magnetometer triad, which provides reference heading information, and air data sensors from which barometric altitude and true airspeed measurements are derived. A variable-dimension U-D factorized Kalman filter is employed to estimate the AHRS error state from the redundant sensor data. Estimated errors are fed back into the system using a combination of continuous and impulsive control methods to bound the inertial attitude, heading, and velocity errors and reduce the rate of position error growth. A data compression algorithm is employed for smoothing of incoming measurement data to enable high-rate information to be incorporated into the filtering process at minimum computational cost. The system operates in three modes: normal AHRS mode, alignment (erection) mode and magnetics calibration mode, in which the U-D filter is utilized to estimate systematic errors in the sensed magnetic field during a ground 'swing' procedure. Initial results obtained by full-scale simulation indicate that, with a low-accuracy strapdown IMU, the system can achieve roll and pitch accuracies of about 5 arc minutes (RMS) and a heading accuracy of approximately .75 degree (RMS). (Author)

A82-12642 # **The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions.** M. S. Dipasquo (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 153-162.

In order to achieve the benefits of an integrated inertial sensor assembly (IISA) for the next generation aircraft, the U.S. Navy has embarked on an advanced development program to demonstrate the IISA concept. This paper examines the requirements definition, the system concept formulation, and the design definition of the advanced development model (ADM) that will be used for concept validation in a later flight test program. P.T.H.

A82-12843 # **Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers.** J. J. Hopkins (Navigation Development Services, Inc., Northridge, CA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 153-170. 17 refs.

The potential of the integrated GPS navigator and the strapdown AHRS as a replacement for several existing avionics systems is investigated. Its application is discussed including the economic impact with regard to acquisition and maintenance. The system components and integration approach are described, and the expectations for favorable performance comparisons with its competition are presented. It is concluded that the economic and performance advantages are unmistakably outstanding. Consequently, to save costs and to safely handle increased traffic there is a strong likelihood that integrated GPS/AHRS will become the standard position, velocity, and attitude reference system for future civil aircraft. P.T.H.

A82-12844 # **Ring Laser Gyro Navigator /RLGN/ flight test results.** K. L. Bachman (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 171-178.

This paper describes a flight test program and the resultant navigation performance achieved on an Advanced Development Model (ADM) Ring Laser Gyro Navigator (RLGN) in Navy A-7E and P-3C aircraft. As the RLGN represents a significant departure from conventional gimballed inertial system technology, a brief functional system description is given highlighting key hardware and software design features. This is followed by a description of the A-7E flight test program, its objective, flight profiles, method of data acquisition, and analysis of results. The P-3C flight test program is discussed including a description of the flight test recording instrumentation, flight profiles, data reduction, and analysis of results. An indication of system reliability, maintenance, and calibration actions versus system design goals is given. Effects of high latitude on system alignment and navigation performance are also highlighted. (Author)

A82-12846 **Kevlar composites; Proceedings of the Symposium, El Segundo, CA, December 2, 1980.** Symposium sponsored by the Technology Conferences. El Segundo, CA, Technology Conferences, 1980. 96 p. $24.

Papers presented cover Kevlar-49 properties and Kevlar/epoxy composite materials. Kevlar roles in the aerospace industry were noted in the design of the L-1011 Tristar components, in the materials processing for commercial aircraft, and applications in commuter aircraft; additional papers describe Kevlar use in life-saving equipment, for rocket motors, pressure vessels, and fuel tanks. Finally, the methods and tools necessary for using Kevlar are presented. D.H.K.

A82-12847 **Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar.** R. H. Stone (Lockheed-California Co., Burbank, CA). In: Kevlar composites; Proceedings of the Symposium, El Segundo, CA, December 2, 1980. El Segundo, CA, Technology Conferences, 1980, p. 25-43.

A history of the use of Kevlar-49 in aircraft structures is presented. The aramid fibers provide a 25-30% weight reduction over fiberglass with 1.5 times the stiffness, in addition to comparable tensile strength; compressive strength is lower, though acceptable. Aircraft parts were fabricated on fiberglass production equipment using epoxy resin prepregs and tested for durability, impact resistance, and flammability; all were found to be comparable to fiberglass. Wing body sandwich fairings, underwing fillet panels, and aft engine fairings were built, tested for aerodynamic loads, and found acceptable in a NASA flight service program. The parts were then mounted on Lockheed L-1011's for use in commercial airline service; after 50,000 flying hours wear was equivalent to the use of fiberglass. Interior and exterior applications in aircraft, such as for rudder and trailing edge flaps, are discussed. D.H.K.

A82-12894 **Wings in the sun - The evolution of Solar Challenger.** M. Cowley. *Flight International*, vol. 119, June 13, 1981, p. 1886-1888.

The design, development and testing of the Solar Challenger aircraft are described, with attention to its lightweight structural design and photovoltaic cell array-powered electric propulsion system. The configuration features a cantilever wing and horizontal tail, whose upper surfaces support 236 sq ft of solar cells that are rated at 13% conversion efficiency. The main wing spar and fuselage boom are constructed by wrapping a carbon fiber tube with 1/4-in.-thick Nomex honeycomb, followed by two layers of Kevlar cloth. Flutter tests of the airframe have been conducted at speeds of up to 65 mph by mounting the tail, fin and wing on a van. The aircraft is designed for 100-mile flights at 5000-10,000 ft altitudes and 25-35 mph, but the nearly horizontal mounting of the solar cells restricts flight conditions to those with high sun angles, at midday. When the sun is low in the sky, as in winter, the Solar Challenger must fly due north to maximize insolation. O.C.

A82-12896 # **Helicopter icing spray system - Improvements and flight experience.** D. Belte (U.S. Army, Edwards AFB, CA). *(Canadian Aeronautics and Space Institute, Flight Test Symposium, Medley, Alberta, Canada, Mar. 31, Apr. 1, 1981.) Canadian Aeronautics and Space Journal*, vol. 27, 2nd Quarter, 1981, p. 93-106. 6 refs.

In 1979 improvements were made to the helicopter icing spray system used in icing qualification tests. The improvements were aimed at reducing drop diameter and eliminating ice formation on the spray boom. A Sonicore nozzle was selected to replace the original atomizers and the number of atomizers on the spray boom was tripled. The newly modified configuration was evaluated using a UH-1H helicopter. Measurements were made of drop size distribution and liquid water content. Spray cloud measurements showed great improvement over earlier characteristics, and the median volumetric diameter approached that of natural clouds. The types of ice formation also reflected the improvement in cloud quality. Since in-flight spray simulation cannot duplicate the 100% relative humidity of a natural icing cloud, a computer program was developed to define the evaporation effect on liquid water content. An expanded airspeed range was used for 1980-1981 tests and results were compiled for the UH-60A, UH-1H ice phobics, Bell Model 412 and Grumman OV-1D. S.C.S.

A82-12897 # **Fractographic determination of fatigue crack growth rates in aircraft components.** W. Wiebe and R. V. Dainty (National Aeronautical Establishment, Structures and Materials Laboratory, Ottawa, Canada). *(Canadian Aeronautics and Space Institute, Annual General Meeting, Montreal, Canada, May 11, 12, 1981.) Canadian Aeronautics and Space Journal*, vol. 27, 2nd Quarter, 1981, p. 107-117.

The application of electron fractography to the failure analysis of aircraft components is considered to be rewarding because it frequently permits the precise identification of the causes of component failure. Quantitatively, considerable effort has been devoted to the development of techniques specifically directed to the evaluation of fatigue crack growth rate information, both from service fatigue failures, and from components fractured during full-scale aircraft laboratory fatigue tests. Originally, the fractographic determination of crack growth rate data in these laboratory tests was relatively straightforward, since discrete numbers of load cycles were applied at each of the various load levels in the fatigue loading spectrum. However, recent use of computer-controlled random fatigue loading equipment has produced new problems associated with the identification and correlation of the randomly spaced fatigue striations on the fracture surface, and the derivation of crack growth rate data from them. The fractographic methods developed for the solution of these problems are described. (Author)

A82-12698 # **SARSAT applications.** W. R. McPherson (Defence Research Establishment, Ottawa, Canada). *(Canadian Aeronautics and Space Institute, Canadian Conference on Astronautics, 1st, Ottawa, Canada, Oct. 20-22, 1980.) Canadian Aeronautics and Space Journal,* vol. 27, 2nd Quarter, 1981, p. 118-126.

The SARSAT system is designed to utilize satellite technology for the rapid detection and location of marine and air distress incidents. The system consists of (1) emergency beacons for small aircraft and boats operating at 406 MHz; (2) space components including on-board receivers and processors; and (3) a ground receiving station with related communication links. The system is expected to detect an emergency beacon within six hours of its activation with local accuracy to the order of 20 km at present, and 5 km or better for the 406 MHz test units. The first SAR instrumented spacecraft will be launched in mid-1982. Five countries are presently involved in the project, including the USSR COSPAS/-SARSAT project and the SARSAT Investigator in Norway. S.C.S.

A82-12775 **F-5G Tigershark.** D. Richardson. *Flight International,* vol. 120, Oct. 17, 1981, p. 1144-1150.

Design features, production goals, and potential markets for the F-5G fighter are reviewed. The aircraft was developed as a counter to the MiG-23 and third generation MiG-21. A GE F404 turbofan engine was chosen, with space left in the redesigned fuselage to accommodate minor engine improvements. A Mach 2 top speed is noted, and an 8,000 hr service life with a 9 g limiting load is projected; fuel consumption is lower than in the F5-E, with more available thrust. Design changes affected the rear fuselage profile, added a carbon composite tailplane, spar, and vertical fin, thicker wing skins to withstand 9 g combat maneuvers, and a larger canopy for greater visibility, in addition to instrument console flexibility. Armament options are provided, with mounts capable of using non-US ordnance; performance characteristics, including the 16,400 lb thrust are given, along with estimated selling price and production schedules. Over 90% of the ground support equipment of the F5-E is mentioned as being compatible with the F-5G. M.S.K.

A82-12801 # **The case for a defensive air-to-air fighter.** W. Hill, Jr. (Rockwell International Corp., North American Aircraft Div., Los Angeles, CA). *Astronautics and Aeronautics,* vol. 19, Nov. 1981, p. 28-36.

An investigation is conducted regarding the approaches available to compensate for the imbalance of tactical air power which favors the Soviets/Warsaw Pact over the U.S./NATO forces, taking into account the constraints of the U.S. Air Force budget. One approach can be to increase the fighter procurement monies, by reducing other budget items, to buy large quantities of the expensive multimission fighter. However, in connection with budgetary considerations related to the urgency of other requirements, it appears that new aircraft the size and capability of the F-15 and F-16 cannot be obtained in quantities sufficient to gain parity with Soviet air forces. It is, therefore, proposed to employ a single-mission aircraft which, because of its simple design and low cost, can be built in quantity. This proposal is based on the recognition that an effective NATO interceptor does not need all the capabilities of the F-15 and F-16. G.R.

A82-12803 * # **Solution to the hidden-line problem.** D. R. Hedgley (NASA, Flight Research Center, Edwards AFB, CA). *Astronautics and Aeronautics,* vol. 19, Nov. 1981, p. 51.

It is pointed out that realistic three-dimensional renderings of solid objects or surfaces by computers have long been needed. The NASA Dryden Flight Research Center will soon publish a report and the computer program on an algorithm that solves for hidden lines. The computer program is written in FORTRAN IV and its size is approximately 35N + 9500 words, where N is the number of elements. A number of pictures are presented which were drawn by a computer using the algorithm. G.R.

A82-12804 # **Parachute technology under pressure.** E. A. Reed (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). *Astronautics and Aeronautics,* vol. 19, Nov. 1981, p. 56-61. 22 refs.

A description is presented of advances in specific areas of parachute technology, taking into account developments occurring since 1975. It is pointed out that stress and parachute design analysis continue to have the same needs as in 1975. Some analytic work has related nonlinear elasticity, energy dissipation and textile weave to the propagation of step strain pulses due to snatch or impact loadings. Sophisticated computer programs exist for stress analysis of parachutes and for calculating their opening load. Attention is given to the improved performance of new textile materials, possibilities for improvements related to supersonic parachutes, aspects of parachute packing, and developments concerning ejection seats. G.R.

STAR ENTRIES

N82-10002# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Festigkeit.

MATHEMATICAL MODEL FOR THE MAINTENANCE PROGRAM OF MODERN JET AIRCRAFT

Rudolf Prinz, Hans-Christian Goetting, Karl-Heinz Galda (Deutsche Lufthansa A.G., Hamburg), and Juergen Kreth (Deutsche Lufthansa A.G., Hamburg) Oct. 1980 44 p refs In GERMAN; ENGLISH summary Report will also be announced as Translatation (ESA-TT-724)
(DFVLR-FB-81-14) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 10,40

Step-by-step escalation of structural inspection intervals based on long-term experience with a fleet of transport aircraft is described by a mathematical model. Fundamental to the model are statistical distributions of load and detectable crack length in a fatigue loaded component. Knowing realistic probabilities of failure enables the calculation of appropriate inspection intervals. Calculation procedure yields increasing intervals up to a maximum value and a decrease when approximating the mean value of detectable crack length. As to usual interval steps, the results show good agreement with practice. Restrictions and possible applications of the model are discussed. Author (ESA)

N82-10016# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

STANDARD TESTS OF A RESEARCH MODEL ROTOR IN A WIND TUNNEL, INCLUDING MODEL SIMILARITY [STANDARD-ERPROBUNG DES FORSCHUNGS-MODELLROTORS IM WINDKANAL, EINSCHLIESSLICH MODELLVERGLEICHEN]

R. Stricker, V. Mikulla, and E. Allramseder Bonn Bundesministerium der Verteidigung 1979 93 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung (BMVg-FBWT-79-16) Avail: NTIS HC A05/MF A01; Dokzentbw, Bonn DM 30

A wind tunnel test program was developed, as a basis the actual flight regime of the BO-105 helicopter. Operation of the test stand and calibration of measuring devices is described. The procedure for data reduction (digital programs) is given. Results include the parameters: mean and fluctuating components of rotor forces and moments; blade bending moments (flapping, lagging); and control forces. Control and static stability derivatives are also determined. The calculations done for comparison with measurements, using aerodynamic/aeroelastic/flight mechanic digital programs, show in almost all cases very good agreement with model test results. The correlation with flight test data of the BO-105 helicopter shows that model similarity according to the most important scaling laws is fulfilled to a high degree and that the results can be used for real comparison of various sizes of hingeless helicopter rotors. Author (ESA)

N82-10017# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Experimentelle Stroemungsmechanik.

EXPERIMENTAL INVESTIGATIONS OF THE SEPARATED FLOW AROUND A RECTANGULAR WING

Hans Bippes, Michael Turk, and Klaus Jacob Oct. 1980 56 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-12) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 10

For the aspect ratios lambda = 3.1 and 2.3, pressure distributions over the whole span were measured at angles of attack up to alpha approximately = 27 deg. For selected cases, oil flow patterns were produced and velocity profiles behind the wing along with shear stresses at the surface were measured. Most of the model and the experiments were carried out at Re approximately = 2,100,000 and M approximately = 0.17. The model and the experiments are described. The results are discussed and partly compared with results from a theoretical model. Author (ESA)

N82-10020# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AIRCRAFT EXCRESCENCE DRAG

A. D. Young, J. H. Paterson, and J. Lloyd Jones, ed. Jul. 1981 172 p refs
(AGARD-AG-264; ISBN-92-835-1382-4) Avail: NTIS HC A08/MF A01

A review was undertaken of the available data on the subject of the drag of excrescences on aircraft surfaces. Information from this review is summarized and presented in a way that is readily usable for prediction and design purposes. The basic characteristics of boundary layers are discussed and, where possible, the drag of excrescences is related to those characteristics. In particular, because the size of many types of surface imperfection is small in comparison with boundary layer thicknesses, the drag of such imperfections can be correlated in terms of the properties of inner regions of the boundary layer. Several previously published analyses of this type are highlighted and, where possible, extensions to other data sources or other types of excrescence are presented. The practical problems of applying these data in the varying velocity gradients existing on aircraft surface are treated and one section is devoted to the drag of auxiliary air inlet and exit openings. Gaps in existing data which offer opportunities for research effort are pointed out. J.M.S.

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.

ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report

David L. Kohlman, William G. Schweikhard, and Alan E. Albright Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wakc surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

N82-10022# Committee on Science and Technology (U. S. House).

SPIN RECOVERY TRAINING

Washington GPO 1980 15 p Presented by the Subcomm. on Invest. and Oversight of the Comm. on Sci. and Technol., 96th Congr., 2nd Sess., Jul. 1980
(GPO-66-020) Avail: Subcommittee on Investigations and Oversight

The FAA policy of not requiring spin recovery training as a prerequisite for a private pilot license was examined in an effort to determine if such a requirement would result in a net savings of life. Only FAA remained adamant in defense of the no-spin training policy. All other witnesses, to varying degrees, expressed the need for spin and recovery training as a common sense safety requirement. It can be concluded without equivocation that experienced aviators overwhelmingly demand that aspiring pilots be trained to protect themselves and be able to recover from post stall gyrations, incipient spins, and spins. The subcommittee's recommondations that such training be required for licensing is discussed with emphasis on the development of a flight training manual and an implementation plan. A.R.H.

N82-10023# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.

A PROPOSED FLIGHT SAFETY PROGRAM FOR THE KOREAN AIR FORCE M.S. Thesis

Chong Kwan Lee Mar. 1981 136 p refs
(AD-A102373) Avail: NTIS HC A07/MF A01 CSCL 05/1

Several methodologies relevant to the development of a safety program for the Korean Air Force were reviewed. Methodologies considered included: Control charts; System safety analysis; and

Critical incident technique. Data collection methods applicable to accident analysis were proposed. Recommendations for the incorporation of these methods into a safety program for the K.A.F. were developed. The safety program described in this thesis possesses the potential for reducing overall operational costs and maximizing aircraft availability. The end result of such a program can only serve to increase operational readiness and thereby maximize overall efficiency and military capability of the K.A.F. GRA

N82-10024# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
LIGHTNING EFFECTS ON AIRCRAFT AND COMPOSITES. LITERATURE STUDY ON LIGHTNING STRIKES AND PROTECTION [VERKAN AV BLIXT I FLYGPLAN OCH KOMPOSITER. LITTERATURSTUDIE OEVER SKADOR OCH SKYDD]
Anita Alm Nov. 1980 102 p refs In SWEDISH
(FOA-C-20388-F9) Avail: NTIS HC A06/MF A01

The frequency and different types of lightning strike on different parts of aircraft and several ways of protection against direct and indirect lightning effects were reviewed. Fiber composites, lightning damage and testing of lightning protection for modern aircraft material are studied by means of simulation techniques. Unshielded composite materials are damaged by lightning. With a correctly shaped lightning shield damage can be prevented. Author (ESA)

N82-10025# Societe Nationale Industrielle Aerospatiale, Paris (France).
COST REDUCTION IN AIR TRANSPORTATION
P. Lebouc 1980 21 p Presented at French Aerospace Week, Indonesia, 8-12 Dec. 1980
(SNIAS-811-150-101) Avail: NTIS HC A02/MF A01

Historical trends in costs are reviewed. By adopting fuel conservation policies, such as renewal of the jet fleet, adaptation of flight operation, and modification of air traffic control procedures, the airlines can limit the effect of expected fuel price increases. In parallel, productivity gains should keep at a constant level all the other costs of airline operations. Under the above conditions, growth of the industry seems to be certain even if fuel prices increase at a rate of 2 to 4% per year above inflation during the next 20 years. Author (ESA)

N82-10026# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bonn (West Germany). Inst. fuer Flugmedizin.
DEVELOPMENT AND CONSTRUCTION OF PILOT EJECTOR SEATS IN GERMANY FROM 1938-1945
Siegfried Ruff Feb. 1981 110 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-04) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 26

Pioneering research, leading to the development of an ejector seat for the Junkers Ju 88, is reviewed. Fundamentals in establishing human acceleration tolerances are discussed. The experimental simulation of shock induced acceleration is described, and human resistance is quantified. Exploitation and follow-up of accident related data are summarized, including investigations of the accelerations experienced with an aircraft out of control, e.g., shot down. The action of airspeed pressure on a person is considered, and experience gained with research aircraft is recounted. Measuring methods for technical and physiological parameters are indicated. The beginning of ejector seat development in England, Sweden, and the U.S. (1944-45) is also briefly reviewed in comparison. Author (ESA)

N82-10027# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
THE STATISTICAL THEORY OF RADIO DIRECTION FINDING
R. L. Holland Jun. 1981 47 p refs
(Contract N00024-81-C-5301)
(AD-A104156; JHU/APL/TG-1330) Avail: NTIS HC A03/MF A01 CSCL 17/3

The statistical theory of radio direction finding as it applied to three-dimensional geometrics is presented in this report. This theory is an extension of the two-dimensional theory presented by R. G. Stansfield in 1947. The theory has application in situations where airborne targets are maneuvering in three dimensions at high speed, especially when the platforms with the direction finding equipment are also aircraft. Author (GRA)

N82-10028*# Wyle Labs., Inc., Huntsville, Ala.
EXPERIMENTAL MODAL ANALYSIS OF THE FUSELAGE PANELS OF AN AERO COMMANDER AIRCRAFT Final Report
David Geisler Sep. 1981 164 p refs Prepared in cooperation with Structural Dynamics Res. Corp., Cincinnati, Ohio
(Contract NAS1-14693)
(NASA-CR-165750; Rept-10568) Avail: NTIS HC A08/MF A01 CSCL 01C

The reduction of interior noise in light aircraft was investigated with emphasis the thin fuselage sidewall. The approach used is theoretical and involves modeling of the sidewall panels and stiffeners. Experimental data obtained from tests investigating the effects of mass and stiffness treatments to the sidewalls are presented. The dynamic characteristics of treated panels are contrasted with the untreated sidewall panels using experimental modal analysis techniques. The results include the natural frequencies, modal damping, and mode shapes of selected panels. Frequency response functions, data relating to the global fuselage response, and acoustic response are also presented. J.M.S.

N82-10029*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
V/STOL AIRCRAFT AND FLUID DYNAMICS
Leonard Roberts (Stanford Univ., Calif.) and Seth B. Anderson Oct. 1981 8 p refs
(NASA-TM-81328; A-8730) Avail: NTIS HC A02/MF A01 CSCL 01C

The impact of military applications on rotorcraft and V/STOL aircraft design is summarized with respect to fixed-wing aircraft. The influence of the mission needs on the configurational design of V/STOL aircraft, the implications regarding some problems in fluid dynamics relating to propulsive flows, and their interaction with the aircraft and the ground plane, are also considered. Additional research in fluid dynamics that can contribute to an improvement in performance of V/STOL aircraft is suggested. B.W.

N82-10030*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN INVESTIGATION OF A STOPPABLE HELICOPTER ROTOR WITH CIRCULATION CONTROL
John D. Ballard, John L. McCloud, III, and T. J. Forsyth Aug. 1980 372 p refs
(NASA-TM-81218; A-8278) Avail: NTIS HC A16/MF A01 CSCL 01C

A stoppable helicopter rotor with circulation control was investigated in the Ames 40 by 80 foot wind tunnel. The model was tested as a rotating wing, a fixed wing, and during transition start/stop sequences. The capability of the model's control system to maintain pitch and roll moment balance during the start/stop sequence, the ability of the blades to withstand the start/stop loads, the adequacy of the control system to maintain balance in the helicopter mode, and the control system capabilities in the fixed-wind mode were assessed. Time-history data of several start/stop sequences of the X-wing rotor, and the steady-state data relating to the model as both a rotor and as a fixed-wing aircraft are presented. In addition, stability data are presented which were acquired during open-loop and closed-loop tests of the hub moment feedback control system. J.M.S.

N82-10031*# National Aeronautics and Space Administration. Washington, D. C.
QUIET SHORT-HAUL RESEARCH AIRCRAFT FAMILIARIZATION DOCUMENT, REVISION 1
Joseph C. Eppel Sep. 1981 81 p refs
(NASA-TM-81298; A-8801) Avail: NTIS HC A05/MF A01 CSCL 01C

The design features and general characteristics of the Quiet Short Haul Research Aircraft are described. Aerodynamic characteristics and performance are discussed based on predictions and early flight test data. Principle airplane systems, including the airborne data acquisition system, are also described. The aircraft was designd and built to fulfill the need for a national research facility to explore the use of upper surface blowing, propulsive lift technology in providing short takeoff and landing capability, and perform advanced experiments in various technical disciplines such as aerodynamics, propulsion, stability and control, handling qualities, avionics and flight control systems, trailing vortex phenomena, acoustics, structure and loads, operating systems, human factors, and airworthiness/certification criteria. An unusually austere approach using experimental shop practices resulted in a low cost and high research capability. Author

N82-10032*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
COMPARATIVE STUDY OF FLARE CONTROL LAWS Final Report, 15 Dec. 1979 - 15 Oct. 1981
A. A. Nadkarni Oct. 1981 52 p refs
(Grant NsG-1480)
(NASA-CR-164903) Avail: NTIS HC A04/MF A01 CSCL 01C

The development of a digital, three dimensional, automatic control law designed to achieve an optimal transition of a B-737 aircraft between glide slope conditions and the desired final touchdown condition is presented. The digital control law is a time invariant, state estimate feedback law, and the design is capable of using the microwave landing system. Major emphasis is placed on the reduction of aircraft noise in communities surroundings airports, the reduction of fuel consumption, the reduction of the effects of adverse weather conditions on aircraft operations, and the efficient use of airspace in congested terminal areas. Attention is also given to the development of the capability to perform automatic flares from steep glide slopes to precise touchdown locations. B.W.

N82-10033# Aberdeen Univ. (Scotland). Dept. of Engineering.
APPLICATION OF NUMERICAL METHODS TO THE CALCULATION OF ELECTROSTATIC FIELDS IN AIRCRAFT FUEL TANKS Final Scientific Report, 1 Jul. 1980 - 30 Jun. 1981
J. R. Smith, P. Lees, and D. McAllister Aug. 1981 65 p refs
(Grant AF-AFOSR-0223-80; AF Proj. 2301; AF Proj. 3048)
(AD-A103270; EOARD-TR-81-9) Avail: NTIS HC A04/MF A01 CSCL 01/3

The solution of electrostatic field problems occurring during the refueling of aircraft fuel tanks containing explosion suppressant foams is discussed. A computational model of a fuel tank is set up, and the finite element method is used to calculate the electrostatic potential distribution within the tank. Author (GRA)

N82-10034# Boeing Military Airplane Development, Seattle, Wash.
LOW MAINTENANCE HYDRAULIC ACCUMULATOR Final Report, Aug. 1976 - Dec. 1980
E. C. Wagner and W. E. Willard Jun. 1981 65 p
(Contract F33615-76-C-2088; AF Proj. 3145)
(AD-A103947; AFWAL-TR-81-2031) Avail: NTIS HC A04/MF A01 CSCL 13/7

This report presents the results of a program to develop a low maintenance accumulator, compatible with current MS envelopes and competitive in cost with conventional accumulators. The purpose of the program was to select and develop a metal bellows configuration/concept to replace the conventional moving piston and seal of conventional accumulators. The selected bellows are of welded construction and welded in place to allow bellows movement identical to piston movement. The accumulator housing is of welded construction to eliminate all possible leak points. The program goal was to develop an accumulator to provide a ten year unserviced life. Test results indicate an accumulator design is possible to achieve a service life of 6 to 10 years based on installation on an F-16 aircraft. Author (GRA)

N82-10035# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
A CFRP TAILERON FOR THE TORNADO: CONSTRUCTION AND PRODUCTION [CFK-TAILERON FUER DEN TORNADO: KONSTRUKTION UND FERTIGUNG]
L. Lemmer, W. Hartmann, and R. Guenther 1980 67 p In GERMAN Presented at Gastvortrag im KL 624, Mannheim, West Germany, 10-14 Nov. 1980
(MBB-FE-212/KFK/PUB/2) Avail: NTIS HC A04/MF A01

A CFRP lightweight structure, i.e., CFRP taileron, for the Tornado aircraft was developed. The CFRP taileron is interchangeable with the currently used metal horizontal stabilizer as far as geometry, function and durability are concerned while a 30% weight reduction is achieved with CFRP construction. The assembly of the CFRP taileron is detailed and results from static, dynamic, and vibration testing of the structure are presented. A series production method is then outlined, including inspection and certification procedures. Author (ESA)

N82-10036# European Space Agency, Paris (France).
THEORETICAL INVESTIGATION OF THE INFLUENCE OF SPOILER DYNAMICS ON THE HANDLING QUALITIES OF AN AIRCRAFT WITH DIRECT LIFT CONTROL
Dieter Schafranek Jul. 1981 66 p refs Transl. into ENGLISH of "Theoretische Untersuchung ueber den Einfluss der Spoilerdynamik auf die Fliegbarkeit eines Flugzeugs mit direkter auftriebssteuerung" Rept. DFVLR-FB-80-07 DFVLR, Brunswick, 1980 Original report in GERMAN previously announced as N81-13975
(ESA-TT-681; DFVLR-FB-80-07) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 14,70

Theoretical parameters describing the pilot's workload during aircraft control pitch tracking and flight path tracking tasks on a transport aircraft equipped with spoiler direct lift control (DLC) were studied. The determined parameters are the necessary phase compensation and gain adapation which the pilot must perform, and also the closed loop resonance. The influence of the DLC-gain factor, spoiler actuator rate, and spoiler deflection washout time constant on pilot workload is presented. Simulated time histories of pitch rate and normal acceleration response due to step type control inputs show the corresponding reactions of the various DLC-configurations which are essential for pitch control and flight path control. Direct lift control using spoilers is shown to be sensible for the aircraft in the test only if the pitching moment of the spoiler is completely compensated, the time constant for the spoiler deflection washout is not too small (greater than 5 seconds) and if the spoiler moves with more delay than the elevator. Author (ESA)

N82-10037*# Detroit Diesel Allison, Indianapolis, Ind.
PROPULSION STUDY FOR SMALL TRANSPORT AIRCRAFT TECHNOLOGY (STAT) Contractor Final Report
J. C. Gill, R. V. Earle, D. V. Staton, P. C. Stolp, D. S. Huelster, and B. A. Zolezzi 16 Dec. 1980 186 p refs
(Contract NAS3-21995)
(NASA-CR-165499; DDA-EDR-10470) Avail: NTIS HC A09/MF A01 CSCL 21E

Propulsion requirements were determined for 0.5 and 0.7 Mach aircraft. Sensitivity studies were conducted on both these aircraft to determine parametrically the influence of propulsion characteristics on aircraft size and direct operating cost (DOC). Candidate technology elements and design features were identified and parametric studies conducted to select the STAT advanced engine cycle. Trade off studies were conducted to determine those advanced technologies and design features that would offer a reduction in DOC for operation of the STAT engines. These features were incorporated in the two STAT engines. A benefit assessment was conducted comparing the STAT engines to current technology engines of the same power and to 1985 derivatives of the current technology engines. Research and development programs were recommended as part of an overall technology development plan to ensure that full commercial development of the STAT engines could be initiated in 1988. T.M.

N82-10038*# Detroit Diesel Allison, Indianapolis, Ind.
PROPULSION STUDY FOR SMALL TRANSPORT AIRCRAFT TECHNOLOGY (STAT), APPENDIX B Final Report
[1980] 11 p refs
(Contract NAS3-21995)
(NASA-CR-165499-App-B; DDA-EDR-10470-App-B) Avail: NTIS HC A02/MF A01 CSCL 21E

Data are tabulated for two conceptual engines designed for small transport aircraft. These are the 1790 W (2400 shp) class engine and the 3579 kW (4800 shp) class engine for the 0.5 M sub N and 0.7 M sub N airplanes, respectively. All data points required to perform the STAT missions are provided including take-off, climb, cruise, loiter, and fuel allowances. The weight, dimensions, price, and maintenance costs are given as well as the installation criteria and equations used for adjusting horsepower for gearbox loss, and converting horsepower to thrust. Scaling equations are included. A.R.H.

N82-10039*# United Technologies Research Center, East Hartford, Conn.
DEVELOPMENT OF LOW MODULUS MATERIAL FOR USE

IN CERAMIC GAS PATH SEAL APPLICATIONS Final Report
H. E. Eaton and R. C. Novak Oct. 1981 83 p refs
(Contract NAS3-22134)
(NASA-CR-165469; R81-915188-13) Avail: NTIS HC A05/MF A01 CSCL 21E

Three candidate materials were examined: Brunsbond (I Pad; plasma sprayed porous NiCrAlY; and plasma sprayed low modulus microcracked zirconia. Evaluation consisted of mechanical, thermophysical, and oxidation resistance testing along with optical microscopy and a feasibility demonstration of attaching the material to a suitable substrate. The goals of the program were the following: feasibility of fastening or depositing the low modulus system onto a broad range of substrate alloys; feasibility of depositing or forming the low modulus system to a thickness of 0.19 cm to 0.38 cm; potential to attain a modulus of elasticity in the range of 3.4 to 6.9 GPa (0.5 to 1.0 MSI), and an ultimate strength of 17.2 MPa (2.5 ksi); suitable thermal conductivity; and static oxidation life of at least 1000 hours at 1311 K. The results of the program indicate that all three systems offer attractive properties as a strain isolator material. T.M.

N82-10040*# General Electric Co., St. Petersburg, Fla.
THERMAL-BARRIER-COATED TURBINE BLADE STUDY Final Report
P. A. Siemers and W. B. Hillig Aug. 1981 134 p refs
(Contract NAS3-21727)
(NASA-CR-165351; SRD-81-063) Avail: NTIS HC A07/MF A01 CSCL 21E

The effects of coating TBC on a CF6-50 stage 2 high-pressure turbine blade were analyzed with respect to changes in the mean bulk temperature, cooling air requirements, and high-cycle fatigue. Localized spallation was found to have a possible deleterious effect on low-cycle fatigue life. New blade design concepts were developed to take optimum advantage of TBCs. Process and material development work and rig evaluations were undertaken which identified the most promising combination as ZrO2 containing 8 w/o Y2O3 applied by air plasma spray onto a Ni22Cr-10Al-1Y bond layer. The bond layer was applied by a low-pressure, high-velocity plasma spray process onto the base alloy. During the initial startup cycles the blades experienced localized leading edge spallation caused by foreign objects. T.M.

N82-10041*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DETERMINATION OF AIRPLANE MODEL STRUCTURE FROM FLIGHT DATA BY USING MODIFIED STEPWISE REGRESSION
Vladislav Klein (Joint Inst. for Advancement of Flight Sciences, Hampton, Va.), James G. Batterson, and Patrick C. Murphy Oct. 1981 48 p refs
(NASA-TP-1916; L-14613) Avail: NTIS HC A03/MF A01 CSCL 01C

The linear and stepwise regressions are briefly introduced, then the problem of determining airplane model structure is addressed. The MSR was constructed to force a linear model for the aerodynamic coefficient first, then add significant nonlinear terms and delete nonsignificant terms from the model. In addition to the statistical criteria in the stepwise regression, the prediction sum of squares (PRESS) criterion and the analysis of residuals were examined for the selection of an adequate model. The procedure is used in examples with simulated and real flight data. It is shown that the MSR performs better than the ordinary stepwise regression and that the technique can also be applied to the large amplitude maneuvers. T.M.

N82-10042*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ESTIMATION OF AIRPLANE STABILITY AND CONTROL DERIVATIVES FROM LARGE AMPLITUDE LONGITUDINAL MANEUVERS
James G. Batterson Oct. 1981 43 p refs
(NASA-TM-83185; L-14524) Avail: NTIS HC A03/MF A01 CSCL 01C

The application of a modified stepwise regression algorithm to both a complete data string and to that same data partitioned into bins as a function of angle of attack was demonstrated. Results from the large-scale maneuver agree well with results from 20 maneuvers in which small perturbation from trim at various angles of attack were induced. T.M.

N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div.
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C

Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

N82-10044# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
ACTIVE CONTROL ELEMENTS ON THE TRANSONIC WING OF THE AIRBUS A-300 (ACTTA A). AIRBUS A-300 WITH REDUCED LONGITUDINAL STABILITY (ACTTA-C) [AKTIVE STEUERELEMENTE AM TRANSSONISCHEN FLUEGEL DES AIRBUS A300 (ACTTA A). AIRBUS A300 MIT REDUZIERTER LAENGSSTABILITAET (ACTTA-C)]
H. G. Klug 1980 34 p In GERMAN Presented at 2nd Bundesministerium fuer Forschung und Technologie Statusseminar Luftfahrtforsch. und Luftfahrtechnol., Garmisch-Partenkirchen, West Germany, 9-9 Oct. 1980
Avail: NTIS HC A03/MF A01

Two projects concerned with the development and design optimization of the Airbus A-300 are reviewed. Studies related to active control are discussed. Investigations specific to gust loading and maneuver induced loading of the A-300 structure are emphasized. Results influence design criteria, e.g., open or closed loop control, sensor selection, etc. Reduced longitudinal stability of the A-300 is then considered as a tradeoff in favor of weight reduction through the use of lightweight materials. Wind tunnel and other simulation tests are described. Author (ESA)

N82-10045# European Space Agency, Paris (France).
SYSTEM IDENTIFICATION OF THE LONGITUDINAL MOTION OF THE DFVLR HFB 320 RESEARCH AIRCRAFT WITH PARTICULAR CONSIDERATION OF CONTROL SURFACE EFFECTIVENESS
Ohad Rix Apr. 1981 55 p refs Transl. into ENGLISH of "Systemidentifizierung des DFVLR-Forschungsflugzeugs HFB 320 in der Laengsbewegung mit besonderer Beruecksichtigung der Steuerflaechenwirksamkeit" Rept. DFVLR-Mitt-79-66 DFVLR, Brunswick, Jul. 1979 Original report in GERMAN previously announced as N81-13971
(ESA-TT-666; DFVLR-Mitt-79-16) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 12

Analysis of the longitudinal motion of the DFVLR HFB-320 research aircraft by means of a maximum likelihood method is described. The control surface effectiveness of separately or simultaneously deflected DLC flaps and spoilers was determined. The flight test technique, and the influence of different mathematical models on the results obtained, are illustrated and discussed. Author (ESA)

N82-10046# European Space Agency, Paris (France).
A CONTRIBUTION TO THE STABILIZATION OF FLIGHT VEHICLE PARACHUTE SYSTEMS
Christos Saliaris and Dieter Muenscher Jun. 1981 30 p refs Transl. into ENGLISH of "Beitrag zur Stabilisierung von Flugkoerper-Fallschirm-Systemen" Rept. Mitt-80-06 DFVLR, Brunswick,

Apr. 1980

(ESA-TT-679; DFVLR-Mitt-80-05) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8.30

The dynamic behavior of a parachute-load system moving in a plane is analyzed. A mathematical model is adopted and a system of nonlinear equations of motion is produced, which are then solved without linearization using a digital computer. Calculations are carried out using a modified guide surface parachute in order to investigate the effects of parachute size, distance between attachment point and canopy, and distance between the attachment point and the center of gravity of the load on the oscillation of the missile. Parameters influencing the variation of the pitch angle of the load with time are also studied. Increasing the canopy and moving the attachment point behind the center of gravity of the load results in better stabilization. The damping increases, i.e. the pitch angle of the load becomes smaller and the period of oscillation decreases. If the distance between the attachment point on the load and the center of the canopy base is varied, there is scarcely any detectable change to the period of oscillation. However, the damping is influenced by a change in this distance; it has a maximum when the distance is approximately that which is customarily used. Author (ESA)

N82-10047# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Abteilung Elastomechanik und Aeroelastische Stabilitaet.

A METHOD FOR DETERMINATION OF THE AEROELASTIC BEHAVIOR OF AIRCRAFT WITH ACTIVE CONTROL SYSTEMS Ph.D. Thesis - Tech. Univ. Carolo-Wilhelmina

Raymond Freymann Feb. 1981 128 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-719)
(DFVLR-FB-81-05) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 26,30

An analytical method for the performance of dynamic calculations on servocontrolled aircraft, based on an extended formulation of the generalized aeroelastic equations is presented. The additional parameters introduced in the extended equations of motion are determined experimentally in a ground vibration test performed on a real aircraft structure as well as with help from an experimental-analytical method for determination of the transfer functions of the hydraulic actuators. The elaborated method is shown satisfactory by comparison of measured and calculated data resulting from investigations performed on a model wing structure with a rudder driven by a hydraulic actuator.
Author (ESA)

N82-10048# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

MULTI-VARIABLE ANALYSIS AND DESIGN TECHNIQUES

Sep. 1981 168 p refs Presented at a Lecture Series held at Ankara, 28-29 Sep. 1981, Bolkesjo, Norway, 1-2 Oct. 1981, and Delft, The Netherlands, 5-6 Oct. 1981
(AGARD-LS-117) Avail: NTIS HC A08/MF A01

The basic theories and concepts involved in the design of advanced guidance and control systems employing state-space and multi-variable design methods are explained. The main topics reviewed include: (1) analysis and synthesis techniques; (2) application of observer and estimation principles; (3) computer-aided design and analysis methods; (4) system simulation techniques; and (5) tests evaluation and validation.

N82-10049# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

THE NEED FOR MULTIVARIABLE DESIGN AND ANALYSIS TECHNIQUES

Rhall E. Pope *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 10 p

Avail: NTIS HC A08/MF A01

Demand for higher accuracy, improved reliability/survivability, and more automation are placing increased emphasis on the control function for successful operation of aircraft weapon systems. Modifications to airframe designs directed at increased maneuverability and reduced weight are placing stringent on flight control systems. Fly-by-wire systems, particularly digital systems, provide the flexibility to not only accommodate but influence airframe design modifications and led to the control configured vehicle (CCV) concept. These advances in air, vehicle design and flight control system implementation are overwhelming traditional design and analysis techniques. Stability and control design specification are inadequate in dealing with statistically unstable vehicles, multiple control loops and high dynamic coupling. Better control system design and analysis techniques are needed which address the multi-input closely coupled dynamic nature of today's and tomorrows aircraft weapon systems.
A.R.H.

N82-10050# Cambridge Univ. (England). Dept. of Engineering.

CHARACTERISTIC AND PRINCIPAL GAINS AND PHASES AND THEIR USE AS MULTIVARIABLE CONTROL DESIGN TOOLS

Alistair G. J. MacFarlane *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 34 p refs

Avail: NTIS HC A08/MF A01

The key to the generalization of classical frequency-response design techniques to the multivariable case lies in the development of ways of suitably extending the concepts of gain and phase. It is shown how algebraic function theory can be used to generalise Nyquist diagram and Root-Locus diagram techniques for use with systems having many inputs and outputs. This is done in such a way that the main structural features of such diagrams can be related to state-space model parameters. The shortcomings of characteristic gains and phases (used in a generalised Nyquist approach) are then noted. An alternative way of introducing amplitude and phase information, via the polar decomposition of an operator, leads to the introduction of principal gains and principal phases. Their properties are examined and, in particular, it is shown how they may be used to characterise robustness. The use of these techniques for design purposes is discussed.
A.R.H.

N82-10051# Honeywell Systems and Research Center, Minneapolis, Minn.

MULTIVARIABLE DESIGN TECHNIQUES BASED ON SINGULAR VALUE GENERALIZATIONS OF CLASSICAL CONTROL

John C. Doyle *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 15 p refs

Avail: NTIS HC A08/MF A01

Singular value analysis was used to generalize the fundamental feedback ideas from classical single loop control theory to multiloop systems. The classical view of measuring the benefit of feedback in terms of desensitizing the system to plant variations and disturbances is discussed. Uncertainty is shown to play a critical role in determining the way in which feedback may be used. Certain singular value plots, called sigma-plots, are introduced as natural and effective generalizations of Bode gain plots and form the basic tools for analysis of multiloop feedback systems. These tools provide reliable means for assessing the stability margins, bandwidth, and desensitizing effects of multiloop feedback systems. Examples of a two input oscillator and control of the rotors of the CH-47 helicopter are given to illustrate the use of the sigma-plots and their interpretations. A.R.H.

N82-10052# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

LIMITATIONS ON ACHIEVABLE PERFORMANCE OF MULTIVARIABLE FEEDBACK SYSTEMS

John C. Doyle *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 9 p refs

Avail: NTIS HC A08/MF A01

The design tradeoffs that are the focus of classical single-loop theory were generalized to multiloop systems using singular value analysis techniques. The first tradeoff is algebraic between large loop gain for good sensitivity properties and small loop gain for stability margins. Another is the functional tradeoff improsed by the Bode gain/phase relations. These tradeoffs impose limitations on the achievable performance of any feedback design. The limitations caused by nonminimum phase zeros are also discussed. The problem of directionality in multiloop systems has no analog in single loop feedback systems is presented and analyzed.
A.R.H.

N82-10053# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

LOG-BASED MULTIVARIABLE DESIGN: FREQUENCY DOMAIN INTERPRETATION

Gunter Stein *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 9 p refs

Avail: NTIS HC A08/MF A01

The use of the Linear-Quadratic-Gaussian (LQG) methodology in designing feedback compensators which meet multivarible performance, stability, and stability robustness requirements expressed as singular value conditions in the frequency domain is demonstrated. A.R.H.

N82-10054# Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

LQG MULTIVARIABLE DESIGN TOOLS

Gunier Stein and Stephen Pratt *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 16 p refs

Avail: NTIS HC A08/MF A01

The basic design algorithms needed for frequency domain oriented Linear-Quadratic-Gaussian feedback design are described and experimental interactive computer aided design package through which these algorithms can be effectively acessed is introduced. The algorithms and design package are illustrated with several flight control design examples for highly maneuverable aircraft. A.R.H.

N82-10055# Groningen Rijksuniversiteit (Netherlands). Mathematics Inst.

DESIGN OF HIGH INTEGRITY MULTIVARIABLE CONTROL SYSTEMS

J. C. Williams *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 10 p refs

Avail: NTIS HC A08/MF A01

The notions of (almost) controlled and conditionally invariant subspaces of linear systems are explained and their application to the synthesis of feedback compensators for disturbance rejection and to robust controller is outlined. The disturbance rejection and the robust controller design problems are viewed as a procedure for designing a high integrity feedback control system. A.R.H.

N82-10056# Toronto Univ. (Ontario). Systems Control Group.

A GEOMETRIC APPROACH TO MULTIVARIABLE CONTROL SYSTEM SYNTHESIS

W. Murray Wonham *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 21 p refs

Avail: NTIS HC A08/MF A01

Multivariable control is discussed with emphasis on Multivariable Control: fundamentals, disturbance decoupling and output stabilization, controllability subspaces, noninteracting control, and regulation and tracking in linear systems and structurally stable nonlinear regulation with step inputs. A version of the internal model principle for controlled sequential machines is included. A.R.H.

N82-10057# McGill Univ., Montreal (Quebec). Dept. of Electrical Engineering.

MULTIVARIABLES DESIGN: THE OPTIMIZATION OF APPROXIMATE INVERSES

G. Zames *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 6 p refs

Avail: NTIS HC A08/MF A01

A mathematical framework for the analysis of sensitivity in multi-input-multi-output linear feedback systems is proposed, based on the concepts of a multiplicative seminorm and an approximate inverse. Many of the empirical results of classical control theory pertaining to the use of lead-lag networks can be deduced in this framework as solutions to well-posed mathematical optimization problems. Moreover, new classes of optimal filters for the reduction of sensitivity are introduced. A definition of optimal sensitivity to plant uncertainty is established. The multiplicative property of seminorms is used to obtain the following principle: for any specified aposteriori accuracy, there is a maximum of apriori plant uncertainty that can be tolerated, and a minimum of identification that is required. Author

N82-10058# McGill Univ., Montreal (Quebec). Dept. of Electrical Engineering.

FEEDBACK AND MINIMAX SENSITIVITY

George Zames and Bruce A. Francis (Waterloo Univ.) *In* AGARD Multi-Variable Analysis and Design Tech. Sep. 1981 8 p refs Sponsored in part by National Science and Engineering Research Council of Canada

(Grant NSF ECS-80-12-565)

Avail: NTIS HC A08/MF A01

Feedbacks that minimize the sensitivity function of a linear, single variable feedback system represented by its frequency responses were considered. Sensitivity is measured in a weighted H (infinity) norm. The single variable cases are studied. The results are extended to unstable plants, and explicit formulas for the general situation of a finite number of RHP plant zeros or poles are provided. The Q or 'approximate-inverse' parameterization of feedbacks that maintain closed-loop stability is extended to the case of unstable plants. The H (infinity) and Wiener-Hopf approaches are compared. A.R.H.

N82-10059*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

EVALUATION OF THE ACOUSTIC MEASUREMENT CAPABILITY OF THE NASA LANGLEY V/STOL WIND TUNNEL OPEN TEST SECTION WITH ACOUSTICALLY ABSORBENT CEILING AND FLOOR TREATMENTS Final Report

Mark A. Theobald May 1978 46 p refs

(Contract NAS1-14611)

(NASA-CR-165796; Rept-3820) Avail: NTIS HC A03/MF A01 CSCL 14B

The single source location used for helicopter model studies was utilized in a study to determine the distances and directions upstream of the model accurate at which measurements of the direct acoustic field could be obtained. The method used was to measure the decrease of sound pressure levels with distance from a noise source and thereby determine the Hall radius as a function of frequency and direction. Test arrangements and procedures are described. Graphs show the normalized sound pressure level versus distance curves for the glass fiber floor treatment and for the foam floor treatment. A.R.H.

N82-10062# Committee on Science and Technology (U. S. House).

AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1981, PART 1

Washington GPO 1981 56 p Rept. to accompany H. R. 2643 Presented by the Comm. on Sci. and Technol. at the 97th Congr., 1st Sess., 19 Mar. 1981

(GPO-76-241-Pt-1) Avail: US Capitol, House Document Room

A bill authorizing appropriations to the FAA in the amount of $85,000,000 for air traffic control, navigation, aviation weather, aviation medicine, and ATC computer modernization for FY-1981-1982 is presented. The Committee directs that funds be reprogrammed to permit completion of the Flight Level 290 and to expedite development of the Doppler weather radar (Nexrad). The request for a trust fund to support $19.81 million of regulatory support research and development was denied. A.R.H.

N82-10063# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AIR-BREATHING ENGINE TEST FACILITIES REGISTER

Joachim H. Krengel, comp. Jul. 1981 122 p

(AGARD-AG-269) Avail: NTIS HC A06/MF A01

A register was compiled, aimed at comprising the test facilities relevant for research and development in NATO countries. Included are test facilities being in use or under construction at the various research organizations, industrial firms, and universities. Test facilities and their technical data are given as far as the response to a questionnaire was received or open literature was available. Test engineers will be able to find whether a test facility suiting their specific demands already exists or may be easily adapted to their purposes. T.M.

N82-10107# European Space Agency, Paris (France).

FLIGHT TEST RESULTS OF THE MODEL SIMULATION CONTROLLER FOR THE HFB 320 FOR IN-FLIGHT SIMULATION OF THE A310 AIRBUS

Hans-Heinz Lange Apr. 1981 72 p refs Transl. into ENGLISH of 'Flugerprobung des modellfolgereglers fuer die HFB 320 zur Simulation des Airbus A 310 in Fluge" Rept. DFVLR-Mitt-79-13

DFVLR, Brunswick, 1979 Original report in GERMAN previously announced as N81-10078
(ESA-TT-660; DFVLR-Mitt-79-13) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 15,40

The onboard computer program which completes the model simulating control system is presented and its fundamental operations explained. The effect of nonlinearities is demonstrated by means of the results of ground simulation of the test aircraft, the control system and the simulated aircraft. The flight test results show the achieved quality of in-flight simulation of the modeled A310 aircraft. Examples of the ground simulation predictions of the overall aircraft and controller system behavior are cited. Author (ESA)

N82-10254# KVB, Inc., Irvine, Calif.
BASELINE DATA ON UTILIZATION OF LOW-GRADE FUELS IN GAS TURBINE APPLICATIONS. VOLUME 3: EMISSIONS EVALUATION Final Report
T. Sonnichsen Jun. 1981 106 p refs Sponsored in part by Electric Power Research Inst.
(EPRI Proj. 1079-3)
(DE81-903764; EPRI-AP-1882-Vol-3) Avail: NTIS HC A06/MF A01

A series of field tests was conducted on two residual-oil-fired gas turbine/heat recovery steam generators (HRSG) comprising a Westinghouse PACE 260-MW combined-cycle unit. Base load emission levels were determined. A series of tests was also made at reduced operating loads. Emission measurements included: (1) gaseous constituents measured by continuous monitoring instrumentation (O2, CO2, NO, NO sub x, and SO2) and by wet chemistry methods (SO3, aldehydes, and chlorides); and (2) particulate characteristics (mass loding, smoke spot number; submicron particle size, and particle morphology). Corrected NO sub x emissions at base load were 170 ppM and 200 ppM with and without HRSG afterburners in service, respectively. The NO sub x emissions decreased with water injection by 50% and were unchanged with the turbine wash. The NO sub x increased with load. DOE

N82-10296*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SYNTHETIC APERTURE RADAR TARGET SIMULATOR Patent Application
Howard A. Zebker (JPL, California Inst. of Technology, Pasadena), Daniel N. Held (JPL, California Inst. of Technology, Pasadena), Richard M. Goldstein (JPL, California Inst. of Technology, Pasadena), and Thomas C. Bickler, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Filed 17 Jul. 1981 15 p
(Contract NAS7-100)
(NASA-Case-NPO-15024-1; US-Patent-Appl-SN-284287) Avail: NTIS HC A02/MF A01 CSCL 17I

A simulator for simulating the radar return, or echo, from a target seen by a SAR antenna mounted on a platform moving with respect to the target is described. It includes a first-in first-out memory which has digital information clocked in at a rate related to the frequency of a transmitted radar signal and digital information clocked out with a fixed delay defining range between the SAR and the simulated target, and at a rate related to the frequency of the return signal. An RF input signal having a frequency similar to that utilized by a synthetic aperture array radar is mixed with a local oscillator signal to provide a first baseband signal to provide a first baseband signal having a frequency considerably lower then that of the RF input signal. T.M.

N82-10326# Boeing Military Airplane Development, Seattle, Wash. Mechanical/Electrical Systems Technology Dept.
ADVANCED AIRCRAFT ELECTRICAL SYSTEM CONTROL TECHNOLOGY DEMONSTRATOR. PHASE 1: REQUIREMENTS ANALYSIS AND CONCEPTUAL DESIGN Interim Technical Report, 1 Sep. 1980 - 28 Feb. 1981
G. L. Dunn, P. J. Leong, and I. S. Mehdi Jul. 1981 103 p refs
(Contract F33615-80-C-2004; AF Proj. 3145)
(AD-A103922; D180-25927-2; AFWAL-TR-81-2058) Avail: NTIS HC A06/MF A01 CSCL 09/3

In Task 1, the requirements for the electrical power system and the integrated power system control were defined. In Task 2, three conceptual designs for the electrical power system were prepared. Each design incorporated a different data bus architecture, integrated, hierarchical, and non-integrated dedicated. The three designs were evaluated for application to a two engine tactical aircraft. Processor and data bus loading were examined for each architecture. Based on the evaluation, the conceptual design based on the integrated architecture is recommended for preliminary design in Task 3, phase I. Author (GRA)

N82-10421# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 9
Judith Nagle-Eshleman, ed. Sep. 1981 123 p refs
(AD-A105062) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Structural dynamic problems inherent to design, analysis, and operation of rotating machinery were investigated. The following Space Shuttle related problems are discussed: analytical and experimental loads, and dynamics efforts; development of data systems and environmental testing programs; Space Shuttle thermal protection system and the Space Shuttle main engine; structural dynamics, dynamic testing, and vibration control.

N82-10452# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastic.
CALCULATION OF NATURAL MODES OF VIBRATION FOR ROTOR BLADES BY THE FINITE ELEMENT METHOD
Fritz Kiessling and Dieter Ludwig Jan. 1981 66 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-81-07) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 14,20

The mass and stiffness matrices for a rotating blade are established by the finite element method. The formulation is based on the Lagrange function presented for combined flapwise bending, chordwise bending, and torsion of twisted nonuniform rotor blades. The element matrices were created by the nonnumeric computer program REDUCE by which it is possible to evaluate the formulas by symbolic manipulation. An ordering scheme was introduced to demonstrate which terms were simplified or neglected. As examples, eigenanalyses are performed for a nonrotating homogeneous beam and for the rotor blade of a wind energy converter. Author (ESA)

N82-10812# Hope Associates, Inc., Washington, D.C.
A COMPREHENSIVE BIBLIOGRAPHY OF LITERATURE ON HELICOPTER NOISE TECHNOLOGY Final Report
A. M. Carter, Jr. Jun. 1981 116 p
(Contract DTFA01-80-Y-10597)
(AD-A103331; FAA-EE-81-4) Avail: NTIS HC A06/MF A01 CSCL 20/1

This bibliography, covering the period 1975 through calendar 1980 also provides abstracts on literature that appear to make a significant contribution to the field of helicopter noise technology. The helicopter is recognized as a complex noise generator, with significant contributions from the rotors, the engine and the gearbox. Progress continues to be made in the noise areas of: (a) Formulations, math models and analytical procedures; (b) Noise prediction methodology; (c) Noise reduction techniques; and (d) Subjective response to helicopter noise. The body of information, data and knowledge has use in many applications, including the reduction of helicopter noise in a cost effective manner and in minimizing annoyance to the civil populace. GRA

N82-10869# Committee on Science and Technology (U. S. House).
NASA AUTHORIZATION, 1982: INDEX
Washington GPO 1981 316 p Hearings on H.R. 1257 before the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 2, 1981
(GPO-84-713) Avail: Committee on Science and Technology

A subject and name index is presented to the testimony delivered, statements received, and questions raised in relation to NASA's budget requests, for program management, construction of facilities, and research and development. A.R.H.

N82-10881# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FINITE DIFFERENCE COMPUTATION OF THE STEADY TRANSONIC POTENTIAL FLOW AROUND AIRPLANES

Luo Shijun, Zheng Yuwen, Qian Hong, and Wang Dieqian *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 5-30 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979

Avail: NTIS HC A17/MF A01

The velocity potential equation was approximated by assuming that the perturbation velocity component in the transverse plane of the body is much smaller than the undistributed flow velocity, while the perturbation velocity component in the longitudinal direction may not be so. It was then solved with mixed schemes of finite differences. The boundary condition on wings (tails) and its wake were approximated similarly. Two numerical examples are included and the results agree well with known wind tunnel test results. T.M.

N82-10982# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SECOND ORDER APPROXIMATION THEORY OF AN ARBITRARY AEROFOIL IN COMPRESSIBLE POTENTIAL FLOW

Lin Chaoqiang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 31-50 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979

Avail: NTIS HC A17/MF A01

The region outside an arbitrary airfoil is conformally transformed into the region outside a unit circle. The transformation functions are expanded into ascending power series and then only those terms up to and including the second order are retained. The resulting formulae are given analytically. The method is nearly an exact solution from the engineering point of view, even for an airfoil with thickness as much as 30 percent of the chord and with maximum camber as much as 10 percent of the chord. T.M.

N82-10983# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AERODYNAMIC CALCULATIONS AND DESIGN OF SUBCRITICAL AEROFOILS

Lin Chaoqiang *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 51-64 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979

Avail: NTIS HC A17/MF A01

A method of calculating the velocity and pressure distribution on an airfoil of given geometrical profile at a given angle of attack in subcritical potential flow is described. Inversely, designing appropriate airfoil geometry and the corresponding angle of attack for a given pressure distribution is discussed. T.M.

N82-10984# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AN AERODYNAMIC DESIGN METHOD FOR TRANSONIC AXIAL FLOW COMPRESSOR STAGE

Zhu Fangynan, Zhou Xinhai, Liu Songling, and Fan Feida *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 65-86 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979

Avail: NTIS HC A17/MF A01

The method is comprised of three main parts: the mean S sub 2 streamsurface calculation, the approximate calculation of S sub 1 streamsurface of revolution, and defining the blade element on the conical surface and stacking the blade airfoil sections. The method is unusual in that the calculation stations for making the S sub 2 streamsurface computations are curves, and particularly in that the airfoil parameters of blade are calculated on a plane tangent to the approximate streamsurface of revolution. On this tangential plane, two dimensional flow is used as basic model to calculate the Mach wave system on the suction surface of cascade entrance region. T.M.

N82-10994# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE AUTOMATIC MATRIX FORCE METHOD AND TECHNIQUES FOR HANDLING MORE COMPLEX COMPUTATIONS WITH GIVEN COMPUTER CAPACITY

Yang Qingxiong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 338-358 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979

Avail: NTIS HC A17/MF A01

The history of using the method for structural computation in domestic aeronautical engineering was reviewed. The development and application of the matrix method was examined. T.M.

N82-10995# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

STRUCTURAL ANALYSIS OF FUSELAGES WITH CUTOUTS BY FINITE ELEMENT METHOD

G. Shoulian, Sun Can, Tang Xuunchun, and Ye Tiangi *In its* Recent Selected Papers of NW Polytech. Univ., pt. 1 (FTD-ID(RS)T-0259-81-Pt-1) 20 Aug. 1981 p 359-378 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 1 (Xian Shaanxi), 1979

Avail: NTIS HC A17/MF A01

The rear part of a transport aircraft's fuselage was studied. It consists of two sections, the front section being a closed cylinder with a floor and the other section containing a large cutout. An idealized structure is considered to have 1950 degrees of freedom. In this analysis, three kinds of finite element were adopted: a flange element with various cross sections; a constant shear flow quadrilateral of arbitrary shape; and a beam element of various cross sections taking account of eccentricity of the nodes from the axes of moment and inertia. A factorization algorithm was adopted in the solution of the system of linear algebraic equations. T.M.

N82-10998# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

MATRIX ANALYSIS OF WINGS

Xu Yuan, Zhu Runziang, Jiang Jinqiag, and Cai Yiuliu *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 76-111 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979

Avail: NTIS HC A18/MF A01

The plate-beam wing constructions are simplified either as plane stress or plate bending models. The triangular element matrix of a laminated plate is introduced as well as the element stiffness matrix of the beam of axially variable rectangular cross section. Two general computer calculation programs are also compiled. Calculations are shown for wings consisting of plates and beams, honeycomb core and solid wings. Compared to the experimental results, the errors in the nodal deflections are generally less than 5%. It is clear that the method adopted has finite accuracy and generality. R.C.T.

N82-11006# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

INITIAL EXPERIMENTAL RESEARCH INTO THE RESPONSE OF TURBOJET ENGINE COMPRESSORS TO DISTORTION OF INTAKE PRESSURE

Chen Fu-qun, Tang Di-yi, Hu Zi-long, Id Wen-lan, Yu Jin-di, Wu Xin-yuan, Zhao Jue-liang, Lin Qi-xun, Wang Zong-yuan, Liu Si-hong et al *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 287-316 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979

Avail: NTIS HC A18/MF A01

The influence which distorations in intake pressure have on the stability and characteristics of the compressors of turbojet engines was investigated. The test bed of a turbojet engines with a nine stage compressor was used as a test bed. The first stage of the compressor was transonic. It was concluded that the capabilities of compressors of this type of turbojet engine are not only determined by the capabilities or characteristics of the compressor but also by the structural arrangement and actual situation of the other components in system of the compressor. Other significant conclusions are reported. R.C.T.

N82-11007# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A PRELIMINARY EXPERIMENTAL INVESTIGATION OF THE RESPONSE OF A TURBOJET ENGINE TO INLET PRESSURE DISTORTION
Chen Fu-qun, Tang Di-yi, Hu Zi-long, Id Wen-lan, Yu Jin-di, Wu Xin-yuan, Zhao Jue-liang, Lin Qi-xun, Wang Zong-yuan, and Liu Si-hong *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 317-346 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979

Avail: NTIS HC A18/MF A01

Preliminary experimental results about the effect of inlet pressure distortion on the characteristics and instability of the axial compressor of a turbojet engine are presented. The experiments were conducted on the test bed on a turbojet engine with a 9-stage compressor, whose first stage is transonic. The tests were run for each of the following cases: (1) at 99% design speed with 180 deg triple-deck 36 mesh screen in front of the engine inlet, i.e., 3x36 mesh; (2) at 90% design speed with 180 deg single-deck 36 mesh screen, i.e., 1x36 mesh; (3) at 90% design speed with clean inlet; and (4) at 87% design speed with a decrease of about 12% of the first stage turbine nozzle exit area. R.C.T.

N82-11008# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AN EXPERIMENTAL INVESTIGATION OF THE ROTATING STALL, SURGE AND WAKE BEHIND THE ROTOR FOR A SINGLE STAGE AXIAL COMPRESSOR
Zhang Weide, Zheng Changsheng, Liu Zhiwei, and Liu Jiafeng *In its* Recent Selected Papers of NW Polytech. Univ., pt. 2 (FTD-ID(RS)T-0260-81-Pt-2) 28 Aug. 1981 p 347-370 refs Transl. into ENGLISH from Recent Selected Papers of NW Polytech. Univ., pt. 2 (Xian Shaanxi), 1979

Avail: NTIS HC A18/MF A01

Dynamic tests were conducted in order to investigate the rotating stall, surge, and wake behind the rotor of a single stage axial compressor. The relationship between the rotating stall and the total turbulence behind the rotor caused by the wake was also studied. It was found that the waveform of the wake behind the rotor shows marked changes when rotating stall approaches. The wake induced degree of total turbulence increases sharply, and therefore may be used as a way to predict rotating stall. The total process of rotating stall and surge as well as the differences between the two and their connection were also compared. R.C.T.

N82-11013*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF VORTEX FLAPS ON THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF AN ARROW WING
Long P. Yip and Daniel G. Murri Nov. 1981 64 p refs
(NASA-TP-1914; L-14575) Avail: NTIS HC A04/MF A01 CSCL 01B

Tests were conducted in the Langley 12-foot low-speed wind-tunnel to determine the longitudinal and lateral-directional aerodynamic effects of plain and tabbed vortex flaps on a flat-plate, highly swept arrow-wing model. Flow-visualization studies were made using a helium-bubble technique. Static forces and moments were measured over an angle-of-attack range from 0 deg to 50 deg for sideslip angles of 0 deg and + or - 4 deg. A.R.H.

N82-11014# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technol. Div.
ACTA MECHANICA SINICA
11 Sep. 1981 47 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979 70-73
(AD-A105184; FTD-ID(RS)T-0704-81) Avail: NTIS HC A03/MF A01 CSCL 01/2

Various fluid dynamics problems are discussed including the computation of three-dimensional flow in turbomachinery, the design of wing root regions of aircraft wing-body combinations, and the diffraction and reflection of traveling shock waves.

N82-11015# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ARBITRARY QUASI-ORTHOGONAL SURFACE METHOD FOR COMPUTING THREE-DIMENSIONAL FLOW IN TURBINE MACHINERY. 2. CALCULATION OF THE THREE-DIMENSIONAL FLOW WITH THE S SUB 1-SURFACE TWISTED
Xin Xiao-Kang, Jiang Jin-Liang, and Zhu Shi-Can *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 1-19 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1979
Avail: NTIS HC A03/MF A01 CSCL 01/2

On the basis of the quasi-orthogonal surface method, a three-dimensional flow field solution of inviscous fluids in turbine machinery is obtained. This method, under the condition allowed by the storage of the computer, can calculate any shapes of S sub 1 and S sub 2 surfaces (including twisting S sub 1 surfaces) and obtain the shapes of space streamlines and the three-dimensional distribution of parameters such as velocity. The calculations for the two conditions of a centrifugal compressor with a small impeller (phi 110) indicate the relative value of the twist of the S sub 1 surface is about 3 to 10 percent. The S sub 1 surface shows a double twist like a twist drill from the inlet to the outlet. M.G.

N82-11016# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PRINCIPLES AND METHODS FOR SHAPING THE WING ROOT REGIONS OF A WING-BODY COMBINATION AT TRANSONIC AND LOWER SUPERSONIC SPEEDS

Yang Tao Sheng, Tai Chia Tsun, Chen Ching Sung, and Fan I. Chia *In its* Acta Mech. Sinica (FTD-ID(RS)T-0704-81) 11 Sep. 1981 p 20-35 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no 1, 1979

Avail: NTIS HC A03/MF A01 CSCL 01/2

The principles and methods for the combined shaping of the wing root regions of a wing-body combination, in accordance with the requirements of area rule and shockless pressure field, are discussed. It is shown that the favorable non-midwing arrangement is able to reduce the amount of fuselage shaping required for the reduction of the zero lift wave drag of a wing-body combination. The combined shaping so designed may thus be realized more easily in structural arrangement. M.G.

N82-11024# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THEORETICAL INVESTIGATIONS AND EXPERIMENTAL RESEARCHES FOR HIGHER SUBSONIC TWO-DIMENSIONAL COMPRESSOR CASCADE
Yan Ru-qun and Qian Zhao-yan *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 1-34 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Thermophys. Eng. Technol. Conf., Gui Lin, China, Apr. 1980
Avail: NTIS HC A05/MF A01 CSCL 21/5

Compressible turbulence flow boundary layer theory and several characteristic boundary layer parameters (momentum thickness, form factors, energy factors and other combinational parameters) were combined with simplified gas flow speed distributions in the boundary layers in the wake behind the blade cascade and used to deduce, on the basis of the research foundation accumulated in the past about the theory of blade cascade losses, a simplified equation for the calculation of total two-dimensional blade cascade pressure losses for subsonic and transonic speeds. With this equation, it is possible to calculate the two-dimensional blade cascade pressure losses in designed operational configurations and off-designed operational configurations. A graphical method for determining the corrected gas compressibility effect in the blade cascade of compressors under operating conditions involving higher subsonic and transonic speeds is also introduced. A.R.H.

N82-11025# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A THEORETICAL ANALYSIS OF THE STREAM SURFACE OF REVOLUTION WITH SUPERSONIC INLET FLOW IN A TRANSONIC AXIAL COMPRESSOR
Xu Jian-zhong, Jiang Zuo-ren, Yang Jin-sheng, Zheng Ying, and Du Zhuan-she *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. and Technol. Conf., Gui Lin, China, Apr. 1980

Avail: NTIS HC A05/MF A01 CSCL 21/5

Changes in the gas flow velocity triangle behind the shock waves being considered were studied in an effort to analyze the effect which shock waves have on gas flow. A planar oblique relationship formula was used to deduce the corresponding values of changes in velocity moment, pressure losses, and total pressure ratios. This explains the important phenomenon involved when the supersonic intake cross section shock waves of transonic compressors cause addition pressurization of gas flow (supercharging). Aerodynamic and thermodynamic analyses and calculations were then carried out on the tip cross sections of the rotors. The characteristic curve calculations for the shock waves in front of the blade cascades and for the intake areas of these cascades are examined. Passageway shock waves are also calculated. Results are discussed. A.R.H.

N82-11027# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A NEW METHOD OF COOLING TURBINE VANES

Gu Wei-zao, Zhang Yu-ming, and Xu Hong-kun *In its* J. of Eng. Thermophys. (Selected Articles) (FTD-ID(RS)T-0570-81) 16 Sep. 1981 p 65-71 refs Transl. into ENGLISH from Gongcheng Rewuli Xuebao (China), v. 2, no. 1, Feb. 1981 Presented at the 3rd Ann. All-China Eng. Thermophys. Technol. Conf., Gui Zhoy, China, Apr. 1980

Avail: NTIS HC A05/MF A01 CSCL 21/5

The combined use of an internal cooling process with strengthened blades and of additives to lessen heat transfer to the blades from fuel gasses is proposed as a means of increasing intake temperature in aircraft turbine engines. Topics covered include coarseness-strengthened heat exchange in the inner passageways of blades and the precipitation of silicon dioxide particles in fuel gases onto blade surfaces. Temperature calculations made for the first stage guide vanes of the MK202 engine are included. A.R.H.

N82-11033*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

WIND-TUNNEL RESULTS FOR A MODIFIED 17-PERCENT-THICK LOW-SPEED AIRFOIL SECTION

Robert J. McGhee and William D. Beasley Nov. 1981 87 p refs

(NASA-TP-1919; L-14666) Avail: NTIS HC A05/MF A01 CSCL 01A

Wind-tunnel tests were conducted in the Langley low-turbulence pressure tunnel to evaluate the effects on performance of modifying a 17-percent-thick low-speed airfoil. The airfoil contour was altered to reduce the pitching-moment coefficient by increasing the forward loading and to increase the climb lift-drag ratio by decreasing the aft upper surface pressure gradient. The tests were conducted over a Mach number range from 0.07 to 0.32, a chord Reynolds number range 1.0 x 10 to the 6th power to 12.0 x 10 to the 6th power, and an angle-of-attack range from about -10 deg to 20 deg. Author

N82-11034# National Aerospace Lab., Tokyo (Japan).

NEW ESTIMATION METHOD FOR FLUTTER OR DIVERGENCE BOUNDARY FROM RANDOM RESPONSES AT SUBCRITICAL SPEEDS

Yuji Matsuzaki and Yasukatsu Ando Apr. 1981 15 p refs

(NAL-TR-667T; ISSN-0389-4-10) Avail: NTIS HC A02/MF A01

A new technique for estimating the flutter or divergence boundary from responses due to turbulence at subcritical speeds is described. The boundary can be predicted without estimating or measuring the dampings and frequencies of the aeroelastic modes. The sampled time response is modeled by the mixed autoregressive moving average process. The orders and coefficients of both autogressive and moving average parts of the process are determined with the aid of Akaike's estimation procedure. The stability boundary is estimated by using Jury's stability determinants which are expressed in terms of the autogressive coefficients alone. The modal frequencies and dampings are also evaluated from the coefficients. The technique proposed has been applied with success to signals from a cantilever wing model tested in a low supersonic flow. Comparison between the actual and estimated flutter boundaries shows that an accurate estimation can be made from data obtained in a narrow range of the dynamic pressure which is sufficiently below the boundary. Author

N82-11035# National Aerospace Lab., Tokyo (Japan). First Airframe Div.

A STUDY ON NUMERICAL METHOD FOR EVALUATING SPANWISE INTEGRAL IN SUBSONIC LIFTING-SURFACE THEORY

Teruo Ichikawa Mar. 1981 22 p refs

(NAL-TR-661T; ISSN-3989-4010) Avail: NTIS HC A02/MF A01

Two disputable points are discussed. The first point is the coincidence of each collocation section with one of the spanwise integration points. The second point is the relatively small, but undesirable, sharp variation of the regularized influence functions near the collocation sections. Two proposals for coping with these difficulties are made. Their effects are examined by computing the downwash at the surface of a steady rectangular wing subjected to a simple wing loading. It is shown that method 1, which avoids the coincidence, makes it possible, with no losses in accuracy, to greatly reduce the computing time in cases of oscillating wings. Further, it is shown that remarkable improvement in convergence with respect to the number of spanwise integration points is obtained by method 2 which distributes the spanwise integration points densely only near the collocation sections. T.M.

N82-11039*# North Carolina State Univ., Raleigh. Center for Sound and Vibration.

AIRCRAFT WING TRAILING-EDGE NOISE

Ronald L. Underwood and Thomas H. Hodgson 1981 145 p refs

(Grant NsG-1377)

(NASA-CR-164952) Avail: NTIS HC A07/MF A01 CSCL 01A

The mechanism and sound pressure level of the trailing-edge noise for two-dimensional turbulent boundary layer flow was examined. Experiment is compared with current theory. A NACA 0012 airfoil of 0.61 m chord and 0.46 m span was immersed in the laminar flow of a low turbulence open jet. A 2.54 cm width roughness strip was placed at 15 percent chord from the leading edge on both sides of the airfoil as a boundary layer trip so that two separate but statistically equivalent turbulent boundary layers were formed. Tests were performed with several trailing-edge geometries with the upstream velocity U sub infinity ranging from a value of 30.9 m/s up to 73.4 m/s. Properties of the boundary layer for the airfoil and pressure fluctuations in the vicinity of the trailing-edge were examined. A scattered pressure field due to the presence of the trailing-edge was observed and is suggested as a possible sound producing mechanism for the trailing-edge noise. T.M.

N82-11042*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

LOW SPEED TESTING OF THE INLETS DESIGNED FOR A TAMDEN-FAN V/STOL NACELLE

Robert C. Williams and Andres H. Ybarra (Vough Corp., Dallas) 1981 13 p refs Presented at the V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981

(NASA-TM-82726; E-1031; AIAA-81-2627) Avail: NTIS HC A02/MF A01 CSCL 01A

An approximately 0.25 scale model of a tandem fan nacelle, designed for a subsonic V/STOL aircraft, was tested in a Lewis wind tunnel. Model variables included long and short aft inlet cowls and the addition of exterior strakes to the short inlet cowl. Inlet pressure recoveries and distortion were measured at pitch angles to 40 deg and at combinations of pitch and yaw to 30 deg. Airspeeds covered a range to 135 knots (69 m/sec). The short aft inlet with added strakes had the best aerodynamic performance and is considered suitable for the intended V/STOL application. T.M.

N82-11043*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

A SUMMARY OF V/STOL INLET ANALYSIS METHODS

Danny P. Hwang 1981 12 p refs Presented at the V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981

(NASA-TM-82725; E-1027) Avail: NTIS HC A02/MF A01 CSCL 01A

Recent extensions and applications of the methods are emphasized. They include the specification of the Kutta condition for a slotted inlet, the calculation of suction and tangential blowing for boundary layer control, and the analysis of auxiliary inlet geometries at angles of attack. A comparison is made with experiment for the slotted inlet. An optimum diffuser velocity distribution was developed. T.M.

N82-11046*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPUTATION OF HIGH REYNOLDS NUMBER INTERNAL/EXTERNAL FLOWS
Michael C. Cline and Richard G. Wilmoth 1981 12 p refs Presented at the 5th AIAA Computational Fluid Dyn. Conf., Palo Alto, Calif., 22-23 Jun. 1981
(Contract W-7405-eng-36)
(NASA-TM-84049; DE81-025343; LA-UR-81-1882; CONF-810664-2) Avail: NTIS HC A02/MF A01 CSCL 01A

A general, user oriented computer program, called VNAP2, was developed to calculate high Reynolds number, internal/external flows. The VNAP2 program solves the two dimensional, time dependent Navier-Stokes equations. The turbulence is modeled with either a mixing-length, a one transport equation, or a two transport equation model. Interior grid points are computed using the explicit MacCormack Scheme with special procedures to speed up the calculation in the fine grid. All boundary conditions are calculated using a reference plane characteristic scheme with the viscous terms treated as source terms. Several internal, external, and internal/external flow calculations are presented. DOE

N82-11047# Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.
THREAT ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS) SYMPOSIUM
22 Jul. 1981 177 p refs Symp. held at Washington, D.C., 22 Jul. 1981
(AD-A104563; FAA-RD-81-76) Avail: NTIS HC A09/MF A01 CSCL 01/4

The Federal Aviation Administration held a symposium on Threat Alert and Collision Avoidance System (TCAS) in Washington, D.C., July 22, 1981, which was attended by representatives of 68 organizations and 21 airlines. This report contains the news release announcing the new approach to providing protection against mid-air collisions, 10 presentations and the transcript of the panel discussion. The TCAS will provide a range of capabilities and costs which will meet the requirements of all airspace users. The least complex part of the system is designed for private pilots and would cost about $2,500. The fully capable, or airline, version would cost between $45,000 and $50,000. This new concept represents a new capability which draws on all FAA has learned about collision avoidance in its past efforts, extends and simplifies FAA's efforts to date, provides new capabilities to all users, and is fully compatible with international standards and improvement activities on the Secondary Surveillance Radar (SSR). Author (GRA)

N82-11048# Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
FLIGHT TRAJECTORY CONTROL INVESTIGATION Final Report, 15 May 1978 - 30 Oct. 1980
M. Bird and J. Karmarker Wright-Patterson AFB, Ohio AFWAL Mar. 1981 174 p refs
(Contract F33615-78-C-3607; AF Proj. 2403)
(AD-A104542; ID-05R-1180; AFWAL-TR-81-3012) Avail: NTIS HC A08/MF A01 CSCL 17/9

Optimal control algorithms for four-dimensional guidance of a transport aircraft were investigated for feasibility. Cost function constraints on the optimal reference path generator appeared impossible to achieve and the optimal guidance algorithms do not achieve significant performance improvement without excessive increases in sophistication and cost of the onboard avionics computer. A modularized existing Mission Management system allows a three-phase flight test plan to demonstrate the operational capability of the existing classical integrated flight trajectory control algorithms. Author (GRA)

N82-11049# General Accounting Office, Washington, D. C. Community and Economics Development Div.
FAA MISSES OPPORTUNITIES TO DISCONTINUE OR REDUCE OPERATING HOURS OF SOME AIRPORT TRAFFIC CONTROL TOWERS Report to the Congress
1 Jun. 1981 39 p
(PB81-224214; CED-81-100) Avail: NTIS HC A03/MF A01 CSCL 17G

FAA is not adequately surveying or evaluating air traffic levels at 24 hour control towers to identify opportunities to reduce operating hours and save money. GRA

N82-11050*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PARAMETRIC STUDY OF MICROWAVE-POWERED HIGH-ALTITUDE AIRPLANE PLATFORMS DESIGNED FOR LINEAR FLIGHT
Charles E. K. Morris, Jr. Nov. 1981 74 p refs
(NASA-TP-1918; L-14606) Avail: NTIS HC A04/MF A01 CSCL 01C

The performance of a class of remotely piloted, microwave powered, high altitude airplane platforms is studied. The first part of each cycle of the flight profile consists of climb while the vehicle is tracked and powered by a microwave beam; this is followed by gliding flight back to a minimum altitude above a microwave station and initiation of another cycle. Parametric variations were used to define the effects of changes in the characteristics of the airplane aerodynamics, the energy transmission systems, the propulsion system, and winds. Results show that wind effects limit the reduction of wing loading and the increase of lift coefficient, two effective ways to obtain longer range and endurance for each flight cycle. Calculated climb performance showed strong sensitivity to some power and propulsion parameters. A simplified method of computing gliding endurance was developed. S.L.

N82-11052*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TESTS OF A COMPOSITE POROUS LEADING EDGE FOR USE WITH A LIQUID ANTI-ICE SYSTEM
David L. Kohlman Sep. 1981 21 p refs
(Grant NAG3-71)
(NASA-CR-164966; KU-FRL-464-3) Avail: NTIS HC A02/MF A01 CSCL 01C

The efficacy of liquid ice protection systems which distribute a glycol-water solution onto leading edge surfaces through a porous skin was demonstrated in tests conducted in the NASA Lewis icing research tunnel using a composite porous leading edge panels. The data obtained were compared with the performance of previously tested stainless steel leading edge with the same geometry. Results show: (1) anti-ice protection of a composite leading edge is possible for all the simulated conditions tested; (2) the glycol flow rates required to achieve anti-ice protection were generally much higher than those required for a stainless steel panel; (3) the low reservoir pressures of the glycol during test runs indicates that more uniform distribution of glycol, and therefore lower glycol flow rates, can probably be achieved by decreasing the porosity of the panel; and (4) significant weight savings can be achieved in fluid ice protection systems with composite porous leading edges. The resistance of composite panels to abrasion and erosion must yet be determined before they can be incorporated in production systems. A.R.H.

N82-11053*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SELECTED BIBLIOGRAPHY OF NACA-NASA AIRCRAFT ICING PUBLICATIONS
John J. Reinmann, comp. Aug. 1981 127 p
(NASA-TM-81651; E-668) Avail: NTIS HC E15/MF A01 CSCL 01C

A summary of NACA-NASA icing research from 1940 to 1962 is presented. It includes: the main results of the NACA icing program from 1940 to 1950; a selected bibliography of 132 NACA-NASA aircraft icing publications; a technical summary of each document cited in the selected bibliography; and a microfiche copy of each document cited in the selected bibliography. T.M.

N82-11054*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPARISON OF THEORETICAL AND EXPERIMENTAL PRESSURE DISTRIBUTIONS FOR TWO ADVANCED FIGHTER WINGS
H. P. Haney (Vought Corp., Dallas) and R. M. Hicks Oct. 1981 87 p refs
(NASA-TM-81331; A-8741) Avail: NTIS HC A05/MF A01 CSCL 01C

A comparison was made between experimental pressure distributions measured during testing of the Vought A-7 fighter and the theoretical predictions of four transonic potential flow codes. Isolated wind and three wing-body codes were used for comparison. All comparisons are for transonic Mach numbers and include both attached and separate flows. In general, the wing-body codes gave better agreement with the experiment than did the isolated wing code but, because of the greater complexity of the geometry, were found to be considerably more expensive and less reliable. Author

N82-11055# Computational Mechanics Consultants, Knoxville, Tenn.
A NUMERICAL THREE-DIMENSIONAL TURBULENT SIMULATION OF A SUBSONIC VSTOL JET IN A CROSS-FLOW USING A FINITE ELEMENT ALGORITHM Final Report, Sep. 1979 - Sep. 1980
A. J. Baker, J. A. Orzechowski, and P. D. Manhardt Jun. 1981 72 p refs
(Contract N62269-79-C-0295)
(AD-A104514; NADC-79021-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

The purpose of this study, the results of which are reported herein, was to formulate a mathematical model of the basic VSTOL jet, and to validate its appropriateness by performing a series of computational experiments on the discrete analog (numerical) approximation to the mathematical description. Since the VSTOL jet problem is essentially steady, turbulent and fully three-dimensional, the mathematical description must be quite comprehensive. The approach selected was to utilize a continuity-constrained, finite element algorithm for solution of the parabolized form of the time-averaged, three-dimensional Navier-Stokes equations (3DPNS). The essential ingredients of this algorithmic description are presented and discussed. A production finite element computer code (COMOC:3DPNS) was utilized to conduct the computational experiments, and the description of problem definition and data deck preparation is contained at the end of the report. The key results of the computational experiments are discussed, regarding the basic causal mechanisms of the VSTOL jet, as well as results for confirmation test cases documenting viability of the constructed computational model. Author (GRA)

N82-11056# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ROTORCRAFT ICING: STATUS AND PROSPECTS
Aug. 1981 136 p refs
(AGARD-AR-166; ISBN-92-835-1397-5) Avail: NTIS HC A07/MF A01

The impact of icing meteorological conditions on helicopter operations was examined, and methods for improving ice protection investigated.

N82-11057# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
OPERATIONAL ENVIRONMENT, METEOROLOGICAL CONDITIONS AND WEATHER FORECASTING
In its Rotorcraft Icing Aug. 1981 p 1-13 refs

Avail: NTIS HC A07/MF A01

Helicopter icing is a significant operational consideration for helicopters operating throughout Europe. Existing weather statistics demonstrate significant operational limitations during the winter months, and for as much as five percent of the time on a year-around basis. Unfortunately the existing meteorological data base is insufficient to describe the operating environment in which NATO rotorcraft must conduct flight. At present for design purposes, the United States Federal Air Regulation 25 Appendix C or the UK Icing Atmosphere are employed for determination of airworthiness release of helicopters. However, neither of these atmospheres adequately defines the operational environment. This condition is exacerbated by the fact that forecasting techniques are currently inadequate to allow unrestricted helicopter operations in icing conditions. Increased coordination among cloud physicists, forecasters, and helicopter icing specialists is needed - and ultimately a new icing atmosphere is required to better define the helicopter operational icing requirements. J.D.H.

N82-11058# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
TECHNOLOGY BASE FOR ICING INSTRUMENTATION AND MATHEMATICAL MODELLING
In its Rotorcraft Icing Aug. 1981 p 14-33 refs

Avail: NTIS HC A07/MF A01

The fundamental mechanisms of ice accretion and shedding from rotor airfoils are considered. It is felt that an opportunity exists to exploit a combination of two-dimensional model and three-dimensional model scale testing, measurement of ice release mechanisms, inclusion of heat transfer models, and consideration of icing simulation. These efforts should be aimed at development of analytical models verified by both laboratory and full-scale data which then can be used to better predict performance of rotors in icing conditions. Only with the above analytical basis can ice accretion and shedding characteristics become sufficiently predictable to permit the determination of what type of ice protection is necessary or, conversely, what degree of flight envelope release might be permitted with a given level of ice protection. Further improvement in research and development of operational icing sensors is recommended. J.D.H.

N82-11059# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
FACILITIES FOR DEVELOPMENT AND CLEARANCE
In its Rotorcraft Icing Aug. 1981 p 34-53

Avail: NTIS HC A07/MF A01

A catalog of all NATO icing test facilities was compiled. It is recommended that the Canadian National Research Council's small high speed icing tunnel is a one-of-a-kind facility that needs to be available to support analytical development recommended, and that the tunnel should be reactivated or replaced. A decision has been made to retain the Ottawa Spray Rig in operational status for the near future. Efforts underway at the NASA-Lewis Research Center regarding rehabilitation of the Icing Research Tunnel and considering a major new icing test facility are endorsed. The US Army Helicopter Icing Spray System Improvement Program is also supported by the Working Group and, as a recommendation for future discussion, the need for European airborne icing spray systems should be considered. A conclusion reached by the Working Group is that current full scale development and qualification facilities and procedures are extremely expensive and time consuming. J.D.H.

N82-11060# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ICE PROTECTION SYSTEM TECHNOLOGY
In its Rotorcraft Icing Aug. 1981 p 54-99 refs

Avail: NTIS HC A07/MF A01

Deicing systems technology concepts are discussed. The conclusion is that electrothermal deicing systems are the only effective present system for broad application. However, it is noted that the cost of electrothermal deicing in terms of weight, power and expense is high, and provides an incentive for examination of alternatives. Therefore, additional work is clearly warranted on options such as ice phobics, fluid ice suppressant systems, pneumatic boots, vibratory surface systems, microwave and other hybrid systems concepts. It is recommended that the operational limitations of ice protected aircraft such as the Black Hawk and Puma, be explored with the ice protection systems deliberately turned off, so as to simulate an aircraft without (or with inoperative) ice protection. Only through such definition of the actual icing environment can a better estimation be made of the operational impact of icing conditions on helicopter flight operations. J.D.H.

N82-11061# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
PROPOSED STANDARD REQUIREMENTS AND PROCEDURES FOR ICING CLEARANCE
In its Rotorcraft Icing Aug. 1981 p 100-117

Avail: NTIS HC A07/MF A01

A set of proposed standard requirements and procedures for icing clearance is presented. It is felt that this clearance procedure constitutes a basis for NATO-wide icing clearance and should be adopted by the NATO military community as an interim approach. The opportunity also exists to consider this proposal for civil icing clearance. J.D.H.

N82-11062# Hughes Aircraft Co., El Segundo, Calif. Display Systems Lab.
STUDY AND DEVELOPMENT OF AN INTEGRATED HEAD-UP DISPLAY Final Report, 1 Jul. 1976 - 31 Aug. 1980
Michael N. Ernstoff Jun. 1981 112 p refs
(Contract F33615-76-C-1243; AF Proj. 2003)
(AD-A104337; HAC-D6210; AFWAL-TR-81-1042) Avail: NTIS HC A06/MF A01 CSCL 14/5

The purpose of the Integrated Head-Up Display (I-HUD) program was to demonstrate the advantages associated with using a Liquid Crystal Matrix Display and Diffraction Optics combiner in the design and construction of a high brightness head-up display system. The program resulted in the design and fabrication of the I-HUD brassboard consisting of a pilot's display unit, built in a form factor similar to that of the production F16 HUD, and test support equipment. The following devices and modules were developed: A 350-by-350 pixel Liquid Crystal Matrix Display complete with custom LSI circuit drivers, a diffraction optics combiner, a diffraction optics diffusing screen, a specular mode projector, and custom lamp with a narrow band (green) spectral output. Although the completed I-HUD brassboard did not meet all of its design goals, it does demonstrate the feasibility of applying advanced technology to the designs of Head-Up Displays. The I-HUD program has succeeded in solving many of the fundamental design problems associated with this approach and stands as a milestone in the development of solid state display devices and the development of more highly reliable, cost effective Head-Up Displays. GRA

N82-11063# Panametrics, Inc., Waltham, Mass.
ADVANCED FUEL FLOWMETER FOR FUTURE NAVAL AIRCRAFT Final Report, Dec. 1977 - Apr. 1981
L. C. Lynnworth, N. E. Pedersen, J. E. Bradshaw, J. E. Matson, E. S. Johansson, and T. H. Nguyen 28 Jun. 1981 149 p refs
(Contract N62269-78-C-0069)
(AD-A104364; NADC-80254-60) Avail: NTIS HC A07/MF A01 CSCL 21/4

A fuel mass flowmeter was developed with the objective of accurately measuring the mass flow rate M-dot of various fuels and their mixtures, for flow rates from 91 to 11,364 kg/hr (200 to 25,000 lb/hr). The delivered system included: (1) an area averaging zigzag flow velocimeter cell, in which the fuel was interrogated in opposite directions by an alternating sequence of ultrasonic pulses, to determine the area averaged flow velocity, V-bar; (2) a densitometer based on the Clausius-Mosotti law, in which the fuel density rho is determined; and (3) electronics which computed rho and V-bar separately, and then generated a square wave output having a frequency proportional to the product of rho and V-bar, namely M-dot = rho(V-bar)A, where A = velocimeter cell cross sectional area. The transducers can operate beyond the temperature range -38 to +150 C, and the flow cell, with transducers, at pressures up to 1500 psig and in the 3-axis, 20 g, 5 to 2000 Hz vibration environment specified by MIL Std. 810-514.1, except for noise problems at a few discrete frequencies. GRA

N82-11064# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, DATA TRANSMISSION STUDY Interim Report, Jun. 1979 - Aug. 1980
Aug. 1980 57 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A104243; ACS-12177; USAAVRADCOM-TR-79-0270-1; IR-1) Avail: NTIS HC A04/MF A01 CSCL 17/2

The development of nonmission related status information is one area of rotary wing instrumentation which has not kept pace with the state of art. This includes raw data, discrete and summary status information related to the engine, transmission, rotor, fuel, hydraulic and electrical subsystems. The objective of this report is to define an efficient and cost effective data transmission method for an electronic master monitor and advisory display system (EMMADS). Several current standard and nonstandard data bus specifications which are applicable to the EMMADS system are introduced. Their tradeoff in terms of hardware, software and system considerations are compared. It should be noted that a typical standard bus specs addresses only the protocol and message formats, not the mechanization of the control algorithm. Hence there is a considerable variation in implementation and cost even for the same bus standard. The materials represent a snapshot of the current state of the art technology. The use of optical fiber instead of conventional electrical cable (such as coaxial) as the transmission medium is also investigated based on the current technical reports. The problems of electromagnetic interference (EMI), and rejection techniques are mentioned. GRA

N82-11065# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, HUMAN ENGINEERING SUMMARY REPORT Interim Report, Jun. 1979 - Jun. 1981
Jun. 1981 227 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A104244; ACS-12385; USAAVRADCOM-TR-79-0270-3; IR-3) Avail: NTIS HC A11/MF A01 CSCL 17/2

Information requirements, information handling formats, and the necessary display/control design criteria are discussed for a system being developed to integrate and display nonmission related information on the status of various subsystems on rotary wing aircraft. GRA

N82-11066# Los Alamos Scientific Lab., N. Mex. Electronics Div.
OUTSIDER'S LOOK AT FLIGHT INSTRUMENTATION
Arvid S. Lundy 1981 7 p refs Presented at the AIAA/SAE/ASME Joint Propulsion Conf., Colorado Springs, Colo., 27-29 Jul. 1981
(Contract W-7405-eng-36)
(DE81-025409; LA-UR-81-1748; CONF-810724-1) Avail: NTIS HC A02/MF A01

Ideas and speculations on possible diagnostic instrumentation for use in missile flight testing are presented. Techniques for use in the development of flight instrumentation are recommended. DOE

N82-11067# National Aerospace Lab., Tokyo (Japan).
NEW MOLDING METHOD OF THREE-DIMENSIONAL HOLLOW PHOTOELASTIC MODEL AND CENTRIFUGAL STRESS ANALYSIS OF AIR COOLED TURBINE BLADE MODEL
Toyoaki Yoshida, Katsutoshi Matsusue, Kitao Takahara, and Ryosaku Hashimoto May 1981 17 p refs In ENGLISH; JAPANESE Summary
(NAL-TR-427T; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

A new molding method for a three dimensional hollow photoelastic model was invented and centrifugal stress analysis performed for air cooled turbine blade models to which the new method was applied. A distinctive feature of the molding method is the introduction of a copper coated wax core which forms a three dimensional hollow shape inside a model. The air cooled turbine photoelastic model with a coolant passage simulates the first stage rotor blade in the high temperature turbine full scale model HT-10H used at the NAL. The results of stress analysis cleared the critical regions and stress magnitude and thus they are of great aid to the successful development of a full scale turbine model. Author

N82-11068*# Teledyne Continental Motors, Muskegon, Mich. General Products Div.
LIGHTWEIGHT DIESEL ENGINE DESIGNS FOR COMMUTER TYPE AIRCRAFT
Alex P. Brouwers Jul. 1981 70 p refs
(Contract NAS3-22149)
(NASA-CR-165470; Rept-995) Avail: NTIS HC A04/MF A01 CSCL 21E

Conceptual designs and performance of advanced technology lightweight diesel engines, suitable for commuter type aircraft power plants are defined. Two engines are discussed, a 1491 kW (2000 SHP) eight-cylinder engine and a 895 kW (1200 SHP) six-cylinder engine. High performance and related advanced technologies are proposed such as insulated cylinders, very high injection pressures and high compressor and turbine efficiencies. The description of each engine includes concept drawings, a performance analysis, and weight data. Fuel flow data are given for full and partial power up to 7620m altitude. The performance data are also extrapolated over a power range from 671 kW(900 SHP) to 1864 kW (2500 SHP). The specific fuel consumption of the 1491 kW (2000 SHP) engine is 182 g/hWh (.299 lb/HPh) at cruise altitude, its weight 620 kg (1365 lb.) and specific weight .415 kg/kW (.683 lb/HP). The specific fuel consumption of the 895 kW (1200 SHP) engine is 187 g/hWh (.308 lb/HPh) at cruise altitude, its weight 465 kg (1025 lb.) and specific weight .520 kg/kW (.854 lb/HP). R.J.F.

N82-11069# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
SUBSONIC CASCADE WIND TUNNEL TESTS USING A COMPRESSOR CONFIGURATION OF DCA BLADES M.S. Thesis
Frank S. Cina Jun. 1981 210 p refs
(AD-A104597) Avail: NTIS HC A10/MF A01 CSCL 21/5

Tests are reported in which air incidence angle was varied to a cascade of 20 blades, 5 inches in chord with aspect ratio of 2.0 and solidity of 1.67. Preliminary blade element performance data were obtained using pneumatic probe surveys and surface pressures were also measured. Results of preparatory tests of a similar cascade of 15 C-series blades at a solidity of 1.28 are also included. Whereas the flow in the C-series blading cascade was always acceptable, the flow in the DCA blading cascade was not acceptable at negative incidence angles. A modification of the cascade inlet guide vanes is recommended which will guarantee periodic conditions and serve to generate more nearly uniform inlet flow at all test conditions. Author (GRA)

N82-11070*# Analytical Mechanics Associates, Inc., Hampton, Va.
AN INFLUENCE COEFFICIENT METHOD FOR THE APPLICATION OF THE MODAL TECHNIQUE TO WING FLUTTER SUPPRESSION OF THE DAST ARW-1 WING Final Report
Samuel Pines Nov. 1981 49 p refs
(Contract NAS1-15593)
(NASA-CR-165772; AMA-81-25) Avail: NTIS HC A03/MF A01 CSCL 01C

The methods used to compute the mass, structural stiffness, and aerodynamic forces in the form of influence coefficient matrices as applied to a flutter analysis of the Drones for Aerodynamic and Structural Testing (DAST) Aeroelastic Research Wing. The DAST wing was chosen because wind tunnel flutter test data and zero speed vibration data of the modes and frequencies exist and are available for comparison. A derivation of the equations of motion that can be used to apply the modal method for flutter suppression is included. A comparison of the open loop flutter predictions with both wind tunnel data and other analytical methods is presented. S.L.

N82-11071*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
AEROACOUSTIC THEORY FOR NONCOMPACT WING-GUST INTERACTION
Rudolph Martinez and Sheila E. Widnall Oct. 1981 124 p refs
(Grant NsG-2142)
(FDRL-81-7) Avail: NTIS HC A06/MF A01 CSCL 01C

Three aeroacoustic models for noncompact wing-gust interaction were developed for subsonic flow. The first is that for a two dimensional (infinite span) wing passing through an oblique gust. The unsteady pressure field was obtained by the Wiener-Hopf technique; the airfoil loading and the associated acoustic field were calculated, respectively, by allowing the field point down on the airfoil surface, or by letting it go to infinity. The second model is a simple spanwise superposition of two dimensional solutions to account for three dimensional acoustic effects of wing rotation (for a helicopter blade, or some other rotating planform) and of finiteness of wing span. A three dimensional theory for a single gust was applied to calculate the acoustic signature in closed form due to blade vortex interaction in helicopters. The third model is that of a quarter infinite plate with side edge through a gust at high subsonic speed. An approximate solution for the three dimensional loading and the associated three dimensional acoustic field in closed form was obtained. The results reflected the acoustic effect of satisfying the correct loading condition at the side edge. R.J.F.

N82-11072# Boeing Military Airplane Development, Seattle, Wash. Advanced Airplane Branch.
AIRCRAFT DIGITAL INPUT CONTROLLED HYDRAULIC ACTUATION AND CONTROL SYSTEM Final Report, Aug. 1977 - Dec. 1980
Eugene T. Raymond and Curtiss W. Robinson Mar. 1981 214 p refs
(Contract F33615-77-C-2034; AF Proj. 3145)
(AD-A104263; AFWAL-TR-81-2012) Avail: NTIS HC A10/MF A01 CSCL 09/2

The development of an incremental digitally-controlled electrohydraulic incremental digitally-controlled electrohydraulic actuation system (DEHA) is reported. An electronic digital controller and a prototype DEHA unit, with an electric-stepper-motor-driven rotary distributor valve, two hydraulic drive motors, and a torque-summing gearbox, were assembled. Significant reductions in the hydraulic power normally required with a conventional geared hydraulic motor system, and some degree of hydraulic power recovery were obtained. Author (GRA)

N82-11073# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Guidance and Control Panel.
THEORY AND APPLICATIONS OF OPTIMAL CONTROL IN AEROSPACE SYSTEMS
Pieter Kant, ed. (National Aerospace Lab., Emmeloord, Netherlands) London Jul. 1981 283 p refs
(AGARD-AG-251; ISBN-92-835-1391-6) Copyright. Avail: NTIS HC A13/MF A01

The basic concepts of control theory were reviewed. Pratical design techniques that were developed from the theory are presented. Design examples and practical applications in real systems are described. Major emphasis is on flight control of distributed parameter systems.

N82-11074# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
AN OVERVIEW OF OPTIMAL CONTROL IN AEROSPACE SYSTEMS
Arthur E. Bryson, Jr. *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 5 p refs

Avail: NTIS HC A13/MF A01

Optimal control started with the calculus of variations (COV). The digital computer made the calculus of variations a practical tool for synthesis of optimal control logic. Optimal control concepts and algorithms are used not only in the field of automatic control but also in fields of structural optmization, econometrics, and operations research. T.M.

N82-11075# Universite Catholique de Louvain (Belgium).
THEORY OF STOCHASTIC OPTIMAL CONTROL SOME BASIC NOTIONS
In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 19 p refs

Avail: NTIS HC A13/MF A01

The optimal control problem for stochastic systems is described in details. Several classes of policy are defined and compared. The corresponding solutions are deduced from Bellman's principle and discussed in connection with the concept of dual effect of the control. After the derivation of the optimal closed-loop solution for the linear quadratic Gaussian problem, several algorithms are proposed for the nonlinear problem and discussed in the perspective of their implementation in aerospace applications. T.M.

N82-11076# Princeton Univ., N. J. Flight Research Lab.
AN INTRODUCTION TO STOCHASIC OPTIMAL CONTROL THEORY
In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 33 p refs

Avail: NTIS HC A13/MF A01

The design of control logic that commands a dynamic system to a desired output or that augments the system's stability is facilitated if objectives are expressed in a quantitative criterion, because the optimization of this criterion establishes a feasible design point for control. If the information which the control logic must use is uncertain or if the dynamic system is forced by random disturbances, only the expected value can be optimized. The methodology for design is based upon stochastic optimal control theory. After introducing the dynamic models of interest, optimal control and estimation are presented separately. Limitations of this approach are addressed, and the unified design of linear stochastic optimal controllers for analog and digital implementations is described. The principal benefit of stochastic optimal control theory is that it provides an engineering framework within which practical control design can be accomplished for complex dynamic systems. T.M.

N82-11077# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
DESIGN CONSIDERATIONS FOR OPTIMAL FLIGHT CONTROL SYSTEMS
F. R. Gill *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 21 p refs

Avail: NTIS HC A13/MF A01

Following a review of the several interacting factors affecting the design of control laws for any kind of flight control system (FCS), the modelling problem is discussed, including accuracy requirements for computer models of the aircraft, FCS, external disturbances and sensor noise. The state-of-the-art in designing the control and scheduling laws is surveyed and the limits of conventional control techniques are exposed. To overcome these limits, the use of selected nonlinear control techniques is discussed, including the concept of redundant adaptation with safeguards. T.M.

N82-11078*# Honeywell Systems and Research Center, Minneapolis, Minn. Systems and Control Technology Sect.
DESIGN TECHNIQUES FOR MUTLIVARIABLE FLIGHT CONTROL SYSTEMS
In AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 33 p refs

(Contracts NAS4-2518; N00014-75-C-01444)
Avail: NTIS HC A13/MF A01 CSCL 01C

Techniques which address the multi-input closely coupled nature of advanced flight control applications and digital implementation issues are described and illustrated through flight control examples. The techniques described seek to exploit the advantages of traditional techniques in treating conventional feedback control design specifications and the simplicity of modern approaches for multivariable control system design. T.M.

N82-11079# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
PRACTICAL DESIGN AND REALIZATION OF A DIGITAL ADAPTIVE FLIGHT CONTROL SYSTEM
V. Krebs and U. Hartmann *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 22 p refs
Sponsored in part by the West German Ministry of Defense

Avail: NTIS HC A13/MF A01

A new approach for the design and the practical realization of a digital adaptive command and stability system is proposed. The control law for the longitudinal motion of the aircraft is obtained by state vector feedback using the MIL-F-8785 B handling qualities requirements. The design principle is based on decoupling of the angle of attack and pitch rate on the one hand and the pole allocation method for the eigenvalues of the control system on the other hand. Since the necessary gain factors contain unknown and variable aircraft parameters, an on-line fading-memory least squares algorithm for the estimation of these parameters is used. Only conventional aircraft sensors (rate gyros and accelerometers) and an airborne digital computer are necessary. Hybrid simulations of the complete system as well as flight test results demonstrate the efficiency of the concept. T.M.

N82-11080# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).
CONTROL LAW DESIGN FOR TRANSPORT AIRCRAFT FLIGHT TASKS
Volkmar Adam and Hagen Leyendecker *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 13 p refs
Avail: NTIS HC A13/MF A01

An integrated digital flight control system was developed. The primary objective of the program was, both to improve the manual control of the aircraft assisted by control systems, and to develop new control and display systems. In addition, automation is to be provided for loner flight phases which are to be optimized with respect to fuel consumption, flight time, or other criteria. Aspects of the control law design and flight test experience with the integrated digital flight control system are described. DOE

N82-11081# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
CONTROL DESIGN OF FLEXIBLE SPACECRAFT
Robert E. Skelton *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 28 p refs

Avail: NTIS HC A13/MF A01

When compared to other large scale systems, flexible spacecraft have some peculiarities which can make control more difficult. Emphasis is placed upon the time domain and suboptimal linear quadratic guassian (LQG) methods, with special attention given to the effects of modeling errors. These effects are discussed in light of the model reduction problem, stability, and control design. Stability, controllability and observability computations are reduced to their simplest form possible to provide insight and to facilitate the location of sensors and actuators. The techniques of modal cost analysis are used to identify the critical parameters and the critical models of the structure. In the final stage of design, component cost analysis reveals which states of the optimal dynamical controller should be deleted to produce a reduced controller which is compatible with the on-line computer software limitations. T.M.

N82-11082*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
OPTIMUM CLIMB AND DESCENT TRAJECTORIES FOR AIRLINE MISSIONS
Heinz Erzberger *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 16 p refs

Avail: NTIS HC A13/MF A01 CSCL 01C

The characteristics of optimum fixed-range trajectories whose structure is constrained to climb, steady cruise, and descent segments are derived by application of optimal control theory. The performance function consists of the sum of fuel and time costs, referred to as direct operating cost (DOC). The state variable is range to go and the independent variable is energy. In this formulation a cruise segment always occurs at the optimum cruise energy for sufficiently large range. At short ranges (400 n. mi. and less), a cruise segment may also occur below the optimum cruise energy. The existence of such a cruise segment depends primarily on the fuel flow vs thrust characteristics and on thrust constraints. If thrust is a free control variable along with airspeed, it is shown that such cruise segments will not generally occur. If thrust is constrained to some maximum value in climb and to some minimum in descent, such cruise segments generally will occur. T.M.

N82-11083*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
APPLICATION OF NONLINEAR SYSTEMS INVERSES TO AUTOMATIC FLIGHT CONTROL DESIGN: SYSTEM CONCEPTS AND FLIGHT EVALUATIONS
George Meyer and Luigi Cicolani *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 29 p refs
Avail: NTIS HC A13/MF A01 CSCL 01C

A practical method for the design of automatic flight control systems for aircraft with complex characteristics and operational requirements, such as the powered lift STOL and V/STOL configurations, is presented. The method is effective for a large class of dynamic systems requiring multi-axis control which have highly coupled nonlinearities, redundant controls, and complex multidimensional operational envelopes. It exploits the concept of inverse dynamic systems, and an algorithm for the construction of inverse is given. A hierarchic structure for the total control logic with inverses is presented. The method is illustrated with an application to the Augmentor Wing Jet STOL Research Aircraft equipped with a digital flight control system. Results of flight evaluation of the control concept on this aircraft are presented. T.M.

N82-11084*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MANAGEMENT OF REDUNDANCY IN FLIGHT CONTROL SYSTEMS USING OPTIMAL DECISION THEORY
In AGARD Theory and Appl. of Optimal Control in Aerospace

Systems Jul. 1981 12 p refs

Avail: NTIS HC A13/MF A01 CSCL 01C

The problem of using redundancy that exists between dissimilar systems in aircraft flight control is addressed. That is, using the redundancy that exists between a rate gyro and an accelerometer--devices that have dissimilar outputs which are related only through the dynamics of the aircraft motion. Management of this type of redundancy requires advanced logic so that the system can monitor failure status and can reconfigure itself in the event of one or more failures. An optimal decision theory was tutorially developed for the management of sensor redundancy and the theory is applied to two aircraft examples. The first example is the space shuttle and the second is a highly maneuvering high performance aircraft--the F8-C. The examples illustrate the redundancy management design process and the performance of the algorithms presented in failure detection and control law reconfiguration. T.M.

N82-11087# Systems Control, Inc., Palo Alto, Calif.

DEVELOPMENT OF MULTIVARIABLE CONTROLLERS FOR AIRCRAFT TURBINE ENGINES

Ronald L. DeHoff, Stephen M. Rock, and Muhammed M. Akhter *In* AGARD Theory and Appl. of Optimal Control in Aerospace Systems Jul. 1981 12 p refs

Avail: NTIS HC A13/MF A01

A model reference structure is discussed which is shown to be a flexible framework within which digital control programs of a wide variety of function and complexity can be formulated. The development of the plant reference model is discussed and trade-offs between accuracy and complexity presented. The techniques used to produce optimized, feed-forward state, control and output trajectories are presented. The well-known methods of regulator synthesis using quadratic performance functions are briefly reviewed and the results of several successful applications of this methodology are summarized. T.M.

N82-11089 Royal Aircraft Establishment, Bedford (England). Library.

ADAPTATION OF A TURBINE TEST FACILITY TO HIGH-TEMPERATURE RESEARCH

J. Francois, Y. LeBot, J. Michard, and P. Deguest Dec. 1980 30 p refs Transl. into ENGLISH from AGARD Conf. Proc. No. 229, Ankara, Sept.
(RAE-Lib-Trans-2064; BR78650) Copyright. Avail: Issuing Activity

A facility for research on a high temperature (1800 K) and high pressure (4.5 bar) turbine stage is described. The turbine operates in a realistic engine environment and is comprehensively instrumented to permit wide variation of mainstream and coolant flow parameters. The development of robust probes for the measurement of turbulence and temperature fluctuations and optical pyrometry techniques is described. Results of studies of nozzle guide vane heat transfer coefficients, metal temperatures and film cooling efficiency are presented together with rotor blade surface temperature distributions. The MINOS rig confirmed the validity of turbine design prediction methods by providing performance data to correlate theory, scale model testing and gas turbine engine testing. T.M.

N82-11212# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

POLYURETHANE FOAMS FOR AIRCRAFT SHOCK MOUNTS. 3: VIBRATION DAMPING BY POLYETHER FOAMS Progress Report, Sep. 1979 - Jun. 1980

James V. Duffy Jul. 1981 38 p refs
(AD-A104496; NSWC/TR-80-343) Avail: NTIS HC A03/MF A01 CSCL 11/9

The objective of this program was to develop flexible foam systems which would meet the specifications outlined in MIL-F-81334B(AS). The vibration damping and mechanical properties of a series of foams based on mixtures of poly (oxytetramethylene) glycol and poly(oxypropylene) polyol were determined. The effect of polyol ratio, foam density, surfactant type and unit loading on vibration output transmissibility for these systems is reported. Author (GRA)

N82-11224*# Lockheed-California Co., Burbank.

EXPERIMENTAL STUDY OF FUEL HEATING AT LOW TEMPERATURES IN A WING TANK MODEL, VOLUME 1 Final Report

Francis J. Stockemer Aug. 1981 75 p refs
(Contract NAS3-21977)
(NASA-CR-165391; LR-29935-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 21D

Scale model fuel heating systems for use with aviation hydrocarbon fuel at low temperatures were investigated. The effectiveness of the heating systems in providing flowability and pumpability at extreme low temperature when some freezing of the fuel would otherwise occur is evaluated. The test tank simulated a section of an outer wing tank, and was chilled on the upper and lower surfaces. Turbine engine lubricating oil was heated, and recirculating fuel transferred the heat. Fuels included: a commercial Jet A; an intermediate freeze point distillate; a higher freeze point distillate blended according to Experimental Referee Broadened Specification guidelines; and a higher freeze point paraffinic distillate used in a preceding investigation. Each fuel was chilled to selected temperature to evaluate unpumpable solid formation (holdup). Tests simulating extreme cold weather flight, without heating, provided baseline fuel holdup data. Heating and recirculating fuel increased bulk temperature significantly; it had a relativley small effect on temperature near the bottom of the tank. Methods which increased penetration of heated fuel into the lower boundary layer improved the capability for reducing holdup. S.L.

N82-11228# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels and Lubrication Div.

JET FUEL LOCKS TO SHALE OIL: THE 1980 TECHNOLOGY REVIEW

Herbert R. Lander May 1981 156 p refs Proceedings of Conf. held at Cincinnati, 19-20 Nov. 1980
(AF Proj. 2480)
(AD-A104414; AFWAL-TR-81-2063) Avail: NTIS HC A08/MF A01 CSCL 11/4

The progress of several Air Force shale oil related programs is reported. Three shale oil processing studies evaluating the yield, cost, and quality of JP-4 and JP-8 turbine fuel produced from whole crude shale oil are discussed. Details of a fourth program that produced 11,300 gallons of specification JP-4 from Geokinetics shale oil are reported. Some of this jet fuel was tested in Air Force Fuel Mainburner/Turbine Effects Programs and was shown to behave very similar to petroleum derived JP-4. An additional study concentrated on developing hydrotreating catalysts that would more efficiently convert shale oil into aviation turbine fuel. Author (GRA)

N82-11230*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.

AN ASSESSMENT OF THE USE OF ANTIMISTING FUEL IN TURBOFAN ENGINES Final Report, Sep. 1979 - Nov. 1980

A. Fiorentino, R. DeSaro, and T. Franz Jun. 1981 53 p refs
(Contract NAS3-22045)
(NASA-CR-165258; AD-A104673; PWA-5697-29; FAA-CT-81-58) Avail: NTIS HC A04/MF A01 CSCL 21/4

An evaluation was made on the effects of using antimisting kerosene (AMK) on the performane of the components from the fuel system and the combustor of a current in-service JT8D aircraft engine. The objectives were to identify problems associated with using antimisting kerosene and to determine the extent of shearing or degradation required to allow the engine components to achieve satisfactory operation. The program consisted of a literature survey and a test program which evaluated the antimisting kerosene fuel in laboratory and bench component testing, and assessed the performance of the combustor in a high pressure facility and in an atitude relight/cold ignition facility. Performance of the fuel pump and control system was evaluated in an open loop simulation. Thus far, results of the program would not preclude the use of antimisting kerosene in a jet engine application. GRA

N82-11232# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

AN INVESTIGATION OF THE COMBUSTION PROCESS IN SOLID FUEL RAMJETS M.S. Thesis

William Vernon Goodwin Jun. 1981 58 p refs
(AD-A104603) Avail: NTIS HC A04/MF A01 CSCL 21/4

An experimental investigation was conducted into four areas of the solid fuel ramjet combustion process: (1) the effects of near-wall turbulent mixing and equivalance ratio on combustion efficiency, (2) the effects of bypass air on combustion efficiency, (3) the combustion process in a cylindrically perforated fuel grain with a twin side-dump/dome configuration, and (4) the comparison of experimental radial temperature profiles to computer generated radial profiles. Polymethylmethacrylate fuel grains were burned in a ramjet motor and a thrust stand. Combustion efficiencies were determined and compared for different configurations. It was found to be insensitive to variations in the mixture ratio and to near-wall mixing. Bypass air was found to adversely affect the combustion efficiency both in stable and unstable combustion environments. The twin side-dump/dome configuration was unable to sustain combustion for all conditions investigated. Theoretical radial temperature profiles were found to have larger near wall gradients than were measured experimentally. Author (GRA)

N82-11313# New Mexico Univ., Albuquerque. Engineering Research Inst.

DESIGN OF AIRPORT PAVEMENTS FOR EXPANSIVE SOILS Final Report

R. Gordon McKeen Jan. 1981 198 p refs
(Contract F29601-76-C-0051)
(AD-A104660; NMERI-AP-37; FAA-RD-81-25) Avail: NTIS HC A09/MF A01 CSCL 08/13

Expansive soil subgrades exhibit volume changes with variation in moisture condition. These changes result in differential movement of airport pavements resting on these soils. Special design procedures must be used to account for the expansive soil activity during equilibration. In addition, special precautions are required to protect the subgrade from moisture variation with climate. Measurement of soil suction is a key step in quantifying moisture-induced soil behavior. Procedures are outlined for suction characterization of the soil and for estimating the in situ differential movement likely to occur under the pavement. Once the wavelength and amplitude characteristics of the differential movement are obtained, design calculations to select the thickness and materials for the pavement may proceed. GRA

N82-11339*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

GENERAL AVIATION AIRCRAFT ANTENNAS FOR THE GLOBAL POSITIONING SYSTEM

Melvin C. Gilreath and J. S. Chatterjee Oct. 1981 37 p refs
(NASA-TM-83212) Avail: NTIS HC A03/MF A01 CSCL 17G

Several antenna designs that utilize the NAVSTAR Global Positioning System in a low-cost system for general aviation aircraft were evaluated. Experimental investigations were made of crossed-dipoles, various types of crossed-slots, and microstrip antennas with modifications to improve their coverage. Principal plane radiation patterns for several of these antennas were measured on a one-seventh scale model of a Gates Lear Jet. R.J.F.

N82-11354# Edgerton, Germeshausen and Grier, Inc., Albuquerque, N. Mex.

SYSTEM SAFETY PROGRAM PLAN Final Report, 31 Mar. - 8 Aug. 180

A. J. Bonham 8 Aug. 1980 79 p refs
(Contract DNA001-80-C-0177)
(AD-A104557; AG-1446; DNA-5487F) Avail: NTIS HC A05/MF A01 CSCL 12/12

This document, System Safety Program Plan, is the implementing document covering the safety aspects of performing an EMP Test on the A7E aircraft in the HPD (Horizontally Polarized Dipole), VPD (Vertically Polarized Dipole), and NWEF hangar facilities at Kirtland AFB, New Mexico. GRA

N82-11391*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AMPLIFIED CROSSFLOW DISTURBANCES IN THE LAMINAR BOUNDARY LAYER ON SWEPT WINGS WITH SUCTION

J. Ray Dagenhart Nov. 1981 90 p refs
(NASA-TP-1902; L-14423) Avail: NTIS HC A05/MF A01 CSCL 20D

Solution charts of the Orr-Sommerfeld equation for stationary crossflow disturbances are presented for 10 typical velocity profiles on a swept laminar flow control wing. The critical crossflow Reynolds number is shown to be a function of a boundary layer shape factor. Amplification rates for crosslow disturbaces are shown to be proportional to the maximum crossflow velocity. A computer stability program called MARIA, employing the amplification rate data for the 10 crossflow velocity profiles, is constructed. This code is shown to adequately approximate more involved computer stability codes using less than two percent as much computer time while retaining the essential physical disturbance growth model. Author

N82-11461*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

INTEGRATED ANALYSIS OF ENGINE

Christos C. Chamis 1981 24 p refs Presented at the Ann. Meeting of the ASME, Washington, D.C., 16-21 Nov. 1981
(NASA-TM-82713; E-995) Avail: NTIS HC A02/MF A01 CSCL 20K

The need for light, durable, fuel efficient, cost effective aircraft requires the development of engine structures which are flexible, made from advaced materials (including composites), resist higher temperatures, maintain tighter clearances and have lower maintenance costs. The formal quantification of any or several of these requires integrated computer programs (multi-level and/or interdisciplinary analysis programs interconnected) for engine structural analysis/design. Several integrated analysis computer prorams are under development at Lewis Reseach Center. These programs include: (1) COBSTRAN-Composite Blade Structural Analysis, (2) CODSTRAN-Composite Durability Structural Analysis, (3) CISTRAN-Composite Impact Structural Analysis, (4) STAEBL-StruTailoring of Engine Blades, and (5) ESMOSS-Engine Structures Modeling Software System. Three other related programs, developed under Lewis sponsorship, are described. Author

N82-11498# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.

STRUCTURAL ANALYSIS COMPUTER PROGRAMS FOR RIGID MULTICOMPONENT PAVEMENT STRUCTURES WITH DISCONTINUITIES, WESLIQID AND WESLAYER. REPORT 1: PROGRAM DEVELOPMENT AND NUMERICAL PRESENTATIONS Technical Report, 1 Oct. 1978 - 30 Sep. 1979

Yu T. Chou May 1981 150 p refs
(DA Proj. 4A7-62719-AT-40)
(AD-A104545; WES/TR/GL-81-8-1) Avail: NTIS HC A07/MF A01 CSCL 13/13

This study was conducted to develop finite element computer programs to calculate stresses and deflections in rigid pavements with cracks and joints subjected to loads and temperature warping, as well as in the supporting subgrade soil. The joints are connected by dowel bars or other load transfer devices. The slabs can have full or partial loss of subgrade support over designed regions of the slabs. Multiple-wheel loads can be handled and the number of wheels is not limited. Two programs were developed, one called WESLIQID and the other WESLAYER. The former is for pavements on liquid foundations and the latter is for linear layered elastic solids. Variable slab thicknesses and moduli of subgrade reaction are incorporated in the WESLIQID program, and any number of slabs arrayed in an arbitrary pattern can be handled. Because of larger computer storage requirement and computational complexity, the WESLAYER program is limited to two slabs. GRA

N82-11514*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

RADAR MAPPING, ARCHAEOLOGY, AND ANCIENT LAND USE IN THE MAYA LOWLANDS

R. E. W. Adams (Cambridge Univ.), W. E. Brown, Jr., and T. Patrick Culbert (Arizona Univ.) 31 Mar. 1981 27 p refs
(Contract NAS7-100)
(NASA-CR-164931) Avail: NTIS HC A03/MF A01 CSCL 08B

Data from the use of synthetic aperture radar in aerial survey of the southern Maya lowlands suggest the presence of very large areas drained by ancient canals for the purpose of intensive cultivation. Preliminary ground checks in several very limited areas confirm the existence of canals and raised fields. Excavations and ground surveys by several scholars provide valuable comparative information. Taken together, the new data suggest that Late Classic period Maya civilization was firmly grounded in large-scale and intensive cultivation of swampy zones. A.R.H.

N82-11636*# National Aeronautics and Space Administration, Washington, D. C.

EFFECTS OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: TESTING AND UTILIZATION OF A NEW METHODOLOGY

Jacques Francois Sep. 1981 34 p Transl. into ENGLISH of "Repercussion du Bruit des Avions sur l'Equilibre des Riverains des Aeroports: Test et Mise au Point d'une Methodologie Nouvelle" Paris, Aug. 1977 p 1-134 Transl. was announced as N81-27692 Transl. Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by IFOP/ETMAR
(Contract NASw-3542)
(NASA-TM-76628) Avail: NTIS HC A03/MF A01 CSCL 13B

The focus of the investigation is centered around two main themes: an analysis of the effects of aircraft noise on the psychological and physiological equilibrium of airport residents; and an analysis of the sources of variability of sensitivity to noise. The methodology used is presented. Nine statistical tables are included, along with a set of conclusions. T.M.

N82-11859*# United Technologies Research Center, East Hartford, Conn.

HELICOPTER ROTOR TRAILING EDGE NOISE Final Report

Robert H. Schlinker and Roy K. Amier Washington NASA Nov. 1981 150 p refs
(Contract NAS1-15730)
(NASA-CR-3470) Avail: NTIS HC A07/MF A01 CSCL 20A

A two dimensional section of a helicopter main rotor blade was tested in an acoustic wind tunnel at close to full-scale Reynolds numbers to obtain boundary layer data and acoustic data for use in developing an acoustic scaling law and testing a first principles trailing edge noise theory. Results were extended to the rotating frame coordinate system to develop a helicopter rotor trailing edge noise prediction. Comparisons of the calculated noise levels with helicopter flyover spectra demonstrate that trailing edge noise contributes significantly to the total helicopter noise spectrum at high frequencies. This noise mechanism is expected to control the minimum rotor noise. In the case of noise radiation from a local blade segment, the acoustic directivity pattern is predicted by the first principles trailing edge noise theory. Acoustic spectra are predicted by a scaling law which includes Mach number, boundary layer thickness and observer position. Spectrum shape and sound pressure level are also predicted by the first principles theory but the analysis does not predict the Strouhal value identifying the spectrum peak. A.R.H.

N82-11860*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SEL AND EPNL NOISE DURATION COEFFICIENTS FOR THE 747 AND T-38 AIRCRAFT

William L. Willshire, Jr. Sep. 1981 12 p refs
(NASA-TM-83214) Avail: NTIS HC A02/MF A01 CSCL 20A

Duration coefficient were calculated for Boeing 747 and T-38 airplanes for sound exposure level (SEL) and effective perceived noise level (EPNL) scales. The measured SEL duration coefficients were 8.4 for the Boeing 747 and 5.5 for the T-38 result was in good agreement with a previous result for a similar F-5 airplane. In EPNL, the duration coefficients were 7.2 for the Boeing 747 and 5.7 for the T-38. The difference in the results between the two airplanes is believed to be due to their different engine noise source spectra. The difference in the Boeing 747 results in the two different metric was due to the different frequency weighting of A-weighted sound pressure level, used in SEL, and tone-corrected perceived noise level, used in EPNL, when applied to the 747 spectra. B.W.

N82-12023# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ON THE KERNEL FUNCTION COLLOCATION METHOD IN STEADY SUBSONIC FLOW FOR WING WITH CONTROL SURFACES

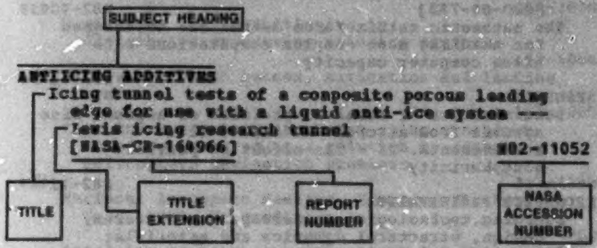
Chen Jing Song *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0705-81) 15 Sep. 1981 p 35-50 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 2, 1979
Avail: NTIS HC A05/MF A01 CSCL 20/4

The forms of the lift distribution function for wings with control surfaces in steady subsonic flow are analyzed. Methods for treating kernel singularities of linear integral equations and singularities of the lift distribution function are discussed and the numerical solution to the integral equation is given. These methods may be used to calculate the lift distribution of the wing by itself or of the wing with partial or full control surfaces on both the leading and trailing edges. The numerical values agree well with experimental data and have the same accuracy as those given by other theories. As compared with the vortex lattice method, the computational storage requirement for this method is smaller and the computational time is less. The numerical computation may be carried out on smaller computers.

SUBJECT INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 145)* FEBRUARY 1982

Typical Subject Index Listing


SUBJECT HEADING
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-7 AIRCRAFT
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81351] N82-11054
System safety program plan --- electromagnetic pulse testing of the A-7E aircraft
[AD-A104557] N82-11354
A-300 AIRCRAFT
Active control elements on the transonic wing of the Airbus A-300 (ACTTA A). Airbus A-300 with reduced longitudinal stability (ACTTA-C) --- advanced control transonic transport aircraft (ACCTA); design considerations
N82-10044
ABSORBERS (MATERIALS)
Evaluation of the acoustic measurement capability of the NASA Langley V/STOL wind tunnel open test section with acoustically absorbent ceiling and floor treatments
[NASA-CR-165796] N82-10059
AC GENERATORS
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics
A82-11721
ACCIDENT PREVENTION
A proposed flight safety program for the Korean Air Force
[AD-A102373] N82-10023
Lightning effects on aircraft and composites. Literature study on lightning strikes and protection --- advanced composite materials
[FOA-C-20380-F9] N82-10024
ACCUMULATORS
Low maintenance hydraulic accumulator
[AD-A103947] N82-10034
ACOUSTIC EMISSION
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure
A82-11149
ACOUSTIC FATIGUE
Response of nonlinear aircraft structural panels to high intensity noise
A82-12041
ACOUSTIC MEASUREMENTS
Effects of vane/blade ratio and spacing on fan noise
[AIAA PAPER 81-2033] A82-10457
ACOUSTIC PROPAGATION
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860
ACOUSTIC PROPERTIES
Evaluation of the acoustic measurement capability of the NASA Langley V/STOL wind tunnel open test section with acoustically absorbent ceiling and floor treatments
[NASA-CR-165796] N82-10059
ACTIVE CONTROL
Active control elements on the transonic wing of the Airbus A-300 (ACTTA A). Airbus A-300 with reduced longitudinal stability (ACTTA-C) --- advanced control transonic transport aircraft (ACCTA); design considerations
N82-10044
A method for determination of the aeroelastic behavior of aircraft with active control systems
[DFVLR-FB-81-05] N82-10047
ACTUATORS
Control of electromechanical actuator elements for flight vehicles --- Russian book
A82-12170
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072
ADAPTIVE CONTROL
Control laws for adaptive wind tunnels
A82-10985
Practical design and realisation of a digital adaptive flight control system
N82-11079
ADDITIVES
Rheological behavior of progressively shear-thickening solutions --- aircraft fuel polymer additives for fire protection in survivable crashes
A82-11177
A protective additive for jet fuels
A82-12022
AERIAL PHOTOGRAPHY
Three navigation systems and their costs of acquiring remote sensing data
A82-10049
AEROACOUSTICS
Helicopter rotor trailing edge noise
[AIAA PAPER 81-2001] A82-10455
Design predictions for noise control in the cryogenic National Transonic Facility
A82-12025
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
AERODYNAMIC BALANCE
Development of new lifting parachute designs with increased trim angle
[AIAA PAPER 81-1921] A82-10407
AERODYNAMIC BRAKES
Aeroballistic characteristics of sonobuoy parachute decelerators limited to a length of three feet
[AIAA PAPER 81-1950] A82-10425
AERODYNAMIC CHARACTERISTICS
Experimental study of subsonic and transonic flows past a wing
A82-10363
Aerodynamics and performance of cruciform parachute canopies
[AIAA PAPER 81-1919] A82-10405
Development of new lifting parachute designs with increased trim angle
[AIAA PAPER 81-1921] A82-10407

Propfan installation aerodynamics of a supercritical swept wing transport configuration
[AIAA PAPER 81-1563] A82-10466
Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459
Comparative study of flare control laws
[NASA-CR-164903] N82-10032
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055

AERODYNAMIC COEFFICIENTS
The effects of flexibility on the steady-state performance of small ribbon parachute models
[AIAA PAPER 81-1923] A82-10408
Determination of airplane model structure from flight data by using modified stepwise regression
[NASA-TP-1916] N82-10041
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033

AERODYNAMIC CONFIGURATIONS
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

AERODYNAMIC DRAG
Reductions in parachute drag due to forebody wake effects
[AIAA PAPER 81-1939] A82-10417
Aircraft excrescence drag
[AGARD-AG-264] N82-10020

AERODYNAMIC FORCES
Increasing the lift:drag ratio of a flat delta wing
A82-11899
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070

AERODYNAMIC HEATING
In-situ calibration of flight heat transfer instrumentation
[ASME PAPER 81-ENAS-13] A82-10901

AERODYNAMIC INTERFERENCE
Effects of vane/blade ratio and spacing on fan noise
[AIAA PAPER 81-2033] A82-10457

AERODYNAMIC LOADS
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359

AERODYNAMIC NOISE
Helicopter rotor trailing edge noise
[AIAA PAPER 81-2001] A82-10455
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039

AERODYNAMIC STABILITY
Experimental determination of parachute apparent mass and its significance in predicting dynamic stability
[AIAA PAPER 81-1920] A82-10406
Numerical treatment of helicopter rotor stability problems
A82-12045
An investigation of a stoppable helicopter rotor with circulation control --- ames 40 by 80 foot wind tunnel
[NASA-TM-81218] N82-10030

AERODYNAMIC STALLING
A microprocessor-based data acquisition system for stall/spin research
[AIAA 81-2177] A82-10126
Spin recovery training --- licensing requirement
[GPO-66-020] N82-10022
An experimental investigation of the rotating stall, surge and wake behind the rotor for a single stage axial compressor
N82-11008

AERODYNAMICS
Control laws for adaptive wind tunnels
A82-10985
The CIVIC - A concept in vortex induced combustion. II
[ASME PAPER 81-GT-12] A82-11997
Aerodynamic calculations and design of subcritical aerofoils
N82-10983

AEROELASTICITY
A method for determination of the aeroelastic behavior of aircraft with active control systems
[DFVLR-FB-81-05] N82-10047

AERONAUTICAL ENGINEERING
NASA Authorization, 1982: Index
[GPO-84-713] N82-10959
The automatic matrix force method and techniques for handling more complex computations with given computer capacity
N82-10994

AEROSOLS
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149

AEROSPACE ENGINEERING
Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980
A82-12026
Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1
A82-12495
NASA Authorization, 1982: Index
[GPO-84-713] N82-10959
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
An overview of optimal control in aerospace systems
N82-11074

AEROSPACE INDUSTRY
Kevlar composites; Proceedings of the Symposium, El Segundo, CA, December 2, 1980
A82-12646

AEROSPACE MEDICINE
Airport and Airway Improvement Act of 1981, part 1
[GPO-76-241-PT-1] N82-10062

AEROSPACE SYSTEMS
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
An overview of optimal control in aerospace systems
N82-11074

AEROSPACE TECHNOLOGY TRANSFER
Considerations and applications for the use of fluidics in aerospace controls
A82-12087

AEROTHERMODYNAMICS
Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893
Quantification of the thermal environment for externally carried aircraft stores and ordnance
A82-12100

AIR BAG RESTRAINT DEVICES
Air bag impact attenuation system for the AQM-34V remote piloted vehicle
[AIAA PAPER 81-1917] A82-10403

AIR BREATHING ENGINES
Air-breathing engine test facilities register
[AGARD-AG-269] N82-10063

AIR CONDITIONING EQUIPMENT
Towards minimum power for environmental control in transport aircraft
[ASME PAPER 81-ENAS-4] A82-10892

AIR COOLING
Air-film cooling returns to ramjets
[ASME PAPER 81-ENAS-8] A82-10896
Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes
[ASME PAPER 81-HT-48] A82-10952
Application of numerical modeling to gas turbine combustor development problems
A82-12118

AIR FLOW
  Application of numerical modeling to gas turbine combustor development problems
    A82-12118
AIR INTAKES
  Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle --- conducted in the Lewis 10 by 10 foot wind tunnel
    [NASA-TM-82728] N82-11042
AIR NAVIGATION
  Three navigation systems and their costs of acquiring remote sensing data
    A82-10049
  Navigation task partitioning in distributed-processing avionics systems
    A82-10646
  Discrete address beacon, navigation and landing system
    A82-10650
  Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
    A82-11927
  National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings
    A82-12626
  Satellite geometry considerations for low cost GPS user equipment
    A82-12630
  A solution to the static geometry problem for JTIDS relative navigation
    A82-12634
  Memory requirements for future navigation systems
    A82-12637
  A navigation systems planning model
    A82-12640
  The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions
    A82-12642
  Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers
    A82-12643
  Ring Laser Gyro Navigator /RLGN/ flight test results
    A82-12644
AIR TRAFFIC CONTROL
  Performance analysis of enroute air traffic control computers in the National Airspace System
    [AIAA 81-2203] A82-10140
  FAA developing new collision avoidance, data acquisition and transmission systems
    A82-10396
  Discrete address beacon, navigation and landing system
    A82-10650
  Airport and Airway Improvement Act of 1981, part 1
    [GPO-76-241-PT-1] N92-10062
  FAA misses opportunities to discontinue or reduce operating hours of some airport traffic control towers
    [PB81-224214] N82-11049
AIR TRANSPORTATION
  Cost reduction in air transportation --- energy conservation
    [SNIAS-811-150-101] N82-10025
AIRBORNE EQUIPMENT
  Instrumented aircraft verification of clear-air radar detection of low-level wind shear
    A82-10221
  A mathematical model of an over-sea airborne UHF radio link
    A82-11406
  High voltage surge and partial discharge test to evaluate aerospace equipment parts
    A82-11740
AIRBORNE SURVEILLANCE RADAR
  Airborne weather radar and severe weather penetration
    A82-10219
AIRBORNE/SPACEBORNE COMPUTERS
  KC-135 Avionics Modernization Hot Bench
    [AIAA 81-2105] A82-10081
  HiMAT onboard flight computer system architecture and qualification
    [AIAA 81-2107] A82-10082
  Synchronous fault-tolerant flight control systems
    [AIAA 81-2109] A82-10083
  The Space Shuttle vehicle checkout involving flight avionics software
    [AIAA 81-2141] A82-10100
  Bridging the gap from aircraft to space computers
    [AIAA 81-2142] A83-10101
  Airborne associative processor /ASPRO/ --- for early warning radar surveillance, command, and control applications
    [AIAA 81-2145] A82-10104
  Controlling the software/hardware interface for the validation of avionics systems --- in flight control systems
    [AIAA 81-2159] A82-10118
  A microprocessor-based data acquisition system for stall/spin research
    [AIAA 81-2177] A82-10126
  Performance analysis of enroute air traffic control computers in the National Airspace System
    [AIAA 81-2203] A82-10140
  Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems
    [AIAA 81-2205] A82-10143
  Navigation task partitioning in distributed-processing avionics systems
    A82-10646
  Memory requirements for future navigation systems
    A82-12637
  Ring Laser Gyro Navigator /RLGN/ flight test results
    A82-12644
AIRCRAFT ACCIDENT INVESTIGATION
  Downbursts and microbursts - An aviation hazard --- downdrafts beneath thunderstorms
    A82-10214
  Airborne weather radar and severe weather penetration
    A82-10219
  A note on fatal aircraft accidents involving metal fatigue
    A82-11400
AIRCRAFT ACCIDENTS
  Relationships between naval aviation safety and pilot flight experience
    A82-11031
  SARSAT applications
    A82-12698
AIRCRAFT ANTENNAS
  General aviation aircraft antennas for the global positioning system
    [NASA-TM-83212] N82-11339
AIRCRAFT COMMUNICATION
  A mathematical model of an over-sea airborne UHF radio link
    A82-11406
AIRCRAFT COMPARTMENTS
  Experimental modal analysis of the fuselage panels of an Aero Commander aircraft
    [NASA-CR-165750] N82-10020
AIRCRAFT CONFIGURATIONS
  Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion
    [AIAA PAPER 81-1776] A82-10462
  V/STOL aircraft and fluid dynamics
    [NASA-TM-81328] N82-10029
AIRCRAFT CONSTRUCTION MATERIALS
  The application of improved aluminium alloys and steels in aircraft structures
    A82-10305
  Sophisticated aircraft structure developments - Combat aeroplanes
    A82-10309
  On the use of carbon composites in slat and stabilizer construction
    A82-11468
  Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1
    A82-12495
  Kevlar composites; Proceedings of the Symposium, El Segundo, CA, December 2, 1980
    A82-12646
  Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar
    A82-12647

AIRCRAFT CONTROL

Controlling the software/hardware interface for the validation of avionics systems --- in flight control systems
[AIAA 81-2159] A82-10116

Use of Space Shuttle technology in conventional aircraft
[AIAA 81-2176] A82-10125

Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion
[AIAA PAPER 81-1776] A82-10462

Improving the MLS through enhanced cockpit displays
A82-10649

Procedures and analysis techniques for determining static air minimum control speeds
A82-12564

Simulation study of a hybrid strapdown attitude and heading reference system
A82-12641

Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[ESA-TT-681] N82-10036

Estimation of airplane stability and control derivatives from large amplitude longitudinal maneuvers
[NASA-TM-83185] N82-10042

Control law design for transport aircraft flight tasks
N82-11080

AIRCRAFT DESIGN

Integration of computer graphics design with analytical models --- for aircraft design
[AIAA 81-2134] A82-10096

Use of Space Shuttle technology in conventional aircraft
[AIAA 81-2176] A82-10125

Design aspects of non rigid airship envelopes
A82-10306

Some possibilities for composite light aircraft construction
A82-10307

Light aircraft structural design in non-metallics - Use of composite honeycomb in light aircraft
A82-10308

Analytical determination of undercarriage retraction kinematics
A82-10364

The balloon and the airship technological heritage
[AIAA PAPER 81-1912] A82-10401

Air bag impact attenuation system for the AQM-34V remote piloted vehicle
[AIAA PAPER 81-1917] A82-10403

Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion
[AIAA PAPER 81-1776] A82-10462

How large should a commuter transport be
[AIAA PAPER 81-1732] A82-10463

Optimization of the principal design parameters of a passenger aircraft
A82-10816

Towards minimum power for environmental control in transport aircraft
[ASME PAPER 81-ENAS-4] A82-10892

Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893

Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459

Design and development of a low cost servoed rate gyro for unmanned aircraft
A82-11932

Response of nonlinear aircraft structural panels to high intensity noise
A82-12041

Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra --- for aircraft structural analysis
A82-12043

ACMA - Fact or fantasy --- Advanced Civilian/Military Aircraft
A82-12048

F-5G Tigershark
A82-12775

The case for a defensive air-to-air fighter
A82-12801

Solution to the hidden-line problem
A82-12803

V/STOL aircraft and fluid dynamics
[NASA-TM-81328] N82-10029

Quiet short-haul research aircraft familiarization document, revision 1
[NASA-TM-81298] N82-10031

Active control elements on the transonic wing of the Airbus A-300 (ACTTA A). Airbus A-300 with reduced longitudinal stability (ACTTA-C) --- advanced control transonic transport aircraft (ACCTA); design considerations
N82-10044

Acta mechanica sinica
[AD-A105184] N82-11014

The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016

New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034

Design techniques for multivariable flight control systems
N82-11078

AIRCRAFT ENGINES

Design considerations for duty cycle, life and reliability of small limited life engines
[AIAA PAPER 81-1402] A82-10465

Air-film cooling returns to ramjets
[ASME PAPER 81-ENAS-8] A82-10896

One reason for the onset of high-frequency self-excited oscillations --- in combustion chambers of aircraft engines
A82-11448

Basic problem of aircraft gasturbine engine analytic design. II
A82-11463

Coupled fluid/structure response predictions for soft body impact of airfoil configurations --- ice and bird impact on aircraft engines
A82-12039

History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1
A82-12049

Considerations and applications for the use of fluidics in aerospace controls
A82-12087

The enhancement of heat exchange in channels /2nd revised and enlarged edition/ --- Russian book
A82-12222

Validation studies of turbulence and combustion models for aircraft gas turbine combustors
A82-12267

Commercial EMS considerations for small gas turbine engines --- automated engine monitoring systems
A82-12449

Further application and development of an engine usage/life monitoring system for military services
A82-12450

Superclean superalloy powders by the rotating electrode process
A82-12496

Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497

Lineup of the IM-series aircraft-derivative gas turbines
A82-12560

Propulsion study for Small Transport Aircraft Technology (STAT), Appendix B
[NASA-CR-165499-APP-B] N82-10038

A new method of cooling turbine vanes
N82-11027

Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068

Development of multivariable controllers for aircraft turbine engines
N82-11087

Integrated analysis of engine
[NASA-TM-82713] N82-11491

AIRCRAFT EQUIPMENT
A new APU for medium place aircraft environmental control systems [ASME PAPER 81-ENAS-1] A82-10889
Air-freon integrated environmental conditioning system for trainer subsonic aircraft [ASME PAPER 81-ENAS-33] A82-10920
New separators for battery systems A82-11715
Sealed lead-acid batteries for aircraft applications A82-11716
A hidden advantage of permanent magnet electrical generating systems A82-11720
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics A82-11721
Design and development of a low cost servoed rate gyro for unmanned aircraft A82-11932
Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980 A82-11934
The all digital military aircraft A82-11937
The digital civil aircraft A82-11938
Low maintenance hydraulic accumulator [AD-A103947] N82-10034
Advanced aircraft electrical system control technology demonstrator. Phase 1: Requirements analysis and conceptual design [AD-A103922] N82-10326
Threat Alert and Collision Avoidance System (TCAS) Symposium [AD-A104563] N82-11047
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams [AD-A104496] N82-11212
AIRCRAFT FUEL SYSTEMS
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks [AD-A103270] N82-10033
Advanced fuel flowmeter for future naval aircraft [AD-A104364] N82-11063
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1 [NASA-CR-165391] N82-11224
AIRCRAFT FUELS
Fuel for future transport aircraft [ASME PAPER 81-HT-80] A82-10965
Rheological behavior of progressively shear-thickening solutions --- aircraft fuel polymer additives for fire protection in survivable crashes A82-11177
Fuel conservation - DC-9 series 20/30/40 A82-12563
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1 [NASA-CR-165391] N82-11224
AIRCRAFT HAZARDS
Detection and display of wind shear and turbulence A82-10222
Selected bibliography of NACA-NASA aircraft icing publications [NASA-TM-81651] N82-11053
System safety program plan --- electromagnetic pulse testing of the A-7E aircraft [AD-A104557] N82-11354
AIRCRAFT HYDRAULIC SYSTEMS
Fluid power technology for the '80s --- Book A82-10851
High-efficiency hydraulic power transfer units for multisystem aircraft A82-10853
'Quiet please' --- aircraft hydraulic systems noise reduction A82-10854
AIRCRAFT INSTRUMENTS
The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT --- Rain Echo Attenuation Compensation Hardware A82-10225
Problems relating to the classical rate-gyro A82-10497
Optical sensors for displacement measurement A82-11407
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity A82-12149
Commercial EMS considerations for small gas turbine engines --- automated engine monitoring systems A82-12449
Further application and development of an engine usage/life monitoring system for military services A82-12450
Hard limited approaches to correlation velocity sensing A82-12636
AIRCRAFT MAINTENANCE
Digital avionics: Promise and practice - An airlines experience in the field A82-11942
Mathematical model for the maintenance program of modern jet aircraft --- crack detection; inspection intervals [DFVLR-FB-81-14] N82-10002
AIRCRAFT MANEUVERS
Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft [AIAA 81-2178] A82-10127
Estimation of airplane stability and control derivatives from large amplitude longitudinal maneuvers [NASA-TM-83185] N82-10042
AIRCRAFT MODELS
Determination of airplane model structure from flight data by using modified stepwise regression [NASA-TP-1916] N82-10041
AIRCRAFT NOISE
'Quiet please' --- aircraft hydraulic systems noise reduction A82-10854
Model helicopter rotor impulsive noise A82-11300
Experimental modal analysis of the fuselage panels of an Aero Commander aircraft [NASA-CR-165750] N82-10028
Aeroacoustic theory for noncompact wing-gust interaction [FDRL-81-7] N82-11071
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology [NASA-TM-76628] N82-11636
Helicopter rotor trailing edge noise --- noise prediction [NASA-CR-3470] N82-11859
AIRCRAFT PARTS
Implementation of AVRADCOM MM&T --- for military aircraft parts production engineering A82-10545
Fatigue life of lugs under service loading - Test results and predictions A82-11605
AIRCRAFT PERFORMANCE
An airport wind shear detection and warning system using Doppler radar A82-10220
Design challenges of high performance aircraft POD EOCM cooling systems --- Electro-Optical/Countermeasure [ASME PAPER 81-ENAS-6] A82-10894
Ideal and simulated performance of an aircraft in the terrain following mission A82-11302
On the question of trailing airplane motion A82-11470
Fuel conservation - DC-9 series 20/30/40 A82-12563
Quiet short-haul research aircraft familiarization document, revision 1 [NASA-TM-81298] N82-10031
AIRCRAFT PILOTS
Relationships between naval aviation safety and pilot flight experience A82-11031
AIRCRAFT PRODUCTION
Automated Paint and Process Line /APPL/ --- for aircraft production [AIAA 81-2166] A82-10120

Development of aircraft production engineering discipline at IIT, Bombay
A82-11317

AIRCRAFT RELIABILITY
The certification of digital systems
A82-11940

AIRCRAFT SAFETY
FAA developing new collision avoidance, data acquisition and transmission systems
A82-10396
Test Pilots' Aviation Safety Workshop, U.S. Naval Postgraduate School, Monterey, CA, February 25-28, 1981, Proceedings
A82-10500
Electrical ground testing of aircraft antistatic protection
A82-10822

AIRCRAFT SPIN
Spin recovery training --- licensing requirement
[GPO-66-020] N82-10022

AIRCRAFT STABILITY
On computing Floquet transition matrices of rotorcraft
A82-11225
A note on fatal aircraft accidents involving metal fatigue
A82-11400
Numerical treatment of helicopter rotor stability problems
A82-12045
Estimation of airplane stability and control derivatives from large amplitude longitudinal maneuvers
[NASA-TM-83195] N82-10042

AIRCRAFT STRUCTURES
The application of improved aluminium alloys and steels in aircraft structures
A82-10305
Some possibilities for composite light aircraft construction
A82-10307
Sophisticated aircraft structure developments - Combat aeroplanes
A82-10309
Analytical determination of undercarriage retraction kinematics
A82-10364
The balloon and the airship technological heritage
[AIAA PAPER 81-1912] A82-10401
Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure
A82-11149
Fatigue substantiation of non-linear structures
A82-11224
Dynamic response of aircraft structure to gun shock loads
A82-11314
Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980
A82-12026
Impact-initiated damage thresholds in composites
A82-12028
Response of nonlinear aircraft structural panels to high intensity noise
A82-12041
Quantification of the thermal environment for externally carried aircraft stores and ordnance
A82-12100
Fractographic determination of fatigue crack growth rates in aircraft components
A82-12697
Aircraft excrescence drag
[AGARD-AG-264] N82-10020
A method for determination of the aeroelastic behavior of aircraft with active control systems
[DFVLR-FB-81-05] N82-10047
Finite difference computation of the steady transonic potential flow around airplanes
N82-10981

AIRCRAFT SURVIVABILITY
Lightning effects on aircraft and composites. Literature study on lightning strikes and protection --- advanced composite materials
[FOA-C-20388-F9] N82-10024

AIRCRAFT WAKES
Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils
A82-10821

AIRFOIL PROFILES
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils
A82-10362
Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils
A82-10821
Wind tunnel tests on airfoils in tandem cascade
A82-10987
Coupled fluid/structure response predictions for soft body impact of airfoil configurations --- ice and bird impact on aircraft engines
A82-12039
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

AIRFOILS
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil --- conducted in the Lewis Research Center icing research tunnel
[NASA-CR-165444] N82-10021
Second order approximation theory of an arbitrary aerofoil in compressible potential flow
N82-10982
Aerodynamic calculations and design of subcritical aerofoils
N82-10983
Matrix analysis of wings
N82-10998

AIRFRAME MATERIALS
Lightning effects on aircraft and composites. Literature study on lightning strikes and protection --- advanced composite materials
[FOA-C-20388-F9] N82-10024

AIRFRAMES
Development of aircraft production engineering discipline at IIT, Bombay
A82-11317
Design techniques for mutlivariable flight control systems
N82-11078

AIRLINE OPERATIONS
How large should a commuter transport be
[AIAA PAPER 81-1732] A82-10463
Optimum climb and descent trajectories for airline missions
N82-11082

AIRPORT TOWERS
FAA misses opportunities to discontinue or reduce operating hours of some airport traffic control towers
[PB81-224214] N82-11049

AIRPORTS
An airport wind shear detection and warning system using Doppler radar
A82-10220
Airport and Airway Improvement Act of 1981, part 1
[GPO-76-241-PT-1] N82-10062
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636

AIRSHIPS
Design aspects of non rigid airship envelopes
A82-10306
The balloon and the airship technological heritage
[AIAA PAPER 81-1912] A82-10401

AIRSPEED
Comparison of simulation and experimental data for a gliding parachute in dynamic flight
[AIAA PAPER 81-1924] A82-10409
Procedures and analysis techniques for determining static air minimum control speeds
A82-12564

ALUMINUM ALLOYS
The application of improved aluminium alloys and steels in aircraft structures
A82-10305
AMPLIFICATION
Characteristic and principal gains and phases and their use as multivariable control design tools --- generalizing Nyquist and root-locus diagram techniques
N82-10050
ANALYSIS (MATHEMATICS)
Multi-variable analysis and design techniques
[AGARD-LS-117] N82-10048
ANGLE OF ATTACK
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359
Estimation of airplane stability and control derivatives from large amplitude longitudinal maneuvers
[NASA-TM-83185] N82-10042
Aerodynamic calculations and design of subcritical aerofoils
N82-10983
ANTENNA DESIGN
Antenna theory and design --- Book
A82-12323
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339
ANTENNA RADIATION PATTERNS
Antenna theory and design --- Book
A82-12323
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
ANTIMISTING FUELS
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230
ANTISHIP MISSILES
Air-film cooling returns to ramjets
[ASME PAPER 81-ENAS-8] A82-10896
APPROXIMATION
Multivariables design: The optimization of approximate inverses
N82-10057
Second order approximation theory of an arbitrary aerofoil in compressible potential flow
N82-10982
ARCHAEOLOGY
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514
ARCHITECTURE (COMPUTERS)
HiMAT onboard flight computer system architecture and qualification
[AIAA 81-2107] A82-10082
Airborne associative processor /ASPRO/ --- for early warning radar surveillance, command, and control applications
[AIAA 81-2145] A82-10104
AREA NAVIGATION
Use of Space Shuttle technology in conventional aircraft
[AIAA 81-2176] A82-10125
Discrete address beacon, navigation and landing system
A82-10650
ARMED FORCES (FOREIGN)
A proposed flight safety program for the Korean Air Force
[AD-A102373] N82-10023
ARROW WINGS
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
ASTRIONICS
Memory requirements for future navigation systems
A82-12637
ATMOSPHERIC CIRCULATION
Multiple Doppler radar observations of PBL structure
A82-10292
ATMOSPHERIC ELECTRICITY
Electrical ground testing of aircraft antistatic protection
A82-10822
ATMOSPHERIC SCATTERING
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149
ATMOSPHERIC SOUNDING
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1918] A82-10404
ATMOSPHERIC TURBULENCE
Downbursts and microbursts - An aviation hazard --- downdrafts beneath thunderstorms
A82-10214
Detection and display of wind shear and turbulence
A82-10222
ATTITUDE CONTROL
Simulation study of a hybrid strapdown attitude and heading reference system
A82-12641
AUTOMATIC CONTROL
Problems relating to the classical rate-gyro
A82-10497
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations
N82-11083
AUTOMATIC FLIGHT CONTROL
HiMAT onboard flight computer system architecture and qualification
[AIAA 81-2107] A82-10082
Controlling the software/hardware interface for the validation of avionics systems --- in flight control systems
[AIAA 81-2159] A82-10116
Ideal and simulated performance of an aircraft in the terrain following mission
A82-11302
The digital civil aircraft
A82-11938
AUTOMATIC LANDING CONTROL
Development and evaluation of automatic landing control laws for light wing loading STOL aircraft
[NASA-CR-166160] N82-10043
AUTOMATIC TEST EQUIPMENT
Air supply system bite for Boeing 767 airplane --- Built-In-Test-Equipment
[ASME PAPER 81-ENAS-7] A82-10895
Commercial EMS considerations for small gas turbine engines --- automated engine monitoring systems
A82-12449
AUTOMATION
Automated Paint and Process Line /APPL/ --- for aircraft production
[AIAA 81-2166] A82-10120
AUXILIARY POWER SOURCES
A new APU for medium place aircraft environmental control systems
[ASME PAPER 81-ENAS-1] A82-10889
AVIONICS
KC-135 Avionics Modernization Hot Bench
[AIAA 81-2105] A82-10081
Bridging the gap from aircraft to space computers
[AIAA 81-2142] A82-10101
Controlling the software/hardware interface for the validation of avionics systems --- in flight control systems
[AIAA 81-2159] A82-10116
Closed loop environmental control systems for fighter aircraft
[ASME PAPER 81-ENAS-2] A82-10890
Design challenges of high performance aircraft POD EOCM cooling systems --- Electro-Optical/Countermeasure
[ASME PAPER 81-ENAS-6] A82-10894
Sealed lead-acid batteries for aircraft applications
A82-11716
Applications of finite element method in aerospace power systems design
A82-11717
Advanced aircraft electric power system
A82-11718
Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership
A82-11719
Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980
A82-11934

The all digital military aircraft
A82-11937
The digital civil aircraft
A82-11938
Digital avionics systems - The RAF experience
A82-11941
Digital avionics: Promise and practice - An airlines experience in the field
A82-11942
Memory requirements for future navigation systems
A82-12637
The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions
A82-12642
F-5G Tigershark
A82-12775
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064

AWACS AIRCRAFT
Airborne associative processor /ASPRO/ --- for early warning radar surveillance, command, and control applications
[AIAA 81-2145] A82-10104

AXIAL STRESS
Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra --- for aircraft structural analysis
A82-12043

AXISYMMETRIC FLOW
On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120

B

BALLISTICS
Aeroballistic characteristics of sonobuoy parachute decelerators limited to a length of three feet
[AIAA PAPER 81-1950] A82-10425

BALLOON FLIGHT
A new thermal and trajectory model for high altitude balloons
[AIAA PAPER 81-1926] A82-10411

BALLOON-BORNE INSTRUMENTS
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1918] A82-10404

BALLOONS
The balloon and the airship technological heritage
[AIAA PAPER 81-1912] A82-10401

BEAMS (SUPPORTS)
Matrix analysis of wings
N82-10998

BELLOWS
Low maintenance hydraulic accumulator
[AD-A103947] N82-10034

BENDING FATIGUE
Matrix analysis of wings
N82-10998

BIBLIOGRAPHIES
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053

BIT SYNCHRONIZATION
Synchronous fault-tolerant flight control systems
[AIAA 81-2109] A82-10083

BLADE SLAP NOISE
Model helicopter rotor impulsive noise
A82-11300

BODY-WING AND TAIL CONFIGURATIONS
Experimental study of empennage snap-through vibrations
A82-11471

BODY-WING CONFIGURATIONS
Acta mechanica sinica
[AD-A105184] N82-11014
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016

BOEING 747 AIRCRAFT
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860

BOEING 767 AIRCRAFT
Air supply system bite for Boeing 767 airplane --- Built-In-Test-Equipment
[ASME PAPER 81-ENAS-7] A82-10895

BOUNDARY LAYER CONTROL
Developments in boundary layer Thrust Vector Control
A82-10855
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

BOUNDARY LAYER FLOW
Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934

BOUNDARY LAYER SEPARATION
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043

BOUNDARY LAYERS
Aircraft excrescence drag
[AGARD-AG-264] N82-10020
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039

BRAKES (FOR ARRESTING MOTION)
Aeroballistic characteristics of sonobuoy parachute decelerators limited to a length of three feet
[AIAA PAPER 81-1950] A82-10425

C

C-135 AIRCRAFT
KC-135 Avionics Modernization Hot Bench
[AIAA 81-2105] A82-10081

CALIBRATING
In-situ calibration of flight heat transfer instrumentation
[ASME PAPER 81-ENAS-13] A82-10901

CANOPIES
Aerodynamics and performance of cruciform parachute canopies
[AIAA PAPER 81-1919] A82-10405
Experimental determination of parachute apparent mass and its significance in predicting dynamic stability
[AIAA PAPER 81-1920] A82-10406
Theoretical analysis of parachute inflation including fluid kinetics
[AIAA PAPER 81-1925] A82-10410
The net-skirt to a parachute canopy as a device to prevent inversion
[AIAA PAPER 81-1927] A82-10412
Stress measurements in a ribbon parachute canopy during inflation and at steady state
[AIAA PAPER 81-1944] A82-10420
Stress measurements in bias constructed parachute canopies during inflation and at steady-state
[AIAA PAPER 81-1945] A82-10421

CAPACITORS
High voltage surge and partial discharge test to evaluate aerospace equipment parts
A82-11740

CARBON FIBER REINFORCED PLASTICS
Sophisticated aircraft structure developments - Combat aeroplanes
A82-10309
On the use of carbon composites in slat and stabilizer construction
A82-11468
A CFRP taileron for the Tornado: Construction and production --- horizontal stabilizer
[MBB-FE-212/KFK/PUB/2] N82-10035

CARGO AIRCRAFT
ACMA - Fact or fantasy --- Advanced Civilian/Military Aircraft
A82-12048

CASCADE FLOW
Wind tunnel tests on airfoils in tandem cascade
A82-10987
End losses in turbine cascades with porous cooling
A82-11434
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024

Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069

CEILINGS (ARCHITECTURE)
Evaluation of the acoustic measurement capability of the NASA Langley V/STOL wind tunnel open test section with acoustically absorbent ceiling and floor treatments
[NASA-CR-165796] N82-10059

CENTRAL AMERICA
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

CERAMICS
Development of low modulus material for use in ceramic gas path seal applications
[NASA-CR-165469] N82-10039

CERTIFICATION
The certification of digital systems
A82-11940

CHANNEL NOISE
Tangential sensitivity of EW receivers
A82-11020

CIRCULATION CONTROL ROTORS
An investigation of a stoppable helicopter rotor with circulation control --- ames 40 by 80 foot wind tunnel
[NASA-TM-81218] N82-10030

CIVIL AVIATION
The digital civil aircraft
A82-11938

Digital avionics: Promise and practice - An airlines experience in the field
A82-11942

CLEAR AIR TURBULENCE
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221

COAL LIQUEFACTION
Jet fuel from carbon
A82-12021

COAL UTILIZATION
Jet fuel from carbon
A82-12021

COLLISION AVOIDANCE
FAA developing new collision avoidance, data acquisition and transmission systems
A82-10396

Threat Alert and Collision Avoidance System (TCAS) Symposium
[AD-A104563] N82-11047

COMBUSTION CHAMBERS
One reason for the onset of high-frequency self-excited oscillations --- in combustion chambers of aircraft engines
A82-11448

The CIVIC - A concept in vortex induced combustion. II
[ASME PAPER 81-GT-12] A82-11997

Application of numerical modeling to gas turbine combustor development problems
A82-12118

On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120

Validation studies of turbulence and combustion models for aircraft gas turbine combustors
A82-12267

COMBUSTION PHYSICS
An investigation of the combustion process in solid fuel ramjets
[AD-A104603] N82-11232

COMBUSTION STABILITY
One reason for the onset of high-frequency self-excited oscillations --- in combustion chambers of aircraft engines
A82-11448

COMMAND AND CONTROL
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems
[AIAA 81-2205] A82-10143

COMMERCIAL AIRCRAFT
ACMA - Fact or fantasy --- Advanced Civilian/Military Aircraft
A82-12048

Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068

COMMUNICATION NETWORKS
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems
[AIAA 81-2205] A82-10143

A solution to the static geometry problem for JTIDS relative navigation
A82-12634

Omega station 10.2 kHz signal selection made easy
A82-12638

COMPONENT RELIABILITY
Extending the limits of reliability theory --- Book
A82-12318

COMPOSITE MATERIALS
Some possibilities for composite light aircraft construction
A82-10307

Light aircraft structural design in non-metallics - Use of composite honeycomb for light aircraft
A82-10308

Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980
A82-12026

Impact-initiated damage thresholds in composites
A82-12028

Lightning effects on aircraft and composites. Literature study on lightning strikes and protection --- advanced composite materials
[FOA-C-20388-P9] N82-10024

COMPOSITE STRUCTURES
Composite main rotor tubular braided
A82-10547

Development of the Triflex rotor head
A82-11222

Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164956] N82-11052

COMPRESSIBILITY EFFECTS
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024

COMPRESSIVE STRENGTH
Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar
A82-12647

COMPRESSOR BLADES
An aerodynamic design method for transonic axial flow compressor stage
N82-10984

Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069

COMPUTATIONAL FLUID DYNAMICS
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils
A82-10362

Theoretical analysis of parachute inflation including fluid kinetics
[AIAA PAPER 81-1925] A82-10410

Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils
A82-10821

Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934

Control laws for adaptive wind tunnels
A82-10985

Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459

Validation studies of turbulence and combustion models for aircraft gas turbine combustors
A82-12267

Acta mechanica sinica
[AD-A105184] N82-11014

The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015

Computation of high Reynolds number
internal/external flows
[NASA-TM-84049] N82-11046

COMPUTER DESIGN
Bridging the gap from aircraft to space computers
[AIAA 81-2142] A82-10101
Airborne associative processor /ASPRO/ --- for
early warning radar surveillance, command, and
control applications
[AIAA 81-2145] A82-10104

COMPUTER GRAPHICS
Integration of computer graphics design with
analytical models --- for aircraft design
[AIAA 81-2134] A82-10096
Improving the MLS through enhanced cockpit displays
A82-10649
Solution to the hidden-line problem
A82-12803

COMPUTER PROGRAMS
The Space Shuttle vehicle checkout involving
flight avionics software
[AIAA 81-2141] A82-10100
Controlling the software/hardware interface for
the validation of avionics systems --- in flight
control systems
[AIAA 81-2159] A82-10116
The certification of digital systems
A82-11940
Digital avionics systems - The RAF experience
A82-11941
Flight test results of the model simulation
controller for the HFB 320 for in-flight
simulation of the A310 airbus
[ESA-TT-660] N82-10107
Computation of high Reynolds number
internal/external flows
[NASA-TM-84049] N82-11046
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Structural analysis computer programs for rigid
multicomponent pavement structures with
discontinuities, WESLIQID and WESLAYER. Report
1: Program development and numerical presentations
[AD-A104545] N82-11498

COMPUTER STORAGE DEVICES
Memory requirements for future navigation systems
A82-12637

COMPUTER SYSTEMS DESIGN
KC-135 Avionics Modernization Hot Bench
[AIAA 81-2105] A82-10081
Synchronous fault-tolerant flight control systems
[AIAA 81-2109] A82-10083
Navigation task partitioning in
distributed-processing avionics systems
A82-10646

COMPUTER SYSTEMS SIMULATION
Performance analysis of enroute air traffic
control computers in the National Airspace System
[AIAA 81-2203] A82-10140

COMPUTERIZED DESIGN
Integration of computer graphics design with
analytical models --- for aircraft design
[AIAA 81-2134] A82-10096
Solution to the hidden-line problem
A82-12803
Multi-variable analysis and design techniques
[AGARD-LS-117] N82-10048
Characteristic and principal gains and phases and
their use as multivariable control design tools
--- generalizing Nyquist and root-locus diagram
techniques
N82-10050
LQG multivariable design tools
N82-10054
The automatic matrix force method and techniques
for handling more complex computations with
given computer capacity
N82-10994

COMPUTERIZED SIMULATION
A new thermal and trajectory model for high
altitude balloons
[AIAA PAPER 81-1926] A82-10411
Ideal and simulated performance of an aircraft in
the terrain following mission
A82-11302
Application of numerical modeling to gas turbine
combustor development problems
A82-12118

CONCRETE STRUCTURES
Structural analysis computer programs for rigid
multicomponent pavement structures with
discontinuities, WESLIQID and WESLAYER. Report
1: Program development and numerical presentations
[AD-A104545] N82-11498

CONFERENCES
Test Pilots' Aviation Safety Workshop, U.S. Naval
Postgraduate School, Monterey, CA, February
25-28, 1981, Proceedings
A82-10500
Digital avionics - Promise and practice;
Proceedings of the Joint Symposium, London,
England, March 20, 1980
A82-11934
Emerging technologies in aerospace structures,
design, structural dynamics and materials;
Proceedings of the Aerospace Conference, San
Francisco, CA, August 13-15, 1980
A82-12026
Powder metallurgy superalloys - Aerospace
materials for the 1980's; Proceedings of the
Conference, Zurich, Switzerland, November 18-20,
1980. Volume 1
A82-12495
National Aerospace Meeting, Trevose, PA, April
8-10, 1981, Proceedings
A82-12626
Kevlar composites; Proceedings of the Symposium,
El Segundo, CA, December 2, 1980
A82-12646
The Shock and Vibration Digest, volume 13, no. 9
[AD-A105062] N82-10421

CONGRESSIONAL REPORTS
Spin recovery training --- licensing requirement
[GPO-66-020] N82-10022
Airport and Airway Improvement Act of 1981, part 1
[GPO-76-241-PT-1] N82-10062

CONSTRUCTION
Development and construction of pilot ejector
seats in Germany from 1938-1945
[DFVLR-FB-81-04] N82-10026
A CFRP taileron for the Tornado: Construction and
production --- horizontal stabilizer
[MBB-FE-212/KFK/PUB/2] N82-10035

CONTROL BOARDS
Electronic master monitor and advisory display
system, human engineering summary report
[AD-A104244] N82-11065

CONTROL EQUIPMENT
Considerations and applications for the use of
fluidics in aerospace controls
A82-12087
Management of redundancy in flight control systems
using optimal decision theory
N82-11084

CONTROL STABILITY
Characteristic and principal gains and phases and
their use as multivariable control design tools
--- generalizing Nyquist and root-locus diagram
techniques
N82-10050
Design of high integrity multivariable control
systems
N82-10055

CONTROL SURFACES
On the kernel function collocation method in
steady subsonic flow for wing with control
surfaces
N82-12023

CONTROL THEORY
Design considerations for the direct digital
control of dry-tuned gyroscope
A82-11933
Control of electromechanical actuator elements for
flight vehicles --- Russian book
A82-12170
Theory and applications of optimal control in
aerospace systems
[AGARD-AG-251] N82-11073
An introduction to stochasic optimal control theory
N82-11076

CONTROLLABILITY
Theoretical investigation of the influence of
spoiler dynamics on the handling qualities of an
aircraft with direct lift control
[ESA-TT-681] N82-10036

CONTROLLERS
Multi-variable analysis and design techniques
[AGARD-LS-117] N82-10048
The need for multivariable design and analysis techniques
N82-10049
Feedback and minimax sensitivity
N82-10058
Development of multivariable controllers for aircraft turbine engines
N82-11087

COOLING
End losses in turbine cascades with porous cooling
A82-11434

COOLING SYSTEMS
Design challenges of high performance aircraft POD EOCM cooling systems --- Electro-Optical/Countermeasure
[ASME PAPER 81-ENAS-6] A82-10894

CORES
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067

CORRELATION
Hard limited approaches to correlation velocity sensing
A82-12636

CORROSION PREVENTION
A protective additive for jet fuels
A82-12022

COST REDUCTION
Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership
A82-11719
ACMA - Fact or fantasy --- Advanced Civilian/Military Aircraft
A82-12048
Cost reduction in air transportation --- energy conservation
[SNIAS-811-150-101] N82-10025
FAA misses opportunities to discontinue or reduce operating hours of some airport traffic control towers
[PB81-224214] N82-11049

COWLINGS
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle --- conducted in the Lewis 10 by 10 foot wind tunnel
[NASA-TM-82728] N82-11042

CRACK PROPAGATION
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure
A82-11149
Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra --- for aircraft structural analysis
A82-12043
Fractographic determination of fatigue crack growth rates in aircraft components
A82-12697

CRITICAL FLOW
Aerodynamic calculations and design of subcritical aerofoils
N82-10983

CRITICAL LOADING
Impact-initiated damage thresholds in composites
A82-12028

CROSS FLOW
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

CRYOGENIC WIND TUNNELS
Design predictions for noise control in the cryogenic National Transonic Facility
A82-12025

CYCLIC LOADS
Fatigue substantiation of non-linear structures
A82-11224

D

DAMAGE ASSESSMENT
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure
A82-11149

DAMPING
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034

DATA ACQUISITION
A microprocessor-based data acquisition system for stall/spin research
[AIAA 81-2177] A82-10126
FAA developing new collision avoidance, data acquisition and transmission systems
A82-10396

DATA TRANSMISSION
FAA developing new collision avoidance, data acquisition and transmission systems
A82-10396
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064

DC 9 AIRCRAFT
Fuel conservation - DC-9 series 20/30/40
A82-12563

DECELERATION
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1918] A82-10404

DECISION MAKING
Management of redundancy in flight control systems using optimal decision theory
N82-11084

DEICERS
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Ice protection system technology
N82-11060

DEICING
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil --- conducted in the Lewis Research Center icing research tunnel
[NASA-CR-165444] N82-10021

DELTA WINGS
Formation of triangular-element stiffness matrix using sliding interpolation
A82-11464
Increasing the lift:drag ratio of a flat delta wing
A82-11899

DESIGN ANALYSIS
Development of new lifting parachute designs with increased trim angle
[AIAA PAPER 81-1921] A82-10407
Optimization of the principal design parameters of a passenger aircraft
A82-10816
Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893
Parachute technology under pressure
A82-12804

DIESEL ENGINES
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068

DIFFUSION ELECTRODES
Unsolved problems of nickel cadmium batteries
A82-11725

DIGITAL COMPUTERS
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072

DIGITAL RADAR SYSTEMS
The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT --- Rain Echo Attenuation Compensation Hardware
A82-10225

DIGITAL SIMULATION
Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft
[AIAA 81-2178] A82-10127

DIGITAL SYSTEMS
- Digital avionics - Promise and practice; Proceedings of the Joint Symposium, London, England, March 20, 1980 A82-11934
- The all digital military aircraft A82-11937
- The digital civil aircraft A82-11938
- The certification of digital systems A82-11940
- Digital avionics systems - The RAF experience A82-11941
- Digital avionics: Promise and practice - An airlines experience in the field A82-11942
- Practical design and realization of a digital adaptive flight control system N82-11079
- Control law design for transport aircraft flight tasks N82-11080
- Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083

DIGITAL TECHNIQUES
- Use of Space Shuttle technology in conventional aircraft [AIAA 81-2176] A82-10125
- Air supply system bite for Boeing 767 airplane --- Built-In-Test-Equipment [ASME PAPER 81-ENAS-7] A82-10895
- Design considerations for the direct digital control of dry-tuned gyroscope A82-11933

DIRECT LIFT CONTROLS
- Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control [ESA-TT-681] N82-10036
- Development and evaluation of automatic landing control laws for light wing loading STOL aircraft [NASA-CR-166160] N82-10043

DISCRETE ADDRESS BEACON SYSTEM
- Discrete address beacon, navigation and landing system A82-10650

DISPERSIONS
- The dispersion of drop sizes in gas turbine fuel nozzle sprays A82-12107

DISPLACEMENT MEASUREMENT
- Optical sensors for displacement measurement A82-11407

DISPLAY DEVICES
- Improving the MLS through enhanced cockpit displays A82-10649
- Electronic master monitor and advisory display system, data transmission study [AD-A104243] N82-11064
- Electronic master monitor and advisory display system, human engineering summary report [AD-A104244] N82-11065

DOPPLER RADAR
- Applications of conventional and Doppler radars for aviation safety A82-10215
- An airport wind shear detection and warning system using Doppler radar A82-10220
- Instrumented aircraft verification of clear-air radar detection of low-level wind shear A82-10221
- Detection and display of wind shear and turbulence A82-10222
- Gust front structure observed by Doppler radar A82-10223
- Multiple Doppler radar observations of PBL structure A82-10292

DRAG REDUCTION
- Reductions in parachute drag due to forebody wake effects [AIAA PAPER 81-1939] A82-10417
- The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds N82-11016

DRONE AIRCRAFT
- Development of a nylon-Kevlar recovery system for the CL-289 /AN/USD 502/ surveillance drone [AIAA PAPER 81-1952] A82-10427

DROP SIZE
- The dispersion of drop sizes in gas turbine fuel nozzle sprays A82-12107

DROP TESTS
- The constricted rigging line trials technique for assessing the opening characteristics of parachutes [AIAA PAPER 81-1932] A82-10413

DYNAMIC CONTROL
- The need for multivariable design and analysis techniques N82-10049
- An introduction to stochastic optimal control theory N82-11076

DYNAMIC MODELS
- New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model [NAL-TR-427T] N82-11067

DYNAMIC RESPONSE
- Dynamic response of aircraft structure to gun shock loads A82-11314
- A method for determination of the aeroelastic behavior of aircraft with active control systems [DFVLR-FB-81-05] N82-10047
- A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion N82-11007

DYNAMIC STABILITY
- A contribution to the stabilization of flight vehicle parachute systems --- mathematical models [ESA-TT-679] N82-10046

DYNAMIC STRUCTURAL ANALYSIS
- Fatigue substantiation of non-linear structures A82-11224
- Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980 A82-12026
- The Shock and Vibration Digest, volume 13, no. 9 [AD-A105062] N82-10421

E

EARLY WARNING SYSTEMS
- Airborne associative processor /ASPRO/ --- for early warning radar surveillance, command, and control applications [AIAA 81-2145] A82-10104

EARTH OBSERVATIONS (FROM SPACE)
- SARSAT applications A82-12698

EDGE LOADING
- Aeroacoustic theory for noncompact wing-gust interaction [FDRL-81-7] N82-11071

EDUCATION
- Development of aircraft production engineering discipline at IIT, Bombay A82-11317

EFFECTIVE PERCEIVED NOISE LEVELS
- SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft [NASA-TM-83214] N82-11860

EIGENVALUES
- Multivariable design techniques based on singular value generalizations of classical control N82-10051

EJECTION INJURIES
- Development and construction of pilot ejector seats in Germany from 1938-1945 [DFVLR-FB-81-04] N82-10026

EJECTION SEATS
- Development and construction of pilot ejector seats in Germany from 1938-1945 [DFVLR-FB-81-04] N82-10026

ELASTIC DEFORMATION
- On low-speed wind tunnels with deformable boundaries A82-11462

ELECTRIC CHARGE
Electrical ground testing of aircraft antistatic protection A82-10822
ELECTRIC CONTROL
Control of electromechanical actuator elements for flight vehicles --- Russian book A82-12170
ELECTRIC EQUIPMENT TESTS
High voltage surge and partial discharge test to evaluate aerospace equipment parts A82-11740
ELECTRIC FIELDS
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks [AD-A103270] N82-10033
ELECTRIC GENERATORS
A hidden advantage of permanent magnet electrical generating systems A82-11720
ELECTRIC POWER SUPPLIES
Applications of finite element method in aerospace power systems design A82-11717
Advanced aircraft electric power system A82-11718
Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership A82-11719
High voltage surge and partial discharge test to evaluate aerospace equipment parts A82-11740
ELECTRICAL RESISTIVITY
Electrical ground testing of aircraft antistatic protection A82-10822
ELECTRO-OPTICS
Design challenges of high performance aircraft POD EOCM cooling systems --- Electro-Optical/Countermeasure [ASME PAPER 81-ENAS-6] A82-10894
Optical sensors for displacement measurement A82-11407
ELECTROMAGNETIC FIELDS
Antenna theory and design --- Book A82-12323
ELECTROMAGNETIC NOISE
Tangential sensitivity of EW receivers A82-11020
ELECTROMAGNETIC PULSES
System safety program plan --- electromagnetic pulse testing of the A-7E aircraft [AD-A104557] N82-11354
ELECTROMECHANICAL DEVICES
Control of electromechanical actuator elements for flight vehicles --- Russian book A82-12170
ELECTRONIC AIRCRAFT
Design challenges of high performance aircraft POD EOCM cooling systems --- Electro-Optical/Countermeasure [ASME PAPER 81-ENAS-6] A82-10894
ELECTRONIC CONTROL
Advanced aircraft electrical system control technology demonstrator. Phase 1: Requirements analysis and conceptual design [AD-A103922] N82-10326
ELECTRONIC COUNTERMEASURES
Design challenges of high performance aircraft POD EOCM cooling systems --- Electro-Optical/Countermeasure [ASME PAPER 81-ENAS-6] A82-10894
ELECTRONIC TRANSDUCERS
Outsider's look at flight instrumentation [DE81-025409] N82-11066
ELECTRONIC WARFARE
Digital avionics systems - The RAF experience A82-11941
ELECTROSTATICS
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks [AD-A103270] N82-10033
ENERGY CONSERVATION
Fuel conservation - DC-9 series 20/30/40 A82-12563
Cost reduction in air transportation --- energy conservation [SNIAS-811-150-101] N82-10025
ENERGY CONSUMPTION
Characteristics and trends of energy consumption in transport missions with aircraft and surface vehicles A82-10495
Towards minimum power for environmental control in transport aircraft [ASME PAPER 81-ENAS-4] A82-10892
ENERGY CONVERSION EFFICIENCY
A hidden advantage of permanent magnet electrical generating systems A82-11720
ENGINE CONTROL
Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine A82-10304
The digital civil aircraft A82-11938
ENGINE COOLANTS
Air-film cooling returns to ramjets [ASME PAPER 81-ENAS-8] A82-10896
End losses in turbine cascades with porous cooling A82-11434
The enhancement of heat exchange in channels /2nd revised and enlarged edition/ --- Russian book A82-12222
ENGINE DESIGN
Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine A82-10304
Design considerations for duty cycle, life and reliability of small limited life engines [AIAA PAPER 81-1402] A82-10465
Basic problem of aircraft gasturbine engine analytic design. II A82-11463
Thermal expansion accommodation in a jet engine frame A82-11999
Propulsion study for Small Transport Aircraft Technology (STAT) [NASA-CR-165499] N82-10037
Propulsion study for Small Transport Aircraft Technology (STAT), Appendix B [NASA-CR-165499-APP-B] N82-10038
Lightweight diesel engine designs for commuter type aircraft [NASA-CR-165470] N82-11068
Development of multivariable controllers for aircraft turbine engines N82-11087
Integrated analysis of engine [NASA-TM-82713] N82-11491
ENGINE INLETS
A summary of V/STOL inlet analysis methods [NASA-TM-82725] N82-11043
ENGINE MONITORING INSTRUMENTS
Commercial EMS considerations for small gas turbine engines --- automated engine monitoring systems A82-12449
Further application and development of an engine usage/life monitoring system for military services A82-12450
ENGINE NOISE
Rotor wake characteristics relevant to rotor-stator interaction noise generation [AIAA PAPER 81-2031] A82-10456
ENGINE PARTS
Superalloy powder engine components; controls employed to assure high quality hardware A82-12499
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure N82-11006
ENGINE STARTERS
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics A82-11721
ENGINE TESTS
History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1 A82-12049

Propulsion study for Small Transport Aircraft Technology (STAT), Appendix B
[NASA-CR-165499-APP-B] N82-10038
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089
ENVIRONMENTAL CONTROL
A new APU for medium place aircraft environmental control systems
[ASME PAPER 81-ENAS-1] A82-10889
Closed loop environmental control systems for fighter aircraft
[ASME PAPER 81-ENAS-2] A82-10890
Towards minimum power for environmental control in transport aircraft
[ASME PAPER 81-ENAS-4] A82-10892
Air-freon integrated environmental conditioning system for trainer subsonic aircraft
[ASME PAPER 81-ENAS-33] A82-10920
ENVIRONMENTAL TESTS
Quantification of the thermal environment for externally carried aircraft stores and ordnance
A82-12100
The Shock and Vibration Digest, volume 13, no. 9
[AD-A105062] N82-10421
EPOXY MATRIX COMPOSITE MATERIALS
Kevlar composites; Proceedings of the Symposium, El Segundo, CA, December 2, 1980
A82-12646
EQUATIONS OF MOTION
Optimal flight paths for winged, supersonic flight vehicles - Extension to the case where thrust can be vectored
A82-10310
On the question of trailing airplane motion
A82-11470
EQUATIONS OF STATE
On computing Floquet transition matrices of rotorcraft
A82-11225
ESTIMATING
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
EXHAUST EMISSION
Baseline data on utilization of low-grade fuels in gas turbine applications. Volume 3: Emissions evaluation
[DE81-903764] N82-10254
EXHAUST GASES
Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine
A82-11444
EXPANSION
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
EXPERIENCE
Relationships between naval aviation safety and pilot flight experience
A82-11031
EXTERNAL STORES
Quantification of the thermal environment for externally carried aircraft stores and ordnance
A82-12100
EXTRUDING
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497

F

F-5 AIRCRAFT
F-5G Tigershark
A82-12775
F-18 AIRCRAFT
Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership
A82-11719
FAILURE ANALYSIS
Synchronous fault-tolerant flight control systems
[AIAA 81-2109] A82-10083
Unsolved problems of nickel cadmium batteries
A82-11725
Extending the limits of reliability theory --- Book
A82-12318
Fractographic determination of fatigue crack growth rates in aircraft components
A82-12697
FAN BLADES
Effects of vane/blade ratio and spacing on fan noise
[AIAA PAPER 81-2033] A82-10457
FATIGUE (MATERIALS)
Sophisticated aircraft structure developments - Combat aeroplanes
A82-10309
Fractographic determination of fatigue crack growth rates in aircraft components
A82-12697
FATIGUE LIFE
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure
A82-11149
Fatigue life of lugs under service loading - Test results and predictions
A82-11685
FATIGUE TESTS
Superclean superalloy powders by the rotating electrode process
A82-12496
Matrix analysis of wings
N82-10998
FATTY ACIDS
A protective additive for jet fuels
A82-12022
FAULT TOLERANCE
Synchronous fault-tolerant flight control systems
[AIAA 81-2109] A82-10083
FEDERAL BUDGETS
Airport and Airway Improvement Act of 1981, part 1
[GPO-76-241-PT-1] N82-10062
NASA Authorization, 1982: Index
[GPO-84-713] N82-10959
FEEDBACK CONTROL
Closed loop environmental control systems for fighter aircraft
[ASME PAPER 81-ENAS-2] A82-10890
Comparative study of flare control laws
[NASA-CR-164903] N82-10032
Multi-variable analysis and design techniques
[AGARD-LS-117] N82-10048
The need for multivariable design and analysis techniques
N82-10049
Characteristic and principal gains and phases and their use as multivariable control design tools --- generalizing Nyquist and root-locus diagram techniques
N82-10050
Multivariable design techniques based on singular value generalizations of classical control
N82-10051
Limitations on achievable performance of multivariable feedback systems
N82-10052
LQG-based multivariable design: Frequency domain interpretation
N82-10053
LQG multivariable design tools
N82-10054
Design of high integrity multivariable control systems
N82-10055
A geometric approach to multivariable control system synthesis
N82-10056
Multivariables design: The optimization of approximate inverses
N82-10057
Feedback and minimax sensitivity
N82-10058
Design techniques for mutlivariable flight control systems
N82-11078
Practical design and realization of a digital adaptive flight control system
N82-11079
FIBER OPTICS
Optical sensors for displacement measurement
A82-11407
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064

FIELD THEORY (PHYSICS)
Antenna theory and design --- Book A82-12323
FIGHTER AIRCRAFT
Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion [AIAA PAPER 81-1776] A82-10462
Closed loop environmental control systems for fighter aircraft [ASME PAPER 81-ENAS-2] A82-10890
Dynamic response of aircraft structure to gun shock loads A82-11314
The case for a defensive air-to-air fighter A82-12801
FILM COOLING
Air-film cooling returns to ramjets [ASME PAPER 81-ENAS-8] A82-10896
FINITE DIFFERENCE THEORY
Finite difference computation of the steady transonic potential flow around airplanes N82-10981
FINITE ELEMENT METHOD
Applications of finite element method in aerospace power systems design A82-11717
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks [AD-A103270] N82-10033
Calculation of natural modes of vibration for rotor blades by the finite element method [DFVLR-FB-81-07] N82-10452
Structural analysis of fuselages with cutouts by finite element method N82-10995
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations [AD-A104545] N82-11498
FIRE PREVENTION
Rheological behavior of progressively shear-thickening solutions --- aircraft fuel polymer additives for fire protection in survivable crashes A82-11177
FLEXIBILITY
The effects of flexibility on the steady-state performance of small ribbon parachute models [AIAA PAPER 81-1923] A82-10408
FLEXIBLE SPACECRAFT
Control design of flexible spacecraft N82-11081
FLIGHT CHARACTERISTICS
Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion [AIAA PAPER 81-1776] A82-10462
Wings in the sun - The evolution of Solar Challenger A82-12694
FLIGHT CONTROL
KC-135 Avionics Modernization Hot Bench [AIAA 81-2105] A82-10081
Synchronous fault-tolerant flight control systems [AIAA 81-2109] A82-10083
The Space Shuttle vehicle checkout involving flight avionics software [AIAA 81-2141] A82-10100
High-efficiency hydraulic power transfer units for multisystem aircraft A82-10853
Developments in boundary layer Thrust Vector Control A82-10855
Control of electromechanical actuator elements for flight vehicles --- Russian book A82-12170
The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions A82-12642
Development and evaluation of automatic landing control laws for light wing loading STOL aircraft [NASA-CR-166160] N82-10043
Flight trajectory control investigation [AD-A104542] N82-11048
Electronic master monitor and advisory display system, human engineering summary report [AD-A104244] N82-11065
Design considerations for optimal flight control systems N82-11077
Design techniques for multivariable flight control systems N82-11078
Practical design and realization of a digital adaptive flight control system N82-11079
Control law design for transport aircraft flight tasks N82-11080
Management of redundancy in flight control systems using optimal decision theory N82-11084
FLIGHT CREWS
The all digital military aircraft A82-11937
FLIGHT HAZARDS
Downbursts and microbursts - An aviation hazard --- downdrafts beneath thunderstorms A82-10214
Airborne weather radar and severe weather penetration A82-10219
FLIGHT INSTRUMENTS
In-situ calibration of flight heat transfer instrumentation [ASME PAPER 81-ENAS-13] A82-10961
FLIGHT MECHANICS
On the question of trailing airplane motion A82-11470
FLIGHT OPTIMIZATION
Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft [AIAA 81-2178] A82-10127
Helicopter icing spray system - Improvements and flight experience A82-12696
Optimum climb and descent trajectories for airline missions N82-11082
FLIGHT PATHS
Optimal flight paths for winged, supersonic flight vehicles - Extension to the case where thrust can be vectored A82-10310
FLIGHT SAFETY
Applications of conventional and Doppler radars for aviation safety A82-10215
Detection and display of wind shear and turbulence A82-10222
Test Pilots' Aviation Safety Workshop, U.S. Naval Postgraduate School, Monterey, CA, February 25-28, 1981, Proceedings A82-10500
Relationships between naval aviation safety and pilot flight experience A82-11031
A proposed flight safety program for the Korean Air Force [AD-A102373] N82-10023
FLIGHT SIMULATION
Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft [AIAA 81-2178] A82-10127
Comparison of simulation and experimental data for a gliding parachute in dynamic flight [AIAA PAPER 81-1924] A82-10409
Ideal and simulated performance of an aircraft in the terrain following mission A82-11302
Fatigue life of lugs under service loading - Test results and predictions A82-11685
FLIGHT TEST INSTRUMENTS
Outsider's look at flight instrumentation [DE81-025409] N82-11066
FLIGHT TESTS
HiMAT onboard flight computer system architecture and qualification [AIAA 81-2107] A82-10082
A microprocessor-based data acquisition system for stall/spin research [AIAA 81-2177] A82-10126

The constricted rigging line trials technique for assessing the opening characteristics of parachutes
[AIAA PAPER 81-1932] A82-10413
Inflatable system for fast deployment of parachutes at low altitudes from slow moving aircraft or stationary supports
[AIAA PAPER 81-1953] A82-10428
Dynamic response of aircraft structure to gun shock loads
A82-11314
History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1
A82-12049
FAA acceptance tests on the NAVSTAR GPS Z-Set receiver
A82-12639
Ring Laser Gyro Navigator /RLGN/ flight test results
A82-12644
Flight test results of the model simulation controller for the HFB 320 for in-flight simulation of the A310 airbus
[ESA-TT-660] N82-10107

FLIGHT TRAINING
Spin recovery training --- licensing requirement
[GPO-66-020] N82-10022

FLOORS
Evaluation of the acoustic measurement capability of the NASA Langley V/STOL wind tunnel open test section with acoustically absorbent ceiling and floor treatments
[NASA-CR-165796] N82-10059

FLOQUET THEOREM
On computing Floquet transition matrices of rotorcraft
A82-11225
Numerical treatment of helicopter rotor stability problems
A82-12045

FLOW DISTORTION
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

FLOW DISTRIBUTION
On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120
Second order approximation theory of an arbitrary aerofoil in compressible potential flow
N82-10982
An aerodynamic design method for transonic axial flow compressor stage
N82-10984
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054

FLOW EQUATIONS
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046

FLOW GEOMETRY
Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes
[ASME PAPER 81-GT-48] A82-10952

FLOW VISUALIZATION
Experimental study of subsonic and transonic flows past a wing
A82-10363
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013

FLOWMETERS
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063

FLUID DYNAMICS
V/STOL aircraft and fluid dynamics
[NASA-TM-81328] N82-10029

FLUID POWER
Fluid power technology for the '80s --- Book
A82-10851

FLUIDIC CIRCUITS
Considerations and applications for the use of fluidics in aerospace controls
A82-12087

FLUTTER
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034

FLUTTER ANALYSIS
Experimental study of empennage snap-through vibrations
A82-11471
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070

FLY BY WIRE CONTROL
Flight test results of the model simulation controller for the HFB 320 for in-flight simulation of the A310 airbus
[ESA-TT-660] N82-10107

FLYING PLATFORMS
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050

FLYWHEELS
Low maintenance hydraulic accumulator
[AD-A103947] N82-10034

FOREBODIES
Reductions in parachute drag due to forebody wake effects
[AIAA PAPER 81-1939] A82-10417

FOREIGN BODIES
Coupled fluid/structure response predictions for soft body impact of airfoil configurations --- ice and bird impact on aircraft engines
A82-12039

FOSSIL FUELS
Baseline data on utilization of low-grade fuels in gas turbine applications. Volume 3: Emissions evaluation
[DE81-903764] N82-10254

FOUNDATIONS
Design of airport pavements for expansive soils
[AD-A104660] N82-11313

FRACTOGRAPHY
Fractographic determination of fatigue crack growth rates in aircraft components
A82-12697

FRACTURE STRENGTH
The application of improved aluminium alloys and steels in aircraft structures
A82-10305

FRAMES
Thermal expansion accommodation in a jet engine frame
A82-11999

FREE FLOW
Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934

FREON
Air-freon integrated environmental conditioning system for trainer subsonic aircraft
[ASME PAPER 81-ENAS-33] A82-10920

FREQUENCY STABILITY
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics
A82-11721

FRONTS (METEOROLOGY)
Gust front structure observed by Doppler radar
A82-10223

FUEL CONSUMPTION
Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine
A82-10304
Characteristics and trends of energy consumption in transport missions with aircraft and surface vehicles
A82-10495
A hidden advantage of permanent magnet electrical generating systems
A82-11720
Fuel conservation - DC-9 series 20/30/40
A82-12563

FUEL CORROSION
A protective additive for jet fuels
A82-12022
FUEL GAGES
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063
FUEL PRODUCTION
Fuel for future transport aircraft
[ASME PAPER 81-HT-80] A82-10965
FUEL SPRAYS
The dispersion of drop sizes in gas turbine fuel nozzle sprays
A82-12107
FUEL TANKS
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks
[AD-A103270] N82-10033
FUSELAGES
Experimental modal analysis of the fuselage panels of an Aero Commander aircraft
[NASA-CR-165750] N82-10028
Structural analysis of fuselages with cutouts by finite element method
N82-10995

G

GAS COOLING
A new method of cooling turbine vanes
N82-11027
GAS FLOW
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024
GAS TEMPERATURE
Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine
A82-11444
GAS TURBINE ENGINES
Design considerations for duty cycle, life and reliability of small limited life engines
[AIAA PAPER 81-1402] A82-10465
A new APU for medium place aircraft environmental control systems
[ASME PAPER 81-ENAS-1] A82-10889
End losses in turbine cascades with porous cooling
A82-11434
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463
The CIVIC - A concept in vortex induced combustion. II
[ASME PAPER 81-GT-12] A82-11997
Thermal expansion accommodation in a jet engine frame
A82-11999
The dispersion of drop sizes in gas turbine fuel nozzle sprays
A82-12107
Application of numerical modeling to gas turbine combustor development problems
A82-12118
Validation studies of turbulence and combustion models for aircraft gas turbine combustors
A82-12267
Commercial EMS considerations for small gas turbine engines --- automated engine monitoring systems
A82-12449
Further application and development of an engine usage/life monitoring system for military services
A82-12450
Superclean superalloy powders by the rotating electrode process
A82-12496
Lineup of the LM-series aircraft-derivative gas turbines
A82-12560
Development of low modulus material for use in ceramic gas path seal applications
[NASA-CR-165469] N82-10039
Baseline data on utilization of low-grade fuels in gas turbine applications. Volume 3: Emissions evaluation
[DE81-903764] N82-10254
A new method of cooling turbine vanes
N82-11027
GAUSS EQUATION
LQG-based multivariable design: Frequency domain interpretation
N82-10053
LQG multivariable design tools
N82-10054
GENERAL AVIATION AIRCRAFT
A new APU for medium place aircraft environmental control systems
[ASME PAPER 81-ENAS-1] A82-10889
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil --- conducted in the Lewis Research Center icing research tunnel
[NASA-CR-165444] N82-10021
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339
GEOMETRY
A solution to the static geometry problem for JTIDS relative navigation
A82-12634
The statistical theory of radio direction finding
[AD-A104156] N82-10027
A geometric approach to multivariable control system synthesis
N82-10056
Aerodynamic calculations and design of subcritical aerofoils
N82-10983
GLASS FIBER REINFORCED PLASTICS
On the use of carbon composites in slat and stabilizer construction
A82-11468
GLIDING
Comparison of simulation and experimental data for a gliding parachute in dynamic flight
[AIAA PAPER 81-1924] A82-10409
GLOBAL POSITIONING SYSTEM
National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings
A82-12626
Satellite geometry considerations for low cost GPS user equipment
A82-12630
FAA acceptance tests on the NAVSTAR GPS Z-Set receiver
A82-12639
A navigation systems planning model
A82-12640
Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers
A82-12643
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339
GROUND BASED CONTROL
HiMAT onboard flight computer system architecture and qualification
[AIAA 81-2107] A82-10082
GROUND TESTS
Electrical ground testing of aircraft antistatic protection
A82-10822
GUATEMALA
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514
GUIDANCE SENSORS
The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions
A82-12642
GUNFIRE
Dynamic response of aircraft structure to gun shock loads
A82-11314
GUST LOADS
Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra --- for aircraft structural analysis
A82-12043
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

GUSTS
- Gust front structure observed by Doppler radar A82-10223

GYROCOMPASSES
- Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems A82-11927

GYROSCOPES
- Problems relating to the classical rate-gyro A82-10497
- Design and development of a low cost servoed rate gyro for unmanned aircraft A82-11932

GYROSTABILIZERS
- Synthesis of system for evaluating gyrostabilizer state with unknown disturbances A82-11469

H

HARDWARE
- Controlling the software/hardware interface for the validation of avionics systems --- in flight control systems [AIAA 81-2159] A82-10116

HEAD-UP DISPLAYS
- Study and development of an integrated head-up display [AD-A104337] N82-11062

HEAT EXCHANGERS
- The enhancement of heat exchange in channels /2nd revised and enlarged edition/ --- Russian book A82-12222
- A new method of cooling turbine vanes N82-11027

HEAT RESISTANT ALLOYS
- Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1 A82-12495
- Superclean superalloy powders by the rotating electrode process A82-12496
- Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet A82-12497
- Superalloy powder engine components; controls employed to assure high quality hardware A82-12499

HEAT TRANSFER
- In-situ calibration of flight heat transfer instrumentation [ASME PAPER 81-ENAS-13] A82-10901
- Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes [ASME PAPER 81-HT-48] A82-10952
- Results of experimental study of heat transfer to turbine blades with porous cooling A82-11446

HEAT TRANSMISSION
- The enhancement of heat exchange in channels /2nd revised and enlarged edition/ --- Russian book A82-12222

HEATING EQUIPMENT
- Ice protection system technology N82-11060
- Experimental study of fuel heating at low temperatures in a wing tank model, volume 1 [NASA-CR-165391] N82-11224

HELICOPTER CONTROL
- Electronic master monitor and advisory display system, data transmission study [AD-A104243] N82-11064
- Electronic master monitor and advisory display system, human engineering summary report [AD-A104244] N82-11065

HELICOPTER DESIGN
- An investigation of a stoppable helicopter rotor with circulation control --- ames 40 by 80 foot wind tunnel [NASA-TM-81218] N82-10030

HELICOPTER ENGINES
- Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine A82-10304

HELICOPTER PERFORMANCE
- Helicopter rotor trailing edge noise [AIAA PAPER 81-2001] A82-10455
- Numerical treatment of helicopter rotor stability problems A82-12045
- Helicopter icing spray system - Improvements and flight experience A82-12696

HELICOPTERS
- Model helicopter rotor impulsive noise A82-11300
- A comprehensive bibliography of literature on helicopter noise technology [AD-A103331] N82-10812
- Rotorcraft icing: Status and prospects [AGARD-AR-166] N82-11056
- Helicopter rotor trailing edge noise --- noise prediction [NASA-CR-3470] N82-11859

HFB-320 AIRCRAFT
- System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness [ESA-TT-666] N82-10045
- Flight test results of the model simulation controller for the HFB 320 for in-flight simulation of the A310 airbus [ESA-TT-660] N82-10107

HIGH ALTITUDE BALLOONS
- A new thermal and trajectory model for high altitude balloons [AIAA PAPER 81-1926] A82-10411

HIGH POLYMERS
- Rheological behavior of progressively shear-thickening solutions --- aircraft fuel polymer additives for fire protection in survivable crashes A82-11177

HIGH STRENGTH STEELS
- The application of improved aluminium alloys and steels in aircraft structures A82-10305

HIGH TEMPERATURE RESEARCH
- Adaptation of a turbine test facility to high-temperature research [RAE-LIB-TRANS-2064] N82-11089

HIGH VOLTAGES
- High voltage surge and partial discharge test to evaluate aerospace equipment parts A82-11740

HONEYCOMB STRUCTURES
- Light aircraft structural design in non-metallics - Use of composite honeycomb for light aircraft A82-10308

HORIZONTAL FLIGHT
- Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion [AIAA PAPER 81-1776] A82-10462
- Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight [NASA-TP-1918] N82-11050

HORIZONTAL TAIL SURFACES
- A CFRP taileron for the Tornado: Construction and production --- horizontal stabilizer [MBB-FE-212/KFK/PUB/2] N82-10035

HUBS
- Development of the Triflex rotor head A82-11222

HUMAN FACTORS ENGINEERING
- Electronic master monitor and advisory display system, human engineering summary report [AD-A104244] N82-11065

HUMAN PERFORMANCE
- Relationships between naval aviation safety and pilot flight experience A82-11031

HUMAN REACTIONS
- Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology [NASA-TM-76628] N82-11636

HYDRAULIC CONTROL
High-efficiency hydraulic power transfer units for multisystem aircraft
A82-10853
HYDRAULIC EQUIPMENT
Fluid power technology for the '80s --- Book
A82-10851
Low maintenance hydraulic accumulator
[AD-A103947] N82-10034
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072
HYDROCARBON FUEL PRODUCTION
Jet fuel from carbon
A82-12021
Jet fuel locks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
HYDROGEN FUELS
Fuel for future transport aircraft
[ASME PAPER 81-HT-80] A82-10965
HYDROGENATION
Jet fuel from carbon
A82-12021

I

ICE FORMATION
Helicopter icing spray system - Improvements and flight experience
A82-12696
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Operational environment, meteorological conditions and weather forecasting
N82-11057
Technology base for icing instrumentation and mathematical modelling
N82-11058
Facilities for development and clearance
N82-11059
Ice protection system technology
N82-11060
Proposed standard requirements and procedures for icing clearance
N82-11061
ICE PREVENTION
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil --- conducted in the Lewis Research Center icing research tunnel
[NASA-CR-165444] N82-10021
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053
IMAGE ENHANCEMENT
Solution to the hidden-line problem
A82-12803
IMPACT ACCELERATION
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1916] A82-10404
IMPACT DAMAGE
Impact-initiated damage thresholds in composites
A82-12026
IMPACT LOADS
Coupled fluid/structure response predictions for soft body impact of airfoil configurations --- ice and bird impact on aircraft engines
A82-12039
IMPACT RESISTANCE
Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar
A82-12647
IMPACT TESTS
Air bag impact attenuation system for the AQM-34V remote piloted vehicle
[AIAA PAPER 81-1917] A82-10403
IN-FLIGHT MONITORING
Performance analysis of enroute air traffic control computers in the National Airspace System
[AIAA 81-2203] A82-10140
Commercial EMS considerations for small gas turbine engines --- automated engine monitoring systems
A82-12449
Further application and development of an engine usage/life monitoring system for military services
A82-12450
Electronic master monitor and advisory display system, data transmission study
[AD-A104243] N82-11064
Electronic master monitor and advisory display system, human engineering summary report
[AD-A104244] N82-11065
INCOMPRESSIBLE FLOW
Theoretical analysis of parachute inflation including fluid kinetics
[AIAA PAPER 81-1925] A82-10410
Second order approximation theory of an arbitrary aerofoil in compressible potential flow
N82-10982
INCOMPRESSIBLE FLUIDS
Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459
INDEXES (DOCUMENTATION)
NASA Authorization, 1982: Index
[GPO-84-713] N82-10959
INERTIAL NAVIGATION
Synthesis of system for evaluating gyrostabilizer state with unknown disturbances
A82-11469
Ring Laser Gyro Navigator /RLGN/ flight test results
A82-12644
INERTIAL REFERENCE SYSTEMS
Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers
A82-12643
INFLATABLE STRUCTURES
Inflatable system for fast deployment of parachutes at low altitudes from slow moving aircraft or stationary supports
[AIAA PAPER 81-1953] A82-10428
INFLATING
Theoretical analysis of parachute inflation including fluid kinetics
[AIAA PAPER 81-1925] A82-10410
The constricted rigging line trials technique for assessing the opening characteristics of parachutes
[AIAA PAPER 81-1932] A82-10413
Stress measurements in a ribbon parachute canopy during inflation and at steady state
[AIAA PAPER 81-1944] A82-10420
INJECTORS
One reason for the onset of high-frequency self-excited oscillations --- in combustion chambers of aircraft engines
A82-11448
INLET FLOW
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043
INLET PRESSURE
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007
INSPECTION
Mathematical model for the maintenance program of modern jet aircraft --- crack detection; inspection intervals
[DFVLR-FB-81-14] N82-10002
INSTRUMENT LANDING SYSTEMS
Discrete address beacon, navigation and landing system
A82-10650
INTAKE SYSTEMS
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006

INTEGRAL EQUATIONS
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035

INTELLIGENCE
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems
[AIAA 81-2205] A82-10143

INTERPOLATION
Feedback and minimax sensitivity
N82-10058

INVERSIONS
The net-skirt to a parachute canopy as a device to prevent inversion
[AIAA PAPER 81-1927] A82-10412

INVISCID FLOW
Theoretical analysis of parachute inflation including fluid kinetics
[AIAA PAPER 81-1925] A82-10410
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015

J

JAGUAR AIRCRAFT
Digital avionics systems - The RAF experience
A82-11941

JET AIRCRAFT
Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459
History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1
A82-12049

JET AIRCRAFT NOISE
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860

JET ENGINE FUELS
Fuel for future transport aircraft
[ASME PAPER 81-HT-80] A82-10965
Jet fuel from carbon
A82-12021
A protective additive for jet fuels
A82-12022
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224
Jet fuel locks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

JET ENGINES
Thermal expansion accommodation in a jet engine frame
A82-11999
Coupled fluid/structure response predictions for soft body impact of airfoil configurations --- ice and bird impact on aircraft engines
A82-12039

JET FLAPS
Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459

JET IMPINGEMENT
Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine
A82-11444

JET VANES
Effects of vane/blade ratio and spacing on fan noise
[AIAA PAPER 81-2033] A82-10457

K

KERNEL FUNCTIONS
On the kernel function collocation method in steady subsonic flow for wing with control surfaces
N82-12023

KEVLAR (TRADEMARK)
Kevlar composites; Proceedings of the Symposium, El Segundo, CA, December 2, 1980
A82-12646
Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar
A82-12647

KINEMATICS
Analytical determination of undercarriage retraction kinematics
A82-10364

KOREA
A proposed flight safety program for the Korean Air Force
[AD-A102373] N82-10023

L

L-1011 AIRCRAFT
History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1
A82-12049
Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar
A82-12647

LAMINAR BOUNDARY LAYER
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

LAMINAR FLOW
On low-speed wind tunnels with deformable boundaries
A82-11462

LAMINATES
Impact-initiated damage thresholds in composites
A82-12028

LAND USE
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

LANDING AIDS
Comparative study of flare control laws
[NASA-CR-164903] N82-10032

LANDING GEAR
The possibility of using deformable rubber components in landing gear
A82-10496

LASER GYROSCOPES
Ring Laser Gyro Navigator /RLGN/ flight test results
A82-12644

LATERAL CONTROL
Procedures and analysis techniques for determining static air minimum control speeds
A82-12564

LEAD ACID BATTERIES
Sealed lead-acid batteries for aircraft applications
A82-11716

LEADING EDGE SLATS
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465
On the use of carbon composites in slat and stabilizer construction
A82-11468

LEADING EDGES
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil --- conducted in the Lewis Research Center icing research tunnel
[NASA-CR-165444] N82-10021
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052

LICENSING
Spin recovery training --- licensing requirement
[GPO-66-020] N82-10022

LIFE CYCLE COSTS
Closed loop environmental control systems for fighter aircraft
[ASME PAPER 81-ENAS-2] A82-10890
Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership
A82-11719
A hidden advantage of permanent magnet electrical generating systems
A82-11720

LIFE SUPPORT SYSTEMS
Air supply system bite for Boeing 767 airplane --- Built-In-Test-Equipment [ASME PAPER 81-ENAS-7] A82-10895
LIFT
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory [NAL-TR-661T] N82-11035
LIFT AUGMENTATION
An investigation of a stoppable helicopter rotor with circulation control --- ames 40 by 80 foot wind tunnel [NASA-TM-81218] N82-10030
LIFT DRAG RATIO
A modular asymmetric parachute for wind tunnel testing [AIAA PAPER 81-1933] A82-10414
Increasing the lift:drag ratio of a flat delta wing A82-11899
LIFTING BODIES
Development of new lifting parachute designs with increased trim angle [AIAA PAPER 81-1921] A82-10407
A modular asymmetric parachute for wind tunnel testing [AIAA PAPER 81-1933] A82-10414
LIGHT AIRCRAFT
Some possibilities for composite light aircraft construction A82-10307
Light aircraft structural design in non-metallics - Use of composite honeycomb for light aircraft A82-10308
The possibility of using deformable rubber components in landing gear A82-10496
Experimental modal analysis of the fuselage panels of an Aero Commander aircraft [NASA-CR-165750] N82-10028
LIGHTNING
Lightning effects on aircraft and composites. Literature study on lightning strikes and protection --- advanced composite materials [FOA-C-20388-F9] N82-10024
LINEAR EQUATIONS
LQG-based multivariable design: Frequency domain interpretation N82-10053
LQG multivariable design tools N82-10054
LINEAR SYSTEMS
Limitations on achievable performance of multivariable feedback systems N82-10052
Design of high integrity multivariable control systems N82-10055
A geometric approach to multivariable control system synthesis N82-10056
Multivariables design: The optimization of approximate inverses N82-10057
Feedback and minimax sensitivity N82-10058
Theory of stochastic optimal control some basic notions N82-11075
LIQUID HYDROGEN
Fuel for future transport aircraft [ASME PAPER 81-HT-80] A82-10965
LOAD TESTS
Fatigue life of lugs under service loading - Test results and predictions A82-11685
LONGITUDINAL CONTROL
System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness [ESA-TT-666] N82-10045
LONGITUDINAL STABILITY
Active control elements on the transonic wing of the Airbus A-300 (ACTTA A). Airbus A-300 with reduced longitudinal stability (ACTTA-C) --- advanced control transonic transport aircraft (ACCTA): design considerations N82-10044
LOOPS
The need for multivariable design and analysis techniques N82-10049
Multivariable design techniques based on singular value generalizations of classical control N82-10051
Limitations on achievable performance of multivariable feedback systems N82-10052
LQG-based multivariable design: Frequency domain interpretation N82-10053
LQG multivariable design tools N82-10054
Design of high integrity multivariable control systems N82-10055
LOW ALTITUDE
Inflatable system for fast deployment of parachutes at low altitudes from slow moving aircraft or stationary supports [AIAA PAPER 81-1953] A82-10428
LOW SPEED STABILITY
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing [NASA-TP-1914] N82-11013
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section [NASA-TP-1919] N82-11033
LOW SPEED WIND TUNNELS
On low-speed wind tunnels with deformable boundaries A82-11462
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment A82-11465
LOW TEMPERATURE ENVIRONMENTS
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1 [NASA-CR-165391] N82-11224
LUGS
Fatigue life of lugs under service loading - Test results and predictions A82-11685

M

MAGNETS
A hidden advantage of permanent magnet electrical generating systems A82-11720
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics A82-11721
MAN MACHINE SYSTEMS
Improving the MLS through enhanced cockpit displays A82-10649
MANUAL CONTROL
Improving the MLS through enhanced cockpit displays A82-10649
Control law design for transport aircraft flight tasks N82-11080
MASS DISTRIBUTION
Experimental determination of parachute apparent mass and its significance in predicting dynamic stability [AIAA PAPER 81-1920] A82-10406
MATCHING
Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils A82-10021
MATERIALS TESTS
The possibility of using deformable rubber components in landing gear A82-10496
MATHEMATICAL MODELS
A mathematical model of an over-sea airborne UHF radio link A82-11406
Validation studies of turbulence and combustion models for aircraft gas turbine combustors A82-12267

Mathematical model for the maintenance program of modern jet aircraft --- crack detection; inspection intervals
[DFVLR-FB-81-14] N82-10002
A contribution to the stabilization of flight vehicle parachute systems --- mathematical models
[ESA-TT-679] N82-10046
Technology base for icing instrumentation and mathematical modelling
N82-11058
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498

MATRICES (MATHEMATICS)
On computing Floquet transition matrices of rotorcraft
A82-11225

MATRIX METHODS
The automatic matrix force method and techniques for handling more complex computations with given computer capacity
N82-10994

MAXWELL EQUATION
Antenna theory and design --- Book
A82-12323

MEASURING INSTRUMENTS
Technology base for icing instrumentation and mathematical modelling
N82-11058

MECHANICAL DEVICES
A comprehensive bibliography of literature on helicopter noise technology
[AD-A103331] N82-10812

MECHANICAL PROPERTIES
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497
Superalloy powder engine components; controls employed to assure high quality hardware
A82-12499

METAL FATIGUE
Fatigue substantiation of non-linear structures
A82-11224
A note on fatal aircraft accidents involving metal fatigue
A82-11400

METAL POWDER
Superclean superalloy powders by the rotating electrode process
A82-12496

METALLIZING
Electrical ground testing of aircraft antistatic protection
A82-10822

METEOROLOGICAL PARAMETERS
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Operational environment, meteorological conditions and weather forecasting
N82-11057

METEOROLOGICAL RADAR
Applications of conventional and Doppler radars for aviation safety
A82-10215
Description of the meteorological research radar system aboard NOAA/Research Facilities Center WP-3D aircraft
A82-10217
Airborne weather radar and severe weather penetration
A82-10219
An airport wind shear detection and warning system using Doppler radar
A82-10220
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221
The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT --- Rain Echo Attenuation Compensation Hardware
A82-10225

METEOROLOGICAL RESEARCH AIRCRAFT
Description of the meteorological research radar system aboard NOAA/Research Facilities Center WP-3D aircraft
A82-10217

MEXICO
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

MICROMETEOROLOGY
Downbursts and microbursts - An aviation hazard --- downdrafts beneath thunderstorms
A82-10214

MICROPROCESSORS
A microprocessor-based data acquisition system for stall/spin research
[AIAA 81-2177] A82-10126
Navigation task partitioning in distributed-processing avionics systems
A82-10646

MICROWAVE LANDING SYSTEMS
Improving the MLS through enhanced cockpit displays
A82-10649

MICROWAVE TRANSMISSION
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050

MILITARY AIRCRAFT
Automated Paint and Process Line /APPL/ --- for aircraft production
[AIAA 81-2166] A82-10120
Sophisticated aircraft structure developments - Combat aeroplanes
A82-10309
Sealed lead-acid batteries for aircraft applications
A82-11716
Advanced aircraft electric power system
A82-11718
The all digital military aircraft
A82-11937
ACMA - Fact or fantasy --- Advanced Civilian/Military Aircraft
A82-12048
Further application and development of an engine usage/life monitoring system for military services
A82-12450

MILITARY AVIATION
Relationships between naval aviation safety and pilot flight experience
A82-11031

MILITARY HELICOPTERS
Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
A82-11927

MILITARY OPERATIONS
The case for a defensive air-to-air fighter
A82-12801

MILITARY TECHNOLOGY
Implementation of AVRADCOM MMST --- for military aircraft parts production engineering
A82-10545
The all digital military aircraft
A82-11937
Digital avionics systems - The RAF experience
A82-11941
Parachute technology under pressure
A82-12804

MINICOMPUTERS
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils
A82-10362

MINIMAX TECHNIQUE
Feedback and minimax sensitivity
N82-10058

MISSILE BODIES
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359

MISSILE DESIGN
Design considerations for duty cycle, life and reliability of small limited life engines
[AIAA PAPER 81-1402] A82-10465

Outsider's look at flight instrumentation [DE81-025409] N82-11066

MOLDS
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model [NAL-TR-427T] N82-11067

MONOPLANES
Analytical determination of undercarriage retraction kinematics A82-10364

MRCA AIRCRAFT
A CFRP taileron for the Tornado: Construction and production --- horizontal stabilizer [MBB-FE-212/KPK/PUB/2] N82-10035

MULTIENGINE VEHICLES
Procedures and analysis techniques for determining static air minimum control speeds A82-12564

MULTIPROCESSING (COMPUTERS)
Airborne associative processor /ASPRO/ --- for early warning radar surveillance, command, and control applications [AIAA 81-2145] A82-10104
Navigation task partitioning in distributed-processing avionics systems A82-10646

N

NACELLES
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle --- conducted in the Lewis 10 by 10 foot wind tunnel [NASA-TM-82728] N82-11042

NASA PROGRAMS
NASA Authorization, 1982: Index [GPO-84-713] N82-10959

NATIONAL AIRSPACE UTILIZATION SYSTEM
Performance analysis of enroute air traffic control computers in the National Airspace System [AIAA 81-2203] A82-10140

NATIONAL AVIATION SYSTEM
Airport and Airway Improvement Act of 1981, part 1 [GPO-76-241-PT-1] N82-10062

NAVIER-STOKES EQUATION
Computation of high Reynolds number internal/external flows [NASA-TM-84049] N82-11046

NAVIGATION
Flight trajectory control investigation [AD-A104542] N82-11048
An overview of optimal control in aerospace systems N82-11074

NAVIGATION AIDS
Three navigation systems and their costs of acquiring remote sensing data A82-10049

NAVSTAR SATELLITES
FAA acceptance tests on the NAVSTAR GPS Z-Set receiver A82-12639

NETS
The net-skirt to a parachute canopy as a device to prevent inversion [AIAA PAPER 81-1927] A82-10412

NETWORK CONTROL
A solution to the static geometry problem for JTIDS relative navigation A82-12634

NICKEL CADMIUM BATTERIES
Unsolved problems of nickel cadmium batteries A82-11725

NOISE GENERATORS
Rotor wake characteristics relevant to rotor-stator interaction noise generation [AIAA PAPER 81-2031] A82-10456
A comprehensive bibliography of literature on helicopter noise technology [AD-A103331] N82-10812

NOISE MEASUREMENT
Model helicopter rotor impulsive noise A82-11300
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft [NASA-TM-83214] N82-11860

NOISE POLLUTION
A comprehensive bibliography of literature on helicopter noise technology [AD-A103331] N82-10812
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology [NASA-TM-76628] N82-11636

NOISE PREDICTION (AIRCRAFT)
Helicopter rotor trailing edge noise [AIAA PAPER 81-2001] A82-10455
Rotor wake characteristics relevant to rotor-stator interaction noise generation [AIAA PAPER 81-2031] A82-10456
Effects of vane/blade ratio and spacing on fan noise [AIAA PAPER 81-2033] A82-10457
Helicopter rotor trailing edge noise --- noise prediction [NASA-CR-3470] N82-11859

NOISE REDUCTION
'Quiet please' --- aircraft hydraulic systems noise reduction A82-10854
Design predictions for noise control in the cryogenic National Transonic Facility A82-12025
Experimental modal analysis of the fuselage panels of an Aero Commander aircraft [NASA-CR-165750] N82-10028
Comparative study of flare control laws [NASA-CR-164903] N82-10032
A comprehensive bibliography of literature on helicopter noise technology [AD-A103331] N82-10812

NOISE SPECTRA
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft [NASA-TM-83214] N82-11860

NONLINEAR SYSTEMS
Fatigue substantiation of non-linear structures A82-11224
A geometric approach to multivariable control system synthesis N82-10056
Theory of stochastic optimal control some basic notions N82-11075
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083

NOZZLE DESIGN
Developments in boundary layer Thrust Vector Control A82-10855

NUMERICAL ANALYSIS
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils A82-10362
Numerical treatment of helicopter rotor stability problems A82-12045
Procedures and analysis techniques for determining static air minimum control speeds A82-12564
The need for multivariable design and analysis techniques N82-10049

NUMERICAL FLOW VISUALIZATION
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm [AD-A104514] N82-11055

NYQUIST DIAGRAM
Characteristic and principal gains and phases and their use as multivariable control design tools --- generalizing Nyquist and root-locus diagram techniques N82-10050

O

OH-58 HELICOPTER
Composite main rotor tubular braided A82-10547

OMEGA NAVIGATION SYSTEM
Omega station 10.2 kHz signal selection made easy A82-12636

ONBOARD DATA PROCESSING
Description of the meteorological research radar system aboard NOAA/Research Facilities Center WP-3D aircraft
A82-10217
Navigation task partitioning in distributed-processing avionics systems
A82-10646
OPENINGS
Structural analysis of fuselages with cutouts by finite element method
N82-10995
OPTICAL MEASURING INSTRUMENTS
Optical sensors for displacement measurement
A82-11407
OPTIMAL CONTROL
Design of high integrity multivariable control systems
N82-10055
Multivariables design: The optimization of approximate inverses
N82-10057
Flight trajectory control investigation
[AD-A104542] N82-11048
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
An overview of optimal control in aerospace systems
N82-11074
Theory of stochastic optimal control some basic notions
N82-11075
An introduction to stochasic optimal control theory
N82-11076
Design considerations for optimal flight control systems
N82-11077
Design techniques for mutlivariable flight control systems
N82-11078
Control law design for transport aircraft flight tasks
N82-11080
Control design of flexible spacecraft
N82-11081
Optimum climb and descent trajectories for airline missions
N82-11082
Management of redundancy in flight control systems using optimal decision theory
N82-11084
OPTIMIZATION
Optimization of the principal design parameters of a passenger aircraft
A82-10816
ORGANIC LIQUIDS
Rheological behavior of progressively shear-thickening solutions --- aircraft fuel polymer additives for fire protection in survivable crashes
A82-11177
ORTHOGONALITY
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015

P

PAINTS
Automated Paint and Process Line /APPL/ --- for aircraft production
[AIAA 81-2166] A82-10120
PANELS
Response of nonlinear aircraft structural panels to high intensity noise
A82-12041
PARACHUTE DESCENT
Aerodynamics and performance of cruciform parachute canopies
[AIAA PAPER 81-1919] A82-10405
Experimental determination of parachute apparent mass and its significance in predicting dynamic stability
[AIAA PAPER 81-1920] A82-10406
Comparison of simulation and experimental data for a gliding parachute in dynamic flight
[AIAA PAPER 81-1924] A82-10409
Theoretical analysis of parachute inflation including fluid kinetics
[AIAA PAPER 81-1925] A82-10410
The constricted rigging line trials technique for assessing the opening characteristics of parachutes
[AIAA PAPER 81-1932] A82-10413
Reductions in parachute drag due to forebody wake effects
[AIAA PAPER 81-1939] A82-10417
Aeroballistic characteristics of sonobuoy parachute decelerators limited to a length of three feet
[AIAA PAPER 81-1950] A82-10425
Inflatable system for fast deployment of parachutes at low altitudes from slow moving aircraft or stationary supports
[AIAA PAPER 81-1953] A82-10428
A contribution to the stabilization of flight vehicle parachute systems --- mathematical models
[ESA-TT-679] N82-10046
PARACHUTE FABRICS
Stress measurements in bias constructed parachute canopies during inflation and at steady-state
[AIAA PAPER 81-1945] A82-10421
Development of a nylon-Kevlar recovery system for the CL-289 /AN/USD 502/ surveillance drone
[AIAA PAPER 81-1952] A82-10427
PARACHUTES
Experimental determination of parachute apparent mass and its significance in predicting dynamic stability
[AIAA PAPER 81-1920] A82-10406
Development of new lifting parachute designs with increased trim angle
[AIAA PAPER 81-1921] A82-10407
The net-skirt to a parachute canopy as a device to prevent inversion
[AIAA PAPER 81-1927] A82-10412
A modular asymmetric parachute for wind tunnel testing
[AIAA PAPER 81-1933] A82-10414
Parachute technology under pressure
A82-12804
PARAMETER IDENTIFICATION
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
PARAMETERIZATION
Estimation of airplane stability and control derivatives from large amplitude longitudinal maneuvers
[NASA-TM-83185] N82-10042
PARTICLE SIZE DISTRIBUTION
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149
PASSENGER AIRCRAFT
How large should a commuter transport be
[AIAA PAPER 81-1732] A82-10463
Optimization of the principal design parameters of a passenger aircraft
A82-10816
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068
PAVEMENTS
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498
PAYLOADS
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1918] A82-10404
PERFORMANCE PREDICTION
Ideal and simulated performance of an aircraft in the terrain following mission
A82-11302

On the prediction of swirling flowfields found in axisymmetric combustor geometries A82-12120
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight [NASA-TP-1918] N82-11050

PERFORMANCE TESTS
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems [AIAA 81-2205] A82-10143
Air bag impact attenuation system for the AQM-34V remote piloted vehicle [AIAA PAPER 81-1917] A82-10403
Aerodynamics and performance of cruciform parachute canopies [AIAA PAPER 81-1919] A82-10405
The constricted rigging line trials technique for assessing the opening characteristics of parachutes [AIAA PAPER 81-1932] A82-10413
High-efficiency hydraulic power transfer units for multisystem aircraft A82-10853
The certification of digital systems A82-11940
FAA acceptance tests on the NAVSTAR GPS Z-Set receiver A82-12639

PERTURBATION THEORY
Synthesis of system for evaluating gyrostabilizer state with unknown disturbances A82-11469

PHOTOELASTICITY
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model [NAL-TR-427T] N82-11067

PILOT TRAINING
Spin recovery training --- licensing requirement [GPO-66-020] N82-10022

PILOTS (PERSONNEL)
Development and construction of pilot ejector seats in Germany from 1938-1945 [DFVLR-FB-81-04] N82-10026

PISTON ENGINES
The CIVIC - A concept in vortex induced combustion. II [ASME PAPER 81-GT-12] A82-11997

PLANETARY BOUNDARY LAYER
Multiple Doppler radar observations of PBL structure A82-10292

PLANING
A navigation systems planning model A82-12640

PLASMA SPRAYING
Thermal-barrier-coated turbine blade study [NASA-CR-165351] N82-10040

PLASTIC AIRCRAFT STRUCTURES
On the use of carbon composites in slat and stabilizer construction A82-11468
Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar A82-12647

PLOTTING
Multivariable design techniques based on singular value generalizations of classical control N82-10051

PNEUMATIC EQUIPMENT
A new APU for medium place aircraft environmental control systems [ASME PAPER 81-ENAS-1] A82-10889
Towards minimum power for environmental control in transport aircraft [ASME PAPER 81-ENAS-4] A82-10892
Air supply system bite for Boeing 767 airplane --- Built-In-Test-Equipment [ASME PAPER 81-ENAS-7] A82-10895

POLLUTION CONTROL
Baseline data on utilization of low-grade fuels in gas turbine applications. Volume 3: Emissions evaluation [DE81-903764] N82-10254

POLYETHER RESINS
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams [AD-A104496] N82-11212

POLYURETHANE FOAM
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams [AD-A104496] N82-11212

POROUS MATERIALS
Development of low modulus material for use in ceramic gas path seal applications [NASA-CR-165469] N82-10039
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel [NASA-CR-164966] N82-11052

POROUS WALLS
Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes [ASME PAPER 81-HT-48] A82-10952
End losses in turbine cascades with porous cooling A82-11430
Results of experimental study of heat transfer to turbine blades with porous cooling A82-11486

POSITION (LOCATION)
A solution to the static geometry problem for JTIDS relative navigation A82-12638
The statistical theory of radio direction finding [AD-A104156] N82-10027

POTENTIAL FLOW
Finite difference computation of the steady transonic potential flow around airplanes N82-10961
Second order approximation theory of an arbitrary aerofoil in compressible potential flow N82-10982
Aerodynamic calculations and design of subcritical aerofoils N82-10983

POWDER METALLURGY
Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1 A82-12495
Superclean superalloy powders by the rotating electrode process A82-12496
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet A82-12497
Superalloy powder engine components; controls employed to assure high quality hardware A82-12499

POWER EFFICIENCY
Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine A82-10304
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics A82-11721

PRECIPITATION (METEOROLOGY)
The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT --- Rain Echo Attenuation Compensation Hardware A82-10225

PREDICTION ANALYSIS TECHNIQUES
A new thermal and trajectory model for high altitude balloons [AIAA PAPER 81-1926] A82-10411

PRESSURE DISTRIBUTION
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils A82-10362
Aerodynamic calculations and design of subcritical aerofoils N82-10983
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion N82-11907

A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054

PRESSURE OSCILLATIONS
One reason for the onset of high-frequency self-excited oscillations --- in combustion chambers of aircraft engines
A82-11448

PRESSURE REDUCTION
Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes
[ASME PAPER 81-HT-40] A82-10952

PRESSURIZED CABINS
Air supply system bite for Boeing 767 airplane --- Built-In-Test-Equipment
[ASME PAPER 81-ENAS-7] A82-10895

PROBABILITY THEORY
Extending the limits of reliability theory --- Book
A82-12318

PROCEDURES
Proposed standard requirements and procedures for icing clearance
N82-11061

PRODUCT DEVELOPMENT
Study and development of an integrated head-up display
[AD-A104337] N82-11062
Integrated analysis of engine
[NASA-TM-82713] N82-11491

PRODUCTION ENGINEERING
Automated Paint and Process Line /APPL/ --- for aircraft production
[AIAA 81-2166] A82-10120
Development of aircraft production engineering discipline at IIT, Bombay
A82-11317
A CFRP taileron for the Tornado: Construction and production --- horizontal stabilizer
[MBB-FE-212/KPK/PUB/2] N82-10035

PROGRAM VERIFICATION (COMPUTERS)
The Space Shuttle vehicle checkout involving flight avionics software
[AIAA 81-2141] A82-10100

PROJECT MANAGEMENT
Implementation of AVRADCOM MM&T --- for military aircraft parts production engineering
A82-10545

PROPELLER FANS
Propfan installation aerodynamics of a supercritical swept wing transport configuration
[AIAA PAPER 81-1563] A82-10466

PROPULSIVE EFFICIENCY
Quiet short-haul research aircraft familiarization document, revision 1
[NASA-TM-81298] N82-10031
Propulsion study for Small Transport Aircraft Technology (STAT), Appendix B
[NASA-CR-165499-APP-B] N82-10038

PROTECTIVE COATINGS
Thermal-barrier-coated turbine blade study
[NASA-CR-165351] N82-10040

PROTUBERANCES
Aircraft excrescence drag
[AGARD-AG-264] N82-10020

PUMPS
High-efficiency hydraulic power transfer units for multisystem aircraft
A82-10853

Q

QUADRATIC EQUATIONS
LQG-based multivariable design: Frequency domain interpretation
N82-10053
LQG multivariable design tools
N82-10054

QUIET ENGINE PROGRAM
Quiet short-haul research aircraft familiarization document, revision 1
[NASA-TM-81298] N82-10031

R

RADAR ATTENUATION
The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT --- Rain Echo Attenuation Compensation Hardware
A82-10225

RADAR DATA
Description of the meteorological research radar system aboard NOAA/Research Facilities Center WP-3D aircraft
A82-10217

RADAR DETECTION
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221

RADAR MAPS
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

RADAR MEASUREMENT
Multiple Doppler radar observations of PBL structure
A82-10292

RADAR TARGETS
Synthetic aperture radar target simulator
[NASA-CASE-NPO-15024-1] N82-10286

RADAR TRACKING
Hard limited approaches to correlation velocity sensing
A82-12636

RADIANT FLUX DENSITY
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149

RADIO DIRECTION FINDERS
The statistical theory of radio direction finding
[AD-A104156] N82-10027

RADIO NAVIGATION
Omega station 10.2 kHz signal selection made easy
A82-12638
FAA acceptance tests on the NAVSTAR GPS Z-Set receiver
A82-12639

RADIO RECEIVERS
Tangential sensitivity of EW receivers
A82-11020
FAA acceptance tests on the NAVSTAR GPS Z-Set receiver
A82-12639

RADIO RELAY SYSTEMS
A mathematical model of an over-sea airborne UHF radio link
A82-11406

RADIO TRACKING
The statistical theory of radio direction finding
[AD-A104156] N82-10027

RAIN
Airborne weather radar and severe weather penetration
A82-10219

RAIN GAGES
The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT --- Rain Echo Attenuation Compensation Hardware
A82-10225

RAMJET ENGINES
Air-film cooling returns to ramjets
[ASME PAPER 81-ENAS-8] A82-10896
An investigation of the combustion process in solid fuel ramjets
[AD-A104603] N82-11232

REAL TIME OPERATION
Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft
[AIAA 81-2178] A82-10127

RECIRCULATIVE FLUID FLOW
On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120

RECOVERY PARACHUTES
Development of a nylon-Kevlar recovery system for the CL-289 /AN/USD 502/ surveillance drone
[AIAA PAPER 81-1952] A82-10427

RECTANGULAR PLATES
Response of nonlinear aircraft structural panels to high intensity noise
A82-12041
RECTANGULAR WINGS
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465
Experimental investigations of the separated flow around a rectangular wing --- in a wind tunnel
[DFVLR-FB-81-12] N82-10017
REDUNDANCY
Management of redundancy in flight control systems using optimal decision theory
N82-11084
REGISTERS
Air-breathing engine test facilities register
[AGARD-AG-269] N82-10063
REGRESSION ANALYSIS
Determination of airplane model structure from flight data by using modified stepwise regression
[NASA-TP-1916] N82-10041
Estimation of airplane stability and control derivatives from large amplitude longitudinal maneuvers
[NASA-TM-83185] N82-10042
RELIABILITY ANALYSIS
Extending the limits of reliability theory --- Book
A82-12316
REMOTE SENSING
Three navigation systems and their costs of acquiring remote sensing data
A82-10049
REMOTELY PILOTED VEHICLES
HiMAT onboard flight computer system architecture and qualification
[AIAA 81-2107] A82-10082
Air bag impact attenuation system for the AQM-34V remote piloted vehicle
[AIAA PAPER 81-1917] A82-10403
Design and development of a low cost servoed rate gyro for unmanned aircraft
A82-11932
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050
RENE 95
Superalloy powder engine components; controls employed to assure high quality hardware
A82-12499
RESCUE OPERATIONS
SARSAT applications
A82-12698
RESEARCH AND DEVELOPMENT
Development and construction of pilot ejector seats in Germany from 1938-1945
[DFVLR-FB-81-04] N82-10026
RESEARCH FACILITIES
Description of the meteorological research radar system aboard NOAA/Research Facilities Center WP-3D aircraft
A82-10237
RESIDENTIAL AREAS
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636
RESOLUTION
Study and development of an integrated head-up display
[AD-A104337] N82-11062
RESONANT FREQUENCIES
Calculation of natural modes of vibration for rotor blades by the finite element method
[DFVLR-FB-81-07] N82-10452
RETRACTABLE EQUIPMENT
Analytical determination of undercarriage retraction kinematics
A82-10363
REYNOLDS NUMBER
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046
RHEOLOGY
Rheological behavior of progressively shear-thickening solutions --- aircraft fuel polymer additives for fire protection in survivable crashes
A82-11177
RIBBON PARACHUTES
The effects of flexibility on the steady-state performance of small ribbon parachute models
[AIAA PAPER 81-1923] A82-10408
Stress measurements in a ribbon parachute canopy during inflation and at steady state
[AIAA PAPER 81-1944] A82-10420
RIGID ROTORS
Development of the Triflex rotor head
A82-11222
RING LASERS
Ring Laser Gyro Navigator /RLGN/ flight test results
A82-12644
ROBUSTNESS (MATHEMATICS)
Limitations on achievable performance of multivariable feedback systems
N82-10052
ROCKET ENGINES
The enhancement of heat exchange in channels /2nd revised and enlarged edition/ --- Russian book
A82-12222
ROCKET NOZZLES
Developments in boundary layer Thrust Vector Control
A82-10855
ROCKET-BORNE INSTRUMENTS
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1910] A82-10404
ROTARY GYROSCOPES
Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
A82-11927
Design considerations for the direct digital control of dry-tuned gyroscope
A82-11933
ROTARY WING AIRCRAFT
On computing Floquet transition matrices of rotorcraft.
A82-11225
ROTARY WINGS
Helicopter rotor trailing edge noise
[AIAA PAPER 81-2001] A82-10455
Composite main rotor tubular braided
A82-10547
Model helicopter rotor impulsive noise
A82-11300
Numerical treatment of helicopter rotor stability problems
A82-12045
Standard tests of a research model rotor in a wind tunnel, including model similarity --- calculations compared with measurements
[BMVG-FBWT-79-16] N82-10016
Rotorcraft icing: Status and prospects
[AGARD-AR-166] N82-11056
Operational environment, meteorological conditions and weather forecasting
N82-11057
Technology base for icing instrumentation and mathematical modelling
N82-11058
Facilities for development and clearance
N82-11059
Ice protection system technology
N82-11060
Proposed standard requirements and procedures for icing clearance
N82-11061
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
Helicopter rotor trailing edge noise --- noise prediction
[NASA-CR-3470] N82-11859
ROTATING BODIES
The Shock and Vibration Digest, volume 13, no. 9
[AD-A105062] N82-10421
ROTATING FLUIDS
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025

ROTOR AERODYNAMICS
Rotor wake characteristics relevant to rotor-stator interaction noise generation [AIAA PAPER 81-2031] A82-10456
Wind tunnel tests on airfoils in tandem cascade A82-10987
Numerical treatment of helicopter rotor stability problems A82-12045
ROTOR BLADES (TURBOMACHINERY)
Effects of vane/blade ratio and spacing on fan noise [AIAA PAPER 81-2033] A82-10457
ROTOR SPEED
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics A82-11721
RUBBER
The possibility of using deformable rubber components in landing gear A82-10496
RUNWAYS
Design of airport pavements for expansive soils [AD-A104660] N82-11313

S

SAFETY MANAGEMENT
A proposed flight safety program for the Korean Air Force [AD-A102373] N82-10023
System safety program plan --- electromagnetic pulse testing of the A-7E aircraft [AD-A104557] N82-11354
SANDWICH STRUCTURES
Impact-initiated damage thresholds in composites A82-12028
SARSAT
SARSAT applications A82-12698
SATELLITE NAVIGATION SYSTEMS
National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings A82-12626
Satellite geometry considerations for low cost GPS user equipment A82-12630
A navigation systems planning model A82-12640
Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers A82-12643
SATELLITE NETWORKS
Satellite geometry considerations for low cost GPS user equipment A82-12630
SCALE MODELS
Standard tests of a research model rotor in a wind tunnel, including model similarity --- calculations compared with measurements [BMVG-FBWT-79-16] N82-10016
SEALS (STOPPERS)
Development of low modulus material for use in ceramic gas path seal applications [NASA-CR-165469] N82-10039
SEARCH RADAR
Threat Alert and Collision Avoidance System (TCAS) Symposium [AD-A104563] N82-11047
SELF OSCILLATION
One reason for the onset of high-frequency self-excited oscillations --- in combustion chambers of aircraft engines A82-11448
SENSITIVITY
Feedback and minimax sensitivity N82-10058
SEPARATED FLOW
Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils A82-10821
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack A82-11359
Experimental investigations of the separated flow around a rectangular wing --- in a wind tunnel [DFVLR-FB-81-12] N82-10017
SEPARATORS
New separators for battery systems A82-11715
SERVICE LIFE
Design considerations for duty cycle, life and reliability of small limited life engines [AIAA PAPER 81-1402] A82-10465
Unsolved problems of nickel cadmium batteries A82-11725
SERVOCONTROL
A method for determination of the aeroelastic behavior of aircraft with active control systems [DFVLR-FB-81-05] N82-10047
SHALE OIL
Jet fuel looks to shale oil: The 1980 technology review [AD-A104414] N82-11228
SHEAR STRESS
Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra --- for aircraft structural analysis A82-12043
SHIP TERMINALS
A mathematical model of an over-sea airborne UHF radio link A82-11406
SHOCK ABSORBERS
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams [AD-A104496] N82-11212
SHOCK LOADS
Dynamic response of aircraft structure to gun shock loads A82-11314
The Shock and Vibration Digest, volume 13, no. 9 [AD-A105062] N82-10421
SHOCK WAVE PROPAGATION
Acta mechanica sinica [AD-A105184] N82-11014
SHORT HAUL AIRCRAFT
Quiet short-haul research aircraft familiarization document, revision 1 [NASA-TM-81298] N82-10031
Propulsion study for Small Transport Aircraft Technology (STAT) [NASA-CR-165499] N82-10037
SHORT TAKEOFF AIRCRAFT
Quiet short-haul research aircraft familiarization document, revision 1 [NASA-TM-81298] N82-10031
Development and evaluation of automatic landing control laws for light wing loading STOL aircraft [NASA-CR-166160] N82-10043
SIGNAL PROCESSING
Omega station 10.2 kHz signal selection made easy A82-12638
SIGNAL TO NOISE RATIOS
Tangential sensitivity of EW receivers A82-11020
SIMILARITY THEOREM
Standard tests of a research model rotor in a wind tunnel, including model similarity --- calculations compared with measurements [BMVG-FBWT-79-16] N82-10016
SIZE DISTRIBUTION
The dispersion of drop sizes in gas turbine fuel nozzle sprays A82-12107
SKIRTS
The net-skirt to a parachute canopy as a device to prevent inversion [AIAA PAPER 81-1927] A82-10412
SLABS
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations [AD-A104545] N82-11498
SNAP
Experimental study of empennage snap-through vibrations A82-11471
SOIL MECHANICS
Design of airport pavements for expansive soils [AD-A104660] N82-11313
SOILS
Design of airport pavements for expansive soils [AD-A104660] N82-11313

SOLAR POWERED AIRCRAFT
  Wings in the sun - The evolution of Solar Challenger
  A82-12694
SOLID ELECTRODES
  Unsolved problems of nickel cadmium batteries
  A82-11725
SOLID PROPELLANT COMBUSTION
  An investigation of the combustion process in solid fuel ramjets
  [AD-A104603] N82-11232
SOLID PROPELLANTS
  An investigation of the combustion process in solid fuel ramjets
  [AD-A104603] N82-11232
SONOBUOYS
  Aeroballistic characteristics of sonobuoy parachute decelerators limited to a length of three feet
  [AIAA PAPER 81-1950] A82-10425
SOUND PRESSURE
  Evaluation of the acoustic measurement capability of the NASA Langley V/STOL wind tunnel open test section with acoustically absorbent ceiling and floor treatments
  [NASA-CR-165796] N82-10059
SOUND TRANSMISSION
  Experimental modal analysis of the fuselage panels of an Aero Commander aircraft
  [NASA-CR-165750] N82-10028
SPACE NAVIGATION
  National Aerospace Meeting, Trevose, PA, April 8-10, 1981, Proceedings
  A82-12626
  Memory requirements for future navigation systems
  A82-12637
SPACE SHUTTLES
  The Space Shuttle vehicle checkout involving flight avionics software
  [AIAA 81-2141] A82-10100
  Use of Space Shuttle technology in conventional aircraft
  [AIAA 81-2176] A82-10125
SPACE VEHICLE CHECKOUT PROGRAM
  The Space Shuttle vehicle checkout involving flight avionics software
  [AIAA 81-2141] A82-10100
SPACECRAFT CONSTRUCTION MATERIALS
  Powder metallurgy superalloys - Aerospace materials for the 1980's; Proceedings of the Conference, Zurich, Switzerland, November 18-20, 1980. Volume 1
  A82-12495
SPACECRAFT CONTROL
  Synthesis of system for evaluating gyrostabilizer state with unknown disturbances
  A82-11469
SPACECRAFT DESIGN
  Control design of flexible spacecraft
  N82-11081
SPACECRAFT ELECTRONIC EQUIPMENT
  Bridging the gap from aircraft to space computers
  [AIAA 81-2142] A82-10101
SPANWISE BLOWING
  A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
  [NAL-TR-661T] N82-11035
SPEED CONTROL
  Procedures and analysis techniques for determining static air minimum control speeds
  A82-12564
SPIN DYNAMICS
  A microprocessor-based data acquisition system for stall/spin research
  [AIAA 81-2177] A82-10126
SPOILERS
  Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
  [ESA-TT-681] N82-10036
  Development and evaluation of automatic landing control laws for light wing loading STOL aircraft
  [NASA-CR-166160] N82-10043
  System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
  [ESA-TT-666] N82-10045
SPRAY NOZZLES
  The dispersion of drop sizes in gas turbine fuel nozzle sprays
  A82-12107
  Helicopter icing spray system - Improvements and flight experience
  A82-12696
STABILIZERS (AGENTS)
  On the use of carbon composites in slat and stabilizer construction
  A82-11460
STANDARDS
  Rotorcraft icing: Status and prospects
  [AGARD-AR-166] N82-11056
  Proposed standard requirements and procedures for icing clearance
  N82-11067
STATE VECTORS
  Synthesis of system for evaluating gyrostabilizer state with unknown disturbances
  A82-11469
STEADY FLOW
  Finite difference computation of the steady transonic potential flow around airplanes
  N82-10981
STEADY STATE
  The effects of flexibility on the steady-state performance of small ribbon parachute models
  [AIAA PAPER 81-1923] A82-10408
STIFFNESS MATRIX
  Formation of triangular-element stiffness matrix using sliding interpolation
  A82-11464
  An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
  [NASA-CR-165772] N82-11070
STOCHASTIC PROCESSES
  Synthesis of system for evaluating gyrostabilizer state with unknown disturbances
  A82-11469
  Theory of stochastic optimal control some basic notions
  N82-11075
  An introduction to stochasic optimal control theory
  N82-11076
STORAGE BATTERIES
  New separators for battery systems
  A82-11715
STORMS (METEOROLOGY)
  Applications of conventional and Doppler radars for aviation safety
  A82-10215
STRAPDOWN INERTIAL GUIDANCE
  Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
  A82-11927
  Design considerations for the direct digital control of dry-tuned gyroscope
  A82-11933
  Simulation study of a hybrid strapdown attitude and heading reference system
  A82-12641
  The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions
  A82-12642
  Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers
  A82-12643
STREAM FUNCTIONS (FLUIDS)
  An aerodynamic design method for transonic axial flow compressor stage
  N82-10980
STRESS ANALYSIS
  Lineup of the IM-series aircraft-derivative gas turbines
  A82-12560
  New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
  [NAL-TR-427T] N82-11067
STRESS CORROSION CRACKING
  The application of improved aluminium alloys and steels in aircraft structures
  A82-10305

STRESS MEASUREMENT
Stress measurements in a ribbon parachute canopy during inflation and at steady state
[AIAA PAPER 81-1944] A82-10420
Stress measurements in bias constructed parachute canopies during inflation and at steady-state
[AIAA PAPER 81-1945] A82-10421
STRUCTURAL ANALYSIS
Formation of triangular-element stiffness matrix using sliding interpolation
A82-11464
Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra --- for aircraft structural analysis
A82-12043
Mathematical model for the maintenance program of modern jet aircraft --- crack detection; inspection intervals
[DFVLR-FB-81-14] N82-10002
Structural analysis of fuselages with cutouts by finite element method
N82-10995
Matrix analysis of wings
N82-10998
Integrated analysis of engine
[NASA-TM-82713] N82-11491
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498
STRUCTURAL DESIGN
Light aircraft structural design in non-metallics - Use of composite honeycomb for light aircraft
A82-10308
Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980
A82-12026
Determination of airplane model structure from flight data by using modified stepwise regression
[NASA-TP-1916] N82-10041
Control design of flexible spacecraft
N82-11081
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
STRUCTURAL FAILURE
A note on fatal aircraft accidents involving metal fatigue
A82-11400
STRUCTURAL INFLUENCE COEFFICIENTS
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070
STRUCTURAL RELIABILITY
Lineup of the IM-series aircraft-derivative gas turbines
A82-12560
STRUCTURAL STABILITY
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070
STRUCTURAL STRAIN
Optical sensors for displacement measurement
A82-11407
STRUCTURAL VIBRATION
Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine
A82-10304
Lineup of the IM-series aircraft-derivative gas turbines
A82-12560
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034
SUBSONIC AIRCRAFT
Air-freon integrated environmental conditioning system for trainer subsonic aircraft
[ASME PAPER 81-ENAS-33] A82-10920
SUBSONIC FLOW
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils
A82-10362
Experimental study of subsonic and transonic flows past a wing
A82-10363
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
On the kernel function collocation method in steady subsonic flow for wing with control surfaces
N82-12023
SUBSONIC WIND TUNNELS
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069
SUCTION
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391
SUPERCRITICAL WINGS
Propfan installation aerodynamics of a supercritical swept wing transport configuration
[AIAA PAPER 81-1563] A82-10466
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
SUPERSONIC AIRCRAFT
Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft
[AIAA 81-2178] A82-10127
SUPERSONIC COMBUSTION RAMJET ENGINES
Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934
SUPERSONIC FLIGHT
Optimal flight paths for winged, supersonic flight vehicles - Extension to the case where thrust can be vectored
A82-10310
SUPERSONIC INLETS
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025
SUPERSONIC JET FLOW
Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934
SUPERSONIC SPEEDS
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016
SURFACE LAYERS
Results of experimental study of heat transfer to turbine blades with porous cooling
A82-11446
SURFACE PROPERTIES
Design of airport pavements for expansive soils
[AD-A104660] N82-11313
SURFACE VEHICLES
Characteristics and trends of energy consumption in transport missions with aircraft and surface vehicles
A82-10495
SURFACES
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035
SURGES
High voltage surge and partial discharge test to evaluate aerospace equipment parts
A82-11740
SURVEILLANCE RADAR
Airborne associative processor /ASPRO/ --- for early warning radar surveillance, command, and control applications
[AIAA 81-2145] A82-10104

SWEAT COOLING
Results of experimental study of heat transfer to turbine blades with porous cooling A82-11446

SWEPT WINGS
Propfan installation aerodynamics of a supercritical swept wing transport configuration [AIAA PAPER 81-1563] A82-10466
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction [NASA-TP-1902] N82-11391

SWITCHING CIRCUITS
Advanced aircraft electrical system control technology demonstrator. Phase 1: Requirements analysis and conceptual design [AD-A103922] N82-10326

SYNTHETIC APERTURE RADAR
Synthetic aperture radar target simulator [NASA-CASE-NPO-15024-1] N82-10286

SYSTEM FAILURES
Extending the limits of reliability theory --- Book A82-12318

SYSTEMS ANALYSIS
Multi-variable analysis and design techniques [AGARD-LS-117] N82-10048
Multivariable design techniques based on singular value generalizations of classical control N82-10051

SYSTEMS ENGINEERING
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure A82-11149
The certification of digital systems A82-11940
Digital avionics: Promise and practice - An airlines experience in the field A82-11942
Multi-variable analysis and design techniques [AGARD-LS-117] N82-10048
The need for multivariable design and analysis techniques N82-10049
Design of high integrity multivariable control systems N82-10055
A geometric approach to multivariable control system synthesis N82-10056
Multivariables design: The optimization of approximate inverses N82-10057
Design considerations for optimal flight control systems N82-11077
Design techniques for mutlivariable flight control systems N82-11078
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations N82-11083

SYSTEMS INTEGRATION
KC-135 Avionics Modernization Hot Bench [AIAA 81-2105] A82-10081
Discrete address beacon, navigation and landing system A82-10650
The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions A82-12642
Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers A82-12643

SYSTEMS SIMULATION
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems [AIAA 81-2205] A82-10143
Simulation study of a hybrid strapdown attitude and heading reference system A82-12641

T

T-38 AIRCRAFT
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft [NASA-TM-83214] N82-11060

TACAN
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems [AIAA 81-2205] A82-10143

TAIL ASSEMBLIES
Experimental study of empennage snap-through vibrations A82-11471

TARGET SIMULATORS
Synthetic aperture radar target simulator [NASA-CASE-NPO-15024-1] N82-10286

TECHNOLOGICAL FORECASTING
Propulsion study for Small Transport Aircraft Technology (STAT) [NASA-CR-165499] N82-10037

TECHNOLOGY ASSESSMENT
Fluid power technology for the '80s --- Book A82-10851
Jet fuel looks to shale oil: The 1980 technology review [AD-A104414] N82-11228

TECHNOLOGY TRANSFER
Bridging the gap from aircraft to space computers [AIAA 81-2142] A82-10101

TECHNOLOGY UTILIZATION
Use of Space Shuttle technology in conventional aircraft [AIAA 81-2176] A82-10125
The balloon and the airship technological heritage [AIAA PAPER 81-1912] A82-10401
SARSAT applications A82-12698

TELEMETRY
Outsider's look at flight instrumentation [DE81-025409] N82-11066

TEMPERATURE MEASUREMENT
In-situ calibration of flight heat transfer instrumentation [ASME PAPER 81-ENAS-13] A82-10901
Adaptation of a turbine test facility to high-temperature research [RAE-LIB-TRANS-2064] N82-11089

TERRAIN FOLLOWING AIRCRAFT
Ideal and simulated performance of an aircraft in the terrain following mission A82-11302

TEST FACILITIES
Air-breathing engine test facilities register [AGARD-AG-269] N82-10063
Rotorcraft icing: Status and prospects [AGARD-AR-166] N82-11056
Facilities for development and clearance N82-11059
Adaptation of a turbine test facility to high-temperature research [RAE-LIB-TRANS-2064] N82-11089
System safety program plan --- electromagnetic pulse testing of the A-7D aircraft [AD-A104557] N82-11354

TEST PILOTS
Test Pilots' Aviation Safety Workshop, U.S. Naval Postgraduate School, Monterey, CA, February 25-28, 1981, Proceedings A82-10560

THERMAL ENVIRONMENTS
Closed loop environmental control systems for fighter aircraft [ASME PAPER 81-ENAS-2] A82-10890
Quantification of the thermal environment for externally carried aircraft stores and ordnance A82-12100

THERMAL EXPANSION
Thermal expansion accommodation in a jet engine frame A82-11999

THERMAL FATIGUE
Thermal expansion accommodation in a jet engine frame A82-11999

THERMAL PROTECTION
The Shock and Vibration Digest, volume 13, no. 9
[AD-A105062] N82-10421
THERMAL RESISTANCE
Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893
Thermal-barrier-coated turbine blade study
[NASA-CR-165351] N82-10040
THERMAL SIMULATION
A new thermal and trajectory model for high altitude balloons
[AIAA PAPER 81-1926] A82-10411
THERMOCOUPLES
In-situ calibration of flight heat transfer instrumentation
[ASME PAPER 81-ENAS-13] A82-10901
THERMODYNAMIC PROPERTIES
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463
THREE DIMENSIONAL FLOW
Acta mechanica sinica
[AD-A105184] N82-11014
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071
THREE DIMENSIONAL MOTION
On the question of trailing airplane motion
A82-11470
THRUST CONTROL
V/STOL aircraft and fluid dynamics
[NASA-TM-81328] N82-10029
THRUST REVERSAL
Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine
A82-11444
THRUST VECTOR CONTROL
Optimal flight paths for winged, supersonic flight vehicles - Extension to the case where thrust can be vectored
A82-10310
Developments in boundary layer Thrust Vector Control
A82-10855
TIME
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860
TIME LAG
Hard limited approaches to correlation velocity sensing
A82-12636
TIME OPTIMAL CONTROL
LQG-based multivariable design: Frequency domain interpretation
N82-10053
TITANIUM ALLOYS
Sophisticated aircraft structure developments - Combat aeroplanes
A82-10309
TOUCHDOWN
Comparative study of flare control laws
[NASA-CR-164903] N82-10032
TRACKING RADAR
Synthetic aperture radar target simulator
[NASA-CASE-NPO-15024-1] N82-10286
TRADEOFFS
Active control elements on the transonic wing of the Airbus A-300 (ACTTA A). Airbus A-300 with reduced longitudinal stability (ACTTA-C) --- advanced control transonic transport aircraft (ACCTA); design considerations
N82-10044
TRAILING EDGES
Helicopter rotor trailing edge noise
[AIAA PAPER 81-2001] A82-10455
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039
Helicopter rotor trailing edge noise --- noise prediction
[NASA-CR-3470] N82-11859
TRAILING-EDGE FLAPS
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465
System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
[ESA-TT-666] N82-10045
TRAINING AIRCRAFT
Air-freon integrated environmental conditioning system for trainer subsonic aircraft
[ASME PAPER 81-ENAS-33] A82-10920
TRAJECTORY ANALYSIS
A new thermal and trajectory model for high altitude balloons
[AIAA PAPER 81-1926] A82-10411
TRAJECTORY CONTROL
Flight trajectory control investigation
[AD-A104542] N82-11048
Optimum climb and descent trajectories for airline missions
N82-11082
TRAJECTORY OPTIMIZATION
Optimal flight paths for winged, supersonic flight vehicles - Extension to the case where thrust can be vectored
A82-10310
TRANSFER FUNCTIONS
Limitations on achievable performance of multivariable feedback systems
N82-10052
TRANSONIC COMPRESSORS
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025
TRANSONIC FLOW
Experimental study of subsonic and transonic flows past a wing
A82-10363
Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils
A82-10621
Finite difference computation of the steady transonic potential flow around airplanes
N82-10981
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
TRANSONIC SPEED
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016
TRANSONIC WIND TUNNELS
Design predictions for noise control in the cryogenic National Transonic Facility
A82-12025
TRANSPONDERS
Threat Alert and Collision Avoidance System (TCAS) Symposium
[AD-A104563] N82-11047
TRANSPORT AIRCRAFT
Propfan installation aerodynamics of a supercritical swept wing transport configuration
[AIAA PAPER 81-1563] A82-10466
Characteristics and trends of energy consumption in transport missions with aircraft and surface vehicles
A82-10495
Towards minimum power for environmental control in transport aircraft
[ASME PAPER 81-ENAS-4] A82-10892
Fuel for future transport aircraft
[ASME PAPER 81-HT-80] A82-10965

History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1
A82-12049
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[ESA-TT-681] N82-10036
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037
Propulsion study for Small Transport Aircraft Technology (STAT), Appendix B
[NASA-CR-165499-APP-B] N82-10038
Control law design for transport aircraft flight tasks
N82-11080

TRAPEZOIDAL WINGS
Experimental study of subsonic and transonic flows past a wing
A82-10363

TUBE HEAT EXCHANGERS
The enhancement of heat exchange in channels /2nd revised and enlarged edition/ --- Russian book
A82-12222

TURBINE BLADES
Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes
[ASME PAPER 81-HT-48] A82-10952
End losses in turbine cascades with porous cooling
A82-11434
Results of experimental study of heat transfer to turbine blades with porous cooling
A82-11446
Thermal-barrier-coated turbine blade study
[NASA-CR-165351] N82-10040
A new method of cooling turbine vanes
N82-11027
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067

TURBINE ENGINES
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497
Superalloy powder engine components; controls employed to assure high quality hardware
A82-12499
Development of multivariable controllers for aircraft turbine engines
N82-11087

TURBOCOMPRESSORS
Wind tunnel tests on airfoils in tandem cascade
A82-10987
An aerodynamic design method for transonic axial flow compressor stage
N82-10984
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
An experimental investigation of the rotating stall, surge and wake behind the rotor for a single stage axial compressor
N82-11008
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025

TURBOFAN ENGINES
Rotor wake characteristics relevant to rotor-stator interaction noise generation
[AIAA PAPER 81-2031] A82-10456
Application of numerical modeling to gas turbine combustor development problems
A82-12118
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

TURBOJET ENGINES
Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine
A82-11444
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

TURBOMACHINE BLADES
Calculation of natural modes of vibration for rotor blades by the finite element method
[DFVLR-FB-81-07] N82-10452

TURBOMACHINERY
Acta mechanica sinica
[AD-A105184] N82-11014
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015

TURBOPROP ENGINES
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037

TURBULENT BOUNDARY LAYER
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024

TURBULENT FLOW
Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934
On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120
Validation studies of turbulence and combustion models for aircraft gas turbine combustors
A82-12267
A new method of cooling turbine vanes
N82-11027
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055

TURBULENT WAKES
Reductions in parachute drag due to forebody wake effects
[AIAA PAPER 81-1939] A82-10417
Rotor wake characteristics relevant to rotor-stator interaction noise generation
[AIAA PAPER 81-2031] A82-10456

TWO DIMENSIONAL FLOW
Control laws for adaptive wind tunnels
A82-10985
An aerodynamic design method for transonic axial flow compressor stage
N82-10984
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024

U

UH-1 HELICOPTER
Helicopter icing spray system - Improvements and flight experience
A82-12696

ULTRAHIGH FREQUENCIES
A mathematical model of an over-sea airborne UHF radio link
A82-11406

UNDERCARRIAGES
Analytical determination of undercarriage retraction kinematics
A82-10364

UNSTEADY FLOW
An experimental investigation of the rotating stall, surge and wake behind the rotor for a single stage axial compressor
N82-11008

UPPER SURFACE BLOWING
Quiet short-haul research aircraft familiarization document, revision 1
[NASA-TM-81298] N82-10031

V

V/STOL AIRCRAFT
V/STOL aircraft and fluid dynamics
[NASA-TM-81328] N82-10029
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle --- conducted in the Lewis 10 by 10 foot wind tunnel
[NASA-TM-82728] N82-11042
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055

VARIABILITY
Characteristic and principal gains and phases and their use as multivariable control design tools --- generalizing Nyquist and root-locus diagram techniques
N82-10050
Multivariable design techniques based on singular value generalizations of classical control
N82-10051

VELOCITY DISTRIBUTION
Aerodynamic calculations and design of subcritical aerofoils
N82-10983

VELOCITY MEASUREMENT
Hard limited approaches to correlation velocity sensing
A82-12636

VERTICAL AIR CURRENTS
Downbursts and microbursts - An aviation hazard --- downdrafts beneath thunderstorms
A82-10214

VERTICAL DISTRIBUTION
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149

VERY LOW FREQUENCIES
Omega station 10.2 kHz signal selection made easy
A82-12638

VIBRATION DAMPING
'Quiet please' --- aircraft hydraulic systems noise reduction
A82-10854
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212

VIBRATION EFFECTS
The Shock and Vibration Digest, volume 13, no. 9
[AD-A105062] N82-10421

VIBRATION ISOLATORS
The possibility of using deformable rubber components in landing gear
A82-10496
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212

VIBRATION MODE
Applications of finite element method in aerospace power systems design
A82-11717
Calculation of natural modes of vibration for rotor blades by the finite element method
[DFVLR-FB-81-07] N82-10452

VIBRATION TESTS
The Shock and Vibration Digest, volume 13, no. 9
[AD-A105062] N82-10421

VIBRATORY LOADS
Lineup of the IM-series aircraft-derivative gas turbines
A82-12560

VIDEO EQUIPMENT
Tangential sensitivity of EW receivers
A82-11020

VISCOUS FLOW
Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils
A82-10821

VORTEX FLAPS
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013

VORTICES
Increasing the lift/drag ratio of a flat delta wing
A82-11899
The CIVIC - A concept in vortex induced combustion. II
[ASME PAPER 81-GT-12] A82-11997

W

WALL FLOW
Control laws for adaptive wind tunnels
A82-10985

WARNING SYSTEMS
An airport wind shear detection and warning system using Doppler radar
A82-10220
Threat Alert and Collision Avoidance System (TCAS) Symposium
[AD-A104563] N82-11047

WAVE DIFFRACTION
Acta mechanica sinica
[AD-A105184] N82-11014

WAVE REFLECTION
Acta mechanica sinica
[AD-A105184] N82-11014

WEAPON SYSTEMS
Quantification of the thermal environment for externally carried aircraft stores and ordnance
A82-12103

WEATHER FORECASTING
Operational environment, meteorological conditions and weather forecasting
N82-11057

WIND DIRECTION
Gust front structure observed by Doppler radar
A82-10223

WIND MEASUREMENT
Detection and display of wind shear and turbulence
A82-10222

WIND SHEAR
An airport wind shear detection and warning system using Doppler radar
A82-10220
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221
Detection and display of wind shear and turbulence
A82-10222
Comparative study of flare control laws
[NASA-CR-164903] N82-10032

WIND TUNNEL DRIVES
Design predictions for noise control in the cryogenic National Transonic Facility
A82-12025

WIND TUNNEL TESTS
A modular asymmetric parachute for wind tunnel testing
[AIAA PAPER 81-1933] A82-10414
Stress measurements in a ribbon parachute canopy during inflation and at steady state
[AIAA PAPER 81-1944] A82-10420
Wind tunnel tests on airfoils in tandem cascade
A82-10987
Standard tests of a research model rotor in a wind tunnel, including model similarity --- calculations compared with measurements
[BMVG-FBWT-79-16] N82-10016
Experimental investigations of the separated flow around a rectangular wing --- in a wind tunnel
[DFVLR-FB-81-12] N82-10017
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069

Helicopter rotor trailing edge noise --- noise prediction
[NASA-CR-3470] N82-11859

WIND TUNNEL WALLS

Control laws for adaptive wind tunnels
A82-10985

On low-speed wind tunnels with deformable boundaries
A82-11462

WIND TUNNELS

Evaluation of the acoustic measurement capability of the NASA Langley V/STOL wind tunnel open test section with acoustically absorbent ceiling and floor treatments
[NASA-CR-165796] N82-10059

WIND VELOCITY

Gust front structure observed by Doppler radar
A82-10[illegible]3

WINDSHIELDS

Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10693

WING FLAPS

Increasing the lift:drag ratio of a flat delta wing
A82-11899

WING FLOW METHOD TESTS

Experimental study of subsonic and transonic flows past a wing
A82-10363

WING LOADING

Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359

On the question of trailing airplane motion
A82-11470

A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035

Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

WING OSCILLATIONS

Experimental study of empennage snap-through vibrations
A82-11471

WING PANELS

Formation of triangular-element stiffness matrix using sliding interpolation
A82-11464

WING PROFILES

An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070

WING ROOTS

Acta mechanica sinica
[AD-A105186] N82-11014

The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016

WING TANKS

Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224

WINGS

Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039

On the kernel function collocation method in steady subsonic flow for wing with control surfaces
N82-12023

X

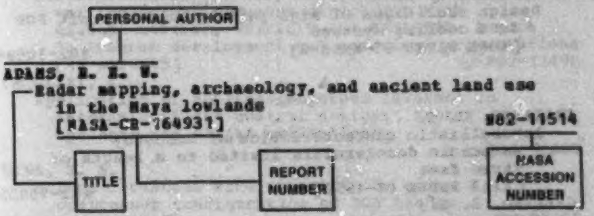
X WING ROTORS

An investigation of a stoppable helicopter rotor with circulation control --- ames 40 by 80 foot wind tunnel
[NASA-TM-81218] N82-10030

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 145)* FEBRUARY 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ADAM, V.
Control law design for transport aircraft flight tasks
N82-11080

ADAMS, R. E. W.
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

AGLIULLIN, I. N.
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463

AKENTEV, V. G.
Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459

AKHTER, M. M.
Development of multivariable controllers for aircraft turbine engines
N82-11087

AKHTIAMOV, E. V.
Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine
A82-11464

ALBRIGHT, A. E.
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-165444] N82-10021

ALLRAMSEDER, H.
Standard tests of a research model rotor in a wind tunnel, including model similarity
[BMVG-FBWT-79-16] N82-10016

ALM, A.
Lightning effects on aircraft and composites. Literature study on lightning strikes and protection
[FOA-C-20388-F3] N82-10024

AMIET, R. K.
Helicopter rotor trailing edge noise
[NASA-CR-3470] N82-11859

AMIET, R. K.
Helicopter rotor trailing edge noise
[AIAA PAPER 81-2001] A82-10455

ANDERSON, S. B.
V/STOL aircraft and fluid dynamics
[NASA-TM-81328] N82-10029

ANDO, Y.
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034

ANDRIANO, N.
Air-freon integrated environmental conditioning system for trainer subsonic aircraft
[ASME PAPER 81-ENAS-33] A82-10920

ARCHDEACON, J. L.
KC-135 Avionics Modernization Hot Bench
[AIAA 81-2105] A82-10081

ARIFULIN, A. C.
Jet fuel from carbon
A82-12021

ASHER, R.
A solution to the static geometry problem for JTIDS relative navigation
A82-12634

ATKINSON, G. F.
Air supply system bite for Boeing 767 airplane
[ASME PAPER 81-ENAS-7] A82-10895

B

BABISH, C. A., III
Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893

BACHMAN, K. L.
Ring Laser Gyro Navigator /RLGN/ flight test results
A82-12644

BAILEY, C. D.
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure
A82-11149

BAILEY, R. E.
Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion
[AIAA PAPER 81-1776] A82-10462

BAKER, A. J.
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055

BALASUBRAMANIAN, T. S.
Numerical treatment of helicopter rotor stability problems
A82-12045

BALBUKH, V. V.
Control of electromechanical actuator elements for flight vehicles
A82-12170

BALLARD, J. D.
An investigation of a stoppable helicopter rotor with circulation control
[NASA-TM-81218] N82-10030

BALOMBIN, J. R.
Rotor wake characteristics relevant to rotor-stator interaction noise generation
[AIAA PAPER 81-2031] A82-10456

BARDE, L.
Quantification of the thermal environment for externally carried aircraft stores and ordnance
A82-12100

BATTERSON, J. G.
Determination of airplane model structure from flight data by using modified stepwise regression
[NASA-TP-1916] N82-10041
Estimation of airplane stability and control derivatives from large amplitude longitudinal maneuvers
[NASA-TM-83185] N82-10042

BEASLEY, W. D.
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033
BELTE, D.
Helicopter icing spray system - Improvements and flight experience
A82-12696
BERKOVITS, A.
Fatigue life of lugs under service loading - Test results and predictions
A82-11685
BICKLER, T. C.
Synthetic aperture radar target simulator
[NASA-CASE-NPO-15024-1] N82-10286
BIPPES, H.
Experimental investigations of the separated flow around a rectangular wing
[DFVLR-FB-81-12] N82-10017
BIRCH, S. A.
The constricted rigging line trials technique for assessing the opening characteristics of parachutes
[AIAA PAPER 81-1932] A82-10413
BIRD, H.
Flight trajectory control investigation
[AD-A104542] N82-11048
BJERKAAS, C. L.
Gust front structure observed by Doppler radar
A82-10223
BJORKLUND, R. C.
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems
[AIAA 81-2205] A82-10143
BLICK, E. F.
An airport wind shear detection and warning system using Doppler radar
A82-10220
BOCKSTAHLER, A. J.
Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893
BOEHRINGER, W. E.
High-efficiency hydraulic power transfer units for multisystem aircraft
A82-10853
BOLTON, W. R.
Development of new lifting parachute designs with increased trim angle
[AIAA PAPER 81-1921] A82-10407
BONHAM, A. J.
System safety program plan
[AD-A104557] N82-11354
BORELLO, L.
Problems relating to the classical rate-gyro
A82-10497
BOROVIK, V. O.
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463
BOROWSKY, M. S.
Relationships between naval aviation safety and pilot flight experience
A82-11031
BRADFIELD, R. N.
Procedures and analysis techniques for determining static air minimum control speeds
A82-12564
BRADSHAW, J. E.
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063
BREWER, G. D.
Fuel for future transport aircraft
[ASME PAPER 81-HT-80] A82-10965
BROUWERS, A. P.
Lightweight diesel engine designs for commuter type aircraft
[NASA-CR-165470] N82-11068
BROWN, W. E., JR.
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514
BRUERE, A.
Electrical ground testing of aircraft antistatic protection
A82-10822
BRYSON, A. E., JR.
An overview of optimal control in aerospace systems
N82-11074
BUCH, A.
Fatigue life of lugs under service loading - Test results and predictions
A82-11685
BUCKER, H. O.
Inflatable system for fast deployment of parachutes at low altitudes from slow moving aircraft or stationary supports
[AIAA PAPER 81-1953] A82-10428
BUCKINGHAM, R. D.
Design challenges of high performance aircraft POD EOCM cooling systems
[ASME PAPER 81-ENAS-6] A82-10894

C

CALIANNO, C. T.
Aeroballistic characteristics of sonobuoy parachute decelerators limited to a length of three feet
[AIAA PAPER 81-1950] A82-10425
CALLIZO, L. A.
HiMAT onboard flight computer system architecture and qualification
[AIAA 81-2107] A82-10082
CAMP, D. W.
An airport wind shear detection and warning system using Doppler radar
A82-10220
CAMPBELL, G. S.
A note on fatal aircraft accidents involving metal fatigue
A82-11400
CAN, S.
Structural analysis of fuselages with cutouts by finite element method
N82-10995
CAPRILE, C.
The possibility of using deformable rubber components in landing gear
A82-10496
CARBONE, R.
Detection and display of wind shear and turbulence
A82-10222
CARLSON, L. A.
A new thermal and trajectory model for high altitude balloons
[AIAA PAPER 81-1926] A82-10411
CARTER, A. H., JR.
A comprehensive bibliography of literature on helicopter noise technology
[AD-A103331] N82-10812
CASSIER, A.
Development of the Triflex rotor head
A82-11222
CENTER, J. L.
Navigation task partitioning in distributed-processing avionics systems
A82-10646
CHAMIS, C. C.
Integrated analysis of engine
[NASA-TM-82713] N82-11491
CHANGSHENG, Z.
An experimental investigation of the rotating stall, surge and wake behind the rotor for a single stage axial compressor
N82-11008
CHAOQIANG, L.
Second order approximation theory of an arbitrary aerofoil in compressible potential flow
N82-10982
Aerodynamic calculations and design of subcritical aerofoils
N82-10983
CHAPMAN, R. E.
Hard limited approaches to correlation velocity sensing
A82-12636
CHATTERJEE, J. S.
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339

CHEN, C.
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497

CHIA, F. I.
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016

CHOU, Y. T.
Structural analysis computer programs for rigid multicomponent pavement structures with discontinuities, WESLIQID and WESLAYER. Report 1: Program development and numerical presentations
[AD-A104545] N82-11498

CICOLANI, L.
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations
N82-11083

CINA, F. S.
Subsonic cascade wind tunnel tests using a compressor configuration of DCA blades
[AD-A104597] N82-11069

CLARK, J. F.
The evolution of airborne weather avoidance radar toward a calibrated remote rain gauge using REACT
A82-10225

CLINE, M. C.
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046

COCKRELL, D. J.
Aerodynamics and performance of cruciform parachute canopies
[AIAA PAPER 81-1919] A82-10405
Experimental determination of parachute apparent mass and its significance in predicting dynamic stability
[AIAA PAPER 81-1920] A82-10406

COUTS, W. H.
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497

COWLEY, M.
Wings in the sun - The evolution of Solar Challenger
A82-12694

COX, S. K.
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149

COYNE, J.
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497

COYNE, J. E.
Superalloy powder engine components; controls employed to assure high quality hardware
A82-12499

CROLL, R. H.
A modular asymmetric parachute for wind tunnel testing
[AIAA PAPER 81-1933] A82-10414

CROW, R. P.
Discrete address beacon, navigation and landing system
A82-10650

CULBERT, T. P.
Radar mapping, archaeology, and ancient land use in the Maya lowlands
[NASA-CR-164931] N82-11514

CZYZEWSKI, K.
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils
A82-10362

D

DAGENHART, J. R.
Amplified crossflow disturbances in the laminar boundary layer on swept wings with suction
[NASA-TP-1902] N82-11391

DAGOSTINO, V.
New separators for battery systems
A82-11715

DAINTY, R. V.
Fractographic determination of fatigue crack growth rates in aircraft components
A82-12697

DEGANI, O.
Development and evaluation of automatic landing control laws for light wing loading STOL aircraft
[NASA-CR-166160] N82-10043

DEGUEST, P.
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089

DEHOFF, R. L.
Development of multivariable controllers for aircraft turbine engines
N82-11007

DESARO, R.
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

DEZIDEREV, S. G.
Results of experimental study of heat transfer to turbine blades with porous cooling
A82-11446

DI-YI, T.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

DINQIAN, W.
Finite difference computation of the steady transonic potential flow around airplanes
N82-10981

DIGIACINTO, T.
Airborne associative processor /ASPRO/
[AIAA 81-2145] A82-10104

DIPASQUO, R. S.
The integrated inertial sensor assembly /IISA/ - A redundant strapdown system for advanced aircraft navigation and flight control functions
A82-12602

DONALDSON, R. J., JR.
Gust front structure observed by Doppler radar
A82-10223

DOVIAK, R. J.
An airport wind shear detection and warning system using Doppler radar
A82-10220
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221

DOWELL, E. H.
Control laws for adaptive wind tunnels
A82-10985

DOYLE, J. C.
Multivariable design techniques based on singular value generalizations of classical control
N82-10051
Limitations on achievable performance of multivariable feedback systems
N82-10052

DREITSER, G. A.
The enhancement of heat exchange in channels /2nd revised and enlarged edition/
A82-12222

DUFFY, J. V.
Polyurethane foams for aircraft shock mounts. 3: Vibration damping by polyether foams
[AD-A104496] N82-11212

DUGRANRUT, J. D.
Description of the meteorological research radar system aboard NOAA/Research Facilities Center WP-3D aircraft
A82-10217

DUNBAR, W. G.
High voltage surge and partial discharge test to evaluate aerospace equipment parts
A82-11740

DUNN, G. L.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Requirements analysis and conceptual design
[AD-A103922] N82-10326

E

EARLE, R. V.
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037

EARLS, M. R.
HiMAT onboard flight computer system architecture and qualification
[AIAA 81-2107] A82-10082

EATON, H. E.
Development of low modulus material for use in ceramic gas path seal applications
[NASA-CR-165469] N82-10039

EISWIRTH, E. A.
In-situ calibration of flight heat transfer instrumentation
[ASME PAPER 81-ENAS-13] A82-10901

ELMORE, K. L.
An airport wind shear detection and warning system using Doppler radar
A82-10220
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221

ENGBLOM, J. J.
Coupled fluid/structure response predictions for soft body impact of airfoil configurations
A82-12039

EPIFANOV, V. M.
End losses in turbine cascades with porous cooling
A82-11434

EPPEL, J. C.
Quiet short-haul research aircraft familiarization document, revision 1
[NASA-TM-81298] N82-10031

ERNSTOFF, M. N.
Study and development of an integrated head-up display
[AD-A104337] N82-11062

ERZBERGER, H.
Optimum climb and descent trajectories for airline missions
N82-11082

ESPOSITO, R. J.
FAA acceptance tests on the NAVSTAR GPS Z-Set receiver
A82-12639

EVERETT, W. H.
Superalloy powder engine components; controls employed to assure high quality hardware
A82-12499

F

FABRIS, G.
Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934

FANGYIAN, Z.
An aerodynamic design method for transonic axial flow compressor stage
N82-10984

FEDORAK, R.
Memory requirements for future navigation systems
A82-12637

FEIDA, F.
An aerodynamic design method for transonic axial flow compressor stage
N82-10984

FEINREICH, B.
Development and evaluation of automatic landing control laws for light wing loading STOL aircraft
[NASA-CR-166160] N82-10043

FERKO, E. J.
Crack growth evaluation of a method to convert real-time loads history to a simplified engineering spectra
A82-12043

FIORENTINO, A.
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

FITZGERALD, R. E.
Developments in boundary layer Thrust Vector Control
A82-10855

FITZSIMMONS, R. D.
How large should a commuter transport be
[AIAA PAPER 81-1732] A82-10463

FORSYTH, T. J.
An investigation of a stoppable helicopter rotor with circulation control
[NASA-TM-81218] N82-10030

FRANCIS, B. A.
Feedback and minimax sensitivity
N82-10058

FRANCOIS, J.
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089
Effects of aircraft noise on the equilibrium of airport residents: Testing and utilization of a new methodology
[NASA-TM-76628] N82-11636

FRANZ, T.
An assessment of the use of antimisting fuel in turbofan engines
[NASA-CR-165258] N82-11230

FREYMANN, R.
A method for determination of the aeroelastic behavior of aircraft with active control systems
[DFVLR-FB-81-05] N82-10047

FROST, W.
An airport wind shear detection and warning system using Doppler radar
A82-10220

FU-QUN, C.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

FUJITA, T. T.
Downbursts and microbursts - An aviation hazard
A82-10214

G

GABRIELLI, G.
Characteristics and trends of energy consumption in transport missions with aircraft and surface vehicles
A82-10495

GALDA, K. H.
Mathematical model for the maintenance program of modern jet aircraft
[DFVLR-FB-81-14] N82-10002

GAONKAR, G. H.
On computing Floquet transition matrices of rotorcraft
A82-11225

GARRARD, W. L.
The effects of flexibility on the steady-state performance of small ribbon parachute models
[AIAA PAPER 81-1923] A82-10408
Stress measurements in a ribbon parachute canopy during inflation and at steady state
[AIAA PAPER 81-1944] A82-10420
Stress measurements in bias constructed parachute canopies during inflation and at steady-state
[AIAA PAPER 81-1945] A82-10421

GARRETT, W. A.
ACMA - Fact or fantasy
A82-12048

GATINEAU, R. J.
History of flight testing the L-1011 TriStar jet transport. II - Testing highlights since initial certification of the L-1011-1
A82-12049

GEISLER, D.
Experimental modal analysis of the fuselage panels of an Aero Commander aircraft
[NASA-CR-165750] N82-10028

GERSHTEIN, S. I.
Experimental study of empennage snap-through vibrations
A82-11471
GEVAERT, G.
Development and evaluation of automatic landing control laws for light wing loading STOL aircraft
[NASA-CR-166160] N82-10043
GILIAZOV, M. SH.
Study of reingestion of exhaust gases with different initial temperature in a reversed turbojet engine
A82-11444
GILL, F. R.
Design considerations for optimal flight control systems
N82-11077
GILL, J. C.
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037
GILREATH, M. C.
General aviation aircraft antennas for the global positioning system
[NASA-TM-83212] N82-11339
GIRARD, L. A., JR.
Air bag impact attenuation system for the AQM-34V remote piloted vehicle
[AIAA PAPER 81-1917] A82-10403
GLIEBE, P. R.
Effects of vane/blade ratio and spacing on fan noise
[AIAA PAPER 81-2033] A82-10457
GOETTING, H. C.
Mathematical model for the maintenance program of modern jet aircraft
[DFVLR-FB-81-14] N82-10002
GOLDBERG, H.
Extending the limits of reliability theory
A82-12310
GOLDSTEIN, R. M.
Synthetic aperture radar target simulator
[NASA-CASE-NPO-15024-1] N82-10286
GOODMAN, A. W.
Sealed lead-acid batteries for aircraft applications
A82-11716
GOODRICK, T. F.
Comparison of simulation and experimental data for a gliding parachute in dynamic flight
[AIAA PAPER 81-1924] A82-10409
GOODWIN, W. V.
An investigation of the combustion process in solid fuel ramjets
[AD-A104603] N82-11232
GORLINE, G. A.
Implementation of AVRADCOM MMST
A82-10545
GRIES, D. A.
Design considerations for duty cycle, life and reliability of small limited life engines
[AIAA PAPER 81-1402] A82-10465
GROSS, S.
Unsolved problems of nickel cadmium batteries
A82-11725
GRUZDEV, A. A.
On low-speed wind tunnels with deformable boundaries
A82-11462
GUENTHER, R.
A CFRP taileron for the Tornado: Construction and production
[MBB-FE-212/KFK/PUB/2] N82-10035
GULIAEV, V. V.
Calculation of aerodynamic characteristics of jet flapped airplane
A82-11459
GUPTA, R. R.
Omega station 10.2 kHz signal selection made easy
A82-12638
GURIANOV, A. IA.
Experimental study of empennage snap-through vibrations
A82-11471
GUSEVA, R. I.
On the use of carbon composites in slat and stabilizer construction
A82-11460
GUSKOV, V. I.
End losses in turbine cascades with porous cooling
A82-11434

H

HALLIDAY, R.
Commercial EMS considerations for small gas turbine engines
A82-12449
HANEY, H. P.
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
HARRIS, W. L.
Model helicopter rotor impulsive noise
A82-11300
HARSHA, P. T.
Multiple-scale turbulence modeling of free turbulent flows
[ASME PAPER 81-FE-20] A82-10934
HARTMANN, U.
Practical design and realization of a digital adaptive flight control system
N82-11079
HARTMANN, H.
A CFRP taileron for the Tornado: Construction and production
[MBB-FE-212/KFK/PUB/2] N82-10035
HASHIMOTO, R.
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
HAWKES, D. J.
The certification of digital systems
A82-11940
HAWLEY, D. L.
Three navigation systems and their costs of acquiring remote sensing data
A82-10049
HEDGLEY, D. R.
Solution to the hidden-line problem
A82-12803
HELD, D. N.
Synthetic aperture radar target simulator
[NASA-CASE-NPO-15024-1] N82-10286
HICKS, R. M.
A comparison of theoretical and experimental pressure distributions for two advanced fighter wings
[NASA-TM-81331] N82-11054
HILDEBRAND, P. H.
Multiple Doppler radar observations of PBL structure
A82-10292
HILDEBRANT, R. V.
Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership
A82-11719
HILL, W., JR.
The case for a defensive air-to-air fighter
A82-12801
HILLIG, W. B.
Thermal-barrier-coated turbine blade study
[NASA-CR-165351] N82-10040
HODGSON, T. H.
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039
HOLL, R.
Further application and development of an engine usage/life monitoring system for military services
A82-12450
HOLLAND, R. L.
The statistical theory of radio direction finding
[AD-A108156] N82-10027
HOLT, I. T.
Development of new lifting parachute designs with increased trim angle
[AIAA PAPER 81-1921] A82-10407
HONG-KUN, Z.
A new method of cooling turbine vanes
N82-11027
HONG, Q.
Finite difference computation of the steady transonic potential flow around airplanes
N82-10981
HOPKINS, J. J.
Integrated satellite navigation and strapdown attitude and heading reference systems for civil air carriers
A82-12643

HORN, W. J.
A new thermal and trajectory model for high altitude balloons
[AIAA PAPER 81-1926] A82-10411
HUBBARD, J. E., JR.
Model helicopter rotor impulsive noise
A82-11300
HUELSTER, D. S.
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037
HUNTER, B. J.
Digital avionics systems - The RAF experience
A82-11941
HWANG, D. P.
A summary of V/STOL inlet analysis methods
[NASA-TM-82725] N82-11043

I

IARKHO, S. A.
The enhancement of heat exchange in channels /2nd revised and enlarged edition/
A82-12222
ICHIKAWA, T.
A study on numerical method for evaluating spanwise integral in subsonic lifting-surface theory
[NAL-TR-661T] N82-11035
ISAEV, V. V.
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465
IULIN, N. K.
Jet fuel from carbon
A82-12021
IUN, G. M.
Optimization of the principal design parameters of a passenger aircraft
A82-10816
IVANOV, V. S.
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463

J

JACOB, K.
Experimental investigations of the separated flow around a rectangular wing
[DFVLR-FB-81-12] N82-10017
JAIN, S. C.
Superalloy powder engine components; controls employed to assure high quality hardware
A82-12499
JENSEN, R. S.
Improving the MLS through enhanced cockpit displays
A82-10649
JIAFENG, L.
An experimental investigation of the rotating stall, surge and wake behind the rotor for a single stage axial compressor
N82-11008
JIAN-ZHONG, X.
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025
JIN-DI, Y.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007
JIN-LIANG, J.
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015
JIE-SHENG, Y.
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025
JINQIAG, J.
Matrix analysis of wings
N82-10998
JOHANSSON, E. S.
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063
JOHNSON, D. W.
Reductions in parachute drag due to forebody wake effects
[AIAA PAPER 81-1939] A82-10417
JONES, J. L.
Aircraft excrescence drag
[AGARD-AG-264] N82-10020
JORGENSEN, D. S.
Aerodynamics and performance of cruciform parachute canopies
[AIAA PAPER 81-1919] A82-10405
JUE-LIANG, Z.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

K

KALININ, E. K.
The enhancement of heat exchange in channels /2nd revised and enlarged edition/
A82-12222
KAMPE, R. F.
Developments in boundary layer Thrust Vector Control
A82-10855
KANIA, W.
Experimental study of subsonic and transonic flows past a wing
A82-10363
KANT, P.
Theory and applications of optimal control in aerospace systems
[AGARD-AG-251] N82-11073
KANTOLA, R. A.
Effects of vane/blade ratio and spacing on fan noise
[AIAA PAPER 81-2033] A82-10457
KARIMOVA, A. G.
Results of experimental study of heat transfer to turbine blades with porous cooling
A82-11446
KARMARKER, J.
Flight trajectory control investigation
[AD-A104542] N82-11048
KHAKIMULLIN, F. SH.
Experimental study of empennage snap-through vibrations
A82-11471
KIESSLING, F.
Calculation of natural modes of vibration for rotor blades by the finite element method
[DFVLR-FB-81-07] N82-10452
KIPP, H. W.
In-situ calibration of flight heat transfer instrumentation
[ASME PAPER 81-ENAS-13] A82-10901
KLEIN, V.
Determination of airplane model structure from flight data by using modified stepwise regression
[NASA-TP-1916] N82-10041
KLIMAS, P. C.
A modular asymmetric parachute for wind tunnel testing
[AIAA PAPER 81-1933] A82-10414
KLUG, H. G.
Active control elements on the transonic wing of the Airbus A-300 (ACTTA A). Airbus A-300 with reduced longitudinal stability (ACTTA-C)
N82-10044
KOHLMAN, D. L.
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-165444] N82-10021

Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system
[NASA-CR-164585] N82-11052
KONDRATEV, K. IA.
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149
KONICKE, T. A.
Stress measurements in a ribbon parachute canopy during inflation and at steady state
[AIAA PAPER 81-1944] A82-10420
Stress measurements in bias constructed parachute canopies during inflation and at steady-state
[AIAA PAPER 81-1945] A82-10421
KORNEV, B. N.
On the use of carbon composites in slat and stabilizer construction
A82-11468
KOZHEVNIKOV, IU. V.
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463
KREBS, V.
Practical design and realization of a digital adaptive flight control system
N82-11079
KRENGEL, J. H.
Air-breathing engine test facilities register
[AGARD-AG-269] N82-10063
KRETH, J.
Mathematical model for the maintenance program of modern jet aircraft
[DFVLR-FB-81-14] N82-10002
KRICHKO, A. A.
Jet fuel from carbon
A82-12021
KRZYSIAK, A.
Experimental study of subsonic and transonic flows past a wing
A82-10363
KSENOFONTOVA, N. N.
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465
KUZMENKO, V. N.
Optimization of the principal design parameters of a passenger aircraft
A82-10816
KUZNETSOV, A. B.
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465

L

LAGARDE, X.
Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
A82-11927
LAHN, T. G.
Controlling the software/hardware interface for the validation of avionics systems
[AIAA 81-2159] A82-10116
LANDEL, R. F.
Rheological behavior of progressively shear-thickening solutions
A82-11177
LANDER, H. R.
Jet fuel looks to shale oil: The 1980 technology review
[AD-A104414] N82-11228
LANGE, H. H.
Flight test results of the model simulation controller for the HFB 320 for in-flight simulation of the A310 airbus
[ESA-TT-660] N82-10107
LAPIN, V. P.
A protective additive for jet fuels
A82-12022
LARGE, E.
Optimal flight paths for winged, supersonic flight vehicles - Extension to the case where thrust can be vectored
A82-10310
LASSITER, W. S.
Design predictions for noise control in the cryogenic National Transonic Facility
A82-12025
LAVOIRIERRE, G.
Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
A82-11927
LE BALLEUR, J. C.
Strong matching method for computing transonic viscous flows including wakes and separations - Lifting airfoils
A82-10021
LEBOT, Y.
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089
LEBOUC, P.
Cost reduction in air transportation
[SNIAS-811-150-101] N82-10025
LEE, C. E.
A proposed flight safety program for the Korean Air Force
[AD-A102373] N82-10023
LEE, J.
New separators for battery systems
A82-11715
LEE, J. T.
Applications of conventional and Doppler radars for aviation safety
A82-10215
LEES, P.
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks
[AD-A103270] N82-10033
LEHNER, L.
A CFRP taileron for the Tornado: Construction and production
[MBB-FE-212/KPZ/PUB/2] N82-10035
LEONG, F. J.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Requirements analysis and conceptual design
[AD-A103922] N82-10326
LEPORSKII, A. A.
Synthesis of system for evaluating gyrostabilizer state with unknown disturbances
A82-11469
LEVASHOV, F. D.
Formation of triangular-element stiffness matrix using sliding interpolation
A82-11464
LEVIN, A. D.
Propfan installation aerodynamics of a supercritical swept wing transport configuration
[AIAA PAPER 81-1563] A82-10466
LEWIS, D.
Helicopter engine technology - With particular reference to the Rolls-Royce Gem engine
A82-10304
LEYENDECKER, H.
Control law design for transport aircraft flight tasks
N82-11080
LIANG, D. F.
Simulation study of a hybrid strapdown attitude and heading reference system
A82-12041
LILLEY, D. G.
On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120
LIN, C.-F.
Real-time, on-line digital simulation of optimum maneuvers of supersonic aircraft
[AIAA 81-2178] A82-10127
LLORET, P.
Fast and accurate gyrocompass using strapdown tuned rotor gyros as a solution to combat helicopters navigation problems
A82-11927

LOEWENSTEIN, P.
Superclean superalloy powders by the rotating electrode process
A82-12496

LOKAI, V. I.
Results of experimental study of heat transfer to turbine blades with porous cooling
A82-11446

LUDWIG, D.
Calculation of natural modes of vibration for rotor blades by the finite element method
[DFVLR-FB-81-07] N82-10452

LUKASZEWICZ, H.
The use of the Weber method for minicomputer-assisted numerical analysis of airfoils
A82-10352

LUND, T. J.
Hard limited approaches to correlation velocity sensing
A82-12636

LUNDY, A. S.
Outsider's look at flight instrumentation
[DE81-025409] N82-11066

LUO, S.
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359

LYKOV, O. P.
A protective additive for jet fuels
A82-12022

LYNNWORTH, L. C.
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063

M

MACFARLANE, A. G. J.
Characteristic and principal gains and phases and their use as multivariable control design tools
N82-10050

MANHARDT, P. D.
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055

MANION, N. E.
Automated Paint and Process Line /APPL/
[AIAA 81-2166] A82-10120

MANNINI, A.
Air-freon integrated environmental conditioning system for trainer subsonic aircraft
[ASME PAPER 81-ENAS-33] A82-10920

MARCHIS, V.
Air-freon integrated environmental conditioning system for trainer subsonic aircraft
[ASME PAPER 81-ENAS-33] A82-10920

MARKHAM, D. L.
The dispersion of drop sizes in gas turbine fuel nozzle sprays
A82-12107

MARTINEZ, R.
Aeroacoustic theory for noncompact wing-gust interaction
[PDRL-81-7] N82-11071

MATIAZH, A. I.
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465

MATSON, J. E.
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063

MATSUSUE, K.
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067

MATSUZAKI, Y.
New estimation method for flutter or divergence boundary from random responses at subcritical speeds
[NAL-TR-667T] N82-11034

MATTICK, A. A.
Increasing the lift:drag ratio of a flat delta wing
A82-11899

MAYER, J. T. B.
The Space Shuttle vehicle checkout involving flight avionics software
[AIAA 81-2141] A82-10100

MAYER, N. J.
The balloon and the airship technological heritage
[AIAA PAPER 81-1912] A82-10401

MCALLISTER, D.
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks
[AD-A103270] N82-10033

MCCARTHY, J.
An airport wind shear detection and warning system using Doppler radar
A82-10220
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221

MCCLOUD, J. L., III
An investigation of a stoppable helicopter rotor with circulation control
[NASA-TM-81218] N82-10030

MCDARMAID, D. S.
The application of improved aluminium alloys and steels in aircraft structures
A82-10305

MCGHEE, R. J.
Wind-tunnel results for a modified 17-percent-thick low-speed airfoil section
[NASA-TP-1919] N82-11033

MCGLADE, S. M.
Optical sensors for displacement measurement
A82-11407

MCKEEN, R. G.
Design of airport pavements for expansive soils
[AD-A104660] N82-11313

MCKENZIE, D. R.
Design and development of a low cost servoed rate gyro for unmanned aircraft
A82-11932

MCLAUGHLIN, D. K.
On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120

MCPHERSON, W. R.
SARSAT applications
A82-12698

MCWILLIAM, D. W.
Simulation study of a hybrid strapdown attitude and heading reference system
A82-12641

MEHDI, I. S.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Requirements analysis and conceptual design
[AD-A103922] N82-10326

MEI, C.
Response of nonlinear aircraft structural panels to high intensity noise
A82-12041

MELUZOV, IU. V.
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463

METCALF, J. I.
Airborne weather radar and severe weather penetration
A82-10219

MEYER, G.
Application of nonlinear systems inverses to automatic flight control design: System concepts and flight evaluations
N82-11083

MICHARD, J.
Adaptation of a turbine test facility to high-temperature research
[RAE-LIB-TRANS-2064] N82-11089

MIKALEVICH, V. S.
Optimization of the principal design parameters of a passenger aircraft
A82-10816

MIKOLOWSKY, W. T.
ACMA - Fact or fantasy
A82-12048

MIKULLA, V.
Standard tests of a research model rotor in a wind tunnel, including model similarity
[BMVG-FBWT-79-16] N82-10016

MILLS, J. R.
Digital avionics: Promise and practice - An airlines experience in the field
A82-11942

MIRONER, A.
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1918] A82-10404

MITCHELL, P.
Bridging the gap from aircraft to space computers
[AIAA 81-2142] A82-10101

MOORE, J. F.
The digital civil aircraft
A82-11938

MORRIS, C. E. K., JR.
Parametric study of microwave-powered high-altitude airplane platforms designed for linear flight
[NASA-TP-1918] N82-11050

MOSINA, L. I.
A protective additive for jet fuels
A82-12022

MUHNSCHER, D.
A contribution to the stabilization of flight vehicle parachute systems
[ESA-TT-679] N82-10046

MURDOCK, G. A.
Hard limited approaches to correlation velocity sensing
A82-12636

MURPHY, P. C.
Determination of airplane model structure from flight data by using modified stepwise regression
[NASA-TP-1916] N82-10041

MURRI, D. G.
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013

MYERS, A. F.
HiMAT onboard flight computer system architecture and qualification
[AIAA 81-2107] A82-10082

N

NADKARNI, A. A.
Comparative study of flare control laws
[NASA-CR-164903] N82-10032

NAGLE-ESHLEMAN, J.
The Shock and Vibration Digest, volume 13, no. 9
[AD-A105062] N82-10421

NAIK, N. K.
Development of aircraft production engineering discipline at IIT, Bombay
A82-11317

NELSON, S. C.
How large should a commuter transport be
[AIAA PAPER 81-1732] A82-10463

NGUYEN, T. H.
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063

NIKIFOROVA, T. C.
Jet fuel from carbon
A82-12021

NOVAD, A. A.
On the question of trailing airplane motion
A82-11470

NOVAK, R. C.
Development of low modulus material for use in ceramic gas path seal applications
[NASA-CR-165469] N82-10039

O

ONEILL, J. J.
A hidden advantage of permanent magnet electrical generating systems
A82-11720

ORZECHOWSKI, J. A.
A numerical three-dimensional turbulent simulation of a subsonic VSTOL jet in a cross-flow using a finite element algorithm
[AD-A104514] N82-11055

P

PALM, L.
Development of a nylon-Kevlar recovery system for the CL-289 /AN/USD 502/ surveillance drone
[AIAA PAPER 81-1952] A82-10427

PAPPE, N. D.
Control of electromechanical actuator elements for flight vehicles
A82-12170

PAPPE, V. F.
Control of electromechanical actuator elements for flight vehicles
A82-12170

PATERSON, J. H.
Aircraft excrescence drag
[AGARD-AG-264] N82-10020

PATRICK, J. F.
Air supply system bite for Boeing 767 airplane
[ASME PAPER 81-ENAS-7] A82-10895

PAVLOV, V. A.
Experimental study of empennage snap-through vibrations
A82-11471

PAVLOVSKII, V. F.
One reason for the onset of high-frequency self-excited oscillations
A82-11448

PEDERSEN, N. E.
Advanced fuel flowmeter for future naval aircraft
[AD-A104364] N82-11063

PEEL, C. J.
The application of improved aluminium alloys and steels in aircraft structures
A82-10305

PENG, S. T. J.
Rheological behavior of progressively shear-thickening solutions
A82-11177

PETERSON, C. W.
Reductions in parachute drag due to forebody wake effects
[AIAA PAPER 81-1939] A82-10417

PETROV, B. I.
Control of electromechanical actuator elements for flight vehicles
A82-12170

PIERREPONT, D.
Towards minimum power for environmental control in transport aircraft
[ASME PAPER 81-ENAS-4] A82-10892

PINES, S.
An influence coefficient method for the application of the modal technique to wing flutter suppression of the DAST ARW-1 wing
[NASA-CR-165772] N82-11070

PLESS, W. M.
Acoustic emission - An emerging technology for assessing fatigue damage in aircraft structure
A82-11149

POPE, R. E.
The need for multivariable design and analysis techniques
N82-10049

PRASAD, D. S. S.
On computing Floquet transition matrices of rotorcraft
A82-11225

PRASAD, U. B.
Ideal and simulated performance of an aircraft in the terrain following mission
A82-11302

PRATT, S.
LQG multivariable design tools
N82-10054

PRESS, J.
Performance analysis of enroute air traffic control computers in the National Airspace System
[AIAA 81-2203] A82-10140

PRINZ, R.
Mathematical model for the maintenance program of modern jet aircraft
[DFVLR-FB-81-14] N82-10002

PUCHKOV, V. A.
Jet fuel from carbon
A82-12021

PURI, S. N.
Design considerations for the direct digital control of dry-tuned gyroscope
A82-11933

PURVIS, J. W.
Theoretical analysis of parachute inflation including fluid kinetics
[AIAA PAPER 81-1925] A82-10410

Q

QI-XUN, L.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

QINGXIONG, Y.
The automatic matrix force method and techniques for handling more complex computations with given computer capacity
N82-10994

R

RAGHUNATHAN, S.
Wind tunnel tests on airfoils in tandem cascade
A82-10987

RAGSDALE, W. A.
Use of Space Shuttle technology in conventional aircraft
[AIAA 81-2176] A82-10125

RAJPAUL, V. K.
Closed loop environmental control systems for fighter aircraft
[ASME PAPER 81-ENAS-2] A82-10890

RAJU, P. N.
Dynamic response of aircraft structure to gun shock loads
A82-11314

RANG, E. R.
Controlling the software/hardware interface for the validation of avionics systems
[AIAA 81-2159] A82-10116

RANGAIAH, V. P.
Dynamic response of aircraft structure to gun shock loads
A82-11314

RAYMOND, E. T.
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072

REED, E. A.
Parachute technology under pressure
A82-12804

REID, D. B.
Simulation study of a hybrid strapdown attitude and heading reference system
A82-12641

REID, J. A. I.
Design aspects of non rigid airship envelopes
A82-10306

REINMANN, J. J.
Selected bibliography of NACA-NASA aircraft icing publications
[NASA-TM-81651] N82-11053

RHODE, D. L.
On the prediction of swirling flowfields found in axisymmetric combustor geometries
A82-12120

RICCI, R. J.
Integration of computer graphics design with analytical models
[AIAA 81-2134] A82-10096

RICHARDSON, D.
F-5G Tigershark
A82-12775

RIES, R. G.
Interoperability testing of decentralized command, control, communications and intelligence /C3I/ systems
[AIAA 81-2205] A82-10143

RIX, O.
System identification of the longitudinal motion of the DFVLR HFB 320 research aircraft with particular consideration of control surface effectiveness
[ESA-TT-666] N82-10045

ROBERTS, L.
V/STOL aircraft and fluid dynamics
[NASA-TM-81328] N82-10029

ROBERTS, W. E.
Air-film cooling returns to ramjets
[ASME PAPER 81-ENAS-8] A82-10896

ROBINSON, C. W.
Aircraft digital input controlled hydraulic actuation and control system
[AD-A104263] N82-11072

ROCK, S. M.
Development of multivariable controllers for aircraft turbine engines
N82-11087

RODGERS, C.
A new APU for medium place aircraft environmental control systems
[ASME PAPER 81-ENAS-1] A82-10889

ROEHM, R. P.
Superalloy turbine components - Which is the superior manufacturing process, as-HIP, HIP plus Isoforge, or 'gatorizing' of extrusion consolidated billet
A82-12497

ROSENTHAL, Y.
Satellite geometry considerations for low cost GPS user equipment
A82-12630

ROUGHTON, D.
The all digital military aircraft
A82-11937

RU-QUN, Y.
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024

RUFF, S.
Development and construction of pilot ejector seats in Germany from 1938-1945
[DFVLR-FB-81-04] N82-10026

RUNZIANG, Z.
Matrix analysis of wings
N82-10998

S

SALIARIS, C.
A contribution to the stabilization of flight vehicle parachute systems
[ESA-TT-679] N82-10046

SALVIONI, L.
The possibility of using deformable rubber components in landing gear
A82-10496

SASHEVSKII, V. V.
A protective additive for jet fuels
A82-12022

SASTRY, D.
On computing Floquet transition matrices of rotorcraft
A82-11225

SCHAFER, H.
Quantification of the thermal environment for externally carried aircraft stores and ordnance
A82-12100

SCHAFRANEK, D.
Theoretical investigation of the influence of spoiler dynamics on the handling qualities of an aircraft with direct lift control
[ESA-TT-681] N82-10036

SCHLINKER, R. H.
Helicopter rotor trailing edge noise
[AIAA PAPER 81-2001] A82-10455
Helicopter rotor trailing edge noise
[NASA-CR-3470] N82-11859

SCHNEIDER, M. H.
Thermal expansion accommodation in a jet engine frame
A82-11999

SCHWARTZ, A. C.
FAA developing new collision avoidance, data acquisition and transmission systems
A82-10396

SCHWEICKART, D.
High voltage surge and partial discharge test to evaluate aerospace equipment parts
A82-11740

SCHWEIKHARD, W. G.
Icing tunnel test of a glycol-exuding porous leading edge ice protection system on a general aviation airfoil
[NASA-CR-165444] N82-10021

SEGREST, J. D.
Advanced aircraft electric power system
A82-11718

SEIF, J.
How large should a commuter transport be
[AIAA PAPER 81-1732] A82-10463
SELLARS, R. J.
Sophisticated aircraft structure developments - Combat aeroplanes
A82-10309
SENDERAK, K. L.
Sealed lead-acid batteries for aircraft applications
A82-11716
SEPULVEDA, D.
Application of numerical modeling to gas turbine combustor development problems
A82-12118
SERAFIN, R.
Detection and display of wind shear and turbulence
A82-10222
SERDIUK, V. A.
Control of electromechanical actuator elements for flight vehicles
A82-12170
SHAPIRO, A. A.
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind tunnel tests of a rectangular wing segment
A82-11465
SHARMA, A. V.
Impact-initiated damage thresholds in composites
A82-12028
SHAW, L. M.
Rotor wake characteristics relevant to rotor-stator interaction noise generation
[AIAA PAPER 81-2031] A82-10456
SHEKLETON, J. R.
The CIVIC - A concept in vortex induced combustion. II
[ASME PAPER 81-GT-12] A82-11997
SHENG, Y. T.
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016
SHI-CAN, Z.
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015
SHIJUN, L.
Finite difference computation of the steady transonic potential flow around airplanes
N82-10981
SHOR, G. I.
A protective additive for jet fuels
A82-12022
SHOU, W.
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359
SHOULIAN, G.
Structural analysis of fuselages with cutouts by finite element method
N82-10995
SI-HONG, L.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007
SIDDIQUI, R. U. A.
Applications of finite element method in aerospace power systems design
A82-11717
SIEMERS, P. A.
Thermal-barrier-coated turbine blade study
[NASA-CR-165351] N82-10040
SKAISTIS, S. J.
'Quiet please'
A82-10654
SKELTON, R. E.
Control design of flexible spacecraft
N82-11087
SLATOR, T.
A mathematical model of an over-sea airborne UHF radio link
A82-11406
SMITH, J. R.
Application of numerical methods to the calculation of electrostatic fields in aircraft fuel tanks
[AD-A103270] N82-10033
SMITH, R. C.
Propfan installation aerodynamics of a supercritical swept wing transport configuration
[AIAA PAPER 81-1563] A82-10466
SMITH, R. E.
Analysis of augmented aircraft flying qualities through application of the Neal-Smith criterion
[AIAA PAPER 81-1776] A82-10462
SMITH, T. D.
Synchronous fault-tolerant flight control systems
[AIAA 81-2109] A82-10083
SOLOMON, H. L.
A navigation systems planning model
A82-12640
SONG, C. J.
On the kernel function collocation method in steady subsonic flow for wing with control surfaces
N82-12023
SONGLING, L.
An aerodynamic design method for transonic axial flow compressor stage
N82-10984
SONNICHSEN, T.
Baseline data on utilization of low-grade fuels in gas turbine applications. Volume 3: Emissions evaluation
[DE81-903764] N82-10254
SRI-JAYANTHA, M.
A microprocessor-based data acquisition system for stall/spin research
[AIAA 81-2177] A82-10126
STANCZAK, R.
Analytical determination of undercarriage retraction kinematics
A82-10364
STATON, D. V.
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037
STEBLETSOV, V. G.
Control of electromechanical actuator elements for flight vehicles
A82-12170
STEIN, G.
LQG-based multivariable design: Frequency domain interpretation
N82-10053
LQG multivariable design tools
N82-10054
STENGEL, R. F.
A microprocessor-based data acquisition system for stall/spin research
[AIAA 81-2177] A82-10126
STEPHENSON, A. R.
A navigation systems planning model
A82-12640
STEPKA, F. S.
Thermal and flow analysis of a convection, air-cooled ceramic coated porous metal concept for turbine vanes
[ASME PAPER 81-HT-46] A82-10952
STERLIN, V. A.
On evaluating the influence of local disruptions of flow over trailing edge and leading edge flaps from the data of wind-tunnel tests of a rectangular wing segment
A82-11465
STEVENS, G. W. H.
The net-skirt to a parachute canopy as a device to prevent inversion
[AIAA PAPER 81-1927] A82-10412
STOCKEMER, F. J.
Experimental study of fuel heating at low temperatures in a wing tank model, volume 1
[NASA-CR-165391] N82-11224
STOCKER, D. P. W.
Fatigue substantiation of non-linear structures
A82-11220

STOLLERY, J. L.
Increasing the lift:drag ratio of a flat delta wing
A82-11899
STOLP, F. C.
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037
STONE, R. H.
Seven years experience with Kevlar-49 in the Lockheed L-1011 Tristar
A82-12647
STRICKER, R.
Standard tests of a research model rotor in a wind tunnel, including model similarity
[BMVG-FBWT-79-16] N82-10016
STURGESS, G. J.
Application of numerical modeling to gas turbine combustor development problems
A82-12118
Validation studies of turbulence and combustion models for aircraft gas turbine combustors
A82-12267
STUTZMAN, W. L.
Antenna theory and design
A82-12323
SUBRAHMANYAM, D. S.
Ideal and simulated performance of an aircraft in the terrain following mission
A82-11302
SUNG, C. C.
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016
SUTTON, T. G.
Considerations and applications for the use of fluidics in aerospace controls
A82-12087
SYED, S. A.
Application of numerical modeling to gas turbine combustor development problems
A82-12118
Validation studies of turbulence and combustion models for aircraft gas turbine combustors
A82-12267

T

TAKAHARA, K.
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067
TALYZIN, V. A.
Basic problem of aircraft gasturbine engine analytic design. II
A82-11463
TAN, C. P.
Wind tunnel tests on airfoils in tandem cascade
A82-10987
TERKEL, B.
An airport wind shear detection and warning system using Doppler radar
A82-10220
TERRY, G.
Sophisticated aircraft structure developments - Combat aeroplanes
A82-10309
THEOBALD, M. A.
Evaluation of the acoustic measurement capability of the NASA Langley V/STOL wind tunnel open test section with acoustically absorbent ceiling and floor treatments
[NASA-CR-165796] N82-10059
THIELE, G. A.
Antenna theory and design
A82-12323
TIANGI, Y.
Structural analysis of fuselages with cutouts by finite element method
N82-10995
TIKHOMIROV, V. A.
On the use of carbon composites in slat and stabilizer construction
A82-11468
TSUI, J.
Tangential sensitivity of EW receivers
A82-11020
TSUJIKAWA, G. S.
Closed loop environmental control systems for fighter aircraft
[ASME PAPER 81-ENAS-2] A82-10890
TSUN, T. C.
The principles and methods for shaping the wing root regions of a wing-body combination at transonic and lower supersonic speeds
N82-11016
TUOMELA, C.
Test Pilots' Aviation Safety Workshop, U.S. Naval Postgraduate School, Monterey, CA, February 25-28, 1981, Proceedings
A82-10500
TURK, R.
Experimental investigations of the separated flow around a rectangular wing
[DFVLR-FB-81-12] N82-10017
TURNER, C. T.
Air bag impact attenuation system for the AQM-34V remote piloted vehicle
[AIAA PAPER 81-1917] A82-10403

U

UNDERWOOD, R. L.
Aircraft wing trailing-edge noise
[NASA-CR-164952] N82-11039
URQUHART, R.
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1918] A82-10404

V

VANNOCKER, R. C.
Variable speed constant frequency /VSCF/ electrical system cuts cost of ownership
A82-11719
VEPA, R.
Numerical treatment of helicopter rotor stability problems
A82-12045
VINSON, J. R.
Emerging technologies in aerospace structures, design, structural dynamics and materials; Proceedings of the Aerospace Conference, San Francisco, CA, August 13-15, 1980
A82-12026
VLCEK, C.
Bridging the gap from aircraft to space computers
[AIAA 81-2142] A82-10101

W

WAGNER, E. C.
Low maintenance hydraulic accumulator
[AD-A103947] N82-10034
WALTERS, R.
Limiting payload deceleration during ground impact
[AIAA PAPER 81-1918] A82-10404
WARREN, R. S.
Omega station 10.2 kHz signal selection made easy
A82-12638
WASSERBERG, S.
Air-film cooling returns to ramjets
[ASME PAPER 81-ENAS-8] A82-10896
WEBB, D. B.
Development of a nylon-Kevlar recovery system for the CL-289 /AN/USD 502/ surveillance drone
[AIAA PAPER 81-1952] A82-10427
WEBB, J. H.
Some possibilities for composite light aircraft construction
A82-10307
WEBB, R. C.
60 KVA ADP permanent magnet VSCF starter generator system - Generator system performance characteristics
A82-11721
WEBER, T.
The effects of flexibility on the steady-state performance of small ribbon parachute models
[AIAA PAPER 81-1923] A82-10408
WEI-ZAO, G.
A new method of cooling turbine vanes
N82-11027

WEIDE, Z.
An experimental investigation of the rotating stall, surge and wake behind the rotor for a single stage axial compressor
N82-11008

WEISS, R.
A solution to the static geometry problem for JTIDS relative navigation
A82-12634

WELCH, R. M.
Determination of vertical profiles of aerosol size spectra from aircraft radiative flux measurements. II - The effect of particle nonsphericity
A82-12149

WELLS, N. A. J.
Wind tunnel tests on airfoils in tandem cascade
A82-10987

WEN-LAN, I.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

WHITE, H.
Composite main rotor tubular braided
A82-10547

WIDDOWS, H. E.
A modular asymmetric parachute for wind tunnel testing
[AIAA PAPER 81-1933] A82-10414

WIDNALL, S. E.
Aeroacoustic theory for noncompact wing-gust interaction
[FDRL-81-7] N82-11071

WIEBE, W.
Fractographic determination of fatigue crack growth rates in aircraft components
A82-12697

WILENT, C. R.
KC-135 Avionics Modernization Hot Bench
[AIAA 81-2105] A82-10081

WILK, K. E.
Applications of conventional and Doppler radars for aviation safety
A82-10215

WILLARD, W. E.
Low maintenance hydraulic accumulator
[AD-A103947] N82-10034

WILLIAMS, J. C.
Design of high integrity multivariable control systems
N82-10055

WILLIAMS, R. C.
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[NASA-TM-82728] N82-11042

WILLSHIRE, W. L., JR.
SEL and EPNL noise duration coefficients for the 747 and T-38 aircraft
[NASA-TM-83214] N82-11860

WILMOTH, R. G.
Computation of high Reynolds number internal/external flows
[NASA-TM-84049] N82-11046

WILSON, J.
Detection and display of wind shear and turbulence
A82-10222

WILSON, V. E.
Design analysis of high temperature transparent windshields for high performance aircraft
[ASME PAPER 81-ENAS-5] A82-10893

WONHAM, W. M.
A geometric approach to multivariable control system synthesis
N82-10056

WOODLEY, G. E.
Light aircraft structural design in non-metallics - Use of composite honeycomb for light aircraft
A82-10308

X

XIAO-KANG, X.
The arbitrary quasi-orthogonal surface method for computing three-dimensional flow in turbine machinery. 2. Calculation of the three-dimensional flow with the S sub 1-surface twisted
N82-11015

XIN-YUAN, W.
Initial experimental research into the responce of turbojet engine compressors to distortion of intake pressure
N82-11006
A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

XINHAI, Z.
An aerodynamic design method for transonic axial flow compressor stage
N82-10984

XUUNCHUN, T.
Structural analysis of fuselages with cutouts by finite element method
N82-10995

Y

YAVUZ, T.
Experimental determination of parachute apparent mass and its significance in predicting dynamic stability
[AIAA PAPER 81-1920] A82-10406

YBARRA, A. H.
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[NASA-TM-82728] N82-11042

YING, Z.
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025

YIP, L. P.
Effects of vortex flaps on the low-speed aerodynamic characteristics of an arrow wing
[NASA-TP-1914] N82-11013

YIULIU, C.
Matrix analysis of wings
N82-10998

YOSHIDA, T.
New molding method of three-dimensional hollow photoelastic model and centrifugal stress analysis of air cooled turbine blade model
[NAL-TR-427T] N82-11067

YOUNG, A. D.
Aircraft excrescence drag
[AGARD-AG-264] N82-10020

YU-MING, Z.
A new method of cooling turbine vanes
N82-11027

YUAN, X.
Matrix analysis of wings
N82-10998

YUWEN, Z.
Finite difference computation of the steady transonic potential flow around airplanes
N82-10981

Z

ZAMES, G.
Multivariables design: The optimization of approximate inverses
N82-10057
Feedback and minimax sensitivity
N82-10058

ZEBKER, H. A.
Synthetic aperture radar target simulator
[NASA-CASE-NPO-15024-1] N82-10206

ZEMPOLICH, B. A.
Memory requirements for future navigation systems
A82-12637

ZHAO-YAN, Q.
Theoretical investigations and experimental researches for higher subsonic two-dimensional compressor cascade
N82-11024

ZHIWEI, L.
An experimental investigation of the rotating stall, surge and wake behind the rotor for a single stage axial compressor
N82-11008

ZHU, P.
Nonlinear prediction of subsonic aerodynamic loads on wings and bodies at high angles of attack
A82-11359

ZHUAN-SHE, D.
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025

ZI-LONG, H.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006

A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

ZGLEZZI, B. A.
Propulsion study for Small Transport Aircraft Technology (STAT)
[NASA-CR-165499] N82-10037

ZONG-YUAN, W.
Initial experimental research into the response of turbojet engine compressors to distortion of intake pressure
N82-11006

A preliminary experimental investigation of the response of a turbojet engine to inlet pressure distortion
N82-11007

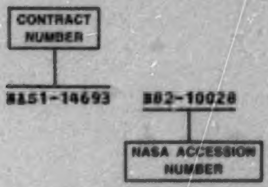
ZRNIC, D. S.
Instrumented aircraft verification of clear-air radar detection of low-level wind shear
A82-10221

ZUO-REN, J.
A theoretical analysis of the stream surface of revolution with supersonic inlet flow in a transonic axial compressor
N82-11025

CONTRACT NUMBER INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 145)* FEBRUARY 1982

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 2003
N82-11062
AF PROJ. 2301
N82-10033
AF PROJ. 2403
N82-11049
AF PROJ. 2480
N82-11228
AF PROJ. 3048
N82-10033
AF PROJ. 3145
N82-10034
N82-10326
N82-11072
AF-AFOSR-0223-80
N82-10033
DA PROJ. 1L2-62202-AH-85
N82-11064
N82-11065
DA PROJ. 4A7-62719-AT-40
N82-11496
DAAG29-C-027 A82-11300
DAAK80-79-C-0270
N82-11064
N82-11065
DE-AC04-76DP-00789
A82-10414
DNA001-80-C-0177
N82-11354
DTFA01-80-Y-10597
N82-10812
EPRI PROJ. 1079-3
N82-10254
F29601-76-C-0051
N82-11313
F33600-80-C-0473
A82-10081
F33615-68-C-3421
A82-10893
F33615-74-C-2037
A82-11721
F33615-76-C-1243
N82-11062
F33615-76-C-2088
N82-10034
F33615-77-C-2034
N82-11072
F33615-78-C-3200
A82-11721
F33615-78-C-3607
N82-11048
F33615-80-C-2004
N82-10326
F49620-79-C-0169
A82-12041
NAG3-71 N82-10021
N82-11052
NAG3-74 A82-12120
NASW-3542 N82-11636
NAS1-14611 N82-10059
NAS1-14693 N82-10028
NAS1-15593 N82-11070
NAS1-15730 A82-10455
N82-11859
NAS1-15980 A82-10934
NAS2-9410 N82-10043
NAS3-20643 A82-11999
NAS3-21727 N82-10040
NAS3-21977 N82-11224
NAS3-21995 N82-10037
N82-10038
NAS3-22045 N82-11230
NAS3-22062 A82-10457
NAS3-22134 N82-10039
NAS3-22149 N82-11068
NAS4-2518 N82-11078
NAS6-3072 A82-10411
NAS7-100 A82-11177
N82-10286
N82-11514
NAS8-31377 A82-10220
A82-10221
NAS8-33458 A82-10220
A82-10221
NGR-14-001-008
A82-10214
NOAA-04-4-158-1
A82-10214
NSF ATM-74-03406-A02
A82-10220
A82-10221
NSF ATM-76-24236
A82-10292
NSF ATM-77-22384
A82-12149
NSF ATM-78-01074
A82-10214
NSF ATM-78-05743
A82-12149
NSF ATM-78-12401
A82-10220
A82-10221
NSF ECS-80-12-565
N82-10058
NSG-1296 A82-12028
NSG-1377 N82-11039
NSG-1480 N82-10032
NSG-2142 N82-11071
N00014-75-C-01444
N82-11078
N00024-81-C-5301
N82-10027
N62269-78-C-0069
N82-11063
N62269-79-C-0295
N82-11055
N62269-80-C-0146
A82-10646
W-7405-ENG-36
N82-11046
N82-11066
500-42-62 N82-11043
505-31-33-05 N82-11033
505-31-41 N82-11054
505-32-03-01 N82-11860
505-32-42 N82-10039
505-34-13-02 N82-11339
505-34-33-06 N82-10041
N82-10042
505-42-71 N82-10029
505-43-13-01 N82-11013
505-44-12 N82-10021
530-01-13-02 N82-11050
532-02-11 N82-10031
534-01-13-14 N82-11391

1. Report No. NASA SP-7037(145)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle AERONAUTICAL ENGINEERING A Continuing Bibliography (Supplement 145)		5. Report Date February 1982
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		11. Contract or Grant No.
		13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

This Bibliography lists 326 reports, articles, and other documents introduced into the NASA scientific and technical information system in January 1982.

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies		18. Distribution Statement Unclassified - Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 104	22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NASA SP-7037(146)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 146)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in February 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141 093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 442 reports, journal articles, and other documents originally announced in February 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	– 1/	– 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

N01	30.00[1]	45.00

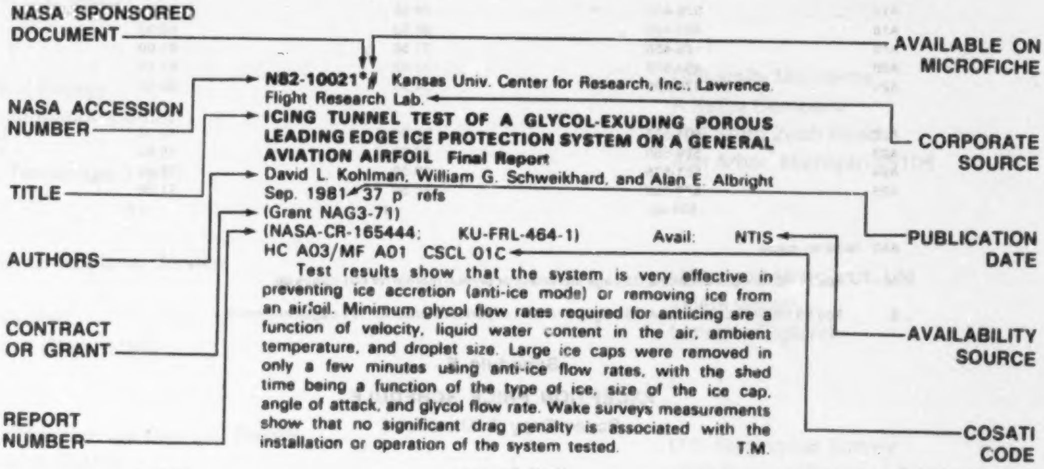
TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) **43**
STAR ENTRIES (N82-10000) **85**

Subject Index **A-1**
Personal Author Index **B-1**
Contract Number Index **C-1**

TYPICAL CITATION AND ABSTRACT FROM *STAR*

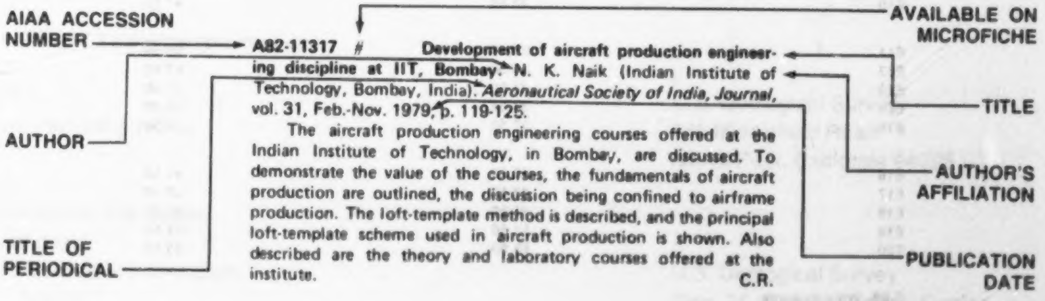


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHORS
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AUTHOR
TITLE OF PERIODICAL
AVAILABLE ON MICROFICHE
TITLE
AUTHOR'S AFFILIATION
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 146)

MARCH 1982

IAA ENTRIES

A82-12987 **Creep and aero gas turbine design.** R. E. Jenkins (Rolls-Royce, Ltd., Aero Div., Bristol, England). In: International Conference on Engineering Aspects of Creep, Sheffield, England, September 15-19, 1980, Proceedings. Volume 1. London, Mechanical Engineering Publications, Ltd., 1980, p. 251-258.

Considerations given to creep in the design of aero gas turbines are reviewed. The basic requirements dictating the creep design of aero gas turbines are the attainment of the highest possible cycle temperature, consistent with the turbine cooling technology and the turbine life, and the maintenance of critical dimensions, such as clearance between rotating and static parts, throughout the service life. The importance of temperature assessment and definition and detailed analysis of typical flights is emphasized. V.L.

A82-13016 **ATARK laser tracking system.** R. Grimes and D. Baxter (Contraves Goerz Corp., Pittsburgh, PA). In: Electro-optics/Laser 80 Conference and Exposition, Boston, MA, November 19-21, 1980, Proceedings. Chicago, Industrial and Scientific Conference Management, Inc., 1980, p. 255-267.

The Automatic Tracking and Ranging Kit (ATARK) is a modular pulsed laser transceiver and electronics system suitable for a wide range of instrumentation requirements found in current programs at test ranges. The primary criterion has been to provide a system with the highest single data point accuracy. Key features of the tracker are modular construction, with processor/software control, operation at 1.06 micron, dual lamp cavity, variable pulse rate, coaxial TV system for visual record/viewing, and linear tracking error over the field of view. Using retroreflectors, the ATARK system is operational to ranges in excess of 100,000 feet and provides range data of one foot with measured tracking error of 100 microradians accuracy. P.T.H.

A82-13020 **Options for GTE precision automated tracking system.** D. Stark (GTE Sylvania, Inc., Mountain View, CA). In: Electro-optics/Laser 80 Conference and Exposition, Boston, MA, November 19-21, 1980, Proceedings. Chicago, Industrial and Scientific Conference Management, Inc., 1980, p. 302-306.

The overall design and performance of the basic PATS (Precision Automated Tracking System) and recently incorporated new features are discussed. The target tracking subsystem of PATS is a 100 pulses-per-second, 15 ns pulse-width laser transmitter and optical receiver mounted on an elevation-over-azimuth tracking mount. A quadrant photodetector is used in conjunction with an amplitude monopulse receiver to develop boresight error data. These data drive the servo system which keeps the laser pointed at the target. The absolute accuracy in azimuth and elevation is better than 0.1 milliradians, the maximum dynamics is 2.0 rad/sec, with an acceleration of 500 milliradians/sq sec. The new features include dual mode capability and automatic camera focus. V.L.

A82-13077 * **Darboux points in minimum-fuel aircraft landing problems.** E. Kreindler and F. Neuman (NASA, Ames Research Center, Moffett Field, CA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981, 5 p. (WA-1A). 13 refs.

An algorithm for suboptimal flight paths is used to show the existence of Darboux points on extremals of a fourth-order minimum-fuel horizontal aircraft landing problem; the states are two position coordinates, velocity and heading. It is shown that there is no simple relationship between Darboux points and conjugate points for a special second-order case of capturing a line at constant velocity. B.J.

A82-13078 **Fuel efficient flight profiles in an ATC flow management environment.** R. W. Schwab (Boeing Commercial Airplane Co., Seattle, WA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981, 6 p. (WA-1B).

The Flow Management research program was established to define the airborne navigation/guidance capabilities needed for efficient operation in the ATC Flow Management system under development; the Flow Management research is one element of the NASA Terminal Configured Vehicle program. This paper examines the Flow Management algorithms, and reviews in-plane geometry and ATC constraints, wind and temperature modeling, descent initialization, runway profile descent calculation, aeroperformance envelope determination, high profile descent calculation, and holding and path stretching. B.J.

A82-13079 * **A decoupled control system for improved flight performance in wind shear.** G. K. Miller, Jr. (NASA, Langley Research Center, Hampton, VA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981. 9 p. (WA-1D). 9 refs.

A fixed-base simulation study has been made to compare the approach and landing performance of a decoupled longitudinal control system and the velocity-vector control-wheel steering (VCWS) system that currently exists on the NASA Terminal Configured Vehicle (TCV). The decoupled control system employed constant prefilter and feedback gains to provide steady-state decoupling of flight-path angle, pitch angle, and forward velocity using symmetric spoilers, throttle, and elevator as active control elements. In severe wind shear, of the Kennedy-type, the decoupled control system improved both approach performance and touchdown performance even when the spoiler deflection was limited to 16 deg. On a 10-point rating scale, three research pilots rated the approach and landing task with decoupled controls as much as 3 to 4 increments better than the use of the VCWS system in severe winds. (Author)

A82-13088 **A dual input actuator for fluidic backup flight control.** M. F. Cycon, Jr. (Garrett Corp., Pneumatic Systems Div., Phoenix, AZ). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981. 8 p. (WA-5B). 5 refs.

This paper describes the application of pneumatic fluidics to obtain closed-loop position control of a high-pressure, direct-drive, electrohydraulic actuator. The fluidic control, which requires no electrical power, is a backup to the primary electronic control. Tests conducted using a prototype fluidic circuit demonstrate the feasibility of a dual input (electronic-fluidic) actuator using technologically dissimilar redundant control methods. (Author)

A82-13093 **Digital redesign of existing multiloop continuous control systems.** K. S. Rattan (Wright State University, Dayton, OH). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981. 8 p. (WP-1D). 9 refs. Contract No. F49620-79-C-0038.

A computer-aided method for converting existing multiloop continuous-data control systems into digital control systems is presented. Digital controllers are synthesized by matching the frequency responses of the digital control system to that of the continuous control system with a minimum weighted mean square error. Formulas for computing the parameters of the digital controllers are obtained as a result. An example of digitalizing existing continuous flight controller for the longitudinal YF-16 aircraft is considered and the results obtained are compared with those obtained by the Tustin transform. (Author)

A82-13094 **Digital control for flexible aircraft using reduced order models.** G. L. Slater and R. Kandadai (Cincinnati, University, Cincinnati, OH). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981, 6 p. (WP-1E). 9 refs.

A control synthesis is presented for a very flexible aircraft, and the effects on performance from different types of suboptimal approximations are compared. By examining the response at varying sample rates, it is shown that there is a tradeoff between model accuracy and computational feasibility. When the computational requirements of higher-order models are considered, the slow sample rates imposed by these requirements make the reduced order model a superior controller. B.J.

A82-13106 **Comparison between the exact and an approximate feedback solution for medium range interception problems.** J. Shinar (Technion - Israel Institute of Technology, Haifa, Israel), K. H. Well, E. Berger (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für dynamik der Flugsysteme, Oberpfaffenhofen, West Germany), and M. Negrin. In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981, 6 p. (TA-1A). 14 refs.

The forced singular perturbation technique (FSPT) is compared with a multiple shooting algorithm known for its high precision. Three-dimensional medium range air-to-air interception is formulated as a minimum-time control problem, and the formal optimal solution is outlined. The FSPT model of the original problem is introduced, and the zero-order composite feedback solution is presented. Results of the comparison for a characteristic example are discussed, and the comparison of the zero-order FSPT feedback approximation to the precise MSA solution was found to be very encouraging. B.J.

A82-13107 * **On-line optimization of aircraft altitude and flight path angle dynamics.** A. J. Calise (Drexel University, Philadelphia, PA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 1. New York, American Institute of Chemical Engineers, 1981. 6 p. (TA-1B). 5 refs. Grant No. NsG-1496.

The optimization of aircraft altitude and flight path angle dynamics is addressed in a form suitable for on-line computation and control. The approach here is a direct extension of the work reported by Calise (1979), where singular perturbation methods were used to optimize position, energy and heading dynamics; it thus represents an optimal control solution that models all of the primary trajectory related dynamics. It is pointed out that the resulting algorithm can be regarded as a nonlinear feedback control law. The minimum time intercept of a fixed terminal point is used in setting the framework in which the analytical results are developed. The main theoretical result is that the dynamics, while not completely separable, can be approximated by singular perturbation methods when the control model includes relative position dynamics. C.R.

A82-13115 * **Air-to-air combat analysis - Review of differential-gaming approaches.** M. D. Ardema (NASA, Ames Research Center, Moffett Field, CA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 2. New York, American Institute of Chemical Engineers, 1981. 9 p. (TP-1B). 15 refs.

The problem of evaluating the combat performance of fighter/attack aircraft is discussed, and the mathematical nature of the problem is examined. The following approaches to air combat analysis are reviewed: (1) differential-turning differential game and (2) coplanar differential game. Selected numerical examples of these approaches are presented. The relative advantages and disadvantages of each are analyzed, and it is concluded that air combat analysis is an extremely difficult mathematical problem and that no one method of approach is best for all purposes. The paper concludes with a discussion of how the two approaches might be used in a complementary manner. (Author)

A82-13119 * **On matching the systems identification technique to the particular application.** W. T. Suit and M. H. Mayo (NASA, Langley Research Center, Hampton, VA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 2. New York, American Institute of Chemical Engineers, 1981, 8 p. (TP-4C). 21 refs.

Several maximum likelihood and multiple regression parameter estimation programs are currently being used at the Langley Research Center of the NASA to analyze aircraft flight test data. Based on this wealth of experience, the pertinent features of these programs are investigated and some of the difficulties involved in their use are discussed. By comparing computational time, data requirements and accuracy needed, a strategy for determining which program can be used to the best advantage of the flight test engineer is discussed. (Author)

A82-13120 **Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes.** G. D. Park and M. H. Abla (Gates Learjet Corp., Wichita, KS). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 2. New York, American Institute of Chemical Engineers, 1981. 6 p. (TP-4D). 8 refs.

Gates Learjet Corporation has utilized parameter identification techniques on flight test data in various ways to substantiate the airloads analyses used in certifying its airplanes. These analyses have concentrated primarily on the empennage and include: horizontal stabilizer rolling moment; vertical tail side load; horizontal tail actuator load; elevator, rudder and aileron pilot forces; and elevator hinge moment. Using the appropriate empennage loads results in conjunction with the results obtained from the total airplane responses, the component (wing-body, vertical tail, horizontal) airplane parameters were determined. The Taylor-Iliff computer program from NASA has been shown to be a very effective and efficient technique to substantiate airload analyses. (Author)

A82-13122 **Wing/store flutter - An active adaptive control application.** C. A. Harvey (Honeywell Systems and Research Center, Minneapolis, MN). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 2. New York, American Institute of Chemical Engineers, 1981. 3 p. (FA-1A). 9 refs. Research supported by Honeywell, Inc., Contracts No. F33615-77-C-3096; No. F33615-80-C-3217.

The paper briefly summarizes the results of a recent feasibility study and progress on a wind tunnel demonstration of digital adaptive control of wing/store flutter with regard to modern fighter aircraft. The design features of such a controller are examined, including sensor selection for feedback, detection, and discrimination, and two adaptive approaches, maximum likelihood estimation and self-tuning regulation. B.J.

A82-13125 * **The design of exact nonlinear model followers.** G. Meyer (NASA, Ames Research Center, Moffett Field, CA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 2. New York, American Institute of Chemical Engineers, 1981. 7 p. (FA-3A). 16 refs.

A practical approach to the design of control systems for strongly nonlinear, multivariable, time-dependent plants is described. The structure of the control system is that of an exact model follower. The model dynamics are decoupled, linear, constant, and of the order of the plant. The plant state and controls are transformed so that the plant, when viewed through these transformations, looks like the simple model. Regulation of disturbances is accomplished by means of the transformed state and controls. Conditions for transformability into linear models, the appropriate models, and the construction of the transformations are discussed. The approach is illustrated on a trajectory autopilot for a helicopter. (Author)

A82-13128 **An approach to robust nonlinear control design.** M. K. Sain (Notre Dame, University, Notre Dame, IN) and J. L. Peczkowski (Bendix Corp., Energy Controls Div., South Bend, IN). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 2. New York, American Institute of Chemical Engineers, 1981. 6 p. (FA-3D). 18 refs.

The paper examines a control philosophy that linearizes the simulation at a finite number of points over the envelope of operation, that applies linear design technique locally about each such point, and that strings all the local designs together into a global design by scheduling the resulting compensations over the envelope as a function of key physical variables, and within a broad nonlinear model following strategy. Attention is given to the relevant local model following ideas, an extension of the local comparison sensitivity concept to the model following situation, and the global model following concept. A complete illustration based on a realistic nonlinear turbojet engine simulation is presented. B.J.

A82-13142 **Fault detection for two physically separated, communicating inertial measurement units.** P. Motyka (Charles Stark Draper Laboratory, Inc., Cambridge, MA). In: Joint Automatic Control Conference, Charlottesville, VA, June 17-19, 1981, Proceedings. Volume 2. New York, American Institute of Chemical Engineers, 1981. 10 p. (FP-2B) 6 refs. Contract No. F33615-78-C-1563.

The paper develops an analytic technique for the generation of failure detection and isolation (FDI) thresholds for a tactical aircraft system with two separated IMUs. The basic problem is to select thresholds which result in the detection and isolation of failures ranging from hard (those which affect flight-control performance) through midvalue (which affect pilot display performance) and soft (which affect navigation and weapon-delivery performance). FDI is accomplished by means of the generalized likelihood test. Results are presented which show the operation of the FDI system over a realistic flight profile, which incorporates maneuvers typical of a fighter aircraft mission. B.J.

A82-13150 # **Aeronautics in China - An AIAA report.** J. Grey. New York, American Institute of Aeronautics and Astronautics (AIAA Aerospace Assessment Series. Volume 4), 1981. 201 p. Members, $20.; nonmembers, $24.

Following the normalization of relations between China and the U.S., it was agreed that the Chinese Society of Aeronautics and Astronautics and the American Institute of Aeronautics and Astronautics would undertake an exchange of scientists and engineers to initiate the process of technical communication between the two nations in the field of aeronautics. This book reports the observations of the AIAA delegation which visited various aeronautical facilities in China. The history of Chinese aeronautics is considered along with aspects of aircraft production, engine production, and aerodynamics research, development, and testing. Attention is given to materials and structures, flight testing, guidance and control, computers, university educational programs, special topics, and aspects of travelling in China. G.R.

A82-13237 **The Agusta A129.** B. Lovera (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate, Italy). *Vertiflite,* vol. 26, Nov.-Dec. 1980, p. 6-9.

The design characteristics, performance capabilities and electronics systems of the A-129 light combat helicopter currently under development for Italian Army use are discussed. Attention is given to the aircraft's Integrated Multiplex System (IMS), whose functions fall into four categories: (1) the optimized interconnection of radios and navigation equipment; (2) the management of electrical power distribution, powerplant monitoring and control, and caution and warning; (3) the integration of motion sensors, digital stability augmentation systems, and flight director function; and (4) the operation of cockpit control and display elements, including flight management and radio control. The twin-turboshaft helicopter is primarily armed for the antitank role, with the TOW missile system mounted on stub wing pylons. Attention is also given to the airframe, mission equipment, and configuration flexibility of the aircraft. O.C.

A82-13238 **Public service helicopters - Is the grass greener on the other side of the fence.** T. R. Stuelpnagel. *Vertiflite,* vol. 26, Nov.-Dec. 1980, p. 10-13.

The impact on helicopter design of public service helicopter users, concerned with such tasks as law enforcement and public safety, search and rescue, wildlife and land management, fire fighting, medical services and disaster relief, is assessed in view of the present and growth markets they represent. New public service helicopter sales are estimated to be 5-10% of total commercial sales. It is recommended that public service helicopter users review their experience with each helicopter type employed and make their evaluations and requirements known to both the government and helicopter manufacturers on an annual basis. An awareness of helicopter equipment and configuration development would also be helpful, in order to propose the incorporation of features relevant to public service missions during the design phase of new helicopters, whose development cost is now on the order of $10,000 per pound of gross weight. O.C.

A82-13239 **The TADS/PNVS 'eyes' for the AH-64 attack helicopter.** B. J. Baskett, C. M. Tsoubanos, and V. M. Weiner (U.S. Army, Aviation Research and Development Command, St. Louis, MO). *Vertiflite,* vol. 26, Nov.-Dec. 1980, p. 14-17.

The Target Acquisition Designation Sight (TADS)/Pilot Night Vision Sensor (PNVS) electrooptical subsystem of the AH-64 advanced attack helicopter is described, with attention to its Integrated Helmet and Display Sight System (IHADSS). The TADS provides the helicopter copilot/gunner with day, night, and adverse weather target search, detection and recognition capabilities by means of (1) direct view optics (DVO), (2) day television (DTV), and (3) forward looking infrared (FLIR) sighting subsystems, each subsystem being used singly or in combination depending on tactical, weather, or visibility conditions. The TADS also provides a laser designator to illuminate the target and guide HELLFIRE missiles, and a laser receiver which provides target range measurements for fire control computations. Samples of typical PNVS symbology, including heading, power management, airspeed, and radar altitude, are also given. O.C.

A82-13240 **Fatigue methodology - A technical management system for helicopter safety and durability.** L. L. Douglas. *Vertiflite,* vol. 27, Mar.-Apr. 1981, p. 14-17.

An account is given of the development since the early 19th century, of the technical disciplines comprising the field of fatigue-related structural safety as it applies to the design and maintenance of helicopters. Attention is given such milestones in the development of analytical methods for rotating machinery and vibration and flutter problems as N.O. Myklestad's (1944) 'A New Method of Calculating Natural Modes of Uncoupled Bending Vibration of Wings and other Types of Beams', as well as the related topics of the fatigue strength of materials and its improvement by surface treatment, stress concentration, cumulative damage and fatigue crack propagation. A review is also made of more recent developments in the design of fail-safe structures, the production of fracture-tough steel, aluminum and titanium alloys, and the application of composite materials to helicopter rotor blades. O.C.

A82-13241 **Heavy lift helicopters - A national technology opportunity.** G. H. Fries (Boeing Vertol Co., Philadelphia, PA). *Vertiflite,* vol. 27, May-June 1981, p. 14-17.

The mission requirements and possible design features of future heavy lift helicopters (HLH) in the 120,000 to 150,000-lb gross weight category are described. Attention is given to the military need for such helicopters in view of the U.S. Army's cancellation of the XCH-62 HLH project and the Soviet Union's reported development of the NATO code-named 'Halo' HLH, which has a lift capacity greater than that of any U.S. cargo helicopter. Consideration is given to the relative advantages of the military, 'crane' configuration and those of a full-fuselage transport design with lower aerodynamic drag and greater productivity in longer-range missions. The transport fuselage configuration is also suited for short-haul commercial passenger service, with 140-150 seats initially and 225 seats in subsequent growth versions. Development-program cooperation between the Department of Defense and NASA is recommended. O.C.

A82-13242 **The FAA's proposed helicopter certification rules.** R. G. Schlegel (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *Vertiflite*, vol. 27, May-June 1981, p. 18-21.

A response is presented by the helicopter manufacturing industry to the FAA's Notice of Proposed Rule Making NPRM 79-13, 'Noise Standards for Helicopters in the Normal, Transport, and Restricted Categories'. Among the grounds cited for rejection are: (1) the proposed regulation sets limits that are too low, and incompatible with, the capabilities of existing technology for predicting and controlling helicopter noise; (2) regulation is premature at this time, because uncertainty as to the actual noise of the helicopters affected prevents a complete analysis of the regulation's economic impact; and (3) a loss of $8 billion in sales of current helicopter models could result from implementation of NPRM 79-13, with an additional $4.8 billion sales loss due to delays in the introduction of new helicopter designs. A joint industry/government program to establish the noise levels of all helicopters affected by the regulation is recommended. O.C.

A82-13243 **Helicopter icing.** A. A. Peterson and L. U. Dadone (Boeing Vertol Co., Philadelphia, PA). *Vertiflite*, vol. 27, May-June 1981, p. 22-25.

Due to the increased Instrument Flight Rules (IFR) capabilities of modern helicopters and the associated need for all-weather clearance, the U.S. Department and Defense and FAA are emphasizing helicopter icing investigations. Of all existing helicopters, only the Bell 412 is undergoing icing certification tests, and the SA 330 PUMA alone has obtained unlimited clearance for flight in forecast icing conditions. Consideration is given to the simulation of natural icing conditions by means of (1) icing wind tunnels; (2) environmental cold chambers; (3) helicopter tie-down sites that employ natural icing; (4) hover spray rigs; and (5) in-flight spray systems. Attention is also given to rotor ice protection systems, including those that employ high-resistance electrical heating elements, inflatable boots, microwave energy, controlled vibration, and such chemical freezing point depressants as glycol. O.C.

A82-13244 **Light Airborne Multi-Purpose System.** J. M. Purtell (U.S. Navy, Washington, DC). *Vertiflite*, vol. 27, Sept.-Oct. 1981, p. 10-13.

The Light Airborne Multi-Purpose System (LAMPS) MK III is the U.S. Navy's first fully integrated ship/air weapons system, combining frigates, destroyers and cruisers as platforms with Seahawk missile-carrying helicopters for the basic ASW mission. The helicopters also provide targeting data for Harpoon surface-to-surface missiles. The LAMPS ship/air system, which will involve over 100 ships and 204 aircraft over the next 25 years, will overcome four traditional weaknesses: (1) radar horizon limits, (2) sonar discrimination limits at extended ranges, (3) the range limitations of ASW weapons, and (4) limited missile-targeting ranges. Other elements comprised by the system are secure and open HF and UHF voice channels system management and control signal processors for the analysis of tactical data, and helicopter-delivered MK-46 ASW torpedoes. O.C.

A82-13245 **Helicopter IFR - Past, present and future and future.** V. E. Albert (Petroleum Helicopters, Inc., New Orleans, LA). *Vertiflite*, vol. 27, Sept.-Oct. 1981, p. 18-20.

An account is given of the developmental history and future prospects of helicopter Instrument Flight Rules (IFR) regulatory policies, flight instruments and procedures. The development of helicopter IFR has been speeded by British North Sea offshore oil drilling operations, whose helicopter service regularly encounters severe flying conditions. Among the problems encountered in the establishment of helicopter IFR in the U.S. have been the development of route structures to support such flights in the Northeast Corridor and Gulf Coast regions, the complexity of telephone and radio relay communications with air traffic controllers, and the establishment of weather stations. At present, in addition to the installation of offshore VHF radio stations in the Gulf of Mexico, a weather observation network and a route structure have been provided. The Loran Flight Following Program being tested at Houston station will provide remote areas with traffic separation services currently available only in urban areas, while costing only as much as two VHF remote radio locations. O.C.

A82-13246 **Wire strike protection.** C. Silvious (Tennessee Valley Authority, Knoxville, TN). *Vertiflite*, vol. 27, Nov.-Dec. 1981, p. 16-19.

Consideration is given to the design requirements of, and experience to date with, helicopter wire-strike protection devices made necessary by low-altitude operations in areas with extensive electrical transmission and communication lines. The tensile strengths of electrical transmission wires varies between 5000 and 233,000 lb, averaging 27,000 lb, and may become entangled in rotating parts even if successfully broken or cut by a helicopter. In addition to the education of pilots to better recognize wire strike hazards, attention is given to the use of wire-marking devices, which are useful in daytime operations, and the design of tail-rotor, main rotor and fuselage devices for cutting through or shielding against wires. It is recommended that all three measures be taken in future strike-reduction efforts by utilities and other helicopter operators. O.C.

A82-13314 **Costs of noise nuisance from aircraft.** P. W. Abelson (McQuarie University, North Ryde, New South Wales, Australia). *International Journal of Environmental Studies*, vol. 17, no. 3-4, 1981, p. 225-232. 10 refs.

The paper summarizes the results of research into aircraft noise costs around Sydney airport. The NEF (noise exposure forecast) model of noise annoyance is shown to provide a fair index of average, but not individual, attitudes toward noise. Although property prices were found to fall only by an average of 0.4% NEF, the fall per NEF is greater for higher values of NEF and for higher income households. However, household turnover rates due to noise, and therefore the costs of moving house, were found to be higher than those predicted by the Roskill Commission for the expected third London airport. Also, householders in noisy areas experience substantial losses in householder surplus, due in part to imperfect expectations of the noise effects. (Author)

A82-13451 **Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers.** Conference sponsored by the American Institute of Aeronautics and Astronautics and Institute of Electrical and Electronics Engineers. New York, American Institute of Aeronautics and Astronautics, 1981. 645 p. Members, $65.; nonmembers, $75.

Digital avionics are discussed in terms of a system integration concept, fault isolation methodology, system effectiveness, advanced designs, sneak software analysis, and the pilot's role in an automated flight deck. Specific applications for the L-1011 flight control system, for hardware/software integration on the Shuttle, for one man operation of the F/A-18 Hornet, with voice command control, and for advanced weapons systems were considered. Papers were also presented on individual components of digital avionics systems such as the MIL-STD-1750 chip set, standardization and semiconductors, fiber optics, connectors for data buses, large screen CRT touch panels, an electronic terrain map, and flat panels for future military aircraft. D.H.K.

A82-13452 # **Integrated avionics - Concepts and concerns.** D. G. Botha (USAF, Avionics Laboratory, Wright-Patterson AFB, OH). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 1-9. 14 refs. (AIAA 81-2211)

It is noted that the capability of avionics technology continues to increase by an order of magnitude every few years, but overall avionic system design architecture lags in the ability to fully exploit new technology and knowledge, particularly in the partitioning of the avionics-as-a-whole into subsystems for implementation by engineers in many disciplines, and in the integration of subsystems into the whole. In this paper, it is suggested that a concerted effort is needed by the avionics community to reexamine system partitioning, considering the relationship of subsystems in the light of new operational concepts, new knowledge in information and control theory, and different concepts of integration such as multisensor information fusion and integrated control and display interface with the crew. B.J.

A82-13453 # **F/A-18A weapon system - 1976 state of the art.** R. C. Drummond (McDonnell Aircraft Co., St. Louis, MO). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers.
New York, American Institute of Aeronautics and Astronautics, 1981, p. 10-20. (AIAA 81-2215)

The F/A-18A system will perform both air/air and air/surface missions and has been designed for low operating and support costs through excellent reliability and maintainability. Advanced technologies include a one-man operable cockpit, using multifunction programmable CRTs and an automated hands-on-throttle-and-stick concept. Also included are a highly flexible radar using advanced digital processing and memory techniques, a programmable stores management set with multiplexed store stations, a quad-redundant electronic flight control system, and an expanded built-in-test capability. The design and performance features of the F/A-18A system are examined, and the future outlook is discussed. B.J.

A82-13455 # **Digital avionics - What a pilot expects to see.** R. A. Berube (Pan American World Airways, Inc., Miami, FL). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers.
New York, American Institute of Aeronautics and Astronautics, 1981, p. 28-38. 57 refs. (AIAA 81-2217)

The application of digital computers to aircraft is discussed from the pilot's point of view. Consideration is given to future digital design, human factors, cockpit instrumentation and predictive information, replication of the visual scene, display types, and performance/flight management systems. Particular attention is given to the importance of cockpit displayed traffic information. B.J.

A82-13456 # **Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond.** J. H. Shannon and J. D. McDonnell (Douglas Aircraft Co., Long Beach, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers.
New York, American Institute of Aeronautics and Astronautics, 1981, p. 39-46. (AIAA 81-2218)

The airlines' decade of experience with digital airborne equipment is reviewed, and some of the benefits arising from active controls, advanced cockpits, and advanced ATC systems that will be incorporated in the 1980's are described. This experience has given the airlines and manufacturers the confidence to further implement avionics systems with digital technology. The DC-9 Super 80 is now in revenue service with a digital flight guidance system, and other aircraft will soon enter service with the new ARINC 700 line of equipment. Additional benefits will be gained in the second half of the 1980's owing to both the cost-effective character of the equipment itself and the increase in efficiency of airframes and propulsion systems that can be obtained through further application of the digital equipment. B.J.

A82-13457 # **The role of avionics in the all electric airplane.** M. J. Cronin (Lockheed-California Co., Burbank, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 47-55. 22 refs. (AIAA 81-2219)

The paper examines the role of avionics in the development of the all-electric airplane (AEP) as a viable and energy-efficient transport. It is noted that avionics will play a key role in the fuel and thrust management of the advanced-technology engines of the AEP via technology such as FADEC (full authority digital engine control). Attention is also given to the important role of avionics in the flight control of future AEPs, operating with a relaxed static stability and advanced supercritical wings. The samarium-cobalt motor/generator development and the proliferating use of power electronics for engine starting/motor control are also discussed. B.J.

A82-13458 # **Fault isolation methodology for the L-1011 digital avionic flight control system.** W. B. Noble (Rockwell International Corp., Collins Air Transport Div., Van Nuys, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers.
New York, American Institute of Aeronautics and Astronautics, 1981, p. 56-61. (AIAA 81-2223)

The operation of and rationale for the fault isolation/data display system for the L-1011 digital avionic flight control system are described. These systems are currently in service and are, despite the usual and expected introductory problems, providing substantial maintenance benefit. The English-language format chosen for the display as well as the storing of the squawk (or event) which accompanied each fault, have been instrumental in reducing maintenance confusion and false LRU removals. Present status mode is being used to solve a number of intricate maintenance problems in minutes, which previously required hours of troubleshooting time. B.J.

A82-13463 # **Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators.** N. J. Kessler and H. Passmore (McDonnell Aircraft Co., St. Louis, MO). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 85-92. (AIAA 81-2230)

The McDonnell Aircraft Company Manned Air Combat Simulator (MACS) is described. The simulator facility is discussed, and a definition of the test models is given. In addition, attention is given to the lessons learned and system modifications which evolved as a result of this type of testing. It is noted that the value of MACS has recently been demonstrated as a tool for the evaluation in a simulated combat environment of the operational utility of such systems as the Advanced Medium Range Air-to-Air Missile (AMRAAM). B.J.

A82-13465 # **Computer-in-control selection logic for a triplex digital flight control system.** F. J. Farrell (Boeing Military Airplane Co., Seattle, WA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 97-101. (AIAA 81-2236)

The computer-in-control logic (CICL) unit is an independent monitor that ensures proper selection of one of two flight control computers to the simplex level with minimum switching. The CICL maximizes fault tolerance without being a source of a single-point failure; its implementation is simple and reliable, and its algorithm is easy to change. This paper presents a functional description of the CICL and examines potential architectural considerations. B.J.

A82-13466 * # **Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft.** G. A. Smith and G. Meyer (NASA, Ames Research Center, Moffett Field, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers.
New York, American Institute of Aeronautics and Astronautics, 1981, p. 102-115. 8 refs. (AIAA 81-2238)

A full envelope automatic flight control system based on nonlinear inverse systems concepts has been applied to a vertical attitude takeoff and landing (VATOL) fighter aircraft. A new method for using an airborne digital aircraft model to perform the inversion of a nonlinear aircraft model is presented together with the results of a simulation study of the nonlinear inverse system concept for the vertical-attitude hover mode. The system response to maneuver commands in the vertical attitude was found to be excellent; and recovery from large initial offsets and large disturbances was found to be very satisfactory. B.J.

A82-13467 # **Aircraft separation assurance avionics.** R. Sobocinski (Bell Aerospace Textron, Belmont, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 116-118. (AIAA 81-2239)

Avionics sensors are under development to detect other transponder equipped aircraft. These sensors are subsets of systems postulated for the next generation aircraft. An Active BCAS system sponsored by the FAA interrogates, tracks and provides vertical collision avoidance commands. A Cockpit Display of Traffic Information (CDTI) sensor under NASA sponsorship passively detects transponder replies to ground based SSR sites. The CDTI provides a horizontal situation traffic display. This unit is being evaluated for pilot human factors interface. (Author)

A82-13468 # **Aircraft alerting systems standardization study.** G. P. Boucek, Jr., D. C. Hanson (Boeing Commercial Airplane Co., Seattle, WA), D. A. Po-Chedley (Douglas Aircraft Co., Long Beach, CA), B. L. Berson, M. F. Leffler (Lockheed-California Co., Burbank, CA), and J. F. Hendrickson (FAA, Washington, DC). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 119-128. 10 refs. FAA-supported research. (AIAA 81-2242)

The objectives of the Aircraft Alerting Systems Standardization Study were to augment the existing alerting system data base, to develop candidate alerting system concepts, to implement and validate these concepts, and to develop a set of alerting system guidelines and recommendations to standardize alerts on future electronic flight decks. This paper examines some of the more salient of these system guidelines and recommendations, which include: (1) that a functionally standardized alerting system be used on all future transport aircraft regardless of manufacturer, aircraft type, or airline operator; (2) that pilots audio/visual environment be improved by minimizing exposure to unnecessary or confusing alerts; (3) that three distinctively coded alert categories be provided to reduce uncertainty; and (4) that use be made of both visual and auditory channels to increase system effectiveness. B.J.

A82-13470 # **Design and analysis of a digitally controlled integrated flight/fire control system.** J. H. Blakelock (Applications Research Corp., Dayton, OH). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 135-143. 7 refs. Contract No. F33615-78-C-3145. (AIAA 81-2245)

An integrated flight/fire control system including a movable gun and gimbaled line-of-sight tracker was designed using root locus techniques for the inner analog control loops and discrete analysis of the sampled-data outer control loops. The control systems designed include a pitch orientational control system with an outer attitude control loop, a beta/first time derivative of beta lateral stability augmentation system (where beta is the sideslip angle) with command yaw rate and a roll angle control system with an outer yaw attitude control loop, a velocity control system, a control loop for the movable gun, and the tracking control system. The discrete analysis was performed in the z-plane using traditional methods and in the s-plane using the Padé approximation. The gains for neutral stability and corresponding system natural frequencies predicted by both analysis techniques showed excellent correlation with the value obtained from a detailed six-degree-of-freedom hybrid simulation of the aircraft and various control systems. B.J.

A82-13471 # **Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing.** R. J. Kelly and J. T. Skudrna (Bendix Corp., Communications Div., Baltimore, MD). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 144-155. 7 refs. (AIAA 81-2247)

The Joint Tactical Microwave Landing System, a lightweight transportable landing system which will provide all-weather precision approach guidance to drop zones, landing zones, and runways for MLS-equipped CTOL, STOL, VTOL, and rotary wing aircraft, is described with emphasis on the airborne avionics. It is shown how the airborne angle receiver satisfies the operational requirements by using an integrated digital avionics design and associated airframe antennas. This integrated avionics system will detect the MLS signal over a wide range of aircraft attitudes and will provide signal processing to generate lateral, vertical, and longitudinal guidance information for the complete spectrum of military FCS and cockpit displays. V.L.

A82-13472 # **LHX - An advanced avionics system design.** D. S. D'Avino (SEMCOR, Inc., Neptune, NJ) and S. S. Spiegel (SEMCOR, Inc., Moorestown, NJ). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 156-162. (AIAA 81-2249)

The paper reports results of a study which was performed with the objective of developing an avionics system concept for the LHX, an advanced Army weapons system. The preliminary results indicate that all currently defined LHX requirements for the armed scout mission are achievable using advanced technology and innovative system integration techniques. It is also shown that a one-man crew for the LHX is technically feasible. V.L.

A82-13481 * # **Have we overlooked the pilot's role in an automated flight deck.** G. G. Steinmetz, L. H. Person, and S. A. Morello (NASA, Langley Research Center, Hampton, VA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 222-227. 22 refs. (AIAA 81-2262)

Having adopted a philosophy of presenting situation information rather than command type as evidenced in flight directors and of keeping the pilot in a decision-making role, a series of simulation and flight experiments has occurred over a number of years as part of the Langley Terminal Configured Vehicle program. This paper traces the development, refinement, and integration of electronic pictorial displays, and a computer augmented velocity vector control mode. Some benefits and performances derived within the basic philosophy and information usage are brought forth in the discussion as results from the various simulator and flight evaluations are presented. (Author)

A82-13482 # **The application of large screen CRT's, touch panels, and voice to the flight stations of the 1990's.** R. L. Wasson and H. S. Archer, III (Lockheed-Georgia Co., Marietta, GA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 228-236. 5 refs. (AIAA 81-2263)

The paper examines how advances in technology, such as large screen displays, touch panels, and voice control affect the design of Lockheed's 1990's flight station. An integrated design embodying these concepts is presented and the advantages of such a design is explored. The paper is divided into two sections, the first addresses the inclusion of the advanced technology in the overall design of the flight station, and specific large screen display formatting, the second discusses the display/control technology necessary to implement such a design. (Author)

A82-13483 # **Electronic flight deck displays for transport aircraft.** R. A. Chorley (Smiths Industries Aerospace and Defence Systems Co., Cheltenham, Glos., England). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 237-246. 5 refs. Research supported by the Department of Industry and Ministry of Defence (Procurement Executive). (AIAA 81-2264)

Electronic flight deck and systems information displays for transport aircraft are discussed. Operational and economic advantages for military and civilian aircraft are reviewed, such as the flexibility of the display format which enables all information required for control of a transport aircraft to be displayed on the main panel, and the flexibility of the electronic system which minimizes the effects of failure within the display system. The display system configuration and the units of the electronic display system are presented, and human factors are considered. D.L.G.

A82-13484 # **F/A-18 'Hornet' - One man operability.** E. C. Adam (McDonnell Aircraft Co., St. Louis, MO). In: Digital Avionics

Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 247-251. (AIAA 81-2266)

Features of the F/A-18 fighter avionics design which allow one man operation in both fighter and attack modes are described. A CRT, along with head-up displays, provide the pilot with information essential for air-to-air, air-to-surface, and navigation modes. Pilot scan times are reduced because of information grouping and mission reliability is enhanced because of redundant image projection capabilities. The hands on throttle and stick system has an automated LOCK light for weapons delivery in a completely head-up, sensor-aided gun or missile attack. Console activity has been minimized through automation of time critical tasks, thus reducing the chances for pilot error or vertigo. A 98% failure detection and 99% failure isolation is built into the weapon system maintenance monitor panel. Operational capability is scheduled for 1983. M.S.K.

A82-13486 # **ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners.** R. K. Chun (Boeing Aerospace Co., Seattle, WA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 252-256. 5 refs. (AIAA 81-2267)

This paper will address the development and applications of the ARINC 429 digital data bus on the new generation of Boeing 757 and 767 commercial aircraft. The ARINC 429 Digital Information Transfer System (DITS) broadly defines a new digital data transmission format for avionics subsystems used in the next generation of commercial aircraft avionics applications. Boeing's development of a transmitter and receiver hybrid circuit which is compatible with ARINC 429 at the data bus interface will also be discussed. The hybrid package is hermetically sealed and designed to comply with the full range of military temperature requirements. (Author)

A82-13487 # **A polled contention multiplex system using MIL-STD-1553 protocol.** D. H. Wilson (Vought Corp., Dallas, TX). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 264-270. (AIAA 81-2271)

The polled contention mode in the Avionic Multiplex System is discussed, and a technique to pass the bus controller function between the terminals based on the activity of input data is presented. Improvements such as decreased data latency, more efficient bus utilization, and simplicity in software implementation are reviewed, and associated problems are considered. It is concluded that the use of dynamic bus allocation will have increasing significance as future systems become larger and more complex, while the polled contention mode may be a viable alternative to the command response system. D.L.G.

A82-13488 # **Avionics systems simulation for the Northrop F/A-18L aircraft.** R. A. Weeks (Northrop Corp., Hawthorne, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 271-278. (AIAA 81-2274)

A real-time, man-in-the-loop avionics systems simulation for the Northrop F/A-18L aircraft is discussed. Objectives include developing, implementing, and verifying the integration of the F/A-18L avionics systems with the human pilot. A fixed-based visual flight simulator with a high fidelity cockpit environment is used to assess pilot/system performance when subjected to multiple aircraft engagements, which provides operational characteristic simulations of the aircraft's radar, head-up display, integrated stores management, mission computer, and navigation systems. Consideration of the human pilot with the electronic systems allows early evaluations of potential problem areas, resulting in significant changes in the avionics systems. D.L.G.

A82-13490 * # **The SIFT computer and its development.** J. Goldberg (SRI International, Menlo Park, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 285-289. 8 refs. Contract No. NAS1-15428. (AIAA 81-2278)

Software Implemented Fault Tolerance (SIFT) is an aircraft control computer designed to allow failure probability of less than 10 to the -10th/hour. The system is based on advanced fault-tolerance computing and validation methodology. Since confirmation of reliability by observation is essentially impossible, system reliability is estimated by a Markov model. A mathematical proof is used to justify the validity of the Markov model. System design is represented by a hierarchy of abstract models, and the design proof comprises mathematical proofs that each model is, in fact, an elaboration of the next more abstract model. S.C.S.

A82-13498 # **The electronic terrain map - A new avionics integrator.** D. M. Small (USAF, Avionics Laboratory, Wright-Patterson AFB, OH). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 356-359. (AIAA 81-2289)

The map reading process is a demanding task which can be simplified by using a digital map subsystem which accesses the information needed and presents it in a form which can be easily interpreted. An electronic map subsystem can generate perspective scenes, which are essentially computer generated images of the surrounding area, and an electronic map should be much easier to interpret. In addition, essential information from the map data base can be placed on the pilots Head Up Display, reducing the need for head down operations. Work on an all electronic map for aircraft display applications was started in 1976. The design and fabrication of an Airborne Electronic Terrain Map System (AETMS) was begun in May 1980. Requirements concerning future avionics systems are examined, and a future aircraft system is discussed. Attention is given to terrain following/terrain avoidance, threat avoidance, and navigation. G.R.

A82-13499 # **The interface of multifunction controls and displays to tomorrow's avionics.** W. G. Mulley (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 360-364. (AIAA 81-2290)

Approaches for keeping the cost of avionics systems at a lower level are considered, taking into account the use of systems which are easy to develop, produce, operate, and maintain. The solution of a maintenance problem includes operations related to recognizing a malfunction, isolating a malfunction, correcting a malfunction, verifying the correction, and documenting the maintenance action. The cockpit can be considered a computer terminal station, and it can become the maintenance shop for all the hardware in the particular aircraft. Five hardware interfaces and one software interface can completely define all hardware and software modules for the entire display and control subsystem. G.R.

A82-13500 # **An update of an integrated CNI system - TIES.** L. E. Smith and G. B. Heal (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 365-371. 9 refs. (AIAA 81-2292)

The Tactical Information Exchange System, TIES, is an integrated approach to providing the Communication, Navigation, and Identification (CNI) suite for future Naval aircraft. The system is based upon identifying the functional elements of a CNI suite and assembling them in a fashion that provides greater system reliability and availability over those currently available. TIES demonstration hardware is discussed, and the frequency conversion subsystem is considered, taking into account the HF site, the VHF/UHF site, and the Lx band site. Attention is given to the frequency division multiplex subsystem, the signal conversion subsystem, the TIES control subsystem, the data management and distribution assembly, the TIES external test, and questions regarding the further development of the TIES system. G.R.

A82-13502 # **The use of separated multifunction inertial sensors for flight control.** W. J. Luedde (McDonnell Aircraft Co., St. Louis, MO). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 377-382. (AIAA 81-2295)

The Multifunction Flight Control Reference System (MFCRS) program has the objective to verify that the outputs of inertial grade ring laser gyros and high quality accelerometers in a 'strapdown' configuration can be processed by a digital computer and used as the flight control feedback reference in a modern fighter, the F-15. To achieve these goals, a control law development study was performed to evaluate the effects of sensor location on flight control stability and performance. In addition, a redundance management algorithm, which uses parity equations, was developed to satisfy sensor selection and fault detection and isolation requirements. The MFCRS simulation model is considered, taking into account the F-15 flight control system, F-15 airframe dynamics, and an MFCRS sensor model. Attention is also given to sensor location studies, moment arm compensation studies, and aspects of simulator evaluation. G.R.

A82-13503 # **Redundancy management of skewed and dispersed inertial sensors.** D. L. Sebring (McDonnell Aircraft Co., St. Louis, MO) and J. T. Young (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 383-391. 13 refs. (AIAA 81-2296)

A redundancy management approach has been developed for strapped-down inertial instruments used as flight control reference sensors. The sensors will be installed and flight tested in a high-performance fighter aircraft (F-15) in a configuration consisting of two skewed and dispersed sensor clusters. Each cluster is an orthogonal triad of co-located, inertial-quality ring-laser gyros, and accelerometers. Two sets of logic (sensor selection and fault detection and isolation) operate in parallel, obtaining sensor selection and failure status information from stored tables. Table pointers are generated by comparing the values of parity equations to variable trip levels. An off-line, analytic computer program is used to generate the stored tables. This approach has been verified using Monte Carlo and F-15 Continuous System Modeling Program (CSMP) simulations. (Author)

A82-13504 # **Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft.** W. K. Toolan and A. M. Zislin (Grumman Aerospace Corp., Bethpage, NY). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 392-399. 8 refs. Contract No. N62269-79-C-0206. (AIAA 81-2297)

This paper presents the results of the second phase of an Integrated Sensory Subsystem (ISS) development effort performed by Grumman under contract to the Naval Air Development Center. The ISS is a combination of redundant inertial sensors, air data probes, transducers, and other flight control related sensors, interfaces, and the associated Data Handling System (DHS). The sensor data derived within the ISS meets the requirements (i.e., performance, redundancy, survivability, etc.) for Digital Fly-By-Wire (DFBW) flight control systems. The key issue of this development phase was the synthesis and development of a DHS for dispersed arrays of flight control inertial sensors subjected to dissimilar motions due to body bending of the aircraft structure. The system design is described in terms of the hardware and Data Handling System synthesis, followed by a discussion of the methods utilized to verify system performance. (Author)

A82-13505 # **Direct digital drive actuation.** L. L. Kohnhorst (Rockwell International Corp., Columbus, OH). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 400-408. (AIAA 81-2298)

The Digital Flight Control System (DFCS) exploits the advantages of fly-by-wire mechanizations and digital technology while maintaining the demonstrated safety and reliability of manual control systems. However, the use of the DFCS would increase aircraft life cycle costs and decrease operational readiness if conventional avionic hardware configuration methods are applied to new aircraft designs. One of the programs initiated by the Navy with the objective to simplify the complexity of DFCS is related to the development of the Advanced Flight Control Actuation System (AFCAS). The AFCAS is to make use of a simplified, modular, fly-by-wire actuator. The simplified actuation can be accomplished without loss in mission reliability, but with improved mean time between failure (MTBF) because of the reduced complexity. The computer interface complexity is simultaneously reduced because of circuit requirements that are more compatible with digital technology than present day analog circuits. G.R.

A82-13506 # **Applications of head-up displays in commercial transport aircraft.** J. R. Lowe and J. R. Ornelas (Douglas Aircraft Co., Long Beach, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 409-414. 6 refs. (AIAA 81-2300)

The demanding tasks which the commercial transport pilot encounters during approach and landing are made easier by a suitable Head-Up Display (HUD) design. The HUD simplifies for the pilot tasks of decision-making, control and management. It also relieves him of the need to take his eyes from the view ahead to refer to his panel instruments. During an instrument approach, all guidance cues are available head-up whether or not any ground cues are visible. The continuously advancing state-of-the-art has improved the HUD with a larger field of view, more distinct images, and more easily followed symbology. These improvements have been made possible by advancements in HUD optic design, the use of the cathode-ray tube, the digital computer, and more sophisticated control laws. The first commercial transport HUD system in general use, now certified for the DC-9 Super 80, benefits from these improvements. G.R.

A82-13507 # **Flat panel developments for future military aircraft.** J. Brindle and W. G. Mulley (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 415-423. (AIAA 81-2302)

The four basic types of information for application in military aircraft are related to imaging or video, graphic, message, and discrete data. Various cockpit-mounted units are considered, taking into account the Head-Up Display, the Helmet-Mounted Display, the Mission Management Display and the Multifunction Programmable Keyboard. The display media employed include thin film electroluminescent devices, the light emitting diode, and the liquid crystal. Display addressing is discussed, giving attention to thin film transistor arrays, the integral silicon drive, the crossed electrode matrix, and the varistor. Plans for establishing technical requirements for each of the display system areas are also described. G.R.

A82-13508 * # **An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display.** I. J. Whitton (General Electric Co., Aircraft Equipment Div., Utica, NY). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 424-427. Contract No. NAS1-16414. (AIAA 81-2303)

Due to the conflicting demands of modern aircraft for increased systems/sensors and the decrease in cockpit panel size, weight, volume, and power, conventional discrete/dedicated methods of display and control are fast becoming obsolete. A means is sought to integrate the control and display into multifunctional programmable devices, thus giving the ability to increase system functions and yet conserve panel space. A potential solution to the control portion of the problem has come to be known as the Integrated Control Panel (ICP) approach. Flat panel display technology and controls using programmable flat panel displays with transparent capacitive touch control overlays offer the largest potential advantages. The flat panel display made of varistor-multiplexed dichroic liquid crystal (LCD) developed by GE in recent years appears to offer the ideal monochrome solution. (Author)

A82-13513 # **Digital avionics display processor.** E. G. Hamiltun, Jr. and S. H. Petrofsky (Emerson Electric Co., St. Louis, MO). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Instituta of Aeronautics and Astronautics, 1981, p. 466-472. (AIAA 81-2311)

This paper addresses the processing and display of the ever increasing amount of data from the new and sophisticated sensors currently being planned for aircraft use. Emphasis is placed on a display processor architecture designed for a multisensor environment. Detailed architecture description and some specific display and signal processing examples are included to illustrate data flow within this architecture. (Author)

A82-13514 # **Advanced display systems for crew stations of tactical aircraft.** W. G. Ast and D. E. Green (Loral Corp., Loral Electronics Systems Div., Atlanta, GA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 473-481. (AIAA 81-2312)

This paper describes the architecture and system characteristics of a family of intelligent operator/machine controlled Advanced Display Systems for use in modern tactical aircraft. A distributed processing communications link facilitates this type of a self contained control/display subsystem by minimizing demand on the central mission computer and providing flexibility in crew and cockpit display/control requirements. The major items of the Advanced Display System, including the Interactive Processing Terminal, the Universal Display Generator and the displays, are described in light of their features, capabilities and applications. The system is discussed from the standpoint of data load, timing constraints, display quality, dynamic performance and human factors. (Author)

A82-13515 # **Computergraphics for aircraft control.** S. F. Filarsky and W. G. Mulley (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 482-485. (AIAA 81-2313)

The Command Flight Path Display (CFPD) has been developed to demonstrate the feasibility of providing attitude, altitude, direction and speed command to the pilot in the form of an electronically generated presentation of the real world flight path which should be flown. The principal objective of the CFPD is to assure the precise and effective guidance and control of piloted aircraft at all times. The display system achieves this goal by computing the desired, or 'command' flight path and the deviations of the aircraft from that path, and then presenting a graphical representation of this combined 'director' and 'orientation' information to the pilot. Complete information on the attitude, altitude, speed and direction of the aircraft is presented continuously by the CFPD, whether the aircraft is under manual or automatic flight control. Therefore, the pilot is able to control all of the vehicle's six degrees of freedom by reference to the single, integrated display. The flight path display concept may be applicable to all phases of flight eventually, but the present developmental effort is confined to earth-referenced applications. Accordingly, the feasibility demonstration was limited to three such applications: takeoff, landing and fixed-target, air-to-ground attack. (Author)

A82-13516 * # **An advanced programmable/reconfigurable color graphics display system for crew station technology research.** R. J. Montoya (Research Triangle Institute, Research Triangle Park, NC), J. N. England (IKONAS Graphics Systems, Inc., Raleigh, NC), J. J. Hatfield (NASA, Langley Research Center, Hampton, VA), and S. A. Rajala (North Carolina State University, Raleigh, NC). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 486-498. 6 refs. (AIAA 81-2314)

The hardware configuration, software organization, and applications software for the NASA IKONAS color graphics display system are described. The systems were created at the Langley Research Center Display Device Laboratory to develop, evaluate, and demonstrate advanced generic concepts, technology, and systems integration techniques for electronic crew station systems of future civil aircraft. A minicomputer with 64K core memory acts as a host for a raster scan graphics display generator. The architectures of the hardware system and the graphics display system are provided. The applications software features a FORTRAN-based model of an aircraft, a display system, and the utility program for real-time communications. The model accepts inputs from a two-dimensional joystick and outputs a set of aircraft states. Ongoing and planned work for image segmentation/generation, specialized graphics procedures, and higher level language user interface are discussed. M.S.K.

A82-13517 # **Higher order Information Transfer Systems are coming.** J. W. McCuen (Hughes Aircraft Co., Fullerton, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 499-506. 11 refs. (AIAA 81-2317)

The functions necessary for airframe/weapons system integration in advanced avionics systems are reviewed, noting the relevance to the establishment of a military standard Information Transfer System (ITS). The requirements driving the changes from older avionics systems are listed, and the importance of hierarchical interconnections in multilevel, multiplexed ITSs to provide lower level ITSs with functionally isolated communications media whenever data interchange is needed is stressed. Flow diagrams for three- and two-level ITSs are provided; a topology of the designs includes functional isolation between critical flight subsystems. New subsystems such as fire control, stores management, weapon guidance, and release will be combined into one subsystem. Independently operating subsystem bus networks will be tied together by higher order systems operating between 1-50 MHz. M.S.K.

A82-13518 # **Advanced fiber optic systems for avionics applications.** B. E. Kincaid (Lockheed Research Laboratories, Palo Alto, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 507-513. 27 refs. (AIAA 81-2319)

The application of fiber optic (FO) systems to avionics is considered, with emphasis on the design of electronic warfare (EW) systems requiring high-speed, real-time data transfer busing and wavelength multiplexing. Single star, three in-line star, and three fully-interconnected star FO data bus architectures are compared with respect to optical loss equations, maximum number of terminals, number of required fibers and bulkhead connectors, optical dynamic range required, and multipath levels for interconnected loop architectures. It is found that the single star configuration is optically superior to the two alternatives, although simplex stars must be added to the single star in order to lessen the installation cost and reliability disadvantages associated with the configuration's large number of fibers and the large pin count in a bulkhead connector. O.C.

A82-13519 # **Light-guided information distribution systems.** H. P. Lavin (General Electric Co., Aircraft Equipment Div., Utica, NY) and G. B. Harrold (GE Electronics Laboratory, Syracuse, NY). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 514-521. (AIAA 81-2320)

This paper examines the pervasiveness of light-guided communication systems into the avionics interconnect system. The capabilities and limitations of current technology are presented together with system architectural alternatives such as the use of wavelength multiplexing of time division and frequency division signals with various modulating schemes. Transducer design techniques for the conversion from electrical to optical signals and optical to electrical signals are presented with some of the limitations of conventional analytical techniques. The extension of light-guided communications into the avionics backplane enhances system growth capability and technological transparency by information broadcasting among the avionics modules. The experimental results of a preliminary light-guided backplane are presented using optics on a wire-wrap backplane to transfer digital clock, data, and control information for a maximum distribution to 40 loads. (Author)

A82-13520 * # On-board communication for active-control transport aircraft. L. D. Brock, A. L. Hopkins, Jr. (Charles Stark Draper Laboratory, Inc., Cambridge, MA), and J. L. Spencer (NASA, Langley Research Center, Hampton, VA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 522-529. Contract No. NAS1-15359. (AIAA 81-2321)

An investigation of active control communications sponsored by the NASA Langley Research Center is summarized. Particular attention is given to comparative architectures, for which a common set of requirements is generated as a baseline. Most of the requirements are aircraft functional in nature, such as stability and command augmentation, structural load relief, flight path control, flight control linkage, flight monitoring, management, navigation, engine control, and ground communication; the time element, the hazard environment, and the communications capacity estimation are also important factors. The architectures involve several communication technologies, including dedicated links, broadcast busing, and multiplex busing. The multiplex bus system provides the greatest flexibility and installation efficiency. A future homogeneous network system is also proposed, which would be fault and damage tolerant and would, with advanced technology, avoid the problems of designing a very large and flight critical multiplex bus system. J.F.

A82-13525 * # Digital detection and processing of laser beacon signals for aircraft collision hazard warning. L. M. Sweet, R. B. Miles, G. F. Russell, M. G. Tomeh, S. G. Webb, and E. Y. Wong (Princeton University, Princeton, NJ). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 563-571. 15 refs. Grants No. NCC2-94; No. NGL-31-001-252. (AIAA 81-2328)

A low-cost collision hazard warning system suitable for implementation in both general and commercial aviation is presented. Laser beacon systems are used as sources of accurate relative position information that are not dependent on communication between aircraft or with the ground. The beacon system consists of a rotating low-power laser beacon, detector arrays with special optics for wide angle acceptance and filtering of solar background light, microprocessors for proximity and relative trajectory computation, and pilot displays of potential hazards. The laser beacon system provides direct measurements of relative aircraft positions; using optimal nonlinear estimation theory, the measurements resulting from the current beacon sweep are combined with previous data to provide the best estimate of aircraft proximity, heading, minimium passing distance, and time to closest approach. (Author)

A82-13526 # An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes. R. C. H. Parkinson. In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 572-579. 19 refs. (AIAA 81-2330)

This paper presents a fuel-efficient cruise performance model which facilitates maximizing specific range of General Aviation airplanes powered by spark-ignition piston engines and propellers. Airplanes of fixed design only are considered. Specific range is the ground distance the airplane flies per unit mass of fuel consumed in cruising flight. The cruise performance model determines the specific range, engine inlet manifold pressure, engine fuel-air mass ratio and engine fuel flow rate which correspond to any given values of geocentric true windspeed along track, equivalent airspeed, airplane gross weight, airplane longitudinal center of gravity position, auxiliary equipment power usage, engine rotational speed, pressure altitude and atmospheric ambient temperature. The use of the cruise performance model for maximizing specific range, with and without constraints on the airplane operation, is discussed. The cruise performance model appears suitable for airborne microprocessor implementation. Improvements in specific range, which are expected to result from implementation of the cruise performance model, are given. The principal hardware items necessary for such implementation are listed. (Author)

A82-13527 # Design and flight test of a lateral-directional command augmentation system. D. Atzhorn (USAF, Washington, DC) and R. F. Stengel (Princeton University, Princeton, NJ). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 580-592. 14 refs. Contract No. N00014-78-C-0257. (AIAA 81-2331)

Two-input/two-output lateral-directional control laws with Type 0 and Type 1 structures have been designed, analyzed, and flight-tested using the microprocessor-based digital flight control system (Micro-DFCS) installed in Princeton's Variable-Response Research Aircraft (VRA). These control laws were designed using linear-quadratic sampled-data regulator theory, and they were evaluated by U.S. Navy test pilots. Major closed-loop response features were found to be relatively insensitive to sampling rate (down to 4 sps), although flying qualities were degraded by increased sampling delay. Type 0 controllers provided satisfactory performance in flight, but the equivalent Type 1 systems were found to be unduly sensitive to disturbances and measurement noise. A novel application of the Tustin transformation proved useful in control law implementation. (Author)

A82-13529 # Fiber-optic immunity to EMI/EMP for military aircraft. M. K. Zaman (Lockheed-California Co., Burbank, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 597-599. (AIAA 81-2339)

Fiber-optic interconnect technology is specifically suited for military aircraft. This paper addresses a major factor of the fiber-optic interconnect technology, namely, the fiber-optic immunity to EMI/EMP, including power line transients and lightning strike. Transmission systems using fiber-optic cables (interconnect) are similar to those using electrical cables (balanced shielded twisted pairs), except that the output of the transmitter is used to modulate a light source. A photodetector responds to the light transmitted by the optical fiber, producing an electrical signal corresponding to the output of the modulated source. This signal can then be processed in a conventional manner in the system. In general, fiber-optic cables are not susceptible to EMI, provide good electromagnetic isolation between circuits, provide wide bandwidth, and are lightweight. Fiber-optic cable characteristics will be explored for shielding effectiveness. The EMI tests conducted to quantify the EMI benefits of fiber-optic cables in aircraft environments will also be discussed. No information related to transient radiation effects on electronics (TREE) is presented in this paper. (Author)

A82-13530 # Real-time flight management avionics software system. J. Chelini and R. H. Farmer (General Motors Corp., Delco Electronics Div., Goleta, CA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 600-607. (AIAA 81-2340)

Recently, the U.S. Air Force evaluated several varieties of Fuel Savings Advisory Systems (FSAS) including a Flight Management System (FMS) considered in the reported investigation. It is pointed out that the engineering effort to provide Flight Management Systems for commercial and military applications is extremely software intensive. To minimize software development efforts, an enlargement of the abstract computing machine was required. This resulted in the development of a kernel. A description is provided of the history associated with the development of a kernel and its use in FMS applications. It is demonstrated that through the use of solid software engineering methodology and proven operating system technology, Fuel Management System software is maintainable and error free, lending itself to a variety of configurations and demands with minimum software costs. G.R.

A82-13531 # Time-referencing of data in an asynchronous environment. B. D. Brumback (General Dynamics Corp., Fort Worth, TX). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 608-613. (AIAA 81-2341)

The time-referencing of data in an avionic system that is based on asynchronous processing is discussed. The time-tag counter, provided by MIL-STD-1553B, is used to precisely define the age of data. An avionic system, which uses three asynchronous multiplex buses, is discussed as an example. A timing-uncertainty error budget is defined and the corresponding position and velocity errors are negligible when compared with the errors in a high-quality navigation sensor. (Author)

A82-13532 * # A Loran-C prototype navigation receiver for general aviation. R. W. Lilley and D. L. McCall (Ohio, University, Athens, OH). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 614-620. 10 refs. Grant No. NGR-36-009-017. (AIAA 81-2329)

Investigations have been conducted regarding the techniques required for Loran-C navigation with application to the general-aviation pilot. The goal has been to produce prototype equipment for flight evaluation which will provide enroute navigation in both latitude-longitude and rho-theta coordinates and to evaluate the nonprecision approach capabilities of such equipment. In connection with the considered project, a prototype Loran-C receiver has been flight-tested using a variety of flight paths, with and without simultaneous ground radar position data collection. Attention is given to a receiver overview, an antenna preamplifier/coupler, the Loran-C receiver RF processor, the tracking loop hardware, tracking loop programming, video output, the laboratory and flight evaluation, and work currently in progress. G.R.

A82-13533 # Advanced weapon systems - Integration technology. M. J. Thullen (USAF, Avionics Laboratory, Wright-Patterson AFB, OH). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 621-628. (AIAA 81-2213)

The Digital Avionics Information System (DAIS) is discussed. DAIS has been characterized as a system architecture which can be applied and configured for a broad class of avionics applications and missions utilizing digital technology to reduce life cycle costs by defining and developing modular hardware and software core elements and standardized interfaces which can be configured and applied to many aircraft. The DAIS approach reflects a total system concept rather than a functional subsystem or hardware oriented system. The DAIS architecture consists of federated processors communicating with each other and the other system elements through a standardized multiplex data bus. Advanced avionics concepts are discussed, taking into account information fusion, functional automation, integrated subsystems, advanced architecture, and aspects of concept validation. G.R.

A82-13534 * # Low cost programmable multisimulator facility. J. G. Kreifeldt (Tufts University, Medford, MA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1981, p. 629-632. 7 refs. Grants No. NsG-2156; No. NCC2-93. (AIAA 81-2229)

A prototype, low cost multisimulator facility consisting of a DEC LSI-11 host computer and multiple desk top simulators is reported. The facility includes a main-frame system, a voice system, and a multi-cab system which consists of a flight panel, a host subsystem, and a flight simulator system. Software components are described, and the simulator computer, which provides flight dynamics, a path predictor, and navigation and data communications is discussed. The system may be computationally upgraded by specification of the DEC LSI-11/23, thus obtaining at least a two-fold increase in real-time computational power. D.L.G.

A82-13600 † Divergence of a sweptforward wing (Divergentsiia kryla s obratnoi strelovidnost'iu). A. P. Seiranian. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela,* Sept.-Oct. 1981, p. 133-138. 10 refs. In Russian.

Equations describing the divergence of a sweptforward wing are examined and found to contain a small parameter. The perturbation method for an arbitrary wing is used to obtain a formula relating the critical divergence rate with the basic characteristics of the wing. Numerical results are obtained using a variational method. P.T.H.

A82-13600 Civil aviation in China. R. Goodson. *Interavia,* vol. 36, Nov. 1981, p. 1098-1102.

An account is given of the present capabilities and development plans of the General Administration of Civil Aviation of China (CAAC), which has over 160 domestic routes, provides scheduled services to more than 80 Chinese cities, and operates 17 international routes. It is reported that, of the 120 airports in the People's Republic of China, only 12 can handle 707 airliner operations and less than 10 those of the CAAC's recently acquired *747SPs.* Among the operational problems cited are the use of 24 different aircraft types and the acquisition cost of such advanced aircraft as the Airbus A300. Of great importance is the ability of the CAAC to purchase aviation fuel directly from the Chinese government, at prices 10-20% lower than those privately owned airlines pay. Attention is given to airport facilities, research and agricultural aircraft operations, and the effects of regional government policy. O.C.

A82-13701 † Estimation of the efficiency of radioelectronic flight navigation systems (Otsenka effektivnosti radioelektronnykh pilotazhno-navigatsionnykh kompleksov). M. S. Iarlykov and A. S. Bogachev. *Radiotekhnika,* vol. 36, Sept. 1981, p. 7-12. In Russian.

A method based on the theory of Markov processes is developed for estimating the efficiency of flight navigation avionics. System components are modeled with three states, which makes it possible to investigate the permanent and temporary malfunctions. Particular attention is given to the selection of a criterion for the operational efficiency of the navigation system, and to the determination of operational states of the system. B.J.

A82-13703 † Digital signal processing on a background of rereflections for the international aircraft landing system (Tsifrovaia obrabotka signala mezhdunarodnoi sistemy posadki samoletov na fone pereotrazhenii). A. K. Berniukov. *Radiotekhnika,* vol. 36, Sept. 1981, p. 26-29. 7 refs. In Russian.

An analysis of multibeam signals in the time-reference scanning-beam (TRSB) system is presented for the case of rereflections and minimum a priori information. Algorithms of real-time digital processing are proposed, which make it possible to discriminate the signal from the rereflection, and to measure the information parameter. B.J.

A82-13652 * # Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/. D. W. Riddle, R. C. Innis, J. L. Martin, and J. A. Cochrane (NASA, Ames Research Center, Moffett Field, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2409.* 14 p. 12 refs.

A powered-lift, reduced thrust takeoff performance program utilizing quiet short-haul research aircraft has been conducted. It has been shown that the powered-lift upper surface blowing concept greatly enhances aircraft takeoff performance. The improvements include: (1) takeoff field lengths may be shortened by approximately 30%; (2) Air Force critical field lengths may be shortened by approximately 60%; (3) powered lift upper surface blowing aircraft have better handling and performance characteristics than comparable conventional aircraft; and (4) the low speeds associated with powered-lift takeoff enhance safety margins. S.C.S.

A82-13653 * # Thunderstorm hazards flight research - Program overview. P. L. Deal, G. L. Keyser, B. D. Fisher, and N. L. Crabill (NASA, Langley Research Center, Hampton, VA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2412.* 11 p. 7 refs.

The NASA thunderstorm hazards research program, designed to study the effects of lightning strikes on the design and operation of aircraft, is described. An all-weather F-106B is instrumented to document the EM characteristics of direct and nearby strikes, measure the field parameters and analyze the ambient atmospheric content, and film the strikes; X-ray detectors are also on board, along with instrumentation for determining the frequency of visible light waveforms. Data is either recorded on-board or sent by telemetry to base, while ground based telemetry is used to direct the pilot and craft into regions of optimal lightning activity. The sensing apparatus is described, and ongoing programs to correlate different storm parameters are reviewed, along with operational procedures and safety precautions. Continued use of the craft through 152 storms and 16 direct hits, with no fatalities or circuit breaker throw, confirms the ability of metal skinned aircraft to withstand lightning strikes; data gathered from flights during 1980 are provided. D.H.K.

A82-13854 # **Enhanced F-15 air-to-ground flight demonstrations.** G. D. Gibbs (McDonnell Aircraft Co., St. Louis, MO). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2413.* 6 p.

Features designed to enhance the F-15 Eagle air-to-ground capabilities are presented. The F-15, intended to provide battlefield air superiority, has a thrust/weight ratio exceeding one-to-one; its armament systems are outlined. Built-in flexible digital avionics have allowed in-weather performance using synthetic aperture radar (SAR), high resolution mapping, and incorporation of an infrared laser sensor pod for use once in target range. The SAR has a resolution of 8.5 ft at 10 miles, suitable for detecting surface vehicles. The flight range has been extended with conformable fuel tanks, which, though adding a small drag increase beyond Mach 1, has doubled the internal fuel capacity; a full fuel load is now 5,120 gal, enough for more than a transatlantic flight. Two seven in. and four two in. CRT displays have been mounted in the aft cockpit, which now has complete flight control capability. Patch mapping, target identification, and blind bombing test flights are described. D.H.K.

A82-13855 # **The F-16/79 test program.** K. G. Timpson (General Dynamics Corp., Fort Worth, TX). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2414.* 8 p.

Flight certification testing for the F-16 fighter outfitted with a J79 engine (F16/79) is described. The use of the J79 engine required a new inlet, a new secondary air variable by-pass system, nacelle structural insulation blankets, and adaptation of the fire detection system and installation of a fire extinguishing system. The tests were concerned only with systems which were affected by the change of engine; 350 test runs were flown. Flight test procedures are outlined, chronography is provided, and instrumentation for real-time telemetry is discussed. A total of thirteen months elapsed between the decision to outfit the export version of the F-16 with a different engine and the completion of the flight certification trials; the results of the tests are now under review by the Air Force. D.H.K.

A82-13856 # **Organizing and training for innovative flight test management.** J. D. Lang (USAF, Wright-Patterson AFB, OH). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2416.* 8 p. 6 refs.

The organization and training for innovative flight test management by the 4950th Test Wing is reported. Current wing structure, methods, planned changes, and employer/employee relationships are discussed. An in-house training program to assist in the transition from old to new by enhancing attitudes and clarifying roles for improved leadership in test project and test engineering management is presented. Future emphasis is also discussed, and is to be on organizational attitude to encourage innovation and motivation to make each project succeed. D.L.G.

A82-13857 * # **Flight experience with a remotely augmented vehicle flight test technique.** K. L. Petersen (NASA, Flight Research Center, Edwards AFB, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2417.* 19 p. 7 refs.

A flight technique which uses the remotely augmented vehicle (RAV) concept is developed to flight test advanced control law concepts. The design, development and flight test validation of a RAV system mechanized on a digital fly-by-wire aircraft are described, and future applications are discussed. Flight experiments investigate complete inner loop, low sample rate, and adaptive control system mechanisms. The technique, which utilizes a ground-based FORTRAN programmable digital computer and up and down telemetry links is found to provide the flexibility necessary to effectively investigate alternate control law mechanisms in flight. D.L.G.

A82-13859 # **A technique to determine lift and drag polars in flight and their application.** A. Knaus (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2420.* 13 p.

The paper presents performance trials of the European combat aircraft Tornado, which concentrate on techniques used to measure lift and drag polars. The polars are measured by means of well adapted test instrumentation, a data reduction system, and a high calibration standard for the aircraft and engines. Steady state and dynamic test maneuvers are combined, and result in a significant reduction in flight time required to obtain sufficient data for determining zero lift drag, induced drag characteristics, and drag increments due to aircraft configuration change. Flight test results are presented, which demonstrate the advantages of the test technique, the high data quality, and the feasibility of in-flight verification over the entire angle of attack range. D.L.G.

A82-13861 # **A cost effective method for the control of roll due to side slip on a low speed aircraft.** S. Chandrashekar and N. S. Kiran (Hindustan Aeronautics, Ltd., Flight Test Dept., Bangalore, India). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2422.* 5 p. 5 refs.

Dihedral effect and its control are important for increasing damping of dutch roll, as well as reducing roll damping and unstable spiral modes. The effectiveness of setting the wing-tips at large anhedral angles to reduce the dihedral effect is demonstrated for the case of a low wing piston trainer with a positive geometric dihedral. Results of flights conducted with four wing-tip an/dihedral values showed that the effective dihedral changed its sense when the aircraft was flown with a 30 deg wingtip anhedral; this change in sense occurred at about 10 deg tip-anhedral. The method was found to be both time and cost effective compared with conventional methods. Lack of agreement with analytical estimates indicates the need to review the analytical methods, which were based on results from wind tunnel measurements. J.F.

A82-13863 # **Performance estimation from non-steady manoeuvres.** K. R. Nippress (Aeroplane and Armament Experimental Establishment, Boscombe Down, Wilts., England). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2424.* 11 p.

Data obtained from non-steady manoeuvers on modern high performance aircraft have been analysed using least squares regression techniques to produce thrust drag models of the aircraft. Predictions of level speed performance, climb performance and turning performance have been produced from the model data and compared with data obtained from traditional test methods. The results presented in this paper demonstrate that use of non-steady techniques offers the possibility of decreasing the flight time required to perform a performance evaluation to approximately one quarter of the time required by traditional steady techniques. (Author)

A82-13869 # **Navy performance modeling techniques.** R. W. Boyd (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2431.* 5 p.

Details of airframe/engine/installation models combined with flight test data to achieve accurate performance modeling are presented. The airframe performance (drag) and engine performance (thrust) have separate computer programs which accompany the components from initial design to flight testing, and are updated with each modification to the hardware. Wind tunnel and flight test measurements are input as drag parameters while engine operational parameters are input into the thrust model. Once installation has been accomplished, a flight test model is developed which must be overlaid with the data from the initial thrust and drag models. A flowchart is presented for performance modeling, and the maneuvers and acceleration tests are described; the performance model is fed into a computer with graphics capability for analysis by project engineers. M.S.K.

A82-13871 * # HiMAT aerodynamic design and flight test experience. N. W. Matheny (NASA, Flight Research Center, Edwards AFB, CA) and G. N. Panageas (Rockwell International Corp., North American Aircraft Div., Los Angeles, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2433.* 18 p. 5 refs.

Consideration is given to the design phase of the highly maneuverable aircraft technology program. Design objectives are examined, noting full-scale design and the remotely piloted research vehicle. Attention is given to subsonic, transonic, and supersonic design. Design results are discussed with reference to aerodynamic efficiency, aeroelastic tailoring, and the flight test program. S.C.S.

A82-13872 # In-flight computation of helicopter transmission fatigue life expenditure. K. F. Fraser (Department of Defence, Aeronautical Research Laboratories, Melbourne, Australia). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2434.* 10 p. 5 refs.

Estimates of the safe fatigue life of critical helicopter transmission components may be made if in-service load data together with component fatigue data are available. Instrumentation has been developed to provide in-flight computation and indication of the current values of fatigue life expended for critical gears in single or twin-engine helicopter transmission systems. In addition basic transmission load data in the form of totalized times spent in a number of contiguous torque bands are continually updated and stored during flight. The basic load data together with values of life expenditure for critical gears for the current flight can be automatically printed out after flight. This development opens the way towards fatigue life monitoring of individual transmissions. (Author)

A82-13873 # Advancing blade concept /ABC/ development test program. A. J. Ruddell (United Technologies Corp., Sikorsky Aircraft Div., West Palm Beach, FL). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2437.* 10 p. 10 refs.

The Advancing Blade Concept (ABC) rotor system derives its name from the fact that the predominant lift load at high forward speeds is carried by the advancing blades on both sides of the aircraft. Since the retreating blades are not required to carry a significant fraction of the total lift load at forward speed, the speed and load factor limitations of the conventional helicopter due to retreating blade stall are eliminated. ABC development began in 1964. The XH-19A ABC demonstrator aircraft was designed as a research tool to investigate the ABC rotor characteristics. A brief review of the concept principles is presented along with a description of the test aircraft. It is pointed out that the XH-59A flight program has completed a successful demonstration of the ABC rotor system. The XH-59A has demonstrated significant maneuver and performance improvements over conventional helicopters. G.R.

A82-13874 * # Recent propulsion system flight tests at the NASA Dryden Flight Research Center. F. W. Burcham, Jr., L. P. Myers, J. Nugent, P. L. Lasagna, and L. D. Webb (NASA, Flight Research Center, Edwards AFB, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2438.* 13 p. 13 refs.

The article presents a summary of the propulsion system tests conducted on a number of aircraft at the NASA Dryden Flight Research Center. The tests included digital engine control systems, engine-inlet compatibility, inlet-airframe interactions, nozzle-boattail drag and advanced turboprop acoustics. Among the aircraft evaluated were the F-15, HiMAT, F-14, and the JetStar. S.C.S.

A82-13875 # C-5A unsurfaced taxi and off-load demonstrations. R. A. W. Brown (Lockheed-Georgia Co., Engineering Flight Test Div., Marietta, GA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2439.* 10 p.

The results of tests to evaluate the C-5A maneuvering and off-load capabilities on unsurfaced soils are presented. Clay-sand, sand, and silty clay soils with a CBR of nine were chosen for runways for the 665,000 lb fully loaded vehicle. Weight was gradually built up to the maximum, using a field with drop-offs no greater than six in. and driving at 5-10 knots. Conditions were created for dry sand, wet ground, snow, and frozen soil. Maneuvering was accomplished in ruts up to 8 in. deep in loose sand and 15-21 in. deep in snow; towing was not considered essential because the C-5A has rolling, rather than powered, wheels. The C-5A was judged operable under the test conditions, and recommendations are given for expanding the number of airfields available for the C-5A by using methods developed in the present tests as reference marks for soil evaluation. D.H.K.

A82-13876 # The Cessna T303 Crusader. T. E. Wallis and M. O. Schiegel (Cessna Aircraft Co., Wichita, KS). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2440.* 7 p.

The Cessna T303 Crusader is a six-place twin with a gross weight of 5150 pounds and an IFR equipped useful load of over 1850 pounds. Extensive initial computer and wind tunnel studies have resulted in an airplane with truly superb flying qualities. A cruciform tail configuration with a high aspect ratio horizontal tail, and advanced flow control devices in critical areas contribute much to these characteristics. The turbocharged 250 bhp engines have a unique turbocharger/compression ratio combination which provides excellent fuel economy. The paper describes the airplane and the development and certification flight test program. (Author)

A82-13877 # Government testing. J. C. O'Connor (U.S. Army, Aviation Research and Development Command, St. Louis, MO. *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2443.* 4 p.

The Department of Defense Directive on Test and Evaluation establishes the policy of conducting test and evaluation throughout the acquisition process of a defense weapon system. The acquisition process consists of four distinction phases, with each phase requiring a particular scope and type of test. This paper addresses the flight testing required for each acquisition phase during the development and production of Army aircraft. The test objectives, scope of tests, and test methodology are presented for the Preliminary Airworthiness Evaluation, Developmental Tests, Operational Tests, artificial/natural inflight icing, climatic laboratory tests, and the Airworthiness and Flight Characteristics Tests. (Author)

A82-13878 * # Flight test method for the determination of reciprocating engine cooling requirements. S. J. Miley, E. J. Cross, Jr. (Texas A & M University, College Station, TX), and D. L. Lawrence (Piper Aircraft Corp., Lakeland, FL). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2446.* 6 p. Grant No. NsG-1083.

It is pointed out that the effective cooling of aircraft reciprocating engines is still a problem area for the general aviation industry. Miley et al. (1981) have reported the results of an investigation of problems associated with cooling and installation aerodynamics. A description is given of a flight test procedure which was developed in connection with the considered investigation. It is shown that the test procedure provides valid cooling requirements data for a particular installation. The data are in terms of easily measurable parameters. The employment of the test procedure, which is based on the NACA cooling correlation method, can lead to more effective cooling installations and the solution of existing cooling problems. G.R.

A82-13879 # Performance assessment of an advanced reheated turbo fan engine. V. Zeidler (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2447.* 15 p.

Testing and evaluation techniques for rating the performance of an advanced reheated turbofan engine are reported. Thrust, specific fuel consumption, and engine operational qualities are calculated for input into a computer. Thrust evaluation requires gross thrust and air mass flow measurements, which are taken as far as possible downstream from the engine, and are linked as input. Other options for thrust evaluation are described, noting that each possesses slight degradations in accuracy. Calibration curves are diagrammed for each option, and the performance evaluation of convergent nozzles is outlined. Calibration runs are performed in an altitude test facility (ATF) with totally controlled inputs to simulate the conditions in which test flights will be flown. Highest accuracy is obtained using linked methods and two engines in the ATF for performance and aircraft drag evaluation. M.S.K.

A82-13880 * # **Selected stability and control derivatives from the first Space Shuttle entry.** K. W. Iliff, R. E. Maine (NASA, Flight Research Center, Edwards, CA), and D. R. Cooke (NASA, Johnson Space Center, Houston, TX). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2451*. 16 p. 10 refs.

Primary stability and control derivative estimates garnered from the first Shuttle entry are reported. The craft was the first vehicle to maneuver over a wide range of hypersonic velocities, yielding data on flight characteristics from previously unexplored regimes. The flight envelope was confined to entry and safe landing, with no additional maneuvers to gain control data. Data for a Mach number range of 25-1.5 and altitudes of 515,000-50,000 ft are provided, and functional ranges of the Shuttle control surfaces and attitude jets are outlined. On-board systems gathered data on aerodynamic coefficient identification, flight condition and Euler angles, and jet chamber pressures. A maximum likelihood estimation program, which contained unknown stability and control derivatives, was used for control; a control input determined the value of the unknown derivatives, and the input and spacecraft response were measured. Longitudinal and lateral directional maneuvers and their derivative estimates are described, noting wind contamination of the sideslip measurements below Mach 3. Further maneuvering and stability tests are projected for subsequent flights. M.S.K.

A82-13881 # **Planning a helicopter flight test program.** K. Kuppuswamy and N. S. Kiran (Hindustan Aeronautics, Ltd., Flight Test Dept., Bangalore, India). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2381*. 6 p.

A study has been undertaken to assess the feasibility of completing the flight test program for the three different prototypes of the Advanced Light Helicopter, a high-performance twin-jet craft designed to operate under Indian conditions, within the 30 months allotted for the purpose. It was found that in order to achieve the 1000 hours of flight time required, all prototypes must carry identical instrumentation packages capable of making about 100 different dynamic, quasi-static and identifying measurements, with a fourth package as backup. Analysis of the weight of such an instrumentation package indicates it to contribute about 400 kg to the weight of the helicopter, with one third of the total represented by cables and connectors. Cost estimates reveal over 50% of the program cost per flight hour to be accounted for by insurance and depreciation, while the more controllable engineering and flying costs make up only 33% of the total. Finally, a study of expected reliability, availability and maintainability of the test vehicle, airborne data acquisition system and telemetry system reveals that they are compatible with the planned schedule. S.C.S.

A82-13888 # **Recent improvements at the Naval Air Test Center for increased test system flexibility.** T. F. Coyle, G. A. Davis, and G. R. Ryan, Jr. (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2392*. 10 p.

Improvements that have been made in two real-time systems used daily at the Naval Air Test Center are described. The systems are the Real-time Telemetry Processing System (RTPS) and Range Computation and Control System (RCCS). The improvements have made possible (1) rapid changes to real-time application programs; (2) increased flexibility in data reduction; (3) increased capability in data analysis; and (4) increased capability in range control systems. It is pointed out that these improvements will enable the RTPS and the RCCS to provide the necessary support for the test and evaluation of both vehicles and mission systems at the center in the 1980's. C.R.

A82-13891 # **Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center.** P. F. Zalesak, Sr. (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2405*. 12 p. 18 refs.

Results of a flight test program are discussed and data are presented in support of the contention that the nonmetallic spline coupling technology can be used to reduce unwanted oscillatory torsional loads transmitted between components. It is shown that the nonmetallic spline coupling technology can be applied to existing hardware systems to improve the reliability of components used to transmit torque. In the test, transmitted torsional load data, as measured at the engine driven compressor test drive shaft, were collected during several flight phases, including takeoff, takeoff abort, negative torque system check, loiter flight conditions at 500 feet and 200 knots indicated airspeed, inflight engine shutdown, inflight engine start up, landing and ground backing up operations. C.R.

A82-13892 # **Commentary on facilities used in the development of a Sea Harrier all weather operations capability.** J. W. Britton (Royal Aircraft Establishment, Bedford, England). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2407*. 8 p.

The resolution of difficulties inherent in developing an all-weather V/STOL aircraft (Sea Harrier) for sea operations is described, along with the test facilities used for the program. Reduced visibility, which restricts pilot instrument use after a certain point while landing, were explored with flight simulators with four-axis motion. The simulator provided motion fidelity, head-up displays, realistic visual and environmental conditions (digital computer controlled), and a TV video system. Additional flight test use was made of a Harrier two-seater equipped with blinds to alter visibility. Visual guidance aids comprising flashing red and white lights and runway markers were employed to provide strong visual cues for pilot orientation during approach. The advantages of having all equipment on-site are stressed, as data from one test is then available for simultaneously run test phases. D.H.K.

A82-13894 # **Information technology and its impact on test and evaluation at the Naval Air Test Center.** R. K. Fairfax, T. C. Lancaster, and G. F. Hurlburt (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2396*. 7 p. 13 refs.

An investigation is conducted regarding the approaches used by the Naval Air Test Center to provide data collection, reduction, and computer support requirements for full-scale aircraft development programs such as the F/A-18, AV-8B, and LAMPS MK-III. Aspects of initial real-time development are discussed, taking into account network components, the data transmission network, the fiber optic cable, the interface equipment, the real-time processor, telemetry application, questions of range application, and problems of graphics application. A description of a satellite communications demonstration is also provided. G.R.

A82-13898 # **Georgia Tech coherent jammer flight test.** H. W. Andrews and D. L. Gordon (Georgia Institute of Technology, Atlanta, GA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2452*. 7 p.

A test program to accurately measure the interaction between a coherent jammer and a radar is described. Theoretical calculations comprised finding closed form solutions for the jammer/radar interaction, and considered slant range antenna patterns, radar cross section, frequency, polarization, and scenario geometry, in addition to the development of computer programs to study electronic countermeasures techniques. A jammer was devised to meet the specifications derived from the analytical work and mounted on a test aircraft with 14 track analog pulse-to-pulse recording equipment.

The data acquisition systems and data flow are diagrammed and experimental procedures are outlined for a radar pulse ratio frequency of 2800 Hz and a pulse width of 0.5 microsec. The plane will follow head-on, zig-zag, and constant off-set flight paths toward the radar to test the jammer capabilities. D.H.K.

A82-13903 # **Fleet Flight Loads Survey monitoring and analysis techniques.** D. A. Rakin (Grumman Aerospace Corp., Bethpage, NY). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2461.* 12 p.

The F-14 Fleet Flight Loads Survey program collected data from operational fleet aircraft for the generation of full-scale fatigue test spectra and fatigue design criteria. Thirty-five channel tape recorders were installed in each of four fleet aircraft to measure aircraft kinematic parameters, surface position, and airframe strains. Computer software was developed to reduce the data to the form of exceedance plots and bivariate exceedance tabulations. Regression equations were generated from structural flight test data and used to generate exceedance plots of major airframe surface loads. J.F.

A82-13906 * # **Flight test experience with high-alpha control system techniques on the F-14 airplane.** J. Gera, R. J. Wilson, E. K. Enevoldson (NASA, Flight Research Center, Edwards, CA), and L. T. Nguyen (NASA, Langley Research Center, Hampton, VA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2505.* 22 p. 5 refs.

Improved handling qualities of fighter aircraft at high angles of attack can be provided by various stability and control augmentation techniques. NASA and the U.S. Navy are conducting a joint flight demonstration of these techniques on an F-14 airplane. This paper reports on the flight test experience with a newly designed lateral-directional control system which suppresses such high angle of attack handling qualities problems as roll reversal, wing rock, and directional divergence while simultaneously improving departure/spin resistance. The technique of integrating a piloted simulation into the flight program was used extensively in this program. This technique had not been applied previously to high angle of attack testing and required the development of a valid model to simulate the test airplane at extremely high angles of attack. (Author)

A82-13907 # **Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor.** W. M. Gibson (De Havilland Aircraft of Canada, Ltd., Downsview, Ontario, Canada). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, FLight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2507.* 8 p.

The DASH-8 is a 30- to 36-passenger high-wing T-tail STOL airliner, powered by two turboprop engines driving hydromatic four-bladed propellers with full blade angle control. The aircraft is designed to meet commercial market requirements in the passenger, cargo, and executive transport roles with concentration on aerodynamic cleanliness to produce an energy efficient aircraft with low operating costs. The STOL criteria are related to requirements for a 3000 ft field length. A microprocessor was selected to perform the onboard data analysis task for the DASH-8. Attention is given to the basic instrumentation system, the microprocessor data stream interface, data analysis by onboard computer, and examples of onboard data analysis. G.R.

A82-13908 # **Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers.** M. J. Burke and E. W. Ferris (Grumman Aerospace Corp., Calverton, NY). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2510.* 4 p.

Pilot 'overshoot' of the desired flight test conditions due to malfunctioning or inadequate cockpit displays has been a continuing problem. In addition, monitoring multiple parameters during dynamic maneuvers is difficult for the pilot. Structural flight testing utilizes indirect parameter ('g') for actual structural strain values resulting in poor predictability of strain values during a maneuver. A Microprocessor Crew Display (MCDS) was generated to meet this need. It consists of a 'bargraph' light emitting diode display, two CRT's and a caution/warning light. A total of five parameters can be selected and displayed at one time. Flight experience with the MCDS indicates more precise and quicker control of the aircraft, reduced probability of 'overshoot', increased flight safety and reduced flight test time. (Author)

A82-13910 * # **Direct strike lightning measurement system.** M. E. Thomas (NASA, Langley Research Center, Hampton, VA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2513.* 8 p. 6 refs.

A research data system developed for in-flight measurement of direct and nearby lightning-strike characteristics is described. The measurement system consists of a wide-band analog recorder which records the continuous lightning scenario and fast sample-rate digital transient recorders with augmented memory capacity for increased time resolution of specific times of interest. Electromagnetic sensors with bandwidths exceeding 100 MHz are used which respond to rates of change of the quantities being measured. Data system immunity from electromagnetic interference is accomplished by the use of a dynamotor for power isolation, shielded system enclosure and fiber-optic data links. (Author)

A82-13911 # **Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/.** J. Gallagher and R. D. Till (FAA, Technical Center, Atlantic City, NJ). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2514.* 9 p. 14 refs.

This paper describes instrumentation developed and flight testing conducted by the Federal Aviation Administration (FAA), Technical Center, to determine the suitability of RNAV systems for helicopter navigation. A data collection package consisting of a militarized minicomputer interfaced to aircraft sensors and RNAV systems typically representative of LORAN-C, GPS, Inertial Navigation, and Omega was designed and fabricated. A portable low cost position tracking system was devised for non-precision approach navigation tests by Kalman filtering post flight position data derived from a pulsed radar ranging system with inertial and air data measurements, resulting in improved position accuracy. (Author)

A82-13913 * # **Rotor systems research aircraft /RSRA/ rotor force and moment measurement system.** J. S. Burks (NASA, Ames Research Center, Moffett Field, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2516.* 12 p.

The two Rotor Systems Research Aircraft (RSRA) are flight vehicles with unique measurement capabilities. The primary goal of the RSRA is direct measurement of rotor forces and moments in flight. This is accomplished through a rotor force and moment measurement system comprised of load cells and/or hydro-pneumatic isolator units which are integral to the aircraft structure. Due to structural flexibility, the aircraft must undergo a physical calibration. A static calibration of the first RSRA has been completed, and data analysis has progressed through determination of a linear calibration algorithm. Design, development, and operation of the RSRA rotor force and moment measurement system and the Static Calibration Facility are described, and results of the calibration are presented. (Author)

A82-13916 # **The Air Force Flight Test Center - Utah Test and Training Range in the 1980's.** C. E. Adolph (USAF, Flight Test Center, Edwards AFB, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2487.* 9 p.

The Air Force Flight Test Center (AFFTC) conducts and supports manned and unmanned aircraft flight tests, development testing of parachutes, operates the Edwards Flight Test Range, the USAF Test Pilot School and the Utah Test and Training Range. This paper summarizes the evolutionary forces in the technical and management areas which gave impetus to today's methods of operation. Current capabilities and procedures are then described, followed by a discussion of improvements planned to meet the demands of the mid to late 1980's. (Author)

A82-13917 # **The need for, and development of, a simulation facility at the Naval Air Test Center.** B. L. Hildreth and A. C. Cruce (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2488.* 9 p.

Attention is given to the problem created by, on the one hand, rapidly rising test costs and, on the other, the increasing test requirements to satisfactorily evaluate systems of ever increasing complexity. A partial solution to this problem is to raise the productivity of the testing performed in terms of quantities of data gathered per dollar or per flight hour. Four benefits of a combined flight test/simulation program are cited: improved safety, increased productivity, ability to test modern, complex, highly integrated systems, and the capability to test system performance against simulated threat environments. The requirements for a facility design based on these factors are discussed, and the current progress of the Naval Air Test Center toward developing a facility to meet these requirements is covered. C.R.

A82-13919 * # **A unique integrated flight testing facility for advanced control/display research.** V. M. Batson, J. J. Hatfield (NASA, Langley Research Center, Hampton, VA), and N. E. Novack (NASA, Wallops Flight Center, Wallops Island, VA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2490.* 11 p. 13 refs.

NASA is engaged in programs aimed at developing avionic concepts and systems technology for air transportation systems of the 1980's and beyond. A part of these programs is related to the development of advanced concepts and avionics technology for integrated displays and controls. In support of these efforts an interactive Flight Display Research System (FDRS) has been developed as an integral part of integrated flight test facilities which have been used in evaluation studies of integrated display and control concepts in support of a VTOL Approach and Landing Technology (VALT) program and current Terminal Configured Vehicle (TCV) program. A description is provided of several of the advanced integrated display and control concepts that have evolved within the VALT, TCV, and general aviation programs, as well as the integrated flight test facilities. G.R.

A82-13921 # **Collection and simulation of spatial infrared signatures of military jet aircraft.** W. D. Foster and H. I. Register (USAF, Eglin AFB, FL). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2494.* 6 p.

The 3246th Test Wing at Eglin Air Force Base has developed airborne systems capable of collecting high resolution infrared data from ground and airborne targets. The beam approach seeker evaluation system includes test guidance units, spatial scanners, television cameras with missile track points and a laser ranger. Infrared target simulation is designed to reproduce the infrared spatial data collected by the high-resolution instrumentation system. The two approaches to this concept are the miniature filament approach and the thermochromics approach which uses VO2. S.C.S.

A82-13922 # **Flight testing the suspended maneuvering system.** R. K. Svec (McDonnell Douglas Corp., St. Louis, MO). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2498.* 8 p.

The Suspended Maneuvering System (SMS) has been developed as a rapid-response rescue vehicle that expands the capabilities and versatility of today's rescue methods. Suspended from a helicopter, the SMS is maneuvered horizontally by an onboard operator using an advanced thrust control system. This unique concept, an adaptation of modern aerospace technology, provides access to places considered inaccessible or hard to reach with conventional emergency equipment. Combating fires in high-rise buildings is one major SMS application. The flight test program concentrated on tests at a simulated high-rise building to develop the capability and techniques for 'docking' at windows and subsequent personnel entry and egress through the windows. (Author)

A82-13924 # **Improved techniques for the calibration and measurement of in-flight loads.** K. A. Birk and R. L. Kuebrich (McDonnell Aircraft Co., St. Louis, MO). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2502.* 10 p.

Techniques are presented for the calibration of strain gage bridge circuits installed in the F/A-18 wings. Methods are described which develop equations to solve for the traditional shear, bending moment, and torsional loads for a variety of flight conditions. The major improvements described are: the use of zone loading techniques to enhance strain gage slope determination from the calibration loads; the application of a family of flight equivalent distributed loads to better assess equation accuracy; and the formulation of computer aided analysis techniques which allow review of larger volume of data while requiring fewer manhours. (Author)

A82-13928 # **Overview of flight and ground testing with emphasis on the wind tunnel.** J. D. Whitefield (Sverdrup Technology, Inc., Tullahoma; Calspan Field Services, Inc., Arnold Air Force Station, TN), B. J. Griffith, R. W. Butler (Calspan Field Services, Inc., Arnold Air Force Station, TN), and C. Bang (USAF, Arnold Air Force Station, TN). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2474.* 11 p. 32 refs.

A general overview of the development of (1) aircraft and missiles, (2) the wind tunnel, and (3) the emerging role of computational techniques is given. Special comparisons between ground test data and flight data from aircraft, space vehicles, and reentry vehicles are made. The paper discusses some of the historical development of aircraft and ground testing with emphasis upon how computational fluid dynamic (CFD) techniques aid both the design and ground testing of flight vehicles. The speed regimes covered include low speed, the transonic regime, supersonic and reentry speeds. The methodology development made possible by the advent of CFD will be illustrated. Finally, likely future trends in ground test facility development, full-scale flight testing and CFD are discussed. The future role of ground testing and CFD in the development of aircraft and missiles in the 1980's and 1990's is assessed. (Author)

A82-13929 # **F-4 Advanced Avionics Flight Test.** H. A. Tracy (USAF, Eglin AFB, FL). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2464.* 6 p.

Testing the integration of a new digital avionics navigation and weapon delivery system, including the interface with its sensors, into an aging aircraft with an analog system can be filled with problems. During previous flight tests, a 3/1 ratio of flown/productive flights was experienced. A current productivity rate approaching 100% can be related to pre-mission testing of software, and real-time display of test data. Pre-mission testing consists of loading the test software into a test simulator, and performing simulated tasks to verify operation of the test software prior to loading it into an aircraft for flight. Real-time display of test data is accomplished by inserting a software overlay into the airborne computer which outputs data to an external instrumentation pod, where the data are recorded and transmitted via microwaves to the ground control facility. The displayed data include switch settings, system errors, ground track of the aircraft, and software discretes. (Author)

A82-13930 # **F/A-18 high authority/high gain digital flight control system development and flight testing.** R. A. Burton and B. T. Kneeland, Jr. (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2465.* 8 p. 6 refs.

The F/A-18 airplane employs a fly-by-wire, full authority/high gain digital flight control system (FCS) which at times can completely dominate aircraft response to pilot inputs, resulting in higher order system responses that are a new and significant challenge for the flight test engineer to analyze. This paper overviews the development of the F/A-18 digital FCS, detailing changes to the programmable read only memory (PROM) flight control laws to correct flying qualities problems. In addition, a summary of the advanced stability and control test techniques and data analysis procedures used are presented and it is demonstrated how these techniques can quantify complex changes in flight control laws. These techniques consist of a maximum likelihood parameter identification program used to perform an equivalent system analysis. Data are presented which demonstrate the success the airframe contractor has had in reducing overall system equivalent time delays. (Author)

A82-13931 * # **The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane.** J. L. Baer-Riedhart (NASA, Flight Research Center, Edwards AFB, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2467.* 10 p. 8 refs.

The Highly Maneuverable Aircraft Technology airplane is a .44-scale version of an advanced fighter design. It is remotely piloted from a ground cockpit and is powered by a J85-GE-21 turbojet engine. The engine is electronically controlled by a digital computer onboard the airplane to operate at selected engine operation modes. The HiMAT design and development philosophy emphasized high-risk, low-cost and minimum testing, and also required that no single failure would cause loss of the vehicle. This philosophy generated unique requirements for design, computer simulation methods, specialized test techniques, and support systems which are discussed in this paper. (Author)

A82-13936 # **Comparison of low-speed handling qualities in ground-based and in-flight simulator tests.** M. F. C. van Gool (Nationaal Lucht- en Ruimtevaarlaboratorium, Amsterdam, Netherlands) and N. C. Weingarten (Calspan Advanced Technology Center, Buffalo, NY). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2478.* 9 p. 9 refs. Research supported by the Nederlands Instituut voor Vliegtuigontwikkeling en Ruimtevaart and Rijksluchtvaartdienst; Contract No. F33615-79-C-3618.

Approaches and landings have been carried out using the Total In-Flight Simulator (TIFS) to validate results of experiments on a ground-based simulator in which handling qualities of transport aircraft equipped with advanced flight control systems were the subject of investigation. The configurations featured rate-command/attitude-hold in the pitch and roll axes. Variation of equivalent short-period frequency, pitch rate overshoot, value of the normal acceleration sensitivity parameter, direct lift control, roll damping and roll time delay was studied. The results indicate that the ground-based investigation predicted the outcome of the in-flight experiments very well with the exception of the case with direct lift control in which objectionable normal accelerations were felt in flight that were not noticed during the ground-based simulation. (Author)

A82-13938 * # **Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA.** V. C. Stevens, D. W. Riddle, J. L. Martin, and R. C. Innis (NASA, Ames Research Center, Moffett Field, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2480.* 16 p. 10 refs.

A moving base carrier landing flight simulation using NASA's Quiet Short-Haul Research Aircraft (QSRA) was conducted during the design and fabrication of the QSRA. After completing its initial flight testing, the QSRA flew simulated carrier landings on land, followed by actual carrier landings at sea. This paper compares the simulated flight characteristics used in the flight simulation (using an aircraft math model based on wind tunnel data) with the aircraft flight characteristics obtained from flight test data. This paper also compares the results of the QSRA flight simulation carrier landings, the land based simulated carrier landings, and the actual carrier landings. (Author)

A82-13939 * # **A large-scale investigation of engine influence on inlet performance at angle-of-attack.** B. K. Hodder, B. W. Farquhar (Boeing Commercial Airlane Co., Seattle, WA), and M. R. Dudley (NASA, Ames Research Center, Moffett Field, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2481.* 13 p. 6 refs.

A low-speed wind tunnel test was conducted in the NASA/Ames 40-x-80-foot wind tunnel to investigate the effect of engine/inlet flowfield interaction on inlet performance near flow separation. The effect of engine/inlet flowfield interaction was determined by comparing the performance of a large-scale subsonic inlet (CR = 1.26) close-coupled and remote-coupled to a TF-34 turbofan engine. The remote coupled inlet configuration removes the influence of the engine on the inlet flowfield and further, typifies conventional small-scale inlet test techniques which generally provide no simulation of turbomachinery effects. Test results indicated that engine interaction allows the inlet to operate with lower distortion levels at and beyond the separation angle-of-attack attained without engine interaction. (Author)

A82-13940 # **Naval Weapons Center - Test and evaluation in the 1980's.** R. V. Boyd (U.S. Naval Weapons Center, China Lake, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2485.* 10 p.

The Naval Weapons Center (NWC) at China Lake, CA, has test and evaluation missions that include strike weapons for land and sea targets, air-to-air systems, antiradiation missiles, and antiship missile defense systems. NWC facilities are outlined, noting current programs that comprise new warheads, propulsion systems, guidance and control units, and missiles with extended range, higher speeds, and multiple target capability. Modernization efforts comprise an on-axis data system, a real-time radar/optics system for precision space position, velocity, and acceleration measurements, a metric video TV system, a telemetry data acquisition system, upgraded range communication, timing and control systems, and airspace surveillance system enhancement. A range control center, centralized and technically current, will provide direct support for weapons testing, provide test data packaging, and be able to support several simultaneous tests. D.H.K.

A82-13941 # **Two at a time - Flight test plans for the new Boeing airliners.** B. S. Wygle (Boeing Co., Seattle, WA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2378.* 5 p.

Contracts regarding the sale of a new 200-passenger medium-range airliner and a 170-passenger short- to medium-range airliner led to a situation in which the first airliner of one type is to be delivered in January 1983, about five months after delivery of the first aircraft of the other type. The flight test programs will substantially overlap during 1982 and create an unprecedented work level during that year. To manage the work load, the company has developed a flight test computer system and a training program for engineers. Remote test sites have been selected to provide good weather conditions and low traffic levels. G.R.

A82-13942 # **Operational evaluation of the new generation of jet transport aircraft.** C. R. Foster (FAA, Seattle, WA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2377.* 12 p.

Within the Lead Region for Transport Aircraft, the FAA is upgrading its capability for operational evaluation of the new generation of transport aircraft. The responsibilities of the Certification and Flight Standards Divisions are described with emphasis on the role of the FAA's Aircraft Evaluation Groups (AEG). The AEG's ensure that the necessary FAR 121, 91, 61 and other operating rules can be met by new aircraft at the time the aircraft enter line service. The AEG's also address aircraft operations policies described in FAA advisory material, or ICAO standards for airport, facility and ATC compatibility. Specific topics covered include the type rating, training and maintenance programs, minimum equipment lists, crew workload and crew complement evaluation, and continued operational support after entry into service. (Author)

A82-13944 # **Flight test concept evolution.** L. G. Van Pelt (USAF, Eglin AFB, FL). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2375.* 11 p.

A chronicle of progress in flight test philosophy is very revealing. Ever-increasing emphasis has been placed upon the need for flight test to be thorough and still meet the need for timely introduction of effective new aircraft into the operational inventory. Major flight test concepts (Phase Testing, Category Testing, and Development Test and Evaluation/Operational Test and Evaluation) have been influenced by nuances such as concurrency, fly-before-buy, total package procurement, prototyping, competitive fly-off, etc. An understanding of these experiences and lessons learned will help in today's preparation of effective and efficient test programs. (Author)

A82-13945 # **Electro-optical vector scoring system.** R. Rackauskas (U.S. Navy, Pacific Missile Test Center, Point Mugu, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2373.* 6 p.

An electrooptical vector scoring system has been developed for miss-distance scoring in fleet training exercises and for the testing and evaluation of weapon systems. The system utilizes solid state light emitting GaAs diodes which emit extremely short pulses of infrared radiation at 0.9 micron wavelength. The raw data obtained (range, azimuth angle, time) can be used to determine the relative velocity vector. A line drawn perpendicular to the relative velocity vector that passes through the center of the vector scoring system determines the miss distance. Score data is telemetered to a ground computer that computes velocity vector, miss distance, and the missile's attitude angle relative to the target. S.C.S.

A82-13946 * # **The development and use of a computer-interactive data acquisition and display system in a flight environment.** G. A. Bever (NASA, Flight Research Center, Edwards, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2371.* 16 p. 6 refs.

The flight test data requirements at the NASA Dryden Flight Research Center increased in complexity, and more advanced instrumentation became necessary to accomplish mission goals. This paper describes the way in which an airborne computer was used to perform real-time calculations on critical flight test parameters during a flight test on a winglet-equipped KC-135A aircraft. With the computer, an airborne flight test engineer can select any sensor for airborne display in several formats, including engineering units. The computer is able to not only calculate values derived from the sensor outputs but also to interact with the data acquisition system. It can change the data cycle format and data rate, and even insert the derived values into the pulse code modulation (PCM) bit stream for recording. (Author)

A82-13947 # **Automatic digital gain ranging.** E. G. Hanson (Grumman Aerospace Corp., Bethpage, NY). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2370.* 5 p. 13 refs.

A logic circuit has been patented that automatically up-scales and down-scales digitized voice or data transmissions in response to variations in input amplitude. Although it was originally developed to compress flight test telemetry data, the circuit can also be used advantageously in 'companding' (data or voice compression and expansion) applications that are widely encountered in the communications industry. In this specialized application the circuit can be made to yield a close approximation to the 'mu-law' characteristic which is an accepted standard in this country. Complementary logic circuitry will also be described for expanding compressed digital transmissions to their original linear digital form. (Author)

A82-13948 # **The Advanced Range Instrumentation Aircraft improvement and modernization program.** J. S. Nash (USAF, Systems Engineering Branch, Wright-Patterson AFB, OH). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2368.* 4 p.

The Advanced Range Instrumentation Aircraft (ARIA), seven EC-135 aircraft configured for reception, recording and real-time relay of telemetry data, are being retrofitted with new instrumentation to meet user's requirements for mobile telemetry collection and retransmission through the turn of the century. Two sets of ARIA Prime Mission Electronic Equipment have been transferred to C-135B aircraft with TF-33 fan engines. Additional conversions will utilize Boeing 707-320Cs. Instrumentation changes include new recorders, antennas, antenna control systems, feeds, tracking systems and telemetry receivers. (Author)

A82-13949 # **Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis.** J. A. Tabb (Lockheed-Georgia Co., Marietta, GA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2367.* 9 p.

This paper describes the more innovative features of the Lockheed Airborne Data System (LADS), and provides some insight into the high performance and cost effectiveness realizable by use of multiple processors in real-time data systems. LADS uses multiprocessors in a highly distributed configuration to control, verify, process, analyze and display data in real-time on board the test aircraft. The approach is to use remotely located signal-conditioner/multiplexer modules controlled in groups by distributed microcomputers which preprocess all incoming data. These microcomputers are synchronously controlled by a central data station which provides digital, analog, video and graphics displays of calibrated (engineering units) data in real-time to on-board test personnel. The airborne system includes an integral analysis computer station with graphics and hard-copy for real-time analysis. (Author)

A82-13955 # **F/A-18 Flight Test program overview - 1 September 1981.** E. R. Shields (McDonnell Aircraft Co., St. Louis, MO). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2351.* 9 p.

This report presents a F/A-18 Flight Test program overview including a discussion of pre-flight planning objectives. The flight envelope expansion program proceeded, subsequent to first flight, accumulating in excess of 2,600 flight hours in 24 months. Initial shipboard trials were completed successfully aboard the USS America. Navy/Marine pilot participation provided early customer inputs to the flight development process. Currently, the flight test program is nearing completion. Service Acceptance Trials and Navy Operational Evaluation are to be conducted during 1982. (Author)

A82-13956 # **Navstar Global Positioning System flight test program overview.** A. J. MacMillan (Aerospace Corp., El Segundo, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2350.* 9 p. Contract No. F04701-80-C-0081.

The Navstar Global Positioning System (GPS), which is now in the full-scale engineering development phase, is discussed. An overview of the program, including brief descriptions of the purpose of the program and of each of the three segments (space, control, and user equipment) is given. A description is also given of the test range at Yuma Proving Ground, Arizona, including the real-time laser tracking system. The development test and evaluation phase, extending from 1977 to 1979, is described, and some of the important results are presented. C.R.

A82-13962 # **Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition.** R. J. Kingsley (Avco Corp., Avco Systems Div., Wilmington, MA) and J. D. Reuter (Pioneer Parachute Co., Inc., Manchester, CT). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1928.* 9 p.

This paper describes a program of analysis and test to develop a lifting parachute to provide ground dispersion for an assemblage of tactical munitions when air launched at low altitudes. A parachute lift-to-drag ratio of 0.3 to 0.4 will provide acceptable pattern length and width. Experiments were begun with parachutes of both ribbon and cruciform designs, but unusual packaging restrictions eliminated the ribbon design. Full-scale parachutes were first evaluated for low-speed lift performance, and then tested in a transonic wind tunnel. Free flight tests were performed with a stack of four munitions using a special rail-launched booster rocket facility. The sequencing, or spacing, of each munition in a stack is a critical factor in achieving optimum ground pattern and avoiding collision. (Author)

A82-13963 # Theoretical analysis of wake-induced parachute collapse. H. R. Spahr and D. F. Wolf (Sandia National Laboratory, Albuquerque, NM). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1922.* 8 p. 16 refs. Research supported by the U.S. Department of Energy.

During recent drop tests of a prototype weapon system, the parachute collapsed soon after it became fully inflated. The magnitude and duration of the collapses were severe enough to degrade parachute performance drastically. A computer-assisted analysis is presented which models parachute inflation, forebody and parachute wake generation, and interaction between the wake and the inflating or collapsing parachute. Comparison of the analysis results with full-scale drop test results shows good agreement for two parachute sizes; both parachutes were tested with and without permanent reefing. Computer-generated graphics (black and white drawings, color slides, and color movies) show the forebody and inflating parachute, the wake, and the wake and parachute interaction. (Author)

A82-13966 # Escape systems decelerator technology. D. N. DeSimone (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). *American Institute of Aeronautics and Astronautics, Aerodynamic Decelerator and Balloon Technology Conference, 7th, San Diego, CA, Oct. 21-23, 1981, Paper 81-1913.* 4 p.

The development of escape system technology is considered, taking into account initial ejection seat concepts during World War II, safe parachute operation following escape from the aircraft, fatality rates among ejectees, and major modification programs during the mid- to late-1960's. Advances in military parachute technology are considered, and technological problems associated with drogue stabilization parachutes are examined. Attention is given to characteristics which are commonly encountered with today's escape system decelerator. There is found to be a need for advancements in the state-of-the-art in escape system decelerator technology. G.R.

A82-13968 * # Modeling procedures for handling qualities evaluation of flexible aircraft. K. S. Govindaraj, B. J. Eulrich, and C. R. Chalk (Calspan Advanced Technology Center, Buffalo, NY). *Institute of Electrical and Electronics Engineers, Annual Allerton Conference on Communication, Control, and Computing, 19th, Monticello, IL, Sept. 30-Oct. 2, 1981, Paper.* 11 p. NASA-supported research; Contract No. F33615-79-C-3618.

This paper presents simplified modeling procedures to evaluate the impact of flexible modes and the unsteady aerodynamic effects on the handling qualities of Supersonic Cruise Aircraft (SCR). The modeling procedures involve obtaining reduced order transfer function models of SCR vehicles, including the important flexible mode responses and unsteady aerodynamic effects, and conversion of the transfer function models to time domain equations for use in simulations. The use of the modeling procedures is illustrated by a simple example. (Author)

A82-13969 * # Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel. W. H. Reed, III (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA). *Deutsche Gesellschaft für Luft- und Raumfahrt and Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, International Symposium on Aeroelasticity, Nürnberg, West Germany, Oct. 5-7, 1981, Paper.* 17 p. 47 refs.

In 1955, work was started on the conversion of a subsonic wind tunnel to a 16-foot transonic tunnel with Freon-12 or air as the test medium. The new facility, designated the Transonic Dynamics Tunnel (TDT), became fully operational in 1960. A description is presented of aeroelastic testing and research performed in the TDT since 1960. It is pointed out that wind-tunnel tests of aeroelastic models require specialized experimental techniques seldom found in other types of wind-tunnel studies. Attention is given to model mount systems, launch vehicle models, aircraft models, aircraft buffet, gust response, stability derivative measurements, and subcritical testing techniques. Aspects of vehicle development testing are considered along with aeroelastic 'fixes', aeroelastic 'surprises', approaches for controlling aeroelastic effects, and unsteady pressure measurements. G.R.

A82-13971 * # The development of cryogenic wind tunnels and their application to maneuvering aircraft technology. E. C. Polhamus and R. P. Boyden (NASA, Langley Research Center, Hampton, VA). *NATO, AGARD, Symposium on Combat Aircraft Maneuverability, Florence, Italy, Oct. 5-8, 1981, Paper.* 13 p. 20 refs.

Cryogenic wind tunnels are considered as a means of studying high Reynolds number (Re) complicated flows encountered by high maneuvering lift and high angles of attack characteristic of modern fighter aircraft. Large decreases in the viscous force while the inertial force remains constant are provided by the use of cryogenic facilities. A 2.5 m square tunnel is nearing completion at the National Transonic Facility (NTF), and will be driven by synchronous motors having a total power of 120,000 hp. The tunnel, using N2 as the cryogenic fluid, will allow large Re sweeps at constant dynamic pressure and dynamic pressure, and aeroelastic sweeps at constant Re; full altitude (air density) and acceleration force simulation will also be possible. Advances in model and strain gage balance technologies for use at the NTF are outlined, and experiments with buffet are described. M.S.K.

A82-13972 * # The integration of control and display concepts for improved pilot situational awareness. L. H. Person, Jr. and G. G. Steinmetz (NASA, Langley Research Center, Hampton, VA). *Flight Safety Foundation, International Air Safety Seminar, 34th, Acapulco, Mexico, Nov. 9-12, 1981, Paper.* 18 p.

Consideration is given to a part of the Langley Terminal Configured Vehicle program in which the pilot is retained as an active segment of an integrated system. The pilot is active in the outer control loop and controls the orientation of the aircraft velocity. The pilot thus has a task, but a low workload. Attention is also given to first- and second-generation primary flight display for horizontal and vertical situation awareness. S.C.S.

A82-13973 * # Jet V/STOL wind-tunnel simulation and groundplane effects. R. J. Margason (NASA, Langley Research Center, Subsonic Aerodynamics Branch, Hampton, VA). *NATO, AGARD, Symposium on Fluid Dynamics of Jets with Applications to V/STOL, Lisbon, Portugal, Nov. 2-6, 1981, Paper.* 22 p. 55 refs.

Low-speed wind-tunnel testing of V/STOL aircraft concepts to determine the aerodynamic-propulsion interaction effects during the transition between hover and wingborne flight is a necessary step in the development cycle of this type of aircraft. Powered models are normally used to determine the aerodynamic performance characteristics. This paper examines some of the pretest preparation necessary to define the objectives of an appropriate investigation. Several factors which influence the selection of the model concept and the engine simulator are discussed. In addition, some of the test techniques important for this class of aircraft model are examined. Finally, the paper reviews some of the wind-tunnel wall effects important to this type of aircraft testing with special emphasis on groundplane effects. (Author)

A82-13974 * # Progress in aeronautical research and technology applicable to civil air transports. R. E. Bower (NASA, Langley Research Center, Hampton, VA). *International Meeting on Transportation Research: State of the Art Perspectives and International Cooperation, Amalfy, Italy, Nov. 11-14, 1981, Paper.* 51 p.

Recent progress in the aeronautical research and technology program being conducted by the United States National Aeronautics and Space Administration is discussed. Emphasis is on computational capability, new testing facilities, drag reduction, turbofan and turboprop propulsion, noise, composite materials, active controls, integrated avionics, cockpit displays, flight management, and operating problems. It is shown that this technology is significantly impacting the efficiency of the new civil air transports. The excitement of emerging research promises even greater benefits to future aircraft developments. (Author)

A82-13975 # **Flight vibration optimization via conformal mapping.** F. D. Bartlett, Jr. (U.S. Army, Structures Laboratory, Hampton, VA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Paper.* 11 p. 7 refs.

An analytical approach based on the principle of conformal transformations is presented for evaluating the effects of structural dynamic changes on flight vibrations. Structural dynamic changes are characterized by discrete and multidimensional impedance adjustments. Discrete impedance changes such as point mass, colinear stiffness, and dynamic absorbers are emphasized to illustrate the practical aspects of the approach for flight vibration optimization. Conformal mapping, through inspections of complex-plane response circles, offers the capability for rapid evaluation of discrete impedance change effects on flight vibrations. The operational equations require only baseline vibration data and impedance change dynamics. Specific criteria for reducing vibrations are established using the response circle equations. In addition, the required impedance change to achieve minimum or zero vibration is uniquely defined. Flight vibration optimization is illustrated using a remote absorber in conjunction with AH-1G helicopter ground and flight vibration measurements. Vibration reduction and absorber performance are assessed at several flight conditions and airframe stations. (Author)

A82-13990 # **A set of finite elements developed for the dynamic computation of composite helicopter blades.** L. Simon (Société Alkan, Valenton, Val-de-Marne; ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Institution of Mechanical Engineers, National Engineering Laboratory, and Paisley College of Technology, International Conference on Composite Structures, Paisley, Scotland, Sept. 16-18, 1981.) ONERA, TP* no. 1981-87, 1981. 16 p. 10 refs.

The paper proposes the creation of a set of finite elements for the computation of the eigenmodes of a helicopter rotor or airscrew blade made of composite materials in rotation or at rest. Isoparametric thick shell type elements are formulated to obtain degrees of freedom on the blade airfoil skeleton. The stiffness and consistent mass elements are presented to allow the computation of the eigenmodes of the clamped structure at rest, and the convenience of discretizing the terms of the variational formulation is demonstrated. Centrifugal effects giving a centrifugal stiffness element are used to determine the quasi-static equilibrium position, which can then determine the prestress due to spinning effects. Finally, the gyroscopic eigenvalue problem is developed, and numerical results are compared with experimental results for a tilt-rotor blade aeroelastic model. D.L.G.

A82-13992 # **Application of the ONERA dynamic stall model to a helicopter blade in forward flight.** C. T. Tran (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France) and D. Falchero (Société Nationale Industrielle Aérospatiale, Marignane, Bouches-du-Rhône, France). *(Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981.) ONERA, TP* no. 1981-89, 1981. 26 p. 12 refs.

A single blade analysis for a helicopter rotor in hover and in forward flight is developed, which applies the unsteady aerodynamics of the ONERA two-dimensional dynamic stall model. The stability of the aeroelastic system is studied by means of the Floquet theory, and it is shown that the subharmonic oscillation and almost periodic oscillation of the Floquet modes can readily occur. Periodic responses for the quasi-steady and unsteady calculations are compared, and it is found that while the blade normal lift force distribution is insensitive to unsteady effects, the blade aerodynamic pitching moment and the torsional response are subjected to more influence of the unsteady aerodynamic pitching moment damping and time delay effects. It is concluded that the introduction of the blade flap and lead-leg elastic deformations should present no difficulty in principle by a modal superposition of the blade's normal modes. D.L.G.

A82-13993 # **Development of an MLS lateral autoland system with automatic path definition.** A. A. Lambregts (Boeing Commercial Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Guidance and Control Conference, Albuquerque, NM, Aug. 19-21, 1981, Paper 81-1751.* 8 p. 5 refs.

The new Microwave Landing System will provide extended aircraft guidance capability in the terminal area. To utilize this capability effectively requires that the approach path be defined. This paper describes the development and simulator evaluation of an MLS lateral autoland control algorithm, using automatic path definition. The algorithm connects the initial approach path to the extended runway centerline, using straight and constant radius turn segments. The path is executed by a linear track and a novel circular turn control law to capture a straight track using MLS azimuth and DME signals. The algorithm eliminates maneuver transients when switching to MLS guidance and avoids external path definition inputs. (Author)

A82-14042 # **Aircraft absorbers - Promise and practice.** A. O. Andersson (Boeing Commercial Airplane Co., Seattle, WA). *Acoustical Society of America, Meeting, 101st, Ottawa, Canada, May 18-22, 1981, Paper.* 21 p.

Attention is given to the application of sound absorbers to aircraft engine ducts. Fan duct application is discussed with reference to the frequency spectrum of fan noise, the wave number spectrum of fan noise, and both local and extended reactions to lining types. The design of duct linings is examined, noting a number of analysis techniques for non-uniform ducts and linings. The impedence meter is considered for non-destructive testing of curved lining panels, and possibilities for mode measurements for lining design are reviewed. S.C.S.

A82-14043 # **Impedance modeling of acoustic absorbing materials for aircraft engine applications.** L. W. Dean, III (United Technologies Corp., Commercial Products Div., East Hartford, CT) and W. P. Patrick (United Technologies Research Center, East Hartford, CT). *Acoustical Society of America, Meeting, 101st, Ottawa, Canada, May 18-22, 1981, Paper.* 51 p. 65 refs.

A review of conditions under which impedance is a useful concept in solving the problem of wave propagation in a duct with flow is presented with illustrative examples. Organized procedures for modeling single and multiple degree of freedom configurations both of the lumped and distributed parameter type are discussed, and data and model predictions are compared for some specific configurations. Assumptions usually made in the modeling process are pointed out, and the effect of the assumptions, particularly on the comparisons with data, are evaluated. Improved impedance models, developed more recently, are reviewed and compared with previous models and with impedance tube data. Included in the discussion are models for bulk absorber materials compatible with aircraft engine environments. (Author)

A82-14354 **Fighters - Improving the breed.** G. Warwick. *Flight International,* vol. 120, Nov. 7, 1981, p. 1369, 1370, 1374, 1375.

Performance capability gains are projected in light of structural and weapon system modifications to the F-15 and F-16 aircraft. The conversion of the F-16 to the F-16E variant entails the addition of two fuselage plugs that lengthen the fuselage by 56 in., and the bolting on of a double-delta wing having 120% greater area than the present one. Together, these modifications increase internal fuel capacity by 82%, representing 124% greater range for the same payload. Attention is also given the staged development and retrofit of day/night, all-weather air defense and ground attack F-16 electronics. The modifications contemplated for the F-15E two-seat variant include synthetic aperture radar (SAR) and a rear cockpit equipped with CRT displays for radar, forward-looking infrared (FLIR), threat warning, and a computer-generated tactical map. O.C.

A82-14363 **Trim tab excitation system for the BAe 146.** P. Lawson (Cranfield Institute of Technology, Cranfield, Beds., England). *Aircraft Engineering,* vol. 53, Oct. 1981, p. 12.

An account is given of the design of an aileron and elevator trim tab controlled excitation system which would assist in BAe 146 control surface flight clearance trials. For the flutter trials to be valid, it was necessary to devise an excitation system which would fit into wing and tailplane structures without their modification. In order to provide an effective fail safe system against electrical or hydraulic failure, the trim tab centralizing mechanism exceeds the actuator stall load by more than 2:1, which in the case of the elevator requires about 5,000 lbs of axial thrust. The mechanism employed comprises a spring-loaded toggle linkage operating a wedge into the side of the main actuator piston. Bench tests show an adequate system response over the 1-60 Hz frequency range required. O.C.

A82-14364 **The protection of gas turbine blades - A platinum aluminide diffusion coating.** R. G. Wing (Rolls-Royce, Ltd., Leavesden, Herts., England) and I. R. McGill. *Aircraft Engineering,* vol. 53, Oct. 1981, p. 15-21. 17 refs.

The combination of high turbine operating temperatures and the presence of ingested sulphate and chloride salts in the marine environments in which ships, hovercraft and helicopters operate can lead to the costly hot corrosion of turbine blades. A discussion is presented of the use of platinum aluminide coatings to protect super-alloy turbine blades from both oxidation and hot corrosion with greater effectiveness than nickel aluminide diffusion coatings. Because of the problems of poor adherence, high porosity and hardness associated with the use of electroplating in the application of the initial platinum coating to nickel-based super-alloy blades, a fused salt platinum deposition process has been developed. The aluminizing of this base layer is conducted at temperatures below 800 C, yielding a 50-micron platinum aluminide layer of which only the outer two microns are pure, with greater depths containing a beta-nickel aluminum intermetallic. Burner rig test results in which contaminants representative of marine environment conditions are reported for the cases of two coatings produced by the new deposition method, JML-1 and -2. O.C.

A82-14365 **Attack on superalloys by chemical and electrolytic processes.** H. Simon and M. Thoma. *Aircraft Engineering,* vol. 53, Oct. 1981, p. 22-25.

In the course of such turbine aircraft engine production and overhaul surface treatment processes as electrolytic degreasing, chemical and electrochemical etching, chemical descaling and chemical stripping of thermally sprayed coatings, the precipitation-hardened nickel- and cobalt-base alloys of the highest-temperature turbine elements are subjected to corrosion. This effect is due to the carbide, nitride and carbonitride intermetallics formed by alloying elements added for precipitation hardening, which appear as inclusions of various shapes and sizes within the grain or at the grain boundaries. It is shown that these intermetallics, present as separate phases, can be dissolved out by oxidative attack. Backscattered electron and X-ray analyses of seven nickel- and cobalt-base materials lead to the conclusion that certain processes or process steps cannot be employed in production and overhaul, and alternative processing methods are suggested. O.C.

A82-14376 # **Status and tracking system for flight test data products.** R. Large, W. May, and D. O'Keefe (USAF, Flight Test Center, Edwards AFB, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2395*. 13 p.

A flight test data product status and tracking (SANDT) system has been developed and used by the Air Force Flight Test Center. Initially used in support of the Air Launched Cruise Missile Program, the SANDT has recently been applied to F-15 testing. The SANDT makes use of System 2000 Data Base Software on the Center's CDC CYBER 74 scientific computer. The paper will discuss the requirements, design alternatives, resource use, and operating experience to date. Results include improved data support planning, flexibility in supporting dissimilar flight test program, and integration of data processing with status reporting. (Author)

A82-14377 # **An advanced facility for processing aircraft dynamic test data.** D. J. Stouder (Douglas Aircraft Co., Long Beach, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2398*. 10 p.

Capabilities of the Acoustics and Vibration Data Center (AVDC) are described, using examples from various flight and laboratory tests related to commercial and military jet transports. Features such as the one-third-octave-band spectrum analysis and the narrow-band spectrum analysis, which were developed to derive noise intensity and annoyance parameters, are discussed. The paired-signal analysis for studying input-output problems, and audio presentation are also described. In addition, future developments are summarized, including the integration of the AVDC with the main flight-test data processing facility. D.L.G.

A82-14379 * # **Experience with flight test trajectory guidance.** M. R. Swann, E. L. Duke, E. K. Enevoldson, and T. D. Wolf (NASA, Flight Research Center, Edwards, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2504*. 8 p. 5 refs.

A system that provides the test pilot with flight test trajectory guidance is presently evolving at the NASA Dryden Flight Research Facility. In use, this system has resulted in discernible improvements in the ease and accuracy with which pilots have approached and maintained the desired flight test conditions or trajectories. This paper describes the use of the guidance system in several past flight programs at Dryden, including the F-111 TACT program, the F-15 airframe/propulsion system interaction program, the F-15 cone transition and boundary layer experiments, and the Space Shuttle tiles flight test program. (Author)

A82-14380 # **Pave Mover Flight Test Program.** D. E. Holberg and J. F. Grabowsky (Hughes Aircraft Co., Los Angeles, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2482*. 11 p. USAF-DARPA-sponsored research.

Pave Mover is an Advanced Development Model Program performed by Hughes Aircraft Company and sponsored by the Rome Air Development Center and DARPA; it is currently under test at White Sands Missile Range, New Mexico. The system consists of an F-111E aircraft carrying a long range MTI/SAR radar and a ground based data processing and control system connected by a two-way Sperry data link. Pave Mover is the radar portion of the DARPA-conceived Assault Breaker concept demonstration designed to counter a massive attack of tank forces by radar updated surface-to-surface missiles equipped with anti-tank submunitions. During the demonstration it is also intended to track and guide air-to-surface missiles and manned attack aircraft. After a brief system description, the paper discusses flight test aspects, such as aircraft modification, the removable radar/pallet design, simulated targets, remotely controlled tank targets, missile simulation using an F-4 aircraft, the accuracy reference instrumentation, and various software simulators used in preparation for the tests. (Author)

A82-14381 * # **In-flight deflection measurement of the HiMAT aeroelastically tailored wing.** V. M. DeAngelis (NASA, Ames Research Center, Edwards, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2450*. 11 p.

An electro-optical flight deflection measurement system was developed for NASA for use on the highly maneuverable aircraft technology (HiMAT) remotely piloted research vehicle (RPRV) to provide a means of evaluating the performance of the HiMAT's aeroelastically tailored composite wing and canard. A description of the flight deflection measurement system is presented from a user's viewpoint and includes the general method of operation, system capabilities and limitations, method of installation on the HiMAT vehicle, and calibration of targets. Also included is a general description of the HiMAT RPRV and its design goals. Preliminary flight deflection and bending moment data were obtained at Mach 0.8 and were extrapolated to the Mach 0.9 maneuver design condition for comparison to NASTRAN predictions and ground loads test results. The preliminary flight test results tended to agree with the results obtained from the static ground loads tests, that is, that the NASTRAN model overpredicted the streamwise twist of the composite outer wing panel. (Author)

A82-14382 * # **A review of flight-to-wind tunnel drag correlation.** E. J. Saltzman and T. G. Ayers (NASA, Flight Research Center, Edwards, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2475*. 19 p. 46 refs.

Comparisons are made of wind-tunnel-model and flight drag data for various configurations representing aircraft from the mid-1940s to the 1970s. Discrepancies between model and flight data such as Reynolds number effects, wall interference, and aeroelastic problems are discussed. String support effects and the inability of models to simulate surface deflections for longitudinal trim are also studied. A wind tunnel-to-flight correlation of turbulent friction drag confirms the incompressible Karman-Schoenherr variation of turbulent skin friction with Reynolds number and the T' method for accounting compressibility effects. NASA tested 10 deg cone research indicates that model tests which are affected by tunnel noise may require the lower disturbance level environment available in flight, and it is concluded that new cryogenic facilities will improve the fidelity of model simulations of full-scale flight flow phenomena. D.L.G.

A82-14383 * # **Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass.** M. B. Meyer (NASA, Flight Research Center, Edwards, CA) and F. Jiran (Fred Jiran Glider Repairs, Mojave, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2445.* 15 p. 5 refs.

The concept of using foam and fiberglass reinforced plastic to modify airfoils and fairings was applied successfully to high-speed aircraft at NASA Dryden Flight Research Center. An on-aircraft installation method was used to modify an F-15 wing glove and wing leading edge and an F-104 flap trailing edge in support of the Shuttle tile airload tests. A combination of methods, both an on-aircraft installation and an off-aircraft fabrication for installation on the aircraft, was used to modify a section of an F-111 supercritical wing with a natural laminar flow airfoil. Techniques, methods, problem areas, and recommendations are presented which indicate that using foam and fiberglass to modify airfoils and fairings on high-speed aircraft is a viable means of quickly developing airfoils and fairings with desired aerodynamic characteristics with little risk to the parent or carrier aircraft. (Author)

A82-14384 # **KC-10, flight test program management - The contractor's viewpoint.** J. L. Cook (Douglas Aircraft Co., Long Beach, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2380.* 4 p.

The management of a flight test program for the KC-10 aerial refueling tanker aircraft, which included elements of development, FAA certification and Air Force qualification and operational testing, is described. In addition to the manufacturer and the FAA, the participants included the Joint AFLC/AFCS Program Office (JPO), the Air Force Primary Test Organization, and the Air Force Test and Evaluation Center. The flight test program involved not only tanker and receiver aircraft qualifications and operational evaluations, but also air crew training, ground crew training, tech order validation, maintainability demonstrations, human factors tests, support equipment compatibility validations, cargo loading demonstrations, and acceptance test procedure validations. It was found that a division of authority between the Air Force and the FAA was highly effective, and that parallel, rather than series development testing is essential to efficient test programs. O.C.

A82-14385 # **62% manned aircraft demonstrator - Next generation trainer.** W. H. Shawler (Fairchild Republic Co., Farmingdale, NY). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2519.* 8 p.

A manned, 62% scale aircraft demonstrator designed for the Air Force's next generation trainer program is reported. Areas investigated include basic handling qualities, hinge moments on the flight control surfaces, vertical and horizontal tail loads, and spin characteristics. Results of the program are compared with wind tunnel results and scaling effects, and show good agreement with the previous data for features such as flap lift increment, aileron and rudder effectiveness, and the maximum lift coefficient. It is concluded that the 62% scale flight tests are accurate, and the concept can be used for new programs such as the NGT at a greatly reduced cost. D.L.G.

A82-14386 # **Hover tests of the XV-15 Tilt Rotor Research Aircraft.** M. D. Maisel (U.S. Army, Research and Technology Laboratories, Moffett Field, CA) and D. J. Harris (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2501.* 13 p. 5 refs.

A series of tests was conducted to investigate the hovering characteristics of the XV-15 Tilt Rotor Research Aircraft. Various wheel heights were flown to examine the effects of ground proximity. In addition to free hover, the aircraft was operated on a tie-down facility that provided a 1.8-m (6-ft) wheel-height condition. Data were obtained for hover performance both in and out of ground effect, downwash phenomena, handling characteristics as a function of hover height, and acoustics around the hovering aircraft. The results show that the XV-15 is efficient in hover and that increased control activity is required as the aircraft approaches the ground. Downwash velocities are moderate at the sides of the aircraft and relatively high fore and aft. The acoustics evaluation revealed moderate noise levels with an acceptable sound quality. (Author)

A82-14387 # **Testing capabilities of the 3246th Test Wing.** D. H. Williams, Jr. (USAF, Eglin AFB, FL). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2484.* 7 p.

The capabilities of the 3246th Test Wing at Eglin Air Force Base are reviewed, and developmental non-nuclear air armament systems and components are evaluated. The Wing's geographic location with respect to major population centers, current testing capabilities, existing instrumentation facilities, and plans for expanding the air-to-surface, air-to-air and electromagnetic capabilities are discussed. Typical missions using the multiobject tracking, ranging and control system are presented, and the seeker evaluation test system and the preflight integration of munitions and electronics systems are reported. Other future programs are discussed, which include increasingly sophisticated all-weather weapons with significantly improved multiple kill per pass hit probabilities. D.L.G.

A82-14389 # **Integrated flight testing based on nonlinear system identification data processing techniques.** J. H. Vincent and S. N. Franklin (Systems Control Technology, Inc., Palo Alto, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2449.* 11 p. 7 refs. Contract No. N00014-78-C-0641.

The results presented in this paper demonstrate the operational status of nonlinear system identification data processing techniques. Aerodynamic, installed thrust, and flight test instrumentation calibration models are identified for the F-4S from six different flight conditions which encompass a large range in angle of attack, sideslip, airspeed, control inputs, and body rotation rates. The capability for identifying nonlinear aerodynamic models in a format compatible with preflight predictions is demonstrated. A methodology for determining the accuracy of the parameters estimates is presented. (Author)

A82-14390 * # **AD-1 oblique wing aircraft program.** T. C. McMurtry, A. G. Sim, and W. H. Andrews (NASA, Flight Research Center, Edwards, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2354.* 7 p.

A NASA program for evaluation of the handling and flying characteristics of the AD-1 oblique wing aircraft is discussed. The vehicle was flown to compare wind tunnel predictions with aerodynamic data, explore the control system requirements, and obtain a preliminary assessment of the aeroelastic effects. The fiberglass sandwich skin aircraft is designed for 8 g positive and 4 g negative loading at 175 knots, while the wing pivot can withstand 25 g loading. Flight monitoring was accomplished with a 41 channel pulse code modulation system for telemetry and by averaging of pilot ratings. Maneuvering tests are outlined, noting that pilot ratings indicated acceptable handling at up to 50 deg sweep. It is concluded that acceptable flying qualities can be achieved with a 60 deg sweep, and that aeroelastic tailoring can be used to satisfy cruise design technology. M.S.K.

A82-14392 * # **The use of frequency methods in rotorcraft system identification.** R. W. DuVal (NASA, Ames Research Center, Moffett Field, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981,* *AIAA Paper 81-2386.* 9 p.

A new approach to model structure determination is examined. Flight data from the Rotor Systems Research Aircraft (RSRA) are transformed into the frequency domain and truncated to provide band limiting. The stepwise regression technique is then used to identify a quasistatic state-space model from the transformed data. The data processing requirements for both time domain and frequency domain identification are discussed and the results of the two techniques are compared. (Author)

A82-14393 * # **Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft.** R. L. Sims and A. L. Carter (NASA, Flight Research Center, Edwards, CA). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2387.* 15 p. 13 refs.

An aeroelastic analysis of the B-1 aircraft was generated using the FLEXSTAB computer program. Relatively simple aerodynamic and structural models were employed. Theoretical wing and horizontal stabilizer airloads were compared to wind tunnel predictions and flight data measured during quasi-steady pitch maneuvers at Mach numbers of 0.85 and 1.2 with the wing in the 67.5 degree full aft sweep position. The basic objective was to evaluate the usefulness of the FLEXSTAB program for pre-flight airloads analysis of large flexible aircraft. Significant aeroelastic increments were noted between rigid and flexible vehicle results. FLEXSTAB predicted airloads for the outer wing panel were in good agreement with measured data for both rigid airloads and elastic increments. FLEXSTAB results for the horizontal stabilizer were useful for defining general aeroelastic trends, but absolute load levels were not well predicted due to theoretical limitations and difficulties encountered in modelling the complex B-1 configuration. Overall, the FLEXSTAB program is viewed as a useful integrated tool for static aeroelastic analysis in support of flight programs. (Author)

A82-14398 # **Advanced fighter technology integration AFTI/F-16 test program overview.** R. A. Gill and C. L. Saint Sauver (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *AIAA, SETP, SFTE, SAE, ITEA, and IEEE, Flight Testing Conference, 1st, Las Vegas, NV, Nov. 11-13, 1981, AIAA Paper 81-2353.* 17 p.

The AFTI/F-16 Advanced Development Program objective is to develop, integrate, and validate advanced fighter technologies to improve air-to-air and air-to-surface weapon delivery and survivability. The technologies include a Digital Flight Control System, Integrated Flight/Fire Control, pilot/vehicle interface advancements, and advanced flight control modes through direct force control and weapon line pointing. Extensive modifications were made to an F-16A for installation of a data instrumentation system, modified inlet with canards, and a dorsal fairing. The AFTI/F-16 is undergoing an extensive test program to provide the confidence necessary to transition the new technologies for retrofit into existing aircraft or incorporation into new fighter aircraft designs. (Author)

A82-14407 * **Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications.** W. Johnson (NASA, Ames Research Center; U.S. Army, Aeromechanics Laboratory, Moffett Field, CA). *Vertica,* vol. 5, no. 3, 1981, p. 185-216. 15 refs.

The development of a comprehensive analytical model of rotorcraft aerodynamics and dynamics is described. Particular emphasis is given to describing the reasons behind the choices and decisions involved in constructing the model. The analysis is designed to calculate rotor performance, loads and noise; helicopter vibration and gust response; flight dynamics and handling qualities; and system aeroelastic stability. It is intended for use in the design, testing and evaluation of a wide class of rotors and rotorcraft and to be the basis for further development of rotary wing theories. The general characteristics of the geometric, structural, inertial and aerodynamic models used for the rotorcraft components are described, including the assumptions introduced by the chosen models and the resulting capabilities and limitations. Finally, some examples from recent applications of the analysis are given. (Author)

A82-14414 **The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine (Zum Betriebsverhalten von Turboluftstrahlantrieben unter besonderer Berücksichtigung der gekühlten Hochdruckturbine).** W. Muggli (München, Technische Universität, Munich, West Germany). *Zeitschrift für Flugwissenschaften und Weltraumforschung,* vol. 5, Sept.-Oct. 1981, p. 273-283. 6 refs. In German.

The employment of a gas turbine has great advantages for aircraft, provided high operational temperatures and pressures can be used. In connection with the current status of technology concerning materials, it is necessary to cool engine components exposed to the hot gases. The consideration of the cooling processes is an importont factor in the determination of the operational characteristics of a turbojet. The computation of the local flow conditions in the blading area of a turbomachine is considered and a description is presented of the computational procedures for determining the amount of heat transferred at a cooled blade of the turbine. The determination of the amount of air needed for cooling is discussed along with the numerical calculation of the operational characteristics of cooled axial turbines. Attention is given to a number of approaches for reducing the amount of air required for cooling in a high-pressure turbine. G.R.

A82-14416 **Wing design for light transport aircraft with improved fuel economy.** D. Welte, R. Birrenbach, and W. Haberland (Dornier GmbH, Friedrichshafen, West Germany). *Zeitschrift für Flugwissenschaften und Weltraumforschung,* vol. 5, Sept.-Oct. 1981, p. 294-303. 5 refs. Research supported by the Bundesministerium für Forschung und Technologie.

Investigations related to the development of a new wing for a light transport aircraft were initiated by a German aerospace company in 1975. Flight tests for the evaluation of the new wing began in June 1979. The considered design incorporates a new wing section and a wing tip having a triangular shape. The induced drag observed in connection with the new wing tip is less than the corresponding value found for wing tips of conventional design. Tradeoff studies were conducted to optimize wing area and wing aspect ratio for the specified performance requirements. A use of the new wing design makes it possible to obtain aircraft with high maximum-lift values, low drag, and good stall characteristics. Attention is given to the wing parameter study, aspects of airfoil design, the flap design, the wing design, the aileron, and the merits of a number of different wing structures. G.R.

A82-14418 **The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region (Das Tragverhalten eines gedrückten Alu-Trapezträgers im Nachbeulbereich).** E. Schneider (Vereinigte Flugtechnische Werke GmbH, Bremen, West Germany). *Zeitschrift für Flugwissenschaften und Weltraumforschung,* vol. 5, Sept.-Oct. 1981, p. 313-323. 8 refs. In German. Research supported by the Bundesministerium der Verteidigung.

An analysis is conducted of the behavior of a trapezoidal aluminum-alloy supporting element which is subjected to a compressive force, taking into consideration before and after the force reaches the value of the carrying capacity. The analysis makes use of the finite-element method, and takes into account geometrical nonlinearities and the elastic-plastic material characteristics of aluminum. It is found that the behavior of the supporting element in the postbuckling region can be determined with the aid of the slow ramp method, a dynamic computational procedure. The magnitude of the considered system damping and the deformation rate selected for the computation are found to have a significant effect on the result. A comparison of computed and experimental data shows that it is possible to predict the behavior of the supporting element analytically with satisfactory accuracy. G.R.

A82-14676 **NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volumes 1, 2 & 3.** Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1981. Vol. 1, 460 p.; vol. 2, 495 p.; vol. 3, 502 p. Price of three volumes, members, $45.; nonmembers, $60.

Topics of aerospace electronics such as the ADA programming language, inertial systems, microcomputer applications, survivability, and the all-electric aircraft were discussed. Papers were presented on laser gyros and advanced navigation systems, as well as advanced architecture, communications, and radar equipment, software, and avionics and armament planning. Failures in high voltage tubes were considered, and attention was given to signal processing techniques, integrated aircraft controls, fire control, software support tools, cost estimates for software, and medical technology. Emphases were placed on Kalman filter, an electronic terrain map, EM compatibility, aerospace power systems, air traffic control, environmental stress measurements, fault isolation, and multivariable flight control design. M.S.K.

A82-14678 **The design and implementation of a canned scenario function for the F-16 dynamic system simulator.** L. Gearhart (Lear Siegler, Inc., Astronics Div., Dayton, OH) and D. L. Dresel (TRW Defense and Space Systems Group, Dayton, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 10-17.

The F-16 Dynamic System Simulator (DSS) is an integrated hardware and software system used to test the F-16 Operational Flight Program (OFP). A major function of DSS is its Canned Scenario, the generation of repeatable scenarios for demonstrations and for the verification and validation of the F-16 OFP. Development of a canned scenario requires the classification of the dynamic characteristics of the system: the inputs, outputs, plant and system states. Analysis of the system being simulated is paralleled by an analysis of the simulation models. The interfaces and models are grouped in blocks according to such characteristics as random or asynchronous versus deterministic behavior. An appropriate set of inputs and initial states is defined for the canned scenario function, based on the user's needs. These initial and input variable sets are incorporated into the software design of the canned scenario, and can be recorded and played back in order to repeat the essential behavior of the system. The scenario is applied to the F-16 OFP as an example, and problems encountered in its implementation are discussed. J.F.

A82-14682 **Strapdown inertial reference systems performance analysis.** G. J. Robinette (USAF, Avionics Laboratory, Wright-Patterson AFB, OH), R. C. Burns, and R. M. Schwarz (McDonnell Aircraft Co., Avionics Engineering Div., St. Louis, MO). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 38-45. 7 refs.

The Strapdown Performance Study (SPS) program is being sponsored by the Air Force Wright Aeronautical Laboratories to determine where improvements in strapdown inertial technology are required to meet the tactical and strategic, navigation and weapon delivery requirements associated with advanced tactical fighters (ATF) and advanced cruise missiles (ACM) of the 1990's. Phase I of this study includes the gathering of data, the development of simulation tools, and the methodology for validation of these tools. Data were gathered on current inertial instruments and systems, fundamental performance limitations, and projected instrument capabilities. Mission profiles for the ATF and ACM are used as the basis for establishing performance goals. Strapdown inertial system implementation data were used to establish a preliminary inertial system error budget consistent with ATF/ACM performance goals. A SIMulated Strapdown Inertial Navigation (SIMSIN) computer program, its development, and seven-step validation process are described. J.F.

A82-14684 **A failure detection and isolation system for tactical aircraft with separated IMUs.** P. Motyka (Charles Stark Draper Laboratory, Inc., Cambridge, MA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 51-60. 7 refs. Contract No. F33615-78-C-1563.

The development and evaluation of a failure-detection and isolation (FDI) system for tactical aircraft with two physically separated inertial measurement units (IMUs) are described. Each IMU consists of four inertial instruments in a symmetrical conical array. The instrument outputs are used for both navigation and flight control, reflecting the underlying multifunction inertial reference assembly concept. FID is performed using the generalized likelihood test, and the thresholds required for FDI are defined. Digital simulation results are presented which show the operation of the FDI system over a spectrum of sensor failures and indicate the effects of these failures on navigation errors. Results show that it may be feasible to detect and isolate only the first three failures of the dual IMU system. Lever-arm compensation results in the faster detection of accelerometer failures at the expense of increased computer throughput. Finally, failures of a magnitude less than the soft-failure-detection threshold are more likely to be isolated incorrectly. J.F.

A82-14685 **A concept for a high-accuracy, low-cost accelerometer.** S. G. Shutt (Rockwell International Corp., Autonetics Div., Anaheim, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 61-69.

A three-axis accelerometer is described in which low cross coupling between axes is achieved by a novel electromagnetic forcing system. A mechanical proof-mass support system is used, which has small bias variation in the presence of large parts instabilities, compared to the usual inertial instruments. This accelerometer concept has the potential for low-cost and high-accuracy operation over a wide temperature range. An experimental accelerometer was designed, built, and tested to determine the feasibility of the accelerometer concept. The main components of this accelerometer are described first: (1) housing and magnet assembly, (2) proof-mass assembly, (3) pickoff assembly, and (4) filament support system. Data were obtained for the spring rates, the bias and scale-factor coupling coefficients, the bias instability, and the bias temperature sensitivity. All measured parameters were within acceptable calculated values; overall operation of the experimental accelerometer was found to be successful. J.F.

A82-14694 **High-accuracy ranging over voice radios for downed aircrew rescue.** R. H. Brader (RCA, Government Communications Systems Div., Camden, NJ). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 128-133.

A high accuracy ranging technique using digital technology and LSI implementation has transformed a conventional military survival walkie-talkie into a position location system that helps rescue downed pilots. This paper first describes the operational requirements and scenario for a military downed-aircrew rescue. The basic technique involved in a half-duplex ranging system and the specific techniques developed to meet the operational requirements and voice radio constraints are then discussed in some detail. The problems discussed are efficient modulations in an AM radio, delay variation control, rapid acquisition using a narrow bandwidth radio, memory requirements for half-duplex operation and digital design for miniaturization. (Author)

A82-14696 **High speed microwave phase-locked loops.** E. M. Perdue (Raytheon Communication Systems Laboratory, Sudbury, MA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 140-145. 9 refs. Research sponsored by the Raytheon Co.; Contracts No. F33615-73-C-4036; No. F33615-78-C-1583.

A microwave synthesizer scheme is developed, which can embody rapid broadband tuning, accuracy and resolution for instituting Doppler correction, spectral purity for low data rate transmission, remote control, and small size for airborne operations. The scheme is directly adaptable to any band of communication, while providing secure antijamming techniques, and the microwave phase-locked loop can control and produce an output with excellent phase noise characteristics, with spurious levels below -60 dBc at any point in the band. The phase-locked synthesizer also meets present switching speed requirements. D.L.G.

A82-14705 **Electromechanical actuation development program.** S. A. Rowe (AiResearch Manufacturing Company of California, Torrance, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 206-213. 12 refs.

A prototype electromechanical actuation system (EMAS) development program for aircraft flight control systems (FCS) was initiated in February 1976, resulting in a working prototype actuation system suitable for aircraft primary FCS applications. Tests involving EMAS components, performance, environment and control/stability are reported, and program motivation, EMAS description and nomenclature, program history, and future objectives are discussed. D.L.G.

A82-14707 **Will power-by-wire replace power-by-hydraulics.** I. S. Mehdi (Boeing Military Airplane Co., Seattle, WA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 221-228. 8 refs.

The development of two parallel aircraft actuation and secondary power systems designed within the context of a two-engined fighter is discussed. One is based on engine-extracted hydraulic power while the other is based on engine-extracted electric power. Consideration is given to actuation system requirements, gun and environmental control system requirements, secondary power system requirements, and temperature parameters. Preliminary results are presented for estimates of weights and life cycle costs for each system. Factors important for achieving an all-electric airplane are identified. S.C.S.

A82-14709 **The all electric airplane - Its development and logistic support.** M. J. Cronin (Lockheed-California Co., Burbank, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 241-247. 19 refs.

Developmental and logistic support aspects that must be considered as a part of the development-cycle of potentially large electric power systems are reviewed. Increasing fuel problems and their impact on the economic viability of commercial airlines are discussed. The hardware design, power generation system, environmental control system, and the engine starting system are also discussed. In addition, the impact of these large electric power systems on ground logistic support and operation from ground power units, auxiliary power units, and fixed-plant installations is considered. D.L.G.

A82-14710 **New all-electric-system technology.** C. W. Clay (Boeing Commercial Airplane Co., Seattle, WA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 248-254.

The status of electromechanical actuators (EMA) as a key element in the development of an all-electric aircraft system is investigated. It is found that the feasibility of EMA hardware has been amply demonstrated in laboratory systems and an EMA for a research aircraft. Attention is also given to a distributed data bus communication system, a distributed dc power system, questions of overall system integration, and the design of a flight deck. The reported evaluation study shows that hardware for a complete, fly-by-wire, all-electric aircraft system is either available or will approach production readiness within a year or so. A program to integrate this hardware into a comprehensive single system is highly desirable to enhance development as well as optimize cost and weight benefits. G.R.

A82-14711 **Weapon delivery system using GPS.** A. K. Aggarwal. In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 258-267.

It is pointed out that in a highly dynamic vehicle, such as a fighter aircraft, the GPS User Set is augmented by an Inertial Measurement Unit (IMU) to maintain weapon delivery accuracy during high acceleration maneuvers. This GPS Weapon Delivery System furnishes highly accurate placement of air-to-ground weapons. The system uses a digital computer for computing the automatic release signal in conjunction with an Inertial Measurement Unit and a GPS User Set. The integrated Weapon Delivery System will work together with a Horizontal Situation Indicator, a Vertical Gyro Indicator and/or a Vertical Display Indicator for displaying pilot aiming information. C.R.

A82-14712 **Updated station deselection procedures to support automatic Omega receiver operation.** R. D. Healy, R. R. Gupta (Analytic Sciences Corp., Reading, MA), and P. B. Morris (U.S. Coast Guard, Washington, DC). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 268-273. 10 refs.

Many automatic Omega receivers use a station selection criterion which does not employ specific propagation-related tests designed to avoid errors caused by wrong-way paths and westerly signal traverse of the magnetic equator. These errors can introduce navigationally significant errors into the Omega position solution, which can, however, be minimized by using the manual station deselection feature of the receiver. This paper describes these potential error sources and presents an updated Omega station selection chart containing specific recommendations for station deselection in a number of worldwide locations. A simple test for detecting wrong-way path propagation is also included. (Author)

A82-14713 **Navigation for helicopters by multiple use of inertial sensors.** V. Held (Elektronik-System-Gesellschaft mbH, Munich, West Germany). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 274-282.

The paper presents a concept for the inertial functions - flight control, sight-stabilization, navigation - of a helicopter. A minimum number of dislocated inertial sensors is proposed. The systems functions are accomplished on a system level by multiple use of the sensor signals. It will be proven that attitude and heading can be derived from the flight control and stabilization hardware, so that the usually required attitude and heading reference for the navigation is saved. Moreover, the proposed concept provides as an additional function the autonomous initial alignment to north. (Author)

A82-14719 **Distributed Time Division Multiple Access /DTDMA/ - A distributed signaling technique for advanced tactical communications.** J. Rubin (ITT, ITT Avionics Div., Nutley, NJ). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 332-337. 7 refs. Research supported by ITT.

The Distributed TDMA concept, based on the premise of maximizing the full utility of time, frequency, and code, is described. This multidimensional approach contributes simultaneously to efficient multiple access, antijamming, and low probability of exploitation (LPE) system solutions. The multiple access problem is solved through pseudo-random time and frequency hopping, coupled with interleaved channelization which utilizes low duty signal structures. This random access technique is particularly suited to a Command Control Communication/integrated communication-navigation-identification system as it provides intra-system and related function interference rejections. C.R.

A82-14720 # **Future directions in CNI integrated avionics.** R. L. Harris (USAF, Avionics Laboratory, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics

Engineers, Inc., 1981, p. 338-344. 21 refs.

In order to appropriately satisfy the expected communications, navigation, and identification (CNI) requirements for tactical aircraft of the 1990's, the estimates of volume, weight, and cost of these functions must somehow be reduced. It is noted that the Air Force and Navy's technology programs for integrated CNI concepts have outlined baselines of current integratable hardware, including the functions of HF, UHF, JTIDS, GPS, SEEK TALK, and IFF interrogator/transponder; the programs have also formulated architectures for future development. Among the developing technologies that affect integrated CNI are very large scale integration (VLSI), very high speed integrated circuits (VHSIC); the future programming language Ada; and the development of charge coupled devices (CCD's), surface acoustic wave (SAW) devices, magnetostatic wave (MSW) devices, and microprocessing. The effects on integration are found to be significant. C.R.

A82-14721 # **A modular multiplexed digital voice intercommunications system.** R. F. Bolt and J. J. Seal (U.S. Navy, Naval Avionics Center, Indianapolis, IN). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 345-349. 7 refs.

The design and development of a modular multiplexed digital voice Intercommunications System (ICS) for military applications is described. This system, under development at the Naval Avionics Center, uses a dedicated MIL-STD-1553B multiplexed data bus; its modular design consists of Weapon Replaceable Assemblies (WRAs). The system architecture will provide integrated radio control using a single data bus that carries both digital voice data and control information. This ICS can be configured for a particular aircraft by arranging the various subsystem WRAs to satisfy the weapon system requirements. This paper discusses the functional requirements of the WRAs in the digital voice ICS. System concepts have been demonstrated in the three-station Multiplexed Digital Voice ICS. This breadboard system provides ten bit-rate/audio bandwidth combinations which have been evaluated for intelligibility in three aircraft acoustic noise environments. The intelligibility test results and the results of a package configuration study are summarized. (Author)

A82-14723 **Detection range analysis of an airborne medium PRF radar.** M. B. Ringel (Westinghouse Electric Corp., Baltimore, MD). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 358-362. 10 refs.

The detection range of an air-to-air medium PRF radar is analyzed in terms of the signal processing involved in multiple PRF ranging, the nature of the ground clutter in the range Doppler space defined by such a radar, and the radar/target kinematics. References containing prerequisite knowledge and similar analysis for other types of radars are cited, and the analysis in this paper is compared to previous works. A flow chart of a computer program implementing the analysis outlined in this paper is presented. (Author)

A82-14725 **Using phased array radar for data communications.** H. D. Lewis (RCA, Government Systems Div., Moorestown, NJ). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 371-376.

The idea of using a multifunction array radar at the controlling master station for the additional function of data transmission and reception is introduced. Here, cooperating stations, equipped with suitable transponders, are beacon tracked by the radar, providing positive identification of each station as well as highly accurate positional data for the cooperating stations. Among the applications of this system are surface-to-air command and control, long-range targeting and track from air-to-surface, and surface-to-surface coordination, including both monostatic and multistatic operations. It is pointed out that the high power aperture product and low antenna sidelobes of the phased array radar are inherent characteristics that can be used in combatting ECM. What is more, the ability of multifunction phased array radar to revisit the cooperating station as often as required permits a reliable interchange of data on an interrogation/rely basis. C.R.

A82-14735 **Computational considerations for fusion in target identification systems.** E. L. Waltz (Bendix Corp., Communications Div., Ann Arbor, MI). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 492-497. 29 refs.

This paper presents an overview of the computational implications of applying multisensor data to the target identification problem. Recent efforts to develop a mathematical basis for multisensor correlation (fusion) have been performed by the services and have been directed at local (autonomous) and regional (netted) systems for a wide range of applications. These studies have developed algorithms for ASW, air-air identification, battlefield management, ocean surveillance and air defense. An overview of these 'fusion algorithms' and their relationship to classical pattern recognition is presented. The hierarchical aspects of correlation, combination and aggregation are described and their effects on system complexity are discussed. Key parameters, which characterize the general fusion system, are described and related to processing requirements. These computational requirements are compared to expected VHSIC/VLSI capabilities to project the potential for integrated fusion processing in advanced avionics and weapons systems. (Author)

A82-14739 **Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor.** S. H. Musick (USAF, Avionics Laboratory, Wright-Patterson AFB, OH) and N. A. Carlson (Intermetrics, Inc., Cambridge, MA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 520-526. 9 refs.

EAR/GEANS is an integrated radar/inertial system consisting of a coherent multimode radar, EAR, and an accurate inertial navigation unit, GEANS. The EAR radar makes velocity and position measurements that aid GEANS while GEANS in turn supplies EAR with navigation data for measurement control and motion compensation. In this complex system many error sources affect navigation performance. This paper describes an effort to evaluate flight test navigation performance in terms of fundamental sensor error sources. The various models and tools that were developed are discussed. The key tool is a high-order Kalman filter, called the Error Isolation Filter, used as a postprocessor of flight-recorded data. Simulated flight test results are presented to demonstrate error recovery performance. Performance of the EIF using actual flight data is discussed. The paper emphasizes the experiential aspects of the effort. (Author)

A82-14740 **The use of observers on relaxed static stability aircraft.** R. H. Rooney and E. Y. Shapiro (Lockheed-California Co., Burbank, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 527-533.

An observer is a dynamical system that reconstructs the states of a system that is used to drive it. Observers can be used when a normally available signal is unavailable due to sensor failure, or as a sensor replacement when the use of a sensor may be undesirable due to operational considerations. The signal provided by the observer can then be used as an input to a controller for various purposes such as stabilization, optimization, or decoupling. The fundamentals of observer design are reviewed and simulation results of observers implemented on Relaxed Static Stability (RSS) aircraft are presented. It is shown that while performance of observers in a RSS aircraft setting is degraded somewhat, their use in unstable applications is not precluded. (Author)

A82-14741 **Integrated Flight/Weapon Control design and evaluation.** W. J. Murphy (McDonnell Aircraft Co., St. Louis, MO) and W. L. Young, Jr. (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the

National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 536-543. Contract No. F33615-79-C-3604.

The Integrated Flight/Weapon Control (IFWC) program is aimed at developing integrated flight/fire control technology. This includes increasing weapon delivery capabilities, survivability, and operability in the delivery of guided weapons and dispenser munitions. The completed development of selected concepts through preliminary design is presented; pilot-in-the-loop simulation was used for concept refinement and validation. The preliminary results, based on pilot evaluation, showed that the tactical munitions dispenser weapon delivery system is accurate and provides increased survivability over conventional delivery. The air-to-surface missile delivery system was also found to be good, especially in clear daylight conditions. The most favorably received feature of the IFWC air-to-air weapon delivery system was IFFC-I/FIREFLY III gunnery, which had increased all-aspect gun opportunities in precision pointing, near head-on, long-range opportunities, and high angle-off opportunities. J.F.

A82-14742 **Software considerations in the design of computer generated flight displays.** M. Miller (HRB Singer, Inc., State College, PA) and A. J. Aretz (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 544-548.

The use of formats which take advantage of color imagery and the capabilities of a digital computer is one way of presenting information to pilots that is clearly understandable and requires little interpretation. The functional requirements of four specific graphic presentations and their impact on the design of the display generation software are discussed. The four formats considered are (1) the tactical situation format, (2) the stores status format, (3) the head-up display format, and (4) the integrated flight path format. Due to the dynamic nature of the aircraft, the formats are also required to be dynamic, with a minimum update rate of 5 Hz. Attempts to simulate flight and generate the integrated flight path format have achieved an update rate of 2 Hz. Generating color pictures with computer graphics is essentially a paint-by-number exercise, where color assignment is determined from a VLT. J.F.

A82-14743 # **The influence of smart computers on the cockpit of the future.** N. L. Gravely and J. O. Mysing (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 549-556. 7 refs.

Recent developments in digital technology at the Air Force Wright Aeronautical Laboratories are presented, which will have great impact on the cockpit of the future. Characteristics of the Digital Avionics Information System, representative of the state-of-the-art in cockpit technology, are first discussed. Future capabilities to be achieved by artificial intelligence are then outlined: flexible cockpit reconfiguration, crew decisions aided by computerized systems consultant, machines that understand and converse in free text, and computer vision that can interpret sensor images. A very high speed integrated circuitry (VHSIC) is being developed, which would extend and refine the metal-oxide-semiconductor and bipolar technology to increase through-put rates and improve reliability, while decreasing size and power consumption. Compared to the present F-16 computer, the VHSIC would provide a 90% reduction in size, volume, and weight, an 85% decrease in power, and a 100% increase in MTBF. An intelligent software program (modification of MYCIN /Bernhard, 1980/) is being considered, which would aid the pilot during in-flight system failures. Subsystem developments in the areas of graphics and computer generated imagery, dynamic pictorial displays, image processing, and aircraft emergency procedures are also discussed. J.F.

A82-14744 **A methodology for missile launch envelope display evaluation.** G. E. Corrick (Hughes Aircraft Co., Culver City, CA) and P. V. Kulwicki (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 557-564. Contract No. F33615-79-C-0508.

A methodology for objective evaluation of advanced display formats is described. A computer generated, manned, non-interactive single-target air combat simulation was used to evaluate two advanced VSD (vertical situation display) and HUD formats with respect to current F-15 air combat displays. The principal performance measures obtained were pilot responses to questions about the simulated engagement and a measure of the cognitive workload imposed by the format, assessed by the Sternberg reserve capacity task. The pilots comments and opinions were also obtained in a post-evaluation debriefing. Nine operational Air Force pilots were subjects. Results showed no large differences in performance on mission questions across formats, but large differences in imposed cognitive workload. All HUD formats imposed more workload than VSD formats and there was a strong correlation between the objective results and subjective opinions. (Author)

A82-14745 # **Assessing pilot workload - Without disturbing pilot behavior.** R. J. Elder (USAF, Warner Robins Air Logistics Center, Robins AFB, GA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 565-571.

The need for the design of practical pilot workload assessment techniques which do not obstruct the normal operational procedures of the pilot subjects is discussed. An analysis of the pilot tasks in an air-to-air engagement is presented. Workload assessment techniques are analyzed for their applicability to the single-seat fighter environment. The procedure for design of an experiment using these techniques is demonstrated for an F-15 air-to-air engagement. Applications of the method in weapon system modification and operational training evaluation are discussed. (Author)

A82-14750 **Evaluation of advanced air-to-air gunnery fire control systems.** N. M. Shah and J. Stalony-Dobrzanski (Northrop Corp., Aircraft Div., Hawthorne, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 615-622.

Three advanced fire control systems, based on the director-type radar fire control system, were designed for an advanced fighter aircraft. These systems are: fixed gun, trainable gun, and integrated fire flight control (IFFC). In addition, an automatic range control (ARC) system, which uses radar information for maintaining range with respect to target, was designed. The air combat performance with each system was evaluated on the simulator with realistic radar noise and hardware constraints. The ARC was evaluated with fixed gun only. The results show definite superiority of the trainable gun, even with relatively modest gun travel and servo power, over a fixed gun and IFFC. The trainable gun, IFFC, and ARC concepts provide improved tracking performance, with considerable reduction in pilot workload, over the fixed gun. The time to achieve first hit is shortest with the trainable gun. The ARC enhances survivability by minimizing overshoots with respect to the target. (Author)

A82-14759 # **Assessment methodology of the lightning threat to advanced aircraft.** R. A. Perala (Electromagnetic Applications, Inc., Denver, CO) and G. A. DuBro (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 6[illegible] 697. 19 refs.

An overview of an assessment methodology concerning the lightning susceptibility of aircraft is presented. Work in this area is concentrated on increasing the general understanding of the physics of the aircraft-lightning interaction and on developing specific laboratory threat simulation testing techniques. Recent advances in both testing/simulation and analytics are discussed. These advances have been made possible by the incorporation of nuclear electromagnetic pulse technology and recent indications from measurements of natural lightning which suggest that significantly greater electromagnetic energy exists in the frequency range where increased coupling of such energy to the aircraft is possible. B.J.

A82-14760 The Navy F/A-18A Hornet electromagnetic compatibility program. J. R. Ketterer (McDonnell Aircraft Co., St. Louis, MO) and J. J. Fisher (U.S. Naval Air Systems Command, Washington, DC). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 698-702.

The F/A-18A Hornet is a first line carrier-deployed aircraft employing advanced composite structures and state-of-the-art digital electronics. Because the electromagnetic environment (EME) generated on present day carrier decks can reach field strengths over 10,000 Volts/meter at some frequencies, electromagnetic compatibility (EMC) challenges were presented. The approach to aircraft EMC design established for the F/A-18A required using the airframe as an enclosed electromagnetic (EM) shield. This shielding concept allowed equipment located within the airframe shield to be designed to a less severe EM environment than equipment located outside the airframe shield. Using the airframe as an electromagnetic shield presented a significant challenge, particularly because graphite/epoxy composites represent more than one-third of the F/A-18A surface area. Overall, this concept was found to represent the least cost, weight, and design impact both to the airframe and to the electrical or electronics equipments. (Author)

A82-14761 A recursive time domain analysis of distributed line grid networks with application to the LTA/EMP problem. W. S. McCormick (Wright State University, Dayton, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 703-708.

Modeling the aircraft fuselage as a two-node, TEM, lossy distributed network, a recursive time domain technique is presented to estimate the fuselage skin-current induced by a remote lightning strike. The technique involves the determination of the two discrete nodal transfer functions followed by an application of Duhamel's theorem to the distributed electromagnetic excitation case. The Fourier transform of the induced fuselage skin-current is presented as a function of the azimuth and elevation angles of the incident, plane electromagnetic lightning excitation. Reference to the PORTER and NOAA flight programs is made along with a discussion of future application areas. (Author)

A82-14762 New advances in signal processing technology for integrated CNI avionics. C. R. Ward and R. A. Reilly (ITT, ITT Avionics Div., Nutley, NJ). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 712-722. 20 refs.

Functionally integrated CNI (communication, navigation, and identification) radio systems appear to be attractive as a means of resolving size and weight conflicts between conventionally designed radio systems on space-limited tactical military aircraft. In practice, integration is often frustrated by basic incompatibilities between widely divergent signal structures. Although there are many very complicated aspects to the problem of functional integration, this paper addresses only the problem of accommodating the reception of different signal structures efficiently and flexibly in the RF to baseband domain. A radically different approach to radio receiver design is proposed, which employs high speed digital and/or CCD technology which could be ready for field deployment by the 1990 time frame. Several alternative system level architectures are proposed and the tradeoffs between them evaluated. (Author)

A82-14763 Advanced integrated CNI architectures. P. C. Camana, S. K. Ogi, and L. R. Stine (TRW Defense and Space Systems Group, Redondo Beach, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 723-728.

Integrated terminal architectures can produce a modern CNI (communications, navigation, and identification) system at an affordable life-cycle cost within real estate requirements. Major considerations include use of common modules, RF and digital large scale integration (LSI) technology insertion, and high performance programmable digital signal processing. The RF subsystem consists of conventional RF and IF chains of common modules combined with the RF-LSI technology. The digital processing subsystem is an array of programmable signal/data processors with the core element being a VLSI 100 MIPS single card signal processor. Common modules, network reconfigurability, and high level of integration will provide for lower life-cycle costs with reduced systems size, weight, and power dissipation. (Author)

A82-14766 The agile transversal filter - A flexible building block for ICNIA. D. G. Botha (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH) and F. W. Smead (ITT, ITT Avionics Div., Nutley, NJ). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 735-740. USAF-sponsored research.

Integrated Communications, Navigation and Identification Avionics (ICNIA) is an advanced development program to demonstrate an integrated systems approach to the implementation of functions normally performed by a collection of independent black boxes. The system design partitions all CNI functions to optimize modular commonality within the ICNIA system. One function required in many parallel channels is the processing of signals with instantaneous bandwidths of 10 MHz or less. A specific implementation is the Narrow Band Agile Transversal Filter (NBATF), which can be implemented in state-of-the-art technology, can process signals with a variety of algorithms selectable under software control, and can be replicated within the system, as required, to perform the total set of functions. The NBATF constitutes a building block module within the ICNIA system. (Author)

A82-14767 Applications of covariance analysis simulation to avionics flight testing. A. Foote, C. Vellenga, J. Price, and W. Buchholz (Logicon, Inc., Dayton, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 750-756.

The application of covariance analysis simulation techniques to the conduct of developmental flight test of integrated navigation systems is presented. In particular, this paper describes how covariance analysis simulation techniques are being used in the planning, execution, and analysis phases of the B-52 Offensive Avionics System (OAS) flight test and discusses how they may be applied to future testing. The mission flexibility of modern strategic aircraft and the built-in redundant modes of operation define a large number of scenarios which must be tested. The role of covariance analysis simulation techniques in the B-52 OAS flight test is to assist in the planning and execution phases and to provide information supplemental to actual flight-test results. Discussions of the use of covariance analysis simulation techniques in each of these test phases are presented together with a sample of results from a B-52 OAS flight test. (Author)

A82-14768 Application of multiple model estimation techniques to a recursive terrain height correlation system. W. Tang and G. L. Mealy (Analytic Sciences Corp., Reading, MA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 757-764. Grant No. DAAK80-79-C-0266.

This paper describes the results of a study which determined the performance capabilities of a recursive terrain correlation system proposed for low altitude helicopter navigation. A Monte Carlo simulation program was developed to asses the effectiveness of the terrain correlation algorithm. The sensitivity of the system to various error sources was evaluated and filter modifications to enhance system performance were proposed. An alternate configuration, based upon multiple model estimation techniques, was shown to afford a substantial decrease in system sensitivity to initial position uncertainty. (Author)

A82-14769 # **Algorithms for an adaptive dynamic window in electronic map systems.** D. L. Sander (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 766-768.

Algorithms have been developed for an adaptive dynamic window which closely conforms to irregular shaped areas. These algorithms advance the window as the aircraft moves, adapt it to new geometries as they evolve, and provide for buffer zones in advance of expected movement and maneuvers. This paper describes these algorithms following a brief discussion of past and present dynamic window techniques used by the Air Force Wright Aeronautical Laboratories Avionics Laboratory. (Author)

A82-14770 **Airborne Electronic Map Systems. I - Design.** R. Hoffman and G. Burnham (Texas Instruments, Inc., Dallas, TX). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 769-772.

The requirements and implementation of an Airborne Electronic Terrain Mapping System (AETMS) are discussed. Display formats with plan views, flat images, and perspective views, all comparable to window or boresight images or viewpoints other than the pilot's, simulation of aircraft motion at speeds up to Mach one, and cost effectiveness, i.e. minimum cost, and interface capabilities are mentioned as necessary aspects for simulation or in-flight use. The data flow comprises a series of refinements of raw terrain data and time dependent user parameters, and the limiting factor of storing only pertinent regional data for airborne use due to technological weight restrictions for stored memory is stressed. Processing and regional memory selection are examined, including the use of up to 13 multipliers and 60 adders to perform up to 80 million operations/sec for a full range of CRT image generation. M.S.K.

A82-14771 **Airborne Electronic Terrain Map System.** J. W. Weber and E. W. Opittek (Hughes Aircraft Co., El Segundo, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 773-778.

The paper reports on the Airborne Electronic Terrain Map System Program, which has resulted in the development of a flyable brassboard for the evaluation of display applications for the Defense Mapping Agency digital data base. A summary of the display formats and supporting simulations such as the plan view contour and perspective views is given, and a system description is presented, which reviews features such as the regional memory, display generator, software, and support equipment. D.L.G.

A82-14772 **Passive terrain following using stored map and global positioning system.** A. C. Woodward and W. M. Hoover (Texas Instruments, Inc., Lewisville, TX). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 779-785.

The configuration and preliminary results are presented for a flight test program conducted to illustrate the potential for passive terrain-following (TF) flight by combining current map storage, the NAVSTAR Global Positioning System (GPS) and TF algorithm technologies. Primary aspects of the GPS/MAP TF system and flight test program include terrain profile descriptions, GPS position and aircraft state information, and TF command computation. Results indicate that position/map techniques can be used in low-level flight control, and eventually operational systems should control primarily from position and map information. D.L.G.

A82-14773 **Airborne Electronic Terrain Map System. II - Applications.** G. Burnham and C. S. Kline (Texas Instruments, Inc., Dallas, TX). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 786-789.

Applications of the Airborne Electronic Terrain Map System are considered. These include: (1) the provision of covert, all-weather weapon delivery for combat aircraft; (2) the use of stored terrain data to substitute for data normally provided by a forward-looking sensor; (3) the use of stored terrain data to generate a display that the pilot can use to fly low and avoid terrain higher than aircraft altitude; and (4) the extension of the system to sensor blending concepts with radar and FLIRs. S.C.S.

A82-14774 **Technical/operational ATC scenarios for future TMA navigation.** K. D. Kricke and L. Knapp (Elektronik-System-Gesellschaft mbH, Munich, West Germany). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 792-799. 8 refs.

Air traffic control is discussed in terms of the entire air traffic system, and as a national authority. The terminal maneuvering area (TMA) is considered with reference to typical configurations, approach and departure phases, and such areas for improvement as possibilities for increased capacity, environmental protection, and fuel-saving flight profiles. A number of possible advances in TMA scenarios are identified, including three- and four-dimensional navigation, secondary radar systems and data-processing systems for automated air traffic control. S.C.S.

A82-14775 **Some Italian research for developing new primary ATC radars.** M. Calamia (Firenze, Università, Florence, Italy). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 800-807. 15 refs.

A survey of Italian research on primary air traffic control radar systems is presented. Types of clutter affecting such systems are discussed, and the parameters defining the filter capacity of radar with respect to clutter are identified as the improvement factor and subclutter visibility. Studies conducted to characterize dynamic clutter phenomena at airports in Rome and Naples in 1979-1980 are reported. Attention is given to adaptive moving target indicator filtering techniques. A method for the recording and analysis of atmospheric clutter echoes using an orthogonally polarized double-channel receiver is considered. S.C.S.

A82-14776 **Performance evaluation of target report extractor in the monopulse ATCRBS.** D. Giuli, M. Fossi (Firenze, Università, Florence, Italy), and E. Dalle Mese (Pisa, Università, Pisa, Italy). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 808-815. 11 refs. Research sponsored by the Consiglio Nazionale delle Ricerche.

In this paper some results are reported, obtained via an analytical approach, which are relevant to the performance evaluation of an Air Traffic Control Radar Beacon System (ATCRBS) monopulse extractor to be devised in a Discrete Address Beacon System (DABS) for Air Traffic Control (ATC). Suitable statistical models of the correlation tests used by the dwell-time section of the receiver are developed. The obtained results refer to a statistical analysis of the dwell-time section which performs the defruiting function. (Author)

A82-14777 **A multimicroprocessor system for ATCRBS monopulse data processing.** E. Borgheresi, D. Giuli, F. Pirri (Firenze, Università, Florence, Italy), G. Oppimiti, and C. Poli (Marina Italiana Istituto G. Vallauri, Leghorn, Italy). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 816-822. Consiglio Nazionale delle Richerche No. 80,00386,91.

In this paper the problem of the dwell time processing of aircraft replies in the Air Traffic Control Radar Beacon System (ATCRBS) section of the Discrete Address Beacon System (DABS) is considered. A solution is suggested which is based on the use of a multimicroprocessor system. A brief description of the hardware structure of the system is given and the algorithms used for processing the replies are shown. Such algorithms aim at improving the efficiency of correlation procedures among reply reports received by the same target during the antenna dwell time. Parallel processing is obtained through a 'sliced-azimuth' subdivision of the amount of the total job. (Author)

A82-14778 **Flight management systems for modern jet aircraft.** R. H. Farmer (General Motors Corp., Delco Electronics Div., Goleta, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 823-829. Contract No. F09603-79-C-1610.

Attention is given to flight management computer systems for modern jet aircraft, noting tests run on Air Force C-141 aircraft. Fuel-saving aircraft operations are identified, including optimum takeoff and climb schedules, cruise Mach control, optimized altitude selection, delayed flaps, ATC flow control, and area navigation/direct routing. Data from the C-141 Fuel Savings Advisory System are reported. In this system, the flight management system provides vertical navigation, speed control, flight planning control, and horizontal flight path commands to the inertial navigation systems. The data show that significant fuel savings are possible by close attention to many small efficiencies of flight operations. S.C.S.

A82-14779 **Weather impact on low-altitude imaging infrared sensors in Europe - An availability model.** E. R. Edge (Analytic Sciences Corp., Reading, MA), J. D. Malick, and J. H. Allen (SRI International, Menlo Park, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 832-839. 5 refs.

This paper discusses the development of a methodology for evaluating the availability of low-altitude electro-optical (EO) sensors for imaging of ground targets. Because of the wide range of possible target types and their possible geographical distribution, a flexible tool for the assessment of current and future sensor designs is presented. This analysis tool, which is available as a FORTRAN computer program named WEATHER, includes a statistical model of all weather effects, accounts for seasonal, diurnal and geographical variabilities, allows for arbitrary distributions of targets, and provides estimates of simultaneous outages over wide geographical areas. (Author)

A82-14780 **Study of the effects of maneuver compensation on beam pointing accuracy.** D. E. Miracle (Logicon, Inc., Dayton, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 840-846. Contract No. F33657-78-C-0490.

It is commonly necessary to aim an airborne antenna consistently at a target antenna. This aiming is simple enough when angle measuring resources are devoted to the target, but these resources are available only a small fraction of the time. Consequently, with no compensation during maneuvers and between measurements, the antenna may be aimed significantly off target. Consideration of this problem for present medium performance aircraft having state-of-the-art navigational and EW systems indicates that several simplifying mathematical approximations are justifiable. These lead to a set of compensation algorithms which are operationally and computationally superior to known alternative methods. The method involves performance angle measurements at a slower rate than is normally required, relying upon a set of intermediate pointing corrections for coverage maintenance. The forms of the algorithms are simple enough to permit implementation on the EW computer, or if necessary, other hardware. (Author)

A82-14788 **Conceptual design of an integrated power and avionics information system.** G. L. Dunn and P. Leong (Boeing Military Airplane Co., Seattle, WA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 954-962. 5 refs. Contract No. F33615-80-C-2004.

A nonintegrated DAIS type architecture has been used as a baseline to determine power system control requirements for a two-engine tactical aircraft and to assess the relative merits of the hierarchical and integrated architectures. Two power generation and distribution configurations using solid state power controllers, three power control system concepts, and two integrated power and avionics architectures were considered. It is found that the integrated architectures with smart ELMCs (electrical load management centers) represents the best utilization of the data bus and has acceptable processor loading. The processor overhead is the least and both logical equation processing and bus loading make optimum use of the available DAIS technology capabilities for a single data bus. P.T.H.

A82-14789 **60 kVA ADP permanent magnet VSCF starter generator system - A program overview.** R. C. Webb (General Electric Co., Binghamton, NY). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 963-965. Contracts No. F33615-78-C-2200; No. F33615-74-C-2037.

The paper reviews an Air Force-sponsored program to design, construct, demonstrate flight worthiness, and flight test 60 kVA variable speed constant frequency (VSCF) permanent magnet (PM) electrical starter/generator systems using high energy product samarium cobalt magnets in an all metallic solid rotor. PM VSCF system offers a significant improvement in electrical generating system efficiency over presently used systems. The PM VSCF also offers a simplification of the engine auxiliary gearbox area and aircraft ducting by combining the engine starting and electrical power generation functions into one system. P.T.H.

A82-14791 **High speed PMG containment study for VSCF system.** M. M. Youn (General Electric Co., Erie, PA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 971-977. 6 refs. Contract No. F33615-80-C-2032.

A permanent magnet rotor containment method chosen for variable speed constant frequency (VSCF) applications is described. The containment method employs amortisseur bars in the magnetic member of the bimetallic shrink ring to reduce the commutating reactance of the generator for stable converter operation. The significantly higher energy product combined with high temperature capability of the magnet provides the basis for permanent magnet machines which are smaller, higher in efficiency, and more reliable than wound rotor machines. P.T.H.

A82-14792 **Failure analysis of variable reluctance stepper motor.** D. L. Hart and J. A. Ziegenhagen (Dayton, University, Dayton, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 978-982.

The variable reluctance stepper motor is an integral part of the electronic fuel control system on a jet engine in that it regulates the fuel flow to the engine. The stepper motor is required to operate in a high temperature environment while immersed in a jet fuel. This paper reviews the failure modes, analysis techniques, and the recommended corrective actions. (Author)

A82-14793 **The payoff from U.S. investment in aeronautical research and development.** R. C. Lenz (Dayton, University, Dayton, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 984-991. NSF Grant No. SRS-79-10397.

This paper presents a quantitative analysis of the returns on U.S. investments in aeronautical research and development over the fifty years from 1926 to 1976. The returns on the investment are those obtained through productivity improvements in the airline industry, independently of any other returns. The net gains from the R&D expenditures are very large in comparison with standard commercial opportunities during the same period. However, neither the aircraft builders who performed most of the R&D, nor the airlines who bought and used the aircraft, received the largest part of the gain. Instead, the gains were distributed primarily to the traveling public, and to a lesser extent to airline employees. A key point of the research is the construction of probable aeronautical R&D expenditures for the years before 1957, the first year for which National Science Foundation statistics are available. Another feature is the use of seat-mile data as the appropriate measure for airline output in the productivity calculations. An innovative concept, the use of hypothetical 'phantom fleets' to determine productivity gains, is introduced. (Author)

A82-14794 **Parallel processing applied to digital flight control systems - Some perspectives.** T. F. Westermeier (McDonnell Aircraft Co., St. Louis, MO). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1010-1017.

Parallel processing techniques are thought to have the potential for increasing the performance of digital flight control systems. A number of issues are addressed to determine if the potential can be realized. The composition of generic flight control software is examined to determine its amenability to parallel solution. From this examination, two prototype software decompositions and their resulting architectures are proposed and evaluated in terms of iteration rate, transport lag, and computation time. The impact of parallel processing on size, weight, power, and reliability is examined next. Finally, the throughputs of microprocessors are evaluated to determine their suitability as processing elements. (Author)

A82-14796 **Microprocessor flight control application study.** F. C. Neebe, S. J. Hissong (General Electric Co., Binghamton, NY), and W. E. Nelson, Jr. (Northrop Corp., Aircraft Div., Hawthorne, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1022-1029.

Digital flight control computers are now being used to implement control functions on high performance military aircraft. Microprocessor technology has advanced to the point where it is possible to implement many simple control functions. Several microprocessor subsystems working in parallel can be used to set up systems which have extensive control capability. This paper describes the results obtained from setting up a small microprocessor system to perform pitch control for a modern lightweight fighter aircraft. Information is presented detailing system configuration and response. (Author)

A82-14814 **Implementing the DAIS executive.** S. W. Behnen (Boeing Military Airplane Co., Seattle, WA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1149-1154. 8 refs.

The Boeing Military Airplane Company has been studying the feasibility of applying the DAIS executive to a production aircraft system. The advantages and disadvantages of implementing a member of the DAIS executive family have been investigated for several existing and projected aircraft systems: new and upgraded avionics systems; flight control systems; and an electrical power distribution and control system. Although certain operational requirements for these systems will entail enhancements in the current executive design, the basic philosophy and structure of the DAIS executive make it desirable in each of these systems. As a result of its favorable review of the DAIS executive, BMAC is proposing to use DAIS executive variants on new systems such as an electrical power and distribution system and an avionics system. The decision to implement a DAIS executive in an upgraded version of an existing system will depend on the result of cost/benefit trades. (Author)

A82-14817 **A storage device for subsystem maintenance information.** C. J. Tavora and H. M. Collins (Houston, University, Houston, TX). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1170-1174. Contract No. F33615-80-C-1095.

This paper describes the Electronic Nameplate (ENP) - an electronic storage device which may be attached physically to avionic subsystems to store information relevant to their identification, interface specifications, calibration procedures, fault-isolation tests and operational performance. The ENP can be integrated into a single chip device with a standard connector through which it receives power and communicates. Prototypes of the ENP have been implemented and tested for the Air Force Wright Aeronautical Laboratories. (Author)

A82-14819 **Computer modeling of an aircraft HVDC electrical system.** J. D. Segrest (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) and D. L. Sommer (Boeing Military Airplane Co., Seattle, WA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1192-1199. 11 refs. Contract No. N62269-79-V-0265.

This paper describes the development of mathematical models, which represent typical 270 VDC aircraft electrical systems, and the analysis of these models on the EASY Model Generation and Analysis Program. The mathematical models of the following components of a high voltage dc (HVDC) electrical system were developed: (1) buck multiple loop switching regulator with EMI input filter; (2) dc solid rotor generation system; (3) dc wound rotor generation system; (4) flat conductor distribution bus; and (5) aircraft load. The EASY program is then used to analyze a system by specifying the topology of a network of these predefined components. Sample simulation results are included. (Author)

A82-14820 **Digital simulation of aircraft electrical generating system by means of Sceptre program.** D. Fair, J. Dhyanchand, E. Parker, and H. Bahanassy (Sundstrand Advanced Technology Corp., Rockford, IL). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1200-1205. 5 refs.

A computer program is presented which simulates the aircraft electrical generating system. In this computation analysis, a constant speed drive with electronic governor, brushless aircraft ac generator, and voltage regulator are simulated as a system. These subsystems were linked for a complete aircraft electrical power generating system by means of the Super-Sceptre program and FORTRAN subroutines. The 60 KVA Sundstrand Aircraft Generating System was simulated with this model for on-off transient loads. The simulated results were found to be in close agreement with experimental data. (Author)

A82-14821 **Computer simulation of an advanced aircraft electrical system.** A. J. Marek, D. F. Sellers (Vought Corp., Dallas, TX), and D. Fox (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1206-1215.

Computer simulation programs which were developed for advanced aircraft electrical system designs are described. The programs consist of four separate modules encompassing the IDG generating system, VSCF generating system, parallel generator operation, and the power distribution system. Each program is written in FORTRAN V and is based on data supplied by power generating system manufacturers and data derived from various texts. This paper describes the procedure for program development; program features, structures, parameters, and accuracy; and program solution run times. The capabilities of the developed programs are discussed, and a representative sample of simulation runs with computer plots are presented. P.T.H.

A82-14823 # **Airborne color CRT displays.** H. L. Waruszewski, Jr. (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21,

1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1224-1243. 15 refs.

It is suggested that new human factors data and cockpit requirements need to be developed and applied to color cockpit displays so that requirements for a usable display can be generated. The color display technology needs to be evaluated with regard to satisfying the established human factors requirements. Test methodologies need to be developed to determine the compliance of the color displays with the specification requirements. In addition, color displays need to be integrated into the cockpit using total cockpit human factors criteria to maximize the possible workload reduction and safety of the aircraft. Such color display technologies as beam penetration color CRT and shadow mask color CRT are described, and applications of color CRTs (including tactical and map displays, and flight control and engine displays) are considered. P.T.H.

A82-14824 **The Maneuvering Flight Path Display - A flight trajectory solution display concept.** J. F. Watler, Jr. and W. B. Logan (Northrop Corp., Aircraft Div., Hawthorne, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1254-1260. 5 refs.

The Maneuvering Flight Path Display (MFPD) provides to the pilot an anticipatory, real-time presentation of the command flight path. The presentation depicts the 'solution' of the desired trajectory, thus telling the pilot 'what to do' and 'how to do it'. This information is displayed graphically, eliminating the need for the traditional dials, scales, pointers, or alpha-numeric readouts. The pilot, by controlling the aircraft to fly just above the graphical flight path being portrayed, is assured of precise 4-D trajectory control. It is concluded that the success of the MFPD development and the consequent rapid maturation of the concept has stimulated a widespread interest in advancing the program to flight demonstration as quickly as possible. P.T.H.

A82-14825 # **The LANTIRN wide field-of-view raster Head-Up Display.** R. L. Berry and J. C. Byrd (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1261-1268.

As part of the Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) System, a new Head-up Display (HUD) is being developed as replacement for the existing HUDs in the F-16 and A-10 aircraft. The primary improvements will be greatly increased field-of-view and the capability to display Forward Looking Infrared (FLIR) video. The HUD will use diffraction optics in the combiner as the main tool by which improvements in field-of-view, contrast ratio, and see-through visibility are achieved. This paper is an overview of the use of diffraction optics in the LANTIRN HUD. (Author)

A82-14826 **Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling.** H. Y. Kim, R. H. Rooney, and E. Y. Shapiro (Lockheed-California Co., Burbank, CA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1270-1275.

The present paper investigates decoupling procedures using output feedback on longitudinal axis dynamics of a wide body transport aircraft. The possibility of decoupling through output feedback is rather restrictive compared to the possibility of full state feedback. Therefore, when output feedback decoupling is not possible, the state variables are reconstructed by the Luenberger observer to be used in full state feedback decoupling of the system. The results of this approach are presented via simulation. (Author)

A82-14827 **A synthesis technique for highly uncertain and interacting multivariable flight control systems.** I. Horowitz, O. Yaniv, B. Golubev, and L. Neumann (Weizmann Institute of Science, Rehovot, Israel). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1276-1283. 7 refs. Grant No. AF-AFOSR-80-0213.

A recent synthesis technique has the attractive property that the uncertain multiple input-output (MIO) feedback problem, is converted into a number of uncertain single-loop problems. Under certain general conditions, the solutions of the single-loop problems are guaranteed to be satisfactory for the MIO problem. This technique is applied to the Ay-direct side force mode of a fighter CCV aircraft. The objective is to achieve fast Ay response with small sideslip and roll, over a range of flight conditions. Three designs of varying complexity are presented with simulation results. The technique clearly reveals the conflicting design factors and trade-offs. (Author)

A82-14828 # **Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft.** D. W. Potts (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) and J. D'Azzo (USAF, Institute of Technology, Wright-Patterson AFB, OH). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1284-1291. 8 refs.

This paper investigates control of an aircraft when there is a primary control surface failure. The object of this study is to reconfigure the remaining control surfaces to compensate for the additional forces and moments generated by the inoperative control surface. To study this flight control problem, a comprehensive aircraft model is required which considers each control surface operating individually. A six degree-of-freedom aircraft model is developed, including all the individual control surfaces. The additional coupling between the axes requires the derivation of several new non-dimensional control derivatives. With the new comprehensive aircraft model, the entire eigenstructure assignment method is used to assign both the eigenvalues and the eigenvectors to the closed-loop plant matrix. This method is used for the direct digital design of a multivariable discrete regulator control law. (Author)

A82-14829 **Design of direct digital flight-mode control systems for high-performance aircraft.** B. Porter and A. Bradshaw (Salford, University, Salford, Lancs., England). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1292-1298. 5 refs. Contract No. F49620-81-C-0026.

The general results of Bradshaw and Porter (1981, 1981) on discrete-time tracking systems are used to design fast-sampling error-actuated digital controllers and associated transducers which effect fuselage pitch pointing and vertical translation maneuvers in the case of the F-16 aircraft. It is thus demonstrated that these severe maneuvers can be readily effected by appropriate fast-sampling error-actuated digital controllers which generate practically acceptable flaperon and elevator deflections. Furthermore, it is also demonstrated that such fast-sampling digital controllers are extremely robust. (Author)

A82-14831 **General purpose real-time interaction panel for digital simulation.** M. T. Lansdaal and M. E. McSharry (Boeing Military Airplane Co., Advanced Airplane Branch, Seattle, WA). In: NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 1305-1310.

Real-time simulations for modelling aircraft or flight control systems often need a controlled real-time event insertion and event monitoring capability. This capability is necessary to study the responses of the simulated system to controlled events or disturbances. A description is presented of an approach providing the solution of event/fault insertion and event monitoring requirements. The approach makes use of an intelligent device, known as the Fault Insertion Panel (FIP), which consists of a minicomputer with a Multiprocessor-Communications Adapter, a Direct Memory Access I/O board, a video terminal, and a hand held control box. The FIP is an inexpensive and versatile replacement for special purpose hardware, such as an aircraft cab/flight deck, and analog instrumentation that must interact with a digital simulation. G.R.

A82-14856 **AN/TPN-25 and AN/GPN-22 precision approach radars.** H. R. Ward (Raytheon Co., Wayland, MA). In: International Radar Conference, Arlington, VA, April 28-30, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 26-31.

A Precision Approach Radar (PAR) is used in a Ground-Controlled Approach (GCA) aircraft landing system to make accurate aircraft position measurements during the final approach to the runway. The PAR recently developed for the U.S. Air Force uses a limited scan phased array to scan, acquire, and track landing aircraft. This paper describes the transportable and fixed-site models of this PAR as well as the results of field tests to verify their coverage and measurement accuracy. (Author)

A82-14857 **Radar hostile fire location.** D. J. Colliver (Royal Signals and Radar Establishment, Malvern, Worcs., England) and J. D. Holcroft (Racal-MESL, Linlithgow, Scotland). In: International Radar Conference, Arlington, VA, April 28-30, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 32-37.

Methods for detecting an attack involving the firing of projectiles are considered, taking into account also the determination of the direction to the source of fire. It is found that for the considered objective, radar-based approaches have important advantages compared to other methods. The requirement for the radar to track projectiles down to short ranges favors the use of a CW system and Doppler processing. Suitable radar hardware is discussed along with aspects of signal processing, taking into account a hybrid processor and a digital processor. Radar systems of the considered type are used in fixed and mobile installations in a security role and have also been installed covertly in armored VIP limousines. Other applications are related to a battlefield environment. G.R.

A82-14868 **Commercial airborne weather radar technology.** G. A. Lucchi (RCA, Avionics Systems Div., Burlington, MA). In: International Radar Conference, Arlington, VA, April 28-30, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 123-130.

From World War II until very recently, there has been little change in the technology of commercial airborne weather radar. The technique being used is still based on the concept of differentiation between various radar backscatter intensities which can be related to rainfall rate. The radar backscatter coefficient for various rainfall rates has been determined sufficiently well for weather radar design calculations. Experiments continue at this time because there are widespread backscatter coefficients depending on such variables as temperature, raindrop size, raindrop shape, and turbulence in the storm cell. Two aircraft were equipped for the conduction of airborne experiments in an attempt to better correlate radar signals with measured turbulence in storm cells. At least three radar manufacturers are developing airborne weather radar systems complying with a new characteristic for a weather radar. Recently a low-cost weather radar system which can be mounted in the leading edge of a single-engine aircraft wing was introduced. G.R.

A82-14871 **Inverse SAR and its application to aircraft classification.** G. Dike, R. Wallenberg (Syracuse Research Corp., Syracuse, NY), and J. Potenza (USAF, Rome Air Development Center, Griffiss AFB, NY). In: International Radar Conference, Arlington, VA, April 28-30, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 161-167.

Two-dimensional radar images of aircraft have been simulated with parameters similar to those of the ARPA/Lincoln C-Band Observables Radar (ALCOR) which has been used in actual radar imaging studies. Development of such a simulation program was necessitated by a need to provide a controlled flight situation to study aircraft image projection planes, and a desire to use the simulation to aid in developing sorting algorithms for use in aircraft classification. The classification approach taken avoids the problem of extraneous responses due to multiple rays, engine modulation, internal antenna scanning, and the addition of stores to the unknown aircraft. A degree of insensitivity to poor focusing is also expected. B.J.

A82-14881 **Air-to-ground MTI radar using a displaced phase center, phased array.** M. L. Stone and W. J. Ince (MIT, Lexington, MA). In: International Radar Conference, Arlington, VA, April 28-30, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 225-230. 5 refs. USAF-sponsored research.

An airborne MTI radar capable of performing surveillance of tactical targets has been assembled and field tested. The design features an electronically scanned displaced phase center antenna, an advanced digital signal processor, and real-time, automated target acquisition and display. The radar represented a scaled model of an all-weather long-range system. Results obtained in the rejection of clutter, the detection of moving targets, and the acquisition and tracking of targets are discussed. (Author)

A82-14908 **A new approach to radar plot extraction for ATC applications.** N. Accarino and E. Giaccari (Selenia S.p.A., Rome, Italy). In: International Radar Conference, Arlington, VA, April 28-30, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 391-396.

It is noted that the capabilities of modern ATC radars require more effective target coordinate evaluation and target resolution capabilities in the extractor than have been available in the past. The availability of powerful processing tools, such as microprocessors, makes possible the implementation of sophisticated algorithms to provide optimum radar plot extraction. A new extraction algorithm, implemented by means of a simulation approach, is described. The improvement in performance is extensively compared with the values obtained using a conventional extractor. The approach described here is given in terms of the following improved characteristics: range and azimuth accuracy, range and azimuth resolution, and target qualification. C.R.

A82-14909 **Extended time radar raw video recording.** R. Inagaki and M. Mochii (Nippon Electric Co., Ltd., Tokyo, Japan). In: International Radar Conference, Arlington, VA, April 28-30, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 397-402.

An attempt is made to develop extended time recording of the radar video for analyzing air traffic control accidents. The combination of a commercial time-lapse video cassette tape recorder and sophisticated video time-compression techniques with radar bandwidth compression demonstrates its validity in realizing 32 hour recording of the ARSR video without deteriorating its image quality from a practical point of view. Improvement in some circuit instability will make it possible to put this newly developed equipment into actual operation in association with magnetic tape recording of the processed digital radar data. C.R.

A82-14927 * **The X-14 - 24 years of V/STOL flight testing.** R. M. Gerdes (NASA, Ames Research Center, Moffett Field, CA). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review,* vol. 16, no. 2, 1981, p. 3-21. 7 refs.

The X-14 V/STOL research aircraft made its first free-hover flight as a proof-of-concept test-bed on Feb. 19, 1957. With the exception of two subsequent modification periods (to X-14A and X-14B) this V/STOL 'workhorse' has been on continuous flight-test status as a research aircraft and flying classroom. The paper presents some of the highlights of its memorable 24-year flight-test career with special emphasis on projects which have contributed to V/STOL technology and on the test pilots who made it happen. (Author)

A82-14928 **Bell-Bertoe Jetwing flight tests.** R. D. Kimberlin (Tennessee, University, Tullahoma, TN). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review,* vol. 16, no. 2, 1981, p. 22-40.

Design features and flight test results of the Jetwing aircraft are reported. The Jetwing employs an upper surface blowing concept in that all engine air is ducted through the leading edge of the wing and ejected over the top surface of the wing through a slot nozzle to achieve supercirculation lift and STOL performance. The nozzle extends over 70% of the wingspan. A Coanda flap is mounted at the trailing edge of the blown portion of the wing and a smaller wing is located over the slot nozzle in low speed flight to reduce installed thrust losses. A test plane with a 21.75 ft wingspan, powered by a single 2200 lb thrust engine, has completed 137 test flights. Test instrumentation is described and in-flight performance with sawtooth climbs at over 55 knots airspeed yielded a lift coefficient of 3.5 and a blowing coefficient of 1.0. Takeoff and landing ground roll are less than 1000 ft, keeping within design goals of a STOL aircraft suitable for aircraft carrier and short, unimproved runway use. D.H.K.

A82-14929 **Flight investigations of integrated descent rate control systems.** W. D. Thompson. *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review*, vol. 16, no. 2, 1981, p. 41-53.

Results of tests to determine the effectiveness of spoilers for enhancing aircraft landing control are reported. Combining the spoiler with a throttle control formed a descent rate control which improved handling performance, produced effective drag control and lift and moment coupling, and expanded the approach airspeed window. The landing ground distances increased from 600 to 1000 ft as the approach angles increased. The spoiler control is viewed as a glide path control which establishes a linear relationship between rate of sink and throttle position. Inexperienced pilots were able to achieve touch-down accuracies comparable to those displayed by experienced pilots flying normal aircraft. No hard landings were encountered during landing testing, the higher approach speeds simplified landings in gusting conditions, and braking during landing roll was reduced. D.H.K.

A82-14930 **Progress report - CH-47 modernization program.** J. C. O'Connor (U.S. Army, Aviation Research and Development Command, St. Louis, MO). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review*, vol. 16, no. 2, 1981, p. 54-64.

Progress toward improving the CH-47D sufficiently to fill the Army medium lift requirements through the year 2000 is reviewed. The mandatory mission profile includes pick-up of a 15,000 lb load at 4000 ft, at 95 F ambient temperature, climb 200 fpm for one minute, cruise outbound for 30 nm, and return with fuel reserves for 30 nm. The CH-47D employs twin turbine engines, tandem counterrotating blades, and can transport troops, cargo, and weapons in day, night, visual, and instrument conditions. An adaptation of the Chinook, the CH-47D has a 30 min oil-out capability, has passed through preliminary air evaluation tests, and features an advanced flight control system which allows hands-off flight. Reliability, availability, and maintenance tests revealed no uncorrectable problems after 342 flight hours, although blade coating may be necessitated by a sparkling phenomenon that occurs during night flights in sandy conditions. D.H.K.

A82-14931 **USNTPS spin program.** J. R. Watkins (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review*, vol. 16, no. 2, 1981, p. 82-86.

The Navy Test Pilot School spin program is described, including test procedures for out of control flight and the aircraft employed. The T-2C Buckeye and X-26A Frigate are the current training aircraft. Students observe upright incipient, oscillatory, and nonoscillating spin and recovery, and are then required to perform similar maneuvers before practicing upright spins as command pilots. Inverted spins are terminated at -1.5 g, and parameters such as minimum entry altitude, mandatory action altitudes, and pre- and post-flight aircraft inspection are outlined. A 30 min out of control flight program is discussed, noting the presence of a chase plane to gather telemetry on rotation, roll, yaw, and pitch/angle rates, and on altitude loss (1000 ft/turn). D.H.K.

A82-14932 **The USAF Test Pilot School high angle of attack and spin training program.** M. D. Edmondson (USAF, Test Pilot School, Edwards AFB, CA). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review*, vol. 16, no. 2, 1981, p. 87-91.

The training program at the Air Force Test Pilot School is reviewed. The course is conducted in academic, flight training, and reporting phases, and high angle of attack and spin conditions are accentuated. Students are exposed to in-depth studies of aerodynamic, inertial, gyroscopic, and other forces and moments necessary for fully developed spin. Flight training begins in sailplanes equipped with a tape recorder and a kneeboard, and proceeds to an A-37B with a 42 channel pulse code modulated data acquisition system. Spin missions are safety monitored by an instructor on TV provided by a radar tracking telescope. Spin recoveries in the sailplane and T-37B are described, including erect and inverted spins. An A-7D vehicle is employed for high angle of attack training, noting the hazard of pilot disorientation during high energy departures and rapid angular attitude changes. D.H.K.

A82-14933 **Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps.** C. L. White and L. E. Parrish (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review*, vol. 16, no. 2, 1981, p. 92-107.

Test results of Navy evaluation of automatic maneuvering flaps (AMF) on an A-7B aircraft are presented. The spin characteristics, the effects of asymmetric drop tank loading on the spin characteristics, and the effects of nose-up longitudinal trim on the A-7 departure recovery were examined. The AMF are on both leading and trailing edges of the wings; modifications to the A-7 necessitated by the use of AMF are listed, along with instrumentation and flight test procedures. AMF was found to enhance the departure, spin, and recovery handling characteristics. The asymmetric fuel tank loading was destabilizing at high angles of attack, but was negated by the presence of AMF. Recommended departure procedures were determined as optimal recovery techniques, and details of the flight test maneuvers for spin entry, recovery, and in asymmetric loading conditions are presented. D.H.K.

A82-14934 **F/A-18A high angle of attack/spin testing.** I. M. Behel and W. G. McNamara (U.S. Navy, Naval Air Test Center, Patuxent River, MD). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review*, vol. 16, no. 2, 1981, p. 108-132.

High angle of attack (AOA) and spin test flights for the F/A-18A aircraft are discussed, noting that high spin resistance features of the control laws necessitated a second, separate set of control laws for spin recovery. Wind tunnel and model testing results are reviewed, with the 16% model yielding more accurate performance prediction than the 6% scale model. The control laws scheduled the maneuvering flaps to increase departure and spin resistance, with full flap extension an optimum configuration for AOA above 25 deg. Instrument feedback for longitudinal stability is outlined and the logic mode for spin recovery is discussed. Finally, the pilot cues, high AOA characteristics, and spin and spin recovery characteristics defined during flight testing are examined, and the benefits of spin recovery cockpit displays for rapid recovery in stressful situations are emphasized. D.H.K.

A82-14935 **KC-10 flight test program.** W. S. Smith (Douglas Aircraft Co., Long Beach, CA) and B. Hinds (USAF, Edwards AFB, CA). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review*, vol. 16, no. 2, 1981, p. 136-143.

Test features and results of refueling interface with various aircraft with the KC-10 Advanced Tanker/Cargo Aircraft are reported. The program sought to define the performance characteristics and operational capabilities of a converted wide-body commercial plane, the DC-10 freighter, as a military cargo and refueling plane. Modifications for the refueling receptacle slipway, bladder fuel tanks, boom, and hose-drogue refueling system are outlined, along with instrumentation alterations. The KC-10 can carry 356,065 lb of fuel or 85 tons of cargo. Acceptable clearances for ground operations were demonstrated and damping of boom oscillations at high Mach numbers was achieved during tests refueling the C-5. Further tests with the B-52, A-10, F-16, F-4, F-15, A-7D and A-7K, aircraft as receptors were successfully completed. Twelve KC-10 aircraft will be operated to extend the Air Force's worldwide deployment operations. D.H.K.

A82-14936 **The all composite Lear Fan 2100.** H. G. Beaird, Jr. (Lear Fan Corp., Reno, NV). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review,* vol. 16, no. 2, 1981, p. 144-153.

Design and performance features of the all-composite Lear Fan 2100 aircraft are described. The plane has two engines, one tail-mounted propeller, and can climb at 1400 fpm with one engine out. The structure is a graphite composite, which results in a greater range than with aluminum due to lighter weight, plus a longer lifetime due to higher durability. The engines provide 850 shaft hp apiece, and the metallic content in the oil is electronically monitored to remain within a wide safety margin. Standard ailerons, elevators, and rudders are controlled through cables and pushrods. The operational altitude is 41,000 ft at 435 mph, with the cabin pressurized to 8000 ft; use of one propeller eliminates the occurrence of asymmetric thrust conditions. Overall simplicity, reliability, durability, and safety were the guiding principles in the design of the aircraft. Nominal operation is given as a Mach 0.65 speed and 31,000 ft altitude. D.H.K.

A82-14937 **Acceptance testing of the Calspan variable stability Learjet.** W. J. Brooks, J. W. Smolka (USAF, Test Pilot School, Edwards AFB, CA), R. M. Norman (U.S. Navy, Test Pilot School, Patuxent River, MD), and A. E. Schelhorn (Calspan Advanced Technology Center, Buffalo, NY). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review,* vol. 16, no. 2, 1981, p. 154-181.

The variable stability system incorporated into a Learjet for use as a flying classroom for USAF and USN Test Pilot students is described. Side-by-side cockpit seating, an observer station, a data station, and the capability of flight in a three-axis, fly-by-wire mode are provided. Various linear and nonlinear flight control system characteristics, along with simulating prefilter effects and transport delay are incorporated in the controls; a number of closed loop flight control system configurations are also included. Components of the variable stability system are discussed, noting the ability of the digitally controlled response feedback system to simulate control reactions of various aircraft in response to the student pilot's control actions when handling numerous aircraft dynamic configurations. D.H.K.

A82-14938 **F-15 SAR.** G. L. Jennings and P. Henry (McDonnell Aircraft Co., St. Louis, MO). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review,* vol. 16, no. 2, 1981, p. 182-197.

The evolution and capabilities of the F-15 synthetic aperture radar (SAR) as an aid to all weather interdiction capabilities are discussed. The radar has eight components and a 384K memory, with Doppler beam sharpened (DBS) and air-to-ground capability. DBS involves cutting the radar beam into azimuth elements and a processing detection filter in each element; range/azimuth resolution is 250 ft. Design goals of 8.5 ft resolution involve the application of coherent processing, which is the SAR. The antenna senses a point on the ground for a predetermined period of time to produce the required synthetic aperture. The 8.5 ft resolution SAR is currently operational for bombing target identification. D.H.K.

A82-14939 **F/A-18 roll rate improvement program.** M. J. Tkach (McDonnell Aircraft Co., St. Louis, MO). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review,* vol. 16, no. 2, 1981, p. 198-202.

The roll rate improvements made during the F/A-18 Full Scale Development Program are reviewed. Detection of low wing stiffness and high aerodynamic damping led to thickening the web and caps of the aft main spar and adding additional layers of composites to the skin aft of the main torque box. Roll power was increased by extending the aileron span, implementing differential edge flaps, and increasing the differential tail authority. Steady state roll at altitudes above 10,000 ft resulted. Differential leading edge flaps were then added to prevent roll rate decay at lower altitudes. A position stick will replace the current force stick to allow the F/A-18 to exceed the time-to-bank requirements throughout the flight envelope. D.H.K.

A82-14940 **AV-8B technical update - Leading edge root extension development.** C. A. Plummer (McDonnell Douglas Corp., St. Louis, MO). *(Society of Experimental Test Pilots, Symposium, 25th, Beverly Hills, CA, Sept. 23-26, 1981.) Society of Experimental Test Pilots, Technical Review,* vol. 16, no. 2, 1981, p. 203-209.

The effects of leading edge root extensions (LERX) on the instantaneous turn rate of the AV-8B aircraft are investigated. The LERX was 5.5 ft long with an 11 ft span and an anhedral of 11 deg; the planform comprised 7.5 sq ft/side, for a net gain of 15 sq ft, a net weight of 150 lb, and a shift of the center of gravity by 0.5%. A total of forty-four test flights carrying various weaponry configurations were conducted for data on the full flight envelope. V/STOL, cruise speed, fuel efficiency, maximum speed, and dynamic stability and control were either unchanged or beneficially affected. Buffet was reduced and instantaneous turn rate increased 21%, although some decrease in longitudinal stability was noted. A reduction of the all-composite LERX to 4.2 ft/side lowered the turn rate increase 17% and kept the decrease in longitudinal stability to 2.5%, which was acceptable. D.H.K.

A82-14946 † **Safety of helicopters in flight (Bezopasnost' poletov vertoletov).** A. M. Volodko. Moscow, Izdatel'stvo Transport, 1981. 224 p. 21 refs. In Russian.

Safety-related aspects of single-rotor and coaxial helicopter operation are summarized with reference to aerodynamics, flight dynamics, aeroelasticity, vibrations and dynamic strength of structures, performance of gas-turbine engines and automatic control systems, reliability, crew performance, and aeronautical meteorology. The physical meaning of the principal flight restrictions contained in the flight manual is examined, and possible errors are discussed. Finally, special situations involving complicated flight conditions and equipment failure are discussed along with recommendations on flight safety and accident investigation. V.L.

A82-14952 **U.S. Navy life support development trends.** D. N. DeSimone (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 1-4.

The methodology and trends in navy aircrew life support research and development are reviewed. Life support and survival gear are complementary between all services where flight, safety, escape, or survival functions may overlap. The hardware and procedural use development of any component undergoes exploratory development, advanced development, and advance engineering development before deployment. Research and development activities are initiated to respond to high accident rates, crew member functional constraints, POW reports, and updated logistics systems. Programs currently exploring improvements in environmental and escape systems, fixed seating, parachutes with no maintenance, protective clothing, survival and rescue, and physiological standards for equipment are described. M.S.K.

A82-14953 * **Emergency in-flight egress for general aviation aircraft.** L. J. Bement (NASA, Langley Research Center, Hampton, VA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 16-24.

A NASA program for development of an inflight egress system for the left (pilot) door of general aviation aircraft is described. The pyrotechnic release door was felt to be necessary because of pilot difficulty in reaching the right door when subjected to spin/stall centrifugal effects. A flexible, linear shaped charge of hexanitrostibene II and a lanyard actuated detonator are discussed, along with mock-up tests and instrumentation. The egress system was designed for minimum structural impact, minimum pilot initiation procedures, low weight, and no egress interference, and to provide sufficient force to blow off the door, have low required maintenance, and high reliability. Results of 68 tests are reviewed, noting the inclusion of a screen to keep glass fragments from spraying the cabin.

Certification was achieved, and uses in the F-111 and B-1 aircraft are noted. M.S.K.

A82-14954 * Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80. G. L. Keyser, Jr., P. L. Deal, B. D. Fisher, and N. L. Crabill (NASA, Langley Research Center, Hampton, VA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 44-49.

The National Aeronautics and Space Administration is conducting a research project called Storm Hazards '80 in order to study the prediction, detectability and avoidance of the hazards of severe storms for aircraft operations. The project, using a highly instrumented NASA F-106B airplane to penetrate thunderstorms, gathered and correlated data from both airborne and ground based instrumentation. The objectives of this project are to determine the effects of lightning on the design and operation of aircraft composite structures and digital electronic systems. The data will be used to determine the correlation of lightning hazards with other severe storm hazards, such as heavy precipitation, hail, turbulence and wind-shear, in order to develop an initial data base for use in design and avoidance. The NASA F-106B was equipped with a weather radar, stormscope, lightning measurement instrumentation and air sampling equipment. This paper will focus on the operational aspects of thunderstorm penetrations and the pilot techniques used to avoid the extremely hazardous portions of the storm such as the tornadoes and hail. It will deal with the effects of the storm elements on the aircraft hardware, avionics and the crew. (Author)

A82-14955 Testing of the SJU-5A ejection seat for the F/A-18 /HORNET/ aircraft. T. A. Pavlik (U.S. Naval Air Systems Command, Washington, DC) and B. Macnab (Martin-Baker Aircraft Co., Ltd., Uxbridge, Middx., England). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 62-65.

Results of developmental testing of the F/A-18 ejection seat are discussed. Changes which were required to the basic configuration MK 10 seat included standard U.S. materials and processes, environmental sealing of the mechanical devices, redundancy of critical components, single point safety handling, incorporation of a navy seat kit, oxygen, and restraint system, and incorporation of parachute water pockets. Difficulties encountered due to the intercontinental distribution of production and testing sites are outlined, and the parachute, pyrotechnic device, and survival kit are considered, noting that testing comprised 14 ejections at speed from 0-600 knots. The seat is now standard equipment on the F/A-18. M.S.K.

A82-14956 Rescue at sea. R. G. Eberhardt (U.S. Naval Weapons Center, Parachute Systems Dept., China Lake, CA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 66, 67.

The Sea Water Activated Release System (SEAWARS) Program has the objective of reducing the number of aircrew-member drownings that occur after a successful ejection and parachute descent into the ocean. This paper addresses the historical evolution and development of the SEAWARS Program, a brief overview of the system requirements, preliminary Navy evaluation, and current program status. (Author)

A82-14958 'Little people' problem /MA-2 torso harness/. V. M. Voge (U.S. Navy, Naval Safety Center, Norfolk, VA) and H. Pheeny (U.S. Naval Weapons Center, China Lake, CA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 76-79.

Changes necessary to the MA-2 torso harness to accommodate use by smaller people, notably females, are described. Measurements of flying personnel weighing less than 140 lb and shorter than 66 in. resulted in a decision to keep the between-K-fitting-distance at a minimum of 7.5 in., which serves as a disqualification level. An adjustable cinch strap has been added to the leg straps to compensate for people who are big enough, yet experience difficulties with proper fitting. Best fit requirements are presented, noting that people who cannot be fit with a standard harness are candidates for custom-fit harnesses. Research into a nylon system with greater negative and lateral g restraint features is indicated. M.S.K.

A82-14960 Automatic parachute releasers for premeditated parachuting. E. Puskas (Para-Flite, Inc., Pennsauken, NJ). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 84-86.

This paper is presented to inform members of the organization of the state of the art of 'Automatic Parachute Opener' design, specifically the design of those used for premeditated parachuting. This presentation covers the history, the philosophy used in establishing design parameters, the technical differences in design dictated by specific applications, the description and the differences in technology of the two primary design approaches currently in use, current trends in utilization, and direction that development of these devices will take in the foreseeable future. (Author)

A82-14961 The history of the development of the GQ aeroconical parachute - 1971-1980. A. J. Harrison (GQ Defence Equipment, Ltd., Woking, Surrey, England). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 93-96.

Development and testing of the GQ aeroconical parachute, which is used to all variants of the MK 10 ejection seat, are reviewed. The chute has a 36 in. diameter vent, equalling 18% of the flying diameter. Two 11.7 sq ft panels positioned to the rear of the canopy at a 45 deg angle from the axis of symmetry allow a positive forward gliding component. Details of the structural materials are presented, and 55 medium/high speed trial drop tests are described. A 20.3 ft/sec rate of descent is provided by the chute, a rate which is not necessarily affected by torn seams. Results of ejection seat tests are provided, noting functional success at Mach 0.98 at 14,000 ft with a maximum deceleration of 26.6 g. The chute inflates within 1.22 sec, deployment occurs at 64 ft/sec, and water pockets are included in the design to collapse the chute within 5 sec of a water landing. M.S.K.

A82-14963 A new safety harness for mobile aircrew. D. C. Reader (USAF, School of Aerospace Medicine, Brooks AFB, TX). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 106-109.

A safety harness for mobile crewmembers in both fixed and rotary winged aircraft has been designed. It consists of a self-tightening assembly of straps attached to a life preserver which is attached to an aircraft strong point by a strap with length adjustment. The safety harness has been assessed for comfort, compatibility with other items of aircrew equipment, strength in suspension and drop tests, and is now recommended for service trial. (Author)

A82-14965 Further test results of parachutes with automatic inflation modulation /A.I.M./. D. B. Webb (Irvin Industries Canada, Ltd., Fort Erie, Ontario, Canada). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 116-123.

An automatic inflation modulation canopy for the next generation of ejector seats is described. The parachute features the use of unidirectional Kevlar stretch fabric in the crown area of the canopy and an auxiliary parachute inside the main canopy mouth. The intent is to reduce the overall recovery flight path distance with a lower peak opening force. A network of reefing lines are organized, i.e. kept from tangling, by a central marquisette, which is held at a fixed point in the center of the canopy by a positioning line connected to the center point of the canopy. Whirl tower, overinflation and descent control, and deployment tests results are reported, and a 29.6 ft diam parachute was shown to display overinflation control, steady state stability, and consistency of inflation timing at speeds up to 275 knots at 16,000 ft. M.S.K.

A82-14966 **A look at the Hoffman Triangular parachute - The first successful glidable parachute.** D. Gold (U.S. Naval Weapons Center, Parachute Systems Dept., China Lake, CA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 124-131.

The development of the Hoffman Triangular parachute is described. Several designs were considered and a cloverleaf configuration with a 25 ft canopy was chosen. A short skirt opposite a lineless tail allowed for an increase in the glide velocity of the canopy. The pilot parachute also featured four vanes, a springless elastic container flap system to throw the chute away from the jumper, and rubber bands to retain bighted suspension lines in the container. The company that produced the parachute failed in business but the use of the rubber bands to retain the suspension lines became a standard feature of parachute containers. M.S.K.

A82-14972 **Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen.** S. M. Reeps, D. C. Johansen, and L. J. SantaMaria (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 183-191.

A82-14974 **Test and evaluation of improved aircrew restraint systems.** G. T. Singley, III (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 196-201. 7 refs.

U.S. Army aviation accident data shows that a majority of all injuries in attack helicopters could have been avoided if these aircraft had been equipped with crashworthy seat and restraint systems. The compactness of the cockpit and the close proximity of mission equipment to the aircrew in attack and scout helicopters pose serious crash impact hazards. Although not desirable from a crashworthiness standpoint, operational considerations may dictate that mission equipment and structure be located within the occupant's crash impact motion envelope. Given this situation, it is critical to the occupant's crash impact survival chances that he be provided with a restraint system that minimizes his crash impact motion envelope, particularly for his head. The cockpit can be delethalized further when the improved restraint is complemented by padding potential strike surfaces in the cockpit, making contact surfaces frangible, and providing weapon system sights with frangibility, telescoping, and/or swingaway features. This paper presents the results of an effort to test and compare the potential of several aircrew restraint systems to reduce the crash impact motion envelope of helicopter aircrewmen. (Author)

A82-14975 **Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter.** R. F. Campbell (Boeing Vertol Co., Philadelphia, PA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 202-208.

The design and test results of a crashworthy seat for the Chinook are presented. Requirements for the seat included the ability to withstand a crash pulse of 30 g peak with a 50 fps velocity change, and a vertical pulse of 48 g peak with a 42 fps velocity change, based on a 0.065 sec pulse duration. An armored bucket capable of protecting against a 30 cal projectile at 100 m was fabricated, and three adjustable attenuator wires were added, each sized to stroke at 600 lb over the seven in. minimum stroking distance. Features of the support structure, the armored Kevlar bucket, cushions, restraints, and testing procedures are outlined, and current work on a self-adjusting, infinitely variable attenuator is indicated, as a means to provide a constant inertia system. M.S.K.

A82-14976 **Crashworthy military passenger seat development.** L. Domzalski (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 209-215. 11 refs.

The performance criteria, design concepts, and test results for Navy crashworthy, fixed-wing aircraft passenger seats are reviewed. Noting the enhanced crashworthiness of a rearward-facing seat, crash pulses with 30 deg pitch, 19 deg roll, and 30 deg yaw are mentioned as dynamic test criteria. Ultimate static loading factors are defined, and the lack of velocity change data from accident investigation reports is stressed as a deficiency. A two passenger seating arrangement with a total weight of 55 lb was chosen, and included a double harness/lap-belt configuration. A steel bench able to withstand a velocity change of 64 fps while supporting two 250 lb passengers resulted, with a maximum energy absorber force setting of 3000 lb on the leg struts. Tests of the seat showed a resistance to up to 8 g force (4000 lb), about half the requirements, and indicate a need to redesign to comply with rearward and lateral static load/deflection criteria. M.S.K.

A82-14977 **HASEP - Survival from crashed Navy helicopters.** J. Micciche (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) and J. J. Iatesta (Sanders and Thomas, Inc., Pottstown, PA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 216-220. 6 refs.

The Navy's Helicopter Aircrew Survivability Program (HASEP) was originally planned to enhance the inflight recovery and survival capability for helicopter aircrewmen. HASEP, more recently, has been directed to eliminate inflight recovery. It focuses on the survival technologies with high near term payoff. The currently active technologies are discussed, taking into account the H-46 helicopter emergency flotation system, the helicopter emergency egress lighting system, a comparison of underwater helicopter escape lights, the H-46 crashworthy cargo restraint, a crashworthy troop seat integration for H-46, and an automatic life raft system. G.R.

A82-14978 **Analysis of escape systems at 687 KEAS.** D. T. Ther and R. F. Yurczyk (Boeing Military Airplane Co., Seattle, WA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 221-225. Contract No. F33615-79-C-3406.

Attention is given to the Advance Ejection Seat program which was concerned with the selection of deployable aerodynamic devices to reduce the acceleration levels of an ejection seat. The object of this program was to find a configuration which could operate at a dynamic pressure of 1600 psf and satisfy the acceleration requirement of MIL-S-94798. Estimated aerodynamic coefficients were used in a three degree of freedom simulation to select a set of configurations which seemed sufficiently promising to be analyzed in a wind tunnel. Refined aerodynamic coefficients were obtained from wind tunnel tests and these data were used in the simulation to select the final configuration. The simulations show that improvement of seat acceleration performance is a complex problem which is not solvable by simply reducing drag. It was found that control of seat attitude and stability is essential to good acceleration performance. G.R.

A82-14979 **Wind tunnel tests of ejection seat for high dynamic pressure escape.** J. O. Bull and R. F. Yurczyk (Boeing Military Airplane Co., Seattle, WA). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 226-230. USAF-supported research.

In connection with the employment of the currently used, multimode, rapidly sequenced ejection system, it was found that a higher injury and fatality rate resulted from more ejections at high speed. A program was initiated to evaluate advanced ejection seat concepts for escape in the high dynamic pressure regime (1600 PSF or 687 KEAS). A description is presented of the wind tunnel test phase of the program. Wind tunnel data were obtained on 12 high Q ejection seat configuration variations. Complete six component data were obtained throughout an angle of attack, angle of yaw, and Mach number range to obtain a basis for conducting six-degree-of-freedom computer simulations of ejection seat stability, trajectory, and performance characteristics. Based on a preliminary review of the data, a seat with 18 deg boom and stabilizer and a seat with 18 deg boom and stabilizer plus a flow diverter appear to be the most viable candidates for the high Q ejection seat. G.R.

A82-14980 **Performance assessment of the ACES-II ejection seat-A-10 configuration.** E. O. Roberts (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 231-234.

A brief overview is presented of a performance analysis of the ACES-II ejection seat for the A-10 aircraft. The analysis is conducted with the aid of a computer simulation program, called SAFEST, which stands for Simulation and Analysis of In-Flight Escape System Techniques. A comparison between track test results and the computer simulation has shown very good simulation. This correlation indicates that complete simulation has now been realized. The obtained results can be used to design and develop new and improved escape systems at lower costs. The analysis proves the value of computer simulation in the design and the evaluation of ejection seat systems. G.R.

A82-14981 **Post ejection survival.** B. Limbrey (Martin-Baker Aircraft Co., Ltd., Uxbridge, Middx., England). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 235-238.

The causes of fatalities occurring during escapes involving ejection seats are examined. It is found that 62% of fatalities were due to striking the ground before the parachute had time to develop. The second principal cause of fatality is drowning or lost at sea, presumed drowned (25%). The remaining causes of fatality are many and varied and each makes up only a very small proportion of all fatalities. Approaches are discussed for aiding the aviator who descends on his parachute into the sea. Attention is given to fatalities occurring in the cases of a single point parachute release and a multiple parachute release. It was found that the number of fatalities for single point releases was much smaller than for multiple releases. G.R.

A82-14982 **Terrain actuated deployment system.** J. K. Seitler (ARO Corp., Buffalo, NY). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 239-244.

A description is presented of a radar altimeter which was developed to automatically detect when an ejectee, after man-seat separation, and a five second delay reaches a height of 500 through 100 feet above the terrain. The radar altimeter then triggers the deployment of the survival kit and subsequent inflation of the life raft contained in the survival kit. The radar altimeter uses a solid-state transmitter and a tuned RF receiver at the transmitter frequency. Sufficient sensitivity and selectivity is assured by RF amplification and filtering. The video processing and timing circuits process received terrain echos only if they exceed the threshold level and are associated with heights of from 100 to 500 feet. G.R.

A82-14983 **A system safety program for aircraft production and deployment.** L. E. Rackley (General Dynamics Corp., Fort Worth, TX). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 245-249.

Changes are sometimes made to an aircraft without adequate consideration of system safety or other specialty engineering aspects. An investigation is conducted concerning the implementation of suitable approaches for avoiding such a neglect with respect to vital system characteristics. It is found to be important that system safety is also considered during design changes made after fleet deployment. System safety considerations should have a significant effect on the decision making process of implementing the change. In order to follow the given recommendations, however, it will be necessary to establish an adequate system safety data base during the development phase and maintain it through the production phase and as long after fleet deployment as necessary. G.R.

A82-14984 **A ballistic design model for initiators for aircraft personnel escape systems.** B. E. Paul (SCOT, Inc., Downers Grove, IL). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 250-252.

In a review of the T-38 interseat sequencing system, it was found that more information was needed regarding the pressure history in an initiator system. In response to this observation, a ballistic model was developed which characterizes the entire pressure-space-time function in the initiator. The model was applied to two diverse initiators. The correlation was found to be quite good. The model was also applied to conditions which yielded rather high in-tube peak pressures, and predicted a similar occurrence. It was then used to establish a method for improvement of this condition. It appears that the model can be efficiently utilized for the development of any new initiator system or the modification of current systems. The model is capable of handling layouts with multiple branches and/or multiple initiator sources. G.R.

A82-14985 **Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation.** A. M. Varney, R. J. Brandstadt, J. D. Martino (Applied Combustion Technology, Inc., Orlando, FL), and J. L. Hinds (U.S. Navy, Naval Ordnance Station, Indian Head, MD). In: Survival and Flight Equipment Association, Annual Symposium, 18th, San Diego, CA, October 12-16, 1980, Proceedings. Canoga Park, CA, Survival and Flight Equipment Association, 1981, p. 253-255.

A82-14998 † **The technology of sheet-metal stamping in the production of aircraft /2nd revised and enlarged edition/ (Tekhnologiia zagotovitel'no-shtampovochnykh rabot v proizvodstve samoletov /2nd revised and enlarged edition/).** M. N. Gorbunov. Moscow, Izdatel'stvo Mashinostroenie, 1981. 224 p. 43 refs. In Russian.

The general characteristics of sheet-metal stamping operations are discussed, followed by a detailed description of the individual stamping procedures. This includes the location and spacing of blanks, and means of improving the quality of the cutting edge. The bending method is then described, including a discussion of the stress-strain state, the minimal radius of bending, bending with tangential tension and compression, and bending with radial compression. The flanging and expansion processes are discussed, as is stretch-wrap forming, molding, and die forging. Attention is also given to the stamping of more complicated shapes and to other methods of stamping in the production of aircraft. J.F.

A82-15311 **Prediction and performance of radome-covered reflector antennas.** P. J. B. Clarricoats, C. G. Parini, and M. S. A. S. Rizk (Queen Mary College, London, England). *(International Union of Radio Science, Symposium on Electromagnetic Waves, 10th, Technische Universität München, Munich, West Germany, Aug. 26-29, 1980.) Radio Science,* vol. 16, Nov.-Dec. 1981, p. 1105-1110. Research supported by the Science Research Council.

The return loss (reflection coefficient) of a paraboloidal radome is predicted by a physical optics method based on the power-coupling theorem. An asymptotic form of the reflection coefficient is found to be very accurate and consistent with a simple geometric optics interpretation. A method to reduce the return loss is investigated using a hemispherical iris-loaded sandwich section of the center of the radome, and an improvement of approximately 5 dB is observed over a useful frequency bandwidth. Contributions of the radome to the radiation pattern of the antenna are identified, and those near to boresight are predicted. D.L.G.

A82-15468 # **A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records (Ricerca di un criterio per la determinazione delle**

cause del wind-shear verificatosi nell'aeroporto di Punta Raisi attraverso i dati statistici rilevati da registrazioni barografiche). O. Cosentino (Aeronautica Militare, Servizio Meteorologico, Rome, Italy) and G. Ferlazzo (Palermo, Università, Palermo, Italy). *Rivista di Meteorologia Aeronautica,* vol. 41, Apr.-June 1981, p. 127-135. 7 refs. In Italian.

A statistical analysis has been conducted on pressure jumps appearing in the barograph records of Punta Raisi airport, which are compared with such corresponding meteorological parameters as wind, temperature and humidity in order to determine the synoptic, local and orographic causes of the phenomena. Attention is given the characteristics and causes of wind shear in the geographical context of the airport, and it is concluded that prefrontal or frontal pressure variations accompanied by local elevation phenomena with cumulus clouding result in horizontal wind shear over the area in which barometric jumps are experienced. O.C.

A82-15482 † **Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures (Issledovanie nesushchei sposobnosti rabochikh koles kompressorov aviatsionnykh GTD pri malotsiklovom nagruzhenii v usloviiakh normal'noi i povyshennykh temperatur).** V. G. Bazhenov, A. D. Baliuk, B. G. Reznik, and V. P. Gontarovskii (Kievskii Politekhnicheskii Institut, Zhitomir, Ukrainian SSR). *Problemy Prochnosti,* Nov. 1981, p. 45-48. In Russian.

A rotor was designed for testing the impeller of gas-turbine engines under low-cycle loading, considering the force interaction of neighboring stages. The stress-strain state of a disk of an impeller was calculated by means of an algorithm based on the finite element method and the theory of small elastoplastic deformations. The load-carrying capacity of the impeller is estimated under conditions approximating those found in a real operational environment. J.F.

A82-15596 **Direct free-flight analysis of aircraft dynamics at high angles of attack.** M. E. Beyers (South African Council for Scientific and Industrial Research, National Institute for Aeronautics and Systems Technology, Pretoria, Republic of South Africa). *Aeronautical Society of South Africa and South African Institute of Aeronautical Engineers, Journal,* vol. 2, no. 1, 1981, p. 17-28. 26 refs.

Concepts are examined for the analysis of high-maneuverability aircraft dynamics on the basis of gross flight-dynamic effects observed in wind-tunnel free-flight experiments. Experimental and analytical techniques developed to study the generic nonoscillatory free-flight motion of flight vehicles trimmed at significant angles of attack, are reviewed. The feasibility of aircraft model free-flight tests is demonstrated on the basis of simulations and trajectory validation schemes are proposed for the corroboration of free-flight and captive-model dynamic data. Finally, the rationale underlying the utilization of data gathered in captive- and free-model dynamic stability tests of high-performance aircraft is examined in the context of design objectives of high maneuverability and good flying qualities. (Author)

A82-15597 **A matter of seconds - A critical account of three notable air disasters /5th Major Miller Memorial Lecture/.** C. S. Margo. *Aeronautical Society of South Africa and South African Institute of Aeronautical Engineers, Journal,* vol. 2, no. 1, 1981, p. 30-35.

Three aircraft accidents are analyzed for causes and remedies. A DC-10 crash of May 25, 1979, comprised the loss of an engine on take-off and subsequent loss of control leading to grounding 31 sec later. Continued unsymmetric repair, maintenance, and replacement of the engines from one side or the other had led to structural failure, and loss of control occurred in the absence of stall indication and power from the side of the lost engine. An increase of speed is judged to have been capable of preventing the crash. Although little evidence was left after the accident that killed Dag Hammarskjold, an evaluation is given that the pilot's knowledge of the height above sea level was uncertain. Finally, a crash of a Boeing 707 on April 20, 1968 is determined to have happened because of premature transition from take-off to climb power. It is noted that the pilot had had a total of one hour's experience with that particular version of the 707. M.S.K.

A82-15599 **Computer image generation for flight simulation.** B. J. Schachter (Westinghouse Defense and Electronics Systems Center, Baltimore, MD). *IEEE Computer Graphics and Applications,* vol. 1, Oct. 1981, p. 29-32, 34-38, 40-46 (17 ff.). 130 refs.

The features and capabilities of computer image generation for producing effective imagery for flight simulation are explored. CRT operational parameters designed to meet necessary realism for human visual interaction are outlined, noting the eye's tendency to concentrate on one small area of resolution at a time. Four currently available systems are examined, along with control logic, the NASA three-view space flight simulator, and block diagrams of information routing. VLSI processors, holographic image displays, interactive computer graphics, and optical disks are considered for advanced simulator systems. M.S.K.

A82-15606 **Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors.** Z.-M. Fan and Z.-F. Chao (China Gas Turbine Research Institute, People's Republic of China). *(Journal of Engineering Thermophysics,* vol. 1, May 1980, p. 185-194.) *Engineering Thermophysics in China,* vol. 1, Apr.-June 1980, p. 207-217. Translation.

Results of theoretical and experimental investigations are presented to demonstrate the feasibility of a solution for certain one-dimensional simultaneous equations. The current flow drag method and the hole blanketing experimental method are shown to have difficulties, and a simple technique of calculation using the mean flow coefficient is provided. Results of calculations in accordance with the one-dimensional flow simultaneous solution are compared with those obtained with the mean flow coefficient method and experimental results, showing good agreement. D.L.G.

A82-15625 **Large terminal maneuvering areas: Operational problems - Possible development of solutions (Les grandes zones de manoeuvre terminale: Problèmes opérationnels - Evolution possible des solutions).** J.-L. Garnier (Direction de la Navigation Aérienne, Paris, France). *(Organisation Européenne pour l'Equipement Electronique de la Navigation Aérienne, Forum Technique, Rome, Italy, May 15, 1981.) Navigation* (Paris), vol. 29, Oct. 1981, p. 443-451. In French.

The operational problems associated with large terminal maneuvering areas (TMAs) are examined, and means by which these problems may be alleviated by the use of expected technological advances are considered. The TMA is defined as the region of space occupied by flights departing from or having a destination in the area concerned, within which aircraft are climbing towards or descending from their cruise levels. Means currently in use for the management of air traffic within a TMA such as that of Paris are indicated. Current problems arising in the use of TMAs are attributed to the phenomena of high traffic levels and the necessity of standbys in the presence of the competing priorities of large capacity and user economics. The possible contributions of the DABS selective addressing secondary radar system, MLS and precision DME to the resolution of these problems are examined, and it is concluded that while all these techniques have their place in the TMAs of the future, additional measures in the areas of onboard navigation equipment, automated ground assistance and traffic control systems are required. A.L.W.

A82-15655 † **Current aerial cameras (Sovremennye aerofotoapparaty).** V. G. Afremov and V. B. Il'in. *Geodeziia i Kartografiia,* Oct. 1981, p. 40-42. 6 refs. In Russian.

The paper considers the development and operation of the TE and TES aerial cameras, having focal distances of 350, 100, 70, and 50 mm and FOV angles of 40, 103, 120, and 136.5 deg, respectively, for 18 x 18 cm frames. The basic technical characteristics and some applications of these cameras are presented. B.J.

A82-15721 † **Quality optimization and unification of aviation gasolines (Optimizatsiia kachestva i unifikatsiia aviatsionnykh benzinov).** V. E. Emel'ianov, K. A. Demidenko, and B. A. Englin (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Neftianoi Promyshlennosti, Moscow, USSR). *Khimiia i Tekhnologiia Topliv i Masel,* no. 11, 1981, p. 18, 19. In Russian.

The introduction of a new process for the production of aviation gasolines based on reformed gasoline has made it possible to optimize the quality of aviation gasolines with respect to their chemical stability, tar content, iodine number, and the content of an antioxidizer. The principal properties of gasolines B-91/115, B-95/130, and B-100/130 are briefly reviewed. It is proposed to replace the aviation gasolines currently in use with a single gasoline type, B-91/115, with an octane number of not less than 95. V.L.

A82-15723 † **Optimization of requirements on the pitting-prevention properties of turbojet-engine oils (Optimizatsiia trebovanii k protivopittingovym svoistvam masel dlia turboreaktivnykh dvigatelei).** B. S. Gutenev, A. V. Vilenkin, G. T. Novosartov, V. G. Gorodetskii, and B. F. Kirdakov. *Khimiia i Tekhnologiia Topliv i Masel*, no. 11, 1981, p. 30, 31. 5 refs. In Russian.

Analysis of the operating conditions of bearings in turbojet engines shows that the probability of trouble-free bearing service is reduced with increasing temperatures and loads. In order to increase the service life of turbojet-engine bearings, a study has been carried out with the aim of improving the pitting-prevention properties of MS-8p oil. This objective has been achieved by substituting a chlorine-containing additive for a phosphorus-containing additive. V.L.

A82-15724 † **Efficient use of working fluids in aviation hydraulic systems (Ratsional'noe primenenie rabochikh zhidkostei v aviatsionnykh gidravlicheskikh sistemakh).** B. G. Sedrik, V. S. Ugriumov, and A. F. Iakovleva. *Khimiia i Tekhnologiia Topliv i Masel*, no. 11, 1981, p. 33-35. In Russian.

Changes in the quality of working fluids in the hydraulic equipment of aircraft in the process of equipment operation are analyzed. It is shown that by scheduling fluid replacement with allowance for the actual condition of the fluid, it would be possible to reduce fluid consumption by 1.5-2 times without a tradeoff in equipment reliability. V.L.

A82-15748 **A VHF homing system with VHF radio-telephony for area-representative strip-survey flights conducted, as part of combined forest inventories, with light aircraft carrying 70 mm and 35 mm cameras (Ein VHF-Homing-System mit VHF-Sprechfunk für flächenrepräsentative Streifenbefliegungen mit 70 mm und 35 mm Kameras von leichten Flugzeugen im Rahmen kombinierter Waldinventuren).** B. Rhody (Bundesforschungsanstalt für Forst- und Holzwirtschaft, Hamburg, West Germany). *Bildmessung und Luftbildwesen*, vol. 49, Nov. 1, 1981, p. 199-203. In German.

A82-15816 **Computer-animated predictive displays for microwave landing approaches.** S. N. Roscoe (New Mexico State University, Las Cruces, NM) and R. S. Jensen (Ohio State University, Columbus, OH). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-11, Nov. 1981, p. 760-765. 55 refs.

It is shown that a safe, orderly, and economical flow of air traffic at congested metropolitan airports can be ensured by microwave radio guidance systems. By furnishing aircraft position in three dimensions, these terminal navigation aids potentially allow steeply curved landing approaches that will faciliate unprecedented noise abatement procedures, large fuel savings, and precisely timed arrivals at airport runways. To implement such complex flight procedures, a combination of semiautomatic computer-assisted airplane guidance and control and radically different flight displays will be required if pilots are to monitor such maneuvers confidently and execute them manually when necessary. Results of a simulator investigation, involving visual guidance and flight-path prediction embedded in computer-animated contact analog displays, show that pilots can reliably execute computer-programmed curved approaches to airport runways with the required precision in the face of severe wind shears. C.R.

A82-15823 **The influence of wind shear and vertical winds on takeoffs and go-arounds.** R. König and P. Krauspe (Braunschweig, Technische Universität, Braunschweig, West Germany). *Airport Forum*, vol. 11, Oct. 1981, p. 43-46. 8 refs.

The effects of wind shear and vertical winds on aircraft takeoffs and go-arounds is discussed. It is noted that with the advent of a more modern autopilot generation and advanced wind shear warning indicators, landing accidents due to wind shear will be avoidable. Hazards posed by low-velocity downdrafts and wind shear in the lee of a large-surface obstacle are also considered with reference to studies made a a German airport and with simulators. Operational considerations of wind shear are assessed. S.C.S.

A82-15824 **'In situ' composites for jet propulsion and stationary gas turbine applications.** W. Bunk (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Werkstoff-Forschung, Cologne; Aachen, Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany) and P. R. Sahm (Aachen, Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). *Zeitschrift für Werkstofftechnik*, vol. 12, Oct. 1981, p. 345-359. 25 refs. Research supported by the Bundesministerium für Forschung und Technologie.

Examples of reinforced superalloys for high temperature applications in jet engines are reported. The phase stability of microstructures is tested with a high thermal gradient device, and first engine tests of directionally solidified Co-Cr7C3 eutectic alloy are reported. Properties such as creep behavior, fatigue, and oxidation resistance are measured and compared with corresponding data for both conventionally and directionally cast Ni-base superalloy IN 738. First engine tests of 18,000 hrs with unalloyed Co-Cr7C3 vanes indicate the importance of a fully eutectic microstructure and stability against carbide transformations. D.L.G.

A82-15827 **Rapid elliptic solvers.** R. W. Hockney (Reading, University, Reading, Berks., England). In: Numerical methods in applied fluid dynamics. London and New York, Academic Press, 1980, p. 1-48. 37 refs.

Rapid direct methods for the solution of certain classes of elliptic partial differential equations (pde) have been in use for over ten years. Such methods are based on Fourier analysis, cyclic reduction, and optimal combinations of the two. To classify as a Rapid Elliptic Solver (RES), the algorithm must solve the elliptic equation of an (n x n) mesh in a number of floating-point arithmetic operations which corresponds approximately to the source of n. The methods are also characterized by the minimum use of storage. A number of different RES algorithms for the solution of pde's are considered, taking into account questions concerning the choice of algorithm, the method of Fourier Analysis and Cyclic Reduction (FACR), the cyclic reduction process, marching methods, and a comparison of programs. Attention is also given to nonseparable equations, and the N-body problem. G.R.

A82-15835 **Remarks on the calculation of transonic potential flow by a finite volume method.** A. Jameson (New York University, New York, NY). In: Numerical methods in applied fluid dynamics. London and New York, Academic Press, 1980, p. 363-386. 18 refs. Contract No. N00014-77-C-0032.

The development of a finite volume method for the numerical calculation of transonic flow is considered. It is assumed that the flow is irrotational, so that the velocity can be represented as the gradient of a potential. Essentially this limits the application of the method to flows containing fairly weak shock waves, for which the Mach number of the normal component of the velocity ahead of the shock is not substantially greater then 1.3, since shock waves are to be modelled by isentropic jumps. The formulation of the equations is discussed, taking into account the case of a wing or wing-body combination in a uniform stream. The discrete approximation to the equations is developed by using a subdivision of the domain into distorted cubic cells. The developed procedure is applied to the study of swept wings. The results of the calculations encourage confidence in the usefulness of the potential flow model for engineering predictions. G.R.

A82-15845 # **Robust flight control - A design example.** S. N. Franklin (Systems Control Technology, Inc., Palo Alto, CA) and J. Ackermann (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Dynamik der Flugsysteme, Oberpfaffenhofen, West Germany). *Journal of Guidance and Control*, vol. 4, Nov.-Dec. 1981, p. 597-605. 6 refs. Research supported by the

Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt; Grant No. AF-AFOSR-78-3633; Contract No. N00014-79-C-0424.

A novel parameter space method is used as a tool for the design of a robust stabilization system for the short-period longitudinal mode of a fighter aircraft. The example is an F-4E with additional horizontal canards. Robustness is achieved, in the sense that military specifications for damping and natural frequency are satisfied, by a constant controller in spite of perturbations. The perturbations are changing flight conditions and undetected sensor failures. The resulting controller structure requires two gyros and one accelerometer. The system, including actuator dynamics and feedback dynamics, is of sixth order and, in the design, four free controller parameters have been assumed. Practical considerations are taken into account, such as bandwidth limitation below structural vibration frequencies, actuator limitations, and relaxed emergency specifications in failure situations. (Author)

A82-15846 # **Airplane performance sensitivities to lateral and vertical profiles.** J. C. Wauer, J. M. H. Bruckner (Rockwell International Corp., Cedar Rapids, IA), and C. H. Humphrey (United Air Lines, Inc., San Francisco, CA). *Journal of Guidance and Control,* vol. 4, Nov.-Dec. 1981, p. 606-613. 11 refs.

Airplane performance sensitivity to the choice of lateral and vertical profiles is studied based on data recorded on in-service flights of a 727-200 airplane equipped with JT9D-7 engines. Lateral profile performance sensitivity is based on analysis of flight technical or guidance error and on varying degrees of direct flight clearance. Vertical analysis is based on an aerodynamic simulation of the recorded flights. Sensitivity to the choice of vertical profile is studied by simulating the actual profile that was flown, two perfectly flown constant IAS/Mach profiles, and minimum-cost and minimum-fuel optimum profiles. Some of the practical considerations in implementing the real-time optimum profile algorithms and some of the difficulties encountered with the optimum profile computations are discussed. Predicted fuel and time savings are related to the air traffic control (ATC) environment experienced by the airlines to obtain net savings predictions with varying degrees of ATC restriction. (Author)

A82-15847 * # **Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches.** A. J. Grunwald (Technion - Israel Institute of Technology, Haifa, Israel), J. B. Robertson, and J. J. Hatfield (NASA, Langley Research Center, Flight Electronics Div., Hampton, VA). *Journal of Guidance and Control,* vol. 4, Nov.-Dec. 1981, p. 623-631. 11 refs.

A computer-generated perspective tunnel display for a steep and strongly curved three-dimensional helicopter approach is studied. The necessary control variables for following a curved trajectory are analyzed, the effectiveness of superimposed predictor symbology is investigated, and a suitable predictor law is formulated. The theoretical considerations are validated by an extensive fixed-base simulator program. The tunnel display with a superimposed predictor symbol is shown to outperform conventional-type displays in its abilities to follow a curved trajectory in the presence of gust disturbances, to enter the trajectory from an unknown position outside this trajectory, as well as to monitor automatic approaches. The feasibility of the tunnel display for operation in actual flight has been demonstrated in an exploratory flight test. (Author)

A82-15864 **Mathematical programming in engineering design problems.** H. J. Baier (Dornier System GmbH, Friedrichshafen, West Germany). In: Numerical optimisation of dynamic systems. Amsterdam, North-Holland Publishing Co., 1980, p. 391-410. 19 refs.

The application of mathematical programming to engineering design problems is considered. After the statement of the problem some real-world applications are discussed and some comments on the impact of mathematical programming on the engineering design process are made. Sequential unconstrained minimization technique, sequential linear programming and Lagrangian multiplier methods are presented as three important representatives of optimization algorithms in this field of application. The discussion of some special features shows what can be undertaken to improve their relative performance. Finally an assessment of these algorithms is made. (Author)

A82-15918 # **High voltage/high power for airborne applications.** F. C. Brockhurst (USAF, Institute of Technology, Wright-Patterson AFB, OH) and M. P. Dougherty (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH). *IEEE Transactions on Aerospace and Electronic Systems,* vol. AES-17, Nov. 1981, p. 795-801. 15 refs.

Advancements made in technologies required for lightweight, high voltage, high power, airborne power systems are discussed. Programs to reduce the weight of rotating machines, transformers, switches, invertors, and capacitors are described, and some aspects in the use of these components in the design of lightweight systems are considered. Interactive programs already developed allow the designer to analyze circuit performance and perform component and limited system design, while additional programs are planned with emphasis on quick response, ease of use, and versatility. D.L.G.

A82-15950 **CT7 - GE attacks commuter turboprop market.** J. Moxon. *Flight International,* vol. 120, Nov. 21, 1981, p. 1572, 1575, 1576.

A description is given of the design features and performance capabilities of the CT7 turboprop engine, which is intended for commuter aircraft of the 30-35 seat class. The 1700 shaft horsepower engine employs a combined axial/centrifugal compressor to achieve a pressure ratio of 17:1 and turbine entry temperatures of over 1200 C. Emphasis is put on the engine's maintainability, which allows field changes of all modules with only a 12-piece standard tool kit. It is claimed that the CT7 engine core is 30% more fuel efficient than the CT58 helicopter engine core which it is scheduled to replace. The engine incorporates a centrifugal inlet separator that rejects 85-95% of all sand and dust. The reliability of the CT7 is in part due to the development and operational experience accumulated with the T700 military turboshaft, on which its design is based. O.C.

STAR ENTRIES

N82-12030 Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

THE NUMERICAL SOLUTION OF INCOMPRESSIBLE TURBULENT FLOW OVER AIRFOILS Ph.D. Thesis

Harwood Allan Hegna 1981 168 p
Avail: Univ. Microfilms Order No. 8119139

An algebraic eddy viscosity turbulence model based on Prandtl's mixing length theory was modified for separated adverse pressure gradient flows. Finite difference methods for solving the inviscid stream function equation and the incompressible laminar Navier-Stokes equations were used. A finite difference method for solving the Reynolds averaged incompressible turbulent two-dimensional Navier-Stokes equations were employed. Solutions for a NACA 0012 airfoil at angles of attack varying from five to 11.5 degrees at a chord Reynolds number of 170.000 were obtained. Velocity profiles near the airfoil surface and surface pressure distributions are presented and compared with experimental data. Lift and drag coefficients agree well with experimental values. Dissert. Abstr.

N82-12031 Arizona Univ., Tucson.

SUBCRITICAL AND SUPERCRITICAL AIRFOILS FOR GIVEN PRESSURE DISTRIBUTION Ph.D. Thesis

Ahmed Abdelatif HassanEissa 1981 52 p
Avail: Univ. Microfilms Order No. 8121930

An effective method, based on hodograph theory, was developed for the aerodynamic design of subcritical and shock-free supercritical airfoil sections. In addition to the free-stream conditions, the input to the design procedure includes a prescription of the subsonic part of a target pressure distribution and, for supercritical airfoils, of a presumed stream function on the sonic line. A computer program carries out a number of sequential steps that result in an airfoil with a pressure distribution close to that desired at little computational cost. Thus, the airfoil designer can alter the input if design goals are not met and quickly produce another candidate airfoil. This is aided by appropriate graphic display of the airfoil and its pressure distribution. Dissert. Abstr.

N82-12041*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AEROELASTICITY MATTERS: SOME REFLECTIONS ON TWO DECADES OF TESTING IN THE NASA LANGLEY TRANSONIC DYNAMICS TUNNEL

Wilmer H. Reed, III Sep. 1981 19 p refs Presented at the Intern. Symp. on Aeroelasticity, Nuremberg, West Germany, 5-7 Oct. 1980 - 1 Oct. 1981
(NASA-TM-83210) Avail: NTIS HC A02/MF A01 CSCL 01A

Testing of wind-tunnel aeroelastic models is a well established, widely used means of studying flutter trends, validating theory and investigating flutter margins of safety of new vehicle designs. The Langley Transonic Dynamics Tunnel was designed specifically for work on dynamics and aeroelastic problems of aircraft and space vehicles. A cross section of aeroelastic research and testing in the facility since it became operational more than two decades ago is presented. Examples selected from a large store of experience illustrate the nature and purpose of some major areas of work performed in the tunnel. These areas include: specialized experimental techniques; development testing of new aircraft and launch vehicle designs; evaluation of proposed 'fixes' to solve aeroelastic problems uncovered during development testing; study of unexpected aeroelastic phenomena (i.e., 'surprises'); control of aeroelastic effects by active and passive means; and, finally, fundamental research involving measurement of unsteady pressures on oscillating wings and control surface. A.R.H.

N82-12042*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

EXPERIMENTAL AND ANALYTICAL STUDIES OF A MODEL HELICOPTER ROTOR IN HOVER

F. X. Caradonna and C. Tung Sep. 1981 61 p refs Presented at the 6th European Rotorcraft and Powered Lift Aircraft Forum, Bristol, England, 16-19 Sep. 1980 Prepared jointly with Army Aviation Research and Development Command
(NASA-TM-81232; A-8332; USAAVRADCOM-TR-81-A-23) Avail: NTIS HC A04/MF A01 CSCL 01A

A benchmark test to aid the development of various rotor performance codes was conducted. Simultaneous blade pressure measurements and tip vortex surveys were made for a wide range of tip Mach numbers including the transonic flow regime. The measured tip vortex strength and geometry permit effective blade loading predictions when used as input to a prescribed wake lifting surface code. It is also shown that with proper inflow and boundary layer modeling, the supercritical flow regime can be accurately predicted. J.M.S.

N82-12047# ARO, Inc., Arnold Air Force Station, Tenn.

EVALUATION AND WIND TUNNEL TESTS OF THE 4,000 LB (NORMAL-FORCE) PITCH/YAW AND ROLL DYNAMIC STABILITY BALANCE SYSTEMS FOR MEASURING DIRECT, CROSS, AND CROSS-COUPLING DERIVATIVES Final Report, 5 Jun. 1978 - 25 May 1979

T. D. Buchanan, S. M. Coulter, and E. J. Marquart Sep. 1981 79 p refs
(AD-A105122; AEDC-TR-80-12) Avail: NTIS HC A05/MF A01 CSCL 20/4

Early in the 1970's, the personnel at the Arnold Engineering Development Center (AEDC) recognized the need for a set of new dynamic test mechanisms for testing aircraft models at high angles of attack. At these angles of attack cross and cross-coupling derivatives may be significant in determining the aircraft's stability. Dynamic balances were fabricated to perform pitch, yaw, and roll dynamic stability tests of aircraft or large missile models at AEDC. The balances were designed to measure not only the direct derivatives but also cross and cross-coupling derivatives. The set of balances comprises a 4,000-lb (normal-force) roll and a 4,000-lb pitch/yaw forced-oscillation balance to measure the direct damping derivatives and a five-component can-type balance to measure the cross and cross-coupling derivatives attributable to pitch or yaw. Extensive laboratory investigations of the balances' static and dynamic response characteristics were performed before wind tunnel tests of a 1/9-scale F-16A model in the AEDC Propulsion Wind Tunnel (16T) at Mach numbers from 0.2 to 1.4 GRA

N82-12050

APPLICATION OF SINGULAR PERTUBATION THEORY TO ONBOARD AIRCRAFT TRAJECTORY OPTIMIZATION Ph.D Thesis

Abhijit J. M. Chakravarty 1981 139 p
Avail: Univ. Microfilms Order No. 8121183

The problem of minimizing direct operating cost in dollars (combined cost per hour and cost of fuel per hour) for a typical commercial jet transport model is formulated via the Pontryagin minimum principle. Singular perturbation theory is applied to reduce the computational burden of solving the resulting optimal control problem. The work of previous investigators is extended to include the aircraft weight variation in the state equations and the resulting seven-state model is analyzed for time scale separation. It is shown that a realistic time scale separation involves only two scales. The resulting model is then used to develop the inner and outer solutions as dictated by singular perturbation theory. Both the free terminal time problem and the time controlled 4-D problem are considered. A comprehensive model for the aerodynamic and fuel flow terms appearing in the equations is developed for use in optimal trajectory computation. Numerical results are presented that illustrate the nature of the optimal trajectory and the control variables. Dissert. Abstr.

N82-12051*# Virginia Univ., Charlottesville. School of Engineering and Applied Science.

TRANSPORTATION SYSTEMS EVALUATION METHODOLOGY DEVELOPMENT AND APPLICATIONS, PHASE 3 Final Report

A. Robert Kuhlthau, I. D. Jacobson, and L. C. Richards Jun. 1981 82 p

(Contract NAS1-14908)
(NASA-CR-164999; UVA/528175/MAE-CE81/101) Avail: NTIS HC A05/MF A01 CSCL 01B

Transportation systems or proposed changes in current systems are evaluated. Four principal evaluation criteria are incorporated in the process, operating performance characteristics as viewed by potential users, decisions based on the perceived impacts of the system, estimating what is required to reduce the system to practice; and predicting the ability of the concept to attract financial support. A series of matrix multiplications in which the various matrices represent evaluations in a logical sequence of the various discrete steps in a management decision process is used. One or more alternatives are compared with the current situation, and the result provides a numerical rating which determines the desirability of each alternative relative to the norm and to each other. The steps in the decision process are isolated so that contributions of each to the final result are readily analyzed. The ability to protect against bias on the part of the evaluators, and the fact that system parameters which are basically qualitative in nature can be easily included are advantageous. S.L.

N82-12052*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INVESTIGATION OF SEVERE LIGHTNING STRIKE INCIDENTS TO TWO USAF F-106A AIRCRAFT
J. Anderson Plumer Hampton, Va. NASA. Langley Research Center Sep. 1981 19 p
(Contract NAS1-15884)
(NASA-CR-165794; LT-80-56) Avail: NTIS HC A02/MF A01 CSCL 01C

The results of the inspection and analysis of two F-106A aircraft that were struck by separate lightning strikes within a few minutes of each other are presented. Each aircraft sustained severe lightning strikes to the pitot booms, resulting in extensive damage to the pitot heater power harness, number 8 ground wire, and lightning suppressors, but there was no damage to either aircraft's electrical or avionic systems. A simulated lightning current of 226 kA and 3.8 million A(2)*S was required to reproduce the damage to the ground wires in the radomes. Photographs and detailed assessments of the damage are included. R.J.F.

N82-12053# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.
AN ANALYSIS OF CIVIL AVIATION PROPELLER-TO-PERSON ACCIDENTS: 1965-1979
William E. Collins, Angelo R. Mastrullo, William R. Kirkham, Deborah K. Taylor, and Paula M. Grape May 1981 13 p refs
(AD-A105365; FAA-AM-81-15) Avail: NTIS HC A02/MF A01 CSCL 01/2

The interest of manufacturing, governmental, and safety personnel using paint schemes on propeller and rotor blades is based on improving the visual conspicuity of those blades when they are rotating. While propeller and rotor paint schemes may serve to reduce the number of fatalities and injuries due to contact with a rotating blade there is little information available regarding analyses of the circumstances surrounding such accidents. Brief reports provided by the National Transportation Safety Board of all 'propeller-to-person' accidents from 1965 through 1979 were examined and analyzed in terms of airport lighting conditions, actions of pilots, actions of passengers and ground crew, phase of flight operation, weather conditions, and others. Analyses based on a total of 319 accidents showed a marked drop in the frequency of 'propeller-to-person' accidents from 1975 through 1978. Several types of educational efforts directed toward pilots and ground crew, both prior to and during that 4-year period, were examined as possible factors contributing to the accident rate decline. Accident patterns provide a basis for assessing the probable efficacy of various recommendations (including propeller conspicuity) for further reducing 'propeller-to-person' accidents. Author (GRA)

N82-12054# Federal Aviation Administration, Washington, D.C. Office of Aviation Safety.
COMPUTER AIR CARRIER SYMPOSIUM
16 Jan. 1981 248 p refs Symp. held at Washington, D.C., 15-16 Jan. 1981
(AD-A104894; FAA-ASF-300-81-6) Avail: NTIS HC A11/MF A01 CSCL 01/2

Partial Contents: Working Session I -- Simulation, Fitness, and Safety Analysis; Working Session II -- Airports and Airways; and Working Session III -- Human Factors. GRA

N82-12055# Federal Aviation Administration, Washington, D.C. Office of Aviation Safety.
SUMMARY OF FEDERAL AVIATION ADMINISTRATION RESPONSES TO NATIONAL TRANSPORTATION SAFETY BOARD SAFETY RECOMMENDATIONS Quarterly Report, Jan. - Mar. 1981
R. E. Livingston and C. A. Carpenter Apr. 1981 243 p refs
(AD-A104922; FAA-ASF-81-3) Avail: NTIS HC A11/MF A01 CSCL 01/2

This report contains NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as 'Closed' by the NTSB as a result of acceptable action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-79-21 through 24), but background material is included only for those recommendations which remain in an 'Open' status. Background information for those recommendations which have been closed is available in FAA Headquarters files. Author (GRA)

N82-12056# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
INDEX OF NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER TECHNICAL REPORTS 1972 - 1977 Final Report, 1972 - 1977
Ruth J. Farrell, comp. and Nancy G. Boylan, comp. May 1981 201 p
(FAA Proj. 999-113-000)
(AD-A104759; FAA-CT-81-54) Avail: NTIS HC A10/MF A01 CSCL 01/3

This report is an index of all technical reports which were assigned NA numbers and published by NAFEC during the period 1972 through 1977. Entries are arranged by NA number and include titles, authors and full abstracts. Separate sections contain indexes by subject, author, and RD number. Author (GRA)

N82-12057# Textron Bell Helicopter, Fort Worth, Tex.
INVESTIGATION OF THE STRUCTURAL DEGRADATION AND PERSONNEL HAZARDS RESULTING FROM HELICOPTER COMPOSITE STRUCTURES EXPOSED TO FIRES AND/OR EXPLOSIONS Final Report, Mar. 1979 - Dec. 1980
Raymond J. Schiltz, Jr. Aug. 1981 111 p refs
(Contract DAAK51-79-C-0009; DA Proj. 1L1-62209-AH-76)
(AD-A104757; USAAVRADCOM-TR-81-D-16) Avail: NTIS HC A06/MF A01 CSCL 13/12

A program was undertaken to investigate the structural degradation and personnel hazards resulting from exposure of helicopter composite structures to fire and/or explosion. The program consisted of a technical survey, a test program, and an analysis phase. A major part of the technical survey was a literature survey. In addition, organizations working in the fields of interest were contacted for information, and some were visited for further, detailed discussions. The computer programs currently available for modeling enclosure fires were screened, and one was chosen for further study. The test program consisted of a series of tests on two representative helicopter structures: a sheet-stiffened, built-up door of Kevlar 49 fabric impregnated with an epoxy resin, and a honeycomb sandwich fuselage shell structure of graphite/epoxy fabric skins on a Nomex honeycomb core. The tests conducted on materials from these structures were smoke generation tests, and structural degradation tests. Ballistic tests on the complete test article were conducted to determine whether the structures would ignite under HEI impact conditions. Based on the survey and testing, design criteria for structural composite components were investigated and, when appropriate, formulated. Author (GRA)

N82-12059# Federal Aviation Administration, Atlantic City, N.J.
FLIGHT EVALUATION OF LORAN-C AS A HELICOPTER NAVIGATION AID IN THE BALTIMORE CANYON OIL EXPLORATION AREA Final Report, Mar. - May 1979
William A. Lynn May 1981 43 p

(FAA Proj. 045-390-130)
(AD-A105260; FAA-CT-80-53; FAA-RD-81-27) Avail: NTIS HC A03/MF A01 CSCL 17/7

A series of flight tests were conducted to investigate the use of long range navigation (LORAN)-C as a helicopter navigation system in the offshore New Jersey Baltimore Canyon oil exploration area. Tests were flown aboard the Federal Aviation Adminstration (FAA) Technical Center's CH-53A using a Teledyne Systems TDL-711 LORAN Micro-Navigator. The purpose of the tests was to determine the accuracy and operational usability of LORAN-C for offshore en route navigation and nonprecision approaches. The total system accuracy met or exceeded the requirements of Advisory Circular (AC) 90-45A 'Accuracy Requirements of Area Navigation Systems' for terminal and en route phases of flight, provided the proper LORAN triads were selected. The LORAN-C System did not meet AC 90-45A nonprecision approach accuracy criteria. Author (GRA)

N82-12060# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
THE USE OF GROUNDSPEED, IN A WIND SHEAR AND THE FLIGHT EVALUATION OF A RADAR-ALTIMETER-BASED SYSTEM FOR THE MEASUREMENT OF GROUNDSPEED Final Report, Jan. 1978 - Oct. 1980
David Lawrence Jul. 1981 44 p refs
(AD-A104758; FAA-CT-81-34; ACT-100F) Avail: NTIS HC A03/MF A01 CSCL 04/2

The use of groundspeed in combination with airspeed has been considered and shown to be an effective aid in the execution of an approach and landing in a heavy jet transport airplane. A flight dynamics analysis shows that the response of such aircraft to sudden changes in headwind is quite sluggish, requiring more than 100 seconds for equilibrium conditions to be regained in the worst case. A feasibility demonstration model of a radar-altimeter-based system for the measurement of groundspeed has been subjected to a limited in-flight evaluation. It is a self-contained unit requiring no ground-based equipment and no on-board equipment other than the small flush transmit and receive antennas and the associated cable runs. While the current unit does not meet the desired accuracy standard (delta = + or 3 knots, or less), it approaches it at times, and greater accuracy can be achieved with further development. Responsiveness to rapidly changing groundspeed matched that of the reference inertial navigation system; and satisfactory groundspeed tracking was maintained during turning, climbing, and descending flight. Author (GRA)

N82-12061# Ohio Univ., Athens. Dept. of Electrical Engineering.
MLS PERFORMANCE ASSESSMENT, TASK 4. VOLUME 1: EVALUATION PROCEDURES AND EQUIPMENT DESIGN Final Report
Robert W. Lilley, Richard H. McFarland, and Walter D. Phipps Dec. 1980 83 p refs
(Contract DOT-FA79NA-6030)
(AD-A105393; EER-47-2-Vol-1; FAA-CT-81-50-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 17/7

Preliminary flight-check procedures and system tolerances for the Microwave Landing System (MLS) are presented. A data-collection and recording package for use in light-aircraft measurement of MLS parameters in support of the System Test and Evaluation Program (STEP) is included containing a ground reference system, digital telemetry link airborne MLS sensor unit and system computation/display element. Author (GRA)

N82-12062# Teledyne Systems Co., Northridge, Calif.
DESIGN STUDY REPORT FOR GENERAL AVIATION LORAN-C RECEIVER Final Report
H. L. Walker and R. Ellerbe May 1981 257 p
(Contract DT-FA01-80-C-10108)
(AD-A104921; FAA/RD-81/36) Avail: NTIS HC A12/MF A01 CSCL 17/7

This document summarizes the results of studies and trade-off analysis conducted for a low cost Loran-C Receiver. The Loran-C Receiver is intended to meet the Minimum Operational Performance Standards for area Navigation (RNAV) equipment for General Aviation Aircraft operating in the National Aerospace System. The studies and analysis examined the required receiver performance, design approaches and design criteria, and cost to the user of the receiver. The study concludes that a low cost receiver meeting the General Aviation RNAV requirements is practical. A design approach for the receiver is described. Author (GRA)

N82-12063# Technische Hogeschool, Delft (Netherlands).
ORIENTING DESCRIPTION OF AIR TRAFFIC CONTROL IN THE NETHERLANDS [ORIENTERENDE BESCHRIJVING VAN DE LUCHTVERKEERSLEIDING IN NEDERLAND]
W. H. vanTuijl Aug. 1979 84 p refs In DUTCH
(VTH-LR-285) Avail: NTIS HC A05/MF A01

A general impression is given of air traffic control (ATC) in the Netherlands and of the signal automatic radar data processing (SARP) air traffic control system for Schiphol airport emphasizing safety and efficiency. Flight conditions, air structure, and navigation and landing aids of the ATL system are described. In the SARP system, data relative to position and flight plans are, on a real time basis, processed by a set of computers and distribued. Task sharing in SARP, its technical layout, its operational layout, operational functions and flight data are reviewed. Author (ESA)

N82-12064# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
THE EFFECT OF VISUAL INFORMATION ON MANUAL APPROACH AND LANDING
P. H. Wewerinke 28 Apr. 1980 20 p refs Presented at 16th Ann. Conf. on Manual Control, Cambridge, Mass., 5-7 May 1980 Abbreviated version of NLR-TR-80055-U
(NLR-MP-80019-U; NLR-TR-80055-U) Avail: NTIS HC A02/MF A01

The effect on approach performance of visual scene information, in combination with basic display information, is discussed for the manual approach and landing task. Good, poor, and night visibility conditions are considered, combined with basic head-up display configurations representing a variety of visual cues (runway contours, etc). A pre-experimental model analysis was performed in terms of an optimal control model. The resulting aircraft approach performance predictions were compared with the results of a moving base simulator program. The results illustrate that the model provides a meaningful description of the visual (scene) perception process involved in the complex (multivariable, time varying) manual approach task with a useful predictive capability. The theoretical framework is shown to allow a straight forward investigation of the complex interaction of a variety of task variables. Author (ESA)

N82-12065*# Foster-Miller Associates, Inc., Waltham, Mass.
EXPERIMENTAL AND ANALYTICAL STUDIES OF ADVANCED AIR CUSHION LANDING SYSTEMS Final Report
E. G. S. Lee, A. B. Boghani, K. M. Captein, H. J. Rutishauser, H. L. Farley, R. B. Fish, and R. L. Jeffcoat Washington NASA Nov. 1981 188 p refs
(Contract NAS1-15051)
(NASA-CR-3476) Avail: NTIS HC A09/MF A01 CSCL 01C

Several concepts are developed for air cushion landing systems (ACLS) which have the potential for improving performance characteristics (roll stiffness, heave damping, and trunk flutter), and reducing fabrication cost and complexity. After an initial screening, the following five concepts were evaluated in detail: damped trunk, filled trunk, compartmented trunk, segmented trunk, and roll feedback control. The evaluation was based on tests performed on scale models. An ACLS dynamic simulation developed earlier is updated so that it can be used to predict the performance of full-scale ACLS incorporating these refinements. The simulation was validated through scale-model tests. A full-scale ACLS based on the segmented trunk concept was fabricated and installed on the NASA ACLS test vehicle, where it is used to support advanced system development. A geometrically-scaled model (one third full scale) of the NASA test vehicle was fabricated and tested. This model, evaluated by means of a series of static and dynamic tests, is used to investigate scaling relationships between reduced and full-scale models. The analytical model developed earlier is applied to simulate both the one third scale and the full scale response. S.L.

N82-12066# Aeronautical Research Labs., Melbourne (Australia).
FLIGHT TRAIL OF THE AIRCRAFT FATIGUE DATA ANALYSIS SYSTEM (AFDAS) Mk 2 PROTOTYPE
P. J. Howard Dec. 1980 37 p refs
(AD-A105270; ARL/STRUC-NOTE-466; AR-002-249) Avail: NTIS HC A03/MF A01 CSCL 01/3

A prototype version of the Aircraft Fatigue Data Analysis System (AFDAS) has been evaluated in flight trials by a comparison with continuously recorded data. Over a limited period of test the range-mean-pairs count of strain cycles was the same for both sets of data, and the gains calculated for the AFDAS are identical to those deduced from the continuous record. Author (GRA)

N82-12067# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.

ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM (EMMADS) Final Report, Jun. 1977 - Jun. 1981

Jun. 1981 38 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A105082; ACS-12386; USAAVRADCOM-TR-79-F-270)
Avail: NTIS HC A03/MF A01 CSCL 01/3

The design and fabrication of a programmable feasibility model of an electronic master monitor and advisory display system for helicoptrs is described. Functional requirements and system interfaces for signal analysis were determined for the helicopters studied. Human factors studies developed formats for reducing crew workloads and maximizing crew performance. Methods of data transfer from sensors to the monitor system were analyzed and appropriate interfaces and data transmission media were recommended. The programmable feasibility model is discussed. R.J.F.

N82-12069# Aeronautical Research Labs., Melbourne (Australia).

A VAPOUR CYCLE CABIN COOLING SYSTEM FOR THE SEA KING MK.50 HELICOPTER

Brian Rebbechi Feb. 1980 59 p refs
(AD-A105211; ARL/MECH-ENG-155; AR-001-793) Avail: NTIS HC A04/MF A01 CSCL 13/1

An experimental determination has been made of the design requirements for a cabin cooling system in the Sea King Mk. 50 helicopter. The purpose of this system is to bring the cabin environment in the helicopter to an acceptable level for effective crew performance. Cooling was provided by an experimental vapour cycle cooling system. Results of the trials have been used to formulate a heat transfer model of the cabin to enable prediction of required cooling capacity for extreme climatic conditions. A comparison, based on the trials results, is made between the performance attainable by a vapour cycle cooling system, and an air cycle system using the available engine bleed. Author (GRA)

N82-12070# Hochschule der Bundeswehr, Munich. (West Germany). Flugmechanik und Flugfuehrung.

EFFECTS OF AERODYNAMIC COUPLING ON THE DYNAMICS OF ROLL AIRCRAFT

Gottfried Sachs and Werner Fohrer Jan. 1981 48 p refs In GERMAN; ENGLISH summary
Avail: NTIS HC A03/MF A01

The effects of coupling of longitudinal and lateral aerodynamic characteristics on the dynamics of aircraft roll were studied, using simplified relations and complete six-degree of freedom calculations. The aerodynamic coupling is caused by unsymmetric flow conditions resulting from sideslipping, where rolling moments due to angle of attack and pitching moments due to angle of sideslip, are of particular significance for the problem. It is shown that the attainable rate of roll is significantly influenced and that marked effects on stability are possible. Furthermore, it is shown that aerodynamic coupling can cause autorotation, i.e., a rolling motion without aileron forcing moments. Author (ESA)

N82-12072# Engins Matra, Velizy (France). Lab. Central.

ADVANTAGES AND LIMITATIONS OF VARIOUS MATERIALS USED IN THE CONSTRUCTION OF MODULES [ATOUT ET LIMITES D'EMPLOIS DES DIVERS MATERIAUX UTILISES DANS LA CONSTRUCTION DES CELLULES]

G. Hilaire 30 Jul. 1981 39 p In FRENCH Presented 9th Colloq. Aciers et Alliages Speciaux dans les Ind. Aerospatiales, Le Bourget, France, 11 Jun. 1981
(SNIAS-812-551-103; C-42796) Avail: NTIS HC A03/MF A01

Steels, light alloys, titanium alloys, and composites are compared for economy, mechanical characteristics, energy content, fatigue effects and toughness. The use of these materials in civil and military aircraft, helicopters, and engines is surveyed. Increasing use of composites is forecast for the next decade, with a corresponding drop in the use of light alloys. Steels and titanium alloys should not be affected. Author (ESA)

N82-12074# Air Force Flight Test Center, Edwards AFB, Calif. Flight Dynamics Div.

AFFTC STANDARD AIRSPEED CALIBRATION PROCEDURES Final Report

Albert G. DeAnda Jun. 1981 162 p refs
(AD-A104830; AFFTC-TIH-81-5) Avail: NTIS HC A08/MF A01 CSCL 01/4

This handbook has been compiled as a reference for use by AFFTC flight test engineers in the standard flight test methods, techniques and procedures for airspeed calibrations. Suggested airspeed calibration data reduction methods are presented. Some of the information included in this reference applies to the local AFFTC facilities; however, the data reduction outlines are for general application. Author (GRA)

N82-12075*# General Electric Co., Lynn, Mass. Aircraft Engine Group.

EFFECT OF A PART SPAN VARIABLE INLET GUIDE VANE ON TF34 FAN PERFORMANCE Final Report

Jose Alvarez and Paul W. Schneider Sep. 1981 133 p refs
(Contract NAS3-21624)
(NASA-CR-165458; R81AEG030) Avail: NTIS HC A07/MF A01 CSCL 21E

Experimental aerodynamic and performance data were obtained from a TF34 engine. Part span variable inlet guide vanes mounted in front of the fan on the TF34 engine were tested to demonstrate the feasibility of modulating air flow and thrust for vertical takeoff aircraft systems. The fan was mapped to stall for a range of speeds and variable inlet guide were settings. Modulated fan tip performance and unmodulated hub performance were evaluated with a without an extended fan bypass splitter. The effect of a crosswind distortion screen on performance was also evaluated. R.J.F.

N82-12076# Aeronautical Research Labs., Melbourne (Australia). Mechanical Engineering Dept.

VIBRATION TEST PROCEDURES FOR ACCESSORY ANGLE DRIVE GEARBOXES ON ATAR 09C ENGINES

P. D. McFadden and D. H. Edwards Mar. 1981 57 p refs
(AD-A105269; ARL/MECH-ENG-TM-408; AR-002-264) Avail: NTIS HC A04/MF A01 CSCL 21/5

The Accessory Angle Drive gearbox powers the fuel and hydraulic pumps on the Atar engine in the Mirage aircraft. To insure against in-flight failure, each gearbox is vibration tested under load after overhaul by the local contractor. A new vibration testing technique, offering greatly improved accuracy and reliability, has been developed. The technique uses a real-time, fast-fourier spectrum analyzer, with direct digital read-out in engineering units, and a tracking adapter with built-in antialiasing filter. This report defines correct procedures for the connection and operation of the instruments, and the interpretation of the results. Author (GRA)

N82-12077# Lucas Group Services Ltd., Solihull (England).

THE USE OF METAL FINISHING IN AIRCRAFT FUEL SYSTEMS

S. L. Forgham and H. L. Tulloch 1981 28 p refs
Avail: NTIS HC A03/MF A01

Topics discussed are; (1) corrosion resistant finishes; (2) finishes to aid manufacture; (3) repair and overhaul; and (4) bearing finishes. In the case of (1) hydrogen embrittlement is identified as a major problem and processes generating hydrogen at the surface should be closely controlled. Results on drawing size of cadmium plating of rotor blades are presented. Various techniques of electrodepositing are compared. Pump rig tests on fuels containing chlorides, showing the effect on torque of additives after a 5 hr run and an additional 16 hr standing, are reported. Author (ESA)

N82-12078# European Space Agency, Paris (France).

THREE DIMENSIONAL FLOW INVESTIGATION WITH A METHOD OF CHARACTERISTICS IN THE INLET REGION AND THE BLADE-TO-BLADE CHANNELS OF SUPERSONIC AXIAL COMPRESSORS Ph.D. Thesis - Paris Univ. 6

Jean Martinon Sep. 1981 341 p refs Transl. into ENGLISH of 'Etude, au moyen d'une methode de bicaracteristiques, de l'ecoulement tridimensionnel dans la region d'entree et les canaux interaubes d'une roue de compresseurs axiaux supersoniques', ONERA, Paris Report ONERA-P-1979-1, 1979 Original report in FRENCH previously announced as N80-23325
(ESA-TT-637; ONERA-P-1979-1) Avail: NTIS

HC A15/MF A01

A three dimensional method of characteristics is developed for the calculation of the supersonic flow in the inlet region and the blade-to-blade channels of blade cascades and high transonic axial flow compressors with subsonic or supersonic axial velocity. The numerical scheme is accurate, and required computer times are short. Results of calculations on several linear or annular cascades and rotating blade rows are presented and compared with test results. Author (ESA)

N82-12079*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.

RELIABILITY ANALYSIS OF THE F-8 DIGITAL FLY-BY-WIRE SYSTEM

L. D. Brock and H. A. Goodman Oct. 1981 152 p refs

(Contract NAS4-2571)

(NASA-CR-163110; R-1324) Avail: NTIS HC A08/MF A01 CSCL 01C

The F-8 Digital Fly-by-Wire (DFBW) flight test program intended to provide the technology for advanced control systems, giving aircraft enhanced performance and operational capability is addressed. A detailed analysis of the experimental system was performed to estimated the probabilities of two significant safety critical events: (1) loss of primary flight control function, causing reversion to the analog bypass system; and (2) loss of the aircraft due to failure of the electronic flight control system. The analysis covers appraisal of risks due to random equipment failure, generic faults in esign of the system or its software, and induced failure due to external events. A unique diagrammatic technique was developed which details the combinatorial reliability equations for the entire system, promotes understanding of system failure characteristics, and identifies the most likely failure modes. The technique provides a systematic method of applying basic probability equations and is augmented by a computer program written in a modular fashion that duplicates the structure of these equations. S.L.

N82-12080*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.

COMPUTATIONAL METHODS OF ROBUST CONTROLLER DESIGN FOR AERODYNAMIC FLUTTER SUPPRESSION Final Report, 14 Nov. 1980 - 15 Nov. 1981

Leonard R. Anderson 15 Nov. 1981 86 p refs Presented at the 3rd Intern. Conf. on Math., Calif., 29-31 Jul. 1981 Submitted for publication

(Grant NAG1-80)

(NASA-CR-164983; VPI-Aero-125) Avail: NTIS HC A05/MF A01 CSCL 01C

The development of Riccati iteration, a tool for the design and analysis of linear control systems is examined. First, Riccati iteration is applied to the problem of pole placement and order reduction in two-time scale control systems. Order reduction, yielding a good approximation to the original system, is demonstrated using a 16th order linear model of a turbofan engine. Next, a numerical method for solving the Riccati equation is presented and demonstrated for a set of eighth order random examples. A literature review of robust controller design methods follows which includes a number of methods for reducing the trajectory and performance index sensitivity in linear regulators. Lastly, robust controller design for large parameter variations is discussed. R.J.F.

N82-12081# Tel-Aviv Univ. (Israel). Dept. of Electronic Systems.

FIXED GAIN CONTROLLER DESIGN FOR AIRCRAFT Final Scientific Report, 1 Jun. 1980 - 31 May 1981

Yoram Baram and Doran Eidelman 30 Jun. 1981 31 p refs

(Grant AF-AFOSR-0178-80; AF Proj. 2301)

(AD-A104877; ESTTR-81-08; SCIENTIFIC-2; EOARD-TR-81-10) Avail: NTIS HC A03/MF A01 CSCL 01/3

A Method for designing fixed gain controllers and filters for systems with large parameter variation is presented. The approach, based of minimax information criteria, is used to design a non-adaptive back-up control system for a given aircraft and is shown to provide good performance qualities. Author (GRA)

N82-12082*# Computer Sciences Corp., Mountain View, Calif.

SIMULATOR CERTIFICATION METHODS AND THE VERTICAL MOTION SIMULATOR Final Report

Thomas W. Showalter 23 Sep. 1981 67 p refs

(Contract NAS2-9741)

(NASA-CR-166252) Avail: NTIS HC A04/MF A01 CSCL 14B

The vertical motion simulator (VMS) is designed to simulate a variety of experimental helicopter and STOL/VTOL aircraft as well as other kinds of aircraft with special pitch and Z axis characteristics. The VMS includes a large motion base with extensive vertical and lateral travel capabilities, a computer generated image visual system, and a high speed CDC 7600 computer system, which performs aero model calculations. Guidelines on how to measure and evaluate VMS performance were developed. A survey of simulation users was conducted to ascertain they evaluated and certified simulators for use. The results are presented. S.L.

N82-12083# National Aerospace Lab., Tokyo (Japan). Aerodynamics Div.

CONSTRUCTION AND PERFORMANCE OF NAL TWO-DIMENSIONAL TRANSONIC WIND TUNNEL

1980 104 p refs In JAPANESE; ENGLISH summary

(NAL-TR-647; ISSN-0389-4010) Avail: NTIS HC A06/MF A01

The construction and the results of initial calibration are described. This tunnel was built to meet the requirements of high Reynolds number testing of wing sections at transonic regime. It is a blowdown tunnel with a test section of 0.3m x 1.0m. The required capability of this wind tunnel is for Mach numbers ranging from 0.2 to 1.2 and for a Reynolds number up to 40 million at Mach number 0.8 with sufficient running time. An outline of the design objectives is given. The completed facilities, i.e., the wind tunnel, the instrumentation and operation system, the silencer and auxiliary equipment of the air compressor and the air reservoir, are described in detail. The performance of the tunnel when it is empty is described, and the results of a few experiments with an airfoil model of the NACA 64A410 are presented. High Reynolds number testing can be achieved in this wind tunnel without any trouble. S.W.

N82-12086*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A LOOK INSIDE THE LANGLEY 16-FOOT TRANSONIC TUNNEL: USER'S GUIDE

Kathryn H. Peddrew, comp. Aug. 1981 197 p refs

(NASA-TM-83186) Avail: NTIS HC A09/MF A01 CSCL 14B

The 16-foot transonic tunnel is a single-return atmospheric wind tunnel having a slotted test section. The primary emphasis for research in this facility is the integration of the propulsion system into advanced aircraft concepts. The large test section size, 15.5 fest in diameter lends itself to conducting research in this area, where large models are required in order to provide adequate definition of the model geometry associated with the integration of the propulsion system. The nominal test Mach number range for this facility varies from 0.20 to 1.3. Topics covered include (1) facility description; (2) model installation equipment for aerodynamics; (3) model support system for propulsion simulation testing; (4) propulsion simulation systems; (5) calibrating propulsion simulation systems; (6) instrumentation; (7) data acquisition; (8) model design criteria; and (9) wind tunnel test planning. A.R.H.

N82-12142*# Boeing Commercial Airplane Co., Seattle, Wash.

IN-SERVICE INSPECTION METHODS FOR GRAPHITE-EPOXY STRUCTURES ON COMMERCIAL TRANSPORT AIRCRAFT Final Report

M. L. Phelps Nov. 1981 105 p refs

(Contract NAS1-15304)

(NASA-CR-165746) Avail: NTIS HC A06/MF A01 CSCL 11D

In-service inspection methods for graphite-epoxy composite structures on commercial transport aircraft are determined. Graphite/epoxy structures, service incurred defects, current inspection practices and concerns of the airline and manufacturers, and other related information were determind by survey. Based on this information, applicable inspection nondestructive inspection methods are evaluated and inspection techniques determined. Technology is developed primarily in eddy current inspection. S.L.

N82-12143# McDonnell Aircraft Co., St. Louis, Mo.

EFFECT OF FIGHTER ATTACK SPECTRUM ON COMPOSITE FATIGUE LIFE Final Report, Sep. 1978 - Oct. 1980

R. Badaliance and H. D. Dill Mar. 1981 126 p refs

(Contract F33615-78-C-3218; AF Proj. 2401)
(AD-A105034; AFWAL-TR-81-3001) Avail: NTIS HC A07/MF A01 CSCL 11/4

The objective was to evaluate the effect of fighter wing load spectrum variations on the life behavior of composite structures. Six types of spectra were generated: (a) clipping to 90% test limit stress, (b) addition of stress overloads, (c) addition of low loads, (d) truncation to 70% test limit stress, (e) clipping of tension loads, (f) increased severity and number of air-to-air loads. A single hole compression test specimen was designed to simulate fatigue critical areas of fighter wing skins. GRA

N82-12168*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FIRE EXTINGUISHANT MATERIALS Patent Application
Robert L. Altman, Ludwig A. Mayer (San Jose State Univ.), and Alan C. Ling, inventors (to NASA) (San Jose State Univ.) Filed 3 Nov. 1981 11 p
(NASA-Case-ARC-11252-1; US-Patent-Appl-SN-317977) Avail: NTIS HC A02/MF A01 CSCL 21B

Fire extinguishant materials were developed for extinguishing fires on hot metal surfaces caused by liquid fuels such as jet engine fuels. The composition of the materials is a mixture of a finely divided aluminum compound and alkali metal, stannous or plumbous halide. The aluminum compound may be aluminum hydroxide, alumina or boehmite, but preferably it is an alkali metal dawsonite. The metal halide may be an alkali metal, e.g. potassium iodide, bromide, or chloride, or stannous or plumbous iodide, bormide, or chloride. Potassium iodide is preferred. The presence of the halide improves the performance of the aluminum compound in extinguishing fires on hot metal surfaces. NASA

N82-12178# Atlantic Research Corp., Alexandria, Va. Combustion and Physical Science Dept.
CHEMISTRY OF COMBUSTION OF FUEL-WATER MIXTURES Final Technical Report, 1 Jun. 1980 - 31 May 1981
Edward G. Skolnik, Edward T. McHale, and Harley L. Heaton Sep. 1981 51 p refs
(Contract N00014-80-C-0534)
(AD-A105401) Avail: NTIS HC A04/MF A01 CSCL 21/2

The continuation of an experimental flame study concerning the nonphysical processes that lead to soot suppression when water is added to fuel, begun in a previous program is reported. The study included a mapping of temperature, chemical species and soot profiles of laminar diffusion flames with and without water added. Fuels studied included ethylene and a benzene/hydrogen mixture. Flames with nonreactive gases added (argon, nitrogen), were also studied for comparison purposes. The study concludes that the reduction of soot by water in an ethylene diffusion flame can be completely explained by thermal effects. The results are not as definitive for benzene. The addition of water causes a greater reduction in soot than does a thermally equivalent addition of argon, but no noticeable differences in chemical species profiles are observed. There is evidence, however, that water addition causes an increase in concentration of an oxygen-containing tarry substance present in the flame prior to soot formation. During the course of the study it was also possible to estimate both soot particle diameters (1-2 x .000001 cm at the beginning of the oxidation zone) and an activation energy for soot oxidation by the OH radical (7-8 kcal/mole). In addition, it was possible to confirm the presence of and quantify the oxygen concentration in the center of diffusion flames, first reported under the previous program. Author (GRA)

N82-12216*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROGRESS IN PROTECTIVE COATINGS FOR AIRCRAFT GAS TURBINES: A REVIEW OF NASA SPONSORED RESEARCH
John P. Merutka 1981 29 p refs Presented at the 5th Ann. Conf. on Composite and Adv. Mater., Merritt Island, Fla., 19-22 Jan. 1981; sponsored by the Am. Ceramic Soc., Inc.
(NASA-TM-82740; E-711) Avail: NTIS HC A03/MF A01 CSCL 11F

Problems associated with protective coatings for advanced aircraft gas turbines are reviewed. Metallic coatings for preventing titanium fires in compressors are identified. Coatings for turbine section are also considered. Ductile aluminide coatings for protecting internal turbine-blade cooling passage surface are also identified. Composite modified external overlay MCrAlY coatings deposited by low-pressure plasma spraying are found to be better in surface protection capability than vapor deposited MCrAlY coatings. Thermal barrier coating (TBC), studies are presented. The design of a turbine airfoil is integrated with a TBC, and computer-aided manufacturing technology is applied. S.L.

N82-12230* International Harvester Co., San Diego, Calif.
FORMULATION AND CHARACTERIZATION OF POLYIMIDE RESILIENT FOAMS OF VARIOUS DENSITIES FOR AIRCRAFT SEATING APPLICATIONS Final Report, 15 Feb. 1980 - 30 Sep. 1981
J. Gagliani, R. Lee, and U. A. K. Sorathia 30 Sep. 1981 151 p refs
(Contract NAS9-16009)
(NASA-CR-167421; CSR81-R-4834-20) Avail: NTIS HC A08/MF A01 CSCL 11G

Light weight, heat and fire resistant low smoke generating polyimide foams are developed for aircraft seating applications. The material is upgraded and classified into groups for fabrication of cushions possessing acceptable comfort properties. Refinement and selection of foaming processes using a variety of previously developd foaming techniques and definition of property relationships to arrive at the selection and classfication of polyimide foams into five groups in accordance with predetermined ILD values are emphasized. S.L.

N82-12240# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering.
DETERMINATION AND ANALYSIS OF JET AND MISSILE FUEL DEPOSITS Final Report
James L. Lauer 14 Aug. 1981 32 p
(Contract N00164-79-M-2522)
(AD-A105458; NWSC/CR-RDTR-151) Avail: NTIS HC A03/MF A01 CSCL 21/4

Jet fuel deposits, some of them supplied on their original support by Dr. Hazlett of the Naval Research Laboratory, were examined by attenuated total reflection spectroscopy and by infrared Fourier transform emission spectroscopy for the purpose of finding a procedure suitable for in situ analysis. The infrared radiation emitted by samples at 50-65 C was adequate for qualitative analysis, which can readily be made quantitative by further work. Definite sharp peaks corresponding to aromatic materials were found. Author (GRA)

N82-12255# Brookhaven National Lab., Upton, N. Y. Catalyst Group.
DEVELOPMENT OF CATALYTIC SYSTEMS FOR THE CONVERSION OF SYNGAS TO JET FUEL AND DIESEL FUEL AND HIGHER ALCOHOLS Annual Report
William A. Slegeir Oct. 1980 18 p
(Contract DE-AC02-76CH-00016)
(DE82-000067; BNL-51423) Avail: NTIS HC A02/MF A01

A highly active series of Fischer-Tropsch catalysts are developed on the basis of insights provided by the oxide theory. The method of catalyst formulation is unique in Fischer-Tropsch chemistry, yet is simple and reproducible. These catalysts are superior to ordinary catalysts for hydrocarbon synthesis with regard to rate, operating conditions, and, product selectivity and longevity. The products of these catalysts are ideally suited for use as diesel and jet fuels. Once formed, the catalysts display remarkable stability toward air. Oxide interactions, the role of promoters, and the synergistic behavior of bimetallic catalysts systems are studied. Bimetallic systems for hydrocarbon and alcohol synthesis are discussed. DOE

N82-12303# Federal Aviation Administration, Atlantic City, N.J.
MOVING TARGET DETECTOR/AIRPORT SURVEILLANCE RADAR (ASR-7) FIELD EVALUATION Final Report, Feb. 1979 - Jan. 1980
W. Goodchild Aug. 1981 52 p refs
(AD-A105196; FAA-CT-81-31; FAA-RD-81-57) Avail: NTIS HC A04/MF A01 CSCL 17/7

The Moving Target Detector (MTD) II, a sophisticated radar processor, was evaluated to determine its capability to provide improved radar detection in an air traffic control (ATC) environment. The MTD II was installed on one channel of an airport surveillance radar (ASR-7) at Burlington, Vermont. The major objective of testing was to compare the performance of the MTD II with that of the ASR-7 Moving Target Indicator (MTI). This report concentrates on the comparative probability of detection, false alarm rate, MTI improvement factor, subclutter visibility, dynamic range, velocity response, and the simultaneous flight test results of the two systems. Comparison of the MTD II to the MTD I system is made when necessary to show major improvements or deficiencies in the MTD II design. The results of the tests have shown that the MTD II provides surveillance capabilities superior to those of the ASR-7/MTI. Author (GRA)

N82-12304# Federal Aviation Administration, Atlantic City, N.J.
COLUMBUS, OHIO, VOICE RESPONSE SYSTEM DEMONSTRATION AND EVALUATION Final Report, Dec. 1979 - Apr. 1980
John C. Henline Jun. 1981 54 p
(FAA Proj. 131-402-854)
(AD-A104750; FAA-CT-80-50; FAA-RD-81-20) Avail: NTIS HC A04/MF A01 CSCL 17/2

The Voice Response System (VRS) was subjected to a 4-month demonstration in the Columbus, Ohio, Flight Service Station (FSS) preflight area. The purpose of the experiment was to test and evaluate the VRS system, user acceptance, and the effects on the specialists/facility workload, and to determine the general impact of VRS on the Columbus (CMH) FSS preflight area. In addition, the test permitted collection of technical performance data which could serve as the framework for an integrated national system for the mass dissemination of weather information. It is concluded that the VRS caused a shift in user demand/preference, reduced FSS briefer workload, reduced demand for basic pilots automatic telephone weather answering service (PATWAS), and was determined to be acceptable to the general aviation user. Author (GRA)

N82-12392# ARO, Inc., Arnold Air Force Station, Tenn.
AN INVESTIGATION OF F-16 NOZZLE-AFTERBODY FORCES AT TRANSONIC MACH NUMBERS WITH EMPHASIS ON MODEL SCALE EFFECTS Final Report, Oct. 1979 - Sep. 1980
Earl A. Price, Jr. Sep. 1981 149 p refs
(AD-A104905; AEDC-TR-80-57; AFWAL-TR-81-2110) Avail: NTIS HC A07/MF A01 CSCL 20/4

An experimental program was conducted to provide nozzle-afterbody data with a minimum interference support system on a 0.25-scale F-16 model and to determine the interference induced on then nozzle-afterbody region by sting and strut model support systems. Data obtained on the 0.25-scale model are compared with data from a 0.11-scale model for evaluation of model scale effects. The investigation was conducted over the Mach number range from 0.6 to 1.5. Data are presented in terms of coefficients and increments in coefficients of nozzle-afterbody axial and normal forces obtained from integrating pressure data. High-pressure air at ambient temperature was utilized for exhaust plume simulation. The results indicate close agreement in axial-force coefficient between configurations having full and annular nozzles at design pressure ratio. Very little effect of Reynolds number was found on the nozzle-afterbody axial force. Wave interference adversely affected axial-force data from the 0.25-scale model at Mach numbers between 1.0 and 1.1, producing lower axial force on the model afterbody. Large differences were determined in both the magnitude and the sign of strut interference from the two model installations. Author (GRA)

N82-12448# Naval Ocean Systems Center, San Diego, Calif.
PORTABLE AIR DRIVEN VARIABLE SPEED FIBER OPTIC CABLE TERMINATION POLISHER Technical Report, Mar. 1979 - Aug. 1980
A. Flores 15 Mar. 1981 46 p refs
(AD-A104797; NOSC/TR-708) Avail: NTIS HC A03/MF A01 CSCL 13/8

Manufacturing processes and techniques were developed to produce in larger volume a portable air driven variable speed fiber optic cable polisher with the necessary characteristics to perform in the operational environments encountered during installation and maintenance of fiber optic cables in military aircraft. Author (GRA)

N82-12648# Joint Publications Research Service, Arlington, Va.
GERMAN-ARGENTINE EXPERIMENT: VERTICAL-ROTOR WIND ENGINE
Peter Raabe *In its* W. Europe Rept.: Sci. and Technol., No. 72 (JPRS-78876) 1 Sep. 1981 p 18-19 Transl. into ENGLISH from Tagesspiegel (Berlin), 4 Jul. 1981 p 12

Avail: NTIS HC A03/MF A01

Designed by aerodynamists, a wind motor built in Patagonia, is independent of the direction of the wind due to its vertical rotating axis. The narrow rotor blades have optimum aerodynamic efficiency. Drum-like wind collectors at the top and bottom of the rotating axis serve as starters. The plant incorporates simple instead of sophisticated mechanical parts, and its maintenance requirements are extremely low. Only the two rotating bearings located at the top and bottom of the axis require lubrication, with the oil being changed only twice a year. A.R.H.

N82-13014# Systems Control, Inc., West Palm Beach, Fla. Technology Industries Div.
ANALYSIS OF INTEGRATED FUEL-EFFICIENT, LOW-NOISE PROCEDURES IN TERMINAL-AREA OPERATIONS
J. B. McKinley Jan. 1981 125 p refs
(Contract DE-AC01-80CS-50141)
(DE81-029833; DOE/CS-50141/T1) Avail: NTIS HC A06/MF A01

The specific aviation energy conservation issues, terminal area fuel conservation and airport noise level relationships, are investigated. The potential fuel savings and noise level reduction in the Los Angeles International (LAX) terminal area between 1980 and 1990 attributable to compliance with the noise requirements of FAR Part 36 were quantified. These savings are due to the retiring, retrofiting and re-engining of older narrow-body aircraft (DC-8, B707, etc.) and the growth of wide body aircraft operations (DC-10, B747, B767, etc.). Current noise abatement procedures that could be relaxed without adversely impacting current (1980) noise levels, and at the same time conserving additional fuel. Two FAA computer models were used. The Integrated Noise Model (INM) Version 2.7, was used for noise analysis, and INKMOD, a preliminary fuel burn model, for the fuel analysis. The results of this detailed analysis revealed that due to the changing aircraft mix at LAX to include more wide body aircraft and fewer narrow body aircraft operations, airport noise level will decrease by 8.5 and 9.2 square miles on the 75 Ldn contour for 1985 and 1990, respectively, from the 1980 baseline. DOE

N82-13043*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESEARCH AND TECHNOLOGY Annual Report
Nov. 1981 68 p
(NASA-TM-83221) Avail: NTIS HC A04/MF A01 CSCL 05B

Langley Research Center is engaged in the basic an applied research necessary for the advancement of aeronautics and space flight, generating advanced concepts for the accomplishment of related national goals, and provding research advice, technological support, and assistance to other NASA installations, other government agencies, and industry. Highlights of major accomplishments and applications are presented. S.L.

N82-13048# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE IMPACT OF NEW GUIDANCE AND CONTROL SYSTEMS ON MILITARY AIRCRAFT COCKPIT DESIGN
Aug. 1981 217 p refs In ENGLISH; partly in FRENCH Symp. held in Bad-Cannstatt, West Germany, 5-8 May 1981
(AGARD-CP-312; ISBN-92-835-0297-3) HC A10/MF A01

The requirements and technologies involved in control systems were reviewed. Topics incude: displays; controls/displays system integration; automated systems/man interface; and cockpit systems evaluation. Emphasis is placed on the design of a cockpit layout with controls and displays that maximize the overall aircraft capability while keeping the pilot's workload within bounds by the use of more automation of system management. For individual titles, see N82-13049 through N82-13064.

N82-13049# Textron Bell Helicopter, Fort Worth, Tex. Human Factors and Cockpit Arrangement Group.
HOW THE HELICOPTER COCKPIT DESIGNER USES DIGITAL AVIONICS
John H. Emery *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 13 p ref
Avail: NTIS HC A10/MF A01

An overview of the approaches to helicopter cockpit design made possible through the application of advanced multiplex technology to cockpit displays and controls is presented. This technology enables the pilot to have more information available while, at the same time, reducing his workload, and provides for substantially improved cockpit management. One of the major research programs through which this technology was tailored for military helicopters is ADAS (Army Digital Avionics System). This program is discussed, along with Bell helicopter cockpit designs. T.M.

N82-13050# Smiths Industries Ltd., Bishops Cleeve (England). Aerospace and Defense Systems.
ELECTRONIC FLIGHT DECK DISPLAYS FOR MILITARY TRANSPORT AIRCRAFT
R. A. Chorley *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 12 p refs
Avail: NTIS HC A10/MF A01

These display systems offer operational and economic advantages which can be realized in military as well as in civil aircraft. In particular, the flexibility of the display formats which can be provided, and the ease with which the information content can be changed, enable all the information required for the control of a transport aircraft to be displayed on the main panel, and go a long way towards making operation by a two-man crew possible. In addition, the flexibility of an electronic display system makes it feasible to minimize the effect of failures witin the display system to an extent which is impossible in the case of conventional instruments. Full realization of this capability, which calls for careful selection of the system architecture to be employed, may lead to a significant in mission success. A discussion of CRT displays is presented. T.M.

N82-13051# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Directorate of Avionics Engineering.
COLOR CRT DISPLAYS FOR THE COCKPIT
Harry L. Waruszewski *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 22 p refs
Avail: NTIS HC A10/MF A01

Color displays are currently being proposed for installation or are being installed in civilian and military aircraft cockpits. The complexity of designing a good color display is much greater than that of a monochromatic display. The human factors data and cockpit requirements needed to develop color cockpit displays so that requirements for a usable display can be generated are discussed. The color display technology was evaluated with respect to satisfying the established human factors requirements. Test methodologies need to be developed to determine compliance of the color displays to the specification requirement. Finally, the need for displays to be integrated into the cockpit using total cockpit human factors criteria to maximize the possible workload reduction and safety of the aircraft is discussed. T.M.

N82-13052# Thomson-CSF, Paris (France).
HEAD UP DISPLAYS
Claude Maureau *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 7 p
Avail: NTIS HC A10/MF A01

The displays present information to pilots without depriving them of a simultaneous external view. This implies that head-up dispdisplays are collimated displays. The problems involved with collimation are discussed and the possibility of head-up providing pilots with directional information is considered. T.M.

N82-13053# Army Avionics Research and Development Activity, Fort Monmouth, N. J.
INTEGRATION OF CONTROLS AND DISPLAYS IN US ARMY HELICOPTER COCKPITS
J. A. Dasaro and C. T. Elliott *In* AGARD The Impacts of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 19 p refs
Avail: NTIS HC A10/MF A01

Expanded missions such as anti-armor, night surveillance, and air-to-air, coupled with the survivability requirement of nap-of-the-Earth flight, dictate the approach to cockpit design. This approach must apply the latest technological innovations in the areas of controls, displays multiplexing, and microprocessors to unburden the pilot. Space, weight, and cost constraints placed on the cockpit system designers must also be satisfied. The U.S. Army completed a full scale engineering development program in the area of cockpit integration, and is currently involved in a more ambitious exploratory development effort. An overview of these efforts to integrate the helicopter cockpit, including results of similation experiments and operational flight tests, is presented. T.M.

N82-13054# Collins Radio Co., Cedar Rapids, Iowa. Government Avionics Div.
A STANDARD CONTROL DISPLAY UNIT FOR MULTI-AIRCRAFT APPLICATION
Ronald L. Swanson and Craig R. Scougton *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p
Avail: NTIS HC A10/MF A01

The need for standardization of military hardware is well documented both within the US DOD and NATO. Standardization issues revolve mainly around interoperability, logistics, and life-cycle cost advantages. The issue of standardization and its suitability in the design of aircraft control/display units (CDU) is addressed. Potential benefits, requirements, and remaining problems associated with standardization of avionics control displays are discussed. Included is a discussion of a CDU that is currently being produced which has many of the features considered essential to the ultimate standard CDU. T.M.

N82-13056# Crouzet Aerospace and Systems, Valence (France).
USING VOICE CONTROL ONBOARD COMBAT AIRCRAFT [UTILISATION DE LA COMMANDE VOCALE A BORD DES AERONEFS DE COMBAT]
J. R. Coster and J. M. Melocco *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpits Design Aug. 1981 5 p In FRENCH
Avail: NTIS HC A10/MF A01

The use of the voice would be a valuable tool in resolving problems associated with pilot workload, in reducing the surface of the flight instrument system and the complexity of the man machine interface in high performance combat aircraft. A program established at the Laboratory of information for Mechanics and Engineering Sciences validates in aircraft environments the methods of speech recognition and synthesis developed in research laboratories. It is merely a matter of the universal recognition, at the acoustic level of isolated words pronounced by a single speaker. The techniques used are described. These include laboratory experiments involving an aeronautical dialog in a noisy environment and experimentation with a simulator of a vocal dialog applied to an aircraft with modern weapons and to the study of human factors. Experimentation also takes place in a flight simulator. Transl. by A.R.H.

N82-13060# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
EXPERIMENTAL INVESTIGATION OF A HELMET MOUNTED SIGHT/DISPLAY FOR HELICOPTER
R. Beyer, E. Danneberg, E. Kohnen, and H. Stein *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 11 p
Avail: NTIS HC A10/MF A01

A helmet mounted sight/display (HMS/D) combined with an infrared camera and electronic instrument displays was investigated as a guidance aid for the low level flight of helicopters at night. The static and dynamic accuracy of the tracking mechanism which aligns the lines of sight of both the pilot and the camera was determined by means of a target and motion simulator. System performance was checked with a Bo 105 helicopter in low level flight at night. From the results obtained the importance of the HMS/D as an guidance aid becomes evident relative to other night vision/display systems. Author

N82-13061# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
USE OF A HELMET-MOUNTED MATRIX DISPLAY FOR PRESENTING ENERGY-MANEUVERABILITY INFORMATION DURING SIMULATED CLOSE COMBAT
D. N. Jarrett *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 10 p refs
Avail: NTIS HC A10/MF A01

Since continuous visual contact display (HMMD) with the enemy is essential in close combat the provision of this information on a helmet-mounted diplay (HMMD) may be particularly useful. However, the (in) visibility of the image against a bright sky background, the increased helmet weight and other inconveniencing counter effects when coupled with the high attentional and physical demands of combat, may obviate any advantages of controlling the aircraft using the extra information. A series of exercises was set up to assess the HMMD in this application. The device was the subject of a flight trial in a light jet aircraft, and two studies were completed in the newly-commissioned RAE air combat simulator. These studios enabled pilots to become familiar with the device and the unusual display format, in order to assess their combined usefulness in a combat context. A.R.H.

N82-13063# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

TANKER AVIONICS AND AIRCREW COMPLEMENT EVALUATION

Richard W. Moss and Gregory J. Barbato (Bunker-Ramo Corp., Dayton, Ohio) *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 18 p refs

Avail: NTIS HC A10/MF A01

A four phase effort addressing the control and display design issues associated with operating the SAC'S KC-135 tanker without the navigator crew position is discussed. Topics covered include the mission analysis phase during which the tanker's operational responsibilities were defined and documented; the design phase durng which alternative crew station design concepts were developed; the mockup evaluation phase which accomplished initial SAC crewmember assessment of cockpit designs; and the simulation phase which validated the usability of the crew system redesign. A recommended crew station configuration is examined and some of the philosophy underlying the selection of cockpit hardware and systems is discussed. A.R.H.

N82-13064# McDonnell Aircraft Co., St. Louis, Mo.

F/A 18 HORNET CREW STATION

Eugene C. Adam *In* AGARD The Impact of New Guidance and Control Systems on Mil. Aircraft Cockpit Design Aug. 1981 6 p

Avail: NTIS HC A10/MF A01

The Hornet crew station design requirement was to essentially provide the capability contained in both the F-4 and A-7 weapon systems so as to perform both the fighter attack roles, make it operable by one pilot, and increase mission reliability by a combination of improved hardware reliability and functional redundancy. To put this requirement in perspective, the F/A-18 cockpit has 40% less usable area than any of its contemporaries. This area constraint necessitated extensive integration of the weapon system controls and displays. The resultant crew station features four miltipurpose cathoderay displays driven by two mission computers, an integrated upfront control panel, and numerous automatic functions on the stick and throttle. The rationale leading up to the configuration is described and a few examples of the one-man-operability features of the Hornet and how they would used by the pilot are presented. A.R.H.

N82-13065# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AERODYNAMICS OF POWER PLANT INSTALLATION

Sep. 1981 510 p refs In ENGLISH and FRENCH Proc. of conf. held in Toulouse, 11-14 May 1981

(AGARD-CP-301; ISBN-92-835-0301-5) Avail: NTIS HC A22/MF A01

The aerodynamic problems in power plant installation are surveyed and computational and design methodologies are presented. Combat aircraft intakes, afterbodies and nozzles, testing and analysis techniques, and installation aerodynamics of transport aircraft are addressed. For individual titles, see N82-13066 through N82-13098.

N82-13066# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

PERFORMANCE OF HIGHLY INTEGRATED INLETS FOR SUPERSONIC AIRCRAFT

Lewis Surber, Jan Syberg, and Joseph Koncsek *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs Prepared in cooperation with Boeing Military Airplane Co., Seattle

Avail: NTIS HC A22/MF A01

Performance data obtained on several subsonic diffusers applicable to advanced supersonic tactical aircraft configurations were used to select a forebody-inlet model for proof-of-concept wind tunnel performance evaluation. Three of the diffusers were designed for high aspect ratio inlets having throat aspect ratios greater than seven. A fourth design incorporated a low aspect ratio inlet. Two of the high aspect ratio diffusers and the low aspect ratio diffuser incorporated duct bends typical of inlets substantially offset from the engine centerline. Preliminary tests of the high aspect of ratio diffuser produced high total pressure recovery coupled with relatively low flow distortion. Furthermore, the use of longitudinal vanes in one high aspect ratio diffuser provided reductions in engine face flow distortion with very little performance degradation. Proof-of-concept tests further investigated the performance of a high aspect ratio, side-mounted external compression supersonic inlet. Tests were performed in a 16-foot supersonic propulsion wind tunnel at Mach numbers of 1.6 to 2.2 over a -5 to 12 deg angle of attack range and sideslip angles from -8 to +8 deg. The results of these tests support the use of high aspect ratio inlets with sharp duct bends as a viable design option in future supersonic aircraft designs. M.G.

N82-13068# Royal Aircraft Establishment, Bedford (England). Aerodynamics Dept.

SOME RAE RESEARCH ON SHIELDED AND UNSHIELDED FUSELAGE MOUNTED AIR INTAKES AT SUBSONIC AND SUPERSONIC SPEEDS

J. A. Ross, I. McGregor, and A. J. Priest *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs

Avail: NTIS HC A22/MF A01

The incidence performance of fuselage-mounted intakes at subsonic and supersonic speeds is examined. The effects of simple changes in intake geometry, such as increasing contraction ratio and altering lower lip shape, are first considered; it is shown that such modifications can be beneficial at subsonic speeds, but drag penalties tend to limit their use at higher Mach numbers. Two intake locations that potentially offer a good degree of incidence shielding - underfuselage and understrake - are then examined. It is concluded that satisfactory performance can be obtained with an understrake installation, but a detailed study of strake shape, slots, splitter plates and boundary layer diverters must be made if the combinaion is to be successful over the whole of the intended flight envelope. However, for the configurations tested, the underfuselage location offers generally better intake performance lower technical risk. Finally, some results for a side-mounted staggered lip intake are presented, together with some two dimensional calculations of the mutual interference effects that occur between the upper and lower lips. It is suggested that an intake of this type can be competitive with an underfuselage installation. M.G.

N82-13069# National Gas Turbine Establishment, Pyestock (England).

PREDICTION AND MEASUREMENT OF TIME-VARIANT, THREE-DIMENSIONAL FLOWS IN MILITARY AIRCRAFT INTAKES

D. E. Colbourne and J. E. Flitcroft *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 18 p refs

Avail: NTIS HC A22/MF A01

The development of a computational method suitable for predicting the three dimensional flows within the diffuser sections of aircraft intakes is described. A fast method for automatic grid generation, application to ducts of any smoothly varying cross-sectional shape, is discussed. The development of a finite-volume, time-marching method for solving the flow equations is also described. The validity of the chosen techniques is discussed in the light of comparisons with analytical and empirical results. Empirical techniques were developed to examine flows in which viscous or time variant effects are dominant. A rotating yaw meter rake was developed to undertake detailed flow surveys at the exit of model diffusers, and results may be obtained from tests both in isolation and in the presence of a compressor. The development of instrumentation and data processing facilities for measuring instantaneous engine face total pressure distortion in small scale models is also described, together with the validation of this technique by comparison with results from a full-size replica of the intake tested under free-jet conditions. M.G.

N82-13070# British Aerospace Aircraft Group, Bristol (England).

EFFECTS OF INTAKE GEOMETRY ON CIRCULAR PITOT

INTAKE PERFORMANCE AT ZERO AND LOW FORWARD SPEEDS

A. C. Willmer, T. W. Brown, and E. L. Goldsmith (RAE, Bedford, England) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs Sponsored in part by Ministry of Defence
Avail: NTIS HC A22/MF A01

A series of experiments on circular cross-section pitot intakes at Mach numbers from 0 to 0.21 and angles of incidence and sideslip from 0 to 40 deg are presented. Measurements were made at the engine face of 72 pitot pressures, 4 unsteady pitot pressures, swirl angle at six positions, and boundary layer profiles at four positions. Static pressure distribution around the cowl lips and along the diffusers were also measured. Five cowl lips covering a range of contraction ratios and lip shapes were tested with both a straight and an S bend diffuser. The effect of inserting parallel section spacers between the cowl lip and the front of the subsonic diffuser and between the end of the subsonic diffuser and the engine face instrumentation and the effect of a thin lip slot upstream of the intake throat were evaluated. Results indicate that, lip losses may be decreased by increasing contraction ratio, fitting a lip slot or a forward spacer. Steady state flow distortion at the engine face is decreased by increasing lip contraction ratio or by fitting an aft extension. For the S duct tested, distortion levels are set by the diffuser as much as by incidence. Sideslip, however, lessens the distortions. M.G.

N82-13071# Institut de Mecanique des Fluides de Lille (France).

TRANSONIC FLOWS IN AN AIR INLET WITH LARGE INCIDENCE AND THE EFFECT OF A BLOWING TRAP [ECOULEMENTS TRANSSONIQUES DANS UNE PRISE D'AIR EN GRANDE INCIDENCE AT EFFET DE TRAPPE DE SOUFFLAGE]

A. Dyment, P. Gryson, and J. P. Flodrops *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p ref In FRENCH

Avail: NTIS HC A22/MF A01

Flow in a bidimensional air intake with large incidence was studied under conditions in which the upstream flow was subsonic and the internal flow could be regulated. The phenomena following flow separation were examined, especially the homogenization of the internal flow. A device for improving mogenization which involves a natural deflection accomplished by a scoop designed to guide the captivated air was tested. The universal aspect of internal flow was studied using probes in different sections. The unsteady phenomena were analyzed from ultra high speed visualizations and the mean flow was characterized from classic visualization. The insertion of the deflector appreciably improved the performance of the air intake. The coefficient of output (sigma) and the total mean pressure (P sub tm) were considerably improved at the level of the compressor. While the use of the scoop to guide the air towards the slot had only a weak influence on sigma and P sub tm at the compressor level, it brought an appreciable gain in the speed of homogenization of the internal flow. Transl. by A.R.H.

N82-13073# Aeritalia S.p.A., Torino (Italy). Combat Aircraft Group.

SUBSONIC MILITARY AIRCRAFT ENGINE INTAKE: AN INTEGRATED THEORETICAL EXPERIMENT DESIGN

G. Bertolone and L. Fornasier *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs

Avail: NTIS HC A22/MF A01

Two numerical codes were developed for the simulation of the engine intake-induced flow field in two dimensional transonic and three dimensional subsonic cases. Both codes were obtained by modification of existing codes suitable for the computation of the exterior flow past airfoils (by a finite element method) and about three dimensional arbitrary configurations (by a panel method). Computed results and comparison with experimental data pertinent to the analysis of a single bifurcated intake proved usefulness of the present numerical schemes for engineering applications. Engine face auxiliary doors design and side intakes diverter shape optimization was studied. Following an extensive testing program performed on a static model, the engine face auxiliary doors with annular air admission into the primary long type duct appeared to be a good alternative to the classical solution placed at the main inlet entry. Diverter geometry influence both on aerodynamics, in terms of drag coefficient, and intake performance, in terms of distortion coefficient, was investigated by testing a low speed model. R.J.F.

N82-13074# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Flugzeuge.

THE DESIGN AND DEVELOPMENT OF THE TORNADO ENGINE AIR INTAKE

C. P. Stocks (British Aerospace, Warton, England) and N. C. Bissinger *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 21 p refs
Avail: NTIS HC A22/MF A01

The design and development of the Tornado aircraft supersonic intake is described. Critical aerodynamic design areas are outlined with special emphasis on compatibility. The intakes were designed to satisfy the conflicting requirements of greater than Mach 2 operation and a very wide incidence operating envelope at subsonic speeds. The problem of design loads is reviewed as well as the theory and operation of the automatic control system. Propulsion system behavior in flight and some examples of intake-airframe interaction are described. R.J.F.

N82-13075# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

INTEGRATION OF ADVANCED EXHAUST NOZZLES

Douglas L. Bowers and James A. Laughrey *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 14 p refs

Avail: NTIS HC A22/MF A01

Attributes of both axisymmetric and nonaxisymmetric advanced nozzles and their incorporation into an aircraft to improve cruise performance, maneuverability and short takeoff and landing operation are discussed. It was concluded that when used as a trimming device, advanced exhaust nozzles with thrust vectoring can provide significant aircraft cruise drag reduction. The aftbody/nozzle installation for advanced airframes and exhaust nozzles must be approached very carefully to demonstrate an installed drag benefit. For maneuver, advanced thrust vectoring exhaust nozzles show advantages at high angle of attack. Improved turn rate and instantaneous maneuver performance can be provided by utilizing these advanced exhaust nozzles in advanced aircraft. For short takeoff and landing aircraft advanced exhaust nozzles with both thrust vectoring and thrust reversing may be necessary. Thrust vectoring up to 60 degrees (or higher) and a propulsive lift control system may be required. R.J.F.

N82-13076# Rolls-Royce Ltd., Bristol (England). Installation Aerodynamics Group.

THE SUBSONIC PERFORMANCE OF PRACTICAL MILITARY VARIABLE AREA CONVERGENT NOZZLES

L. R. Harper IN AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs

Avail: NTIS HC A22/MF A01

Performance considerations involved in the selection of a variable area nozzle for reheated engines for combat aircraft are discussed. The main emphasis is on dry operation at subsonic speeds since drag, weight, leakage and other penalties in this regime can prevent an aircraft attaining its design radius of action. Zero-base nozzles are compared with a moving shroud nozzle which has a substantial annular base area in dry setting. The moving shroud nozzle, as used on the RB199 engine in the Tornado MRCA, is very competitive with zero base nozzles in terms of overall performance. It is light, mechanically simple, reliable, and its short length permits a target type thrust reverser to be used. It is concluded that this type of nozzle is the optimum choice for combat aircraft until further technology advances permit substantial improvements in the overall performace of the more sophisticated nozzles. R.J.F.

N82-13077# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).

COMPARISON OF DIFFERENT NOZZLE CONCEPTS FOR A REHEATED TURBOFAN

H. Grieb, R. Vedova, H. Enderle, and H. Nagel *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 15 p refs Sponsored in part by German Ministry of Defence

Avail: NTIS HC A22/MF A01

Several concepts of convergent and convergent/divergent nozzles are investigated and compared in view of performance, weight, complexity and the influence on afterbody drag of combat aircraft. The influence of different nozzle cooling concepts on thrust, with subsequent cooling air requirements, is investigated. The optimum ratio of exit area/throat area of convergent/divergent nozzles dependent on nozzle concept and nozzle pressure ratio is identified. The performance comparison shows that fully variable convergent/divergent nozzles promise some advantages against the simple convergent nozzle at high nozzle pressure ratios. However, the higher weight and complexity of convergent/divergent nozzles lead to the conclusion that the choice of convergent/divergent nozzles for reheated turbofan engines in combat aircraft is not generally justified. J.D.H.

N82-13078# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Aero Propulsion Lab.

ADVANCED EXHAUST NOZZLE TECHNOLOGY

Ronald J. Glidewell and Robert E. Warburton (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 11 p refs

Avail: NTIS HC A22/MF A01

Turbine engine exhaust nozzle technology, including nonaxisymmetric nozzles, thrust reversing, and thrust vectoring was investigated. Trade studies to determine the impact of these developments on the thrust-to-weight ratio and specific fuel consumption of an advanced high performance, augmented turbofan engine are reported. Results are presented in a manner which provides a understanding of the sources and magnitudes of differences in the basic elements of nozzle internal performance and weight as they relate to conventional axisymmetric nozzle technology. These comparisons are presented for three categories of nozzle functional capability: jet area and exit area control, thrust reversing, and thrust vectoring. J.D.H.

N82-13082# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).

AN ACQUISITION AND ANALYSIS SYSTEM FOR DYNAMIC TESTS OF AIR INLETS [SYSTEME D'ACQUISITION ET D'ANALYSE POUR ESSAIS DYNAMIQUES D'ENTREES D'AIR]

Pierre Perrier, Bertrand Delahaye (SNWCMA, Moissy Cramayel, France), and Gerard Laruelle (ONERA, Chatillon, France) *In* AGARD Aerodyn. of Power Plant Installation Aug. 1981 14 p refs In FRENCH

Avail: NTIS HC A22/MF A01

Improving the flight domain of combat aircraft leads to operations involving a much large variation of unsteady aerodynamic characteristics at the engine inlet than in the past. To determine if the augmentation will be effectively acceptable for compressors and engines of the future, sufficient knowledge of flows must be acquired. This entails measuring a sufficient number of unsteady flow characteristics; however, the number of measurements made must be limited because of cost as well as because of the possibility of instantaneous or deferred processing. This sequence of measurements takes into account necessary compromises. Cooperation is needed among the aircraft designer, the engine designer, and the research organization so that the work of each can complement that of the others, and an economy of means and a homogeneity of methods for analyzing and interpreting the results is possible. Transl. by A.R.H.

N82-13084# Fluidyne Engineering Corp., Minneapolis, Minn.

MODEL TESTING TECHNIQUES FOR MEASURING INLET DRAG

James S. Holdhusen and James L. Grunnet *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 8 p refs

Avail: NTIS HC A22/MF A01

Two methods of measuring inlet drag in transonic flow are described. In the first method, a flow through nacelle is tested in a transonic wind tunnel. Capture ratio is varied by installing individual annular blockers in the nacelle. Corrections for the drag force exerted by the captured streamtube are determined from blow through tests in a static test stand. In the second method, drag is determined directly using a special rig which has a variable loss throttle. The thrust exiting the control surface is determined by a choked ASME nozzle. The advantages and disadvantages of the two methods are compared. E.A.K.

N82-13085# National Defence Headquarters, Ottawa (Ontario). Directorate of Science and Technology.

COMPRESSOR STALL INDUCING INSTALLATION EFFECTS OF AN ENGINE CONTROL PARAMETER FOR THE CF-5 AIRCRAFT

W. L. Macmillan, D. M. Rudnitski, and W. Grabe *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p Prepared in cooperation with National Research Council of Canada, Ottawa

Avail: NTIS HC A22/MF A01

Compressor stall problems with CF-5 aircraft powered by two J85-CAN-15 engines were investigated. One major cause for compressor stalls as improper operation of the engines' control system under low temperature conditions was identified. It is demonstrated that this control system malfunction is the result of engine installation effects, which produce an erroneous compressor inlet temperature signal to the main fuel control unit. The degree of signal error for several flight conditions, such as level flight, high angles of attack, aircraft stalls, and weapons delivery profiles are identified. It is found that temperature errors are greater at high angles of attack where severe compressor inlet distortion acts cumulatively in reducing the stall margin under this flight condition. E.A.K.

N82-13086# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).

THE ROLE AND IMPLEMENTATION OF DIFFERENT NACELLE/ENGINE SIMULATION CONCEPTS FOR WIND-TUNNEL TESTING IN RESEARCH AND DEVELOPMENT WORK ON TRANSPORT AIRCRAFT

B. Ewald and R. Smyth *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 35 p refs

Avail: NTIS HC A22/MF A01

Different experimental methods and their specific roles in various stages of research and development were investigated. The main problem is the simulation and calibration of the propulsion system. Different simulation methods are: flow through nacelles, powered nacelles (blowing, turbine powered simulators (TPS), ejector powered), inlet models. The TPS represent the most advanced simulation of the high bypass ratio engine in model scale. A large part of the wind tunnel tests still have to rely upon flow through nacelles. A novel flow through nacelle with a variable plug is presented. It is shown that the combination of flow through nacelles and TPS can be efficiently used in the windtunnel investigation of propulsion system effects for transport aircraft. E.A.K.

N82-13087# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

WIND TUNNEL TESTS OF POWERED MODELS: A COMPARISON OF TWO METHODS OF SIMULATING THE JETS OF JET ENGINES [ESSAIS EN SOUFFLERIE DE MAQUETTES MOTORISEES: COMPARAISON DE DEUX METHODES DE SIMULATION DES JETS DES REACTEURS]

J. P. Becle and R. Perin (SNIAS, Toulouse) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 18 p ref In FRENCH

Avail: NTIS HC A22/MF A01

Two methods for simulating engine jets were developed at ONERA. The so-called blowing jets were previously mounted for studying the Concorde. The second method, which uses small air breathing turbines was recently installed for Airbus family aircraft. Tests were conducted on semi-models mounted on a balance with six components traversed by the flow from the engine. An original mounting permits the same measurement means to be used for any principle of power or type of test used (fixed point or wind tunnel test). The installations, means of measurement, and methods of using the results are described. The respective advantages of each type of power simulation are considered from the viewpoints of complexity, duration, and precision of measurements obtained. Transl. by A.R.H.

N82-13088# Aircraft Research Association Ltd., Bedford (England).

WIND TUNNEL TEST AND ANALYSIS TECHNIQUES USING POWERED SIMULATORS FOR CIVIL NACELLE INSTALLATION DRAG ASSESSMENT

A. E. Harris and E. C. Carter *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 16 p refs

Avail: NTIS HC A22/MF A01

Full span and semi-span wind tunnel model tests and powered nacelle calibration techniques are discussed in the context of civil nacelle installation drag assessment and optimization. In order to achieve the accuracy required for drag analysis it is necessary to determine the installed net thrust of the powered nacelle simulator to the equivalent of at least one aircraft drag count. This implies stringent control of mass flow and thrust accounting and imposes the need for consistency of approach in the wind-on and calibration tests where thrust and mass flow coefficients must be known to 0.1% to 0.2% accuracy. This need for high confidence in the data at all stages of analysis led to a methodology in which the measured data is combined in various ways to enhance confidence in its final use. Experiences obtained in the use of a Mach simulation tank (MST) for the calibration of turbine powered simulator units are discussed. The MST is used to obtain simultaneous mass flow and thrust calibrations with representative internal nacelle conditions in the presence of a quiescent exhaust environment. Practical problems associated with the design of balance and airfeed arrangements are discussed along with the use of blown and turbine powered simulators. B.W.

N82-13089# Rolls-Royce Ltd., Derby (England).
ESTABLISHMENT OF AN EXPERIMENTAL TECHNIQUE TO PROVIDE ACCURATE MEASUREMENT OF THE INSTALLED DRAG OF CLOSE COUPLED CIVIL NACELLE/AIRFRAME CONFIGURATIONS, USING A FULL SPAN MODEL WITH TURBINE POWERED ENGINE SIMULATORS
G. Pugh and A. E. Harris (Aircraft Research Association Ltd., Bedford, England) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 9 p refs

Avail: NTIS HC A22/MF A01
Definition and optimization of installed thrust/drag in civil nacelle installation design and development was studied. As a means of validating the calibration and thrust/drag analysis techniques bodied transport, Lockheed L1011, having high bypass ratio RB 211 turbofan engines with two alternative exhaust system designs was used. Wind tunnel model representation comprised a full span simulation with underwing mounted turbine powered engine simulators. Calibration techniques included the use of a Mach simulation tank in which concurrent mass flow and thrust calibrations were conducted in a quiescent exhaust environment. Data presented includes nacelle thrust and discharge coefficients, installed drag comparisons, and, finally, model to flight correlations. B.W.

N82-13090# National Aerospace Lab., Amsterdam (Netherlands).
EVALUATION OF AN EXPERIMENTAL TECHNIQUE TO INVESTIGATE THE EFFECTS OF THE ENGINE POSITION ON ENGINE/PYLON/WING INTERFERENCE
J. A. J. vanEngelen, B. Munniksma, and A. Elsenaar *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p refs

Avail: NTIS HC A22/MF A01
A flexible experimental technique to study the effect of a variation of engine position for a range of test conditions was evaluated. In this test an underwing mounted 3/4 fancowl engine was investigated at six different positions as a free flow nacelle and as a strut mounted blown nacelle. Pressure and balance force measurements were made. Some typical aspects of the aerodynamic interference are discussed, notably the value of free flow nacelle measurements. Also a comparison of balance weighed and integrated pressure forces is presented. Results indicate that accurate simulation of the engine nozzle geometry is of prime importance for an investigation concerning engine/airframe integration. Nevertheless, tests on a free flow nacelle may still be useful for the selection of the most favourable engine position. A reasonable correlation was established between interference forces as obtained from pressure integration and balance measurements. However, the pressure forces tend to underestimate the balance forces. For a flexible pathfinder test, interference forces derived from pressure integration only appear to be very useful for the determination of trends in interference effects. B.W.

N82-13091# Office National d'Etudes et de Recherches Aerospatiales, Paris (France)
STUDIES OF AIR INLETS AT REYNOLDS NUMBERS COMPARABLE TO FLIGHT IN ONERA'S F1 AND S1MA WIND TUNNELS [ESSAIS DE PRISES D'AIR A DES NOMBRES DE REYNOLDS COMPARABLES AU VOL DANS LES SOUFFLERIES F1 ET S1MA DE L'ONERA]
J. Leynaert *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs In FRENCH

Avail: NTIS HC A22/MF A01
The pressurization of the subsonic F1 wind tunnel at ONERA's Fauga-Mauzac Center was a benefit in wind tunnel tests of the air intakes of Airbus-type aircraft on a large scale at a Reynolds number near that of flight. The same model can thus be tested up to a Mach number near 1 in the S1MA wind tunnel at the Modane Center. Air intakes of military aircraft can likewise be studied in the two wind tunnels at high Reynolds numbers. The apparatus used, the methods of measurement, and the means of calibrating and control used to assure valid results are presented. Transl. by A.R.H.

N82-13092# British Aerospace Aircraft Group, Hertfordshire (England). Research Dept.
THE INFLUENCE OF CLOSED-COUPLED, REAR FUSELAGE MOUNTED NACELLES ON THE DESIGN OF AN ADVANCED HIGH SPEED WING
R. D. Laugher *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 17 p refs

Avail: NTIS HC A22/MF A01
The design approach aimed at integrating the effect of the nacelle into the basic wing design is described. Particular attention is drawn to the design risk associated with the modified inner wing supercritical flow development when nacelles are not represented in the transonic design calculations. Experimental test results are described which demonstrate the general success of the design technique. Finally, some results are presented from theoretical investigations in which an attempt was made to simulate the interference effect of the nacelle on the wing supercritical flowfield. A technique was developed whereby the nacelle and intake streamtube are replaced by an equivalent interfering body, which is derived from subcritical flow interference pressures. Results show that this technique provides a simple, cost effective tool for the supercritical design of a wing operating in the influence of a rear nacelle. M.D.K.

N82-13093# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Aerodynamics Dept.
AERODYNAMIC ASPECTS OF A HIGH BYPASS RATIO ENGINE INSTALLATION ON A FUSELAGE AFTERBODY

N. Voogt, J. vanHengst, and J. Th. v.d.Kolk (NRL) *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 10 p refs

Avail: NTIS HC A22/MF A01
The design process used in shaping rear fuselage mounted large diameter engine nacelles, pylons, and fuselage for a transport type aircraft is described. The objective was to suppress the local velocity levels and pressure gradients to avoid aerodynamic interference drag of the nacelle-pylon-fuselage combination in high speed cruise flight. Shapes of fuselage afterbody, nacelle, and stubwing were modified in a design-by-analysis process involving iterative and three dimensional singularity methods for inviscid subsonic flow. Windtunnel tests confirmed the adequacy of these methods. M.D.K.

N82-13094# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Service Aerodynamique Theorique.
A NUMERICAL METHOD FOR STUDYING NACELLE-JET-AIRFOIL INTERACTION IN INVISCID THREE-DIMENSIONAL FLOW [UNE METHODE NUMERIQUE POUR L'ETUDE DE L'INTERACTION NACELLE-JET-VOILURE EN ECOULEMENT TRIDIMENSIONEL NON VISQUEUX]
G. LeGall, J. Bousquet, and M. Yermia *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 13 p refs In FRENCH

Avail: NTIS HC A22/MF A01
The nacelle-jet-airfoil interaction is a complex three dimensional phenomena which is addressed in two simplified hypotheses: the fluid is incompressible and inviscid. Under these two hypotheses, the propulsive configuration is modeled by air intake with flow control and a propulsive jet with control of the pressure generator. A method of singularities is used which considers the sources and doublets of constant density and doublets of linear density on a flat panel. The equations which govern the problem constitute a nonlinear system which is divided into a linear part and a quadratic part. These two parts are solved iteratively by the Gauss-Seidel method and the Newton method. The free bounderies of the flow are also calculated by an iterative process which is integrated into the two preceding methods. Some practical results are proposed in two and three dimensional

flow. Comparison with tests permits evaluation of the advantage of the simplified hypotheses. Transl. by A.R.H.

N82-13095# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).
CALCULATION OF WING-BODY-NACELLE INTERFERENCE IN SUBSONIC AND TRANSONIC POTENTIAL FLOW
K. D. Klevenhusen, H. Jakob, and H. Struck *In* AGARD Aerodyn. in Power Plant Installation Sep. 1981 8 p refs

Avail: NTIS HC A22/MF A01

A calculation method especially for transport aircraft wing design with consideration of wing/body or engine/airframe interference was developed. A hybrid method, consisting of a combination of panel method and finite difference method, is an improvement of a well proved analogy method. The panel method is of higher order using linear source and doublet distributions. The transonic flow region is removed from the entire flow field and the panel method is used for calculating boundary values for the subsequent finite difference method. The finite difference method solves the full potential equation in streamline coordinates. E.A.K.

N82-13096*# Boeing Military Airplane Development, Seattle, Wash.
PREDICTION OF SUBSONIC AIRCRAFT FLOWS WITH JET EXHAUST INTERACTIONS
D. W. Roberts *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 12 p refs

(Contract NAS2-10100)
Avail: NTIS HC A22/MF A01 CSCL 02A

A numerical procedure to calculate the flow fields resulting from the viscous inviscid interactions that occur when a strong jet exhaust and aircraft flow field coupling exists was developed. The approach divides the interaction region into zones which are either predominantly viscous or inviscid. The flow in the inviscid zone, which surrounds most of the aircraft, is calculated using an existing potential flow code. The viscous flow zone, which encompasses the jet plume, is modeled using a parabolized Navier-Stokes code. The procedure features the coupling of the zonal solutions such that sufficient information is transferred between the zones to preserve the effects of the interactions. The zonal boundaries overlap and the boundary conditions are the information link between zones. An iteration scheme iterates the coupled analysis until convergence has been obtained. E.A.K.

N82-13097# Douglas Aircraft Co., Inc., Long Beach, Calif
PROP-FAN INTEGRATION AT CRUISE SPEEDS
H. Robert Welge *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 14 p refs

Avail: NTIS HC A22/MF A01

The aerodynamic installation features of a highly loaded turboprop (prop fan) on an aircraft for flight at Mach 0.8 are discussed. The aerodynamic flow environment in which the prop fan must operate is shown for both wing and aft-fuselage installations using advanced surface panel methods. The effects of prop fan slipstream parameters on the drag of a supercritical wing are presented indicating that only small drag penalties occur. Drag reductions are possible by tailoring the local wing section to account for the rotor induced flow. Using these inputs, an integrated wing/nacelle is shown. E.A.K.

N82-13098*# Boeing Commercial Airplane Co., Seattle, Wash. New Product Development Dept.
AIRFRAME-PROPULSION SYSTEM AERODYNAMIC INTERFERENCE PREDICTIONS AT HIGH TRANSONIC MACH NUMBERS INCLUDING OFF-DESIGN ENGINE AIRFLOW EFFECTS
R. M. Kulfan and A. Sigalla *In* AGARD Aerodyn. of Power Plant Installation Sep. 1981 23 p refs

(Contract NAS1-14623)
Avail: NTIS HC A22/MF A01 CSCL 02A

The transonic speed regime for airplanes at conditions where inlet spillage takes place is discussed. A wind tunnel test program to evaluate aerodynamic performance penalties associated with propulsion system installation and operation at subsonic through low supersonic speeds was conducted. The accuracy of analytic methods for predicting transonic engine airframe interference effects was assessed. Study variables included Mach number, angle of attack, relative cowl location, and nacelle mass flow ratio. Results include test theory comparisons of forces as well as induced pressure fields. Prediction capability of induced shock wave strength and locations is assessed. It was found that large interference forces due to engine location and flow spillage occur at transonic speeds, that theory explains these effects; and that theory can predict quantitatively these effects. E.A.K.

N82-13104 Iowa Univ., Oakdale.
TURBULENT WAKE DEVELOPMENT BEHIND STREAMLINED BODIES Ph.D. Thesis
Sastry Suryanarayana Munukutla 1981 316 p
Avail: Univ. Microfilms Order No. 8123346

The developing turbulent wake behind streamlined bodies is reported. Detailed measurements of mean and turbulent flow properties are made in three different wake flows. The first is the symmetric wake of a flat plate, the second is the asymmetric wake of a flat plate, (asymmetry being produced by roughening on side of the plate) and the third is the curved wake of an asymmetric airfoil at incidence. It is possible to identify three important regions in the wake, namely the near wake, intermediate wake and the far wake. The performance of the existing turbulence models in the case of the symmetric flat plate wake is studied. The near and intermediate wake regions are predicted by a sophisticated turbulence model. Dissert. Abstr.

N82-13106*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FORCE AND MOMENT, FLOW-VISUALIZATION, AND BOUNDARY-LAYER TESTS ON A SHUTTLE ORBITER MODEL AT MACH 6
Robert L. Calloway Dec. 1981 25 p refs
(NASA-TP-1952; L-14782) Avail: NTIS HC A02/MF A01 CSCL 01A

Force and moment, flow visualization, and boundary layer state tests were conducted using two 0.004 scale shuttle orbiter models. The force and moment tests were conducted for an angle of attack range from 20 to 40 deg and for Reynolds numbers based on reference length from 0.4 million to 3.6 million. Schlieren photographs were obtained for each angle of attack and Reynolds number. The boundary layer state tests, which were conducted using hot film sensors mounted in a separate model, were conducted over the same range of conditions as the force tests. Test results were combined to show that changes in the boundary layer on a typical hypersonic force test model affect measurement of the axial force coefficient and that the state of the local boundary layer is important for interpreting hypersonic aerodynamic test results. S.L.

N82-13107*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF BLADE TIP GEOMETRY ON THE INTERACTION OF TORSIONAL LOADS AND PERFORMANCE FOR AN ARTICULATED HELICOPTER ROTOR
William T. Yeager and Wayne R. Mantay Dec. 1981 64 p refs Prepared in cooperation with Army Aviation Research and Development Command, Hampton, Va.
(DA Proj. 1L2-62209-AH-76)
(NASA-TP-1926; AVRADCOM-TR-81-B-5; L-14674) Avail: NTIS HC A04/MF A01 CSCL 01A

The Langley transonic dynamics tunnel was used to determine the degree of correlation between rotor performance and the dynamic twist generated by changes in blade tip geometry using an articulated rotor with four different tip geometries at advance ratios of 0.20, 0.30 and 0.35. Based on the data obtained, it is concluded that: (1) there appears to be no strong correlation between blade torsion loads and rotor performance prediction; (2) for a given rotor task at each advance ratio investigated, both the azimuthal variation of torsional moment and the mean torsional moment at 81% radius are configuration dependent; (3) reducing the nose down twist on the advancing blade appears to be more important to forward flight performance than increasing the nose down twist on the retreating blade; (4) the rotor inflow model used was important in predicting the performance of the adaptive rotor; and (5) neither rigid blade solidity effects, inflow environment, nor blade torsion loads can be used alone to accurately predict active rotor performance.
A.R.H.

N82-13109# National Aerospace Lab., Tokyo (Japan).
AN AERODYNAMIC DESIGN AND THE OVERALL STAGE

PERFORMANCE OF AN AIR-COOLED AXIAL-FLOW TURBINE

Atsumasa Yamamoto, Kitao Takahara, Hiroyuki Nouse, Shigeo Inoue, Hiroschi Usui, and Fugio Mimura Jan. 1981 44 p refs
(NAL-TR-321T) Avail: NTIS HC A03/MF A01

In order to investigate air-cooled turbines for application to high-temperature engines, a single stage turbine with a 0.56-m (22-inch) tip diameter was designed. The aerodynamical design procedures of the turbine are presented. The stator and rotor blades are characterized by low blade solidity, thick blade section, blunt leading edge and trailing edge, and low blade aspect ratio. A cold air test without supply of cooling air was conducted to determine the turbine aerodynamic performance. The highest efficiency obtained over the range of conditions investigated was 0.865. The turbine satisfied the equivalent design value of specific work output at the design condition (i.e., at equivalent design speed and equivalent design pressure ratio) with an efficiency of 0.856. Detailed surveys of rotor-outlet gas flow were made with Pitot tubes and temperature sensors and the results are also presented. T.M.

N82-13110*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

PRESSURE DISTRIBUTIONS ON THREE DIFFERENT CRUCIFORM AFT-TAIL CONTROL SURFACES OF A WINGLESS MISSILE AT MACH 1.60, 2.36, AND 3.70. VOLUME 1: TRAPEZOIDAL TAIL

Milton Lamb, Wallace C. Sawyer, Donald L. Wassum, and C. Donald Babb Aug. 1979 345 p
(NASA-TM-80097; L-12993-Vol-1) Avail: NTIS HC A15/MF A01 CSCL 01A

The results of pressure distribution tests conducted in a wind tunnel are presented without analysis. The data were obtained for trapezoidal aft tail control surfaces on a wingless missile model at Mach numbers of 1.60, 2.36, and 3.70 for angles of attack from -4 to 20 deg model roll angles from 0 to 90 deg and tail deflections of 0 and -15 deg. The test Reynolds number used was 6.6 million per meter. M.D.K.

N82-13112*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THRUST MODULATION METHODS FOR A SUBSONIC V/STOL AIRCRAFT

Richard R. Woollett 1981 16 p refs Presented at V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981; sponsored by AIAA and NASA Ames
(NASA-TM-82747; E-1063) Avail: NTIS HC A02/MF A01 CSCL 01A

Low speed wind tunnel tests were conducted to assess four methods for attaining thrust modulation for V/STOL aircraft. The four methods were: (1) fan speed change, (2) fan nozzle exit area change, (3) variable pitch rotor (VPR) fan, and (4) variable inlet guide vanes (VIGV). The interrelationships between inlet and thrust modulation system were also investigated using a double slotted inlet and thick lip inlet. Results can be summarized as: (1) the VPR and VIGV systems were the most promising, (2) changes in blade angle to obtain changes in fan thrust have significant implications for the inlet, and (3) both systems attained required level of thrust with acceptable levels of fan blade stress. M.D.K.

N82-13115# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

A CALCULATION METHOD FOR SLENDER WING-BODY CONFIGURATIONS IN SUPERSONIC FLOW AT HIGH ANGLES OF ATTACK [EIN BERECHNUNGSVERFAHREN FUER SCHLANKE FLUEGEL-RUMPFANORDNUNGEN IM UEBERSCHALL BEI HOHEN ANSTELLWINKELN]

D. Nikolitsch Bonn Bundesministerium der Verteidigung 1979 58 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-15) Avail: NTIS HC A04/MF A01; DOK-ZENTBw, Bonn DM 30

An analysis which determines nonlinear force and pitching moment characteristics of slender bodies and slender wing-body configurations at high angles of attack in supersonic flow is presented. The linear coefficients of the body are calculated by means of a singularity distribution along the body axis. The nonlinear coefficients are determined by a method based on Wardlaw's multivortex model which is modified so that it is applicable at Mach > 1. The wing characteristics are calculated with the Huerlimann prediction method; this method is limited to slender, tapered wing planforms. The mutual interference of wing and body is accounted for by Nielsen interference factors. The range of application of the analysis is exemplified by sample calculations. Author (ESA)

N82-13116# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Flugzeuge.

FINAL REPORT ON THE FUEFO-4 MAJOR THEME: INTERFERENCE DRAG WITH AIRFRAME/ENGINE INTEGRATION ON FIGHTER AIRCRAFT Final Report [ABSCHLUSSBEREICHT ZUM RUEFO-4 RAHMENTHEMA 'INTERFERENZWIDERSTAND BEI DER ZELLEN-/TREIBWERKSINTEGRATION VON KAMPFFLUGZEUGEN']

H. L. Weinreich and R. Smyth (Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, West Germany) Bonn Bundesministerium der Verteidigung 1979 182 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-79-20) Avail: NTIS HC A09/MF A01; DOK-ZENTBw, Bonn DM 40

Theoretical and experimental (wind tunnel) studies of engine nozzle characteristics as well as of engine/airframe aerodynamic interaction are summarized. Results significant to fighter aircraft configuration optimization are identified. Wind tunnel experiment design is also critically assessed. Results emphasized concern: experimental data for parameters influencing afterbody drag; theoretical and construction concepts of variable 'CONDI' nozzles; theoretical methods for the correction of wind tunnel data; the synthesis of inlet drag; and investigations of jet decay structures. Author (ESA)

N82-13131*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

GROUP 1: SCENARIO DESIGN AND DEVELOPMENT ISSUES

Peter Sherwin *In its* Guidelines for Line-oriented Flight Training, Vol. 2 1981 p 113-117

Avail: NTIS HC A08/MF A01 CSCL 05I

All LOFT scenarios and flight segments should be designed on the basis of a detailed statement of specific objectives. These objectives must state what kind of situation is to be addressed and why. The origin, routing, and destination of a particular scenario should be dictated by the specific objectives for that scenario or leg. Other factors to be considered are the desired weather, climate, etc. Simulator visual system, as well as other capabilities and limitations must be considered at a very early stage of scenario design. The simulator navigation area must be apropriate and must coincide with current Jeppeson charts. Much of the realism of LOFT is destroyed if the crew is unable to use current manuals and other materials. A.R.H.

N82-13135# SCI Systems, Inc., Huntsville, Ala.

TECHNIQUES FOR INTERFACING MULTIPLEX SYSTEMS Final Report, 10 Sep. 1979 - 10 May 1980

James P. Gross Feb. 1981 138 p
(Contract F33615-79-C-1876; AF Proj. 2003)
(AD-A101457; AFWAL-TR-80-1223) Avail: NTIS HC A07/MF A01 CSCL 17/2

Data describing the characteristics of a number of aircraft multiplex systems were collected and compiled. Although Air Force aircraft received priority, were consideration was also given to other military and commercial aircraft. The F-16, B-52 OAS, YAH-64, F-18, F-15 and ARINC 575 systems were included. MIL-STD-1553B was used as a baseline for comparison. The compiled data was analyzed to determine points of incompatibility between these systems and a feasibility study was performed to assess possible techniques to be used in achieving bus compatibility. A programmable interface module design philosophy is recommended which utilizes a distributed three-microprocessor arrangement to achieve the desired interface compatibility. The three-processor conept allows three independent software-controlled events to occur simultaneously, thus providing an extremely high degree of flexibility both for existing systems and for future growth. Author

N82-13136# Institute for Defense Analyses, Arlington, Va. Program Analysis Div.

HELICOPTER RELIABILITY AND MAINTAINABILITY

TRENDS DURING DEVELOPMENT AND PRODUCTION
Final Report
Norman J. Asher, Lee L. Douglas, and Ray H. Jakobovits Jul. 1981 279 p refs Revised
(Contract MDA903-79-C-0320)
(AD-A105775; AD-E500409; IDA/HQ-81-23636) Avail: NTIS HC A13/MF A01 CSCL 01/3

This study updates and extends IDA Study S-451, 'Changes in Helicopter Reliability/Maintainability Characteristics Over Time,' dated March 1975. This study presents more recent data and, based on the combined data of both studies, summarizes the observed helicopter R&M trends. Trends observed during the development phase are compared with those of the production phase. GRA

N82-13137# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Drehfluegler und Verkehr.

SYSTEM IDENTIFICATION HELICOPTER PARAMETERS. DETERMINATION FROM FLIGHT TESTS, PHASE 2 [SYSTEMIDENTIFIZIERUNG DREHFLUEGLER KENNWERT-ERMITTLUNG AUS FLUGMESSUNGEN (PHASE 2)]
M. Kloster and S. Attlfellner Bonn Bundesministerium der Verteidigung 1980 92 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-80-12) Avail: NTIS HC A05/MF A01; DOKZENTw, Bonn DM 30

A parameter identification program for a hingeless rotor helicopter is considered. Flight conditions were selected with increasing instability, i.e., hover and level flight at maximum speed; with maximum weight and with a rearward center of gravity. A strap down system was chosen to provide the attitude feedback control necessary for proper identification. The control input signals were optimized for the unstabilized helicopter. Calculations in the time and frequency domains show that special distributions in the power spectrum of the input signals are needed for optimizing the closed loop system. The identified derivatives and the smoothened time histories from flight tests are compared with the identification results of linear and nonlinear simulations and of the quasistatic theory. Author (ESA)

N82-13138# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).

MANEUVER LOAD CONTROL FOR THE REDUCTION OF DESIGN LOADS AND IMPROVEMENT OF THE MANEUVERABILITY OF MODERN FIGHTER AIRCRAFT
Horst Balke Bonn Bundesministerium der Verteidigung 1981 283 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-2) Avail: NTIS HC A13/MF A01; DOKZENTBw, Bonn DM 50

Active control technology is applied and the feasibility of design load reduction is analyzed. The influence of direct force control on aircraft component loads and on aircraft maneuverability is seen. The deflection of secondary control surfaces in proportion with the commanded control surface was investigated in an open loop control system. Load reduction efficiency diagrams and tables are presented. A comparison of two different aircraft shows that with an open loop control system a considerable reduction in design load is possible. The loads acting on several aircraft components for different open loop control systems are compared. Several closed loop control systems with aircraft response feedback parameters were also investigated. The results are again presented as diagrams, and tables. Only in some cases does closed loop control achieve better results than open loop control. The best design load reduction is achieved with a combined open and closed loop control system. The investigation results are comprehensively evaluated and the parameters relevant for design load reduction are summarized. Author (ESA)

N82-13139 Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

RAVEN AIRCRAFT FILTER-ABSORBER
Jerzy Chojnacki 26 Nov. 1980 5 p Transl. into ENGLISH from Skrzydlata Polska (Poland), Vol. 1, no. 51-52, 1979 p 7
(AD-A098962; FTD-ID(RS)T-2017-80) HC A02/MF A01 CSCL 06/11

A filter-absorber in the shape of a rectangular box and weighing 9.5 kg is mounted outside the cockpit of an agricultural aircraft. Toxic compounds given off during crop spraying are trapped by internal filters. The first, or forward filter has Anilana fibers. The second, or actual purification filter, is made from fiberglass which absorbs the finest airborne contaminants. The pesticide filter-absorber device is guaranteed for 100 hours of operation and was designed for use in Africa. A.R.H.

N82-13140*# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

PRACTICAL ASPECTS OF INSTRUMENTATION SYSTEM INSTALLATION, VOLUME 13
R. W. Borek, A. Pool, ed., and K. C. Sanderson, ed. Sep. 1981 197 p refs
(NASA-TM-84067; AGARD-AG-160-Vol-13;
ISBN-92-835-1399-1) Avail: NTIS HC A09/MF A01 CSCL 01D

A review of factors influencing installation of aircraft flight test instrumentation is presented. Requirements, including such factors as environment, reliability, maintainability, and system safety are discussed. The assessment of the mission profile is followed by an overview of electrical and mechanical installation factors with emphasis on shock/vibraion isolation systems and standardization of the electric wiring installation, two factors often overlooked by instrumentation engineers. A discussion of installation hardware reviews the performance capabilities of wiring, connectors, fuses and circuit breakers, and a guide to proper selections is provided. The discussion of the installation is primarily concerned with the electrical wire routing, shield terminations and grounding. Also inclued are some examples of installation mistakes that could affect system accuracy. System verification procedures and special considerations such as sneak circuits, pyrotechnics, aircraft antenna patterns, and lightning strikes are discussed. M.D.K.

N82-13141# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.

ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM TEST AND DEMONSTRATION REPORT
Interim Report, Jan. - Jun. 1981
Jun. 1981 52 p
(Contract DAAK80-79-C-0270)
(AD-A105317; ACS-12388; AVRADCOM-TR-79-0270-5; IR-5)
Avail: NTIS HC A04/MF A01 CSCL 01/4

The hardware and software of the electronic master monitor and advisory display system are tested. The results are documented and the feasibility of the system is demonstrated. Author

N82-13142*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

NUMERICAL ANALYSIS OF THE SCRAMJET-INLET FLOW FIELD BY USING TWO-DIMENSIONAL NAVIER-STOKES EQUATIONS
Ajay Kumar Dec. 1981 30 p refs
(NASA-TP-1940; L-14776) Avail: NTIS HC A03/MF A01 CSCL 21E

A computer code was developed to solve the full two dimensional Navier-Stokes equations in a supersonic combustion ramjet (scramjet) inlet. In order to be able to consider a general inlet geometry with embedded bodies, a numerical coordinate transformation is used which generates a set of boundary-fitted curvilinear coordinates. The explicit finite difference algorithm of MacCormack is used to solve the governing equations. An algebraic, two-layer eddy-viscosity model is used for the turbulent flow. The code can analyze both inviscid and viscous flows with no strut, one strut, or multiple struts in the flow field. The application of the two dimensional analysis in the preliminary parametric design studies of a scramjet inlet is discussed. Detailed results are presented for one model problem and for several actual scramjet-inlet configurations. R.J.F.

N82-13143*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF FUEL-AIR-RATIO NONUNIFORMITY ON EMISSIONS OF NITROGEN OXIDES
Valerie J. Lyons Nov. 1981 14 p refs
(NASA-TP-1798; E-648) Avail: NTIS HC A02/MF A01 CSCL 21E

The inlet fuel-air ratio nonuniformity is studied to deterine how nitrogen oxide (NOx) emissions are affected. An increase in NOx emissions with increased fuel-air ratio nonuniformity for average equivalence ratios less than 0.7 and a decrease in NOx emissions for average equivalence ratios near stoichiometric is predicted. The degree of uniformityy of fuel-air ratio profiles that is necessary to achieve NOx emissions goals for actual engines that use lean, premixed, prevaporized combustion systems is determined. S.L.

N82-13144*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

A REAL TIME PEGASUS PROPULSION SYSTEM MODEL FOR VSTOL PILOTED SIMULATION EVALUATION

James R. Mihaloew, Stephen P. Roth (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.), and Robert Creekmore (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.) 1981 18 p refs Presented at VSTOL Conf., Palo Alto, Calif., 7-9 Dec. 1981; sponsored by AIAA and NASA. Ames Research Center
(NASA-TM-82770; E-1004; AIAA-81-2663) Avail: NTIS HC A02/MF A01 CSCL 21E

A real time propulsion system modeling technique suitable for use in man-in-the-loop simulator studies was developed. This technique provides the system accuracy, stability, and transient response required for integrated aircraft and propulsion control system studies. A Pegasus-Harrier propulsion system was selected as a baseline for developing mathematical modeling and simulation techniques for VSTOL. Initially, static and dynamic propulsion system characteristics were modeled in detail to form a nonlinear aerothermodynamic digital computer simulation of a Pegasus engine. From this high fidelity simulation, a real time propulsion model was formulated by applying a piece-wise linear state variable methodology. A hydromechanical and water injection control system was also simulated. The real time dynamic model includes the detail and flexibility required for the evaluation of critical control parameters and propulsion component limits over a limited flight envelope. The model was programmed for interfacing with a Harrier aircraft simulation. Typical propulsion system simulation results are presented. M.D.K.

N82-13145*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.

SENSOR FAILURE DETECTION SYSTEM Final Report

E. C. Beattie, R. F. LaPrad, M. E. McGlone, S. M. Rock, and M. M. Akhter Aug. 1981 172 p refs Prepared in cooperation with Systems Control, Inc., Palo Alto, Calif.
(Contract NAS3-22481)
(NASA-CR-165515; PWA-5736-17) Avail: NTIS HC A08/MF A01 CSCL 21E

Advanced concepts for detecting, isolating, and accommodating sensor failures were studied to determine their applicability to the gas turbine control problem. Five concepts were formulated based upon such techniques as Kalman filters and a screening process led to the selection of one advanced concept for further evaluation. The selected advanced concept uses a Kalman filter to generate residuals, a weighted sum square residuals technique to detect soft failures, likelihood ratio testing of a bank of Kalman filters for isolation, and reconfiguring of the normal mode Kalman filter by eliminating the failed input to accommodate the failure. The advanced concept was compared to a baseline parameter synthesis technique. The advanced concept was shown to be a viable concept for detecting, isolating, and accommodating sensor failures for the gas turbine applications. M.G.

N82-13146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA RESEARCH IN AIRCRAFT PROPULSION

Milton A. Beheim 1982 17 p Proposed for presentation at the 27th Ann. Intern. Gas Turbine Conf., London, 18-22 Apr. 1982; sponsored by ASME
(NASA-TM-82771; E-1096) Avail: NTIS HC A02/MF A01 CSCL 21E

A broad overview of the scope of research presently being supported by NASA in aircraft propulsion is presented with emphasis on Lewis Research Center activities related to civil air transports, CTOL and V/STOL systems. Aircraft systems work is performed to identify the requirements for the propulsion system that enhance the mission capabilities of the aircraft. This important source of innovation and creativity drives the direction of propulsion research. In a companion effort, component research of a generic nature is performed to provide a better basis for design and provides an evolutionary process for technological growth that increases the capabilities of all types of aircraft. Both are important. A.R.H.

N82-13147*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

DESIGN FOR ACTIVE AND PASSIVE FLUTTER SUPPRESSION AND GUST ALLEVIATION Ph.D. Thesis

Mordechay Karpel Washington NASA Nov. 1981 117 p refs
(Grant NGL-05-020-243)
(NASA-CR-3482) Avail: NTIS HC A06/MF A01 CSCL 01C

Analytical design techniques for active and passive control of aeroelastic systems are based on a rational approximation of the unsteady aerodynamic loads in the entire Laplace domain, which yields matrix equations of motion with constant coefficients. Some existing schemes are reviewed, the matrix Pade approximant is modified, and a technique which yields a minimal number of augmented states for a desired accuracy is presented. The state-space aeroelastic model is used to design an active control system for simultaneous flutter suppression and gust alleviation. The design target is for a continuous controller which transfers some measurements taken on the vehicle to a control command applied to a control surface. Structural modifications are formulated in a way which enables the treatment of passive flutter suppression system with the same procedures by which active control systems are designed. A.R.H.

N82-13148*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LIMITED EVALUATION OF AN F-14A AIRPLANE UTILIZING AN AILERON-RUDDER INTERCONNECT CONTROL SYSTEM IN THE LANDING CONFIGURATION

Wendell W. Kelley and Einar K. Enevoldson (NASA. Dryden Flight Research Center) Dec. 1981 39 p refs
(NASA-TM-81972; L-14756) Avail: NTIS HC A03/MF A01 CSCL 01C

A flight test was conducted for preliminary evaluation of an aileron-rudder interconnect (ARI) control system for the F-14A airplane in the landing configuration. Two ARI configurations were tested in addition to the standard F-14 flight control system. Results of the flight test showed marked improvement in handling qualities when the ARI systems were used. Sideslip due to adverse yaw was considerably reduced and airplane turn rate was more responsive to pilot lateral control inputs. Pilot comments substantiated the flight data and indicated that the ARI systems were superior to the standard control system in terms of pilot capability to make lateral offset corrections and heading changes on final approach. Author

N82-13149*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

ANALYSIS OF A LONGITUDINAL PILOT-INDUCED OSCILLATION EXPERIENCED ON THE APPROACH AND LANDING TEST OF THE SPACE SHUTTLE

John W. Smith Dec. 1981 45 p refs
(NASA-TM-81366) Avail: NTIS HC A03/MF A01 CSCL 05H

During the final free flight (FF-5) of the shuttle's approach and landing tests, the vehicle experienced pilot-induced oscillations near touchdown. The flight test data showed that pilot inputs to the hand controller reached peak-to-peak amplitudes of 20 deg at a frequency between 3 and 3.5 radians per second. The controller inputs were sufficient to exceed the priority rate limit set in the pitch axis. A nonlinear analytical study was conducted to investigate the combined effects of pilot input, rate limiting, and time delays. The frequency response of the total system is presented parametrically as a function of the three variables. In general, with no dead time, for controller inputs of 5 deg or less, the total system behaves in a linear fashion. For 10 deg of controller input, independent of the delay time, the elevon loop will be rate saturated above a frequency of 4 radians per second. Author

N82-13150*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.

INTERACTIVE AIRCRAFT FLIGHT CONTROL AND AEROELASTIC STABILIZATION Interim Report

Terrence A. Weisshaar and David K. Schmidt 31 Oct. 1981 39 p refs
(Grant NAG1-157)
(NASA-CR-165036) Avail: NTIS HC A03/MF A01 CSCL 01C

Several examples are presented in which flutter involving interaction between flight mechanics modes and elastic wind bending occurs for a forward swept wing flight vehicle. These results show the basic mechanism by which the instability occurs and form the basis for attempts to actively control such a vehicle. A.R.H.

N82-13186*# San Jose State Univ., Calif.
DEVELOPMENT AND TESTING OF DRY CHEMICALS IN ADVANCED EXTINGUISHING SYSTEMS FOR JET ENGINE NACELLE FIRES Final Report
Robert L. Altman, A. Campbell Ling, ed., Ludwig A. Mayer, and Donald J. Myronik Sep. 1979 314 p
(Grant NsG-2165)
(NASA-CR-165011) Avail: NTIS HC A14/MF A01 CSCL 21B

The effectiveness of dry chemical in extinguishing and delaying reignition of fires resulting from hydrocarbon fuel leaking onto heated surfaces such as can occur in jet engine nacelles is studied. The commercial fire extinguishant dry chemical tried are sodium and potassium bicarbonate, carbonate, chloride, carbamate (Monnex), metal halogen, and metal hydroxycarbonate compounds. Synthetic and preparative procedures for new materials developed, a new concept of fire control by dry chemical agents, descriptions of experiment assemblages to test dry chemical fire extinguishant efficiencies in controlling fuel fires initiated by hot surfaces, comparative testing data for more than 25 chemical systems in a 'static' assemblage with no air flow across the heated surface, and similar comparative data for more than ten compounds in a dynamic system with air flows up to 350 ft/sec are presented. S.L.

N82-13442 Purdue Univ., Lafayette, Ind.
MEASURED PAVEMENT RESPONSE TO TRANSIENT AIRCRAFT LOADINGS Ph.D. Thesis
Thomas Dale White 1981 243 p
Avail: Univ. Microfilms Order No. 8123723

Pavement deformation response to aircraft traffic was studied. Linear variable differential transducers (LVDT's) were installed in an active taxiway. The LVDT's were attached to reference rods anchored at 16, 36, 120, and 209 in. Basic pavement responses, information on how pavement layers accommodate dynamic loads, as well as data to compare vertical deformations predicted by a theoretical model were examined. A finite difference solution was used to predict pavement temperatures. The solution is shown to have limited application for predicting pavement temperatures. The pavement response phenomena reported are significant. They expose pavement responses that have been minimized in past research but must now be considered. Current theoretical models used in pavement analysis or design are limited in predicting pavement response phenomena. They do not represent the observed compression and extension in a pavement under and away from actual aircraft loads. Dissert. Abstr.

N82-13457# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
STRUCTURAL DYNAMICS: MODIFIED CALCULATIONS
G. Hornung and H. Roehrle Bonn Bundesministerium der Verteidigung 1981 83 p refs In GERMAN; ENGLISH summary
Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-1) Avail: NTIS HC A05/MF A01; DOKZENTBw, Bonn DM 30

Calculation methods which give natural and harmonically excited vibrations of modified structures, using the results of the original systems, are presented and tested. Most of the methods are based on a linear approximation, i.e., the individual terms of the equations of motion are subdivided into those of the original system and into corresponding difference terms whose products are subsequently neglected. Tests are carried out for simple models as well as for three-dimensionally idealized wing and aircraft structures. Concerning natural vibrations, it is difficult to estimate the achieved accuracy without knowing the exact results. The applied methods are Wielandt iteration and subspace iteration. Using the original natural modes as starting vectors leads to a considerable reduction in computation cost, even with severe modifications. Application of the linear approximation is shown for the reduction of the number of degrees of freedom, which precedes dynamic analysis. Author (ESA)

N82-13813 Tennessee Univ., Knoxville.
PREDICTION OF AERODYNAMIC LOADS ON AIRCRAFTS WITH EXTERNAL STORES AT TRANSONIC SPEEDS Ph.D. Thesis
Chandrasekaran Balasubramanyan 1981 204 p
Avail: Univ. Microfilms Order No. 8123139

The integral equation method was applied to calculate the pressure distribution over an arbitrary, three dimensional lifting wing and a three dimensional wing with an external store, kept beneath the wing. A method to calculate the interference effects imposed by an external store on the wing and vice-versa is given. The wing along transonic solution is analyzed and compared with the experimental results and as well as a wing with an external store. A theory for the flow field nonlinear velocity prediction is developed, programmed, and applied to a wing with an external store configuration and the flow field velocities are compared with the experimental results. The numerical methods for solving the triple and double integrals with limits to infinity are studied and the application of one such method to the flow field prediction problem is briefly indicated. Further extension of this work is indicated with the limitations and advantages. Dissert. Abstr.

N82-13835# Rockwell International Corp., Columbus, Ohio. North American Aircraft Div.
INVESTIGATION OF ACOUSTIC INTERACTIONS IN JET THRUST AUGMENTING EJECTORS Final Report, 1 Jan. 1979 - 30 Sep. 1980
J. R. Campbell, K. D. Korkan (Ohio State Univ., Columbus), and H. Viets (Wright State Univ.) 5 Mar. 1981 244 p refs
(Contract N00019-79-C-0225)
(AD-A106083; NR80H-50) Avail: NTIS HC A11/MF A01 CSCL 20/1

The performance of a constant area rectangular ejector with varying mixing length was investigated to determine the aeroacoustic interaction effects. The rectangular ejector investigation was conducted in two phases. The phase one investigation involved the testing of three different aspect ratio rectangular convergent nozzles at pressures between 15-45 psig to determine the acoustic and jet spreading characteristics. From these data a rectangular ejector incorporating endwall and ejector flap blowing was fabricated and investigated at pressure ratios between 2.0 and 5.0. These investigations were conducted at ejector flap length (L) to ejector throat widths (W), L/W of 11.0, 9.5, 8.0, 6.5, 5.0, 3.5, 2.0, and 0.9 to determine the ejector performance. The data for the rectangular ejector configuration investigated showed an aeroacoustic interaction in the present ratio range of 3.3 - 3.8. However, the resulting performance was not improved to the degree experienced with axisymmetric ejectors. Author (GRA)

N82-13906*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF VACUUM EXHAUST PRESSURE ON THE PERFORMANCE OF MHD DUCTS AT HIGH B-FIELD
J. Marlin Smith, J. L. Morgan, and Shih-Ying Wang 1982 13 p refs Presented at the 20th Aerospace Sci. Meeting, Orlando, Fla., 11-14 Jan. 1982; sponsored by AIAA
(Contract DE-AI01-77ET-10769)
(NASA-TM-82750; DOE/NASA/10769-23; E-1066) Avail: NTIS HC A02/MF A01 CSCL 20I

The effect of area ratio variation on the performance of a supersonic Hall MHD duct is investigated. Results indicate that for a given combustion pressure there exists an area ratio below which the power generating region of the duct is shock free and the power output increases linearly with the square of the magnetic field. For area ratios greater than this, a shock forms in the power generating region which moves upstream with increasing magnetic field strength resulting in a less rapid raise in the power output. The shock can be moved downstream by either increasing the combustion pressure of decreasing the exhaust pressure. The influence of these effects upon duct performance is presented. B.W.

N82-13974# Naval Postgraduate School, Monterey, Calif.
COMPILATION OF ABSTRACTS OF DISSERTATIONS THESES, AND RESEARCH PAPERS SUBMITTED BY CANDIDATES FOR DEGREES, 1 OCTOBER 1979 - 30 SEPTEMBER 1980
Mar. 1981 514 p
(AD-A104124; NPS-012-81-002PR) Avail: NTIS HC A22/MF A01 CSCL 05/2

Abstracts are presented of works submitted in fulfillment of degree requirements in the area of aeronautical, electrical, and mechanical engineering as well as in applied mathematics, applied sciences, and computer sciences. Author

N82-13975# Naval Postgraduate School, Monterey, Calif.
A SUMMARY OF THE NAVAL POSTGRADUATE SCHOOL RESEARCH PROGRAM **Summary Report, 1 Oct. 1979 - 30 Sep. 1980**
Apr. 1981 528 p
(AD-A104112; NPS-012-81-003PR) Avail: NTIS
HC A23/MF A01 CSCL 05/2

Two hundred thirty research projects are summarized in the following areas: computer science; mathematics; administrative sciences; defense resources management; operations research; national security affairs; physics and chemistry; electrical engineering; meteorology; aeronautics; oceanography; and mechanical engineering. Author

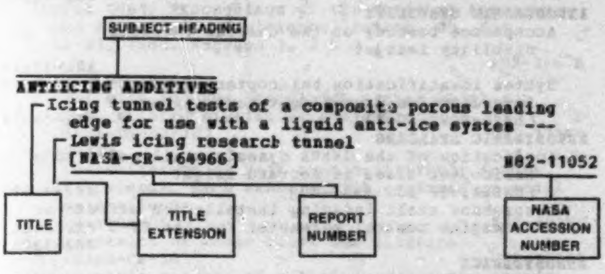
N82-13979# RAND Corp., Santa Monica, Calif.
A NEW APPROACH TO MODELING THE COST OF OWNERSHIP FOR AIRCRAFT SYSTEMS **Interim Report**
K. E. Marks, H. G. Massey, B. D. Bradley, and J. Lu Aug. 1981 151 p refs
(Contract F49620-77-C-0023)
(AD-A104434; RAND/R-2601-AF) Avail: NTIS
HC A08/MF A01 CSCL 05/1

Support investment costs and recurring operations and support costs are through determined using a model for estimating aircraft cost of ownership (MACO), which also provides a framework for future research. An outgrowth of an earlier evaluation of the strengths and weaknesses of the most widely used aircraft life cycle cost models, MACO combines algorithms for major, maintenance related costs with formulas drawn from existing models for other cost elements. A full set of ownership cost elements is related to component level reliability and maintainability characteristics and to aircraft design, operations, logistics, and deployment parameters. Resource quantities are computed in units that can be related directly to Air Force programming categories, including base maintenance manning (by work center), depot manning, and recoverable spares inventory levels. Output and input parameters accommodate annual changes in system parameters and operating conditions such as component reliability and aircraft inventory size and activity rates. Author

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 146)* **MARCH 1982**

Typical Subject Index Listing


SUBJECT HEADING
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966]
N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-7 AIRCRAFT
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft
A82-14828
Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps
A82-14933
A-10 AIRCRAFT
Performance assessment of the ACES-II ejection seat-A-10 configuration
A82-14980
ABSORBERS (EQUIPMENT)
Raven aircraft filter-absorber --- agricultural aircraft
[AD-A098962] N82-13139
ABSORBERS (MATERIALS)
Aircraft absorbers - Promise and practice --- sound attenuation
A82-14042
AC GENERATORS
Digital simulation of aircraft electrical generating system by means of Sceptre program
A82-14820
ACCELEROMETERS
A concept for a high-accuracy, low-cost accelerometer
A82-14685
ACCIDENT PREVENTION
A matter of seconds - A critical account of three notable air disasters /5th Major Miller Memorial Lecture/
A82-15597
An analysis of civil aviation propeller-to-person accidents: 1965-1979
[AD-A105365] N82-12053
ACOUSTIC ATTENUATION
Aircraft absorbers - Promise and practice --- sound attenuation
A82-14042
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043
ACOUSTIC DUCTS
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043
ACOUSTIC IMPEDANCE
Aircraft absorbers - Promise and practice --- sound attenuation
A82-14042
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043
ACTIVE CONTROL
Fault isolation methodology for the L-1011 digital avionic flight control system
[AIAA 81-2223] A82-13458
On-board communication for active-control transport aircraft
[AIAA 81-2321] A82-13520
Maneuver load control for the reduction of design loads and improvement of the maneuverability of modern fighter aircraft
[BMVG-FBWT-81-2] N82-13138
Design for active and passive flutter suppression and gust alleviation
[NASA-CR-3482] N82-13147
Interactive aircraft flight control and aeroelastic stabilization --- forward swept wing flight vehicles
[NASA-CR-165036] N82-13150
ACTUATORS
A dual input actuator for fluidic backup flight control
A82-13068
Direct digital drive actuation
[AIAA 81-2298] A82-13505
Electromechanical actuation development program
A82-14705
New all-electric-system technology --- electromechanical actuators for aircraft
A82-14710
ADAPTIVE CONTROL
Wing/store flutter - An active adaptive control application
A82-13122
ADAPTIVE FILTERS
Fixed gain controller design for aircraft
[AD-A104877] N82-12081
ADDITIVES
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178
ADVANCED TECHNOLOGY LABORATORY
A unique integrated flight testing facility for advanced control/display research
[AIAA PAPER 81-2490] A82-13919
AERIAL PHOTOGRAPHY
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model
A82-14779
Current aerial cameras
A82-15655
A VHF homing system with VHF radiotelephony for area-representative strip-survey flights conducted, as part of combined forest inventories, with light aircraft carrying 70 mm and 35 mm cameras
A82-15748
AERODYNAMIC BALANCE
Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft
[AIAA 81-2238] A82-13466
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090

AERODYNAMIC CHARACTERISTICS
  Divergence of a sweptforward wing
    A82-13560
  HiMAT aerodynamic design and flight test experience
    [AIAA PAPER 81-2433] A82-13871
  The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
    A82-13971
  AD-1 oblique wing aircraft program
    [AIAA PAPER 81-2354] A82-14390
  Aeroelasticity matters: Some reflections on two decades of testing in the NASA Langley transonic dynamics tunnel
    [NASA-TM-83210] N82-12041
  Effects of aerodynamic coupling on the dynamics of roll aircraft
    N82-12070
  Aerodynamics of Power Plant Installation
    [AGARD-CP-301] N82-13065
  Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds
    N82-13068
  Subsonic military aircraft engine intake: An integrated theoretical experiment design
    N82-13073
  The design and development of the Tornado engine air intake
    N82-13074
  Integration of advanced exhaust nozzles
    N82-13075
  Prop-fan integration at cruise speeds
    N82-13097
  Force and moment, flow-visualization, and boundary-layer tests on a shuttle orbiter model at Mach 6
    [NASA-TP-1952] N82-13106
  An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
    [NAL-TR-321T] N82-13109
AERODYNAMIC COEFFICIENTS
  Analysis of escape systems at 687 KEAS
    A82-14978
AERODYNAMIC CONFIGURATIONS
  Analysis of escape systems at 687 KEAS
    A82-14978
  Subcritical and supercritical airfoils for given pressure distribution
    N82-12031
AERODYNAMIC DRAG
  A technique to determine lift and drag polars in flight and their application
    [AIAA PAPER 81-2420] A82-13859
  A review of flight-to-wind tunnel drag correlation
    [AIAA PAPER 81-2475] A82-14382
  Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
    N82-13088
  Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
    N82-13089
  Prop-fan integration at cruise speeds
    N82-13097
AERODYNAMIC FORCES
  An investigation of F-16 nozzle-afterbody forces at transonic Mach numbers with emphasis on model scale effects
    [AD-A104905] N82-12392
AERODYNAMIC INTERFERENCE
  Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects
    N82-13098
AERODYNAMIC LOADS
  Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes
    A82-13120
  Improved techniques for the calibration and measurement of in-flight loads
    [AIAA PAPER 81-2502] A82-13924
  Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications
    A82-14407
  Maneuver load control for the reduction of design loads and improvement of the maneuverability of modern fighter aircraft
    [BMVG-FBWT-81-2] N82-13138
  Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds
    N82-13813
AERODYNAMIC STABILITY
  Acceptance testing of the Calspan variable stability Learjet
    A82-14937
  System identification helicopter parameters. Determination from flight tests, phase 2
    [BMVG-FBWT-80-12] N82-13137
AERODYNAMIC STALLING
  Application of the ONERA dynamic stall model to a helicopter blade in forward flight
    [ONERA, TP NO. 1981-89] A82-13992
  Compressor stall inducing installation effects of an engine control parameter for the CF-5 aircraft
    N82-13085
AERODYNAMICS
  Rapid elliptic solvers
    A82-15827
  Remarks on the calculation of transonic potential flow by a finite volume method
    A82-15835
  Effect of a part span variable inlet guide vane on TF34 fan performance
    [NASA-CR-165458] N82-12075
  A look inside the Langley 16-foot transonic tunnel: User's guide
    [NASA-TM-83186] N82-12085
  Research and Technology
    [NASA-TM-83221] N82-13043
  Prediction of subsonic aircraft flows with jet exhaust interactions
    N82-13096
AEROELASTICITY
  Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel
    A82-13969
  Application of the ONERA dynamic stall model to a helicopter blade in forward flight
    [ONERA, TP NO. 1981-89] A82-13992
  In-flight deflection measurement of the HiMAT aeroelastically tailored wing
    [AIAA PAPER 81-2450] A82-14381
  Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft
    [AIAA PAPER 81-2387] A82-14393
  Aeroelasticity matters: Some reflections on two decades of testing in the NASA Langley transonic dynamics tunnel
    [NASA-TM-83210] N82-12041
  Design for active and passive flutter suppression and gust alleviation
    [NASA-CR-3482] N82-13147
  Interactive aircraft flight control and aeroelastic stabilization --- forward swept wing flight vehicles
    [NASA-CR-165036] N82-13150
AERONAUTICAL ENGINEERING
  Aeronautics in China - An AIAA report --- Book
    A82-13150
  Progress in aeronautical research and technology applicable to civil air transports
    A82-13974
  Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977
    [AD-A104759] N82-12056
  Research and Technology
    [NASA-TM-83221] N82-13043
  NASA research in aircraft propulsion
    [NASA-TM-82771] N82-13146
  Compilation of abstracts of dissertations theses, and research papers submitted by candidates for degrees, 1 October 1979 - 30 September 1980
    [AD-A104124] N82-13974
AERONAUTICS
  Aeronautics in China - An AIAA report --- Book
    A82-13150

The payoff from U.S. investment in aeronautical research and development
A82-14793
A summary of the Naval Postgraduate School Research Program
[AD-A104112] N82-13975

AEROSOLS
Raven aircraft filter-absorber --- agricultural aircraft
[AD-A098962] N82-13139

AEROSPACE SYSTEMS
NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volumes 1, 2 & 3
A82-14676

AEROTHERMODYNAMICS
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[NASA-TM-82770] N82-13144

AFTERBODIES
An investigation of F-16 nozzle-afterbody forces at transonic Mach numbers with emphasis on model scale effects
[AD-A104905] N82-12392
Aerodynamics of Power Plant Installation
[AGARD-CP-301] N82-13065
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093

AGRICULTURAL AIRCRAFT
Raven aircraft filter-absorber --- agricultural aircraft
[AD-A098962] N82-13139

AH-64 HELICOPTER
The TADS/PNVS 'eyes' for the AH-64 attack helicopter
A82-13239

AILERONS
Trim tab excitation system for the BAe 146
A82-14363
Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration
[NASA-TM-81972] N82-13148

AIR COOLING
The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine
A82-14414
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109

AIR CUSHION LANDING SYSTEMS
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

AIR FILTERS
Raven aircraft filter-absorber --- agricultural aircraft
[AD-A098962] N82-13139

AIR FLOW
Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors
A82-15606
A vapour cycle cabin cooling system for the Sea King MK.50 helicopter
[AD-A105211] N82-12069

AIR INTAKES
Transonic flows in an air inlet with large incidence and the effect of a blowing trap
N82-13071
An acquisition and analysis system for dynamic tests of air inlets
N82-13082
Studies of air inlets at Reynolds numbers comparable to flight in CNERA's F1 and S1MA wind tunnels
N82-13091
Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects
N82-13098

AIR NAVIGATION
Fuel efficient flight profiles in an ATC flow management environment
A82-13070
An update of an integrated CNI system - TIES --- Communication, Navigation, and Identification provided by Tactical Information Exchange System
[AIAA 81-2292] A82-13500
Time-referencing of data in an asynchronous environment --- for fighter aircraft avionics
[AIAA 81-2341] A82-13531
A Loran-C prototype navigation receiver for general aviation
[AIAA 81-2329] A82-13532
Estimation of the efficiency of radioelectronic flight navigation systems
A82-13701
Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/
[AIAA PAPER 81-2514] A82-13911
Navstar Global Positioning System flight test program overview
[AIAA PAPER 81-2350] A82-13956
Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor --- Electronically Agile Radar/Gimbaled Electrically suspended gyro Airborne Navigation System
A82-14739
The agile transversal filter - A flexible building block for ICNIA --- Integrated Communications, Navigation and Identification Avionics
A82-14765
Application of multiple model estimation techniques to a recursive terrain height correlation system
A82-14768
Technical/operational ATC scenarios for future TMA navigation
A82-14774
The LANTIRN wide field-of-view raster Head-Up Display --- Low Altitude Navigation and Targeting IR for Night
A82-14825

AIR TO AIR MISSILES
Integrated Flight/Weapon Control design and evaluation
A82-14741

AIR TO AIR REFUELING
KC-10, flight test program management - The contractor's viewpoint
[AIAA PAPER 81-2380] A82-14384

AIR TO SURFACE MISSILES
Integrated Flight/Weapon Control design and evaluation
A82-14741

AIR TRAFFIC CONTROL
Fuel efficient flight profiles in an ATC flow management environment
A82-13070
Technical/operational ATC scenarios for future TMA navigation
A82-14774
Some Italian research for developing new primary ATC radars
A82-14775
Performance evaluation of target report extractor in the monopulse ATCRBS --- Air Traffic Control Radar Beacon System
A82-14776
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777
A new approach to radar plot extraction for ATC applications
A82-14908
Extended time radar raw video recording
A82-14909
Large terminal maneuvering areas: Operational problems - Possible development of solutions
A82-15625
Computer-animated predictive displays for microwave landing approaches
A82-15816
Orienting description of air traffic control in the Netherlands
[VTH-LR-285] N82-12063
Moving target Detector/Airport Surveillance radar (ASR-7) field evaluation
[AD-A105196] N82-12303

AIR TRANSPORTATION
Transportation systems evaluation methodology development and applications, phase 3 [NASA-CR-164999] N82-12051

AIRBORNE EQUIPMENT
On-board communication for active-control transport aircraft [AIAA 81-2321] A82-13520
Detection range analysis of an airborne medium PRF radar A82-14723
Airborne Electronic Terrain Map System A82-14771
Airborne Electronic Terrain Map System. II - Applications A82-14773
Commercial airborne weather radar technology A82-14868
High voltage/high power for airborne applications A82-15918

AIRBORNE SURVEILLANCE RADAR
Air-to-ground MTI radar using a displaced phase center, phased array A82-14881

AIRBORNE/SPACEBORNE COMPUTERS
Fuel efficient flight profiles in an ATC flow management environment A82-13078
Integrated avionics - Concepts and concerns [AIAA 81-2211] A82-13452
F/A-18A weapon system - 1976 state of the art [AIAA 81-2215] A82-13453
Digital avionics - What a pilot expects to see [AIAA 81-2217] A82-13455
Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond [AIAA 81-2218] A82-13456
The role of avionics in the all electric airplane [AIAA 81-2219] A82-13457
Computer-in-control selection logic for a triplex digital flight control system [AIAA 81-2236] A82-13465
Design and analysis of a digitally controlled integrated flight/fire control system [AIAA 81-2245] A82-13470
Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing [AIAA 81-2247] A82-13471
LHX - An advanced avionics system design [AIAA 81-2249] A82-13472
The SIFT computer and its development --- Software Implemented Fault Tolerance for aircraft control [AIAA 81-2278] A82-13490
The electronic terrain map - A new avionics integrator [AIAA 81-2289] A82-13498
An update of an integrated CNI system - TIES --- Communication, Navigation, and Identification provided by Tactical Information Exchange System [AIAA 81-2292] A82-13500
Digital avionics display processor [AIAA 81-2311] A82-13513
Advanced display systems for crew stations of tactical aircraft [AIAA 81-2312] A82-13514
An advanced programmable/reconfigurable color graphics display system for crew station technology research [AIAA 81-2314] A82-13516
Higher order Information Transfer Systems are coming [AIAA 81-2317] A82-13517
Advanced weapon systems - Integration technology --- Digital Avionic Information System [AIAA 81-2213] A82-13533
Flight experience with a remotely augmented vehicle flight test technique [AIAA PAPER 81-2417] A82-13857
The need for, and development of, a simulation facility at the Naval Air Test Center [AIAA PAPER 81-2488] A82-13917
The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane [AIAA PAPER 81-2467] A82-13931
The development and use of a computer-interactive data acquisition and display system in a flight environment [AIAA PAPER 81-2371] A82-13946
Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis [AIAA PAPER 81-2367] A82-13949
NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volumes 1, 2 & 3 A82-14676
Computational considerations for fusion in target identification systems --- multisensor correlation A82-14735
Software considerations in the design of computer generated flight displays A82-14742
The influence of smart computers on the cockpit of the future A82-14743
Algorithms for an adaptive dynamic window in electronic map systems A82-14769
Airborne Electronic Map Systems. I - Design A82-14770
Flight management systems for modern jet aircraft A82-14778
Design of direct digital flight-mode control systems for high-performance aircraft A82-14829

AIRCRAFT
Computer-animated predictive displays for microwave landing approaches A82-15816
The impact of new guidance and control systems on military aircraft cockpit design [AGARD-CP-312] N82-13048
Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds N82-13813

AIRCRAFT ACCIDENT INVESTIGATION
Extended time radar raw video recording A82-14909
A matter of seconds - A critical account of three notable air disasters /5th Major Miller Memorial Lecture/ A82-15597
Investigation of severe lightning strike incidents to two USAF F-106A aircraft [NASA-CR-165794] N82-12052
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations [AD-A104922] N82-12055

AIRCRAFT ACCIDENTS
HASEP - Survival from crashed Navy helicopters A82-14977
Post ejection survival A82-14981
A matter of seconds - A critical account of three notable air disasters /5th Major Miller Memorial Lecture/ A82-15597

AIRCRAFT ANTENNAS
Study of the effects of maneuver compensation on beam pointing accuracy A82-14780

AIRCRAFT APPROACH SPACING
Aircraft separation assurance avionics [AIAA 81-2239] A82-13467
Large terminal maneuvering areas: Operational problems - Possible development of solutions A82-15625

AIRCRAFT CARRIERS
Commentary on facilities used in the development of a Sea Harrier all weather operations capability [AIAA PAPER 81-2407] A82-13892
The Navy F/A-18A Hornet electromagnetic compatibility program A82-14760

AIRCRAFT COMMUNICATION
ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners [AIAA 81-2267] A82-13485
An update of an integrated CNI system - TIES --- Communication, Navigation, and Identification provided by Tactical Information Exchange System [AIAA 81-2292] A82-13500
On-board communication for active-control transport aircraft [AIAA 81-2321] A82-13520
Future directions in CNI integrated avionics A82-14720

The agile transversal filter - A flexible building block for ICNIA --- Integrated Communications, Navigation and Identification Avionics
A82-14765

AIRCRAFT COMPARTMENTS
A vapour cycle cabin cooling system for the Sea King MK.50 helicopter
[AD-A105211] N82-12069

AIRCRAFT CONFIGURATIONS
The Agusta A129
A82-13237
The F-16/79 test program
[AIAA PAPER 81-2414] A82-13855
Navy performance modeling techniques
[AIAA PAPER 81-2431] A82-13869
The Cessna T303 Crusader
[AIAA PAPER 81-2440] A82-13876
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090
NASA research in aircraft propulsion
[NASA-TM-82771] N82-13146

AIRCRAFT CONSTRUCTION MATERIALS
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043

AIRCRAFT CONTROL
Darboux points in minimum-fuel aircraft landing problems
A82-13077
Digital redesign of existing multiloop continuous control systems --- with application to YF-16 aircraft flight controller
A82-13093
Digital control for flexible aircraft using reduced order models
A82-13094
Comparison between the exact and an approximate feedback solution for medium range interception problems
A82-13106
Integrated avionics - Concepts and concerns
[AIAA 81-2211] A82-13452
The interface of multifunction controls and displays to tomorrow's avionics
[AIAA 81-2290] A82-13499
Advanced display systems for crew stations of tactical aircraft
[AIAA 81-2312] A82-13514
Computergraphics for aircraft control
[AIAA 81-2313] A82-13515
Design and flight test of a lateral-directional command augmentation system
[AIAA 81-2331] A82-13527
Flight experience with a remotely augmented vehicle flight test technique
[AIAA PAPER 81-2417] A82-13857
Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906
A unique integrated flight testing facility for advanced control/display research
[AIAA PAPER 81-2490] A82-13919
62% manned aircraft demonstrator - Next generation trainer --- cost effective pilot trainer
[AIAA PAPER 81-2519] A82-14385
Electromechanical actuation development program
A82-14705
Will power-by-wire replace power-by-hydraulics
A82-14707
The all electric airplane - Its development and logistic support
A82-14709
Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling
A82-14826
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft
A82-14828
Design of direct digital flight-mode control systems for high-performance aircraft
A82-14829
Ball-Bartoe Jetwing flight tests
A82-14928
Reliability analysis of the F-8 digital fly-by-wire system
[NASA-CR-163110] N82-12079
Fixed gain controller design for aircraft
[AD-A104877] N82-12081
A standard control display unit for multi-aircraft application
N82-13054

AIRCRAFT DESIGN
The application of large screen CRT's, touch panels, and voice to the flight stations of the 1990's
[AIAA 81-2263] A82-13482
Light-guided information distribution systems
[AIAA 81-2320] A82-13519
Thunderstorm hazards flight research - Program overview
[AIAA PAPER 81-2412] A82-13853
HiMAT aerodynamic design and flight test experience
[AIAA PAPER 81-2433] A82-13871
The Cessna T303 Crusader
[AIAA PAPER 81-2440] A82-13876
Fleet Flight Loads Survey monitoring and analysis techniques
[AIAA PAPER 81-2461] A82-13903
Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA --- Quiet Short-haul Research Aircraft
[AIAA PAPER 81-2480] A82-13938
Flight test concept evolation
[AIAA PAPER 81-2375] A82-13944
Trim tab excitation system for the BAe 146
A82-14363
62% manned aircraft demonstrator - Next generation trainer --- cost effective pilot trainer
[AIAA PAPER 81-2519] A82-14385
Hover tests of the XV-15 Tilt Rotor Research Aircraft
[AIAA PAPER 81-2501] A82-14386
The use of frequency methods in rotorcraft system identification
[AIAA PAPER 81-2386] A82-14392
Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications
A82-14407
Wing design for light transport aircraft with improved fuel economy
A82-14416
New all-electric-system technology --- electromechanical actuators for aircraft
A82-14710
The influence of smart computers on the cockpit of the future
A82-14743
The all composite Lear Fan 2100
A82-14936
Emergency in-flight egress for general aviation aircraft
A82-14953
A new safety harness for mobile aircrew
A82-14963
Crashworthy military passenger seat development
A82-14976
Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977
[AD-A104759] N82-12056
Computational methods of robust controller design for aerodynamic flutter suppression
[NASA-CR-164983] N82-12080
Research and Technology
[NASA-TM-83221] N82-13043
The impact of new guidance and control systems on military aircraft cockpit design
[AGARD-CP-312] N82-13048
Aerodynamics of Power Plant Installation
[AGARD-CP-301] N82-13065
The design and development of the Tornado engine air intake
N82-13074
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090

AIRCRAFT DETECTION
Inverse SAR and its application to aircraft classification
A82-14871

AIRCRAFT ENGINES
Creep and aero gas turbine design
A82-12987

Direct digital drive actuation
[AIAA 81-2298] A82-13505
Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2438] A82-13874
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13878
Aircraft absorbers - Promise and practice --- sound attenuation
A82-14042
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043
Conceptual design of an integrated power and avionics information system
A82-14788
60 kVA ADP permanent magnet VSCF starter generator system - A program overview --- Variable Speed Constant Frequency
A82-14789
High speed PMG containment study for VSCF system --- Permanent Magnet Generator for Variable Speed Constant Frequency applications
A82-14791
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482
The use of metal finishing in aircraft fuel systems
N82-12077
Aerodynamics of Power Plant Installation
[AGARD-CP-301] N82-13065
Integration of advanced exhaust nozzles
N82-13075
An acquisition and analysis system for dynamic tests of air inlets
N82-13082
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
N82-13088
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
N82-13089
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090
Thrust modulation methods for a subsonic V/STOL aircraft
[NASA-TM-82747] N82-13112
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[NASA-TM-82770] N82-13144
Sensor failure detection system --- for the F100 turbofan engine
[NASA-CR-165515] N82-13145

AIRCRAFT EQUIPMENT
The Agusta A129
A82-13237
The development and use of a computer-interactive data acquisition and display system in a flight environment
[AIAA PAPER 81-2371] A82-13946
Fighters - Improving the breed
A82-14354
Pave Mover Flight Test Program
[AIAA PAPER 81-2492] A82-14380
The all electric airplane - Its development and logistic support
A82-14709
New all-electric-system technology --- electromechanical actuators for aircraft
A82-14710
A modular multiplexed digital voice intercommunications system
A82-14721
Computer modeling of an aircraft HVDC electrical system
A82-14819
Digital simulation of aircraft electrical generating system by means of Sceptre program
A82-14820
Computer simulation of an advanced aircraft electrical system
A82-14821
Portable air driven variable speed fiber optic cable termination polisher
[AD-A104797] N82-12448
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140

AIRCRAFT FUEL SYSTEMS
The use of metal finishing in aircraft fuel systems
N82-12077

AIRCRAFT FUELS
Darboux points in minimum-fuel aircraft landing problems
A82-13077
Quality optimization and unification of aviation gasolines
A82-15721

AIRCRAFT GUIDANCE
Fuel efficient flight profiles in an ATC flow management environment
A82-13078
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525
Commentary on facilities used in the development of a Sea Harrier all weather operations capability
[AIAA PAPER 81-2407] A82-13892
Development of an MLS lateral autoland system with automatic path definition
[AIAA PAPER 81-1751] A82-13993

AIRCRAFT HAZARDS
Wire strike protection
A82-13246
Assessment methodology of the lightning threat to advanced aircraft
A82-14759
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80
A82-14954
A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records
A82-15468
Investigation of severe lightning strike incidents to two USAF F-106A aircraft
[NASA-CR-165794] N82-12052

AIRCRAFT HYDRAULIC SYSTEMS
Will power-by-wire replace power-by-hydraulics
A82-14707
Efficient use of working fluids in aviation hydraulic systems
A82-15724

AIRCRAFT INDUSTRY
Advantages and limitations of various materials used in the construction of modules --- aircraft construction
[SNIAS-812-551-103] N82-12072

AIRCRAFT INSTRUMENTS
Options for GTE precision automated tracking system --- airborne laser tracking system
A82-13020
Helicopter IFR - Past, present and future and future
A82-13245
Electronic flight deck displays for transport aircraft
[AIAA 81-2264] A82-13483
Redundancy management of skewed and dispersed inertial sensors
[AIAA 81-2296] A82-13503
Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft
[AIAA 81-2297] A82-13504
Flat panel developments for future military aircraft
[AIAA 81-2302] A82-13507
An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display
[AIAA 81-2303] A82-13508
Digital avionics display processor
[AIAA 81-2311] A82-13513
A Loran-C prototype navigation receiver for general aviation
[AIAA 81-2329] A82-13532
Georgia Tech coherent jammer flight test
[AIAA PAPER 81-2452] A82-13898

Collection and simulation of spatial infrared signatures of military jet aircraft [AIAA PAPER 81-2494] A82-13921
The Advanced Range Instrumentation Aircraft improvement and modernization program [AIAA PAPER 81-2368] A82-13948
Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis [AIAA PAPER 81-2367] A82-13949
Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977 [AD-A104759] N82-12056
Electronic Master Monitor and Advisory Display System (EMMADS) [AD-A105082] N82-12067

AIRCRAFT LANDING
Darboux points in minimum-fuel aircraft landing problems A82-13077
Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing [AIAA 81-2247] A82-13471
Applications of head-up displays in commercial transport aircraft [AIAA 81-2300] A82-13506
Digital signal processing on a background of rereflections for the international aircraft landing system A82-13703
Comparison of low-speed handling qualities in ground-based and in-flight simulator tests [AIAA PAPER 81-2478] A82-13936
AN/TPN-25 and AN/GPN-22 precision approach radars A82-14856
Flight investigations of integrated descent rate control systems A82-14929
The use of groundspeed, in a wind shear and the flight evaluation of a radar-altimeter-based system for the measurement of groundspeed [AD-A104758] N82-12060
The effect of visual information on manual approach and landing [NLR-MP-80019-U] N82-12064
Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration [NASA-TM-81972] N82-13148

AIRCRAFT MAINTENANCE
Fault isolation methodology for the L-1011 digital avionic flight control system [AIAA 81-2223] A82-13458

AIRCRAFT MANEUVERS
Performance estimation from non-steady manoeuvres [AIAA PAPER 81-2424] A82-13863
HiMAT aerodynamic design and flight test experience [AIAA PAPER 81-2433] A82-13871
Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers [AIAA PAPER 81-2510] A82-13908
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology A82-13971
Technical/operational ATC scenarios for future TMA navigation A82-14774
Study of the effects of maneuver compensation on beam pointing accuracy A82-14780
The Maneuvering Flight Path Display - A flight trajectory solution display concept A82-14824
Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps A82-14933
Large terminal maneuvering areas: Operational problems - Possible development of solutions A82-15625

AIRCRAFT MODELS
Modeling procedures for handling qualities evaluation of flexible aircraft A82-13968
Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel A82-13969
Jet V/STOL wind-tunnel simulation and groundplane effects A82-13973
The use of frequency methods in rotorcraft system identification [AIAA PAPER 81-2386] A82-14392
Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications A82-14407
A recursive time domain analysis of distributed line grid networks with application to the LTA/EMP problem --- Lightning Threat Analysis A82-14761
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment N82-13088
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators N82-13089

AIRCRAFT NOISE
The FAA's proposed helicopter certification rules A82-13242
Costs of noise nuisance from aircraft A82-13314
Aircraft absorbers - Promise and practice --- sound attenuation A82-14042
An advanced facility for processing aircraft dynamic test data [AIAA PAPER 81-2398] A82-14377
Research and Technology [NASA-TM-83221] N82-13043

AIRCRAFT PARTS
In-flight computation of helicopter transmission fatigue life expenditure [AIAA PAPER 81-2434] A82-13872

AIRCRAFT PERFORMANCE
Air-to-air combat analysis - Review of differential-gaming approaches A82-13115
On matching the systems identification technique to the particular application --- in evaluating flight test data A82-13119
An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes [AIAA 81-2330] A82-13526
Real-time flight management avionics software system [AIAA 81-2340] A82-13530
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/ [AIAA PAPER 81-2409] A82-13852
The F-16/79 test program [AIAA PAPER 81-2414] A82-13855
A technique to determine lift and drag polars in flight and their application [AIAA PAPER 81-2420] A82-13859
Performance estimation from non-steady manoeuvres [AIAA PAPER 81-2424] A82-13863
Navy performance modeling techniques [AIAA PAPER 81-2431] A82-13869
The Cessna T303 Crusader [AIAA PAPER 81-2440] A82-13876
Information technology and its impact on test and evaluation at the Naval Air Test Center [AIAA PAPER 81-2396] A82-13894
The Air Force Flight Test Center - Utah Test and Training Range in the 1980's [AIAA PAPER 81-2487] A82-13916
Fighters - Improving the breed A82-14354
A review of flight-to-wind tunnel drag correlation [AIAA PAPER 81-2475] A82-14382
62% manned aircraft demonstrator - Next generation trainer --- cost effective pilot trainer [AIAA PAPER 81-2519] A82-14385
AD-1 oblique wing aircraft program [AIAA PAPER 81-2354] A82-14390
Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications A82-14407

Design of direct digital flight-mode control systems for high-performance aircraft A82-14829
The X-14 - 24 years of V/STOL flight testing A82-14927
Ball-Bartoe Jetwing flight tests A82-14928
F/A-18A high angle of attack/spin testing A82-14934
KC-10 flight test program A82-14935
The all composite Lear Fan 2100 A82-14936
F/A-18 roll rate improvement program A82-14939
AV-8B technical update - Leading edge root extension development A82-14940
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80 A82-14954
Airplane performance sensitivities to lateral and vertical profiles A82-15846
Experimental and analytical studies of advanced air cushion landing systems [NASA-CR-3476] N82-12065

AIRCRAFT PILOTS
F/A-18 'Hornet' - One man operability [AIAA 81-2266] A82-13464
The integration of control and display concepts for improved pilot situational awareness A82-13972
Assessing pilot workload - Without disturbing pilot behavior A82-14745

AIRCRAFT PRODUCTION
Aeronautics in China - An AIAA report --- Book A82-13150
A system safety program for aircraft production and deployment A82-14983
The technology of sheet-metal stamping in the production of aircraft /2nd revised and enlarged edition/ --- Russian book A82-14998

AIRCRAFT RELIABILITY
Fault detection for two physically separated, communicating inertial measurement units A82-13142
Wire strike protection A82-13246
Government testing [AIAA PAPER 81-2443] A82-13877
Planning a helicopter flight test program [AIAA PAPER 81-2381] A82-13881
Operational evaluation of the new generation of jet transport aircraft [AIAA PAPER 81-2377] A82-13942
Progress report - CH-47 modernization program A82-14930
Helicopter reliability and maintainability trends during development and production [AD-A105775] N82-13136

AIRCRAFT SAFETY
Fatigue methodology - A technical management system for helicopter safety and durability A82-13240
Fiber-optic immunity to EMI/EMP for military aircraft [AIAA 81-2339] A82-13529
Safety of helicopters in flight --- Russian book A82-14946
U.S. Navy life support development trends A82-14952
A system safety program for aircraft production and deployment A82-14983
An analysis of civil aviation propeller-to-person accidents: 1965-1979 [AD-A105365] N82-12053
Computer Air Carrier Symposium [AD-A104894] N82-12054
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations [AD-A104922] N82-12055

AIRCRAFT STABILITY
Navigation for helicopters by multiple use of inertial sensors A82-14713
The use of observers on relaxed static stability aircraft A82-14740
F/A-18A high angle of attack/spin testing A82-14934
Acceptance testing of the Calspan variable stability Learjet A82-14937
AV-8B technical update - Leading edge root extension development A82-14940
Direct free-flight analysis of aircraft dynamics at high angles of attack A82-15596

AIRCRAFT STRUCTURES
Fatigue methodology - A technical management system for helicopter safety and durability A82-13240
Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center [AIAA PAPER 81-2405] A82-13891
Flight vibration optimization via conformal mapping A82-13975
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass [AIAA PAPER 81-2445] A82-14383
The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region A82-14418
Flight trail of the Aircraft Fatigue Data Analysis System (AFDAS) Mk 2 prototype [AD-A105270] N82-12066
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow N82-13095

AIRCRAFT SURVIVABILITY
Fighters - Improving the breed A82-14354

AIRCRAFT TIRES
Measured pavement response to transient aircraft loadings N82-13442

AIRCRAFT WAKES
Turbulent wake development behind streamlined bodies N82-13104

AIRFOIL PROFILES
Subcritical and supercritical airfoils for given pressure distribution N82-12031
German-Argentine experiment: Vertical-rotor wind engine N82-12648
Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor [NASA-TP-1926] N82-13107

AIRFOILS
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass [AIAA PAPER 81-2445] A82-14383
The numerical solution of incompressible turbulent flow over airfoils N82-12030

AIRFRAME MATERIALS
Advantages and limitations of various materials used in the construction of modules --- aircraft construction [SNIAS-812-551-103] N82-12072

AIRFRAMES
The Navy F/A-18A Hornet electromagnetic compatibility program A82-14760
The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft N82-13086
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators N82-13089

Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects N82-13098

AIRLINE OPERATIONS
Civil aviation in China A82-13600
The payoff from U.S. investment in aeronautical research and development A82-14793
Analysis of integrated fuel-efficient, low-noise procedures in terminal-area operations [DE81-029833] N82-13014

AIRPORT PLANNING
Analysis of integrated fuel-efficient, low-noise procedures in terminal-area operations [DE81-029833] N82-13014

AIRPORTS
Costs of noise nuisance from aircraft A82-13314
A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records A82-15468

AIRSPACE
Large terminal maneuvering areas: Operational problems - Possible development of solutions A82-15625

AIRSPEED
AFFTC standard airspeed calibration procedures [AD-A104830] N82-12074

ALGORITHMS
Development of an MLS lateral autoland system with automatic path definition [AIAA PAPER 81-1751] A82-13993

ALKALI HALIDES
Fire extinguishant materials [NASA-CASE-ARC-11252-1] N82-12168

ALKALI METALS
Fire extinguishant materials [NASA-CASE-ARC-11252-1] N82-12168

ALL-WEATHER AIR NAVIGATION
Commentary on facilities used in the development of a Sea Harrier all weather operations capability [AIAA PAPER 81-2407] A82-13892

ALUMINUM ALLOYS
The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region A82-14418

ALUMINUM COMPOUNDS
The protection of gas turbine blades - A platinum aluminide diffusion coating A82-14364
Fire extinguishant materials [NASA-CASE-ARC-11252-1] N82-12168

ANALOGIES
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow N82-13095

ANALYSIS (MATHEMATICS)
Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds N82-13813

ANGLE OF ATTACK
A large-scale investigation of engine influence on inlet performance at angle-of-attack [AIAA PAPER 81-2481] A82-13939
The USAF Test Pilot School high angle of attack and spin training program A82-14932
F/A-18A high angle of attack/spin testing A82-14934
Direct free-flight analysis of aircraft dynamics at high angles of attack A82-15596
Force and moment, flow-visualization, and boundary-layer tests on a shuttle orbiter model at Mach 6 [NASA-TP-1952] N82-13106
A calculation method for slender wing-body configurations in supersonic flow at high angles of attack --- nonlinear force and pitching moment characteristics [BMVG-FBWT-79-15] N82-13115

ANGULAR VELOCITY
F/A-18 roll rate improvement program A82-14939

ANTENNA ARRAYS
Study of the effects of maneuver compensation on beam pointing accuracy A82-14780

ANTIFRICTION BEARINGS
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils A82-15723

ANTISUBMARINE WARFARE
Light Airborne Multi-Purpose System A82-13244

APPROACH
The use of groundspeed, in a wind shear and the flight evaluation of a radar-altimeter-based system for the measurement of groundspeed [AD-A104758] N82-12060
The effect of visual information on manual approach and landing [NLR-MP-80019-U] N82-12064

APPROACH AND LANDING TESTS (STS)
Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle [NASA-TM-81366] N82-13149

APPROACH CONTROL
Comparison of low-speed handling qualities in ground-based and in-flight simulator tests [AIAA PAPER 81-2478] A82-13936
Development of an MLS lateral autoland system with automatic path definition [AIAA PAPER 81-1751] A82-13993

APPROACH INDICATORS
Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches A82-15847

APPROXIMATION
Structural dynamics: Modified calculations --- natural and harmonically excited vibrations of modified structures; increased computation efficiency [BMVG-FBWT-81-1] N82-13457

ARCHITECTURE (COMPUTERS)
An advanced programmable/reconfigurable color graphics display system for crew station technology research [AIAA 81-2314] A82-13516
Advanced weapon systems - Integration technology --- Digital Avionic Information System [AIAA 81-2213] A82-13533
Advanced integrated CNI architectures --- Communications, Navigation and Identification avionics for tactical aircraft and attack helicopter A82-14763

ARGENTINA
German-Argentine experiment: Vertical-rotor wind engine N82-12646

ATMOSPHERIC EFFECTS
Updated station deselection procedures to support automatic Omega receiver operation A82-14712

ATMOSPHERIC ELECTRICITY
Direct strike lightning measurement system --- for aircraft [AIAA PAPER 81-2513] A82-13910

ATMOSPHERIC PRESSURE
A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records A82-15468

ATMOSPHERIC SCATTERING
Commercial airborne weather radar technology A82-14668

ATTACK AIRCRAFT
Air-to-air combat analysis - Review of differential-gaming approaches A82-13115
The TADS/PNVS 'eyes' for the AH-64 attack helicopter A82-13239
Test and evaluation of improved aircrew restraint systems A82-14974
Using voice control onboard combat aircraft N82-13056

A new approach to modeling the cost of ownership for aircraft systems [AD-A104434] N82-13979

ATTITUDE STABILITY
- Selected stability and control derivatives from the first Space Shuttle entry [AIAA PAPER 81-2451] A82-13880

AUTOMATIC CONTROL
- Technical/operational ATC scenarios for future TMA navigation A82-14774
- Automatic parachute releasers for premeditated parachuting A82-14960
- Further test results of parachutes with automatic inflation modulation /A.I.M./ A82-14965
- Sensor failure detection system --- for the F100 turbofan engine [NASA-CR-165515] N82-13145

AUTOMATIC FLIGHT CONTROL
- Digital redesign of existing multiloop continuous control systems --- with application to YF-16 aircraft flight controller A82-13093
- Digital control for flexible aircraft using reduced order models A82-13094
- F/A-18A weapon system - 1976 state of the art [AIAA 81-2215] A82-13453
- Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft [AIAA 81-2238] A82-13466
- Have we overlooked the pilot's role in an automated flight deck [AIAA 81-2262] A82-13481
- Direct digital drive actuation [AIAA 81-2298] A82-13505
- Higher order Information Transfer Systems are coming [AIAA 81-2317] A82-13517
- Electromechanical actuation development program A82-14705
- Integrated Flight/Weapon Control design and evaluation A82-14741
- Parallel processing applied to digital flight control systems - Some perspectives A82-14794
- Microprocessor flight control application study A82-14796
- A synthesis technique for highly uncertain and interacting multivariable flight control systems A82-14827

AUTOMATIC GAIN CONTROL
- Automatic digital gain ranging --- for flight test telemetry data [AIAA PAPER 81-2370] A82-13947

AUTOMATIC LANDING CONTROL
- Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing [AIAA 81-2247] A82-13471
- Applications of head-up displays in commercial transport aircraft [AIAA 81-2300] A82-13506
- Development of an MLS lateral autoland system with automatic path definition [AIAA PAPER 81-1751] A82-13993
- AN/TPN-25 and AN/GPN-22 precision approach radars A82-14856
- Flight investigations of integrated descent rate control systems A82-14929

AUTOMATIC PILOTS
- The design of exact nonlinear model followers --- with application to trajectory autopilot for helicopter A82-13125

AUTOMATIC TEST EQUIPMENT
- Information technology and its impact on test and evaluation at the Naval Air Test Center [AIAA PAPER 81-2396] A82-13894
- Vibration test procedures for accessory angle drive gearboxes on Atar 09C engines --- turbojet engines [AD-A105269] N82-12076

AVIONICS
- Options for GTE precision automated tracking system --- airborne laser tracking system A82-13020
- The Agusta A129 A82-13237
- Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers A82-13451
- Integrated avionics - Concepts and concerns [AIAA 81-2211] A82-13452
- F/A-18A weapon system - 1976 state of the art [AIAA 81-2215] A82-13453
- Digital avionics - What a pilot expects to see [AIAA 81-2217] A82-13455
- Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond [AIAA 81-2218] A82-13456
- The role of avionics in the all electric airplane [AIAA 81-2219] A82-13457
- Fault isolation methodology for the L-1011 digital avionic flight control system [AIAA 81-2223] A82-13458
- Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators [AIAA 81-2230] A82-13463
- Aircraft separation assurance avionics [AIAA 81-2239] A82-13467
- Aircraft alerting systems standardization study [AIAA 81-2242] A82-13468
- LHX - An advanced avionics system design [AIAA 81-2249] A82-13472
- F/A-18 'Hornet' - One man operability [AIAA 81-2266] A82-13484
- ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners [AIAA 81-2267] A82-13485
- A polled contention multiplex system using MIL-STD-1553 protocol [AIAA 81-2271] A82-13487
- Avionics systems simulation for the Northrop F/A-18L aircraft [AIAA 81-2274] A82-13488
- The electronic terrain map - A new avionics integrator [AIAA 81-2289] A82-13498
- The interface of multifunction controls and displays to tomorrow's avionics [AIAA 81-2290] A82-13499
- Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft [AIAA 81-2297] A82-13504
- An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display [AIAA 81-2303] A82-13508
- Digital avionics display processor [AIAA 81-2311] A82-13513
- An advanced programmable/reconfigurable color graphics display system for crew station technology research [AIAA 81-2314] A82-13516
- Advanced fiber optic systems for avionics applications [AIAA 81-2319] A82-13518
- Light-guided information distribution systems [AIAA 81-2320] A82-13519
- On-board communication for active-control transport aircraft [AIAA 81-2321] A82-13520
- Real-time flight management avionics software system [AIAA 81-2340] A82-13530
- Time-referencing of data in an asynchronous environment --- for fighter aircraft avionics [AIAA 81-2341] A82-13531
- A Loran-C prototype navigation receiver for general aviation [AIAA 81-2329] A82-13532
- Advanced weapon systems - Integration technology --- Digital Avionic Information System [AIAA 81-2213] A82-13533
- Estimation of the efficiency of radioelectronic flight navigation systems A82-13701
- Georgia Tech coherent jammer flight test [AIAA PAPER 81-2452] A82-13898

F-4 Advanced Avionics Flight Test [AIAA PAPER 81-2464] A82-13929
The Advanced Range Instrumentation Aircraft improvement and modernization program [AIAA PAPER 81-2360] A82-13948
NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volumes 1, 2 & 3 A82-14676
Navigation for helicopters by multiple use of inertial sensors A82-14713
Future directions in CNI integrated avionics A82-14720
A modular multiplexed digital voice intercommunications system A82-14721
The influence of smart computers on the cockpit of the future A82-14743
Assessment methodology of the lightning threat to advanced aircraft A82-14759
New advances in signal processing technology for integrated CNI avionics --- Communication, Navigation, and Identification A82-14762
Advanced integrated CNI architectures --- Communications, Navigation and Identification avionics for tactical aircraft and attack helicopter A82-14763
The agile transversal filter - A flexible building block for ICNIA --- Integrated Communications, Navigation and Identification Avionics A82-14765
Applications of covariance analysis simulation to avionics flight testing A82-14767
Conceptual design of an integrated power and avionics information system A82-14788
Implementing the DAIS executive --- Digital Avionics Information System software feasibility for aircraft systems A82-14814
A storage device for subsystem maintenance information A82-14817
Air-to-ground MTI radar using a displaced phase center, phased array A82-14881
Portable air driven variable speed fiber optic cable termination polisher [AD-A104797] N82-12448
The impact of new guidance and control systems on military aircraft cockpit design [AGARD-CP-312] N82-13048
How the helicopter cockpit designer uses digital avionics N82-13049
Electronic flight deck displays for military transport aircraft N82-13050
Integration of controls and displays in US Army helicopter cockpits N82-13053
A standard control display unit for multi-aircraft application N82-13054
Tanker avionics and aircrew complement evaluation N82-13063
Techniques for interfacing multiplex systems [AD-A101457] N82-13135
Electronic master monitor and advisory display system test and demonstration report [AD-A105317] N82-13141
AXES OF ROTATION
German-Argentine experiment: Vertical-rotor wind engine N82-12648
AXIAL FLOW TURBINES
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine [NAL-TR-321T] N82-13109
AXISYMMETRIC FLOW
Investigation of acoustic interactions in jet thrust augmenting ejectors [AD-A106083] N82-13835

B

B-1 AIRCRAFT
Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft [AIAA PAPER 81-2387] A82-14393
B-52 AIRCRAFT
Applications of covariance analysis simulation to avionics flight testing A82-14767
BACKSCATTERING
Commercial airborne weather radar technology A82-14868
BALLISTICS
A ballistic design model for initiators for aircraft personnel escape systems A82-14984
BEACONS
Digital detection and processing of laser beacon signals for aircraft collision hazard warning [AIAA 81-2328] A82-13525
BIBLIOGRAPHIES
Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977 [AD-A104759] N82-12056
Compilation of abstracts of dissertations theses, and research papers submitted by candidates for degrees, 1 October 1979 - 30 September 1980 [AD-A104124] N82-13974
BLADE TIPS
Experimental and analytical studies of a model helicopter rotor in hover [NASA-TM-81232] N82-12042
Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor [NASA-TP-1926] N82-13107
BODY SIZE (BIOLOGY)
'Little people' problem /MA-2 torso harness/ A82-14958
BODY-WING CONFIGURATIONS
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing N82-13092
A calculation method for slender wing-body configurations in supersonic flow at high angles of attack --- nonlinear force and pitching moment characteristics [BMVG-FBWT-79-15] N82-13115
BOEING AIRCRAFT
Two at a time - Flight test plans for the new Boeing airliners [AIAA PAPER 81-2378] A82-13941
Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter A82-14975
BOEING 757 AIRCRAFT
ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners [AIAA 81-2267] A82-13485
BOEING 767 AIRCRAFT
ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners [AIAA 81-2267] A82-13485
BOUNDARY LAYER FLOW
Force and moment, flow-visualization, and boundary-layer tests on a shuttle orbiter model at Mach 6 [NASA-TP-1952] N82-13106
BRAKES (FOR ARRESTING MOTION)
Escape systems decelerator technology [AIAA PAPER 81-1913] A82-13966
BYPASS RATIO
The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft N82-13086
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody N82-13093

C

C-5 AIRCRAFT
C-5A unsurfaced taxi and off-load demonstrations [AIAA PAPER 81-2439] A82-13875

CALIBRATING
Rotor systems research aircraft /RSRA/ rotor force and moment measurement system [AIAA PAPER 81-2516] A82-13913
Improved techniques for the calibration and measurement of in-flight loads [AIAA PAPER 81-2502] A82-13924
AFFTC standard airspeed calibration procedures [AD-A104830] N82-12074
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment N82-13088
Practical aspects of instrumentation system installation, volume 13 [NASA-TM-84067] N82-13140

CAMERAS
Current aerial cameras A82-15655

CANOPIES
Further test results of parachutes with automatic inflation modulation /A.I.M./ A82-14965
A look at the Hoffman Triangular parachute - The first successful glidable parachute A82-14966

CARGO AIRCRAFT
KC-10 flight test program A82-14935

CARTRIDGES
Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation A82-14985

CASCADE CONTROL
Digital redesign of existing multiloop continuous control systems --- with application to YF-16 aircraft flight controller A82-13093

CATALYSTS
Development of catalytic systems for the conversion of syngas to jet fuel and diesel fuel and higher alcohols [DE82-000067] N82-12255

CATHODE RAY TUBES
The application of large screen CRT's, touch panels, and voice to the flight stations of the 1990's [AIAA 81-2263] A82-13482
Electronic flight deck displays for transport aircraft [AIAA 81-2264] A82-13483
Airborne color CRT displays A82-14823
Electronic flight deck displays for military transport aircraft N82-13050
Color CRT displays for the cockpit N82-13051

CENTRIFUGAL COMPRESSORS
CT7 - GE attacks commuter turboprop market A82-15950

CERTIFICATION
The FAA's proposed helicopter certification rules A82-13242
The F-16/79 test program [AIAA PAPER 81-2414] A82-13855
Simulator certification methods and the vertical motion simulator [NASA-CR-166252] N82-12082

CESSNA AIRCRAFT
The Cessna T303 Crusader [AIAA PAPER 81-2440] A82-13876

CH-47 HELICOPTER
Progress report - CH-47 modernization program A82-14930
Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter A82-14975

CHANNELS (DATA TRANSMISSION)
A polled contention multiplex system using MIL-STD-1553 protocol [AIAA 81-2271] A82-13487
Advanced fiber optic systems for avionics applications [AIAA 81-2319] A82-13518
A modular multiplexed digital voice intercommunications system A82-14721
Techniques for interfacing multiplex systems [AD-A101457] N82-13135

CHEMICAL ATTACK
Attack on superalloys by chemical and electrolytic processes A82-14365

CHEMICAL COMPOSITION
Efficient use of working fluids in aviation hydraulic systems A82-15724

CHINESE PEOPLES REPUBLIC
Aeronautics in China - An AIAA report --- Book A82-13150

CHIPS (ELECTRONICS)
A storage device for subsystem maintenance information A82-14817

CIRCULAR CYLINDERS
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds N82-13070

CIVIL AVIATION
Public service helicopters - Is the grass greener on the other side of the fence A82-13238
Civil aviation in China A82-13600
Progress in aeronautical research and technology applicable to civil air transports A82-13974
Computer Air Carrier Symposium [AD-A104894] N82-12054
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations [AD-A104922] N82-12055
Group 1: Scenario design and development issues N82-13131

CLASSIFICATIONS
Inverse SAR and its application to aircraft classification A82-14871

CLOCKS
Electronic master monitor and advisory display system test and demonstration report [AD-A105317] N82-13141

COCKPITS
Have we overlooked the pilot's role in an automated flight deck [AIAA 81-2262] A82-13481
The application of large screen CRT's, touch panels, and voice to the flight stations of the 1990's [AIAA 81-2263] A82-13482
F/A-18 'Hornet' - One man operability [AIAA 81-2266] A82-13484
Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers [AIAA PAPER 81-2510] A82-13908
The influence of smart computers on the cockpit of the future A82-14743
Airborne color CRT displays A82-14823
The impact of new guidance and control systems on military aircraft cockpit design [AGARD-CP-312] N82-13048
How the helicopter cockpit designer uses digital avionics N82-13049
Electronic flight deck displays for military transport aircraft N82-13050
Color CRT displays for the cockpit N82-13051
Integration of controls and displays in US Army helicopter cockpits N82-13053

F/A 18 Hornet crew station
N82-13064
COLLAPSE
Theoretical analysis of wake-induced parachute collapse
[AIAA PAPER 81-1922] A82-13963
COLLIMATION
Head up displays
N82-13052
COLLISION AVOIDANCE
Aircraft separation assurance avionics
[AIAA 81-2239] A82-13467
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525
COLOR VISION
Airborne color CRT displays
A82-14823
COMBAT
Air-to-air combat analysis - Review of differential-gaming approaches
A82-13115
Use of a helmet-mounted matrix display for presenting energy-maneuverability information during simulated close combat
N82-13061
COMBUSTION CHAMBERS
Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors
A82-15606
COMBUSTION PRODUCTS
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178
COMMAND AND CONTROL
Computergraphics for aircraft control
[AIAA 81-2313] A82-13515
Using voice control onboard combat aircraft
N82-13056
COMMAND GUIDANCE
A polled contention multiplex system using MIL-STD-1553 protocol
[AIAA 81-2271] A82-13487
Design and flight test of a lateral-directional command augmentation system
[AIAA 81-2331] A82-13527
COMMERCIAL AIRCRAFT
Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond
[AIAA 81-2218] A82-13456
Applications of head-up displays in commercial transport aircraft
[AIAA 81-2300] A82-13506
CT7 - GE attacks commuter turboprop market
A82-15950
Application of singular perturbation theory
N82-12050
In-service inspection methods for graphite-epoxy structures on commercial transport aircraft
[NASA-CR-165746] N82-12142
COMMUNICATION CABLES
Fiber-optic immunity to EMI/EMP for military aircraft
[AIAA 81-2339] A82-13529
COMMUNICATION EQUIPMENT
Light-guided information distribution systems
[AIAA 81-2320] A82-13519
Portable air driven variable speed fiber optic cable termination polisher
[AD-A104797] N82-12448
COMMUNICATION NETWORKS
Using phased array radar for data communications
A82-14725
COMMUNICATION THEORY
Distributed Time Division Multiple Access /DTDMA/ - A distributed signaling technique for advanced tactical communications
A82-14719
COMPONENT RELIABILITY
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140
COMPOSITE MATERIALS
Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions
[AD-A104757] N82-12057
Effect of fighter attack spectrum on composite fatigue life
[AD-A105034] N82-12143
Research and Technology
[NASA-TM-83221] N82-13043
COMPOSITE STRUCTURES
A set of finite elements developed for the dynamic computation of composite helicopter blades
[ONERA, TP NO. 1981-87] A82-13990
The all composite Lear Fan 2100
A82-14936
COMPRESSION LOADS
The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region
A82-14418
Measured pavement response to transient aircraft loadings
N82-13442
COMPRESSOR EFFICIENCY
Compressor stall inducing installation effects of an engine control parameter for the CF-5 aircraft
N82-13085
COMPUTATIONAL FLUID DYNAMICS
Overview of flight and ground testing with emphasis on the wind tunnel
[AIAA PAPER 81-2474] A82-13928
The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine
A82-14414
Rapid elliptic solvers
A82-15827
Remarks on the calculation of transonic potential flow by a finite volume method
A82-15835
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
N82-13069
COMPUTER DESIGN
The SIFT computer and its development --- Software Implemented Fault Tolerance for aircraft control
[AIAA 81-2278] A82-13490
COMPUTER GRAPHICS
The electronic terrain map - A new avionics integrator
[AIAA 81-2289] A82-13498
Computergraphics for aircraft control
[AIAA 81-2313] A82-13515
An advanced programmable/reconfigurable color graphics display system for crew station technology research
[AIAA 81-2314] A82-13516
Software considerations in the design of computer generated flight displays
A82-14742
Airborne Electronic Map Systems. I - Design
A82-14770
Computer image generation for flight simulation
A82-15599
Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches
A82-15847
COMPUTER NETWORKS
Low cost programmable multisimulator facility
[AIAA 81-2229] A82-13534
COMPUTER PROGRAMMING
Mathematical programming in engineering design problems
A82-15864
COMPUTER PROGRAMS
The SIFT computer and its development --- Software Implemented Fault Tolerance for aircraft control
[AIAA 81-2278] A82-13490
Navy performance modeling techniques
[AIAA PAPER 81-2431] A82-13869
The need for, and development of, a simulation facility at the Naval Air Test Center
[AIAA PAPER 81-2488] A82-13917
The design and implementation of a canned scenario function for the F-16 dynamic system simulator
A82-14678
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model
A82-14779

Digital simulation of aircraft electrical generating system by means of Sceptre program
A82-14820
Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions
[AD-A104757] N82-12057
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073
Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations
[NASA-TP-1940] N82-13142

COMPUTER STORAGE DEVICES
A storage device for subsystem maintenance information
A82-14817

COMPUTER SYSTEMS DESIGN
Information technology and its impact on test and evaluation at the Naval Air Test Center
[AIAA PAPER 81-2396] A82-13894
The need for, and development of, a simulation facility at the Naval Air Test Center
[AIAA PAPER 81-2488] A82-13917
Two at a time - Flight test plans for the new Boeing airliners
[AIAA PAPER 81-2378] A82-13941
The design and implementation of a canned scenario function for the F-16 dynamic system simulator
A82-14678

COMPUTER SYSTEMS PROGRAMS
An advanced programmable/reconfigurable color graphics display system for crew station technology research
[AIAA 81-2314] A82-13516
Real-time flight management avionics software system
[AIAA 81-2340] A82-13530
Software considerations in the design of computer generated flight displays
A82-14742
Implementing the DAIS executive --- Digital Avionics Information System software feasibility for aircraft systems
A82-14814
General purpose real-time interaction panel for digital simulation --- of flight control systems
A82-14831

COMPUTER TECHNIQUES
The Maneuvering Flight Path Display - A flight trajectory solution display concept
A82-14824
Computer-animated predictive displays for microwave landing approaches
A82-15816
Compilation of abstracts of dissertations theses, and research papers submitted by candidates for degrees, 1 October 1979 - 30 September 1980
[AD-A104124] N82-13974

COMPUTERIZED DESIGN
Digital redesign of existing multiloop continuous control systems --- with application to YF-16 aircraft flight controller
A82-13093
High voltage/high power for airborne applications
A82-15918
Subcritical and supercritical airfoils for given pressure distribution
N82-12031

COMPUTERIZED SIMULATION
Low cost programmable multisimulator facility
[AIAA 81-2229] A82-13534
Navy performance modeling techniques
[AIAA PAPER 81-2431] A82-13869
The need for, and development of, a simulation facility at the Naval Air Test Center
[AIAA PAPER 81-2488] A82-13917
Strapdown inertial reference systems performance analysis
A82-14682
A methodology for missile launch envelope display evaluation
A82-14744
Computer modeling of an aircraft HVDC electrical system
A82-14819
Computer simulation of an advanced aircraft electrical system
A82-14821
A synthesis technique for highly uncertain and interacting multivariable flight control systems
A82-14827
Performance assessment of the ACES-II ejection seat-A-10 configuration
A82-14980
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073

CONFERENCES
Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers
A82-13451
NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volumes 1, 2 & 3
A82-14676
The impact of new guidance and control systems on military aircraft cockpit design
[AGARD-CP-312] N82-13048

CONFORMAL MAPPING
Flight vibration optimization via conformal mapping
A82-13975

CONICAL NOZZLES
The subsonic performance of practical military variable area convergent nozzles
N82-13076

CONTROL BOARDS
Flat panel developments for future military aircraft
[AIAA 81-2302] A82-13507
An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display
[AIAA 81-2303] A82-13508
Tanker avionics and aircrew complement evaluation
N82-13063
F/A 18 Hornet crew station
N82-13064

CONTROL CONFIGURED VEHICLES
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft
A82-14828

CONTROL EQUIPMENT
The interface of multifunction controls and displays to tomorrow's avionics
[AIAA 81-2290] A82-13499
The use of separated multifunction inertial sensors for flight control
[AIAA 81-2295] A82-13502
The integration of control and display concepts for improved pilot situational awareness
A82-13972
The impact of new guidance and control systems on military aircraft cockpit design
[AGARD-CP-312] N82-13048
Integration of controls and displays in US Army helicopter cockpits
N82-13053
A standard control display unit for multi-aircraft application
N82-13054
Sensor failure detection system --- for the F100 turbofan engine
[NASA-CR-165515] N82-13145

CONTROL SIMULATION
An approach to robust nonlinear control design --- with illustration of J-85 turbojet engine simulation
A82-13128
Avionics systems simulation for the Northrop F/A-18L aircraft
[AIAA 81-2274] A82-13488
Modeling procedures for handling qualities evaluation of flexible aircraft
A82-13968

CONTROL STABILITY
The use of observers on relaxed static stability aircraft
A82-14740

CONTROL SURFACES
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft
A82-14828

Force and moment, flow-visualization, and boundary-layer tests on a shuttle orbiter model at Mach 6
[NASA-TP-1952] N82-13106
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110

CONTROL THEORY
Robust flight control - A design example
A82-15845
Computational methods of robust controller design for aerodynamic flutter suppression
[NASA-CR-164983] N82-12080
Fixed gain controller design for aircraft
[AD-A104877] N82-12081

CONTROLLABILITY
Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906
Comparison of low-speed handling qualities in ground-based and in-flight simulator tests
[AIAA PAPER 81-2478] A82-13936
Modeling procedures for handling qualities evaluation of flexible aircraft
A82-13968
In-flight deflection measurement of the HiMAT aeroelastically tailored wing
[AIAA PAPER 81-2450] A82-14381
Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling
A82-14826
Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration
[NASA-TM-81972] N82-13148

CONTROLLERS
Computational methods of robust controller design for aerodynamic flutter suppression
[NASA-CR-164983] N82-12080

CONVERGENT NOZZLES
Performance assessment of an advanced reheated turbo fan engine
[AIAA PAPER 81-2447] A82-13879
The subsonic performance of practical military variable area convergent nozzles
N82-13076
Comparison of different nozzle concepts for a reheated turbofan
N82-13077
Investigation of acoustic interactions in jet thrust augmenting ejectors
[AD-A106083] N82-13835

CONVERGENT-DIVERGENT NOZZLES
Comparison of different nozzle concepts for a reheated turbofan
N82-13077

COOLING SYSTEMS
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13878
A vapour cycle cabin cooling system for the Sea King MK.50 helicopter
[AD-A105211] N82-12069

CORROSION PREVENTION
The protection of gas turbine blades - A platinum aluminide diffusion coating
A82-14364
Attack on superalloys by chemical and electrolytic processes
A82-14365

COST ANALYSIS
Costs of noise nuisance from aircraft
A82-13314

COST EFFECTIVENESS
A cost effective method for the control of roll due to side slip on a low speed aircraft
[AIAA PAPER 81-2422] A82-13861

COST ESTIMATES
A new approach to modeling the cost of ownership for aircraft systems
[AD-A104434] N82-13979

COUPLED MODES
Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling
A82-14826

COUPLING
Effects of aerodynamic coupling on the dynamics of roll aircraft
N82-12070

COUPLINGS
Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center
[AIAA PAPER 81-2405] A82-13891

COVARIANCE
Applications of covariance analysis simulation to avionics flight testing
A82-14767

CRACK PROPAGATION
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482

CRASHES
Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter
A82-14975
Crashworthy military passenger seat development
A82-14976
NASEP - Survival from crashed Navy helicopters
A82-14977

CREEP RUPTURE STRENGTH
Creep and aero gas turbine design
A82-12987

CREW STATIONS
An advanced programmable/reconfigurable color graphics display system for crew station technology research
[AIAA 81-2314] A82-13516

CROSS COUPLING
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047

CRYOGENIC WIND TUNNELS
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
A82-13971

CYCLIC LOADS
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482

D

DAMAGE ASSESSMENT
Investigation of severe lightning strike incidents to two USAF F-106A aircraft
[NASA-CR-165794] N82-12052

DAMPING
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

DATA ACQUISITION
The development and use of a computer-interactive data acquisition and display system in a flight environment
[AIAA PAPER 81-2371] A82-13946
AFFTC standard airspeed calibration procedures
[AD-A104830] N82-12074
An acquisition and analysis system for dynamic tests of air inlets
N82-13082

DATA BASES
Aircraft alerting systems standardization study
[AIAA 81-2282] A82-13460

DATA COMPRESSION
Automatic digital gain ranging --- for flight test telemetry data
[AIAA PAPER 81-2370] A82-13947

DATA LINKS
Distributed Time Division Multiple Access /DTDMA/ - A distributed signaling technique for advanced tactical communications
A82-14719

DATA MANAGEMENT
Two at a time - Flight test plans for the new Boeing airliners
[AIAA PAPER 81-2379] A82-13941
Algorithms for an adaptive dynamic window in electronic map systems
A82-14769

DATA PROCESSING
Digital avionics display processor
[AIAA 81-2311] A82-13513
Time-referencing of data in an asynchronous environment --- for fighter aircraft avionics
[AIAA 81-2341] A82-13531
Recent improvements at the Naval Air Test Center for increased test system flexibility
[AIAA PAPER 81-2392] A82-13888
Fleet Flight Loads Survey monitoring and analysis techniques
[AIAA PAPER 81-2461] A82-13903
The Advanced Range Instrumentation Aircraft improvement and modernization program
[AIAA PAPER 81-2368] A82-13948
Status and tracking system for flight test data products
[AIAA PAPER 81-2395] A82-14376
Integrated flight testing based on nonlinear system identification data processing techniques
[AIAA PAPER 81-2449] A82-14389
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777
DATA RECORDERS
Extended time radar raw video recording
A82-14909
DATA REDUCTION
On matching the systems identification technique to the particular application --- in evaluating flight test data
A82-13119
DATA STORAGE
A storage device for subsystem maintenance information
A82-14817
DATA SYSTEMS
Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft
[AIAA 81-2297] A82-13504
Advanced fiber optic systems for avionics applications
[AIAA 81-2319] A82-13518
A technique to determine lift and drag polars in flight and their application
[AIAA PAPER 81-2420] A82-13859
An advanced facility for processing aircraft dynamic test data
[AIAA PAPER 81-2398] A82-14377
DATA TRANSMISSION
ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners
[AIAA 81-2267] A82-13485
Higher order Information Transfer Systems are coming
[AIAA 81-2317] A82-13517
Light-guided information distribution systems
[AIAA 81-2320] A82-13519
High speed microwave phase-locked loops
A82-14696
Using phased array radar for data communications
A82-14725
Columbus, Ohio, Voice response system demonstration and evaluation
[AD-A104750] N82-12304
DC 9 AIRCRAFT
Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond
[AIAA 81-2218] A82-13456
DC 10 AIRCRAFT
KC-10, flight test program management - The contractor's viewpoint
[AIAA PAPER 81-2380] A82-14384
DE HAVILLAND AIRCRAFT
Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor
[AIAA PAPER 81-2507] A82-13907
DECELERATION
Escape systems decelerator technology
[AIAA PAPER 81-1913] A82-13966
DECOUPLING
A decoupled control system for improved flight performance in wind shear
A82-13079
DEFLECTION
Measured pavement response to transient aircraft loadings
N82-13442
DEFLECTORS
Transonic flows in an air inlet with large incidence and the effect of a blowing trap
N82-13071
DEFORMATION
Measured pavement response to transient aircraft loadings
N82-13442
DEGREES OF FREEDOM
Analysis of escape systems at 687 KEAS
A82-14578
DENSITY MEASUREMENT
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications
[NASA-CR-167421] N82-12230
DEPOSITS
Determination and analysis of jet and missile fuel deposits
[AD-A105458] N82-12248
DESCENT TRAJECTORIES
Flight investigations of integrated descent rate control systems
A82-14929
DESCRIPTIONS
Orienting description of air traffic control in the Netherlands
[VTH-LR-285] N82-12063
DESIGN ANALYSIS
Air-to-ground MTI radar using a displaced phase center, phased array
A82-14881
The history of the development of the GQ aeroconical parachute - 1971-1980
A82-14961
A look at the Hoffman Triangular parachute - The first successful glidable parachute
A82-14966
Mathematical programming in engineering design problems
A82-15864
Design study report for General Aviation Loran-C receiver
[AD-A104921] N82-12062
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
N82-13089
DETECTION
Sensor failure detection system --- for the F100 turbofan engine
[NASA-CR-165515] N82-13145
DIESEL FUELS
Development of catalytic systems for the conversion of syngas to jet fuel and diesel fuel and higher alcohols
[DE82-000067] N82-12255
DIFFUSION FLAMES
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178
DIGITAL DATA
Automatic digital gain ranging --- for flight test telemetry data
[AIAA PAPER 81-2370] A82-13947
Airborne Electronic Terrain Map System
A82-14771
DIGITAL FILTERS
The agile transversal filter - A flexible building block for ICNIA --- Integrated Communications, Navigation and Identification Avionics
A82-14765
DIGITAL INTEGRATORS
Techniques for interfacing multiplex systems
[AD-A101457] N82-13135
DIGITAL NAVIGATION
Digital redesign of existing multiloop continuous control systems --- with application to YF-16 aircraft flight controller
A82-13093
Digital control for flexible aircraft using reduced order models
A82-13094
F-4 Advanced Avionics Flight Test
[AIAA PAPER 81-2464] A82-13929
Future directions in CNI integrated avionics
A82-14720

DIGITAL RADAR SYSTEMS
Radar hostile fire location A82-14857
Air-to-ground MTI radar using a displaced phase center, phased array A82-14881
A new approach to radar plot extraction for ATC applications A82-14908

DIGITAL SIMULATION
A failure detection and isolation system for tactical aircraft with separated IMUs A82-14684
Digital simulation of aircraft electrical generating system by means of Sceptre program A82-14820
General purpose real-time interaction panel for digital simulation --- of flight control systems A82-14831
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation [NASA-TM-82770] N82-13144

DIGITAL SYSTEMS
Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers A82-13451
Integrated avionics - Concepts and concerns [AIAA 81-2211] A82-13452
Digital avionics - What a pilot expects to see [AIAA 81-2217] A82-13455
Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond [AIAA 81-2218] A82-13456
The role of avionics in the all electric airplane [AIAA 81-2219] A82-13457
Fault isolation methodology for the L-1011 digital avionic flight control system [AIAA 81-2223] A82-13458
Computer-in-control selection logic for a triplex digital flight control system [AIAA 81-2236] A82-13465
Design and analysis of a digitally controlled integrated flight/fire control system [AIAA 81-2245] A82-13470
ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners [AIAA 81-2267] A82-13485
Direct digital drive actuation [AIAA 81-2298] A82-13505
Digital detection and processing of laser beacon signals for aircraft collision hazard warning [AIAA 81-2328] A82-13525
Design and flight test of a lateral-directional command augmentation system [AIAA 81-2331] A82-13527
Advanced weapon systems - Integration technology --- Digital Avionic Information System [AIAA 81-2213] A82-13533
F/A-18 high authority/high gain digital flight control system development and flight testing [AIAA PAPER 81-2465] A82-13930
Implementing the DAIS executive --- Digital Avionics Information System software feasibility for aircraft systems A82-14814
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft A82-14828
Design of direct digital flight-mode control systems for high-performance aircraft A82-14829
Reliability analysis of the F-8 digital fly-by-wire system [NASA-CR-163110] N82-12079
How the helicopter cockpit designer uses digital avionics N82-13049

DIGITAL TECHNIQUES
Digital signal processing on a background of rereflections for the international aircraft landing system A82-13703
Parallel processing applied to digital flight control systems - Some perspectives A82-14794
Microprocessor flight control application study A82-14796

DIRECT CURRENT
Computer modeling of an aircraft HVDC electrical system A82-14819

DIRECTIONAL ANTENNAS
Study of the effects of maneuver compensation on beam pointing accuracy A82-14780

DIRECTIONAL CONTROL
Design and flight test of a lateral-directional command augmentation system [AIAA 81-2331] A82-13527

DIRECTIONAL SOLIDIFICATION (CRYSTALS)
'In situ' composites for jet propulsion and stationary gas turbine applications A82-15824

DISCRETE ADDRESS BEACON SYSTEM
Performance evaluation of target report extractor in the monopulse ATCRBS --- Air Traffic Control Radar Beacon System A82-14776
A multimicroprocessor system for ATCRBS monopulse data processing A82-14777

DISPLACEMENT MEASUREMENT
In-flight deflection measurement of the HiMAT aeroelastically tailored wing [AIAA PAPER 81-2450] A82-14381

DISPLAY DEVICES
Digital avionics - What a pilot expects to see [AIAA 81-2217] A82-13455
Aircraft separation assurance avionics [AIAA 81-2239] A82-13467
Aircraft alerting systems standardization study [AIAA 81-2242] A82-13468
The application of large screen CRT's, touch panels, and voice to the flight stations of the 1990's [AIAA 81-2263] A82-13482
Electronic flight deck displays for transport aircraft [AIAA 81-2264] A82-13483
The electronic terrain map - A new avionics integrator [AIAA 81-2289] A82-13498
The interface of multifunction controls and displays to tomorrow's avionics [AIAA 81-2290] A82-13499
Flat panel developments for future military aircraft [AIAA 81-2302] A82-13507
An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display [AIAA 81-2303] A82-13509
Digital avionics display processor [AIAA 81-2311] A82-13513
Advanced display systems for crew stations of tactical aircraft [AIAA 81-2312] A82-13514
Computergraphics for aircraft control [AIAA 81-2313] A82-13515
An advanced programmable/reconfigurable color graphics display system for crew station technology research [AIAA 81-2314] A82-13516
Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers [AIAA PAPER 81-2510] A82-13908
A unique integrated flight testing facility for advanced control/display research [AIAA PAPER 81-2490] A82-13919
The development and use of a computer-interactive data acquisition and display system in a flight environment [AIAA PAPER 81-2371] A82-13946
The integration of control and display concepts for improved pilot situational awareness A82-13972
Software considerations in the design of computer generated flight displays A82-14742
A methodology for missile launch envelope display evaluation A82-14744
Airborne color CRT displays A82-14823

The Manoeuvering Flight Path Display - A flight trajectory solution display concept
A82-14824

Computer image generation for flight simulation
A82-15599

Computer-animated predictive displays for microwave landing approaches
A82-15816

Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches
A82-15847

Electronic Master Monitor and Advisory Display System (EMMADS)
[AD-A105082] N82-12067

The impact of new guidance and control systems on military aircraft cockpit design
[AGARD-CP-312] N82-13046

Electronic flight deck displays for military transport aircraft
N82-13050

Color CRT displays for the cockpit
N82-13051

Integration of controls and displays in US Army helicopter cockpits
N82-13053

A standard control display unit for multi-aircraft application
N82-13054

Tanker avionics and aircrew complement evaluation
N82-13063

F/A 18 Hornet crew station
N82-13064

Electronic master monitor and advisory display system test and demonstration report
[AD-A105317] N82-13141

DIVERGENCE

Divergence of a sweptforward wing
A82-13560

DIVERTERS

Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073

DOORS

Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073

DRAG MEASUREMENT

Model testing techniques for measuring inlet drag
N82-13084

DRAG REDUCTION

Analysis of escape systems at 687 KEAS
A82-14978

DUCT GEOMETRY

Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070

Effect of vacuum exhaust pressure on the performance of MHD ducts at high D-field
[NASA-TM-82750] N82-13908

DYNAMIC CONTROL

The design of exact nonlinear model followers --- with application to trajectory autopilot for helicopter
A82-13125

Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft
[AIAA 81-2238] A82-13466

DYNAMIC LOADS

Measured pavement response to transient aircraft loadings
N82-13442

DYNAMIC MODELS

Performance estimation from non-steady manoeuvres
[AIAA PAPER 81-2424] A82-13863

DYNAMIC PRESSURE

Wind tunnel tests of ejection seat for high dynamic pressure escape
A82-14979

DYNAMIC RESPONSE

Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047

DYNAMIC STABILITY

Direct free-flight analysis of aircraft dynamics at high angles of attack
A82-15596

Robust flight control - A design example
A82-15845

Effects of aerodynamic coupling on the dynamics of roll aircraft
N82-12070

DYNAMIC STRUCTURAL ANALYSIS

A set of finite elements developed for the dynamic computation of composite helicopter blades
[ONERA, TP NO. 1981-87] A82-13990

Application of the ONERA dynamic stall model to a helicopter blade in forward flight
[ONERA, TP NO. 1981-89] A82-13992

Structural dynamics: Modified calculations --- natural and harmonically excited vibrations of modified structures; increased computation efficiency
[BMVG-FBWT-81-1] N82-13457

DYNAMIC TESTS

An advanced facility for processing aircraft dynamic test data
[AIAA PAPER 81-2398] A82-14377

An acquisition and analysis system for dynamic tests of air inlets
N82-13082

E

ECONOMIC ANALYSIS

Transportation systems evaluation methodology development and applications, phase 3
[NASA-CR-164999] N82-12051

ECONOMIC IMPACT

The FAA's proposed helicopter certification rules
A82-13242

EGRESS

Emergency in-flight egress for general aviation aircraft
A82-14953

EIGENVALUES

A set of finite elements developed for the dynamic computation of composite helicopter blades
[ONERA, TP NO. 1981-87] A82-13990

EJECTION INJURIES

Wind tunnel tests of ejection seat for high dynamic pressure escape
A82-14979

Post ejection survival
A82-14981

EJECTION SEATS

Escape systems decelerator technology
[AIAA PAPER 81-1913] A82-13966

Testing of the SJU-5A ejection seat for the F/A-18 /HORNET/ aircraft
A82-14955

Further test results of parachutes with automatic inflation modulation /A.I.M./
A82-14965

Analysis of escape systems at 687 KEAS
A82-14978

Wind tunnel tests of ejection seat for high dynamic pressure escape
A82-14979

Performance assessment of the ACES-II ejection seat-A-10 configuration
A82-14980

Post ejection survival
A82-14981

Terrain actuated deployment system --- radar altimeter for man-ejector seat separation
A82-14982

EJECTORS

Investigation of acoustic interactions in jet thrust augmenting ejectors
[AD-A106083] N82-13835

ELASTIC DAMPING

Design for active and passive flutter suppression and gust alleviation
[NASA-CR-3482] N82-13147

ELASTIC DEFORMATION

In-flight deflection measurement of the HiMAT aeroelastically tailored wing
[AIAA PAPER 81-2450] A82-14381

ELECTRIC EQUIPMENT
Computer modeling of an aircraft HVDC electrical system
A82-14819
Computer simulation of an advanced aircraft electrical system
A82-14821
ELECTRIC GENERATORS
60 kVA ADP permanent magnet VSCF starter generator system - A program overview --- Variable Speed Constant Frequency
A82-14789
ELECTRIC POWER
Will power-by-wire replace power-by-hydraulics
A82-14707
The all electric airplane - Its development and logistic support
A82-14709
ELECTRIC POWER SUPPLIES
Conceptual design of an integrated power and avionics information system
A82-14788
60 kVA ADP permanent magnet VSCF starter generator system - A program overview --- Variable Speed Constant Frequency
A82-14789
High speed PMG containment study for VSCF system --- Permanent Magnet Generator for Variable Speed Constant Frequency applications
A82-14791
Computer simulation of an advanced aircraft electrical system
A82-14821
ELECTRICAL ENGINEERING
Compilation of abstracts of dissertations theses, and research papers submitted by candidates for degrees, 1 October 1979 - 30 September 1980
[AD-A104124] N82-13974
ELECTRO-OPTICAL PHOTOGRAPHY
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model
A82-14779
ELECTRO-OPTICS
The TADS/PNVS 'eyes' for the AH-64 attack helicopter
A82-13239
Electro-optical vector scoring system --- for missile miss distance in fleet training exercises
[AIAA PAPER 81-2373] A82-13945
ELECTROCHEMICAL MACHINING
Attack on superalloys by chemical and electrolytic processes
A82-14365
ELECTROMAGNETIC COMPATIBILITY
The Navy F/A-18A Hornet electromagnetic compatibility program
A82-14760
ELECTROMAGNETIC INTERACTIONS
Georgia Tech coherent jammer flight test
[AIAA PAPER 81-2452] A82-13898
A concept for a high-accuracy, low-cost accelerometer
A82-14685
Assessment methodology of the lightning threat to advanced aircraft
A82-14759
ELECTROMAGNETIC INTERFERENCE
Fiber-optic immunity to EMI/EMP for military aircraft
[AIAA 81-2339] A82-13529
ELECTROMAGNETIC PULSES
Fiber-optic immunity to EMI/EMP for military aircraft
[AIAA 81-2339] A82-13529
A recursive time domain analysis of distributed line grid networks with application to the LTA/EMP problem --- Lightning Threat Analysis
A82-14761
ELECTROMAGNETIC SHIELDING
The Navy F/A-18A Hornet electromagnetic compatibility program
A82-14760
ELECTROMAGNETS
60 kVA ADP permanent magnet VSCF starter generator system - A program overview --- Variable Speed Constant Frequency
A82-14789
ELECTROMECHANICAL DEVICES
Electromechanical actuation development program
A82-14705
New all-electric-system technology --- electromechanical actuators for aircraft
A82-14710
High speed PMG containment study for VSCF system --- Permanent Magnet Generator for Variable Speed Constant Frequency applications
A82-14791
ELECTRONIC AIRCRAFT
The role of avionics in the all electric airplane
[AIAA 81-2219] A82-13457
The all electric airplane - Its development and logistic support
A82-14709
New all-electric-system technology --- electromechanical actuators for aircraft
A82-14710
Airborne Electronic Map Systems. I - Design
A82-14770
Airborne Electronic Terrain Map System
A82-14771
ELECTRONIC CONTROL
Algorithms for an adaptive dynamic window in electronic map systems
A82-14769
Failure analysis of variable reluctance stepper motor --- in electronic fuel control system on jet engine
A82-14792
ELECTRONIC EQUIPMENT
Electronic flight deck displays for transport aircraft
[AIAA 81-2264] A82-13483
The Advanced Range Instrumentation Aircraft improvement and modernization program
[AIAA PAPER 81-2368] A82-13948
Airborne Electronic Terrain Map System. II - Applications
A82-14773
ELECTRONIC WARFARE
The TADS/PNVS 'eyes' for the AH-64 attack helicopter
A82-13239
Advanced fiber optic systems for avionics applications
[AIAA 81-2319] A82-13518
Study of the effects of maneuver compensation on beam pointing accuracy
A82-14780
ELEVATORS (CONTROL SURFACES)
Trim tab excitation system for the BAe 146
A82-14363
ELLIPTIC DIFFERENTIAL EQUATIONS
Rapid elliptic solvers
A82-15827
EMERGENCIES
Flight testing the suspended maneuvering system --- helicopter firefighting and rescue techniques
[AIAA PAPER 81-2498] A82-13922
ENERGY CONSERVATION
Airplane performance sensitivities to lateral and vertical profiles
A82-15846
Analysis of integrated fuel-efficient, low-noise procedures in terminal-area operations
[DE81-029833] N82-13014
ENGINE CONTROL
The role of avionics in the all electric airplane
[AIAA 81-2219] A82-13457
Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2438] A82-13874
The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane
[AIAA PAPER 81-2467] A82-13931
Failure analysis of variable reluctance stepper motor --- in electronic fuel control system on jet engine
A82-14792
Sensor failure detection system --- for the F100 turbofan engine
[NASA-CR-165515] N82-13145
ENGINE COOLANTS
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13870
The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine
A82-14414

ENGINE DESIGN
  Creep and aero gas turbine design
    A82-12987
  An approach to robust nonlinear control design --- with illustration of J-85 turbojet engine simulation
    A82-13128
  CT7 - GE attacks commuter turboprop market
    A82-15950
  Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
    N82-13093
  An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
    [NAL-TR-321T] N82-13109

ENGINE INLETS
  A large-scale investigation of engine influence on inlet performance at angle-of-attack
    [AIAA PAPER 81-2481] A82-13939
  Effect of a part span variable inlet guide vane on TF34 fan performance
    [NASA-CR-165458] N82-12075
  Aerodynamics of Power Plant Installation
    [AGARD-CP-301] N82-13065
  Performance of highly integrated inlets for supersonic aircraft
    N82-13066
  Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds
    N82-13068
  Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
    N82-13069
  Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
    N82-13070
  Subsonic military aircraft engine intake: An integrated theoretical experiment design
    N82-13073
  The design and development of the Tornado engine air intake
    N82-13074
  Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines
    N82-13087
  Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations
    [NASA-TP-1940] N82-13142

ENGINE STARTERS
  60 kVA ADP permanent magnet VSCF starter generator system - A program overview --- Variable Speed Constant Frequency
    A82-14789

ENGINE TESTS
  Recent propulsion system flight tests at the NASA Dryden Flight Research Center
    [AIAA PAPER 81-2438] A82-13874
  Performance assessment of an advanced reheated turbo fan engine
    [AIAA PAPER 81-2447] A82-13879

ENGINEERING MANAGEMENT
  Organizing and training for innovative flight test management
    [AIAA PAPER 81-2416] A82-13856

ENVIRONMENT EFFECTS
  Transportation systems evaluation methodology development and applications, phase 3
    [NASA-CR-164999] N82-12051

ENVIRONMENT SIMULATION
  Helicopter icing
    A82-13243

EQUIPMENT
  The impact of new guidance and control systems on military aircraft cockpit design
    [AGARD-CP-312] N82-13048

EQUIPMENT SPECIFICATIONS
  Practical aspects of instrumentation system installation, volume 13
    [NASA-TM-84067] N82-13140

ERROR ANALYSIS
  Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor --- Electronically Agile Radar/Gimbaled Electrically suspended gyro Airborne Navigation System
    A82-14739

  Compressor stall inducing installation effects of an engine control parameter for the CF-5 aircraft
    N82-13085

ESCAPE SYSTEMS
  Escape systems decelerator technology
    [AIAA PAPER 81-1913] A82-13966
  Emergency in-flight egress for general aviation aircraft
    A82-14953
  Wind tunnel tests of ejection seat for high dynamic pressure escape
    A82-14979
  A ballistic design model for initiators for aircraft personnel escape systems
    A82-14984
  Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation
    A82-14985

EUTECTIC ALLOYS
  'In situ' composites for jet propulsion and stationary gas turbine applications
    A82-15824

EVALUATION
  Naval Weapons Center - Test and evaluation in the 1980's
    [AIAA PAPER 81-2485] A82-13940

EXCITATION
  Trim tab excitation system for the BAe 146
    A82-14363

EXHAUST EMISSION
  Effect of fuel-air-ratio nonuniformity on emissions of nitrogen oxides
    [NASA-TP-1798] N82-13143

EXHAUST FLOW SIMULATION
  Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
    N82-13088
  Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
    N82-13089

EXHAUST NOZZLES
  An investigation of F-16 nozzle-afterbody forces at transonic Mach numbers with emphasis on model scale effects
    [AD-A104905] N82-12392
  Aerodynamics of Power Plant Installation
    [AGARD-CP-301] N82-13065
  Integration of advanced exhaust nozzles
    N82-13075
  Advanced exhaust nozzle technology
    N82-13078
  Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
    N82-13090

EXHAUST SYSTEMS
  Investigation of acoustic interactions in jet thrust augmenting ejectors
    [AD-A106083] N82-13835

EXPERIMENTAL DESIGN
  The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing
    N82-13092

EXPLOSIONS
  Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions
    [AD-A104757] N82-12057

EXTERNAL STORES
  Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds
    N82-13813

F

F-4 AIRCRAFT
  F-4 Advanced Avionics Flight Test
    [AIAA PAPER 81-2464] A82-13929

F-14 AIRCRAFT
Fleet Flight Loads Survey monitoring and analysis techniques
[AIAA PAPER 81-2461] A82-13903
Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906
Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration
[NASA-TM-81972] N82-13148
F-15 AIRCRAFT
The use of separated multifunction inertial sensors for flight control
[AIAA 81-2295] A82-13502
Redundancy management of skewed and dispersed inertial sensors
[AIAA 81-2296] A82-13503
Enhanced F-15 air-to-ground flight demonstrations
[AIAA PAPER 81-2413] A82-13854
Fighters - Improving the breed
A82-14354
Status and tracking system for flight test data products
[AIAA PAPER 81-2395] A82-14376
A methodology for missile launch envelope display evaluation
A82-14744
Assessing pilot workload - Without disturbing pilot behavior
A82-14745
F-15 SAR
A82-14938
F-16 AIRCRAFT
Digital redesign of existing multiloop continuous control systems --- with application to YF-16 aircraft flight controller
A82-13093
The F-16/79 test program
[AIAA PAPER 81-2414] A82-13855
Fighters - Improving the breed
A82-14354
Advanced fighter technology integration AFTI/F-16 test program overview
[AIAA PAPER 81-2353] A82-14398
The design and implementation of a canned scenario function for the F-16 dynamic system simulator
A82-14678
Design of direct digital flight-mode control systems for high-performance aircraft
A82-14829
An investigation of F-16 nozzle-afterbody forces at transonic Mach numbers with emphasis on model scale effects
[AD-A104905] N82-12392
F-18 AIRCRAFT
F/A-18A weapon system - 1976 state of the art
[AIAA 81-2215] A82-13453
F/A-18 'Hornet' - One man operability
[AIAA 81-2266] A82-13484
Avionics systems simulation for the Northrop F/A-18L aircraft
[AIAA 81-2274] A82-13488
F/A-18 high authority/high gain digital flight control system development and flight testing
[AIAA PAPER 81-2465] A82-13930
F/A-18 Flight Test program overview - 1 September 1981
[AIAA PAPER 81-2351] A82-13955
The Navy F/A-18A Hornet electromagnetic compatibility program
A82-14760
F/A-18A high angle of attack/spin testing
A82-14934
F/A-18 roll rate improvement program
A82-14939
Testing of the SJU-5A ejection seat for the F/A-18 /HORNET/ aircraft
A82-14955
F/A 18 Hornet crew station
N82-13064
F-106 AIRCRAFT
Thunderstorm hazards flight research - Program overview
[AIAA PAPER 81-2412] A82-13853
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80
A82-14954
Investigation of severe lightning strike incidents to two USAF F-106A aircraft
[NASA-CR-165794] N82-12052
F-111 AIRCRAFT
Pave Mover Flight Test Program
[AIAA PAPER 81-2492] A82-14380
FAIL-SAFE SYSTEMS
The SIFT computer and its development --- Software Implemented Fault Tolerance for aircraft control
[AIAA 81-2278] A82-13490
General purpose real-time interaction panel for digital simulation --- of flight control systems
A82-14831
FAILURE ANALYSIS
Fault detection for two physically separated, communicating inertial measurement units
A82-13142
Theoretical analysis of wake-induced parachute collapse
[AIAA PAPER 81-1922] A82-13963
A failure detection and isolation system for tactical aircraft with separated IMUs
A82-14684
Failure analysis of variable reluctance stepper motor --- in electronic fuel control system on jet engine
A82-14792
FAIRINGS
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass
[AIAA PAPER 81-2445] A82-14383
FAN BLADES
Thrust modulation methods for a subsonic V/STOL aircraft
[NASA-TM-82747] N82-13112
FATIGUE (MATERIALS)
Fatigue methodology - A technical management system for helicopter safety and durability
A82-13240
Flight trail of the Aircraft Fatigue Data Analysis System (AFDAS) Mk 2 prototype
[AD-A105270] N82-12066
FATIGUE LIFE
Creep and aero gas turbine design
A82-12987
In-flight computation of helicopter transmission fatigue life expenditure
[AIAA PAPER 81-2434] A82-13872
Effect of fighter attack spectrum on composite fatigue life
[AD-A105034] N82-12143
FAULT TOLERANCE
Fault detection for two physically separated, communicating inertial measurement units
A82-13142
Fault isolation methodology for the L-1011 digital avionic flight control system
[AIAA 81-2223] A82-13458
Computer-in-control selection logic for a triplex digital flight control system
[AIAA 81-2236] A82-13465
The SIFT computer and its development --- Software Implemented Fault Tolerance for aircraft control
[AIAA 81-2278] A82-13490
A failure detection and isolation system for tactical aircraft with separated IMUs
A82-14684
FEASIBILITY ANALYSIS
Implementing the DAIS executive --- Digital Avionics Information System software feasibility for aircraft systems
A82-14814
Transportation systems evaluation methodology development and applications, phase 3
[NASA-CR-164999] N82-12051
FEEDBACK CONTROL
A dual input actuator for fluidic backup flight control
A82-13088
Digital redesign of existing multiloop continuous control systems --- with application to YF-16 aircraft flight controller
A82-13093
Comparison between the exact and an approximate feedback solution for medium range interception problems
A82-13106

The design of exact nonlinear model followers --- with application to trajectory autopilot for helicopter A82-13125
The use of observers on relaxed static stability aircraft A82-14740
A synthesis technique for highly uncertain and interacting multivariable flight control systems A82-14827
Acceptance testing of the Calspan variable stability Learjet A82-14937
Experimental and analytical studies of advanced air cushion landing systems [NASA-CR-3476] N82-12065
Computational methods of robust controller design for aerodynamic flutter suppression [NASA-CR-164983] N82-12080

FIBER OPTICS
Advanced fiber optic systems for avionics applications [AIAA 81-2319] A82-13518
Fiber-optic immunity to EMI/EMP for military aircraft [AIAA 81-2339] A82-13529
Portable air driven variable speed fiber optic cable termination polisher [AD-A104797] N82-12448

FIELD OF VIEW
The LANTIRN wide field-of-view raster Head-Up Display --- Low Altitude Navigation and Targeting IR for Night A82-14825

FIGHTER AIRCRAFT
Air-to-air combat analysis - Review of differential-gaming approaches A82-13115
Wing/store flutter - An active adaptive control application A82-13122
Fault detection for two physically separated, communicating inertial measurement units A82-13142
Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators [AIAA 81-2230] A82-13463
Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft [AIAA 81-2238] A82-13466
Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing [AIAA 81-2247] A82-13471
An update of an integrated CNI system - TIES --- Communication, Navigation, and Identification provided by Tactical Information Exchange System [AIAA 81-2292] A82-13500
Time-referencing of data in an asynchronous environment --- for fighter aircraft avionics [AIAA 81-2341] A82-13531
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology A82-13971
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass [AIAA PAPER 81-2445] A82-14383
A failure detection and isolation system for tactical aircraft with separated IMUs A82-14684
Will power-by-wire replace power-by-hydraulics A82-14707
Integrated Flight/Weapon Control design and evaluation A82-14741
The influence of smart computers on the cockpit of the future A82-14743
Evaluation of advanced air-to-air gunnery fire control systems A82-14750
Airborne color CRT displays A82-14823
A synthesis technique for highly uncertain and interacting multivariable flight control systems A82-14827
Robust flight control - A design example A82-15845
Aerodynamics && Power Plant Installation [AGARD-CP-301] N82-13065
Performance of highly integrated inlets for supersonic aircraft N82-13066
Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds N82-13068
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes N82-13069
The subsonic performance of practical military variable area convergent nozzles N82-13076
Final report on the FuePo-4 major theme: Interference drag with airframe/engine integration on fighter aircraft [BMVG-FBWT-79-20] N82-13116
Maneuver load control for the reduction of design loads and improvement of the maneuverability of modern fighter aircraft [BMVG-FBWT-81-2] N82-13138

FINITE DIFFERENCE THEORY
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow N82-13095
Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations [NASA-TP-1940] N82-13142

FINITE VOLUME METHOD
Remarks on the calculation of transonic potential flow by a finite volume method A82-15835

FIRE CONTROL
Design and analysis of a digitally controlled integrated flight/fire control system [AIAA 81-2245] A82-13470
Evaluation of advanced air-to-air gunnery fire control systems A82-14750

FIRE EXTINGUISHERS
Fire extinguishant materials [NASA-CASE-ARC-11252-1] N82-12168
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires [NASA-CR-165011] N82-13186

FIRE FIGHTING
Flight testing the suspended maneuvering system --- helicopter firefighting and rescue techniques [AIAA PAPER 81-2498] A82-13922

FIRES
Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions [AD-A104757] N82-12057

FIXED WINGS
Wing design for light transport aircraft with improved fuel economy A82-14416
Crashworthy military passenger seat development A82-14976

FLAME RETARDANTS
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications [NASA-CR-167421] N82-12230

FLAPS (CONTROL SURFACES)
Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps A82-14933

FLAT PLATES
Turbulent wake development behind streamlined bodies N82-13104

FLEXIBLE BODIES
Digital control for flexible aircraft using reduced order models A82-13094
Modeling procedures for handling qualities evaluation of flexible aircraft A82-13968

FLIGHT ALTITUDE
  On-line optimization of aircraft altitude and flight path angle dynamics A82-13107
FLIGHT CHARACTERISTICS
  A decoupled control system for improved flight performance in wind shear A82-13079
  Government testing [AIAA PAPER 81-2443] A82-13877
  Selected stability and control derivatives from the first Space Shuttle entry [AIAA PAPER 81-2451] A82-13880
  Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA --- Quiet Short-haul Research Aircraft [AIAA PAPER 81-2480] A82-13938
  AD-1 oblique wing aircraft program [AIAA PAPER 81-2354] A82-14390
FLIGHT CLOTHING
  Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen A82-14972
FLIGHT CONTROL
  A decoupled control system for improved flight performance in wind shear A82-13079
  A dual input actuator for fluidic backup flight control A82-13088
  Fault detection for two physically separated, communicating inertial measurement units A82-13142
  Integrated avionics - Concepts and concerns [AIAA 81-2211] A82-13452
  Digital avionics - What a pilot expects to see [AIAA 81-2217] A82-13455
  The role of avionics in the all electric airplane [AIAA 81-2219] A82-13457
  Fault isolation methodology for the L-1011 digital avionic flight control system [AIAA 81-2223] A82-13458
  Computer-in-control selection logic for a triplex digital flight control system [AIAA 81-2236] A82-13465
  Design and analysis of a digitally controlled integrated flight/fire control system [AIAA 81-2245] A82-13470
  The use of separated multifunction inertial sensors for flight control [AIAA 81-2295] A82-13502
  Redundancy management of skewed and dispersed inertial sensors [AIAA 81-2296] A82-13503
  Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft [AIAA 81-2297] A82-13504
  Enhanced F-15 air-to-ground flight demonstrations [AIAA PAPER 81-2413] A82-13854
  Flight experience with a remotely augmented vehicle flight test technique [AIAA PAPER 81-2417] A82-13857
  A cost effective method for the control of roll due to side slip on a low speed aircraft [AIAA PAPER 81-2422] A82-13861
  F/A-18 high authority/high gain digital flight control system development and flight testing [AIAA PAPER 81-2465] A82-13930
  Comparison of low-speed handling qualities in ground-based and in-flight simulator tests [AIAA PAPER 81-2478] A82-13936
  Experience with flight test trajectory guidance [AIAA PAPER 81-2504] A82-14379
  Navigation for helicopters by multiple use of inertial sensors A82-14713
  Evaluation of advanced air-to-air gunnery fire control systems A82-14750
  Passive terrain following using stored map and global positioning system A82-14772
  Design of direct digital flight-mode control systems for high-performance aircraft A82-14829
  USNTPS spin program A82-14931
  Robust flight control - A design example A82-15045
  Fixed gain controller design for aircraft [AD-A104877] N82-12081
  Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration [NASA-TM-81972] N82-13148
  Interactive aircraft flight control and aeroelastic stabilization --- forward swept wing flight vehicles [NASA-CR-165036] N82-13150
FLIGHT CREWS
  High-accuracy ranging over voice radios for downed aircrew rescue A82-14694
  Rescue at sea A82-14956
  'Little people' problem /MA-2 torso harness/ A82-14958
  A new safety harness for mobile aircrew A82-14963
  Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen A82-14972
  Test and evaluation of improved aircrew restraint systems A82-14974
  HASEP - Survival from crashed Navy helicopters A82-14977
  Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation A82-14985
  Tanker avionics and aircrew complement evaluation N82-13063
  F/A 18 Hornet crew station N82-13064
  Group 1: Scenario design and development issues N82-13131
FLIGHT HAZARDS
  Thunderstorm hazards flight research - Program overview [AIAA PAPER 81-2412] A82-13853
  Direct strike lightning measurement system --- for aircraft [AIAA PAPER 81-2513] A82-13910
FLIGHT INSTRUMENTS
  Software considerations in the design of computer generated flight displays A82-14742
FLIGHT LOAD RECORDERS
  Fleet Flight Loads Survey monitoring and analysis techniques [AIAA PAPER 81-2461] A82-13903
  Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft [AIAA PAPER 81-2387] A82-14393
FLIGHT OPERATIONS
  The influence of wind shear and vertical winds on takeoffs and go-arounds A82-15623
FLIGHT OPTIMIZATION
  Real-time flight management avionics software system [AIAA 81-2340] A82-13530
  Flight management systems for modern jet aircraft A82-14778
  Airplane performance sensitivities to lateral and vertical profiles A82-15846
FLIGHT PATHS
  Darboux points in minimum-fuel aircraft landing problems A82-13077
  On-line optimization of aircraft altitude and flight path angle dynamics A82-13107
  Computergraphics for aircraft control [AIAA 81-2313] A82-13515
  Development of an MLS lateral autoland system with automatic path definition [AIAA PAPER 81-1751] A82-13993

The Maneuvering Flight Path Display - A flight trajectory solution display concept
A82-14824

Application of singular perturbation theory
N82-12050

FLIGHT SAFETY

Safety of helicopters in flight --- Russian book
A82-14946

A new safety harness for mobile aircrew
A82-14963

Computer Air Carrier Symposium
[AD-A104894] N82-12054

Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A104922] N82-12055

Orienting description of air traffic control in the Netherlands
[VTH-LR-285] N82-12063

FLIGHT SIMULATION

Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators
[AIAA 81-2230] A82-13463

Avionics systems simulation for the Northrop F/A-18L aircraft
[AIAA 81-2274] A82-13488

The need for, and development of, a simulation facility at the Naval Air Test Center
[AIAA PAPER 81-2488] A82-13917

Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA --- Quiet Short-haul Research Aircraft
[AIAA PAPER 81-2480] A82-13938

Jet V/STOL wind-tunnel simulation and groundplane effects
A82-13973

A review of flight-to-wind tunnel drag correlation
[AIAA PAPER 81-2475] A82-14382

Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor --- Electronically Agile Radar/Gimbaled Electrically suspended gyro Airborne Navigation System
A82-14739

General purpose real-time interaction panel for digital simulation --- of flight control systems
A82-14831

Inverse SAR and its application to aircraft classification
A82-14871

Computer image generation for flight simulation
A82-15599

The effect of visual information on manual approach and landing
[NLR-MP-80019-U] N82-12064

Use of a helmet-mounted matrix display for presenting energy-maneuverability information during simulated close combat
N82-13061

FLIGHT SIMULATORS

Low cost programmable multisimulator facility
[AIAA 81-2229] A82-13534

Commentary on facilities used in the development of a Sea Harrier all weather operations capability
[AIAA PAPER 81-2407] A82-13892

Comparison of low-speed handling qualities in ground-based and in-flight simulator tests
[AIAA PAPER 81-2478] A82-13936

The design and implementation of a canned scenario function for the F-16 dynamic system simulator
A82-14678

A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[NASA-TM-82770] N82-13144

FLIGHT TEST INSTRUMENTS

Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140

FLIGHT TESTS

On matching the systems identification technique to the particular application --- in evaluating flight test data
A82-13119

Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes
A82-13120

Aircraft separation assurance avionics
[AIAA 81-2239] A82-13467

The use of separated multifunction inertial sensors for flight control
[AIAA 81-2295] A82-13502

Design and flight test of a lateral-directional command augmentation system
[AIAA 81-2331] A82-13527

Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/
[AIAA PAPER 81-2409] A82-13852

Enhanced F-15 air-to-ground flight demonstrations
[AIAA PAPER 81-2413] A82-13854

The F-16/79 test program
[AIAA PAPER 81-2414] A82-13855

Organizing and training for innovative flight test management
[AIAA PAPER 81-2416] A82-13856

Flight experience with a remotely augmented vehicle flight test technique
[AIAA PAPER 81-2417] A82-13857

A technique to determine lift and drag polars in flight and their application
[AIAA PAPER 81-2420] A82-13859

Navy performance modeling techniques
[AIAA PAPER 81-2431] A82-13869

HiMAT aerodynamic design and flight test experience
[AIAA PAPER 81-2433] A82-13871

Advancing blade concept /ABC/ development test program
[AIAA PAPER 81-2437] A82-13873

Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2438] A82-13874

The Cessna T303 Crusader
[AIAA PAPER 81-2440] A82-13876

Government testing
[AIAA PAPER 81-2443] A82-13877

Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13878

Planning a helicopter flight test program
[AIAA PAPER 81-2381] A82-13881

Recent improvements at the Naval Air Test Center for increased test system flexibility
[AIAA PAPER 81-2392] A82-13888

Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center
[AIAA PAPER 81-2405] A82-13891

Information technology and its impact on test and evaluation at the Naval Air Test Center
[AIAA PAPER 81-2396] A82-13894

Georgia Tech coherent jammer flight test
[AIAA PAPER 81-2452] A82-13898

Fleet Flight Loads Survey monitoring and analysis techniques
[AIAA PAPER 81-2461] A82-13903

Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906

Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor
[AIAA PAPER 81-2507] A82-13907

Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers
[AIAA PAPER 81-2510] A82-13908

Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/
[AIAA PAPER 81-2514] A82-13911

The Air Force Flight Test Center - Utah Test and Training Range in the 1980's
[AIAA PAPER 81-2487] A82-13916

The need for, and development of, a simulation facility at the Naval Air Test Center
[AIAA PAPER 81-2488] A82-13917

A unique integrated flight testing facility for advanced control/display research
[AIAA PAPER 81-2490] A82-13919

Flight testing the suspended maneuvering system --- helicopter firefighting and rescue techniques
[AIAA PAPER 81-2498] A82-13922

Improved techniques for the calibration and measurement of in-flight loads
[AIAA PAPER 81-2502] A82-13924

Overview of flight and ground testing with emphasis on the wind tunnel
[AIAA PAPER 81-2474] A82-13928

F-4 Advanced Avionics Flight Test
[AIAA PAPER 81-2464] A82-13929
F/A-18 high authority/high gain digital flight control system development and flight testing
[AIAA PAPER 81-2465] A82-13930
The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane
[AIAA PAPER 81-2467] A82-13931
Comparison of low-speed handling qualities in ground-based and in-flight simulator tests
[AIAA PAPER 81-2478] A82-13936
Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA --- Quiet Short-haul Research Aircraft
[AIAA PAPER 81-2480] A82-13938
Two at a time - Flight test plans for the new Boeing airliners
[AIAA PAPER 81-2378] A82-13941
Flight test concept evolution
[AIAA PAPER 81-2375] A82-13944
The development and use of a computer-interactive data acquisition and display system in a flight environment
[AIAA PAPER 81-2371] A82-13946
Automatic digital gain ranging --- for flight test telemetry data
[AIAA PAPER 81-2370] A82-13947
F/A-18 Flight Test program overview - 1 September 1981
[AIAA PAPER 81-2351] A82-13955
Navstar Global Positioning System flight test program overview
[AIAA PAPER 81-2350] A82-13956
Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition
[AIAA PAPER 81-1920] A82-13962
Status and tracking system for flight test data products
[AIAA PAPER 81-2395] A82-14376
An advanced facility for processing aircraft dynamic test data
[AIAA PAPER 81-2398] A82-14377
Experience with flight test trajectory guidance
[AIAA PAPER 81-2504] A82-14379
Pave Mover Flight Test Program
[AIAA PAPER 81-2492] A82-14380
In-flight deflection measurement of the HiMAT aeroelastically tailored wing
[AIAA PAPER 81-2450] A82-14381
KC-10, flight test program management - The contractor's viewpoint
[AIAA PAPER 81-2380] A82-14384
62% manned aircraft demonstrator - Next generation trainer --- cost effective pilot trainer
[AIAA PAPER 81-2519] A82-14385
Hover tests of the XV-15 Tilt Rotor Research Aircraft
[AIAA PAPER 81-2501] A82-14386
Testing capabilities of the 3246th Test Wing
[AIAA PAPER 81-2484] A82-14387
Integrated flight testing based on nonlinear system identification data processing techniques
[AIAA PAPER 81-2449] A82-14389
Applications of covariance analysis simulation to avionics flight testing
A82-14767
Flight management systems for modern jet aircraft
A82-14778
The X-14 - 24 years of V/STOL flight testing
A82-14927
Ball-Bartoe Jetwing flight tests
A82-14928
Flight investigations of integrated descent rate control systems
A82-14929
Progress report - CH-47 modernization program
A82-14930
USNTPS spin program
A82-14931
The USAF Test Pilot School high angle of attack and spin training program
A82-14932
Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps
A82-14933
F/A-18A high angle of attack/spin testing
A82-14934
KC-10 flight test program
A82-14935
The all composite Lear Fan 2100
A82-14936
Acceptance testing of the Calspan variable stability Learjet
A82-14937
F/A-18 roll rate improvement program
A82-14939
AV-8B technical update - Leading edge root extension development
A82-14940
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80
A82-14954
Direct free-flight analysis of aircraft dynamics at high angles of attack
A82-15596
Flight trail of the Aircraft Fatigue Data Analysis System (AFDAS) Mk 2 prototype
[AD-A105270] N82-12066

FLIGHT TIME
Electronic master monitor and advisory display system test and demonstration report
[AD-A105317] N82-13141

FLIGHT TRAINING
Group 1: Scenario design and development issues
N82-13131

FLOQUET THEOREM
Application of the ONERA dynamic stall model to a helicopter blade in forward flight
[ONERA, TP NO. 1981-89] A82-13992

FLOW CHARACTERISTICS
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing
N82-13092

FLOW DISTRIBUTION
A large-scale investigation of engine influence on inlet performance at angle-of-attack
[AIAA PAPER 81-2481] A82-13939
Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors
A82-15606
The numerical solution of incompressible turbulent flow over airfoils
N82-12030
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073
Model testing techniques for measuring inlet drag
N82-13084
The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft
N82-13086
Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations
[NASA-TP-1940] N82-13142

FLOW EQUATIONS
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
N82-13069

FLOW MEASUREMENT
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
N82-13069
Prop-fan integration at cruise speeds
N82-13097

FLOW THEORY
Prop-fan integration at cruise speeds
N82-13097

FLUIDIC CIRCUITS
A dual input actuator for fluidic backup flight control
A82-13088

FLUTTER
Trim tab excitation system for the BAe 146
A82-14363
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

Design for active and passive flutter suppression and gust alleviation
[NASA-CR-3482] N82-13147
FLUTTER ANALYSIS
Wing/store flutter - An active adaptive control application A82-13122
Flight vibration optimization via conformal mapping A82-13975
Aeroelasticity matters: Some reflections on two decades of testing in the NASA Langley transonic dynamics tunnel
[NASA-TM-83210] N82-12041
Computational methods of robust controller design for aerodynamic flutter suppression
[NASA-CR-164983] N82-12080
Interactive aircraft flight control and aeroelastic stabilization --- forward swept wing flight vehicles
[NASA-CR-165036] N82-13150
FLY BY WIRE CONTROL
A dual input actuator for fluidic backup flight control A82-13088
Direct digital drive actuation
[AIAA 81-2298] A82-13505
Reliability analysis of the F-8 digital fly-by-wire system
[NASA-CR-163110] N82-12079
FOAMS
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass
[AIAA PAPER 81-2445] A82-14383
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications
[NASA-CR-167421] N82-12230
FREE FLIGHT TEST APPARATUS
Direct free-flight analysis of aircraft dynamics at high angles of attack A82-15596
FREQUENCY RESPONSE
The use of frequency methods in rotorcraft system identification
[AIAA PAPER 81-2386] A82-14392
FREQUENCY SYNTHESIZERS
High speed microwave phase-locked loops A82-14696
FRICTION DRAG
A review of flight-to-wind tunnel drag correlation
[AIAA PAPER 81-2475] A82-14382
FUEL COMBUSTION
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178
Effect of fuel-air-ratio nonuniformity on emissions of nitrogen oxides
[NASA-TP-1798] N82-13143
FUEL CONSUMPTION
Darboux points in minimum-fuel aircraft landing problems A82-13077
Fuel efficient flight profiles in an ATC flow management environment A82-13078
An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes
[AIAA 81-2330] A82-13526
Real-time flight management avionics software system
[AIAA 81-2340] A82-13530
Performance assessment of an advanced reheated turbo fan engine
[AIAA PAPER 81-2447] A82-13879
Wing design for light transport aircraft with improved fuel economy A82-14416
The all electric airplane - Its development and logistic support A82-14709
Flight management systems for modern jet aircraft A82-14778
Failure analysis of variable reluctance stepper motor --- in electronic fuel control system on jet engine A82-14792
Airplane performance sensitivities to lateral and vertical profiles A82-15846
CT7 - GE attacks commuter turboprop market A82-15950
FUEL TESTS
Quality optimization and unification of aviation gasolines A82-15721
FUEL-AIR RATIO
Effect of fuel-air-ratio nonuniformity on emissions of nitrogen oxides
[NASA-TP-1798] N82-13143
FULL SCALE TESTS
F/A-18 roll rate improvement program A82-14939
FUSELAGES
A recursive time domain analysis of distributed line grid networks with application to the LTA/EMP problem --- Lightning Threat Analysis A82-14761
Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds N82-13066
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing N82-13092
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody N82-13093

G

GAME THEORY
Air-to-air combat analysis - Review of differential-gaming approaches A82-13115
GARMENTS
Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen A82-14972
GAS FLOW
Divergence of a sweptforward wing A82-13560
GAS TURBINE ENGINES
Creep and aero gas turbine design A82-12987
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures A82-15482
Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors A82-15636
'In situ' composites for jet propulsion and stationary gas turbine applications A82-15824
Progress in protective coatings for aircraft gas turbines: A Review of NASA sponsored research
[NASA-TM-82740] N82-12216
GASOLINE
Quality optimization and unification of aviation gasolines A82-15721
GEARS
Vibration test procedures for accessory angle drive gearboxes on Atar 09C engines --- turbojet engines
[AD-A105269] N82-12076
GENERAL AVIATION AIRCRAFT
An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes
[AIAA 81-2330] A82-13526
Emergency in-flight egress for general aviation aircraft A82-14953
Design study report for General Aviation Loran-C receiver
[AD-A104921] N82-12062
NASA research in aircraft propulsion
[NASA-TM-82771] N82-13146
GLASS FIBER REINFORCED PLASTICS
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass
[AIAA PAPER 81-2445] A82-14383

GLIDING
  A look at the Hoffman Triangular parachute - The first successful glidable parachute A82-14966
GLOBAL POSITIONING SYSTEM
  Navstar Global Positioning System flight test program overview [AIAA PAPER 81-2350] A82-13956
  Weapon delivery system using GPS A82-14711
  Passive terrain following using stored map and global positioning system A82-14772
GOVERNMENT/INDUSTRY RELATIONS
  Government testing [AIAA PAPER 81-2443] A82-13877
  The payoff from U.S. investment in aeronautical research and development A82-14793
GRAPHITE-EPOXY COMPOSITES
  In-service inspection methods for graphite-epoxy structures on commercial transport aircraft [NASA-CR-165746] N82-12142
GROUND BASED CONTROL
  AN/TPN-25 and AN/GPN-22 precision approach radars A82-14856
GROUND EFFECT (AERODYNAMICS)
  Jet V/STOL wind-tunnel simulation and groundplane effects A82-13973
GROUND HANDLING
  C-5A unsurfaced taxi and off-load demonstrations [AIAA PAPER 81-2439] A82-13875
GROUND SPEED
  The use of groundspeed, in a wind shear and the flight evaluation of a radar-altimeter-based system for the measurement of groundspeed [AD-A104758] N82-12060
GROUND TESTS
  Overview of flight and ground testing with emphasis on the wind tunnel [AIAA PAPER 81-2474] A82-13928
  Comparison of low-speed handling qualities in ground-based and in-flight simulator tests [AIAA PAPER 81-2478] A82-13936
GUIDANCE (MOTION)
  Experience with flight test trajectory guidance [AIAA PAPER 81-2504] A82-14379
GUIDANCE SENSORS
  Redundancy management of skewed and dispersed inertial sensors [AIAA 81-2296] A82-13503
  Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft [AIAA 81-2297] A82-13504
  Navigation for helicopters by multiple use of inertial sensors A82-14713
GUIDE VANES
  Effect of a part span variable inlet guide vane on TF34 fan performance [NASA-CR-165458] N82-12075
  Transonic flows in an air inlet with large incidence and the effect of a blowing trap N82-13071
GUNS (ORDNANCE)
  Evaluation of advanced air-to-air gunnery fire control systems A82-14750
GUST ALLEVIATORS
  Design for active and passive flutter suppression and gust alleviation [NASA-CR-3482] N82-13147

H

HALL EFFECT
  Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field [NASA-TM-82750] N82-13908
HARMONIC EXCITATION
  Structural dynamics: Modified calculations --- natural and harmonically excited vibrations of modified structures; increased computation efficiency [BMVG-FBWT-81-1] N82-13457
HARNESSES
  'Little people' problem /MA-2 torso harness/ A82-14958
  A new safety harness for mobile aircrew A82-14963
HARRIER AIRCRAFT
  Commentary on facilities used in the development of a Sea Harrier all weather operations capability [AIAA PAPER 81-2407] A82-13892
  AV-8B technical update - Leading edge root extension development A82-14940
  A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation [NASA-TM-82770] N82-13144
HAZARDS
  Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions [AD-A104757] N82-12057
HEAD-UP DISPLAYS
  Applications of head-up displays in commercial transport aircraft [AIAA 81-2300] A82-13506
  The LANTIRN wide field-of-view raster Head-Up Display --- Low Altitude Navigation and Targeting IR for Night A82-14825
  Head up displays N82-13052
HEAT RESISTANT ALLOYS
  Attack on superalloys by chemical and electrolytic processes A82-14365
  'In situ' composites for jet propulsion and stationary gas turbine applications A82-15824
HEAVY LIFT HELICOPTERS
  Heavy lift helicopters - A national technology opportunity A82-13241
HELICOPTER CONTROL
  The design of exact nonlinear model followers --- with application to trajectory autopilot for helicopter A82-13125
  Helicopter IFR - Past, present and future and future A82-13245
  Navigation for helicopters by multiple use of inertial sensors A82-14713
  Application of multiple model estimation techniques to a recursive terrain height correlation system A82-14768
  Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches A82-15847
HELICOPTER DESIGN
  The Agusta A129 A82-13237
  Public service helicopters - Is the grass greener on the other side of the fence A82-13238
  Fatigue methodology - A technical management system for helicopter safety and durability A82-13240
  Heavy lift helicopters - A national technology opportunity A82-13241
  The FAA's proposed helicopter certification rules A82-13242
  Wire strike protection A82-13246
  Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter A82-14975
  How the helicopter cockpit designer uses digital avionics N82-13039
  Integration of controls and displays in US Army helicopter cockpits N82-13053
HELICOPTER ENGINES
  The protection of gas turbine blades - A platinum aluminide diffusion coating A82-14364
HELICOPTER PERFORMANCE
  The Agusta A129 A82-13237

Heavy lift helicopters - A national technology opportunity A82-13241
Helicopter icing A82-13243
Planning a helicopter flight test program [AIAA PAPER 81-2381] A82-13881
Flight vibration optimization via conformal mapping A82-13975
Progress report - CH-47 modernization program A82-14930
Safety of helicopters in flight --- Russian book A82-14946
System identification helicopter parameters. Determination from flight tests, phase 2 [BMVG-FBWT-80-12] N82-13137

HELICOPTER PROPELLER DRIVE
In-flight computation of helicopter transmission fatigue life expenditure [AIAA PAPER 81-2434] A82-13872

HELICOPTER TAIL ROTORS
An analysis of civil aviation propeller-to-person accidents: 1965-1979 [AD-A105365] N82-12053

HELICOPTER WAKES
Experimental and analytical studies of a model helicopter rotor in hover [NASA-TM-81232] N82-12042

HELICOPTERS
Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/ [AIAA PAPER 81-2514] A82-13911
Flight testing the suspended maneuvering system --- helicopter firefighting and rescue techniques [AIAA PAPER 81-2498] A82-13922
HASEP - Survival from crashed Navy helicopters A82-14977
Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions [AD-A104757] N82-12057
Flight evaluation of LORAN-C as a helicopter navigation aid in the Baltimore Canyon oil exploration area [AD-A105260] N82-12059
Electronic Master Monitor and Advisory Display System (EMMADS) [AD-A105082] N82-12067
A vapour cycle cabin cooling system for the Sea King MK.50 helicopter [AD-A105211] N82-12069
Experimental investigation of a helmet mounted sight/display for helicopter N82-13060
Helicopter reliability and maintainability trends during development and production [AD-A105775] N82-13136

HELMET MOUNTED DISPLAYS
Head up displays N82-13052
Experimental investigation of a helmet mounted sight/display for helicopter N82-13060
Use of a helmet-mounted matrix display for presenting energy-maneuverability information during simulated close combat N82-13061

HIGH PRESSURE
The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine A82-14414

HIGH VOLTAGES
Computer modeling of an aircraft HVDC electrical system A82-14819
High voltage/high power for airborne applications A82-15918

HOMING DEVICES
A VHF homing system with VHF radiotelephony for area-representative strip-survey flights conducted, as part of combined forest inventories, with light aircraft carrying 70 mm and 35 mm cameras A82-15748

HOT SURFACES
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires [NASA-CR-165011] N82-13186

HOVERING
Application of the ONERA dynamic stall model to a helicopter blade in forward flight [ONERA, TP NO. 1981-89] A82-13992
Hover tests of the XV-15 Tilt Rotor Research Aircraft [AIAA PAPER 81-2501] A82-14386
Experimental and analytical studies of a model helicopter rotor in hover [NASA-TM-81232] N82-12042

HUGHES AIRCRAFT
Pave Hover Flight Test Program [AIAA PAPER 81-2492] A82-14380

HUMAN FACTORS ENGINEERING
Digital avionics - What a pilot expects to see [AIAA 81-2217] A82-13455
Electronic flight deck displays for transport aircraft [AIAA 81-2264] A82-13483
F/A-18 'Hornet' - One man operability [AIAA 81-2266] A82-13484
'Little people' problem /MA-2 torso harness/ A82-14956
Computer image generation for flight simulation A82-15599
Computer Air Carrier Symposium [AD-A104894] N82-12054
Color CRT displays for the cockpit N82-13051
Using voice control onboard combat aircraft N82-13056
Experimental investigation of a helmet mounted sight/display for helicopter N82-13060
Tanker avionics and aircrew complement evaluation N82-13063
F/A 18 Hornet crew station N82-13064
Paven aircraft filter-absorber --- agricultural aircraft [AD-A058962] N82-13139

HYDRAULIC CONTROL
Will power-by-wire replace power-by-hydraulics A82-14707

HYDRAULIC FLUIDS
Efficient use of working fluids in aviation hydraulic systems A82-15724

HYDROCARBON FUEL PRODUCTION
Development of catalytic systems for the conversion of syngas to jet fuel and diesel fuel and higher alcohols [DE82-000067] N82-12255

HYDROCARBON FUELS
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires [NASA-CR-165011] N82-13186

I

ICE FORMATION
Helicopter icing A82-13243

IDENTIFYING
An update of an integrated CNI system - TIES --- Communication, Navigation, and Identification provided by Tactical Information Exchange System [AIAA 81-2292] A82-13500

IMAGE PROCESSING
Computational considerations for fusion in target identification systems --- multisensor correlation A82-14735
Algorithms for an adaptive dynamic window in electronic map systems A82-14769
Inverse SAR and its application to aircraft classification A82-14871

IMAGING TECHNIQUES
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model A82-14779

Head up displays
N82-13052

IMPACT DAMAGE
Wire strike protection
A82-13246

IMPACT RESISTANCE
The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region
A82-14416

IMPACT TESTS
Test and evaluation of improved aircrew restraint systems
A82-14974

IN-FLIGHT MONITORING
Computer-in-control selection logic for a triplex digital flight control system
[AIAA 81-2236] A82-13465
In-flight computation of helicopter transmission fatigue life expenditure
[AIAA PAPER 81-2434] A82-13872
Direct strike lightning measurement system --- for aircraft
[AIAA PAPER 81-2513] A82-13910
Improved techniques for the calibration and measurement of in-flight loads
[AIAA PAPER 81-2502] A82-13924
Flight trail of the Aircraft Fatigue Data Analysis System (AFDAS) Mk 2 prototype
[AD-A105270] N82-12066
Electronic Master Monitor and Advisory Display System (EMMADS)
[AD-A105082] N82-12067

INCIDENCE
Transonic flows in an air inlet with large incidence and the effect of a blowing trap
N82-13071

INCOMPRESSIBLE FLOW
The numerical solution of incompressible turbulent flow over airfoils
N82-12030

INDEXES (DOCUMENTATION)
Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977
[AD-A104759] N82-12056

INERTIAL NAVIGATION
Fault detection for two physically separated, communicating inertial measurement units
A82-13142
The use of separated multifunction inertial sensors for flight control
[AIAA 81-2295] A82-13502
Navigation for helicopters by multiple use of inertial sensors
A82-14713
Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor --- Electronically Agile Radar/Gimbaled Electrically suspended gyro Airborne Navigation System
A82-14739

INERTIAL PLATFORMS
A failure detection and isolation system for tactical aircraft with separated IMUs
A82-14684

INERTIAL REFERENCE SYSTEMS
The use of separated multifunction inertial sensors for flight control
[AIAA 81-2295] A82-13502
Strapdown inertial reference systems performance analysis
A82-14682

INFLATING
Further test results of parachutes with automatic inflation modulation /A.I.M./
A82-14965

INFORMATION FLOW
Higher order Information Transfer Systems are coming
[AIAA 81-2317] A82-13517

INFORMATION SYSTEMS
An update of an integrated CNI system - TIES --- Communication, Navigation, and Identification provided by Tactical Information Exchange System
[AIAA 81-2292] A82-13500
Advanced weapon systems - Integration technology --- Digital Avionic Information System
[AIAA 81-2213] A82-13533
Information technology and its impact on test and evaluation at the Naval Air Test Center
[AIAA PAPER 81-2396] A82-13894
Implementing the DAIS executive --- Digital Avionics Information System software feasibility for aircraft systems
A82-14814

INFRARED DETECTORS
Collection and simulation of spatial infrared signatures of military jet aircraft
[AIAA PAPER 81-2494] A82-13921

INFRARED IMAGERY
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model
A82-14779
The LANTIRN wide field-of-view raster Head-Up Display --- Low Altitude Navigation and Targeting IR for Night
A82-14825

INITIATORS (EXPLOSIVES)
A ballistic design model for initiators for aircraft personnel escape systems
A82-14984
Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation
A82-14985

INLET AIRFRAME CONFIGURATIONS
Aerodynamics of Power Plant Installation
[AGARD-CP-301] N82-13065
Performance of highly integrated inlets for supersonic aircraft
N82-13066
Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds
N82-13068
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
N82-13069
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070
The design and development of the Tornado engine air intake
N82-13074
Final report on the FueFo-4 major theme: Interference drag with airframe/engine integration on fighter aircraft
[BMVG-FBWT-79-20] N82-13116

INLET FLOW
A large-scale investigation of engine influence on inlet performance at angle-of-attack
[AIAA PAPER 81-2481] A82-13939
Effect of a part span variable inlet guide vane on TF34 fan performance
[NASA-CR-165458] N82-12075
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
N82-13069
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073
The design and development of the Tornado engine air intake
N82-13074
An acquisition and analysis system for dynamic tests of air inlets
N82-13082
Model testing techniques for measuring inlet drag
N82-13084
Thrust modulation methods for a subsonic V/STOL aircraft
[NASA-TM-82747] N82-13112
Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations
[NASA-TP-1940] N82-13102

INSTALLATION MANUALS
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140

INSTALLING
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
N82-13088
INSTRUMENT COMPENSATION
AFFTC standard airspeed calibration procedures
[AD-A104830] N82-12074
INSTRUMENT ERRORS
A concept for a high-accuracy, low-cost accelerometer
A82-14685
INSTRUMENT FLIGHT RULES
Helicopter icing
A82-13243
Helicopter IFR - Past, present and future and future
A82-13245
INSTRUMENT PACKAGES
Planning a helicopter flight test program
[AIAA PAPER 81-2381] A82-13881
INTERACTIVE CONTROL
Advanced display systems for crew stations of tactical aircraft
[AIAA 81-2312] A82-13514
The development and use of a computer-interactive data acquisition and display system in a flight environment
[AIAA PAPER 81-2371] A82-13946
A synthesis technique for highly uncertain and interacting multivariable flight control systems
A82-14627
INTERCEPTION
Comparison between the exact and an approximate feedback solution for medium range interception problems
A82-13106
INTERFACES
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140
INTERFERENCE DRAG
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing
N82-13092
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093
Final report on the FuePo-4 major theme: Interference drag with airframe/engine integration on fighter aircraft
[BMVG-FBWT-79-20] N82-13116
INTERFERENCE LIFT
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090
INVESTMENTS
The payoff from U.S. investment in aeronautical research and development
A82-14793
A new approach to modeling the cost of ownership for aircraft systems
[AD-A104434] N82-13979
INVISCID FLOW
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093
A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow
N82-13094
ISOPARAMETRIC FINITE ELEMENTS
A set of finite elements developed for the dynamic computation of composite helicopter blades
[ONERA, TP NO. 1981-87] A82-13990
ITERATIVE SOLUTION
Computational methods of robust controller design for aerodynamic flutter suppression
[NASA-CR-164983] N82-12080

J

J-79 ENGINE
The F-16/79 test program
[AIAA PAPER 81-2414] A82-13855
JAMMERS
Georgia Tech coherent jammer flight test
[AIAA PAPER 81-2452] A82-13898
JET AIRCRAFT
Collection and simulation of spatial infrared signatures of military jet aircraft
[AIAA PAPER 81-2494] A82-13921
Operational evaluation of the new generation of jet transport aircraft
[AIAA PAPER 81-2377] A82-13942
Jet V/STOL wind-tunnel simulation and groundplane effects
A82-13973
Flight management systems for modern jet aircraft
A82-14778
The influence of wind shear and vertical winds on takeoffs and go-arounds
A82-15823
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing
N82-13092
JET ENGINE FUELS
Determination and analysis of jet and missile fuel deposits
[AD-A105458] N82-12248
Development of catalytic systems for the conversion of syngas to jet fuel and diesel fuel and higher alcohols
[DE82-000067] N82-12255
JET ENGINES
Failure analysis of variable reluctance stepper motor --- in electronic fuel control system on jet engine
A82-14792
'In situ' composites for jet propulsion and stationary gas turbine applications
A82-15824
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073
The design and development of the Tornado engine air intake
N82-13074
Integration of advanced exhaust nozzles
N82-13075
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires
[NASA-CR-165011] N82-13186
JET EXHAUST
Prediction of subsonic aircraft flows with jet exhaust interactions
N82-13096
JET MIXING FLOW
Investigation of acoustic interactions in jet thrust augmenting ejectors
[AD-A106083] N82-13835
JET THRUST
Performance assessment of an advanced reheated turbo fan engine
[AIAA PAPER 81-2447] A82-13879

K

KALMAN FILTERS
Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor --- Electronically Agile Radar/Gimbaled Electrically suspended gyro Airborne Navigation System
A82-14739
Application of multiple model estimation techniques to a recursive terrain height correlation system
A82-14760

L

L-1011 AIRCRAFT
Fault isolation methodology for the L-1011 digital avionic flight control system
[AIAA 81-2223] A82-13458

LAGRANGE MULTIPLIERS
  Mathematical programming in engineering design problems
  A82-15864

LANDING AIDS
  Digital signal processing on a background of rereflections for the international aircraft landing system
  A82-13703

LANDING SIMULATION
  Computer-animated predictive displays for microwave landing approaches
  A82-15816

LASER APPLICATIONS
  Digital detection and processing of laser beacon signals for aircraft collision hazard warning
  [AIAA 81-2328] A82-13525

LASER RANGER/TRACKER
  ATARK laser tracking system
  A82-13016
  Options for GTE precision automated tracking system --- airborne laser tracking system
  A82-13020

LASER TARGET DESIGNATORS
  Electro-optical vector scoring system --- for missile miss distance in fleet training exercises
  [AIAA PAPER 81-2373] A82-13945

LASER TARGETS
  ATARK laser tracking system
  A82-13016

LATERAL CONTROL
  Design and flight test of a lateral-directional command augmentation system
  [AIAA 81-2331] A82-13527
  A cost effective method for the control of roll due to side slip on a low speed aircraft
  [AIAA PAPER 81-2422] A82-13861
  Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle
  [NASA-TM-81366] N82-13149

LATERAL STABILITY
  A cost effective method for the control of roll due to side slip on a low speed aircraft
  [AIAA PAPER 81-2422] A82-13861

LEADING EDGES
  AV-8B technical update - Leading edge root extension development
  A82-14940

LEAR JET AIRCRAFT
  Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes
  A82-13120
  The all composite Lear Fan 2100
  A82-14936
  Acceptance testing of the Calspan variable stability Learjet
  A82-14937

LEAST SQUARES METHOD
  Performance estimation from non-steady manoeuvres
  [AIAA PAPER 81-2424] A82-13863

LIFE CYCLE COSTS
  Advanced integrated CNI architectures --- Communications, Navigation and Identification avionics for tactical aircraft and attack helicopter
  A82-14763
  A new approach to modeling the cost of ownership for aircraft systems
  [AD-A104434] N82-13979

LIFE SUPPORT SYSTEMS
  U.S. Navy life support development trends
  A82-14952

LIFT
  A technique to determine lift and drag polars in flight and their application
  [AIAA PAPER 81-2420] A82-13859

LIFT AUGMENTATION
  Progress report - CH-47 modernization program
  A82-14930

LIFT DRAG RATIO
  Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition
  [AIAA PAPER 81-1926] A82-13962

LIGHT AIRBORNE MULTIPURPOSE SYSTEM
  Light Airborne Multi-Purpose System
  A82-13244

LIGHT AIRCRAFT
  Wing design for light transport aircraft with improved fuel economy
  A82-14416

LIGHTNING
  Thunderstorm hazards flight research - Program overview
  [AIAA PAPER 81-2412] A82-13853
  Direct strike lightning measurement system --- for aircraft
  [AIAA PAPER 81-2513] A82-13910
  A recursive time domain analysis of distributed line grid networks with application to the LTA/EMP problem --- Lightning Threat Analysis
  A82-14761
  Investigation of severe lightning strike incidents to two USAF F-106A aircraft
  [NASA-CR-165794] N82-12052

LIGHTNING SUPPRESSION
  Assessment methodology of the lightning threat to advanced aircraft
  A82-14759

LINE OF SIGHT
  Experimental investigation of a helmet mounted sight/display for helicopter
  N82-13060

LINEAR PROGRAMMING
  Mathematical programming in engineering design problems
  A82-15864

LINEAR SYSTEMS
  Computational methods of robust controller design for aerodynamic flutter suppression
  [NASA-CR-164983] N82-12080

LINEARITY
  Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field
  [NASA-TM-82750] N82-13908

LIQUID CRYSTALS
  An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display
  [AIAA 81-2303] A82-13508

LIQUID ROCKET PROPELLANTS
  Determination and analysis of jet and missile fuel deposits
  [AD-A105458] N82-12248

LOAD DISTRIBUTION (FORCES)
  Calculation of wing-body-nacelle interference in subsonic and transonic potential flow
  N82-13095
  Prediction of subsonic aircraft flows with jet exhaust interactions
  N82-13096

LOAD TESTS
  The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region
  A82-14418
  Vibration test procedures for accessory angle drive gearboxes on Atar 09C engines --- turbojet engines
  [AD-A105269] N82-12076

LOGIC CIRCUITS
  Automatic digital gain ranging --- for flight test telemetry data
  [AIAA PAPER 81-2370] A82-13947

LOGIC DESIGN
  Computer-in-control selection logic for a triplex digital flight control system
  [AIAA 81-2236] A82-13465

LOGISTICS
  The all electric airplane - Its development and logistic support
  A82-14709

LONGITUDINAL CONTROL
  A decoupled control system for improved flight performance in wind shear
  A82-13079
  Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling
  A82-14826

LONGITUDINAL STABILITY
  Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle
  [NASA-TM-81366] N82-13149

LORAN C
A Loran-C prototype navigation receiver for general aviation
[AIAA 81-2329] A82-13532
Flight evaluation of LORAN-C as a helicopter navigation aid in the Baltimore Canyon oil exploration area
[AD-A105260] N82-12059
Design study report for General Aviation Loran-C receiver
[AD-A104921] N82-12062
LOW ALTITUDE
Application of multiple model estimation techniques to a recursive terrain height correlation system
A82-14768
The LANTIRN wide field-of-view raster Head-Up Display --- Low Altitude Navigation and Targeting IR for Night
A82-14025
LOW COST
Low cost programmable multisimulator facility
[AIAA 81-2229] A82-13534
A concept for a high-accuracy, low-cost accelerometer
A82-14685
LOW SPEED
A cost effective method for the control of roll due to side slip on a low speed aircraft
[AIAA PAPER 81-2422] A82-13861
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070
LOW SPEED WIND TUNNELS
A large-scale investigation of engine influence on inlet performance at angle-of-attack
[AIAA PAPER 81-2481] A82-13939
LUBRICATING OILS
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
A82-15723

M

MACH NUMBER
Studies of air inlets at Reynolds numbers comparable to flight in ONERA's F1 and S1MA wind tunnels
N82-13091
Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects
N82-13098
MAGNETOHYDRODYNAMICS
Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field
[NASA-TM-82750] N82-13908
MAGNETS
High speed PMG containment study for VSCF system --- Permanent Magnet Generator for Variable Speed Constant Frequency applications
A82-14791
MAINTAINABILITY
Helicopter reliability and maintainability trends during development and production
[AD-A105775] N82-13136
MAINTENANCE
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140
MAN MACHINE SYSTEMS
Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators
[AIAA 81-2230] A82-13463
Have we overlooked the pilot's role in an automated flight deck
[AIAA 81-2262] A82-13481
Avionics systems simulation for the Northrop F/A-18L aircraft
[AIAA 81-2274] A82-13488
Advanced display systems for crew stations of tactical aircraft
[AIAA 81-2312] A82-13514
The integration of control and display concepts for improved pilot situational awareness
A82-13972
The Maneuvering Flight Path Display - A flight trajectory solution display concept
A82-14824
Using voice control onboard combat aircraft
N82-13056
MANAGEMENT INFORMATION SYSTEMS
Conceptual design of an integrated power and avionics information system
A82-14788
MANAGEMENT METHODS
A summary of the Naval Postgraduate School Research Program
[AD-A104112] N82-13975
MANAGEMENT SYSTEMS
Fuel efficient flight profiles in an ATC flow management environment
A82-13078
MANEUVERABILITY
C-5A unsurfaced taxi and off-load demonstrations
[AIAA PAPER 81-2439] A82-13875
Use of a helmet-mounted matrix display for presenting energy-maneuverability information during simulated close combat
N82-13061
Maneuver load control for the reduction of design loads and improvement of the maneuverability of modern fighter aircraft
[BMVG-FBWT-81-2] N82-13130
MAP MATCHING GUIDANCE
Airborne Electronic Map Systems. I - Design
A82-14770
MAPPING
Airborne Electronic Map Systems. I - Design
A82-14770
Airborne Electronic Terrain Map System. II - Applications
A82-14773
MAPS
The electronic terrain map - A new avionics integrator
[AIAA 81-2289] A82-13498
MARKET RESEARCH
Public service helicopters - Is the grass greener on the other side of the fence
A82-13238
MATHEMATICAL MODELS
Digital control for flexible aircraft using reduced order models
A82-13094
Costs of noise nuisance from aircraft
A82-13314
Modeling procedures for handling qualities evaluation of flexible aircraft
A82-13968
Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions
[AD-A104757] N82-12057
The effect of visual information on manual approach and landing
[NLR-MP-80019-U] N82-12064
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[NASA-TM-82770] N82-13144
A new approach to modeling the cost of ownership for aircraft systems
[AD-A104434] N82-13979
MATHEMATICAL PROGRAMMING
Mathematical programming in engineering design problems
A82-15864
MAXIMUM LIKELIHOOD ESTIMATES
On matching the systems identification technique to the particular application --- in evaluating flight test data
A82-13119
MEASURING INSTRUMENTS
Rotor systems research aircraft /RSRA/ rotor force and moment measurement system
[AIAA PAPER 81-2516] A82-13913
MECHANICAL ENGINEERING
Compilation of abstracts of dissertations theses, and research papers submitted by candidates for degrees, 1 October 1979 - 30 September 1980
[AD-A104124] N82-13974

METAL COATINGS
The protection of gas turbine blades - A platinum aluminide diffusion coating
A82-14364
Progress in protective coatings for aircraft gas turbines: A Review of NASA sponsored research
[NASA-TM-82740] N82-12216
METAL FINISHING
The use of metal finishing in aircraft fuel systems
N82-12077
METAL SHEETS
The technology of sheet-metal stamping in the production of aircraft /2nd revised and enlarged edition/ --- Russian book
A82-14998
METAL WORKING
The technology of sheet-metal stamping in the production of aircraft /2nd revised and enlarged edition/ --- Russian book
A82-14998
METEOROLOGICAL RADAR
Commercial airborne weather radar technology
A82-14868
METEOROLOGICAL RESEARCH AIRCRAFT
Thunderstorm hazards flight research - Program overview
[AIAA PAPER 81-2412] A82-13853
METEOROLOGICAL SERVICES
Columbus, Ohio, Voice response system demonstration and evaluation
[AD-A104750] N82-12304
METEOROLOGY
A summary of the Naval Postgraduate School Research Program
[AD-A104112] N82-13975
METHOD OF CHARACTERISTICS
Three dimensional flow investigation with a method of characteristics in the inlet region and the blade-to-blade channels of supersonic axial compressors
[ESA-TT-637] N82-12078
MICROCOMPUTERS
Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis
[AIAA PAPER 81-2367] A82-13949
MICROPROCESSORS
Digital avionics display processor
[AIAA 81-2311] A82-13513
An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes
[AIAA 81-2330] A82-13526
Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor
[AIAA PAPER 81-2507] A82-13907
Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers
[AIAA PAPER 81-2510] A82-13908
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777
Microprocessor flight control application study
A82-14796
MICROWAVE EQUIPMENT
High speed microwave phase-locked loops
A82-14696
MICROWAVE LANDING SYSTEMS
Joint Tactical Microwave landing System /JTMLS/ airborne signal processing
[AIAA 81-2247] A82-13471
Development of an MLS lateral autoland system with automatic path definition
[AIAA PAPER 81-1751] A82-13993
Computer-animated predictive displays for microwave landing approaches
A82-15816
MLS performance assessment, task 4. Volume 1: Evaluation procedures and equipment design
[AD-A105393] N82-12061
MICROWAVE SWITCHING
High speed microwave phase-locked loops
A82-14696
MILITARY AIRCRAFT
Heavy lift helicopters - A national technology opportunity
A82-13241
LHX - An advanced avionics system design
[AIAA 81-2249] A82-13472
Flat panel developments for future military aircraft
[AIAA 81-2302] A82-13507
Fiber-optic immunity to EMI/EMP for military aircraft
[AIAA 81-2339] A82-13529
Recent improvements at the Naval Air Test Center for increased test system flexibility
[AIAA PAPER 81-2392] A82-13888
Collection and simulation of spatial infrared signatures of military jet aircraft
[AIAA PAPER 81-2494] A82-13921
KC-10, flight test program management - The contractor's viewpoint
[AIAA PAPER 81-2380] A82-14384
Future directions in CNI integrated avionics
A82-14720
New advances in signal processing technology for integrated CNI avionics --- Communication, Navigation, and Identification
A82-14762
Applications of covariance analysis simulation to avionics flight testing
A82-14767
Microprocessor flight control application study
A82-14796
Testing of the SJU-5A ejection seat for the F/A-18 /HORNET/ aircraft
A82-14955
Crashworthy military passenger seat development
A82-14976
Electronic flight deck displays for military transport aircraft
N82-13050
MILITARY HELICOPTERS
Light Airborne Multi-Purpose System
A82-13244
Advancing blade concept /ABC/ development test program
[AIAA PAPER 81-2437] A82-13873
Test and evaluation of improved aircrew restraint systems
A82-14974
Integration of controls and displays in US Army helicopter cockpits
N82-13053
MILITARY TECHNOLOGY
The interface of multifunction controls and displays to tomorrow's avionics
[AIAA 81-2290] A82-13499
Radar hostile fire location
A82-14857
MINICOMPUTERS
Low cost programmable multisimulator facility
[AIAA 81-2229] A82-13534
MISS DISTANCE
Electro-optical vector scoring system --- for missile miss distance in fleet training exercises
[AIAA PAPER 81-2373] A82-13945
MISSILE CONTROL
Electro-optical vector scoring system --- for missile miss distance in fleet training exercises
[AIAA PAPER 81-2373] A82-13945
Integrated Flight/Weapon Control design and evaluation
A82-14741
MISSILE LAUNCHERS
A methodology for missile launch envelope display evaluation
A82-14744
MISSILE TESTS
Naval Weapons Center - Test and evaluation in the 1980's
[AIAA PAPER 81-2485] A82-13940
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110
MONITORS
Electronic Master Monitor and Advisory Display System (EMMADS)
[AD-A105082] N82-12067
MONOPULSE RADAR
Performance evaluation of target report extractor in the monopulse ATCRBS --- Air Traffic Control Radar Beacon System
A82-14776

MOVING TARGET INDICATORS
Pave Mover Flight Test Program
[AIAA PAPER 81-2492] A82-14380
Some Italian research for developing new primary ATC radars
A82-14775
Air-to-ground MTI radar using a displaced phase center, phased array
A82-14681
Moving target Detector/Airport Surveillance radar (ASR-7) field evaluation
[AD-A105196] N82-12303
MRCA AIRCRAFT
A technique to determine lift and drag polars in flight and their application
[AIAA PAPER 81-2420] A82-13859
The design and development of the Tornado engine air intake
N82-13074
The subsonic performance of practical military variable area convergent nozzles
N82-13076
MULTIPLEXING
A polled contention multiplex system using MIL-STD-1553 protocol
[AIAA 81-2271] A82-13487
Advanced fiber optic systems for avionics applications
[AIAA 81-2319] A82-13518
Techniques for interfacing multiplex systems
[AD-A101457] N82-13135
MULTIPROCESSING (COMPUTERS)
Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis
[AIAA PAPER 81-2367] A82-13949
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777

N

NACELLES
Aerodynamics of Power Plant Installation
[AGARD-CP-301] N82-13065
Model testing techniques for measuring inlet drag
N82-13084
The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft
N82-13086
Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines
N82-13087
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
N82-13088
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
N82-13089
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing
N82-13092
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093
A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow
N82-13094
Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects
N82-13098
Thrust modulation methods for a subsonic V/STOL aircraft
[NASA-TM-82747] N82-13112
NASA PROGRAMS
Progress in aeronautical research and technology applicable to civil air transports
A82-13974
NAVIER-STOKES EQUATION
Prediction of subsonic aircraft flows with jet exhaust interactions
N82-13096
Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations
[NASA-TP-1940] N82-13142
NAVIGATION AIDS
Time-referencing of data in an asynchronous environment --- for fighter aircraft avionics
[AIAA 81-2341] A82-13531
Estimation of the efficiency of radioelectronic flight navigation systems
A82-13701
Flight evaluation of LORAN-C as a helicopter navigation aid in the Baltimore Canyon oil exploration area
[AD-A105260] N82-12059
NAVIGATION INSTRUMENTS
A Loran-C prototype navigation receiver for general aviation
[AIAA 81-2329] A82-13532
Applications of covariance analysis simulation to avionics flight testing
A82-14767
NAVSTAR SATELLITES
Navstar Global Positioning System flight test program overview
[AIAA PAPER 81-2350] A82-13956
Passive terrain following using stored map and global positioning system
A82-14772
NAVY
U.S. Navy life support development trends
A82-14952
HASEP - Survival from crashed Navy helicopters
A82-14977
A summary of the Naval Postgraduate School Research Program
[AD-A104112] N82-13975
NEAR WAKES
Theoretical analysis of wake-induced parachute collapse
[AIAA PAPER 81-1922] A82-13963
NEODYMIUM LASERS
Options for GTE precision automated tracking system --- airborne laser tracking system
A82-13020
NETHERLANDS
Orienting description of air traffic control in the Netherlands
[VTH-LR-285] N82-12063
NETWORK SYNTHESIS
Conceptual design of an integrated power and avionics information system
A82-14788
NEW JERSEY
Flight evaluation of LORAN-C as a helicopter navigation aid in the Baltimore Canyon oil exploration area
[AD-A105260] N82-12059
NIGHT VISION
The TADS/PNVS 'eyes' for the AH-64 attack helicopter
A82-13239
The LANTIRN wide field-of-view raster Head-Up Display --- Low Altitude Navigation and Targeting IR for Night
A82-14825
Experimental investigation of a helmet mounted sight/display for helicopter
N82-13060
NITROGEN OXIDES
Effect of fuel-air-ratio nonuniformity on emissions of nitrogen oxides
[NASA-TP-1798] N82-13143
NOISE POLLUTION
Costs of noise nuisance from aircraft
A82-13314
NOISE PREDICTION (AIRCRAFT)
The FAA's proposed helicopter certification rules
A82-13242

NOISE REDUCTION
  Aircraft absorbers - Promise and practice --- sound attenuation
    A82-14042
  Analysis of integrated fuel-efficient, low-noise procedures in terminal-area operations
    [DE81-029833] N82-13014
NONDESTRUCTIVE TESTS
  In-service inspection methods for graphite-epoxy structures on commercial transport aircraft
    [NASA-CR-165746] N82-12142
NONLINEAR SYSTEMS
  The design of exact nonlinear model followers --- with application to trajectory autopilot for helicopter
    A82-13125
  An approach to robust nonlinear control design --- with illustration of J-85 turbojet engine simulation
    A82-13128
  Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft
    [AIAA 81-2238] A82-13466
  Integrated flight testing based on nonlinear system identification data processing techniques
    [AIAA PAPER 81-2449] A82-14389
NONUNIFORM FLOW
  Effect of fuel-air-ratio nonuniformity on emissions of nitrogen oxides
    [NASA-TP-1798] N82-13143
NOSE INLETS
  Thrust modulation methods for a subsonic V/STOL aircraft
    [NASA-TM-82747] N82-13112
NOZZLE DESIGN
  Integration of advanced exhaust nozzles
    N82-13075
  The subsonic performance of practical military variable area convergent nozzles
    N82-13076
  Advanced exhaust nozzle technology
    N82-13078
NOZZLE EFFICIENCY
  Comparison of different nozzle concepts for a reheated turbofan
    N82-13077
  Advanced exhaust nozzle technology
    N82-13078
NOZZLE GEOMETRY
  The subsonic performance of practical military variable area convergent nozzles
    N82-13076
NOZZLE THRUST COEFFICIENTS
  Thrust modulation methods for a subsonic V/STOL aircraft
    [NASA-TM-82747] N82-13112
NUMERICAL ANALYSIS
  Air-to-air combat analysis - Review of differential-gaming approaches
    A82-13115
NUMERICAL CONTROL
  Parallel processing applied to digital flight control systems - Some perspectives
    A82-14794
  Microprocessor flight control application study
    A82-14796
NUMERICAL FLOW VISUALIZATION
  The numerical solution of incompressible turbulent flow over airfoils
    N82-12030

O

OBLIQUE WINGS
  AD-1 oblique wing aircraft program
    [AIAA PAPER 81-2354] A82-14390
OBSERVABILITY (SYSTEMS)
  The use of observers on relaxed static stability aircraft
    A82-14740
OCEANOGRAPHY
  A summary of the Naval Postgraduate School Research Program
    [AD-A104112] N82-13975
OFFSHORE ENERGY SOURCES
  Flight evaluation of LORAN-C as a helicopter navigation aid in the Baltimore Canyon oil exploration area
    [AD-A105260] N82-12059
OIL ADDITIVES
  Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
    A82-15723
OMEGA NAVIGATION SYSTEM
  Updated station deselection procedures to support automatic Omega receiver operation
    A82-14712
ONBOARD DATA PROCESSING
  Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor
    [AIAA PAPER 81-2507] A82-13907
  Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis
    [AIAA PAPER 81-2367] A82-13949
ONBOARD EQUIPMENT
  Rotor systems research aircraft /RSRA/ rotor force and moment measurement system
    [AIAA PAPER 81-2516] A82-13913
  Design study report for General Aviation Loran-C receiver
    [AD-A104921] N82-12062
OPERATING COSTS
  A new approach to modeling the cost of ownership for aircraft systems
    [AD-A104434] N82-13979
OPERATING TEMPERATURE
  The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine
    A82-14414
OPTICAL COMMUNICATION
  Light-guided information distribution systems
    [AIAA 81-2320] A82-13519
OPTICAL RADAR
  Options for GTS precision automated tracking system --- airborne laser tracking system
    A82-13020
OPTICAL TRACKING
  ATARS laser tracking system
    A82-13016
  Experimental investigation of a helmet mounted sight/display for helicopter
    N82-13060
OPTICAL WAVEGUIDES
  Light-guided information distribution systems
    [AIAA 81-2320] A82-13519
OPTIMAL CONTROL
  Digital control for flexible aircraft using reduced order models
    A82-13094
  On-line optimization of aircraft altitude and flight path angle dynamics
    A82-13107
  Application of singular perturbation theory
    N82-12050
  Computational methods of robust controller design for aerodynamic flutter suppression
    [NASA-CR-164983] N82-12080
OPTIMIZATION
  Flight vibration optimization via conformal mapping
    A82-13975
ORIFICE FLOW
  Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors
    A82-15606
OSCILLATIONS
  Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle
    [NASA-TM-81366] N82-13149

P

PANEL METHOD (FLUID DYNAMICS)
  A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow
    N82-13094

PARABOLIC ANTENNAS
Prediction and performance of radome-covered reflector antennas A82-15311

PARABOLIC REFLECTORS
Prediction and performance of radome-covered reflector antennas A82-15311

PARACHUTE DESCENT
Theoretical analysis of wake-induced parachute collapse [AIAA PAPER 81-1922] A82-13963
Escape systems decelerator technology [AIAA PAPER 81-1913] A82-13966
Automatic parachute releasers for premeditated parachuting A82-14960

PARACHUTES
The Air Force Flight Test Center - Utah Test and Training Range in the 1980's [AIAA PAPER 81-2487] A82-13916
Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition [AIAA PAPER 81-1928] A82-13962
The history of the development of the GQ aeroconical parachute - 1971-1980 A82-14961
Further test results of parachutes with automatic inflation modulation /A.I.M./ A82-14965
A look at the Hoffman Triangular parachute - The first successful glidable parachute A82-14966
Post ejection survival A82-14981

PARALLEL PROCESSING (COMPUTERS)
Parallel processing applied to digital flight control systems - Some perspectives A82-14794

PARAMETER IDENTIFICATION
On matching the systems identification technique to the particular application --- in evaluating flight test data A82-13119
Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes A82-13120
Computational considerations for fusion in target identification systems --- multisensor correlation A82-14735
The agile transversal filter - A flexible building block for ICNIA --- Integrated Communications, Navigation and Identification Avionics A82-14765
Application of multiple model estimation techniques to a recursive terrain height correlation system A82-14768
System identification helicopter parameters. Determination from flight tests, phase 2 [BMVG-FBWT-80-12] N82-13137

PASSENGER AIRCRAFT
Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor [AIAA PAPER 81-2507] A82-13907
Two at a time - Flight test plans for the new Boeing airliners [AIAA PAPER 81-2378] A82-13941
CT7 - GE attacks commuter turboprop market A82-15950
Computer Air Carrier Symposium [AD-A104894] N82-12054

PAVEMENTS
Measured pavement response to transient aircraft loadings N82-13442

PERFORMANCE PREDICTION
Performance estimation from non-steady manoeuvres [AIAA PAPER 81-2424] A82-13863
Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft [AIAA PAPER 81-2387] A82-14393
Strapdown inertial reference systems performance analysis A82-14682
Experimental and analytical studies of advanced air cushion landing systems [NASA-CR-3476] N82-12065
Simulator certification methods and the vertical motion simulator [NASA-CR-166252] N82-12082

PERFORMANCE TESTS
A decoupled control system for improved flight performance in wind shear A82-13079
Helicopter icing A82-13243
C-5A unsurfaced taxi and off-load demonstrations [AIAA PAPER 81-2439] A82-13875
Performance assessment of an advanced reheated turbo fan engine [AIAA PAPER 81-2447] A82-13879
Planning a helicopter flight test program [AIAA PAPER 81-2381] A82-13881
The Air Force Flight Test Center - Utah Test and Training Range in the 1980's [AIAA PAPER 81-2487] A82-13916
A unique integrated flight testing facility for advanced control/display research [AIAA PAPER 81-2490] A82-13919
F/A-18 Flight Test program overview - 1 September 1981 [AIAA PAPER 81-2351] A82-13955
Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition [AIAA PAPER 81-1928] A82-13962
Theoretical analysis of wake-induced parachute collapse [AIAA PAPER 81-1922] A82-13963
Testing capabilities of the 3246th Test Wing [AIAA PAPER 81-2484] A82-14387
Advanced fighter technology integration AFTI/F-16 test program overview [AIAA PAPER 81-2353] A82-14398
A concept for a high-accuracy, low-cost accelerometer A82-14685
Testing of the SJU-5A ejection seat for the F/A-18 /HORNET/ aircraft A82-14955
Test and evaluation of improved aircrew restraint systems A82-14974
Performance assessment of the ACES-II ejection seat-A-10 configuration A82-14980
Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation A82-14985

PERTURBATION THEORY
Comparison between the exact and an approximate feedback solution for medium range interception problems A82-13106
Application of singular perturbation theory N82-12050
Computational methods of robust controller design for aerodynamic flutter suppression [NASA-CR-164983] N82-12080

PHASE LOCKED SYSTEMS
High speed microwave phase-locked loops A82-14696

PHASE TRANSFORMATIONS
'In situ' composites for jet propulsion and stationary gas turbine applications A82-15824

PHASED ARRAYS
Using phased array radar for data communications A82-14725
Air-to-ground MTI radar using a displaced phase center, phased array A82-14881

PHOTOMAPPING
Algorithms for an adaptive dynamic window in electronic map systems A82-14769
Airborne Electronic Terrain Map System A82-14771

A VHF homing system with VHF radiotelephony for area-representative strip-survey flights conducted, as part of combined forest inventories, with light aircraft carrying 70 mm and 35 mm cameras
A82-15748

PILOT PERFORMANCE
Have we overlooked the pilot's role in an automated flight deck
[AIAA 81-2262] A82-13481
Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen
A82-14972

PILOT TRAINING
62% manned aircraft demonstrator - Next generation trainer --- cost effective pilot trainer
[AIAA PAPER 81-2519] A82-14385
USNTPS spin program
A82-14931
The USAF Test Pilot School high angle of attack and spin training program
A82-14932
Acceptance testing of the Calspan variable stability Learjet
A82-14937
Computer image generation for flight simulation
A82-15599
Simulator certification methods and the vertical motion simulator
[NASA-CR-166252] N82-12082

PIPER AIRCRAFT
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13878

PISTON ENGINES
An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes
[AIAA 81-2330] A82-13526
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13878

PITCHING MOMENTS
A calculation method for slender wing-body configurations in supersonic flow at high angles of attack --- nonlinear force and pitching moment characteristics
[BMVG-FBWT-79-15] N82-13115

PITOT TUBES
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070

PITTING
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
A82-15723

PLANFORMS
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110

PLASMA SPRAYING
Progress in protective coatings for aircraft gas turbines: A Review of NASA sponsored research
[NASA-TM-82740] N82-12216

PLATINUM COMPOUNDS
The protection of gas turbine blades - A platinum aluminide diffusion coating
A82-14364

PLENUM CHAMBERS
Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines
N82-13087

PNEUMATIC CONTROL
A dual input actuator for fluidic backup flight control
A82-13008

POLES (SUPPORTS)
Computational methods of robust controller design for aerodynamic flutter suppression
[NASA-CR-164983] N82-12080

POLYIMIDE RESINS
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications
[NASA-CR-167421] N82-12230

POSITION ERRORS
Updated station deselection procedures to support automatic Omega receiver operation
A82-14712
AN/TPN-25 and AN/GPN-22 precision approach radars
A82-14856

POSTFLIGHT ANALYSIS
Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor --- Electronically Agile Radar/Gimballed Electrically suspended gyro Airborne Navigation System
A82-14739

POTENTIAL FLOW
Remarks on the calculation of transonic potential flow by a finite volume method
A82-15835

POWER CONDITIONING
High voltage/high power for airborne applications
A82-15910

POWER EFFICIENCY
Will power-by-wire replace power-by-hydraulics
A82-14707

POWER SUPPLY CIRCUITS
High voltage/high power for airborne applications
A82-15910

POWERED LIFT AIRCRAFT
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/
[AIAA PAPER 81-2409] A82-13852

PREDICTION ANALYSIS TECHNIQUES
Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds
N82-13013

PREMIXING
Effect of fuel-air-ratio nonuniformity on emissions of nitrogen oxides
[NASA-TP-1798] N82-13143

PRESSURE DISTRIBUTION
Subcritical and supercritical airfoils for given pressure distribution
N82-12031
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110

PRESSURE DROP
Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors
A82-15606

PRESSURE EFFECTS
Effect of vacuum exhaust pressure on the performance of MHD ducts at high D-field
[NASA-TM-82750] N82-13908

PROCUREMENT MANAGEMENT
Government testing
[AIAA PAPER 81-2443] A82-13877
Flight test concept evolution
[AIAA PAPER 81-2375] A82-13944

PRODUCT DEVELOPMENT
Advanced fighter technology integration AFTI/F-16 test program overview
[AIAA PAPER 81-2353] A82-14398
Electromechanical actuation development program
A82-14705

PRODUCTION ENGINEERING
Quality optimization and unification of aviation gasolines
A82-15721

PROGRAM VERIFICATION (COMPUTERS)
The design and implementation of a canned scenario function for the F-16 dynamic system simulator
A82-14670

PROJECT MANAGEMENT
Organizing and training for innovative flight test management
[AIAA PAPER 81-2416] A82-13856
KC-10, flight test program management - The contractor's viewpoint
[AIAA PAPER 81-2300] A82-14384

PROJECTILES
- Radar hostile fire location A82-14857

PROPELLER BLADES
- An analysis of civil aviation propeller-to-person accidents: 1965-1979 [AD-A105365] N82-12053

PROPELLER EFFICIENCY
- An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes [AIAA 81-2330] A82-13526

PROPELLER FANS
- Prop-fan integration at cruise speeds N82-13097

PROPULSION SYSTEM CONFIGURATIONS
- The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft N82-13086
- NASA research in aircraft propulsion [NASA-TM-82771] N82-13146

PROPULSION SYSTEM PERFORMANCE
- Advancing blade concept /ABC/ development test program [AIAA PAPER 81-2437] A82-13873
- Recent propulsion system flight tests at the NASA Dryden Flight Research Center [AIAA PAPER 81-2438] A82-13874
- A look inside the Langley 16-foot transonic tunnel: User's guide [NASA-TM-83186] N82-12085

PROTECTIVE COATINGS
- The protection of gas turbine blades - A platinum aluminide diffusion coating A82-14364
- Progress in protective coatings for aircraft gas turbines: A Review of NASA sponsored research [NASA-TM-82740] N82-12216

PULSE COMMUNICATION
- A modular multiplexed digital voice intercommunications system A82-14721

PULSE DOPPLER RADAR
- Detection range analysis of an airborne medium PRF radar A82-14723

PULSED LASERS
- ATARK laser tracking system A82-13016

PYLONS
- Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference N82-13090
- Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody N82-13093

PYROTECHNICS
- Emergency in-flight egress for general aviation aircraft A82-14953
- A ballistic design model for initiators for aircraft personnel escape systems A82-14984

Q

QUALITATIVE ANALYSIS
- Determination and analysis of jet and missile fuel deposits [AD-A105458] N82-12248

QUALITY CONTROL
- Quality optimization and unification of aviation gasolines A82-15721

R

RADAR ANTENNAS
- Air-to-ground MTI radar using a displaced phase center, phased array A82-14881

RADAR APPROACH CONTROL
- AN/TPN-25 and AN/GPN-22 precision approach radars A82-14856

RADAR BEACONS
- Performance evaluation of target report extractor in the monopulse ATCRBS --- Air Traffic Control Radar Beacon System A82-14776
- A multimicroprocessor system for ATCRBS monopulse data processing A82-14777

RADAR DATA
- Using phased array radar for data communications A82-14725
- Extended time radar raw video recording A82-14909

RADAR DETECTION
- Detection range analysis of an airborne medium PRF radar A82-14723
- Radar hostile fire location A82-14857
- Moving target Detector/Airport Surveillance radar (ASR-7) field evaluation [AD-A105195] N82-12303

RADAR EQUIPMENT
- Some Italian research for developing new primary ATC radars A82-14775

RADAR FILTERS
- Some Italian research for developing new primary ATC radars A82-14775

RADAR IMAGERY
- Inverse SAR and its application to aircraft classification A82-14871

RADAR NAVIGATION
- Evaluating sources of error in EAR/GEANS navigation using a Kalman postprocessor --- Electronically Agile Radar/Gimbaled Electrically suspended gyro Airborne Navigation System A82-14739

RADAR RANGE
- Detection range analysis of an airborne medium PRF radar A82-14723

RADAR RECEIVERS
- Performance evaluation of target report extractor in the monopulse ATCRBS --- Air Traffic Control Radar Beacon System A82-14776

RADAR RESOLUTION
- F-15 SAR A82-14938

RADAR SCATTERING
- Commercial airborne weather radar technology A82-14868

RADAR TARGETS
- Detection range analysis of an airborne medium PRF radar A82-14723
- Evaluation of advanced air-to-air gunnery fire control systems A82-14750
- A new approach to radar plot extraction for ATC applications A82-14908

RADAR TRACKING
- Radar hostile fire location A82-14857
- Air-to-ground MTI radar using a displaced phase center, phased array A82-14881
- A new approach to radar plot extraction for ATC applications A82-14908

RADARSCOPES
- A new approach to radar plot extraction for ATC applications A82-14908

RADIATION DISTRIBUTION
- Collection and simulation of spatial infrared signatures of military jet aircraft [AIAA PAPER 81-2494] A82-13921

RADIO ALTIMETERS
- Terrain actuated deployment system --- radar altimeter for man-ejector seat separation A82-14982

The use of groundspeed, in a wind shear and the flight evaluation of a radar-altimeter-based system for the measurement of groundspeed [AD-A104758] N82-12060

RADIO COMMUNICATION
High-accuracy ranging over voice radios for downed aircrew rescue A82-14694
Distributed Time Division Multiple Access /DTDMA/ - A distributed signaling technique for advanced tactical communications A82-14719

RADIO NAVIGATION
Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/ [AIAA PAPER 81-2514] A82-13911

RADIO RANGE
High-accuracy ranging over voice radios for downed aircrew rescue A82-14694

RADIO RECEIVERS
A Loran-C prototype navigation receiver for general aviation [AIAA 81-2329] A82-13532
New advances in signal processing technology for integrated CNI avionics --- Communication, Navigation, and Identification A82-14762

RADIO TRANSMISSION
Updated station deselection procedures to support automatic Omega receiver operation A82-14712

RADIOTELEPHONES
A VHF homing system with VHF radiotelephony for area-representative strip-survey flights conducted, as part of combined forest inventories, with light aircraft carrying 70 mm and 35 mm cameras A82-15748

RADOMES
Prediction and performance of radome-covered reflector antennas A82-15311

RANDOM ACCESS
Distributed Time Division Multiple Access /DTDMA/ - A distributed signaling technique for advanced tactical communications A82-14719

REACTION KINETICS
Chemistry of combustion of fuel-water mixtures [AD-A105401] N82-12178

REAL TIME OPERATION
Avionics systems simulation for the Northrop F/A-18L aircraft [AIAA 81-2274] A82-13488
Real-time flight management avionics software system [AIAA 81-2340] A82-13530
Recent improvements at the Naval Air Test Center for increased test system flexibility [AIAA PAPER 81-2392] A82-13888
The Advanced Range Instrumentation Aircraft improvement and modernization program [AIAA PAPER 81-2368] A82-13948
Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis [AIAA PAPER 81-2367] A82-13949
General purpose real-time interaction panel for digital simulation --- of flight control systems A82-14831
Group 1: Scenario design and development issues N82-13131
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation [NASA-TM-82770] N82-13144

RECEIVERS
Design study report for General Aviation Loran-C receiver [AD-A104921] N82-12062

RECORDING INSTRUMENTS
Direct strike lightning measurement system --- for aircraft [AIAA PAPER 81-2513] A82-13910

RECURSIVE FUNCTIONS
A recursive time domain analysis of distributed line grid networks with applications to the LTA/EMP problem --- Lightning Threat Analysis A82-14761

REDUNDANCY
Redundancy management of skewed and dispersed inertial sensors [AIAA 81-2296] A82-13503

REFLECTANCE
Prediction and performance of radome-covered reflector antennas A82-15311

REFUELING
KC-10 flight test program A82-14935

REGRESSION ANALYSIS
On matching the systems identification technique to the particular application --- in evaluating flight test data A82-13119

RELEASING
Automatic parachute releasers for premeditated parachuting A82-14960

RELIABILITY ANALYSIS
Estimation of the efficiency of radioelectronic flight navigation systems A82-13701
Planning a helicopter flight test program [AIAA PAPER 81-2381] A82-13881
Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen A82-14972
Reliability analysis of the F-8 digital fly-by-wire system [NASA-CR-163110] N82-12079

RELIABILITY ENGINEERING
An approach to robust nonlinear control design --- with illustration of J-85 turbojet engine simulation A82-13128
F/A-18A weapon system - 1976 state of the art [AIAA 81-2215] A82-13453
The SIFT computer and its development --- Software Implemented Fault Tolerance for aircraft control [AIAA 81-2278] A82-13490

RELIEF MAPS
Airborne Electronic Terrain Map System A82-14771
Passive terrain following using stored map and global positioning system A82-14772

REMOTE SENSING
Computational considerations for fusion in target identification systems --- multisensor correlation A82-14735

REMOTELY PILOTED VEHICLES
Flight experience with a remotely augmented vehicle flight test technique [AIAA PAPER 81-2417] A82-13857
HiMAT aerodynamic design and flight test experience [AIAA PAPER 81-2433] A82-13871
The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane [AIAA PAPER 81-2467] A82-13931
In-flight deflection measurement of the HiMAT aeroelastically tailored wing [AIAA PAPER 81-2450] A82-14301

RESCUE OPERATIONS
Flight testing the suspended maneuvering system --- helicopter firefighting and rescue techniques [AIAA PAPER 81-2498] A82-13922
High-accuracy ranging over voice radios for downed aircrew rescue A82-14694
Rescue at sea A82-14956

RESEARCH
A summary of the Naval Postgraduate School Research Program [AD-A108112] N82-13975

RESEARCH AIRCRAFT
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/ [AIAA PAPER 81-2409] A82-13852
Recent propulsion system flight tests at the NASA Dryden Flight Research Center [AIAA PAPER 81-2430] A82-13870

The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane
[AIAA PAPER 81-2467] A82-13931

Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA --- Quiet Short-haul Research Aircraft
[AIAA PAPER 81-2480] A82-13938

New all-electric-system technology --- electromechanical actuators for aircraft
A82-14710

Ball-Bartoe Jetwing flight tests
A82-14928

RESEARCH AND DEVELOPMENT

Aeronautics in China - An AIAA report --- Book
A82-13150

Civil aviation in China
A82-13600

Advancing blade concept /ABC/ development test program
[AIAA PAPER 81-2437] A82-13873

F/A-18 Flight Test program overview - 1 September 1981
[AIAA PAPER 81-2351] A82-13955

Progress in aeronautical research and technology applicable to civil air transports
A82-13974

Some Italian research for developing new primary ATC radars
A82-14775

The payoff from U.S. investment in aeronautical research and development
A82-14793

U.S. Navy life support development trends
A82-14952

Current aerial cameras
A82-15655

RESEARCH VEHICLES

HiMAT aerodynamic design and flight test experience
[AIAA PAPER 81-2433] A82-13871

RESONANT FREQUENCIES

Structural dynamics: Modified calculations --- natural and harmonically excited vibrations of modified structures; increased computation efficiency
[BMVG-FBWT-81-1] N82-13457

REYNOLDS NUMBER

Studies of air inlets at Reynolds numbers comparable to flight in ONERA's F1 and S1MA wind tunnels
N82-13091

Force and moment, flow-visualization, and boundary-layer tests on a shuttle orbiter model at Mach 6
[NASA-TP-1952] N82-13106

RICCATI EQUATION

Computational methods of robust controller design for aerodynamic flutter suppression
[NASA-CR-164983] N82-12080

RIGID ROTORS

System identification helicopter parameters. Determination from flight tests, phase 2
[BMVG-FBWT-80-12] N82-13137

ROBUSTNESS (MATHEMATICS)

An approach to robust nonlinear control design --- with illustration of J-85 turbojet engine simulation
A82-13128

ROLL

F/A-18 roll rate improvement program
A82-14939

Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

ROLLING MOMENTS

Effects of aerodynamic coupling on the dynamics of roll aircraft
N82-12070

ROTARY WING AIRCRAFT

Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications
A82-14407

A new safety harness for mobile aircrew
A82-14963

ROTARY WINGS

Advancing blade concept /ABC/ development test program
[AIAA PAPER 81-2437] A82-13873

A set of finite elements developed for the dynamic computation of composite helicopter blades
[ONERA, TP NO. 1981-87] A82-13990

Application of the ONERA dynamic stall model to a helicopter blade in forward flight
[ONERA, TP NO. 1981-89] A82-13992

Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor
[NASA-TP-1926] N82-13107

ROTATING GENERATORS

High speed PMG containment study for VSCF system --- Permanent Magnet Generator for Variable Speed Constant Frequency applications
A82-14791

ROTOR AERODYNAMICS

Rotor systems research aircraft /RSRA/ rotor force and moment measurement system
[AIAA PAPER 81-2516] A82-13913

Experimental and analytical studies of a model helicopter rotor in hover
[NASA-TM-81232] N82-12042

German-Argentine experiment: Vertical-rotor wind engine
N82-12640

Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor
[NASA-TP-1926] N82-13107

An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109

ROTOR BLADES (TURBOMACHINERY)

Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482

Thrust modulation methods for a subsonic V/STOL aircraft
[NASA-TM-82747] N82-13112

ROTOR SYSTEMS RESEARCH AIRCRAFT

Rotor systems research aircraft /RSRA/ rotor force and moment measurement system
[AIAA PAPER 81-2516] A82-13913

ROTORCRAFT AIRCRAFT

The use of frequency methods in rotorcraft system identification
[AIAA PAPER 81-2386] A82-14392

ROTORS

High speed PMG containment study for VSCF system --- Permanent Magnet Generator for Variable Speed Constant Frequency applications
A82-14791

RUDDERS

Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration
[NASA-TM-81972] N82-13148

RUNWAY CONDITIONS

C-5A unsurfaced taxi and off-load demonstrations
[AIAA PAPER 81-2439] A82-13875

RUNWAYS

Measured pavement response to transient aircraft loadings
N82-13442

S

SAFETY DEVICES

'Little people' problem /MA-2 torso harness/
A82-14958

A new safety harness for mobile aircrew
A82-14963

Test and evaluation of improved aircrew restraint systems
A82-14974

Wind tunnel tests of ejection seat for high dynamic pressure escape
A82-14979

Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140

SAFETY MANAGEMENT
Fatigue methodology - A technical management system for helicopter safety and durability
A82-13240
SCALE EFFECT
An investigation of F-16 nozzle-afterbody forces at transonic Mach numbers with emphasis on model scale effects
[AD-A104905] N82-12392
SCATTERING COEFFICIENTS
Commercial airborne weather radar technology
A82-14868
SCORING
Electro-optical vector scoring system --- for missile miss distance in fleet training exercises
[AIAA PAPER 81-2373] A82-13945
SEA WATER
Rescue at sea
A82-14956
SEARCH RADAR
Moving target Detector/Airport Surveillance radar (ASR-7) field evaluation
[AD-A105?96] N82-12303
SEATS
Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter
A82-14975
Crashworthy military passenger seat development
A82-14976
SERVICE LIFE
Operational evaluation of the new generation of jet transport aircraft
[AIAA PAPER 81-2377] A82-13942
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
A82-15723
SHIELDING
Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds
N82-13068
SHORT HAUL AIRCRAFT
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/
[AIAA PAPER 81-2409] A82-13852
SHORT TAKEOFF AIRCRAFT
Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor
[AIAA PAPER 81-2507] A82-13907
Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA --- Quiet Short-haul Research Aircraft
[AIAA PAPER 81-2480] A82-13938
Ball-Bartoe Jetwing flight tests
A82-14928
Integration of advanced exhaust nozzles
N82-13075
SHROUDED NOZZLES
The subsonic performance of practical military variable area convergent nozzles
N82-13076
SIDESLIP
A cost effective method for the control of roll due to side slip on a low speed aircraft
[AIAA PAPER 81-2422] A82-13861
Effects of aerodynamic coupling on the dynamics of roll aircraft
N82-12070
SIGNAL ANALYSIS
An advanced facility for processing aircraft dynamic test data
[AIAA PAPER 81-2398] A82-14377
SIGNAL DETECTION
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525
SIGNAL PROCESSING
Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing
[AIAA 81-2247] A82-13471
Digital signal processing on a background of rereflections for the international aircraft landing system
A82-13703
NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volumes 1, 2 & 3
A82-14676
Detection range analysis of an airborne medium PRF radar
A82-14723
New advances in signal processing technology for integrated CNI avionics --- Communication, Navigation, and Identification
A82-14762
Performance evaluation of target report extractor in the monopulse ATCRBS --- Air Traffic Control Radar Beacon System
A82-14776
Radar hostile fire location
A82-14857
F-15 SAR
A82-14938
SIGNAL RECEPTION
Updated station deselection procedures to support automatic Omega receiver operation
A82-14712
SIGNAL TO NOISE RATIOS
Digital signal processing on a background of rereflections for the international aircraft landing system
A82-13703
SIKORSKY AIRCRAFT
Light Airborne Multi-Purpose System
A82-13244
SIMULATION
Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines
N82-13087
SLENDER BODIES
A calculation method for slender wing-body configurations in supersonic flow at high angles of attack --- nonlinear force and pitching moment characteristics
[BMVG-FBWT-79-15] N82-13115
SLENDER WINGS
A calculation method for slender wing-body configurations in supersonic flow at high angles of attack --- nonlinear force and pitching moment characteristics
[BMVG-FBWT-79-15] N82-13115
SLOTTED WIND TUNNELS
A look inside the Langley 16-foot transonic tunnel: User's guide
[NASA-TM-83186] N82-12085
SOOT
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178
SOUND PROPAGATION
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043
SOUND WAVES
Investigation of acoustic interactions in jet thrust augmenting ejectors
[AD-A106083] N82-13835
SPACE FLIGHT TRAINING
Computer image generation for flight simulation
A82-15599
SPACE SHUTTLE ORBITERS
Force and moment, flow-visualization, and boundary-layer tests on a shuttle orbiter model at Mach 6
[NASA-TP-1952] N82-13106
Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle
[NASA-TM-81366] N82-13149
SPACE TRANSPORTATION SYSTEM FLIGHTS
Selected stability and control derivatives from the first Space Shuttle entry
[AIAA PAPER 81-2451] A82-13880
SPACECRAFT CONTROL
Selected stability and control derivatives from the first Space Shuttle entry
[AIAA PAPER 81-2451] A82-13880
SPACECRAFT DESIGN
Research and Technology
[NASA-TM-83221] N82-13043

SPACECRAFT ELECTRONIC EQUIPMENT
NAECON 1981; Proceedings of the National Aerospace and Electronics Conference, Dayton, OH, May 19-21, 1981. Volumes 1, 2 & 3 A82-14676
SPACECRAFT REENTRY
Selected stability and control derivatives from the first Space Shuttle entry [AIAA PAPER 81-2451] A82-13880
SPECTRAL SIGNATURES
Collection and simulation of spatial infrared signatures of military jet aircraft [AIAA PAPER 81-2494] A82-13921
SPECTROSCOPIC ANALYSIS
Determination and analysis of jet and missile fuel deposits [AD-A105456] N82-12248
SPEECH RECOGNITION
Using voice control onboard combat aircraft N82-13056
SPEED CONTROL
Flight investigations of integrated descent rate control systems A82-14929
SPIN TESTS
USNTPS spin program A82-14931
The USAF Test Pilot School high angle of attack and spin training program A82-14932
Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps A82-14933
F/A-18A high angle of attack/spin testing A82-14934
SPLINES
Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center [AIAA PAPER 81-2405] A82-13891
SPOILERS
Flight investigations of integrated descent rate control systems A82-14929
STABILITY DERIVATIVES
Selected stability and control derivatives from the first Space Shuttle entry [AIAA PAPER 81-2451] A82-13880
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives [AD-A105122] N82-12047
Interactive aircraft flight control and aeroelastic stabilization --- forward swept wing flight vehicles [NASA-CR-165036] N82-13150
STAGNATION FLOW
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds N82-13070
STAGNATION PRESSURE
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail [NASA-TM-80097] N82-13110
STAMPING
The technology of sheet-metal stamping in the production of aircraft /2nd revised and enlarged edition/ --- Russian book A82-14998
STANDARDIZATION
Aircraft alerting systems standardization study [AIAA 81-2242] A82-13468
A standard control display unit for multi-aircraft application N82-13054
STATIC STABILITY
The use of observers on relaxed static stability aircraft A82-14740
STATISTICAL ANALYSIS
A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records A82-15460
STEPPING MOTORS
Failure analysis of variable reluctance stepper motor --- in electronic fuel control system on jet engine A82-14792
STORM DAMAGE
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80 A82-14954
STRAIN GAGES
Improved techniques for the calibration and measurement of in-flight loads [AIAA PAPER 81-2502] A82-13924
STRAPDOWN INERTIAL GUIDANCE
The use of separated multifunction inertial sensors for flight control [AIAA 81-2295] A82-13502
Redundancy management of skewed and dispersed inertial sensors [AIAA 81-2296] A82-13503
Strapdown inertial reference systems performance analysis A82-14682
STREAMLINED BODIES
Turbulent wake development behind streamlined bodies N82-13100
STRUCTURAL ANALYSIS
Fatigue methodology - A technical management system for helicopter safety and durability A82-13240
Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft [AIAA PAPER 81-2387] A82-14393
Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications A82-14407
STRUCTURAL DESIGN
Status and tracking system for flight test data products [AIAA PAPER 81-2395] A82-14376
Performance assessment of the ACES-II ejection seat-A-10 configuration A82-14980
Mathematical programming in engineering design problems A82-15864
STRUCTURAL RELIABILITY
Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter A82-14975
Crashworthy military passenger seat development A82-14976
STRUCTURAL VIBRATION
Flight vibration optimization via conformal mapping A82-13975
Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle [NASA-TM-81366] N82-13149
Structural dynamics: Modified calculations --- natural and harmonically excited vibrations of modified structures; increased computation efficiency [BMVG-FBWT-81-1] N82-13457
SUBSONIC FLOW
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow N82-13095
Prediction of subsonic aircraft flows with jet exhaust interactions N82-13096
SUBSONIC SPEED
Thrust modulation methods for a subsonic V/STOL aircraft [NASA-TM-82747] N82-13112
SUBSONIC WIND TUNNELS
Studies of air inlets at Reynolds numbers comparable to flight in ONERA's F1 and S1MA wind tunnels N82-13091
SUPERCRITICAL FLOW
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing N82-13092

SUPERCRITICAL WINGS
Subcritical and supercritical airfoils for given pressure distribution
N82-12031
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing
N82-13092
SUPERSONIC AIRCRAFT
Aerodynamics of Power Plant Installation
[AGARD-CP-301] N82-13065
Performance of highly integrated inlets for supersonic aircraft
N82-13066
SUPERSONIC COMBUSTION
Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field
[NASA-TM-82750] N82-13908
SUPERSONIC COMBUSTION RAMJET ENGINES
Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations
[NASA-TP-1940] N82-13142
SUPERSONIC FLOW
A calculation method for slender wing-body configurations in supersonic flow at high angles of attack --- nonlinear force and pitching moment characteristics
[BMVG-FBWT-79-15] N82-13115
SUPERSONIC INLETS
Performance of highly integrated inlets for supersonic aircraft
N82-13066
The design and development of the Tornado engine air intake
N82-13074
SUPERSONIC SPEEDS
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110
SUPPORTS
The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region
A82-14418
SURFACE FINISHING
Attack on superalloys by chemical and electrolytic processes
A82-14365
SURVEILLANCE RADAR
Computational considerations for fusion in target identification systems --- multisensor correlation
A82-14735
SURVIVAL
NASEP - Survival from crashed Navy helicopters
A82-14977
SURVIVAL EQUIPMENT
Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen
A82-14972
SWEPT FORWARD WINGS
Divergence of a sweptforward wing
A82-13560
Interactive aircraft flight control and aeroelastic stabilization --- forward swept wing flight vehicles
[NASA-CR-165036] N82-13150
SWITCHING CIRCUITS
Electronic master monitor and advisory display system test and demonstration report
[AD-A105317] N82-13141
SYMMETRICAL BODIES
Turbulent wake development behind streamlined bodies
N82-13104
SYNTHETIC APERTURE RADAR
Enhanced F-15 air-to-ground flight demonstrations
[AIAA PAPER 81-2413] A82-13054
Pave Mover Flight Test Program
[AIAA PAPER 81-2492] A82-14380
Inverse SAR and its application to aircraft classification
A82-14871
F-15 SAR
A82-14938
SYNTHETIC FUELS
Development of catalytic systems for the conversion of syngas to jet fuel and diesel fuel and higher alcohols
[DE82-000067] N82-12255
SYSTEM EFFECTIVENESS
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468
Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/
[AIAA PAPER 81-2514] A82-13911
Strapdown inertial reference systems performance analysis
A82-14682
SYSTEM FAILURES
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft
A82-14828
Electronic master monitor and advisory display system test and demonstration report
[AD-A105317] N82-13141
Sensor failure detection system --- for the F100 turbofan engine
[NASA-CR-165515] N82-13145
SYSTEM IDENTIFICATION
Integrated flight testing based on nonlinear system identification data processing techniques
[AIAA PAPER 81-2449] A82-14389
The use of frequency methods in rotorcraft system identification
[AIAA PAPER 81-2386] A82-14392
Future directions in CNI integrated avionics
A82-14720
SYSTEMS ENGINEERING
The design of exact nonlinear model followers --- with application to trajectory autopilot for helicopter
A82-13125
Design and analysis of a digitally controlled integrated flight/fire control system
[AIAA 81-2245] A82-13470
LHX - An advanced avionics system design
[AIAA 81-2249] A82-13472
A polled contention multiplex system using MIL-STD-1553 protocol
[AIAA 81-2271] A82-13487
F/A-18 high authority/high gain digital flight control system development and flight testing
[AIAA PAPER 81-2465] A82-13930
Experience with flight test trajectory guidance
[AIAA PAPER 81-2504] A82-14379
Design for active and passive flutter suppression and gust alleviation
[NASA-CR-3482] N82-13147
SYSTEMS INTEGRATION
Light Airborne Multi-Purpose System
A82-13244
Integrated avionics - Concepts and concerns
[AIAA 81-2211] A82-13452
Design and analysis of a digitally controlled integrated flight/fire control system
[AIAA 81-2245] A82-13470
LHX - An advanced avionics system design
[AIAA 81-2249] A82-13472
An update of an integrated CNI system - TIES --- Communication, Navigation, and Identification provided by Tactical Information Exchange System
[AIAA 81-2292] A82-13500
Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft
[AIAA 81-2297] A82-13504
An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display
[AIAA 81-2303] A82-13508
Higher order Information Transfer Systems are coming
[AIAA 81-2397] A82-13517
Advanced weapon systems - Integration technology --- Digital Avionic Information System
[AIAA 81-2213] A82-13533
F-4 Advanced Avionics Flight Test
[AIAA PAPER 81-2464] A82-13929
The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane
[AIAA PAPER 81-2467] A82-13931

Integrated flight testing based on nonlinear system identification data processing techniques [AIAA PAPER 81-2449] A82-14389
Future directions in CNI integrated avionics A82-14720
New advances in signal processing technology for integrated CNI avionics --- Communication, Navigation, and Identification A82-14762
Advanced integrated CNI architectures --- Communications, Navigation and Identification avionics for tactical aircraft and attack helicopter A82-14763
The agile transversal filter - A flexible building block for ICNIA --- Integrated Communications, Navigation and Identification Avionics A82-14765
Conceptual design of an integrated power and avionics information system A82-14788
A look inside the Langley 16-foot transonic tunnel: User's guide [NASA-TM-83186] N82-12085
Integration of advanced exhaust nozzles N82-13075
Techniques for interfacing multiplex systems [AD-A101457] N82-13135

SYSTEMS MANAGEMENT
Redundancy management of skewed and dispersed inertial sensors [AIAA 81-2296] A82-13503

SYSTEMS SIMULATION
Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators [AIAA 81-2230] A82-13463
The design and implementation of a canned scenario function for the F-16 dynamic system simulator A82-14678
Strapdown inertial reference systems performance analysis A82-14682
A failure detection and isolation system for tactical aircraft with separated IMUs A82-14684
The use of observers on relaxed static stability aircraft A82-14740
Computer modeling of an aircraft HVDC electrical system A82-14819
Digital simulation of aircraft electrical generating system by means of Sceptre program A82-14820

T

T-38 AIRCRAFT
A ballistic design model for initiators for aircraft personnel escape systems A82-14584

TABS (CONTROL SURFACES)
Trim tab excitation system for the BAe 146 A82-14363

TACT PROGRAM
Experience with flight test trajectory guidance [AIAA PAPER 81-2504] A82-14379

TAIL ASSEMBLIES
Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes A82-13120
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail [NASA-TM-80097] N82-13110

TAKEOFF RUNS
The influence of wind shear and vertical winds on takeoffs and go-arounds A82-15823

TANKER AIRCRAFT
KC-10, flight test program management - The contractor's viewpoint [AIAA PAPER 81-2380] A82-14384
Tanker avionics and aircrew complement evaluation N82-13063

TARGET ACQUISITION
The TADS/PNVS 'eyes' for the AH-64 attack helicopter A82-13239

TARGET RECOGNITION
The TADS/PNVS 'eyes' for the AH-64 attack helicopter A82-13239
Computational considerations for fusion in target identification systems --- multisensor correlation A82-14735
The LANTIRN wide field-of-view raster Head-Up Display --- Low Altitude Navigation and Targeting IR for Night A82-14825
A new approach to radar plot extraction for ATC applications A82-14908
F-15 SAR A82-14938

TARGET SIMULATORS
A methodology for missile launch envelope display evaluation A82-14744

TECHNOLOGICAL FORECASTING
The influence of smart computers on the cockpit of the future A82-14743

TECHNOLOGY ASSESSMENT
Aeronautics in China - An AIAA report --- Book A82-13150
Information technology and its impact on test and evaluation at the Naval Air Test Center [AIAA PAPER 81-2396] A82-13894
Progress in aeronautical research and technology applicable to civil air transports A82-13974
A methodology for missile launch envelope display evaluation A82-14744
Progress report - CH-47 modernization program A82-14930
F-15 SAR A82-14938
The technology of sheet-metal stamping in the production of aircraft /2nd revised and enlarged edition/ --- Russian book A82-14998

TECHNOLOGY UTILIZATION
Airborne Electronic Terrain Map System. II - Applications A82-14773

TELEMETRY
Recent improvements at the Naval Air Test Center for increased test system flexibility [AIAA PAPER 81-2392] A82-13888
Automatic digital gain ranging --- for flight test telemetry data [AIAA PAPER 81-2370] A82-13947
The Advanced Range Instrumentation Aircraft improvement and modernization program [AIAA PAPER 81-2368] A82-13948
MLS performance assessment, task 4. Volume 1: Evaluation procedures and equipment design [AD-A105393] N82-12061

TERMINAL CONFIGURED VEHICLE PROGRAM
Have we overlooked the pilot's role in an automated flight deck [AIAA 81-2262] A82-13481
The integration of control and display concepts for improved pilot situational awareness A82-13972

TERMINAL FACILITIES
Technical/operational ATC scenarios for future TMA navigation A82-14774
Analysis of integrated fuel-efficient, low-noise procedures in terminal-area operations [DE81-029833] N82-13018

TERRAIN ANALYSIS
The electronic terrain map - A new avionics integrator [AIAA 81-2289] A82-13498
Application of multiple model estimation techniques to a recursive terrain height correlation system A82-14768
Airborne Electronic Map Systems. I - Design A82-14770
Airborne Electronic Terrain Map System A82-14771

Airborne Electronic Terrain Map System. II - Applications A82-14773

TERRAIN FOLLOWING AIRCRAFT
Passive terrain following using stored map and global positioning system A82-14772

TEST EQUIPMENT
Recent improvements at the Naval Air Test Center for increased test system flexibility [AIAA PAPER 81-2392] A82-13888

TEST FACILITIES
Commentary on facilities used in the development of a Sea Harrier all weather operations capability [AIAA PAPER 81-2407] A82-13892
The Air Force Flight Test Center - Utah Test and Training Range in the 1980's [AIAA PAPER 81-2487] A82-13916
A unique integrated flight testing facility for advanced control/display research [AIAA PAPER 81-2490] A82-13919
Naval Weapons Center - Test and evaluation in the 1980's [AIAA PAPER 81-2485] A82-13940
Two at a time - Flight test plans for the new Boeing airliners [AIAA PAPER 81-2378] A82-13941
Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel A82-13969
Testing capabilities of the 3246th Test Wing [AIAA PAPER 81-2484] A82-14387

TEST PILOTS
USNTPS spin program A82-14931
The USAF Test Pilot School high angle of attack and spin training program A82-14932

TEST RANGES
Naval Weapons Center - Test and evaluation in the 1980's [AIAA PAPER 81-2485] A82-13940

TF-34 ENGINE
Effect of a part span variable inlet guide vane on TF34 fan performance [NASA-CR-165458] N82-12075

THERMAL FATIGUE
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures A82-15482

THERMAL PROTECTION
Progress in protective coatings for aircraft gas turbines: A Review of NASA sponsored research [NASA-TM-82740] N82-12216
Research and Technology [NASA-TM-83221] N82-13043

THERMAL RESISTANCE
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications [NASA-CR-167421] N82-12230

THERMAL STABILITY
A concept for a high-accuracy, low-cost accelerometer A82-14685

THESES
Compilation of abstracts of dissertations theses, and research papers submitted by candidates for degrees, 1 October 1979 - 30 September 1980 [AD-A104124] N82-13974

THREE DIMENSIONAL FLOW
Three dimensional flow investigation with a method of characteristics in the inlet region and the blade-to-blade channels of supersonic axial compressors [ESA-TT-637] N82-12078
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes N82-13069
A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow N82-13094

THREE DIMENSIONAL MOTION
Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches A82-15847

THRUST
Integration of advanced exhaust nozzles N82-13075
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators N82-13089

THRUST CONTROL
Thrust modulation methods for a subsonic V/STOL aircraft [NASA-TM-82747] N82-13112

THRUST REVERSAL
Advanced exhaust nozzle technology N82-13078

THRUST VECTOR CONTROL
Effect of a part span variable inlet guide vane on TF34 fan performance [NASA-CR-165458] N82-12075
Advanced exhaust nozzle technology N82-13078
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation [NASA-TM-82770] N82-13144

THRUST-WEIGHT RATIO
Enhanced F-15 air-to-ground flight demonstrations [AIAA PAPER 81-2413] A82-13854

THUNDERSTORMS
Thunderstorm hazards flight research - Program overview [AIAA PAPER 81-2412] A82-13853
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80 A82-14954

TILT ROTOR AIRCRAFT
Hover tests of the XV-15 Tilt Rotor Research Aircraft [AIAA PAPER 81-2501] A82-14386

TIMBER INVENTORY
A VHF homing system with VHF radiotelephony for area-representative strip-survey flights conducted, as part of combined forest inventories, with light aircraft carrying 70 mm and 35 mm cameras A82-15748

TIME DIVISION MULTIPLE ACCESS
Distributed Time Division Multiple Access /DTDMA/ - A distributed signaling technique for advanced tactical communications A82-14719

TIME DIVISION MULTIPLEXING
A modular multiplexed digital voice intercommunications system A82-14721

TIME FUNCTIONS
A recursive time domain analysis of distributed line grid networks with application to the LTA/EMP problem --- Lightning Threat Analysis A82-14761

TIME OPTIMAL CONTROL
Comparison between the exact and an approximate feedback solution for medium range interception problems A82-13106

TIME SHARING
A polled contention multiplex system using MIL-STD-1553 protocol [AIAA 81-2271] A82-13487

TORQUE
Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes A82-13120

TORSION
Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor [NASA-TP-1926] N82-13107

TORSIONAL VIBRATION
Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center [AIAA PAPER 81-2405] A82-13891

TRACKING NETWORKS
Status and tracking system for flight test data products
[AIAA PAPER 81-2395] A82-14376
TRACKING RADAR
Georgia Tech coherent jammer flight test
[AIAA PAPER 81-2452] A82-13898
Using phased array radar for data communications
A82-14725
TRAINING AIRCRAFT
62% manned aircraft demonstrator - Next generation trainer --- cost effective pilot trainer
[AIAA PAPER 81-2519] A82-14385
USNTPS spin program
A82-14931
The USAF Test Pilot School high angle of attack and spin training program
A82-14932
TRAINING EVALUATION
Organizing and training for innovative flight test management
[AIAA PAPER 81-2416] A82-13856
Assessing pilot workload - Without disturbing pilot behavior
A82-14745
TRAINING SIMULATORS
Low cost programmable multisimulator facility
[AIAA 81-2229] A82-13534
Group 1: Scenario design and development issues
N82-13131
TRAJECTORY CONTROL
Experience with flight test trajectory guidance
[AIAA PAPER 81-2504] A82-14379
The Maneuvering Flight Path Display - A flight trajectory solution display concept
A82-14824
TRAJECTORY OPTIMIZATION
Darboux points in minimum-fuel aircraft landing problems
A82-13077
Fuel efficient flight profiles in an ATC flow management environment
A82-13078
On-line optimization of aircraft altitude and flight path angle dynamics
A82-13107
Application of singular perturbation theory
N82-12050
TRANSCONTINENTAL SYSTEMS
Transportation systems evaluation methodology development and applications, phase 3
[NASA-CR-164999] N82-12051
TRANSMISSION EFFICIENCY
Columbus, Ohio, Voice response system demonstration and evaluation
[AD-A104750] N82-12304
TRANSMISSION LINES
Wire strike protection
A82-13246
Portable air driven variable speed fiber optic cable termination polisher
[AD-A104797] N82-12448
TRANSMISSIONS (MACHINE ELEMENTS)
In-flight computation of helicopter transmission fatigue life expenditure
[AIAA PAPER 81-2434] A82-13872
TRANSONIC FLOW
Remarks on the calculation of transonic potential flow by a finite volume method
A82-15835
Transonic flows in an air inlet with large incidence and the effect of a blowing trap
N82-13071
Model testing techniques for measuring inlet drag
N82-13084
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow
N82-13095
Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects
N82-13098
Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds
N82-13813
TRANSONIC WIND TUNNELS
Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition
[AIAA PAPER 81-1928] A82-13962
Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel
A82-13969
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
A82-13971
Aeroelasticity matters: Some reflections on two decades of testing in the NASA Langley transonic dynamics tunnel
[NASA-TM-83210] N82-12041
Construction and performance of NAL two-dimensional transonic wind tunnel
[NAL-TR-647] N82-12083
A look inside the Langley 16-foot transonic tunnel: User's guide
[NASA-TM-83186] N82-12085
TRANSPONDERS
Aircraft separation assurance avionics
[AIAA 81-2239] A82-13467
TRANSPORT AIRCRAFT
Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond
[AIAA 81-2218] A82-13456
Electronic flight deck displays for transport aircraft
[AIAA 81-2264] A82-13483
Applications of head-up displays in commercial transport aircraft
[AIAA 81-2300] A82-13506
On-board communication for active-control transport aircraft
[AIAA 81-2321] A82-13520
Operational evaluation of the new generation of jet transport aircraft
[AIAA PAPER 81-2377] A82-13942
Progress in aeronautical research and technology applicable to civil air transports
A82-13974
An advanced facility for processing aircraft dynamic test data
[AIAA PAPER 81-2398] A82-14377
Wing design for light transport aircraft with improved fuel economy
A82-14416
Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling
A82-14826
In-service inspection methods for graphite-epoxy structures on commercial transport aircraft
[NASA-CR-165746] N82-12142
Electronic flight deck displays for military transport aircraft
N82-13050
Aerodynamics of Power Plant Installation
[AGARD-CP-301] N82-13065
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093
TRAPEZOIDAL TAIL SURFACES
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110
TRENDS
Advantages and limitations of various materials used in the construction of modules --- aircraft construction
[SNIAS-812-551-103] N82-12072
TURBINE BLADES
The protection of gas turbine blades - A platinum aluminide diffusion coating
A82-14364
The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine
A82-14414
Progress in protective coatings for aircraft gas turbines: A Review of NASA sponsored research
[NASA-TM-82740] N82-12216

TURBINES
Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines N82-13087
TURBOCOMPRESSORS
Three dimensional flow investigation with a method of characteristics in the inlet region and the blade-to-blade channels of supersonic axial compressors [ESA-TT-637] N82-12078
TURBOFAN ENGINES
Performance assessment of an advanced reheated turbo fan engine [AIAA PAPER 81-2447] A82-13879
The all composite Lear Fan 2100 A82-14936
Sensor failure detection system --- for the F100 turbofan engine [NASA-CR-165515] N82-13145
TURBOJET ENGINE CONTROL
An approach to robust nonlinear control design --- with illustration of J-85 turbojet engine simulation A82-13128
Compressor stall inducing installation effects of an engine control parameter for the CF-5 aircraft N82-13085
TURBOJET ENGINES
The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine A82-14414
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils A82-15723
Vibration test procedures for accessory angle drive gearboxes on Atar 09C engines --- turbojet engines [AD-A105269] N82-12076
TURBOMACHINERY
The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft N82-13086
TURBOPROP ENGINES
CT7 - GE attacks commuter turboprop market A82-15950
TURBULENT FLOW
The numerical solution of incompressible turbulent flow over airfoils N82-12030
Turbulent wake development behind streamlined bodies N82-13104
TURBULENT WAKES
Turbulent wake development behind streamlined bodies N82-13104

U

UNLOADING
C-5A unsurfaced taxi and off-load demonstrations [AIAA PAPER 81-2439] A82-13875
UNSTEADY FLOW
An acquisition and analysis system for dynamic tests of air inlets N82-13082
UPPER SURFACE BLOWING
Ball-Bartoe Jetwing flight tests A82-14928
USER REQUIREMENTS
Public service helicopters - Is the grass greener on the other side of the fence A82-13238
Transportation systems evaluation methodology development and applications, phase 3 [NASA-CR-164999] N82-12051
UTILIZATION
Advantages and limitations of various materials used in the construction of modules --- aircraft construction [SNIAS-812-551-103] N82-12072

V

V/STOL AIRCRAFT
Commentary on facilities used in the development of a Sea Harrier all weather operations capability [AIAA PAPER 81-2407] A82-13892
Jet V/STOL wind-tunnel simulation and groundplane effects A82-13973
The X-14 - 24 years of V/STOL flight testing A82-14927
Thrust modulation methods for a subsonic V/STOL aircraft [NASA-TM-82747] N82-13112
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation [NASA-TM-82770] N82-13144
VACUUM EFFECTS
Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field [NASA-TM-82750] N82-13908
VAPORS
A vapour cycle cabin cooling system for the Sea King MK.50 helicopter [AD-A105211] N82-12069
VARIABLE GEOMETRY STRUCTURES
The subsonic performance of practical military variable area convergent nozzles N82-13076
VATOL AIRCRAFT
Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft [AIAA 81-2238] A82-13466
VECTOR ANALYSIS
Electro-optical vector scoring system --- for missile miss distance in fleet training exercises [AIAA PAPER 81-2373] A82-13945
VELOCITY MEASUREMENT
The use of groundspeed, in a wind shear and the flight evaluation of a radar-altimeter-based system for the measurement of groundspeed [AD-A104758] N82-12060
VENTILATION
A vapour cycle cabin cooling system for the Sea King MK.50 helicopter [AD-A105211] N82-12069
VERTICAL DISTRIBUTION
German-Argentine experiment: Vertical-rotor wind engine N82-12648
VERTICAL MOTION SIMULATORS
Simulator certification methods and the vertical motion simulator [NASA-CR-166252] N82-12082
VIBRATION DAMPING
Wing/store flutter - An active adaptive control application A82-13122
Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center [AIAA PAPER 81-2405] A82-13891
VIBRATION TESTS
Vibration test procedures for accessory angle drive gearboxes on Atar 09C engines --- turbojet engines [AD-A105269] N82-12076
VIDEO DATA
Extended time radar raw video recording A82-14909
VISCOUS FLOW
The numerical solution of incompressible turbulent flow over airfoils N82-12030
VISIBILITY
Use of a helmet-mounted matrix display for presenting energy-maneuverability information during simulated close combat N82-13061
VISUAL AIDS
Group 1: Scenario design and development issues N82-13131
VISUAL CONTROL
The effect of visual information on manual approach and landing [NLR-MP-80019-U] N82-12064

VISUAL PERCEPTION
Airborne color CRT displays
A82-14823
VOICE COMMUNICATION
High-accuracy ranging over voice radios for downed aircrew rescue
A82-14694
A modular multiplexed digital voice intercommunications system
A82-14721
Columbus, Ohio, Voice response system demonstration and evaluation
[AD-A104750] N82-12304
VOICE CONTROL
Using voice control onboard combat aircraft
N82-13056
VORTICES
Experimental and analytical studies of a model helicopter rotor in hover
[NASA-TM-81232] N82-12042

W

WARNING SYSTEMS
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525
WAVE PROPAGATION
Updated station deselection procedures to support automatic Omega receiver operation
A82-14712
WEAPON SYSTEM MANAGEMENT
Advanced weapon systems - Integration technology --- Digital Avionic Information System
[AIAA 81-2213] A82-13533
Government testing
[AIAA PAPER 81-2443] A82-13877
Naval Weapons Center - Test and evaluation in the 1980's
[AIAA PAPER 81-2485] A82-13940
WEAPON SYSTEMS
Light Airborne Multi-Purpose System
A82-13244
Integrated avionics - Concepts and concerns
[AIAA 81-2211] A82-13452
F/A-18A weapon system - 1976 state of the art
[AIAA 81-2215] A82-13453
Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators
[AIAA 81-2230] A82-13463
LHX - An advanced avionics system design
[AIAA 81-2249] A82-13472
Higher order Information Transfer Systems are coming
[AIAA 81-2317] A82-13517
Enhanced F-15 air-to-ground flight demonstrations
[AIAA PAPER 81-2413] A82-13854
Theoretical analysis of wake-induced parachute collapse
[AIAA PAPER 81-1922] A82-13963
Fighters - Improving the breed
A82-14354
Testing capabilities of the 3246th Test Wing
[AIAA PAPER 81-2484] A82-14387
Assessing pilot workload - Without disturbing pilot behavior
A82-14745
Evaluation of advanced air-to-air gunnery fire control systems
A82-14750
WEAPONS DELIVERY
F-4 Advanced Avionics Flight Test
[AIAA PAPER 81-2464] A82-13929
Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition
[AIAA PAPER 81-1928] A82-13962
Advanced fighter technology integration AFTI/F-16 test program overview
[AIAA PAPER 81-2353] A82-14398
Weapon delivery system using GPS
A82-14711
Integrated Flight/Weapon Control design and evaluation
A82-14741

Airborne Electronic Terrain Map System. II - Applications
A82-14773
WEATHER
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model
A82-14779
WEATHERING
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140
WEIGHT INDICATORS
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047
WEIGHT REDUCTION
High voltage/high power for airborne applications
A82-15918
WIND EFFECTS
The influence of wind shear and vertical winds on takeoffs and go-arounds
A82-15823
WIND SHEAR
A decoupled control system for improved flight performance in wind shear
A82-13079
A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records
A82-15468
The influence of wind shear and vertical winds on takeoffs and go-arounds
A82-15823
The use of groundspeed, in a wind shear and the flight evaluation of a radar-altimeter-based system for the measurement of groundspeed
[AD-A104758] N82-12060
WIND TUNNEL APPARATUS
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047
Construction and performance of NAL two-dimensional transonic wind tunnel
[NAL-TR-647] N82-12083
A look inside the Langley 16-foot transonic tunnel: User's guide
[NASA-TM-83186] N82-12085
WIND TUNNEL CALIBRATION
Construction and performance of NAL two-dimensional transonic wind tunnel
[NAL-TR-647] N82-12083
WIND TUNNEL MODELS
Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel
A82-13969
A review of flight-to-wind tunnel drag correlation
[AIAA PAPER 81-2475] A82-14382
An investigation of F-16 nozzle-afterbody forces at transonic Mach numbers with emphasis on model scale effects
[AD-A104905] N82-12392
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
N82-13088
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
N82-13089
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110
Thrust modulation methods for a subsonic V/STOL aircraft
[NASA-TM-82747] N82-13112
WIND TUNNEL STABILITY TESTS
Direct free-flight analysis of aircraft dynamics at high angles of attack
A82-15596

WIND TUNNEL TESTS
Navy performance modeling techniques [AIAA PAPER 81-2431] A82-13869
Overview of flight and ground testing with emphasis on the wind tunnel [AIAA PAPER 81-2474] A82-13928
A large-scale investigation of engine influence on inlet performance at angle-of-attack [AIAA PAPER 81-2481] A82-13939
Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel A82-13969
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology A82-13971
Jet V/STOL wind-tunnel simulation and groundplane effects A82-13973
A review of flight-to-wind tunnel drag correlation [AIAA PAPER 81-2475] A82-14382
Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft [AIAA PAPER 81-2387] A82-14393
Analysis of escape systems at 687 KEAS A82-14978
Wind tunnel tests of ejection seat for high dynamic pressure escape A82-14979
Aeroelasticity matters: Some reflections on two decades of testing in the NASA Langley transonic dynamics tunnel [NASA-TM-83210] N82-12041
Construction and performance of NAL two-dimensional transonic wind tunnel [NAL-TR-647] N82-12083
Performance of highly integrated inlets for supersonic aircraft N82-13066
Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines N82-13087
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment N82-13088
Studies of air inlets at Reynolds numbers comparable to flight in ONERA's F1 and S1MA wind tunnels N82-13091
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing N82-13092
Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor [NASA-TP-1926] N82-13107
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail [NASA-TM-80097] N82-13110
Final report on the FuePo-4 major theme: Interference drag with airframe/engine integration on fighter aircraft [BMVG-FBWT-79-20] N82-13116
WINDOWS (APERTURES)
Algorithms for an adaptive dynamic window in electronic map systems A82-14769
WINDPOWERED GENERATORS
German-Argentine experiment: Vertical-rotor wind engine N82-12648
WING FLOW METHOD TESTS
Wing design for light transport aircraft with improved fuel economy A82-14416
WING LOADING
Divergence of a sweptforward wing A82-13560
Effect of fighter attack spectrum on composite fatigue life [AD-A105034] N82-12143
WING NACELLE CONFIGURATIONS
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators N82-13089
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference N82-13090
A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow N82-13094
WING OSCILLATIONS
Aeroelasticity matters: Some reflections on two decades of testing in the NASA Langley transonic dynamics tunnel [NASA-TM-83210] N82-12041
WING ROOTS
AV-8B technical update - Leading edge root extension development A82-14940
WING-FUSELAGE STORES
Wing/store flutter - An active adaptive control application A82-13122
WINGED VEHICLES
In-flight deflection measurement of the HiMAT aeroelastically tailored wing [AIAA PAPER 81-2450] A82-14381
WINGS
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow N82-13095
Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds N82-13813
WIRE
Wire strike protection A82-13246
WORKING FLUIDS
Efficient use of working fluids in aviation hydraulic systems A82-15724
WORKLOADS (PSYCHOPHYSIOLOGY)
Assessing pilot workload - Without disturbing pilot behavior A82-14745

X

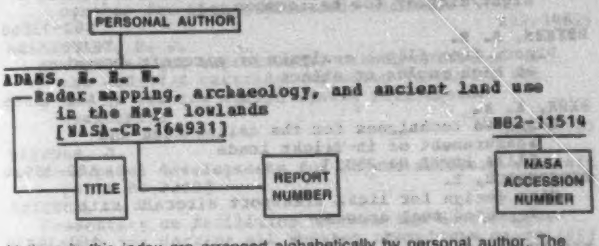
X-14 AIRCRAFT
The X-14 - 24 years of V/STOL flight testing A82-14927
XV-15 AIRCRAFT
Hover tests of the XV-15 Tilt Rotor Research Aircraft [AIAA PAPER 81-2501] A82-14386

Y

YAG LASERS
Options for GTS precision automated tracking system --- airborne laser tracking system A82-13020

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ABELSON, P. H.
Costs of noise nuisance from aircraft A82-13314

ABLA, M. M.
Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes A82-13120

ACCARINO, N.
A new approach to radar plot extraction for ATC applications A82-14908

ACKERMANN, J.
Robust flight control - A design example A82-15845

ADAM, R. C.
F/A-18 'Hornet' - One man operability [AIAA 81-2266] A82-13484
F/A 18 Hornet crew station N82-13064

ADOLPH, C. E.
The Air Force Flight Test Center - Utah Test and Training Range in the 1980's [AIAA PAPER 81-2407] A82-13916

AFREMOV, V. G.
Current aerial cameras A82-15655

AGGARWAL, A. K.
Weapon delivery system using GPS A82-14711

AKHTER, M. M.
Sensor failure detection system [NASA-CR-165515] N82-13145

ALBERT, V. R.
Helicopter IFR - Past, present and future and future A82-13245

ALLEN, J. H.
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model A82-14779

ALTMAN, R. L.
Fire extinguishant materials [NASA-CASE-ARC-11252-1] N82-12168
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires [NASA-CR-165011] N82-13186

ALVAREZ, J.
Effect of a part span variable inlet guide vane on TF34 fan performance [NASA-CR-165458] N82-12075

ANDERSON, L. R.
Computational methods of robust controller design for aerodynamic flutter suppression [NASA-CR-164983] N82-12080

ANDERSSON, A. O.
Aircraft absorbers - Promise and practice A82-14042

ANDREWS, H. W.
Georgia Tech coherent jammer flight test [AIAA PAPER 81-2452] A82-13898

ANDREWS, W. H.
AD-1 oblique wing aircraft program [AIAA PAPER 81-2354] A82-14390

ARCHER, R. S., III
The application of large screen CRT's, touch panels, and voice to the flight stations of the 1990's [AIAA 81-2263] A82-13482

ARDEMA, M. D.
Air-to-air combat analysis - Review of differential-gaming approaches A82-13115

ARETZ, A. J.
Software considerations in the design of computer generated flight displays A82-14742

ASHER, H. J.
Helicopter reliability and maintainability trends during development and production [AD-A105775] N82-13136

AST, W. G.
Advanced display systems for crew stations of tactical aircraft [AIAA 81-2312] A82-13514

ATTLFELLNER, S.
System identification helicopter parameters. Determination from flight tests, phase 2 [BMVG-FBWT-80-12] N82-13137

ATZHORN, D.
Design and flight test of a lateral-directional command augmentation system [AIAA 81-2331] A82-13527

AYERS, T. G.
A review of flight-to-wind tunnel drag correlation [AIAA PAPER 81-2475] A82-14302

B

BABB, C. D.
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail [NASA-TM-80097] N82-13110

BADALIANCE, R.
Effect of fighter attack spectrum on composite fatigue life [AD-A105034] N82-12143

BAER-RIEDHART, J. L.
The development and flight test evaluation of an integrated propulsion control system for the HiMAT research airplane [AIAA PAPER 81-2467] A82-13931

BAHANASSY, M.
Digital simulation of aircraft electrical generating system by means of Sceptre program A82-14820

BAIER, H. J.
Mathematical programming in engineering design problems A82-15864

BALASUBRAMANYAN, C.
Prediction of aerodynamic loads on aircrafts with external stores at transonic speeds N82-13813

BALIUK, A. D.
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482
BALKE, H.
Maneuver load control for the reduction of design loads and improvement of the maneuverability of modern fighter aircraft
[BMVG-FBWT-81-2] N82-13138
BANG, C.
Overview of flight and ground testing with emphasis on the wind tunnel
[AIAA PAPER 81-2474] A82-13928
BARAN, Y.
Fixed gain controller design for aircraft
[AD-A104877] N82-12081
BARBATO, G. J.
Tanker avionics and aircrew complement evaluation
N82-13063
BARTLETT, F. D., JR.
Flight vibration optimization via conformal mapping
A82-13975
BASKETT, B. J.
The TADS/PNVS 'eyes' for the AH-64 attack helicopter
A82-13239
BATSON, V. M.
A unique integrated flight testing facility for advanced control/display research
[AIAA PAPER 81-2490] A82-13919
BAXTER, D.
ATARK laser tracking system
A82-13016
BAZHENOV, V. G.
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482
BEAIRD, H. G., JR.
The all composite Lear Fan 2100
A82-14936
BEATTIE, E. C.
Sensor failure detection system
[NASA-CR-165515] N82-13145
BECLE, J. P.
Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines
N82-13087
BEDRIK, B. G.
Efficient use of working fluids in aviation hydraulic systems
A82-15724
BEHEIM, M. A.
NASA research in aircraft propulsion
[NASA-TM-82771] N82-13146
BEHEL, I. M.
F/A-18A high angle of attack/spin testing
A82-14934
BEHNKE, S. W.
Implementing the DAIS executive
A82-14814
BEMENT, L. J.
Emergency in-flight egress for general aviation aircraft
A82-14953
BERGER, R.
Comparison between the exact and an approximate feedback solution for medium range interception problems
A82-13106
BERNIUKOV, A. K.
Digital signal processing on a background of rereflections for the international aircraft landing system
A82-13703
BERRY, R. L.
The LANTIRN wide field-of-view raster Head-Up Display
A82-14825
BERSON, B. L.
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468
BERTOLONE, G.
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073
BERUDE, H. A.
Digital avionics - What a pilot expects to see
[AIAA 81-2217] A82-13455
BEVER, G. A.
The development and use of a computer-interactive data acquisition and display system in a flight environment
[AIAA PAPER 81-2371] A82-13946
BEYER, H.
Experimental investigation of a helmet mounted sight/display for helicopter
N82-13060
BEYERS, M. E.
Direct free-flight analysis of aircraft dynamics at high angles of attack
A82-15596
BIRK, K. A.
Improved techniques for the calibration and measurement of in-flight loads
[AIAA PAPER 81-2502] A82-13924
BIRRENBACH, R.
Wing design for light transport aircraft with improved fuel economy
A82-14816
BISSINGER, N. C.
The design and development of the Tornado engine air intake
N82-13074
BLAKELOCK, J. H.
Design and analysis of a digitally controlled integrated flight/fire control system
[AIAA 81-2245] A82-13470
BOGACHEV, A. S.
Estimation of the efficiency of radioelectronic flight navigation systems
A82-13701
BOGHANI, A. B.
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065
BOLT, R. F.
A modular multiplexed digital voice intercommunications system
A82-14721
BOREK, R. W.
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140
BORGHERESI, E.
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777
BOTHA, D. G.
Integrated avionics - Concepts and concerns
[AIAA 81-2211] A82-13452
The agile transversal filter - A flexible building block for ICNIA
A82-14765
BOUCEK, G. P., JR.
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468
BOUSQUET, J.
A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow
N82-13094
BOWER, R. E.
Progress in aeronautical research and technology applicable to civil air transports
A82-13974
BOWERS, D. L.
Integration of advanced exhaust nozzles
N82-13075
BOYD, R. V.
Naval Weapons Center - Test and evaluation in the 1980's
[AIAA PAPER 81-2485] A82-13940
BOYD, R. W.
Navy performance modeling techniques
[AIAA PAPER 81-2431] A82-13869
BOYDEN, R. P.
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
A82-13971
BOYLAN, W. G.
Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977
[AD-A104759] N82-12056

BRADER, R. H.
High-accuracy ranging over voice radios for downed aircrew rescue
A82-14694

BRADLEY, R. D.
A new approach to modeling the cost of ownership for aircraft systems
[AD-A104434] N82-13979

BRADSHAW, A.
Design of direct digital flight-mode control systems for high-performance aircraft
A82-14829

BRANDSTADT, R. J.
Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation
A82-14985

BRINDLE, J.
Flat panel developments for future military aircraft
[AIAA 81-2302] A82-13507

BRITTON, J. W.
Commentary on facilities used in the development of a Sea Harrier all weather operations capability
[AIAA PAPER 81-2407] A82-13892

BROCK, L. D.
On-board communication for active-control transport aircraft
[AIAA 81-2321] A82-13520
Reliability analysis of the F-8 digital fly-by-wire system
[NASA-CR-163110] N82-12079

BROCKHURST, F. C.
High voltage/high power for airborne applications
A82-15918

BROOKS, W. J.
Acceptance testing of the Calspan variable stability Learjet
A82-14937

BROWN, R. A. W.
C-5A unsurfaced taxi and off-load demonstrations
[AIAA PAPER 81-2439] A82-13875

BROWN, T. W.
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070

BRUCKNER, J. M. H.
Airplane performance sensitivities to lateral and vertical profiles
A82-15846

BRUMBACK, B. D.
Time-referencing of data in an asynchronous environment
[AIAA 81-2341] A82-13531

BUCHANAN, T. D.
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047

BUCHHOLZ, W.
Applications of covariance analysis simulation to avionics flight testing
A82-14767

BULL, J. O.
Wind tunnel tests of ejection seat for high dynamic pressure escape
A82-14979

BUNK, W.
'In situ' composites for jet propulsion and stationary gas turbine applications
A82-15024

BURCHAM, F. W., JR.
Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2438] A82-13874

BURKE, M. J.
Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers
[AIAA PAPER 81-2510] A82-13906

BURKS, J. S.
Rotor systems research aircraft /RSRA/ rotor force and moment measurement system
[AIAA PAPER 81-2516] A82-13913

BURNHAM, G.
Airborne Electronic Map Systems. I - Design
A82-14770
Airborne Electronic Terrain Map System. II - Applications
A82-14773

BURNS, R. C.
Strapdown inertial reference systems performance analysis
A82-14682

BURTON, R. A.
F/A-18 high authority/high gain digital flight control system development and flight testing
[AIAA PAPER 81-2465] A82-13930

BUTLER, R. W.
Overview of flight and ground testing with emphasis on the wind tunnel
[AIAA PAPER 81-2474] A82-13928

BIRD, J. C.
The LANTIRN wide field-of-view raster Head-Up Display
A82-14825

C

CALAMIA, M.
Some Italian research for developing new primary ATC radars
A82-14775

CALISE, A. J.
On-line optimization of aircraft altitude and flight path angle dynamics
A82-13107

CALLOWAY, R. L.
Force and moment, flow-visualization, and boundary-layer tests on a shuttle orbiter model at Mach 6
[NASA-TP-1952] N82-12106

CAMANA, P. C.
Advanced integrated CNI architectures
A82-14763

CAMPBELL, J. R.
Investigation of acoustic interactions in jet thrust augmenting ejectors
[AD-A106083] N82-13035

CAMPBELL, R. F.
Design of a crashworthy crew seat for the Boeing Vertol Chinook helicopter
A82-14975

CAPTAIN, K. M.
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

CARADONNA, F. X.
Experimental and analytical studies of a model helicopter rotor in hover
[NASA-TM-81232] N82-12042

CARLSON, N. A.
Evaluating sources of error in NAR/GEANS navigation using a Kalman postprocessor
A82-14739

CARPENTER, C. A.
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A104922] N82-12055

CARTER, A. L.
Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft
[AIAA PAPER 81-2387] A82-14393

CARTER, R. C.
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
N82-13088

CHAKRAVARTY, A. J. N.
Application of singular perturbation theory
N82-12050

CHALK, C. R.
Modeling procedures for handling qualities evaluation of flexible aircraft
A82-13968

CHANDRASHEKAR, S.
A cost effective method for the control of roll due to side slip on a low speed aircraft
[AIAA PAPER 81-2422] A82-13861

CHAO, Y.-F.
Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors
A82-15606

CHELINI, J.
Real-time flight management avionics software system
[AIAA 81-2340] A82-13530
CHOJNACKI, J.
Raven aircraft filter-absorber
[AD-A098962] N82-13139
CHORLEY, R. A.
Electronic flight deck displays for transport aircraft
[AIAA 81-2264] A82-13483
Electronic flight deck displays for military transport aircraft
N82-13050
CHUN, R. K.
ARINC 429 digital data communications on the Boeing 757 and 767 commercial airliners
[AIAA 81-2267] A82-13485
CLARRICOATS, P. J. B.
Prediction and performance of radome-covered reflector antennas
A82-15311
CLAY, C. W.
New all-electric-system technology
A82-14710
COCHRANE, J. A.
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/
[AIAA PAPER 81-2409] A82-13852
COLBOURNE, D. E.
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
N82-13069
COLLINS, S. N.
A storage device for subsystem maintenance information
A82-14817
COLLINS, W. E.
An analysis of civil aviation propeller-to-person accidents: 1965-1979
[AD-A105365] N82-12053
COLLIVER, D. J.
Radar hostile fire location
A82-14857
COOK, J. L.
KC-10, flight test program management - The contractor's viewpoint
[AIAA PAPER 81-2380] A82-14384
COOKE, D. R.
Selected stability and control derivatives from the first Space Shuttle entry
[AIAA PAPER 81-2451] A82-13880
CORRICK, G. E.
A methodology for missile launch envelope display evaluation
A82-14744
COSENTINO, O.
A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records
A82-15468
COSTER, J. R.
Using voice control onboard combat aircraft
N82-13056
COULTER, S. M.
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047
COYLE, T. F.
Recent improvements at the Naval Air Test Center for increased test system flexibility
[AIAA PAPER 81-2392] A82-13888
CRABILL, N. L.
Thunderstorm hazards flight research - Program overview
[AIAA PAPER 81-2412] A82-13853
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80
A82-14954
CREEKMORE, R.
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[NASA-TM-82770] N82-13144
CRONIN, M. J.
The role of avionics in the all electric airplane
[AIAA 81-2219] A82-13457
The all electric airplane - Its development and logistic support
A82-14709
CROSS, E. J., JR.
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13878
CRUCE, A. C.
The need for, and development of, a simulation facility at the Naval Air Test Center
[AIAA PAPER 81-2408] A82-13917
CYCON, H. F., JR.
A dual input actuator for fluidic backup flight control
A82-13088

D

DADONE, L. U.
Helicopter icing
A82-13243
DALLE MESE, E.
Performance evaluation of target report extractor in the monopulse ATCRBS
A82-14776
DANNENBERG, E.
Experimental investigation of a helmet mounted sight/display for helicopter
N82-13060
DASARO, J. A.
Integration of controls and displays in US Army helicopter cockpits
N82-13053
DAVINO, D. S.
LHX - An advanced avionics system design
[AIAA 81-2249] A82-13472
DAVIS, G. A.
Recent improvements at the Naval Air Test Center for increased test system flexibility
[AIAA PAPER 81-2392] A82-13888
DAZZO, J.
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft
A82-14828
DEAL, P. L.
Thunderstorm hazards flight research - Program overview
[AIAA PAPER 81-2412] A82-13853
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80
A82-14954
DEAN, L. W., III
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043
DEANDA, A. G.
AFFTC standard airspeed calibration procedures
[AD-A104830] N82-12074
DEANGELIS, V. M.
In-flight deflection measurement of the HiMAT aeroelastically tailored wing
[AIAA PAPER 81-2450] A82-14381
DELAFAYE, B.
An acquisition and analysis system for dynamic tests of air inlets
N82-13082
DEMIDENKO, K. A.
Quality optimization and unification of aviation gasolines
A82-15721
DESIMONE, D. E.
Escape systems decelerator technology
[AIAA PAPER 81-1913] A82-13966
U.S. Navy life support development trends
A82-14952
DHYANCHAND, J.
Digital simulation of aircraft electrical generating system by means of Sceptre program
A82-14820
DIKE, G.
Inverse SAR and its application to aircraft classification
A82-14871
DILL, H. D.
Effect of fighter attack spectrum on composite fatigue life
[AD-A105034] N82-12143

DOMZALSKI, L.
Crashworthy military passenger seat development
A82-14976

DOUGHERTY, E. P.
High voltage/high power for airborne applications
A82-15918

DOUGLAS, L. L.
Fatigue methodology - A technical management system for helicopter safety and durability
A82-13240
Helicopter reliability and maintainability trends during development and production
[AD-A105775] N82-13136

DRESEL, D. L.
The design and implementation of a canned scenario function for the F-16 dynamic system simulator
A82-14678

DRUMMOND, R. C.
F/A-18A weapon system - 1976 state of the art
[AIAA 81-2215] A82-13853

DUBRO, G. A.
Assessment methodology of the lightning threat to advanced aircraft
A82-14759

DUDLEY, M. R.
A large-scale investigation of engine influence on inlet performance at angle-of-attack
[AIAA PAPER 81-2481] A82-13939

DUKE, E. L.
Experience with flight test trajectory guidance
[AIAA PAPER 81-2504] A82-14379

DUNN, G. L.
Conceptual design of an integrated power and avionics information system
A82-14788

DUVAL, R. W.
The use of frequency methods in rotorcraft system identification
[AIAA PAPER 81-2386] A82-14392

DYMENT, A.
Transonic flows in an air inlet with large incidence and the effect of a blowing trap
N82-13071

E

EBERHARDT, R. G.
Rescue at sea
A82-14956

EDGE, H. R.
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model
A82-14779

EDMONDSON, H. D.
The USAF Test Pilot School high angle of attack and spin training program
A82-14932

EDWARDS, D. H.
Vibration test procedures for accessory angle drive gearboxes on Atar 09C engines
[AD-A105269] N82-12076

EIDELMAN, B.
Fixed gain controller design for aircraft
[AD-A104877] N82-12081

ELDER, R. J.
Assessing pilot workload - Without disturbing pilot behavior
A82-14745

ELLERBE, R.
Design study report for General Aviation Loran-C receiver
[AD-A104921] N82-12062

ELLIOTT, C. T.
Integration of controls and displays in US Army helicopter cockpits
N82-13053

ELSENAAR, A.
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090

EMELIANOV, V. E.
Quality optimization and unification of aviation gasolines
A82-15721

EMERY, J. E.
How the helicopter cockpit designer uses digital avionics
N82-13049

ENDERLE, H.
Comparison of different nozzle concepts for a reheated turbofan
N82-13077

ENEVOLDSON, E. K.
Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906
Experience with flight test trajectory guidance
[AIAA PAPER 81-2504] A82-14379
Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration
[NASA-TM-81972] N82-13146

ENGLAND, J. N.
An advanced programmable/reconfigurable color graphics display system for crew station technology research
[AIAA 81-2314] A82-13516

ENGLIN, B. A.
Quality optimization and unification of aviation gasolines
A82-15721

EULRICH, B. J.
Modeling procedures for handling qualities evaluation of flexible aircraft
A82-13968

EWALD, B.
The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft
N82-13086

F

FAIR, D.
Digital simulation of aircraft electrical generating system by means of Sceptre program
A82-14820

FAIRFAX, R. K.
Information technology and its impact on test and evaluation at the Naval Air Test Center
[AIAA PAPER 81-2396] A82-13894

FALCHERO, D.
Application of the ONERA dynamic stall model to a helicopter blade in forward flight
[ONERA, TP NO. 1981-89] A82-13992

FAN, Y.-N.
Experimental investigation of total pressure loss and airflow distribution for gas turbine combustors
A82-15606

FARLEY, H. L.
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

FARMER, R. H.
Real-time flight management avionics software system
[AIAA 81-2340] A82-13530
Flight management systems for modern jet aircraft
A82-14770

FARQUHAR, B. W.
A large-scale investigation of engine influence on inlet performance at angle-of-attack
[AIAA PAPER 81-2481] A82-13939

FARRELL, R. J.
Index of National Aviation Facilities Experimental Center technical reports 1972 - 1977
[AD-A104759] N82-12056

FERLAZZO, G.
A criterion for determining the causes of wind shear at Punta Raisi Airport, on the basis of statistical data from barograph records
A82-15468

FERRELL, P. J.
Computer-in-control selection logic for a triplex digital flight control system
[AIAA 81-2236] A82-13465

FERRIS, E. W.
Application of a microprocessor controlled cockpit display for enhanced pilot control of flight test maneuvers
[AIAA PAPER 81-2510] A82-13900

FILARSKY, S. F.
Computergraphics for aircraft control
[AIAA 81-2313] A82-13515

FISH, R. B.
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065
FISHER, B. D.
Thunderstorm hazards flight research - Program overview
[AIAA PAPER 81-2412] A82-13853
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80
A82-14954
FISHER, J. J.
The Navy F/A-18A Hornet electromagnetic compatibility program
A82-14760
FLITCROFT, J. E.
Prediction and measurement of time-variant, three-dimensional flows in military aircraft intakes
N82-13069
FLODROPS, J. P.
Transonic flows in an air inlet with large incidence and the effect of a blowing trap
N82-13071
FLORES, A.
Portable air driven variable speed fiber optic cable termination polisher
[AD-A104797] N82-12448
FOHRER, W.
Effects of aerodynamic coupling on the dynamics of roll aircraft
N82-12070
FOOTE, A.
Applications of covariance analysis simulation to avionics flight testing
A82-14767
FORGHAM, S. L.
The use of metal finishing in aircraft fuel systems
N82-12077
FORNASIER, L.
Subsonic military aircraft engine intake: An integrated theoretical experiment design
N82-13073
FOSSI, M.
Performance evaluation of target report extractor in the monopulse ATCRBS
A82-14776
FOSTER, C. R.
Operational evaluation of the new generation of jet transport aircraft
[AIAA PAPER 81-2377] A82-13942
FOSTER, W. D.
Collection and simulation of spatial infrared signatures of military jet aircraft
[AIAA PAPER 81-2494] A82-13921
FOX, D.
Computer simulation of an advanced aircraft electrical system
A82-14821
FRANKLIN, S. N.
Integrated flight testing based on nonlinear system identification data processing techniques
[AIAA PAPER 81-2449] A82-14389
Robust flight control - A design example
A82-15845
FRASER, K. F.
In-flight computation of helicopter transmission fatigue life expenditure
[AIAA PAPER 81-2434] A82-13872
FRIES, G. H.
Heavy lift helicopters - A national technology opportunity
A82-13241

G

GAGLIANI, J.
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications
[NASA-CR-167421] N82-12230
GALLAGHER, J.
Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/
[AIAA PAPER 81-2514] A82-13911
GARNIER, J.-L.
Large terminal maneuvering areas: Operational problems - Possible development of solutions
A82-15625
GEBHART, L.
The design and implementation of a canned scenario function for the F-16 dynamic system simulator
A82-14678
GERA, J.
Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906
GERDES, R. M.
The X-14 - 24 years of V/STOL flight testing
A82-14927
GIACCARI, E.
A new approach to radar plot extraction for ATC applications
A82-14908
GIBBS, G. D.
Enhanced F-15 air-to-ground flight demonstrations
[AIAA PAPER 81-2413] A82-13854
GIBSON, W. M.
Flight testing De Havilland Aircraft Limited DASH-8 utilizing onboard data analysis by microprocessor
[AIAA PAPER 81-2507] A82-13907
GILL, B. A.
Advanced fighter technology integration AFTI/F-16 test program overview
[AIAA PAPER 81-2353] A82-14398
GIULI, D.
Performance evaluation of target report extractor in the monopulse ATCRBS
A82-14776
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777
GLIDEWELL, R. J.
Advanced exhaust nozzle technology
N82-13078
GOLD, D.
A look at the Hoffman Triangular parachute - The first successful glidable parachute
A82-14966
GOLDBERG, J.
The SIFT computer and its development
[AIAA 81-2278] A82-13490
GOLDSMITH, E. L.
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070
GOLUBEV, B.
A synthesis technique for highly uncertain and interacting multivariable flight control systems
A82-14827
GONTAROVSKII, V. P.
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482
GOODCHILD, W.
Moving target Detector/Airport Surveillance radar (ASR-7) field evaluation
[AD-A105196] N82-12303
GOODMAN, H. A.
Reliability analysis of the F-8 digital fly-by-wire system
[NASA-CR-163110] N82-12079
GOODSON, R.
Civil aviation in China
A82-13600
GORBUNOV, M. N.
The technology of sheet-metal stamping in the production of aircraft /2nd revised and enlarged edition/
A82-14998
GORDON, D. L.
Georgia Tech coherent jammer flight test
[AIAA PAPER 81-2452] A82-13898
GORODETSKII, V. G.
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
A82-15723
GOVINDARAJ, K. S.
Modeling procedures for handling qualities evaluation of flexible aircraft
A82-13968

GRABE, W.
Compressor stall inducing installation effects of an engine control parameter for the CF-5 aircraft
N82-13085

GRABOWSKY, J. F.
Pave Mover Flight Test Program
[AIAA PAPER 81-2492] A82-14380

GRAPE, F. R.
An analysis of civil aviation propeller-to-person accidents: 1965-1979
[AD-A105365] N82-12053

GRAVELY, W. L.
The influence of smart computers on the cockpit of the future
A82-14743

GREEN, D. R.
Advanced display systems for crew stations of tactical aircraft
[AIAA 81-2312] A82-13514

GREY, J.
Aeronautics in China - An AIAA report
A82-13150

GRIEB, H.
Comparison of different nozzle concepts for a reheated turbofan
N82-13077

GRIFFITH, B. J.
Overview of flight and ground testing with emphasis on the wind tunnel
[AIAA PAPER 81-2474] A82-13928

GRIMES, R.
ATARK laser tracking system
A82-13016

GROSS, J. P.
Techniques for interfacing multiplex systems
[AD-A101457] N82-13135

GRUNNET, J. L.
Model testing techniques for measuring inlet drag
N82-13084

GRUNWALD, A. J.
Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches
A82-15047

GRYSON, P.
Transonic flows in an air inlet with large incidence and the effect of a blowing trap
N82-13071

GUPTA, R. R.
Updated station deselection procedures to support automatic Omega receiver operation
A82-14712

GUTENEV, B. S.
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
A82-15723

H

HABERLAND, C.
Wing design for light transport aircraft with improved fuel economy
A82-14416

HAMILTON, B. G., JR.
Digital avionics display processor
[AIAA 81-2311] A82-13513

HANSON, D. C.
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468

HANSON, H. G.
Automatic digital gain ranging
[AIAA PAPER 81-2370] A82-13947

HARPER, L. R.
The subsonic performance of practical military variable area convergent nozzles
N82-13076

HARRIS, A. E.
Wind tunnel test and analysis techniques using powered simulators for civil nacelle installation drag assessment
N82-13086
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
N82-13089

HARRIS, D. J.
Hover tests of the XV-15 Tilt Rotor Research Aircraft
[AIAA PAPER 81-2581] A82-14386

HARRIS, R. L.
Future directions in CNI integrated avionics
A82-14720

HARRISON, A. J.
The history of the development of the GQ aeroconical parachute - 1971-1980
A82-14961

HARROLD, G. R.
Light-guided information distribution systems
[AIAA 81-2320] A82-13519

HART, D. L.
Failure analysis of variable reluctance stepper motor
A82-14792

HARVEY, C. A.
Wing/store flutter - An active adaptive control application
A82-13122

HASSANBRISSA, A. A.
Subcritical and supercritical airfoils for given pressure distribution
N82-12031

HATFIELD, J. J.
An advanced programmable/reconfigurable color graphics display system for crew station technology research
[AIAA 81-2314] A82-13516
A unique integrated flight testing facility for advanced control/display research
[AIAA PAPER 81-2490] A82-13919
Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches
A82-15047

HEAL, G. B.
An update of an integrated CNI system - TIES
[AIAA 81-2292] A82-13500

HEALY, E. D.
Updated station deselection procedures to support automatic Omega receiver operation
A82-14712

HEATON, H. L.
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178

HEGNA, H. A.
The numerical solution of incompressible turbulent flow over airfoils
N82-12030

HELD, V.
Navigation for helicopters by multiple use of inertial sensors
A82-14713

HENDRICKSON, J. F.
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468

HENLINE, J. C.
Columbus, Ohio, Voice response system demonstration and evaluation
[AD-A104750] N82-12304

HENRY, P.
F-15 SAR
A82-14938

HILAIRE, G.
Advantages and limitations of various materials used in the construction of modules
[SNIAS-812-551-103] N82-12072

HILDRETH, B. L.
The need for, and development of, a simulation facility at the Naval Air Test Center
[AIAA PAPER 81-2480] A82-13917

HINDS, B.
KC-10 flight test program
A82-14935

HINDS, J. L.
Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation
A82-14985

HISSONG, S. J.
Microprocessor flight control application study
A82-14796

HOCKNEY, R. W.
Rapid elliptic solvers
A82-15827

HODDER, B. K.
A large-scale investigation of engine influence on inlet performance at angle-of-attack
[AIAA PAPER 81-2481] A82-13939
HOFFMAN, R.
Airborne Electronic Map Systems. I - Design
A82-14770
HOLBERG, D. B.
Pave Hover Flight Test Program
[AIAA PAPER 81-2492] A82-14380
HOLCROFT, J. D.
Radar hostile fire location
A82-14857
HOLDHUSEN, J. S.
Model testing techniques for measuring inlet drag
N82-13084
HOOVER, W. R.
Passive terrain following using stored map and global positioning system
A82-14772
HOPKINS, A. L., JR.
On-board communication for active-control transport aircraft
[AIAA 81-2321] A82-13520
HORNUNG, G.
Structural dynamics: Modified calculations
[BMVG-FBWT-81-1] N82-13457
HOROWITZ, I.
A synthesis technique for highly uncertain and interacting multivariable flight control systems
A82-14827
HOWARD, P. J.
Flight trail of the Aircraft Fatigue Data Analysis System (AFDAS) Mk 2 prototype
[AD-A105270] N82-12066
HUMPHREY, C. R.
Airplane performance sensitivities to lateral and vertical profiles
A82-15046
HURLBURT, G. F.
Information technology and its impact on test and evaluation at the Naval Air Test Center
[AIAA PAPER 81-2396] A82-13894

I

IAKOVLEVA, A. F.
Efficient use of working fluids in aviation hydraulic systems
A82-15724
IARLYKOV, M. S.
Estimation of the efficiency of radioelectronic flight navigation systems
A82-13701
IATESTA, J. J.
NASEP - Survival from crashed Navy helicopters
A82-14977
ILIFF, K. W.
Selected stability and control derivatives from the first Space Shuttle entry
[AIAA PAPER 81-2451] A82-13880
ILIN, V. B.
Current aerial cameras
A82-15655
INAGAKI, R.
Extended time radar raw video recording
A82-14909
INCE, W. J.
Air-to-ground MTI radar using a displaced phase center, phased array
A82-14881
INNIS, R. C.
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/
[AIAA PAPER 81-2409] A82-13852
Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA
[AIAA PAPER 81-2480] A82-13938
INOUE, S.
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109

J

JACOBSON, I. D.
Transportation systems evaluation methodology development and applications, phase 3
[NASA-CR-164999] N82-12051
JAKOB, H.
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow
N82-13095
JAKOBOVITS, R. H.
Helicopter reliability and maintainability trends during development and production
[AD-A105775] N82-13136
JAMESON, A.
Remarks on the calculation of transonic potential flow by a finite volume method
A82-15035
JARRETT, D. N.
Use of a helmet-mounted matrix display for presenting energy-maneuverability information during simulated close combat
N82-13061
JEFFCOAT, R. L.
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065
JENKINS, B. Z.
Creep and aero gas turbine design
A82-12987
JENNINGS, G. L.
F-15 SAR
A82-14938
JENSEN, R. S.
Computer-animated predictive displays for microwave landing approaches
A82-15816
JIRAN, F.
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass
[AIAA PAPER 81-2445] A82-14383
JOHANSON, D. C.
Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen
A82-14972
JOHNSON, W.
Development of a comprehensive analysis for rotorcraft. II - Aircraft model, solution procedure and applications
A82-14407

K

KANDADAI, R.
Digital control for flexible aircraft using reduced order models
A82-13094
KARPEL, M.
Design for active and passive flutter suppression and gust alleviation
[NASA-CR-3482] N82-13147
KELLEY, W. W.
Limited evaluation of an F-14A airplane utilizing an aileron-rudder interconnect control system in the landing configuration
[NASA-TM-81972] N82-13148
KELLY, R. J.
Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing
[AIAA 81-2247] A82-13471
KESSLER, R. J.
Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators
[AIAA 81-2230] A82-13463
KETTERER, J. R.
The Navy F/A-18A Hornet electromagnetic compatibility program
A82-14760
KEYSER, G. L.
Thunderstorm hazards flight research - Program overview
[AIAA PAPER 81-2412] A82-13853

KEYSER, G. L., JR.
Operational evaluation of thunderstorm penetration test flights during project Storm Hazards '80 A82-14954

KIM, H. Y.
Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling A82-14826

KIMBERLIN, R. D.
Ball-Bartoe Jetwing flight tests A82-14928

KINCAID, B. E.
Advanced fiber optic systems for avionics applications
[AIAA 81-2319] A82-13518

KINGSLEY, R. J.
Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition
[AIAA PAPER 81-1928] A82-13962

KIRAN, N. S.
A cost effective method for the control of roll due to side slip on a low speed aircraft
[AIAA PAPER 81-2422] A82-13861
Planning a helicopter flight test program
[AIAA PAPER 81-2381] A82-13881

KIRDAKOV, E. F.
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils A82-15723

KIRKHAM, W. R.
An analysis of civil aviation propeller-to-person accidents: 1965-1979
[AD-A105365] N82-12053

KLEVENHUSEN, K. D.
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow N82-13095

KLINE, C. S.
Airborne Electronic Terrain Map System. II - Applications A82-14773

KLOSTER, M.
System identification helicopter parameters. Determination from flight tests, phase 2
[BMVG-FBWT-80-12] N82-13137

KNAPP, L.
Technical/operational ATC scenarios for future TMA navigation A82-14774

KNAUS, A.
A technique to determine lift and drag polars in flight and their application
[AIAA PAPER 81-2420] A82-13859

KNEELAND, B. T., JR.
F/A-18 high authority/high gain digital flight control system development and flight testing
[AIAA PAPER 81-2465] A82-13930

KOENIG, R.
The influence of wind shear and vertical winds on takeoffs and go-arounds A82-15823

KOHNEN, E.
Experimental investigation of a helmet mounted sight/display for helicopter N82-13060

KONNHORST, L. L.
Direct digital drive actuation
[AIAA 81-2298] A82-13505

KONCSEK, J.
Performance of highly integrated inlets for supersonic aircraft N82-13066

KORKAN, K. D.
Investigation of acoustic interactions in jet thrust augmenting ejectors
[AD-A106083] N82-13035

KRAUSPE, P.
The influence of wind shear and vertical winds on takeoffs and go-arounds A82-15823

KREIFELDT, J. G.
Low cost programmable multisimulator facility
[AIAA 81-2229] A82-13534

KREINDLER, E.
Darboux points in minimum-fuel aircraft landing problems A82-13077

KRICKE, K. D.
Technical/operational ATC scenarios for future TMA navigation A82-14774

KUEBRICH, R. L.
Improved techniques for the calibration and measurement of in-flight loads
[AIAA PAPER 81-2502] A82-13924

KUHLTHAU, A. R.
Transportation systems evaluation methodology development and applications, phase 3
[NASA-CR-164999] N82-12051

KULFAN, R. M.
Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects N82-13098

KULWICKI, P. V.
A methodology for missile launch envelope display evaluation A82-14744

KUMAR, A.
Numerical analysis of the scramjet-inlet flow field by using two-dimensional Navier-Stokes equations
[NASA-TP-1940] N82-13142

KUPPUSWAMY, K.
Planning a helicopter flight test program
[AIAA PAPER 81-2381] A82-13881

L

LAMB, M.
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110

LAMBREGTS, A. A.
Development of an MLS lateral autoland system with automatic path definition
[AIAA PAPER 81-1751] A82-13993

LANCASTER, T. C.
Information technology and its impact on test and evaluation at the Naval Air Test Center
[AIAA PAPER 81-2396] A82-13894

LANG, J. D.
Organizing and training for innovative flight test management
[AIAA PAPER 81-2416] A82-13856

LANSDAAL, M. T.
General purpose real-time interaction panel for digital simulation A82-14831

LAPRAD, R. F.
Sensor failure detection system
[NASA-CR-165515] N82-13145

LARGE, R.
Status and tracking system for flight test data products
[AIAA PAPER 81-2395] A82-14376

LARUELLE, G.
An acquisition and analysis system for dynamic tests of air inlets N82-13082

LASAGNA, P. L.
Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2430] A82-13874

LAURE, J. L.
Determination and analysis of jet and missile fuel deposits
[AD-A105458] N82-12248

LAUGHER, R. D.
The influence of closed-coupled, rear fuselage mounted nacelles on the design of an advanced high speed wing N82-13092

LAUGHREY, J. A.
Integration of advanced exhaust nozzles N82-13075

LAVIN, H. P.
Light-guided information distribution systems
[AIAA 81-2320] A82-13519

LAWRENCE, D.
The use of groundspeed, in a wind shear and the flight evaluation of a radar-altimeter-based system for the measurement of groundspeed
[AD-A104756] N82-12060

LAWRENCE, D. L.
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13878

LAWSON, F.
Trim tab excitation system for the BAe 146
A82-14363

LEE, B. G. S.
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

LEE, R.
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications
[NASA-CR-167421] N82-12230

LEFFLER, M. F.
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468

LEGALL, G.
A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow
N82-13094

LENZ, R. C.
The payoff from U.S. investment in aeronautical research and development
A82-14793

LEONG, P.
Conceptual design of an integrated power and avionics information system
A82-14788

LEWIS, H. D.
Using phased array radar for data communications
A82-14725

LEYNAERT, J.
Studies of air inlets at Reynolds numbers comparable to flight in ONERA's F1 and S1MA wind tunnels
N82-13091

LILLEY, R. W.
A Loran-C prototype navigation receiver for general aviation
[AIAA 81-2329] A82-13532
MLS performance assessment, task 4. Volume 1: Evaluation procedures and equipment design
[AD-A105393] N82-12061

LINBERY, B.
Post ejection survival
A82-14981

LING, A. C.
Fire extinguishant materials
[NASA-CASE-ARC-11252-1] N82-12168
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires
[NASA-CR-165011] N82-13186

LIVINGSTON, R. R.
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A104922] N82-12055

LOGAN, W. B.
The Maneuvering Flight Path Display - A flight trajectory solution display concept
A82-14824

LOVERA, B.
The Agusta A129
A82-13237

LOWE, J. R.
Applications of head-up displays in commercial transport aircraft
[AIAA 81-2300] A82-13506

LU, J.
A new approach to modeling the cost of ownership for aircraft systems
[AD-A104434] N82-13979

LUCCHI, G. A.
Commercial airborne weather radar technology
A82-14868

LUEDDE, W. J.
The use of separated multifunction inertial sensors for flight control
[AIAA 81-2295] A82-13502

LYNN, R. A.
Flight evaluation of LORAN-C as a helicopter navigation aid in the Baltimore Canyon oil exploration area
[AD-A105260] N82-12059

LYONS, V. J.
Effect of fuel-air-ratio nonuniformity on emissions of nitrogen oxides
[NASA-TP-1798] N82-13143

M

MACMILLAN, A. J.
Navstar Global Positioning System flight test program overview
[AIAA PAPER 81-2350] A82-13956

MACMILLAN, W. L.
Compressor stall inducing installation effects of an engine control parameter for the CF-5 aircraft
N82-13085

MACNAB, R.
Testing of the SJU-5A ejection seat for the F/A-18 /HORNET/ aircraft
A82-14955

MAINE, R. E.
Selected stability and control derivatives from the first Space Shuttle entry
[AIAA PAPER 81-2451] A82-13880

MAISEL, M. D.
Hover tests of the XV-15 Tilt Rotor Research Aircraft
[AIAA PAPER 81-2501] A82-14306

MALICK, J. D.
Weather impact on low-altitude imaging infrared sensors in Europe - An availability model
A82-14779

MANTAY, W. R.
Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor
[NASA-TP-1926] N82-13107

MAREK, A. J.
Computer simulation of an advanced aircraft electrical system
A82-14821

MARGASON, R. J.
Jet V/STOL wind-tunnel simulation and groundplane effects
A82-13973

MANGO, C. S.
A matter of seconds - A critical account of three notable air disasters /5th Major Miller Memorial Lecture/
A82-15597

MARKS, E. E.
A new approach to modeling the cost of ownership for aircraft systems
[AD-A104434] N82-13979

MARQUART, E. J.
Evaluation and wind tunnel tests of the 4,000 lb (normal-force) pitch/yaw and roll dynamic stability balance systems for measuring direct, cross, and cross-coupling derivatives
[AD-A105122] N82-12047

MARTIN, J. L.
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/
[AIAA PAPER 81-2409] A82-13852
Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA
[AIAA PAPER 81-2480] A82-13938

MARTINO, J. D.
Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation
A82-14985

MARTINON, J.
Three dimensional flow investigation with a method of characteristics in the inlet region and the blade-to-blade channels of supersonic axial compressors
[ESA-TT-637] N82-12070

MASSEY, E. G.
A new approach to modeling the cost of ownership for aircraft systems
[AD-A104434] N82-13979
MASTRULLO, A. R.
An analysis of civil aviation propeller-to-person accidents: 1965-1979
[AD-A105365] N82-12053
MATHENY, N. W.
HiMAT aerodynamic design and flight test experience
[AIAA PAPER 81-2433] A82-13871
MAUREAU, C.
Head up displays
N82-13052
MAY, B.
Status and tracking system for flight test data products
[AIAA PAPER 81-2395] A82-14376
MAYER, L. A.
Fire extinguishant materials
[NASA-CASE-ARC-11252-1] N82-12168
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires
[NASA-CR-165011] N82-13186
MAYO, W. H.
On matching the systems identification technique to the particular application
A82-13119
MCCALL, D. L.
A Loran-C prototype navigation receiver for general aviation
[AIAA 81-2329] A82-13532
MCCORMICK, B. S.
A recursive time domain analysis of distributed line grid networks with application to the LTA/EMP problem
A82-14761
MCCUEN, J. W.
Higher order Information Transfer Systems are coming
[AIAA 81-2317] A82-13517
MCDONNELL, J. D.
Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond
[AIAA 81-2218] A82-13456
MCFADDEN, P. D.
Vibration test procedures for accessory angle drive gearboxes on Atar 09C engines
[AD-A105269] N82-12076
MCFARLAND, R. H.
MLS performance assessment, test 4. Volume 1: Evaluation procedures and equipment design
[AD-A105393] N82-12061
MCGILL, I. R.
The protection of gas turbine blades - A platinum aluminide diffusion coating
A82-14364
MCGLONE, M. E.
Sensor failure detection system
[NASA-CR-165515] N82-13145
MCGREGOR, I.
Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds
N82-13068
MCHALE, E. T.
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178
MCKINLEY, J. B.
Analysis of integrated fuel-efficient, low-noise procedures in terminal-area operations
[DE81-029833] N82-13014
MCMURTRY, T. C.
AD-1 oblique wing aircraft program
[AIAA PAPER 81-2354] A82-14390
MCNAMARA, T. G.
F/A-18A high angle of attack/spin testing
A82-14934
MCSHARRY, M. E.
General purpose real-time interaction panel for digital simulation
A82-14831
MEALY, G. L.
Application of multiple model estimation techniques to a recursive terrain height correlation system
A82-14768
MEHDI, I. S.
Will power-by-wire replace power-by-hydraulics
A82-14707
MELOCCO, J. M.
Using voice control onboard combat aircraft
N82-13056
MERUTKA, J. P.
Progress in protective coatings for aircraft gas turbines: A Review of NASA sponsored research
[NASA-TM-82740] N82-12216
MEYER, G.
The design of exact nonlinear model followers
A82-13125
Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft
[AIAA 81-2238] A82-13466
MEYER, R. B.
Techniques for modifying airfoils and fairings on aircraft using foam and fiberglass
[AIAA PAPER 81-2445] A82-14383
MICCICHE, J.
NASEP - Survival from crashed Navy helicopters
A82-14977
MIHALOEW, J. R.
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[NASA-TM-82770] N82-13144
MILES, R. B.
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2320] A82-13525
MILEY, S. J.
Flight test method for the determination of reciprocating engine cooling requirements
[AIAA PAPER 81-2446] A82-13870
MILLER, G. K., JR.
A decoupled control system for improved flight performance in wind shear
A82-13079
MILLER, M.
Software considerations in the design of computer generated flight displays
A82-14742
MIMURA, F.
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109
MIRACLE, D. E.
Study of the effects of maneuver compensation on beam pointing accuracy
A82-14780
MOCHII, M.
Extended time radar raw video recording
A82-14909
MONTOYA, R. J.
An advanced programmable/reconfigurable color graphics display system for crew station technology research
[AIAA 81-2314] A82-13516
MORELLO, S. A.
Have we overlooked the pilot's role in an automated flight deck
[AIAA 81-2262] A82-13481
MORGAN, J. L.
Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field
[NASA-TM-82750] N82-13908
MORRIS, P. B.
Updated station deselection procedures to support automatic Omega receiver operation
A82-14712
MOSS, R. W.
Tanker avionics and aircrew complement evaluation
N82-13063
MOTYKA, P.
Fault detection for two physically separated, communicating inertial measurement units
A82-13142
A failure detection and isolation system for tactical aircraft with separated IMUs
A82-14684
MOXON, J.
CT7 - GE attacks commuter turboprop market
A82-15950

MUGGLI, W.
The operational characteristics of turbojets, giving particular attention to the cooled high-pressure turbine
A82-14414
MULLEY, W. G.
The interface of multifunction controls and displays to tomorrow's avionics
[AIAA 81-2290] A82-13499
Flat panel developments for future military aircraft
[AIAA 81-2302] A82-13507
Computergraphics for aircraft control
[AIAA 81-2313] A82-13515
MUNNIKSMA, B.
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090
MUNUKUTLA, S. S.
Turbulent wake development behind streamlined bodies
N82-13104
MURPHY, W. J.
Integrated Flight/Weapon Control design and evaluation
A82-14741
MUSICK, S. H.
Evaluating sources of error in EAR/GIANS navigation using a Kalman postprocessor
A82-14739
MYERS, L. P.
Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2438] A82-13874
MYRONUK, D. J.
Development and testing of dry chemicals in advanced extinguishing systems for jet engine nacelle fires
[NASA-CR-165011] N82-13186
MYSING, J. O.
The influence of smart computers on the cockpit of the future
A82-14743

N

NAGEL, H.
Comparison of different nozzle concepts for a reheated turbofan
N82-13077
NASH, J. S.
The Advanced Range Instrumentation Aircraft improvement and modernization program
[AIAA PAPER 81-2368] A82-13948
NEEBE, F. C.
Microprocessor flight control application study
A82-14796
NEGRIN, M.
Comparison between the exact and an approximate feedback solution for medium range interception problems
A82-13106
NELSON, W. E., JR.
Microprocessor flight control application study
A82-14796
NEUMAN, F.
Darboux points in minimum-fuel aircraft landing problems
A82-13077
NEUMANN, L.
A synthesis technique for highly uncertain and interacting multivariable flight control systems
A82-14827
NGUYEN, L. T.
Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906
NIKOLITSCH, D.
A calculation method for slender wing-body configurations in supersonic flow at high angles of attack
[BMVG-FBWT-79-15] N82-13115
NIPPRESS, K. R.
Performance estimation from non-steady manoeuvres
[AIAA PAPER 81-2424] A82-13863
NOBLE, W. S.
Fault isolation methodology for the L-1011 digital avionic flight control system
[AIAA 81-2223] A82-13458
NORMAN, R. H.
Acceptance testing of the Calspan variable stability Learjet
A82-14937
NOUSE, H.
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109
NOVACK, W. E.
A unique integrated flight testing facility for advanced control/display research
[AIAA PAPER 81-2490] A82-13919
NOVOSARTOV, G. T.
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
A82-15723
NUGENT, J.
Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2438] A82-13874

O

OCONNOR, J. C.
Government testing
[AIAA PAPER 81-2443] A82-13877
Progress report - CH-47 modernization program
A82-14930
OGI, S. M.
Advanced integrated CNI architectures
A82-14763
OKEEFE, D.
Status and tracking system for flight test data products
[AIAA PAPER 81-2395] A82-14376
OPITTEK, E. W.
Airborne Electronic Terrain Map System
A82-14771
OPPINITI, G.
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777
ORNELAS, J. R.
Applications of head-up displays in commercial transport aircraft
[AIAA 81-2300] A82-13506

P

PANAGEAS, G. N.
HiMAT aerodynamic design and flight test experience
[AIAA PAPER 81-2433] A82-13871
PARINI, C. G.
Prediction and performance of radome-covered reflector antennas
A82-15311
PARK, G. D.
Determining hinge moments and empennage airload parameters from flight data for Learjet airplanes
A82-13120
PARKER, R.
Digital simulation of aircraft electrical generating system by means of Sceptre program
A82-14820
PARKINSON, R. C. H.
An operational model of specific range for microprocessor applications in piston-prop general aviation airplanes
[AIAA 81-2330] A82-13526
PARRISH, L. R.
Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps
A82-14933
PASSMORE, H.
Avionics implications from weapon system operational utility studies on Manned Air Combat Simulators
[AIAA 81-2230] A82-13463
PATRICK, W. P.
Impedance modeling of acoustic absorbing materials for aircraft engine applications
A82-14043
PAUL, B. E.
A ballistic design model for initiators for aircraft personnel escape systems
A82-14984

PAVLIK, T. A.
Testing of the SJU-5A ejection seat for the F/A-18 /HORNET/ aircraft
A82-14955

PECZKOWSKI, J. L.
An approach to robust nonlinear control design
A82-13128

PEDDREW, K. H.
A look inside the Langley 16-foot transonic tunnel: User's guide
[NASA-TM-83186] N82-12085

PERALA, R. A.
Assessment methodology of the lightning threat to advanced aircraft
A82-14759

PERDUE, R. R.
High speed microwave phase-locked loops
A82-14696

PERIN, R.
Wind tunnel tests of powered models: A comparison of two methods of simulating the jets of jet engines
N82-13087

PERRIER, P.
An acquisition and analysis system for dynamic tests of air inlets
N82-13082

PERSON, L. H.
Have we overlooked the pilot's role in an automated flight deck
[AIAA 81-2262] A82-13481

PERSON, L. H., JR.
The integration of control and display concepts for improved pilot situational awareness
A82-13972

PETERSEN, K. L.
Flight experience with a remotely augmented vehicle flight test technique
[AIAA PAPER 81-2417] A82-13857

PETERSON, A. A.
Helicopter icing
A82-13243

PETROFSKY, S. H.
Digital avionics display processor
[AIAA 81-2311] A82-13513

PHEBBY, E.
'Little people' problem /MA-2 torso harness/
A82-14956

PHELPS, H. L.
In-service inspection methods for graphite-epoxy structures on commercial transport aircraft
[NASA-CR-165746] N82-12142

PHIPPS, W. D.
MLS performance assessment, task 4. Volume 1: Evaluation procedures and equipment design
[AD-A105393] N82-12061

PIRRI, F.
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777

PLUMER, J. A.
Investigation of severe lightning strike incidents to two USAF F-106A aircraft
[NASA-CR-165794] N82-12052

PLUMMER, C. A.
AV-8B technical update - leading edge root extension development
A82-14940

PO-CHEDLEY, D. A.
Aircraft alerting systems standardization study
[AIAA 81-2242] A82-13468

POLHAMUS, E. C.
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
A82-13971

POLI, C.
A multimicroprocessor system for ATCRBS monopulse data processing
A82-14777

POOL, A.
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140

PORTER, R.
Design of direct digital flight-mode control systems for high-performance aircraft
A82-14829

POTENZA, J.
Inverse SAR and its application to aircraft classification
A82-14871

POTTS, D. W.
Direct digital design method for reconfigurable multivariable control laws for the A-7D Digitac II aircraft
A82-14828

PRICE, E. A., JR.
An investigation of F-16 nozzle-afterbody forces at transonic Mach numbers with emphasis on model scale effects
[AD-A104905] N82-12392

PRICE, J.
Applications of covariance analysis simulation to avionics flight testing
A82-14767

PRIEST, A. J.
Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds
N82-13068

PUGH, G.
Establishment of an experimental technique to provide accurate measurement of the installed drag of close coupled civil nacelle/airframe configurations, using a full span model with turbine powered engine simulators
N82-13089

PURTELL, J. E.
Light Airborne Multi-Purpose System
A82-13244

PUSKAS, E.
Automatic parachute releasers for premeditated parachuting
A82-14960

R

RAABE, F.
German-Argentine experiment: Vertical-rotor wind engine
N82-12648

RACKAUSKAS, R.
Electro-optical vector scoring system
[AIAA PAPER 81-2373] A82-13865

RACKLEY, L. T.
A system safety program for aircraft production and deployment
A82-14983

RAJALA, S. A.
An advanced programmable/reconfigurable color graphics display system for crew station technology research
[AIAA 81-2314] A82-13516

RAKIN, D. A.
Fleet Flight Loads Survey monitoring and analysis techniques
[AIAA PAPER 81-2461] A82-13903

RATTAN, K. S.
Digital redesign of existing multiloop continuous control systems
A82-13093

READER, D. C.
A new safety harness for mobile aircrew
A82-14963

REBBECHI, B.
A vapour cycle cabin cooling system for the Sea King MK.50 helicopter
[AD-A105211] N82-12069

REED, W. H., III
Aeroelasticity matters - Some reflections on two decades of testing in the NASA Langley Transonic Dynamics Tunnel
A82-13969

Aeroelasticity matters: Some reflections on two decades of testing in the NASA Langley transonic dynamics tunnel
[NASA-TM-83210] N82-12081

REEPS, S. M.
Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen
A82-14972

REGISTER, H. I.
Collection and simulation of spatial infrared signatures of military jet aircraft
[AIAA PAPER 81-2494] A82-13921

REILLY, R. A.
New advances in signal processing technology for integrated CNI avionics
A82-14762

REUTER, J. D.
Development of a lifting parachute to provide self-dispersing capability for an Avco-designed tactical munition
[AIAA PAPER 81-1928] A82-13962

REZNIK, B. G.
Study of the load-carrying capacity of aviation gas-turbine engine impellers under low-cycle loading at normal and high temperatures
A82-15482

RHODY, B.
A VHF homing system with VHF radiotelephony for area-representative strip-survey flights conducted, as part of combined forest inventories, with light aircraft carrying 70 mm and 35 mm cameras
A82-15748

RICHARDS, E. C.
Transportation systems evaluation methodology development and applications, phase 3
[NASA-CR-164999] N82-12051

RIDDLE, D. W.
Powered-lift takeoff performance characteristics determined from flight test of the Quiet Short-haul Research Aircraft /QSRA/
[AIAA PAPER 81-2409] A82-13852
Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA
[AIAA PAPER 81-2480] A82-13938

RINGEL, M. B.
Detection range analysis of an airborne medium PRF radar
A82-14723

RISK, H. S. A. S.
Prediction and performance of radome-covered reflector antennas
A82-15311

ROBERTS, D. W.
Prediction of subsonic aircraft flows with jet exhaust interactions
N82-13096

ROBERTS, E. O.
Performance assessment of the ACES-II ejection seat-A-10 configuration
A82-14980

ROBERTSON, J. B.
Experimental evaluation of a perspective tunnel display for three-dimensional helicopter approaches
A82-15847

ROBINETTE, G. J.
Strapdown inertial reference systems performance analysis
A82-14682

ROCK, S. M.
Sensor failure detection system
[NASA-CR-165515] N82-13145

ROEHRLE, H.
Structural dynamics: Modified calculations
[BMVG-FBWT-81-1] N82-13457

ROONEY, R. H.
The use of observers on relaxed static stability aircraft
A82-14740
Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling
A82-14826

ROSCOE, S. N.
Computer-animated predictive displays for microwave landing approaches
A82-15816

ROSS, J. A.
Some RAE research on shielded and unshielded fuselage mounted air intakes at subsonic and supersonic speeds
N82-13068

ROTH, S. P.
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[NASA-TM-82770] N82-13144

ROWE, S. A.
Electromechanical actuation development program
A82-14705

RUBIN, J.
Distributed Time Division Multiple Access /DTDMA/ - A distributed signaling technique for advanced tactical communications
A82-14719

RUDDELL, A. J.
Advancing blade concept /ABC/ development test program
[AIAA PAPER 81-2437] A82-13073

RUDNITSKI, D. M.
Compressor stall inducing installation effects of an engine control parameter for the CF-5 aircraft
N82-13085

RUSSELL, G. F.
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525

RUTISHAUSER, H. J.
Experimental and analytical studies of advanced air cushion landing systems
[NASA-CR-3476] N82-12065

RYAN, G. W., JR.
Recent improvements at the Naval Air Test Center for increased test system flexibility
[AIAA PAPER 81-2392] A82-13888

S

SACHS, G.
Effects of aerodynamic coupling on the dynamics of roll aircraft
N82-12070

SAHM, P. R.
'In situ' composites for jet propulsion and stationary gas turbine applications
A82-15824

SAIN, M. K.
An approach to robust nonlinear control design
A82-13120

SAINT SAUVER, C. L.
Advanced fighter technology integration AFTI/F-16 test program overview
[AIAA PAPER 81-2353] A82-14398

SALTZMAN, E. J.
A review of flight-to-wind tunnel drag correlation
[AIAA PAPER 81-2475] A82-14382

SANDER, D. L.
Algorithms for an adaptive dynamic window in electronic map systems
A82-14769

SANDERSON, E. C.
Practical aspects of instrumentation system installation, volume 13
[NASA-TM-84067] N82-13140

SANTAMARIA, L. J.
Evaluation of a selected group of anti-exposure garment configurations for their effects on the operational performance and survival of Naval aircrewmen
A82-14972

SAWYER, W. C.
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13110

SCHACHTER, B. J.
Computer image generation for flight simulation
A82-15599

SCHELHORN, A. E.
Acceptance testing of the Calspan variable stability Learjet
A82-14937

SCHILTZ, E. J., JR.
Investigation of the structural degradation and personnel hazards resulting from helicopter composite structures exposed to fires and/or explosions
[AD-A104757] N82-12057

SCHLEGEL, H. O.
The Cessna T303 Crusader
[AIAA PAPER 81-2440] A82-13876

SCHLEGEL, R. G.
The FAA's proposed helicopter certification rules
A82-13242

SCHMIDT, D. K.
Interactive aircraft flight control and aeroelastic stabilization
[NASA-CR-165036] N82-13150

SCHNEIDER, E.
The load-carrying behavior of a trapezoidal aluminum-alloy supporting element, subjected to a compressive stress, in the postbuckling region
A82-14418

SCHNEIDER, F. B.
Effect of a part span variable inlet guide vane on TF34 fan performance
[NASA-CR-165458] N82-12075

SCHWAB, R. W.
Fuel efficient flight profiles in an ATC flow management environment
A82-13078

SCHWARE, R. E.
Strapdown inertial reference systems performance analysis
A82-14682

SCOUGTON, C. R.
A standard control display unit for multi-aircraft application
N82-13054

SEAL, J. J.
A modular multiplexed digital voice intercommunications system
A82-14721

SEBRING, D. L.
Redundancy management of skewed and dispersed inertial sensors
[AIAA 81-2296] A82-13503

SEGREST, J. D.
Computer modeling of an aircraft HVDC electrical system
A82-14819

SEIRANIAN, A. P.
Divergence of a sweptforward wing
A82-13560

SEITLER, J. K.
Terrain actuated deployment system
A82-14982

SELLERS, D. F.
Computer simulation of an advanced aircraft electrical system
A82-14821

SHAW, W. H.
Evaluation of advanced air-to-air gunnery fire control systems
A82-14760

SHANNON, J. H.
Applications of digital avionics to commercial transport aircraft - The DC-9 Super 80 and beyond
[AIAA 81-2218] A82-13456

SHAPIRO, E. Y.
The use of observers on relaxed static stability aircraft
A82-14740
Enhanced aircraft handling qualities by longitudinal dynamics mode decoupling
A82-14826

SHAWLER, W. H.
62% manned aircraft demonstrator - Next generation trainer
[AIAA PAPER 81-2519] A82-14385

SHERWIN, P.
Group 1: Scenario design and development issues
N82-13131

SHIELDS, R. H.
F/A-18 Flight Test program overview - 1 September 1981
[AIAA PAPER 81-2351] A82-13955

SHINAR, J.
Comparison between the exact and an approximate feedback solution for medium range interception problems
A82-13106

SHOWALTER, T. W.
Simulator certification methods and the vertical motion simulator
[NASA-CR-166252] N82-12082

SHUTY, S. G.
A concept for a high-accuracy, low-cost accelerometer
A82-14665

SIGALLA, A.
Airframe-propulsion system aerodynamic interference predictions at high transonic Mach numbers including off-design engine airflow effects
N82-13098

SILVIOSS, C.
Wire strike protection
A82-13246

SIM, A. G.
AD-1 oblique wing aircraft program
[AIAA PAPER 81-2354] A82-10390

SIMON, E.
Attack on superalloys by chemical and electrolytic processes
A82-14365

SIMON, L.
A set of finite elements developed for the dynamic computation of composite helicopter blades
[ONERA, TP NO. 1981-87] A82-13990

SIMS, R. L.
Comparison of wind tunnel and theoretical aeroelastic predictions with flight measured airloads for the B-1 aircraft
[AIAA PAPER 81-2307] A82-14393

SINGLEY, G. T., III
Test and evaluation of improved aircrew restraint systems
A82-14974

SKOLNIK, E. G.
Chemistry of combustion of fuel-water mixtures
[AD-A105401] N82-12178

SKUDRNA, J. T.
Joint Tactical Microwave Landing System /JTMLS/ airborne signal processing
[AIAA 81-2247] A82-13471

SLATER, G. L.
Digital control for flexible aircraft using reduced order models
A82-13094

SLEGEIR, W. A.
Development of catalytic systems for the conversion of syngas to jet fuel and diesel fuel and higher alcohols
[DE82-000067] N82-12255

SMALL, D. M.
The electronic terrain map - A new avionics integrator
[AIAA 81-2209] A82-13498

SMEAD, F. W.
The agile transversal filter - A flexible building block for ICNIA
A82-14765

SMITH, G. A.
Application of the concept of dynamic trim control and nonlinear system inverses to automatic control of a vertical attitude takeoff and landing aircraft
[AIAA 81-2238] A82-13466

SMITH, J. M.
Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field
[NASA-TM-82750] N82-13908

SMITH, J. W.
Analysis of a longitudinal pilot-induced oscillation experienced on the approach and landing test of the space shuttle
[NASA-TM-81366] N82-13149

SMITH, L. R.
An update of an integrated CNI system - TIES
[AIAA 81-2292] A82-13500

SMITH, W. S.
KC-10 flight test program
A82-14935

SMOLKA, J. W.
Acceptance testing of the Calspan variable stability Learjet
A82-14937

SMYTH, R.
The role and implementation of different nacelle/engine simulation concepts for wind-tunnel testing in research and development work on transport aircraft
N82-13086
Final report on the FuePo-4 major theme: Interference drag with airframe/engine integration on fighter aircraft
[BMVG-FBWT-79-20] N82-13116

SOBOCINSKI, R.
Aircraft separation assurance avionics
[AIAA 81-2239] A82-13467
SOMMER, D. L.
Computer modeling of an aircraft HVDC electrical system
A82-14819
SORATHIA, U. A. K.
Formulation and characterization of polyimide resilient foams of various densities for aircraft seating applications
[NASA-CR-167421] N82-12230
SPAHR, H. R.
Theoretical analysis of wake-induced parachute collapse
[AIAA PAPER 81-1922] A82-13963
SPENCER, J. L.
On-board communication for active-control transport aircraft
[AIAA 81-2321] A82-13520
SPIEGEL, S. S.
LHX - An advanced avionics system design
[AIAA 81-2249] A82-13472
STALONY-DOBRZANSKI, J.
Evaluation of advanced air-to-air gunnery fire control systems
A82-14750
STARK, D.
Options for GTE precision automated tracking system
A82-13020
STEIN, H.
Experimental investigation of a helmet mounted sight/display for helicopter
N82-13060
STEINMETZ, G. G.
Have we overlooked the pilot's role in an automated flight deck
[AIAA 81-2262] A82-13401
The integration of control and display concepts for improved pilot situational awareness
A82-13972
STENGEL, R. F.
Design and flight test of a lateral-directional command augmentation system
[AIAA 81-2331] A82-13527
STEVENS, V. C.
Powered-lift STOL aircraft shipboard operations - A comparison of simulation, land-based and sea trial results for the QSRA
[AIAA PAPER 81-2480] A82-13938
STINE, L. R.
Advanced integrated CNI architectures
A82-14763
STOCKS, C. P.
The design and development of the Tornado engine air intake
N82-13074
STONE, M. L.
Air-to-ground MTI radar using a displaced phase center, phased array
A82-14881
STOUDER, D. J.
An advanced facility for processing aircraft dynamic test data
[AIAA PAPER 81-2398] A82-14377
STRUCK, H.
Calculation of wing-body-nacelle interference in subsonic and transonic potential flow
N82-13095
STUELPNAGEL, T. R.
Public service helicopters - Is the grass greener on the other side of the fence
A82-13238
SUIT, W. T.
On matching the systems identification technique to the particular application
A82-13119
SURBER, L.
Performance of highly integrated inlets for supersonic aircraft
N82-13066
SVRC, R. K.
Flight testing the suspended maneuvering system
[AIAA PAPER 81-2498] A82-13922
SWANN, M. R.
Experience with flight test trajectory guidance
[AIAA PAPER 81-2504] A82-14379
SWANSON, R. L.
A standard control display unit for multi-aircraft application
N82-13054
SWEET, L. M.
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525
SYBERG, J.
Performance of highly integrated inlets for supersonic aircraft
N82-13066

T

TABB, J. A.
Lockheed Airborne Data System - Distributed microcomputers provide on-board real-time analysis
[AIAA PAPER 81-2367] A82-13949
TAKAHARA, K.
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109
TANG, W.
Application of multiple model estimation techniques to a recursive terrain height correlation system
A82-14768
TAVORA, C. J.
A storage device for subsystem maintenance information
A82-14817
TAYLOR, D. E.
An analysis of civil aviation propeller-to-person accidents: 1965-1979
[AD-A105365] N82-12053
THER, D. T.
Analysis of escape systems at 687 KEAS
A82-14978
THOMA, H.
Attack on superalloys by chemical and electrolytic processes
A82-14365
THOMAS, R. E.
Direct strike lightning measurement system
[AIAA PAPER 81-2513] A82-13910
THOMPSON, W. D.
Flight investigations of integrated descent rate control systems
A82-14929
THULLEN, R. J.
Advanced weapon systems - Integration technology
[AIAA 81-2213] A82-13533
TILL, R. D.
Instrumentation to determine the suitability of RNAV systems for helicopter navigation in the national airspace system /NAS/
[AIAA PAPER 81-2514] A82-13911
TIMPSON, K. G.
The F-16/79 test program
[AIAA PAPER 81-2414] A82-13855
TKACH, M. J.
F/A-18 roll rate improvement program
A82-14939
TOMEH, M. G.
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525
TOOLAN, W. E.
Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft
[AIAA 81-2297] A82-13504
TRACY, H. A.
F-4 Advanced Avionics Flight Test
[AIAA PAPER 81-2464] A82-13929
TRAN, C. T.
Application of the ONERA dynamic stall model to a helicopter blade in forward flight
[ONERA, TP NO. 1981-89] A82-13992
TSOUBANOS, C. M.
The TADS/PNVS 'eyes' for the AH-64 attack helicopter
A82-13239
TULLOCH, H. L.
The use of metal finishing in aircraft fuel systems
N82-12077
TUNG, C.
Experimental and analytical studies of a model helicopter rotor in hover
[NASA-TM-81232] N82-12042

U

UGRIUMOV, V. S.
Efficient use of working fluids in aviation hydraulic systems
A82-15724

USUI, H.
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109

V

V.D.KOLK, J. T.
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093

VAN GOOL, M. F. C.
Comparison of low-speed handling qualities in ground-based and in-flight simulator tests
[AIAA PAPER 81-2478] A82-13936

VAN PELT, L. G.
Flight test concept evolution
[AIAA PAPER 81-2375] A82-13944

VANENGELEN, J. A. J.
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
N82-13090

VANHENGST, J.
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093

VANTUIJL, W. H.
Orienting description of air traffic control in the Netherlands
[VTH-LR-285] N82-12063

VARNEY, A. M.
Analytical and experimental characterization of the JAU-14/A cartridge actuated initiator for use in aircrew escape system performance evaluation
A82-14985

VEDOVA, R.
Comparison of different nozzle concepts for a reheated turbofan
N82-13077

VELLENGA, C.
Applications of covariance analysis simulation to avionics flight testing
A82-14767

VIETS, H.
Investigation of acoustic interactions in jet thrust augmenting ejectors
[AD-A106083] N82-13835

VILENKIN, A. V.
Optimization of requirements on the pitting-prevention properties of turbojet-engine oils
A82-15723

VINCENT, J. H.
Integrated flight testing based on nonlinear system identification data processing techniques
[AIAA PAPER 81-2449] A82-14389

VOGE, V. M.
'Little people' problem /MA-2 torso harness/
A82-14958

VOLODKO, A. M.
Safety of helicopters in flight
A82-14946

VOOGT, N.
Aerodynamic aspects of a high bypass ratio engine installation on a fuselage afterbody
N82-13093

W

WALKER, W. L.
Design study report for General Aviation Loran-C receiver
[AD-A104921] N82-12062

WALLENBERG, R.
Inverse SAR and its application to aircraft classification
A82-14871

WALLIS, T. E.
The Cessna T303 Crusader
[AIAA PAPER 81-2440] A82-13876

WALTZ, E. L.
Computational considerations for fusion in target identification systems
A82-14735

WANG, S. Y.
Effect of vacuum exhaust pressure on the performance of MHD ducts at high B-field
[NASA-TM-82750] N82-13908

WARBURTON, R. E.
Advanced exhaust nozzle technology
N82-13678

WARD, C. R.
New advances in signal processing technology for integrated CNI avionics
A82-14762

WARD, H. R.
AN/TPN-25 and AN/GPN-22 precision approach radars
A82-14856

WARUSZEWSKI, H. L.
Color CRT displays for the cockpit
N82-13051

WARUSZEWSKI, H. L., JR.
Airborne color CRT displays
A82-14823

WARWICK, G.
Figators - Improving the breed
A82-14354

WASSON, R. L.
The application of large screen CRT's, touch panels, and voice to the flight stations of the 1990's
[AIAA 81-2263] A82-13482

WASSUM, D. L.
Pressure distributions on three different cruciform aft-tail control surfaces of a wingless missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal tail
[NASA-TM-80097] N82-13119

WATKINS, J. R.
USNTPS spin program
A82-14931

WATLER, J. F., JR.
The Maneuvering Flight Path Display - A flight trajectory solution display concept
A82-14820

WAUER, J. C.
Airplane performance sensitivities to lateral and vertical profiles
A82-15846

WEBB, D. R.
Further test results of parachutes with automatic inflation modulation /A.I.M./
A82-14965

WEBB, L. D.
Recent propulsion system flight tests at the NASA Dryden Flight Research Center
[AIAA PAPER 81-2438] A82-13874

WEBB, R. C.
60 kVA ADP permanent magnet VSCF starter generator system - A program overview
A82-14789

WEBB, S. G.
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525

WEBER, J. W.
Airborne Electronic Terrain Map System
A82-14771

WEEKS, R. A.
Avionics systems simulation for the Northrop F/A-18L aircraft
[AIAA 81-2274] A82-13488

WEINGARTEN, N. C.
Comparison of low-speed handling qualities in ground-based and in-flight simulator tests
[AIAA PAPER 81-2478] A82-13936

WEINREICH, H. L.
Final report on the FusFo-4 major theme: Interference drag with airframe/engine integration on fighter aircraft
[BMVG-FBWT-79-20] N82-13116

WEISSHAAR, T. A.
Interactive aircraft flight control and aeroelastic stabilization
[NASA-CR-165036] N82-13150

WELGE, H. R.
Prop-fan integration at cruise speeds
N82-13097

WELL, K. H.
Comparison between the exact and an approximate feedback solution for medium range interception problems
A82-13106

WELBER, V. E.
The TADS/PNVS 'eyes' for the AH-64 attack helicopter
A82-13239

WELTE, D.
Wing design for light transport aircraft with improved fuel economy
A82-14416

WESTERMEIER, T. F.
Parallel processing applied to digital flight control systems - Some perspectives
A82-14794

WEWERINKE, P. H.
The effect of visual information on manual approach and landing
[NLR-MP-80019-U] N82-12064

WHITE, C. L.
Navy spin evaluation of the A-7 airplane configured with automatic maneuvering flaps
A82-14933

WHITE, T. D.
Measured pavement response to transient aircraft loadings
N82-13442

WHITFIELD, J. D.
Overview of flight and ground testing with emphasis on the wind tunnel
[AIAA PAPER 81-2474] A82-13928

WHITTON, I. J.
An integrated control panel utilizing a programmable varistor-multiplexed dichroic liquid crystal display
[AIAA 81-2303] A82-13508

WILLIAMS, D. H., JR.
Testing capabilities of the 3246th Test Wing
[AIAA PAPER 81-2484] A82-14387

WILLMER, A. C.
Effects of intake geometry on circular pitot intake performance at zero and low forward speeds
N82-13070

WILSON, D. H.
A polled contention multiplex system using MIL-STD-1553 protocol
[AIAA 81-2271] A82-13487

WILSON, R. J.
Flight test experience with high-alpha control system techniques on the F-14 airplane
[AIAA PAPER 81-2505] A82-13906

WING, R. G.
The protection of gas turbine blades - A platinum aluminide diffusion coating
A82-14364

WOLF, D. F.
Theoretical analysis of wake-induced parachute collapse
[AIAA PAPER 81-1922] A82-13963

WOLF, T. D.
Experience with flight test trajectory guidance
[AIAA PAPER 81-2504] A82-14379

WONG, R. Y.
Digital detection and processing of laser beacon signals for aircraft collision hazard warning
[AIAA 81-2328] A82-13525

WOODWARD, A. C.
Passive terrain following using stored map and global positioning system
A82-14772

WOOLLETT, R. R.
Thrust modulation methods for a subsonic V/STOL aircraft
[NASA-TM-82747] N82-13112

WYGLE, B. S.
Two at a time - Flight test plans for the new Boeing airliners
[AIAA PAPER 81-2378] A82-13941

Y

YAMAMOTO, A.
An aerodynamic design and the overall stage performance of an air-cooled axial-flow turbine
[NAL-TR-321T] N82-13109

YANIV, O.
A synthesis technique for highly uncertain and interacting multivariable flight control systems
A82-14827

YEAGER, W. T.
Wind-tunnel investigation of the effects of blade tip geometry on the interaction of torsional loads and performance for an articulated helicopter rotor
[NASA-TP-1926] N82-13107

YERMIA, M.
A numerical method for studying nacelle-jet-airfoil interaction in inviscid three-dimensional flow
N82-13094

YOUN, M. S.
High speed PMG containment study for VSCF system
A82-14791

YOUNG, J. T.
Redundancy management of skewed and dispersed inertial sensors
[AIAA 81-2296] A82-13503

YOUNG, W. L., JR.
Integrated Flight/Weapon Control design and evaluation
A82-14741

YURCZYK, R. F.
Analysis of escape systems at 687 KEAS
A82-14978
Wind tunnel tests of ejection seat for high dynamic pressure escape
A82-14979

Z

ZALESAK, P. F., SR.
Flight testing the nonmetallic spline coupling technology at the Naval Air Test Center
[AIAA PAPER 81-2405] A82-13891

ZAMAN, M. K.
Fiber-optic immunity to EMI/EMP for military aircraft
[AIAA 81-2339] A82-13529

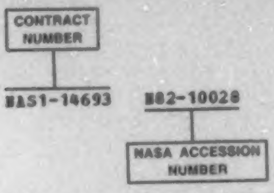
ZEIDLER, V.
Performance assessment of an advanced reheated turbo fan engine
[AIAA PAPER 81-2447] A82-13879

ZIEGENHAGEN, J. A.
Failure analysis of variable reluctance stepper motor
A82-14792

ZISLIN, A. N.
Development and laboratory test of an integrated sensory system /ISS/ for advanced aircraft
[AIAA 81-2297] A82-13504

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 2003 N82-13135
AF PROJ. 2301 N82-12081
AF PROJ. 2401 N82-12143
AF-AFOSR-78-3633 A82-15845
AF-AFOSR-80-0213 A82-14827
AF-AFOSR-0178-80 N82-12081
DA PROJ. 1L1-62209-AH-76 N82-12057
DA PROJ. 1L2-62202-AH-85 N82-12067
DA PROJ. 1L2-62209-AH-76 N82-13107
DAAK51-79-C-0009 N82-12057
DAAK80-79-C-0268 A82-14768
DAAK80-79-C-0270 N82-12067
N82-13141
DE-AC01-80CS-50141 N82-13014
DE-AC02-76CH-00016 N82-12255
DE-AI01-77ET-10769 N82-13908
DOT-FA79NA-6030 N82-12061
DT-FA01-80-C-10108 N82-12062
FAA PROJ. 045-390-130 N82-12059
FAA PROJ. 131-402-054 N82-12304
FAA PROJ. 999-113-000 N82-12056
F04701-80-C-0081 A82-13956
F09603-79-C-1610 A82-14778
F33615-73-C-4036 A82-14696
F33615-74-C-2037 A82-14789
F33615-77-C-3096 A82-13122
F33615-78-C-1563 A82-13142
A82-14684
F33615-78-C-1583 A82-14696
F33615-78-C-2200 A82-14789
F33615-78-C-3145 A82-13470
F33615-78-C-3218 N82-12143
F33615-79-C-0508 A82-14744
F33615-79-C-1878 N82-13135
F33615-79-C-3406 A82-14978
F33615-79-C-3604 A82-14741
F33615-79-C-3618 A82-13936
A82-13968
F33615-80-C-1095 A82-14017
F33615-80-C-2004 A82-14788
F33615-80-C-2032 A82-14791
F33615-80-C-3217 A82-13122
F33657-78-C-0490 A82-14780
F49620-77-C-0023 N82-13979
F49620-79-C-0038 A82-13093
F49620-81-C-0026 A82-14829
MDA903-79-C-0320 N82-13136
NAG1-80 N82-12080
NAG1-157 N82-13150
NAS1-14623 N82-13098
NAS1-14908 N82-12051
NAS1-15051 N82-12065
NAS1-15304 N82-12142
NAS1-15359 A82-13520
NAS1-15428 A82-13490
NAS1-15884 N82-12052
NAS1-16414 A82-13508
NAS2-9741 N82-12082
NAS2-10100 N82-13096
NAS3-21624 N82-12075
NAS3-22481 N82-13145
NAS4-2571 N82-12079
NAS9-16009 N82-12230
NCC2-93 A82-13534
NCC2-94 A82-13525
NGL-05-020-243 N82-13147
NGL-31-001-252 A82-13525
NGR-36-009-017 A82-13532
NSF SRS-79-10397 A82-14793
NSG-1083 A82-13878
NSG-1456 A82-13107
NSG-2156 A82-13534
NSG-2165 N82-13186
N00014-77-C-0032 A82-15835
N00014-78-C-0257 A82-13527
N00014-78-C-0641 A82-14389
N00014-79-C-0424 A82-15845
N00014-80-C-0534 N82-12178
N00019-79-C-0225 N82-13835
N00164-79-M-2522 N82-12248
N62259-79-C-0206 A82-13504
N62269-79-V-0265 A82-14819
505-11-23-03 N82-13110
505-32-12 N82-13146
505-32-32 N82-13143
505-32-93-01 N82-13142
505-33-53-01 N82-12041
505-42-13-04 N82-13107
505-43-13-01 N82-13148
505-43-14 N82-13149
505-44-13-01 N82-12052
506-51-13-02 N82-13106
512-54-14 N82-12079
778-11-05 N82-13908
922-21-01 N82-12082

1. Report No.
NASA SP-7037 (146)

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle
AERONAUTICAL ENGINEERING
A Continuing Bibliography (Supplement 146)

5. Report Date
March 1982

6. Performing Organization Code

7. Author(s)

8. Performing Organization Report No.

9. Performing Organization Name and Address
National Aeronautics and Space Administration
Washington, DC 20546

10. Work Unit No.

11. Contract or Grant No.

12. Sponsoring Agency Name and Address

13. Type of Report and Period Covered

14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 442 reports, articles, and other documents introduced into the NASA scientific and technical information system in February 1982.

17. Key Words (Suggested by Author(s))

Aerodynamics
Aeronautical Engineering
Aeronautics
Bibliographies

18. Distribution Statement
Unclassified-Unlimited

19. Security Classif. (of this report)
Unclassified

20. Security Classif. (of this page)
Unclassified

21. No. of Pages
140

22. Price*
$5.00 HC

NASA-Langley, 1982

NASA SP-7037(147)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 147)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in March 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 347 reports, journal articles, and other documents originally announced in March 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).*

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A23	576-600	40.50	81.00
	601-up	– 1/	– 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

N01	30.00	45.00

TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) 103

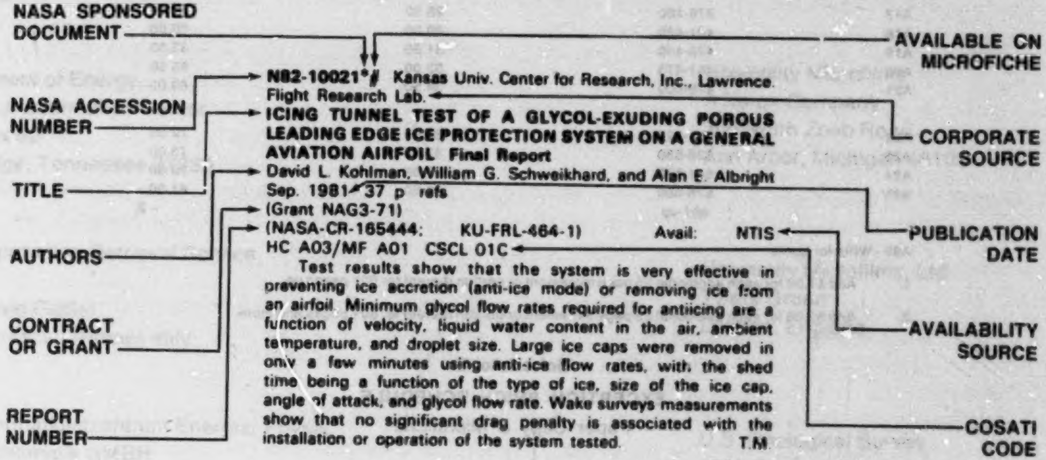
STAR ENTRIES (N82-10000) 131

Subject Index A-1

Personal Author Index B-1

Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*

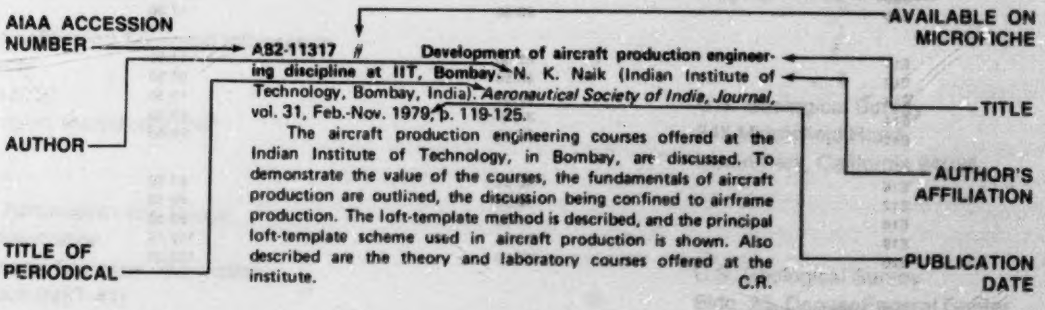


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
CORPORATE SOURCE
TITLE
AUTHORS
PUBLICATION DATE
CONTRACT OR GRANT
AVAILABILITY SOURCE
REPORT NUMBER
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested.
T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AVAILABLE ON MICROFICHE
TITLE
AUTHOR
AUTHOR'S AFFILIATION
TITLE OF PERIODICAL
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal*, vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute.
C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 147)

APRIL 1982

IAA ENTRIES

A82-16025 **A high strength ejector release unit for the Tornado.** L. Botting (Normalair-Garrett, Ltd., Yeovil, Somerset, England). *Aircraft Engineering,* vol. 53, Nov. 1981, p. 10-15.

The development of bomb ejector release units (ERU) is traced, and an ERU suitable for the MACE form of suspension is described. The design of the ERU is provided, noting its use on the Tornado and its acceptability for NATO armaments. Reduced drag has been experienced by use of the ERU, and sway-bracing is achieved without crutch arms, although these can added with a conversion kit. A 3.3 m/sec ejection velocity has been measured for a store mass of 544 kg within a reaction limitation of 44.5 kn. The unit withstands 30 firings before maintenance, and recommendations for system alterations for use with smart weapons are outlined. M.S.K.

A82-16040 # **On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/.** K. Nishioka and H. Kuroda (National Defense Academy, Yokosuka, Kanagawa, Japan). *JSME, Bulletin,* vol. 24, Oct. 1981, p. 1739-1747. 15 refs.

The unsteady forces and moments acting on the blades of centrifugal machines which vibrate harmonically in a torsional mode about the mid-chord have been studied experimentally. At small interblade phase angles, the unsteady normal forces and moments are found to vary periodically as a function of the cascade geometry, flow coefficient, and the wake length of vortex distribution; for small flow coefficients, the damping moments become negative. When the interblade phase angle is more than 180 deg, the aerodynamic damping moment becomes negative for relatively small reduced frequencies. As the interblade phase angle increases still further, the damping moment becomes negative even at comparatively large reduced frequencies. Experimental results are in qualitative agreement with theory. V.L.

A82-16091 # **Workshop report for the AIAA 6th Aeroacoustics Conference.** C. K. W. Tam (Florida State University, Tallahassee, FL). *Journal of Aircraft,* vol. 18, Dec. 1981, p. 1005-1010. 5 refs.

Summaries are given of the workshops conducted at the AIAA 6th Aeroacoustics Conference, each summary having been prepared by the workshop chairman. The six workshops are: jet noise, duct acoustics, turbomachinery noise, aircraft interior noise, airframe and propulsive lift noise, and propeller and helicopter noise. It is noted that the primary purpose of the workshops is to provide a forum where new ideas and concepts can be openly discussed and controversies freely debated. C.R.

A82-16092 # **Infrared emissions from turbofans with high aspect ratio nozzles.** R. Decher (Washington, University, Seattle, WA). *Journal of Aircraft,* vol. 18, Dec. 1981, p. 1025-1031. 12 refs.

A mixed flow turbofan is analyzed from the point of view of IR emission characteristics. A simple absorption coefficient model of the core flow gas displays the potential effectiveness of high aspect ratio nozzles as a variable in the design of aircraft engine installations for low IR signature. The simplicity of the model described and the limited view perspectives used to assess the signature restrict the usefulness of the results to that of guiding preliminary design. In general, more precise solutions are complex and depend on specification of a relatively large number of independent variables to describe the source - seeker geometry, weather, etc. The level of effort to carry out more accurate analysis may be inconsistent with the preliminary design process where simple criteria such as those described may be sufficient to select the best of several candidate designs. The influence of cycle parameters is assessed using an n-th power dependence of radiation on temperature and a simple mixing model to estimate the core length. The analysis shows that cycle parameters which improve cycle efficiency and thus fuel consumption also reduce IR emissions. Bypass ratio near unity gives low IR signature for both optically thin and thick spectral regions. (Author)

A82-16093 # **Symmetric flow characteristics of thin rectangular wings.** E. S. Larson (Flygtekniska Forsoksanstalten, Stockholm, Sweden). *Journal of Aircraft,* vol. 18, Dec. 1981, p. 1070, 1071. 7 refs. Research supported by the Defence Materiel Administration.

Semiempirical analytic expressions are presented which are shown to contain in themselves Mach number influences that are in very good agreement with the investigated panel method results for M less than or equal to 1, the intended regime of application of the equations. The differences between the equations and the theoretical results are small and in fact only of minor significance when shortcut evaluations are desired. It is noted, however, that a comparison with relevant transonic experimental results, if such results existed, would show an appreciable discrepancy in the transonic regime as a result of the neglect of genuine transonic terms in the linearized theory. C.R.

A82-16135 # **Aerospace highlights 1981.** *Astronautics and Aeronautics,* vol. 19, Dec. 1981, p. 24-34, 36-40, 42-108.

Topics such as air transportation systems, aeroacoustics, aerospace power systems, aircraft design, interactive computer graphics, and flight simulation are considered. Attention is also given to flight mechanics, extendible exit cones, general aviation systems, LTA vehicles, and testing programs. Plasma dynamics and lasers are discussed, as are solid rockets, propellants, software systems, sensors, marine technologies, and CAD/CAM. Finally, papers are presented on terrestrial energy systems, structural dynamics, space sciences, space structures, thermophysics, V/STOL aircraft, aerospace maintenance, communications, economics, and electric propulsion, as well as materials, management, and guidance and control. M.S.K.

A82-16143 **Aircraft composite materials and structures.** S. J. Dastin (Grumman Aerospace Corp., Advanced Development Section, Bethpage, NY). *SAMPE Journal,* vol. 17, Nov.-Dec. 1981, p. 10-15.

A ten year advanced composite aircraft structural history is reviewed. Composite material development is traced from fiberglass epoxy to mixed fiber polymer hybrids containing boron, graphite and Kevlar. Typical composites processing and tooling approaches utilized in the industry is given along with techniques being developed for high volume production. (Author)

A82-16145 **The well tempered transport aircraft engine /The Sir Henry Royce Memorial Lecture/.** J. G. Borger. *Aeronautical Journal,* vol. 85, Nov. 1981, p. 395-413.

An historical account is presented of the development, over 45 years, of nine piston and eight turbofan and turbojet engines as installed in 22 different transport aircraft. Attention is given to the contribution of engine design to improvements in overall aircraft performance, as highlighted by such contrasting figures as (1) the 600-800 hour overhaul periods considered acceptable during the Second World War and the 10,000-hour periods typical of present transport aircraft, and (2) the 150 mph speeds and 2400-mile ranges of 84,000-lb aircraft carrying 20 passengers by comparison to 550 mph, 4500-mile range figures for 800,000-lb aircraft carrying 450 passengers. Performance figures are given for engines representative of the state-of-the-art at pivotal points of engine and airframe design development. O.C.

A82-16147 **Digital active control system for load alleviation for the Lockheed L-1011.** G. E. Bendixen (Rockwell International Corp., Cedar Rapids, IA), R. F. O'Connell, and C. D. Siegert (Lockheed-California Co., Burbank, CA). *Aeronautical Journal*, vol. 85, Nov. 1981, p. 430-436. 5 refs.

A digital active control system (ACS) is described which is used to reduce maneuver and gust loads in the extended-wing L-1011 TriStar, permitting improved aircraft performance with minimal wing structure changes. Reliability requirements aimed at high system availability are satisfied by means of a dual-dual, fail operational system architecture in which each of the two ACS computers contains two digital processors. The digital computer provides for control of the aileron servos, self-test capability and redundancy management. Attention is given the compatibility of automatic and primary flight control systems, the digital sensor data transfer functions of the ACS computer and its Algol-like software configuration, redundancy management, and servo and computer monitoring. O.C.

A82-16148 **Scattering of sound by a vortex ring.** T. Kambe and U. M. Oo (Kyushu University, Fukuoka, Japan). *Physical Society of Japan, Journal*, vol. 50, Oct. 1981, p. 3507-3516. 13 refs.

The scattering of a plane acoustic wave by a vortex ring is analyzed in terms of the Lighthill theory of aerodynamic sound generation. A formula for the scattered pressure is obtained from the term representing the interaction of the sound wave with the flow in the source terms of the inhomogeneous wave equation, and is applied to the case of scattering by a circular vortex ring in translational motion. Scattering amplitudes and cross sections are evaluated numerically for the case of slow motion. The total scattering cross section is found to depend not only on the wavelengths of the incident wave, but on the Mach number and direction of a vortex motion. A comparison reveals the scattering power of the vortex ring to be small in relation to that of a solid sphere of the same size. S.C.S.

A82-16153 **Effect of fleet size on estimates of safety against airframe fatigue (Vliv velikosti flotily na odhad unavove spolehlivosti draku letounu).** V. Nejedly. *Zpravodaj VZLU*, no. 3, 1981, p. 111-126. 22 refs. In Czech.

A method is proposed for determining the effect of fleet size on the values of safety coefficients used for aircraft service life estimation. The proposed theoretical solution is based on a statistical analysis of the fatigue damage sequence. Results are presented in a graphical form convenient for practical applications. V.L.

A82-16164 **The application of programmable pocket calculators for computations during survey flights.** H. C. Zorn (International Institute for Aerial Survey and Earth Sciences, Enschede, Netherlands). *ITC Journal*, no. 3, 1981, p. 308-333.

Computation during survey flights can be effectively achieved using a programmable pocket calculator such as the Hewett-Packard C41 model. Using this calculator, formulas and programs have been developed for computing survey turns; wind star; heading and ground speed, given wind vector and required course; pressure altitude required to reach required true altitude; and true airspeed given indicated airspeed, air temperature, and pressure altitude. Other potential applications include the conversion of latitude and longitude to UTM zone and coordinates, and great circle and loxodrome computations. S.C.S.

A82-16172 **Supersonic nozzles without shocks.** M. Burnat (Warszawa, Uniwersytet, Warsaw, Poland). *Archiwum Mechaniki Stosowanej*, vol. 33, no. 1, 1981, p. 117-132. 7 refs.

The Busemann hodograph technique is extended to three-dimensional flows of ideal gases. By using the proposed method of Bernoulli manifolds, it is shown that there exists a wide class of nozzles which transform one uniform supersonic flow into another one without shock. The present analysis can provide a basis for a numerical method aimed at constructing nozzles with specified characteristics. V.L.

A82-16174 **Improvement of the first-ply-failure strength in laminates by using softening strips.** C. T. Sun (Purdue University, West Lafayette, IN) and P. M. Voit. *Composites Technology Review*, vol. 3, Fall 1981, p. 109-113. U.S. Department of Transportation Contract No. RC-92004.

Results of a study of softening strips for various laminates are reported. Baseline systems, all graphite/epoxy laminates, were subjected to stress analysis by means of a finite element program using equivalent elastic constants, with a maximum stress criterion of the first ply failure. Softening strips were added and the tests were repeated. The strip reduced the stress concentration in notched laminated composites and increased the load carrying capability for the first ply failure. It is noted that stresses in individual plies must be calculated to determine the ply failure strength, and also that the width of the softening strip significantly affects the load-carrying capability of laminates. The results are applicable to aircraft structures with fastener holes subject to stress concentrations. M.S.K.

A82-16178 **The Federal Radionavigation Plan.** W. K. May (U.S. Coast Guard, Washington, DC). *(Institute of Navigation, Annual Meeting, Annapolis, MD, June 9-11, 1981.) Navigation*, vol. 28, Fall 1981, p. 231-246.

Policies and plans for the U.S. radionavigation services which are delineated by the Federal Radionavigation Plan are described. Areas of authority and responsibility as well as management structure for defining cost requirements and cost-effective operation are provided, along with various navigation phases and current and future requirements for each phase. Federally operated systems with a high degree of common use, both military and civil, including Loran-A, Loran-B, Omega, VOR, VOR/DME, VORTAC, TACAN, ILS, TRANSIT, MLS, Radiobeacons, and the Navstar GPS are examined for a suitable mix to satisfy user requirements. A preliminary recommendation for the future navigation mix will be issued by the DOD/DOT in 1983, and a decision at the national level will be forthcoming in 1986. It is noted that maritime navigation is tending toward a minimum number of systems, while aviation has witnessed heavy investments in VOR/DME. M.S.K.

A82-16187 **Determination of the flammability characteristics of aerospace hydraulic fluids.** C. E. Snyder, Jr. (USAF, Materials Laboratory, Wright-Patterson AFB, OH), A. A. Krawetz, and T. Tovrog (Phoenix Chemical Laboratory, Inc., Chicago, IL). *(American Society of Lubrication Engineers, Annual Meeting, 35th, Anaheim, CA, May 5-8, 1980.) Lubrication Engineering*, vol. 37, Dec. 1981, p. 705-713; Discussion, p. 713, 714.

The hazards associated with the flammability characteristics of aerospace hydraulic fluids are well known. In an effort to reduce these hazards, commercial airlines converted to the use of a phosphate-ester-based, fire-resistant hydraulic fluid with the advent of jet aircraft in the early 1950s. More recently, some of the military aircraft were converted to a compatible, synthetic-hydrocarbon-based hydraulic fluid for the same reason. The flammability characteristics of these and other aerospace hydraulic fluids and test methods used to determine them are discussed. Since a deficiency exists in the area of determination of the flame and/or fire-propagation characteristics of fluids and lubricants, a new test method was developed and is described. The degree of correlation of the data from this test method with other flammability tests is discussed. (Author)

A82-16267 † **An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet (Eksperimental'noe issledovanie goreniia zhidkogo uglevodorodnogo topliva raspylennogo v diffuzionnom vodorodno-vozdushnom fakele).** Iu. M. Annushkin and G. F. Maslov. *Fizika Goreniia i Vzryva*, vol. 17, Sept.-Oct. 1981, p. 34-38. 7 refs. In Russian.

Simultaneous combustion of liquid hydrocarbon fuel and gaseous hydrogen has been investigated experimentally using a coaxial jet placed in an air stream along the central axis of a subsonic wind tunnel of 160 mm diameter. It is shown that when the liquid fuel is sprayed into the stream, stable combustion with moderate flame lengths is achieved in a high-velocity air stream even at low hydrogen concentrations. V.L.

A82-16289 † **Mechanism for the elimination of instability in a shimmy problem (Mekhanizm ustraneniia neustoichivosti v zadache o shimmi).** L. G. Lobas and N. V. Nikitina (Akademiia Nauk Ukrainskoi SSR, Institut Mekhaniki, Kiev, Ukrainian SSR). *Matematicheskaia Fizika,* no. 30, 1981, p. 24-28. In Russian.

A theoretical study is presented of a square-law damper suitable for reducing the shimmy of a landing gear strut. Numerical integration shows that the square-law damper leads to the stabilization of self-oscillations, which are then reduced by dry friction. B.J.

A82-16290 † **Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis (Avtokolebaniia orientiruiushcheisia stoiki shassi pri nalichii vynosa kolesa v predpolozhenii gipotezy uvoda).** L. G. Lobas (Akademiia Nauk Ukrainskoi SSR, Institut Mekhaniki, Kiev, Ukrainian SSR). *Matematicheskaia Fizika,* no. 30, 1981, p. 28-34. In Russian.

A theoretical analysis of the self-oscillations of a front caster wheel strut is presented. The dependence of the limit-cycle amplitude on the characteristics of a square-law damper connected in parallel to the elastic element is determined. Numerical results are presented on the occurrence of self-oscillations at velocities above the critical one. B.J.

A82-16335 **FILE-IB aircraft flight test program.** H. M. Thomas (Martin Marietta Aerospace, Denver, CO). In: Guidance and control 1981; Proceedings of the Annual Rocky Mountain Guidance and Control Conference, Keystone, CO, January 31-February 4, 1981. San Diego, CA, Univelt, Inc., 1981, p. 363-378. 5 refs. (AAS 81-041)

The Feature Identification and Location Experiment (FILE-IB) is an earth observation experiment, which was successfully flown on the NASA CV-990 aircraft. The FILE-IB classifies earth scenes into four categories: water, bare land, vegetation, and cloud/snow. The FILE system consists of three major elements: electronics for experiments control, sensors to provide multispectral image data, and a buffer memory and magnetic tape recorder for data storage. The sensors have two silicon-charged coupled device television cameras, one for the 650 nanometer (VR) band, and the other for the 850 nanometer (NIR) band. The data, obtained during eight flight missions over low altitude regions of the U.S. west coast, were analyzed on both a micro and a macro scale: the micro scale analysis, which concentrates on individual scenes, identifies specific classification problems; the macro scale analysis, operating on the statistics for the population of all the scenes, ensures that the algorithm performs well over a variety of scenes. J.F.

A82-16404 # **Direct approach to aerodynamic design problems.** W. C. Chin. *ASME, Transactions, Journal of Applied Mechanics,* vol. 48, Dec. 1981, p. 721-728. 11 refs.

'Direct' small disturbance approaches to inviscid aerodynamic 'inverse' or 'design' problems in two- and three-dimensional subsonic, supersonic, and transonic flow are presented which extend the stream function method of Chin and Rizzetta (1979). The shape solutions generally involve nonlinear differential equations of mixed type for scalar 'streamlike' functions. Dualities relating the analysis problem for camber to the design problem for thickness and the design problem for camber to the analysis problem for thickness are given for planar flow; both closed trailing edges and cusped ones, which are generally opened and which model the displacement effects of viscous wakes, are treated. C.R.

A82-16417 # **Resonant whirling of aircraft propeller-engine systems.** S. H. Crandall and J. Dugundji (MIT, Cambridge, MA). *ASME, Transactions, Journal of Applied Mechanics,* vol. 48, Dec. 1981, p. 929-935. 5 refs.

At a critical speed, a light aircraft can experience severe vibrations in steady flight in which the propeller blades vibrate at one frequency while the engine block vibrates at a lower frequency. A model is presented which explains this phenomenon. A three-bladed propeller-engine system is considered to have six rigid-body degrees of freedom plus six blade vibration degrees of freedom. This system is analyzed and simplified by introducing a constraint based on observation of the flight phenomenon. Multiblade coordinates are introduced and a linear eigenvalue problem is derived which describes whirling motions of the engine coupled to progressive waves of blade deformation which circle the propeller disk. These whirling motions are excited by harmonics of the transverse forces on the engine due to the explosive gas pressures in the cylinders. The effects of varying the propeller blade pitch angle are studied and a high-speed instability mechanism is examined. (Author)

A82-16428 # **Cavitation inception in spool valves.** C. S. Martin (Georgia Institute of Technology, Atlanta, GA), H. Medlarz (Karlsruhe, Universität, Karlsruhe, West Germany), D. C. Wiggert (Michigan State University, East Lansing, MI), and C. Brennen (California Institute of Technology, Pasadena, CA). *ASME, Transactions, Journal of Fluids Engineering,* vol. 103, Dec. 1981, p. 564-575; Discussion, p. 575, 576. 40 refs. Contract No. F33615-77-C-2036.

Cavitation has been investigated in directional control valves in order to identify damage mechanisms characteristic of components of aircraft hydraulic systems. Tests have been conducted in a representative metal spool valve and in a model three times larger. Data taken under noncavitating conditions with both valves showed that the position of the high-velocity annular jet shifts orientation, depending upon valve opening and Reynolds number. By means of high-frequency response pressure transducers strategically placed in the valve chamber cavitation could be sensed by the correlation of noise with a cavitation index. The onset of cavitation can be detected by comparing energy spectra for a fixed valve opening and a constant discharge. Another sensitive indicator of cavitation inception is the ratio of cavitating to noncavitating spectral densities. The incipient cavitation number as defined in this investigation is correlated with the Reynolds number for both valves. (Author)

A82-16432 # **Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies.** A. R. George (Cornell University, Ithaca, NY). *ASME, Transactions, Journal of Fluids Engineering,* vol. 103, Dec. 1981, p. 631-637; Discussion, p. 637, 638. 17 refs.

A82-16456 **Applications for Nonweiler Waverider spacecraft.** D. Lunan. *British Interplanetary Society, Journal (Space Chronicle),* vol. 35, Jan. 1982, p. 45-47. 11 refs.

The use of the Waverider concept for an atmospheric entry vehicle is discussed. The Waverider has a flat upper surface, a straight leading edge, and anhedral 'V' shaped wings. Entering an atmosphere at near-orbital speed, the craft would fly with nose-up at a high angle of incidence, riding a plasma shock wave, heating to an equilibrium temperature of 1500 C, and offer the opportunity for a low-speed landing at a wider choice of sites than the Shuttle. The flat upper surface protects against radio black-out and can be used as a platform for planetary exploration instruments. Martian aerographic, and Venus and Jupiter missions are examined, noting that the Waverider would probably never land on Venus and Jupiter due to its aerodynamic characteristics and the densities and wind speeds of the two planets' atmospheres. The use of mass-driver launched Waveriders to deliver raw materials directly from the moon to earth is also explored. D.H.K.

A82-16557 **Management of a large avionics project.** H. R. Sandilands (Marconi Avionics, Ltd., Hemel Hempstead, Herts., England) and B. Taylor (Marconi Avionics, Ltd., St. Albans, Herts., England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 408-411.

The management of a major avionics project is discussed, using as an example the Airborne Early Warning Nimrod Mission System Avionics project, sponsored by the UK Ministry of Defense. A multilayer project family tree is outlined; this family tree structure is the basis for the identification and interrelation of all the elemental and incremental tasks which must be performed to implement the project. It serves to allocate managerial responsibility for conduct and achievement on a direct, one-to-one basis. It is fundamental to all management and control activities, such as cost and timescale estimation and attribution, preparation of program networks, identification of milestones and key events, allocation of resources, preparation of management information, as well as progress, cost and performance reporting. It may even play a future role in forming the contract with the customer. J.F.

A82-16558 **Special problems associated with aircraft radomes.** D. A. Conti (British Aerospace Public, Ltd., Co., Dynamics Group, Stevenage, Herts., England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 412-418. 13 refs.

The paper discusses the design and manufacturing aspects of nose radomes for high-speed aircraft. Aircraft radomes are an acceptable comprise of the conflict between the electrical, structural, environmental and aerodynamic requirements. The paper reviews the requirements placed on the design and summarizes the basic radome design and construction methods, as applied in current radome technology, concluding with an examination of the shortcomings of existing radomes and an indication of possible solutions to current problems. (Author)

A82-16559 **Advanced cockpit for tactical aircraft.** G. Roe (British Aerospace Public, Ltd., Co., Aircraft Group, Brough, Humberside, England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 419-426. 8 refs.

The progressive development of aircraft systems and changes in their requirements over the past 20 years are shown to have affected the cockpit of the Harrier aircraft. Several mature technologies, as well as several which are likely to mature within the next ten years are described. Ways in which these technologies may be used to redesign an all-electronic cockpit, while still meeting the pilot's basic need to remain in overall control of the aircraft and its system, are discussed. A final advanced cockpit design is offered: it consists of a side-mounted flight controller and sliding-throttle arrangement, with the appropriate controls and switches to facilitate a hands-on-throttle-and-stick operation. All once-aflight-type switches are located on the right console, reducing hands-off stick operation, while all major system panels are located on the left console. When possible, all controls are located on a priority and frequency-of-use basis. J.F.

A82-16560 **Techniques for overhead-wire detection.** K. E. Potter (Royal Signals and Radar Establishment, Malvern, Worcs., England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 427-432.

The paper describes three wire detection techniques. A millimetre-wave pulsed radar system operating on the grating returns from wires with a regular mechanical structure is discussed. Experimental evidence at 35 GHz proves the operational philosophy of the system and suggests that higher frequencies would produce more successful results. A passive 50 Hz system operating on the magnetic flux produced by live overhead power cables is shown to be capable of indicating the presence and direction of such wires at ranges in excess of 500 m. Finally, a CO2 pulsed laser radar is discussed together with a processing algorithm to highlight wire presence. It is shown that identification of a 1/8 in. diameter wire at 200 m range and in a visibility of 200 m is possible using only 4 W of laser power. (Author)

A82-16561 **Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77.** A. F. Loy (Ministry of Defence /Procurement Executive/, London, England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 433-439. 6 refs.

The procurement situation with respect to reliability and maintainability (R&M), prior to the DCAD Technical Publication 1/77 (1978), is reviewed first. The general contents of the document and the translation of the document's principles into a form suitable for contracts are then discussed. Application of the publication is outlined, and an indication is given of the direction R&M activity should proceed in order to meet the challenges of future systems. Particular attention is given to the reliability parameter, which has presented a more serious problem during the design, development, and production phases. J.F.

A82-16562 **Head-up displays - The integrity of flight information.** L. L. Dopping-Hepenstal (British Aerospace Public, Ltd., Co., Aircraft Group, Kingston-upon-Thames, Surrey, England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 440-442.

Single-pilot military aircraft are usually designed with head-up displays (HUD), which enhance the safe operational flight envelope and the flexibility of weapons delivery. The shortcomings of the self-monitoring circuits in these HUD systems require the pilot to continually cross-check the display with the conventional head-down instruments. A fully integrated approach to the system design is required which would tackle the subject as a whole, and not as a set of individual equipment-related problems. Sensor redundancy is the most straightforward way to improve system integrity, but is likely to have the highest cost, weight, and installation penalty. A general solution will probably not be found, since each aircraft system will have to be studied with respect to its equipment fit, as well as its operational task and environment. J.F.

A82-16563 **VOR waveform synthesis and calibration.** R. W. White, R. N. Clarke, and R. W. Yell (National Physical Laboratory, Teddington, Middx., England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 443-450. 9 refs.

The development and assessment of two standard VHF omnirange radial systems (VOR) waveform synthesizers and a VOR waveform decoder are considered. The synthesizers are designed to regenerate waveforms for calibrating aircraft receivers on the ground. One synthesizer, a computer-controlled system, is excellent for producing imperfect waveforms; the second synthesizer standard is a compact portable unit suitable for field system testing and standards dissemination. The decoder design is based on digital sampling and storage of one cycle of the composite audio waveform; the data is then Fourier transformed and analyzed to determine the FM depth and the differential phase of the two 30 Hz modulating signals, the VOR bearing angle. The standard synthesizer and decoder standards have demonstrated uncertainties not exceeding the 95% confidence level. The sensitivity of the detection method to digitization uncertainties, asynchronism between decoder and generator, anharmonic 9.96 kHz subcarriers, and random amplitude and phase noise is also investigated. J.F.

A82-16564 **Design and performance of airborne radomes - A review.** G. A. E. Crone (ESA, European Space Research and Technology Centre, Noordwijk, Netherlands), A. W. Rudge (ERA Technology, Ltd., Leatherhead, Surrey, England), and G. N. Taylor (Royal Signals and Radar Establishment, Malvern, Worcs., England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing,* vol. 128, pt. F, no. 7, Dec. 1981, p. 451-464. 68 refs.

Radomes for airborne amplification can be classified as either (1) large aircraft radomes of the nose-cone or under-fuselage type, (2) small aircraft radomes flush-mounted to the airframe, or (3) missile radomes. The geometry of the radome often leads to severe degradation of the electrical performance of any enclosed antenna. The requirement for a good aerodynamic shape is shown to influence the electromagnetic design of the radome, and the choice of dielectric materials is limited by the needs for structural strength, low weight, thermal stability, and rain erosion resistance. The radome performance may also be compromised by the scattering of electromagnetic waves from metallic pilot tubes and lightning protection strips outside the radome, as well as dielectric pressure tubes within it. The electromagnetic design of the three types of radomes are reviewed, sources of degradation of the enclosed antenna radiation pattern are examined, and the design requirements of the radomes, with respect to their operational environment, are discussed. J.F.

A82-16692 **A method for predicting the lifetime of gas turbine blades.** H. Policella and J.-P. Culié (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *Fatigue of Engineering Materials and Structures,* vol. 4, no. 2, 1981, p. 157-172. 17 refs.

The article describes a method developed at ONERA for predicting the lifetime of gas turbine blades. This method makes use of non-linear viscoplastic constitutive laws, the problem being solved from a plane cross section assumption and through a time-step linearization. The initiation of the first macroscopic crack is calculated from a stabilized cycle condition. A blade test rig has been developed for checking the method under load and temperature conditions that are as close as possible to operational ones. The results of two series of test on convenction cooled IN100 blades prove the method to be acceptable to design engineers. (Author)

A82-16734 **Technological innovation for success - Liquid hydrogen propulsion.** J. L. Sloop (International Consultants on Energy Systems, Bethesda, MD). In: Between Sputnik and the Shuttle - New perspectives on American astronautics. San Diego, CA, Univelt, Inc., 1981, p. 225-239. 23 refs.

Hydrogen produces the highest exhaust velocity of all chemical fuels, thus producing the highest rocket velocities, but also has a low density, only one-quarter that of water. The development of hydrogen as a rocket fuel was begun in the early 1900s, though experiments were few due to the difficulty of obtaining liquid hydrogen. Para- and orthohydrogen were discovered in 1926, and catalysts to prevent the natural conversion of para to ortho, which tended to boil away liquefied hydrogen, were invented in the 1950s. Rocket testing using liquid hydrogen began in the 1940s, and the demand for liquid hydrogen increased for testing of thermonuclear weapons, although the supply of LH did not grow until the possibility for its use as a fuel for high altitude reconnaissance planes was investigated. Once NASA was created, the progress of an LH fueled stage for the Atlas rocket accelerated LH research, and led to NASA control of the development of the Saturn CV launch vehicle. An alternative use of liquid hydrogen as an automotive fuel is indicated. M.S.K.

A82-16746 **Noise control measures in the new Singapore International Airport.** R. B. W. Heng (National University of Singapore, Kent Ridge, Singapore). *Applied Acoustics,* vol. 14, Nov.-Dec. 1981, p. 439-453. 9 refs.

Noise control designs for the passenger terminal building of the Singapore International Airport are discussed. Three internal noise level areas were defined: noncritical public areas, general office areas, and conference rooms and the VIP lounge. Overall facade sound insulation comprised 27 mm of laminated glass. Rockwool blankets and perforated metal sheets were used in ceilings to lower reverberation levels in public areas. All contracted components were laboratory tested as a quality control procedure. Sound insulation requirements ranged from 32-45 dB, including doors, and an articulation loss level of 20% was set as a maximum for the distributed speaker public address system. M.S.K.

A82-16800 **Grumman Tomcat - In a class of its own.** R. M. Braybrook. *Air International,* vol. 22, Jan. 1982, p. 23-30.

Design, performance, and operational features of the F-14A Tomcat fighter are discussed. The validity of the variable geometry wings was established by NASA in wind tunnel tests which defined hinge points far enough away from the fuselage to stabilize the aerodynamic center in its rearward movement during a swept back mode. The Tomcat has a maximum mission weight of 70,426 lb with six Phoenix missiles, a maximum speed over Mach 2, can take off in 1300 ft, and land at 122 kt in 2500 ft. The wings sweep from 20-68 deg, roll is provided by differential tailplane movements, and the plane flies with no angle-of-attack restrictions. The weapons and target detection systems are described, noting the presence of an IR sensor to offset radar deficiencies in a jamming environment. Future versions of the F-14 will feature television for long range visual target identification, an improved Phoenix missile with longer range and better target resolution in a cluttered environment, and an expanded computer radar memory. M.S.K.

A82-16901 # **Experience with high performance V/STOL fighter projects at MBB.** F. Aulehla and G. K. Kissel (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2614.* 16 p., 9 refs.

Flight control systems and aerodynamic aspects of experimental V/STOL aircraft are discussed. The VJ 101 C featured tilting engines for increased thrust, reheat for takeoff, simple translation, triangular decentralization of the engines for thrust modulation, and moderate ground effects. Two experimental aircraft were built, with and without reheat, capable of Mach 2 and Mach 1.04, respectively. The mechanical flight control system and tests are outlined, both for hover rig and flight configurations. Ground suction, acoustic and thermal loading, sodium silicate coatings to avoid ground corrosion, and recirculation are considered. Results of the follow-on project to the VJ 101 C, the AVS, which was developed by NASA, are reviewed, and it is noted that trends toward thrust-to-weight ratios exceeding one, in concert with low wing loading, favor the development of V/STOL aircraft. M.S.K.

A82-16902 * # **A summary of V/STOL inlet analysis methods.** D. P. Hwang and J. H. Diedrich (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2628.* 8 p. 21 refs.

Methods to analyze the aerodynamic performance of V/STOL inlets at the NASA Lewis Research Center are discussed with emphasis on recent extensions and applications. Methods include the specification of the Kutta condition for a slotted inlet, the calculation of suction and tangential blowing for boundary layer control, and the analysis of auxiliary inlet geometries at angles of attack. An optimum diffuser velocity distribution is also developed, which can result in the shortest no-boundary layer control inlet and the lowest loss for the required amount of diffusion. D.L.G.

A82-16903 # **Development and validation of the V/STOL aerodynamics and stability and control manual.** C. Henderson and M. M. Walters (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2611.* 8 p. 13 refs.

A V/STOL Aerodynamics and Stability and Control Manual was developed to provide prediction methods which are applicable to a wide range of V/STOL configurations in hover and transition flight, in and out of ground effect. Propulsion-induced effects have been combined with unpowered aerodynamics in a buildup of total forces and moments for the jet-lift concept, so that total aerodynamics can be used to predict aircraft stability, control, and flying qualities characteristics. Results of longitudinal aerodynamic predictions have been compared with test data, and indicate that the methods are fast, inexpensive, and within the desired accuracy for the objective preliminary design stage. D.L.G.

A82-16904 # **A summary of jet-impingement studies at McDonnell Douglas Research Laboratories.** W. W. Bower, K. R. Saripalli, and R. K. Agarwal (McDonnell Douglas Research Laboratories, St. Louis, MO). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2613.* 13 p. 12 refs. Contracts No. N00014-76-C-0494; No. N00014-79-C-0635.

It has been the primary objective of the considered studies to determine and describe, through calculation, measurement, and visualization of the flowfields, the basic character of isolated and interacting impinging jets. The secondary objective has been to provide computed and experimental flow properties which can be used in the development and verification of empirically based prediction methodologies for complete aircraft configurations. The studies have resulted in the solution of the Reynolds-averaged Navier-Stokes and Jones-Launder turbulence model equations for two- and three-dimensional configurations and in the acquisition of an extensive data base and flow-visualization photographs for these configurations. G.R.

A82-16905 # **An investigation of the use of a propulsive wing/canard concept for improved maneuvering.** V. R. Stewart (Rockwell International Corp., Columbus, OH). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2622.* 8 p.

The propulsive wing concept is an extension of the flap boundary layer control utilized on several aircraft configurations. Several studies have been made regarding the benefits of the propulsive wing in STOL operation. However, the propulsive wing/canard provides performance benefits also in areas other than STOL. It is expected to improve the maneuvering capability by providing reduced drag at high lift coefficients without appreciably affecting the low lift drag. An increase in the buffet free load factor can also be expected with the blown wing and canard. Attention is given to a program to investigate the wing/canard at maneuvering conditions, and tests at ranges of blowing coefficients equivalent to STOL operation. G.R.

A82-16906 # **Advanced technology airfoil development for the XV-15 tilt-rotor vehicle.** J. C. Narramore (Bell Helicopter Textron, Fort Worth, TX). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2623.* 10 p. 15 refs.

Advances in the state-of-the-art of aerodynamics, dynamics, and structures suggest that the flight envelope of the tilt-rotor VTOL vehicle XV-15 can be expanded by an improved rotor blade design. A description is presented of an intensive airfoil development study which has been conducted in connection with the conceived possibilities. State-of-the-art design techniques were used to produce the new sections, and a wind tunnel "fly-off" between the best airfoils was held. Advanced technology airfoils demonstrated significant improvements in aerodynamic characteristics compared to existing XV-15 blade airfoils. G.R.

A82-16907 * # **Ground test of a large scale 'D' vented thrust deflecting nozzle.** E. W. Rosenberg (McDonnell Aircraft Co., St. Louis, MO) and R. S. Christiansen (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2630.* 10 p.

Future V/STOL aircraft will require efficient techniques for changing the thrust vector from the vertical direction for VTOL operation to the horizontal direction for conventional flight. Most V/STOL concepts utilize thrust vectoring nozzles to provide this variation in the thrust vector direction. An experimental test program was initiated to demonstrate the capabilities of a large scale 'D' vented thrust deflecting system coupled with a high bypass ratio turbofan engine. Data were obtained for a 'D' vented nozzle mounted behind a YTF-34-F5 turbofan engine. Preliminary data are presented for a variety of test conditions. Attention is given to aspects of 'D' vented nozzle design, the test apparatus, engine-nozzle compatibility, exit area variation, longitudinal vectoring performance, nozzle temperature distribution, and large scale - small scale comparisons. G.R.

A82-16908 # **NASA V/STOL Propulsion Control Analysis - Phase I and II program status.** R. J. Miller, S. P. Roth, and W. B. Kerr (United Technologies Corp., Government Products Div., West Palm Beach, FL). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2632.* 11 p.

NASA-Lewis Research Center initiated the V/STOL Propulsion Control Analysis Program in 1979 in order to take advantage of advanced electronic control technology for the next generation of V/STOL aircraft. The rationale, methods, and criteria developed during Phase I and Phase II of the program are discussed first. The development of an integrated flight and propulsion control system is then described. Most V/STOL aircraft under consideration depend on reaction thrusters or separate lift engines for attitude control and on engine thrust variations for height control. S/CTOL aircraft vector-thrust for pitch control during low speed operation. The baseline propulsion control system provides a thrust level response of 10 rad/sec and a vectoring response of 22 rad/sec. The requirements of the control components include: (1) redundant electronic control computers with minimum software and 100% Fault Coverage; (2) prime reliable electromechanical actuator interfaces; (3) miniature, digitally compatible sensors with easily detected failure modes; and (4) dual element, fail operational fuel pumps. J.F.

A82-16909 * # **V/STOL propulsion control technology.** H. Brown (General Electric Co., Cincinnati, OH). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2634.* 10 p. Contract No. NAS3-22057.

Results of a NASA sponsored study of V/STOL Propulsion Control Analysis are presented. The study involved propulsion control requirements, design concepts and procedures, and control designs for supersonic V/STOL. A variable cycle engine with a remote augmented lift system was used as a basis for establishing typical operating requirements and control concepts, and a nonlinear engine model was developed for control development as a precursor to a real-time simulation capability. A simplified aircraft model was also used to investigate transition requirements, and a long-range technology plan was developed to define subsequent program requirements for achieving a real-time piloted simulation capability. D.L.G.

A82-16910 * # **Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft.** G. C. Hill (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2636.* 8 p. 9 refs.

Piloted simulation studies of candidate control systems for VATOL aircraft were conducted on a six degree of freedom simulator. Hover and transitions from wing-born to hovering flight were performed, with and without turbulence, on a representative high performance fighter configuration. Deflection of the rear engine nozzle provided pitch and yaw control moments in concert with reaction controls for roll. Unique motion cues in hover result from the vertical displacement of the cockpit and the thrust vectoring nozzles. Abundant control power available with moderate engine nozzle deflection combined with rate feedback for stability augmentation provided very satisfactory control. (Author)

A82-16911 * # **Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles.** F. J. Capone, R. J. Re, and E. A. Bare (NASA, Langley Research Center, Transonic Aerodynamics Div., Hampton, VA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2639.* 15 p. 21 refs.

The effects of thrust reversing on stability, control and vertical tail loads of advanced fighter aircraft are reviewed. Several static test stand and wind tunnel investigations of nonaxisymmetric nozzles with integral thrust reversers are presented, and it is found that base drag on the aft face of reverser panels of blockers provides a significant contribution to in-flight thrust reverser performance. The location of tail surfaces relative to the thrust reverser has significant impact on control surface effectiveness, and depending on thrust reverser location, large vertical tail side force can result from the use of in-flight thrust reversers. It is concluded that highly effective nonaxisymmetric nozzle reversers can be designed to achieve a 50% static reverse thrust. D.L.G.

A82-16912 # **Greenlandair VTOL transportation study.** R. R. Reber (Bell Helicopter Textron, Fort Worth, TX). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2642.* 6 p.

An operational and economic analysis was conducted on Greenlandair, a large helicopter commuter operation. Results indicate that the airline could realize a significant increase in available seat miles with a decrease in total cost by replacing the fleet of helicopters and fixed-wing aircraft with Tiltrotors. The Tiltrotor can fly 2.5 times faster than the helicopters, and 25% faster than the presently used turboprop aicraft. Fuel consumption could be reduced by one half, and with additional savings on maintenance, crew costs, and ground support costs, plus expanded flight schedules, the airline could achieve a net yearly savings of over 2 million dollars. D.L.G.

A82-16913 # **V/STOL status from the engine technology viewpoint.** G. M. Lewis and W. J. Lewis (Rolls-Royce, Ltd., Bristol, England). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2648.* 10 p.

Directions for designs and powerplant configurations for V/STOL aircraft are explored. The Harrier is the only V/STOL aircraft in service, having performed for over 12 yr. Rolls-Royce has studied engines with powered lift separation from forward propulsion, and engines with composite lift/propulsion modes, resulting in concentration on vectored thrust using rotating or deflected nozzles. The necessity for higher combat performance creates a need for higher specific thrust for supersonic flight (Mach 2), which is achievable with plenum chamber burning. The core flows are exhausted through separate nozzle systems for independent control. Intake in a V/STOL follows a short path and results in nonuniform flow, and testing is described to account for the effects of nonuniform static pressures and temperatures. M.S.K.

A82-16914 * # **Helical helicopter approaches with microwave landing system guidance.** L. A. McGee, J. D. Foster, and D. C. Dugan (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2654*. 13 p. 8 refs.

It is desirable that the landing approach of helicopters and V/STOL aircraft into a congested airport equipped with a microwave landing system (MLS) can take place essentially independent of CTOL traffic. The helical approach has been proposed as one way to provide aircraft separation while requiring minimum airspace. A helical descent makes it possible for the helicopter to lose altitude in a confined airspace without descending along an excessively steep glide slope. This avoids helicopter handling problems which occur at slow airspeeds. Preliminary flight-test data are presented regarding the operational feasibility of the helical approach under IFR conditions where the primary guidance information is from an MLS. G.R.

A82-16915 # **Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft.** C. W. Stanley and W. E. Hood (U.S. Navy, Cherry Point, NC). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2656*. 8 p.

The U.S. Marine Corp (USMC) has been operating the only V/STOL attack aircraft in the western world since 1971. Some of the maintenance problems experienced are related to the unique V/STOL design criteria of the Pegasus engine. However, the major part of the required maintenance effort is found to involve the more conventional engine problems. A description of the aircraft engine is provided and the problems resulting from V/STOL design demands are examined. Attention is given to the fuel system control, the engine air bleed, foreign object damage to the hp compressor, and the engine exhaust system. G.R.

A82-16916 # **A low cost maritime control aircraft-ship-weapons system.** H. Fluk (U.S. Naval Air Engineering Center, Lakehurst, NJ). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2660*. 10 p. 7 refs.

It is pointed out that the long-range antiship standoff missile is emerging as the foremost threat on the seas. Delivered by high speed bombers, surface ships, and submarines, a missile attack can be mounted against selected targets from any point on the compass. An investigation is conducted regarding the configuration of a system which could most efficiently identify and destroy standoff threats before thay launch their weapons. It is found that by using ships for carrying and launching missiles, and employing aircraft with a powerful radar only for search and missile directing operations, aircraft cost and weight can be greatly reduced. The employment of V/STOL aircraft in preference to other types of aircraft makes it possible to use ships of smaller size for carrying the aircraft. However, in order to obtain an all-weather operational capability for the system, ships are selected which are still big enough to display the required stability in heavy seas. G.R.

A82-16917 # **Type 'A' V/STOL - One aircraft for all support missions.** W. H. Adelt (McDonnell Aircraft Co., St. Louis, MO). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2661*. 14 p. 5 refs.

An investigation is conducted regarding the feasibility of developing a single support aircraft type for the Navy, taking into account the current naval inventory of utility aircraft types. Support mission characteristics are examined, giving attention to antisubmarine warfare, airborne early warning, marine assault, carrier on board delivery/vertical on board delivery, the aerial tanker mission, long-range rescue, surface attack, and aspects of combat, search, and rescue. With the aid of a sample design for a V/STOL aircraft with a medium disc loading lift system it is demonstrated that it is now possible to design an aircraft which, with minor modifications, can meet the wide variety of support missions. G.R.

A82-16972 # **Airbus - Perspectives for the future (Airbus - Perspectivas para el futuro).** K. Schleicher Tafel (Construcciones Aeronáuticas, S.A., Madrid, Spain). *IAA/Ingenieria Aeronáutica y Astronáutica,* vol. 33, Nov. 1981, p. 5-16. In Spanish.

The derivation of future commercial aircraft in the 150-300 seat range from the A-300 and A-310 design, according to a staged program of development and technology transfer, is described. After brief consideration of the distribution of program responsibilities among the members of the Airbus consortium, and the derivation of the A-310 from the A-300, attention is given to the features of the A-300-600 series aircraft, which incorporates and A-310 rear fuselage and will replace the A-300 toward the end of 1984. Also considered are (1) the long-term replacements of the A-300 and A-310, the twin-aisle TA-9 and TA-11, respectively, and (2) the single- aisle A-320, which is to be a new design for the short-range market and the precursor of a new family of aircraft in the 125-175 seat range. The A-320 is compared to the 737, DC9 and 757 aircraft. O.C.

A82-16973 # **The justification of the need for ILS by means of cost/benefit methods (Justificacion de la necesidad de un ils mediante tecnicas costo/beneficio).** E. Lallemand Abella. *IAA/Ingenieria Aeronáutica y Astronáutica,* vol. 33, Nov. 1981, p. 33-36. In Spanish.

FAA criteria for the establishment of an Instrument Landing System (ILS) at a given airport have been applied since 1977 in light of cost/benefit studies. The criteria apply to airports with regular jet aircraft traffic which are open to use by general aviation aircraft, and are applicable to other airports in which (1) the number of yearly landing approaches under instrument-only control is greater than a minimum figure and (2) the cost/benfit ratio is better than unity. Attention is given to benefits both annually and in the long term, as well as investment and operating costs. Benefits are defined in terms of regularity of operations and the statistical reduction of accident rates. O.C.

A82-17116 † **A method for locating aircraft wing damage by nonlinear vibration analysis (Ob odnom metode poiska povrezhdeniia kryla samoleta, osnovannom na analize ego nelineinykh kolebanii).** S. L. Tsyfanskii, V. M. Ozhiganov, A. B. Milov, and Ia. N. Nevskii. *Voprosy Dinamiki i Prochnosti,* no. 39, 1981, p. 3-10. 7 refs. In Russian.

A procedure is proposed for the electrical modeling of the vibrations of a spar wing with a crack. A diagnostic technique based on the spectral analysis of ultraharmonic vibrations is described. V.L.

A82-17124 **Some aerodynamic aspects of hang gliding.** A. Fischer (Dortmund, Universität, Dortmund, West Germany). *Endeavour,* vol. 5, no. 4, 1981, p. 152-157.

Hang gliding began with experiments for spacecraft return to earth using delta wings for gliding. Manipulation of the steering bar on modern hang gliders is outlined, along with the high-strength, light-weight construction. The pointed nose of early gliders is actually suitable only for supersonic craft, and led to the addition of a permanently adjusted elevator to eliminate flap induced dive. Hang glider wings have a lift coefficient of one, a glide angle of 1:10, and a sink ratio of 0.9 m/sec. A progression toward elliptical wings is noted, and designs for semi-rigid and powered gliders are discussed. The addition of a motor leads to stability and thrust axis considerations as well as weight penalties and greater induced drag. Finally, ultralights are mentioned, including the canard and the solar powered aircraft. M.S.K.

A82-17135 **Design procedures for compressor blades (Entwurfsverfahren für Verdichterschaufeln).** H. Starken (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Antriebstechnik, Cologne, West Germany). *DFVLR-Nachrichten,* Nov. 1981, p. 49-51. In German.

The conventional methods for the design of the blades in the case of axial turbomachines are considered, taking into account difficulties concerning the determination of optimal blade profiles. These difficulties have been partly overcome as a consequence of the introduction of new numerical methods during the last few years. It is pointed out that, in the case of the subsonic range, a new procedure is now available for the determination of the form of blade profile on the basis of a given velocity distribution on the profile surface. The search for a profile form with favorable characteristics is consequently transformed into a search for a favorable velocity or pressure distribution on the blade. The distribution of velocities depends to a large degree on the characteristics of the profile boundary layers. The considered concept is not new. However, its practical implementation has only recently become possible. The employment of the new design procedure is illustrated with the aid of an example involving a concrete design problem. G.R.

A82-17136 **The German-Dutch wind tunnel as aeroacoustic experimental installation (Der Deutsch-Niederländische Windkanal als aeroakustische Versuchseinrichtung).** K.-J. Schultz (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Abteilung technische Akustik, Braunschweig, West Germany). *DFVLR-Nachrichten,* Nov. 1981, p. 52-56. In German.

The construction of the currently largest European low-speed wind tunnel was completed as a joint project of the Federal Republic of Germany and the Netherlands. The aeroacoustic configuration of the wind tunnel makes use of an open test section and a free jet of air having a length of 20 m. A 8 x 6 m nozzle is employed. Acoustic distant field measurements with respect to test objects exposed to the airstream are possible. Attention is given to the performance of distant field measurements, the sound-absorbing wall surfaces, the acoustic characteristics of the test chamber, and aspects of acoustic calibration. A few characteristic experimental results are also reported. G.R.

A82-17137 **Current investigations regarding noise research in the Braunschweig Center of the German Institute for Research and Experimentation in Aeronautics and Astronautics (Aktuelle Arbeiten der Lärmforschung im DFVLR-Zentrum Braunschweig).** H. Heller (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Abteilung technische Akustik, Braunschweig, West Germany). *DFVLR-Nachrichten,* Nov. 1981, p. 56-61. In German.

The German Institute for Research and Experimentation in Aeronautics and Astronautics has established, four years ago, the Department of Technical Acoustics in its Braunschweig research center to conduct research related to the occurrence of noise. The initiation of the investigations conducted in the new department was motivated by the desirability to reduce noise produced at airports, in traffic, and in connection with industrial processing operations. The organizational relation of the Department of Technical Acoustics to the research sector of fluid mechanics takes into account the fact that, in aeronautics, the generation of noise is frequently a consequence of turbulent flow and separation processes. Attention is given to investigations concerning the noise produced by aircraft with propeller drive, studies related to helicopter noise, and research regarding the noise generated in connection with the flow of air around aircraft or automobiles. Activities with respect to a use of the German-Dutch Wind Tunnel for aeroacoustic studies are also considered and an outlook concerning future developments is provided. G.R.

A82-17149 **Turboprop resurgence - The next step.** B. Rek. *Interavia,* vol. 36, Dec. 1981, p. 1245-1247.

The prospects for the development of turboprop commercial aircraft in the 40- to 80-seat capacity range are assessed, with attention to the PW120, CT7-5 and -7, and TPE331-14/15 powerplants. Among the performance requirements of aircraft of this class are a cruise speed of approximately 740 km/hr, and a cruise altitude of more than 30,000 ft. These levels of performance would eliminate block-time penalties over sectors of up to 900 km. Among existing designs that may be developed to satisfy the emerging market for state-of-the-art 40-80 seat airliners are the F27, 748, Dash 7, F28 and BAe 146. The aircraft are expected to incorporate advanced avionics, Microwave Landing System (MLS) capability, composite primary structures, supercritical wing aerodynamics, and propfan rotors. O.C.

A82-17243 **Crack edge instability - A criterion for safe crack propagation limit in thin sheets.** B. K. Parida (Indian Institute of Technology, Kharagpur, India). In: Fracture and fatigue: Elasto-plasticity, thin sheet and micromechanisms problems; Proceedings of the Third European Colloquium on Fracture, London, England, September 8-10, 1980. Oxford, Pergamon Press, 1980, p. 307-314. 5 refs.

Results from a series of experiments to determine the safe crack propagation limit of thin aluminum alloy (D16-ATV) sheets under constant amplitude fatigue loading are presented. An empirical relation is developed which can be used to predict the critical crack length associated with the onset of crack-edge instability under constant amplitude loading. The relationship used to correlate the critical half-crack length, L(cr), and the corresponding tensile stress, S, for local buckling of the free edges of a crack is given as S = K x E (T/L(cr))-squared, where T is the sheet thickness, E is the elastic modulus, and K is a constant, depending upon the material properties and the specimen geometry. The critical crack length obtained from the constant amplitude fatigue test was compared to that predicted by the empirical relation; the magnitude of maximum stress in the fatigue test is considered to be equivalent to the critical stress in predicting the critical crack length for the onset of crack-edge instability. The error involved in the prediction is shown to be small. J.F.

A82-17276 **Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980.** Seminar sponsored by the Flight Safety Foundation, Boeing Commercial Airplane Co., Ministry of Transport of New Zealand, et al. Edited by L. J. Scott. Arlington, VA, Flight Safety Foundation, Inc., 1980. 336 p. $30.

Topics discussed include accident prevention and safety, air traffic management for fuel economy, and quality control of fuel from the refinery to the engine. Particular attention is given to air traffic control problems, flight crew management and cockpit performance systems, and gas path analysis for engine condition monitoring. Consideration is also given to energy conservation through airport design and management, and computer flight planning for fuel efficiency. J.F.

A82-17277 **Why safety.** M. Eastburn (American Airlines, Inc., New York, NY). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 13-28.

It is claimed that safety and the prevention of accidents are the greatest conservers of energy. The worldwide commercial jet transport accident experience is briefly described; this description covers the period from 1959, the beginning of the air carrier jet age, through to September 1980. Aircraft lost as a result of sabotage and war-like action, as well as the six Comets lost prior to 1959, are also included in the analysis. Passenger and hull loss liability, and its effect on airline operational costs, are then discussed. Finally, it is estimated that if no action is taken to ensure their prevention, by 1986 there will be an additional 115 hull losses to the present total of 354. J.F.

A82-17278 **Accident prevention - A regulators view.** G. V. Hughes (Department of Transport, Canberra, Australia). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 29-37.

Details of aircraft accidents in the world involving passenger fatalities on scheduled services from 1969 to 1979 are presented and compared to data on general aviation accidents for U.S. and Australian operations. It is shown that the fatalities in general aviation are much greater and continue to grow. Safety prevention is then discussed from the viewpoint of a regulator, who is responsible for the development, implementation, and monitoring of compliance with standards covering all matters to do with aircraft. Problems related to the development of comprehensive and precise standards, as well as the decision to vary these standards when necessary, are discussed. Lack of standardization of controls in fuel systems and undercarriages is used to exemplify the extent of the problem. J.F.

A82-17279 **Air traffic management for fuel economy.** W.

C. W. Fraes (National Air Traffic Services, London, England). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 56-74. 9 refs.

Air traffic management, which includes airspace arrangements, air traffic control (ATC) facilities, and ATC procedures, is discussed. In particular, ATC capacities in the U.K. are described, with respect to their means of regulating departures and handling delays so as to minimize the total fuel consumption. It is shown that airspace arrangements and procedures should be devised and operated in such a way that would allow (1) uninterrupted climbs to cruising level; (2) maximun chance of obtaining the optimum cruising level; (3) the shortest practical mileage; and (4) the optimum descent profile. Finally, the operation of an efficient ground movement system is cited as a further means of conserving fuel. J.F.

A82-17280 **The shape of the air traffic control system of the future - A U.S. perspective.** S. B. Poritzky (FAA, Office of Systems Engineering Management, Washington, DC). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 75-82.

Based on recommendations from the user community, the FAA has postulated a safety-and-efficiency-oriented Air Traffic Control (ATC) system, which should be in operation by the start of the 21st century. Problems in the present system are considered from an operations vantage point, as well as from an assessment of expected technology and the possible evolution of aircraft and aviation systems. There will continue to be several levels of ATC service in the U.S., ranging from a highly automated system serving fully participating aircraft in certain airspace to those in which no separation service is provided. Real-time knowledge of actual airport capacity and the use of automated runway configuration management systems will permit the use of optimum airport configurations and scheduling to achieve limited capacity gains. The ATC system will automatically make available severe weather and traffic information. One separation assurance device in particular, the Active Beacon-based Collision Avoidance System, is shown to be an efficient tail cutter which will offer benefits in relatively high-density traffic. J.F.

A82-17281 **Fuel conservation now.** R. A. Davis (Boeing Commercial Airplane Co., Renton, WA). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 83-95.

Boeing is developing improvements for the existing production run of second generation transports, the 727 and 737 aircraft, in order to meet the escalation of jet transport fuel prices. The improvements include reduction in aircraft weight and aerodynamic drag, engine fuel efficiency, and aircraft operational improvements. Applications of a Kapton lightweight wire insulation was shown to save approximately 386 pounds for each 727 and 170 pounds for each 737. A 1% retrofit table drag reduction package is currently available for the 727. The JT8D 'A' series of engines for the -15 and -17 versions promise specific fuel consumption improvements of 5.5% to be available in 1982. The Performance Data Computer coupled with the full range Autothrottle/Speed Control will provide fuel savings up to 7% for the 727 and up to 6% for the 737. J.F.

A82-17282 **Energy savings with today's technology.** H. Dibley (British Airways, Heathrow, Middx., England). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 97-133.

The crew of an aircraft seeks to maximize the energy available in the atmosphere and in the aircraft's fuel so as to ensure the efficient and safe operation of a flight. This is accomplished by displaying clear data in front of the crew, by providing the crew with comprehensive but readily useable information for fuel management (enabling minimum fuel reserves to be carried out), and by relieving the crew of an unnecessary mental work load to use this information. The optimum profile for minimum fuel use involves (1) climbing with maximum thrust at an optimum speed to optimum cruise altitude for a given aircraft weight and wind gradient; (2) cruise climbing as weight decreases; (3) unrestricted descent to the destination field at optimum descent speed with the idle thrust; and (4) selection of a route which takes advantage of the wind structure to fly the minimum air miles. This can be accomplished by supplying the crew with meteorological information, the fuel flight plan, as well as knowledge of the fuel reserves. A minimum safe altitude display on the pilot's panel is also suggested. J.F.

A82-17283 **Air traffic control problems and solutions.** C. W. Victor. In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 137-152. 14 refs.

The inefficiencies of the present Air Traffic Control (ATC) system are both costly and hazardous to the U.S. airlines network. An improved ATC system is sought which will make use of predetermined flight profiles and time schedules as well as airborne and ground-based computers for transmitting and receiving operational data. The new system is required to (1) improve safety in flight (2) make more efficient use of the airspace; (3) have greater fuel efficiency; (4) make better use of airport runways; and (5) improve flight instrument systems. Several relatively inexpensive solutions to the above criteria are discussed. J.F.

A82-17284 **Productivity and safety.** D. R. Clifford (Boeing Commercial Airplane, Co., Renton, WA). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 153-165.

Due to the effect of fuel price increases on direct operating costs, more fuel-efficient designs for new transport aircraft are sought. This effort includes the use of increased wing span, advanced air foils, better materials, flight management avionics systems, and more efficient engines. The lower costs available through a reduction in crew complement have also been cited. Results of accident statistics are analyzed in order to resolve the controversial two or three-member flight crew issue. It is concluded that two-crew aircraft have a better safety record than three-crew aircraft, and that a jet transport designed for operation by two pilots can be at least as safe as one designed for operation by three. J.F.

A82-17285 **Flight crew management and cockpit performance systems.** R. N. Buck. In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 166-170.

The performance computer systems in jet aircraft cockpits have the potential for saving fuel and improving the efficient management of aircraft by the flight crew; they also have the potential, however, for increasing work loads, heads-down time, and certain hazards caused by error. Data must therefore be presented so that the crew has maximum use of information with minimum distraction. The performance advisory system displays information on air speed, thrust setting, and required pitch by a digital read-out or by moveable bugs on the air speed indicator and EPR gauges. Having the system work with auto throttles and a set thrust (a performance management system) relieves the crew from high concentration on thrust setting and assures that the thrust is set correctly for the current weight and altitude. A flight management system with a more comprehensive cockpit display is envisioned; it would perform such functions as maintenance monitoring, weather data collection, and center-of-gravity management. J.F.

A82-17286 **Gas path analysis - A tool for engine condition monitoring.** L. A. Urban (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 171-201. 10 refs.

Engine condition diagnostics and monitoring in all phases of operation from the test cell to on-wing is recognized as a highly economical procedure. A technique is required, however, whereby engines can be analyzed to the module level in a reliable and technically sound way. Gas Path Analysis (GPA) with multiple simultaneous fault isolation and the ability to deal with measurement noise, has been developed to meet that need. Major GPA activity as of mid-1980 is summarized, based on its use by eight airlines. Results show that GPA is a successful technique and can be used for on-wing engine monitoring to the module level for the new generation aircraft. J.F.

A82-17287 **Energy conservation through airport design and management.** H. I. F. Ouyang (Civil Aeronautics Administration, Taipei, Republic of China). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 208-233.

Energy conservation principles through airport design and management are described and then compared with those applied at the Chiang Kai-Shek International Airport. The results of the comparison may be used at existing airports, where current systems and operation procedures can be evaluated, and where programs necessary to reduce energy consumption without affecting airport performance may be developed. The analysis should also be considered at the design stage of new airports, where the material specifications of an architectural structure and the technical requirements of mechanical and electrical systems with energy saving functions may be considered and reviewed in order that necessary modifications may be made as early as possible. J.F.

A82-17288 **Handling problems associated with jet aircraft fuels.** L. C. Quigg (Lockheed Air Terminal, Inc., Burbank, CA). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 234-250. 18 refs.

A good quality control program is needed to eliminate the threat of dirty fuel, a problem that can adversely affect aircraft maintenance and safety. The contaminants that affect fuel cleanliness include particulate matter (rust, millscale, sand), water (dissolved and undissolved), surfactants (refinery carry-overs and fuel additives picked up in pipeline delivery systems), and microorganisms. If not effectively controlled or removed from the fuel, they can cause fuel tank corrosion, tank quantity gage inaccuracies, engine fuel control problems, and filter and screen blockage. An effective quality control program will eliminate these contaminants by (1) verifying the product; (2) detecting the presence and origin of contaminants; (3) effectively removing the contaminants; (4) providing well-designed facilities; and (5) establishing a reliable inspection program. J.F.

A82-17289 **Computer flight planning for fuel efficiency.** L. M. Reinkens (Lockheed Aircraft Service Co., Ontario, CA). In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 258-269.

The need to improve fuel efficiency is forcing the aviation industry to reassess the use of computer flight planning (CFP). In the past decade, CFP was based on mechanizing manual techniques; the demand now is for CFP to take technology one step further into (1) inexpensive on-line conversational systems available throughout the world; (2) refined optimization techniques in route and profile selection to minimize fuel uplift, maximize payload, and extend range; (3) reanalysis enroute to reflect take-off variations and minimize fuel consumption; (4) reanalysis in the event of diversion to an alternate; (5) remote data base entry; and (6) refined reserve fuel consumption. The proposed interactive system and conversational network are given; differences in cruise speeds, fuel, and payload requirements of the Boeing 737 and 747 are illustrated. J.F.

A82-17290 **Liquid hydrogen - An outstanding alternate fuel for transport aircraft.** W. M. Hawkins. In: Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980. Arlington, VA, Flight Safety Foundation, Inc., 1980, p. 270-295.

Liquid hydrogen is proposed as an excellent alternate aircraft fuel, owing to its worldwide availability, low cost, ability to be transported and stored without difficulty, and minimum impact on the environment. NASA compared the characteristics and performance of three aircraft using (1) synthetic Jet A, (2) liquid methane, and (3) liquid hydrogen. The liquid hydrogen aircraft was found to weigh considerably less than the others, thereby reducing the take-off gross weight. Every pound of hydrogen produces 51,590 BTU's, whereas a pound of Jet A produces only 18,400 BTU's. Moreover the liquid hydrogen aircraft uses the least energy in spite of aerodynamic disadvantages of the aircraft and high energy needs for liquefaction and the manufacturing process. Liquid hydrogen also has a fly-over noise level of 89 decibels compared to the 94 decibels for the Synjet aircraft. A simple system of laminar flow maintenance using liquid hydrogen is discussed, and several safety features of the fuel are noted. J.F.

A82-17310 # **NAVSTAR Global Positioning System.** J. H. Martel (USAF, Washington, DC). In: Space tracking and data systems; Proceedings of the Symposium, Arlington, VA, June 16-18, 1981. New York, American Institute of Aeronautics and Astronautics, 1981, p. 89-93.

The NAVSTAR Global Positioning System (GPS) is an important new space-based radio navigation system currently under development by the Department of Defense. The system will provide highly accurate three-dimensional position, velocity, and time information to an unlimited number of suitably equipped users anywhere on or near the earth. The system will consist of three segments: the Satellite or Space Segments, the Control Segment, and the User Segment. All three segments are currently in full scale development leading to a full three-dimensional world-wide capability by late 1987. Potential military applications of the system are virtually limitless. Potential civil applications, while currently less well defined than military uses, are also extensive. Testing of early development models have clearly demonstrated that the system has the potential to perform up to near theoretical expectations. Early problems with spacecraft atomic clocks appear to have been solved and the program is progressing on a sound technical basis. The remaining challenge is to achieve an optimum balance to assure that sufficient accuracy is available to satisfy valid civil needs without jeopardizing national security objectives. (Author)

A82-17417 **Development of the Lockheed SR-71 Blackbird.** C. L. Johnson. *Lockheed Horizons,* Winter 1981-1982, p. 2-7, 13-18.

An account is given of the development history of the SR-71 reconnaissance aircraft, with attention to the use of novel design concepts in high-temperature materials and their fabrication and the aerodynamics required for efficient flight at cruise speeds of Mach 3.0. Consideration is also given to the parallel development of the YF-12A, air defense long-range fighter derivative. Emphasis is placed on the integration of the J58 engine into the SR-71's nacelles, whose inlets, air bleed mechanisms and ejector underwent the greatest portion of wind tunnel testing time for optimization. Age B-120 titanium alloy was chosen as the main structural material, in the form of machined forgings and corrugated skins which resist high-temperature warping. With refueling, the special cockpit and lubrication cooling systems developed allow continuous flights of 15,000 miles. Aircraft of this type have exceeded Mach 3.0 over 11,000 times since becoming operational in 1964. O.C.

A82-17418 **J58/SR-71 propulsion integration or the great adventure into the technical unknown.** W. H. Brown. *Lockheed Horizons,* Winter 1981-1982, p. 7-13.

The integration of the J58 engine into the SR-71 nacelles is detailed, with attention to the accommodation of such consequences of Mach 3.0 cruise speeds as (1) engine inlet air temperatures exceeding 800 F, (2) fuel inlet temperatures of 350 F, (3) fuel temperatures ranging from 600 to 700 F at the main and afterburner nozzles, and (4) lubricant temperatures of 700-1000 F in localized parts of the engine. A new fuel and a chemical lubricant were developed to meet temperature requirements. Consideration is given to the mounting of the engine, and the air flow patterns induced in the nacelle through the actuation of bypass and suck-in doors, centerbody bleed, and external ejector flaps. Special efforts were made in the solution of engine inlet unstart problems. Testing facilities and development program management are also considered. O.C.

A82-17419 **Modern aircraft accident investigation equipment and techniques.** E. J. Rosenbauer, Sr. (Lockheed Aircraft Service Co., Ontario, CA). *Lockheed Horizons,* Winter 1981-1982, p. 20-27.

A description is given of the design features and operational capabilities of the Model 109 Flight Data Recorder (FDR) and Model 209 Digital Flight Data Recorder (DFDR), with emphasis on the superior survivability standards addressed by the Model 209. The DFDR has operated properly when subjected to (1) vibrations of 5-500 Hz, at 0.036-inch double amplitude and 10 G acceleration, in 15-min cycles for a period of 1 hr in each axis; (2) impact shocks having a peak acceleration magnitude of 1000 G and 5 msec duration; and (3) flames of 1100 C over 50% of the external surface for 30 min. In addition, the data on the DFDR's recording medium remained intact after 24 hours of immersion in aircraft fuel, lubricating oil, and fire extinguishing fluids, and reproducible after 36 hours of immersion in seawater. Post-accident recorder handling and data recovery procedures are also covered. O.C.

A82-17420 **The all-electric airplane - A new trend.** M. J. Cronin (Lockheed-California Co., Burbank, CA). *Lockheed Horizons,* Winter 1981-1982, p. 28-39.

After a brief, historical consideration of the progress of aeronautics and of the feasibility of electrical-propulsion aircraft such as the photovoltaic Solar Challenger, a description is given of the direct operating cost reductions and system efficiencies derived from the replacement of bleed air/hydraulic/pneumatic/electrical aircraft power systems by a single, electric power system. In such a system, electric generators are the sole source of power for such functions as (1) the primary/secondary flight control system; (2) de-icing and anti-icing; (3) environmental controls; (4) electronics and avionics loads; and (5) landing gear actuation and other mechanical functions. Estimates are presented of cycled weight savings and of the power extraction penalties that may be obviated by the all-electric system. The integration of power-by-wire and fly-by-wire systems is also discussed. O.C.

A82-17531 **Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes.** D. F. Bashford, A. K. Green (Fulmer Research Institute, Ltd., Stoke Poges, Bucks., England), K. F. Rogers, and D. M. Kingston-Lee (Royal Aircraft Establishment, Materials Dept., Farnborough, Hants., England). In: Composite structures; Proceedings of the First International Conference, Paisley, Scotland, September 16-18, 1981. London, Applied Science Publishers, 1981, p. 555-572. Research supported by the Ministry of Defence (Procurement Executive).

Five matrix resin systems have been evaluated as potential candidates for use in a rapid repair system for aircraft skin damage, incorporating glass/carbon fiber hybrid reinforced plastics as the repair material. Two epoxy and three polyester resin systems were evaluated at 20 C. Additionally, the three polyester systems were evaluated at 0 C. The effect of contamination of metal surfaces by aviation fuel and hydraulic fluid was investigated. The properties measured were metal/composite joint overlap shear strength, as manufactured and following a fixed schedule of tensile fatigue load conditioning, and bending stiffness. These properties were determined 4 h and 24 h after fabricating the simulated repair. The resin system Quickcure QC3/Lucidol CH50/dimethyl-p-toluidine was found to give repairs equal to riveted metal plate repairs under all circumstances except to hydraulic fluid contaminated substrates at 0 C. (Author)

A82-17536 **Stress intensity factor measurements in composite sandwich structures.** I. Roman, H. Harel, and G. Marom (Jerusalem, Hebrew University, Jerusalem, Israel). In: Composite structures; Proceedings of the First International Conference, Paisley, Scotland, September 16-18, 1981. London, Applied Science Publishers, 1981, p. 633-645. 8 refs.

It is pointed out that although LEFM and its fracture criterion - the critical stress intensity factor - have been used in research with composites for quite some time, its applicability is not yet commonly accepted. The study described here seeks to provide an experimental certification of the applicability of the concept to a composite control surface. The structure used is constructed of angle-ply composite skins and a composite honeycomb core. The research is confined to cases of skin damage, such as surface scratches or notches, and seeks to provide a tool for determining when such forms of detectable damage become critical. [illegible] noted that in many cases the fracture process in sandwich structures containing skin surface notches is confined to delamination in the skin at the vicinity of the notch tip; this is ultimately followed by splitting at the adhesive layer between the skin and the core. In such cases, it is possible to calculate the fracture stress of the sandwich structure from the fracture toughness of the skin. The relevant Y value is the one obtained from the new Y polynomials derived for the skin and from the corresponding ratio of notch depth to skin thickness. C.R.

A82-17538 **Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems.** R. J. Moulton (Hexcel Corp., Dublin, CA) and R. Y. Ting (U.S. Navy, Naval Research Laboratory, Orlando, FL). In: Composite structures; Proceedings of the First International Conference, Paisley, Scotland, September 16-18, 1981. London, Applied Science Publishers, 1981, p. 674-689. 16 refs.

Both the fracture behavior and the mechanical properties balance of fiber-reinforced composites containing a modified resin system are discussed on the basis of the results of an extensive experimental study. A series of acrylonitrile-butadiene modified epoxy polymers is used. Resin fracture energies are determined by using standard compact tension specimens and the Izod impact specimens. The elastomeric modifiers greatly increase the fracture energy of the base epoxy, and the extent of this increase is found to depend on the weight percentage and the molecular weight of the CTBN additives. In addition, post-failure fractography is also carried out to examine the system morphology for the identification of the basic mechanism of toughening. Enhanced toughness is always found to couple with trade-offs in strength and modulus. The results also show that the short beam shear test gives the interlaminar shear strength of the composite sample but not the interlaminar fracture energy. C.R.

A82-17594 * # **Multilevel optimum design of structures with fiber-composite stiffened-panel components.** L. A. Schmit and M. Mehrinfar (California, University, Los Angeles, CA). *(AIAA, ASME, ASCE, and AHS, Structures, Structural Dynamics and Materials Conference, 21st, Seattle, WA, May 12-14, 1980, AIAA Paper 80-0723.) AIAA Journal,* vol. 20, Jan. 1982, p. 138-147. 14 refs. Grant No. NsG-1490.

The multilevel approach to minimum weight structural design is extended to wing box structures with fiber-composite stiffened-panel components. Strength, deflection, and panel buckling constraints are treated at the system level with equivalent-thickness-type design variables. Local buckling and panel buckling constraints are guarded against at the component level, employing detailed component dimensions as design variables. A key feature of the method is selection of change in stiffness as the component level objective function to be minimized. Numerical results are given for wing box structures with sandwich and hat-stiffened fiber-composite panels. (Author)

A82-17602 # **Effect on surface pressures of trapezoidal holes in a T-38 stabilator.** J. C. Westkaemper and R. M. Chandrasekharan (Texas, University, Austin, TX). *Journal of Aircraft,* vol. 19, Jan. 1982, p. 81, 82. USAF-sponsored research.

Subsonic wind tunnel measurements were made of the surface-pressure distributions on a T-38 stabilator with four configurations of trapezoidal holes, in a study of the effects of damage on wing and tail aeroelastic characteristics. The effects of the holes on surface pressures were found to follow two patterns, one for attached flow and another for separated flow, depending on the extent of leading-edge separation on the stabilator. At angles of attack of more than 6 deg, with separation, all upper surface pressures were perturbed. O.C.

A82-17603 * # **Propeller tip vortex - A possible contributor to aircraft cabin noise.** B. A. Miller, J. H. Dittmar, and R. J. Jeracki (NASA, Lewis Research Center, Cleveland, OH). *Journal of Aircraft,* vol. 19, Jan. 1982, p. 84-86. 8 refs.

Wind tunnel model tests support the hypothesis that a propeller tip vortex may subject a downstream wing surface to greater excitation than would be experienced by the aircraft fuselage side wall exposed to propeller-generated noise, ultimately transmitting this structural response to incident dynamic pressure to the cabin interior. Even if structure-borne excitations are less efficient than airborne excitations in the creation of cabin noise, the higher level of the former could still govern cabin noise levels. O.C.

A82-17604 # **Estimate of human control over mid-air collisions.** J. N. Anno (Research Dynamics, Inc., Cincinnati, OH). *Journal of Aircraft*, vol. 19, Jan. 1982, p. 86-88. 5 refs.

A comparison between random collision theoretical predictions and actual cases shows that while human control is very effective in air-carrier mid-air collision accidents, it is relatively ineffective in general aviation. This discrepancy may be due to traffic control, pilot training, or instrumentation. The greatest weakness of the analysis presented is the arbitrary choice of representative aircraft for the two groups considered. A more detailed analysis for general aviation aircraft is called for. O.C.

A82-17605 # **Subsonic flow over airborne optical turrets.** A. J. Laderman (Ford Aerospace and Communications Corp., Newport Beach, CA) and R. de Jonckheere (USAF, Weapons Laboratory, Kirtland AFB, NM). *Journal of Aircraft*, vol. 19, Jan. 1982, p. 88-90. 6 refs. Contract No. F2960-79-C-0010.

It is shown that a good estimate of the pressure coefficient distribution of an airborne optical turret can be provided by means of an incompressible, inviscid code, which succeeds in (1) rationalizing the results of wind tunnel test measurements and (2) accounts for the effects of turret configuration. Compressibility effects are found to be small for the freestream Mach number range considered, but an improved agreement between data and analysis is obtained by using the code in conjunction with the compressibility correction proposed. O.C.

A82-17606 # **ADEN plume flow properties for infrared analysis.** C.-W. Chu and J. Der, Jr. (Northrop Corp., Aircraft Div., Hawthorne, CA). *Journal of Aircraft*, vol. 19, Jan. 1982, p. 90-92. 5 refs.

A simple modeling technique is described for the prediction of two-dimensional nozzle plume properties in IR signature analyses. Attention is given models for converging-diverging nozzles, augmented deflecting exhaust nozzles, and two-dimensional plug nozzles with and without bypass flow and/or engine swirl. A 10-deg engine swirl was found to reduce predicted plume temperature to the extent that, although swirl is undesirable from the point of view of performance, it must be recommended for two-dimensional nozzle plume IR signature reduction. O.C.

A82-17607 # **Take-off ground roll of propeller driven aircraft.** R. J. Hawks (Tri-State University, Angola, IN). *Journal of Aircraft*, vol. 19, Jan. 1982, p. 92, 93. 5 refs.

The solution to the acceleration problem for constant power with aerodynamic drag, including lift, developed by Hawks and Sayre (1973) is applied to the take-off ground roll problem in propeller driven aircraft. The major difficulty with the constant power calculation is that the static thrust has to be infinite in order for true constant power to be maintained. The problem is avoided by treating thrust as constant at the static thrust value up to the speed where the static thrust would produce the rated thrust-power, and then treating the power as constant above that speed. O.C.

A82-17608 # **Kelvin-Helmholtz stability analysis of air cushion landing gear trunk flutter.** M. Hinchey and P. Sullivan (Toronto, University, Toronto, Ontario, Canada). *Journal of Aircraft*, vol. 19, Jan. 1982, p. 94-96. Research supported by the Natural Sciences and Engineering Research Council of Canada.

It is shown that a Kelvin-Helmholtz linear stability analysis, similar to those used for aeroelastic problems such as panel flutter, predicts a divergent oscillation at the conditions for which flutter was observed during the development of bag or trunk-type air cushion landing gear. The flutter is therefore not neccessarily the result of a static instability, as suggested by Boghani and Fish (1979). The trunk is modeled locally as a membrane of infinite extent, set parallel to the ground plane. O.C.

A82-17714 * **Calculations of lightning return stroke electric and magnetic fields above ground.** M. J. Master, M. A. Uman, Y. T. Ling, and R. B. Standler (Florida, University, Gainesville, FL). *Journal of Geophysical Research*, vol. 86, Dec. 20, 1981, p. 12127-12132. 16 refs. NSF Grant No. ATM-79-02627; Grant No. NGR-10-005-169; Contracts No. N00014-81-K-0177; No. F33615-79-C-3412.

Lin et al., (1980) presented a lightning return stroke model with which return stroke electric and magnetic fields measured at ground level could be reproduced. This model and a modified version of it, in which the initial current peak decays with height above ground, are used to compute waveforms for altitudes from 0-10 km and at ranges of 20 m to 10 km. Both the original and modified models gave accurate predictions of measured ground-based fields. The use of the calculated fields in calibrating airborne field measurements from simultaneous ground and airborne data is discussed. J.F.

A82-17733 # **Mesoscale convective weather systems and aviation operations.** R. A. Maddox and J. M. Fritsch (NOAA, Office of Weather Research and Modification, Boulder, CO). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0015.* 9 p. 10 refs.

Enhanced, infrared satellite imagery is used to reveal that meso-alpha scale convective weather systems often develop and move across the central and eastern United States. The convectively driven weather systems are called mesoscale convective complexes (MCC), and are accompanied by a variety of weather phenomena. A comparison is made of 200 mb winds with numerical forecasts, which indicates that MCCs produce large changes in the airflow within atmospheric layers heavily traversed by commercial aircraft. Examples of MCCs and their impact on aircraft operations and actual flights are also discussed. D.L.G.

A82-17734 # **The Joint Airport Weather Studies project.** J. McCarthy, J. W. Wilson (National Center for Atmospheric Research, Boulder, CO), and T. T. Fujita (Chicago, University, Chicago, IL). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0017.* 9 p. 19 refs.

Convective microburst events are analyzed and objectives of the summer, 1982 Joint Airport Weather Studies (JAWS) project are outlined. Microbursts occur on a horizontal scale of 1-4 km (misoscale), and comprise small, strong downdrafts, which cause outflows at ground level resulting in winds exceeding 40 mph. A continued outflow may lead to a gust front, a feature present in squall lines. JAWS facilities include three Doppler radars, two research aircraft, three rawinsonde units, a lightning detection system, and the Portable Automated Mesonet. High resolution data on downdrafts will provide four-dimensional details of dynamic forcing mechanisms of microbursts for modelling such events in computer simulations. The modelling will further serve for understanding the behavior of aircraft in a wind shear environment and determining the causes of microburst events. M.S.K.

A82-17735 * # **Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil.** T. A. Lasinski, A. E. Andrews, R. L. Sorenson, D. S. Chaussee, T. H. Pulliam, and P. Kutler (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0021.* 16 p. 14 refs.

The augmentor wing consists of a main airfoil with a slotted trailing edge for blowing, and two smaller aft airfoils which shroud the jet. This configuration has been modeled for numerical simulation by a novel discretization procedure which generates four separate grids: three surface-oriented airfoil grids and one outer free-stream grid. Grid lines and slopes are continuous across boundaries, so grid overlap at common boundaries provides boundary information without interpolation. A two-dimensional unsteady thin-layer Navier-Stokes code is used to calculate the flow for the no-blowing case at freestream Mach number = 0.7, Re = 12,600,000, and angles-of-incidence = 1.05 deg. Qualitative agreement with experimental data indicates the utility of this procedure in the analysis of multi-element configurations. (Author)

A82-17753 * # **Screech suppression in supersonic jets.** T. D. Norum (NASA, Langley Research Center, Hampton, VA). *American*

Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0050. 9 p. 12 refs.

Jet screech from underexpanded sonic nozzles has been investigated experimentally. Multiple screech modes, or stages, are found to be present at some jet operating conditions. The fundamental screech tone of each mode attains a maximum amplitude at about 20 deg from the inlet axis, with higher harmonics exhibiting multiple lobes. The directivity of each harmonic is predicted quite well from a stationary array of acoustic monopoles, with phasing between consecutive monopoles determined by the shock cell spacing and eddy convection velocity. Large reduction of screech amplitude can be obtained from modifications to the nozzle exit, although the extent of this suppression is mode dependent. (Author)

A82-17755 # **Wind tunnel investigations for the flat spin of slender bodies at high angles of attack.** H. Kubota, I. Arai, and M. Matsuzaka (Tokyo, University, Tokyo, Japan). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0054*. 12 p. 16 refs. Research supported by the Ministry of Education of Japan.

Low speed wind tunnel investigations for the flat spin of slender bodies at high angles of attack at Reynolds number of 120,000-440,000 are conducted. Effects of geometrical configuration of model, free stream Reynolds number and angle of attack on the flat spin motion are studied with spin rate measurement, associated in situ surface pressure distribution and static side force measurements. It is verified that the occurrence of the flat spin is caused by the difference of flow separation patterns near the critical Reynolds number region. The flat spin motion can be alleviated by making turbulent separation with the use of surface roughness. (Author)

A82-17788 * # **A simple finite difference procedure for the vortex controlled diffuser.** A. A. Busnaina and D. G. Lilley (Oklahoma State University, Stillwater, OK). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0109*. 9 p. 21 refs. USAF-supported research; Grant No. NAG3-74.

A simple prediction procedure for sudden expansion incompressible flows is developed and applied to the vortex controlled diffuser. Transient Navier-Stokes equations of an incompressible fluid are solved by means of their associated finite difference equations in terms of the primitive pressure velocity variables. A computer code is developed using a laminar flow simulation with free slip or no slip wall boundary conditions. In addition, predicted results confirm that effectiveness increases with increases in duct length and bleed flow rate. D.L.G.

A82-17791 # **Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model.** G. J. Sturgess and S. A. Syed (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0113*. 13 p. 20 refs.

A numerical simulation of the isothermal flow in the Wright Aeronautical Propulsion Laboratory diffusion-flame research combustor is carried out. An axisymmetric finite difference solution of the time-averaged, steady-state, elliptic form of the Reynolds equations is used with closure provided by a two-equation turbulence model. Although the simulation gives acceptable agreement with experimental data in many respects, it is deficient in predicting the recovery rate of a central near-wake region. Several possible explanations for this failure are explored and it is hypothesized that the most probable cause is an inability in the turbulence model to account for the effects on Reynolds stresses of streamwise curvature of the streamlines. (Author)

A82-17796 * # **An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight.** S. J. Horowitz, R. K. Sigman, and B. T. Zinn (Georgia Institute of Technology, Atlanta, GA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-012*[illegible]. 9 p. 23 refs. Grant No. NsG-3036.

A new iterative solution technique for predicting the sound field radiated from a turbofan inlet in steady flight is presented. The sound field is divided into two regions: the sound field within and near the inlet which is computed using the finite element method and the radiation field beyond the inlet which is calculated using an integral solution technique. A continuous solution is obtained by matching the finite element and integral solutions at the interface between the two regions. The applicability of the iterative technique is demonstrated by comparison of experimental results with the theoretical results for several different inlet configurations with and without flow. These examples show that good agreement between experiment and theory is obtained within five iterations. (Author)

A82-17798 # **Unsteady flow patterns associated with spoiler control devices.** A. Ayoub, B. Satynarayana, K. Karamcheti (Stanford University, Stanford, CA), and H. C. Seetharam (Boeing Commercial Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 32-0127*. 9 p.

The unsteady flow field past a Boeing research airfoil fitted with a spoiler has been examined using surface pressure measurements as well as a limited number of velocity measurements in and outside the boundary layer. Definite flow patterns associated with the process of vortex shedding were sought in an effort to establish some correlation with the performance of the spoiler as a lift control device. The flow patterns were found to be complex and not easily reconcilable with known notions about the flow in general. The flow details at two different Reynolds numbers (based on the chord), 2.82 x 10 to the 5th and 5.18 x 10 to the 5th, and three spoiler deflection angles are presented and discussed. (Author)

A82-17799 # **Trailing edge flap influence on leading edge vortex flap aerodynamics.** J. F. Marchman, III and A. C. Grantz (Virginia Polytechnic Institute and State University, Blacksburg, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0128*. 7 p. 6 refs.

A study was conducted to explore the effects of trailing edge flaps (TEF) on leading edge vortex flap (LEVF) aerodynamics. A variety of LEVF and TEF configurations were tested on flat plate delta wings with leading edge sweep angles of 60 and 75 degrees. Results indicated that the well established vortex flowfield of the 75 degree wing was not substantially improved due to the deflection of trailing edge flaps. Significant changes were seen to occur to the marginal vortices of the 60 degree wing. For the 60 degree wing with inverted constant chord LEVFs the deflection of TEFs resulted in substantial increases in life coefficient at low angles of attack without sacrificing other performance parameters. Also shown was the capability for eliminating the adverse longitudinal characteristics of constant chord LEVFs. (Author)

A82-17800 # **Optimal subsonic diffuser wall design for arbitrary entry conditions.** J. L. Livesey and M. Heravi (Salford, University, Salford, Lancs., England). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0132*. 6 p.

Pressure gain in diffusers is basically limited by the flow separation. It is possible theoretically to determine the design of a diffuser with the limiting condition of flow separation occurring throughout. The cross-sectional variation as a function of location in the diffuser, in order to achieve optimal pressure gain, is thus determinable. An attempt has been made to predict, through an integral boundary layer method, the shape of a diffuser with optimal pressure gain. The entry condition is quite general (Reynolds number, Mach number, profile shape, momentum thickness and turbulence). The optimization in the present model is based on the assumption of constant profile shape (Hsep) and zero skin friction. The general effects of each individual entry parameters on the final design shape are discussed, and the general indications are that the pressure recovery of the present optimal diffusers are higher than those of conical diffusers of the same area ratios and that conical diffusers are comperable to the optimal shapes for high inlet Mach numbers. (Author)

A82-17814 # **Computational treatment of transonic canard-wing interactions.** V. Shankar and N. Malmuth (Rockwell International Science Center, Thousand Oaks, CA). *American Institute of*

Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982. Paper 82-0161. 9 p. 9 refs. Contract No. F44620-81-C-0044.

The transonic canard-wing interaction problem is simulated using modified small disturbance (MSD) transonic theory. The wing and the canard are treated in a sheared fine grid system that is embedded in a global Cartesian crude grid. An appropriate far field and asymptotic expression for the velocity potential derived using Green's theorem is implemented. Results are presented for a few canard-wing configurations and compared with available experimental data. The weakening of the wing shock due to the presence of the canard downwash is illustrated in terms of contour plots. An empirical incidence correction for the wing leading edge vortex gives good agreement with experiment at low incidences. For higher angles of attack, the results indicate that a more sophisticated vortex roll-up and induction model is required. (Author)

A82-17815 # **A more-accurate transonic computational method for wing-body configurations.** L. T. Chen (McDonnell Douglas Research Laboratories, St. Louis, MO). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0162.* 10 p. 16 refs. Contract No. N000167-81-C-0057.

Second- and third-order, quasi-conservative and fully conservative schemes have been developed for computing inviscid flowfields about transonic wings. The fully conservative schemes are developed by modifying an existing finite-volume algorithm, while the quasi-conservative schemes are developed by solving a transformed full-potential equation with the addition of new second- or third-order artificial viscosities at supersonic points. A new shock-point operator is introduced, which adjusts the amount of nonconservative differencing at shock points and thus modifies the location and strength of captured shocks. Numerical results obtained using the second- and third-order schemes will be discussed and compared with experimental data. (Author)

A82-17816 * # **Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis.** E. G. Waggoner (Vought Corp., Dallas, TX). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0163.* 12 p. 16 refs. Contract No. NAS1-16055.

A three-dimensional small disturbance transonic analysis code has been coupled with a three-dimensional integral boundary layer code. A scheme was developed to interact the two codes through the use of a controlling module. The resulting hybrid code does not increase the costs or computer core requirements over that of the previous capabilities of the analysis code, which used a two-dimensional boundary layer analysis to model viscous effects. Several configurations have been analyzed and results compared against both experimental data and computational results using the two-dimensional viscous model. Results indicate good agreement with experimental data when using the three-dimensional interaction scheme, with the most marked improvement in the correlations observed for wing pressure coefficient predictions in the lower surface cusp region for supercritical wings. (Author)

A82-17820 # **Recent improvements in prediction techniques for supersonic weapon separation.** A. Cenko (Grumman Aerospace Corp., Bethpage, NY) and J. Waskiewicz (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0170.* 9 p. 7 refs. Contract No. F33615-81-3011.

The Influence Function Method (IFM) considered in the investigation has been reported by Meyer et al. (1981). The principal assumption is that a store's normal force and moment in a nonuniform flow can be correlated with the angle-of-attack distribution along the store length. At supersonic speeds, the influence coefficients A and B can be determined by traversing a store through an oblique shock generated by a wedge and measuring the normal force and moment along the traverse. Theoretically determined weapon/store influence coefficients for four stores are shown to yield accurate IFM store force and moment predictions. Considering the geometric dissimilarity of the stores examined in the study, it would appear that the use of theoretically determined influence coefficients is a practical and cost-effective alternative to the use of experimental weapon calibrations for IFM applications at supersonic speeds. G.R.

A82-17827 # **Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data.** G. D. Park and M. H. Abla (Gates Learjet Corp., Wichita, KS). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0183.* 8 p. 21 refs.

Gates Learjet Corporation recently received the type certificate for the Model 55 Longhorn, its newest and largest business jet aircraft. During the certification effort, the aircraft flight characteristics, as well as the horizontal tail airloads and elevator hinge moments, were evaluated from inflight response data. The purpose of these analyses were to verify the design airloads used in the documentation required for FAA certification. Two parameter identification computer programs developed by NASA were used. One was developed by Taylor and Iliff in 1972. The other was developed by Maine and Iliff in 1980. (Author)

A82-17828 # **A binary matrix technique for aircraft collision threat recognition and avoidance.** M. N. Wagdi (Riyadh, University, Riyadh, Saudi Arabia). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0184.* 9 p.

A new technique is presented for aircraft collision threat recognition and avoidance. The lateral plane of the airspace in front of own aircraft is represented by a square binary matrix, whose central element coincides with the own aircraft body axes system. Each element of the binary matrix defines an airspace cell with known area. The elements representing the flight domains of own and threat aircraft have digits 1 while all other elements are zeros. The binary matrix approach enables one to project the three dimensional threat information onto a two dimensional indicator. This is done through the introduction of the threat signal intensity concept. A possible collision threat is recognized when the digit in one of the cells bounding the own aircraft domain changes from 0 to 1. The location of such cell in the binary matrix indicates the threat bearing angles. An evasive maneuver based on such information is thus initiated. (Author)

A82-17831 # **3 DOF gyro analysis from measured and derived rates.** G. T. Chrusciel and N. J. French (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0189.* 13 p. 5 refs.

Hypersonic three degree-of-freedom (3DOF) angular motion reentry simulation tests were performed using telemetry of onboard rate gyro signals for direct extraction of the aerodynamic moments. Conditions are described which produced high quality signals during one test entry and intermittant loss of signal for a subsequent test. Body fixed angular rate data were reconstructed from the 3DOF balance angular position results; these compared well with the gyro data. Feasibility of using the AEDC 3DOF gas bearing angular data for extraction of moments is demonstrated by good agreement of aerodynamic moments extracted using the derived rates and gyro rates. (Author)

A82-17833 * # **Development and operating characteristics of an advanced two-stage combustor.** W. Greene, S. Tanrikut (United Technologies Corp., Commercial Products Div., East Hartford, CT), and D. E. Sokolowski (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0191.* 14 p. 10 refs.

Results are presented from an experimental program aimed at optimizing the features of an advanced two-stage combustor that currently is being developed as part of the National Aeronautics and Space Administration/Pratt & Whitney Aircraft Energy Efficient Engine program. The combustor is designed to meet stringent goals for performance, emissions, durability and operational characteristics. An overview of the design selection process in light of these goals is discussed. Combustor rig test results, which highlight the techniques used to reduce emissions, development of the pilot and main power zone fuel injection systems, and methods of achieving efficient fuel staging, are presented. (Author)

A82-17836 * # Water ingestion into jet engine axial compressors. T. Tsuchiya and S. N. B. Murthy (Purdue University, West Lafayette, IN). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0196.* 11 p. 14 refs. Contract No. F33615-78-C-2401; Grant No. NAG3-62.

An axial flow compressor has been tested with water droplet ingestion under a variety of conditions. The results illustrate the manner in which the compressor pressure ratio, efficiency and surging characteristics are affected. A model for estimating the performance of a compressor during water ingestion has been developed and the predictions obtained compare favorably with the test results. It is then shown that with respect to five droplet-associated nonlinearly-interacting processes (namely, droplet-blade interactions, blade performance changes, centrifugal action, heat and mass transfer processes and droplet break-up), the initial water content and centrifugal action play the most dominant roles. (Author)

A82-17843 # An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil. F. M. Payne (Boeing Commercial Aircraft Co., Seattle, WA) and R. C. Nelson (Notre Dame, University, Notre Dame, IN). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0214.* 10 p. 17 refs. Research supported by the University of Notre Dame; U.S. Department of Transportation Contract No. RC-82010.

An experimental wind tunnel investigation was carried out to determine the influence of a vertical wind shear on the static longitudinal aerodynamic coefficients (i.e., the sectional drag, lift, and moment coefficients) of an airfoil. Force balance and surface pressure measurements were obtained from a NACA 0018 airfoil in a linear velocity gradient. The airfoil was tested in a Reynolds number range from 75,000 to 200,000, with endplates to simulate an infinite wing, and with the outboard endplate removed to simulate a finite wing. The effect of grit on the surface of the airfoil was also investigated. The influence of the velocity gradient on the aerodynamic characteristics of the airfoil was found to be small, especially in comparison to the effects of the grit. (Author)

A82-17844 * # Simulation of phugoid excitation due to hazardous wind shear. W. Frost (FWG Associates, Inc.; Tennessee, University, Space Institute, Tullahoma, TN), B. S. Turkel (Peachtree Dekalb Airport, Atlanta, GA), and J. McCarthy (National Center for Atmospheric Research, Boulder, CO). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0215.* 13 p. 11 refs. Contract No. NAS8-33458.

Computer and manned flight simulator studies of the effect of thunderstorm wind shear on the excitation of phugoid oscillations of commercial-type aircraft are reported. Previous studies have suggested that the characteristic scale of thunderstorm wind shear drives commercial-type aircraft at the critical phugoid frequency. To further investigate this phenomenon, aircraft performance in a hypothetical sinusoidal wind shear was investigated. Sinusoidal winds at the phugoid frequency and with frequencies above and below this value were studied both analytically and in manned flight simulators. Results indicate that excessive oscillations in flight path amplitude predicted by computer analyses were not fully collaborated by the manned flight simulator studies. Some resolution of this problem is given and additional research necessary to further identify the discrepencies between the flight simulator and the computer analysis is outlined. (Author)

A82-17855 * # Three-dimensional flow studies on a slotted transonic wind tunnel wall. J. M. Wu, F. G. Collins, and M. K. Bhat (Tennessee, University, Space Institute, Tullahoma, TN). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0230.* 12 p. 18 refs. Grant No. NsG-2379.

Three-dimensional flow field measurements were made near a transonic slotted wall. Field velocity vectors and static pressure distributions have been obtained. The boundary layer displacement thickness was found to vary in the transverse plane with its maximum at the slot center line but decreased with increasing suction rate through the slot. The boundary layer characteristics were sensitive to the mass transfer through the slot. The projection on the flow field velocity vectors on the transverse plane reveals a vortex-like flow formation. The center of this secondary flow was located nearly at the edge of the wall shear layer and decreased in strength with applied suction. The secondary vortex motion may be attributed to the mean flow skewing, inhomogeneous transverse plane boundary layer and the wall turbulence anisotropy. (Author)

A82-17856 * # Vortex lift augmentation by suction on a 60 deg swept Gothic wing. A. H. Taylor, L. R. Jackson, and J. K. Huffman (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0231.* 8 p. 12 refs.

An experimental investigation was conducted in the Langley high-speed 7- by 10-foot wind tunnel to determine the aerodynamic performance of suction applied near the wing tips above the trailing edge of a 60 deg swept Gothic wing. Moveable suction inlets were symmetrically mounted in the proximity of the trailing edge, and the amount of suction was varied to maximize wing lift. Tests were conducted at Mach 0.15, 0.30, and 0.45, and the angle of attack was varied from -4 to 50 deg. The suction augmentation increases the lift coefficient over the entire range of angle of attack. The lift improvement exceeds the unaugmented wing lift by over 20%. Moreover, the augmented lift exceeds the lift predicted by vortex lattice theory to 30 deg angle of attack. Suction augmentation is postulated to strengthen the vortex system by increasing its velocity and making it more concentrated. This causes the vortex breakdown to be delayed to a higher angle of attack. (Author)

A82-17858 * # Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel. A. V. Murthy, C. B. Johnson, E. J. Ray, and P. L. Lawing (NASA, Langley Research Center, Transonic Aerodynamics Div., Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0234.* 12 p. 21 refs.

An experimental and theoretical study of the Langley 0.3-m Transonic Cryogenic Tunnel (TCT) sidewall boundary-layer with and without suction, has been made. Without suction, the boundary-layer displacement thickness at a station ahead of the model varied from about 1.6 mm to 1.3 mm over a Reynolds number range of 20 million to 200 million per m at Mach numbers from 0.30 to 0.76. Measured velocity profiles were correlated using the defect law of Hama. The boundary-layer displacement thickness decreased when suction was applied; however, after suction of about 2 percent of test section mass flow, the change in the thickness was small. A comparison of the measured suction effectiveness with finite difference and integral methods of boundary-layer calculation showed that both methods predicted the right trend over the range of suction velocities (up to a suction to free-stream velocity ratio of -0.02). (Author)

A82-17861 * # Dynamic stability of a buoyant quad-rotor aircraft. B. L. Nagabhushan and N. P. Tomlinson (Goodyear Aerospace Corp., Defense Systems Div., Akron, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0242.* 10 p. 13 refs. Contract No. NAS2-10777.

Stability characteristics of a buoyant quad-rotor aircraft (BQRA) in hover and forward flight are examined by considering linear, state-variable, and nonlinear flight simulation models of such a configuration. The effects of carrying a sling load on the vehicle dynamics is predicted by considering a coupled model of the two bodies. Inherent stability characteristics of the vehicle are analyzed and compared with those of a helicopter and an airship in free flight. Typical operational conditions that could lead to vehicle instability are described in the flight envelope of interest. (Author)

A82-17862 * # Bifurcation analysis of nonlinear stability of aircraft at high angles of attack. W. H. Hui (Waterloo, University, Waterloo, Ontario, Canada) and M. Tobak (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0244.* 11 p. 13 refs. Grant No. NAGW-130.

The problem of stability of steady flight of an aircraft flying at high angles of attack subject to finite-amplitude disturbances in pitch is studied using bifurcation theory, taking account of the interactions between the pitching motion and the unsteady flow. The aerodynamic responses to large-amplitude slow oscillations of the aircraft are obtained from that of infinitesimal amplitude case. Increasing the angle of attack past some critical angle for which the damping vanishes, the steady flight becomes unstable and Hopf bifurcation sets in, resulting in a periodic motion. A simple criterion in terms of the aerodynamic coefficients is given for determining the stability of the bifurcating period motion. For supersonic/hypersonic flat plate airfoils the bifurcating periodic motion is found to be unstable. This implies that when the angle of attack is increased past that of neutral damping, there will be drastic changes of the motion of the aircraft from its steady flight condition at the critical angle, including, e.g. hysteresis. (Author)

A82-17864 # **Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg.** L. Devan, L. A. Mason, and F. G. Moore (U.S. Navy, Naval Surface Weapons Center, Dahlgren, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0250.* 13 p. 14 refs. Army-sponsored research. Navy Task RF32-391-801; SEA Task SF32392-591; SEA Task SR02302.

The Naval Surface Weapons Center Aeroprediction Code has been extensively applied to the prediction of static and dynamic aerodynamics of missile configurations. Major extensions have recently been made to the code to extend its capability to freestream Mach number between 0 and 8 and angles of attack between 0 and 180 deg, and also to improve the transonic, inviscid, body-alone, static, aerodynamic predictions and the dynamic derivative predictions for all Mach numbers. The theoretical basis for the code extensions are outlined and previous methods are briefly reviewed. The code is evaluated through comparisons of computational examples with experiment for body-alone, body-tail and body-tail-canard configurations. The speed and accuracy of the code are ideal for use in preliminary design. (Author)

A82-17865 # **Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies.** R. R. Cosner (McDonnell Aircraft Co., St. Louis, MO). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0252.* 10 p. 12 refs.

The velocity-splitting method for solving the Navier-Stokes equations has been formulated into a procedure to predict external 3-D flowfields at subsonic and transonic speeds. A wide range of geometry can be treated, including realistic fighter-type forebody and afterbody configurations. Accurate results for pressure and drag have been obtained for several configurations at transonic speeds, including cases in which the pressure field is modified substantially by boundary layer separation. The procedure has demonstrated the needed accuracy, versatility, reliability, and economy to be a practical engineering tool. (Author)

A82-17866 # **Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator.** C. D. Wagenknecht, G. E. Hoff (General Electric Co., Cincinnati, OH), and T. J. Norbut (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0254.* 12 p. 9 refs.

Experimental performance data were obtained for a Compact Multimission Aircraft Propulsion Simulator configured with dry and reheat exhaust nozzles simulating a broad range of advanced multimission aircraft propulsion system cycles. Exhaust nozzles, pancake mixers, and circular arc venturi flow meters were calibrated over the expected range of operation prior to simulator testing. Agreement of the C-MAPS performance results with the calibration data are presented in order to assess methods for determining installed simulator inlet airflow. Installed operability considerations with regard to cycle simulation, model scaling, and aircraft integration are discussed. The C-MAPS test program demonstrated a 20 percent improvement in engine pressure ratio simulation capability relative to a prototype design. This was accomplished for the 1.65 lb/sec. C-MAPS in a compact size equivalent to a 36 percent overall length reduction and a 21 percent maximum diameter reduction. (Author)

A82-17867 # **Digital test pilot concept.** W. J. Bezdek (McDonnell Aircraft Co., St. Louis, MO) and R. T. Galloway (U.S. Navy, Naval Training Equipment Center, Orlando, FL). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0259.* 12 p. 9 refs.

A series of automated digital tests have been developed to verify the fidelity of aircraft systems, performance, and flying qualities for aircraft models developed for man-in-the-loop simulation. The aircraft digital tests include time to accelerate/decelerate, level turning performance, time to climb/descend, steady state trim, dynamic longitudinal stability, static and dynamic lateral-directional stability, lateral control effectiveness, and engine operation. The implementation of the test driver equations, verification of the test methods and comparisons with other validation methods are described. Examples using F-4J/S flight test data are used to demonstrate the concept. (Author)

A82-17868 * # **Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI.** L. Tobias, H. Q. Lee, L. L. Peach (NASA, Ames Research Center, Moffett Field, CA), F. M. Willett, Jr., and P. J. O'Brien (FAA, Technical Center, Atlantic City, NJ). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0260.* 13 p. 11 refs.

Helicopter IFR routes at hub airports have been investigated in an air-traffic-control system simulation involving a piloted helicopter simulator, computer-generated air traffic, and air traffic controllers. Problems studied included: (1) pilot acceptance of the approach procedure and tracking accuracy; (2) ATC procedures for handling a mix of helicopter and fixed-wing traffic; and (3) utility of the Cockpit Display of Traffic Information (CDTI) for the helicopter. Results indicate that the helicopter routes were pilot acceptable and were noninterfering with fixed-wing traffic. Merging and spacing maneuvers using CDTI were successfully carried out by the pilots, but controllers had some reservations concerning CDTI. (Author)

A82-17874 # **Icing analysis of an unprotected aircraft radome.** J. Stone and R. Ross (Ross Aviation Associates, Sedgwick, KS). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0281.* 6 p.

Artificial icing tests were conducted to determine the rate of ice accretion on an unprotected aircraft radome. These data are correlated with accepted means of calculating water catch rate. The theoretical method of calculating water catch rate is subsequently modified to produce a more accurate prediction technique. A method is also developed to predict the thickness distribution of the accumulated ice on the radome. Since fully descriptive icing tunnel data does not exist for radome shapes, assumptions are made concerning the shape of the forward fuselage in the determination of the average collection efficiency. Other assumptions, such as ice density and the amount of water catch that freezes, are made to give the highest ice accumulation. (Author)

A82-17875 # **A Microwave Ice Accretion Measurement Instrument - MIAMI.** B. Magenheim and J. K. Rocks (Ideal Research, Inc., Rockville, MD). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0285.* 9 p.

A Microwave Ice Accretion Measurement instrument (MIAMI), controlled by a microprocessor, has been developed that can: (1) detect the presence of ice and sound an alarm; (2) measure and digitally display the ice thickness and ice accretion rate; (3) plot the ice thickness and accretion rate on a pen recorder; (4) log and printout a permanent record of the ice thickness and ice accretion rate versus time; and (5) store data for delayed time statistical analysis and printout. The MIAMI was tested in the NASA Lewis Research Center's Icing Research Tunnel, demonstrating its ability to measure ice growth on a two-dimensional air foil. The MIAMI transducer is constructed from solid-state components, all of which have a low mass and are ruggedly built. The device may be mounted nonintrusively on any part of the aircraft skin, including the rotor blades and engine inlets. J.F.

A82-17894 * # **The NASA MERIT program - Developing new concepts for accurate flight planning.** R. Steinberg (NASA, Lewis

Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0340*. 6 p.

It is noted that the rising cost of aviation fuel has necessitated the development of a new approach to upper air forecasting for flight planning. It is shown that the spatial resolution of the present weather forecast models used in fully automated computer flight planning is an important accuracy-limiting factor, and it is proposed that man be put back into the system, although not in the way he has been used in the past. A new approach is proposed which uses the application of man-computer interactive display techniques to upper air forecasting to retain the fine scale features of the atmosphere inherent in the present data base in order to provide a more accurate and cost effective flight plan. It is pointed out that, as a result of NASA research, the hardware required for this approach already exists. C.R.

A82-17895 # **Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component.** C. L. Chandler and C. J. Emmons (Delta Air Lines, Inc., Atlanta, GA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0341*. 4 p.

Attention is called to the fact that many airlines overlook the effect of winds when setting the cruise speeds that will produce the most economical speed schedule for a flight. It is shown through calculations that as a headwind gets stronger the Mach number should be increased or at least maintained. Conversely, as the tailwinds increase in strength, the Mach number should be reduced. Another advantage of the method proposed is the improvement that would be seen in on-time performance by compensating for the winds with the wider use of Mach numbers. C.R.

A82-17896 * # **The influence of turbulence models on computer-simulated aircraft landing.** W. Frost (Tennessee, University, Tullahoma, TN), S.-T. Wang (FWG Associates, Inc., Tullahoma, TN), and D. W. Camp (NASA, Marshall Space Flight Center, Huntsville, AL). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0342*. 4 p. 9 refs. Contract No. NAS8-32692.

Three models of simulated atmospheric turbulence were used to determine their respective influence on a computer-simulated, DC-8 type, aircraft landing. Statistical results based on a sample of 20 simulated landings illustrate the influence of turbulence simulated by the different models. For the same spectrum function, a non-Gaussian turbulence model produces the higher degree of touchdown variability. When different spectrum functions are used the von Karman model induces a smaller standard deviation in position error than the Dryden model. The turbulence energy contained by the higher frequency fluctuation has little effect on the landing position. (Author)

A82-17900 * # **Computations of transonic flow over an oscillating airfoil with shock-induced separation.** W. J. Chyu and K. Kuwahara (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0350*. 11 p. 22 refs.

A numerical study is presented on unsteady transonic flow over an airfoil in pitching oscillation at a moderately high incidence. The study was focused on the effects of unsteady shock-wave/boundary-layer interactions and subsequent flow separations. An implicit finite-difference scheme was used to solve the full time-dependent compressible Navier-Stokes equations in conservation-law form. The algorithm adopted for this study is the Beam-Warming spatially factored scheme. It is, however, constructed in a body-fitted curvilinear coordinate system for efficient unsteady flow computations. The computational results are compared with experimental data measured in the Ames 11- by 11-Foot Transonic Wind Tunnel. (Author)

A82-17901 # **Instantaneous turbulence profiles in the wake of an oscillating airfoil.** J. De Ruyck and C. Hirsch (Brussel, Vrije Universiteit, Brussels, Belgium). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0353*. 13 p. 18 refs. Research supported by the Fonds National de la Recherche Scientifique; Grant No. DAJA37-80-C-0367.

Instantaneous velocity and turbulence profiles are measured in the wake of a NACA 0012 oscillating airfoil. All non-zero Reynolds stresses are determined using a single slanted rotating hot wire measurement technique. Data acquisition is performed through an on-line sampling, digitizing and recording facility. Measurements are made at 0.7, 2, 5, 10 and 20% chord downstream of the trailing edge. The frequency coefficient ranges from 0 to 1.23. Four mean incidences are considered corresponding to no stall, stall onset and light dynamic stall. Results are discussed and compared with steady state results. (Author)

A82-17902 # **Numerical computation of optimal atmospheric trajectories involving staged vehicles.** C. R. Hargraves (Boeing Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0360*. 6 p. 5 refs.

A trajectory optimization procedure is described which can solve practical problems involving staged vehicles or discontinuous equations of motion. It is an extension of a computer code called CTOP (Chebychev Trajectory Optimization Program) which was described by Hargraves et al. (1981). With CTOP, the state and control variables are described as functions of time by patched polynomials. A subset of the patch points (including initial and final time) may be designated as free parameters called events. It is pointed out that discontinuities may occur at events and that the payoff may depend on them. The values of the events are adjusted in order to achieve the desired optimum. Numerical examples are presented. C.R.

A82-17904 # **Constant L/D glide trajectories.** J. L. Raymond (Hughes Aircraft Co., Missile Systems Group, Canoga Park, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0362*. 7 p.

The present paper reviews the phenomenon of constant L/D glide trajectories with the result that new, simple and accurate closed-form expressions are derived. They include relations between glide path angle, altitude, time, velocity, density, and dynamic pressure. Results obtained compare well with those obtained by a digital computer using step-by-step integration of the equations of motion for a point mass. The relations may be used for rapid preliminary design estimates of constant L/D trajectories. (Author)

A82-17905 # **Optimum configuration for a 10 passenger business turbofan jet airplane.** M. Aronson. *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0365*. 11 p. 7 refs.

The optimum external configuration for an airplane which will meet specific design and performance requirements is determined by use of an analytical method which considers systematic variations of wing sweep, thickness ratio, fuselage fineness ratio, cruising speed and design weight. Relationships between the various structural, weight and aerodynamic parameters used in the method are derived. Evaluation of the parameters is then based on limits imposed by current experience and assumptions. The specific design objective in this study was to minimize take-off weight and maximize the cruising speed for a specific range with a designated power plant. The optimum configuration resulting from this study has 38 deg wing sweep and 14.6% wing section thickness, a ramp weight of 21,575 pounds and a range of 2500 n. miles with 10 passengers. Besides providing an optimum design and an analytical method for its determination, the method and a number of the curves can be used to determine configurations which will meet other specific performance requirements. (Author)

A82-17906 # **Optimal trajectories in supersonic flight.** D.-F. Lin (Applied Dynamics International, Ann Arbor, MI). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0366*. 10 p. 6 refs.

A discussion emphasizing the analytic aspect of the theory of the optimal trajectories is presented, beginning with an overview of optimal trajectories in two dimensions. Solving the general problem of optimal trajectories in three dimensions is discussed in detail. Included here are the general properties of optimal trajectories consisting of the integrals of motion and the characteristic features in engine and aerodynamic controls. In addition, the optimality of singular thrust control and the optimal junction of different subarcs are analyzed. It is noted that with the normalizing of the control variables, that is, the thrust-to-weight ratio, the bank angle, and the load factor, the results can be applied to any supersonic aircraft. C.R.

A82-17907 # **An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays.** A. S. C. Sinha (Purdue University, Indianapolis, IN). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0367.* 7 p. 13 refs. Contract No. F49620-79-C-0038.

A method is presented for analyzing pilot-induced oscillations (PIO) for the NT-33 closed-loop pilot model when retardations and coefficients are not constant. The variation of retardations and coefficients results from the effect of wind shear and the neuromuscular dynamics of the pilot reported in available data. Nonlinearities in the model are also considered. The method is based on the use of a new description of such systems in terms of convolution equations. Spectral factorization is applied to the entire functions of exponential order. The result is a criterion for the PIO-system with variable coefficients and variable delays. The criterion assumes continuity and boundedness of the coefficients and delays. A Lyapunov functional is constructed which gives a criterion on the roots of a certain 'quasi-polynomial,' i.e., a polynomial in a variable and the exponential of that variable. The largest domain of attraction is obtained from the Invariance Principle. (Author)

A82-17908 # **Flutter mode suppression using hyperstable feedback.** G. L. Slater (Cincinnati, University, Cincinnati, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0368.* 11 p. 9 refs.

The stability properties of hyperstable systems are explained and a synthesis procedure for multivariable feedback control laws is formulated and applied to the flutter control problem. The feedback controller is determined by: (a) constructing a state variable feedback law using a simplified model of the actual system dynamics, and (b) constructing a Luenberger observer for this system where the observer gain matrix is determined based on the hyperstable criterion. The procedure is applied to two design cases, one which is open-loop stable and the second which is open loop unstable. Results indicate that the hyperstability conditions can be utilized conveniently to develop a stable, robust elastic mode suppression system. (Author)

A82-17909 * # **The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system.** D. P. Gluch (Honeywell, Inc., Clearwater, FL). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0369.* 9 p. 8 refs. Research supported by the Honeywell, Inc., Rockwell International Corp., and NASA.

A residue-measure criterion model reduction technique is applied to the vehicle dynamics model used in the design and analysis of the NASA Space Shuttle's digital flight control system. As implemented in this study the residue-measure technique involved an a priori residue calculation with control system biasing. The predictions of the reduced model are compared to vehicle level dynamic stability test data. These comparisons show an excellent correlation of the dominant spectral and response features between the model and test data. In addition, the application of the reduction technique to various Shuttle mission flight phases is demonstrated. (Author)

A82-17910 # **Target acceleration modeling for tactical missile guidance.** P. L. Vergez (USAF, Armament Laboratory, Eglin AFB, FL). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0370.* 13 p. 8 refs.

This paper addresses the critical problem of estimating the missile-to-target position, velocity, and acceleration (required by the linear optimal guidance law) when only passive (angle only) seeker information is available on-board a highly maneuverable bank-to-turn missile concept. More specifically, the problem is how to model the target acceleration to achieve improved missile performance. Four target acceleration models coupled with an extended Kalman filter are presented and evaluated on a six degree-of-freedom missile simulation to determine their estimation effectiveness and their influence on missile guidance. (Author)

A82-17911 # **Performance considerations in the design of subsonic cruise missiles.** R. L. Hanson and M. H. Kiehle (Boeing Aerospace Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0371.* 11 p.

The recent introduction of advanced radar-controlled defenses to the territory of potential enemies has altered the requirements of both strategic and tactical cruise missiles, which have previously included only low specific fuel consumption and low vehicle weight. After a historical survey of cruise missile design practices, and an assessment of the capabilities of the current Harpoon, ALCM and Tomahawk systems, consideration is given to the impact of cruise missile radar cross section (RCS) and infrared signature in the emerging enemy defenses scenario. It is shown that the avoidance of fuselage, wing and control surface configurations with sharp points and tips that increase RCS leads to deltoid and saucer-like designs whose aerodynamic characteristics are not strictly in keeping with the efficient, high-speed cruise requirement. The construction of airframes from radar-absorbing materials is recommended. O.C.

A82-17912 # **An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts.** R. J. Krieger (McDonnell Douglas Astronautics Co., St. Louis, MO). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0373.* 10 p. 13 refs.

A technique has been developed for optimizing the aerodynamic and signature characteristics of advanced, non-circular supersonic missile concepts. Sensitivity equations which guide configuration shaping are derived for the aerodynamic coefficients of axial force, normal force, pitching moment and lift-to-drag ratio; and for the signature characteristics of radar cross section and shadowing of surfaces. The implementation of the procedure in the computer aided design process is presented. Characteristics of the resulting shapes are verified by comparison with wind tunnel and high range resolution radar data. Applications are given for forebodies, boattail/base/nozzle integration and a complete configuration. (Author)

A82-17919 # **Viscous flow - Nemesis of the theoretician in pursuit of higher order accuracy.** L. E. Ericsson (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0389.* 13 p. 60 refs.

A review of viscous flow effects shows that the effects of large regions of separated flow on the vehicle dynamics cannot be mistaken for higher order inviscid flow effects because of their magnitude and nature. The effects of a thick boundary layer or of a small local separated flow region is less drastic; they may often be mistaken for a higher order inviscid flow effect. It is noted that because viscous effects are often large, even for attached hypersonic flow, great care is needed when comparing inviscid theory with experiment. An example is furnished by the effect of nose bluntness on slender cone unsteady aerodynamics. It is thought that for the foreseeable future the only practical means of obtaining the full scale unsteady viscous flow characteristics will be by the interactive use of experimental and theoretical results to obtain 'dynamic solution through analytic extrapolation'. C.R.

A82-17920 # **Evaluation of supersonic missile aerodynamic prediction techniques.** J. E. Williams (McDonnell Douglas Astronautics Co., St. Louis, MO). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-1[illegible]82, Paper 82-0390.* 12 p. 30 refs.

Qualitative and quantitative analyses performed by comparing predictions with test data, and evaluating method accuracy according to a novel criterion, are presented for the case of ten methods used in the prediction of missile aerodynamic characteristics at supersonic speeds. It is found that: (1) while adequate predictions can be obtained for missile configurations in the conventional, airbreathing, and cruise missile classes, improvements are needed to address the lifting-body missile class; (2) of the two method categories considered, component-buildup and paneling techniques, that composed of methods employing configuration component-buildup may be enhanced by existing techniques that would result in greater accuracy or capability; and (3) the Datcom, NSWC, Missile 2, Aerodyn, and S/HABP component-buildup methods are found useful in the complete longitudinal aerodynamic analysis of missiles. O.C.

A82-17928 # **The feasibility of turnback from a low altitude engine failure during the takeoff climb-out phase.** B. W. Jett (U.S. Naval Academy, Annapolis, MD). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0406.* 12 p.

A new procedure is proposed for responding to engine failures in single-engine aircraft that occur at a low altitude during the takeoff/climb-out phase of flight. The procedure involves a 180-deg turn back to the vicinity of the airfield. Here, the pilot must find the optimum bank angle and airspeed for the turn; this can be done by applying aerodynamic principles to a steady state power-off gliding turn. The feasibility of this maneuver is investigated here by testing a wide range of pilots under controlled conditions using a variable stability flight simulator. It is noted that the theoretical optimum bank angle and airspeed can also be verified experimentally. Data are acquired in real time during the test flights using an automated, computer-controlled data acquisition system. The combination of theoretical analysis and experimental data yields an optimum procedure for a turn back to the airfield and demonstrates that the maneuver is within the capability of a typical private pilot. C.R.

A82-17930 # **Experimental structural testing on a composite aircraft canard and its applications.** K. S. Caldwell, Jr. (Texas, University, Arlington, TX). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0408.* 9 p.

This paper presents the results and discussion of several structural tests performed on the canard of The University of Texas at Arlington's experimental aircraft, the Varieze. From various tests the influence and the c-cubed coefficients of the bending and twisting matrixes were obtained. From these results one can accurately determine the bending and twisting of the canard that will result for any force and moment applied. Applications of these coefficients to graphics computers and swept-wing design are discussed. Two canards that were failed to destruction due to an excess bending load are also discussed, documenting radical structural differences in the final homebuilt products when both canards employed the same amount of material and were constructed from the same set of plans. (Author)

A82-18831 # **High temperature in situ experimentation in HVEM instrumentation and application to materials science.** R. Valle, B. Genty, A. Marraud (CNRS and ONERA, Laboratoire de Microscopie THT, Châtillon-sous-Bagneux, Hauts-de-Seine, France), and J. Cadoz (CNRS, Laboratoire de Physique des Matériaux, Meudon, Hauts-de-Seine, France). *ONERA, TP* no. 1981-77, 1981. 5 p.

The design and construction of high temperature specimen holders for experimentation on superalloys and ceramics is discussed. A double tilting holder, a double tilting straining holder, and the composition and surface finishes are described. The holders can withstand up to 1500 K, using optically smooth tungsten jaws held in a golden molybdenum tip. Gold-coated shield, either tantalum or silica, have been chosen because of low emissivity when used as thermal shields, in addition to the mechanical property of remaining flat at elevated temperatures. A heating system has been devised comprising tungsten heating elements radiating in long holes machined directly in the jaws. Mention is made of experiments already performed on NiO single crystals at 1400 K. M.S.K.

A82-17932 # **Highlights of a design concept for a close ground support fighter.** D. J. Dacquino (Lockheed-California Co., Burbank, CA) and R. J. Raffaele (Arizona State University, Tucson, AZ). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0411.* 12 p. 9 refs.

The design concept makes use of recent technological developments in order to improve payload and endurance capabilities. The preliminary design is based on a study of gross weight, airfoil and wing design, weight and balance, and performance analysis. A computer simulation of such standard performance requirements as takeoff and initial climb, climb performance, and range and endurance indicates a successful integration of these techniques. C.R.

A82-17934 # **Pressure distribution on an ogee wing in supersonic flow.** M. E. Vaughn, Jr. (Auburn University, Auburn, AL). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0414.* 11 p. 22 refs. Research sponsored by Auburn University; Grant No. DAAG29-78-G-0036.

An approximate method is developed which extends pressure distribution theories for wings of constant sweep to wings with curvilinear leading edges. Two cases are considered. In the first case of a predominantly subsonic leading edge, and analogy is made to a wing in conical flow. In the second case of a supersonic/subsonic leading edge, physical reasoning is used to approximate the flow regions on the wing with line-source solutions. An application is made to a wing of ogee planform and comparisons with experimental data prove very favorable. Each case typically required under 7 seconds of computer time (IBM 3031). (Author)

A82-17936 * # **The effect of non-linear propagation in jet noise.** J. A. Gallagher. *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0416.* 9 p. 10 refs. Grant No. NAG1-10.

An experimental investigation of the nonlinear propagation effects which occur in the noise radiated from low and moderate Reynolds number supersonic jets has been performed. An array of three condenser microphones was used to measure the waveforms propogated by axisymmetric, cold model jets of Mach numbers 2.1 and 2.5. Relatively low Reynolds numbers were obtained by exhausting the jets into a low pressure anechoic test chamber. The results show that phenomena normally associated with nonlinear acoustic propagation, such as wave steepening, harmonic generation and wave merging, are measurable in the high speed model jets. (Author)

A82-17951 **Flight mechanics - Modern aircraft design and control concepts (Flugmechanik - Moderne Flugzeugentwurfs- und Steuerungskonzepte).** X. Hafer (Darmstadt, Technische Hochschule, Darmstadt, West Germany) and G. Sachs (München, Hochschule der Bundeswehr, Munich, West Germany). Berlin, Springer-Verlag, 1980. 202 p. 199 refs. In German. $34.25.

The state-of-the-art of aircraft design and control concepts are presented. Design features of aircraft of natural and artificial stability are discussed, with emphasis on the tail unit, trim drag and maximum lift, as well as the dynamics of unregulated, unstable aircraft. Various aspects of direct force control are then outlined: direct lift control, direct side force control, and direct drag control. Finally, other possible uses for active control technology are discussed, including artificial lateral stability, automatic maneuvering flaps, variable cambers, maneuver load control for large aircraft, gust load alleviation, and active flutter suppression. J.F.

A82-18021 # **Responses of oscillating wings in weak shear flow.** A. Sasaki (Mitsubishi Electric Co., Ltd., Amagasaki, Japan) and M. Kobayakawa (Kyoto University, Kyoto, Japan). *Japan Society for Aeronautical and Space Sciences, Transactions,* vol. 24, Nov. 1981, p. 139-151. 10 refs.

In this paper, a theory on wings which are oscillating in a weak shear flow is presented. The potential lifting surface theory is extended to the shear flow case by successive approximations. An integral equation is derived by the singularity method to the first order approximation, and it is solved numerically by the mode function method. For examples of calculations, oscillating wings with heaving and pitching modes in a shear flow are treated. Generalized forces which can easily be related with unsteady lift forces and moments are obtained. Results show that the shear flow decreases all forces in amplitudes, and moreover, a slight phase-lag and a phase-lead appear in heaving and pitching oscillations, respectively. (Author)

A82-18022 # **A contribution to the hodograph method for shock-free transonic airfoil sections.** T. Shigemi (National Aerospace Laboratory, Tokyo, Japan). *Japan Society for Aeronautical and Space Sciences, Transactions,* vol. 24, Nov. 1981, p. 152-168. 13 refs.

A simple method is developed for the design of transonic shock-free airfoil sections based on the analytical hodograph method. Traditional procedure is used in which a compressible flow is built up by transformation from an incompressible analog which is now called a model flow. In view of the defect in existing models such as a circular- or elliptic-cylinder, a new model, YC-profile, is introduced. (Author)

A82-18094 # **Results of a Differential Omega experiment.** T. M. Watt, L. E. Abrams, and F. G. Karkalik (Systems Control, Inc., Palo Alto, CA). In: Symposium on the Effect of the Ionosphere on Radiowave Systems, Washington, DC, April 14-16, 1981, Preprints. Washington, DC, U.S. Naval Research Laboratory, 1981. (4B-3). 12 p. 6 refs.

An experiment was performed to examine the utility of Differential Omega navigation for general aviation in Alaska and Northwest Canada, with emphasis on operational issues. The performance of a prototype Differential Omega system is evaluated for performance parameters such as maximum range of the data link, mean and variance of navigation error, and range decorrelation error. Mean error was observed to be about 0.5 NM, and the standard deviation error was about 0.25 NM. Ground tests yielded results that were consistent with results of earlier experiments, and random errors agreed well with the minimum range results. D.L.G.

A82-18117 **Introduction to V/STOL airplanes.** D. L. Kohlman (University of Kansas Center for Research, Inc., Lawrence, KS). Ames, Iowa State University Press, 1981. 242 p. 161 refs.

After a brief historical account of V/STOL aircraft requirements and experiments, consideration is given to (1) propulsion system devices, such as ducted propellers and augmenting ejectors, (2) operational problems, including ground effects and terminal area operations, (3) takeoff performance and equations for its description, (4) landing performance, relationships, equations and characteristics, and (5) the transition from hover to forward flight, including its equations of motion. Also covered are (6) blowing and suction boundary layer control and powered lift systems, such as jet flaps and blown flaps, propulsive wings and circulation-control airfoils, (7) stability and control in hover and handling qualities criteria, and (8) V/STOL propulsion considerations including number of engines and trends in speciafic fuel consumption and thrust-to-weight ratio. O.C.

A82-18126 **PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record.** Symposium sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1980. 511 p. Members, $25.; nonmembers, $37.50.

Aspects of satellite navigation are examined, taking into account the nonuniform GPS constellation, differential GPS navigation, navigation processing design for a low-cost GPS navigation system, an ionospheric refraction correction model for single-frequency Doppler navigation, a GPS receiver design for general aviation navigation, and geodetic positioning using a global positioning system of satellites. Questions of undersea navigation are investigated, giving attention to gravity gradiometry in a shipboard environment, stochastic and deterministic modeling of gravity gradiometer data, state-space models of gravity disturbance gradients, the astro-geodetic measurement of vertical deflection, the real-time estimation of vertical deflections using a gravimeter, and the laser gyro potential for long endurance marine navigation. Other topics discussed are related to time and frequency as applied to navigation systems, terrestrial-based radio navigation, self-contained navigation, integrated communications and navigation systems, the emerging civil navigation requirements and applications, the navigation of space vehicles, and mapping, charting, and geodesy for navigation systems. G.R.

A82-18132 **A GPS receiver design for general aviation navigation.** B. D. Elrod (Stanford Telecommunications, Inc., McLean, VA), H. A. Bustamante, and F. D. Natali (Stanford Telecommunications, Inc., Sunnyvale, CA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 33-41. 6 refs. U.S. Department of Transportation Contracts No. FA77WAI-757; No. FA78WA-4216.

The NAVSTAR Global Positioning System (GPS) will provide RF transmissions from a constellation of satellites for accurate position, velocity and/or time determination by suitably equipped users. An investigation by the FAA is conducted regarding the potential use of the GPS system for civil navigation to supplement or replace VOR/DME in the National Aerospace System. Of the nearly 200,000 civil aviation aircraft in use today, about 30% are equipped with 'low budget' navigation avionics. One of the objectives of the investigation is related to the development of low cost receiver designs for the navigation requirements of civil aviation. A description is presented of a GPS receiver design satisfying the needs of general aviation navigation. G.R.

A82-18139 **Maneuver dependent component error models and synchronized reset filters for inertial navigation systems.** W. H. Fincke and A. J. Kleinman (Dynamics Research Corp., Wilmington, MA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 107-114.

In many inertial navigation systems (INS), external information in the form of position and/or velocity updates is used in conjunction with an estimation filter to make corrections to the INS to improve accuracy. Attention is given to a design of statistical estimation filters which has been found effective in improving accuracy when there are error sources that are sensitive to vehicle maneuvers. The errors may include reference velocity errors which are speed sensitive, or other errors that may be implemented as part of the navigation reset filter, or as a special prenavigate calibration sequence of vehicle maneuvers or platform rotations. G.R.

A82-18141 # **Selecting the post 1990 civil aviation radionavigation system.** J. C. Heurtley and J. W. Bradley (FAA, Office of Systems Engineering Management, Washington, DC). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 177-181.

Investigations are being conducted which are to provide a basis for the selection of the radionavigation system or combination of systems which can best satisfy the requirements of the post 1990 time period. In 1983 the Department of Defense and the Department of Transportation are to make a joint recommendation on the navigation system mix for the post 1995 timeframe. The final area of consideration in selecting the post 1990 Civil Aviation Radionavigation System is the institutional issue. This issue encompasses international acceptance and standards, cost recovery policies, and in the case of NAVSTAR GPS the denial of accuracy, number of satellites, spare satellite policy, and military control of a system used for civil navigation. These issues are still to be resolved. G.R.

A82-18143 **A new end-fire ILS glide slope.** C. B. Watts, Jr. In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 190-197. 8 refs.

The end-fire glide slope described here is a modification of standard ILS ground equipment designed to serve runways where it is not practical to install one of the present conventional systems. The antenna does not use a tower; an array of slotted cable elements is mounted on the runway shoulder, sufficiently low to clear wings and engine nacelles, and is frangible to avoid serious damage to an airplane which might run off the pavement. It is noted that savings in earth movement can amount to many times the cost of the antenna. End-fire development is traced from 1942. C.R.

A82-18144 **Solid-state VORTAC with remote maintenance and monitoring.** A. Lang (ITT Avionics Div., Nutley, NJ) and W. Hundley (Wilcox Electric, Inc., Kansas City, MO). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 198-207.

Because of the widespread use and high capital investments in the VORTAC and VOR/DME system, there are indications that the U.S. and the ICAO will extend these services beyond 1995, the year that protection was to have expired. Owing to problems related to maintenance and the replacement of parts, the FAA let a contract to industry to replace all the old tube-equipped VORs, VOR-DMEs, and VORTACs with a total system architecture that embodies modern technology. The system being produced for the FAA is described. Maintenance costs have been reduced as a result of four improvements: (1) improved reliability of an all solid-state design; (2) improved maintainability through modular construction with automatic fault isolation; (3) reduced maintenance by use of a solid-state and digital circuits; and (4) reduced routine trips by maintenance technicians to each facility, from one or two per week to once per 3 months, as a result of remote certification and maintenance testing. C.R.

A82-18145 **MLS - A new generation landing guidance system is here.** R. M. Cox and J. M. Shirey (Bendix Corp., Communications Div., Baltimore, MD). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 208-215.

The Microwave Landing System (MLS), an air-derived system operating in the C-band, comprises azimuth guidance, elevation guidance, and ranging elements which provide continuous, accurate, three-dimensional position information within a wide coverage volume of the desired landing site. In the Time Reference Scanning Beam (TRSB) MLS, ground-based equipments provide signals to the airborne user from which position information is derived. An important difference between ILS and MLS is angular coverage; ILS is a VHF/UHF system which provides straight-in guidance only on a single fixed glide path. The MLS is a high-frequency microwave system operating at C-band (5031-5090 MHz), providing volumetric coverage over a sector of as much as + or - 60 deg in azimuth and 0-30 deg in elevation. It is noted that a precision DME (L-band, 978-1213 MHz) is available with the MLS to provide accurate range information and thus allow the aircraft to determine its exact position in the prescribed coverage volume. C.R.

A82-18146 **The DME-based Azimuth System /DAS/.** H. Vogel and W. Seith (Standard Elektrik Lorenz AG, Stuttgart, West Germany). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 216-223. 5 refs.

In a competition organized by the ICAO to select a new precision approach and landing system, the DME-based Landing System (DLS) was submitted by the Federal Republic of Germany. Parts of this design were recommended for further development. These elements, which represent the DME-based Azimuth System (DAS), are the L-band precision DME and the 360-deg azimuth service utilizing DLS principles. The DME-based Azimuth System can be regarded as an improved Distance Measuring System (DME) with additional capabilities. The DAS has three essential characteristics: (1) in comparison with the conventional DME, where the measurement errors may amount to several hundred meters, the DAS distance measurement accuracy is considerably improved; (2) the DAS ground station determines with a high degree of accuracy the bearing to the interrogation aircraft and transmits this azimuth information to the airborne station; and (3) the DAS contains a ground-to-air data link. The frequency range is 962-1213 MHz; there are 20 DME frequencies with existing modes and 40 DME frequencies with additional co-channel modes. C.R.

A82-18147 **Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors.** R. A. Harlow (Royal Aircraft Establishment, Bedford, England). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 228-235.

A description is given of flight trials undertaken to determine the accuracy of an Area Navigation (RNAV) System which uses currently available radio aids, and practical aspects of RNAV operation are discussed. Results show that, in an en-route environment, the position-fixing errors made by using Distance Measuring Equipment (DME)/DME navigation were less than half as many as those made in the course of VHF Omnidirectional Range (VOR)/DME navigation. In addition, DME/DME navigation proved to be more accurate than VOR/DME in a Terminal Maneuvering Area (TMA) environment, although the difference was less pronounced in the en-route situation because of the limited ground aids available in the trials area. The trials area was not representative of major European TMAs. The use of inertial velocity information rather than air data signals for the smoothing of RNAV aircraft position estimates was found to give significant accuracy improvements in VOR/DME guidance. O.C.

A82-18150 **Laboratory and flight test of a new RLG strapdown INS.** R. E. Ebner (Litton Systems, Inc., Woodland Hills, CA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 257-263.

A strapdown inertial navigation system using ring laser gyros is tested. Laboratory data are presented showing gyrocompass heading accuracy under differing gyro random walk disturbances, navigation during three-axis Scorsby motion, and navigation following a 180 deg turn. A dominant error source during the Scorsby motion is described, and test data for preliminary gyros which achieve a CEP of 1.4 nmi/h are presented. A new generation system with missile grade RLGs and a third series with higher performance instruments are tested, and the third series demonstrates a performance under 1 nmi/h with a 4 minute reaction time. D.L.G.

A82-18151 **Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems.** J. Yoh and R. Dunn (Intermetrics, Inc., Warminster, PA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 280-284.

The Position Extrapolation Quality (PEQ) is defined as the second mean of the second backward difference of the earth-referenced level position error read from the dead reckoner, sampled every thirty seconds. It is noted that because of truncation error in the outputs, this second difference is not available for all dead reckoners to the precision required. In this case, one takes the second mean of the second difference of the integral of the error in reported velocity. When the reporting interval is short, this quantity is equivalent to the other and is affected to a much lesser extent by truncation. Since certain of the underlying processes encountered in most dead reckoner types are not ergodic, it is not possible to evaluate this covariance matrix with a time average. It is necessary to either average over a number of runs with different equipment of the same type or to compute the PEQ using an established model for the type. It is shown here how it is possible to develop reasonable estimates for the PEQ of three types of dead reckoners from statistical models. C.R.

A82-18152 **JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance.** J. Rubin and S. Welt (ITT, ITT Avionics Div., Nutley, NJ). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 285-299. Contract No. N62269-76-C-0105.

Laboratory testing has been completed for Advanced Development Model (ADM) terminals developed for the DOD Joint Tactical Information Distribution System (JTIDS) program. The terminals feature the JTIDS Phase II Distributed Time Division Multiple Access (TDMA) architecture, and include two Class 1 Command and Control terminals, two Class 2 Tactical Fighter terminals, and one JTIDS Environment Simulator. The JTIDS II/D-TDMA operates in Lx-band, from 960 to 1215 MHz, and provides a system that combines spread-spectrum multiple-access command and control functions with conventional TACAN navigation and IFF identification service. Attention is given the Relative Navigation (REL NAV) function of the system, which ties the operations of a tactical community of users to a common relative navigation grid, while optimally blending the fast-response and short-term accuracy of self-contained, dead reckoning navigation with JTIDS-derived position and status reports from multiple users. O.C.

A82-18153 **JTIDS RELNAV network off-line simulation.** J. B. Chadwick (Hughes Aircraft Co., Ground Systems Group, Fullerton, CA). In: PLANS '80 - Position Location and Navigation

Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 300-302.

A description is presented of the Joint Tactical Information Distribution System (JTIDS) Relative Navigation (RELNAV) off-line simulator. The simulator was originally developed for use as an algorithm design test bed. This effort supported writing specifications for the RELNAV function software package addition to the Hughes Improved Terminal (HIT) operational computer program (OCP). After the design phase the simulator was modified to accommodate detailed step-by-step checkout of the subsequently developed RELNAV software by comparing the simulator's exact solutions with those of the OCP. The JTIDS RELNAV network off-line simulator is comprised of two distinct FORTRAN programs. One of the programs generates up to 12 arbitrary trajectories over a reference ellipsoid. The second simulation program is the RELNAV off-line simulator. Its main tasks are to generate and simulate at each JTIDS time slot real world events for up to 12 net numbers. G.R.

A82-18154 **Post-flight assessment of the JTIDS Rel Nav.** M. S. Greenberg (Dynamics Research Corp., Wilmington, MA) and L. Chin (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 303-312. 5 refs.

Assessment of the Joint Tactical Information Distribution System (JTIDS) Relative Navigation (Rel Nav) function requires accurate and frequent precision navigation data to determine the position, velocity, and attitude errors of each JTIDS terminal under test. An approach was developed to create a synthetic reference for vehicle ground speed and attitude. A postflight Rel Nav data reduction program (RNDRP) was designed to filter the flight-recorded records of uncorrected inertial data at a 4 Hz rate and the asynchronously recorded radar tracking data at a 5-10 Hz rate. The RNDRP is also used to perform quick-look analysis of the Rel Nav function by bypassing the filter/smoother and simply differencing radar tracking data and Rel Nav position data. Attention is given to grid navigation, the Nav controller, grid translation and rotation, the Rel Nav figures-of-merit, the Rel Nav analysis approach, and aspects of RNDRP filter and inertial system integration. G.R.

A82-18155 **A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system.** R. Dunn (Intermetrics, Inc., Warminster, PA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 313-317.

A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system is presented. The technique is illustrated by computing an upper bound on the achievable performance of a nodeless relative navigation system, which is given in terms of position extrapolation quality and available position quality. This specification procedure furnishes a parametric specification, which is fair when the parameters indicate that the available source qualities, geometry, and supporting equipment are good. The technique also permits a specific graceful degradation as the parameters indicate a weakening of the environment. D.L.G.

A82-18156 **A stable decentralized filtering implementation for JTIDS RelNav.** T. H. Kerr (Intermetrics, Inc., Cambridge, MA) and L. Chin (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 318-329. 45 refs.

Eight alternative decentralized linear estimation schemes are surveyed to find the mechanization most appropriate for stable community relative navigation in the JTIDS RelNav tactical scenario. Discrete-time mechanization equations for the sequentially partitioned algorithm (SPA) and the surely locally unbiased (SLU) filtering are presented, and an analytical proof of asymptotic stability for both SPA and SLU filters are estimated in terms of core memory requirements and operation counts. There are some indications that the RelNav algorithm exhibits some anomalous stability behavior. D.L.G.

A82-18157 **PLRS engineering development testing - Early results.** J. A. Kivett and F. L. Morse (Hughes Aircraft Co., Communications and Radar Div., Fullerton, CA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 330-334. Grant No. DAAB07-76-C-1750.

For all participants, the system (which operates beyond line-of-sight through integral relays) incorporates effective electronic counter-counter measures and provides cryptographically secure digital data communication. Each user has the capability of sending preassigned 2-character messages to furnish data to or request information from the system, as well as 12 character free text message exchanges. PLRS operates both ashore and afloat irrespective of visibility, weather, and terrain. Its configuration guarantees continuity of operation during the transitions of tactical headquarters and allows for survivability even if a major system element becomes inoperative. Full system performance is provided within a 47-km by 47-km primary operating area, and airborne users can be located and tracked (with slightly less accuracy) within a 300-km by 300-km extended operating area. C.R.

A82-18158 **Coordinate transformation in PLRS.** J. M. Lull, F. L. Morse, and R. Cook (Hughes Aircraft Co., Fullerton, CA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 335-338. Grant No. DAAB-07-76-C-1750.

A description is given of the primary coordinate transformation algorithm employed by the Position Location and Reporting System (PLRS), which operates between internal coordinates and the Universal Transverse Mercator (UTM) Military Grid Reference (MGR) coordinates. The PLRS coordinate transformation (1) operates over a 300 x 300 km area, with its given system center anywhere between 80 deg S and 84 deg N latitudes; (2) processes UTM grid zone boundaries, spheroid and datum boundaries, and irregularities in the MGR 100 km grid square identifications; (3) does not require large amounts of on-line storage; and (4) permits datum and MGR grid definitions to be changed easily. O.C.

A82-18159 **Navigation system integrity and reliability for civil aviation.** R. Braff, C. Shively (Mitre Corp., McLean, VA), and J. Bradley (FAA, Washington, DC). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 367-374. 6 refs.

The integrity and reliability of the present primary civil air navigation system, VOR/DME, is discussed to identify and develop an understanding of the specific integrity and reliability performance factors that must be considered when evaluating alternative navigation systems. The identified performance factors are then used to define applicable technical analyses. Major issues relating to the integrity and reliability of the space segment of the Navstar Global Positioning system are discussed. V.L.

A82-18160 * # **Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont.** F. D. MacKenzie (U.S. Department of Transportation, Transportation Systems Center, Cambridge, MA) and C. D. Lytle (NASA, Langley Research Center, Hampton, VA). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 375-380.

Results obtained in completing 257 nonprecision approaches and 44 data flights are discussed. The flights were initiated in the summer months and extended through four seasons and practically all weather conditions typical of the northeastern U.S. A preliminary assessment of the available data indicates that Loran-C signals are suitable as a means of navigation during enroute, terminal, and nonprecision approach operations and that the performance exceeds the minimum accuracy criteria specified by the applicable FAA advisory circular. Enroute operations are found to remain within + or - 0.75 nm of the desired track, compared with the requirement of + or - 2.5 nm. Terminal operations remained within + or - 0.65 nm of the desired track, compared with the FAA circular's requirement of + or - 1.5 nm; the nonprecision final approach operations were within the limit of + or - 0.6 nm for all operations. C.R.

A82-18161 # **Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions.** P. S. Demko (U.S. Army, Air Traffic Management Systems Div., Fort Monmouth, NJ). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 381-388.

It is shown how small, portable microwave landing guidance systems, used with 4-cue decelerated steep approach and landing (DSAL) flight director systems designed especially for helicopters, can now overcome visibility barriers and provide a true all-visibility DSAL capability. The extension of the DSAL capabilities into the instrument meteorological conditions (IMC) realm is thought to be perhaps the greatest practical step which could be taken to expand the usefulness of helicopters. It is noted that technology has advanced sufficiently to provide the helicopter with IMC DSAL capability at the present time. C.R.

A82-18170 **Status of the COSPAS-SARSAT project and its possible operation in conjunction with INMARSAT system.** Y. G. Zurabov and V. A. Bogdanov (Vsesoiuznoe Ob'edinenie Morsviaz'-sputnik, Moscow, USSR). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 459-467.

The status and main technical characteristics of the COSPAS-SARSAT project are considered, along with the possibility of its operation in conjunction with the INMARSAT system. The COSPAS-SARSAT project is an experimental satellite-aided project for the search and rescue of distressed vehicles, administered by U.S.S.R., U.S., French and Canadian agencies. Both the detection and location of distress signals will be undertaken, and the information facilities for completion of data processing and its further transmission to rescue services. The COSPAS and SARSAT projects interoperate at 121.5 and 406.0 MHz. Detailed block diagrams are given of the COSPAS system's spaceborne equipment and functions. O.C.

A82-18171 **Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver.** H. J. Rome (Lowell, University, Lowell, MA), R. A. Reilly, and C. D. Ward (ITT, ITT Avionics Div., Nutley, NJ). In: PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 477-493. 13 refs.

The functional design of an integrated Joint Tactical Information Distribution System/Global Positioning System (JTIDS/GPS) receiving network, using data fragments from multiple sources to obtain dramatic improvement in positional reliability in an adverse signal environment, is described. It is shown that proper selection and synergistic use of data from both systems improve positional reliability under certain noise environments by up to four orders of magnitude. The higher the number of fully integrated terminals in the network, the greater the improvement in jam resistance; significant improvement, however, is attainable to an entire network by having even a limited number of integrated terminals. The key to the system is the use of 'smart' data source selection logic to properly weigh and choose the best current data available from JTIDS and GPS sources for navigation updating. C.R.

A82-18182 **The electromagnetic theta gun and tubular projectiles.** T. J. Burgess, E. C. Cnare, W. L. Oberkampf, S. G. Beard, and M. Cowan (Sandia National Laboratory, Albuquerque, NM). *(U.S. Army Armaments Research and Development Command and Defense Advanced Research Projects Agency, Conference on Electromagnetic Guns and Launchers, San Diego, CA, Nov. 4-6, 1980.) IEEE Transactions on Magnetics*, vol. MAG-18, Jan. 1982, p. 46-59. 15 refs. Research supported by the U.S. Department of Energy.

Unlike the better known rail gun, the theta gun applies the propelling force along the length of its projectile. This is shown to allow much greater acceleration of high fineness ratio projectiles for a given barrel pressure, allowing much shorter barrels for military applications. A computer code which simulates performance of the theta gun is described and experimental results from a few simple, low energy experiments show close agreement with code predictions. Trajectories and aerodynamic heating for three candidate military projectiles are calculated for vertical and horizontal atmospheric launches where initial velocity is as high as 5 km/s. The calculations indicate that in some cases a thin layer of heatshield (ablator) will be required to control projectile heating. (Author)

A82-18200 **Helical rail glider launcher.** P. Mongeau and F. Williams (MIT, Cambridge, MA). *(U.S. Army Armaments Research and Development Command and Defense Advanced Research Projects Agency, Conference on Electromagnetic Guns and Launchers, San Diego, CA, Nov. 4-6, 1980.) IEEE Transactions on Magnetics*, vol. MAG-18, Jan. 1982, p. 190-193. NSF-supported research; Grant No. DAAK10-79-C-0184.

The electromagnetic acceleration group at MIT has undertaken to build an electric glider launcher. The launcher features a mobile helical rail accelerator and power supply. It will launch a 6 foot radio-controlled glider for an overall range of several miles. This device is a prototype for a larger system that will provide a launch platform for munition and supply loaded gliders and a wide variety of RPV's. A 6 meter helical rail launcher has been constructed and is being tested. It is a twin boom device designed to accelerate a 5 kg glider to 100 m/s at 100 g's acceleration. (Author)

A82-18272 **Data communications within the Air Navigation Services system.** W. J. A. Vonk (Philips Telecommunicatie Industrie, Hilversum, Netherlands). *The Controller*, vol. 20, Dec. 1981, p. 17, 18.

A comparison is made between: (1) the Société Internationale des Telecommunications Aeronautique (SITA) communications network, which consists of 12,000 stations in 800 cities and employs land lines, radio links, and satellites for the transmission of passenger and cargo handling, averaging 3-sec in replying to information requests; and (2) the Aeronautical Fixed Telecommunication Network (AFTN), which is not suited to request/reply traffic, and supports the Air Navigation Services (ANS) system. Suggestions are made for the upgrading of the AFTN, based on a color graphics terminal that gives access to stored aeronautical information. Such a unit has been demonstrated in air traffic control roles, and presents through carefully selected function keys such information as airspace and route data, local regulations and weather data. O.C.

A82-18273 **Modernizing the Egyptian A.T.C. system.** R. Kahane. *The Controller*, vol. 20, Dec. 1981, p. 19, 20, 22, 23.

A description is given of plans for the modernization of the Egyptian ATC system, through the phased implementation of systems and services. The plan includes the modernization of: (1) the radar detection network; (2) radar data processing and display; (3) flight plan processing and display; (4) air-to-ground, and both domestic and international point-to-point communications networks, including telephonic and telegraphic links and HF, VHF and UHF radio and microwave links; also (5) the extension of navigation aids; and (6) the modernization of controller training programs. The installation of these systems throughout the country will, moreover, call for the construction of five building complexes, of which the largest is to be the Cairo Air Navigation Center (CANC), located at Heliopolis Airport. O.C.

A82-18274 # **'Integral Noise': An automatic calculation model for the prediction and control of fixed-wing aircraft noise. I - General considerations, theoretical bases and model analysis ('Integral Noise': Un modello di calcolo automatico per il controllo e la previsione del rumore degli aeromobili ad ala fissa. I - Considerazioni generali, fondamenti teorici ed analisi del modello).** F. Bosso (Consulenza Aeronautica, Mondovi, Italy) and R. Gualdi (Provincia di Milano, Laboratorio di Igiene e Profilassi, Milan, Italy). *Ingegneria*, Sept.-Oct. 1981, p. 257-265. 9 refs. In Italian.

A description is given of the INTNOI Integral Noise Program for advanced aircraft noise prediction and control. This computer model performs, on a modular basis, the analysis of both boundary layer aerodynamic noise and engine noise for the case of such turbofan-powered commercial aircraft as the 737. It also permits the prediction of noise levels due to engine and aerodynamic sources in the communities affected by approach and landing noise footprints. Attention is given to the effect on engine noise levels of low and high fan bypass ratios, the noise components contributed by nacelles, slats, and flaps at various angles, and the specialized options offered by the modular-structure program. O.C.

A82-18321 **A short history of aviation gasoline development, 1903-1980.** A. R. Ogston. *(Society of Automotive Engineers, West Coast International Meeting, Seattle, WA, Aug. 3-6, 1981.) Aeronautical Journal,* vol. 85, Dec. 1981, p. 441-450. 9 refs.

An historical account is given of the development of gasoline for aircraft engines, in keeping with advances in reciprocating engine design and increasing performance requirements. Consideration is given to the capabilities of the oil refining industry at the time of the Wright brother's first powered flight in 1903, and the dependence between engine performance and fuel chemistry established shortly thereafter by the Wrights and other aviation pioneers. The cracking process, yielding gasolines with superior anti-knock properties, was not invented until 1913, and no official specifications for aviation gasoline existed before the First World War. The first systematic studies of the relation of detonation to fuel quality were made by Harry Ricardo in 1919, using a single-cylinder, variable-compression engine, and the first truly adequate, 100 octane gasolines became available in 1935. The 30% horsepower increase resulting from 100 octane gasoline's use was an essential element of the RAF's victory over the Luftwaffe in the Battle of Britain. The introduction of turboprop and turbojet airliners during the 1950s brought an end to the development of aviation gasoline. O.C.

A82-18322 **Design evolution of the Boeing 757.** P. M. Condit (Boeing Commercial Airplane Co., Renton, WA). *Aeronautical Journal,* vol. 85, Dec. 1981, p. 451-458.

An account is given of the development history of the 757-200 airliner, which is scheduled to enter service in January 1983. Attention is given the degree of structural commonality with the 727 aircraft that the 757 replaces, and the advanced flight management and hydraulic and electrical power systems shared by the 757 and wide-body 767 designs. The 757-200 may be fitted with 25-32% more seats than the 727, and incorporates RB211 engines whose specific fuel consumption is 26-31% lower than those used in the 727-300B program. The all-digital, two-pilot flight deck of the 757 provides flight path/energy management computation and display capabilities unavailable in current airliners, and can in addition display weather radar and optimum climb profiles and cruise altitudes. The energy efficiency gains estimated for the digital avionics are as high as 6%. O.C.

A82-18346 **F101DFE in Tomcat - Preliminary test results.** M. Gaines. *Flight International,* vol. 120, Dec. 19, 1981, p. 1826-1828.

System features and performance of the F101DFE engines in the F-14 Tomcat fighter are described. The two 29,000 lb thrust engines have a bypass ratio of 0.85, the core of the F101, and a scaled-up front end and nozzle from the F404 like in the F-18 Hornet. The engine components are detailed, and it is noted that the F101DFE can cross-start at ground idle. The new engines give a 62% combat radius increase, 34% longer patrol on-station, and 22% more energy for maneuvering. The Super Tomcat can climb at Mach 0.8, 30 deg pitch, with 8,000 lb of fuel and have power left at 40,000 ft, having taken off without afterburners from a carrier deck. The fuel is burned smokelessly, and combat maneuvering tests with F-5s showed that the F-5 pilots were unable to achieve either a gun or missile fix on the F101DFE aircraft, although a reticence to use full dual throttle capability was noted during test pilots' first flights. M.S.K.

A82-18347 **2037 - Pratt & Whitney tests new turbofan.** J. Moxon. *Flight International,* vol. 120, Dec. 19, 1981, p. 1832-1834.

The PW2037 turbofan, earmarked for use on the Boeing 757, is discussed. The engine provides 37,000 lb of thrust, spins 30% faster than the JT9D, and employs powdered metal nickel alloy discs. Other features are a 30:1 pressure ratio, single crystal blades, an inlet temperature of 1385 C, an electron beam welded drum, and digital engine control. Dual redundancy and three levels of self-test and fault isolation are included in the electronics, and active clearance control, abradable tip seals, and increased stiffness and concentricity result in a 2% added fuel efficiency. Flight testing aboard a 747 is scheduled for February 1983, with actual delivery for use on the 757 to begin in 1984. M.S.K.

A82-18348 **Lear Fan - The plastic aeroplane arrives.** R. Whitaker. *Flight International,* vol. 120, Dec. 26, 1981, p. 1896-1901.

The carbon reinforced plastic Lear rear-mounted turboprop aircraft is discussed. The design includes a 15,000 hr/15,000 cycle life, and high-strength areas where aluminum was used are indicated. The Kevlar radome is built to withstand a 4-lb birdstrike at 250 knots airspeed. The airfoils are computer optimized from the NACA 65 series and have Nomex honeycomb cores. A weight of 7200 lb and a wing area of 163 sq ft are mentioned for the Y-tailed plane. Centerline thrust is provided by independent dual engines, which are monitored by a metal chip detector to expand the operating safety margin. The engines have 850 shp and the cruise speed is 311 kt at 40,000 ft. It is noted that the propeller can operate at high Mach speeds and is also made of composites. Full certification is projected for 1983 with the addition of deicers. M.S.K.

A82-18349 **Boeing 757 - Introducing the big-fan narrowbody.** D. Velupillai and F. Munger. *Flight International,* vol. 121, Jan. 2, 1982, p. 12-20.

The Boeing 757, a 180 passenger turbofan powered aircraft intended for short haul airliner service, is described. Intended as a replacement for the 727, the 757 has a narrow-bodied fuselage with seating arranged six abreast, and offers fuel savings of 20% over previous turbofans. Many systems are interchangeable with the 767, and a cruise speed of Mach 0.8 is given for the 155 ft 3 in. long aircraft. Components of the body made of composites and advanced aluminum alloys have achieved significant weight savings and improved strength, in addition to increased range. The plane has a design range of 500 n.m. Emergency equipment is designed to operate automatically for the most part, and it is noted that the cockpit, with CRT displays, is the same cockpit used for the 767. M.S.K.

A82-18412 **Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft.** H. E. Fewtrell (Lockheed-California Co., Burbank, CA). *American Society of Lubrication Engineers and American Society of Mechanical Engineers, Lubrication Conference, New Orleans, LA, Oct. 5-7, 1981, ASLE Preprint 81-LC-2B-3.* 4 p. Members, $2.00; nonmembers, $4.00.

A comparison of the performance of aluminum nickel bronze and beryllium copper under test and service conditions demonstrates that mechanical, physical and chemical properties must all be considered in the selection of bearing materials. These properties are related to specific performance requirements for the cases of (1) pin joints lubricated with diester grease and (2) shock strut pistons lubricated with MIL 5606 hydraulic oil, to show that the greater thermal diffusivity of beryllium copper can effectively prevent hot spotting under marginal lubrication conditions. In addition, data are presented which demonstrate how the chemical reactivity of beryllium copper, in the presence of the tricresyle phosphate of MIL 5606 hydraulic oil, can preclude the generation of ladder cracks in large transport landing gear pistons with chrome plating. O.C.

A82-18429 # **Four pad tilting pad bearing design and application for multistage axial compressors.** J. C. Nicholas and R. G. Kirk (Ingersoll-Rand Co., Turbo Machinery Div., Phillipsburg, NJ). *American Society of Mechanical Engineers and American Society of Lubrication Engineers, Joint Lubrication Conference, New Orleans, LA, Oct. 5-7, 1981, ASME Paper 81-Lub-12.* 7 p. 17 refs. Members, $2.00; nonmembers, $4.00.

Advantages of operating multistage axial compressors on 4 pad tilting pad bearings are discussed and compared to other fixed bore and tilting pad bearing designs. Advantages include operation free of subsynchronous vibrations, and placement of peak response speeds outside of the operating speed range with between pilot loading. Three axial groove and step journal bearings have asymmetric stiffness and damping properties, and therefore produce a split or double first critical speed. An axial compressor operating on three axial groove bearings may be subject to oil whirl and/or aerodynamic induced stabilities. Test results are in good agreement with theoretical analyses, and for the cases presented, the 4 pad tilting pad bearing is successful in removing the peak response from the operating speed range. D.L.G.

A82-18436 * # **Effects of ultra-clean and centrifugal filtration on rolling-element bearing life.** S. H. Loewenthal (NASA, Lewis Research Center, Cleveland, OH), D. W. Moyer (Tribon Bearing Co., Cleveland, OH), and W. M. Needelman (Pall Corp., Glen Cove, NY). *American Society of Mechanical Engineers and American Society of Lubrication Engineers, Joint Lubrication Conference, New Orleans, LA, Oct. 5-7, 1981, ASME Paper 81-Lub-35.* 9 p. 20 refs. Members, $2.00; nonmembers, $4.00.

Fatigue tests were conducted on groups of 65-mm bore diameter deep-groove ball bearings in a MIL-L-23699 lubricant under two levels of filtration to determine the upper limit in bearing life under the strictest possible lubricant cleanliness conditions. Bearing fatigue lives, surface distress and weight loss were compared to previous bearing fatigue tests in contaminated and noncontaminated oil filters having absolute removal ratings of 3, 30, 49, and 105 microns, with lubricant and sump temperatures maintained at 347 K. Ultra clean lubrication was found to produce bearing fatigue lives that were approximately twice that obtained in previous tests with contaminated oil using 3 micron absolute filtration. It was also observed that the centrifugal oil filter has the same effectiveness as a 30 micron absolute filter in preventing surface damage. D.L.G.

A82-18444 # **Inclusions and service induced cracks in a mature population of gas turbine engine bearings.** J. R. Barton, F. N. Kusenberger, and B. B. Baber (Southwest Research Institute, San Antonio, TX). *American Society of Mechanical Engineers and American Society of Lubrication Engineers, Joint Lubrication Conference, New Orleans, LA, Oct. 5-7, 1981, ASME Paper 81-Lub-48.* 9 p. 34 refs. Members, $2.00; nonmembers, $4.00. Contract No. F09603-74-C-5158.

The automated bearing inspection system called Critical Inspection of Bearings for Life Extension (CIBLE) was used to process NDE data acquired on approximately 1000 main shaft bearings used in the J57/TF33 gas turbine engine. Bearing service ranged from zero to about 13,000 hours, and both inclusions and service-induced cracks had been detected in a number of their components. In light of endurance testing that was conducted in addition to the metallurgical sectioning and scanning electron microscope investigations used in correlation analyses, a linear extrapolation of the total service population of the number 2 bearing position of the engine leads to the forecast of over 200 cracked bearings in the fleet of B52, KC135, C141, and E3A aircraft in which the J57/TF33 is installed. O.C.

A82-18452 # **Design and testing of a new double labyrinth seal.** J. S. Wyler (General Electric Co., Aircraft Instruments Dept., Wilmington, MA). *American Society of Mechanical Engineers and American Society of Lubrication Engineers, Joint Lubrication Conference, New Orleans, LA, Oct. 5-7, 1981, ASME Paper 81-Lub-58.* 6 p. 10 refs. Members, $2.00; nonmembers, $4.00.

A labyrinth seal that increases the fluid loss or fluid resistance through the leakage gap is presented. The design includes an inner member which can be slid axially into the outer member without interference. Losses are generated by the double labyrinth effect, and an analysis of loss measurement parameters is provided. Testing with a weight stand with JP4 jet fuel is described for the pressure drop across the seal. The results are noted to eliminate certain labyrinth designs from consideration for seal designs in a laminar region. The double labyrinth seal is, however, judged to be more effective than an equivalent annulus, although further tests on rotation are needed. Application of the results for improvements in the accuracy of fluid drive type angular momentum flowmeters are indicated. M.S.K.

A82-18479 † **Damage of turbine blades due to interaction with fuel resinification products (Razrushenie rabochikh lopatok turbiny v usloviiakh vzaimodeistviia s produktami osmoleniia topliva).** G. P. Pimenova, O. I. Marusii, I. A. Makovetskaia, and B. A. Griaznov (Akademiia Nauk Ukrainskoi SSR, Institut Problem Prochnosti, Kiev, Ukrainian SSR). *Problemy Prochnosti,* Dec. 1981, p. 27-32. 5 refs. In Russian.

The sulfide corrosion damage of the rotor blades of aircraft and stationary gas turbine engines have been studied after actual operation. Conditions leading to the formation of a corrosion layer containing films of nickel-nickel sulfide eutectics (35% S and 65% Ni) on ZhS6kp and EI826 alloy blading are identified. It is shown that such a layer reduces the fatigue strength of the blades by 50%. V.L.

A82-18484 † **Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature (K voprosu o vliianii tipa reshetki na aerodinamicheskoe dempfirovanie kolebanii lopatok suchetom krivizny profilei).** N. Ia. Nastenko (Akademiia Nauk SSSR, Institut Problem Prochnosti, Kiev, Ukrainian SSR). *Problemy Prochnosti,* Dec. 1981, p. 66-70. 7 refs. In Russian.

The aerodynamic damping of blade vibrations has been studied experimentally as a function of the blading type, blade stagger angle, and blade curvature. It is shown that the effect of the adjacent blades on one another depends on the blading type and blade curvature. Experimental results are found to be in good qualitative agreement with the known theoretical studies; the quantitative deviation does not exceed 30-40%. V.L.

A82-18575 † **A mathematical model of a subsonic transport aircraft (O matematicheskoi modeli dozvukovogo transportnogo samoleta).** A. F. Latypov and B. N. Soroka (Akademiia Nauk SSSR, Institut Teoreticheskoi i Prikladnoi Mekhaniki, Novosibirsk, USSR). *Akademiia Nauk SSSR, Sibirskoe Otdelenie, Izvestiia, Seriia Tekhnicheskikh Nauk,* Oct. 1981, p. 83-88. In Russian.

A mathematical model of a subsonic turbojet-engine transport aircraft is developed which is based on the representation of the aerodynamic polar curve and the engine throttling characteristic in the form of generalized relationships. Also included are the necessary conditions for maximum flight range. Dimensionless parameters are incorporated into the model which reflect the characteristics of the airframe and power plant and make it possible to vary the optimum lift-drag ratio of the airframe and the thermodynamic efficiency of the power plant within wide limits. Examples are included of calculations carried out to determine the optimum dimensions of the power plant and to assess the effect of the dimensionless parameters on the aircraft's characteristics. C.R.

A82-18583 † **Determination of the trimmed drag of an aircraft (Opredelenie balansirovochnogo aerodinamicheskogo soprotivleniia samoleta).** V. A. Barinov and A. G. Obrubov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 78-84. 5 refs. In Russian.

It is shown that rake angles of flow from the wing near the horizontal tail surface calculated by the Glauert method agree well with experimentally measured angles. Formulas for calculating the drag of the horizontal tail surface are presented. An analysis is presented of the influence of the longitudinal static stability margin and longitudinal moment coefficient (at zero lift) on the lift-drag ratio under trim conditions. B.J.

A82-18584 † **Game-theoretical method for the synthesis of aircraft control during landing approach (Igrovoi podkhod k zadache sinteza upravleniia samoletom pri zakhode na posadku).** I. N. Titovskii. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 85-92. In Russian.

The theory of differential games is used to consider the control of a nonmaneuvering aircraft in a longitudinal channel on a glide descent path under wind disturbances. An optimal control algorithm is obtained that ensures minimum deviation of the aircraft from glide, with allowance for constraints on the speed of control-surface reversal. Numerical results are presented. B.J.

A82-18588 † **Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating (Issledovanie napriazhenno-deformirovannogo priamougol'nogo kessona peremennoi tolshchiny pri sosredotochennykh nagruzkakh i nagreve).** S. N. Bulatov and P. N. Kurochka. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 121-128. In Russian.

The Lagrange principle of virtual displacements is used to obtain a system of differential equations with variable coefficients. The solution of this system is used to determine the displacements of the arbitrary cross-section contour of a rectangular wing section under concentrated loads and an inhomogeneous temperature field. Displacements of contour points caused by warping are determined from the inhomogeneous Bessel equations. Computational results are presented. B.J.

A82-18589 † **Concerning the calculation of the aerodynamic characteristics of mechanized wings (K raschetu aerodinamicheskikh kharakteristik mekhanizirovannykh kryl'ev).** V. S. Savin. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 129-133. In Russian.

The numerical method of discrete vortices is used for a comparative analysis of some results on the total and distributed aerodynamic characteristics of thin wings with control surfaces. Attention is given to the solution of the problem in the linear formulation and to the solution of the problem with allowance for the spatial distribution of vortices. B.J.

A82-18590 † **Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave (Raschet nestatsionarnykh nagruzok, deistvuiushchikh na poverkhnost' dvizhushchegosia klina pri padenii na nego udarnoi volny).** R. Ia. Tugazakov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 134-138. In Russian.

The maximum pressure on the surface of a moving wedge with an incident shock wave is calculated. Pressure on the body is determined as a function of the intensity of the incident wave and the angle of incidence when the intensity of the bow wave is equal to that of the incident wave. Hypersonic small-perturbation theory is used to study the influence of the contact discontinuity on the pressure distribution on the wedge surface. A decrease in the adiabatic exponent leads to an intensification of the unsteady effects. B.J.

A82-18591 † **The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities (Vliianie okhlazhdeniia poverkhnosti kryla na perekhod laminarnogo pogranichnogo sloia v turbulentnyi pri sverkhzvukovykh skorostiakh potoka).** V. A. Kuz'minskii. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 139-144. In Russian.

The influence of the cooling of a straight-wing model on the laminar-to-turbulent boundary layer transition was studied in a wind tunnel at Mach numbers of 1.8, 2.0, and 2.5, and Reynolds numbers (for one meter of length) in the ranges (11.7-16.9) x 10 to the 6th and (23.4-27.3) x 10 to the 6th. An analysis of experimental results shows that asymmetric cooling of the wing surface leads to an asymmetric development of the laminar-to-turbulent transition. B.J.

A82-18596 † **A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters (Issledovanie vliianiia potentsiala korpusa letatel'nogo apparata na kharakteristiki ionnykh datchikov orientatsii).** G. V. Eniutin, V. V. Skvortsov, and A. A. Uspenskii. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 166-172. In Russian.

The effect of the flight vehicle body potential on the angular characteristics of ion attitude transmitters has been modeled experimentally in an ionized gas flow with parameters similar to those of the ionosphere. Possible ways to suppress this effect are examined, including the use of metal disks and screen grids in front of the transmitters. V.L.

A82-18612 † **Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures (Primenenie metoda konechnykh elementov k raschetu form i chastot sobstvennykh kolebanii aviatsionnykh konstruktsii).** T. V. Snisarenko. *TsAGI, Uchenye Zapiski,* vol. 12, no. 1, 1981, p. 137-140. 6 refs. In Russian.

The paper develops a method for calculating the modes and frequencies of natural vibrations based on the finite-element modeling of the elastic and mass properties of the structure. An algorithm for solving the incomplete eigenvalue problem for a system of high-order equations is examined. The natural vibrations of a cylindrical shell are calculated as an example. B.J.

A82-18620 † **Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/ (Krutil'nye kolebaniia kryla, nesushchego sosredotochennyi gruz /asimptotika/).** Ia. M. Parkhomovskii. *TsAGI, Uchenye Zapiski,* vol. 12, no. 3, 1981, p. 69-82. In Russian.

Asymptotic formulas are obtained for the frequencies and modes of torsional vibrations of a wing carrying a concentrated load. These formulas are used to study the characteristics of the higher tones of the torsional vibrations. Results are presented for loads elastically and rigidly attached to the wing. B.J.

A82-18621 † **Calculation of the stability of crosswise-reinforced cylindrical shells (K raschetu ustoichivosti karkasirovannykh tsilindricheskikh obolochek).** G. N. Zamula and K. M. Ierusalimskii. *TsAGI, Uchenye Zapiski,* vol. 12, no. 3, 1981, p. 83-94. 9 refs. In Russian.

General equations of stability and thermal stability are obtained for crosswise-reinforced noncircular cylindrical shells. The analysis takes into account nonuniform loading, variable stiffness, the anisotropy of the structure, and nonlinear effects. The equations make it possible to analyze the shell stability with allowance for the plastic state of the material and the buckling of the skin. The development of computational algorithms for this stability analysis is considered. B.J.

A82-18691 # **Fluidics in aircraft engine controls.** G. E. Davies (Plessey Aerospace, Ltd., Fareham, Hants., England). *ASME, Transactions, Journal of Dynamic Systems, Measurement, and Control,* vol. 103, Dec. 1981, p. 324-330. 6 refs.

Fluidics may be used to measure pressure ratio as a fundamental engine performance parameter using simple robust components, capable of withstanding high pressures and temperatures, and severe vibration. It improves the accuracy of measurement, and obviates the need of conventional systems to utilize nonoptimum, but easier to control parameters. A wide range of aircraft engine controls has been developed, including those for compressor inlet guide vanes, compressor bleed valves, engine fuel flow, and instrumentation. Total fluidic unit deliveries are now over 4200, and the civil operating hours exceed 13.5 million. A completely fluidic engine control is proposed with an electronic computer-controlled trim system for efficiency optimization. J.F.

A82-18726 **Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981.** Conference sponsored by the North Carolina State University and the Institute of Noise Control Engineering. Edited by L. H. Royster, F. D. Hart (North Carolina State University, Raleigh, NC), and N. D. Stewart (Acoustical Consultants, Inc., Gary, NC). Poughkeepsie, NY, Noise Control Foundation, 1981. 482 p. $42.

Topics discussed include noise control regulations and benefits, noise source identification, and the applications of damping materials. Papers are presented on Federal control technology initiatives in occupational noise, sound power measurement using the cross-spectral technique, low frequency noise reduction of acoustic enclosures, and the reflection and absorption of high-intensity sound at the surface of bulk porous materials. Attention is also given to nonacoustic design parameters for industrial mufflers, to educational programs for hearing conservation, and to a finite element analysis applied to open-end spinning noise. C.R.

A82-18727 **Reduction of the acoustic environment in an F100-PW-100 engine test cell.** V. R. Miller (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). In: Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, Raleigh, NC, June 8-10, 1981. Poughkeepsie, NY, Noise Control Foundation, 1981, p. 257-260. 5 refs.

It is found that adding the acoustic treatment to the modification of the ejector tube lowers the acoustic environment in the test cell. The measured acoustic levels after modifications are below the design levels for engine structures as close as 40 inches ahead of the engine exhaust plane for maximum afterburner for the aft ejector tube position (AETP) and standard ejector tube position (SETP) configurations. The acoustic environment in the modified test cell is found to be lowest when the ejector tube is in the aft position (AETP). The measured acoustic levels exceed the design levels for engine structure with engine operation at the forward ejector tube position (FETP) configuration at maximum afterburner. C.R.

A82-18728 **Development of a transmission loss test facility for light aircraft structures.** C. K. Barton (Garrett Turbine Engine Co., Phoenix, AZ). In: Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, Raleigh, NC, June 8-10, 1981. Poughkeepsie, NY, Noise Control Foundation, 1981, p. 265-268.

The development of a transmission loss (TL) test facility designed specifically for light aircraft structures is described, and preliminary data obtained in the new facility are presented. The facility features automated control of the entire measurement procedure through the use of a desk-top computer interfaced with digital relays and a one-third octave frequency analyzer. The computer is programmed to start and stop the sound sources, switch microphones for the analyzer, and operate the analyzer. C.R.

A82-18729 * **Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft.** L. A. Roussos and J. S. Mixson (NASA, Langley Research Center, Hampton, VA). In: Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, Raleigh, NC, June 8-10, 1981. Poughkeepsie, NY, Noise Control Foundation, 1981, p. 291-294.

A response analysis is carried out to determine the predictability of sidewall accelerations in aircraft, to investigate whether it is necessary to model the exterior pressure as a traveling wave as opposed to a standing wave, and to determine the importance of parameters describing the exterior pressure and sidewall panel. Prediction of the acceleration response is found to be improved by including traveling wave and spatial variation effects of the exterior pressure in the model. Variations with propeller rpm are found to be important for the longer panel. C.R.

A82-18730 **Noise control plan for a new airplane manufacturing facility.** M. D. Lockleer and R. C. Klein (Boeing Commercial Airplane Co., Seattle, WA). In: Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, Raleigh, NC, June 8-10, 1981. Poughkeepsie, NY, Noise Control Foundation, 1981, p. 299-302.

The work done by a noise technology staff in designing a noise control treatment for a new factory that had already been designed and had an established floor plan is described. The staff also had the responsibility of estimating noise levels in the new factory before it was completed. The noise-estimating procedures were based on acquiring noise measurements in a similar manufacturing facility with comparable enclosed area dimensions, production activities, and room characteristics. Noise was measured along the periphery of each area by recording the dBA level for a period of one minute. These noise levels were then transferred onto the new factory floor layout, where they were adjusted to account for work cycle, density of work parts, and number of production workers per unit area. C.R.

A82-18731 **Noise monitoring in airport communities.** W. K. Connor (Tracor, Inc., Austin, TX). In: Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, Raleigh, NC, June 8-10, 1981. Poughkeepsie, NY, Noise Control Foundation, 1981, p. 401-406. 6 refs.

Current noise monitoring practices at airports are surveyed, with emphasis placed on extent, implementation, and rationale. It is noted that contemporary aircraft monitoring systems can perform a wide variety of functions in support of an airport noise abatement program. In establishing a system, the importance of developing the program before locating the stations and specifying functions is stressed. Among the basic design considerations are the location and type of the central station, the number and locations of the remote stations, the type of data output, the amount of data to be stored, and the operating costs. C.R.

A82-18732 * **Quantification of airport community noise impact in terms of noise levels, population density, and human subjective response.** R. DeLoach (NASA, Langley Research Center, Hampton, VA). In: Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, Raleigh, NC, June 8-10, 1981. Poughkeepsie, NY, Noise Control Foundation, 1981, p. 419-422. 7 refs.

The Fraction Impact Method (FIM), developed by the National Research Council (NRC) for assessing the amount and physiological effect of noise, is described. Here, the number of people exposed to a given level of noise is multiplied by a weighting factor that depends on noise level. It is pointed out that the Aircraft-noise Levels and Annoyance MOdel (ALAMO), recently developed at NASA Langley Research Center, can perform the NRC fractional impact calculations for given modes of operation at any U.S. airport. The sensitivity of these calculations to errors in estimates of population, noise level, and human subjective response is discussed. It is found that a change in source noise causes a substantially smaller change in contour area than would be predicted simply on the basis of inverse square law considerations. Another finding is that the impact calculations are generally less sensitive to source noise errors than to systematic errors in population or subjective response. C.R.

A82-18776 **The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results.** R. L. Simpson, Y.-T. Chew, and B. G. Shivaprasad (Southern Methodist University, Dallas, TX). *Journal of Fluid Mechanics,* vol. 113, Dec. 1981, p. 23-51, 53-73. 60 refs. Navy-supported research. Project SQUID.

The structure of a separating turbulent boundary layer was studied experimentally for an airfoil-type flow. Reynolds stress and mean flow were determined, and results are provided for velocity probability distribution flatness and skewness factors for higher order turbulence. The flow was accelerated and decelerated until separation occurred, and measurements were made by hot-wire and laser anemometry. A small mean backflow in the separation is found to be supplied intermittently by large-scale structures passing through the separated flow. This mechanism is suggested to be dominant only when the thickness of the backflow region is small compared with the turbulent shear-layer thickness. M.S.K.

A82-18837 # **The application of bifurcation theory to the study of loss of control over combat aircraft (Application de la theorie des bifurcations à l'etude des pertes de controle sur avion de combat).** P. Guicheteau (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(NATO, AGARD, Symposium on Combat Aircraft Manoeuverability, Florence, Italy, Oct. 5-8, 1981.) ONERA, TP* no. 1981-100, 1981. 14 p. 8 refs. In French.

Nonlinear models of aircraft in spin and loss of control conditions are constructed using bifurcation theory. The cases of Riemann-Hugoniot catastrophe and Hopf bifurcation are considered, and bifurcation and the mechanics of flight are analyzed. A nonlinear model without hysteresis, with angles of attack ranging from -10 to 90 deg and slip angles from -40 to 40 deg is developed for combat aircraft with high wings and back empennage. Behavior at high angles of attack is discussed in terms of regaining control in movements transverse to the depth of the fixed position and in movements of pure depth. Areas of equilibrium of the flight envelope are defined for escaping from the hazardous situations. M.S.K.

STAR ENTRIES

N82-14049*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OPTIMIZATION AND PERFORMANCE CALCULATION OF DUAL-ROTATION PROPELLERS
Robert E. Davidson Dec. 1981 46 p refs
(NASA-TP-1948; L-14679) Avail: NTIS HC A03/MF A01 CSCL 01A

An analysis is given which enables the design of dual-rotation propellers. It relies on the use of a new tip loss factor deduced from T. Theodorsen's measurements coupled with the general methodology of C. N. H. Lock. In addition, it includes the effect of drag in optimizing. Some values for the tip loss factor are calculated for one advance ratio. Author

N82-14055*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISON OF EXPERIMENTAL AND THEORETICAL TURBULENCE REDUCTION CHARACTERISTICS FOR SCREENS, HONEYCOMB, AND HONEYCOMB-SCREEN COMBINATIONS
James Scheiman Dec. 1981 55 p refs
(NASA-TP-1958; L-14628) Avail: NTIS HC A04/MF A01 CSCL 01A

Turbulence reduction research using screens, honeycomb, and combinations thereof was conducted in a half-scale model of a portion of the Langley 8-foot transonic pressure tunnel. It was found that screens alone reduce axial turbulence more than lateral turbulence; whereas, honeycomb alone reduces laterial turbulence more than axial turbulence. Because of this difference, the physical mechanism for decreasing turbulence for screens and honeycomb must be completely different. It is concluded that honeycomb with a downstream screen is an excellent combination for reducing turbulences. E.A.K.

N82-14056*# National Aeronautics and Space Administration, Washington, D. C.
SYSTEM FOR ACQUISITION AND ANALYSIS OF DYNAMIC TESTS ON AIR INTAKES
P. Perrier, B. Delahaye (SNECMA, Moissy-Cramayel, France), and G. Laruelle (ONERA, Paris) Dec. 1981 54 p refs Transl. into ENGLISH of "Systeme d'Acquisition et d'Analyse pour Essais Dynamiques d'Entees d'Air". Rept. ONERA-TP-1981-37 ONERA, France, 1981 15 p Presented at the AGARD Symp. on Aerodyn. of Power Plant Installation, Toulose, 11-14 May 1981 Original language document was announced as A81-39240 Transl. by Scientific Translation Service, Santa Barabara, Calif. Original doc. prep. by Avions Marcel Dassault-Breguet Aviation
(Contract NASw-3542)
(NASA-TM-76646) Avail: NTIS HC A04/MF A01 CSCL 01A

The problem of compatibility between the airflow developed through the aircraft's air intake ducting and its suitability to the jet engine are studied. A review of the various functions of the air intake is presented. A proposed solution to measure the various parameters is described. The specifications and details of the system permit measurements with a satisfactory reliability on the test bench, as well as in the wind tunnel or in flight. R.J.F.

N82-14057*# National Aeronautics and Space Administration, Washington, D. C.
EXPERIMENTAL INVESTIGATION OF A TRANSONIC POTENTIAL FLOW AROUND A SYMMETRIC AIRFOIL
W. J. Hiller and G. E. A. Meier Dec. 1981 26 p refs Transl. into ENGLISH from Rept. 10/1971 Max-Planck Inst. fuer Stroemungsforschung, Goettingen, W. Germany, Nov. 1971 22 p Original language document was announced as N72-19396 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76676; Rept-10/1971) Avail: NTIS HC A03/MF A01 CSCL 01A

Experimental flow investigations on smooth airfoils were done using numerical solutions for transonic airfoil streaming with shockless supersonic range. The experimental flow reproduced essential sections of the theoretically computed frictionless solution. Agreement is better in the expansion part of the of the flow than in the compression part. The flow was nearly stationary in the entire velocity range investigated. Author

N82-14058*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A FLIGHT INVESTIGATION OF BLADE-SECTION AERODYNAMICS FOR A HELICOPTER MAIN ROTOR HAVING 10-64C AIRFOIL SECTIONS
Charles E. K. Morris, Jr. Nov. 1981 181 p refs
(NASA-TM-83226) Avail: NTIS HC A09/MF A01 CSCL 01A

Pressure data at 90 percent blade radius were obtained for a helicopter main rotor with 10-64C blade sections during flight. Concurrent measurements were made of vehicle flight state, performance and some rotor loads. The test envelope included hover, level flight from about 65 to 162 knots, climb and descent, and collective fixed maneuvers. Good agreement is shown between some sets of airfoil pressure distributions obtained in flight and those from two-dimensional wind-tunnel tests or theoretical calculations. A.R.H.

N82-14059*# Low Energy Transport Systems, Capistrano Beach, Calif.
LOW REYNOLDS NUMBER AIRFOIL SURVEY, VOLUME 1 Final Report
B. H. Carmichael Nov. 1981 100 p refs
(NASA Order L-4059B)
(NASA-CR-165803-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 10A

The differences in flow behavior two dimensional airfoils in the critical chordlength Reynolds number compared with lower and higher Reynolds number are discussed. The large laminar separation bubble is discussed in view of its important influence on critical Reynolds number airfoil behavior. The shortcomings of application of theoretical boundary layer computations which are successful at higher Reynolds numbers to the critical regime are discussed. The large variation in experimental aerodynamic characteristic measurement due to small changes in ambient turbulence, vibration, and sound level is illustrated. The difficulties in obtaining accurate detailed measurements in free flight and dramatic performance improvements at critical Reynolds number, achieved with various types of boundary layer tripping devices are discussed. E.A.K.

N82-14060# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ACTA MECHANICA SINICA (SELECTED ARTICLES)
20 Oct. 1981 37 p refs Transl. into ENGLISH from Acta Mech. Sinica (Communist China), no. 3, 1980 p 217-231, 302-310
(AD-A107322; FTD-ID(RS)T-0709-81) Avail: NTIS HC A03/MF A01 CSCL 01/1

Simplified Navier-Stokes equations, their mathematical properties, and equations of flight mechanics used in analyzing the effects of wind and atmospheric turbulence on flight performance are presented. Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds is also presented.

N82-14061# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
LIFTING SURFACE THEORY FOR WINGS IN LOW FREQUENCY SMALL AMPLITUDE YAWING AND SIDE SLIPPING OSCILLATING MOTIONS AT LOW SPEEDS
Huang Mingke *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0709-81) 20 Oct. 1981 p 1-15 refs Transl. into ENGLISH from Acta Mech. Sinica (Communist China), no. 3, 1980 p 217-231, 302-310

Avail: NTIS HC A03/MF A01 CSCL 01/1

The mathematical problem of flow at low speeds past a yawing oscillating wing set up by using a coordinate system fixed in the wing is discussed. The snake-like tail vortices behind the wing are investigated in detail. In the case of low frequency oscillations, numerical solution is obtained by the non-steady vortex-lattice method which can be used to calculate the rolling moment aerodynamic derivatives of the wing due to yaw and side slip. Some of the computed results are compared with the experimental results. Author

N82-14071# Arinc Research Corp., Annapolis, Md.
THE USE OF FLIGHT MANAGEMENT COMPUTERS IN AIR CARRIER OPERATIONS IN THE 1990S Interim Report
I. Gershkoff Washington FAA Aug. 1981 113 p refs
(Contract DTFA01-80-C-10030)
(AD-A105621; Rept-1378-11-1-2482; FAA-EM-81-10) Avail: NTIS HC A06/MF A01 CSCL 09/2

The use of on-board flight management computers (FMCs) in air carrier operations has the potential for significant fuel savings. This report assesses the general capabilities of the FMCs currently available. From this information, economic benefits and rates at which aircraft would be equipped were developed. Minimum-cost flight profiles were analyzed for various common conditions to determine the problems associated with incorporating the capabilities of FMCs into a heavy traffic Air Traffic Control environment. GRA

N82-14072# Hamilton Standard, Windsor Locks, Conn.
ADVANCED CRASH SURVIVABLE FLIGHT DATA RECORDER AND ACCIDENT INFORMATION RETRIEVAL SYSTEM (AIRS) Final Report, Oct. 1978 - Dec. 1980
Henry R. Ask, Donald L. White, and Kent E. Berwick Fort Eustis, Va. Army Research and Technology Labs. Aug. 1981 166 p refs
(Contract DAAK51-78-C-0025; DA Proj. 1L1-62209-AH-76)
(AD-A105510; ESP-8109; USAAVRADCOM-TR-81-D-20) Avail: NTIS HC A08/MF A01 CSCL 01/3

The Accident Information Retrieval System, (AIRS) development program consisted of four phases. Design concepts were formulated based on selection and definition of aircraft parameters to be monitored by the AIRS, selection of memory technology, circuit definitions for aircraft interfacing, and studies and tests related to the development of an armored module to protect the memory device. Brassboard electronics were fabricated and tested and software which proved the feasibility of data collection and storage in a solid-state memory device utilizing unique data compression techniques to reproduce critical aircraft flight information was developed and tested. Flight-worthiness assurance tests were performed on the AIRS brassbroad. The hardware was installed in a Sikorsky UH-60A BLACK HAWK helicopter. The system was reviewed for final configuration, risk areas, final size (207 cu. in. or less), weight (less than 9.3 lbs.), and life cost (greater than 10,000 hours MTBF). GRA

N82-14073# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
ANALYSIS OF TWO AIR TRAFFIC SAMPLES IN THE TERMINAL AREA OF FRANKFURT/MAIN, AUGUST 4TH 1978
Uwe Voelckers, Manfred Schubert, and Albrecht Seyfried 1981 127 p refs In GERMAN
(DFVLR-Mitt-81-12) Avail: NTIS HC A07/MF A01

Two 'arrival peaks' are analyzed. Computer programs used to combine data recorded from several sources are discussed. Traffic analysis includes quantitative evaluation of traffic density, studies of air traffic distributions relating to space and time, investigation of air traffic control procedures, determination of the approach control planning strategies, and a basic investigation of traffic vectoring in the terminal area. The similarities and differences of the two traffic samples are discussed. N.W.

N82-14075*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DESIGN AND IMPLEMENTATION OF A TELECOMMUNICATION INTERFACE FOR THE TAATM/TCV REAL-TIME EXPERIMENT
Joseph D. Nolan Dec. 1981 26 p refs
(NASA-TM-83231; L-15021) Avail: NTIS HC A03/MF A01 CSCL 17G

The traffic situation display experiment of the terminal configured vehicle (TCV) research program requires a bidirectional data communications tie line between an computer complex. The tie line is used in a real time environment on the CYBER 175 computer by the terminal area air traffic model (TAATM) simulation program. Aircraft position data are processed by TAATM with the resultant output sent to the facility for the generation of air traffic situation displays which are transmitted to a research aircraft. E.A.K.

N82-14076# Federal Aviation Administration, Atlantic City, N.J.
IN-SERVICE TESTING OF THE PRECISION APPROACH PATH INDICATOR (PAPI) AT NEWARK INTERNATIONAL AIRPORT, NEW JERSEY Interim Report, Dec. 8, 1980 - Apr. 8, 1981
Bret B. Castle Dec. 1981 11 p
(DOT-081-502-510)
(DOT/FAA/RD-81/95; DOT/FAA/CT-81/79) Avail: NTIS HC A02/MF A01

The Precision Approach Path Indicator (PAPI) tests involving four months of inservice testing at Newark International Airport, New Jersey are presented. Basically, the PAPI was compared against the standard red/white Visual Approach Slope Indicator (VASI) system at a large airport and on a runway with an Instrument Landing System (ILS). The PAPI system was installed in a manner to take care of aircraft of all sizes; that is, different wheel to eye distances. Information was obtained from pilots of large commercial aircraft. Results show that under these conditions about 60 percent of the pilots prefer the PAPI over the VASI system. S.L.

N82-14078*# Ohio Univ., Athens. Avionics Engineering Center.
A PROTOTYPE INTERFACE UNIT FOR MICROPROCESSOR BASED LORAN-C RECEIVER
Stanley M. Novacki, III Nov. 1981 11 p refs
(Grant NGR-36-009-017)
(NASA-CR-164887; TM-82-NASA) Avail: NTIS HC A02/MF A01 CSCL 17G

An inexpensive data/command entry and CRT display system capable of alphanumeric and graphics mode operation and designed to operate in place of a separate ASCII terminal, is documented. The software to interface this unit to the 6502-based Loran C receiver is also described. The system simplifies receiver operations to a level typical of current avionics systems. N.W.

N82-14079# Mitre Corp., McLean, Va.
REQUIREMENTS FOR INSTRUMENT APPROACHES TO TRIPLE PARALLEL RUNWAYS
T. N. Shimi, W. J. Swedish, and L. C. Newman Jul. 1981 148 p refs
(Contract DTFA01-81-C-10001)
(AD-A105622; MTR-81W145; FAA-EM-81-12) Avail: NTIS HC A07/MF A01 CSCL 01/2

Current ATC procedures do not consider instrument approaches to more than two parallel runways. This document discusses the engineering results of an analysis that examined the technical feasibility of conducting triple parallel instrument approaches as a means of increasing the aircraft flow at congested airports. The technical criteria that were subjected to analysis include the physical characteristics of the airfield, airspace and aircraft mix, surveillance (the radar and display systems), and control (procedures for normal and abnormal operations. The expected performance in safety and capacity was estimated for alternative landing concepts. An analysis was conducted of blunders and evasion strategies. It was found that, for a given configuration, a single blunder recovery strategy could be specified that would produce acceptable separations between aircraft. Missed approaches on triple parallels and pilot acceptance of triple approaches are also discussed. Lastly, recommended requirements and control procedures for triple parallel instrument approaches are presented. Author (GRA)

N82-14080# Mitre Corp., McLean, Va.
REQUIREMENTS FOR INDEPENDENT AND DEPENDENT PARALLEL INSTRUMENT APPROACHES AT REDUCED RUNWAY SPACING
A. L. Haines and W. J. Swedish Washington FAA May 1981 182 p refs
(Contract DTFA01-81-C-10001)
(AD-A105673; MTR-81W15; FAA-EM-81-8) Avail: NTIS

HC A09/MF A01 CSCL 01/2

Independent parallel instrument approaches are conducted today only if the runway centerlines are 4300 ft apart or more. The rationale behind this criterion is reviewed, and the requirements for reducing the criterion to 3000 ft are evaluated. Although some benefit is derived from improvements in navigational accuracy, the performance of the surveillance system has the greatest impact on the required runway spacing. Dependent alternating instrument approaches to parallel runways are also evaluated. Currently such approaches require a runway spacing of 3000 ft or more. The effects of reducing this runway spacing are discussed, especially with regard to blunder recovery. Reducing the runway spacing required for these approaches could increase the arrival capacity and reduce delays at certain airports and would provide increased flexibility for planning new runways. Author (GRA)

N82-14082# Kaman Aerospace Corp., Bloomfield, Conn.
ADVANCED TECHNOLOGY LIGHTWEIGHT GONDOLA SYSTEM EXPERIMENTAL FABRICATION PROGRAM Final Report, Aug. 1979 - Mar. 1981
John D. Porterfield Jul. 1981 133 p refs
(Contract DAAK51-79-C-0036; DA Proj. 1L1-62209-AH-76)
(AD-A104157; R-1630; USAAVRADCOM-TR-81-D-24) Avail: NTIS HC A07/MF A01 CSCL 01/3

Design concept verification hardware for the helicopter external gondola systems (HEGS) 10 and 20 modules, critical element and component fabrication and testing and full-scale HEGS 20 gondola assemblies were accomplished. The HEGS 20 module characteristics demonstrated during design, fabrication, and testing included (1) structural efficiency (2) impact resistance potential, (3) producibility, (4) repairability without post heat treatment, (5) maintenance, (6) functional and structural capabilities, (7) load and unload capabilities, (8) cargo tie-down capabilities, (9) compatibility with automated lifting devices and ground transport equipment, (10) suitability for loading and unloading on uneven terrain, and (11) low weight potential. Author

N82-14083# Army Armament Research and Development Command, Watervliet, N. Y. Geotechnical Lab.
C-5A OPERATIONAL UTILITY EVALUATION SOIL TESTS AND ANALYSIS Final Report, Jun. - Aug. 1980
Robert W. Grau Aug. 1981 74 p refs
(Contract MIPR-F7813001430001)
(AD-A105535; WES-TR-GL-81-7) Avail: NTIS HC A04/MF A01 CSCL 08/13

The purpose of this report is to present the data collected concerning the ground flotation characteristics of the C-5A aircraft during the C-5A operational utility evaluation test program. This report gives a description of the three test sites selected for this program, a summary of all soil and surface distress measurements taken at each site during aircraft operations, and an analysis of the data. Results of this evaluation test program indicate that 3-in. ruts have little or no effect on the performance of the C-5A aircraft on unsurfaced areas. Author (GRA)

N82-14084# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
A METHOD FOR MEASURING TAKEOFF AND LANDING PERFORMANCE OF AIRCRAFT, USING AN INERTIAL SENSING SYSTEM
A. Pool, J. L. Simons, G. J. H. Wensink, and A. J. L. Willekens 25 Sep. 1980 10 p refs Presented at AGARD Flight Mech. Panel Symp. on Subsystem Testing and Flight Test Instrumentation, Geilo, Norway, 27-30 Oct. 1980
(NLR-MP-80036-U) Avail: NTIS HC A02/MF A01

An inertial sensing system, STALINS, used to provide trajectory data for takeoff and landing measurement instrument design, is presented. The system specifications based on certification requirements for civil transport aircraft are defined for continuous and rejected takeoff, minimum unstick speed, minimum control speed on the ground, and landing. Calculations are performed using a computer program supplemented by a manual check, giving horizontal distance and height measurements. Data are made available within 24 hours. The method is accurate and is suitable for tests at several airfields, since instrumentation is either onboard already, or easily transported by the aircraft. Author (ESA)

N82-14085*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A GENERAL AVIATION SIMULATOR EVALUATION OF A RATE-ENHANCED INSTRUMENT LANDING SYSTEM DISPLAY
David A. Hinton Dec. 1981 44 p
(NASA-TP-1960; L-13911) Avail: NTIS HC A03/MF A01 CSCL 01D

A piloted-simulation study was conducted to evaluate the effect on instrument landing system tracking performance of integrating localizer-error rate with raw localizer and glide-slope error. The display was named the pseudocommand tracking indicator (PCTI) because it provides an indication of the change of heading required to track the localizer center line. Eight instrument-rated pilots each flew five instrument approaches with the PCTI and five instrument approaches with a conventional course deviation indicator. The results show good overall pilot acceptance of the display, a significant improvement in localizer tracking error, and no significant changes in glide-slope tracking error or pilot workload. B.W.

N82-14086 Royal Aircraft Establishment, Farnborough (England).
A TRUE AIR SPEED SENSOR FOR MINIATURE UNMANNED AIRCRAFT
J. A. C. Beattie Jun. 1981 11 p refs
(RAE-TM-SPACE-287; BR80019) Copyright. Avail: Issuing Activity

A prototype sensor with digital output is described. Vortex shedding principles are exploited by using a bluff body with end-plates to produce a stable set of vortices alternately from the edges of the body. Vortex production frequency is directly proportional to the speed of the fluid past the body. A pair of printed thick film thermistors detect the vortices. Tests show excellent linearity of response, although sensor geometry, and signal processing electronics can be improved. Author (ESA)

N82-14087# General Electric Co., Cincinnati, Ohio. Aircraft Equipment Div.
ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM, OPERATIONAL FUCTIONS REPORT Interim Report, Jun. 1979 - Oct. 1980
Oct. 1980 201 p refs
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A105516; ACS-12-217; AVRADCOM-TR-79-0270-2; IR-2) Avail: NTIS HC A10/MF A01 CSCL 01/3

Basic system operating requirements for an Electronic Master Monitor and Advisory Display System (EMMADS), developed for use on U.S. Army helicopters to reduce crew workload by assuming responsibility for tasks associated with subsystem status monitoring, are described. A baseline for defining the requirements of the feasibility demonstration hardware is provided EMMADS functions described include examples related to the CH-47C helicopter, the aircraft selected as the basis for the EMMADS feasibility model. Author

N82-14088# Naval Air Development Center, Warminster, Pa.
INVESTIGATION OF FUNCTIONAL COMMONALITY OF AVIONICS SYSTEMS IN NAVAL AIRCRAFT Final Report, Jan. - Sep. 1981
John M. Cunningham 30 Sep. 1981 136 p refs
(W05720000)
(AD-A105503; NADC-81235-20) Avail: NTIS HC A07/MF A01 CSCL 09/3

This report presents the results of a study to determine general requirements for the development of core avionics equipment for common usage by Naval aircraft. The study addresses the core avionics architecture and the relationship between existing core avionics equipment and advanced subsystems under development. The report provides specific recommendations regarding: procurement policies; the application of standards to electronic interfaces; and the development of the basic architectural components. GRA

N82-14089# Southwest Research Inst., San Antonio, Tex.
HELICOPTER MODEL STUDIES FOR ON-BOARD ELECTROSTATIC SENSORS Final Report, 25 Sep. 1979 - 24 Jan. 1981
O. Tranbarger, B. M. Duff, and T. R. Owen Fort Eustis, Va. Army Research and Technology Labs. Sep. 1981 286 p refs
(Contract DAAK51-79-C-0060; DA Proj. 1L1-62209-AH-76)

(AD-A105511; SWRI-14-5863; USAAVRADCOM-TR-81-D-26) Avail: NTIS HC A13/MF A01 CSCL 13/12

Hovering helicopters accumulate excessive charge as a result of triboelectrification, surrounding space charge, and external electric fields that result in high electrostatic potentials on the aircraft. Electrostatic energy stored on the helicopter can cause electrical discharges to occur from the cargo hook when contact is made with the ground or ground personnel. Laboratory model studies were conducted under electrostatic conditions simulating hovering aircraft to show that on-board instrumentation capable of measuring electric field intensity and charge density can provide the basis for indirectly inferring the correct potential relative to ground of a spherical model test body. Potential of the model was inferred for three cases involving electrostatic instrumentation located (1) on the ground below the model, (2) installed at the south pole of the model, and (3) mounted at the end of the simulated cargo hook. Analysis of laboratory test data resulted in empirical derivations of unique electric field curves for each of the three cases studied. The first two cases were also studied analytically by solving Poisson's equation for a sphere between two parallel plates, and the mathematical expressions substantiated the laboratory results. Methodology for developing a full-scale helicopter electrostatic discharger system to eliminate hazardous potentials on helicopter aircraft is described.
Author (GRA)

N82-14090*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
GAS TURBINE CERAMIC-COATED-VANE CONCEPT WITH CONVECTION-COOLED POROUS METAL CORE
Albert F. Kascak (AVRADCOM Research and Technology Labs., Cleveland), Curt H. Liebert, Robert F. Handschuh, and Lawrence P. Ludwig Dec. 1981 14 p refs Sponsored in part by U.S. Army Aviation Research and Development Command, St. Louis
(NASA-TP-1942; AVRADCOM-TR-81-C-7; E-732) Avail: NTIS HC A02/MF A01 CSCL 21E

Analysis and flow experiments on a ceramic-coated-porous-metal vane concept indicated the feasibility, from a heat transfer standpoint, of operating in a high-temperature (2500 F) gas turbine cascade facility. The heat transfer and pressure drop calculations provided a basis for selecting the ceramic layer thickness (to 0.08 in.), which was found to be the dominant factor in the overall heat transfer coefficient. Also an approximate analysis of the heat transfer in the vane trailing edge revealed that with trailing-edge ejection the ceramic thickness could be reduced to (0.01 in.) in this portion of the vane. B.W.

N82-14091*# National Aeronautics and Space Administration, Washington, D. C.
WIND TUNNEL TESTS OF ENGINE-EQUIPPED MODELS: COMPARISON OF TWO JET WASH SIMULATION METHODS
J. P. Becle and R. Perin Dec. 1981 43 p ref Transl. into ENGLISH of "Essais en Soufflerie de Maquetter Motorisees. Comparison de Deux Methodes de Simulation des Jets des Reacteurs" rept. T.P. 1981-42, France, 1981 p 1-18 Presented at the AGARD/FDP Symp. Aerodynamics of Power Plant Installation, Toulouse, 11-14 May 1981 Original language document was announced as A81-39245 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by ONERA, Toulouse
(Contract NASw-3542)
(NASA-TM-76764; TP-1981-42) Avail: NTIS HC A03/MF A01 CSCL 21E

The optimization of performance factors in state of the art civil aircraft was studied by using powered models in wind tunnels. In cooperation with ONERA, two methods of cold simulation of jet engine washes were developed. The first, called 'blown jet', benefitted from the previously perfected test set-ups made for studies of the CONCORDE. The second, which utilized small air-turbines, were recently put into operation for the AIRBUS family of aircraft. The facilities, the measurement equipment and the methods of exploiting the results are described. The relative value of each of the methods of motorization is analyzed: complexity of equipment, duration, precision of measurements and comparison of results are also discussed. A.R.H.

N82-14094*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE USE OF OPTIMIZATION TECHNIQUES TO DESIGN CONTROLLED DIFFUSION COMPRESSOR BLADING
Nelson L. Sanger 1982 18 p refs Proposed for presentation at the 27th Ann. Intern. Gas Turbine Conf., London, Apr. 18-22, 1982; sponsored by ASME
(NASA-TM-82763; E-1084) Avail: NTIS HC A02/MF A01 CSCL 21E

A method for automating compressor blade design using numerical optimization, and applied to the design of a controlled diffusion stator blade row is presented. A general purpose optimization procedure is employed, based on conjugate directions for locally unconstrained problems and on feasible directions for locally constrained problems. Coupled to the optimizer is an analysis package consisting of three analysis programs which calculate blade geometry, inviscid flow, and blade surface boundary layers. The optimizing concepts and selection of design objective and constraints are described. The procedure for automating the design of a two dimensional blade section is discussed, and design results are presented. E.A.K.

N82-14095*# AiResearch Mfg. Co., Phoenix, Ariz.
POLLUTION REDUCTION TECHNOLOGY PROGRAM SMALL JET AIRCRAFT ENGINES, PHASE 3 Final Report
T. W. Bruce, F. G. Davis, T. E. Kuhn, and H. C. Mongia Dec. 1981 180 p refs
(Contract NAS3-20819)
(NASA-CR-165386; AiResearch-21-3615) Avail: NTIS HC A09/MF A01 CSCL 21E

A series of Model TFE731-2 engine tests were conducted with the Concept 2 variable geometry airblast fuel injector combustion system installed. The engine was tested to: (1) establish the emission levels over the selected points which comprise the Environmental Protection Agency Landing-Takeoff Cycle; (2) determine engine performance with the combustion system; and (3) evaulate the engine acceleration/deceleration characteristics. The hydrocarbon (HC), carbon monoxide (CO), and smoke goals were met. Oxides of nitrogen (NOx) were above the goal for the same configuration that met the other pollutant goals. The engine and combustor performance, as well as accelaration/deceleration characteristics, were acceptable. The Concept 3 staged combustor system was refined from earlier phase development and subjected to further rig refinement testing. The concept met all of the emissions goals. E.A.K.

N82-14096*# AiResearch Mfg. Co., Phoenix, Ariz.
ERBS FUEL ADDENDUM: POLLUTION REDUCTION TECHNOLOGY PROGRAM SMALL JET AIRCRAFT ENGINES, PHASE 3 Final Report
T. W. Bruce, F. G. Davis, T. E. Kuhn, and H. C. Mongia [1982] 47 p refs
(Contract NAS3-20819)
(NASA-CR-165387; AiResearch-21-3619) Avail: NTIS HC A03/MF A01 CSCL 21E

A Model TFE731-2 engine with a low emission, variable geometry combustion system was tested to compare the effects of operating the engine on Commercial Jet-A aviation turbine fuel and experimental referee broad specification (ERBS) fuels. Low power emission levels were essentially identical while the high power NOx emission indexes were approximately 15% lower with the EBRS fuel. The exhaust smoke number was approximately 50% higher with ERBS at the takeoff thrust setting; however, both values were still below the EPA limit of 40 for the Model TFE731 engine. Primary zone liner wall temperature ran an average of 25 K higher with ERBS fuel than with Jet-A. The possible adoption of broadened proprties fuels for gas turbine applications is suggested. E.A.K.

N82-14097# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
OPTIMIZATION OF COMPRESSOR VANE AND BLEED SETTINGS Final Report, May 1979 - May 1981
J. E. Garberoglio, J. O. Song, and W. L. Boudreaux Wright-Patterson AFB, Ohio AFWAL Jun. 1981 83 p refs
(Contract F33615-79-C-2018; AF Proj. 2307)
(AD-A106059; PWA-FR-14487; AFWAL-TR-81-2046) Avail: NTIS HC A05/MF A01 CSCL 21/5

This report evaluates optimization methods for their effectiveness in relating multistage axial compressor test data to the decision to vary a selected vane or bleed to reach a predetermined performance goal. Compressor simulations were used in a comparative evaluation and each method was judged on the basis of the number of tests required to achieve an optimum performance goal. The influence of measurement errors and finite vane travel were also prime considerations. Based on this evaluation, the COPES/CONMIN approximate optimization technique was chosen most suitable. Author (GRA)

N82-14098# Naval Postgraduate School, Monterey, Calif.
FOREIGN OBJECT DAMAGE IN NAVAL AIRCRAFT ENGINES M.S. Thesis
Jack B. Mills Jun. 1981 138 p refs
(AD-A105787) Avail: NTIS HC A07/MF A01 CSCL 01/3

An investigation of historical data was conducted in an attempt to assign a specific cause to each foreign object damage incident reported during an eighteen month period. Interviews were conducted with engineers and fleet maintenance personnel in support of the above research. The impact of current FOD reporting procedures, the foreign objects, the ingestion process and the operating environment are discussed. Conclusions and recommendations are included. Author (GRA)

N82-14099# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
CORROSION INHIBITING ENGINE OILS Final Interim Report, 4 Sep. 1979 - 1 Dec. 1980
G. C. Brown, R. J. Meehan, and P. A. Warner Wright-Patterson AFB, Ohio AFWAL Aug. 1981 73 p refs
(Contract F33615-79-C-5089)
(AD-A106127; PWA-FR-13906; AFWAL-TR-81-4028) Avail: NTIS HC A04/MF A01 CSCL 11/8

The Fluids, Lubricants, and Elastomers Branch of the Materials Laboratory, AFWAL, established the requirements for a MIL-L-7808H operational oil with corrosion inhibition characteristics at least equal to those of MIL-C-8188C. The new oil formulation is to provide corrosion inhibition under long-term storage conditions of the ALCM F107 turbine engine. During the initial fifteen-month effort, several approaches were evaluated as candidate methods for determining the effectiveness of corrosion inhibiting oil additives. A screening procedure was developed after preliminary modifications were made to the Corrosion Rate Evaluation Procedure (CREP). Using the CREP together with compatibility and miscibility screening of oil/inhibitor blends, a total of 67 candidate corrosion inhibitors (CCI) were evaluated. These included CCI obtained from Bray Oil Company, El Monte, California, as part of a subcontract to synthesize candidate corrosion inhibitors. Additional tests were completed on a preliminary physical and chemical property evaluation of the oil/inhibitor blends in regard to MIL-L-7808H and MIL-C-8188C specifications. GRA

N82-14101*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MLS VERTICAL GUIDANCE AND NAVIGATION FOR A STOL AIRPLANE LANDING ON AN ELEVATED STOLPORT
David N. Warner, Jr. Nov. 1981 27 p refs
(NASA-TM-81338) Avail: NTIS HC A03/MF A01 CSCL 01C

In contrast to CTOL landing operations, STOL airplanes landing on short STOLport runways typically begin the flare maneuver before reaching the runway surface. Vertical guidance procedures were developed to allow an autoland flight control system for a STOL airplane to use Microwave Landing System (MLS) signals as altitude and sink rate references for flare initiation, with a transition to radar altimeter after the airplane is over the runway. The implementation has minimum impact on the control system and landing performance. Data are presented which show validation of the concepts in a simulator. Author

N82-14102 Royal Aircraft Establishment, Farnborough (England).
THE DESIGN OF A JET CATCHER
K. G. Winter and L. F. East Feb. 1981 11 p refs
(RAE-TM-AERO-1891; BR78582) Copyright. Avail: Issuing Activity

A device for catching and dissipating the kinetic energy of a jet used in a boundary layer tunnel to eliminate unwanted air currents is described. A dished front face and a large outlet catch the jet, avoiding spillage, and pass it through a screen set normal to the flow in order to reduce kinetic energy. The screen is inclined so as to take advantage of refraction. An additional muslin screen reduces noise. Final outlet velocity is 1/8 of the jet velocity, although there is slight spillage. Author (ESA)

N82-14103 Royal Aircraft Establishment, Farnborough (England).
AN AFTERBODY DRAG BALANCE
A. G. Kurn Mar. 1981 12 p ref
(RAE-TM-AERO-1897; BR78346) Copyright. Avail: Issuing Activity

A strain gage drag balance was made to fit into the jet blowing rig in a transonic wind tunnel. Differences in the drag of various axisymmetric boattailed afterbodies surrounding an engine exhaust nozzle were determined. Three sets of four flexures are spaced equally along the x axis, with strain gages on the middle set. The gages on the center flexures form bridges, compensated for thermal induced drift. Calibration shows that signals are linear with drag force. Output signals can be monitored from two separate strain gage circuits. The device can withstand components of force and moment that might be applied during model assembly. Drag values up to 20N can be measured. Author (ESA)

N82-14104# Grumman Aerospace Corp., Bethpage, N.Y.
STUDY OF FIBER OPTICS TO ENHANCE AN ENVIRONMENTAL LIGHTING LABORATORY Final Report, Nov. 1979 - Mar. 1981
J. Connelly Wright-Patterson AFB, Ohio AFWAL Aug. 1981 154 p Prepared in cooperation with Galileo Electro-Optics Corp., Strubridge, Mass.
(Contract F33615-79-C-3629; AF Proj. 2403)
(AD-A106117; AFWAL-TR-81-3098) Avail: NTIS HC A08/MF A01 CSCL 13/1

This report documents the results of an investigation to determine how fiber optic materials can be utilized to substantially increase the simulation capabilities of an Environmental Lighting Laboratory. This Laboratory must provide the capability to dynamically simulate the ambient environmental illumination conditions encountered in day, night and high threat/high risk aircraft missions. Three cockpit lighting simulator concepts were studied. Two of these concepts utilized a spherical lighting enclosure with a visual scene being projected at the inner surface via a remote projection input surface; fiber optics carry the image from input surface to output surface. In one concept, the pilot views a back-projected image on a translucent spherical screen via a spherical output surface with imbedded fiber optics. In the other concept, the pilot views the spherical fiber optic output surface directly. Both concepts were considered possible to implement; each concept having appropriate cost vs. performance tradeoffs. No useful solution was found using the third concept, a fiber optic input to mirrored ellipsoidal enclosure. It was found that the spherical enclosure concept with an internal translucent projection screen offers the best combination of illumination level and resolution; however, the cost of implementing this concept is substantial. GRA

N82-14312# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels Branch.
DETERMINATION OF SELECTED DISTILLATE BLENDING SOLVENTS IN SIMPLE AND COMPLEX AIRCRAFT FUEL MATRICES VIA GLASS CAPILLARY GAS CHROMATOGRAPHY Final Report, Jan. - Dec. 1979
Paul C. Hayes, Jr. Jun. 1981 44 p refs
(AF Proj. 3048)
(AD-A105588; AFWAL-TR-80-2082) Avail: NTIS HC A03/MF A01 CSCL 07/4

A study was initiated to accurately determine the volume percent of various hydrocarbon distillate solvents present in blends with aircraft jet fuels JP-4 and JP-8. These modified fuels were an integral part of a combustion program to elucidate the effect altered fuel properties had on selected combustion parameters. A method of analysis was desired to check the accuracy of both in-house and contractual blending work. The effort was further expanded to even determine the amount of JP-4 present in the event of gross cross-contamination. Author (GRA)

N82-14313# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels Branch.
DETERMINATION OF PYRIDINE IN MODIFIED JP-4 VIA HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) Final Report, Jun. - Jul. 1975
Paul C. Hayes, Jr. Apr. 1981 24 p refs
(AF Proj. 3048)
(AD-A105589; AFWAL-TR-80-2081) Avail: NTIS HC A02/MF A01 CSCL 07/4

A study was initiated to accurately determine the weight percent of pyridine present in pyridine-modified JP-4 used for contractual combustion studies. High Performance Liquid Chromatography (HPLC) was the method of choice. A chromatographic process was developed and systematic quantitative analyses performed to substantiate the accuracy and precision of the new test method. A computing integrator interfaced with the HPLC system performed all data collection and calculations automatically, with the results printed on a teletype. Least square curve fitting accentuated the reliability for determining pyridine in the 0.5 to 5.0 weight percent concentration range. Author (GRA)

N82-14316# Naval Postgraduate School, Monterey, Calif.
COMBUSTION BEHAVIOR OF SOLID FUEL RAMJETS. VOLUME 1: CORRELATION OF REACTING AND NON-REACTING FLOW CHARACTERISTICS Final Report
Brian A. Binn, Winston E. Scott, and David W. Wetzer Jul. 1981 68 p refs
(AD-A106061; NPS67-81-010-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 21/2

An experimental investigation was conducted to determine the relationship between the cold flow characteristics of velocity, pressure distribution, and turbulence intensity and the reacting flow performance and combustion characteristics of a solid fuel ramjet. The effects of configuration and air flow changes on the above characteristics were examined. Average regression rates and combustion efficiencies were not significantly affected by changes in configuration. These variations in test conditions significantly affected the centerline turbulence intensity but not the near-wall turbulence intensity in cold flow. Near-wall turbulence profiles in cold flow were found to correlate with the fuel regression profiles in reacting flows. The use of bypass resulted in decreases in regression rate and efficiencies for all cases. Author (GRA)

N82-14333*# Avco Lycoming Div., Stratford, Conn. Materials Lab.
DEVELOPMENT OF IMPROVED HIGH TEMPERATURE COATINGS FOR IN-792 + Hf Final Report
D. D. Profant and S. K. Naik Jun. 1981 95 p refs
(Contract NAS3-22371; DA Proj. 1L1-62209-AH-76)
(NASA-CR-165395) Avail: NTIS HC A05/MF A01 CSCL 11F

The development for t-55 I712 engine of high temperature for integral turbine nozzles with improved thermal fatigue resistance without sacrificing oxidation/corrosion protection is discussed. The program evaluated to coating systems which comprised one baseline plasma spray coating (12% Al-NiCoCrALY), three aluminide coatings including the baseline aluminide (701), two CoNiCrAly (6% Al) + aluminide systems and four NiCoCrY + aluminide coating were evaluated. The two-step coating processes were investigated since it offered the advantage of tailoring the composition as well as properly coating surfaces of an integral or segmented nozzle. Cyclic burner rig thermal fatigue and oxidation/corrosion tests were used to evaluate the candidate coating systems. The plasma sprayed 12% Al-NiCoCrAlY was rated the best coating in thermal fatigue resistance and outperformed all coatings by a factor between 1.4 to 2.5 in cycles to crack initiation. However, this coatings is not applicable to integral or segmented nozzles due to the line of sight limitation of the plasma spray process. The 6% Al-CoNiCrAlY + Mod. 701 aluminide (32 w/o Al) was rated the best coating in oxidation/corrosion resistance and was rated the second best in thermal fatigue resistance. J.D.H.

N82-14371*# United Technologies Research Center, East Hartford, Conn.
EXTERNAL FUEL VAPORIZATION STUDY Final Report
E. J. Szetela and J. A. TeVelde Nov. 1981 92 p refs
(NASA-CR-165513; UTRC-81-915326-15) HC A05/MF A01 CSCL 21D

The feasibility of external fuel vaporization in advanced aircraft gas turbine engines is addressed. Experiments were run to determine key fuel properties including boiling points, dew points, critical temperature, critical pressure, heat transfer coefficients, deposit formation rates, and deposit removal in a flowing system. Of particular concern were the heat transfer rate in the heat exchanger and the performance of the orifice used in the throttling process. Three fuels were utilized in the experiments including Jet-A, Experimental referee broad specification fuel, and a premium No. 2 diesel fuel. Engine conditions representing the NASA Energy Efficient Engine at sea level takeoff, cruise, and idle were simulated in the vaporization system and it was found that single phase flow was maintained in the heat exchanger and downstream of the throttle. Deposits encountered in the heat exchanger represented a thermal resistance as high as .0013 sq M K/watt and a deposit formation rate as high as 800 micro-gC/sq cm hr. These values are equivalent to a buildup of 0.055 cm of thickness in 36 hours resulting in a more severe fouling condition than originally anticipated. It was found that the deposit can be removed by cleaning with air at a temperature of 720 K for 10 minutes. R.J.F.

N82-14388# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BI-MONTHLY BULLETIN NO. 1981-2, MARCH - APRIL 1981
Claude Sevestre, ed. Sep. 1981 77 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981
(ESA-TT-713) Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

Research in aerodynamics is reported, including: thermal fatigue tests; cryogenic wind tunnels; plate buckling; subsonic flow; thin film transducers for temperature and heat flux measurements; and laser pumping by electron beam discharge.

N82-14394# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
RESEARCH ON AN INDUCTION DRIVEN CRYOGENIC WIND TUNNEL
Alain Blanchard, Jean-Bernard Dor, Andre Mignosi, and Jean-Francois Breil *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-2, Mar. - Apr. 1981 (ESA-TT-713) Sep. 1981 p 63-77 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimensuel (Paris) No. 1981-2, Mar. - Apr. 1981

Avail: NTIS HC A05/MF A01; original FRENCH report available at ONERA, Paris FF 45

The cryogenitization of an induction driven transonic wind tunnel is discussed. Internal insulation and the design of a liquid nitrogen injection system are considered. A unit of 32 injectors is arranged at the periphery of the first diffuser in two rows. Each injector is controlled by a solenoid valve. Several elements can be brought together at the control point to form a 10 bit digital regulation unit. The nitrogen pulses are kept symmetrical by varying the response time of the solenoid valves. This induction system works well, since the increase in nozzle performance compensates increase of flow in the test, section due to the drop in temperature. It should be suitable with nitrogen gas. Composite and homogeneous insulating materials were repeatedly plunged into liquid nitrogen. All reveal defects when exposed to stress induced by differences in the expansion between their internal and external faces. Internal surfaces must be reinforced with polyurethane. Author (ESA)

N82-14424# ITT Avionics, Nutley, N.J.
MODULAR MULTI-FUNCTION MULTI-BAND AIRBORNE RADIO SYSTEM (MFBARS). VOLUME 2: DETAILED REPORT Final Technical Report, Mar. 1978 - Jun. 1980
R. A. Reilly, C. W. Ward, A. Lee, R. Schineller, A. Clemens, W. Robertson, and J. Rome (Lowell Univ.) Wright-Patterson AFB, Ohio AFWAL Jun. 1981 231 p 2 Vol.
(Contract F33615-78-C-1518; AF Proj. 2003)
(AD-A106052; AFWAL-TR-81-1077-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 17/2

A top down, system oriented study of the selected system approach was conducted. System configuration details and performance parameters were refined. In addition, to minimize system development risk and to provide guidance on the best direction among which MFBARS should proceed, recommended plans were defined for development of the system and supporting technology. Emphasis is placed on the final recommended development plans. T.M.

N82-14447*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
MODELING AND ANALYSIS OF POWER PROCESSING

SYSTEMS (MAPPS). VOLUME 1: TECHNICAL REPORT Final Technical Report, Oct. 1977 - Aug. 1980
F. C. Lee, S. Rahman, R. A. Carter, C. H. Wu, Yuang Yu (TRW Defense and Space Systems Group, Redondo Beach, Calif.), and R. Chang (TRW Defense and Space Systems Group, Redondo Beach, Calif.) Dec. 1980 335 p refs
(Contract NAS3-21051)
(NASA-CR-165538; TRW-32660-6001-RU-01) Avail: NTIS HC A15/MF A01 CSCL 09C

Computer aided design and analysis techniques were applied to power processing equipment. Topics covered include: (1) discrete time domain analysis of switching regulators for performance analysis; (2) design optimization of power converters using augmented Lagrangian penalty function technique; (3) investigation of current-injected multiloop controlled switching regulators; and (4) application of optimization for Navy VSTOL energy power system. The generation of the mathematical models and the development and application of computer aided design techniques to solve the different mathematical models are discussed. Recommendations are made for future work that would enhance the application of the computer aided design techniques for power processing systems. A.R.H.

N82-14454# Naval Research Lab., Washington, D. C. Combustion and Fuels Branch.
GENERATION OF ELECTROSTATIC CHARGE IN FUEL HANDLING SYSTEMS: A LITERATURE SURVEY Final Report, 1973 - 1980
J. T. Leonard 24 Sep. 1981 55 p refs
(AD-A106056; NRL-8484) Avail: NTIS HC A04/MF A01 CSCL 05/2

A review is presented on the status of research on the generation and dissipation of electrostatic charge by hydrocarbon liquids and fuels, with emphasis on the period 1973-1980. Both metallic and nonmetallic fuel handling systems are covered, including the special problems encountered in aircraft fuel tanks filled with polyurethane foam. The review stresses recent advances and presents opportunities for future research in some neglected, but nonetheless fundamentals areas affecting the charge generation process. Author (GRA)

N82-14527# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
CONTROL METHODOLOGY: NONDESTRUCTIVE TESTING IN THE AERONAUTICS INDUSTRY [METHODOLOGIE DE CONTROLE: CONTROLE NON DESTRUCTIF DOMAINE AERONAUTIQUE]
J. Odorico 12 Jun. 1980 39 p refs In FRENCH Presented at l'Ecole d'Ete Franco-Quebecoise Conf., Montreal, 14-23 Jul. 1980
(SNIAS-812-551-110) Avail: NTIS HC A03/MF A01

Quality control in aircraft production using nondestructive tests is considered. Training and administration are covered. Examples of procedures involving suppliers, constructors, and clients are given. Topics include: use of X-rays; holography; examination of alloys; and ultrasonic testing. The need for an integrated approach is stressed, involving client, inspectors, etc. Author (ESA)

N82-14529*# Flow Research, Inc., Kent, Wash.
DEVELOPMENT OF AN EFFICIENT PROCEDURE FOR CALCULATING THE AERODYNAMIC EFFECTS OF PLANFORM VARIATION Final Report
J. E. Mercer and E. W. Geller Washington NASA Dec. 1981 36 p refs
(Contract NAS1-15977)
(NASA-CR-3489; FLOW-RR-186) Avail: NTIS HC A03/MF A01 CSCL 20K

Numerical procedures to compute gradients in aerodynamic loading due to planform shape changes using panel method codes were studied. Two procedures were investigated: one computed the aerodynamic perturbation directly; the other computed the aerodynamic loading on the perturbed planform and on the base planform and then differenced these values to obtain the perturbation in loading. It is indicated that computing the perturbed values directly can not be done satisfactorily without proper aerodynamic representation of the pressure singularity at the leading edge of a thin wing. For the alternative procedure, a technique was developed which saves most of the time-consuming computations from a panel method calculation for the base planform. Using this procedure the perturbed loading can be calculated in about one-tenth the time of that for the base solution. Author

N82-14673*# National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: SUPPLEMENTARY ANALYSES TO THE STUDY CARRIED OUT AROUND ORLY
J. Francois Sep. 1981 43 p Transl. into ENGLISH of "Repercussion du bruit des avions sur l'equilibre des reverains des aeroports--Analyses complementaires de l'enquete realisee autour d'Orly" Aug. 1977 42 p Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Inst. Francais d'Opinion Publique, Paris
(Contract NASw-3542)
(NASA-TM-76627) Avail: NTIS HC A03/MF A01 CSCL 13B

The effects of aircraft noise on humans living near airports were studied. Two main questions were considered: do residents give evidence of psychological or physiological disturbances in unusually intense noise sectors; and do personality or health factors account for the high interindividual variability of annoyance? The methodology used and results obtained are presented. Samples of the survey questionnaires are included. E.A.K.

N82-14674*# National Aeronautics and Space Administration, Washington, D. C.
TAKING INTO ACCOUNT NIGHTTIME ANNOYANCE IN THE CALCULATION OF THE PSOPHIC INDEX
Jacques Francois May 1981 30 p ref Transl. into ENGLISH of "Le Prise en Compte de la Gene Nocturne dans le Calcul de l'Indice Psophique" Rept., France, Feb. 1977 p 1-33 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Inst. Francaise d'Opinion Publique (IFOP), Paris
(Contract NASw-3199)
(NASA-TM-76580) Avail: NTIS HC A03/MF A01 CSCL 13B

The annoyance factor caused by air traffic noise on the residents of areas near airports is discussed. The psophic index is used to predict the level of overall annoyance suffered on the average by residents around airports. The calculation method differentiates between daytime and nighttime annoyance. E.A.K.

N82-14763# Air Force Geophysics Lab., Hanscom AFB, Mass. Mesoscale Forecasting Branch.
THE MODULAR AUTOMATED WEATHER SYSTEM (MAWS) CONCEPT
Donald A. Chisholm, Richard H. Lynch, and James C. Weyman *In* ESA Nowcasting: Mesoscale Observations and Short-Range Prediction Jun. 1981 p 303-307 refs

Avail: NTIS HC A19/MF A01; ESA, Paris FF 160 Member States, AU, CN and NO (+20% others)

A modular automated weather system (MAWS) which is a supervisory microprocessor that manages, disseminates and archives visibility, wind, temperature, and dew point measurements as well as outputs from ceilometers, transmissometers, digital altimeters, and digital clocks is discussed. Results are assessed for: (1) aviation weather elements and sensors suitable for automation; (2) sensor siting requirements for aviation critical weather elements; (3) performance potential of microprocessor components, display devices and communication systems; (4) the importance of met watch parameters in support of aviation operations; and (5) utility of short range forecast guidance based on simple statistical models. A microprocessor based MAWS system satisfies most automated observation requirements and provides an essential data base for the development of operational prototypes. Author (ESA)

N82-14[illegible] California State Univ., Fullerton. Dept. of Management Science.
REAL TIME SIMULATION OF COMPUTER-ASSISTED SEQUENCING OF TERMINAL AREA OPERATIONS Final Report, Jul. 1978 - Jan. 1981
Roger G. Dear 31 Jan. 1981 115 p refs
(Contract NCA2-OR253-801)
(NASA-CR-166195) Avail: NTIS HC A06/MF A01 CSCL 09B

A simulation was developed to investigate the utilization of computer assisted decision making for the task of sequencing and scheduling aircraft in a high density terminal area. The simulation incorporates a decision methodology termed Constrained Position Shifting. This methodology accounts for aircraft velocity profiles, routes, and weight classes in dynamically sequencing and scheduling arriving aircraft. A sample demonstration of Constrained Position Shifting is presented where six aircraft types (including both light and heavy aircraft) are sequenced to land at Denver's Stapleton International Airport. A graphical display is utilized and Constrained Position Shifting with a maximum shift of four positions (rearward or forward) is compared to first come, first serve with respect to arrival at the runway. The implementation of computer assisted sequencing and scheduling methodologies is investigated. A time based control concept will be required and design considerations for such a system are discussed. Author

N82-14829*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RUGGEDIZED MINICOMPUTER HARDWARE AND SOFTWARE TOPICS, 1981: PROCEEDINGS OF THE 4TH ROLM MIL-SPEC COMPUTER USER'S GROUP CONFERENCE
Dec. 1981 214 p refs Conf. held in San Diego, Calif., 22-25 Feb. 1981
(NASA-CP-2206; L-14886) Avail: NTIS HC A11/MF A01 CSCL 09B

Presentations of a conference on the use of ruggedized minicomputers are summarized. The following topics are discussed: (1) the role of minicomputers in the development and/or certification of commercial or military airplanes in both the United States and Europe; (2) generalized software error detection techniques; (3) real time software development tools; (4) a redundancy management research tool for aircraft navigation/flight control sensors; (5) extended memory management techniques using a high order language; and (6) some comments on establishing a system maintenance scheme. Copies of presentation slides are also included.

N82-14830*# Boeing Commercial Airplane Co., Seattle, Wash.
AIRBORNE DATA ANALYSIS/MONITOR SYSTEM
Darryl B. Stephison *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 1-21

Avail: NTIS HC A11/MF A01 CSCL 09B

An Airborne Data Analysis/Monitor System (ADAMS), a ROLM 1666 computer based system installed onboard test airplanes used during experimental testing is evaluated. In addition to the 1666 computer, the ADAMS hardware includes a DDC System 90 fixed head disk and a Miltape DD400 floppy disk. Boeing designed a DMA interface to the data acquisition system and an intelligent terminal to reduce system overhead and simplify operator commands. The ADAMS software includes RMX/RTOS and both ROLM FORTRAN and assembly language are used. The ADAMS provides real time displays that enable onboard test engineers to make rapid decisions about test conduct thus reducing the cost and time required to certify new model airplanes, and improved the quality of data derived from the test, leading to more rapid development of improvements resulting in quieter, safer, and more efficient airplanes. The availability of airborne data processing removes most of the weather and geographical restrictions imposed by telemetered flight test data systems. A data base is maintained to describe the airplane, the data acquisition system, the type of testing, and the conditions under which the test is performed. M.D.K.

N82-14831*# Boeing Commercial Airplane Co., Seattle, Wash.
ADAMS EXECUTIVE AND OPERATING SYSTEM
W. D. Pittman *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 23-31
Avail: NTIS HC A11/MF A01 CSCL 09B

The ADAMS Executive and Operating System, a multitasking environment under which a variety of data reduction, display and utility programs are executed, a system which provides a high level of isolation between programs allowing them to be developed and modified independently, is described. The Airborne Data Analysis/Monitor System (ADAMS) was developed to provide a real time data monitoring and analysis capability onboard Boeing commercial airplanes during flight testing. It inputs sensor data from an airplane performance data by applying transforms to the collected sensor data, and presents this data to test personnel via various display media. Current utilization and future development are addressed. M.D.K.

N82-14833*# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Flight Test Management Dept.
ON-BOARD COMPUTER PROGRESS IN DEVELOPMENT OF A 310 FLIGHT TESTING PROGRAM
Pierre Reau *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 47-57
Avail: NTIS HC A11/MF A01 CSCL 09B

Onboard computer progress in development of an Airbus A 310 flight testing program is described. Minicomputers were installed onboard three A 310 airplanes in 1979 in order to: (1) assure the flight safety by exercising a limit check of a given set of parameters; (2) improve the efficiency of flight tests and allow cost reduction; and (3) perform test analysis on an external basis by utilizing onboard flight types. The following program considerations are discussed: (1) conclusions based on simulation of an onboard computer system; (2) brief descriptions of A 310 airborne computer equipment, specifically the onboard universal calculator (CUB) consisting of a ROLM 1666 system and visualization system using an AFIGRAF CRT; (3) the ground system and flight information inputs; and (4) specifications and execution priorities for temporary and permanent programs. M.D.K.

N82-14839*# National Aerospace Lab., Amsterdam (Netherlands).
ROLM COMPUTERS IN THE FLIGHT TESTING OF THE FOKKER F29 AIRCRAFT
P. J. Manders *In* NASA. Langley Research Center Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 171-192
Avail: NTIS HC A11/MF A01 CSCL 09B

The design, development, installation, and operation of the test equipment (MRVS) is discussed. The main feature of the MRVS is continuous recording on an instrumentation recorder data of up to 1500 parameters with a total sample rate of up to 10,000 samples per second. In order to compress the evaluation and calibration time period, the following additional requirements were set for two test systems: (1) recording of selected parameters, time tagged on computer compatible tape (CCT); (2) recording of selected high bandwidth signals and ad hoc parameters on analog tape; (3) onboard presentation of calibrated parameter data, in engineering units, in numerical as well as graphical form for: system checkout during pre-, in- and post-flight, and quick look analysis during in-flight; (4) real time presentation on the ground by telemetry for: flight monitoring, takeoff and landing measurements, and noise measurements; and (5) data processing on the ground on the Fokker-NLR computer network. S.L.

N82-14842*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Flight Electronics Div.
DESCRIPTION OF A DUAL FAIL OPERATIONAL REDUNDANT STRAPDOWN INERTIAL MEASUREMENT UNIT FOR INTEGRATED AVIONICS SYSTEMS RESEARCH
W. H. Bryant and F. R. Morrell *In its* Ruggedized Minicomputer Hardware and Software Topics, 1981 Dec. 1981 p 209-217 refs
Avail: NTIS HC A11/MF A01 CSCL 09B

An experimental redundant strapdown inertial measurement unit (RSDIMU) is developed as a link to satisfy safety and reliability considerations in the integrated avionics concept. The unit includes four two degree-of-freedom tuned rotor gyros, and four accelerometers in a skewed and separable semioctahedral array. These sensors are coupled to four microprocessors which compensate sensor errors. These microprocessors are interfaced with two flight computers which process failure detection, isolation, redundancy management, and general flight control/navigation algorithms. Since the RSDIMU is a developmental unit, it is imperative that the flight computers provide special visibility and facility in algorithm modification. S.L.

N82-14849*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

APPLICATION OF INTEGRATION ALGORITHMS IN A PARALLEL PROCESSING ENVIRONMENT FOR THE SIMULATION OF JET ENGINES
Susan M. Krosel and Edward J. Milner 1982 25 p refs To be presented at the 15th Ann. Simulation Symp., Tampa, Fla., 17-19 Mar. 1982
(NASA-TM-82746; E-1059) Avail: NTIS HC A02/MF A01 CSCL 12A

The application of Predictor corrector integration algorithms developed for the digital parallel processing environment are investigated. The algorithms are implemented and evaluated through the use of a software simulator which provides an approximate representation of the parallel processing hardware. Test cases which focus on the use of the algorithms are presented and a specific application using a linear model of a turbofan engine is considered. Results are presented showing the effects of integration step size and the number of processors on simulation accuracy. Real time performance, interprocessor communication, and algorithm startup are also discussed. B.W.

N82-14880*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PREDICTION OF FLYOVER JET NOISE SPECTRA FROM STATIC TESTS
Ulf Michel and Alfons Michalke (Technische Univ., Berlin) Dec. 1981 27 p refs Presented at the 100th Meeting of the Acoust. Soc. of Am., Los Angeles, Nov. 1980
(NASA-TM-83219; L-14953) Avail: NTIS HC A03/MF A01 CSCL 20A

A scaling law is derived for predicting the flyover noise spectra of a single-stream shock-free circular jet from static experiments. The theory is based on the Lighthill approach to jet noise. Density terms are retained to include the effects of jet heating. The influence of flight on the turbulent flow field is considered by an experimentally supported similarity assumption. The resulting scaling laws for the difference between one-third-octave spectra and the overall sound pressure level compare very well with flyover experiments with a jet engine and with wind tunnel experiments with a heated model jet. Author

N82-15010# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
AERONAUTICAL APPLICATIONS OF BONDING [LES APPLICATIONS AERONAUTIQUES DU COLLAGE]
G. Briens 23 Jun. 1981 23 p In FRENCH Presented at Journee d'Information sur le Collage Organisee, Senlis, France, 17 Jun. 1981; sponsored by Federation des Industries Mecaniques et Transformatrices des Metaux and Centre Technique des Industries Mecaniques
(SNIAS-812-551-102; C42-886) Avail: NTIS HC A02/MF A01

Adhesive bonding agents and techniques and their utilization in aircraft construction are reviewed. Adhesives are classified by their physical presentation, chemical nature, normal application, hardening temperature, and by service temperature and life. The principal structures in which adhesives are used include: honeycomb sandwich constructions, panel stiffeners, reinforcing backing, crack arresters, and laminates. Advantages in bonding assembly are mentioned. Mechanical limitations like shear strength, tensile strength, and resistance to peeling or cleaving, are discussed. The growing importance of bonding in the aerospace industry is emphasized. Author (ESA)

N82-15011# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
ADVANTAGES AND LIMITATIONS IN THE USE OF DIVERSE MATERIALS FOR AIRCRAFT CONSTRUCTION [ATOUTS ET LIMITES D'EMPLOIS DES DIVERS MATERIAUX UTILISES DANS LA CONSTRUCTION DES CELLULES]
G. Hilaire 1981 37 p In FRENCH Presented at 9th Colloq. Aciers et Alliages Speciaux dans les Ind. Aerospatiales, Le Bourget, France, 11 Jun. 1981
(SNIAS-811-551-104) Avail: NTIS HC A03/MF A01

The properties and applications of steels, light alloys, titanium, and carbon composites are compared. A percentage evaluation of their use in civil aircraft, military aircraft, helicopters, and spacecraft shows trends in airframe materials selection. Criteria for the choice of materials are discussed. Mechanical static characteristics, fatigue behavior, ruggedness, and cost are considered. A more widespread utilization of composites is indicated. Author (ESA)

N82-15013*# Cincinnati Univ., Ohio. Dept. of Aerospace Engineering and Applied Mechanics.
FLAG-LAC-TORSIONAL DYNAMICS OR EXTENSIONAL AND INEXTENSIONAL ROTOR BLADES IN HOVER AND IN FORWAND FLIGHT Semiannual Progress Report, Jul. - Dec 1981
M. R. M. CrespoDaSilva Dec. 1981 6 p refs
(Grant NAG2-38)
(NASA-CR-165078) Avail: NTIS HC A02/MF A01 CSCL 01A

The differential equations describing the flap-lag-torsional motion of a flexible rotor blade including third-order nonlinearities were derived for hover and forward flight. Making use of the two boundary conditions, those equations were reduced to a set of three integro partial differential equations written in terms of the flexural deflections and the torsional variable. L.F.M.

N82-15014*# Vigyan Research Associates, Inc., Hampton, Va.
SUBSONIC BALANCE AND PRESSURE INVESTIGATION OF A 60-DEG DELTA WING WITH LEADING-EDGE DEVICES (DATA REPORT)
Dhanvada M. Rao and Stephen A. Tingas (North Carolina State Univ., Raleigh) Hampton, Va NASA. Langley Research Center Nov. 1981 126 p refs
(Contract NAS1-16259)
(NASA-CR-165806) Avail: NTIS HC A07/MF A01 CSCL 01A

The drag reduction potential of leading edge devices on a 60 degree delta wing at high lift was examined. Geometric variations of fences, chordwise slots, pylon type vortex generators, leading edge vortex flaps, and sharp leading edge extensions were tested individually and in specific combinations to improve high-alpha drag performance with a minimum of low-alpha drag penalty. The force, moment, and surface static pressure data for angles of attack up to 23 degrees, at Mach and Reynolds numbers of 0.16 and 3.85 x 10 to the 6th power per meter are documented. E.A.K.

N82-15015*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LOW-SPEED AERODYNAMIC PERFORMANCE OF A HIGH-ASPECT-RATIO SUPERCRITICAL-WING TRANSPORT MODEL EQUIPPED WITH FULL-SPAN SLAT AND PART-SPAN DOUBLE-SLOTTED FLAPS
Harry L. Morgan, Jr. and John W. Paulson, Jr. Dec. 1979 145 p refs
(NASA-TP-1580; L-13201) Avail: NTIS HC A07/MF A01 CSCL 01A

An investigation was conducted in the Langley V/STOL tunnel to determine the static longitudinal and lateral-directional aerodynamic characteristics of an advanced high-aspect-ratio supercritical-wing transport model equipped with a full-span leading-edge slat and part-span double-slotted trailing-edge flaps. This wide-body transport model was also equipped with spoiler and aileron control surfaces, flow-through nacelles, landing gear, movable horizontal tails, and interchangeable wing tips with aspect ratios of 10 and 12. The model was tested with leading-edge slat and trailing-edge flap combinations representative of cruise, climb, takeoff, and landing wing configurations. The tests were conducted at free-stream conditions corresponding to Reynolds numbers (based on mean geometric chord) of 0.97 to 1.63 x 10 to the 6th power and corresponding Mach numbers of 0.12 to 0.20, through an angle-of-attack range of -2 deg to 24 deg and a sideslip-angle range of -10 deg to 5 deg. Author

N82-15017*# Boeing Commercial Airplane Co., Seattle, Wash. Preliminary Design Dept.
HIGH LIFT SELECTED CONCEPTS Final Report, Aug. 1977 - Jul. 1978
M. L. Henderson Hampton, Va. NASA Aug. 1979 108 p refs
(Contract NAS1-14742)
(NASA-CR-159093) Avail: NTIS HC A06/MF A01 CSCL 01A

The benefits to high lift system maximum life and, alternatively, to high lift system complexity, of applying analytic design and analysis techniques to the design of high lift sections for flight conditions were determined and two high lift sections were designed to flight conditions. The influence of the high lift section on the sizing and economics of a specific energy efficient transport (EET) was clarified using a computerized sizing technique and an existing advanced airplane design data base. The impact of the best design resulting from the design applications studies on EET sizing and economics were evaluated. Flap technology trade studies, climb and descent studies, and augmented stability studies are included along with a description of the baseline high lift system geometry, a calculation of lift and pitching moment when separation is present, and an inverse boundary layer technique for pressure distribution synthesis and optimization. A.R.H.

N82-15018*# Boeing Commercial Airplane Co., Seattle, Wash. Preliminary Design Dept.
NATURAL LAMINAR FLOW AIRFOIL ANALYSIS AND TRADE STUDIES Final Report, Aug. 1977 - Jun. 1978
May 1979 86 p refs
(Contract NAS1-14742)
(NASA-CR-159029; B-7220) Avail: NTIS HC A05/MF A01 CSCL 01A

An analysis of an airfoil for a large commercial transport cruising at Mach 0.8 and the use of advanced computer techniques to perform the analysis are described. Incorporation of the airfoil into a natural laminar flow transport configuration is addressed and a comparison of fuel requirements and operating costs between the natural laminar flow transport and an equivalent turbulent flow transport is addressed. Author

N82-15025*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NASA AVIATION SAFETY REPORTING SYSTEM Quarterly Report
Sep. 1981 57 p refs Prepared in cooperation with Battelle Columbus Labs., Mountain View, Calif.
(NASA-TM-81274; A-8504; QR-13) Avail: NTIS HC A04/MF A01 CSCL 01C

Aviation safety reports that relate to loss of control in flight, problems that occur as a result of similar sounding alphanumerics, and pilot incapacitation are presented. Problems related to the go around maneuver in air carrier operations, and bulletins (and FAA responses to them) that pertain to air traffic control systems and procedures are included. S.L.

N82-15026# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
DETECTION OF OBSTACLES BY LOW FLYING AIRCRAFT
Dietmar Letalick Aug. 1981 42 p refs
(FOA-C-30227-E1) Avail: NTIS HC A03/MF A01

A model which calculates reflection from cylindrical obstacle surfaces, e.g., power cables is presented. Measurements of reflection of 10.6 micron radiation from various types of wires, cables and framework are reported. The measurements were performed in the laboratory using a CO2 laser and direct detection, with the targets a few meters away. Detection at distances of 500 and 1100 m using a coherent laser was also performed. Calculations of detection range for typical situations indicate that detection at km distances is possible. Author (ESA)

N82-15027*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
AUTOMATED PILOT ADVISORY SYSTEM Final Report
John L. Parks, Jr. and James G. Haidt (Research Triangle Inst., N.C.) Nov. 1981 184 p refs
(NASA-TM-73296) Avail: NTIS HC A09/MF A01 CSCL 17G

An Automated Pilot Advisory System (APAS) was developed and operationally tested to demonstrate the concept that low cost automated systems can provide air traffic and aviation weather advisory information at high density uncontrolled airports. The system was designed to enhance the see and be seen rule of flight, and pilots who used the system preferred it over the self announcement system presently used at uncontrolled airports. S.L.

N82-15028# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Flugzeugsteuerung und -regelung.
ANALYSIS OF TWO AIR TRAFFIC SAMPLES IN THE TERMINAL AREA OF FRANKFURT AM MAIN, 3 AUGUST 1979
Manfred Schubert and Uwe Voelckers Jun. 1981 110 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-740)
(DFVLR-Mitt-81-17; ESA-TT-740) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 26,50

The random deviation of air traffic arrivals in the terminal area, the different structure of standard arrival routes and a multitude of operational procedures affect the overall planning of arrival traffic. The necessary time-balance between arrivals can be established partly by coordination between approach control and enroute controller and by flight path planning within the terminal area. The effect of the applied control procedures on arrival distributions, traffic handling, traffic sequence, and traffic density in the terminal area are analyzed for the recorded air traffic periods on August 3rd, 1979. The findings are discussed in comparison with the results of a proceeding analysis of approach traffic on August 4th, 1978. Author

N82-15029# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Arteilung flugzeugsteuerung und -regelung.
ANALYSIS OF TWO AIR TRAFFIC SAMPLES IN THE TERMINAL AREA OF FRANKFURT AM MAIN, 4 AUGUST 1978
Uwe Voelckers, Manfred Schubert, and Albrecht Seyfried Jun. 1981 128 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-739)
(DFVLR-Mitt-81-12; ESA-TT-739) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 28

Two 'arrival peaks' in the near terminal area of Frankfurt/Main were analyzed. Extensive computer-programs were used to combine the recorded data from seven different data-sources. The traffic analysis includes the quantitative evaluation of traffic density, studies of air traffic distributions relating to space and time, the investigation of air traffic control procedures, the determination of the approach control planning strategies and a basic investigation of traffic vectoring in the terminal area. The two traffic samples are discussed and compared. A.R.H.

N82-15030*# Boeing Vertol Co., Philadelphia, Pa.
XV-15 TILT ROTOR FLY-BY-WIRE COLLECTIVE CONTROL DEMONSTRATOR DEVELOPMENT SPECIFICATIONS Final Report, Mar. 1981
R. J. Meuleners Mar. 1981 34 p
(Contract NAS2-10160)
(NASA-CR-166262; D210-11819-1) Avail: NTIS HC A03/MF A01 CSCL 01C

A fly by wire system in the collective control system for XV-15 Tilt Rotor Research Aircraft was evaluated. The collective control system was selected because it requires a system tracking accuracy between right and left rotors of approximately 0.1%. The performance characteristics of the collectors axel provide typical axis control response data. The demonstrator is bread boarded as a dual system instead of the triplex system. E.A.K.

N82-15031*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
A THEORETICAL INVESTIGATION OF WING ROCKING Semiannual Status Report, 1 Jul. - 31 Dec. 1981
C. Edward Lan and Chung-Hao Hsu 31 Dec. 1981 36 p refs
(Contract NAG1-134)
(NASA-CR-165058) Avail: NTIS HC A03/MF A01 CSCL 01A

A semiempirical method to predict vortex breakdown effects on aerodynamic characteristics of slender wings is described. The method is based on Polhamus' method of suction analogy. Both longitudinal and lateral directional characteristics are predicted. S.L.

N82-15032*# Connecticut Univ., Storrs.
STOCHASTIC CONTROL AND IDENTIFICATION OF HELICOPTER DYNAMIC MODES Semiannual Progress Report, 1 Jul. - 31 Dec. 1981
J. Molusis and Y. Bar-Shalom Dec. 1981 35 p refs
(Grant NAG2-72)

(NASA-CR-165057) Avail: NTIS HC A03/MF A01 CSCL 01C

Simulations of ground resonance model with constant and periodic coefficient measurement models were made. The extended Kalman filters, as an identification method, and it's convergence properties were reviewed. Free response data for identification of damping for ground resonance was used and the ground resonance parameter identification results for constant coefficient and periodic coefficient measurement models are presented. S.L.

N82-15033*# Boeing Co., Seattle, Wash.

SELECTED ADVANCED AERODYNAMIC AND ACTIVE CONTROL CONCEPTS DEVELOPMENT Summary Report, 10 Aug. 1977 - 9 Aug. 1979

Washington, D.C. NASA Jan. 1980 56 p refs
(Contract NAS1-14742)
(NASA-CR-3220; D6-46705) Avail: NTIS HC A04/MF A01 CSCL 01C

A summary is presented of results obtained during analysis, design and test activities on six selected technical tasks directed at exploratory improvement of fuel efficiency for new and derivative transports. The work included investigations into the potential offered by natural laminar flow, improved surface coatings and advanced high lift concepts. Similar investigations covering optimum low-energy flight path control, integrated application of active controls and evaluation of primary flight control systems reliability and maintenance are also summarized. Recommendations are included for future work needed to exploit potential advancements. Author

N82-15034*# Boeing Commercial Airplane Co., Seattle, Wash.

DEVELOPMENT OF INTEGRATED PROGRAMS FOR AEROSPACE-VEHICLE DESIGN (IPAD) - IPAD USER REQUIREMENTS Final Report

G. L. Anderton Mar. 1979 103 p
(Contract NAS1-14700)
(NASA-CR-2985; D6-IPAD-70013-D) Avail: NTIS HC A06/MF A01 CSCL 01C

Results of a requirements analysis task for Integrated Programs for Aerospace Vehicle Design (IPAD) are presented. User requirements which, in part, will shape the IPAD system design are given. Requirements considered were: generation, modification, storage, retrieval, communication, reporting, and protection of information. Data manipulation and controls on the system and the information were also considered. Specific needs relative to the product design process are also discussed. M.D.K.

N82-15035# Textron Bell Helicopter, Fort Worth, Tex.

HELICOPTER LANDING GEAR DESIGN AND TEST CRITERIA INVESTIGATION Final Report

David Crist and L. H. Symes Aug. 1981 102 p refs
(Contract DAAK51-79-C-8011; DA Proj. 1L1-62209-AH-76)
(AD-A105512; BHT-699-099-026; USAAVRADCOM-TR-81-D-15) Avail: NTIS HC A09/MF A01 CSCL 01/3

This program was an investigation of the criteria relating to helicopter landing gears. A computerized literature search was conducted and a bibliography is included in this report. Existing criteria were reviewed and conflicts were identified. An analysis of survivable Army helicopter accidents was performed. The results were used to formulate a tentative criterion. A design study was conducted to evaluate the practicality of the tentative criteria. This investigation compared wheel and skid-type landing gears designed to the tentative criteria and to MIL-S-8698. A crashworthiness analysis of the tentative criteria tailwheel tricycle gear was performed. Weights and landing loads were calculated. A cost comparison was made between tailwheel tricycle gears designed to the two criteria. The gear designed to the new criteria was cost-effective. The results of the investigation were used to modify the tentative criteria and recommendations were made for a new helicopter landing gear military specification and for changes to the existing criteria. Author (GRA)

N82-15037# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).

ESTIMATION METHODS FOR THE DETERMINATION OF DYNAMIC RESPONSES OF ELASTIC AIRCRAFT

S. Vogel Bonn Bundesministerium der Verteidigung 1981 123 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-6) Avail: NTIS HC A06/MF A01; DOKZENTBw, Bonn DM 40

A method for establishing the dynamic response of an elastic aircraft structure to external excitation, such as random gusts or arbitrarily timed maneuver loads is presented. The solution is based on an analytic representation of the admittance functions by partical fractions. The time response frequency dependence of the aerodynamic forces induced by motion are approximated to allow analytical solutions which are shown to be as accurate, but more economical, than more elaborate numerical Fourier methods. Elasticity is introduced through eigenfrequencies and generalized masses. Several examples are shown which also include the influence of control systems and of elasticity on loads and accelerations. Depending on the quality of the structural and aerodynamical input, the method may be used as an estimation method or as an inexpensive approximation method for all dynamic problems in which elasticity, control systems and excitation time lag effects play a role. Author (ESA)

N82-15038# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Flugzeugsteuerung und -regelung.

INTEGRATION OF A DIGITAL AIR DATA COMPUTER INTO THE TEST AIRCRAFT HFB-320

Rainer Dombrowsky and Volkmar Adam May 1981 62 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-09) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 16

The digital air data computer HG 280 D5 is presented with its essential characteristics, output signals, and failure test facilities. Integration with the measuring equipment of the test aircraft HFB 320 as well as the hard and software developed for the signal interface of the onboard computer are described. The system processes flight data, such as rate of climb and descent, and altitude. Author (ESA)

N82-15039*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPUTER PROGRAM FOR AERODYNAMIC AND BLADING DESIGN OF MULTISTAGE AXIAL-FLOW COMPRESSORS

James E. Crouse and William T. Gorrell Dec. 1981 105 p refs Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.
(NASA-TP-1946; AVRADCOM-TR-80-C-21; E-280) Avail: NTIS HC A06/MF A01 CSCL 21E

A code for computing the aerodynamic design of a multistage axial-flow compressor and, if desired, the associated blading geometry input for internal flow analysis codes is presented. Compressible flow, which is assumed to be steady and axisymmetric, is the basis for a two-dimensional solution in the meridional plane with viscous effects modeled by pressure loss coefficients and boundary layer blockage. The radial equation of motion and the continuity equation are solved with the streamline curvature method on calculation stations outside the blade rows. The annulus profile, mass flow, pressure ratio, and rotative speed are input. A number of other input parameters specify and control the blade row aerodynamics and geometry. In particular, blade element centerlines and thicknesses can be specified with fourth degree polynomials for two segments. The output includes a detailed aerodynamic solution and, if desired, blading coordinates that can be used for internal flow analysis codes. Author

N82-15040*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF FUEL INJECTOR TYPE ON PERFORMANCE AND EMISSIONS OF REVERSE-FLOW COMBUSTOR

Carl T. Norgren and Stephen M. Riddlebaugh Dec. 1981 40 p refs
(NASA-TP-1945; E-556) Avail: NTIS HC A03/MF A01 CSCL 21E

The combustion process in a reverse-flow combustor suitable for a small gas turbine engine was investigated to evaluate the effect of fuel injector type on performance and emissions. Fuel injector configurations using pressure-atomizing, spill-flow, air blast, and air-assist techniques were compared and evaluated on the basis of performance obtained in a full-scale experimental combustor operated at inlet conditions corresponding to takeoff, cruise, low power, and idle and typical of a 16:1-pressure-ratio turbine engine. Major differences in combustor performance and emissions characteristics were experienced with each injector type even though the aerodynamic configuration was common to most combustor models. Performance characteristics obtained with the various fuel injector types could not have been predicted from bench-test injector spray characteristics. The effect of the number of operating fuel injectors on performance and emissions is also presented. Author

N82-15041*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

INTERACTIVE-GRAPHIC FLOWPATH PLOTTING FOR TURBINE ENGINES

Robert R. Corban Nov. 1981 51 p refs
(NASA-TM-82756; E-1074) Avail: NTIS HC A04/MF A01 CSCL 21E

An engine cycle program capable of simulating the design and off-design performance of arbitrary turbine engines, and a computer code which, when used in conjunction with the cycle code, can predict the weight of the engines are described. A graphics subroutine was added to the code to enable the engineer to visualize the designed engine with more clarity by producing an overall view of the designed engine for output on a graphics device using IBM-370 graphics subroutines. In addition, with the engine drawn on a graphics screen, the program allows for the interactive user to make changes to the inputs to the code for the engine to be redrawn and reweighed. These improvements allow better use of the code in conjunction with the engine program. T.M.

N82-15042 Ecole Polytechnique Federale de Lausanne (Switzerland). Inst. de Thermique Appliquee.

AEROELASTICITY IN TURBOMACHINES

P. Suter, ed. Zurich Juris-Verlag 1981 487 p refs Proc. of 2nd Intern. Symposium, Lausanne, Switzerland, 8-12 Sep. 1980
(EPFL-ITA-10; ISBN-3-260-04871-5) Avail: Issuing Activity

The understanding and prevention of failures in turbomachines caused by aeroelastic blade vibrations is considered. Calculation of subsonic cascades, cascade tests, vibration measurements and annular cascade tests, unsteady supersonic flow in cascades, and theoretical methods are discussed.

N82-15047 Tokyo Univ. (Japan). Inst. of Space and Aeronautical Sciences.

AERODYNAMIC RESPONSE OF A BLADE IN PITCHING OSCILLATION WITH PARTIAL AND FULL SEPARATION

H. Tanaka, I. Fujimoto, and S. Ishii *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 129-142 refs
Avail: Issuing Activity

The aerodynamic responses of a blade in pitching oscillation with separation bubble and trailing edge separation are analyzed, and the mechanism of energy transfer between the oscillating blade and the air flow is elucidated. In the state of partial separation and leading edge separation, the aerodynamic response of a Goe801 model airfoil vibrating in pitching motion around a midchord of the blade was observed in a blowdown low speed wind tunnel. The dynamic pressure distribution along the blade surface was measured. By considering physical phenomena on the blade surface, it is understood how the phase shift of the unsteady pressure on the blade surface is affected by the deformation of the pressure wave caused by the movement of the reattaching point of the separation bubble and the separation point of trailing edge separation. Author (ESA)

N82-15048 Ecole Polytechnique Federale de Lausanne (Switzerland).

DAMPING FOR TURBOMACHINE BLADE VARIATIONS IN SUBSONIC FLOW

G. S. Pisarenko, A. A. Kaminer, V. A. Balalayev, N. Y. Nastenko, A. L. Stelmach, and A. V. Dunayev *In its* Aeroelasticity in Turbomachinery 1981 p 151-161 refs

Avail: Issuing Activity

The reduction of dynamic stresses in turbomachine blades through an increase in aerodynamic damping of blade vibration is discussed. The influence of camber and stagger angle are investigated. An aeroelastic damping analysis for the case of stalled flow is presented. An experimental investigation of aerodynamic damping for planar bending and torsional vibrations of a flat cascade of model blades was carried out. In the range of camber variation from 0.025 to 1.0 dependence turns out not to be substantial; increased aerodynamic damping that never exceeds 10 to 15% accompanies an increase in camber. The influence of stagger angle on damping is also revealed to be relatively slight for angle variations from 0 to 60 deg. Author (ESA)

N82-15049 Toshiba Research and Development Center, Kawasaki (Japan). Research and Development Center.

SELF EXCITED FLOW OSCILLATION IN THE LOW PRESSURE STEAM TURBINE CASCADE

T. Araki, Y. Okamoto, and F. Ohtomo *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 171-186 refs
Avail: Issuing Activity

The problem of unsteady flow in a turbine cascade with subsonic inlet and supersonic outlet flow was approached through experiments. The type of flow considered occurs at the tip of the last stages of low pressure steam turbine rotors. Experiments were made on a linear cascade over a range of outlet Mach numbers up to 1.8. The measurements included unsteady flow visualization by the Schlieren method and time traces of pressure on the blade surface by transducers on nonoscillating and oscillating blades. In addition, unsteady aerodynamic moments were measured. Results show that the transonic flow field at the tip section of the rotor blades of large steam turbines is steady, operating at rated conditions. Operating under partial load, the steady flow breaks down. Aerodynamic damping in pitching motion for unsteady flow conditions is negative, leading to the possibility that self excited vibration exists in the case of a free standing blade. Author (ESA)

N82-15050 Notre Dame Univ., Ind. Dept. of Aerospace and Mechanical Engineering.

STABILITY AND FLUTTER ANALYSIS OF TURBINE BLADES AT LOW SPEED

T. J. Akai and H. Atassi *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 187-201 refs

(Contract F49620-76-C-0014)
Avail: Issuing Activity

An aeroelastic analysis for highly loaded turbine blades at low speed is carried out for various vibratory modes. These include pure bending and torsion as well as coupled oscillatory modes. The analysis is based on a complete aerodynamic theory which fully accounts for the blade geometry, flow conditions and cascade parameters. A damping coefficient simulating structural damping is also included. The results clearly show that classical flutter can occur for low speed turbine cascades at typical operating conditions. This is directly attributable to high blade loading and thickness. Author (ESA)

N82-15051 Akademiya Nauk SSSR, Novosibirsk. Inst. of Hydrodynamics.

CALCULATION OF QUASI-STATIONARY AERODYNAMIC FORCE ACTING ON A CASCADE OF OSCILLATING AIRFOILS IN SUBSONIC FLOW

V. B. Kurzin and V. P. Ryabchenko *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 203-210 refs
Avail: Issuing Activity

Nonstationary aerodynamic characteristics of the cascade of thin airfoils in a subsonic gas flow are investigated showing that the influence of gas compressibility on their behavior can be characterized by two parameters: Mach number M and the wave number K. For the cascade of arbitrary airfoils, a theoretical statement of this problem for K tends to zero is considered; here nonstationary aerodynamic characteristics of the cascade are described well by their quasi-stationary approximation. A mathematical model of the nonstationary ideal gas flow at subsonic velocities through an arbitrary airfoil cascade in a quasi-stationary state is formulated. In accordance with the model, functions for the velocity potential wholly define the nonstationary gas flow through the cascade in a quasi-stationary approximation at any time moment. The determination problems for these functions are solved, using Chaplygin's approximation. Author (ESA)

N82-15052 Ecole Polytechnique Federale de Lausanne (Switzerland). Inst. de Thermique Appliquee.

NUMERICAL EXPERIMENTS ON UNSTEADY FLOWS

THROUGH VIBRATING CASCADES
Maurizio Pandolfi *In its* Aeroelasticity of Turbomachines 1981 p 211-228 refs
Avail: Issuing Activity

A numerical approach is presented for computing the inviscid compressible two-dimensional unsteady flow in a vibrating cascade. The full Euler equations are considered and no restrictive assumptions are required about geometry of the blading. The analysis is confined to subsonic flows. The modeling of the boundaries and the numerical methodology is described. Particular attention is paid to the explicit treatment of the wake behind the blade during the unsteady flow. Checks on the accuracy of the computations are made. Calculation results on the steady shockless transonic flow in an impulse cascade, where the exact solution is available, show acceptable agreement at least for the space-like discretization. Further evaluation of accuracy is hindered by a lack of benchmark solutions with which to compare. Author (ESA)

N82-15053 Ecole Polytechnique Federale de Lausanne (Switzerland).
COMPUTER AIDED INVESTIGATION OF TURBOMACHINE AERODYNAMICS AND AEROELASTICITY
S. M. Belotserkovskii, A. S. Volmir, V. V. Kuleshov, M. I. Nisht, G. U. Stepanov, and R. M. Ejodorov *In its* Aeroelasticity of Turbomachines 1981 p 229-249 refs

Avail: Issuing Activity

Computer aided solutions of aeroelasticity problems related to turbomachines are presented. A synthesis of numerical methods from nonstationary aerodynamics and elasticity theory are employed. Solutions derive from an understanding of general characteristics and aerodynamic loads acting on each turbomachine blade while taking into account the interference of the blades and blade rows. Aerodynamic stationary characteristics, aerodynamic derivatives at various values of the vibration frequencies, and aerodynamic characteristics with arbitrary dependence of the kinematic parameters on time were investigated. Elastic deformation of blade and blade/disk systems is explained. A flow chart for the computerized evaluation of these phenomena is shown, the results of which support a turbomachine aeroelasticity mathematical model. Author (ESA)

N82-15054 Mitsubishi Heavy-Industries Ltd., Nagasaki (Japan). Nagasaki Technical Inst.
ON THE NUMERICAL ANALYSIS OF STALL FLUTTER IN TURBINE CASCADES
S. Takahara, T. Adachi, and Y. Kadoya *In* Ecole Polytechnique de Lausanne Aerolasticity of Turbomachines 1981 p 251-262 refs
Avail: Issuing Activity

A numerical method using a triangular finite element mesh pattern is applied in order to solve the problem of unsteady stalled flow through a turbine cascade. The flow in the blade-to-blade plane is assumed to be viscous, and in addition, the friction drag on the blade surface is considered. The basic equations for two-dimensional compressible viscous flow are described. Boundary conditions and a vibration condition are also explained. Numerical results for low pressure end blades of a steam turbine are compared with flutter test data on aerodynamic damping and satisfactory agreement is obtained between calculation and experiment. Author (ESA)

N82-15055 Imperial Coll. of Science and Technology, London (England).
A METHOD FOR FORCE DETERMINATION FROM VIBRATION RESPONSE MEASUREMENTS
D. J. Ewins and B. Hillary *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 263-283 refs
Sponsored by Rolls Royce Ltd.

Avail: Issuing Activity

Dynamic force determination from response measurements was studied numerically and experimentally. Application to turbomachine blades undergoing steady or transient vibration is considered. In theory, the case of harmonic excitation and response is expressed as an inverse input/output equation. A cantilever beam and an isolated turbomachine blade were used as test pieces for the experimental study. Results show that application of the pseudoinverse force determination method is subject to a form of conditioning in the region of the fundamental mode. However, the results of tests on an actual compressor blade suggest that with very accurate dynamic modeling of the test structure and careful curve fitting this method is feasible, using current techniques and equipment. Author (ESA)

N82-15056 Brown, Boveri and Co., Ltd., Baden (Switzerland).
CONTROL OF VIBRATION IN AEROELASTIC CASCADE EXPERIMENTS
A. Krischner, B. Fosco, and E. Muller *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 285-296 refs
Avail: Issuing Activity

The aeroelastic behavior of an annular, transonic turbine cascade with three degrees of freedom and an electromagnetic excitation system was investigated. Excitation and vibration control which allows measurement of effective damping in the stable operating domain of the cascade is discussed. The vibration control system demonstrates its capability to maintain preset vibration amplitudes and interblade phase angles throughout the resonance range if sufficient damping is present. Author (ESA)

N82-15057 New South Wales Univ., Kensington (Australia). School of Mechanical and Industrial Engineering.
STABILITY ANALYSIS OF THE TWIN MODE MODEL OF COUPLED FLEXION/TORSION VIBRATIONS IN TURBOFANS
R. A. J. Ford *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 297-308 refs

Avail: Issuing Activity

The twin mode representation of coupled flexion/torsion vibrations in turbofans, a linear feedback system which depicts flutter as a system instability, is reviewed. An analysis which uses classical automatic control theory is presented. A stability analysis for zero phase lag on aerodynamic coupling is developed. A transfer function for the system is found, and determination of stability using Routh's criterion is explained. A more versatile characterization of flutter behavior for the twin orthogonal mode model results. Author (ESA)

N82-15058 Rolls-Royce Ltd., Derby (England). Aero Div.
AERODYNAMIC CONSIDERATIONS IN THE PREDICTION OF UNSTALLED SUPERSONIC FLUTTER IN TRANSONIC FANS
D. G. Halliwell *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 309-322 refs

Avail: Issuing Activity

Two methods for the prediction of unsteady lift and moment coefficients for blades with supersonic entry flow pertaining to coupled flutter in turbofans are discussed. The first method uses a linearized supersonic model, with only weak pressure waves, while the second uses a strong normal shock model, however both are based on flat plate cascades. A basic problem in the application of the first model is discussed and a correction procedure to obtain a more rational solution is suggested. For the second model, although its shock structure is closer to the real case, overall comparison with experiment shows no improvement on the simpler model. However, results are qualitatively consistant with implied working line differences. Author (ESA)

N82-15059 Kyushu Univ., Fukuoka (Japan). Dept. of Aeronautical Engineering.
EFFECT OF MEAN BLADE LOADING ON SUPERSONIC CASCADE FLUTTER
M. Namba and R. Minami *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 323-332 refs

Avail: Issuing Activity

A theory for supersonic cascade flutter with nonzero mean blade loadings was developed. An inviscid supersonic flow past a rectilinear two-dimensional cascade with subsonic leading edge locus was investigated. The theory allows for the effect of displacement of mass source and body force singular points which represent blades with nonzero thickness and mean lift force, but it neglects the effect of deviation of the local convection velocity and local speed of sound from the undisturbed uniform ones. The theory also predicts the occurrence of supersonic bending flutter at higher blade loadings. Author (ESA)

N82-15060 Technische Hochschule, Aachen (West Germany). Inst. fuer Strahlantriebe und Turboarbeitsmashinen.
A METHOD OF CHARACTERISTICS SOLUTION FOR A FINITE OSCILLATING SUPERSONIC CASCADE WITH THICKNESS EFFECTS
K. Vogeler *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 333-347 refs

Avail: Issuing Activity

A method of characteristics approach to a nonlinear oscillating supersonic cascade is presented. The method is extended to a complete cascade computation for cascades with blades of nonzero thickness on the upper and lower sides. The flow field behind a single oscillating airfoil in a supersonic flow is treated and compared with an analytical flat plate solution. The technique is merged with an existing algorithm. The performance is compared with flat plate and slender blade solutions for infinite cascades. The effect of slender blades in comparison with flat plates on the unsteady aerodynamic response of an oscillating supersonic cascade are calculated for a nonlinear cascade in both the subresonant and superresonant region. Author (ESA)

N82-15061 Akademiya Nauk SSSR, Novosibirsk. Inst. of Hydrodynamics.
CALCULATION OF NONSTATIONARY FORCE RATIOS ON BLADES OF A ROTATING ROW IN INCOMPRESSIBLE FLOW
V. P. Ryabchenko *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 349-356 refs

Avail: Issuing Activity

A numerical solution to a three-dimensional problem of unsteady vortex-free (in the coordinate system coupled with the cascade) flow of ideal incompressible fluid past a rotating annular cascade, based on propeller vortex and finite wing span theory, is presented. The geometry of blade edge is modeled as an annular cascade whose blades are parts of helical surfaces. Aerodynamic force calculations are given only for a large number of blades since it is essential to this method. Analysis results also show the effect of flow three-dimensionality on aerodynamic forces acting on the annular cascade blade when their number is small. Author (ESA)

N82-15062 Tokyo Univ. (Japan). Dept. of Aeronautics.
THREE-DIMENSIONAL ANALYSIS OF CASCADE FLUTTER IN PARALLEL SHEAR FLOW
S. Kaji, H. Takata, and N. Niwa *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 357-370 refs

Avail: Issuing Activity

The effect of spanwise nonuniformity of stream velocity as well as that of oscillation amplitude on flutter characteristics were studied. The main stream is assumed incompressible and to be a parallel shear flow with linear velocity profile. Flutter characteristics vary in spanwise direction in accordance with the variation of flow incidence and flow velocity. The cascade model of a semiactuator disk composed of a number of flat plate blades undergoing bending oscillation is used. It is indicated that the flow shear effect becomes noticeable in connection with oscillation modes. For uniform oscillation it is weak and for linear and quadratic modes it is significant. It is found that weak shear deteriorates aerodynamic damping and extends the unstable frequency range. Author (ESA)

N82-15063 Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.
THE EFFECT OF ASPECT RATIO ON THE UNSTEADY AERODYNAMIC FORCES INDUCED BY VIBRATION OF A CASCADE BLADE
J. M. R. Graham and I. Kullar *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 371-381 refs

Avail: Issuing Activity

A correction for three dimensionality made to strip theory when calculating the aerodynamic forces due to vibration of a cascade blade in incompressible flow is discussed. The three dimensional effects arise from the spanwise variation of unsteady velocity induced at the blade by the mode of vibration. Results are presented for simple cantilever type modes of vibration, using a three dimensional unsteady cascade theory for the Fourier transform of the spanwise upwash distribution. An integral equation is formulated which is solved numerically. The integral equation is also used to derive a perturbation solution for the correction terms as a series in inverse powers of the blade aspect ratio. The effect of three dimensionality on the critical reduced frequency for torsional flutter. Author (ESA)

N82-15065 Ecole Polytechnique Federale de Lausanne (Switzerland).
PRACTICAL EXPERIENCE WITH A NONCONTACT BLADE VIBRATION MEASURING SYSTEM IN INDUSTRIAL TURBOCOMPRESSORS
R. Jenny, C. Gremli, and H. D. Guemoes *In its* Aeroelasticity in Turbomachines 1981 p 419-428 refs

Avail: Issuing Activity

Blade vibration measurement with noncontact stationary probes in turbomachines is discussed. Due to the low sampling rate, the problem of nondefinite vibration reconstruction arises. This complicates vibration mode identification which is necessary for stress calculation. A method of probability analysis of the stress amplitude in connection with frequency analysis is presented. Two examples are given and blade flutter and rotating stall identification from turbocompressor measurements are shown. Author (ESA)

N82-15067 Tennessee Univ., Tullahoma. Space Inst.
LINEAR AND NONLINEAR ANALYSIS OF VORTEX WHISTLE: ANOTHER BLADE BUSTER
M. Kurosaka *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 443-453 refs

Avail: Issuing Activity

A flow induced vibration problem in gas turbines, the vortex whistles, is discussed. The whistle is caused by high swirl flow and its characteristics are such that the frequency of fluctuation is discrete (a pure tone). The frequency becomes higher as the swirl or flow rate increases. An incident of vortex whistle is cited. Besides dynamic behavior of the flow field, the data reveal an unexpected change in the steady or time averaged flow field when the whistle is present. It is implicated that dynamic flow can affect even the steady flow field in turbomachinery, which causes damage. Author (ESA)

N82-15068 Mitsubishi Heavy-Industries Ltd., Takasago (Japan). Tagasago Technical Inst.
STUDY OF ACOUSTIC RESONANCE OF CASCADES
M. Honjo and T. Tominaga *In* Ecole Polytechnique de Lausanne Aeroelasticity of Turbomachines 1981 p 455-464 refs

Avail: Issuing Activity

The discrete sound generated by guide vanes was investigated experimentally. A two dimensional cascade test and a three dimensional duct guide vane model test were carried out. It is shown that the discrete noise generated by guide vanes is an acoustic resonance effect in the flow path of the vanes. The main excitation source which induces resonance is wake vortex shedding off the trailing edges of the vanes. Bubble vortices on the concave surfaces or leading edges are not excitation sources. Author (ESA)

N82-15070 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany).
TECHNICAL EVALUATION REPORT ON THE AEROELASTICITY IN TURBOMACHINES SYMPOSIUM
H. Foershing *In* Ecole Polytechnique de Lausanne Aeroelasticity in Turbomachines 1981 p 469-477 refs

Avail: Issuing Activity

Papers presented at the symposium on aeroelasticity in turbomachines are reviewed. Emphasis is on fluid mechanics of aeroelasticity in turbomachines, motion induced fluid dynamic forces, and unsteady fluid dynamic disturbance forces along with forced blade vibrations. Also covered are classic blade flutter, stalled flow, stall flutter and other unsteady phenomena.
Author (ESA)

N82-15073# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
ADVANCED COMPRESSOR COMPONENTS. PHASE 1:

1978 TO 1979 Final Report, May 1980
Wolfgang Weiler, Franz Strasser, Eberhard Knodel, and Herbert Merz Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 250 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-025; ISSN-0170-1339) Avail: NTIS HC A11/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 42,50

An advanced 800 kW aero engine type compressor was developed. The design is of the axial centrifugal type where the cascades of the axial part have supercritical profiles. Detailed layouts are shown and the aerodynamic design and optimization techniques for the cascades are given. The application of fiber reinforced materials is actively investigated for both the compressor housing and its rotor and a detailed catalog of the various functions of and solicitutions for such materials is appended. Author (ESA)

N82-15074*# Calspan Advanced Technology Center, Buffalo, N.Y.
IN-FLIGHT INVESTIGATION OF THE EFFECTS OF PILOT LOCATION AND CONTROL SYSTEM DESIGN ON AIRPLANE FLYING QUALITIES FOR APPROACH AND LANDING Final Report
Norman C. Weingarten and Charles R. Chalk Jan. 1982 215 p refs Sponsored jointly by Dryden Flight Research Facility and USAF Flight Dynamis Labs.
(Contract F33615-79-C-3618)
(NASA-CR-163115; CALSPAN-6645-F-7) Avail: NTIS HC A10/MF A01 CSCL 01C

The handling qualities of large airplanes in the approach and landing flight phase were studied. The primary variables were relative pilot position with respect to center of rotation, command path time delays and phase shifts, augmentation schemes and levels of augmentation. It is indicated that the approach and landing task with large airplanes is a low bandwidth task. Low equivalent short period frequencies and relatively long time delays are tolerated only when the pilot is located at considerable distance forward of the center of rotation. The control problem experienced by the pilots, when seated behind the center of rotation, tended to occur at low altitude when they were using visual cues of rate of sink and altitude. A direct lift controller improved final flight path control of the shuttle like configurations. E.A.K.

N82-15075*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LONGITUDINAL AND LATERAL STATIC STABILITY AND CONTROL CHARACTERISTICS OF A 1/6-SCALE MODEL OF A REMOTELY PILOTED RESEARCH VEHICLE WITH A SUPERCRITICAL WING
Thomas A. Byrdsong and James B. Hallissy May 1979 118 p refs
(NASA-TP-1360; L-12059) Avail: NTIS HC A06/MF A01 CSCL 01C

An investigation was conducted in the Langley 8-foot transonic pressure tunnel to determine the longitudinal and lateral-directional static stability and control characteristics of a 1/6-scale force model of a remotely piloted research vehicle. The model was equipped with a supercritical wing and employed elevons for pitch and roll control. Test conditions were as follows: Reynolds number of about 6.6 x 10 to the 6th power per meter, variations of sideslip from -6 deg to 6 deg, elevon deflection angle (symmetrically and asymmetrically) from -5 deg to 3 deg, and rudder deflection angle from 0 deg to -10 deg. The model was longitudinally statically stable at angles of attack up to about 7 deg, which is significantly greater than the angle of attack for the cruise condition (approximately 4 deg). In the range of test Mach numbers, the model was directionally stable and had positive effective dihedral, sufficient pitch control, and positive effectiveness of roll and yaw control. Author

N82-15076*# Lockheed-California Co., Burbank.
ACCELERATED DEVELOPMENT AND FLIGHT EVALUATION OF ACTIVE CONTROLS CONCEPTS FOR SUBSONIC TRANSPORT AIRCRAFT. VOLUME 1: LOAD ALLEVIATION/EXTENDED SPAN DEVELOPMENT AND FLIGHT TESTS Final Report
J. F. Johnston Sep. 1979 261 p refs
(Contract NAS1-14690)
(NASA-CR-159097; LR-29003-1-Vol-1) Avail: NTIS HC A12/MF A01 CSCL 01C

Active wing load alleviation to extend the wing span by 5.8 percent, giving a 3 percent reduction in cruise drag is covered. The active wing load alleviation used symmetric motions of the outboard ailerons for maneuver load control (MLC) and elastic mode suppression (EMS), and stabilizer motions for gust load alleviation (GLA). Slow maneuvers verified the MLC, and open and closed-loop flight frequency response tests verified the aircraft dynamic response to symmetric aileron and stabilizer drives as well as the active system performance. Flight tests in turbulence verified the effectiveness of the active controls in reducing gust-induced wing loads. It is concluded that active wing load alleviation/extended span is proven in the L-1011 and is ready for application to airline service; it is a very practical way to obtain the increased efficiency of a higher aspect ratio wing with minimum structural impact. T.M.

N82-15077*# Lockheed-California Co., Burbank.
ACCELERATED DEVELOPMENT AND FLIGHT EVALUATION OF ACTIVE CONTROLS CONCEPTS FOR SUBSONIC TRANSPORT AIRCRAFT. VOLUME 2: AFT C.G. SIMULATION AND ANALYSIS Final Report
D. M. Urie Hampton, Va. NASA Sep. 1979 89 p
(Contract NAS1-14690)
(NASA-CR-159098; LR-29003-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 01C

Relaxed static stability and stability augmentation with active controls were investigated for subsonic transport aircraft. Analytical and simulator evaluations were done using a contemporary wide body transport as a baseline. Criteria for augmentation system performance and unaugmented flying qualities were evaluated. Augmentation control laws were defined based on selected frequency response and time history criteria. Flying qualities evaluations were conducted by pilots using a moving base simulator with a transport cab. Static margin and air turbulence intensity were varied in test with and without augmentation. Suitability of a simple pitch control law was verified at neutral static margin in cruise and landing flight tasks. Neutral stability was found to be marginally acceptable in heavy turbulence in both cruise and landing conditions. Author

N82-15078# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Flugzeugsteuerung und -regelung.
AN OBSERVER APPROACH TO THE IDENTIFICATION AND ISOLATION OF SENSOR FAILURES IN FLIGHT CONTROL SYSTEMS Ph.D. Thesis - Tech. Univ., Carolo-Wilhelmina, West Germany
Norbert Stuckenberg Jul. 1981 140 p refs Report will also be announced as translation (ESA-TT-738)
(DFVLR-FB-81-26; ESA-TT-738) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 32

A reliability concept for flight control sensors is presented providing a duplex sensor configuration with fail-operational capabilities by using analytical redundancy with deterministic observers. Without disregarding disturbances and plant parameter variations the identification performance is evaluated with respect to the failure signal properties. The concept is applied to a command and stability augmentation system for the lateral motion of the executive aircraft HFB 320. Author

N82-15079*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
NASA DRYDEN FLIGHT LOADS RESEARCH FACILITY
Walter J. Sefic Dec. 1981 43 p refs
(NASA-TM-81368) Avail: NTIS HC A03/MF A01 CSCL 14B

The Dryden Flight Loads Research Facility (NASA) and the associated equipment for simulating the loading and heating of aircraft or their components are described. Particular emphasis is placed on various fail-safe devices which are built into the equipment to minimize the possibility of damage to flight vehicles. The equipment described includes the ground vibration and moment of inertia equipment, the data acquisition system, and the instrumentation available in the facility for measuring load, position, strain, temperature, and acceleration. R.J.F.

N82-15081# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

OPTICAL PROPERTIES OF AIRFIELD LIGHTING FIXTURES OF THE ROYAL NETHERLANDS AIRFORCE. PART 1: COLOR MEASUREMENTS
P. Padmos and R. vanLeeuwen 1980 20 p In DUTCH; ENGLISH summary 2 Vol.
(Contract A78/KLu/085)
(IZF-1980-1-Vol-1; TDCK-73414) Avail: NTIS HC A02/MF A01

Airfield lighting fixtures in use in the Royal Netherlands' Airforce were sampled and used to measure to what extent the chromaticity coordinates are corresponding to the NATO-Standardization Agreements. For the yellow and red filters, especially, it is important to measure the chromaticity of the mounted lamp-filter combinations, because heating may cause a considerable shift in chromaticity. For each fixture the measurements were performed at nominal maximum luminous intensity. Moreover, for a number of representative colors, measurements were made at the reduced intensity settings normally in use. Conclusions regarding, rejecting, or accepting are tabulated. Author

N82-15082# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
OPTICAL PROPERTIES OF AIRFIELD LIGHTING FIXTURES OF THE ROYAL NETHERLANDS AIRFORCE. PART 2: INTENSITY MEASUREMENTS
P. Padmos and R. vanLeeuwen 1980 38 p In DUTCH; ENGLISH summary 2 Vol.
(Contract A78/KLu/085)
(IZF-1980-12-Vol-2; TDCK-75011) Avail: NTIS HC A03/MF A01

Most lighting fixtures did not fulfill NATO-Standardization requirements in one or another way. The most conspicuous error was found in a taxiway fixture, where the beam maximum appeared to be directed downwards. Many red filters have a deep red color, which lessens the light output. In most cases a considerable improvement in light output can be obtained by applying a more orange-red-color, for which the color requirements give room. It appears that for some red glass filters the transmission is lowered considerably by heating. Author

N82-15083# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Experimental Aerodynamics.
DEVELOPMENT AND TRIAL OF A ROTARY BALANCE FOR THE 3 m-LOW SPEED WIND TUNNELS IN THE FEDERAL REPUBLIC OF GERMANY Final Report, Dec. 1979
Bernd Schulze Bonn Bundesministerium fuer Forschung und Technologie Jul. 1981 70 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-022; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,70

A rotary balance was developed for determining aerodynamic damping due to rolling by means of a stationary measuring procedure. Due to the uniform rotation around the wind tunnel axis, vortex relaxation effects that might result from oscillatory balances are avoided. Layout, instrumentation, and data processing are described. Results obtained by using the apparatus during different wind tunnel tests with a calibration model correlate well with existing reference data and flight test data. Dynamic stability derivates due to rolling can be measured for angles of attack up to 90 deg and for extreme angles of inclination. Author (ESA)

N82-15111# Fraunhofer-Inst. fuer Naturwissenschaftlich-Technische Trendanalysen, Euskirchen (West Germany).
SENSOR FOOTPRINTS AND HOMING RANGE OF TERMINAL GUIDANCE MUNITION [SENSOR-FOOTPRINT UND NACHLENKBEREICH BEI ENDPHASENGELENKTER MUNITION]
K.-D. Leuthaeuser and H. Wessel Bonn Bundesministerium der Verteidigund 1981 56 p refs In GERMAN Sponsored by Bundesministerium der Verteidigung
(BMVg-FBWT-81-5) Avail: NTIS HC A04/MF A01; DOK-ZENTBw, Bonn DM 30

The footprints of terminal guidance projectiles were analyzed. These footprints, which correspond to the accessible target range on the surface, depend on the vicion range of the sensor and on the homing range of the projectile. The sensor vision range is calculated as a function of trajectory parameters, sensor aperture, and sensor range. The extent of the homing range is determined for the special case of circular trajectories, i.e., proportional navigation, in dependence of flight height, angle of incidence, and maximal transverse acceleration. The resulting footprints are represented in overlay diagrams. Author (ESA)

N82-15277*# Old Dominion Univ., Norfolk, Va. Dept. of Electrical Engineering.
AIRBORNE ANTENNA PATTERN CALCULATIONS Final Report, 1 Nov. 1980 - 31 Oct. 1981
Timothy J. Knerr, Teri M. Owens, and Roland R. Mielke Dec. 1981 322 p refs
(Grant NsG-1655)
(NASA-CR-165059) Avail: NTIS HC A14/MF A01 CSCL 20N

Calculated principal-and off-principal plane patterns are presented for the following aircraft: de Havilland DHC-7, Rockwell Sabreliner 75A, Piper PA-31T Cheyenne, Lockheed Jet Star II, Piper PA-31-350 Navajo Chieftain, Beechcraft Duke B60, Rockwell Commander 700, Cessna Citation 3, Piper PA-31P Pressurized Navajo, Lear Jet, and Twin Otter DHC-6. Author

N82-15313*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH TEMPERATURE ELECTRONIC REQUIREMENTS IN AEROPROPULSION SYSTEMS
William C. Nieberding and J. Anthony Powell *In its* Proc. of The Conf. on High-Temp. Electron. 1981 p 13-16 refs

(E-708) Avail: NTIS HC A07/MF A01 CSCL 09C

The needs for high temperature electronic and electro-optic devices as they would be used on aircraft engines in either research and development applications, or operational applications are discussed. The conclusion reached is that the temperature at which the devices must be able to function is in the neighborhood of 500 to 600 C either for R&D or for operational applications. In R&D applications the devices must function in this temperature range when in the engine but only for a moderate period of time. On an operational engine, the reliability requirements dictate that the devices be able to be burned-in at temperatures significantly higher than those at which they will function on the engine. The major point made is that semiconductor technology must be pushed well beyond the level at which silicon will be able to function. M.G.

N82-15369*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RELATIONS FOR THE THERMODYNAMIC AND TRANSPORT PROPERTIES IN THE TESTING ENVIRONMENT OF THE LANGLEY HYPERSONIC CF4 TUNNEL
Kenneth Sutton Oct. 1981 40 p refs
(NASA-TM-83220) Avail: NTIS HC A03/MF A01 CSCL 20D

Thermodynamic and transport properties of gaseous CF4 that can be used in flow field computer codes and theoretical analyses for comparison of results with experimental data from the Langley Hypersonic CF4 Tunnel are presented. The thermodynamic relations which are based on thermally perfect but calorifically imperfect gas are adequate for the testing environment of the CF4 tunnel and are simpler to use than the imperfect gas relations required to define the complete expansion from the tunnel reservoir. Relations for the transport properties are based on the kinetic theory of gases in which published experimental data are used in the derivation of the relations. Extensive experimental data were located for viscosity and the derived relation should provide values for viscosity with errors of less than 1 percent. The experimental data for thermal conductivity were limited with significant disagreement between the various sources. The derived relation will probably provide values for the thermal conductivity with errors of no more than 5 percent which is within the accuracy of the experimental data. M.D.K.

N82-15498*# EG and G Washington Analytical Services Center, Inc., Pocomoke City, Md.
A GLOBAL ATLAS OF GEOS-3 SIGNIFICANT WAVEHEIGHT DATA AND COMPARISON OF THE DATA WITH NATIONAL BUOY DATA
J. D. McMillan Wallops Island, Va. NASA. Wallops Flight Center Nov. 1981 163 p refs

(Contract NAS6-2639)
(NASA-CR-156882) Avail: NTIS HC A08/MF A01 CSCL 08C

The accuracy of the GEOS-3 significant waveheight estimates compared with buoy measurements of significant waveheight were determined. A global atlas of the GEOS-3 significant waveheight estimates gathered is presented. The GEOS-3 significant waveheight estimation algorithm is derived by analyzing the return waveform characteristics of the altimeter. Convergence considerations are examined, the rationale for a smoothing technique is presented and the convergence characteristics of the smoothed estimate are discussed. The GEOS-3 data are selected for comparison with buoy measurements. The GEOS-3 significant waveheight estimates are assembled in the form of a global atlas of contour maps. Both high and low sea state contour maps are presented, and the data are displayed both by seasons and for the entire duration of the GEOS-3 mission. E.A.K.

N82-15886# Prins Maurits Lab. TNO, Rijswijk (Netherlands). Inst. voor Chemische en Technologische Research.
POLLUTION OF THE SOIL BY AVIATION GASOLINE
A. Verweij Aug. 1979 26 p ref In DUTCH; ENGLISH summary
(Contract A78/KL4/146)
(PML-1979-41; TDCK-73390) Avail: NTIS HC A03/MF A01

A literature search was conducted to determine the effects of aviation gasoline spills and more general oil spills on the environment and on the condition of oil storage tanks. Remedial measures are presented. Attention is given to natural restoration processes as well as to actions to speed up these processes. Author

N82-15894*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OPTICAL INFORMATION PROCESSING FOR AEROSPACE APPLICATIONS
Dec. 1981 347 p refs Conf. held in Hampton, Va., 18-19 Aug. 1981
(NASA-CP-2207; L-15018) Avail: NTIS HC A15/MF A01 CSCL 20F

Current research in optical processing is reviewed. Its role in future aerospace systems is determined. The development of optical devices and components demonstrates that system concepts can be implemented in practical aerospace configurations.

N82-15897*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROLE OF OPTICAL COMPUTERS IN AERONAUTICAL CONTROL APPLICATIONS
Robert J. Baumbick *In* NASA. Langley Research Center Opt. Inform. Process. for Aerospace Appl. Dec. 1981 p 33-43

Avail: NTIS HC A15/MF A01 CSCL 30F

The role that optical computers play in aircraft control is determined. The optical computer has the potential high speed capability required, especially for matrix/matrix operations. The optical computer also has the potential for handling nonlinear simulations in real time. They are also more compatible with fiber optic signal transmission. Optics also permit the use of passive sensors to measure process variables. No electrical energy need be supplied to the sensor. Complex interfacing between optical sensors and the optical computer is avoided if the optical sensor outputs can be directly processed by the optical computer. S.L.

N82-15930# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Wessling (West Germany). Inst. fuer Physik der Atmosphaere.
THE OPTICAL RECOGNITION OF SEA TARGETS AS A FUNCTION OF SURROUNDING AND OBSERVATION PARAMETERS IN AIR TO WATER OBSERVATIONS
Hans-Eberhard Hoffmann Bonn Bundesministerium der Verteidigung 1981 41 p refs In GERMAN; ENGLISH summary
(BMVG-FBWT-81-10) Avail: NTIS HC A03/MF A01; DOK-ZENTBW, Bonn DM 30

The influence of environmental and observation parameters on visibility ranges, maximum detection range, and maximum identification range were determined. The determination of the visibility ranges and the measurements of environmental parameters took place from helicopters. On the basis of the test results the influence of the following parameters on visibility ranges is shown: visual range, illumination, flight altitude, and environmental brightness as environmental parameters; and naked eye, light-intensifier, night goggles, limitation of field of view as observation parameters. T.M.

N82-15984# Dayton Univ., Ohio. Research Inst.
THE INFLUENCE OF AERONAUTICAL R&D EXPENDITURES UPON THE PRODUCTIVITY OF AIR TRANSPORTATION Final Report, 1926-1976
Ralph C. Lenz, John A. Machnic, and Anthony W. Elkins Jul. 1981 248 p refs
(Grant NSF SRS-79-10397)
(PB81-247140; UDR-TR-81-72; NSF/SIU-81-1) Avail: NTIS HC A11/MF A01 CSCL 05A

The impact which aeronautical R&D expenditures have had upon productivity growth in the air transportation industry over the 50-year period from 1926 to 1976 is examined. Quantitative analyses of the returns on U.S. investments in aeronautical R&D show that the net gains from such investments are very large in comparison with standard commercial opportunities during the same period. The gains were distributed primarily to the traveling public and, to a lesser extent, to the airline employees. Author

N82-15985* National Aeronautics and Space Administration. Washington, D. C.
INDEX TO NASA NEWS RELEASES AND SPEECHES, 1980
1981 131 p
Avail: NTIS HC A07/MF A01 CSCL 05B

A listing is provided of 201 news releases distributed by the Office of Public Affairs, NASA Headquarters and 10 selected speeches presented by Headquarters staff in 1980. Subject and name indexes are arranged alphabetically. Indexes to titles, news release numbers and accession numbers are arranged numerically. A.R.H.

N82-16008*# Helicopter Association of America, Washington, D. C.
COMMUNITY ROTORCRAFT AIR TRANSPORTATION BENEFITS AND OPPORTUNITIES Final Report, Dec. 1981
Glen A. Gilbert, Darrel J. Freund, Robert M. Winick, Nicholas J. Cafarelli, Richard F. Hodgkins, Tirey K. Vickers et al Dec. 1981 181 p refs
(Contract NAS2-10798)
(NASA-CR-166266) Avail: NTIS HC A09/MF A01 CSCL 01C

Information about rotorcraft that will assist community planners in assessing and planning for the use of rotorcraft transportation in their communities is provided. Information useful to helicopter researchers, manufacturers, and operators concerning helicopter opportunities and benefits is also given. Three primary topics are discussed: the current status and future projections of rotorcraft technology, and the comparison of that technology with other transportation vehicles; the community benefits of promising rotorcraft transportation opportunities; and the integration and interfacing considerations between rotorcraft and other transportation vehicles. Helicopter applications in a number of business and public service fields are examined in various geographical settings. R.J.F.

N82-16022*# National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICS AND SPACE REPORT OF THE PRESIDENT, 1980 ACTIVITIES
1981 108 p
(NASA-TM-84079) Avail: NTIS HC A06/MF A01 CSCL 05A

The year's achievements in the areas of communication, Earth resources, environment, space sciences, transportation, and space energy are summarized and current and planned activities in these areas at the various departments and agencies of the Federal Government are summarized. Tables show U.S. and world spacecraft records, spacecraft launchings for 1980, and scientific payload and probes launched 1975-1980. Budget data are included. A.R.H.

[illegible]

POLLUTION OF THE SOIL BY AVIATION GASOLINE

[illegible]

ROLE OF OPTICAL COMPUTERS IN AIRCRAFT CONTROL APPLICATIONS

[illegible]

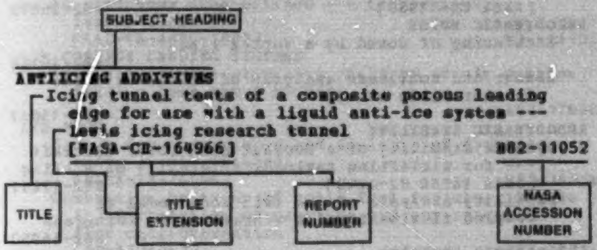
THE OPTICAL RECOGNITION OF SEA TARGETS AS A FUNCTION OF SURROUNDING AND DISCRIMINATION PARAMETERS IN AIR TO WATER OBSERVATIONS

[illegible]

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 147)* APRIL 1982

Typical Subject Index Listing


SUBJECT HEADING
ANTICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ACCELERATION (PHYSICS)
Take-off ground roll of propeller driven aircraft
A82-17607
Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft
A82-18729

ACCELERATION PROTECTION
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072

ACCIDENT PREVENTION
Why safety --- fuel conservation through aircraft safety
A82-17277
Accident prevention - A regulators view
A82-17278

ACOUSTIC ATTENUATION
Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981
A82-18726

ACOUSTIC PROPAGATION
The effect of non-linear propagation in jet noise
[AIAA PAPER 82-0416] A82-17936

ACOUSTIC SCATTERING
Scattering of sound by a vortex ring
A82-16148

ACOUSTIC VELOCITY
Taking into account nighttime annoyance in the calculation of the psophic index
[NASA-TM-76580] N82-14674

ACRYLONITRILES
Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems
A82-17538

ACTIVE CONTROL
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests
[NASA-CR-159097] N82-15076
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 2: AFT C.G. simulation and analysis
[NASA-CR-159098] N82-15077

ADAPTIVE CONTROL
Role of optical computers in aeronautical control applications
N82-15697

ADDITIVES
Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems
A82-17538

ADHESIVE BONDING
Aeronautical applications of bonding
[SNIAS-812-551-102] N82-15010

AERIAL RECONNAISSANCE
The optical recognition of sea targets as a function of surrounding and observation parameters in air to water observations
[BMVG-FBWT-81-10] N82-15930

AEROACOUSTICS
Workshop report for the AIAA 6th Aeroacoustics Conference
A82-16091
Aerospace highlights 1981
A82-16135
Scattering of sound by a vortex ring
A82-16148
The German-Dutch wind tunnel as aeroacoustic experimental installation
A82-17136
Current investigations regarding noise research in the Braunschweig Center of the German Institute for Research and Experimentation in Aeronautics and Astronautics
A82-17137

AERODYNAMIC BALANCE
Determination of the trimmed drag of an aircraft
A82-18503

AERODYNAMIC CHARACTERISTICS
Symmetric flow characteristics of thin rectangular wings
A82-16093
Experience with high performance V/STOL fighter projects at MBB
[AIAA PAPER 81-2614] A82-16901
A summary of V/STOL inlet analysis methods
[AIAA PAPER 81-2620] A82-16902
Advanced technology airfoil development for the XV-15 tilt-rotor vehicle
[AIAA PAPER 81-2623] A82-16906
Trailing edge flap influence on leading edge vortex flap aerodynamics
[AIAA PAPER 82-0128] A82-17799
Recent improvements in prediction techniques for supersonic weapon separation
[AIAA PAPER 82-0170] A82-17820
An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil
[AIAA PAPER 82-0214] A82-17843
Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg
[AIAA PAPER 82-0250] A82-17864
Viscous flow - Nemesis of the theoretician in pursuit of higher order accuracy
[AIAA PAPER 82-0389] A82-17919
Evaluation of supersonic missile aerodynamic prediction techniques
[AIAA PAPER 82-0390] A82-17920
Concerning the calculation of the aerodynamic characteristics of mechanized wings
A82-18589
Low Reynolds number airfoil survey, volume 1
[NASA-CR-165803-VOL-1] N82-14059
A theoretical investigation of wing rocking
[NASA-CR-165058] N82-15031

Computer program for aerodynamic and blading design of multistage axial-flow compressors [NASA-TP-1946] N82-15039
Aerodynamic response of a blade in pitching oscillation with partial and full separation --- measurement of the instantaneous pressure distribution around a vibrating blade surface in a wind tunnel N82-15047
Damping for turbomachine blade variations in subsonic flow N82-15048

AERODYNAMIC COEFFICIENTS
Vortex lift augmentation by suction on a 60 deg swept Gothic wing [AIAA PAPER 82-0231] A82-17856
Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature A82-18484
ACTA Mechanica Sinica (selected articles) [AD-A107322] N82-14060
Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds N82-14061
Low-speed aerodynamic performance of a high-aspect-ratio supercritical-wing transport model equipped with full-span slat and part-span double-slotted flaps [NASA-TP-1580] N82-15015
High lift selected concepts [NASA-CR-159093] N82-15017
Aerodynamic considerations in the prediction of unstalled supersonic flutter in transonic fans N82-15058

AERODYNAMIC CONFIGURATIONS
Direct approach to aerodynamic design problems A82-16404
Development and validation of the V/STOL aerodynamics and stability and control manual [AIAA PAPER 81-2611] A82-16903
Optimum configuration for a 10 passenger business turbofan jet airplane [AIAA PAPER 82-0365] A82-17905

AERODYNAMIC DRAG
Take-off ground roll of propeller driven aircraft A82-17607
Determination of the trimmed drag of an aircraft A82-18583
Optimization and performance calculation of dual-rotation propellers [NASA-TP-1948] N82-14049
Comparison of experimental and theoretical turbulence reduction characteristics for screens, honeycomb, and honeycomb-screen combinations [NASA-TP-1958] N82-14055
An afterbody drag balance --- transonic wind tunnel gages [RAE-TM-AERO-1897] N82-14103
Subsonic balance and pressure investigation of a 60-deg delta wing with leading-edge devices (data report) [NASA-CR-165806] N82-15014

AERODYNAMIC FORCES
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/ A82-16040
Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies A82-16432
Calculation of quasi-stationary aerodynamic force acting on a cascade of oscillating airfoils in subsonic flow N82-15051
A method for force determination from vibration response measurements --- application to turbomachine blades N82-15055
Calculation of nonstationary force ratios on blades of a rotating row in incompressible flow N82-15061
The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade N82-15063

AERODYNAMIC LOADS
Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave A82-18590
Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds N82-14061
Effect of mean blade loading on supersonic cascade flutter N82-15059
NASA Dryden Flight Loads Research Facility [NASA-TM-81368] N82-15079

AERODYNAMIC NOISE
Scattering of sound by a vortex ring A82-16148
Linear and nonlinear analysis of vortex whistle: Another blade buster N82-15067

AERODYNAMIC STABILITY
Dynamic stability of a buoyant quad-rotor aircraft --- for airlifting payloads externally on a sling [AIAA PAPER 82-0242] A82-17861
Stability analysis of the twin mode model of coupled flexion/torsion vibrations in turbofans N82-15057

AERODYNAMIC STALLING
On the numerical analysis of stall flutter in turbine cascades N82-15054

AERODYNAMICS
Some aerodynamic aspects of hang gliding A82-17124

AEROELASTICITY
Effect on surface pressures of trapezoidal holes in a T-38 stabilator A82-17602
Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature A82-18484
Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/ A82-18620
Estimation methods for the determination of dynamic responses of elastic aircraft --- to random loads [BMVG-FBWT-81-6] N82-15037
Aeroelasticity in turbomachines --- conference proceedings [EPFL-ITA-10] N82-15042
Computer aided investigation of turbomachine aerodynamics and aeroelasticity N82-15053
Control of vibration in aeroelastic cascade experiments N82-15056
Technical evaluation report on the Aeroelasticity in Turbomachines Symposium N82-15070

AERONAUTICAL ENGINEERING
Control methodology: Nondestructive testing in the aeronautics industry [SNIAS-812-551-110] N82-14527
Aeronautical applications of bonding [SNIAS-812-551-102] N82-15010
The influence of aeronautical R&D expenditures upon the productivity of air transportation [PB81-247140] N82-15984
Aeronautics and space report of the President, 1980 activities [NASA-TM-84079] N82-16022

AEROSPACE ENGINEERING
La Recherche Aerospatiale, Bi-monthly Bulletin No. 1981-2, March - April 1981 --- aerodynamic research [ESA-TT-713] N82-14308
Aeronautics and space report of the President, 1980 activities [NASA-TM-84079] N82-16022

AEROSPACE INDUSTRY
Noise control plan for a new airplane manufacturing facility A82-18730

AEROSPACE SYSTEMS
Aerospace highlights 1981 A82-16135

Determination of the flammability characteristics of aerospace hydraulic fluids
A82-16187
AEROSPACE VEHICLES
Development of Integrated Programs for Aerospace-Vehicle Design (IPAD) - IPAD user requirements
[NASA-CR-2985] N82-15030
AFTERBODIES
Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies
[AIAA PAPER 82-0252] A82-17865
An afterbody drag balance --- transonic wind tunnel gages
[RAE-TM-AERO-1897] N82-14103
AIR CUSHION LANDING SYSTEMS
Kelvin-Helmholtz stability analysis of air cushion landing gear trunk flutter
A82-17608
AIR FLOW
System for acquisition and analysis of dynamic tests on air intakes
[NASA-TM-76646] N82-14056
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics
[AD-A106061] N82-14316
AIR INTAKES
Wind tunnel tests of engine-equipped models: Comparison of two jet wash simulation methods
[NASA-TM-76764] N82-14091
AIR NAVIGATION
PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record
A82-18126
Selecting the post 1990 civil aviation radionavigation system
A82-18141
Solid-state VORTAC with remote maintenance and monitoring
A82-18144
Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems
A82-18151
JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance
A82-18152
JTIDS RELNAV network off-line simulation
A82-18153
Post-flight assessment of the JTIDS Rel Nav
A82-18154
A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system
A82-18155
A stable decentralized filtering implementation for JTIDS RelNav --- stable community relative navigation
A82-18156
Navigation system integrity and reliability for civil aviation
A82-18159
Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver --- Joint Tactical Information Distribution System
A82-18171
Data communications within the Air Navigation Services system
A82-18272
Modernizing the Egyptian A.T.C. system
A82-18273
AIR TO AIR MISSILES
Target acceleration modeling for tactical missile guidance
[AIAA PAPER 82-0370] A82-17910
AIR TRAFFIC
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 4 August 1978
[DFVLR-MITT-81-12] N82-15029
AIR TRAFFIC CONTROL
Air traffic management for fuel economy
A82-17279
The shape of the air traffic control system of the future - A U.S. perspective
A82-17280
Air traffic control problems and solutions
A82-17283
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0266] A82-17868
Data communications within the Air Navigation Services system
A82-18272
Modernizing the Egyptian A.T.C. system
A82-18273
The use of flight management computers in air carrier operations in the 1980s
[AD-A105621] N82-14071
Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978
[DFVLR-MITT-81-12] N82-14073
Design and implementation of a telecommunication interface for the TAATM/TCV real-time experiment
[NASA-TM-83231] N82-14075
Requirements for instrument approaches to triple parallel runways
[AD-A105622] N82-14079
Real time simulation of computer-assisted sequencing of terminal area operations
[NASA-CR-166195] N82-14817
Automated Pilot Advisory System
[NASA-TM-73296] N82-15027
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 3 August 1979
[DFVLR-MITT-81-17] N82-15028
AIR TRANSPORTATION
Aerospace highlights 1981
A82-16135
Greenlandair VTOL transportation study
[AIAA PAPER 81-2642] A82-16913
The influence of aeronautical R&D expenditures upon the productivity of air transportation
[PB81-247140] N82-15984
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008
AIRBORNE EQUIPMENT
Design and performance of airborne radomes - A review
A82-16564
A GPS receiver design for general aviation navigation
A82-18132
Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors
A82-18147
AIRBORNE SURVEILLANCE RADAR
AEW Nimrod - The Mission System Avionics
A82-16556
AIRBORNE/SPACEBORNE COMPUTERS
Advanced cockpit for tactical aircraft
A82-16559
Head-up displays - The integrity of flight information
A82-16562
The use of flight management computers in air carrier operations in the 1980s
[AD-A105621] N82-14071
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference
[NASA-CP-2206] N82-14829
airborne data analysis/monitor system
N82-14830
ADAMS executive and operating system
N82-14831
On-board computer progress in development of A 310 flight testing program
N82-14833
ROLM computers in the flight testing of the Fokker F29 aircraft
N82-14839
Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research
N82-14842
AIRCRAFT
F101DFE in Tomcat - Preliminary test results
A82-18346
AIRCRAFT ACCIDENT INVESTIGATION
Modern aircraft accident investigation equipment and techniques
A82-17418

AIRCRAFT ACCIDENTS
Why safety --- fuel conservation through aircraft safety
A82-17277
Accident prevention - A regulators view
A82-17278
Estimate of human control over mid-air collisions
A82-17604
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072
AIRCRAFT ANTENNAS
Design and performance of airborne radomes - A review
A82-16564
Airborne antenna pattern calculations
[NASA-CR-165059] N82-15277
AIRCRAFT APPROACH SPACING
Requirements for independent and dependent parallel instrument approaches at reduced runway spacing
[AD-A105673] N82-14080
AIRCRAFT CONFIGURATIONS
Experience with high performance V/STOL fighter projects at MBB
[AIAA PAPER 81-2614] A82-16901
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904
V/STOL status from the engine technology viewpoint
[AIAA PAPER 81-2648] A82-16913
AIRCRAFT CONSTRUCTION MATERIALS
Aircraft composite materials and structures
A82-16143
Development of the Lockheed SR-71 Blackbird
A82-17417
Experimental structural testing on a composite aircraft canard and its applications
[AIAA PAPER 82-0409] A82-17930
Lear Fan - The plastic aeroplane arrives
A82-18348
AIRCRAFT CONTROL
Development and validation of the V/STOL aerodynamics and stability and control manual
[AIAA PAPER 81-2611] A82-16903
Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft
[AIAA PAPER 81-2636] A82-16910
Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles
[AIAA PAPER 81-2639] A82-16911
An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays
[AIAA PAPER 82-0367] A82-17907
Flight mechanics - Modern aircraft design and control concepts --- German book
A82-17951
Game-theoretical method for the synthesis of aircraft control during landing approach
A82-18584
A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
A82-18596
The application of bifurcation theory to the study of loss of control over combat aircraft
[ONERA, TP NO. 1981-100] A82-18837
NASA aviation safety reporting system
[NASA-TM-81274] N82-15025
An observer approach to the identification and isolation of sensor failures in flight control systems
[DFVLR-FB-81-26] N82-15078
Role of optical computers in aeronautical control applications
N82-15897
AIRCRAFT DESIGN
Aerospace highlights 1981
A82-16135
Direct approach to aerodynamic design problems
A82-16404
Special problems associated with aircraft radomes
A82-16558
Advanced cockpit for tactical aircraft
A82-16559
Grumman Tomcat - In a class of its own
A82-16800
V/STOL status from the engine technology viewpoint
[AIAA PAPER 81-2648] A82-16913
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft
[AIAA PAPER 81-2656] A82-16915
Type 'A' V/STOL - One aircraft for all support missions
[AIAA PAPER 81-2661] A82-16917
Airbus - Perspectives for the future
A82-16972
Turboprop resurgence - The next step
A82-17149
Fuel conservation now --- improvements for existing production run transport aircraft
A82-17281
Productivity and safety --- reducing transport aircraft operating costs and increasing safety
A82-17284
Development of the Lockheed SR-71 Blackbird
A82-17417
The all-electric airplane - A new trend
A82-17420
Optimum configuration for a 10 passenger business turbofan jet airplane
[AIAA PAPER 82-0365] A82-17905
Highlights of a design concept for a close ground support fighter
[AIAA PAPER 82-0411] A82-17932
Flight mechanics - Modern aircraft design and control concepts --- German book
A82-17951
Introduction to V/STOL airplanes --- Book
A82-18117
Design evolution of the Boeing 757
A82-18322
Lear Fan - The plastic aeroplane arrives
A82-18348
Boeing 757 - Introducing the big-fan narrowbody
A82-18349
High lift selected concepts
[NASA-CR-159093] N82-15017
AIRCRAFT ENGINES
The well tempered transport aircraft engine /The Sir Henry Royce Memorial Lecture/
A82-16145
Resonant whirling of aircraft propeller-engine systems
A82-16417
V/STOL propulsion control technology
[AIAA PAPER 81-2634] A82-16909
V/STOL status from the engine technology viewpoint
[AIAA PAPER 81-2648] A82-16913
Turboprop resurgence - The next step
A82-17149
Fuel conservation now --- improvements for existing production run transport aircraft
A82-17281
Gas path analysis - A tool for engine condition monitoring
A82-17286
Development of the Lockheed SR-71 Blackbird
A82-17417
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator
[AIAA PAPER 82-0254] A82-17866
A short history of aviation gasoline development, 1903-1980
A82-18321
2037 - Pratt & Whitney tests new turbofan
A82-18347
A mathematical model of a subsonic transport aircraft
A82-18575
Fluidics in aircraft engine controls
A82-18691
Reduction of the acoustic environment in an F100-PW-100 engine test cell
A82-18727
Foreign object damage in naval aircraft engines
[AD-A105787] N82-14098
Advanced compressor components. Phase 1: 1978 to 1979 --- for aircraft engines
[BMFT-FB-W-81-025] N82-15073
High temperature electronic requirements in aeropropulsion systems
[E-708] N82-15313

AIRCRAFT EQUIPMENT
Optical Information Processing for Aerospace Applications [NASA-CP-2207] N82-15894
AIRCRAFT FUEL SYSTEMS
External fuel vaporization study [NASA-CR-165513] N82-14371
AIRCRAFT FUELS
Liquid hydrogen - An outstanding alternate fuel for transport aircraft A82-17290
The NASA MERIT program - Developing new concepts for accurate flight planning [AIAA PAPER 82-0340] A82-17894
A short history of aviation gasoline development, 1903-1980 A82-18321
Design and testing of a new double labyrinth seal [ASME PAPER 81-LUB-58] A82-18452
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography [AD-A105588] N82-14312
External fuel vaporization study [NASA-CR-165513] N82-14371
Pollution of the soil by aviation gasoline [PML-1979-41] N82-15596
AIRCRAFT GUIDANCE
Helical helicopter approaches with microwave landing system guidance [AIAA PAPER 81-2654] A82-16914
Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors A82-18147
Requirements for independent and dependent parallel instrument approaches at reduced runway spacing [AD-A105673] N82-14080
MLS vertical guidance and navigation for a STOL airplane landing on an elevated STOLport [NASA-TM-81338] N82-14101
AIRCRAFT HAZARDS
Simulation of phugoid excitation due to hazardous wind shear [AIAA PAPER 82-0215] A82-17844
The influence of turbulence models on computer-simulated aircraft landing [AIAA PAPER 82-0342] A82-17896
AIRCRAFT HYDRAULIC SYSTEMS
Cavitation inception in spool valves A82-16420
AIRCRAFT INDUSTRY
Computer flight planning for fuel efficiency A82-17289
Control methodology: Nondestructive testing in the aeronautics industry [SNIAS-812-551-110] N82-14527
AIRCRAFT INSTRUMENTS
A Microwave Ice Accretion Measurement Instrument - MIAMI [AIAA PAPER 82-0285] A82-17875
AIRCRAFT LANDING
The influence of turbulence models on computer-simulated aircraft landing [AIAA PAPER 82-0342] A82-17896
An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays [AIAA PAPER 82-0367] A82-17907
Game-theoretical method for the synthesis of aircraft control during landing approach A82-18584
Requirements for independent and dependent parallel instrument approaches at reduced runway spacing [AD-A105673] N82-14080
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system [NLR-MP-80036-U] N82-14084
Real time simulation of computer-assisted sequencing of terminal area operations [NASA-CR-166195] N82-14817
AIRCRAFT MAINTENANCE
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft [AIAA PAPER 81-2656] A82-16915
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes A82-17531
AIRCRAFT MANEUVERS
An investigation of the use of a propulsive wing/canard concept for improved maneuvering [AIAA PAPER 81-2622] A82-16905
A binary matrix technique for aircraft collision threat recognition and avoidance [AIAA PAPER 82-0184] A82-17828
The feasibility of turnback from a low altitude engine failure during the takeoff climb-out phase [AIAA PAPER 82-0406] A82-17928
Maneuver dependent component error models and synchronized reset filters for inertial navigation systems A82-18139
NASA aviation safety reporting system [NASA-TM-81274] N82-15025
AIRCRAFT MODELS
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator [AIAA PAPER 82-0254] A82-17866
A mathematical model of a subsonic transport aircraft A82-18575
The application of bifurcation theory to the study of loss of control over combat aircraft [ONERA, TP NO. 1981-100] A82-18837
Development of an efficient procedure for calculating the aerodynamic effects of planform variation [NASA-CR-3489] N82-14529
AIRCRAFT NOISE
Workshop report for the AIAA 6th Aeroacoustics Conference A82-16091
Noise control measures in the new Singapore International Airport A82-16746
Current investigations regarding noise research in the Braunschweig Center of the German Institute for Research and Experimentation in Aeronautics and Astronautics A82-17137
Propeller tip vortex - A possible contributor to aircraft cabin noise A82-17603
Reduction of the acoustic environment in an F100-PW-100 engine test cell A82-18727
Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft A82-18729
Noise monitoring in airport communities A82-18731
Quantification of airport community noise impact in terms of noise levels, population density, and human subjective response A82-18732
AIRCRAFT PARTS
A method for locating aircraft wing damage by nonlinear vibration analysis A82-17116
AIRCRAFT PERFORMANCE
The well tempered transport aircraft engine /The Sir Henry Royce Memorial Lecture/ A82-16145
Grumman Tomcat - In a class of its own A82-16800
Experience with high performance V/STOL fighter projects at MBB [AIAA PAPER 81-2618] A82-16901
Turboprop resurgence - The next step A82-17149
Energy savings with today's technology --- aircraft fuel management through in-flight monitoring A82-17282
Flight crew management and cockpit performance systems A82-17285
Computer flight planning for fuel efficiency A82-17289
Liquid hydrogen - An outstanding alternate fuel for transport aircraft A82-17290
Take-off ground roll of propeller driven aircraft A82-17607

Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data
[AIAA PAPER 82-0183] A82-17827
Simulation of phugoid excitation due to hazardous wind shear
[AIAA PAPER 82-0215] A82-17844
Digital test pilot concept
[AIAA PAPER 82-0259] A82-17867
Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component
[AIAA PAPER 82-0341] A82-17895
Optimum configuration for a 10 passenger business turbofan jet airplane
[AIAA PAPER 82-0365] A82-17905
Design evolution of the Boeing 757
A82-18322
F101DFE in Tomcat - Preliminary test results
A82-18346
Boeing 757 - Introducing the big-fan narrowbody
A82-18349
C-5A operational utility evaluation soil tests and analysis
[AD-A105555] N82-14083
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system
[NLR-MP-80036-U] N82-14084

AIRCRAFT PILOTS
Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft
[AIAA PAPER 81-2636] A82-16910

AIRCRAFT PRODUCTION
Special problems associated with aircraft radomes
A82-16558
Noise control plan for a new airplane manufacturing facility
A82-18730

AIRCRAFT SAFETY
Effect of fleet size on estimates of safety against airframe fatigue
A82-16153
Determination of the flammability characteristics of aerospace hydraulic fluids
A82-16187
Techniques for overhead-wire detection --- to prevent helicopter wirestrikes
A82-16560
Why safety --- fuel conservation through aircraft safety
A82-17277
Accident prevention - A regulators view
A82-17278
The shape of the air traffic control system of the future - A U.S. perspective
A82-17280
Air traffic control problems and solutions
A82-17283
Productivity and safety --- reducing transport aircraft operating costs and increasing safety
A82-17284
Flight crew management and cockpit performance systems
A82-17285
A binary matrix technique for aircraft collision threat recognition and avoidance
[AIAA PAPER 82-0184] A82-17828
NASA aviation safety reporting system
[NASA-TM-81274] N82-15025

AIRCRAFT STABILITY
Development and validation of the V/STOL aerodynamics and stability and control manual
[AIAA PAPER 81-2611] A82-16903
Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles
[AIAA PAPER 81-2639] A82-16911
Bifurcation analysis of nonlinear stability of aircraft at high angles of attack
[AIAA PAPER 82-0244] A82-17862

AIRCRAFT STRUCTURES
Aircraft composite materials and structures
A82-16143
Crack edge instability - A criterion for safe crack propagation limit in thin sheets
A82-17243
Subsonic flow over airborne optical turrets
A82-17605
Icing analysis of an unprotected aircraft radome
[AIAA PAPER 82-0281] A82-17874
Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures
A82-18612
Calculation of the stability of crosswise-reinforced cylindrical shells
A82-18621
Development of a transmission loss test facility for light aircraft structures
A82-18728
Estimation methods for the determination of dynamic responses of elastic aircraft --- to random loads
[BMVG-FBWT-81-6] N82-15037

AIRFOIL PROFILES
Advanced technology airfoil development for the XV-15 tilt-rotor vehicle
[AIAA PAPER 81-2623] A82-16906
Design procedures for compressor blades
A82-17135
Unsteady flow patterns associated with spoiler control devices
[AIAA PAPER 82-0127] A82-17798
Computations of transonic flow over an oscillating airfoil with shock-induced separation
[AIAA PAPER 82-0350] A82-17900
A contribution to the hodograph method for shock-free transonic airfoil sections
A82-18022
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
A82-18776
Optimization and performance calculation of dual-rotation propellers
[NASA-TP-1948] N82-14049
A flight investigation of blade-section aerodynamics for a helicopter main rotor having 10-64C airfoil sections
[NASA-TM-83226] N82-14058
Low Reynolds number airfoil survey, volume 1
[NASA-CR-165803-VOL-1] N82-14059
High lift selected concepts
[NASA-CR-159093] N82-15017
Computer program for aerodynamic and blading design of multistage axial-flow compressors
[NASA-TP-1946] N82-15039

AIRFOILS
An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil
[AIAA PAPER 82-0214] A82-17843
Bifurcation analysis of nonlinear stability of aircraft at high angles of attack
[AIAA PAPER 82-0244] A82-17862
Instantaneous turbulence profiles in the wake of an oscillating airfoil
[AIAA PAPER 82-0353] A82-17901
Experimental investigation of a transonic potential flow around a symmetric airfoil
[NASA-TM-76676] N82-14057
Natural laminar flow airfoil analysis and trade studies
[NASA-CR-159029] N82-15018

AIRFRAME MATERIALS
Control methodology: Nondestructive testing in the aeronautics industry
[SNIAS-812-551-110] N82-14527
Advantages and limitations in the use of diverse materials for aircraft construction --- composite versus metallic materials
[SNIAS-811-551-104] N82-15011

AIRFRAMES
Effect of fleet size on estimates of safety against airframe fatigue
A82-16153

AIRLINE OPERATIONS
Effect of fleet size on estimates of safety against airframe fatigue
A82-16153
Greenlandair VTOL transportation study
[AIAA PAPER 81-2642] A82-16912

AIRPLANE PRODUCTION COSTS
A low cost maritime control aircraft-ship-weapons system --- antiship missile defense
[AIAA PAPER 81-2660] A82-16916

AIRPORT LIGHTS
  Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements
  [IZF-1980-1-VOL-1] N82-15081
  Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 2: Intensity measurements
  [IZF-1980-12-VOL-2] N82-15082
AIRPORT PLANNING
  Noise control measures in the new Singapore International Airport
  A82-16746
  Energy conservation through airport design and management
  A82-17287
  A new end-fire ILS glide slope
  A82-18143
AIRPORTS
  Air traffic management for fuel economy
  A82-17279
  The shape of the air traffic control system of the future - A U.S. perspective
  A82-17280
  Air traffic control problems and solutions
  A82-17283
  The Joint Airport Weather Studies project --- investigation of convective microbursts
  [AIAA PAPER 82-0017] A82-17734
  Noise monitoring in airport communities
  A82-18731
  Quantification of airport community noise impact in terms of noise levels, population density, and human subjective response
  A82-18732
  Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978
  [DFVLR-MITT-81-12] N82-14073
  Requirements for instrument approaches to triple parallel runways
  [AD-A105622] N82-14079
  Effects of aircraft noise on the equilibrium of airport residents: Supplementary analyses to the study carried out around Orly
  [NASA-TM-76627] N82-14673
  Taking into account nighttime annoyance in the calculation of the psophic index
  [NASA-TM-76580] N82-14674
  The Modular Automated Weather System (MAWS) concept --- airfield weather support
  N82-14763
  Automated Pilot Advisory System
  [NASA-TM-73296] N82-15027
  Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 4 August 1978
  [DFVLR-MITT-81-12] N82-15029
AIRSPEED
  The application of programmable pocket calculators for computations during survey flights
  A82-16164
  A true air speed sensor for miniature unmanned aircraft
  [RAE-TM-SPACE-287] N82-14086
ALGORITHMS
  Application of integration algorithms in a parallel processing environment for the simulation of jet engines
  [NASA-TM-82746] N82-14849
ALL-WEATHER LANDING SYSTEMS
  Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions
  A82-18161
ALPHANUMERIC CHARACTERS
  A prototype interface unit for microprocessor based Loran-C receiver
  [NASA-CR-164887] N82-14078
ALTIMETERS
  A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data
  [NASA-CR-156882] N82-15498
ANALOG TO DIGITAL CONVERTERS
  XV-15 Tilt Rotor fly-by-wire collective control demonstrator development specifications
  [NASA-CR-166262] N82-15030
ANGLE OF ATTACK
  Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
  [AIAA PAPER 82-0054] A82-17755
  Bifurcation analysis of nonlinear stability of aircraft at high angles of attack
  [AIAA PAPER 82-0244] A82-17862
  Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg
  [AIAA PAPER 82-0250] A82-17864
ANGULAR VELOCITY
  3 DOF gyro analysis from measured and derived rates --- hypersonic reentry simulation test
  [AIAA PAPER 82-0189] A82-17831
ANTENNA RADIATION PATTERNS
  Airborne antenna pattern calculations
  [NASA-CR-165059] N82-15277
ANTIFRICTION BEARINGS
  Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft
  [ASLE PREPRINT 81-LC-2B-3] A82-18412
  Four pad tilting pad bearing design and application for multistage axial compressors
  [ASME PAPER 81-LUB-12] A82-18429
ANTIMISSILE DEFENSE
  A low cost maritime control aircraft-ship-weapons system --- antiship missile defense
  [AIAA PAPER 81-2660] A82-16916
ANTISHIP MISSILES
  A low cost maritime control aircraft-ship-weapons system --- antiship missile defense
  [AIAA PAPER 81-2660] A82-16916
APPLICATIONS PROGRAMS (COMPUTERS)
  airborne data analysis/monitor system
  N82-14830
APPROACH AND LANDING TESTS (STS)
  In-flight investigation of the effects of pilot location and control system design on airplane flying qualities for approach and landing
  [NASA-CR-163115] N82-150[illegible]
APPROACH CONTROL
  Helical helicopter approaches with microwave landing system guidance
  [AIAA PAPER 81-2654] A82-16914
  The DME-based Azimuth System /DAS/
  A82-18146
  Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont
  A82-18160
  Game-theoretical method for the synthesis of aircraft control during landing approach
  A82-18584
  Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978
  [DFVLR-MITT-81-12] N82-14073
  Requirements for instrument approaches to triple parallel runways
  [AD-A105622] N82-14079
  Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 3 August 1979
  [DFVLR-MITT-81-17] N82-15028
  Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 4 August 1978
  [DFVLR-MITT-81-12] N82-15029
APPROACH INDICATORS
  In-service testing of the Precision Approach Path Indicator (PAPI) at Newark International Airport, New Jersey
  [DOT/FAA/RD-81/95] N82-14076
  Requirements for independent and dependent parallel instrument approaches at reduced runway spacing
  [AD-A105673] N82-14080
AREA NAVIGATION
  Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors
  A82-18147
  Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont
  A82-18160
ASPECT RATIO
  Infrared emissions from turbofans with high aspect ratio nozzles
  A82-16892

Low-speed aerodynamic performance of a high-aspect-ratio supercritical-wing transport model equipped with full-span slat and part-span double-slotted flaps
[NASA-TP-1580] N82-15015

High lift selected concepts
[NASA-CR-159093] N82-15017

The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade
N82-15063

ASYMPTOTIC METHODS

A stable decentralized filtering implementation for JTIDS RelNav --- stable community relative navigation
A82-18156

Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/
A82-18620

ATMOSPHERIC EFFECTS

Constant L/D glide trajectories
[AIAA PAPER 82-0362] A82-17904

ATMOSPHERIC ELECTRICITY

Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714

ATMOSPHERIC TURBULENCE

The influence of turbulence models on computer-simulated aircraft landing
[AIAA PAPER 82-0342] A82-17896

ATTITUDE (INCLINATION)

Four pad tilting pad bearing design and application for multistage axial compressors
[ASME PAPER 81-LUB-12] A82-18429

ATTITUDE INDICATORS

A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
A82-18596

AUTOMATED PILOT ADVISORY SYSTEM

Automated Pilot Advisory System
[NASA-TM-73296] N82-15027

AUTOMATIC CONTROL

Electronic master monitor and advisory display system, operational fuctions report
[AD-A105516] N82-14087

AUTOMATIC FLIGHT CONTROL

Flight crew management and cockpit performance systems
A82-17285

Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072

AUTOMATIC LANDING CONTROL

MLS vertical guidance and navigation for a STOL airplane landing on an elevated STOLport
[NASA-TM-81338] N82-14101

AUTOMATIC TEST EQUIPMENT

ROLM computers in the flight testing of the Fokker F29 aircraft
N82-14839

AUTOMATIC WEATHER STATIONS

The Modular Automated Weather System (MAWS) concept --- airfield weather support
N82-14763

AUTOMOBILE FUELS

Technological innovation for success - Liquid hydrogen propulsion
A82-16734

AUTOMOBILES

Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies
A82-16432

AVIONICS

AEW Nimrod - The Mission System Avionics
A82-16556

Management of a large avionics project
A82-16557

Advanced cockpit for tactical aircraft
A82-16559

Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77
A82-16561

JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance
A82-18152

The use of flight management computers in air carrier operations in the 1980s
[AD-A105621] N82-14071

Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072

Investigation of functional commonality of avionics systems in naval aircraft
[AD-A105503] N82-14088

Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424

Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research
N82-14842

AXIAL FLOW

Optimization of compressor vane and bleed settings
[AD-A106059] N82-14097

AXIAL FLOW TURBINES

The use of optimization techniques to design controlled diffusion compressor blading
[NASA-TM-82763] N82-14094

AZIMUTH

The DME-based Azimuth System /DAS/
A82-18146

B

BALL BEARINGS

Effects of ultra-clean and centrifugal filtration on rolling-element bearing life
[ASME PAPER 81-LUB-35] A82-18436

Inclusions and service induced cracks in a mature population of gas turbine engine bearings
[ASME PAPER 81-LUB-48] A82-18444

BINARY DATA

A binary matrix technique for aircraft collision threat recognition and avoidance
[AIAA PAPER 82-0184] A82-17828

BLADE TIPS

Propeller tip vortex - A possible contributor to aircraft cabin noise
A82-17603

BLOWDOWN WIND TUNNELS

Research on an induction driven cryogenic wind tunnel
N82-14394

BLUFF BODIES

Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies
A82-16432

BODY-WING CONFIGURATIONS

Computational treatment of transonic canard-wing interactions
[AIAA PAPER 82-0161] A82-17814

A more-accurate transonic computational method for wing-body configurations
[AIAA PAPER 82-0162] A82-17815

Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis
[AIAA PAPER 82-0163] A82-17816

BOEING 727 AIRCRAFT

Fuel conservation now --- improvements for existing production run transport aircraft
A82-17281

BOEING 737 AIRCRAFT

Fuel conservation now --- improvements for existing production run transport aircraft
A82-17281

BOEING 747 AIRCRAFT

Selected advanced aerodynamic and active control concepts development
[NASA-CR-3220] N82-15033

BOEING 757 AIRCRAFT

Design evolution of the Boeing 757
A82-18322

2037 - Pratt & Whitney tests new turbofan
A82-18347

Boeing 757 - Introducing the big-fan narrowbody
A82-18349

BOUNDARY LAYER CONTROL

A summary of V/STOL inlet analysis methods
[AIAA PAPER 81-2628] A82-16902

An investigation of the use of a propulsive wing/canard concept for improved maneuvering
[AIAA PAPER 81-2622] A82-16905

BOUNDARY LAYER FLOW
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855
BOUNDARY LAYER SEPARATION
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
A82-10776
BOUNDARY LAYER TRANSITION
The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities
A82-18591
BRANCHING (MATHEMATICS)
The application of bifurcation theory to the study of loss of control over combat aircraft
[ONERA, TP NO. 1981-100] A82-18837
BRISTOL-SIDDELEY BS 53 ENGINE
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft
[AIAA PAPER 81-2656] A82-16915
BUOYS
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data
[NASA-CR-156882] N82-15498
BUTADIENE
Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems
A82-17538

C

C-5 AIRCRAFT
C-5A operational utility evaluation soil tests and analysis
[AD-A105555] N82-14083
CALCULATORS
The application of programmable pocket calculators for computations during survey flights
A82-16164
CALIBRATING
VOR waveform synthesis and calibration
A82-16563
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator
[AIAA PAPER 82-0254] A82-17866
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows
[AIAA PAPER 82-0410] A82-17931
CAMBER
Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies
A82-16432
CANARD CONFIGURATIONS
An investigation of the use of a propulsive wing/canard concept for improved maneuvering
[AIAA PAPER 81-2622] A82-16905
Computational treatment of transonic canard-wing interactions
[AIAA PAPER 82-0161] A82-17814
Experimental structural testing on a composite aircraft canard and its applications
[AIAA PAPER 82-0409] A82-17930
CAPILLARY TUBES
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105580] N82-14312
CARBON FIBER REINFORCED PLASTICS
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
A82-17531
CARBON FIBERS
Lear Fan - The plastic aeroplane arrives
A82-10348
CARBON TETRAFLUORIDE
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel
[NASA-TM-83220] N82-15359
CASCADE FLOW
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/
A82-16040
Self excited flow oscillation in the low pressure steam turbine cascade
N82-15049
Stability and flutter analysis of turbine blades at low speed
N82-15050
Calculation of quasi-stationary aerodynamic force acting on a cascade of oscillating airfoils in subsonic flow
N82-15051
Numerical experiments on unsteady flows through vibrating cascades
N82-15052
On the numerical analysis of stall flutter in turbine cascades
N82-15054
Control of vibration in aeroelastic cascade experiments
N82-15056
A method of characteristics solution for a finite oscillating supersonic cascade with thickness effects
N82-15060
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062
The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade
N82-15063
Study of acoustic resonance of cascades --- sound generated by guide vanes; wind tunnel investigations
N82-15068
CATHODE RAY TUBES
A prototype interface unit for microprocessor based Loran-C receiver
[NASA-CR-164887] N82-14078
CAVITATION FLOW
Cavitation inception in spool valves
A82-16428
CDC CYBER 175 COMPUTER
Design and implementation of a telecommunication interface for the TAATM/TCV real-time experiment
[NASA-TM-83231] N82-14075
CENTER OF GRAVITY
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 2: AFT C.G. simulation and analysis
[NASA-CR-159098] N82-15077
CENTRIFUGAL COMPRESSORS
Advanced compressor components. Phase 1: 1978 to 1979 --- for aircraft engines
[BMFT-FB-W-81-025] N82-15073
CERAMIC COATINGS
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090
CERTIFICATION
Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data
[AIAA PAPER 82-0183] A82-17027
CHEMICAL PROPERTIES
Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft
[ASLE PREPRINT 81-LC-2B-3] A82-18412
Aeronautical applications of bonding
[SNIAS-812-551-102] N82-15010
CIRCUIT RELIABILITY
Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77
A82-16561
CIVIL AVIATION
Selecting the post 1990 civil aviation radionavigation system
A82-18141
Navigation system integrity and reliability for civil aviation
A82-18159
CLIMBING FLIGHT
Energy savings with today's technology --- aircraft fuel management through in-flight monitoring
A82-17282

COAXIAL FLOW
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model [AIAA PAPER 82-0113] A82-17791

COCKPIT SIMULATORS
A general aviation simulator evaluation of a rate-enhanced instrument landing system display [NASA-TP-1960] N82-14085

COCKPITS
Flight crew management and cockpit performance systems A82-17285

COLD FLOW TESTS
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics [AD-A106061] N82-14316

COLLISION AVOIDANCE
A binary matrix technique for aircraft collision threat recognition and avoidance [AIAA PAPER 82-0184] A82-17828

COLOR
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements [IZF-1980-1-VOL-1] N82-15081

COMBAT
The application of bifurcation theory to the study of loss of control over combat aircraft [ONERA, TP NO. 1981-100] A82-18837

COMBUSTION CHAMBERS
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model [AIAA PAPER 82-0113] A82-17791
Development and operating characteristics of an advanced two-stage combustor [AIAA PAPER 82-0191] A82-17833
Effect of fuel injector type on performance and emissions of reverse-flow combustor [NASA-TP-1945] N82-15040

COMBUSTION EFFICIENCY
Development and operating characteristics of an advanced two-stage combustor [AIAA PAPER 82-0191] A82-17833

COMBUSTION PRODUCTS
Damage of turbine blades due to interaction with fuel resinification products A82-18479

COMMERCIAL AIRCRAFT
Turboprop resurgence - The next step A82-17149
Why safety --- fuel conservation through aircraft safety A82-17277
Accident prevention - A regulators view A82-17278
Estimate of human control over mid-air collisions A82-17604
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference [NASA-CP-2206] N82-14829
Natural laminar flow airfoil analysis and trade studies [NASA-CR-159029] N82-15018

COMMONALITY (EQUIPMENT)
Investigation of functional commonality of avionics systems in naval aircraft [AD-A105503] N82-14088

COMMUNICATION NETWORKS
PLRS engineering development testing - Early results --- Position Location Reporting System with data communication network for community users in tactical environment A82-18157
Data communications within the Air Navigation Services system A82-18272
Modernizing the Egyptian A.T.C. system A82-18273

COMMUNITIES
Community rotorcraft air transportation benefits and opportunities [NASA-CR-166266] N82-16008

COMPOSITE MATERIALS
Aircraft composite materials and structures A82-16143
Advantages and limitations in the use of diverse materials for aircraft construction --- composite versus metallic materials [SNIAS-811-551-104] N82-15011

COMPOSITE STRUCTURES
Stress intensity factor measurements in composite sandwich structures A82-17535
Experimental structural testing on a composite aircraft canard and its applications [AIAA PAPER 82-0409] A82-17930

COMPRESSIBLE FLOW
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows [AIAA PAPER 82-0410] A82-17931
A contribution to the hodograph method for shock-free transonic airfoil sections A82-18022
Computer program for aerodynamic and blading design of multistage axial-flow compressors [NASA-TP-1946] N82-15039

COMPRESSION WAVES
Experimental investigation of a transonic potential flow around a symmetric airfoil [NASA-TM-76676] N82-14057

COMPRESSOR BLADES
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/ A82-16040
Design procedures for compressor blades A82-17135
The use of optimization techniques to design controlled diffusion compressor blading [NASA-TM-82763] N82-14094
Computer program for aerodynamic and blading design of multistage axial-flow compressors [NASA-TP-1946] N82-15039

COMPUTATIONAL FLUID DYNAMICS
Supersonic nozzles without shocks A82-16172
Direct approach to aerodynamic design problems A82-16404
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories [AIAA PAPER 81-2613] A82-16904
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil [AIAA PAPER 82-0021] A82-17735
A simple finite difference procedure for the vortex controlled diffuser [AIAA PAPER 82-0109] A82-17788
Computational treatment of transonic canard-wing interactions [AIAA PAPER 82-0161] A82-17814
A more-accurate transonic computational method for wing-body configurations [AIAA PAPER 82-0162] A82-17815
Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis [AIAA PAPER 82-0163] A82-17816
Computations of transonic flow over an oscillating airfoil with shock-induced separation [AIAA PAPER 82-0350] A82-17900
Viscous flow - Nemesis of the theoretician in pursuit of higher order accuracy [AIAA PAPER 82-0389] A82-17913
Responses of oscillating wings in weak shear flow A82-18021
A contribution to the hodograph method for shock-free transonic airfoil sections A82-18022
Experimental investigation of a transonic potential flow around a symmetric airfoil [NASA-TM-76676] N82-14057
Aeroelasticity in turbomachines --- conference proceedings [EPFL-ITA-10] N82-15042
Aerodynamic response of a blade in pitching oscillation with partial and full separation --- measurement of the instantaneous pressure distribution around a vibrating blade surface in a wind tunnel N82-15047
Calculation of quasi-stationary aerodynamic force acting on a cascade of oscillating airfoils in subsonic flow N82-15051

Numerical experiments on unsteady flows through vibrating cascades N82-15052
Computer aided investigation of turbomachine aerodynamics and aeroelasticity N82-15053
A method for force determination from vibration response measurements --- application to turbomachine blades N82-15055

COMPUTER COMPONENTS
A prototype interface unit for microprocessor based Loran-C receiver [NASA-CR-164887] N82-14078

COMPUTER GRAPHICS
A prototype interface unit for microprocessor based Loran-C receiver [NASA-CR-164887] N82-14078
Interactive-graphic flowpath plotting for turbine engines [NASA-TM-82756] N82-15041

COMPUTER PROGRAMS
The application of programmable pocket calculators for computations during survey flights A82-16164
Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis [AIAA PAPER 82-0163] A82-17816
Numerical computation of optimal atmospheric trajectories involving staged vehicles [AIAA PAPER 82-0360] A82-17902
'Integral Noise': An automatic calculation model for the prediction and control of fixed-wing aircraft noise. I - General considerations, theoretical bases and model analysis A82-18274
Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978 [DFVLR-MITT-81-12] N82-14073

COMPUTER STORAGE DEVICES
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference [NASA-CP-2206] N82-14829

COMPUTER SYSTEMS PROGRAMS
Real time simulation of computer-assisted sequencing of terminal area operations [NASA-CR-166195] N82-14817
airborne data analysis/monitor system N82-14830
Development of Integrated Programs for Aerospace-Vehicle Design (IPAD) - IPAD user requirements [NASA-CR-2985] N82-15034

COMPUTER TECHNIQUES
VOR waveform synthesis and calibration A82-16563
Air traffic control problems and solutions A82-17283
Flight crew management and cockpit performance systems A82-17285
Computer flight planning for fuel efficiency A82-17289
The NASA MERIT program - Developing new concepts for accurate flight planning [AIAA PAPER 82-0340] A82-17894

COMPUTERIZED DESIGN
An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts [AIAA PAPER 82-0373] A82-17912
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report [NASA-CR-165538] N82-14447
High lift selected concepts [NASA-CR-159093] N82-15017
Computer program for aerodynamic and blading design of multistage axial-flow compressors [NASA-TP-1946] N82-15039
Interactive-graphic flowpath plotting for turbine engines [NASA-TM-82756] N82-15041

COMPUTERIZED SIMULATION
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil [AIAA PAPER 82-0021] A82-17735
A simple finite difference procedure for the vortex controlled diffuser [AIAA PAPER 82-0109] A82-17788
Computational treatment of transonic canard-wing interactions [AIAA PAPER 82-0161] A82-17814
Simulation of phugoid excitation due to hazardous wind shear [AIAA PAPER 82-0215] A82-17844
Digital test pilot concept [AIAA PAPER 82-0259] A82-17867
The influence of turbulence models on computer-simulated aircraft landing [AIAA PAPER 82-0342] A82-17896
JTIDS RELNAV network off-line simulation A82-18153
The electromagnetic theta gun and tubular projectiles A82-18182
'Integral Noise': An automatic calculation model for the prediction and control of fixed-wing aircraft noise. I - General considerations, theoretical bases and model analysis A82-18274
Real time simulation of computer-assisted sequencing of terminal area operations [NASA-CR-166195] N82-14817
On-board computer progress in development of A 310 flight testing program N82-14833

CONFERENCES
Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980 A82-17276
PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record A82-18126
Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981 A82-18726
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference [NASA-CP-2206] N82-14829
Aeroelasticity in turbomachines --- conference proceedings [EPFL-ITA-10] N82-15042
Technical evaluation report on the Aeroelasticity in Turbomachines Symposium N82-15070
Optical Information Processing for Aerospace Applications [NASA-CP-2207] N82-15896

CONFIGURATION MANAGEMENT
The shape of the air traffic control system of the future - A U.S. perspective A82-17280

CONTRACT MANAGEMENT
Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77 A82-16561

CONTROL
Control of vibration in aeroelastic cascade experiments N82-15056

CONTROL CONFIGURED VEHICLES
Flight mechanics - Modern aircraft design and control concepts --- German book A82-17951

CONTROL SIMULATION
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI [AIAA PAPER 82-0260] A82-17868
A general aviation simulator evaluation of a rate-enhanced instrument landing system display [NASA-TP-1960] N82-14085

CONTROL STABILITY
Flutter mode suppression using hyperstable feedback [AIAA PAPER 82-0368] A82-17908
In-flight investigation of the effects of pilot location and control system design on airplane flying qualities for approach and landing [NASA-CR-163115] N82-15078

CONTROL SURFACES

Stress intensity factor measurements in composite sandwich structures A82-17535

Concerning the calculation of the aerodynamic characteristics of mechanized wings A82-18589

CONTROL VALVES

Cavitation inception in spool valves A82-16428

CONTROLLABILITY

In-flight investigation of the effects of pilot location and control system design on airplane flying qualities for approach and landing [NASA-CR-163115] N82-15074

CONVECTION

Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core [NASA-TP-1942] N82-14090

CONVECTIVE FLOW

Mesoscale convective weather systems and aviation operations [AIAA PAPER 82-0015] A82-17733

The Joint Airport Weather Studies project --- investigation of convective microbursts [AIAA PAPER 82-0017] A82-17734

CONVERGENT-DIVERGENT NOZZLES

Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles [AIAA PAPER 81-2639] A82-16911

ADEN plume flow properties for infrared analysis --- Augmented Deflecting Exhaust Nozzle A82-17606

COOLING

The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities A82-18591

COORDINATE TRANSFORMATIONS

Coordinate transformation in PLRS --- algorithm and error analysis of Position Location and Reporting System A82-18158

CORROSION PREVENTION

Corrosion inhibiting engine oils [AD-A106127] N82-14099

CORROSION RESISTANCE

Development of improved high temperature coatings for IN-792 + HF [NASA-CR-165395] N82-14333

CORROSION TESTS

Corrosion inhibiting engine oils [AD-A106127] N82-14099

COST ANALYSIS

The Federal Radionavigation Plan A82-16178

COST EFFECTIVENESS

The justification of the need for ILS by means of cost/benefit methods A82-16973

COUPLED MODES

Stability analysis of the twin mode model of coupled flexion/torsion vibrations in turbofans N82-15057

CRACK PROPAGATION

Crack edge instability - A criterion for safe crack propagation limit in thin sheets A82-17243

Inclusions and service induced cracks in a mature population of gas turbine engine bearings [ASME PAPER 81-LUB-48] A82-18444

CRACKS

A method for locating aircraft wing damage by nonlinear vibration analysis A82-17116

CRUISE MISSILES

Performance considerations in the design of subsonic cruise missiles [AIAA PAPER 82-0371] A82-17911

CRUISING FLIGHT

Energy savings with today's technology --- aircraft fuel management through in-flight monitoring A82-17282

Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component [AIAA PAPER 82-0341] A82-17895

CRYOGENIC ROCKET PROPELLANTS

Technological innovation for success - Liquid hydrogen propulsion A82-16734

CRYOGENIC WIND TUNNELS

Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel [AIAA PAPER 82-0234] A82-17858

Research on an induction driven cryogenic wind tunnel N82-14394

CUMULATIVE DAMAGE

Cavitation inception in spool valves A82-16428

CYLINDRICAL SHELLS

Calculation of the stability of crosswise-reinforced cylindrical shells A82-18621

D

DAMAGE ASSESSMENT

Foreign object damage in naval aircraft engines [AD-A105787] N82-14098

DAMPING

Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany [BMFT-FB-W-81-022] N82-15083

DATA ACQUISITION

NASA Dryden Flight Loads Research Facility [NASA-TM-81368] N82-15079

DATA BASES

airborne data analysis/monitor system N82-14830

ADAMS executive and operating system N82-14831

DATA COMPRESSION

Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS) [AD-A105510] N82-14072

DATA LINKS

PLRS engineering development testing - Early results --- Position Location Reporting System with data communication network for community users in tactical environment A82-18157

Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver --- Joint Tactical Information Distribution System A82-18171

Modernizing the Egyptian A.T.C. system A82-18273

DATA REDUCTION

ADAMS executive and operating system N82-14831

DATA TRANSMISSION

Air traffic control problems and solutions A82-17283

Data communications within the Air Navigation Services system A82-18272

DEAD RECKONING

Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems A82-18151

A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system A82-18155

DECELERATION

Comparison of experimental and theoretical turbulence reduction characteristics for screens, honeycomb, and honeycomb-screen combinations [NASA-TP-1958] N82-14055

DECODERS

VOR waveform synthesis and calibration A82-16563

DELTA WINGS

Subsonic balance and pressure investigation of a 60-deg delta wing with leading-edge devices (data report) [NASA-CR-165806] N82-15014

DESIGN ANALYSIS

Direct approach to aerodynamic design problems A82-16404

Design and performance of airborne radomes - A review
A82-16564
Flight mechanics - Modern aircraft design and control concepts --- German book
A82-17951
Four pad tilting pad bearing design and application for multistage axial compressors
[ASME PAPER 81-LUB-12] A82-18429
Helicopter landing gear design and test criteria investigation
[AD-A105512] N82-15035

DESIGN TO COST
Productivity and safety --- reducing transport aircraft operating costs and increasing safety
A82-17288

DESTRUCTIVE TESTS
Experimental structural testing on a composite aircraft canard and its applications
[AIAA PAPER 82-0409] A82-17930

DIFFUSERS
Optimal subsonic diffuser wall design for arbitrary entry conditions
[AIAA PAPER 82-0132] A82-17800

DIFFUSION FLAMES
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model
[AIAA PAPER 82-0113] A82-17791

DIGITAL COMPUTERS
Role of optical computers in aeronautical control applications
N82-15897

DIGITAL SIMULATION
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model
[AIAA PAPER 82-0113] A82-17791
Application of integration algorithms in a parallel processing environment for the simulation of jet engines
[NASA-TM-82746] N82-14849

DIGITAL SYSTEMS
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147
The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system
[AIAA PAPER 82-0369] A82-17909
Integration of a digital air data computer into the test aircraft HFB-320
[DFVLR-MITT-81-09] N82-15038

DISCRETE FUNCTIONS
Concerning the calculation of the aerodynamic characteristics of mechanized wings
A82-18589

DISPLAY DEVICES
A prototype interface unit for microprocessor based Loran-C receiver
[NASA-CR-164887] N82-14078
A general aviation simulator evaluation of a rate-enhanced instrument landing system display
[NASA-TP-1960] N82-14085
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference
[NASA-CP-2206] N82-14829

DISTANCE
Sensor footprints and homing range of terminal guidance munition
[BMVG-FBWT-81-5] N82-15111

DISTANCE MEASURING EQUIPMENT
The DME-based Azimuth System /DAS/
A82-18146
Navigation system integrity and reliability for civil aviation
A82-18159

DIVERGENT NOZZLES
Ground test of a large scale 'D' vented thrust deflecting nozzle
[AIAA PAPER 81-2630] A82-16907

DOCUMENTS
Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77
A82-16561

DOPPLER NAVIGATION
Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems
A82-18151

DRAG MEASUREMENT
Determination of the trimmed drag of an aircraft
A82-18583

DRAG REDUCTION
Comparison of experimental and theoretical turbulence reduction characteristics for screens, honeycomb, and honeycomb-screen combinations
[NASA-TP-1958] N82-14055
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests
[NASA-CR-159097] N82-15076

DROP SIZE
Water ingestion into jet engine axial compressors
[AIAA PAPER 82-0196] A82-17836

DRY FRICTION
Mechanism for the elimination of instability in a shimmy problem
A82-16289

DUAL WING CONFIGURATIONS
Optimization and performance calculation of dual-rotation propellers
[NASA-TP-1948] N82-14049

DYNAMIC CHARACTERISTICS
Stochastic control and identification of helicopter dynamic modes
[NASA-CR-165057] N82-15032

DYNAMIC RESPONSE
Estimation methods for the determination of dynamic responses of elastic aircraft --- to random loads
[BMVG-FBWT-81-6] N82-15037
A method for force determination from vibration response measurements --- application to turbomachine blades
N82-15055

DYNAMIC STABILITY
Mechanism for the elimination of instability in a shimmy problem
A82-16289
Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis
A82-16290
The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system
[AIAA PAPER 82-0369] A82-17909

DYNAMIC TESTS
System for acquisition and analysis of dynamic tests on air intakes
[NASA-TM-76646] N82-14056

E

EARLY WARNING SYSTEMS
AEW Nimrod - The Mission System Avionics
A82-16556
Management of a large avionics project
A82-16557

ECONOMIC ANALYSIS
Greenlandair VTOL transportation study
[AIAA PAPER 81-2642] A82-16912

ECONOMICS
The influence of aeronautical R&D expenditures upon the productivity of air transportation
[PB81-247140] N82-15984

EDGE DISLOCATIONS
Crack edge instability - A criterion for safe crack propagation limit in thin sheets
A82-17243

EJECTORS
A high strength ejector release unit for the Tornado
A82-16025

ELASTIC DAMPING
Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature
A82-18484

ELECTRIC DISCHARGES
Helicopter model studies for on-board electrostatic sensors
[AD-A105511] N82-14089

ELECTRIC FIELDS
Calculations of lightning return stroke electric and magnetic fields above ground A82-17714
ELECTRIC POTENTIAL
A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters A82-18596
ELECTRIC POWER SUPPLIES
The all-electric airplane - A new trend A82-17420
Helical rail glider launcher A82-18200
ELECTRO-OPTICS
High temperature electronic requirements in aeropropulsion systems [E-708] N82-15313
ELECTROMAGNETIC ACCELERATION
The electromagnetic theta gun and tubular projectiles A82-18182
Helical rail glider launcher A82-18200
ELECTROMAGNETIC COMPATIBILITY
Design and performance of airborne radomes - A review A82-16564
ELECTRONIC CONTROL
FILE-IB aircraft flight test program --- Feature Identification and Location Experiment [AAS 81-041] A82-16335
NASA V/STOL Propulsion Control Analysis - Phase I and II program status [AIAA PAPER 81-2632] A82-16908
ELECTROSTATIC CHARGE
Generation of electrostatic charge in fuel handling systems: A literature survey [AD-A106056] N82-14454
ELECTROSTATIC PROBES
Helicopter model studies for on-board electrostatic sensors [AD-A105511] N82-14089
EMERGENCY LOCATOR TRANSMITTERS
Status of the COSPAS-SARSAT project and its possible operation in conjunction with INMARSAT system A82-18170
ENDFIRE ARRAYS
A new end-fire ILS glide slope A82-18143
ENERGY CONSERVATION
Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980 A82-17276
Why safety --- fuel conservation through aircraft safety A82-17277
Fuel conservation now --- improvements for existing production run transport aircraft A82-17281
Energy savings with today's technology --- aircraft fuel management through in-flight monitoring A82-17282
Energy conservation through airport design and management A82-17287
The use of flight management computers in air carrier operations in the 1980s [AD-A105621] N82-14071
Selected advanced aerodynamic and active control concepts development [NASA-CR-3220] N82-15033
ENERGY TRANSFER
Aerodynamic response of a blade in pitching oscillation with partial and full separation --- measurement of the instantaneous pressure distribution around a vibrating blade surface in a wind tunnel N82-15047
ENGINE CONTROL
NASA V/STOL Propulsion Control Analysis - Phase I and II program status [AIAA PAPER 81-2632] A82-16908
V/STOL propulsion control technology [AIAA PAPER 81-2634] A82-16909
Fluidics in aircraft engine controls A82-18691
Role of optical computers in aeronautical control applications N82-15897
ENGINE DESIGN
The well tempered transport aircraft engine /The Sir Henry Royce Memorial Lecture/ A82-16145
J58/SR-71 propulsion integration or the great adventure into the technical unknown A82-17418
Development and operating characteristics of an advanced two-stage combustor [AIAA PAPER 82-0191] A82-17833
2037 - Pratt & Whitney tests new turbofan A82-18347
Interactive-graphic flowpath plotting for turbine engines [NASA-TM-82756] N82-15041
ENGINE FAILURE
The feasibility of turnback from a low altitude engine failure during the takeoff climb-out phase [AIAA PAPER 82-0406] A82-17928
ENGINE INLETS
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight [AIAA PAPER 82-0124] A82-17796
System for acquisition and analysis of dynamic tests on air intakes [NASA-TM-76646] N82-14056
ENGINE MONITORING INSTRUMENTS
Gas path analysis - A tool for engine condition monitoring A82-17286
High temperature electronic requirements in aeropropulsion systems [E-708] N82-15313
ENGINE NOISE
Workshop report for the AIAA 6th Aeroacoustics Conference A82-16091
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight [AIAA PAPER 82-0124] A82-17796
ENGINE TESTS
J58/SR-71 propulsion integration or the great adventure into the technical unknown A82-17418
Development and operating characteristics of an advanced two-stage combustor [AIAA PAPER 82-0191] A82-17833
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator [AIAA PAPER 82-0254] A82-17866
F101DFE in Tomcat - Preliminary test results A82-18346
2037 - Pratt & Whitney tests new turbofan A82-18347
Reduction of the acoustic environment in an F100-PW-100 engine test cell A82-18727
Pollution reduction technology program small jet aircraft engines, phase 3 [NASA-CR-165386] N82-14095
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3 [NASA-CR-165387] N82-14096
ENVIRONMENT EFFECTS
Pollution of the soil by aviation gasoline [PBL-1979-41] N82-15596
The optical recognition of sea targets as a function of surrounding and observation parameters in air to water observations [BMVG-FBWT-81-10] N82-15930
ENVIRONMENT SIMULATORS
JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance A82-18152
EPOXY RESINS
Effects of elastomeric additives on the mechanical properties of epoxy resins and composite systems A82-17538

EQUATIONS OF MOTION
Numerical computation of optimal atmospheric trajectories involving staged vehicles [AIAA PAPER 82-0360] A82-17902
ACTA Mechanica Sinica (selected articles) [AD-A107322] N82-14060
Flag-lag-torsional dynamics or extensional and inextensional rotor blades in hover and in forward flight [NASA-CR-165078] N82-15013

EQUIPMENT SPECIFICATIONS
A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system A82-18155

ERROR ANALYSIS
Coordinate transformation in PLRS --- algorithm and error analysis of Position Location and Reporting System A82-18158

EUROPEAN AIRBUS
Airbus - Perspectives for the future A82-16972

EVASIVE ACTIONS
A binary matrix technique for aircraft collision threat recognition and avoidance [AIAA PAPER 82-0184] A82-17828

EXCIMER LASERS
La Recherche Aerospatiale, Bi-monthly Bulletin No. 1981-2, March - April 1981 --- aerodynamic research [ESA-TT-713] N82-14388

EXHAUST EMISSION
Infrared emissions from turbofans with high aspect ratio nozzles A82-16092
Development and operating characteristics of an advanced two-stage combustor [AIAA PAPER 82-0191] A82-17833

EXHAUST GASES
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3 [NASA-CR-165387] N82-14096

EXHAUST NOZZLES
ADEN plume flow properties for infrared analysis --- Augmented Deflecting Exhaust Nozzle A82-17606

EXHAUST SYSTEMS
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft [AIAA PAPER 81-2656] A82-16915

EXPERIMENTAL DESIGN
Control of vibration in aeroelastic cascade experiments N82-15056

EXTERNAL STORE SEPARATION
Recent improvements in prediction techniques for supersonic weapon separation [AIAA PAPER 82-0170] A82-17820

EXTERNALLY BLOWN FLAPS
An investigation of the use of a propulsive wing/canard concept for improved maneuvering [AIAA PAPER 81-2622] A82-16905

F

F-14 AIRCRAFT
Grumman Tomcat - In a class of its own A82-16800
F101DFE in Tomcat - Preliminary test results A82-18346

FAILURE MODES
An observer approach to the identification and isolation of sensor failures in flight control systems [DFVLR-FB-81-26] N82-15078

FATIGUE LIFE
Effect of fleet size on estimates of safety against airframe fatigue A82-16153
A method for predicting the lifetime of gas turbine blades A82-16692
Inclusions and service induced cracks in a mature population of gas turbine engine bearings [ASME PAPER 81-LUB-48] A82-18444

FATIGUE TESTS
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes A82-17531
Effects of ultra-clean and centrifugal filtration on rolling-element bearing life [ASME PAPER 81-LUB-35] A82-18436

FEEDBACK CONTROL
Flutter mode suppression using hyperstable feedback [AIAA PAPER 82-0368] A82-17908

FIBER OPTICS
Study of fiber optics to enhance an environmental lighting laboratory [AD-A106117] N82-14104
Role of optical computers in aeronautical control applications N82-15897

FIBER REINFORCED COMPOSITES
Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems A82-17530
Multilevel optimum design of structures with fiber-composite stiffened-panel components [AIAA PAPER 80-0723] A82-17594
Advanced compressor components. Phase 1: 1978 to 1979 --- for aircraft engines [BMFT-FB-W-81-025] N82-15073

FIGHTER AIRCRAFT
Advanced cockpit for tactical aircraft A82-16559
Experience with high performance V/STOL fighter projects at MBB [AIAA PAPER 81-2614] A82-16901
Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft [AIAA PAPER 81-2636] A82-16910
Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles [AIAA PAPER 81-2639] A82-16911
Digital test pilot concept [AIAA PAPER 82-0259] A82-17867
Highlights of a design concept for a close ground support fighter [AIAA PAPER 82-0411] A82-17932

FILTRATION
Handling problems associated with jet aircraft fuels A82-17288
Effects of ultra-clean and centrifugal filtration on rolling-element bearing life [ASME PAPER 81-LUB-35] A82-18436

FINITE DIFFERENCE THEORY
A simple finite difference procedure for the vortex controlled diffuser [AIAA PAPER 82-0109] A82-17788

FINITE ELEMENT METHOD
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight [AIAA PAPER 82-0124] A82-17796
Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures A82-18612

FLAME PROPAGATION
Determination of the flammability characteristics of aerospace hydraulic fluids A82-16187

FLAMMABILITY
Determination of the flammability characteristics of aerospace hydraulic fluids A82-16187

FLASHING (VAPORIZING)
External fuel vaporization study [NASA-CR-165513] N82-14371

FLIGHT CHARACTERISTICS
Development and validation of the V/STOL aerodynamics and stability and control manual [AIAA PAPER 81-2611] A82-16903
Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data [AIAA PAPER 82-0183] A82-17827
Digital test pilot concept [AIAA PAPER 82-0259] A82-17867

FLIGHT CONTROL
Head-up displays - The integrity of flight information A82-16562

Experience with high performance V/STOL fighter projects at MBB [AIAA PAPER 81-2614] A82-16901
The all-electric airplane - A new trend A82-17420
The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system [AIAA PAPER 82-0369] A82-17909
Selected advanced aerodynamic and active control concepts development [NASA-CR-3220] N82-15033
In-flight investigation of the effects of pilot location and control system design on airplane flying qualities for approach and landing [NASA-CR-163115] N82-15074

FLIGHT CREWS
Flight crew management and cockpit performance systems A82-17285
Electronic master monitor and advisory display system, operational fuctions report [AD-A105516] N82-14087

FLIGHT HAZARDS
Mesoscale convective weather systems and aviation operations [AIAA PAPER 82-0015] A82-17733
The Joint Airport Weather Studies project --- investigation of convective microbursts [AIAA PAPER 82-0017] A82-17734
Detection of obstacles by low flying aircraft --- using CO2 laser; mathematical model [FOA-C-30227-E1] N82-15026

FLIGHT INSTRUMENTS
The application of programmable pocket calculators for computations during survey flights A82-16164
An observer approach to the identification and isolation of sensor failures in flight control systems [DFVLR-FB-81-26] N82-15078

FLIGHT MECHANICS
Flight mechanics - Modern aircraft design and control concepts --- German book A82-17951
ACTA Mechanica Sinica (selected articles) [AD-A107322] N82-14060

FLIGHT OPTIMIZATION
Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component [AIAA PAPER 82-0341] A82-17895
A mathematical model of a subsonic transport aircraft A82-18575

FLIGHT PATHS
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 3 August 1979 [DFVLR-MITT-81-17] N82-15028

FLIGHT PLANS
Computer flight planning for fuel efficiency A82-17289
The NASA MERIT program - Developing new concepts for accurate flight planning [AIAA PAPER 82-0340] A82-17894
The use of flight management computers in air carrier operations in the 1980s [AD-A105621] N82-14071

FLIGHT RECORDERS
Modern aircraft accident investigation equipment and techniques A82-17419
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS) [AD-A105510] N82-14072
ROLM computers in the flight testing of the Fokker F29 aircraft N82-14839
Integration of a digital air data computer into the test aircraft HFB-320 [DFVLR-MITT-81-09] N82-15038

FLIGHT SIMULATION
Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft [AIAA PAPER 81-2636] A82-16910
3 DOF gyro analysis from measured and derived rates --- hypersonic reentry simulation test [AIAA PAPER 82-0189] A82-17831
Simulation of phugoid excitation due to hazardous wind shear [AIAA PAPER 82-0215] A82-17884
Dynamic stability of a buoyant quad-rotor aircraft --- for airlifting payloads externally on a sling [AIAA PAPER 82-0242] A82-17861
The feasibility of turnback from a low altitude engine failure during the takeoff climb-out phase [AIAA PAPER 82-0406] A82-17928
Longitudinal and lateral static stability and control characteristics of a 1/6-scale model of a remotely piloted research vehicle with a supercritical wing [NASA-TP-1360] N82-15075
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 2: AFT C.G. simulation and analysis [NASA-CR-159098] N82-15077

FLIGHT SIMULATORS
A general aviation simulator evaluation of a rate-enhanced instrument landing system display [NASA-TP-1960] N82-14095
Study of fiber optics to enhance an environmental lighting laboratory [AD-A106117] N82-14104

FLIGHT TESTS
FILE-IB aircraft flight test program --- Feature Identification and Location Experiment [AAS 81-041] A82-16335
Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft [AIAA PAPER 81-2636] A82-16910
Helical helicopter approaches with microwave landing system guidance [AIAA PAPER 81-2654] A82-16914
Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data [AIAA PAPER 82-0183] A82-17827
Digital test pilot concept [AIAA PAPER 82-0259] A82-17867
Icing analysis of an unprotected aircraft radome [AIAA PAPER 82-0281] A82-17874
Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors A82-18147
Post-flight assessment of the JTIDS Rel Nav A82-18154
Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont A82-18160
F101DFE in Tomcat - Preliminary test results A82-18346
A flight investigation of blade-section aerodynamics for a helicopter main rotor having 10-64C airfoil sections [NASA-TM-83226] N82-14058
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference [NASA-CP-2206] N82-14829
airborne data analysis/monitor system N82-14830
ADAMS executive and operating system N82-14831
On-board computer progress in development of A 310 flight testing program N82-14833
ROLM computers in the flight testing of the Fokker F29 aircraft N82-14839
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests [NASA-CR-159097] N82-15076

FLOW CHARACTERISTICS
Symmetric flow characteristics of thin rectangular wings A82-16093
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel [NASA-TM-83220] N82-15359

FLOW CHARTS
Interactive-graphic flowpath plotting for turbine engines
[NASA-TM-82756] N82-15081
FLOW DIRECTION INDICATORS
The design of a jet catcher --- for wind tunnels
[RAE-TM-AERO-1891] N82-14102
FLOW DISTRIBUTION
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904
Subsonic flow over airborne optical turrets
A82-17605
Unsteady flow patterns associated with spoiler control devices
[AIAA PAPER 82-0127] A82-17798
A more-accurate transonic computational method for wing-body configurations
[AIAA PAPER 82-0162] A82-17815
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855
Experimental investigation of a transonic potential flow around a symmetric airfoil
[NASA-TM-76676] N82-14057
Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds
N82-14061
FLOW GEOMETRY
Determination of the trimmed drag of an aircraft
A82-18583
The use of optimization techniques to design controlled diffusion compressor blading
[NASA-TM-82763] N82-14094
FLOW MEASUREMENT
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows
[AIAA PAPER 82-0410] A82-17931
System for acquisition and analysis of dynamic tests on air intakes
[NASA-TM-76646] N82-14056
FLOW THEORY
Direct approach to aerodynamic design problems
A82-16404
FLOW VELOCITY
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics
[AD-A106061] N82-14316
FLUID DYNAMICS
Technical evaluation report on the Aeroelasticity in Turbomachines Symposium
N82-15070
FLUID FILMS
Four pad tilting pad bearing design and application for multistage axial compressors
[ASME PAPER 81-LUB-12] A82-18429
FLUIDICS
Fluidics in aircraft engine controls
A82-18691
FLUTTER ANALYSIS
Flutter mode suppression using hyperstable feedback
[AIAA PAPER 82-0368] A82-17908
Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures
A82-18612
Stability and flutter analysis of turbine blades at low speed
N82-15050
On the numerical analysis of stall flutter in turbine cascades
N82-15054
Stability analysis of the twin mode model of coupled flexion/torsion vibrations in turbofans
N82-15057
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062
Longitudinal and lateral static stability and control characteristics of a 1/6-scale model of a remotely piloted research vehicle with a supercritical wing
[NASA-TP-1360] N82-15075
FLY BY WIRE CONTROL
The all-electric airplane - A new trend
A82-17420
XV-15 Tilt Rotor fly-by-wire collective control demonstrator development specifications
[NASA-CR-166262] N82-15030
FOREBODIES
Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies
[AIAA PAPER 82-0252] A82-17865
FOURIER TRANSFORMATION
The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade
N82-15063
FRACTURE MECHANICS
Stress intensity factor measurements in composite sandwich structures
A82-17535
FRACTURE STRENGTH
Improvement of the first-ply-failure strength in laminates by using softening strips
A82-16174
Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems
A82-17538
FREE JETS
The German-Dutch wind tunnel as aeroacoustic experimental installation
A82-17136
FUEL COMBUSTION
An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet
A82-16267
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105588] N82-14312
Determination of pyridine in modified JP-4 via High Performance Liquid Chromatography (HPLC)
[AD-A105589] N82-14313
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics
[AD-A106061] N82-14316
FUEL CONSUMPTION
Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980
A82-17276
Air traffic management for fuel economy
A82-17279
Fuel conservation now --- improvements for existing production run transport aircraft
A82-17281
Energy savings with today's technology --- aircraft fuel management through in-flight monitoring
A82-17282
Productivity and safety --- reducing transport aircraft operating costs and increasing safety
A82-17284
Computer flight planning for fuel efficiency
A82-17289
The all-electric airplane - A new trend
A82-17420
Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component
[AIAA PAPER 82-0381] A82-17895
The use of flight management computers in air carrier operations in the 1980s
[AD-A105621] N82-14071
FUEL CONTAMINATION
Handling problems associated with jet aircraft fuels
A82-17288
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105588] N82-14312
FUEL INJECTION
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
External fuel vaporization study
[NASA-CR-165513] N82-14371
Effect of fuel injector type on performance and emissions of reverse-flow combustor
[NASA-TP-1945] N82-15040

FUEL SPRAYS
An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet
A82-16267

FUEL SYSTEMS
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft
[AIAA PAPER 81-2656] A82-16915
Generation of electrostatic charge in fuel handling systems: A literature survey
[AD-A106056] N82-14454

FULL SCALE TESTS
Advanced technology lightweight gondola system experimental fabrication program
[AD-A104157] N82-14082

FUNCTION GENERATORS
VOR waveform synthesis and calibration
A82-16563

FUSELAGES
Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft
A82-18729

G

GAME THEORY
Game-theoretical method for the synthesis of aircraft control during landing approach
A82-18584

GAS ANALYSIS
Gas path analysis - A tool for engine condition monitoring
A82-17286

GAS BEARINGS
3 DOF gyro analysis from measured and derived rates --- hypersonic reentry simulation test
[AIAA PAPER 82-0189] A82-17831

GAS CHROMATOGRAPHY
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105588] N82-14312

GAS DYNAMICS
Supersonic nozzles without shocks
A82-16172

GAS TURBINE ENGINES
A method for predicting the lifetime of gas turbine blades
A82-16692
Inclusions and service induced cracks in a mature population of gas turbine engine bearings
[ASME PAPER 81-LUB-48] A82-18444
Damage of turbine blades due to interaction with fuel resinification products
A82-18479
Fluidics in aircraft engine controls
A82-18691
The use of optimization techniques to design controlled diffusion compressor blading
[NASA-TM-82763] N82-14094
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096
External fuel vaporization study
[NASA-CR-165513] N82-14371
Effect of fuel injector type on performance and emissions of reverse-flow combustor
[NASA-TP-1945] N82-15040

GAS TURBINES
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090
Linear and nonlinear analysis of vortex whistle: Another blade buster
N82-15067

GAS-SOLID INTERFACES
Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave
A82-18590

GASOLINE
A short history of aviation gasoline development, 1903-1980
A82-18321
Pollution of the soil by aviation gasoline
[PB1-1979-41] N82-15596

GENERAL AVIATION AIRCRAFT
Accident prevention - A regulators view
A82-17278
Estimate of human control over mid-air collisions
A82-17604
Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data
[AIAA PAPER 82-0183] A82-17827
Optimum configuration for a 10 passenger business turbofan jet airplane
[AIAA PAPER 82-0365] A82-17905
Results of a Differential Omega experiment
A82-18094
A GPS receiver design for general aviation navigation
A82-18132
Automated Pilot Advisory System
[NASA-TM-73296] N82-15027
Airborne antenna pattern calculations
[NASA-CR-165059] N82-15277

GEODETIC SATELLITES
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data
[NASA-CR-156882] N82-15498

GLASS FIBER REINFORCED PLASTICS
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
A82-17531

GLIDE PATHS
Constant L/D glide trajectories
[AIAA PAPER 82-0362] A82-17904
A new end-fire ILS glide slope
A82-18143
In-service testing of the Precision Approach Path Indicator (PAPI) at Newark International Airport, New Jersey
[DOT/FAA/RD-81/95] N82-14076

GLIDERS
Helical rail glider launcher
A82-18200

GLOBAL POSITIONING SYSTEM
NAVSTAR Global Positioning System
A82-17310
A GPS receiver design for general aviation navigation
A82-18132
Navigation system integrity and reliability for civil aviation
A82-18159
Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver --- Joint Tactical Information Distribution System
A82-18171

GONDOLAS
Advanced technology lightweight gondola system experimental fabrication program
[AD-A104157] N82-14082

GRAPHITE-EPOXY COMPOSITES
Improvement of the first-ply-failure strength in laminates by using softening strips
A82-16174

GROUND EFFECT (AERODYNAMICS)
Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies
A82-16432
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904
Stochastic control and identification of helicopter dynamic modes
[NASA-CR-165057] N82-15032

GROUND EFFECT (COMMUNICATIONS)
Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors
A82-18147

GROUND STATIONS
Data communications within the Air Navigation Services system
A82-18272

GROUND SUPPORT SYSTEMS
Highlights of a design concept for a close ground support fighter
[AIAA PAPER 82-0411] A82-17932

GROUND TESTS
Ground test of a large scale 'D' vented thrust deflecting nozzle
[AIAA PAPER 81-2630] A82-16907

GUIDE VANES
Optimization of compressor vane and bleed settings
[AD-A106059] N82-14097
Study of acoustic resonance of cascades --- sound generated by guide vanes; wind tunnel investigations
N82-15068

GUN LAUNCHERS
The electromagnetic theta gun and tubular projectiles
A82-18182

GUST ALLEVIATORS
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147

GUST LOADS
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147
Estimation methods for the determination of dynamic responses of elastic aircraft --- to random loads
[BMVG-FBWT-81-6] N82-15037
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests
[NASA-CR-159097] N82-15076

GUSTS
The Joint Airport Weather Studies project --- investigation of convective microbursts
[AIAA PAPER 82-0017] A82-17734

H

HANG GLIDERS
Some aerodynamic aspects of hang gliding
A82-17124

HARMONIC OSCILLATION
A method of characteristics solution for a finite oscillating supersonic cascade with thickness effects
N82-15060

HARRIER AIRCRAFT
Advanced cockpit for tactical aircraft
A82-16559
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft
[AIAA PAPER 81-2656] A82-16915

HEAD-UP DISPLAYS
Head-up displays - The integrity of flight information
A82-16562

HEAT EXCHANGERS
External fuel vaporization study
[NASA-CR-165513] N82-14371

HEAT RESISTANT ALLOYS
Damage of turbine blades due to interaction with fuel resinification products
A82-18479

HEAT TRANSFER
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090
External fuel vaporization study
[NASA-CR-165513] N82-14371

HELICOPTER CONTROL
Helical helicopter approaches with microwave landing system guidance
[AIAA PAPER 81-2654] A82-16914
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868
Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions
A82-18161
Electronic master monitor and advisory display system, operational fuctions report
[AD-A105516] N82-14087

HELICOPTER DESIGN
Advanced technology airfoil development for the XV-15 tilt-rotor vehicle
[AIAA PAPER 81-2623] A82-16906
Helicopter landing gear design and test criteria investigation
[AD-A105512] N82-15035

HELICOPTER PERFORMANCE
A flight investigation of blade-section aerodynamics for a helicopter main rotor having 10-64C airfoil sections
[NASA-TM-83226] N82-14058

HELICOPTERS
Techniques for overhead-wire detection --- to prevent helicopter wirestrikes
A82-16560
Advanced technology lightweight gondola system experimental fabrication program
[AD-A104157] N82-14082
Helicopter model studies for on-board electrostatic sensors
[AD-A105511] N82-14089
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-165078] N82-15013
Helicopter landing gear design and test criteria investigation
[AD-A105512] N82-15035
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008

HFB-320 AIRCRAFT
Integration of a digital air data computer into the test aircraft HFB-320
[DFVLR-MITT-81-09] N82-15038

HIGH TEMPERATURE ENVIRONMENTS
High temperature electronic requirements in aeropropulsion systems
[E-708] N82-15313

HISTORIES
A short history of aviation gasoline development, 1903-1980
A82-18321

HODOGRAPHS
A contribution to the hodograph method for shock-free transonic airfoil sections
A82-18022

HOLE DISTRIBUTION (MECHANICS)
Effect on surface pressures of trapezoidal holes in a T-38 stabilator
A82-17602

HOMING
Sensor footprints and homing range of terminal guidance munition
[BMVG-FBWT-81-5] N82-15111

HONEYCOMB STRUCTURES
Comparison of experimental and theoretical turbulence reduction characteristics for screens, honeycomb, and honeycomb-screen combinations
[NASA-TP-1958] N82-14055

HORIZONTAL TAIL SURFACES
Effect on surface pressures of trapezoidal holes in a T-38 stabilator
A82-17602
Determination of the trimmed drag of an aircraft
A82-18583

HOT CORROSION
Damage of turbine blades due to interaction with fuel resinification products
A82-18479

HOT-WIRE FLOWMETERS
Instantaneous turbulence profiles in the wake of an oscillating airfoil
[AIAA PAPER 82-0353] A82-17901

HOVERING STABILITY
Dynamic stability of a buoyant quad-rotor aircraft --- for airlifting payloads externally on a sling
[AIAA PAPER 82-0242] A82-17861
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-165078] N82-15013

HUMAN FACTORS ENGINEERING
Taking into account nighttime annoyance in the calculation of the psophic index
[NASA-TM-76580] N82-14674

HUMAN REACTIONS
Quantification of airport community noise impact in terms of noise levels, population density, and human subjective response
A82-18732
Taking into account nighttime annoyance in the calculation of the psophic index
[NASA-TM-76580] N82-14670

HYBRID COMPUTERS
Role of optical computers in aeronautical control applications
N82-15897

HYDRAULIC FLUIDS
Determination of the flammability characteristics of aerospace hydraulic fluids
A82-16187

HYDROCARBON COMBUSTION
An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet
A82-16267

HYDROGEN FUELS
An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet
A82-16267
Technological innovation for success - Liquid hydrogen propulsion
A82-16734
Liquid hydrogen - An outstanding alternate fuel for transport aircraft
A82-17290

HYPERSONIC AIRCRAFT
NASA Dryden Flight Loads Research Facility
[NASA-TM-81368] N82-15079

HYPERSONIC REENTRY
3 DOF gyro analysis from measured and derived rates --- hypersonic reentry simulation test
[AIAA PAPER 82-0189] A82-17831

HYPERSONIC WIND TUNNELS
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel
[NASA-TM-83220] N82-15359

HYPERVELOCITY PROJECTILES
The electromagnetic theta gun and tubular projectiles
A82-18182

I

ICE FORMATION
Icing analysis of an unprotected aircraft radome
[AIAA PAPER 82-0281] A82-17874
A Microwave Ice Accretion Measurement Instrument - MIAMI
[AIAA PAPER 82-0285] A82-17875

IN-FLIGHT MONITORING
Energy savings with today's technology --- aircraft fuel management through in-flight monitoring
A82-17282
Gas path analysis - A tool for engine condition monitoring
A82-17286
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system
[NLR-MP-80036-U] N82-14084
ROLM computers in the flight testing of the Fokker F29 aircraft
N82-14839

INCLUSIONS
Inclusions and service induced cracks in a mature population of gas turbine engine bearings
[ASME PAPER 81-LUB-48] A82-18444

INCOMPRESSIBLE FLOW
Subsonic flow over airborne optical turrets
A82-17605
A simple finite difference procedure for the vortex controlled diffuser
[AIAA PAPER 82-0109] A82-17788
Calculation of nonstationary force ratios on blades of a rotating row in incompressible flow
N82-15061

INDEXES (DOCUMENTATION)
Index to NASA News Releases and Speeches, 1980
N82-15985

INDUSTRIAL PLANTS
Noise control plan for a new airplane manufacturing facility
A82-18730

INERTIAL NAVIGATION
Maneuver dependent component error models and synchronized reset filters for inertial navigation systems
A82-18139
Laboratory and flight test of a new ELG strapdown INS
A82-18150
Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems
A82-18151
Post-flight assessment of the JTIDS Rel Nav
A82-18154

INFLUENCE COEFFICIENT
An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil
[AIAA PAPER 82-0214] A82-17843

INFORMATION DISSEMINATION
Index to NASA News Releases and Speeches, 1980
N82-15985

INFORMATION RETRIEVAL
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072

INFORMATION SYSTEMS
Head-up displays - The integrity of flight information
A82-16562

INFRARED IMAGERY
Mesoscale convective weather systems and aviation operations
[AIAA PAPER 82-0015] A82-17733

INFRARED RADIATION
Infrared emissions from turbofans with high aspect ratio nozzles
A82-16092
ADEN plume flow properties for infrared analysis --- Augmented Deflecting Exhaust Nozzle
A82-17606

INGESTION (ENGINES)
Water ingestion into jet engine axial compressors
[AIAA PAPER 82-0196] A82-17836
Foreign object damage in naval aircraft engines
[AD-A105787] N82-14098

INLET AIRFRAME CONFIGURATIONS
Wind tunnel tests of engine-equipped models: Comparison of two jet wash simulation methods
[NASA-TM-76764] N82-14091

INLET FLOW
A summary of V/STOL inlet analysis methods
[AIAA PAPER 81-2628] A82-16902

INLET TEMPERATURE
J58/SR-71 propulsion integration or the great adventure into the technical unknown
A82-17418

INSTRUMENT APPROACH
Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions
A82-18161
In-service testing of the Precision Approach Path Indicator (PAPI) at Newark International Airport, New Jersey
[DOT/FAA/RD-81/95] N82-14076

INSTRUMENT FLIGHT RULES
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868
Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions
A82-18161

INSTRUMENT LANDING SYSTEMS
The justification of the need for ILS by means of cost/benefit methods
A82-16973
A new end-fire ILS glide slope
A82-18143
Requirements for instrument approaches to triple parallel runways
[AD-A105622] N82-14079

Requirements for independent and dependent parallel instrument approaches at reduced runway spacing
[AD-A105673] N82-14080
A general aviation simulator evaluation of a rate-enhanced instrument landing system display
[NASA-TP-1960] N82-14085
INTEGRATED OPTICS
Optical Information Processing for Aerospace Applications
[NASA-CP-2207] N82-15894
INTERFACES
Design and implementation of a telecommunication interface for the TAATM/TCV real-time experiment
[NASA-TM-83231] N82-14075
Integration of a digital air data computer into the test aircraft HFB-320
[DFVLR-MITT-81-09] N82-15038
INTERNAL COMBUSTION ENGINES
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096
INVARIANCE
An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays
[AIAA PAPER 82-0367] A82-17907
INVISCID FLOW
Subsonic flow over airborne optical turrets
A82-17605
Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis
[AIAA PAPER 82-0163] A82-17816
IONIZATION GAGES
A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
A82-18596
IONIZED GASES
A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
A82-18596
IPAD
Development of Integrated Programs for Aerospace-Vehicle Design (IPAD) - IPAD user requirements
[NASA-CR-2985] N82-15034
ISOTHERMAL FLOW
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model
[AIAA PAPER 82-0113] A82-17791
ITERATIVE SOLUTION
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight
[AIAA PAPER 82-0124] A82-17796

J

J-58 ENGINE
J58/SR-71 propulsion integration or the great adventure into the technical unknown
A82-17418
JET AIRCRAFT
Handling problems associated with jet aircraft fuels
A82-17288
JET AIRCRAFT NOISE
Screech suppression in supersonic jets
[AIAA PAPER 82-0050] A82-17753
The effect of non-linear propagation in jet noise
[AIAA PAPER 82-0416] A82-17936
Prediction of flyover jet noise spectra from static tests
[NASA-TM-83219] N82-14880
JET ENGINE FUELS
Handling problems associated with jet aircraft fuels
A82-17288
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
JET ENGINES
Water ingestion into jet engine axial compressors
[AIAA PAPER 82-0196] A82-17836
F101DFE in Tomcat - Preliminary test results
A82-18346
System for acquisition and analysis of dynamic tests on air intakes
[NASA-TM-76646] N82-14056
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096
Application of integration algorithms in a parallel processing environment for the simulation of jet engines
[NASA-TM-82746] N82-14849
JET FLOW
Wind tunnel tests of engine-equipped models: Comparison of two jet wash simulation methods
[NASA-TM-76764] N82-14091
JET IMPINGEMENT
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904
JOURNAL BEARINGS
Four pad tilting pad bearing design and application for multistage axial compressors
[ASME PAPER 81-LUB-12] A82-18429
JP-4 JET FUEL
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105588] N82-14312
Determination of pyridine in modified JP-4 via High Performance Liquid Chromatography (HPLC)
[AD-A105589] N82-14313
JP-8 JET FUEL
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105588] N82-14312

K

KALMAN FILTERS
Target acceleration modeling for tactical missile guidance
[AIAA PAPER 82-0370] A82-17910
Maneuver dependent component error models and synchronized reset filters for inertial navigation systems
A82-18139
Post-flight assessment of the JTIDS Rel Nav
A82-18154
A stable decentralized filtering implementation for JTIDS RelNav --- stable community relative navigation
A82-18156
KELVIN-HELMHOLTZ INSTABILITY
Kelvin-Helmholtz stability analysis of air cushion landing gear trunk flutter
A82-17608
KUTTA-JOUKOWSKI CONDITION
A summary of V/STOL inlet analysis methods
[AIAA PAPER 81-2628] A82-16902

L

L-1011 AIRCRAFT
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests
[NASA-CR-159097] N82-15076
LABYRINTH SEALS
Design and testing of a new double labyrinth seal
[ASME PAPER 81-LUB-58] A82-18452
LAMINAR BOUNDARY LAYER
The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities
A82-18591
LAMINAR FLOW
A simple finite difference procedure for the vortex controlled diffuser
[AIAA PAPER 82-0109] A82-17708

Natural laminar flow airfoil analysis and trade studies
[NASA-CR-159029] N82-15018

LAMINATES
Improvement of the first-ply-failure strength in laminates by using softening strips
A82-16174

LANDING AIDS
Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont
A82-18160
In-service testing of the Precision Approach Path Indicator (PAPI) at Newark International Airport, New Jersey
[DOT/FAA/RD-81/95] N82-14076
Real time simulation of computer-assisted sequencing of terminal area operations
[NASA-CR-166195] N82-14817

LANDING GEAR
Mechanism for the elimination of instability in a shimmy problem
A82-16289
Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis
A82-16290
Kelvin-Helmholtz stability analysis of air cushion landing gear trunk flutter
A82-17608
Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft
[ASLE PREPRINT 81-LC-2B-3] A82-18412
Helicopter landing gear design and test criteria investigation
[AD-A105512] N82-15035

LANDING SIMULATION
MLS vertical guidance and navigation for a STOL airplane landing on an elevated STOLport
[NASA-TM-81338] N82-14101

LARGE SPACE STRUCTURES
Aerospace highlights 1981
A82-16135

LASER GYROSCOPES
Laboratory and flight test of a new RLG strapdown INS
A82-18150

LASER TARGET DESIGNATORS
Detection of obstacles by low flying aircraft --- using CO2 laser; mathematical model
[FOA-C-30227-E1] N82-15026

LATERAL CONTROL
An observer approach to the identification and isolation of sensor failures in flight control systems
[DFVLR-FB-81-26] N82-15078

LATTICES (MATHEMATICS)
Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds
N82-14061

LAUNCHERS
Helical rail glider launcher
A82-18200

LEADING EDGE FLAPS
Trailing edge flap influence on leading edge vortex flap aerodynamics
[AIAA PAPER 82-0128] A82-17799
Subsonic balance and pressure investigation of a 60-deg delta wing with leading-edge devices (data report)
[NASA-CR-165806] N82-15014

LEADING EDGES
Effect on surface pressures of trapezoidal holes in a T-38 stabilator
A82-17602
Development of an efficient procedure for calculating the aerodynamic effects of planform variation
[NASA-CR-3489] N82-14529

LEAKAGE
Design and testing of a new double labyrinth seal
[ASME PAPER 81-LUB-58] A82-18452

LEAR JET AIRCRAFT
Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data
[AIAA PAPER 82-0183] A82-17827

LIFE (DURABILITY)
Aeronautical applications of bonding
[SNIAS-812-551-102] N82-15010

LIFT
ACTA Mechanica Sinica (selected articles)
[AD-A107322] N82-14060
High lift selected concepts
[NASA-CR-159093] N82-15017

LIFT AUGMENTATION
Vortex lift augmentation by suction on a 60 deg swept Gothic wing
[AIAA PAPER 82-0231] A82-17856

LIFT DEVICES
Selected advanced aerodynamic and active control concepts development
[NASA-CR-3220] N82-15033

LIFT DRAG RATIO
Constant L/D glide trajectories
[AIAA PAPER 82-0362] A82-17904

LIFTING BODIES
Responses of oscillating wings in weak shear flow
A82-18021

LIGHT AIRCRAFT
Development of a transmission loss test facility for light aircraft structures
A82-18728
Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft
A82-18729

LIGHT ALLOYS
Advantages and limitations in the use of diverse materials for aircraft construction --- composite versus metallic materials
[SNIAS-811-551-104] N82-15011

LIGHTING EQUIPMENT
Study of fiber optics to enhance an environmental lighting laboratory
[AD-A106117] N82-14104
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements
[IZF-1980-1-VOL-1] N82-15081
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 2: Intensity measurements
[IZF-1980-12-VOL-2] N82-15082

LIGHTNING
Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714

LINEAR VIBRATION
Linear and nonlinear analysis of vortex whistle: Another blade buster
N82-15067

LIQUID CHROMATOGRAPHY
Determination of pyridine in modified JP-4 via High Performance Liquid Chromatography (HPLC)
[AD-A105589] N82-14313

LIQUID FUELS
An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet
A82-16267
Liquid hydrogen - An outstanding alternate fuel for transport aircraft
A82-17290

LIQUID HYDROGEN
Technological innovation for success - Liquid hydrogen propulsion
A82-16734
Liquid hydrogen - An outstanding alternate fuel for transport aircraft
A82-17290

LOAD DISTRIBUTION (FORCES)
Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/
A82-18620

LOAD TESTS
Experimental structural testing on a composite aircraft canard and its applications
[AIAA PAPER 82-0409] A82-17930

LOCKHEED AIRCRAFT
Development of the Lockheed SR-71 Blackbird
A82-17417

LORAN C
Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont
A82-18160

A prototype interface unit for microprocessor based Loran-C receiver
[NASA-CR-164887] N82-14078

LOW ALTITUDE
Detection of obstacles by low flying aircraft --- using CO2 laser; mathematical model
[FOA-C-30227-E1] N82-15026

LOW SPEED
Low-speed aerodynamic performance of a high-aspect-ratio supercritical-wing transport model equipped with full-span slat and part-span double-slotted flaps
[NASA-TP-1580] N82-15015

LOW SPEED STABILITY
Stability and flutter analysis of turbine blades at low speed
N82-15050

LOW SPEED WIND TUNNELS
The German-Dutch wind tunnel as aeroacoustic experimental installation
A82-17136
Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
[AIAA PAPER 82-0054] A82-17755
Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany
[BMFT-FB-W-81-022] N82-15083

LUBRICANT TESTS
Determination of the flammability characteristics of aerospace hydraulic fluids
A82-16187

LUBRICATING OILS
Effects of ultra-clean and centrifugal filtration on rolling-element bearing life
[ASME PAPER 81-LUB-35] A82-18436
Corrosion inhibiting engine oils
[AD-A106127] N82-14099

LUMINANCE
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 2: Intensity measurements
[IZF-1980-12-VOL-2] N82-15082

M

MACH NUMBER
Symmetric flow characteristics of thin rectangular wings
A82-16093

MAGNETIC FIELDS
Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714

MAINTAINABILITY
Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77
A82-16561

MAINTENANCE
Solid-state VORTAC with remote maintenance and monitoring
A82-18144

MAN MACHINE SYSTEMS
Advanced cockpit for tactical aircraft
A82-16559
Head-up displays - The integrity of flight information
A82-16562
Digital test pilot concept
[AIAA PAPER 82-0259] A82-17867
The NASA MERIT program - Developing new concepts for accurate flight planning
[AIAA PAPER 82-0340] A82-17894

MANAGEMENT METHODS
Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980
A82-17276

MANAGEMENT PLANNING
The Federal Radionavigation Plan
A82-16178
Management of a large avionics project
A82-16557

MANUALS
Development and validation of the V/STOL aerodynamics and stability and control manual
[AIAA PAPER 81-2611] A82-16903

MARKOV PROCESSES
Target acceleration modeling for tactical missile guidance
[AIAA PAPER 82-0370] A82-17910

MASS FLOW RATE
Design and testing of a new double labyrinth seal
[ASME PAPER 81-LUB-58] A82-18452

MATERIALS HANDLING
Handling problems associated with jet aircraft fuels
A82-17288
Generation of electrostatic charge in fuel handling systems: A literature survey
[AD-A106056] N82-14454

MATHEMATICAL MODELS
A method for locating aircraft wing damage by nonlinear vibration analysis
A82-17116
A mathematical model of a subsonic transport aircraft
A82-18575
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447

MATRICES (MATHEMATICS)
A binary matrix technique for aircraft collision threat recognition and avoidance
[AIAA PAPER 82-0184] A82-17828

MEASURING INSTRUMENTS
A Microwave Ice Accretion Measurement Instrument - MIAMI
[AIAA PAPER 82-0285] A82-17875

MECHANICAL DEVICES
A high strength ejector release unit for the Tornado
A82-16025

MECHANICAL PROPERTIES
Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft
[ASLE PREPRINT 81-LC-2B-3] A82-18412
Advantages and limitations in the use of diverse materials for aircraft construction --- composite versus metallic materials
[SNIAS-811-551-104] N82-15011

MESOSCALE PHENOMENA
Mesoscale convective weather systems and aviation operations
[AIAA PAPER 82-0015] A82-17733

METAL FATIGUE
Crack edge instability - A criterion for safe crack propagation limit in thin sheets
A82-17243

METAL SHEETS
Crack edge instability - A criterion for safe crack propagation limit in thin sheets
A82-17243

METAL SURFACES
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090

METEOROLOGICAL SERVICES
The Joint Airport Weather Studies project --- investigation of convective microbursts
[AIAA PAPER 82-0017] A82-17734
Automated Pilot Advisory System
[NASA-TM-73296] N82-15027

METHOD OF CHARACTERISTICS
A method of characteristics solution for a finite oscillating supersonic cascade with thickness effects
N82-15060

MICROPROCESSORS
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference
[NASA-CP-2206] N82-14829
On-board computer progress in development of A 310 flight testing program
N82-14833
Integration of a digital air data computer into the test aircraft HFB-320
[DFVLR-MITT-81-09] N82-15038

MICROWAVE EQUIPMENT
A Microwave Ice Accretion Measurement Instrument - MIAMI
[AIAA PAPER 82-0285] A82-17875

MICROWAVE LANDING SYSTEMS
Helical helicopter approaches with microwave landing system guidance
[AIAA PAPER 81-2654] A82-16918

MLS - A new generation landing guidance system is here A82-18145

The DME-based Azimuth System /DAS/ A82-18146

Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions A82-18161

MLS vertical guidance and navigation for a STOL airplane landing on an elevated STOLport [NASA-TM-81338] N82-14101

MIDAIR COLLISIONS

Estimate of human control over mid-air collisions A82-17604

MILITARY AIR FACILITIES

Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements [IZF-1980-1-VOL-1] N82-15081

Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 2: Intensity measurements [IZF-1980-12-VOL-2] N82-15082

MILITARY AIRCRAFT

Head-up displays - The integrity of flight information A82-16562

Type 'A' V/STOL - One aircraft for all support missions [AIAA PAPER 81-2661] A82-16917

The application of bifurcation theory to the study of loss of control over combat aircraft [ONERA, TP NO. 1981-100] A82-18837

Investigation of functional commonality of avionics systems in naval aircraft [AD-A105503] N82-14088

MILITARY TECHNOLOGY

A low cost maritime control aircraft-ship-weapons system --- antiship missile defense [AIAA PAPER 81-2660] A82-16916

PLRS engineering development testing - Early results --- Position Location Reporting System with data communication network for community users in tactical environment A82-18157

MISSILE CONFIGURATIONS

Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg [AIAA PAPER 82-0250] A82-17864

Performance considerations in the design of subsonic cruise missiles [AIAA PAPER 82-0371] A82-17911

An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts [AIAA PAPER 82-0373] A82-17912

Evaluation of supersonic missile aerodynamic prediction techniques [AIAA PAPER 82-0390] A82-17920

MISSILE CONTROL

Target acceleration modeling for tactical missile guidance [AIAA PAPER 82-0370] A82-17910

MISSILE DEFENSE

Performance considerations in the design of subsonic cruise missiles [AIAA PAPER 82-0371] A82-17911

MISSILE DESIGN

Performance considerations in the design of subsonic cruise missiles [AIAA PAPER 82-0371] A82-17911

An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts [AIAA PAPER 82-0373] A82-17912

Evaluation of supersonic missile aerodynamic prediction techniques [AIAA PAPER 82-0390] A82-17920

MISSILE SIGNATURES

An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts [AIAA PAPER 82-0373] A82-17912

MISSILES

Viscous flow - Nemesis of the theoretician in pursuit of higher order accuracy [AIAA PAPER 82-0389] A82-17919

MISSION PLANNING

Type 'A' V/STOL - One aircraft for all support missions [AIAA PAPER 81-2661] A82-16917

MODULATION TRANSFER FUNCTION

The Modular Automated Weather System (MAWS) concept --- airfield weather support N82-14763

MOISTURE CONTENT

Water ingestion into jet engine axial compressors [AIAA PAPER 82-0196] A82-17836

MOMENTS OF INERTIA

A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system [NLR-MP-80036-U] N82-14084

MRCA AIRCRAFT

A high strength ejector release unit for the Tornado A82-16025

MULTIPHASE FLOW

Infrared emissions from turbofans with high aspect ratio nozzles A82-16092

N

NACELLES

J58/SR-71 propulsion integration or the great adventure into the technical unknown A82-17418

NASA PROGRAMS

NASA V/STOL Propulsion Control Analysis - Phase I and II program status [AIAA PAPER 81-2632] A82-16908

Index to NASA News Releases and Speeches, 1980 N82-15985

NATIONAL AVIATION SYSTEM

Modernizing the Egyptian A.T.C. system A82-18273

NAVIER-STOKES EQUATION

A simple finite difference procedure for the vortex controlled diffuser [AIAA PAPER 82-0109] A82-17788

Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies [AIAA PAPER 82-0252] A82-17865

ACTA Mechanica Sinica (selected articles) [AD-A107322] N82-14060

NAVIGATION AIDS

The application of programmable pocket calculators for computations during survey flights A82-16164

PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record A82-18126

Selecting the post 1990 civil aviation radionavigation system A82-18141

Solid-state VORTAC with remote maintenance and monitoring A82-18144

Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors A82-18147

Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont A82-18160

NAVSTAR SATELLITES

NAVSTAR Global Positioning System A82-17310

Navigation system integrity and reliability for civil aviation A82-18159

Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver --- Joint Tactical Information Distribution System A82-18171

NAVY

Investigation of functional commonality of avionics systems in naval aircraft [AD-A105503] N82-14088

NICKEL ALLOYS

Damage of turbine blades due to interaction with fuel resinification products A82-18479

NOISE GENERATORS
Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981 A82-18726

NOISE INTENSITY
Quantification of airport community noise impact in terms of noise levels, population density, and human subjective response A82-18732

NOISE MEASUREMENT
Noise control measures in the new Singapore International Airport A82-16746
The effect of non-linear propagation in jet noise [AIAA PAPER 82-0416] A82-17936
Noise monitoring in airport communities A82-18731

NOISE POLLUTION
Noise monitoring in airport communities A82-18731
Quantification of airport community noise impact in terms of noise levels, population density, and human subjective response A82-18732
Effects of aircraft noise on the equilibrium of airport residents: Supplementary analyses to the study carried out around Orly [NASA-TM-76627] N82-14673
Taking into account nighttime annoyance in the calculation of the psophic index [NASA-TM-76580] N82-14674

NOISE PREDICTION
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight [AIAA PAPER 82-0124] A82-17796

NOISE PREDICTION (AIRCRAFT)
'Integral Noise': An automatic calculation model for the prediction and control of fixed-wing aircraft noise. I - General considerations, theoretical bases and model analysis A82-18274

NOISE PROPAGATION
The effect of non-linear propagation in jet noise [AIAA PAPER 82-0416] A82-17936

NOISE REDUCTION
Noise control measures in the new Singapore International Airport A82-16746
Current investigations regarding noise research in the Braunschweig Center of the German Institute for Research and Experimentation in Aeronautics and Astronautics A82-17137
Screech suppression in supersonic jets [AIAA PAPER 82-0050] A82-17753
Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver --- Joint Tactical Information Distribution System A82-18171
'Integral Noise': An automatic calculation model for the prediction and control of fixed-wing aircraft noise. I - General considerations, theoretical bases and model analysis A82-18274
Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981 A82-18726
Reduction of the acoustic environment in an F100-PW-100 engine test cell A82-18727
Development of a transmission loss test facility for light aircraft structures A82-18728
Noise control plan for a new airplane manufacturing facility A82-18730

NOISE SPECTRA
Prediction of flyover jet noise spectra from static tests [NASA-TM-83219] N82-14880

NONDESTRUCTIVE TESTS
Inclusions and service induced cracks in a mature population of gas turbine engine bearings [ASME PAPER 81-LUB-48] A82-18444
Control methodology: Nondestructive testing in the aeronautics industry [SNIAS-812-551-110] N82-14527

NONLINEARITY
Linear and nonlinear analysis of vortex whistle: Another blade buster N82-15067

NONUNIFORM FLOW
Recent improvements in prediction techniques for supersonic weapon separation [AIAA PAPER 82-0170] A82-17820

NOZZLE DESIGN
Ground test of a large scale 'D' vented thrust deflecting nozzle [AIAA PAPER 81-2630] A82-16907
Development and operating characteristics of an advanced two-stage combustor [AIAA PAPER 82-0191] A82-17833

NOZZLE FLOW
Supersonic nozzles without shocks A82-16172
ADEN plume flow properties for infrared analysis --- Augmented Deflecting Exhaust Nozzle A82-17606

NOZZLE GEOMETRY
A summary of V/STOL inlet analysis methods [AIAA PAPER 81-2628] A82-16902
Ground test of a large scale 'D' vented thrust deflecting nozzle [AIAA PAPER 81-2630] A82-16907
Screech suppression in supersonic jets [AIAA PAPER 82-0050] A82-17753

NOZZLES
Development of improved high temperature coatings for IN-792 + HF [NASA-CR-165395] N82-14333

NUMERICAL ANALYSIS
Numerical computation of optimal atmospheric trajectories involving staged vehicles [AIAA PAPER 82-0360] A82-17902
Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds N82-14061

NUMERICAL CONTROL
The Modular Automated Weather System (MAWS) concept --- airfield weather support N82-14763

NUMERICAL INTEGRATION
Application of integration algorithms in a parallel processing environment for the simulation of jet engines [NASA-TM-82746] N82-14849

O

OBSTACLE AVOIDANCE
Techniques for overhead-wire detection --- to prevent helicopter wirestrikes A82-16560

OIL ADDITIVES
Corrosion inhibiting engine oils [AD-A106127] N82-14099

OIL POLLUTION
Pollution of the soil by aviation gasoline [PBL-1979-41] N82-15596

OMEGA NAVIGATION SYSTEM
Results of a Differential Omega experiment A82-18094

ONBOARD DATA PROCESSING
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference [NASA-CP-2206] N82-14829
airborne data analysis/monitor system N82-14830
ADAMS executive and operating system N82-14831
On-board computer progress in development of A 310 flight testing program N82-14833

ONBOARD EQUIPMENT
3 DOF gyro analysis from measured and derived rates --- hypersonic reentry simulation test [AIAA PAPER 82-0189] A82-17831
Helicopter model studies for on-board electrostatic sensors [AD-A105511] N82-14089

OPERATING COSTS
Greenlandair VTOL transportation study
[AIAA PAPER 81-2642] A82-16912
Productivity and safety --- reducing transport aircraft operating costs and increasing safety
A82-17284
Energy conservation through airport design and management
A82-17287

OPERATORS (PERSONNEL)
Accident prevention - A regulators view
A82-17278

OPTICAL DATA PROCESSING
FILE-IB aircraft flight test program --- Feature Identification and Location Experiment
[AAS 81-041] A82-16335
Optical Information Processing for Aerospace Applications
[NASA-CP-2207] N82-15894
Role of optical computers in aeronautical control applications
N82-15897

OPTICAL DATA STORAGE MATERIALS
FILE-IB aircraft flight test program --- Feature Identification and Location Experiment
[AAS 81-041] A82-16335

OPTICAL PROPERTIES
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements
[IZF-1980-1-VOL-1] N82-15081

OPTICAL WAVEGUIDES
Optical Information Processing for Aerospace Applications
[NASA-CP-2207] N82-15894

OPTIMAL CONTROL
Optimal trajectories in supersonic flight
[AIAA PAPER 82-0366] A82-17906
Target acceleration modeling for tactical missile guidance
[AIAA PAPER 82-0370] A82-17910
Game-theoretical method for the synthesis of aircraft control during landing approach
A82-18584

OPTIMIZATION
Multilevel optimum design of structures with fiber-composite stiffened-panel components
[AIAA PAPER 80-0723] A82-17594
The use of optimization techniques to design controlled diffusion compressor blading
[NASA-TM-82763] N82-14094
Optimization of compressor vane and bleed settings
[AD-A106059] N82-14097

OSCILLATING FLOW
Bifurcation analysis of nonlinear stability of aircraft at high angles of attack
[AIAA PAPER 82-0244] A82-17862
Computations of transonic flow over an oscillating airfoil with shock-induced separation
[AIAA PAPER 82-0350] A82-17900
Instantaneous turbulence profiles in the wake of an oscillating airfoil
[AIAA PAPER 82-0353] A82-17901
Responses of oscillating wings in weak shear flow
A82-18021

OSCILLATIONS
Simulation of phugoid excitation due to hazardous wind shear
[AIAA PAPER 82-0215] A82-17844

OXIDATION RESISTANCE
Development of improved high temperature coatings for IN-792 + HF
[NASA-CR-165395] N82-14333

P

PANEL FLUTTER
Kelvin-Helmholtz stability analysis of air cushion landing gear trunk flutter
A82-17608

PANEL METHOD (FLUID DYNAMICS)
Recent improvements in prediction techniques for supersonic weapon separation
[AIAA PAPER 82-0170] A82-17820
Development of an efficient procedure for calculating the aerodynamic effects of planform variation
[NASA-CR-3489] N82-14529

PANELS
Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft
A82-18729

PARALLEL FLOW
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062

PARALLEL PROCESSING (COMPUTERS)
Application of integration algorithms in a parallel processing environment for the simulation of jet engines
[NASA-TM-82746] N82-14849

PARAMETER IDENTIFICATION
Stochastic control and identification of helicopter dynamic modes
[NASA-CR-165057] N82-15032
Practical experience with a noncontact blade vibration measuring system in industrial turbocompressors --- vibration mode identification
N82-15065

PASSENGER AIRCRAFT
Optimum configuration for a 10 passenger business turbofan jet airplane
[AIAA PAPER 82-0365] A82-17905
Boeing 757 - Introducing the big-fan narrowbody
A82-18349

PERFORMANCE PREDICTION
Design and performance of airborne radomes - A review
A82-16564
Recent improvements in prediction techniques for supersonic weapon separation
[AIAA PAPER 82-0170] A82-17820
Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg
[AIAA PAPER 82-0250] A82-17864
Evaluation of supersonic missile aerodynamic prediction techniques
[AIAA PAPER 82-0390] A82-17920
The electromagnetic theta gun and tubular projectiles
A82-18182

PERFORMANCE TESTS
Experience with high performance V/STOL fighter projects at MBB
[AIAA PAPER 81-2614] A82-16901
The German-Dutch wind tunnel as aeroacoustic experimental installation
A82-17136
Results of a Differential Omega experiment
A82-18094
JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance
A82-18152
PLRS engineering development testing - Early results --- Position Location Reporting System with data communication network for community users in tactical environment
A82-18157
Design and testing of a new double labyrinth seal
[ASME PAPER 81-LUB-58] A82-18452
The Modular Automated Weather System (MAWS) concept --- airfield weather support
N82-14763
XV-15 Tilt Rotor fly-by-wire collective control demonstrator development specifications
[NASA-CR-166262] N82-15030
Effect of fuel injector type on performance and emissions of reverse-flow combustor
[NASA-TP-1945] N82-15040

PHYSICAL PROPERTIES
Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft
[ASLE PREPRINT 81-LC-2B-3] A82-18412

PHYSIOLOGICAL EFFECTS
Effects of aircraft noise on the equilibrium of airport residents: Supplementary analyses to the study carried out around Orly
[NASA-TM-76627] N82-14673

PILOT PERFORMANCE
Estimate of human control over mid-air collisions
A82-17604
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868

An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays
[AIAA PAPER 82-0367] A82-17907
NASA aviation safety reporting system
[NASA-TM-81274] N82-15025

PITCHING MOMENTS
Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies
A82-16432

PLASTIC AIRCRAFT STRUCTURES
Lear Fan - The plastic aeroplane arrives
A82-18348

PLUMES
ADEN plume flow properties for infrared analysis --- Augmented Deflecting Exhaust Nozzle
A82-17606

PLY ORIENTATION
Improvement of the first-ply-failure strength in laminates by using softening strips
A82-16174

POINT TO POINT COMMUNICATION
Modernizing the Egyptian A.T.C. system
A82-18273

POLICIES
The Federal Radionavigation Plan
A82-16178

POLLUTION CONTROL
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096

POLLUTION MONITORING
Noise monitoring in airport communities
A82-18731

POROUS BOUNDARY LAYER CONTROL
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0234] A82-17858

POROUS MATERIALS
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090

POSITION (LOCATION)
PLRS engineering development testing - Early results --- Position Location Reporting System with data communication network for community users in tactical environment
A82-18157
Coordinate transformation in PLRS --- algorithm and error analysis of Position Location and Reporting System
A82-18158

POSITION ERRORS
Maneuver dependent component error models and synchronized reset filters for inertial navigation systems
A82-18139
Laboratory and flight test of a new RLG strapdown INS
A82-18150
Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems
A82-18151
JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance
A82-18152
A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system
A82-18155
Coordinate transformation in PLRS --- algorithm and error analysis of Position Location and Reporting System
A82-18158
Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver --- Joint Tactical Information Distribution System
A82-18171

POSITION INDICATORS
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data
[NASA-CR-156882] N82-15498

POSTFLIGHT ANALYSIS
Post-flight assessment of the JTIDS Rel Nav
A82-18154
ROLM computers in the flight testing of the Fokker F29 aircraft
N82-14839

POTENTIAL FLOW
A more-accurate transonic computational method for wing-body configurations
[AIAA PAPER 82-0162] A82-17815
Experimental investigation of a transonic potential flow around a symmetric airfoil
[NASA-TM-76676] N82-14057

POWER CONDITIONING
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447

POWERED MODELS
Wind tunnel tests of engine-equipped models: Comparison of two jet wash simulation methods
[NASA-TM-76764] N82-14091

PREDICTION ANALYSIS TECHNIQUES
A method for predicting the lifetime of gas turbine blades
A82-16692
Prediction of flyover jet noise spectra from static tests
[NASA-TM-83219] N82-14880
Aerodynamic considerations in the prediction of unstalled supersonic flutter in transonic fans
N82-15058

PREFLIGHT ANALYSIS
ROLM computers in the flight testing of the Fokker F29 aircraft
N82-14839

PRESIDENTIAL REPORTS
Aeronautics and space report of the President, 1980 activities
[NASA-TM-84079] N82-16022

PRESSURE DISTRIBUTION
Subsonic flow over airborne optical turrets
A82-17605
Optimal subsonic diffuser wall design for arbitrary entry conditions
[AIAA PAPER 82-0132] A82-17800
Pressure distribution on an ogee wing in supersonic flow
[AIAA PAPER 82-0414] A82-17934
Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave
A82-18590

PRESSURE MEASUREMENT
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows
[AIAA PAPER 82-0410] A82-17931

PRESSURE RATIO
Fluidics in aircraft engine controls
A82-18691

PRESSURE REDUCTION
Optimization of compressor vane and bleed settings
[AD-A106059] N82-14097

PRESSURE SENSORS
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows
[AIAA PAPER 82-0410] A82-17931

PROBABILITY DISTRIBUTION FUNCTIONS
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
A82-18776

PROBLEM SOLVING
Development of Integrated Programs for Aerospace-Vehicle Design (IPAD) - IPAD user requirements
[NASA-CR-2985] N82-15034

PROCEEDINGS
Technical evaluation report on the Aeroelasticity in Turbomachines Symposium
N82-15070

PROCUREMENT MANAGEMENT
Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77
A82-16561

PRODUCT DEVELOPMENT
Aircraft composite materials and structures A82-16143
The well tempered transport aircraft engine /The Sir Henry Royce Memorial Lecture/ A82-16145
Development of the Lockheed SR-71 Blackbird A82-17417
Design evolution of the Boeing 757 A82-18322
Advanced technology lightweight gondola system experimental fabrication program [AD-A104157] N82-14082
Development of Integrated Programs for Aerospace-Vehicle Design (IPAD) - IPAD user requirements [NASA-CR-2985] N82-15034
Advanced compressor components. Phase 1: 1978 to 1979 --- for aircraft engines [BMFT-FB-W-81-025] N82-15073

PROJECT MANAGEMENT
The Federal Radionavigation Plan A82-16178
Management of a large avionics project A82-16557

PROJECTILES
Sensor footprints and homing range of terminal guidance munition [BMVG-FBWT-81-5] N82-15111

PROPELLER BLADES
Resonant whirling of aircraft propeller-engine systems A82-16417
Optimization and performance calculation of dual-rotation propellers [NASA-TP-1948] N82-14049

PROPELLER DRIVE
Resonant whirling of aircraft propeller-engine systems A82-16417

PROPELLER SLIPSTREAMS
Propeller tip vortex - A possible contributor to aircraft cabin noise A82-17603

PROPULSION SYSTEM CONFIGURATIONS
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator [AIAA PAPER 82-0254] A82-17866

PROPULSION SYSTEM PERFORMANCE
NASA V/STOL Propulsion Control Analysis - Phase I and II program status [AIAA PAPER 81-2632] A82-16908
V/STOL propulsion control technology [AIAA PAPER 81-2634] A82-16909

PROPULSIVE EFFICIENCY
An investigation of the use of a propulsive wing/canard concept for improved maneuvering [AIAA PAPER 81-2622] A82-16905

PSYCHOLOGICAL EFFECTS
Effects of aircraft noise on the equilibrium of airport residents: Supplementary analyses to the study carried out around Orly [NASA-TM-76627] N82-14673

PUBLIC RELATIONS
Index to NASA News Releases and Speeches, 1980 N82-15985

PYRIDINES
Determination of pyridine in modified JP-4 via High Performance Liquid Chromatography (HPLC) [AD-A105589] N82-14313

Q

QUALITY CONTROL
Handling problems associated with jet aircraft fuels A82-17288

QUANTITATIVE ANALYSIS
Determination of pyridine in modified JP-4 via High Performance Liquid Chromatography (HPLC) [AD-A105589] N82-14313

R

RADAR CROSS SECTIONS
Performance considerations in the design of subsonic cruise missiles [AIAA PAPER 82-0371] A82-17911
An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts [AIAA PAPER 82-0373] A82-17912

RADAR DETECTION
Techniques for overhead-wire detection --- to prevent helicopter wirestrikes A82-16560

RADAR EQUIPMENT
Management of a large avionics project A82-16557

RADAR TRACKING
Post-flight assessment of the JTIDS Rel Nav A82-18154

RADIO EQUIPMENT
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report [AD-A106052] N82-14424

RADIO NAVIGATION
The Federal Radionavigation Plan A82-16178
NAVSTAR Global Positioning System A82-17310
Selecting the post 1990 civil aviation radionavigation system A82-18141
Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors A82-18147
A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system A82-18155

RADIO RECEIVERS
A GPS receiver design for general aviation navigation A82-18132
A prototype interface unit for microprocessor based Loran-C receiver [NASA-CR-164887] N82-14078

RADOMES
Special problems associated with aircraft radomes A82-16558
Design and performance of airborne radomes - A review A82-16564
Icing analysis of an unprotected aircraft radome [AIAA PAPER 82-0281] A82-17874

RAILGUN ACCELERATORS
The electromagnetic theta gun and tubular projectiles A82-18182
Helical rail glider launcher A82-18200

RAMJET ENGINES
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics [AD-A106061] N82-14316

RANDOM LOADS
Estimation methods for the determination of dynamic responses of elastic aircraft --- to random loads [BMVG-FBWT-81-6] N82-15037

RANDOM PROCESSES
Estimate of human control over mid-air collisions A82-17604

REAL TIME OPERATION
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI [AIAA PAPER 82-0260] A82-17868
A stable decentralized filtering implementation for JTIDS RelNav --- stable community relative navigation A82-18156
Design and implementation of a telecommunication interface for the TAATM/TCV real-time experiment [NASA-TM-83231] N82-14075
BOLM computers in the flight testing of the Fokker F29 aircraft N82-14839

RECONNAISSANCE AIRCRAFT
Development of the Lockheed SR-71 Blackbird A82-17417
J58/SR-71 propulsion integration or the great adventure into the technical unknown A82-17418

RECTANGULAR WINGS
  Symmetric flow characteristics of thin rectangular wings
    A82-16093
  Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating
    A82-18588
  The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities
    A82-18591
REDUNDANT COMPONENTS
  Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research
    N82-14842
REINFORCED PLASTICS
  Lear Fan - The plastic aeroplane arrives
    A82-18348
REINFORCED SHELLS
  Calculation of the stability of crosswise-reinforced cylindrical shells
    A82-18621
RELAXATION METHOD (MATHEMATICS)
  Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies
  [AIAA PAPER 82-0252] A82-17865
RELIABILITY ENGINEERING
  Special problems associated with aircraft radomes
    A82-16558
  Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver --- Joint Tactical Information Distribution System
    A82-18171
REMOTE SENSING
  FILE-IB aircraft flight test program --- Feature Identification and Location Experiment
  [AAS 81-041] A82-16335
REMOTELY PILOTED VEHICLES
  A true air speed sensor for miniature unmanned aircraft
  [RAE-TM-SPACE-287] N82-14086
REPORTS
  Technical evaluation report on the Aeroelasticity in Turbomachines Symposium
    N82-15070
RESCUE OPERATIONS
  Status of the COSPAS-SARSAT project and its possible operation in conjunction with INMARSAT system
    A82-18170
RESEARCH AND DEVELOPMENT
  V/STOL status from the engine technology viewpoint
  [AIAA PAPER 81-2648] A82-16913
  The influence of aeronautical R&D expenditures upon the productivity of air transportation
  [PB81-247140] N82-15984
  Aeronautics and space report of the President, 1980 activities
  [NASA-TM-84079] N82-16022
RESEARCH FACILITIES
  NASA Dryden Flight Loads Research Facility
  [NASA-TM-81368] N82-15079
RESIN MATRIX COMPOSITES
  Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
    A82-17531
RESONANT FREQUENCIES
  Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures
    A82-18612
RESONANT VIBRATION
  Resonant whirling of aircraft propeller-engine systems
    A82-16417
  Stochastic control and identification of helicopter dynamic modes
  [NASA-CR-165057] N82-15032
RESOURCE ALLOCATION
  Management of a large avionics project
    A82-16557
REYNOLDS NUMBER
  Low Reynolds number airfoil survey, volume 1
  [NASA-CR-165803-VOL-1] N82-14059
REYNOLDS STRESS
  The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
    A82-18776
RIGID STRUCTURES
  Multilevel optimum design of structures with fiber-composite stiffened-panel components
  [AIAA PAPER 80-0723] A82-17594
RING LASERS
  Laboratory and flight test of a new RLG strapdown INS
    A82-18150
ROLL
  Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany
  [BMFT-FB-W-81-022] N82-15083
ROTARY GYROSCOPES
  3 DOF gyro analysis from measured and derived rates --- hypersonic reentry simulation test
  [AIAA PAPER 82-0189] A82-17831
ROTARY WINGS
  A flight investigation of blade-section aerodynamics for a helicopter main rotor having 10-64C airfoil sections
  [NASA-TM-83226] N82-14058
  Flag-lag-torsional dynamics or extensional and inextensional rotor blades in hover and in forward flight
  [NASA-CR-165078] N82-15013
  Stochastic control and identification of helicopter dynamic modes
  [NASA-CR-165057] N82-15032
ROTOR AERODYNAMICS
  A flight investigation of blade-section aerodynamics for a helicopter main rotor having 10-64C airfoil sections
  [NASA-TM-83226] N82-14058
  Aeroelasticity in turbomachines --- conference proceedings
  [EPFL-ITA-10] N82-15042
  Aerodynamic response of a blade in pitching oscillation with partial and full separation --- measurement of the instantaneous pressure distribution around a vibrating blade surface in a wind tunnel
    N82-15047
  Damping for turbomachine blade variations in subsonic flow
    N82-15048
  Self excited flow oscillation in the low pressure steam turbine cascade
    N82-15049
  Calculation of quasi-stationary aerodynamic force acting on a cascade of oscillating airfoils in subsonic flow
    N82-15051
  Computer aided investigation of turbomachine aerodynamics and aeroelasticity
    N82-15053
  On the numerical analysis of stall flutter in turbine cascades
    N82-15054
  Control of vibration in aeroelastic cascade experiments
    N82-15056
  Effect of mean blade loading on supersonic cascade flutter
    N82-15059
  A method of characteristics solution for a finite oscillating supersonic cascade with thickness effects
    N82-15060
  Calculation of nonstationary force ratios on blades of a rotating row in incompressible flow
    N82-15061
  Three-dimensional analysis of cascade flutter in parallel shear flow
    N82-15062
ROTORCRAFT AIRCRAFT
  Dynamic stability of a buoyant quad-rotor aircraft --- for airlifting payloads externally on a sling
  [AIAA PAPER 82-0242] A82-17861
RUNGE-KUTTA METHOD
  The influence of turbulence models on computer-simulated aircraft landing
  [AIAA PAPER 82-0342] A82-17896

RUNWAY CONDITIONS
C-5A operational utility evaluation soil tests and analysis
[AD-A105555] N82-14083
Automated Pilot Advisory System
[NASA-TM-73296] N82-15027
RUNWAYS
Air traffic management for fuel economy
A82-17279
The shape of the air traffic control system of the future - A U.S. perspective
A82-17280
Air traffic control problems and solutions
A82-17283
A new end-fire ILS glide slope
A82-18143
Requirements for instrument approaches to triple parallel runways
[AD-A105622] N82-14079
Requirements for independent and dependent parallel instrument approaches at reduced runway spacing
[AD-A105673] N82-14080

S

SAFETY MANAGEMENT
Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980
A82-17276
SANDWICH STRUCTURES
Stress intensity factor measurements in composite sandwich structures
A82-17535
SARSAT
Status of the COSPAS-SARSAT project and its possible operation in conjunction with INMARSAT system
A82-18170
SATELLITE NAVIGATION SYSTEMS
PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record
A82-18126
Navigation system integrity and reliability for civil aviation
A82-18159
SATELLITE TRANSMISSION
Data communications within the Air Navigation Services system
A82-18272
SATELLITE-BORNE PHOTOGRAPHY
Mesoscale convective weather systems and aviation operations
[AIAA PAPER 82-0015] A82-17733
SEALING
Aeronautical applications of bonding
[SNIAS-812-551-102] N82-15010
SEARCHING
Status of the COSPAS-SARSAT project and its possible operation in conjunction with INMARSAT system
A82-18170
SELF OSCILLATION
Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis
A82-16290
SEMICONDUCTOR DEVICES
High temperature electronic requirements in aeropropulsion systems
[E-708] N82-15313
SEPARATED FLOW
Computations of transonic flow over an oscillating airfoil with shock-induced separation
[AIAA PAPER 82-0350] A82-17900
Low Reynolds number airfoil survey, volume 1
[NASA-CR-165803-VOL-1] N82-14059
Aerodynamic response of a blade in pitching oscillation with partial and full separation --- measurement of the instantaneous pressure distribution around a vibrating blade surface in a wind tunnel
N82-15047
SERVICE LIFE
A method for predicting the lifetime of gas turbine blades
A82-16692
Effects of ultra-clean and centrifugal filtration on rolling-element bearing life
[ASME PAPER 81-LUB-35] A82-18436
SHEAR FLOW
Responses of oscillating wings in weak shear flow
A82-18021
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062
SHELL STABILITY
Calculation of the stability of crosswise-reinforced cylindrical shells
A82-18621
SHOCK WAVE INTERACTION
Computations of transonic flow over an oscillating airfoil with shock-induced separation
[AIAA PAPER 82-0350] A82-17900
Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave
A82-18590
SHOCK WAVES
Experimental investigation of a transonic potential flow around a symmetric airfoil
[NASA-TM-76676] N82-14057
SHORT TAKEOFF AIRCRAFT
An investigation of the use of a propulsive wing/canard concept for improved maneuvering
[AIAA PAPER 81-2622] A82-16905
MLS vertical guidance and navigation for a STOL airplane landing on an elevated STOLport
[NASA-TM-81338] N82-14101
SIGNATURE ANALYSIS
ADEN plume flow properties for infrared analysis --- Augmented Deflecting Exhaust Nozzle
A82-17606
SIMULATORS
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator
[AIAA PAPER 82-0254] A82-17866
SKIN (STRUCTURAL MEMBER)
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
A82-17531
SLENDER BODIES
Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
[AIAA PAPER 82-0054] A82-17755
Viscous flow - Nemesis of the theoretician in pursuit of higher order accuracy
[AIAA PAPER 82-0389] A82-17919
SLENDER WINGS
A theoretical investigation of wing rocking
[NASA-CR-165058] N82-15031
SLOTTED WIND TUNNELS
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855
SOIL MECHANICS
C-5A operational utility evaluation soil tests and analysis
[AD-A105555] N82-14083
SOLID PROPELLANT COMBUSTION
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics
[AD-A106061] N82-14316
SOLID STATE DEVICES
Solid-state VORTAC with remote maintenance and monitoring
A82-18144
SOLVENTS
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105588] N82-14312
SONIC NOZZLES
Screech suppression in supersonic jets
[AIAA PAPER 82-0050] A82-17753
SOUND FIELDS
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight
[AIAA PAPER 82-0124] A82-17796

SOUND PRESSURE
  Propeller tip vortex - A possible contributor to aircraft cabin noise
  A82-17603
SOUND PROPAGATION
  Scattering of sound by a vortex ring
  A82-16148
SOUND TRANSMISSION
  Noise control measures in the new Singapore International Airport
  A82-16746
  Development of a transmission loss test facility for light aircraft structures
  A82-18728
SOUND WAVES
  Scattering of sound by a vortex ring
  A82-16148
SPACE MISSIONS
  Aeronautics and space report of the President, 1980 activities
  [NASA-TM-84079] N82-16022
SPACE SHUTTLE ORBITERS
  The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system
  [AIAA PAPER 82-0369] A82-17909
SPACECRAFT CHARGING
  A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
  A82-18596
SPACECRAFT CONTROL
  NAVSTAR Global Positioning System
  A82-17310
SPACECRAFT DESIGN
  Aerospace highlights 1981
  A82-16135
SPEED INDICATORS
  A true air speed sensor for miniature unmanned aircraft
  [RAE-TM-SPACE-287] N82-14086
SPILLING
  Pollution of the soil by aviation gasoline
  [PML-1979-41] N82-15596
SPIN DYNAMICS
  Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
  [AIAA PAPER 82-0054] A82-17755
SPIN TESTS
  Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
  [AIAA PAPER 82-0054] A82-17755
SPLINE FUNCTIONS
  Development of an efficient procedure for calculating the aerodynamic effects of planform variation
  [NASA-CR-3489] N82-14529
SPOILERS
  Unsteady flow patterns associated with spoiler control devices
  [AIAA PAPER 82-0127] A82-17798
SPOOLS
  Cavitation inception in spool valves
  A82-16428
STABILITY AUGMENTATION
  Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 2: AFT C.G. simulation and analysis
  [NASA-CR-159098] N82-15077
STABILITY DERIVATIVES
  Stability and flutter analysis of turbine blades at low speed
  N82-15050
  Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany
  [BMFT-FB-W-81-022] N82-15083
STABILITY TESTS
  The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system
  [AIAA PAPER 82-0369] A82-17909
STATIC PRESSURE
  Subsonic balance and pressure investigation of a 60-deg delta wing with leading-edge devices (data report)
  [NASA-CR-165806] N82-15014
STATIC TESTS
  Prediction of flyover jet noise spectra from static tests
  [NASA-TM-83219] N82-14880
STATIC THRUST
  Take-off ground roll of propeller driven aircraft
  A82-17607
STEELS
  Advantages and limitations in the use of diverse materials for aircraft construction --- composite versus metallic materials
  [SNIAS-811-551-104] N82-15011
STRAIN GAGE BALANCES
  An afterbody drag balance --- transonic wind tunnel gages
  [RAE-TM-AERO-1897] N82-14103
STRAPDOWN INERTIAL GUIDANCE
  Laboratory and flight test of a new RLG strapdown INS
  A82-18150
  Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research
  N82-14842
STREAM FUNCTIONS (FLUIDS)
  Direct approach to aerodynamic design problems
  A82-16404
STRESS CONCENTRATION
  Improvement of the first-ply-failure strength in laminates by using softening strips
  A82-16174
  Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating
  A82-18588
STRESS INTENSITY FACTORS
  Stress intensity factor measurements in composite sandwich structures
  A82-17535
STRESS MEASUREMENT
  Stress intensity factor measurements in composite sandwich structures
  A82-17535
STRESS-STRAIN RELATIONSHIPS
  Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating
  A82-18588
STRUCTURAL ANALYSIS
  La Recherche Aerospatiale, Bi-monthly Bulletin No. 1981-2, March - April 1981 --- aerodynamic research
  [ESA-TT-713] N82-14388
STRUCTURAL DESIGN
  Design procedures for compressor blades
  A82-17135
  Modern aircraft accident investigation equipment and techniques
  A82-17419
  Optimal subsonic diffuser wall design for arbitrary entry conditions
  [AIAA PAPER 82-0132] A82-17800
  Flutter mode suppression using hyperstable feedback
  [AIAA PAPER 82-0368] A82-17908
  The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system
  [AIAA PAPER 82-0369] A82-17909
  Highlights of a design concept for a close ground support fighter
  [AIAA PAPER 82-0411] A82-17932
  Design and testing of a new double labyrinth seal
  [ASME PAPER 81-LUB-58] A82-18452
  The design of a jet catcher --- for wind tunnels
  [RAE-TM-AERO-1891] N82-14102
STRUCTURAL DESIGN CRITERIA
  Multilevel optimum design of structures with fiber-composite stiffened-panel components
  [AIAA PAPER 80-0723] A82-17594
STRUCTURAL INFLUENCE COEFFICIENTS
  Experimental structural testing on a composite aircraft canard and its applications
  [AIAA PAPER 82-0409] A82-17930
STRUCTURAL RELIABILITY
  Special problems associated with aircraft radomes
  A82-16558
  Modern aircraft accident investigation equipment and techniques
  A82-17419

STRUCTURAL STABILITY
Crack edge instability - A criterion for safe crack propagation limit in thin sheets A82-17243
Flutter mode suppression using hyperstable feedback [AIAA PAPER 82-0368] A82-17908
STRUCTURAL VIBRATION
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/ A82-16040
A method for locating aircraft wing damage by nonlinear vibration analysis A82-17116
Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures A82-18612
STRUCTURAL WEIGHT
Multilevel optimum design of structures with fiber-composite stiffened-panel components [AIAA PAPER 80-0723] A82-17594
STRUTS
Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis A82-16290
SUBSONIC AIRCRAFT
A mathematical model of a subsonic transport aircraft A82-18575
SUBSONIC FLOW
Subsonic flow over airborne optical turrets A82-17605
Optimal subsonic diffuser wall design for arbitrary entry conditions [AIAA PAPER 82-0132] A82-17800
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows [AIAA PAPER 82-0410] A82-17931
Calculation of quasi-stationary aerodynamic force acting on a cascade of oscillating airfoils in subsonic flow N82-15051
Numerical experiments on unsteady flows through vibrating cascades N82-15052
SUBSONIC FLUTTER
Damping for turbomachine blade variations in subsonic flow N82-15048
SUBSONIC SPEED
Performance considerations in the design of subsonic cruise missiles [AIAA PAPER 82-0371] A82-17911
SUBSONIC WIND TUNNELS
Unsteady flow patterns associated with spoiler control devices [AIAA PAPER 82-0127] A82-17798
Subsonic balance and pressure investigation of a 60-deg delta wing with leading-edge devices (data report) [NASA-CR-165806] N82-15014
SUCTION
Vortex lift augmentation by suction on a 60 deg swept Gothic wing [AIAA PAPER 82-0231] A82-17856
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel [AIAA PAPER 82-0234] A82-17858
A theoretical investigation of wing rocking [NASA-CR-165058] N82-15031
SUPERCRITICAL WINGS
Low-speed aerodynamic performance of a high-aspect-ratio supercritical-wing transport model equipped with full-span slat and part-span double-slotted flaps [NASA-TP-1580] N82-15015
Longitudinal and lateral static stability and control characteristics of a 1/6-scale model of a remotely piloted research vehicle with a supercritical wing [[illegible]ASA-TP-1360] N82-15075
SUPERSONIC AIRCRAFT
[illegible]/STOL propulsion control technology [AIAA PAPER 81-2634] A82-16909
NASA Dryden Flight Loads Research Facility [NASA-TM-81368] N82-15079
SUPERSONIC FLIGHT
Optimal trajectories in supersonic flight [AIAA PAPER 82-0366] A82-17906
An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts [AIAA PAPER 82-0373] A82-17912
SUPERSONIC FLOW
Pressure distribution on an ogee wing in supersonic flow [AIAA PAPER 82-0414] A82-17934
The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities A82-18591
Experimental investigation of a transonic potential flow around a symmetric airfoil [NASA-TM-76676] N82-14057
A method of characteristics solution for a finite oscillating supersonic cascade with thickness effects N82-15060
SUPERSONIC FLUTTER
Aerodynamic considerations in the prediction of unstalled supersonic flutter in transonic fans N82-15058
Effect of mean blade loading on supersonic cascade flutter N82-15059
SUPERSONIC JET FLOW
Screech suppression in supersonic jets [AIAA PAPER 82-0050] A82-17753
SUPERSONIC NOZZLES
Supersonic nozzles without shocks A82-16172
SUPERSONIC SPEEDS
Recent improvements in prediction techniques for supersonic weapon separation [AIAA PAPER 82-0170] A82-17820
Evaluation of supersonic missile aerodynamic prediction techniques [AIAA PAPER 82-0390] A82-17920
SURFACE GEOMETRY
Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature A82-18484
SURFACE NAVIGATION
PLANS '80 - Position Location and Navigation Symposium, Atlantic City, NJ, December 8-11, 1980, Record A82-18126
SURFACE ROUGHNESS
C-5A operational utility evaluation soil tests and analysis [AD-A105555] N82-14083
SURFACE WAVES
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data [NASA-CR-156882] N82-15498
SWEPT FORWARD WINGS
Computational treatment of transonic canard-wing interactions [AIAA PAPER 82-0161] A82-17814
SWEPT WINGS
Vortex lift augmentation by suction on a 60 deg swept Gothic wing [AIAA PAPER 82-0231] A82-17856
SYNOPTIC METEOROLOGY
Mesoscale convective weather systems and aviation operations [AIAA PAPER 82-0015] A82-17733
SYSTEM EFFECTIVENESS
Coordinate transformation in PLRS --- algorithm and error analysis of Position Location and Reporting System A82-18158
On-board computer progress in development of A 310 flight testing program N82-14833
SYSTEM FAILURES
Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research N82-14842

SYSTEMS ENGINEERING
MLS - A new generation landing guidance system is here A82-18145
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS) [AD-A105510] N82-14072
ADAMS executive and operating system N82-14831
SYSTEMS INTEGRATION
A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system A82-18155
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report [AD-A106052] N82-14424
The Modular Automated Weather System (MAWS) concept --- airfield weather support N82-14763
SYSTEMS SIMULATION
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI [AIAA PAPER 82-0260] A82-17868
JTIDS RELNAV network off-line simulation A82-18153
PLRS engineering development testing - Early results --- Position Location Reporting System with data communication network for community users in tactical environment A82-18157
SYSTEMS STABILITY
A stable decentralized filtering implementation for JTIDS RelNav --- stable community relative navigation A82-18156

T

T-33 AIRCRAFT
An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays [AIAA PAPER 82-0367] A82-17907
T-38 AIRCRAFT
Effect on surface pressures of trapezoidal holes in a T-38 stabilator A82-17602
TAKEOFF
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system [NLR-MP-80036-U] N82-14084
TAKEOFF RUNS
Take-off ground roll of propeller driven aircraft A82-17607
The feasibility of turnback from a low altitude engine failure during the takeoff climb-out phase [AIAA PAPER 82-0406] A82-17928
TARGET ACQUISITION
Target acceleration modeling for tactical missile guidance [AIAA PAPER 82-0370] A82-17910
Sensor footprints and homing range of terminal guidance munition [BMVG-FBWT-81-5] N82-15111
The optical recognition of sea targets as a function of surrounding and observation parameters in air to water observations [BMVG-FBWT-81-10] N82-15930
TARGET RECOGNITION
The optical recognition of sea targets as a function of surrounding and observation parameters in air to water observations [BMVG-FBWT-81-10] N82-15930
TECHNOLOGICAL FORECASTING
Airbus - Perspectives for the future A82-16972
The shape of the air traffic control system of the future - A U.S. perspective A82-17280
Selecting the post 1990 civil aviation radionavigation system A82-18141
ADAMS executive and operating system N82-14831
TECHNOLOGY ASSESSMENT
Aerospace highlights 1981 A82-16135
V/STOL status from the engine technology viewpoint [AIAA PAPER 81-2648] A82-16913
Gas path analysis - A tool for engine condition monitoring A82-17286
The all-electric airplane - A new trend A82-17420
Aeronautical applications of bonding [SNIAS-812-551-102] N82-15010
Community rotorcraft air transportation benefits and opportunities [NASA-CR-166266] N82-16008
TECHNOLOGY UTILIZATION
Aircraft composite materials and structures A82-16143
Technological innovation for success - Liquid hydrogen propulsion A82-16734
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference [NASA-CP-2206] N82-14829
TELECOMMUNICATION
Design and implementation of a telecommunication interface for the TAATM/TCV real-time experiment [NASA-TM-83231] N82-14075
TEMPERATURE DISTRIBUTION
Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating A82-18508
TEMPERATURE EFFECTS
NASA Dryden Flight Loads Research Facility [NASA-TM-81368] N82-15079
TENSILE STRENGTH
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes A82-17531
TERMINAL GUIDANCE
MLS - A new generation landing guidance system is here A82-18145
Sensor footprints and homing range of terminal guidance munition [BMVG-FBWT-81-5] N82-15111
TEST FACILITIES
Development of a transmission loss test facility for light aircraft structures A82-18728
NASA Dryden Flight Loads Research Facility [NASA-TM-81368] N82-15079
THEMATIC MAPPING
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data [NASA-CR-156882] N82-15498
THEODORSEN TRANSFORMATION
Optimization and performance calculation of dual-rotation propellers [NASA-TP-1948] N82-14049
THERMAL CONDUCTIVITY
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel [NASA-TM-83220] N82-15359
THERMAL CONTROL COATINGS
Development of improved high temperature coatings for IN-792 + HF [NASA-CR-165395] N82-14333
THERMAL FATIGUE
A method for predicting the lifetime of gas turbine blades A82-16692
Development of improved high temperature coatings for IN-792 + HF [NASA-CR-165395] N82-14333
THERMAL STABILITY
Calculation of the stability of crosswise-reinforced cylindrical shells A82-18621
THERMODYNAMIC PROPERTIES
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel [NASA-TM-83220] N82-15359

THICKNESS
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090
A method of characteristics solution for a finite oscillating supersonic cascade with thickness effects
N82-15060

THIN WINGS
Symmetric flow characteristics of thin rectangular wings
A82-16093
Concerning the calculation of the aerodynamic characteristics of mechanized wings
A82-18589

THREE DIMENSIONAL BOUNDARY LAYER
Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis
[AIAA PAPER 82-0163] A82-17816

THREE DIMENSIONAL FLOW
Supersonic nozzles without shocks
A82-16172
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855

THREE DIMENSIONAL MOTION
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062

THROTTLING
External fuel vaporization study
[NASA-CR-165513] N82-14371

THRUST CONTROL
V/STOL propulsion control technology
[AIAA PAPER 81-2634] A82-16909
Optimal trajectories in supersonic flight
[AIAA PAPER 82-0366] A82-17906

THRUST REVERSAL
Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles
[AIAA PAPER 81-2639] A82-16911

THRUST VECTOR CONTROL
Ground test of a large scale 'D' vented thrust deflecting nozzle
[AIAA PAPER 81-2630] A82-16907
NASA V/STOL Propulsion Control Analysis - Phase I and II program status
[AIAA PAPER 81-2632] A82-16908

THUNDERSTORMS
Simulation of phugoid excitation due to hazardous wind shear
[AIAA PAPER 82-0215] A82-17844

TILT ROTOR RESEARCH AIRCRAFT PROGRAM
XV-15 Tilt Rotor fly-by-wire collective control demonstrator development specifications
[NASA-CR-166262] N82-15030

TILTING ROTORS
Advanced technology airfoil development for the XV-15 tilt-rotor vehicle
[AIAA PAPER 81-2623] A82-16906

TIME DIVISION MULTIPLE ACCESS
JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance
A82-18152

TITANIUM ALLOYS
Advantages and limitations in the use of diverse materials for aircraft construction --- composite versus metallic materials
[SNIAS-811-551-104] N82-15011

TOOLING
Aircraft composite materials and structures
A82-16143

TORSIONAL STRESS
Flag-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-165078] N82-15013

TORSIONAL VIBRATION
Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/
A82-18620

TRACKING (POSITION)
A general aviation simulator evaluation of a rate-enhanced instrument landing system display
[NASA-TP-1960] N82-14085

TRACKING NETWORKS
PLRS engineering development testing - Early results --- Position Location Reporting System with data communication network for community users in tactical environment
A82-18157

TRAILING EDGES
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735

TRAILING-EDGE FLAPS
Trailing edge flap influence on leading edge vortex flap aerodynamics
[AIAA PAPER 82-0128] A82-17799

TRAJECTORY ANALYSIS
Constant L/D glide trajectories
[AIAA PAPER 82-0362] A82-17904
Sensor footprints and homing range of terminal guidance munition
[BMVG-FBWT-81-5] N82-15111

TRAJECTORY OPTIMIZATION
Numerical computation of optimal atmospheric trajectories involving staged vehicles
[AIAA PAPER 82-0360] A82-17902
Optimal trajectories in supersonic flight
[AIAA PAPER 82-0366] A82-17906

TRANSDUCERS
La Recherche Aerospatiale, Bi-monthly Bulletin No. 1981-2, March - April 1981 --- aerodynamic research
[ESA-TT-713] N82-14388

TRANSFER FUNCTIONS
Flutter mode suppression using hyperstable feedback
[AIAA PAPER 82-0368] A82-17908

TRANSFORMATIONS (MATHEMATICS)
A stable decentralized filtering implementation for JTIDS RelNav --- stable community relative navigation
A82-18156

TRANSMISSION LOSS
Development of a transmission loss test facility for light aircraft structures
A82-18728

TRANSONIC COMPRESSORS
Aerodynamic considerations in the prediction of unstalled supersonic flutter in transonic fans
N82-15058

TRANSONIC FLOW
Computational treatment of transonic canard-wing interactions
[AIAA PAPER 82-0161] A82-17814
A more-accurate transonic computational method for wing-body configurations
[AIAA PAPER 82-0162] A82-17815
Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis
[AIAA PAPER 82-0163] A82-17816
Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies
[AIAA PAPER 82-0252] A82-17865
Computations of transonic flow over an oscillating airfoil with shock-induced separation
[AIAA PAPER 82-0350] A82-17900
A contribution to the hodograph method for shock-free transonic airfoil sections
A82-18022
Experimental investigation of a transonic potential flow around a symmetric airfoil
[NASA-TM-76676] N82-14057

TRANSONIC WIND TUNNELS
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0234] A82-17858
An afterbody drag balance --- transonic wind tunnel gages
[RAE-TM-AERO-1897] N82-14103
Research on an induction driven cryogenic wind tunnel
N82-14394
Longitudinal and lateral static stability and control characteristics of a 1/6-scale model of a remotely piloted research vehicle with a supercritical wing
[NASA-TP-1360] N82-15075

TRANSPORT AIRCRAFT
The well tempered transport aircraft engine /The Sir Henry Royce Memorial Lecture/ A82-16145
Productivity and safety --- reducing transport aircraft operating costs and increasing safety A82-17284
Liquid hydrogen - An outstanding alternate fuel for transport aircraft A82-17290
Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft [ASLE PREPRINT 81-LC-2B-3] A82-18412
A mathematical model of a subsonic transport aircraft A82-18575
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 2: AFT C.G. simulation and analysis [NASA-CR-159098] N82-15077
TRANSPORT PROPERTIES
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel [NASA-TM-83220] N82-15359
TRANSPORTATION ENERGY
Technological innovation for success - Liquid hydrogen propulsion A82-16734
TURBINE BLADES
A method for predicting the lifetime of gas turbine blades A82-16692
Damage of turbine blades due to interaction with fuel resinification products A82-18479
Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature A82-18484
Stability and flutter analysis of turbine blades at low speed N82-15050
On the numerical analysis of stall flutter in turbine cascades N82-15054
TURBINE ENGINES
Corrosion inhibiting engine oils [AD-A106127] N82-14099
Interactive-graphic flowpath plotting for turbine engines [NASA-TM-82756] N82-15041
TURBINE EXHAUST NOZZLES
Infrared emissions from turbofans with high aspect ratio nozzles A82-16092
TURBOCOMPRESSORS
Design procedures for compressor blades A82-17135
Water ingestion into jet engine axial compressors [AIAA PAPER 82-0196] A82-17836
Four pad tilting pad bearing design and application for multistage axial compressors [ASME PAPER 81-LUB-12] A82-18429
The use of optimization techniques to design controlled diffusion compressor blading [NASA-TM-82763] N82-14094
Optimization of compressor vane and bleed settings [AD-A106059] N82-14097
Computer program for aerodynamic and blading design of multistage axial-flow compressors [NASA-TP-1946] N82-15039
Practical experience with a noncontact blade vibration measuring system in industrial turbocompressors --- vibration mode identification N82-15065
TURBOFAN AIRCRAFT
Optimum configuration for a 10 passenger business turbofan jet airplane [AIAA PAPER 82-0365] A82-17905
Boeing 757 - Introducing the big-fan narrowbody A82-18349
TURBOFAN ENGINES
Infrared emissions from turbofans with high aspect ratio nozzles A82-16092
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight [AIAA PAPER 82-0124] A82-17796
2037 - Pratt & Whitney tests new turbofan A82-18347
TURBOFANS
Stability analysis of the twin mode model of coupled flexion/torsion vibrations in turbofans N82-15057
Aerodynamic considerations in the prediction of unstalled supersonic flutter in transonic fans N82-15058
TURBOMACHINE BLADES
Aerodynamic response of a blade in pitching oscillation with partial and full separation --- measurement of the instantaneous pressure distribution around a vibrating blade surface in a wind tunnel N82-15047
Damping for turbomachine blade variations in subsonic flow N82-15048
Self excited flow oscillation in the low pressure steam turbine cascade N82-15049
Numerical experiments on unsteady flows through vibrating cascades N82-15052
Computer aided investigation of turbomachine aerodynamics and aeroelasticity N82-15053
A method for force determination from vibration response measurements --- application to turbomachine blades N82-15055
Effect of mean blade loading on supersonic cascade flutter N82-15059
Calculation of nonstationary force ratios on blades of a rotating row in incompressible flow N82-15061
The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade N82-15063
TURBOMACHINERY
Technical evaluation report on the Aeroelasticity in Turbomachines Symposium N82-15070
TURBOPROP AIRCRAFT
Turboprop resurgence - The next step A82-17149
Lear Fan - The plastic aeroplane arrives A82-18348
TURBULENCE EFFECTS
The influence of turbulence models on computer-simulated aircraft landing [AIAA PAPER 82-0342] A82-17896
Comparison of experimental and theoretical turbulence reduction characteristics for screens, honeycomb, and honeycomb-screen combinations [NASA-TP-1958] N82-14055
TURBULENT BOUNDARY LAYER
The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities A82-18591
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results A82-18776
TURBULENT FLOW
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics [AD-A106061] N82-14316
TURBULENT JETS
Screech suppression in supersonic jets [AIAA PAPER 82-0050] A82-17753
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model [AIAA PAPER 82-0113] A82-17791
TURBULENT WAKES
Instantaneous turbulence profiles in the wake of an oscillating airfoil [AIAA PAPER 82-0353] A82-17901

TWO DIMENSIONAL BODIES
Low Reynolds number airfoil survey, volume 1
[NASA-CR-165803-VOL-1] N82-14059
TWO DIMENSIONAL FLOW
ADEN plume flow properties for infrared analysis --- Augmented Deflecting Exhaust Nozzle
A82-17606
A contribution to the hodograph method for shock-free transonic airfoil sections
A82-18022

U

UNSTEADY FLOW
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/
A82-16040
Unsteady flow patterns associated with spoiler control devices
[AIAA PAPER 82-0127] A82-17798
Bifurcation analysis of nonlinear stability of aircraft at high angles of attack
[AIAA PAPER 82-0244] A82-17862
Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave
A82-18590
Self excited flow oscillation in the low pressure steam turbine cascade
N82-15049
Numerical experiments on unsteady flows through vibrating cascades
N82-15052
USER REQUIREMENTS
Ruggedized minicomputer hardware and software topics, 1981: Proceedings of the 4th ROLM MIL-SPEC Computer User's Group Conference
[NASA-CP-2206] N82-14829
Development of Integrated Programs for Aerospace-Vehicle Design (IPAD) - IPAD user requirements
[NASA-CR-2985] N82-15034

V

V/STOL AIRCRAFT
Experience with high performance V/STOL fighter projects at MBB
[AIAA PAPER 81-2614] A82-16901
A summary of V/STOL inlet analysis methods
[AIAA PAPER 81-2628] A82-16902
Development and validation of the V/STOL aerodynamics and stability and control manual
[AIAA PAPER 81-2611] A82-16903
Ground test of a large scale 'D' vented thrust deflecting nozzle
[AIAA PAPER 81-2630] A82-16907
NASA V/STOL Propulsion Control Analysis - Phase I and II program status
[AIAA PAPER 81-2632] A82-16908
V/STOL propulsion control technology
[AIAA PAPER 81-2634] A82-16909
V/STOL status from the engine technology viewpoint
[AIAA PAPER 81-2648] A82-16913
A low cost maritime control aircraft-ship-weapons system --- antiship missile defense
[AIAA PAPER 81-2660] A82-16916
Type 'A' V/STOL - One aircraft for all support missions
[AIAA PAPER 81-2661] A82-16917
Introduction to V/STOL airplanes --- Book
A82-18117
VANES
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090
VARIABLE GEOMETRY STRUCTURES
Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating
A82-18588
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
VARIABLE SWEEP WINGS
Pressure distribution on an ogee wing in supersonic flow
[AIAA PAPER 82-0414] A82-17934
VATOL AIRCRAFT
Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft
[AIAA PAPER 81-2636] A82-16910
VELOCITY DISTRIBUTION
Design procedures for compressor blades
A82-17135
Instantaneous turbulence profiles in the wake of an oscillating airfoil
[AIAA PAPER 82-0353] A82-17901
Responses of oscillating wings in weak shear flow
A82-18021
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
A82-18776
VERTICAL AIR CURRENTS
The Joint Airport Weather Studies project --- investigation of convective microbursts
[AIAA PAPER 82-0017] A82-17734
An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil
[AIAA PAPER 82-0214] A82-17843
VERTICAL TAKEOFF AIRCRAFT
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904
Greenlandair VTOL transportation study
[AIAA PAPER 81-2642] A82-16912
VHF OMNIRANGE NAVIGATION
VOR waveform synthesis and calibration
A82-16563
Solid-state VORTAC with remote maintenance and monitoring
A82-18144
Navigation system integrity and reliability for civil aviation
A82-18159
VIBRATION DAMPING
Mechanism for the elimination of instability in a shimmy problem
A82-16289
Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis
A82-16290
Flutter mode suppression using hyperstable feedback
[AIAA PAPER 82-0368] A82-17908
Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature
A82-18484
Stochastic control and identification of helicopter dynamic modes
[NASA-CR-165057] N82-15032
Damping for turbomachine blade variations in subsonic flow
N82-15048
VIBRATION EFFECTS
The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade
N82-15063
VIBRATION MEASUREMENT
A method for force determination from vibration response measurements --- application to turbomachine blades
N82-15055
Practical experience with a noncontact blade vibration measuring system in industrial turbocompressors --- vibration mode identification
N82-15065
Technical evaluation report on the Aeroelasticity in Turbomachines Symposium
N82-15070
VIBRATION MODE
Resonant whirling of aircraft propeller-engine systems
A82-16417
Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures
A82-18612
Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/
A82-18620

Stability analysis of the twin mode model of coupled flexion/torsion vibrations in turbofans
N82-15057
Practical experience with a noncontact blade vibration measuring system in industrial turbocompressors --- vibration mode identification
N82-15065
VIBRATIONAL SPECTRA
Control of vibration in aeroelastic cascade experiments
N82-15056
VISCOSITY
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel
[NASA-TM-83220] N82-15359
VISCOUS FLOW
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735
Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis
[AIAA PAPER 82-0163] A82-17816
Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies
[AIAA PAPER 82-0252] A82-17865
Viscous flow - Nemesis of the theoretician in pursuit of higher order accuracy
[AIAA PAPER 82-0389] A82-17919
VISIBILITY
The optical recognition of sea targets as a function of surrounding and observation parameters in air to water observations
[BMVG-FBWT-81-10] N82-15930
VOICE COMMUNICATION
NASA aviation safety reporting system
[NASA-TM-81274] N82-15025
VOLTAGE CONVERTERS (DC TO DC)
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447
VOLTAGE REGULATORS
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447
VORTEX BREAKDOWN
Vortex lift augmentation by suction on a 60 deg swept Gothic wing
[AIAA PAPER 82-0231] A82-17856
A theoretical investigation of wing rocking
[NASA-CR-165058] N82-15031
VORTEX FLAPS
Trailing edge flap influence on leading edge vortex flap aerodynamics
[AIAA PAPER 82-0128] A82-17799
VORTEX RINGS
Scattering of sound by a vortex ring
A82-16148
VORTICES
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/
A82-16040
Propeller tip vortex - A possible contributor to aircraft cabin noise
A82-17603
Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds
N82-14061
Linear and nonlinear analysis of vortex whistle: Another blade buster
N82-15067
VORTICITY EQUATIONS
Concerning the calculation of the aerodynamic characteristics of mechanized wings
A82-18589

W

WALL FLOW
Optimal subsonic diffuser wall design for arbitrary entry conditions
[AIAA PAPER 82-0132] A82-17800
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0234] A82-17858
WARFARE
Type 'A' V/STOL - One aircraft for all support missions
[AIAA PAPER 81-2661] A82-16917
WARNING SYSTEMS
Detection of obstacles by low flying aircraft --- using CO2 laser; mathematical model
[FOA-C-30227-E1] N82-15026
WAVEFORMS
VOR waveform synthesis and calibration
A82-16563
Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data
[NASA-CR-156882] N82-15498
WEAPON SYSTEMS
Grumman Tomcat - In a class of its own
A82-16800
A low cost maritime control aircraft-ship-weapons system --- antiship missile defense
[AIAA PAPER 81-2660] A82-16916
WEAPONS DELIVERY
A high strength ejector release unit for the Tornado
A82-16025
Recent improvements in prediction techniques for supersonic weapon separation
[AIAA PAPER 82-0170] A82-17820
WEAPONS DEVELOPMENT
Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg
[AIAA PAPER 82-0250] A82-17864
WEATHER FORECASTING
The NASA MERIT program - Developing new concepts for accurate flight planning
[AIAA PAPER 82-0340] A82-17894
WEDGE FLOW
Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave
A82-18590
WEIGHT INDICATORS
Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany
[BMFT-FB-W-81-022] N82-15083
WEST GERMANY
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 4 August 1978
[DFVLR-MITT-81-12] N82-15029
WHEELS
Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis
A82-16290
WHISTLERS
Linear and nonlinear analysis of vortex whistle: Another blade buster
N82-15067
WIND EFFECTS
Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component
[AIAA PAPER 82-0341] A82-17895
WIND SHEAR
An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil
[AIAA PAPER 82-0214] A82-17843
Simulation of phugoid excitation due to hazardous wind shear
[AIAA PAPER 82-0215] A82-17844
An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays
[AIAA PAPER 82-0367] A82-17907
WIND TUNNEL APPARATUS
The design of a jet catcher --- for wind tunnels
[RAE-TM-AERO-1891] N82-14102
Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany
[BMFT-FB-W-81-022] N82-15083
WIND TUNNEL NOZZLES
The German-Dutch wind tunnel as aeroacoustic experimental installation
A82-17136

Research on an induction driven cryogenic wind tunnel N82-14394

WIND TUNNEL TESTS

Grumman Tomcat - In a class of its own A82-16800

Advanced technology airfoil development for the XV-15 tilt-rotor vehicle [AIAA PAPER 81-2623] A82-16906

The German-Dutch wind tunnel as aeroacoustic experimental installation A82-17136

Effect on surface pressures of trapezoidal holes in a T-38 stabilator A82-17602

Propeller tip vortex - A possible contributor to aircraft cabin noise A82-17603

Wind tunnel investigations for the flat spin of slender bodies at high angles of attack [AIAA PAPER 82-0054] A82-17755

Trailing edge flap influence on leading edge vortex flap aerodynamics [AIAA PAPER 82-0128] A82-17799

An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil [AIAA PAPER 82-0214] A82-17843

Vortex lift augmentation by suction on a 60 deg swept Gothic wing [AIAA PAPER 82-0231] A82-17856

Wind tunnel tests of engine-equipped models: Comparison of two jet wash simulation methods [NASA-TM-76764] N82-14091

Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel [NASA-TM-83220] N82-15359

WIND TUNNEL WALLS

Three-dimensional flow studies on a slotted transonic wind tunnel wall [AIAA PAPER 82-0230] A82-17855

WIND TUNNELS

La Recherche Aerospatiale, Bi-monthly Bulletin No. 1981-2, March - April 1981 --- aerodynamic research [ESA-TT-713] N82-14388

WING LOADING

Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating A82-18588

Development of an efficient procedure for calculating the aerodynamic effects of planform variation [NASA-CR-3489] N82-14529

Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests [NASA-CR-159097] N82-15076

WING OSCILLATIONS

A method for locating aircraft wing damage by nonlinear vibration analysis A82-17116

Instantaneous turbulence profiles in the wake of an oscillating airfoil [AIAA PAPER 82-0353] A82-17901

Responses of oscillating wings in weak shear flow A82-18021

Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/ A82-18620

Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds N82-14061

A theoretical investigation of wing rocking [NASA-CR-165058] N82-15031

WING PANELS

Multilevel optimum design of structures with fiber-composite stiffened-panel components [AIAA PAPER 80-0723] A82-17594

Development of an efficient procedure for calculating the aerodynamic effects of planform variation [NASA-CR-3489] N82-14529

WING PLANFORMS

Development of an efficient procedure for calculating the aerodynamic effects of planform variation [NASA-CR-3489] N82-14529

WING PROFILES

Determination of the trimmed drag of an aircraft A82-18583

WING SLOTS

Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil [AIAA PAPER 82-0021] A82-17735

WING SPAN

Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests [NASA-CR-159097] N82-15076

WING TIP VORTICES

Vortex lift augmentation by suction on a 60 deg swept Gothic wing [AIAA PAPER 82-0231] A82-17856

WING TIPS

Optimization and performance calculation of dual-rotation propellers [NASA-TP-1948] N82-14049

WIRE

Techniques for overhead-wire detection --- to prevent helicopter wirestrikes A82-16560

WORKLOADS (PSYCHOPHYSIOLOGY)

Electronic master monitor and advisory display system, operational fuctions report [AD-A105516] N82-14087

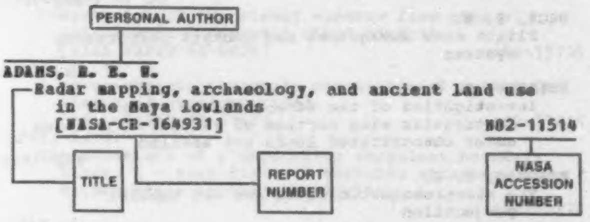
X

XV-15 AIRCRAFT

Advanced technology airfoil development for the XV-15 tilt-rotor vehicle [AIAA PAPER 81-2623] A82-16906

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ABLA, M. M.
Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data
[AIAA PAPER 82-0183] A82-17827

ABRAMS, L. E.
Results of a Differential Omega experiment
A82-18094

ADACHI, T.
On the numerical analysis of stall flutter in turbine cascades
N82-15054

ADAM, V.
Integration of a digital air data computer into the test aircraft HFB-320
[DFVLR-MITT-81-09] N82-15038

ADELT, W. H.
Type 'A' V/STOL - One aircraft for all support missions
[AIAA PAPER 81-2661] A82-16917

AGARWAL, R. K.
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904

AKAI, T. J.
Stability and flutter analysis of turbine bladqs at low speed
N82-15050

ANDERTON, G. L.
Development of Integrated Programs for Aerospace-Vehicle Design (IPAD) - IPAD user requirements
[NASA-CR-2985] N82-15034

ANDREWS, A. E.
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735

ANNO, J. N.
Estimate of human control over mid-air collisions
A82-17604

ANNUSHKIN, IU. M.
An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet
A82-16267

ARAI, I.
Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
[AIAA PAPER 82-0054] A82-17755

ARAKI, T.
Self excited flow oscillation in the low pressure steam turbine cascade
N82-15049

ARONSON, M.
Optimum configuration for a 10 passenger business turbofan jet airplane
[AIAA PAPER 82-0365] A82-17905

ASK, H. R.
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072

ATASSI, H.
Stability and flutter analysis of turbine blades at low speed
N82-15050

AULEHLA, F.
Experience with high performance V/STOL fighter projects at MBB
[AIAA PAPER 81-2614] A82-16901

AYOUB, A.
Unsteady flow patterns associated with spoiler control devices
[AIAA PAPER 82-0127] A82-17798

B

BABER, B. B.
Inclusions and service induced cracks in a mature population of gas turbine engine bearings
[ASME PAPER 81-LUB-48] A82-18444

BALALAYEV, V. A.
Damping for turbomachine blade variations in subsonic flow
N82-15048

BAR-SHALOM, Y.
Stochastic control and identification of helicopter dynamic modes
[NASA-CR-165057] N82-15032

BARE, E. A.
Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles
[AIAA PAPER 81-2639] A82-16911

BARINOV, V. A.
Determination of the trimmed drag of an aircraft
A82-18583

BARTON, C. K.
Development of a transmission loss test facility for light aircraft structures
A82-18728

BARTON, J. R.
Inclusions and service induced cracks in a mature population of gas turbine engine bearings
[ASME PAPER 81-LUB-48] A82-18444

BASHFORD, D. P.
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
A82-17531

BAUMBICK, R. J.
Role of optical computers in aeronautical control applications
N82-15097

BEARD, S. G.
The electromagnetic theta gun and tubular projectiles
A82-18182

BEATTIE, J. A. C.
A true air speed sensor for miniature unmanned aircraft
[RAE-TM-SPACE-287] N82-14086

BECLE, J. P.
Wind tunnel tests of engine-equipped models: Comparison of two jet wash simulation methods
[NASA-TM-76764] N82-14091

BELOTSERKOVSKII, S. M.
Computer aided investigation of turbomachine aerodynamics and aeroelasticity
N82-15053

BENDIXEN, G. E.
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147

BERWICK, K. E.
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072

BEZDEK, W. J.
Digital test pilot concept
[AIAA PAPER 82-0259] A82-17867

BHAT, M. K.
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855

BINN, B. A.
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics
[AD-A106061] N82-14316

BLANCHARD, A.
Research on an induction driven cryogenic wind tunnel
N82-14394

BOGDANOV, V. A.
Status of the COSPAS-SARSAT project and its possible operation in conjunction with INMARSAT system
A82-18170

BORGER, J. G.
The well tempered transport aircraft engine /The Sir Henry Royce Memorial Lecture/
A82-16145

BOSSA, F.
'Integral Noise': An automatic calculation model for the prediction and control of fixed-wing aircraft noise. I - General considerations, theoretical bases and model analysis
A82-18274

BOTTING, L.
A high strength ejector release unit for the Tornado
A82-16025

BOUDREAUX, W. L.
Optimization of compressor vane and bleed settings
[AD-A106059] N82-14097

BOWER, W. W.
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904

BRADLEY, J.
Navigation system integrity and reliability for civil aviation
A82-18159

BRADLEY, J. W.
Selecting the post 1990 civil aviation radionavigation system
A82-18141

BRAFF, R.
Navigation system integrity and reliability for civil aviation
A82-18159

BRAYBROOK, R. M.
Grumman Tomcat - In a class of its own
A82-16800

BREIL, J. F.
Research on an induction driven cryogenic wind tunnel
N82-14394

BRENNEN, C.
Cavitation inception in spool valves
A82-16428

BRIENS, G.
Aeronautical applications of bonding
[SNIAS-812-551-102] N82-15010

BROWN, G. C.
Corrosion inhibiting engine oils
[AD-A106127] N82-14099

BROWN, H.
V/STOL propulsion control technology
[AIAA PAPER 81-2634] A82-16909

BROWN, W. H.
J58/SR-71 propulsion integration or the great adventure into the technical unknown
A82-17418

BRUCE, T. W.
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
EPBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096

BRYANT, W. H.
Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research
N82-14842

BUCK, R. N.
Flight crew management and cockpit performance systems
A82-17285

BULATOV, S. N.
Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating
A82-18588

BURGESS, T. J.
The electromagnetic theta gun and tubular projectiles
A82-18182

BURNAT, M.
Supersonic nozzles without shocks
A82-16172

BUSNAINA, A. A.
A simple finite difference procedure for the vortex controlled diffuser
[AIAA PAPER 82-0109] A82-17788

BUSTAMANTE, H. A.
A GPS receiver design for general aviation navigation
A82-18132

BYRDSONG, T. A.
Longitudinal and lateral static stability and control characteristics of a 1/6-scale model of a remotely piloted research vehicle with a supercritical wing
[NASA-TP-1360] N82-15075

C

CAFARELLI, N. J.
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008

CALDWELL, K. S., JR.
Experimental structural testing on a composite aircraft canard and its applications
[AIAA PAPER 82-0409] A82-17930

CAMP, D. W.
The influence of turbulence models on computer-simulated aircraft landing
[AIAA PAPER 82-0342] A82-17896

CAPONE, F. J.
Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles
[AIAA PAPER 81-2639] A82-16911

CARMICHAEL, B. H.
Low Reynolds number airfoil survey, volume 1
[NASA-CR-165803-VOL-1] N82-14059

CARTER, R. A.
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447

CASTLE, D. B.
In-service testing of the Precision Approach Path Indicator (PAPI) at Newark International Airport, New Jersey
[DOT/FAA/RD-81/95] N82-14076

CENKO, A.
Recent improvements in prediction techniques for supersonic weapon separation
[AIAA PAPER 82-0170] A82-17820

CHADWICK, J. B.
JTIDS RELNAV network off-line simulation
A82-18153

CHALK, C. R.
In-flight investigation of the effects of pilot location and control system design on airplane flying qualities for approach and landing
[NASA-CR-163115] N82-15074

CHANDLER, C. L.
Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component
[AIAA PAPER 82-0341] A82-17895

CHANDRASEKHARAN, R. M.
Effect on surface pressures of trapezoidal holes in a T-38 stabilator
A82-17602

CHANG, R.
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447

CHAUSSEE, D. S.
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735

CHEN, L. T.
A more-accurate transonic computational method for wing-body configurations
[AIAA PAPER 82-0162] A82-17815

CHEW, Y.-T.
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
A82-18776

CHIN, L.
Post-flight assessment of the JTIDS Rel Nav
A82-18154
A stable decentralized filtering implementation for JTIDS RelNav
A82-18156

CHIN, W. C.
Direct approach to aerodynamic design problems
A82-16404

CHISHOLM, D. A.
The Modular Automated Weather System (MAWS) concept
N82-14763

CHRISTIANSEN, R. S.
Ground test of a large scale 'D' vented thrust deflecting nozzle
[AIAA PAPER 81-2630] A82-16907

CHRUSCIEL, G. T.
3 DOF gyro analysis from measured and derived rates
[AIAA PAPER 82-0189] A82-17831

CHU, C.-W.
ADEN plume flow properties for infrared analysis
A82-17606

CHYU, W. J.
Computations of transonic flow over an oscillating airfoil with shock-induced separation
[AIAA PAPER 82-0350] A82-17900

CLARKE, R. W.
VOR waveform synthesis and calibration
A82-16563

CLEMENS, A.
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424

CLIFFORD, D. R.
Productivity and safety
A82-17284

CNARE, E. C.
The electromagnetic theta gun and tubular projectiles
A82-18182

COLLINS, F. G.
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855

CONDIT, P. M.
Design evolution of the Boeing 757
A82-18322

CONNELLY, J.
Study of fiber optics to enhance an environmental lighting laboratory
[AD-A106117] N82-14104

CONNOR, W. K.
Noise monitoring in airport communities
A82-18731

CONTI, D. A.
Special problems associated with aircraft radomes
A82-16558

COOK, R.
Coordinate transformation in PLRS
A82-18158

CORBAN, R. R.
Interactive-graphic flowpath plotting for turbine engines
[NASA-TM-82756] N82-15041

COSNER, R. R.
Relaxation solution for viscous transonic flow about fighter-type forebodies and afterbodies
[AIAA PAPER 82-0252] A82-17865

COWAN, M.
The electromagnetic theta gun and tubular projectiles
A82-18182

COX, R. M.
MLS - A new generation landing guidance system is here
A82-18145

CRANDALL, S. H.
Resonant whirling of aircraft propeller-engine systems
A82-16417

CRESPODASILVA, M. R. M.
Flap-lag-torsional dynamics or extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-165078] N82-15013

CRIST, D.
Helicopter landing gear design and test criteria investigation
[AD-A105512] N82-15035

CRONE, G. A. E.
Design and performance of airborne radomes - A review
A82-16564

CRONIN, M. J.
The all-electric airplane - A new trend
A82-17420

CROUSE, J. E.
Computer program for aerodynamic and blading design of multistage axial-flow compressors
[NASA-TP-1946] N82-15039

CULIE, J.-P.
A method for predicting the lifetime of gas turbine blades
A82-16692

CUNNINGHAM, J. E.
Investigation of functional commonality of avionics systems in naval aircraft
[AD-A105503] N82-14080

D

DACQUINO, D. J.
Highlights of a design concept for a close ground support fighter
[AIAA PAPER 82-0411] A82-17932

DASTIN, S. J.
Aircraft composite materials and structures
A82-16143

DAVIDSON, R. E.
Optimization and performance calculation of dual-rotation propellers
[NASA-TP-1948] N82-14049

DAVIES, G. E.
Fluidics in aircraft engine controls
A82-18691

DAVIS, F. G.
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096

DAVIS, R. A.
Fuel conservation now
A82-17281

DE JONCKHEERE, R.
Subsonic flow over airborne optical turrets
A82-17605

DE RUYCK, J.
Instantaneous turbulence profiles in the wake of an oscillating airfoil
[AIAA PAPER 82-0353] A82-17901

DEAN, R. G.
Real time simulation of computer-assisted sequencing of terminal area operations
[NASA-CR-166195] N82-14817

DECHER, R.
Infrared emissions from turbofans with high aspect ratio nozzles
A82-16092

DELAHAYE, B.
System for acquisition and analysis of dynamic tests on air intakes
[NASA-TM-76646] N82-14056
DELOACH, R.
Quantification of airport community noise impact in terms of noise levels, population density, and human subjective response
A82-18732
DEMKO, P. S.
Helicopter decelerated steep approach and landing to confined areas under instrument meteorological conditions
A82-18161
DER, J., JR.
ADEN plume flow properties for infrared analysis
A82-17606
DEVAN, L.
Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg
[AIAA PAPER 82-0250] A82-17864
DIBLEY, E.
Energy savings with today's technology
A82-17282
DIEDRICH, J. H.
A summary of V/STOL inlet analysis methods
[AIAA PAPER 81-2628] A82-16902
DITTMAR, J. H.
Propeller tip vortex - A possible contributor to aircraft cabin noise
A82-17603
DOMBROWSKY, R.
Integration of a digital air data computer into the test aircraft HFB-320
[DFVLR-MITT-81-09] N82-15038
DOPPING-HEPENSTAL, L. L.
Head-up displays - The integrity of flight information
A82-16562
DOR, J. B.
Research on an induction driven cryogenic wind tunnel
N82-14394
DUFF, B. M.
Helicopter model studies for on-board electrostatic sensors
[AD-A105511] N82-14089
DUGAN, D. C.
Helical helicopter approaches with microwave landing system guidance
[AIAA PAPER 81-2654] A82-16914
DUGUNDJI, J.
Resonant whirling of aircraft propeller-engine systems
A82-16417
DUNAYEV, A. V.
Damping for turbomachine blade variations in subsonic flow
N82-15048
DUNN, R.
Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems
A82-18151
A natural parameter-controller specification procedure for an integrated radio/dead reckoner navigation system
A82-18155

E

EAST, L. F.
The design of a jet catcher
[RAE-TM-AERO-1891] N82-14102
EASTBURN, M.
Why safety
A82-17277
EBNER, R. E.
Laboratory and flight test of a new RLG strapdown INS
A82-18150
EJODOROV, R. M.
Computer aided investigation of turbomachine aerodynamics and aeroelasticity
N82-15053
ELKINS, A. W.
The influence of aeronautical R&D expenditures upon the productivity of air transportation
[PB81-247140] N82-15984
ELROD, B. D.
A GPS receiver design for general aviation navigation
A82-18132
EMMONS, C. J.
Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component
[AIAA PAPER 82-0341] A82-17895
ENIUTIN, G. V.
A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
A82-18596
ERICSSON, L. E.
Viscous flow - Nemesis of the theoretician in pursuit of higher order accuracy
[AIAA PAPER 82-0389] A82-17919
EWINS, D. J.
A method for force determination from vibration response measurements
N82-15055

F

FEWTRELL, H. E.
Consideration of mechanical, physical, and chemical properties in bearing selection for landing gear of large transport aircraft
[ASLE PREPRINT 81-LC-2B-3] A82-18412
FINCKE, W. H.
Maneuver dependent component error models and synchronized reset filters for inertial navigation systems
A82-18139
FISCHER, A.
Some aerodynamic aspects of hang gliding
A82-17124
FLUK, H.
A low cost maritime control aircraft-ship-weapons system
[AIAA PAPER 81-2660] A82-16916
FOERSHING, H.
Technical evaluation report on the Aeroelasticity in Turbomachines Symposium
N82-15070
FORD, R. A. J.
Stability analysis of the twin mode model of coupled flexion/torsion vibrations in turbofans
N82-15057
FOSCO, B.
Control of vibration in aeroelastic cascade experiments
N82-15056
FOSTER, J. D.
Helical helicopter approaches with microwave landing system guidance
[AIAA PAPER 81-2654] A82-16914
FRABS, W. C. W.
Air traffic management for fuel economy
A82-17279
FRANCOIS, J.
Effects of aircraft noise on the equilibrium of airport residents: Supplementary analyses to the study carried out around Orly
[NASA-TM-76627] N82-14673
Taking into account nighttime annoyance in the calculation of the psophic index
[NASA-TM-76580] N82-14674
FRENCH, N. J.
3 DOF gyro analysis from measured and derived rates
[AIAA PAPER 82-0189] A82-17831
FREUND, D. J.
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008
FRITSCH, J. M.
Mesoscale convective weather systems and aviation operations
[AIAA PAPER 82-0015] A82-17733
FROST, W.
Simulation of phugoid excitation due to hazardous wind shear
[AIAA PAPER 82-0215] A82-17844
The influence of turbulence models on computer-simulated aircraft landing
[AIAA PAPER 82-0342] A82-17896

FUJIMOTO, I.
Aerodynamic response of a blade in pitching oscillation with partial and full seperation
N82-15047

FUJITA, T. T.
The Joint Airport Weather Studies project
[AIAA PAPER 82-0017] A82-17734

G

GAINES, M.
F101DFE in Tomcat - Preliminary test results
A82-18346

GALLAGHER, J. A.
The effect of non-linear propagation in jet noise
[AIAA PAPER 82-0416] A82-17936

GALLOWAY, R. T.
Digital test pilot concept
[AIAA PAPER 82-0259] A82-17867

GARBEROGLIO, J. E.
Optimization of compressor vane and bleed settings
[AD-A106059] N82-14097

GELLER, E. W.
Development of an efficient procedure for calculating the aerodynamic effects of planform variation
[NASA-CR-3489] N82-14529

GEORGE, A. R.
Aerodynamic effects of shape, camber, pitch, and ground proximity on idealized ground-vehicle bodies
A82-16432

GERNER, A. A.
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows
[AIAA PAPER 82-0410] A82-17931

GERSHKOFF, I.
The use of flight management computers in air carrier operations in the 1980s
[AD-A105621] N82-14071

GILBERT, G. A.
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008

GLUCH, D. P.
The residue-measure criterion for model reduction in the analysis of the NASA Space Shuttle's digital flight control system
[AIAA PAPER 82-0369] A82-17909

GORRELL, W. T.
Computer program for aerodynamic and blading design of multistage axial-flow compressors
[NASA-TP-1946] N82-15039

GRAHAM, J. M. R.
The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade
N82-15063

GRANTZ, A. C.
Trailing edge flap influence on leading edge vortex flap aerodynamics
[AIAA PAPER 82-0128] A82-17799

GRAU, R. W.
C-5A operational utility evaluation soil tests and analysis
[AD-A105555] N82-14083

GREEN, A. K.
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
A82-17531

GREENBERG, M. S.
Post-flight assessment of the JTIDS Rel Nav
A82-18154

GREENE, W.
Development and operating characteristics of an advanced two-stage combustor
[AIAA PAPER 82-0191] A82-17833

GREMLI, C.
Practical experience with a noncontact blade vibration measuring system in industrial turbocompressors
N82-15065

GRIAZNOV, B. A.
Damage of turbine blades due to interaction with fuel resinification products
A82-18479

GUALDI, R.
'Integral Noise': An automatic calculation model for the prediction and control of fixed-wing aircraft noise. I - General considerations, theoretical bases and model analysis
A82-18274

GUEMOES, M. B.
Practical experience with a noncontact blade vibration measuring system in industrial turbocompressors
N82-15065

GUICHETEAU, P.
The application of bifurcation theory to the study of loss of control over combat aircraft
[ONERA, TP NO. 1981-100] A82-18837

H

HAFER, X.
Flight mechanics - Modern aircraft design and control concepts
A82-17951

HAIDT, J. G.
Automated Pilot Advisory System
[NASA-TM-73296] N82-15027

HAINES, A. L.
Requirements for independent and dependent parallel instrument approaches at reduced runway spacing
[AD-A105673] N82-14080

HALLISSY, J. B.
Longitudinal and lateral static stability and control characteristics of a 1/6-scale model of a remotely piloted research vehicle with a supercritical wing
[NASA-TP-1360] N82-15075

HALLIWELL, D. G.
Aerodynamic considerations in the prediction of unstalled supersonic flutter in transonic fans
N82-15058

HANDSCHUH, R. F.
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090

HANSON, R. L.
Performance considerations in the design of subsonic cruise missiles
[AIAA PAPER 82-0371] A82-17911

HAREL, H.
Stress intensity factor measurements in composite sandwich structures
A82-17535

HARGRAVES, C. R.
Numerical computation of optimal atmospheric trajectories involving staged vehicles
[AIAA PAPER 82-0360] A82-17902

HARLOW, R. A.
Flight measurements of Area Navigation System performance using various combinations of ground aids and airborne sensors
A82-18107

HART, F. D.
Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981
A82-18726

HAWKINS, W. M.
Liquid hydrogen - An outstanding alternate fuel for transport aircraft
A82-17290

HAWKS, B. J.
Take-off ground roll of propeller driven aircraft
A82-17607

HAYES, P. C., JR.
Determination of selected distillate blending solvents in simple and complex aircraft fuel matrices via glass capillary gas chromatography
[AD-A105588] N82-14312
Determination of pyridine in modified JP-4 via High Performance Liquid Chromatography (HPLC)
[AD-A105589] N82-14313

HELLER, H.
Current investigations regarding noise research in the Braunschweig Center of the German Institute for Research and Experimentation in Aeronautics and Astronautics
A82-17137

HENDERSON, C.
Development and validation of the V/STOL aerodynamics and stability and control manual
[AIAA PAPER 81-2611] A82-16903

HENDERSON, M. L.
High lift selected concepts
[NASA-CR-159093] N82-15017

HENG, R. B. W.
Noise control measures in the new Singapore International Airport
A82-16746

HERAVI, M.
Optimal subsonic diffuser wall design for arbitrary entry conditions
[AIAA PAPER 82-0132] A82-17800

HEURTLEY, J. C.
Selecting the post 1990 civil aviation radionavigation system
A82-18141

HILAIRE, G.
Advantages and limitations in the use of diverse materials for aircraft construction
[SNIAS-811-551-104] N82-15011

HILL, G. C.
Piloted simulation of hover and transition of a vertical attitude takeoff and landing aircraft
[AIAA PAPER 81-2636] A82-16910

HILLARY, B.
A method for force determination from vibration response measurements
N82-15055

HILLER, W. J.
Experimental investigation of a transonic potential flow around a symmetric airfoil
[NASA-TM-76676] N82-14057

HINCHEY, M.
Kelvin-Helmholtz stability analysis of air cushion landing gear trunk flutter
A82-17608

HINTON, D. A.
A general aviation simulator evaluation of a rate-enhanced instrument landing system display
[NASA-TP-1960] N82-14085

HIRSCH, C.
Instantaneous turbulence profiles in the wake of an oscillating airfoil
[AIAA PAPER 82-0353] A82-17901

HODGKINS, R. P.
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008

HOFF, G. E.
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator
[AIAA PAPER 82-0254] A82-17866

HOFFMANN, H. E.
The optical recognition of sea targets as a function of surrounding and observation parameters in air to water observations
[BMVG-FBWT-81-10] N82-15930

HONJO, H.
Study of acoustic resonance of cascades
N82-15068

HOOD, W. E.
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft
[AIAA PAPER 81-2656] A82-16915

HOROWITZ, S. J.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight
[AIAA PAPER 82-0124] A82-17796

HSU, C. H.
A theoretical investigation of wing rocking
[NASA-CR-165058] N82-15031

HUFFMAN, J. K.
Vortex lift augmentation by suction on a 60 deg swept Gothic wing
[AIAA PAPER 82-0231] A82-17856

HUGHES, G. V.
Accident prevention - A regulators view
A82-17278

HUI, W. H.
Bifurcation analysis of nonlinear stability of aircraft at high angles of attack
[AIAA PAPER 82-0244] A82-17862

HUNDLEY, W.
Solid-state VORTAC with remote maintenance and monitoring
A82-18144

HWANG, D. P.
A summary of V/STOL inlet analysis methods
[AIAA PAPER 81-2628] A82-16902

I

IERUSALIMSKII, K. M.
Calculation of the stability of crosswise-reinforced cylindrical shells
A82-18621

ISHII, S.
Aerodynamic response of a blade in pitching oscillation with partial and full separation
N82-15047

J

JACKSON, L. R.
Vortex lift augmentation by suction on a 60 deg swept Gothic wing
[AIAA PAPER 82-0231] A82-17856

JENNY, R.
Practical experience with a noncontact blade vibration measuring system in industrial turbocompressors
N82-15065

JERACKI, R. J.
Propeller tip vortex - A possible contributor to aircraft cabin noise
A82-17603

JETT, B. W.
The feasibility of turnback from a low altitude engine failure during the takeoff climb-out phase
[AIAA PAPER 82-0406] A82-17928

JOHNSON, C. B.
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0234] A82-17858

JOHNSON, C. L.
Development of the Lockheed SR-71 Blackbird
A82-17417

JOHNSTON, J. F.
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 1: Load alleviation/extended span development and flight tests
[NASA-CR-159097] N82-15076

K

KADOYA, Y.
On the numerical analysis of stall flutter in turbine cascades
N82-15054

KAHANE, R.
Modernizing the Egyptian A.T.C. system
A82-18273

KAJI, S.
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062

KAMBE, T.
Scattering of sound by a vortex ring
A82-16148

KAMINER, A. A.
Damping for turbomachine blade variations in subsonic flow
N82-15048

KARAMCHETI, K.
Unsteady flow patterns associated with spoiler control devices
[AIAA PAPER 82-0127] A82-17798

KARKALIK, F. G.
Results of a Differential Omega experiment
A82-18094

KASCAK, A. F.
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090

KERR, T. H.
A stable decentralized filtering implementation for JTIDS RelNav
A82-18156

KERR, W. B.
NASA V/STOL Propulsion Control Analysis - Phase I and II program status
[AIAA PAPER 81-2632] A82-16908

KIEHLE, S. H.
Performance considerations in the design of subsonic cruise missiles
[AIAA PAPER 82-0371] A82-17911

KINGSTON-LEE, D. M.
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
A82-17531

KIRK, R. G.
Four pad tilting pad bearing design and application for multistage axial compressors
[ASME PAPER 81-LUB-12] A82-18429

KISSEL, G. K.
Experience with high performance V/STOL fighter projects at MBB
[AIAA PAPER 81-2614] A82-16901

KIVETT, J. A.
PLRS engineering development testing - Early results
A82-18157

KLEIN, R. C.
Noise control plan for a new airplane manufacturing facility
A82-18730

KLEINMAN, A. J.
Maneuver dependent component error models and synchronized reset filters for inertial navigation systems
A82-18139

KNERR, T. J.
Airborne antenna pattern calculations
[NASA-CR-165059] N82-15277

KNODEL, E.
Advanced compressor components. Phase 1: 1978 to 1979
[BMFT-FB-W-81-025] N82-15073

KOBAYAKAWA, M.
Responses of oscillating wings in weak shear flow
A82-18021

KOHLMAN, D. L.
Introduction to V/STOL airplanes
A82-18117

KRAWETZ, A. A.
Determination of the flammability characteristics of aerospace hydraulic fluids
A82-16187

KRIEGER, R. J.
An aerodynamic and signature shaping technique for developing advanced supersonic missile concepts
[AIAA PAPER 82-0373] A82-17912

KRISCHNER, A.
Control of vibration in aeroelastic cascade experiments
N82-15056

KROSEL, S. M.
Application of integration algorithms in a parallel processing environment for the simulation of jet engines
[NASA-TM-82746] N82-14849

KUBOTA, H.
Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
[AIAA PAPER 82-0054] A82-17755

KUHN, T. E.
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096

KULESHOV, V. V.
Computer aided investigation of turbomachine aerodynamics and aeroelasticity
N82-15053

KULLAR, I.
The effect of aspect ratio on the unsteady aerodynamic forces induced by vibration of a cascade blade
N82-15063

KURN, A. G.
An afterbody drag balance
[RAE-TM-AERO-1897] N82-14103

KUROCHKA, P. N.
Investigation of the stress-strain state of a rectangular wing section of variable thickness under concentrated loads and heating
A82-18588

KURODA, H.
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/
A82-16040

KUROSAKA, M.
Linear and nonlinear analysis of vortex whistle: Another blade buster
N82-15067

KURZIN, V. B.
Calculation of quasi-stationary aerodynamic force acting on a cascade of oscillating airfoils in subsonic flow
N82-15051

KUSENBERGER, F. N.
Inclusions and service induced cracks in a mature population of gas turbine engine bearings
[ASME PAPER 81-LUB-48] A82-18444

KUTLER, P.
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735

KUWAHARA, K.
Computations of transonic flow over an oscillating airfoil with shock-induced separation
[AIAA PAPER 82-0350] A82-17900

KUZMINSKII, V. A.
The effect of the cooling of the wing surface on laminar-to-turbulent boundary layer transition at supersonic flow velocities
A82-18591

L

LADERMAN, A. J.
Subsonic flow over airborne optical turrets
A82-17605

LALLEMAND ABELLA, E.
The justification of the need for ILS by means of cost/benefit methods
A82-16973

LAN, C. E.
A theoretical investigation of wing rocking
[NASA-CR-165058] N82-15031

LANG, A.
Solid-state VORTAC with remote maintenance and monitoring
A82-18144

LARSON, E. S.
Symmetric flow characteristics of thin rectangular wings
A82-16093

LARUELLE, G.
System for acquisition and analysis of dynamic tests on air intakes
[NASA-TM-76646] N82-14056

LASINSKI, T. A.
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735

LATYPOV, A. F.
A mathematical model of a subsonic transport aircraft
A82-18575

LAWING, P. L.
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0234] A82-17858

LEACY, A. C.
AEW Nimrod - The Mission System Avionics
A82-16556

LEE, A.
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424

LEE, F. C.
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447

LEE, H. Q.
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868

LENZ, R. C.
The influence of aeronautical R&D expenditures upon the productivity of air transportation
[PB81-247140] N82-15984

LEONARD, J. T.
Generation of electrostatic charge in fuel handling systems: A literature survey
[AD-A106056] N82-14454

LETALICK, D.
Detection of obstacles by low flying aircraft
[FOA-C-30227-E1] N82-15026

LEUTHAEUSER, K. D.
Sensor footprints and homing range of terminal guidance munition
[BMVG-FBWT-81-5] N82-15111

LEWIS, G. M.
V/STOL status from the engine technology viewpoint
[AIAA PAPER 81-2648] A82-16913

LEWIS, W. J.
V/STOL status from the engine technology viewpoint
[AIAA PAPER 81-2648] A82-16913

LIEBERT, C. H.
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090

LILLEY, D. G.
A simple finite difference procedure for the vortex controlled diffuser
[AIAA PAPER 82-0109] A82-17788

LIN, D.-F.
Optimal trajectories in supersonic flight
[AIAA PAPER 82-0366] A82-17906

LING, Y. T.
Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714

LIVESEY, J. L.
Optimal subsonic diffuser wall design for arbitrary entry conditions
[AIAA PAPER 82-0132] A82-17800

LOBAS, L. G.
Mechanism for the elimination of instability in a shimmy problem
A82-16289
Self-oscillations of the front caster wheel strut for a given track width under the assumption of the wheel drift hypothesis
A82-16290

LOCKLEER, H. D.
Noise control plan for a new airplane manufacturing facility
A82-18730

LOEWENTHAL, S. H.
Effects of ultra-clean and centrifugal filtration on rolling-element bearing life
[ASME PAPER 81-LUB-35] A82-18436

LOY, A. F.
Trends in maintainability and reliability of avionics systems with particular reference to DCAD Technical Publication 1/77
A82-16561

LUDWIG, L. P.
Gas turbine ceramic-coated-vane concept with convection-cooled porous metal core
[NASA-TP-1942] N82-14090

LULL, J. H.
Coordinate transformation in PLRS
A82-18158

LYNCH, R. H.
The Modular Automated Weather System (MAWS) concept
N82-14763

LYTLE, C. D.
Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont
A82-18160

M

MACHNIC, J. A.
The influence of aeronautical R&D expenditures upon the productivity of air transportation
[PB81-247140] N82-15984

MACKENZIE, F. D.
Evaluation of Loran-C enroute navigation and non-precision approaches within the State of Vermont
A82-18160

MADDOX, R. A.
Mesoscale convective weather systems and aviation operations
[AIAA PAPER 82-0015] A82-17733

MAGENHEIM, B.
A Microwave Ice Accretion Measurement Instrument - MIAMI
[AIAA PAPER 82-0285] A82-17875

MAKOVETSKAIA, I. A.
Damage of turbine blades due to interaction with fuel resinification products
A82-18479

MALMUTH, N.
Computational treatment of transonic canard-wing interactions
[AIAA PAPER 82-0161] A82-17818

MANDERS, P. J.
ROLM computers in the flight testing of the Fokker F29 aircraft
N82-14839

MARCHMAN, J. F., III
Trailing edge flap influence on leading edge vortex flap aerodynamics
[AIAA PAPER 82-0128] A82-17799

MAROM, G.
Stress intensity factor measurements in composite sandwich structures
A82-17535

MARTEL, J. H.
NAVSTAR Global Positioning System
A82-17310

MARTIN, C. S.
Cavitation inception in spool valves
A82-16428

MARUSII, O. I.
Damage of turbine blades due to interaction with fuel resinification products
A82-18479

MASLOV, G. F.
An experimental study of the combustion of liquid hydrocarbon fuel sprayed into a diffusion hydrogen-air jet
A82-16267

MASON, L. A.
Aerodynamics of tactical weapons to Mach number 8 and angle-of-attack of 180 deg
[AIAA PAPER 82-0250] A82-17864

MASTER, M. J.
Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714

MATSUZAKA, R.
Wind tunnel investigations for the flat spin of slender bodies at high angles of attack
[AIAA PAPER 82-0054] A82-17755

MAURER, C. L.
Calibration of seven-hole probes suitable for high angles in subsonic compressible flows
[AIAA PAPER 82-0410] A82-17931

MAY, W. K.
The Federal Radionavigation Plan
A82-16178

MCCARTHY, J.
The Joint Airport Weather Studies project
[AIAA PAPER 82-0017] A82-17734
Simulation of phugoid excitation due to hazardous wind shear
[AIAA PAPER 82-0215] A82-17844

MCGEE, L. A.
Helical helicopter approaches with microwave landing system guidance
[AIAA PAPER 81-2654] A82-16914

MCMILLAN, J. D.
A global atlas of GEOS-3 significant waveheight data and comparison of the data with national buoy data
[NASA-CR-156882] N82-15498

MEDLARZ, H.
Cavitation inception in spool valves
A82-16428

MEEHAN, R. J.
Corrosion inhibiting engine oils
[AD-A106127] N82-14099

MEHRINFAR, M.
Multilevel optimum design of structures with fiber-composite stiffened-panel components
[AIAA PAPER 80-0723] A82-17594

MEIER, G. E. A.
Experimental investigation of a transonic potential flow around a symmetric airfoil
[NASA-TM-76676] N82-14057

MERCER, J. E.
Development of an efficient procedure for calculating the aerodynamic effects of planform variation
[NASA-CR-3489] N82-14529

MERZ, H.
Advanced compressor components. Phase 1: 1978 to 1979
[BMFT-FB-W-81-025] N82-15073

MEULENEERS, R. J.
XV-15 Tilt Rotor fly-by-wire collective control demonstrator development specifications
[NASA-CR-166262] N82-15030

MICHALKE, A.
Prediction of flyover jet noise spectra from static tests
[NASA-TM-83219] N82-14880

MICHEL, U.
Prediction of flyover jet noise spectra from static tests
[NASA-TM-83219] N82-14880

MIELKE, R. R.
Airborne antenna pattern calculations
[NASA-CR-165059] N82-15277

MIGNOSI, A.
Research on an induction driven cryogenic wind tunnel
N82-14394

MILLER, B. A.
Propeller tip vortex - A possible contributor to aircraft cabin noise
A82-17603

MILLER, R. J.
NASA V/STOL Propulsion Control Analysis - Phase I and II program status
[AIAA PAPER 81-2632] A82-16908

MILLER, V. R.
Reduction of the acoustic environment in an F100-PW-100 engine test cell
A82-18727

MILLS, J. B.
Foreign object damage in naval aircraft engines
[AD-A105787] N82-14098

MILNER, E. J.
Application of integration algorithms in a parallel processing environment for the simulation of jet engines
[NASA-TM-82746] N82-14849

MILOV, A. D.
A method for locating aircraft wing damage by nonlinear vibration analysis
A82-17116

MINAMI, R.
Effect of mean blade loading on supersonic cascade flutter
N82-15059

MINGKE, H.
Lifting surface theory for wings in low frequency small amplitude yawing and side slipping oscillating motions at low speeds
N82-14061

MIXSON, J. S.
Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft
A82-18729

MOLUSIS, J.
Stochastic control and identification of helicopter dynamic modes
[NASA-CR-165057] N82-15032

MONGEAU, P.
Helical rail glider launcher
A82-18200

MONGIA, H. C.
Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165386] N82-14095
ERBS fuel addendum: Pollution reduction technology program small jet aircraft engines, phase 3
[NASA-CR-165387] N82-14096

MOORE, F. G.
Aerodynamics of tactical weapons to Mach number 3 and angle-of-attack of 180 deg
[AIAA PAPER 82-0250] A82-17864

MORGAN, H. L., JR.
Low-speed aerodynamic performance of a high-aspect-ratio supercritical-wing transport model equipped with full-span slat and part-span double-slotted flaps
[NASA-TP-1580] N82-15015

MORRELL, F. R.
Description of a dual fail operational redundant strapdown inertial measurement unit for integrated avionics systems research
N82-14842

MORRIS, C. E. K., JR.
A flight investigation of blade-section aerodynamics for a helicopter main rotor having 10-64C airfoil sections
[NASA-TM-83226] N82-14050

MORSE, F. L.
PLRS engineering development testing - Early results
A82-18157
Coordinate transformation in PLRS
A82-18158

MOULTON, R. J.
Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems
A82-17538

MOXON, J.
2037 - Pratt & Whitney tests new turbofan
A82-18347

MOYER, D. W.
Effects of ultra-clean and centrifugal filtration on rolling-element bearing life
[ASME PAPER 81-LUB-35] A82-18436

MULLER, E.
Control of vibration in aeroelastic cascade experiments
N82-15056

MUNGER, P.
Boeing 757 - Introducing the big-fan narrowbody
A82-18349

MURTHY, A. V.
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0234] A82-17858

MURTHY, S. N. B.
Water ingestion into jet engine axial compressors
[AIAA PAPER 82-0196] A82-17836

N

NAGABHUSHAN, B. L.
Dynamic stability of a buoyant quad-rotor aircraft
[AIAA PAPER 82-0242] A82-17861

NAIK, S. K.
Development of improved high temperature coatings for IN-792 + HF
[NASA-CR-165395] N82-14333

NAMBA, M.
Effect of mean blade loading on supersonic cascade flutter
N82-15059

NARRAMORE, J. C.
Advanced technology airfoil development for the XV-15 tilt-rotor vehicle
[AIAA PAPER 81-2623] A82-16906

NASTFENKO, N. IA.
Effect of the blading type on the aerodynamic damping of blade vibrations with allowance for the profile curvature
A82-18404

NASTENKO, U. I.
Damping for turbomachine blade variations in subsonic flow
N82-15048

NATALI, F. D.
A GPS receiver design for general aviation navigation
A82-18132

NEEDELMAN, W. M.
Effects of ultra-clean and centrifugal filtration on rolling-element bearing life
[ASME PAPER 81-LUB-35] A82-18436

NEJEDLY, V.
Effect of fleet size on estimates of safety against airframe fatigue
A82-16153

NELSON, R. C.
An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil
[AIAA PAPER 82-0214] A82-17843

NEVSKII, IU. N.
A method for locating aircraft wing damage by nonlinear vibration analysis
A82-17116

NEWMAN, L. C.
Requirements for instrument approaches to triple parallel runways
[AD-A105622] N82-14079

NICHOLAS, J. C.
Four pad tilting pad bearing design and application for multistage axial compressors
[ASME PAPER 81-LUB-12] A82-18429

NIEBERDING, W. C.
High temperature electronic requirements in aeropropulsion systems
[E-708] N82-15313

NIKITINA, N. V.
Mechanism for the elimination of instability in a shimmy problem
A82-16289

NISHIOKA, K.
On unsteady aerodynamic forces and moments of the circular cascading blades /Experiments of the outward-flow case/
A82-16040

NISHT, M. I.
Computer aided investigation of turbomachine aerodynamics and aeroelasticity
N82-15053

NIWA, N.
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062

NOLAN, J. D.
Design and implementation of a telecommunication interface for the TAATM/TCV real-time experiment
[NASA-TM-83231] N82-14075

NORBUT, T. J.
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator
[AIAA PAPER 82-0254] A82-17866

NORGREN, C. T.
Effect of fuel injector type on performance and emissions of reverse-flow combustor
[NASA-TP-1945] N82-15040

NORUM, T. D.
Screech suppression in supersonic jets
[AIAA PAPER 82-0050] A82-17753

NOVACKI, S. M., III
A prototype interface unit for microprocessor based Loran-C receiver
[NASA-CR-164887] N82-14078

O

OBERKAMPF, W. L.
The electromagnetic theta gun and tubular projectiles
A82-18182

OBRIEN, P. J.
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868

OBRUBOV, A. G.
Determination of the trimmed drag of an aircraft
A82-18583

OCONNELL, R. F.
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147

ODORICO, J.
Control methodology: Nondestructive testing in the aeronautics industry
[SNIAS-812-551-110] N82-14527

OGSTON, A. R.
A short history of aviation gasoline development, 1903-1980
A82-18321

OHTOMO, F.
Self excited flow oscillation in the low pressure steam turbine cascade
N82-15049

OKAMOTO, Y.
Self excited flow oscillation in the low pressure steam turbine cascade
N82-15049

OO, U. H.
Scattering of sound by a vortex ring
A82-16148

OWEN, T. E.
Helicopter model studies for on-board electrostatic sensors
[AD-A105511] N82-14089

OWENS, T. M.
Airborne antenna pattern calculations
[NASA-CR-165059] N82-15277

OZHIGANOV, V. M.
A method for locating aircraft wing damage by nonlinear vibration analysis
A82-17116

P

PADMOS, P.
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements
[IZF-1980-1-VOL-1] N82-15081
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 2: Intensity measurements
[IZF-1980-12-VOL-2] N82-15082

PANDOLFI, M.
Numerical experiments on unsteady flows through vibrating cascades
N82-15052

PARIDA, B. K.
Crack edge instability - A criterion for safe crack propagation limit in thin sheets
A82-17243

PARK, G. D.
Determination of Learjet Longhorn airplane horizontal tail load and hinge moment characteristics from flight data
[AIAA PAPER 82-0183] A82-17827

PARKHOMOVSKII, IA. M.
Torsional vibrations of a wing carrying a concentrated load /asymptotic behavior/
A82-18620

PARKS, J. L., JR.
Automated Pilot Advisory System
[NASA-TM-73296] N82-15027

PAULSON, J. W., JR.
Low-speed aerodynamic performance of a high-aspect-ratio supercritical-wing transport model equipped with full-span slat and part-span double-slotted flaps
[NASA-TP-1580] N82-15015

PAYNE, F. M.
An experimental investigation of the influence of vertical wind shear on the aerodynamic characteristics of an airfoil
[AIAA PAPER 82-0214] A82-17843

PEACH, L. L.
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868

PERIN, R.
Wind tunnel tests of engine-equipped models: Comparison of two jet wash simulation methods
[NASA-TM-76764] N82-14091

PERRIER, P.
System for acquisition and analysis of dynamic tests on air intakes
[NASA-TM-76646] N82-14056

PIMENOVA, G. P.
Damage of turbine blades due to interaction with fuel resinification products
A82-18479

PISARENKO, G. S.
Damping for turbomachine blade variations in subsonic flow
N82-15048

PITTMAN, W. D.
ADAMS executive and operating system
N82-14831

POLICELLA, N.
A method for predicting the lifetime of gas turbine blades
A82-16692
POOL, A.
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system
[NLR-MP-80036-U] N82-14084
PORITZKY, S. B.
The shape of the air traffic control system of the future - A U.S. perspective
A82-17280
PORTERFIELD, J. D.
Advanced technology lightweight gondola system experimental fabrication program
[AD-A104157] N82-14082
POTTER, K. E.
Techniques for overhead-wire detection
A82-16560
POWELL, J. A.
High temperature electronic requirements in aeropropulsion systems
[E-708] N82-15313
PROFANT, D. D.
Development of improved high temperature coatings for IN-792 + HF
[NASA-CR-165395] N82-14333
PULLIAM, T. H.
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735

Q

QUIGG, L. C.
Handling problems associated with jet aircraft fuels
A82-17208
QUYANG, H. I. F.
Energy conservation through airport design and management
A82-17287

R

RAFFAELE, R. J.
Highlights of a design concept for a close ground support fighter
[AIAA PAPER 82-0411] A82-17932
RAHMAN, S.
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447
RAO, D. M.
Subsonic balance and pressure investigation of a 60-deg delta wing with leading-edge devices (data report)
[NASA-CR-165806] N82-15014
RAY, E. J.
Recent sidewall boundary-layer investigations with suction in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0234] A82-17850
RAYMOND, J. L.
Constant L/D glide trajectories
[AIAA PAPER 82-0362] A82-17904
RE, R. J.
Thrust reversing effects on twin-engine aircraft having nonaxisymmetric nozzles
[AIAA PAPER 81-2639] A82-16911
REAU, P.
On-board computer progress in development of A 310 flight testing program
N82-14833
REBER, R. R.
Greenlandair VTOL transportation study
[AIAA PAPER 81-2642] A82-16912
REILLY, M. A.
Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver
A82-18171
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424
REINKENS, L. H.
Computer flight planning for fuel efficiency
A82-17209
REK, B.
Turboprop resurgence - The next step
A82-17149
RIDDLEBAUGH, S. M.
Effect of fuel injector type on performance and emissions of reverse-flow combustor
[NASA-TP-1945] N82-15040
ROBERTSON, W.
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424
ROCKS, J. K.
A Microwave Ice Accretion Measurement Instrument - MIAMI
[AIAA PAPER 82-0285] A82-17875
ROE, G.
Advanced cockpit for tactical aircraft
A82-16559
ROGERS, K. F.
Tensile fatigue assessment of candidate resins for use in fibre reinforced composite repair schemes
A82-17531
ROMAN, I.
Stress intensity factor measurements in composite sandwich structures
A82-17535
ROME, H. J.
Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver
A82-18171
ROME, J.
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424
ROSENBAUER, E. J., SR.
Modern aircraft accident investigation equipment and techniques
A82-17419
ROSENBERG, E. W.
Ground test of a large scale 'D' vented thrust deflecting nozzle
[AIAA PAPER 81-2630] A82-16907
ROSS, R.
Icing analysis of an unprotected aircraft radome
[AIAA PAPER 82-0281] A82-17074
ROTH, S. P.
NASA V/STOL Propulsion Control Analysis - Phase I and II program status
[AIAA PAPER 81-2632] A82-16908
ROUSSOS, L. A.
Acceleration response of fuselage sidewall panels on a twin-engine, light aircraft
A82-18729
ROYSTER, L. H.
Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981
A82-18726
RUBIN, J.
JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance
A82-18152
RUDGE, A. W.
Design and performance of airborne radomes - A review
A82-16564
RYABCHENKO, V. P.
Calculation of quasi-stationary aerodynamic force acting on a cascade of oscillating airfoils in subsonic flow
N82-15051
Calculation of nonstationary force ratios on blades of a rotating row in incompressible flow
N82-15061

S

SACHS, G.
Flight mechanics - Modern aircraft design and control concepts
A82-17951
SANDILANDS, N. B.
Management of a large avionics project
A82-16557

SANGER, N. L.
The use of optimization techniques to design controlled diffusion compressor blading
[NASA-TM-82763] N82-14094
SARIPALLI, K. R.
A summary of jet-impingement studies at McDonnell Douglas Research Laboratories
[AIAA PAPER 81-2613] A82-16904
SASAKI, A.
Responses of oscillating wings in weak shear flow
A82-18021
SATYANARAYANA, B.
Unsteady flow patterns associated with spoiler control devices
[AIAA PAPER 82-0127] A82-17798
SAVIN, V. S.
Concerning the calculation of the aerodynamic characteristics of mechanized wings
A82-18589
SCHEIMAN, J.
Comparison of experimental and theoretical turbulence reduction characteristics for screens, honeycomb, and honeycomb-screen combinations
[NASA-TP-1958] N82-14055
SCHINELLER, R.
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424
SCHLEICHER TAFEL, K.
Airbus - Perspectives for the future
A82-16972
SCHMIT, L. A.
Multilevel optimum design of structures with fiber-composite stiffened-panel components
[AIAA PAPER 80-0723] A82-17594
SCHUBERT, M.
Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978
[DFVLR-MITT-81-12] N82-14073
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 3 August 1979
[DFVLR-MITT-81-17] N82-15028
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 4 August 1978
[DFVLR-MITT-81-12] N82-15029
SCHULTZ, K.-J.
The German-Dutch wind tunnel as aeroacoustic experimental installation
A82-17136
SCHULZE, B.
Development and trial of a rotary balance for the 3 m-low speed wind tunnels in the Federal Republic of Germany
[BMFT-FB-W-81-022] N82-15083
SCOTT, L. J.
Safe and efficient management of energy; Proceedings of the Thirty-third Annual International Air Safety Seminar, Christchurch, New Zealand, September 15-18, 1980
A82-17276
SCOTT, W. R.
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics
[AD-A106061] N82-14316
SEETHARAM, H. C.
Unsteady flow patterns associated with spoiler control devices
[AIAA PAPER 82-0127] A82-17798
SEFIC, W. J.
NASA Dryden Flight Loads Research Facility
[NASA-TM-81368] N82-15079
SEITH, W.
The DME-based Azimuth System /DAS/
A82-18146
SEVESTRE, C.
La Recherche Aerospatiale, Bi-monthly Bulletin No. 1981-2, March - April 1981
[ESA-TT-713] N82-14388
SEYFRIED, A.
Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978
[DFVLR-MITT-81-12] N82-14073
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 4 August 1978
[DFVLR-MITT-81-12] N82-15029
SHANKAR, V.
Computational treatment of transonic canard-wing interactions
[AIAA PAPER 82-0161] A82-17814
SHIGEMI, T.
A contribution to the hodograph method for shock-free transonic airfoil sections
A82-18022
SHIMI, T. N.
Requirements for instrument approaches to triple parallel runways
[AD-A105622] N82-14079
SHIREY, J. E.
MLS - A new generation landing guidance system is here
A82-18145
SHIVAPRASAD, B. G.
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
A82-18776
SHIVELY, C.
Navigation system integrity and reliability for civil aviation
A82-18159
SIEGERT, C. D.
Digital active control system for load alleviation for the Lockheed L-1011
A82-16147
SIGMAN, R. K.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight
[AIAA PAPER 82-0124] A82-17796
SIMONS, J. L.
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system
[NLR-MP-80036-U] N82-14084
SIMPSON, R. L.
The structure of a separating turbulent boundary layer. I - Mean flow and Reynolds stresses. II - Higher-order turbulence results
A82-18776
SINHA, A. S. C.
An application of invariance principle to pilot model for NT-33 aircraft with variable coefficients and delays
[AIAA PAPER 82-0367] A82-17907
SKVORTSOV, V. V.
A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
A82-18596
SLATER, G. L.
Flutter mode suppression using hyperstable feedback
[AIAA PAPER 82-0368] A82-17908
SLOOP, J. L.
Technological innovation for success - Liquid hydrogen propulsion
A82-16734
SMISARENKO, T. V.
Application of the finite element method to the calculation of the modes and frequencies of natural vibrations of aircraft structures
A82-18612
SNYDER, C. E., JR.
Determination of the flammability characteristics of aerospace hydraulic fluids
A82-16187
SOKOLOWSKI, D. E.
Development and operating characteristics of an advanced two-stage combustor
[AIAA PAPER 82-0191] A82-17833
SONG, J. O.
Optimization of compressor vane and bleed settings
[AD-A106059] N82-14097
SORENSON, R. L.
Computation of the steady viscous flow over a tri-element 'augmentor wing' airfoil
[AIAA PAPER 82-0021] A82-17735
SOROKA, B. N.
A mathematical model of a subsonic transport aircraft
A82-18575
STANDLER, R. B.
Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714

STANLEY, C. W.
Maintenance problems associated with the operation of the F402 /Pegasus/ engine in the AV-8A /Harrier/ aircraft
[AIAA PAPER 81-2656] A82-16915

STARKEN, H.
Design procedures for compressor blades
A82-17135

STEINBERG, R.
The NASA MERIT program - Developing new concepts for accurate flight planning
[AIAA PAPER 82-0340] A82-17898

STELMACH, A. L.
Damping for turbomachine blade variations in subsonic flow
N82-15048

STEPANOV, G. U.
Computer aided investigation of turbomachine aerodynamics and aeroelasticity
N82-15053

STEPHISON, D. B.
airborne data analysis/monitor system
N82-14030

STEWART, N. D.
Noise-Con 81; Proceedings of the National Conference on Noise Control Engineering, North Carolina State University, Raleigh, NC, June 8-10, 1981
A82-18726

STEWART, V. R.
An investigation of the use of a propulsive wing/canard concept for improved maneuvering
[AIAA PAPER 81-2622] A82-16905

STONE, J.
Icing analysis of an unprotected aircraft radome
[AIAA PAPER 82-0281] A82-17874

STRASSER, F.
Advanced compressor components. Phase 1: 1978 to 1979
[BMFT-FB-W-81-025] N82-15073

STUCKENBERG, N.
An observer approach to the identification and isolation of sensor failures in flight control systems
[DFVLR-FB-81-26] N82-15078

STURGESS, G. J.
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model
[AIAA PAPER 82-0113] A82-17791

SULLIVAN, P.
Kelvin-Helmholtz stability analysis of air cushion landing gear trunk flutter
A82-17608

SUN, C. T.
Improvement of the first-ply-failure strength in laminates by using softening strips
A82-16174

SUTER, P.
Aeroelasticity in turbomachines
[EPFL-ITA-10] N82-15042

SUTTON, K.
Relations for the thermodynamic and transport properties in the testing environment of the Langley hypersonic CF4 tunnel
[NASA-TM-83220] N82-15359

SWEDISH, W. J.
Requirements for instrument approaches to triple parallel runways
[AD-A105622] N82-14079
Requirements for independent and dependent parallel instrument approaches at reduced runway spacing
[AD-A105673] N82-14080

SYED, S. A.
Widely-spaced co-axial jet, diffusion-flame combustor - Isothermal flow calculations using the two-equation turbulence model
[AIAA PAPER 82-0113] A82-17791

SYMES, L. H.
Helicopter landing gear design and test criteria investigation
[AD-A105512] N82-15035

SZETELA, E. J.
External fuel vaporization study
[NASA-CR-165513] N82-14371

T

TAKAHARA, S.
On the numerical analysis of stall flutter in turbine cascades
N82-15054

TAKATA, H.
Three-dimensional analysis of cascade flutter in parallel shear flow
N82-15062

TAM, C. K. W.
Workshop report for the AIAA 6th Aeroacoustics Conference
A82-16091

TANAKA, H.
Aerodynamic response of a blade in pitching oscillation with partial and full separation
N82-15047

TANRIKUT, S.
Development and operating characteristics of an advanced two-stage combustor
[AIAA PAPER 82-0191] A82-17833

TAYLOR, A. H.
Vortex lift augmentation by suction on a 60 deg swept Gothic wing
[AIAA PAPER 82-0231] A82-17856

TAYLOR, D.
Management of a large avionics project
A82-16557

TAYLOR, G. W.
Design and performance of airborne radomes - A review
A82-16564

TEVELDE, J. A.
External fuel vaporization study
[NASA-CR-165513] N82-14371

THOMAS, H. H.
FILE-IB aircraft flight test program
[AAS 81-041] A82-16335

TING, R. Y.
Effects of elastomeric additives on the mechanical properties of epoxy resin and composite systems
A82-17538

TINGAS, S. A.
Subsonic balance and pressure investigation of a 60-deg delta wing with leading-edge devices (data report)
[NASA-CR-165806] N82-15014

TITOVSKII, I. N.
Game-theoretical method for the synthesis of aircraft control during landing approach
A82-18584

TOBAK, M.
Bifurcation analysis of nonlinear stability of aircraft at high angles of attack
[AIAA PAPER 82-0244] A82-17862

TOBIAS, L.
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868

TOMINAGA, T.
Study of acoustic resonance of cascades
N82-15068

TOMLINSON, N. P.
Dynamic stability of a buoyant quad-rotor aircraft
[AIAA PAPER 82-0242] A82-17861

TOVNOG, T.
Determination of the flammability characteristics of aerospace hydraulic fluids
A82-16187

TRANBARGER, O.
Helicopter model studies for on-board electrostatic sensors
[AD-A105511] N82-14089

TSUCHIYA, T.
Water ingestion into jet engine axial compressors
[AIAA PAPER 82-0196] A82-17836

TSYFANSKII, S. L.
A method for locating aircraft wing damage by nonlinear vibration analysis
A82-17116

TUGAZAKOV, R. IA.
Calculation of the unsteady loads on the surface of a moving wedge with an incident shock wave
A82-18590

TURKEL, B. S.
Simulation of phugoid excitation due to hazardous wind shear
[AIAA PAPER 82-0215] A82-17844

U

UMAN, M. A.
Calculations of lightning return stroke electric and magnetic fields above ground
A82-17714
URBAN, L. A.
Gas path analysis - A tool for engine condition monitoring
A82-17286
URIE, D. M.
Accelerated development and flight evaluation of active controls concepts for subsonic transport aircraft. Volume 2: AFT C.G. simulation and analysis
[NASA-CR-159098] N82-15077
USPENSKII, A. A.
A study of the effect of the flight vehicle body potential on the characteristics of ion attitude transmitters
A82-18596

V

VANLEEUWEN, R.
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 1: Color measurements
[IZF-1980-1-VOL-1] N82-15081
Optical properties of airfield lighting fixtures of the Royal Netherlands Airforce. Part 2: Intensity measurements
[IZF-1980-12-VOL-2] N82-15082
VAUGHN, H. R., JR.
Pressure distribution on an ogee wing in supersonic flow
[AIAA PAPER 82-0414] A82-17934
VELUPILLAI, D.
Boeing 757 - Introducing the big-fan narrowbody
A82-18349
VERGEZ, P. L.
Target acceleration modeling for tactical missile guidance
[AIAA PAPER 82-0370] A82-17910
VERWEIJ, A.
Pollution of the soil by aviation gasoline
[PML-1979-41] N82-15596
VICKERS, T. K.
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008
VIETOR, C. W.
Air traffic control problems and solutions
A82-17283
VOELCKERS, U.
Analysis of two air traffic samples in the terminal area of Frankfurt/Main, August 4th 1978
[DFVLR-MITT-81-12] N82-14073
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 3 August 1979
[DFVLR-MITT-81-17] N82-15028
Analysis of two air traffic samples in the terminal area of Frankfurt am Main, 4 August 1978
[DFVLR-MITT-81-12] N82-15029
VOGEL, H.
The DME-based Azimuth System /DAS/
A82-18146
VOGEL, S.
Estimation methods for the determination of dynamic responses of elastic aircraft
[BMVG-FBWT-81-6] N82-15037
VOGELER, K.
A method of characteristics solution for a finite oscillating supersonic cascade with thickness effects
N82-15060
VOIT, F. H.
Improvement of the first-ply-failure strength in laminates by using softening strips
A82-16174
VOLMIR, A. S.
Computer aided investigation of turbomachine aerodynamics and aeroelasticity
N82-15053
VONK, W. J. A.
Data communications within the Air Navigation Services system
A82-18272

W

WAGDI, M. N.
A binary matrix technique for aircraft collision threat recognition and avoidance
[AIAA PAPER 82-0184] A82-17828
WAGENKNECHT, C. D.
Performance calibration results for a Compact Multimission Aircraft Propulsion Simulator
[AIAA PAPER 82-0254] A82-17866
WAGGONER, E. G.
Transonic three-dimension viscous-inviscid interaction for wing-body configuration analysis
[AIAA PAPER 82-0163] A82-17616
WALTERS, M. M.
Development and validation of the V/STOL aerodynamics and stability and control manual
[AIAA PAPER 81-2611] A82-16903
WANG, S.-T.
The influence of turbulence models on computer-simulated aircraft landing
[AIAA PAPER 82-0342] A82-17896
WARD, C. D.
Enhanced noise immunity and error control in a fully integrated JTIDS/GPS receiver
A82-18171
WARD, C. W.
Modular Multi-Function Multi-Band Airborne Radio System (MFBARS). Volume 2: Detailed report
[AD-A106052] N82-14424
WARNER, D. N., JR.
MLS vertical guidance and navigation for a STOL airplane landing on an elevated STOLport
[NASA-TM-81338] N82-14101
WARNER, P. A.
Corrosion inhibiting engine oils
[AD-A106127] N82-14099
WASKIEWICZ, J.
Recent improvements in prediction techniques for supersonic weapon separation
[AIAA PAPER 82-0170] A82-17820
WATT, T. M.
Results of a Differential Omega experiment
A82-18094
WATTS, C. B., JR.
A new end-fire ILS glide slope
A82-18143
WEILER, W.
Advanced compressor components. Phase 1: 1978 to 1979
[BMFT-FB-W-81-025] N82-15073
WEINGARTEN, N. C.
In-flight investigation of the effects of pilot location and control system design on airplane flying qualities for approach and landing
[NASA-CR-163115] N82-15074
WELT, S.
JTIDS distributed TDMA /DTDMA/ terminal development results with emphasis on relative navigation performance
A82-18152
WENSINK, G. J. H.
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system
[NLR-MP-80036-U] N82-14084
WESSEL, H.
Sensor footprints and homing range of terminal guidance munition
[BMVG-FBWT-81-5] N82-15111
WESTKAEMPER, J. C.
Effect on surface pressures of trapezoidal holes in a T-38 stabilator
A82-17602
WETZER, D. W.
Combustion behavior of solid fuel ramjets. Volume 1: Correlation of reacting and non-reacting flow characteristics
[AD-A106061] N82-14316
WEYMAN, J. C.
The Modular Automated Weather System (MAWS) concept
N82-14763

WHITAKER, R.
Lear Fan - The plastic aeroplane arrives
A82-16348
WHITE, D. L.
Advanced crash survivable flight data recorder and Accident Information Retrieval System (AIRS)
[AD-A105510] N82-14072
WHITE, R. W.
VOR waveform synthesis and calibration
A82-16563
WIGGERT, D. C.
Cavitation inception in spool valves
A82-16428
WILLEKENS, A. J. L.
A method for measuring takeoff and landing performance of aircraft, using an inertial sensing system
[NLR-MP-80036-U] N82-14084
WILLETT, F. M., JR.
Real-time simulation of helicopter IFR approaches into major terminal areas using RNAV, MLS, and CDTI
[AIAA PAPER 82-0260] A82-17868
WILLIAMS, F.
Helical rail glider launcher
A82-18200
WILLIAMS, J. E.
Evaluation of supersonic missile aerodynamic prediction techniques
[AIAA PAPER 82-0390] A82-17920
WILSON, J. W.
The Joint Airport Weather Studies project
[AIAA PAPER 82-0017] A82-17734
WINICK, R. M.
Community rotorcraft air transportation benefits and opportunities
[NASA-CR-166266] N82-16008
WINTER, K. G.
The design of a jet catcher
[RAE-TM-AERO-1891] N82-14102
WU, C. H.
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447
WU, J. M.
Three-dimensional flow studies on a slotted transonic wind tunnel wall
[AIAA PAPER 82-0230] A82-17855
WYLER, J. S.
Design and testing of a new double labyrinth seal
[ASME PAPER 81-LUB-58] A82-18452

Y

YELL, R. W.
VOR waveform synthesis and calibration
A82-16563
YON, J.
Position extrapolation quality calculation for inertial and Doppler-AHRS navigation systems
A82-18151
YU, Y.
Modeling and Analysis of Power Processing Systems (MAPPS). Volume 1: Technical report
[NASA-CR-165538] N82-14447

Z

ZAMULA, G. N.
Calculation of the stability of crosswise-reinforced cylindrical shells
A82-18621
ZINN, B. T.
An iterative finite element-integral technique for predicting sound radiation from turbofan inlets in steady flight
[AIAA PAPER 82-0124] A82-17796
ZORN, H. C.
The application of programmable pocket calculators for computations during survey flights
A82-16164
ZURABOV, Y. G.
Status of the COSPAS-SARSAT project and its possible operation in conjunction with INMARSAT system
A82-18170

[illegible]

U

[illegible]

V

[illegible]

Y

[illegible]

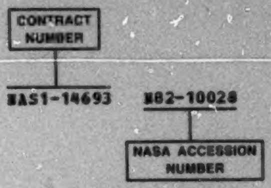
Z

[illegible]

CONTRACT NUMBER INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 147)* APRIL 1982

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 2003
N82-14424
AF PROJ. 2307
N82-14097
AF PROJ. 2403
N82-14104
AF PROJ. 3048
N82-14312
N82-14313
A78/KLU/085 N82-15081
N82-15082
A78/KL4/146 N82-15596
DA PROJ. 1L1-62209-AH-76
N82-14072
N82-14082
N82-14089
N82-14333
N82-15035
DA PROJ. 1L2-62202-AH-85
N82-14087
DAAB-07-76-C-1750
A82-18158
DAAB07-76-C-1750
A82-18157
DAAG29-78-G-0036
A82-17934
DAAK10-79-C-0184
A82-18200
DAAK51-78-C-0025
N82-14072
DAAK51-79-C-0036
N82-14082
DAAK51-79-C-0060
N82-14089
DAAK51-79-C-8011
N82-15035
DAAK80-79-C-0270
N82-14087
DAJA37-80-C-0367
A82-17901
DOT-FA77WAI-757
A82-18132
DOT-FA78WA-4216
A82-18132
DOT-RC-82010 A82-17843
DOT-RC-92004 A82-16174
DOT-081-502-510
N82-14076
DTFA01-80-C-10030
N82-14071
DTFA01-81-C-10001
N82-14079
N82-14080
F2960-79-C-0010
A82-17605
F09603-74-C-5158
A82-18444
F33615-77-C-2036
A82-16428
F33615-78-C-1518
N82-14424
F33615-78-C-2401
A82-17836
F33615-79-C-2018
N82-14097
F33615-79-C-3412
A82-17714
F33615-79-C-3618
N82-15074
F33615-79-C-3629
N82-14104
F33615-79-C-5089
N82-14099
F33615-81-3011
A82-17820
F44620-81-C-0044
A82-17814
F49620-76-C-0014
N82-15050
F49620-79-C-0038
A82-17907
MIPR-F7B13001430001
N82-14083
NAGW-130 A82-17862
NAG1-10 A82-17936
NAG1-134 N82-15031
NAG2-38 N82-15013
NAG2-72 N82-15032
NAG3-62 A82-17836
NAG3-74 A82-17788
NASA ORDER L-4059B
N82-14059
NASW-3199 N82-14674
NASW-3541 N82-14057
NASW-3542 N82-14056
N82-14091
N82-14673
NAS1-14690 N82-15076
N82-15077
NAS1-14700 N82-15034
NAS1-14742 N82-15017
N82-15018
N82-15033
NAS1-15977 N82-14529
NAS1-16055 A82-17816
NAS1-16259 N82-15014
NAS2-10160 N82-15030
NAS2-10777 A82-17861
NAS2-10798 N82-16008
NAS3-20819 N82-14095
N82-14096
NAS3-21051 N82-14447
NAS3-22057 A82-16909
NAS3-22371 N82-14333
NAS6-2639 N82-15498
NAS8-32692 A82-17896
NAS8-33458 A82-17844
NAVY TASK RF32-391-801
A82-17864
NCA2-OR253-801
N82-14817
NGR-10-005-169
A82-17714
NGR-36-009-017
N82-14078
NSF ATM-79-02627
A82-17714
NSF SES-79-10397
N82-15984
NSG-1490 A82-17594
NSG-1655 N82-15277
NSG-2379 A82-17855
NSG-3036 A82-17796
N00014-76-C-0494
A82-16904
N00014-79-C-0635
A82-16904
N00014-81-K-0177
A82-17714
N62269-76-C-0105
A82-18152
N000167-81-C-0057
A82-17815
PROJECT SQUID
A82-18776
SEA TASK SF32392-591
A82-17864
SEA TASK SR02302
A82-17864
N05720000 N82-14088
307-90-00 N82-14090
505-02-23-02 N82-15075
505-31-33-08 N82-14049
505-31-33-09 N82-14055
505-32 N82-15039
505-32-03-05 N82-14880
505-32-32 N82-15040
505-32-72 N82-15041
505-34-34 N82-15074
505-41-63-02 N82-14829
595-41-73-01 N82-14085
506-51-13-01 N82-15359
506-54-63-03 N82-15894
516-53-03-12 N82-15015
530-14-13-01 N82-14058
532-02-11 N82-14101
992-16-05-03 N82-14075

1. Report No. NASA-SP-7037(147)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle AERONAUTICAL ENGINEERING A Continuing Bibliography (Supplement 147)		5. Report Date April 1982
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C.		11. Contract or Grant No.
		13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code
15. Supplementary Notes		
16. Abstract This bibliography lists 347 reports, articles and other documents introduced into the NASA scientific and technical information system in March 1982.		

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified-Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 112	22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NASA SP-7037(148)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 148)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in April 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141 093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic: $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 512 reports, journal articles, and other documents originally announced in April 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service. American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche(1) of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-- 1/	-- 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

N01	30.00	45.00

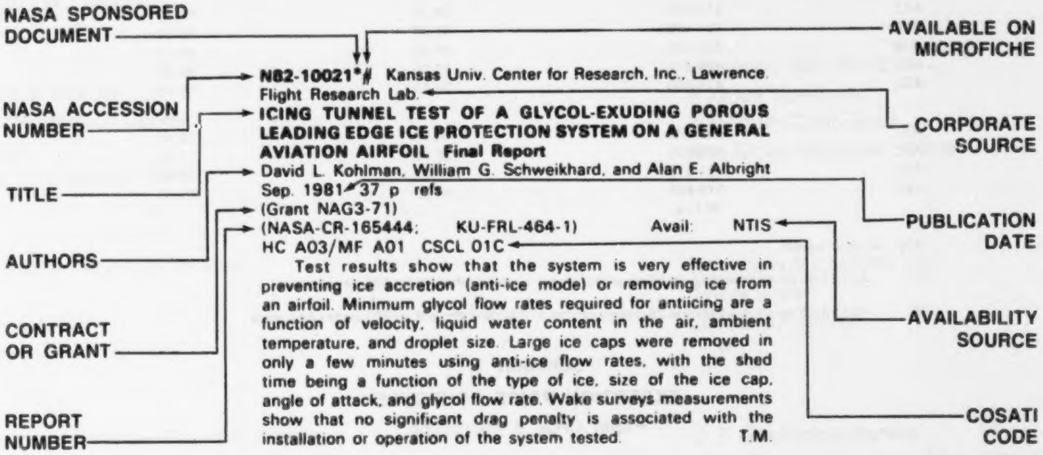
TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) 149
STAR ENTRIES (N82-10000) 187

Subject Index A-1
Personal Author Index B-1
Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*

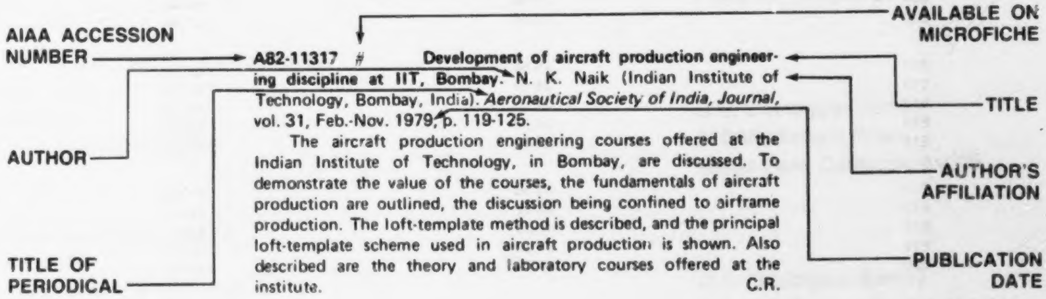


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
CORPORATE SOURCE
TITLE
PUBLICATION DATE
AUTHORS
CONTRACT OR GRANT
AVAILABILITY SOURCE
REPORT NUMBER
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AVAILABLE ON MICROFICHE
AIAA ACCESSION NUMBER
TITLE
AUTHOR
AUTHOR'S AFFILIATION
TITLE OF PERIODICAL
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 148)

MAY 1982

IAA ENTRIES

A82-18874 † **Soviet helicopter construction /2nd revised and enlarged edition/ (Sovetskoe vertoletostroenie /2nd revised and enlarged edition/).** A. M. Izakson. Moscow, Izdatel'stvo Mashinostroenie, 1981. 295 p. 61 refs. In Russian.

A brief history is presented of the development of helicopter construction in the Soviet Union. Following a review of the fundamental design characteristics of the basic classes of helicopters and of the major steps in the development of the Soviet helicopter industry, the prehistory of helicopter construction is traced from the designs of Leonardo da Vinci to Russian helicopter designs in the second half of the 19th century. The first stages in actual construction beginning with advances in aviation in the early 20th century are outlined, and the first Soviet helicopters to be built and operated successfully are presented, including the TsAGI 1-EA, 5-EA and 11-EA models. Attention is then given to the subsequent development of autogyros, true vertical lift helicopters, and present-day helicopters for various applications as exemplified by the Mi, Ka, and Yak series and foreign designs. An evaluation of the current status and future problems in helicopter design is also presented. A.L.W.

A82-18893 **Transient two-dimensional temperature distributions in air-cooled turbine blades.** K. Gue, X. Ge, and X. Sun (China University of Science and Technology, Hefei, People's Republic of China). *Engineering Thermophysics in China,* vol. 1, July-Sept. 1980, p. 255-264. 10 refs. Translation.

The effect of using varying time increments is studied for finite element techniques for unsteady conduction problems, and a FORTRAN program for solving two-dimensional unsteady temperature field of air-cooled turbine blades is presented. The differential equation of two-dimensional unsteady conduction problems is defined with Robin's condition for inner and outer walls of the blade exchanging heat with the fluid by convection. After discretization into spatial triangular elements, three different discretizations of time are shown: a weighted-residual method, assuming the temperature distribution to be a linear time function, a weighted-residual method, assuming the temperature to be a quadratic time function between each step, and a technique treating the difference quotient of temperature to time as a linear function of time. The highest temperature of the blade was found to occur at the trailing edge and the burning-gas side, using the third time discretization method. M.S.K.

A82-18894 **Impingement cooling of concave surfaces of turbine airfoils.** J. Cheng and B. Wang (Nanjing Aeronautical Engineering College, Nanjing, People's Republic of China). *Engineering Thermophysics in China,* vol. 1, July-Sept. 1980, p. 275-291. 12 refs. Translation.

Experimental results of impingement cooling of two aluminum specimens of different sizes with three impingement tubes are presented in this paper. The specimens, simulating the leading edge of a turbine blade, were preheated and cooled by jets from different impingement tubes at various flow rates and distances. The lumped capacity method was used to determine the cooling rate of the aluminum specimen. The mean heat transfer coefficients were calculated and correlated with dimensionless parameters. The results of the Nusselt numbers obtained from experiments were consistent with those calculated from the recommended formula. Furthermore, these results were compared with the correlations of Metzger and those of Ravuni and Tabakoff, and it was concluded that the formula proposed by this paper was more reasonable. (Author)

A82-18898 † **The city and aviation (Gorod i aviatsiia).** A. I. Borodach, B. N. Mel'nikov, V. I. Chernikov, and B. I. Berdnik. Moscow, Stroiizdat, 1980. 184 p. 22 refs. In Russian.

Basic information is presented on various types of air transportation facilities that serve cities: airports for conventional aircraft and for STOL and V/STOL aircraft, helicopter stations, and railroad stations connecting the city with the airports. Attention is given to requirements concerning the location of airports in relation to cities; problems of convenient access, noise reduction, and flight safety are considered. The basic principles of the organization of transportation between cities and airports are examined. B.J.

A82-18899 † **Accidents of surface effect ships and hydrofoil craft (Avarii sudov na vozdushnoi podushke i podvodnykh kryl'iakh).** I. M. Korotkin. Leningrad, Izdatel'stvo Sudostroenie, 1981. 216 p. 79 refs. In Russian.

The work describes 200 accidents and disasters of hovercraft and hydrofoil craft of the United States, Great Britain, France, and other fleets which occurred in the 1960s and 1970s as a result of capsizing, storm damage, collisions, fires, explosions, etc. The causes of the accidents, the functioning of various craft systems, and the actions of the crews are examined. Recommendations on the prevention of such accidents are discussed. B.J.

A82-18903 # **Tactical Radar Threat Generator system.** W. T. Harpster and J. L. Gebhart (Emerson Electric Co., St. Louis, MO). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 43-53.

It is pointed out that a military force's survival, and the successful accomplishment of its objective is highly dependent on preconflict training. The success of military training is, in turn, dependent on the accuracy with which the combat environment is duplicated. The combat environment for the crew of an attack aircraft is examined. Realistic training of combat pilots cannot be accomplished unless a typical threat environment is simulated in the target area. A cost effective approach to training involves the procurement of threat emitter equipment which meets certain minimum requirements for effective aircrew training. A suitably low-cost threat simulator is the Tactical Radar Threat Generator (TRTG). The U.S. Army version has become known as 'GRETA' an acronym for Ground Radar Emitter for Training Aviators. Attention is given to TRTG hardware, the digital scan converter, and the scoring equipment. G.R.

A82-18904 # **Design criteria for a miss distance radar.** L. I. Ruffe (Racal-MESL, Ltd., Linlithgow, Scotland). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 54-59. Research supported by the Ministry of Defence (Procurement Executive).

When a missile, fired in connection with development trials or operator training, misses the target, it is most desirable to know by how much it has missed. This miss-distance must be measured without imposing restrictive conditions on the engagement geometry. The design of a Doppler radar system for measuring the miss-distance is considered. The system makes use of the Doppler frequency shift due to the relative velocity between projectile and target to determine the magnitude of the miss-distance. The practical realization of the system measuring concepts is discussed, taking into account aspects of target installation, the antennae, and the ground equipment. The maximum miss-distance which may be determined depends on the size of the projectile. Typical maximum values are 4 m for a 30 mm shell, 11 m for a 114 mm shell, and 15 m for a guided weapon. G.R.

A82-18906 # **Sanctuary radar.** F. L. Fleming (Technology Service Corp., Santa Monica, CA) and N. J. Willis (U.S. Defense Advanced Research Projects Agency, Arlington, VA). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 103-108. Army-USAF-supported research.

This paper describes the Sanctuary bistatic radar test bed and fundamental technical issues addressed in the test program. It outlines the choice of waveform and digital signal processor configuration, which performs both Doppler filtering and pulse compression in the frequency domain. It explains clutter suppression techniques, including those involving real-time software control of the digital processor. Finally, it summarizes flight test objectives and results obtained during initial system tests with the airborne transmitter. (Author)

A82-18908 **Recent developments in military telemetry.** R. G. A. Marzolini (EMI Electronics, Ltd., Feltham, Middx., England). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 123-128.

Developments regarding UK guided weapon telemetry systems following World War II are examined. Analog systems operating in the frequency band from 430 to 450 MHz were replaced in the 1960's by the Type 4650 Variant I and Variant II systems. In the early 1970's, due to the expansion of private mobile radio services, military telemetry moved to new allocations in the frequency band from 1430 to 1450 MHz. The change in frequency operation is to be completed by Jan. 1, 1981. This change in carrier frequency affected the systems which would be allowed to operate in the new band, and one resulting development was the Type 1440 (PAM/FM/FM) system. In parallel with this carrier frequency change the development of digital telemetry in the form of the Type 109 (PCM/FM) system commenced. Attention is given to details regarding carrier frequency, FM transmitters, PCM encoders, standards, and a flight proving trial. G.R.

A82-18911 **Microwave communications to remotely piloted vehicles.** M. R. B. Dunsmore and S. E. Gibbs (Royal Signals and Radar Establishment, Malvern, Worcs., England). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 141-148.

Remotely piloted vehicles (RPVs) rely on two-way communication links to return data from their surveillance sensors to their ground control stations and to receive data for monitor and control operations. The requirements of a data link are examined, and a data link design for meeting these requirements is discussed. It is found that RPV data links are constrained to operate in or above the microwave frequency bands, typically G or J bands. The information (video) bandwidth is considered along with channel bandwidths, the operating range, antenna patterns, receiver sensitivity, and transmitter power. The vulnerability of RPV data links to electronic countermeasures (ECM) is evaluated, taking into account also remotely piloted helicopters. G.R.

A82-18914 # **L-band power generation in the General Electric solid-state radar.** G. B. Sleeper (General Electric Co., Syracuse, NY). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 199-205.

A solid-state, L-band air defense radar is discussed. The considered radar is entirely computer controlled. By handling the energy management problem with a computer in real time, it is possible to exploit fully the high-duty-cycle capability of solid-state power generation. An approach combining computer and solid-state device technologies provides a number of advantages related to high reliability, long operational life, graceful degradation, and low maintenance costs. Attention is given to the array configuration, aspects of array phase calibration, row transmitters, the array transmitter, the power modules, the DC power supply transmit/receive switching, and phase shifting for both transmit and receive. G.R.

A82-18917 **R.F. calibrators for Doppler radars.** T. Billing and P. A. R. Holder (EMI Electronics, Ltd., Wells, Somerset, England). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 245-250. Research supported by the Ministry of Defence (Procurement Executive).

This paper deals with the problem of achieving reliable calibration of Doppler radars. Calibration with a simulator at constant range is examined for two practical cases: in a radar trials situation, where the simulator is placed at a distance for a line-of-sight type calibration; and in the laboratory, where a simulator is connected directly to the radar and where the range delay is simulated. (Author)

A82-18920 # **Automatic controlled terrain following flights.** R. Rode and A. Hessel (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 275-280.

Three low-level flying modes are named: terrain-following, terrain-avoidance, and terrain-clearance. Because the terrain avoidance mode is difficult under bad weather conditions and because the terrain-clearance mode is unacceptable with regard to vulnerability, the terrain-following mode is regarded as an acceptable compromise. Block diagrams describing this system are given. It is noted that the system is based on a scanning forward looking radar which, together with other sensors, operates in a closed loop with an automatic flight control system. The radar scans the terrain ahead of the aircraft; the computer then calculates a vertical acceleration based on this information which is then used by the autopilot and flight control system to keep the aircraft on its required flight path. C.R.

A82-18934 # **Octave bandwidth dual polarized antenna.** C. Nicolai, R. Scarpetta, and P. Russo (Selenia S.p.A., Pomezia, Italy). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 417-421.

It is noted that the requirements in the design of ECM antennas become harder to meet for the lower operating microwave frequency band (S or L). A crossed dipole in the short backfire configuration with high performance over more than a 2:1 frequency band is described. Wideband operation is achieved by a proper design of the dipoles and cavity geometry and of the feeding baluns and sleeves. The dipole length and the distance from the cavity are, respectively, about 1/2 and 1/4 of the wavelength at the center frequency. It is noted that radiation patterns optimization and control are possible by varying the sleeves and the back cavity geometry. Good amplitude and phase pattern optimization is achieved with the circular sleeves geometry and the polygonal cavity geometry. C.R.

A82-18936 # **Microwave systems for radar guided missiles.** M. F. Godfrey (Marconi Space and Defence Systems, Ltd., Stanmore, Middx., England). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 433-438.

The importance of the microwave components in radar homing heads is stressed, noting that it is these components which condition the radar signal for the signal-processing unit. The difference between the coherent and incoherent radars used in guided weapons is discussed. Attention is also given to semiactive and active incoherent radars. It is noted that a coherent transmitter must provide mean powers of up to 1 kW, depending on the application, at duty ratios of up to 50% and with pulse repetition rates which may be as high as 500 kHz. The dc to microwave efficiency should be more than 20%. Incoherent transmitters must provide peak powers above 50 kW at duty ratios of 0.1%. C.R.

A82-18937 # **A terminal guidance simulator for evaluation of millimeter wave seekers.** A. J. Witsmeer and K. L. Wismer (Boeing Aerospace Co., Seattle, WA). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 445-451.

A theoretical and physical description is given of a simulator for evaluating passive terminal guidance seekers operating in the millimeter region 10-100 GHz. Attention is also given to the expansion of the present facility into the active regime. It is noted that the chamber may be the only one of its kind in the world. A feature that makes it unique is the use of aluminum foil to reflect the excess microwave energy out of the room through a skylight. In effect, this makes the walls appear cold like the sky background so that the seeker sees only the array with its picture of the target scene. C.R.

A82-18940 # **Airborne measurements with a sensitive high resolution 90 GHz radiometer.** K. Grüner and B. Aumiller (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Hochfrequenztechnik, Oberpfaffenhofen, West Germany). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 473-480.

Design criteria and realized configurations of sensitive, high-resolution airborne 90 GHz radiometer used in low-altitude flights are described. Selected results of the first test measurements are given. The receiver front end comprises an antenna scalar feed horn and a GaAs single-ended Schottky mixer with an integrated first-stage FET-IF-amplifier mounted in an evacuated compartment and cooled to 23 K by a two-stage temperature-controlled helium refrigerator. Among the characteristics are an RF input frequency of 83.9-85.1 and 90.9-92.1 GHz, an IF band of 2.9-4.1 GHz, and a scan angle of plus or minus 14.5 deg. C.R.

A82-18942 # **A study of potentially low cost millimetre-wave radiometric sensors.** S. J. Nightingale and R. N. Bates (Philips Research Laboratories, Redhill, Surrey, England). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 486-491. 7 refs.

Some of the design considerations for a radiometric sensor are examined with a view to developing a compact, lightweight unit which would be cheap to produce. The construction and performance of a 35 GHz Dicke radiometer are described. The r.f. components are made with 'E' plane circuitry, which makes it possible to realize a variety of different transmission structures, for example, finline, microstrip, and coplanar waveguide. It is noted that the r.f. and i.f. circuit techniques discussed here can also be used to make similar units operating at frequencies up to at least 100 GHz. C.R.

A82-18943 **Radiometric measurements at 80 GHz.** S. E. Millard, K. O. Rossiter, and G. R. Selby (EMI Electronics, Ltd., Wells, Somerset, England). In: Military microwaves '80; Proceedings of the Second Conference, London, England, October 22-24, 1980. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 492-497. Research sponsored by the EMI Electronics, Ltd. and Royal Signals and Radar Establishment.

The radiometer system employs the Dicke-switch principle with a 50% duty ratio but also incorporates an additional reference load which can replace the antenna for calibration purposes. Each load is maintained at a certain temperature by immersion in a dewar together with either ice (273 K) or solid CO2 (195 K). It is noted that, in addition, the overall system can be calibrated and the gain checked by fitting small 'black body' cones filled with either ice or solid CO2 over the antenna feed. The measurements made at 81 GHz show acceptable contrasts between a variety of metal targets and characteristic backgrounds for various weather conditions. To the extent that they have been analyzed to date, the measurements confirm that a center frequency in the range 75-90 GHz is acceptable for all-weather operation. They also emphasize the need for both vertical and horizontal polarization measurements to discriminate between metallic and wet, nonmetallic surfaces. C.R.

A82-18975 † **Airport radar systems (Radiolokatsionnye sistemy aeroportov).** L. T. Perevezentsev, A. V. Zelenkov, and V. N. Ogarkov. Moscow, Izdatel'stvo Transport, 1981. 384 p. 27 refs. In Russian.

The design principles of ground-based radar systems for civil aviation are presented along with techniques for implementing these principles and structural and operational characteristics of airport radar systems. Consideration is given to transmitter, receiver, and feed design, and to MTI systems, the primary processing of radar data, the interpretation and processing of secondary radar data, and radar display techniques. B.J.

A82-18998 † **Aircraft electrical equipment - Design and operation (Elektrooborudovanie samoletov - Ustroistvo i ekspluatatsiia).** A. P. Barvinskii and F. G. Kozlova. Moscow, Izdatel'stvo Transport, 1981. 290 p. In Russian.

Design principles and circuit designs are presented for a variety of aircraft electrical systems. Particular consideration is given to ac and dc generators in aircraft power supply systems, and to the electromechanical drive equipment. Various electrical control systems are also examined, including engine starting, fuel control, antiicing, lighting, and fire extinguishing. B.J.

A82-19001 **Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports (Die Luftrettung: Ergebnisse, Analysen, Entwicklungen; Internationaler Luftrettungs-Kongress, 1st, Munich, West Germany, September 16-19, 1980, Berichte).** Congress sponsored by the Allgemeiner Deutscher Automobil-Club. Edited by H. H. Atrott. Munich, Allgemeiner Deutscher Automobil-Club, 1981. 503 p. In German and English.

A survey of aeromedical evacuation services throughout the world is provided, taking into account conditions in Switzerland, Austria, France, Norway, Great Britain, Italy, West Germany, Belgium, Sweden, Spain, the United States, Australia, East Africa, South Africa, Argentina, Chile, New Zealand, and Behrain. Subjects related to organization, legal and financial bases are investigated, giving attention to basic guidelines for a helicopter ambulance service, an air emergency service, a universal system for the identification of emergency vehicles, marketing the hospital-based helicopter system in a free enterprise environment, and limitations and developments of commercial schedule airline flights for the carriage of invalid passengers. Other topics explored are related to aviation medicine, flight guidance and control systems, the training of aeromedical evacuation personnel, and medical and technical requirements for aircraft and equipment. G.R.

A82-19002 **The marketing, organisation and financing of aeromedical evacuation by a motoring organisation.** A. J. Whitaker (British Automobile Association, Basingstoke, Hants., England). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 71, 72.

The features and effectiveness of a British automotive club aeromedical insurance plan for travellers in Europe, North Africa, and Turkey are described. The plan is sold through banks, travel agents, and service centers, and the service is provided by an amubulance organization with an aeromedical wing. A central communications base can dispatch emergency air services for transport back to Britain in case of accident or illness, using either small general aviation aircraft, chartered jets, or scheduled air services. M.S.K.

A82-19003 Survey of aeromedical evacuation in Italy. C. Manni (Roma, Università Cattolica, Rome, Italy) and G. Ruggieri. In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 73-75. 6 refs.

Aeromedical rescue efforts in Italy, primarily performed by the Italian Air Force, are outlined. Air rescue is mainly confined to remote locations or small islands, and follows the identification by county authorities of the level of the request, the availability of beds in the nearest hospital, and the ensurance of ground transport from the nearest airfield. The Air Force is responsible for providing personnel and machines, including fixed wing aircraft or helicopters, and readiness requirements are detailed. It is noted that the overlapping of various jurisdictional regions by armed forces, state corps, and governing bodies sometimes results in a redundancy of services arriving for the same rescue mission. The training of Air Force aeromedical personnel for first aid and resuscitation tasks is discussed, and can comprise basic medical actions which justify the cost of airborne rescue. M.S.K.

A82-19004 The network of civilian air rescue in Germany (Das Netz der zivilen Luftrettung in Deutschland). G. Kugler (Allgemeiner Deutscher Automobil-Club, Munich, West Germany). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 76-79. In German.

For the last 10 years a network of 26 helicopter air rescue stations have been in operation in West Germany, which can reach 80% of the population within 15 minutes. This civilian air rescue system is used to transport physicians to the scene of an accident, transport patients to hospitals or specialized clinics, transport organs, medical equipment or blood, and act as a search vehicle over mountainous land. Since the beginning of the program, 88,000 rescue flights have been completed, with a maximum daily frequency of 15 flights. In addition to the helicopter rescue program, West Germany has an ambulance aircraft service that specializes in flying patients from outlying areas to suitable clinics in the interior of the country for treatment. D.L.G.

A82-19005 Ambulance helicopter in the Stockholm archipelago. B. Brismar (Huddinge University Hospital, Huddinge, Sweden) and A. Alveryd. In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 85-87.

The results of a summer trial program for aeromedical relief of persons in the Swedish archipelago are reported. A Bell 206 helicopter provided room for a pilot, a prone passenger, and a seated passenger. Noting that in no instance was more than one patient transported at a time, the response time from call receipt to chopper arrival was an average of 25 min, and was extended only when the helicopter was otherwise occupied with another call or during night and bad weather conditions. The lack of an on-site, suitable helicopter landing pad at some hospitals forced a transfer of 85% of the patients by surface ambulance to a hospital in other locations. The cost of the helicopter service was about four times the cost of calling an ambulance in Stockholm, and it was found that in only 16% of the calls was a trained physician necessary, with most cases amenable to treatment by a nurse or other paramedic. M.S.K.

A82-19006 Military assistance to safety and traffic /MAST/. W. R. Gemma (U.S. Department of Health and Human Services, Office of International Health Affairs, Rockville, MD). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 90-94.

The lessons learned and the organizational scheme for the U.S. Military Assistance to Safety and Traffic (MAST) Program are examined. A six-month evaluation of five demonstration sites showed that the use of military personnel and equipment, including helicopters, for emergency medical services is feasible, the military provides round-the-clock readiness, while communities must actively seek to utilize the sources available, and some resistance to MAST use was encountered with local law enforcement agencies. The performance of MAST missions was found to serve as training and mandatory flight time for military personnel, and was employed by civilians only when the available civilian aeromedical services were considered inadequate. Problems of communications involved providing civilian coordinating teams with units compatible with military communications. M.S.K.

A82-19007 Aerial ambulance service in Australia. S. Rowley (Sydney Helicopter Rescue Service, Sydney, Australia). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 94-99.

The operations of the Royal Doctor Flying Service of Australia, which provides medical services for persons living in the remote regions of the Outback, are described. All the doctors are pilots, and also run daily two-way radio clinics, fly rounds for immunization programs, and accompany emergency aeromedical evacuation teams to transfer seriously ill or injured persons to medical facilities. Surf rescue and other coastal aeromedical functions are enacted by helicopter services, which feature a crew comprising a pilot, a rescue crewman, and a doctor. The services are available to everyone, and no charge is levied on anyone or any community for the services rendered. M.S.K.

A82-19008 Flying doctor service in East Africa. A. M. Wood (Flying Doctor Service of Africa, Nairobi, Kenya). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 100-103.

The various features of the East Africe Flying Doctor Service are outlined. The service comprises eight aircraft and a radio network of 100 stations, with calls averaging 2200/mo. Over 100 airstrips are provided near medical facilities, and the flying doctor performs a routine six-month circuit, with the emergency calls occurring at any time. Treatment is confined to dealing with the patient on-site wherever possible, due to overcrowded hospitals, the patient's familiarity and tasks at home, and the opportunity to treat other persons while on the visit. A complete operating team travels on each trip, and also a pilot who is frequently from the region and has a commercial pilots' rating. It is noted that the aircraft method provides a service where otherwise there would be none at all. M.S.K.

A82-19009 Air ambulance systems in the Republic of South Africa. G. O. F. Lippert. In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 104-107.

The operations of the three air ambulance systems in South Africa are discussed. The Johannesburg district has the only helicopter ambulance service, and services an area 500 km in radius. A three minute interval exists between call arrival and dispatch with a full medical team on board. The commercial helicopter firms in Cape Town also offer a 300 km radius air ambulance service, while other population centers have fixed-wing services with either voluntary or Red Cross personnel as the medical teams. Military air ambulances are reserved for particular rescue missions, and it is noted that emergency notification is usually accomplished by telephone. M.S.K.

A82-19010 The situation of air rescue in Argentina (Die Situation der Luftrettung in Argentinien). K. Liebig (Rappard y Cia, S.A., Buenos Aires, Argentina). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 108-110. In German.

Due to the geography of Argentina, air rescue is often the only possible mode of rescue. In case of land catastrophes such as earthquakes, the army will be used to evacuate the elderly, the children and the injured from the area, and fly in medical aid and foodstuffs. Helicopters are often used by the police to rescue people from tall buildings, and water emergencies are taken care of by a special branch of the police who are in charge of the rivers and coasts in the region. Their duties include rescue operations in case of flooding, usually using helicopters. In 1979, the four helicopters in the program flew 320 hours and aided 355 people. D.L.G.

A82-19011 **Aeromedical evacuation in New Zealand.** R. J. Worth. In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 120-122.

The operations and integration of military, government, and private air ambulance services in New Zealand are explored. Only one commercial air ambulance helicopter service exists, which logged 40 missions in its first year of operations carrying premature babies, pregnant mothers, burns victims, trauma victims, and patients with head injuries. The helicopter is used for commercial purposes until called on to make a medical emergency call, when a medical supplies unit can be mounted on-board in four minutes. The role of the U.S. Air Force in carrying out rescue missions in Antarctica from the base at Christchurch is reviewed, and a recommendation is made for a central command to coordinate the activities of the U.S. Air Force, the New Zealand Air Force, and the private aeromedical services. M.S.K.

A82-19013 **A comparative study on mechanical vibration and noise during patient transportation.** S. Rowley (Sydney Helicopter Rescue Service, Sydney, Australia). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 175-177. 5 refs.

The magnitude of mechanical vibration and noise has been investigated for three different forms of patient transportation: helicopters, fixed-wing aircraft, and road vehicles. The figures obtained for all forms of patient transportation studied are below the level set by international standards, but no conclusive evidence of adverse effects on injured tissue is yet available. It is noted that in the case of the helicopter, where the vibration frequencies (6.5, 13, and 19 Hz) are constant during the entire flight, some components are located in the resonance frequency spectrum of some body organs. It is, however, possible to reduce the magnitude of these critical frequencies more readily than to suppress not only the very low frequencies, but also the displacement of the body occurring both in the fixed-wing aircraft and in the road vehicle. V.L.

A82-19015 **Helicopter secondary applications for neurotraumatic emergencies (Helikopter-Sekundäreinsätze für neurotraumatologische Notfälle).** L. M. Auer (Universitätsklinik für Neurochirurgie, Graz, Austria). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 184-186. In German.

Since the life of patients can depend on minutes in neurological cases, the fastest possible transportation of trained neurological surgeons is very important. Since many mountainous regions in Austria are hours away by car from clinics where patients can receive proper neurological care, a program was developed whereby helicopters can transport neurosurgeons to the patients often within minutes. The system allows the patient to be operated on immediately without being moved, and afterwards the patient can either be flown to a neurological clinic or remain in the original hospital for post-operative care. Results of the program have been good; in 1973-1974 before the program, only 25% of neurotraumatic patients survived, while in 1977-1979 after the application of the program, 58% of the patients survived. D.L.G.

A82-19017 **Helicopters - Night operations (Hubschrauber-Einsätze bei Nacht).** C. Bühler (Schweizerische Rettungsflugwacht, Zurich, Switzerland). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 214-218. In German.

In Switzerland the helicopter is often used to transport accident patients from the south to the university clinics in the north. Pilots are required to make three types of flights: return flights to the homebase, flights to familiar destinations such as hospitals, and flights to unfamiliar destinations such as where first aid is administered. Weather is critical, and bad weather can create delays and additional risk. Accessories are used to improve flying, including obstacle maps, altimeters, night viewing goggles, and projector lamps, and electronic equipment may be used in the future to improve vision. D.L.G.

A82-19018 **Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas (Flugtechnische Probleme beim Bergrettungseinsatz mit Hubschraubern).** B. Klingner (Bundeswehr, Penzing über Landsberg, West Germany). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 219-222. In German.

The use of helicopters for rescue operations in mountainous areas can provide sometimes very great advantages compared to an employment of more conventional means. However, the conditions might be such that a use of helicopters, although urgently needed, is not possible in connection with technological and environmental factors. An investigation is conducted regarding the criteria which have to be taken into account in an evaluation concerning the feasibility of an employment of a helicopter in a specific situation, giving attention to limitations with respect to machines and pilots. Aspects of engine performance are considered along with the helicopter payload, the weather, and a special training of helicopter pilots for flight operations in mountainous areas. G.R.

A82-19019 **The helicopter in rescue operations in high-mountain areas (Der Hubschrauber beim Rettungsdienst im Hochgebirge).** W. Phleps and G. Flora (Innsbruck, Chirurgische Universitätsklinik, Innsbruck, Austria). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobil-Club, 1981, p. 222-229. In German.

The use of helicopters for rescue operations in high-mountain areas is briefly reviewed. It is pointed out that in a number of cases the employment of a helicopter represents the only possibility to effect a rescue. It is estimated that, taking into account only the Alps, considerably more than 100 persons owe their rescue from certain death each year exclusively to the availability of a helicopter. The decision regarding an employment of a helicopter in an area of high mountains is based on three criteria, which are related to the medical aspects involved, considerations regarding the general feasibility of rescue operations, and economic factors. Differences regarding the characteristics of helicopter operations in mountainous areas and in flat country are discussed, and a description is provided of the advantages and drawbacks of the five helicopter types which are most frequently employed in the Alps. G.R.

A82-19020 **Design requirements for modern rescue helicopters (Konstruktive Anforderungen an moderne Rettungshubschrauber /RTH/).** E. Weiland (Messerschmitt-Bölkow-Blohm GmbH, Unternehmensbereich Drehflüger und Verkehr, Munich, West Germany). In: Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobile-Club, 1981, p. 418-436. In German.

The architecture and size of a rescue helicopter is determined by its function as well as the time and space required to successfully complete its mission. A matrix is presented which outlines the various technical requirements of a rescue helicopter and the corresponding design solutions. The resulting architecture includes a helicopter airframe with a large interior cabin for transporting and caring for the sick or injured; a wide door to facilitate loading; a main rotor with at least three blades; a rotor arrangement that provides sufficient ground clearance; the use of gas turbine propulsive units, interior noise attenuation; and additional communication linkages. The weight of the helicopter and the diameter of its rotor must also be determined. As an example, the German BK 117 and BO 105 rescue helicopters are discussed in detail; the necessary mobile and standard equipment and instrumentation for these aircraft are illustrated. J.F.

A82-19021 **Aircraft for secondary long range emergency ambulance flight.** K. J. J. Waldeck and G. B. J. Bramer (Algemeene Nederlandsche Wielrijders Bond, The Hague, Netherlands). In: Aeromedical evacuation; Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports. Munich, Allgemeiner Deutscher Automobile-Club, 1981, p. 460-463.

The primary aim for medical transport today is mobile intensive treatment and care. Rules and directives for medical assistance in flight must therefore be developed, and an ambulance for long-range emergency flight must be designed. This includes the need for special equipment, such as a floating stretcher, which will protect the body of the patient against accelerations with frequencies, corresponding with the natural frequencies of parts of the body and organs. The Fokker F-27 Friendship turboprop from Holland has been converted into an ambulance aircraft with the primary function of in-flight intensive treatment and care. The helicopter features three compartments for (1) the patient and medical equipment; (2) the medical personnel; and (3) the passengers. The F-27 has a large front cargo door with lift installation and a communication area to maintain radio contact with a ground station for medical purposes. The whole medical system can be loaded into the aircraft on pallets, thus enabling every F-17 fitted with a front cargo door to be converted into an ambulance-aircraft within a short period. J.F.

A82-19061 # **An application of total synthesis to robust coupled design.** M. K. Sain, R. M. Schafer, and K. P. Dudek (Notre Dame, University, Notre Dame, IN). In: Annual Allerton Conference on Communication, Control, and Computing, 18th, Monticello, IL, October 8-10, 1980, Proceedings. Urbana, IL, University of Illinois, 1980, p. 386-395. 10 refs. Contract No. N00014-79-C-0475.

Total synthesis techniques for the control of linear multivariable systems are module theoretic methods aimed at bottom line design, wherein the designer selects at the outset the control action and system response characteristics which will be attained. This selection is made from the class having associated with it the possibility of an internally stable feedback realization. In practice, however, such realizations are normally carried out with decentralized dynamics - or fixed structure. Moreover, they must be achieved in such a way that plant parameter variation does not materially inhibit the nominal filter responses. This paper reports on the extension of the Total Synthesis Problem (TSP) concept to robust feedback realizations of fixed structure. An example from turbojet engine data illustrates the concepts. (Author)

A82-19065 # **The use of adaptive control for helicopter trajectories in search operations.** A. Chacón, M. Azagoury, B. Fernández (Universidad Simón Bolívar, Caracas, Venezuela), R. Padilla, and C. Padilla (Instituto Venezolano de Investigaciones Científicas, Caracas, Venezuela). In: Annual Allerton Conference on Communication, Control, and Computing, 18th, Monticello, IL, October 8-10, 1980, Proceedings. Urbana, IL, University of Illinois. 1980, p. 633-642.

An effective and successful search operation by helicopter requires close tracking of predetermined trajectories defined by the characteristics of the terrain and the prior information available to the search party. We investigate here the design of an adaptive controller such that the helicopter follows a predetermined trajectory in a horizontal plane. A model reference control approach is used. Simulation results are given to illustrate the behavior of the controller. (Author)

A82-19069 # **Broader bandwidth for thin conformal antennas.** K. D. Arkind (Sanders Associates, Inc., Nashua, NH). *Astronautics and Aeronautics,* vol. 20, Jan. 1982, p. 31-33.

Current broadband design technology for thin arrays is described. The ability now exists to analyze array concepts with arbitrary element locations and to use printed circuit antenna concepts, which yields minimum drag on a vehicle surface and reduces the cost of complex array designs. A tee-fed-slot design is described which offers 10-20 times the bandwidths of a similar microstrip counterpart, and is noted to employ layered construction. The array antenna is suggested for applications in ECM environments for radar and communications. M.S.K.

A82-19071 * # **On the track of practical forward-swept wings.** T. J. Hertz, M. H. Shirk (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH), R. H. Ricketts (NASA, Langley Research Center, Hampton, VA), and T. A. Weisshaar (Purdue University, West Lafayette, IN). *Astronautics and Aeronautics,* vol. 20, Jan. 1982, p. 40-52. 30 refs.

Structural laminates which comprise wing-cover skins for forward swept winged aircraft are examined. The laminates are themselves composed of lamina arranged in a symmetrical and unbalanced fashion. The fibers are oriented so that no fiber has a counterpart in the same ply which is at an exact anti-angle to itself. The laminate orientation creates a wash-out in a forward swept wing and alleviates aeroelastic loading. Further discussion is devoted to center-of-pressure movement, flutter behavior, aeroelasticity and aeroelastic divergence, and wind tunnel testing of aerodynamically tailored wings. It is found that rotating the laminate to increase the divergence dynamic pressure decreases strain under aerodynamic loading. Flight tests with three models are reported, and it is concluded that divergence can be avoided by the use of an efficient composite structure. M.S.K.

A82-19195 **A simplified wing procedure in connection with the lifting line theory and the doublet-lattice method (Ein vereinfachtes Tragflächenverfahren in Verbindung mit der Traglinientheorie und der Doublet-Lattice Methode).** R. Dziurzynski and M. Nowak (Polska Akademia Nauk, Instytut Podstawowych Problemow Techniki, Warsaw, Poland). *(Gesellschaft für angewandte Mathematik und Mechanik, Wissenschaftliche Jahrestagung, Berlin, West Germany, Apr. 8-11, 1980.) Zeitschrift für angewandte Mathematik und Mechanik,* vol. 61, Apr. 1981, p. T 145, T 146. In German.

A82-19197 **Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow.** A. Nastase and H. Stahl (Aachen, Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). *(Gesellschaft für angewandte Mathematik und Mechanik, Wissenschaftliche Jahrestagung, Berlin, West Germany, Apr. 8-11, 1980.) Zeitschrift für angewandte Mathematik und Mechanik,* vol. 61, Apr. 1981, p. T 165-T 168. 13 refs.

The considered wave rider is a delta wing which is designed specifically for hypersonic flight at the cruising Mach number 7. After a flight outside the atmosphere, the wave rider will reenter at supersonic speed. The present investigation is concerned with the theoretical determination of the distribution of the pressure coefficient on the wing surface. The calculation procedure involves the solution of a boundary value problem with respect to the axial disturbance velocity. In the considered case, it is necessary to find the solution of a three-dimensional linearized partial differential equation, taking into account the linearized boundary condition on the wing, or the Mach cone (at the apex of the wave rider), and at infinity. A comparison of the theoretically and experimentally determined values for the pressure distribution shows very good agreement for the entire wing surface. G.R.

A82-19198 **The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory (Das Geschwindigkeitspotential für den harmonisch schwingenden, rechteckigen Flügel halbunendlicher Spannweite in der nichtlinearen Theorie).** S. Turbatu (Centrul National de Fizica, Bucharest, Rumania). *(Gesellschaft für angewandte Mathematik und Mechanik, Wissenschaftliche Jahrestagung, Berlin, West Germany, Apr. 8-11, 1980.) Zeitschrift für angewandte Mathematik und Mechanik,* vol. 61, Apr. 1981, p. T 193-T 195. 9 refs. In German.

A nonlinear potential equation employed by Landahl (1961) is considered. The equation is obtained on the basis of small perturbation theory for conditions near the sonic velocity. The present investigation is concerned with flows for which the free stream Mach number is one. The simplified equation corresponding to the selected condition is solved with the aid of an approach reported by Teipel (1964) and Ruo (1974). The solution procedure makes also use of the parabolic method considered by Oswatitsch and Keune (1955). A boundary value problem is obtained, and solved according to a method reported by Burger (1959). A general formula for the calculation of all desired quantities is derived, and the solution of the problem for the wing is obtained. The formula can be transformed into an expression of linear theory by setting a certain parameter equal to zero. The resulting expression agrees with the solution reported by Turbatu (1964, 1973). G.R.

A82-19201 * # **Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model.** M. R. Dudley, M. D. Falarski (NASA, Ames Research Center, Moffett Field, CA), A. Pisano (U.S. Navy, Naval Air Systems Command, Washington, DC), and W. G. Hill (Grumman Aerospace Corp., Bethpage, NY). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2609.* 11 p. 8 refs. Research sponsored by the Grumman Aerospace Corp., U.S. Navy, and NASA.

This paper is a summary of an analysis of the ground-effect characteristics of a large-scale twin-engine, tilt-nacelle V/STOL model. The analysis considers data from the flow field beneath the full-scale model, as well as small-scale model test data, and makes comparisons with jet-ground interactions predicted by a computer code. The data from the large-scale test comprise ground-plane surface temperatures, static pressure distribution and wall-jet total-pressure profiles, fuselage undersurface static pressures, and model forces and moments. The results indicate that the near-field flow is more complex than is indicated by either the small-scale uniform jet studies or the computer predictions. The far-field flow characteristics do show some similarity for these three cases. (Author)

A82-19202 * # **Experimental investigation of a jet inclined to a subsonic crossflow.** K. Aoyagi and P. K. Snyder (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2610.* 15 p. 10 refs.

Experimental investigations have been conducted to determine the surface-pressure distribution on a flat plate and a body of revolution with a jet issuing at a large angle to the free stream and to obtain a better understanding of the entrainment mechanism close to the jet exit by quantitative mean velocity surveys. Pressure data were obtained with a flat plate model at several nozzle injection angles using a single round nozzle. For the body of revolution model, data were obtained with a round jet exhausting perpendicular to the crossflow and with two round jets spaced two to six nozzle diameters apart. Mean velocity measurements were obtained with laser velocimeter surveys near the base of a round jet exhausting normal to a flat plate. For the flat plate model, the pressure field shifts downstream and the entrainment effect decreases with decreasing nozzle injection angle. For the body of revolution model with two jets, the jet-induced effect of the rear jet on the surface-pressure distribution was less than the front jet. The flow regions close to the jet are defined by the laser surveys, but further mean velocity surveys are required to understand the entrainment mechanism. (Author)

A82-19203 * # **Thrust-induced effects on low-speed aerodynamics of fighter aircraft.** D. W. Banks, P. F. Quinto, and J. W. Paulson, Jr. (NASA, Langley Research Center, Subsonic Aerodynamics Branch, Hampton, VA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2612.* 10 p. 10 refs.

The design and technology requirements for STOL fighter aircraft as defined in NASA studies are reviewed. The research has concentrated on advanced high-lift systems using mechanical flaps, methods of obtaining longitudinal trim during the use of thrust vectoring, and thrust reversal to shorten ground roll distances. Several early configurations are described, and investigations of the effect of thrust reversal on the low-speed aerodynamics of the F-15 are detailed. Although the NASA design was a wing-canard configuration, similarities in a Grumman baseline STOL aircraft allowed incorporation of the Grumman nacelle, primary nozzles, spanwise blowing nozzles, and trailing-edge flap systems. M.S.K.

A82-19204 # **Tactical STOL moment balance through innovative configuration technology.** G. J. Eckard, R. C. Sutton (Boeing Military Airplane Co., Seattle, WA), and G. E. Poth (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2615.* 16 p.

Innovative and conventional thrust vectoring moment balance mechanisms, as applied to advanced tactical fighters, are examined. The innovative mechanisms include thrust line translation, life line translation, and auxiliary power control; the conventional mechanisms under investigation are horizontal tails, canards, and variable sweep wings. These mechanisms are tested for their ability to provide negative static margins for landing approach or relocation of the vectored thrust line nearer the aircraft's center of gravity. The net pitching moment due to wing, flaps, and vectored thrust lift would then be small, making possible beneficial trim forces from small trimming devices. These innovative mechanisms are, however, possibly heavy and must be evaluated on their complexity, reliability, maintainability, and STOL capabilities. Several candidate fighter configurations are compared and evaluated. J.F.

A82-19205 # **Application of thrust vectoring for STOL.** P. D. Whitten, R. W. Woodrey, and J. E. Hames (General Dynamics Corp., Fort Worth, TX). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2616.* 13 p. 12 refs.

Studies of generic aircraft configurations to determine the payoff of thrust vectoring for direct lift during STOL landings and takeoff and for control power augmentation during weapons-delivery maneuvers are described. Results show that for a nominal 1000-foot landing distance, direct-lift benefits are small, but significant improvements in control power augmentation contribute to payoffs in takeoff distance and recovery from roll-pitch-coupling-induced departures at high angles of attack. (Author)

A82-19206 # **STOL capability impact on advanced tactical aircraft design.** R. E. Krepski (Grumman Aerospace Corp., Bethpage, NY) and R. E. Hudson, Jr. (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2617.* 9 p.

The design and technical issues affecting supersonic STOL development as an airbase attack fighter are discussed. An Air Force study has indicated that, from a weight and cost standpoint, the preferred directions will include two-dimensional nozzles with vectoring and thrust reversing capability. Take-off and landing requirements would determine other design features, and the use of a jump strut to enable landing maneuvers to be made at pitch angles which would normally drag the tail is detailed. The addition of a tip-mounted reaction control system is foreseen as necessary for roll control at the low aerodynamic speeds of STOL landing. A severe 700 ft landing distance design is outlined, and includes a lifting engine with bleed-air features to feed the reaction control system. M.S.K.

A82-19207 * # **Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration.** M. D. Falarski, M. D. Dudley (NASA, Ames Research Center, Moffett Field, CA), and G. Howell (General Dynamics Corp., Fort Worth, TX). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2620.* 21 p. 13 refs.

The surface pressure and thermal characteristics of a large-scale model of a highly maneuverable supersonic fighter with STOL capability are described. The 7.28 m span model is powered by two J-97 turbojets, operated at 9340 N thrust. It combines upper-surface and spanwise blowing to augment the lift characteristics over a wide angle-of-attack range. The most significant feature of the fighter's flow field is the leading edge vortex that forms at low alphas, grows stronger, and moves inboard as alpha is increased. Upper surface blowing enhanced the lift on the wing in both stalled and unstalled areas significantly, while generating only a modest aft shift in the center of pressure. Lift gains were greatest at high alphas and with the flap deflected. Spanwise blowing was most significant at angles-of-attack greater than 8 deg, when the jet strengthened the vortex. The 1100 F spanwise blowing jet mixed very rapidly with the wing flow field, creating a maximum temperature rise of only 300-350 F. A comparison of small-scale and large-scale model wing pressure characteristics showed similar trends created by upper surface blowing, while spanwise blowing characteristics differed considerably. Force data correlated well with semi-empirical predictions for gross thrust coefficients less than 1.0. J.F.

A82-19208 * # **Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack.** F. Stoll (NASA, Ames Research Center, Helicopter and Powered Lift Technology Div., Moffett Field, CA) and E. A. Minter (Vought Corp., Dallas, TX). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2621*. 12 p. 6 refs.

A new sting model support has been developed for the NASA/Ames 40- by 80-Foot Wind Tunnel. This addition to the facility permits testing of relatively large models to large angles of attack or angles of yaw depending on model orientation. An initial test on the sting is described. This test used a 0.4-scale powered V/STOL model designed for testing at angles of attack to 90 deg and greater. A method for correcting wake blockage was developed and applied to the force and moment data. Samples of this data and results of surface-pressure measurements are presented. (Author)

A82-19209 * # **Quiet Short-Haul Research Aircraft - The first 3 years of flight research.** J. A. Cochrane, D. W. Riddle, and V. C. Stevens (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2625*. 18 p. 9 refs.

NASAs first three years of flight research in an investigation of terminal area flight operation with the Quiet Short-Haul Research Aircraft (QSRA) are presented. An initial flight and modification program was devoted to improving the capabilities of the QSRA and measuring its performance. Later programs included a joint program with the US Navy, a guest pilot program involving 23 pilots from 16 organizations, and a program to measure benefits of propulsive-lift to CTOL aircraft. Development flight research, complemented by the aircraft modification program, has resulted in improvements in the maximum lift coefficient of more than two units, and has greatly improved flight characteristics and handling qualities. D.L.G.

A82-19210 * # **Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle.** R. C. Williams (NASA, Lewis Research Center, Cleveland, OH) and A. H. Ybarra (Vought Corp., Dallas, TX). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2627*. 12 p. 5 refs.

An approximately 0.25 scale model of a tandem fan nacelle, designed for a subsonic V/STOL aircraft, was tested in a Lewis wind tunnel. Model variables included long and short aft inlet cowls and the addition of exterior strakes to the short inlet cowl. Inlet pressure recoveries and distortion were measured at pitch angles to 40 deg and at combinations of pitch and yaw to 30 deg. Airspeeds covered a range to 135 knots (69 m/sec). The short aft inlet with added strakes had the best aerodynamic performance and is considered suitable for the intended V/STOL application. (Author)

A82-19211 * # **Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability.** D. G. Koenig, F. Stoll, and K. Aoyagi (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2629*. 23 p. 41 refs.

The status of ejector development in terms of application to V/STOL aircraft is reported in three categories: aircraft systems and ejector concepts; ejector performance including prediction techniques and experimental data base available; and, integration of the ejector with complete aircraft configurations. Available prediction techniques are reviewed and performance of three ejector designs with vertical lift capability is summarized. Applications of the 'fuselage' and 'short diffuser' ejectors to fighter aircraft are related to current and planned research programs. Recommendations are listed for effort needed to evaluate installed performance. (Author)

A82-19212 * # **Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft.** D. B. Smeltzer, W. P. Nelms, and T. L. Williams (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2631*. 10 p. 8 refs.

Inlet flow-field and compressor-face performance data were obtained for a 0.095-scale model of a VSTOL fighter-attack aircraft configuration with twin top-mounted inlets. Tests were conducted at Mach numbers from 0.6 to 2.0 and at angles of attack and sideslip up to 27 deg and 12 deg, respectively. The effects of inlet location, wing leading-edge extension planform area, canopy-dorsal integration, and variable incidence canards were determined. The results show that distortion at the compressor face when maneuvering is relatively low (20% or less) at Mach numbers up to 0.9. However, at Mach numbers of 1.2 and above, maneuverability may be restricted because of high distortion or low pressure recovery (80% or less) or both. (Author)

A82-19213 * # **Thrust modulation methods for a subsonic V/STOL aircraft.** R. R. Woollett (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2633*. 17 p.

Attention is given to four techniques for attaining thrust modulation, namely (1) varying the engine rotational speed; (2) varying the fan nozzle exit area; (3) changing the thrust of the propulsion system by using a variable pitch rotor; and (4) changing the thrust by means of variable inlet guide vanes. The thrust modulation range, thrust level, and blade stresses are examined for each of the thrust modulation systems. Results are shown at the high angles of attack associated with tilt-nacelle V/STOL aircraft. Finally, the interrelationship between the inlet and the thrust modulation system is illustrated for two inlet types. C.R.

A82-19214 * # **Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL.** R. W. Luidens, G. E. Turney, and J. Allen (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2637*. 15 p. 5 refs.

The thrust, specific fuel consumption, and relative merits of the tandem fan and the dual reverse flow front fan propulsion systems for a supersonic V/STOL aircraft are discussed. Consideration is given to: fan pressure ratio, fan air burning, and variable core supercharging. The special propulsion system components required are described, namely: the reflecting front inlet/nozzle, the aft subsonic inlet, the reverse pitch fan, the variable core supercharger and the low pressure forward burner. The potential benefits for these unconventional systems are indicated. (Author)

A82-19215 # **VTOL as it applies to resource development in the Canadian north.** R. N. Lightfoot (UMA Group, Edmonton, Alberta, Canada). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2640*. 18 p. 58 refs.

It is pointed out that, for many of the natural resource development projects planned in Canada between now and the end of the century, it may be necessary for the work force to commute to the site by air. Examples of successful operations, including those involving VTOL, are given. A computer program developed for determining the least expensive type of aircraft for commuting to remote projects is described. It is noted that the program can select both fixed-wing and helicopter aircraft types for a specific project, employing such variables as the size and shift schedules of the work force and the commuting distance. Capital and operating costs of existing and proposed aircraft types, as well as groundside infrastructure operations and maintenance costs, are compared for competing aircraft. C.R.

A82-19216 * # **Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft.** W. P. Nelms and D. A. Durston (NASA, Ames Research Center, Aircraft Aerodynamics Branch, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2647.* 28 p. 15 refs.

The results obtained in the early stages of a research program to develop aerodynamic technology for single-engine V/STOL fighter/attack aircraft projected for the post-1990 period are summarized. This program includes industry studies jointly sponsored by NASA and the Navy. Four contractors have identified promising concepts featuring a variety of approaches for providing propulsive lift. Vertical takeoff gross weights range from about 10,000 to 13,600 kg (22 000 to 30,000 lb). The aircraft have supersonic capability, are highly maneuverable, and have significant short takeoff overload capability. The contractors have estimated the aerodynamics and identified aerodynamic uncertainties associated with their concepts. Wind-tunnel research programs will be formulated to investigate these uncertainties. A description of the concepts is emphasized. (Author)

A82-19217 # **Sea based support aircraft alternatives.** R. T. Priestley and A. R. Yackle (Lockheed-California Co., Burbank, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2649.* 10 p. 5 refs.

Multi-mission, CTOL, STOL and V/STOL aircraft concepts were sized for the Navy ASW/ASUW missions and comparatively evaluated. Initially, technology levels in the areas of lift, control systems, propulsion, advanced materials and avionics were established for the early 1990's. The aircraft were compared to determine the impact of multi-mission requirements, operational considerations, chiefly takeoff mode, as well as the technology advancements. Results presented include performance envelopes, weight statements, growth factors, impact of technology on weight reduction and the impact of design constraints. (Author)

A82-19218 # **Design features of a sea-based multipurpose V/STOL, STOVL, and STOL aircraft in a support role for the U.S. Navy.** G. W. Bradfield (General Dynamics Corp., Fort Worth, TX). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2650.* 9 p.

Design features and certain performance data are outlined for three different basic airframes. The heart of the design is a powered lift system known formally as the Advanced Blown Lift Enhancement system. A summary of the results of both powered-model wind tunnel tests of the airplane and of static tests of the vectoring-nozzle system is given to indicate the rather high degree of thrust vectoring efficiency and powered lift enhancement attained. C.R.

A82-19219 # **Application of the ABC helicopter to the emergency medical service role.** L. S. Levine (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2653.* 18 p. 23 refs.

Attention is called to the use of helicopters in transporting the sick and injured to medical facilities. It is noted that the helicopter's speed of response and delivery increases patient survival rates and may reduce the cost of medical care and its burden on society. Among the vehicle characteristics desired for this use are a cruising speed of 200 knots, a single engine hover capability at 10,000 ft, and an absence of a tail rotor. Three designs for helicopters incorporating such new technologies as digital/optical control systems, all composite air-frames, and third-generation airfoils are presented. A sensitivity analysis is conducted to show the effect of design speed, mission radius, and single engine hover capability on vehicle weight, fuel consumption, operating costs, and productivity. C.R.

A82-19220 * # **Analysis of selected VTOL concepts for a civil transportation mission.** S. B. Wilson, III, J. V. Bowles, and J. D. Foster (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2655.* 19 p. 15 refs.

As part of defining the needs and technology requirements for VTOL aircraft research and development, the objective of this paper is to study the application of two tilt propulsion concept VTOL aircraft to the business/executive transport mission. The two concepts selected for study are the tilt jet concept utilizing rotating turbofan engines for both vertical lift and cruise thrust, and the tilt rotor concept using relatively low disc loading propellers for hover and cruise. Overall mission costs, including the time-value cost of the executives, was computed for a selected range of mission distances, up to the design mission range of 750 nm (1400 km). The total trip cost was also compared to that of a conventional helicopter/business jet combination for a typical executive transport mission. (Author)

A82-19221 * # **A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation.** J. R. Mihaloew (NASA, Lewis Research Center, Cleveland, OH), S. P. Roth, and R. Creekmore (United Technologies Corp., Government Products Div., West Palm Beach, FL). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2663.* 18 p. 6 refs.

A Pegasus-Harrier propulsion system is selected as a baseline for developing mathematical modeling and simulation techniques for VSTOL. Initially, static and dynamic propulsion system characteristics are modeled in detail to form a nonlinear aerothermodynamic digital computer simulation of a Pegasus engine. From this high fidelity simulation, a real-time propulsion model is formulated by applying a piecewise linear state variable methodology. A hydromechanical and water injection control system is also simulated. It is noted that the real-time dynamic model includes the detail and flexibility required for evaluating critical control parameters and propulsion component limits over a limited flight envelope. C.R.

A82-19234 **Utilization of hybrid computational equipment for the simulation of parachute system flight.** W. H. Curry and P. R. Schatzle (Sandia National Laboratory, Albuquerque, NM). In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 143-147. 5 refs. Research supported by the U.S. Department of Energy.

Some computational programs which ordinarily would be run on large-scale, all-digital central computing equipment could also be implemented on hybrid computing equipment located in dedicated facilities such as, for example, aerospace flight simulation laboratories. Advantages would be cost-effective use of equipment and, in many cases, shorter run time. A description is presented of the utilization of a hybrid computer for parachute system flight simulation, taking into account some typical results. The described simulations were programmed for hybrid computer facilities which include fully expanded AD/FIVE analog computers interfaced to a PDP11/60 digital computer with a 64-kiloword core and two 2.5 megaword disks. G.R.

A82-19244 **KC-135 avionics modernization hot bench - An evaluation of requirements and design for the future.** S. J. Cristiani (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 338-340.

The U.S. Air Force has been extending the operational capabilities and useful life of its KC-135 air refueling fleet through a series of improvements. In order to evaluate various options for avionics system design, projects were initiated with the Directorates of Avionics Engineering (ENA) and Equipment Engineering (ENE). Attention is given to the development of the Avionics Modernization Hot Bench (AMHB). This effort is providing the technical data base for near term KC-135 avionic updates and for charting the long-term roadmap for future updates. The Hot Bench consists of a mix of actual avionics hardware (e.g., computers, displays) and software simulation of certain subsystems. The hot bench is a well known development, test, and integration tool for real-time avionics systems. The simulation software portion of the Hot Bench is discussed. G.R.

A82-19245 **Radar environment simulation for software test.** W. D. Horner (Westinghouse Defense and Electronic Systems Center, Baltimore, MD). In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 341-343.

Real-time radar environment simulations are used to speed up the software integration and debug phase of radar system development. The entire radar environment can be simulated for the operational flight program (OFP) resident within the fire control radar computer (RC) by physically connecting the RC to a simulation support computer through special purpose hardware interfaces. A description is provided of some of the capabilities of a radar environment simulation used in conjunction with actual embedded radar computer hardware. The real power of the simulation lies in its organization which makes it possible to make use of the hardware freeze capability, within the embedded computer. G.R.

A82-19253 **A fuel control system designers approach to gas turbine engine computer model validation.** R. M. Evans (Aviation Electric, Ltd., Montreal, Canada). In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 532-537. Department of Industry, Trade and Commerce Contract No. 9ST79-00058.

A hybrid computer model of a gas turbine driving a helicopter rotor system is assembled and shown to be an accurate simulation in both steady state and transient modes of operation when compared to actual engine data. A fuel controller is designed, which employs innovative control mode concepts using the engine model to define the control mode concepts using the engine model to define the control mode parameters. The basic structure of the model is shown to be sound and applicable to other types of gas turbines. D.L.G.

A82-19256 **SIMATR - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars.** J. Golub, D. M. Greeley, and B. B. Levy (RCA, Missile and Surface Radar Div., Moorestown, NJ). In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 636-641.

The objective of SIMATR (Simulation of Integrated Multiple Advanced Tactical Radars) is to demonstrate the value of a network of Advanced Tactical Radars (ATRs) in an air battle through the increased effectiveness of the interceptors in repulsing the attack. This increased effectiveness is attained by directly controlling and designating the airborne interceptor radar to provide the interceptor a relatively free and unanswered first shot of an air-to-air weapon. The basic SIMATR operation is described, and an example is provided of defensive force reaction to a massive enemy air attack. System enhancements that may further expand its capabilities and increase its effectiveness are discussed. C.R.

A82-19259 **Simulation of advanced cockpits.** J. M. Reising (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) and L. Hitchcock (FAA, Technical Center, Atlantic City, NJ). In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 662-665. 5 refs.

The development of advanced digital graphics and displays which utilize the capabilities of full-color, computer generated pictures is described. The transition is being made from electromechanical displays and associated numerical formats to electro-optical displays which employ advanced symbols and special algorithms for real-time projection. Pictorial formats provide intuitive, simple representations of how the aircraft is performing, its situation relative to other traffic, the presence of ground obstacles, and emergencies and remedial procedures. New formats are recommended to be screened in a two stage evaluation involving mock-ups and simulators, and are subjected to pilot scrutiny to determine acceptability. The digital Synthesis Facility is described, including the use of an A-7 cockpit and a PDP-11/50 computer system for real-time simulation of A-7 flight. M.S.K.

A82-19260 * **Real-Time Simulation Computation System.** J. L. Fetter (NASA, Ames Research Center, Moffett Field, CA). In: Summer Computer Simulation Conference, Washington, DC, July 15-17, 1981, Proceedings. Arlington, VA, AFIPS Press, 1981, p. 666-670. 9 refs.

The Real-Time Simulation Computation System, which will provide the flexibility necessary for operation in the research environment at the Ames Research Center is discussed. Designing the system with common subcomponents and using modular construction techniques enhances expandability and maintainability qualities. The 10-MHz series transmission scheme is the basis of the Input/Output Unit System and is the driving force providing the system flexibility. Error checking and detection performed on the transmitted data provide reliability measurements and assurances that accurate data are received at the simulators. D.L.G.

A82-19263 # **Experience with flight simulators - Training effectiveness-future developments.** J. F. Smith (USAF, Human Resources Laboratory, Williams AFB, AZ). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-110.* 12 p.

The progress, development, and effectiveness of flight simulators are examined from the introduction of the Link trainer to predictions of future directions and capabilities. The first six simulators were delivered in 1934 and by WW II congressional reports asserted that armed service savings in manhours and expenses were in millions of hours and hundreds of millions of dollars. Electronic simulation began after WW II, and with the arrival of jet aircraft, simulators were used for instrument and procedures training, as well as weaponry and refueling operations. Visual representations were added in the 1970's, along with low-level flight cuing, manual reversion problems, and remote operation of a simulator from different bases. Recommendations are provided for optimized use of present simulators, and the employment of simulators as testing grounds for pilots, for total environment simulation, and the development of part-task trainer systems in the future are discussed. M.S.K.

A82-19264 # **Cost efficiency versus objective fidelity in flight simulation (Kosteneffektivität gegenüber objektivem Realismus bei der Flugsimulation).** G. Dörfel and H. Distelmaier (Forschungsinstitut für Anthropotechnik, Wachtberg-Werthoven, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-104.* 15 p. 8 refs. In German.

The effect of the objective fidelity level on the simulation cost is considered, taking into account relative cost as a function of motion fidelity and visual scene fidelity levels. Cost considerations make it necessary to conduct an investigation regarding the degree to which an achievement of objective fidelity is desirable for flight simulation processes. It has to be taken into account that the simulator is not an aircraft copy, but any educational device employed to obtain a certain objective regarding the training of a pilot. A study is required regarding the approaches needed to achieve this objective, taking into account the extent of the information which has to be presented and the effect of the various cues on the pilot and his performance. Previous investigations show that subjective fidelity can help to achieve, at a lower cost, training results of the same quality as objective fidelity. These conclusions apply to full-mission simulators and to part-time training devices. G.R.

A82-19265 # **Properties of the new flight and tactics simulators (Eigenschaften der neuen Flug- und Taktiksimulatoren).** H.-J. Balke (Bundesamt für Wehrtechnik und Beschaffung, Koblenz, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-106.* 17 p. In German.

In the 1970s, the Armed Forces of the Federal Republic of Germany have placed orders for many simulators, which are currently being used or which will be received in the next few years. All new simulators employ exclusively digital computers. The combined use of display and computer makes the simulator an efficient training device. A pilot can draw conclusions regarding the flight conditions of the aircraft on the basis of the aircraft motions perceived by him. Facilities are provided which make it possible for the pilot to practice such a utilization of aircraft motions in the simulator. The employed kinematic system performs motion processes involving 6 degrees of freedom. The G-seat in connection with the G-suit can convey to the pilot the impression that he is flying at accelerations greater than 1 g. Attention is also given to equipment used to make the aid of the instructor more effective, aspects of radar simulation, and the simulation of electronic warfare situations. G.R.

A82-19266 # **Procurement of the new flight and tactics simulators - Experience, problems, meaning (Beschaffung der neuen Flug- und Taktiksimulatoren - Erfahrungen, Probleme, Sinn).** H.-J. Balke (Bundesamt für Wehrtechnik und Beschaffung, Koblenz, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-095.* 8 p. In German.

The stationary flight and tactics simulator is used for the training of flight crews. An aircraft cockpit is employed, while electronic computers simulate the behavior of the aircraft, the characteristics of the aircraft equipment, and the operation of the engine. A number of similar appearing names are employed for simulators and other training devices. It is, therefore, sometimes difficult to distinguish between training devices for ground personnel and the simulators for flight crews. A description of the meaning of the various terms employed in this connection is provided as an aid for the appropriate identification of a device. Attention is given to market considerations regarding the purchase of simulators, details concerning the simulator procurement process, and the benefits obtained by an employment of flight and tactics simulators. G.R.

A82-19267 # **Requirements regarding digital external view systems for full mission flight and tactics simulators (Anforderungen an Digitale Aussensichtsysteme für Full Mission Flug- und Taktiksimulatoren).** P. Güldenpfennig (Messerschmitt-Bölkow-Blohm GmbH, Ottobrunn, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-100.* 14 p. In German.

During the time period from 1975 to 1977 a computer-generated image (CGI) system for the training simulator Tornado was developed by an aerospace company in West Germany. A school for the study of weapon systems, four squadrons of the German Air Force, and two squadrons of the German Navy were equipped with flight and tactics simulators for the training of Tornado crews. The principal combat objectives for the Tornado aircraft are related to the performance of battlefield interdiction and strike missions. A CGI system prototype is considered along with an evaluation of the CGI system prototype by pilots of the German Air Force and Navy. The results of the evaluation are discussed, taking into account each of the various types of operation to be performed with the aircraft. The evaluation led to the formulation of requirements for new technical system parameters. The specified requirements are related to an enhancement of the data base storage capacity, image improvement, improved resolution, and the employment of texturing and curved shading. G.R.

A82-19268 # **The procurement of flight simulators at the German Lufthansa (Die Beschaffung von Flugsimulatoren bei der Deutschen Lufthansa).** W.-D. Hass (Deutsche Lufthansa AG, Frankfurt am Main, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-093.* 10 p. In German.

Flight simulators have become indispensable for the training of airline pilots. Questions regarding the requirements for flight simulators arise, therefore, in connection with the introduction of new aircraft types or the enlargement of the fleet of existing aircraft types. Decisions have to be made concerning the placing of an order for a simulator or the purchase of simulator time on devices of the aircraft manufacturer or other companies. It is advisable to specify in the contract covering the purchase of the aircraft that the aircraft manufacturer has to provide data and components to a flight simulator producer. With respect to the Lufthansa, during the last 15 years there was almost always a relationship between the orders for an aircraft and a simulator. Price and delivery information from simulator manufacturers is obtained as soon as the negotiations regarding the purchase of aircraft appear to lead to a concrete agreement. Attention is given to procurement specifications, evaluation criteria, and a point system for an evaluation. G.R.

A82-19269 # **Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators (Flugsimulatorbedienkonsolen, Hilfe oder Behinderung - Objektive Bewertung von Bedienkonsolen moderner Flug- und Taktiksimulatoren).** B. Heger, A. L. Lippay, M. McKinnon, A. Del Mar, and R. Glass (CAE Electronics GmbH, Stolberg, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-097.* 24 p. In German.

An investigation was conducted with the objective to develop a model for the evaluation of control consoles at training simulators, taking into account the function of the console as human-machine interface. The obtained information is to be used in connection with the development of new control consoles. The investigation made use of System Analysis by Integrated Network of Tasks (SAINT) to analyze the operational stress to which an instructor is subjected during the training. The tasks of the instructor were divided with respect to typical activity modules. Each task could be assigned to any arbitrary control device. The described approach makes it possible to determine the time required for the performance of each task. The number of tasks performed or omitted in connction with a lack of time can be obtained along with the causes for an overload. The results obtained indicate various nonoptimal conditions, which are related to existing design characteristics and an inappropriate division of tasks between man and machine. G.R.

A82-19270 # **Data base generation for digital external view systems (Datenbasisgenerierung für digitale Aussensicht-systeme).** U. List (Bundesamt für Wehrtechnik und Beschaffung, Koblenz, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-101.* 14 p. 6 refs. In German.

Flight simulators make increasing use of systems which provide the pilot with a computer-generated image in simulation of the external scene which the pilot would perceive from the cockpit of the aircraft. Realistic impressions of motion are conveyed. The degree of realism achieved in the image is essentially determined by the processing capacity of the employed system. The realism of representation could be improved in connection with advances in electronics and automatic data processing made during the last few years. A computer-generated image system prototype is discussed along with the data base generation system (DBGS) used with it. Attention is given to the DBGS hardware configuration, the automatic transformation procedure, aspects of interactive processing, and questions of data base verification. The DBGS uses as a basis for its operation magnetic tapes with topographic information along with maps, aerial photographs, and other photographs. G.R.

A82-19271 # **Official recognition and the significance of simulators for safe flight operations (Die behördliche Anerkennung und der Stellenwert von Simulatoren für den sicheren Flugbetrieb).** G. Voss (Luftfahrt-Bundesamt, Braunschweig, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-094.* 8 p. In German.

The evolution of the flight simulator since its first introduction in the 1950s is considered. It is pointed out that the performance of modern flight simulators exceeds greatly the requirements for simulators described in the original definition of the International Civil Aviation Organization. The possibilities provided by the simulators for a replacement of flight training led to regulations by the appropriate authorities in the various countries regarding the use of flight simulators in training leading to the licensing of pilots. Attention is also given to the procedures to be followed for the testing of simulators to obtain official recognition. Test guides and, perhaps, even simulator self-test processes developed by the simulator industry would make it possible to reduce the time and work required in conducting the initial admission tests for simulators and the required follow-up tests. Improvements in simulation are discussed which would make the simulator even more efficient. G.R.

A82-19272 # **Simulation of modern radar installations in full-mission flight and tactics simulators (Simulation moderner Radaranlagen in Full-Mission-Flug- und Taktiksimulatoren).** H. G. Werner (Messerschmitt-Bölkow-Blohm GmbH, Ottobrun, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-103.* 17 p. In German.

The correct use of the radar systems represents one of the most important functions of the crew of modern bomber aircraft. The simulation of radar display and radars signals for other systems comprises, therefore, an essential part of the work load of the simulators. Terrain profiles are produced with the aid of a digital terrain data base, taking into account suitable antenna models, and the aircraft parameters. The terrain profiles provide the basis for the derivation of the radar echo data. The main function of the Multi-Role Combat Aircraft (MRCA) radar simulation is the generation of a realistic radar display video signal for the Ground Mapping Radar (GMR) and the Terrain Following Radar (TFR). A description is provided of design and functions of the Digital Radar Land Mass Simulator (DRLMS) of the MRCA Operational Flight and Tactics Simulator (OFTS). G.R.

A82-19273 # **Training in the flight and tactics simulator of the Navy Flight Squadron 3 'Graf Zeppelin' (Ausbildung im Flug- und Taktiksimulator des Marinefliegergeschwader 3 'Graf Zeppelin').** J. Zielke. *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper 81-109.* 11 p. In German.

The squadron has 14 antisubmarine warfare aircraft of the type Breguet 1150. The aircraft represents a NATO development, which is also employed by the French, Dutch, and Italian navies. In tactical combat missions the aircraft is employed with a crew of twelve men. The considered training device has been designed for the simulation of antisubmarine warfare situations. The simulation operations are essentially related to tactical basic and advanced training of the crew, the testing of new tactical procedures, and a participation in the tactical combat training program. The use of the simulator made it possible to reduce substantially the time required for actual flight training. The employment of the simulator makes it feasible to represent realistic combat situations which can generally not be economically provided by other means. G.R.

A82-19274 # **Report covering experience obtained at the German Lufthansa with respect to training involving the use of flight simulators (Erfahrungsbericht aus der Schulung mit Flugsimulatoren bei der Deutschen Lufthansa).** G. Wendt (Deutsche Lufthansa AG, Cologne, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über Schulung mit Flug- und Taktiksimulatoren, Cologne, West Germany, May 20, 21, 1981, Paper.* 17 p. In German.

The use of flight simulators in the basic training of flight crews is steadily increasing. Basically, the reasons for this trend can be divided into three categories, which are related to aspects of safety, efficiency, and economics. Safety is probably the most important factor. The rate of accidents involving the death of persons was found to be nine times higher for training flights than for regular airline flights. Another advantage of training with a simulator is the possibility to provide many abnormal and emergency situations which, in connection with safety considerations, cannot be reproduced in an aircraft. A training involving the use of a simulator is consequently much more realistic and, therefore, more efficient than the training in an aircraft. Advantages of simulator training related to economics become increasingly important with rising fuel costs. G.R.

A82-19300 **Flexibility is offered by XV-15 tilt-rotor concept.** R. R. Ropelewski. *Aviation Week and Space Technology,* vol. 116, Jan. 11, 1982, p. 74-76, 78, 83, 85.

The flight profile flexibility, low pilot work load and relatively low noise and vibration levels for which the XV-15 tilt-rotor VLOL experimental aircraft was designed are confirmed by flight tests. The aircraft uses two three-blade, 25 ft diameter rotors powered by two 1550 shp turboshaft engines for both vertical lift and forward thrust, thereby combining rotary wing and fixed wing aircraft operational capabilities. Attention is given to the 'conversion corridor', or difference between wing stall speed and rotor overstress speed at any given angle of wingtip nacelle tilt angle. With a normal rate of nacelle conversion of 7.8 deg/sec, the nacelles can translate through the full 95 deg of rotation from horizontal to vertical flight in 12-13 sec. It is noted that the dual flight capability of the XV-15 has not called for the introduction of many new flight instruments into the cockpit. O.C.

A82-19305 * # **Analytical prediction of aerospace vehicle vibration environments.** J. F. Wilby and A. G. Piersol (Bolt Beranek and Newman, Inc., Canoga Park, CA). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-29.* 10 p. 11 refs. Members, $2.00; nonmembers, $4.00. Contracts No. NAS5-22832; No. NAS9-15231; No. NAS1-14611; No. NAS1-15426.

Considerable attention has been given recently to the formulation and validation of analytical models for the prediction of aerospace vehicle vibration response to acoustic and fluctuating pressures. This paper summarizes the development of such analytical models for two applications, (1) structural vibrations of the Space Shuttle orbiter vehicle due to broadband rocket noise and aerodynamic boundary layer turbulence, and (2) structural vibrations of general aviation aircraft due to discrete frequency propeller and reciprocating engine exhaust noise. In both cases, the spatial exterior excitations are convected pressure fields which are described on the basis of measured cross spectra (coherence and phase) information. Structural modal data are obtained from analytical predictions, and structural responses to appropriate excitation fields are calculated. The results are compared with test data, and the strengths and weaknesses of the analytical models are assessed. (Author)

A82-19306 # **Modal analysis using helicopter dynamic test data.** N. Giansante (Kaman Aerospace Corp., Bloomfield, CT) and N. Calapodas (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-30.* 9 p. Members, $2.00; nonmembers, $4.00. Army-supported research.

A description is presented of experimental techniques for dynamic test data acquisition and analytical procedures for performing modal analysis. Modal analysis was applied to data acquired from dynamic test of the AH-IG helicopter airframe. Application of the methodology allowed accurate definition of the structure's natural frequencies, generalized modal parameters and complex mode shapes. The AH-IG airframe exhibits complex modes because of the nonproportional distribution of damping resulting from elastomeric isolators and nonstructural access panels on the helicopter. Underlying the technique of modal testing is the principle of the linear decomposition of structural dynamic response into contributions from the natural modes occuring within a specified frequency interval. A measure of the success of a modal analysis technique is the ability to duplicate analytically the measured frequency response data for a given frequency range using the modal parameters extracted from the dynamic test results. In the subject program the dynamic response of the AH-IG was accurately synthesized over a continuous frequency interval attesting to the success both of the experimental and analytical techniques utilized. (Author)

A82-19307 # **Dynamic response of blades and vanes to wakes in axial turbomachinery.** R. N. Tadros and M. Botman (Pratt and Whitney Aircraft of Canada, Ltd., Longueil, Quebec, Canada). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-33.* 8 p. 17 refs. Members, $2.00; nonmembers, $4.00.

A numerical method is presented which allows the calculation of vibratory stresses in blades and vanes of axial turbines and compressors. The viscous wakes of the cascaded stages are defined by means of thin airfoil theory. The flow is incompressible and the cascades have low solidity. The attention is confined to the case of a single stator row upstream of a single blade row. An existing beam-type program is used to calculate structural natural frequencies and modal shapes. Structural and aerodynamic quantities are combined in a Lagrangian formulation in terms of generalized coordinates. The solution of the equations of motion results in generalized displacements and vibratory stresses. Theoretical results for a compressor turbine blade show the effects of some design parameters on the blade vibratory response. The vibratory stress obtained in a strain gauge test indicates a reasonable agreement. (Author)

A82-19310 # **Balancing of flexible rotors by the complex modal method.** S. Saito and T. Azuma (Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-46.* 7 p. 22 refs. Members, $2.00; nonmembers, $4.00.

A new calculation method of the modal unbalance response for general flexible rotors in fluid film bearings has been developed by introducing the concept of modal exciting force vector into the usual complex modal method, and the physical meaning of the damping ratio at a critical speed is discussed. Next, application of this method, that correction weights can be determined in only one trial operation, is reported, and positions to measure vibration and to correct unbalance weight are discussed on the basis of the right eigenvector and the exciting factor mode, respectively. Lastly, it is shown by experiments that the proposed balancing method is of use for actual rotors. (Author)

A82-19311 # **Application of the principle of reciprocity to flexible rotor balancing.** M. S. Darlow and A. J. Smalley (Southwest Research Institute, San Antonio, TX). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-49.* 5 p. 7 refs. Members, $2.00; nonmembers, $4.00. Research sponsored by the Mechanical Technology, Inc.

A series of numerical and experimental studies have been conducted to investigate the validity of the principle of reciprocity for real rotordynamic systems in the presence of damping, gyroscopic, and cross-coupling bearing effects. All of the results are found to be consistent with the principle of reciprocity. It is pointed out that by using the principle of reciprocity it is possible to substantially reduce the number of trial mass runs required for influence coefficient balancing or for the unified balancing approach, a recently developed procedure for balancing flexible rotors. V.L.

A82-19314 # **Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl.** R. B. Bhat, T. S. Sankar (Concordia University, Montreal, Canada), and J. S. Rao. *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-55.* 6 p. 12 refs. Members, $2.00; nonmembers, $4.00. Natural Sciences and Engineering Research Council of Canada Grant No. A-7104.

The unbalance response of a Jeffcott-type rotor is analyzed with reference to the contributions of hydrodynamic bearing parameters including the bearing diameter, clearance, and the oil viscosity. Optimization of the bearing parameters is carried out using the method of feasible directions. It is shown that by using a four-shoe tilting pad type bearing with a L/D of 0.5, the maximum unbalance response of the original rotor studied can be reduced by 55%. V.L.

A82-19326 # **Development of a correlated finite element dynamic model of a complete aero engine.** R. A. Bellamy, J. C. Bennett, and S. T. Elston (Rolls-Royce, Ltd., Derby, England). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-74.* 8 p. 5 refs. Members, $2.00; nonmembers, $4.00.

This paper presents a particular case study in which a complete RB 211-524 engine carcass and nacelle was modelled using the Rolls-Royce finite element system. This structure was also vibration tested in the laboratory using two independent modal analysis systems. Close correlation between theory and experiment is demonstrated, which gives confidence in the finite element method for prediction of the dynamic properties of a real engineering structure. It also demonstrates that commercial modal analysis systems can measure the dynamic characteristics of such structures with sufficient quality to validate the theoretical models. (Author)

A82-19332 # **Prediction of aircraft interior noise using the statistical energy analysis method.** V. R. Miller (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) and L. L. Faulkner (Battelle-Columbus Laboratories, Columbus, OH). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-102.* 9 p. 18 refs. Members, $2.00; nonmembers, $4.00.

An analytical model is developed to predict the transmission of noise into an airplane interior through the fuselage sidewall by the statistical energy analysis (SEA) method. The fuselage structure is represented as a series of curved, isotropic plates, the isotropic representation resulting from the effects of smearing out the stiffeners. Other complicating effects such as pressurization, acoustic transmission through windows or seal leaks, and aerodynamic excitation are excluded in this effort but could be modeled by these same methods. Evaluation of the model was made using measured full scale acoustic data from both an adhesively bonded and a mechanically fastened airplane fuselage structure. Reasonably good agreement was obtained between predicted and measured levels in the higher frequencies. Predicted levels were shown to be sensitive to the value chosen for structural loss factor. Comparisons were also made with the measured data with an estimation procedure reported in the literature. (Author)

A82-19333 # **A CAD/CAM graphics system with relative datums and tolerances.** J. P. Memery, W. R. Marler, and J. D. Lancaster (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-108.* 6 p. 10 refs. Members, $2.00; nonmembers, $4.00.

An interactive graphic design system for turned parts in use at Pratt & Whitney Aircraft is described. This CAD/CAM system is capable of capturing relative datums and tolerances required for the manufacture and inspection of these parts. Tolerance capacity allows application of the system to broaching, a process which is commonly used to produce the parts. In the CAD/CAM system, turned parts and bladed disk attachment cross-section profiles are created in the computer. The required position of the attachment root can be calculated to minimize moments created by centrifugal force and air loads on the airfoil. The leakage area between the blade root and the disk slot can be computed, and the weight of the finished part estimated. The computer description is stored in the CAD/CAM data base and identified on the engineering drawing. More than 20 design and manufacturing application modules are currently in place as part of the Pratt & Whitney Aircraft CAD/CAM system. J.F.

A82-19337 * # **Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows.** R. E. Kielb (NASA, Lewis Research Center, Structural Dynamics Section, Cleveland, OH) and K. R. V. Kaza (NASA, Lewis Research Center, Cleveland; Toledo, University, Toledo, OH). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-122.* 12 p. 19 refs. Members, $2.00; nonmembers, $4.00.

An investigation of the effects of mistuning on flutter and forced response of a cascade in subsonic and supersonic flows is presented. The aerodynamic and structural coupling between the bending and torsional motions and the aerodynamic coupling between the blades are included. It is shown that frequency mistuning always has a beneficial effect on flutter. Additionally, the results indicate that frequency mistuning may have either a beneficial or an adverse effect on forced response, depending on the engine order of the excitation and Mach number. (Author)

A82-19338 # **Natural frequencies of rotating bladed discs using clamped-free blade modes.** S. J. Wildheim (Stal-Laval Turbin AB, Finspang, Sweden). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-124.* 11 p. 16 refs. Members, $2.00; nonmembers, $4.00.

A method for calculating the natural frequencies of practical bladed disk assemblies is described, which is based on a dynamic substructuring technique. The out-of-plane vibrations of the rotating prestressed disk are described by receptances, while the blade dynamics are described by the clamped-free modes. A blade dynamic stiffness matrix of order 4 + 10I, (where I is the number of lacing wires), is formed directly from the blade modal data in the interface displacements between the disk and the blades and between the blades and the lacing wires. The lacing-wires are treated as elastic and massless. The sign-count method and bisection are used to locate the eigenvalues. The method presents no numerical difficulties and is automatic as well as efficient. J.F.

A82-19340 # **On the formulation of coupled/uncoupled dynamics analyses of blade-disc assemblies.** P. S. Kuo (Avco Corp., Avco Lycoming Stratford Div., Stratford, CT). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-126.* 9 p. 6 refs. Members, $2.00; nonmembers, $4.00.

The interaction between the blades and their attachments on a flexible rotor-disc assembly may induce potential vibration problems. Coupled blade-disc resonance, the dissimilar behavior of blade groups, and the uncoupled blade or disc natural frequencies must be evaluated. To satisfy all of the requirements and at the same time reduce the complexity of the analysis, an efficient analytical formulation of a combined blade-disc segment model using finite element rotational symmetry techniques was developed. The capability of the technique, as demonstrated, using a plate-element model, includes computer plots of the blade and disc normalized modal deformations in consecutive segments at the respective natural frequencies. The results are discussed and verified by fundamental vibration theory. Various finite element models of blades and discs are also presented to clarify the modeling procedure. The method is shown to be a cost-effective tool that readily lends itself to daily routine use. (Author)

A82-19342 # **Optimal shape design of turbine blades.** J. P. Queau and P. Trompette (Lyon, Institut National des Sciences Appliquées, Villeurbanne, Rhône, France). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-128.* 6 p. 10 refs. Members, $2.00; nonmembers, $4.00.

This paper attempts to present a general engineering method for minimizing the weight of rotating turbine blades in optimizing the cross section shapes. The constraints originate from either aerodynamic or solid mechanic specifications. As the problem is reformated after a first F.E. analysis the optimization process is quite inexpensive. A large variety of compressor or turbine rotating blades can be designed by this method which uses the variables selected by the aerodynamicists and leads to continuous optimal profiles. (Author)

A82-19343 # **Investigation of vibration of shrouded turbine blades.** J. Wachter and H. Wolfs (Stuttgart, Universität, Stuttgart, West Germany). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-129.* 5 p. 6 refs. Members, $2.00; nonmembers, $4.00.

The grouping of cantilever blades by means of shrouding (bands, plates or damping wires) results in a new vibratory system the theoretical and experimental analysis of which would pose a variety of problems. In order to find some improved approach of numeric predictive computation we must carry out experimental analyses while varying systematically some of the influencing parameters. This paper discusses some static parameter analyses of model blades of simplified geometry. The results obtained are compared with numeric calculations by the finite elements method. (Author)

A82-19344 # **A practical approach to systems mode analysis.** P. W. Spence (General Electric Co., Aircraft Engine Group, Lynn, MA). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-130.* 8 p. 5 refs. Members, $2.00; nonmembers, $4.00.

A simplified methodology is presented for the analysis of disc-blade-shroud assemblies to obtain system mode frequencies and stress and load distributions in the blades. The method uses the cantilever vibration characteristics of the blades with a travelling wave solution applied to the shroud boundary conditions. Theoretical and experimental results are compared and some design criteria are indicated for frequency tuning to meet design objectives. (Author)

A82-19347 # **An investigation of dual mode phenomena in a mistuned bladed-disk.** W. O. Stange and J. C. MacBain (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-133.* 12 p. 5 refs. Members, $2.00; nonmembers, $4.00.

This paper presents the results of an investigation addressing the effects of mistuning on the lower modes of vibration of a simple bladed-disk model. The phenomena of dual modes, also known as mode splitting, is studied using holographic interferometry and strain gage measurements under nonrotating and rotating conditions. Resonant amplitudes, mode shapes, and natural frequencies of the disk model were determined, without deliberately mistuning the disk. The tests were then repeated with the disk deliberately mistuned to varying degrees, paying particular attention to the second diameter (2N) dual modes. Additionally, tests were conducted on the disk at a rotational speed of 2000 rpm, in an effort to gain insight as to the vibratory characteristics of the disk under rotating conditions. (Author)

A82-19348 # **Measurement of the influence of flow distortions on the blade vibration amplitude in an air turbine.** J. Beckmann and J. Wachter (Stuttgart, Universität, Stuttgart, West Germany). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-135.* 9 p. 6 refs. Members, $2.00; nonmembers, $4.00.

Experimental investigations in an air turbine are carried out to determine the influence of exciting forces due to flow distortions on the vibration amplitudes of a rotating bladed disk. Flow distortions are simulated at different operating points by changing the outlet angle of the guide vanes. The dynamic signals like blade vibrations and fluctuating pressures are measured, transmitted by a five channel telemetry system, stored on a multitrack tape and subsequently analyzed by a real-time analyzer and a computer comparing amplitude and phase shift. (Author)

A82-19349 # **A parametric study of dynamic response of a discrete model of turbomachinery bladed disk.** A. Muszynska (Dayton, University, Dayton, OH) and D. I. G. Jones (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-137.* 12 p. 8 refs. Members, $2.00; nonmembers, $4.00.

A model consisting of n five-degree-of-freedom subsystems has been developed to characterize some of the mechanical response features of a bladed disk system, including four modes of each blade, n bending modes of the disk, blade-to-blade and blade-to-ground Coulomb friction, structural damping, blade-to-blade mistuning, and various types of excitation. The equations of motion and method of solution are described, and numerical results illustrate some of the interesting effects of various levels of frictional damping on tuned and mistuned systems, which may shed light on some aspects of damped system design and performance. (Author)

A82-19351 # **Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine.** H. Bedrossian and R. Phoenix (Avco Corp., Avco Lycoming Stratford Div., Stratford, CT). *American Society of Mechanical Engineers, Design Engineering Technical Conference, Hartford, CT, Sept. 20-23, 1981, Paper 81-DET-143.* 8 p. Members, $2.00; nonmembers, $4.00.

The development of a structural and dynamics finite element model of a complete gas-turbine engine was achieved using the resources of the Integrated Turbine Analysis System, an in-house research program. This system employed interactive graphics and an engineering database to generate a NASTRAN dynamic model of the subject engine. A normal modes analysis identified the natural frequencies and associated mode shapes for the engine structure within its operating range. A forced-response analysis due to the steady-state sinusoidal load of rotor unbalanced was obtained. Results were found to be in good agreement with typical vibration records obtained in a production test cell. The forced response strain energy method was utilized to identify the structural elements primarily contributing to the response. The effect of component stiffness on engine vibration levels and the recommended design modification to reduce these levels, was established. (Author)

A82-19521 # **Analysis and tolerance study of an array antenna for a new generation of secondary radars.** M. Di Fausto, A. Saitto (Selenia S.p.A., Rome, Italy), and G. Pelosi (Roma, Università, Rome, Italy). In: European Microwave Conference, 10th, Warsaw, Poland, September 8-12, 1980, Proceedings.
Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 144-148. 11 refs.

An open array antenna is analyzed considering performance and tolerances with respect to the specifications given by Eurocontrol and FAA. Computed results and parametric charts are presented. The analytical methods used are briefly described. Some considerations on the choice of the radiating element (slot or dipole) are given with respect to the desired performance. (Author)

A82-19552 # **Leaky wave antenna using an inverted strip dielectric waveguide.** R. Crampagne, L. Padellec, and A. Sarremejean (ONERA, Centre d'Etudes et de Recherches de Toulouse, Toulouse, France). In: European Microwave Conference, 10th, Warsaw, Poland, September 8-12, 1980, Proceedings. Sevenoaks, Kent, England, Microwave Exhibitions and Publishers, Ltd., 1981, p. 474-479. 5 refs.

Experimental results on a leaky wave antenna built from an inverted strip dielectric waveguide are presented, the frequency ranging from 64 to 74 GHz. The frequency scanning for beams inclined backward is investigated, along with the variations of gain and 3 dB beamwidth. An approximate analysis is proposed for calculating the main lobe angle and the radiating space harmonic's amplitude. Comparison between experimental and theoretical results shows that the angle's value (for inclined beams) is very sensitive to machining tolerance. Several approximate theoretical methods are proposed for determining the main lobe angle. C.R.

A82-19621 **Trends in aviation fuels and lubricants; Proceedings of the West Coast International Meeting, Seattle, WA, August 3-6, 1981.** Meeting sponsored by the Society of Automotive Engineers. Warrendale, PA, Society of Automotive Engineers, Inc. (SAE Proceedings SP-492), 1981. 65 p. $9.00.

Trends in aviation fuels and lubricants are reviewed in a historical aspect and with reference to recent measurements which can provide projections for anticipated trends in the near future. Topics discussed include a short history of aviation gasoline development covering the period 1903-1980; a history of aircraft piston engine lubricants; aviation turbine fuel properties and their trends; and finally, the history of aviation turbine lubricants. V.L.

A82-19622 **A history of aircraft piston engine lubricants.** R. V. Kerley. In: Trends in aviation fuels and lubricants; Proceedings of the West Coast International Meeting, Seattle, WA, August 3-6, 1981. Warrendale, Pa, Society of Automotive Engineers, Inc., 1981, p. 15-42. 50 refs.

This paper is a review of the literature covering the history of the use of lubricants. The uses of oils derived from animals, vegetables and minerals are placed in perspective from ancient times to the Wright Brothers' flight in 1903. After that period, the discussion is confined largely to the lubrication of aircraft piston engines. The paper attempts to explain the preference for castor oil in European and British engines and the more general, but by no means exclusive, use of petroleum-based mineral oils in the United States. The background for the continued, and often controversial use of straight mineral oil, some of the additives used, tests of synthetic oil in winter use, and oil reclamation are reviewed through World War II until 1963 when lubricating oils containing ashless additives became the predominant products. (Author)

A82-19623 * **Aviation turbine fuel properties and their trends.** R. Friedman (NASA, Lewis Research Center, Cleveland, OH). In: Trends in aviation fuels and lubricants; Proceedings of the West Coast International Meeting, Seattle, WA, August 3-6, 1981.
Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 43-54. 16 refs.

This paper is an examination of published Jet A inspection data covering selected property distributions, averages, and trends for the period from 1969 to 1979. Yearly median values of aromatics, mercaptan sulfur content, 10-percent distillation temperature, smoke point, and freezing point are changing with time, approaching their specification limit values, particularly in the last three years. A near-specification property is defined as one within a stated tolerance band around the specification limit. On this basis, most fuel samples have one to three near-specification properties, the most common being aromatics, smoke point, and freezing point. (Author)

A82-19624 **The history of aviation turbine lubricants.** R. Knipple and J. Thich (Royal Lubricants Co., Inc., East Hanover, NJ). In: Trends in aviation fuels and lubricants; Proceedings of the West Coast International Meeting, Seattle, WA, August 3-6, 1981.
Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 55-63. 24 refs.

Condensed in this report are the salient points of the forty year history of the development of the gas turbine engine, its associated aircraft and the various lubricants used. Tables are included comparing some of the important specification properties of many of these fluids, both petroleum and synthetics. An explanation is incorporated outlining the reasons synthetics perform well in the turbine engine environment. A genealogical chart detailing the various dates on which lubricant specifications or important changes were issued is provided. There are indications that some commercially available lubricants are being stressed to the limits of the fluids capabilities. Any new engine designs, therefore, may require entirely new lubricants and/or new lubrication systems. (Author)

A82-19649 # **The significance of electronics for air traffic control at the present time and in the future (Die Bedeutung der Elektronik für die Flugsicherung in Gegenwart und Zukunft).** K. Platz (Bundesanstalt für Flugsicherung, Frankfurt am Main, West Germany). *Luft- und Raumfahrt,* vol. 2, 4th Quarter, 1981, p. 109-112, 114-116. In German.

It is pointed out that the current Air Traffic Control (ATC) system is the result of an evolutionary development process, taking place during the last thirty years. The ATC system can perform its tasks only by making use of the advances made in the area of electronics. The system aids provided for the air traffic controller must be continuously improved in connection with the adaptation of ATC to aircraft-related technological advances. Improved ACT procedures make it also possible to enhance the control capacity of the system in response to increases in the volume of air traffic. Attention is given to the technical system of ATC, future developments on the international level, and technological possibilities for future ATC systems. The use of an onboard computer is considered along with traffic flow control, a European flight-plan data bank, the telecommunication network for aviation, an enlarged radar system, data transmission, new data-display methods, and the cost of ATC. G.R.

A82-19733 # **Technical evaluation report of the AGARD Fluid Dynamics Panel Symposium on computation of viscous-inviscid interactions (Rapport d'evaluation technique du Symposium organisé par la Commission de Dynamique des Fluides de l'AGARD sur le calcul de l'interaction fluide-parfait-fluide visqueux).** J. C. Le Balleur (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Association Aéronautique et Astronomique de France, Colloque d'Aérodynamique Appliquée, 18th, Poitiers, France, Nov. 18-20, 1981.) ONERA, TP* no. 1981-116, 1981. 9 p. 31 refs. In French.

The symposium surveys the status of current research in computational aerodynamics based on methods solving a viscous-inviscid interaction problem. In spite of limitation in the models or numerical techniques for shock wave boundary layer interaction or trailing edge problems, the situation is well advanced in unseparated, steady two-dimensional flow, with the potential approximation for the inviscid part. Progress has advanced in the computation of separations, based on strong interaction models. It would be fruitful to make use of the complete Euler equations in transonic flow. Progress toward strong interaction methods is much less advanced in unsteady or three-dimensional flow, but seems likely. The development of strong interaction methods, highly connected with that of inviscid and Navier-Stokes numerical techniques, appears as mandatory to having access to practical application needs. (Author)

A82-19737 # **A progress report on the European Transonic Wind Tunnel Project (Le Projet de Soufflerie Transsonique euro-**

péenne ETW - Etat actuel). J. P. Morel (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Association Aéronautique et Astronomique de France, Colloque d'Aérodynamique Appliquée, 18th, Poitiers, France, Nov. 18-20, 1981.) ONERA, TP* no. 1981-121, 1981. 24 p. 5 refs. In French.

An interim report on the design for a European Transonic Wind Tunnel, being built by the cooperative efforts of West Germany, Britain, and the Low Countries is presented, and details of the partially completed prototype wind tunnel are provided. The ETW will be a cryogenic, nitrogen gas installation for examining flows at high Reynolds numbers, and consultations are continuing with NASA on the cryogenic technology. The full test channel will have a 2.4 x 2 sq m cross section, with a pressure variance between 1.25-4.5 bars. Temperatures will range from 120-168 K at Mach numbers up to 1.7, and equipment altering the incidence angle of test models at a rate of four deg/sec is intended. A pilot ETW is under construction, with a cross-section of 0.27-0.23 m, and is being used to verify the aerodynamic performance of the flow circuit, the responses to Mach number, pressure, and temperature, and the control circuits. M.S.K.

A82-19738 # **Aerodynamics of a transport aircraft-type wing-fuselage assembly (Aérodynamique d'un ensemble voilure-fuselage du type 'Avion de transport').** V. Schmitt (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Association Aéronautique et Astronautique de France, Colloque d'Aérodynamique Appliquée, 18th, Poitiers, France, Nov. 18-20, 1981.) ONERA, TP* no. 1981-122, 1981. 24 p. 19 refs. In French.

This study, carried out at ONERA is based on the DFVLR-F4 wing-body combination. The 1/38 model is formed by a 9.5 aspect ratio transonic wing and an Airbus A 310 fuselage. After a description of the F4 wing geometrical characteristics, main experimental results obtained in the S2MA wind tunnel are discussed. Both wing-fuselage interferences and viscous effects, which are important on the wing due to a high rear loading, are investigated. In order to do that three-dimensional calculations are performed; an attempt is made to find their limitations. (Author)

A82-19740 # **Three-dimensional calculation of the flow in helicopter air intakes (Calculs tridimensionnels de l'écoulement dans les prises d'air d'hélicoptères).** B. Boizard (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Association Aéronautique et Astronautique de France, Colloque d'Aérodynamique Appliquée, 18th, Poitiers, France, Nov. 18-20, 1981.) ONERA, TP* no. 1981-124, 1981. 14 p. In French. Research supported by the Direction des Recherches, Etudes et Techniques.

The results of an ONERA-initiated investigation to optimize the efficiency of helicopter air intakes and minimize the aerodynamic drag are reported. A method of singularities was used to study the internal flow in the air intakes, with the flow considered as incompressible and the air as an ideal fluid. The walls of the intake were discretized into quadrilateral facets for solution of a series of linear equations in a computer. The velocity fields induced by the facets were obtained for the intensities of the calculated doublets. The air intake during hovering and acceleration are modeled for two existing aircraft, and the necessity of accounting for viscous effects in future programs is indicated. M.S.K.

A82-19784 * # **Control law development for a close-coupled canard, relaxed static stability fighter.** R. W. Klein, M. Lapins, R. P. Martorella, and M. Sturm (Grumman Aerospace Corp., Bethpage, NY). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0180.* 20 p. Contract No. NAS1-16636.

The performance benefits to be gained from relaxed static stability (RSS) are illustrated for M = 0.9 and M = 2.0 flight conditions. The longitudinal, directional, and lateral control system structure is developed. The effect of static margin, bandwidth, and canard-wing interaction on canard rate requirements is analyzed. Control and maneuver limiter functions are developed and implemented about all three axes; simulation results strikingly demonstrate the concomitant improvement in energy management and improved resistance to departure and spin. C.R.

A82-19786 * # **An analytical technique for the analysis of airplane spin entry and recovery.** L. W. Taylor, Jr. and G. K. Miller, Jr. (NASA, Langley Research Center, Flight Dynamics and Control Div., Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0243.* 9 p. 10 refs.

The dynamic equations of motion for a spinning airplane are simplified to facilitate the analysis of spin entry and recovery maneuvers. Solutions of a nonlinear, first order equation for spin rate enable calculation of spin entry and recovery times and control required for recovery. The analysis is applied to a light airplane for which both aerodynamic data, rotory balance wind tunnel tests, and spin flight test data have been obtained. A comparison of predicted and actual transient spin responses is made which supports the validity of the analytical approach taken but which also illustrates the difficulty in obtaining accurate aerodynamic data for spinning airplanes. Certain normalized parameters of the reduced state spin equation suggest criteria for assessing the transient spin characteristics of light airplanes. (Author)

A82-19791 # **The sooting tendency of fuels containing polycyclic aromatics in a research combustor.** D. W. Naegeli, L. G. Dodge, and C. A. Moses (Southwest Research Institute, San Antonio, TX). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0299.* 11 p. 21 refs.

An investigation regarding soot formation has been conducted for a variety of jet fuels, taking into account a wide range of combustor conditions covering the operating envelopes of many gas turbine engines. The results demonstrate that the dominant soot formation mechanisms in gas turbine engines are dependent on operating conditions. There are evidently a number of competing soot formation and oxidation steps whose relative importance varies with inlet air temperature, reference velocity, and fuel/air ratio. Under some operating conditions the sooting tendency is significantly affected by polycyclic aromatics including tetralin, but the H/C ratio is the principal correlating parameter. At high power conditions where soot formation is of greatest concern, the fuel/air ratio of most engines is high (0.02), and there is little sensitivity to polycyclics. G.R.

A82-19796 * # **Experimental studies of the Eppler 61 airfoil at low Reynolds numbers.** T. F. Burns and T. J. Mueller (Notre Dame, University, Notre Dame, IN). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0345.* 12 p. 15 refs. Research sponsored by the University of Notre Dame; Grant No. NsG-1419.

The results of an experimental study to document the effects of separation and transition on the performance of an airfoil designed for low Reynolds number operation are presented. Lift, drag and flow visualization data were obtained for the Eppler 61 airfoil section for chord Reynolds numbers from about 30,000 to over 200,000. Smoke flow visualization was employed to document the boundary layer behavior and was correlated with the Eppler airfoil design and analysis computer program. Laminar separation, transition and turbulent reattachment had significant effects on the performance of this airfoil. (Author)

A82-19797 * # **Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions.** D. P. Rizzetta and C. J. Borland (Boeing Military Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0352.* 37 p. 30 refs. Contract No. NAS2-10762.

A method is presented for computing the unsteady three-dimensional transonic flowfield about twin wings of arbitrary planform and section geometry including the effects of inviscid/viscous interaction. Dominant effects of the shock-boundary-layer interaction are accounted for by a simple empirically defined model, while viscous regions adjacent to the wing surface and along the trailing wake are described by a set of integral equations appropriate for two-dimensional turbulent flows. The validity of the proposed method is verified by comparison with steady three-dimensional experimental data and a solution of more exact equations for a typical transport wing configuration. V.L.

A82-19798 * # **Unsteady lifting-line theory with applications.** A. R. Ahmadi (Bolt Beranek and Newman, Inc., Cambridge, MA) and S. E. Widnall (MIT, Cambridge, MA). *American Institute of*

Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0354. 21 p. 32 refs. Research supported by the Bolt Beranek and Newman, Inc.; Grant No. NGR-22-009-818.

Unsteady lifting-line theory is developed for a flexible unswept wing of large aspect ratio oscillating at low frequency in inviscid incompressible flow. The theory is formulated in terms of the acceleration potential and treated by the method of matched asymptotic expansions. The wing displacements are prescribed and the pressure field, airloads, and unsteady induced downwash are obtained in closed form. Sample numerical calculations are presented. The present work identifies and resolves errors in the unsteady lifting-line theory of James and points out a limitation in that of Van Holten. Comparison of the results of Reissner's approximate unsteady lifting-surface theory with those of the present work shows favorable agreement. The present work thus provides some formal justification for Reissner's ad hoc theory. For engineering purposes, the region of applicability of the theory in the reduced frequency-aspect ratio domain is identified approximately and found to cover most cases of practical interest. (Author)

A82-19801 # **Real gas flows over complex geometries at moderate angles of attack.** S. Swaminathan, C. H. Lewis (Virginia Polytechnic Institute and State University, Blacksburg, VA), and M. D. Kim. *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0392.* 22 p. 12 refs.

Numerical simulation of supersonic and hypersonic flows over arbitrary geometries at moderate angles of attack is presented in this paper. The different geometries considered for analysis include a slab delta wing, a sphere-cone-cylinder-flare, a blunt-nosed inlet and a 7-degree half-angle sphere-cone. The three-dimensional flowfields over these geometries are analyzed by a parabolized Navier-Stokes code (HYTAC) and a new viscous shock-layer code (VSLET), and the results are compared. Both laminar and turbulent flowfield results for both perfect gas and equilibrium air are presented. In general the surface pressure distributions are in good agreement whereas the heat-transfer results differ depending on the differencing scheme used in the calculation of gradients and turbulent modelling. Aerodynamic force and moment coefficients are presented for some typical cases. Computing times for various test cases are presented. (Author)

A82-19810 † **Aerodynamic characteristics of waveriders at subsonic flight speeds (Aerodinamicheskie kharakteristiki Lambda-kryl'ev na dozvukovykh skorostiakh poleta).** V. I. Voronin and A. I. Shvets. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Zhidkosti i Gaza,* Nov.-Dec. 1981, p. 104-109. 10 refs. In Russian.

Theoretical and experimental results are presented on the aerodynamic characteristics of two series of waverider models, differing in dihedral angle and sweep angle. The method of discrete vortices was used to analyze the characteristics of thin triangular-platform waveriders. Theoretical results were compared with experimental data on thin waveriders with a relative thickness up to 3%; wind tunnel tests were carried out in the 0.4-0.8 Mach number range. B.J.

A82-19813 † **Analysis of an ideal-fluid flow past a finite-thickness wing (Raschet obtekaniia kryla konechnoi tolshchiny ideal'noi zhidkost'iu).** A. A. Zaitsev and A. D. Khamzaev. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Zhidkosti i Gaza,* Nov.-Dec. 1981, p. 124-131. 12 refs. In Russian.

A numerical analysis of potential flow past a finite-span wing is carried out using a piecewise-linear approximation of the unknown functions with respect to wing span. In the nonlinear problem the vortex sheet is represented as vortex threads, while in the linear problem it is represented as vortex threads and as a vortex surface. An aerodynamic analysis of swept-wings of finite thickness is presented, and theoretical results are compared with experimental data. B.J.

A82-19814 † **The design of compact asymmetric maximum-thrust nozzles for a given lift force (O postroenii kompaktnykh nesimmetrichnykh sopl maksimal'noi tiagi pri zadannoi pod'emnoi sile).** A. I. Rylov. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Zhidkosti i Gaza,* Nov.-Dec. 1981, p. 132-136. 7 refs. In Russian.

Kraiko's (1979) indeterminate-control-contour method is used to solve the variational design problem for an asymmetric supersonic plane maximum-thrust nozzle for a given lift force and given size constraints. It is shown that the present problem is equivalent to the maximum thrust problem (with the absence of the lift-force constraint) in a coordinate system that differs from the original system by a certain angle of rotation. Numerical calculations are presented which illustrate the influence of the lift force on nozzle geometry and thrust. B.J.

A82-19850 **X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations.** P. H. Hildebrand, R. A. Oye, and R. E. Carbone (National Center for Atmospheric Research, Boulder, CO). *Journal of Applied Meteorology,* vol. 20, Nov. 1981, p. 1353-1361. 21 refs. U.S. Bureau of Reclamation Contract No. 7-07-83-V001; NSF Grant No. ATM-78-27420.

A simulation of X-band and C-band radar is given, with consideration of the effects of attenuation and beamwidth on measurements of radar equivalent reflectivity factor. Two tornadic storms were examined, to determine the ability of radar to adequately show a safe path through a storm. Historical data were acquired and attenuated for the radar wavelength chosen, filtered in azimuth, elevation, and range desired according to the radar beamwidth and pulse depth desired, and filtered in threshold on the basis of received power in order to approximate the simulated radar sensitivity. It was found that X-band radar can provide incorrect information in severe convective storms, while C-band radar is more accurate in severe storm penetration, especially with sampling at 1/3-1/4 beamwidth intervals. The results are noted to hold significance for both operational and research airborne radar use. M.S.K.

A82-19928 † **Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading (Ob avtomatizatsii rascheta napriazhennogo sostoianiia obolochechnykh sistem pri nesimmetrichnykh silovykh i teplovykh vozdeistviiakh).** Ia. M. Grigorenko, G. I. Genkin, N. D. Draigor, E. T. Fedorova, and V. N. Khoroshilov (Akademiia Nauk Ukrainskoi SSR, Institut Mekhaniki, Kiev, Ukrainian SSR). *Prikladnaia Mekhanika,* vol. 17, Dec. 1981, p. 49-56. In Russian.

Problems related to the computer calculation of the strength of structural elements of aircraft engines are presented. The engines are considered to be elastic systems, composed of various shells of revolution, which are under the effects of non-axisymmetrical mechanical and thermal loads, as well as boundary forces and moments. The calculated values are found to be in good agreement with experimental results. J.F.

A82-19947 **Consequences of American airline deregulation Legislative theory in a concrete example (Auswirkungen der amerikanischen Airline Deregulation - Gesetzgebungslehre an einem konkreten Beispiel).** R. H. Weber. *Zeitschrift für Luft- und Weltraumrecht,* vol. 30, Dec. 1981, p. 333-348. 52 refs. In German.

The Airline Deregulation Act of 1978 is discussed in terms of its impact on American and international air commerce. Major advantages and disadvantages are presented, including a lower cost of flying for the consumer and efficient and profitable air route structures on the one hand and the reduction of safety standards and the creation of operational and financial instability for airlines on the other. Consequences of deregulation in the American market include the establishment of a tariff, a reduction of service for smaller airports, and an increase in small commuter aircraft which run a greater accident risk, especially at take-off and landing. The impact of the tariff on international air traffic is discussed, and a comprehensive evaluation of the Deregulation Act is given. It is concluded that innovation in the airline industry will play a larger role due to increased competition resulting from the deregulation. D.L.G.

A82-19958 # **Subsonic and transonic roll damping measurements on Basic Finner.** H. S. Murthy (National Aeronautical Laboratory, Bangalore, India). *Journal of Spacecraft and Rockets,* vol. 19, Jan.-Feb. 1982, p. 86, 87. 7 refs. Research sponsored by the Indian Space Research Organization.

Wind tunnel roll damping data on the Basic Finner are presented for subsonic speeds up to Mach 3. Rolling moment coefficients were obtained with a 5% accuracy in the transonic regime and to within 3% at supersonic speeds. A drop in roll damping in the transonic region is attributed to the occurrence of a shock wave on the fin causing a drop in fin lift. The measured roll rate coefficient was found to be invariant with the roll rate at all Mach speeds at zero angle of incidence, in contrast to previous tests in which the roll rate constant remained invariant with the rate only in supersonic regimes. M.S.K.

A82-19966 # **Fuel property effects on radiation intensities in a gas turbine combustor.** J. A. Clark (Ohio State University, Columbus, OH). *AIAA Journal*, vol. 20, Feb. 1982, p. 274-281. 20 refs.

The effect of fuel properties on primary zone radiation intensities in gas turbine combustors is examined. This study concludes that there is a strong empirical relationship between the primary zone radiation intensity and two fuel properties - percent hydrogen and percent polycyclic aromaticity. These two properties are combined in a single parameter called 'effective hydrogen content,' which is then used to correlate radiation intensities from seven different fuels burning under a variety of operating conditions. The explanation for the empirical relationship is that effective hydrogen content is a measure of the soot-forming tendency of a fuel. (Author)

A82-19970 **Ground reflection effects in aircraft noise measurements (Bodenreflexionseffekte bei Fluglärmessungen).** W. M. Dobrzynski (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Abteilung Technische Akustik, Braunschweig, West Germany). *Zeitschrift für Flugwissenschaften und Weltraumforschung*, vol. 5, Nov.-Dec. 1981, p. 367-374. 6 refs. In German.

Aircraft noise measurements were carried out for the certification of propeller aircraft (weighing no more than 5.7 tons), and the maximum A-weighted flyover noise level was determined as a coefficient of measure. Since the flyover signal is known to be affected by ground reflection interference experimental and theoretical methods were used to determine the extent to which these effects can also change the maximum A-weighted flyover noise level. Measurements were made by microphones on several aircraft at 1.2 m in altitude; a second microphone was placed on the ground as a reference. Calculations and measurement results show that, depending on the propeller rotational speed and blade number, level differences of up to 3 dB(A) can be obtained between unaffected signals plus signals affected by reflection interference. J.F.

A82-20054 **Ultrasonic method for flow field measurement in wind tunnel tests.** R. H. Engler, D. W. Schmidt, W. J. Wagner, and B. Weitemeier (Max-Planck-Institut für Strömungsforschung; Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Göttingen, West Germany). *Acoustical Society of America, Journal*, vol. 71, Jan. 1982, p. 42-50. 14 refs.

An ultrasonic measuring system suitable for rapid and nondisturbing measurements of the flowfield around models in wind tunnels is presented. The shift in two sound beams propagating parallel to one another when crossing a vortex is modeled, and the velocity field traversed is defined. The running times of the sound beams are used to determine the circulation of the vortex under test directly from a derived curve. Condensor microphones emit the sound pulses, which are received by similar apparatus for processing by computer. Examples are provided for a single vortex, for the influence of a spoiler, and for tip vortices behind an oscillating blade. Future developments in the system which include using an array of up to 18 ultrasonic microphones to eliminate mechanical shifting of the model are indicated. M.S.K.

A82-20058 **Comparison of aircraft and ground vehicle noise levels in front and backyards of residences.** J. C. Ortega (Paul S. Veneklasen and Associates, Santa Monica, CA) and K. D. Kryter (SRI International, Menlo Park, CA). *Acoustical Society of America, Journal*, vol. 71, Jan. 1982, p. 216, 217.

Measurements and measurement techniques for comparing front and backyard noise levels for aircraft and surface vehicle noises are presented. Microphones in the front and back of a house were used to gather sounds from aircraft taking off, a manual shift small vehicle pulling in and out of the driveway, and a garbage collection truck making its rounds past the front of the house. Two residences were monitored, and the tapes were analyzed for maximum A-weighted noise levels. The reduction for surface vehicle noise traveling from front-to-back of the house ranged from 17-21 dBA, while no significant difference was found for the aircraft noise. M.S.K.

A82-20128 **Design of the composite spar-wingskin joint.** R. D. Cope and R. B. Pipes (Delaware, University, Newark, DE). *Composites*, vol. 13, Jan. 1982, p. 47-53. Contract No. F33615-77-C-3102.

A variety of composite spar-wingskin joint concepts have been investigated to optimize out-of-plane strength while still providing low weight and ease of fabrication. The spar-wingskin configuration consists of a thin spar which overlaps and is co-cured perpendicular to a thick wingskin. Investigation parameters were the joint geometry in the immediate vicinity of the base of the spar, and the spar-to-spar spacing. It was found that by varying the overlap geometry and decreasing the interspar spacing a significant increase in out-of-plane strength could be realized. A theoretical analysis was made by the extended use of the finite element technique. Joint strength was predicted through the application of Tsai-Wu, maximum stress and maximum shear failure criteria. These results were verified by comparison to experimental results in which all significant concepts were fabricated and tested. (Author)

A82-20137 **The prospects for liquid hydrogen fueled aircraft.** G. D. Brewer (Lockheed-California Co., Burbank, CA). *International Journal of Hydrogen Energy*, vol. 7, no. 1, 1982, p. 21-41. 12 refs.

It is pointed out that an alternative fuel for transport aircraft must be either producible or available anywhere in the world. It is contended that this requirement can be met by liquid hydrogen because it can be produced from water using any locally available energy source. It is not dependent on the availability of fossil resources. With conventional production technologies, LH2 may cost more per unit energy than hydrocarbon alternatives. Because of the weight advantage, however, aircraft using LH2 will be more efficient and their direct operating costs will be competitive. It is shown that, with advanced technologies, LH2 can provide cost and energy advantages. A plan to develop LH2 technology on an international basis is proposed. C.R.

A82-20172 **New life for an 'old' body - Vienna's master plan for revitalization.** R. Schano. *Airport Forum*, vol. 11, June 1981, p. 27, 28, 30, 32.

Details of a new master plan for the Vienna airport are presented, noting the departure from a piece-by-piece add-on system to meet new demands. The plan was developed to anticipate the needs and services for an increase of one million passengers/yr every five years until the year 2000. A decision was reached to expand the existing terminal, making more efficient use of available space. The two legs of the V-shaped runways will be extended and equipped for Cat 3, all-weather conditions, sufficient for the 230,000 projected aircraft movements which prodded the expansion. The phased improvements will be undertaken while the airport continues normal operations, and will at some point involve ferrying passengers to parked aircraft by wide-bodied buses. A doubling of the ramp area is also planned. M.S.K.

A82-20221 **Movement in Category III conditions.** P. J. Hunt (British Airways, Hounslow, Middx., England). *Aircraft Engineering*, vol. 53, Dec. 1981, p. 14-17.

All-weather operations are defined and discussed for the London Heathrow Airport. The decision height and the runway visual range are the critical parameters for choosing the operational conditions and the category. To make a landing with 100 m visibility and a decision height of 10-20 ft, a fully automatic landing system is required and must operate fully linked with an ILS localizer on the ground. Traffic is cleared of the sensitive landing corridor to maintain clean signals to the incoming craft just before touchdown.

The distance at Heathrow is set at 135 m, and it is noted that the procedures reduce the rate of arrivals by only one/hour. A surface radar is employed to maintain surveillance over ground traffic and control the patterns, mainly through a controllable taxiway centerline, stop-bar lights, and a flashing red Category 2/3 holding point marker. M.S.K.

A82-20222 **Ground movement control and guidance - Cat. 3 operations experience in Air Inter.** Mr. Roland-Billecart (Air Inter, Paray-Vieille-Poste, Essonne, France). *Aircraft Engineering*, vol. 53, Dec. 1981, p. 17-19.

A82-20266 **Pressure dependence of jet noise and silencing of blow-offs.** D.-Y. Maa and P.-Z. Li (Chinese Academy of Sciences, Acoustics Institute, Beijing, People's Republic of China). *Noise Control Engineering*, vol. 17, Nov.-Dec. 1981, p. 104-112. 13 refs.

Improvements in methods of jet noise prediction and reduction are discussed. Measurements were performed on a cold-air jet exiting through convergent nozzles of varying diameters, and on superheated jet streams at an oil refinery. A critical value was determined for the stagnation pressure, beyond which the jet becomes choked and shock-cell noise occurs along with turbulent noise. The turbulent noise was isolated by making the lip of the jet irregular, then measuring the A-weighted sound level. Blow-down studies were also made of the shock-cell noise, which was found to happen above the frequency peak of the turbulent noise. The interaction of microjets grouped together is considered, noting that a form of the Coanda effect causes the formation of a single jet. A micropore muffler is presented, which consists of a pipe drilled with many holes, and a diffuse-muffler is mentioned, which contains randomly distributed holes internally to dampen the noise emission. M.S.K.

A82-20276 **Computer graphics for quality assurance.** V. W. Gott (Northrop Corp., Aircraft Div., Hawthorne, CA). *IEEE Computer Graphics and Applications*, vol. 2, Jan. 1982, p. 39-41, 43, 44.

The use of CAD/CAM for quality assurance at Northrop is examined. The use of on-line and library computer graphics systems by the quality assurance personnel enabled the programming of lofting for at-will retrieval. The data is used to inspect master tools check features, castings, forgings, parts with basic moldline features, drawings, and tool design drawings. Lofting requests are made if the files are found to have inadequacies, and quality assurance findings are returned to the requester in hard copy form. Continuous updating of the system is reviewed, and the relevant data for cataloguing and identifying parts and parts surfaces are outlined. A reduction of time spent in inspections of 400% has been achieved with the system. M.S.K.

A82-20277 **Graphics in numerical control - The user's challenge.** J. H. Mabry (Rockwell International Corp., Tulsa, OK). *IEEE Computer Graphics and Applications*, vol. 2, Jan. 1982, p. 45-49.

The use of computer graphics to develop numerical control programs for the aerospace industry, particularly for parts for the Boeing 757, is explored. The user's understanding of the command structure of the graphics system was found to be the critical element in increasing productivity with the CAD/CAM systems. Other productivity gains were obtained by programming commonalities, reviewing the processing requirements to identify the command stream, elimination of operator response where possible, and menu or software revision early in the task. M.S.K.

A82-20278 **The future of integrated CAD/CAM systems - The Boeing perspective.** W. Beeby (Boeing Commercial Airplane Co., Engineering Div., Seattle, WA). *IEEE Computer Graphics and Applications*, vol. 2, Jan. 1982, p. 51, 52, 54-56.

The operations and upgrading of the interactive CAD/CAM system at Boeing for the design and manufacture of aircraft are discussed. The introduction of the system allowed engineering drawings to be used by manufacturing personnel without necessitating face-to-face contact, and the inclusion of lofting diagrams permitted the designers and builders to talk through the system to define changes. An upgrading to three-dimensional representation to enhance the engineering and manufacturing sections of the system is outlined, with stress upon the use of a shared data base. Critical areas of the system are listed as data management, which delineates the product definition data and planning and control data; a geometry engine for manipulating and evaluating the image data; and the communications processing network, which facilitates the rapid transfer of data between any discipline in the plant. M.S.K.

A82-20291 * # **Dilution jet behavior in the turn section of a reverse flow combustor.** S. M. Riddlebaugh (NASA, Lewis Research Center, Cleveland, OH), I. Greber (Case Western Reserve University, Cleveland, OH), and A. Lipshitz. *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0192.* 13 p.

Measurements of the temperature field produced by a single jet and a row of dilution jets issued into a reverse flow combustor are presented. The temperature measurements are presented in the form of consecutive normalized temperature profiles, and jet trajectories. Single jet trajectories were swept toward the inner wall of the turn, whether injection was from the inner or outer wall. This behavior is explained by the radially inward velocity component necessary to support irrotational flow through the turn. Comparison between experimental results and model calculations showed poor agreement due to the model's not including the radial velocity component. A widely spaced row of jets produced trajectories similar to single jets at similar test conditions, but as spacing ratio was reduced, penetration was reduced to the point where the dilution jet flow attached to the wall. (Author)

A82-20293 * # **An experimental study of separated flow on a finite wing.** A. E. Winkelmann (Maryland, University, College Park, MD). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, Albuquerque, NM, Aug. 19-21, 1981, Paper 81-1882.* 21 p. 8 refs. Grant No. NsG-1570.

The flow field associated with the formation of a mushroom shaped trailing edge stall cell on a low-aspect-ratio (AR = 4.0) wing was investigated in a series of low speed wind tunnel tests (Reynolds number based on 15.2 cm chord = 480,000). Flow field surveys of the separation bubble and wake of a partially stalled and fully stalled wing were completed using a hot-wire probe, a split-film probe, and a directional sensitive pressure probe. A new color video display technique was developed to display the flow field survey data. Photographs were obtained of surface oil flow patterns and smoke flow visualization. (Author)

A82-20294 # **Digital avionics - Advances in maintenance designs.** D. W. Mineck (Rockwell International Corp., Collins Air Transport Div., Cedar Rapids, IA). In: Digital Avionics Systems Conference, 4th, St. Louis, MO, November 17-19, 1981, Collection of Technical Papers. Conference sponsored by the American Institute of Aeronautics and Astronautics and Institute of Electrical and Electronics Engineers. New York, American Institute of Aeronautics and Astronautics, 1981. 11 p. (AIAA 81-2240)

It is shown that the performance benefits of advanced digital avionics systems can only be realized through the refinement of maintenance techniques. Digital technology permits the cost-effective application of line replaceable unit (LRU) level testing, centralized avionics system monitoring, and fault isolation. It is expected that maintenance designs under development will further reduce costs, and ensure that performance benefits are consistently achieved through high availability. Automatic and interactive ground testing can be realized through the application of maintenance oriented ground rules throughout avionics systems' design and development process, including on-aircraft maintenance of in-flight fault storage and in-flight fault consolidation. In this way, carry-on equipment will be virtually eliminated. O.C.

A82-20296 * # **Piloted simulation of an on-board trajectory optimization algorithm.** D. B. Price (NASA, Langley Research Center, Hampton, VA), A. J. Calise, and D. D. Moerder (Drexel University, Philadelphia, PA). *AIChE, ASME, IEEE, and ISA, Joint Automatic Control Conference, University of Virginia, Charlottesville, VA, June 17-19, 1981, Paper.* 28 p.

This paper will describe a real time piloted simulation of algorithms designed for on-board computation of time-optimal intercept trajectories for an F-8 aircraft. The algorithms, which were derived using singular perturbation theory, generate commands that are displayed to the pilot on flight director needles on the 8-ball. By flying the airplane so as to zero the horizontal and vertical needles, the pilot flies an approximation to a time-optimal intercept trajectory. The various display and computation modes that are available will be described and results will be presented illustrating the performance of the algorithms with a pilot in the loop. (Author)

A82-20297 * # **Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing.** N. Halyo (Information and Control Systems, Inc., Hampton, VA) and R. M. Hueschen (NASA, Langley Research Center, Hampton, VA). *AIChE, ASME, IEEE, and ISA, Joint Automatic Control Conference, University of Virginia, Charlottesville, VA, June 17-19, 1981, Paper*, 10 p. 12 refs. Contracts No. NAS1-15116; No. NAS1-12754.

This paper describes the development of a three-dimensional digital integrated automatic landing system (DIALS) for a small commercial jet transport. The system uses the Microwave Landing System (MLS), body-mounted accelerometers, as well as on-board sensors usually available on commercial aircraft, but does not require inertial platforms. The system development uses modern digital control techniques. The phases of flight considered are the localizer and glideslope capture, which may be performed simultaneously or sequentially, localizer and glideslope track (hold), crab/decrab, and flare to touchdown. The system captures, tracks and flares from steep glideslopes (2.5 - 5.5 deg) selected prior to glideslope capture. The results of a nonlinear simulation are presented. (Author)

A82-20298 # **Endwall boundary layer flows and losses in an axial turbine stage.** I. H. Hunter (Shell Research, Ltd., Thornton Research Centre, Chester, Ches., England). *(American Society of Mechanical Engineers, International Gas Turbine Conference and Products Show, Houston, TX, Mar. 9-12, 1981.) ASME, Transactions, Journal of Engineering for Power*, vol. 104, Jan. 1982, p. 184-193. 12 refs. Research supported by the Central Electricity Generating Board.

In order to gain an insight into boundary layer phenomena in axial flow turbines, experimental studies were carried out on a large-scale, low speed, single stage machine. Low and high frequency instrumentation supplemented by flow visualizations were used to determine the details of the flows and losses in the stator and rotor blade rows. Measurements of the turbine stator flows, which were obtained at two different inlet wall boundary layer thicknesses, were generally consistent with typical linear cascade observations. A major difference concerned the presence of appreciable radially directed flow. Hot-wire anemometry measurements at the turbine rotor exit, revealed strong secondary flows at the high turning hub section. The flow pattern was seen to be influenced by the spacing between the two rows of blades and by the rotor's instantaneous position with respect to the periodic flow field arising from the upstream stator row. (Author)

A82-20299 # **Boundary layer transition and separation on a compressor rotor airfoil.** R. P. Dring (United Technologies Research Center, East Hartford, CT). *ASME, Transactions, Journal of Engineering for Power*, vol. 104, Jan. 1982, p. 251-253.

Boundary layer calculations based on potential flow comparisons and comparisons with surface flow visualizations are presented for locating the boundary layer transition and separation. The flow at the midspan of a multistage compressor was studied using Ozalid paper on the blades in an ammonia flow with operational conditions. A turbulent boundary layer calculation showed separation close to the trailing edge, while actual observations showed attachment at the trailing edge. The visualization technique using Ozalid paper on compressor rotors is judged to be effective in studying boundary layer transition where centrifugal and Coriolis forces cause boundary layer skewing, and allows two-dimensional boundary layer analysis for predictions of the locations of transition and separation in the design of compressor airfoils. M.S.K.

A82-20407 **Mapping in tropical forests - A new approach using the laser APR.** H. Arp, J. C. Griesbach (TRANARG CA, Caracas, Venezuela), and J. P. Burns. *Photogrammetric Engineering and Remote Sensing*, vol. 48, Jan. 1982, p. 91-100. 7 refs.

Novel techniques involving the Laser Airborne Profile Recorder (Laser APR) have been developed as a solution to the problem of topographic mapping in dense tropical forests. The narrow laser beam used is able not only to record profiles of the tree canopy, but penetrate through small openings to ground level. Tree heights are then determined by comparing recorded profiles. The system is applied to the mapping of the Rio Caura reservoir site in southern Venezuela, where topographic maps showing 5-10 m contours of the 800 sq km area were completed in five months by means of Laser APR flights at 1.5 km intervals. A special, three-channel Autotape, mounted on a helicopter, was used in photogrammetric control location by trilateration from ground stations to the hovering aircraft. Many Laser APR-derived elevations were identified on the existing, 1:50,000-scale photography used for the mapping. O.C.

A82-20447 * # **Structure and variability of the Alboran Sea frontal system.** R. E. Cheney (NASA, Goddard Space Flight Center, Greenbelt, MD) and R. A. Doblar (U.S. Navy, Naval Ocean Research and Development Activity, Bay St. Louis, MS). *Journal of Geophysical Research*, vol. 87, Jan. 20, 1982, p. 585-594. 8 refs. Navy-sponsored research.

A distinct oceanic front coinciding with the jet of incoming North Atlantic water, and an associated anticyclonic gyre in the western half of the basin, were observed during a ship and aircraft survey of the physical characteristics of the Alboran Sea in the western Mediterranean in October 1977. The front was confined to the upper 200 m and was a continuous feature, extending from the Strait of Gibraltar 500 km eastward to the prime meridian. It is noted that in ten days between two surveys, the center of the gyre shifted 50 km westward. This variability of the anticyclonic gyre may correspond to changes of North Atlantic inflow strength, as inferred by local wind and the average atmospheric pressure over the western Mediterranean. O.C.

A82-20506 **Methods and models for predicting fatigue crack growth under random loading.** Edited by J. B. Chang (Rockwell International Corp., North American Aircraft Div., Los Angeles, CA) and C. M. Hudson (NASA, Langley Research Center, Hampton, VA). Philadelphia, PA, American Society for Testing and Materials (ASTM Special Technical Publication, No. 748), 1981. 145 p. $16.50.

Papers are presented in the volume summarizing the baseline data, methodology, procedures, and results of a round-robin analysis which was conducted to predict the fatigue crack growth in 2219-T851 aluminum center-cracked specimens subjected to flight loading in random cycle-by-cycle format. The objective of the analysis was to assess whether data from constant-amplitude fatigue crack growth tests on center-cracked specimens can be used to predict fatigue crack growth lives under random loading. The following approaches are discussed in detail: a root-mean-square approach, a crack-closure model, a multi-parameter yield zone model, and a load-interaction model. V.L.

A82-20509 * **A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading.** J. C. Newman, Jr. (NASA, Langley Research Center, Hampton, VA). In: Methods and models for predicting fatigue crack growth under random loading. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 53-84. 20 refs.

The present paper is concerned with the development and application of an analytical model of cyclic crack growth that includes the effects of crack closure. The model was based on a concept like the Dugdale model, but was modified to leave plastically deformed material in the wake of the advancing crack tip. The model was used to correlate crack growth rates under constant-amplitude loading and to predict crack growth under aircraft spectrum loading on 2219-T851 aluminum alloy plate material. The predicted crack growth lives agreed well with experimental data. The ratio of predicted-to-experimental lives ranged from 0.66 to 1.48. (Author)

A82-20510 * **Multi-parameter yield zone model for predicting spectrum crack growth.** W. S. Johnson (NASA, Langley Research Center, Hampton, VA). In: Methods and models for predicting fatigue crack growth under random loading. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 85-102. 24 refs.

A phenomenological load interaction model referred to as the Multi-Parameter Yield Zone model is presented which accounts for crack growth retardation caused by previous overloads, acceleration due to current overloads, and underload effects. In the present model, load interaction effects are calculated utilizing a residual stress intensity concept. Crack growth retardation and acceleration are accounted for by decreasing or increasing, respectively, the effective stress ratio used in a modified Forman's (1967) crack growth equation. Results of spectrum crack growth predictions for 2219-T851 aluminum are presented. V.L.

A82-20511 **Crack growth behavior of center-cracked panels under random spectrum loading.** J. L. Rudd and R. M. Engle, Jr. (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: Methods and models for predicting fatigue crack growth under random loading. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 103-114. 8 refs.

A study was carried out to assess the validity of using constant-amplitude fatigue crack growth rate data for center-cracked panels to predict the crack growth behavior of center-cracked panels subjected to random flight-by-flight spectrum loading. Analytical/experimental correlations and an evaluation of the sensitivity of the correlations to the overload shut-off ratio and threshold maximum stress-intensity factor used in the analyses are presented. It is concluded that the crack growth behavior of center-cracked panels subjected to random flight-by-flight loading can be accurately predicted from center-cracked panel constant-amplitude fatigue crack growth rate data. V.L.

A82-20512 **Random spectrum fatigue crack life predictions with or without considering load interactions.** J. B. Chang, M. Szamossi, and K.-W. Liu (Rockwell International Corp., North American Aircraft Div., Los Angeles, CA). In: Methods and models for predicting fatigue crack growth under random loading. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 115-132. 14 refs. Contract No. F33615-77-C-3121.

Constant-amplitude fatigue crack growth rate data for 2219-T851 aluminum center-cracked tension specimens have been used to predict fatigue crack lives under random spectrum loading with and without considering load interaction. When the load interaction effects are not considered, the predictions are shown to be conservative for those spectra consisting of predominant tensile overload cycles, whereas for spectra consisting of predominant tension-compression cycles, unconservative predictions will result. A range-pair counting procedure that properly counts the cycles in a random spectrum improves crack growth predictions. The crack growth analysis methodology and computation procedures are discussed in detail. V.L.

A82-20513 **Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981.** Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1981. 77 p.

Topics discussed include design possibilities for improved fuel efficiency of civil transport aircraft, energy management in military combat aircraft, and the control of aircraft gas turbines for fuel economy. Particular attention is given to the impact of increasing cost upon the design of avionic fuel management systems and the operational and performance aspects of fuel management in civil aircraft. Consideration is also given to the FS2 Bedford Civil Flight Research Program as well as current and future developments in thrust management. J.F.

A82-20514 **Design possibilities for improved fuel efficiency of civil transport aircraft.** D. H. Jagger (Airbus Industrie, Blagnac, Haute-Garonne, France). In: Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981. London, Royal Aeronautical Society, 1981. 9 p.

The possible application and potential benefits of various technical advances in aerodynamics, structures, and propulsion for the reduction of fuel usage in future Airbus aircraft are discussed. In particular, technical comparisons and tradeoffs in terms of fuel economy are considered for a hypothetical medium-range project aircraft of the 1980's. Improvements in fuel used per passenger at 1,000 n.m. range over two successive periods of 20 years are estimated. A breakdown of the objectives, time-scales, and costs of

of a turbine blade, were preheated and cooled by jets from different impingement tubes at various flow rates and distances. The lumped capacity method was used to determine the cooling rate of the aluminum specimen. The mean heat transfer coefficients were calculated and correlated with dimensionless parameters. The results of the Nusselt numbers obtained from experiments were consistent with those calculated from the recommended formula. Furthermore, these results were compared with the correlations of Metzger and those of Ravuni and Tabakoff, and it was concluded that the formula proposed by this paper was more reasonable. (Author)

A82-20515 **Energy management in military combat aircraft.** J. W. Lyons (British Aerospace Public, Ltd., Co., Aircraft Group, Brough, Humberside, England). In: Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981. London, Royal Aeronautical Society, 1981. 6 p. 5 refs.

Energy management is important not only for fuel economy, but for efficient three-dimensional maneuvering capabilities as well. The principles of several new techniques for energy efficient three-dimensional maneuvers in combat aircraft are discussed. Efficient turbofan engines have been adopted which are electronically controlled for achieving precise thrust settings within engine limits. Engine bleed can be better controlled, and hydraulic pressure control, resulting in reduced mechanical offtakes from the engine, is now possible using microprocessors. Self-healing systems can be used in the battlefield scenario, and advanced display concepts are being employed to make better use of available maneuver energy. These techniques individually result in greater efficiency, but together they provide significant synergistic improvements. J.F.

A82-20516 **The control of aircraft gas turbines for fuel economy.** D. J. Lee (Rolls-Royce, Ltd., Bristol, England). In: Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981. London, Royal Aeronautical Society, 1981. 7 p.

Electronic controls are important to the fuel efficient aircraft of the future as sophisticated fly by wire controls, flight management systems, and complex ATC navigation systems. The functions obtainable using electronic controls are often more complex and more flexible than those produced with hydromechanical systems. They provide greater accuracy in staying within temperature and stress limitations, as well as increased fuel economy. Electronic engine control is also very cost effective over the life of the unit and has the benefit of reducing the pilot workload. Microprocessors have made the use of digital technology for engine control more popular; the benefits of digital control may be seen in terms of improved accuracy, fault diagnostics and tolerance, fuel-type variations, system complexity, and airframe integration. Finally, engine health monitoring systems are used for the programmed maintenance of mechanical parts of gas turbines. J.F.

A82-20517 **The impact of increasing energy costs upon the design philosophy of avionic fuel management systems.** P. R. Thrift (Smiths Industries Aerospace and Defence Systems Co., London, England). In: Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981. London, Royal Aeronautical Society, 1981. 9 p.

Parameters of fuel quantity remaining and rate-of-usage are determinate factors in the operational range of any aircraft. Methods for designing engines with lower fuel consumption, and airframes with lower drag coefficients to minimize the mass of fuel to be carried are being investigated. Operating costs may be reduced by using unused portions of fuel as dynamic balast to control the center of gravity throughout a flight profile. Fuel consumption can also be reduced by control of the aircraft's complete flight envelope. Strategies for measuring fuel mass and determining fuel density are discussed. Means of improving the twin concentric circular cross section transducers are discussed, and the production of a fault tolerant system by the incorporation of two computer systems is described. Finally, the use of microprocessors to control the center of gravity and to detect fuel leaks is discussed. J.F.

A82-20518 **Operational and performance aspects of fuel management in civil aircraft.** H. P. K. Dibley (British Airways, Hounslow, Middx., England). In: Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981. London, Royal Aeronautical Society, 1981. 13 p.

In order to carry maximum payload at minimum cost, an airline must find means of optimizing fuel purchasing, pre-flight planning, and in-flight procedures. Accurate forecasting and monitoring of fuel costs is needed to obtain adequate fuel supplies at the best price, to maximize uplift at cheap stations, and to show the effect of outages of uplift stations. Pre-flight planning is used to determine the route for minimum fuel consumption and to calculate the maximum take-off weight. Minimization of fuel consumption during flight can be achieved by (1) presentation of optimum climb, cruise and descent information; (2) flight management systems coupled to the autopilot; (3) optimizing the use of engine climb derate; (4) improving navigational accuracy; (5) presentation of more navigation parameters to the pilot; (6) vertical navigation; and (7) minimizing noise and fuel consumption on approach. J.F.

A82-20519 **The FS2 RAE Bedford civil flight research programme.** R. W. Jones and R. C. Rawlings (Royal Aircraft Establishment, Bedford, England). In: Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981. London, Royal Aeronautical Society, 1981. 11 p. 12 refs.

The RAE/FS2 Bedford Civil Avionics Flight Research Program is aimed at studying the individual component systems for flight control, navigation, display, and flight management and at integrating these systems for optimum air traffic control (ATC). Modern equipment can provide accurate automatic navigation in four dimensions, and electronic displays can improve methods of displaying information to the flight crew as well as improve interaction between pilot/ATC and automatic navigation systems. Radar monitoring will be needed to ensure the meeting of safety standards, and monopulse SSR will provide an improved method of tracking and identifying aircraft. More use will be made of high level stacking to provide the airspace necessary to handle more aircraft and to reduce fuel wastage. The ADSEL/DABS system reduces garbling and provides a suitable data link to pass ATC requirements and wind data to the aircraft as well as aircraft derived parameters to the ATC. J.F.

A82-20520 **Thrust management - Current achievements and future developments.** J. L. Weston (Smiths Industries Aerospace and Defence Systems Co., Cheltenham, Glos., England). In: Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981. London, Royal Aeronautical Society, 1981. 12 p.

A system architecture has been developed to provide a fuel efficient full-flight regime auto-throttle system and a second generation flight management computer system. The auto-throttle system is capable of controlling the engine throttle levers from before take-off until touchdown as well as providing command signals to the aircraft flight director system. The operation modes of the system include take-off, climb, cruise, descent, maximum continuous thrust, hold, approach and go-around. The flight management computer system is responsible for the overall operation of the aircraft between the take-off location and the destination point. Its eight major functions are (1) flight planning; (2) navigation; (3) control of VOR/DME receivers; (4) lateral guidance; (5) vertical path optimization; (6) vertical guidance; (7) look ahead information; and (8) provision of information to support the electronic flight instrument system. J.F.

A82-20521 **Pactec V - Plastics technology advances/1980 update; Proceedings of the Fifth Annual Pacific Technical Conference, Los Angeles, CA, February 26-28, 1980. Volume 3.** Conference sponsored by the Society of Plastics Engineers. Greenwich, CT, Society of Plastics Engineers, Inc.; El Segundo, CA, Technology Conferences, 1981. 257 p. $17.50.

The latest contributions to the scientific and engineering knowledge of plastics are discussed under the headings of reinforced plastics and composites, structural foams, and plastics in building. Papers presented include: conductive prepregs for lightning strike protection of aircraft, fatigue behavior of selected nonwoven fiber composites for helicopter rotor blades, conductive plastics for EMI shielding, recent advances in plastic concrete, and thermoplastics in solar energy. V.L.

A82-20523 **Conductive prepregs for lightning strike protection on aircraft.** G. L. Patz (Hexcel Corp., Dublin, CA). In: Pactec V - Plastics technology advances/1980 update; Proceedings of the Fifth Annual Pacific Technical Conference, Los Angeles, CA, February 26-28, 1980. Volume 3. Greenwich, CT, Society of Plastics Engineers, Inc.; El Segundo, CA, Technology Conferences, 1981, p. 15-22.

A prepreg system has been developed which is capable of dissipating a full 200,000 amp lightning strike. The prepreg system is based on an E-glass fiber which has a continuous uniform coating of pure aluminum chemically bonded to the glass filament. Simulated lightning tests of a series of aircraft-skin-type sandwich panels on which the new prepreg was used as a surface ply over graphite, Kevlar, and glass prepreg systems have shown that the tested material is capable of conducting lightning currents without undue structural damage. Preliminary testing has also shown that there is no appreciable galvanic cell interaction between the outer ply and the graphite substructure. V.L.

A82-20524 **Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades.** J. W. Davis and G. J. Sundsrud (3M Co., Structural Products Dept., St. Paul, MN). In: Pactec V - Plastics technology advances/1980 update; Proceedings of the Fifth Annual Pacific Technical Conference, Los Angeles, CA, February 26-28, 1980. Volume 3. Greenwich, CT, Society of Plastics Engineers, Inc.; El Segundo, CA, Technology Conferences, 1981, p. 23-38.

A number of variables characterizing nonwoven glass-reinforced composites used for propeller and rotor blade structures have been studied in order to determine which of the many raw material variables could contribute to improving the fatigue properties of the composite. The properties investigated included variations in resin, glass type, glass supplier, glass finish, glass monofilament diameter, and fiber bundle size. Both unidirectional and 45-degree orientations were used in tensile fatigue tests. The study has produced a series of thirty-one alternating stress vs cycle to failure curves for the raw material variables investigated. V.L.

A82-20526 **Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981.** Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1981. 116 p.

The state-of-the-art in flight simulator trainers is examined, with consideration given to both commercial and military uses of simulators. Training with simulators by the RAF, the French Air Force, and the USAF is explored, and attention is paid to commercial pilot training for airlines and in general aviation aircraft. Specific mention is made of simulators for crew member training for the Nimrod helicopter and for the B-52 bomber. The employment of simulators by aircraft manufacturers is discussed, including the automation of in-flight simulation of data handling and validation testing of the simulator programs. The effects of simulators on advanced aircraft technology is explored, as are advances in simulation, in visual representation technology, and the direction of civil simulation, particularly for the case of satisfying FAA Phase III requirements. M.S.K.

A82-20527 **The simulator and the airline pilot.** G. T. Lavery (British Air Line Pilots Association, Hayes, Middx., England). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981. London, Royal Aeronautical Society, 1981. 6 p.

The purposes, a summary, and future goals of pilot simulator training techniques are reviewed. Simulators eliminate the expense of flying an actual aircraft for many hazardous operating experiences, can be used regardless of weather conditions, allows repetitive exposure to abnormal situations, and allows the instructor to be close-at-hand. Simulators are noted to often lack fidelity in terms of power applications and yaw, magnitude of response to configuration changes and drag changes, instrument reproduction, visual system response, and accurate aircraft cabin noises. Persisting problems are stressed as down-time for the simulators, lack of use of simulators for practice instead of as a testing tool only, and lack of authentic parts in the cockpit. Future necessities for actual zero-flight time training are outlined, and methods for training for flying different types of aircraft to maximize shifts of trained abilities are suggested. M.S.K.

A82-20528 The use of flight simulators in l'Armée de l'Air. F. Lemarchal (Ministère de la Défense, Etat-Major de l'Armée de l'Air, Paris, France). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981.
London, Royal Aeronautical Society, 1981. 3 p.

Various aspects of the use of flight simulators by the French air force are examined, noting a decrease in fuel expenditures by use of the trainers. Proficient control of the aircraft is considered essential to making maximum use of other sophisticated instrumentation such as advanced radars and missile store indicators. Flying time is eliminated during take-off and runway circuit training, and human factor accident rates are decreased by exposing the pilots to critical situations, as well as recovery procedures, before actual flying begins. The deployment of simulators among service divisions is outlined, and current programs in operation are described. Finally, the French air force combat simulator is discussed, including its advantages for repetitive exposure, adjustments in the flight envelope to fit the students' abilities, and comprehensive instrumentation replication. M.S.K.

A82-20530 The aircraft manufacturer's needs as a simulator user. J. W. Martz (Boeing Commercial Airplane Co., Renton, WA). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981. London, Royal Aeronautical Society, 1981. 6 p.

The use of flight simulators by the aerospace industry is examined. Aircraft manufacturers use engineering and flight training simulators, and also test facilities and equipment rigs for each developmental phase of a craft. The test facilities include wind tunnels, a system integration test facility, cabin air supply mock-up, engineering mock-ups, etc. Actual flight simulators are divided into one unit for acquainting the pilot with primary instrumentation and the electro-hydraulic force feel, another with the electro-hydraulic system and a three degrees-of-freedom motion base, and other units for differing numbers of crew members, all equipped with digital avionics and systems integration. Boeing is noted to be preparing simulators with six degrees of freedom for simulation of flight conditions on the 727, 737, 757, and 767 aircraft, with training curricula available for pilots having anywhere from 300 to 20,000 hr of experience. M.S.K.

A82-20531 ASW and weapon system simulation with reference to the Nimrod MR Mk2 maritime crew trainer. K. Wells (Marconi Space and Defense Systems, Ltd., Stanmore, Middx., England). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981. London, Royal Aeronautical Society, 1981. 5 p.

The features and operational characteristics of the Mk 1 and Mk 2 training simulators for the Nimrod helicopter crew members are described. The Maritime Crew Trainer (MCT) for the Mk 1 system fully simulates sonar, ESM, radar, MAD, communications, routine and tactical navigation, and weapons management. Crew members are supplied with alphanumeric displays and a keyboard, and the instructor can direct a full range of targets, operational conditions, and instrument faults. Improvements to the Mk 2 facility include digital provisions for ASW operations, navigational interlinks with the sonar and radar system, and weapons systems management. Further additions in sonar and radar target, environmental, sonobuoy, and receiver-transmitter simulation are outlined, and a recommendation is given that simulators be designed with same requirements as the aircraft they simulate. M.S.K.

A82-20532 Automation in flight simulation of data handling and validation testing. J. Shlien (CAE Electronics, Ltd., Montreal, Canada). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981.
London, Royal Aeronautical Society, 1981. 11 p.

The use of automated simulation devices to effect heightened fidelity in the transfer of actual operational aircraft parameters to training simulators is discussed. The automated hardware use digital processing, allowing consideration of large volume data points of lateral to longitudinal cross-coupling, complicated surface interference effects, ground effects, engine interference effects, and downwash effects. System inputs comprise a library listing of all breakpoints to be used, correlation of function to corresponding function, and the manufacturers' data points. There is no loss of data resolution, updates can be rapidly incorporated, and a direct traceability exists between the manufacturer's data and the simulator's files. FORTRAN is noted as the accepted software checking language, and the use of automated simulator six degree-of-freedom hardware is stressed as having released the instructor from having to verify the simulator program and allowed concentration on presenting actual critical flying conditions to the trainee. M.S.K.

A82-20533 The effects on simulators of advances in aircraft technology. J. Baradat (Thomson - CSF, Division Simulateurs, Trappes, Yvelines, France). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981.
London, Royal Aeronautical Society, 1981. 5 p.

Advances in flight technology which impinge on the design of flight simulators are discussed. The increase in control surfaces, automated flying modes, and digital avionics displays have increased the magnitude and complexity of the software data necessary for high-fidelity simulation. The characteristics of the transfer circuits are adapted to the aircraft equipment input-output characteristics, and simulators are required to provide freeze-frame capability, repetition of important flight phases, and time acceleration or jumps. The use of either common bus or arborescent architecture for the data processing is outlined, and attention is given to software updates, particularly for the autopilot, and the choice of software, specifically when a necessity arises for a manufacturer to yield aircraft software to the simulator manufacturer. M.S.K.

A82-20535 Advanced simulation. C. H. Huettner (FAA, Office of Flight Operations, Washington, DC). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981.
London, Royal Aeronautical Society, 1981. 6 p.

The Advanced Simulation Rule, the guidance implementing the Rule, the FAA National Simulator Evaluation Team, the status of other simulator evaluation activities, and future FAA simulator activities are discussed. The Phase II certification occurred in January 1981, and signalled the incorporation of realistic three-dimensional windshear dynamics, stopping and directional control forces for various runway conditions, braking dynamics, six degrees-of-freedom simulation, operational navigation, and aircraft cabin noise fidelity into pilot training simulators. Further cloud and lighting advances are described, and Phase III requirements are mentioned as including varying light and visual representations, weather anomalies, realistic colors, and weather radar. FAA circular 121-14C is outlined, the manner of using Phase I equipment to gain Phase II certification, and the functions of the nine FAA simulator evaluations specialists are examined. M.S.K.

A82-20536 A European airline's future simulator requirements. J. Meier (Swissair AG, Zurich, Switzerland). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981. London, Royal Aeronautical Society, 1981. 13 p.

The features and operations of the Swissair DC-9-81 simulator are reviewed, and the Phase I, II, and III FAA requirements for simulators are discussed. The simulator software has been upgraded in the DC-9-81 to include ground reactions and handling, brake and antiskid modeling, ground proximity, atmospheric simulation, FORTRAN programming, and an improved motion program. Control feel and force have also been added to express the mass of control components, the dead band, breakout forces, autopilot forces, trim, aerodynamic forces and surface blow back, and 200 types of malfunction. Simulator hardware changes to upgrade the computer, the motion simulation, control loading, sound, and visual fidelity are examined. Finally, actual implementation of the Phase II regulations are discussed, noting that the goal is to make the training simulation experience more thorough than will actually be encountered in flight. M.S.K.

A82-20537 **An independent view of where civil simulation should be headed.** J. A. Carrodus (Cathay Pacific Airways, Ltd., Hong Kong). In: Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981. London, Royal Aeronautical Society, 1981. 5 p.

Deficiencies in the optimal use of simulators are discussed and suggestions for improvements in the use of simulators are offered. The inadequacies in validation documents for testing the fidelity of one variable factor against another in a dynamic program are examined, and a remedy is found in obtaining validation data from the aircraft manufacturer. Recommendations are also offered that simulator construction be given the same lead time as the aircraft they simulate, while manufacturers should also supply qualified pilots who can validate the simulator programs for conditions outside of the normal flight envelope. Error checking is emphasized, as are buffet and motion realism, sound reproduction fidelity, meeting development schedules, and provisions for automatic testing. Finally, maintenance in simulators is reviewed, along with government oversight agencies to uphold the integrity of simulator training. M.S.K.

A82-20540 **Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980.** Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1980. 99 p.

Topics discussed include the airworthiness of helicopter transmissions, the application of condition monitoring, and the minimum-cost performance monitoring of turboshaft engines. Consideration is also given to single-shot diagnostics, helicopter transmission philosophy, and on-site vibration measurement, dynamic tracking and balancing. J.F.

A82-20541 # **Airworthiness of helicopter transmissions.** P. D. Vinall (Civil Aviation Authority, London, England). In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 30 p.

The fatal accident rates caused by the rotor and transmission systems of rotorcraft are almost an order of magnitude worse than those of fixed-wing aircraft. This is in part due to the single load path characteristics of the vehicle. Redundancy in the transmission system would mean, however, a change in the current design practice and the possible disadvantages of increased weight and complexity. The standards achieved on rotorcraft transmissions bear comparison with experience on similar dynamic components in turboprop engines. Safety considerations are of greater significance in a helicopter, however, and these aircraft should have higher standards for airworthiness. It is suggested that there be manufacturing control of critical parts for rotorcraft, and that transmissions not be used as a source of power for accessory functions which might reduce the integrity and reliability of the transmissions. Better diagnostic aids should also be established, including an in-flight indicator of transmission condition and a periodic vibrographic oil and sonic analysis. J.B.

A82-20542 # **The application of condition monitoring.** A. T. Dalton (Civil Aviation Authority, London, England). In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 14 p.

The development in the application and management of in-service maintenance of commercial helicopters has lagged the advancements in design and operation. The Primary Maintenance Process is discussed in detail, emphasizing its three primary maintenance processes: (1) hard time maintenance for known deterioration; (2) on-condition inspection at regular intervals; and (3) condition monitoring, which relies on in-service information analysis. The primary processes (1 and 2) are applied in detail to each item of a helicopter, after which condition monitoring (3) is used as a secondary surveillance activity for engineering management. It is maintained that formalized application of condition monitoring to safely develop maintenance tasks will reduce costs and promote deregulation by delegation of certain activities to the helicopter operator under controlled program conditions. J.F.

A82-20543 # **Quick learning diagnostics.** R. M. Stewart (Southampton, University, Southampton, England). In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 14 p.

Single-shot diagnostics implies the ability to judge the state or condition of a component on the basis of one measurement and without reliance on past history. Vibration patterns that signal the existence of a fault and the nondimensional numbers to encode them are found; use of both patterns and numbers reduces the data storage requirement, since the diagnosis is independent of past history, machine speed/load and monitoring position. Noise reduction and multiple techniques are developed to permit inspection of more complex machines. Single-shot diagnostics was used to monitor the vibrations of a gear box and a rolling contact bearing. In the former, the pattern recognition procedure resulted in the production of a true nondimensional number; in the latter, mere detection of the pattern was considered sufficient. Both cases required a great deal of computation, first during the primary phase of signal averaging or power spectrum analysis, and then in the secondary phase of reducing the complicated primary signature to a simple statement: acceptable or unacceptable. J.F.

A82-20544 # **Minimum cost performance monitoring of turboshaft engines.** H. I. H. Saravanamuttoo (Carleton University, Ottawa, Canada). In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 13 p.

A low-cost Engine Health Monitoring system for turboshaft engines is presented, which is suitable for use by small operators who do not have access to computing facilities. Two approaches are discussed, Gas Path Analysis (GPA) and Trend Analysis, according to which measurements are made of the power fuel flow, inlet conditions, pressure levels, and temperatures. GPA is shown to be the more powerful method, but requires extra instrumentation. Fuel flow errors can be detected either by a large increase in airflow or an increase in turbine efficiency. Fuel flow proved to be the most critical measurement (a 1% error gave a 1.4% error in airflow, whereas a 1% error in power only gave a 0.4% error in airflow). This lower sensitivity to power errors results since GPA deduces the airflow from the gross power developed by both turbines, and power absorbed by the compressor is usually greater than that absorbed by the rotor. Trend Analysis, on the other hand, requires no extra instrumentation, but when applied with good judgement, can indicate troubles before they become critical. J.F.

A82-20545 # **On-site vibration measurement, dynamic tracking and balancing.** N. E. Trigg (Helitune, Ltd., Fleet, Hants., England). In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980. London, Royal Aeronautical Society, 1980. 10 p.

Undetected vibration can severely damage expensive and often unobtainable major components, resulting in lengthy, costly, and untimely overhauls. Old and new methods of vibration analysis and tracking are compared, and the various techniques and equipment used by these methods are discussed: flag tracking, hand-held vibrograph, the Scientific Atlanta Vibration Signature Analyzer. The latter instrument provides a hard copy of vibration signatures recorded in the vertical, lateral, and fore and aft planes; by relating the peaks of the signatures to a vibration order sheet, the sources of vibration can be found and sharply reduced. Out-of-track and out-of-balance conditions in the main and tail rotors can be pin-pointed with accuracy and eliminated. The future will involve microprocessors to interpret the data more rapidly and give instructions for speedy tuning. J.F.

A82-20546 # **Helicopter transmission philosophy - The way ahead.** B. A. Shotter (Westland Helicopters, Ltd., Yeovil, Somerset, England). In: Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980.
London, Royal Aeronautical Society, 1980. 10 p.

Factors influencing the design of a helicopter transmission system are discussed. The power and speed of the slowest output are of primary importance since these define the maximum torques where the highest weights are likely to be found. The physical arrangement of the aircraft usually demands that the engine axis be near-horizontal, while the main rotor axis be near-vertical; one stage of gearing will therefore be concerned with changing the rotation axis. The physical form of the system is also influenced by the rotor control principles and the nature of the forces emanating from the rotor. The system should also have a light weight, high reliability, a minimum amount of maintenance, and a long life. Improvements in materials can contribute to a consistent performance, and a simple system, based on a large number of units of the same design, will make the unit more problem-free. J.F.

A82-20551 **Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981.** Symposium sponsored by the Royal Aeronautical Society, Royal Institution of Naval Architects, and Airship Association. London, Royal Aeronautical Society, 1981. 114 p.

After giving an historical account of the development of rigid and non-rigid airship design, the conference covers the application of airships to offshore military and economic activities such as those defined by the Third U.N. Conference on the Law of the Sea, the incorporation of modern technologies into maritime patrol airships, comparisons of airships and conventional aircraft in maritime roles off the Japanese Archipelago, and possibile military roles for airships of various designs in the Royal Navy. Consideration is also given the airworthiness of airships under severe flight conditions, the design of a surveillance airship for duty in the area of New Zealand, and the design characteristics and operational capabilities of the Skyship 500 airship. O.C.

A82-20552 **An introduction to the airship.** E. Mowforth (Airfloat Transport, Ltd., Guildford, Surrey, England). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 8 p.

This paper seeks to indicate some of the principal design parameters and operational characteristics of the airship, making particular reference to those features relevant to maritime applications. The greater part of the presentation is devoted to the traditional airship geometry, typified historically by for example the Goodyear 'blimps' and the Hindenburg'; structural categories for this form will first be described, leading to a survey of selected operational aspects, a brief historical account of the use of airships in a maritime context, and some comments on the performance to be expected from the conventional configuration. The paper will then conclude with a short look at some of the modern proposals deviating from the traditional concept, particularly at 'hybrid' designs. (Author)

A82-20553 **Offshore uses of the airship.** M. B. F. Ranken (Aquamarine International /Fisheries and Ocean Development/, Ltd., London, England). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 12 p. 42 refs.

An assessment is made of the application of airships to the maritime surveillance tasks made neccessary by the definition of exclusive economic zones (EEZs) for coastal states by the Third U.N. Conference on the Law of the Sea. It is suggested that the fuel economy, long mission durations, and large horizon for radar use make airships attractive tools in the implementation of surveillance within the EEZs. Attention is given the construction, operation and crew training cost advantages of airships, the ease with which avionics and specialized electronic surveillance equipment can be accomodated in an airship gondola, and the all-weather operational capabilities of modern airships. O.C.

A82-20554 **Studies of modern technology airships for maritime patrol applications.** D. B. Bailey (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA), K. E. Williams, and L. J. Nivert (U.S. Coast Guard, Washington, DC). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 12 p. 24 refs.

The energy efficiency of airships has prompted the reexamination of their capabilities in maritime patrol roles, in light of competition from hydrofoil, surface effect, and small waterplane area ship designs. Based on the past performance of airships and the incorporation of modern technology for propulsion, structures, materials and flight controls, it is assumed that the new airships would be capable of hover, VTOL operation, a 90-knot maximum speed, sensor and vessel towing, and all-weather flight. The lifting gas considered is 95% pure helium. Studies concerning vehicle sizing, estimated life cycle costs, and vehicle case studies are invoked by conclusions which recommend that (1) airship flight demonstrations be conducted for technical and operational validation, and (2) that analyses be conducted of such operational and logistic factors as crew training, maintenance, basing and utilization. O.C.

A82-20555 **The airship - Its application and promotional activity.** K. Iinuma (Japan Buoyant Flight Association, Japan). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 7 p.

The opportunities for airship operation in the Japanese Archipelago are assessed, with a view toward more economical fulfilment of territorial waters control and maritime surveillance requirements than present YS-11 and 737 conventional aircraft. Attention is given the use of airships in traffic between the main islands and small outlying islands. The airship design assumed in all comparisons and estimates is a four-rotor, helistat-type craft incorporating a buoyant hull with vectorable, helicopter-like propellers. O.C.

A82-20556 **The uses of airships in the Royal Navy.** B. Shaw (Ministry of Defence /Navy/, London, England). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 6 p. 7 refs.

An assessment is given of the operational capabilities offered by airships incorporating new materials and novel design concepts, in the context of the NATO roles to which the British Navy is commited in the North Atlantic. In addition to considering ASW, mine warfare, flying command communications center and RPV-carrying functions, attention is given to the structural design of an airship whose service altitude would be 15,000 ft. The structural configuration consists of a carbon fiber-reinforced plastic central beam, which would support the hull envelope by means of circular frames attached to the beam by radial wires. Design suggestions are also made for a low-level airship with four vectorable rotors. Emphasis is placed on the advantages of airships in the airborne early warning role and in the role of logistics support for ships at sea. O.C.

A82-20557 **Airworthiness of airships.** E. J. Niedermayer (Civil Aviation Authority, London, England). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 6 p.

Criteria under consideration by the British Civil Aviation Authority with a view of establishing airship airworthiness and safety requirements for certification of future commercial designs are presented. Emphasis is put on the airship hull's ability to withstand storm-strength gust conditions, and of the control surfaces' ability to establish sufficient stability under those conditions. It is noted that the velocities of up- and down-drafts in the center of a severe thunderstorm may reach 3000 ft/min at the 3000 ft altitudes at which airships traditionally cruise. Attention is also given to the free-balloon condition that results from total engine failure, and to the establishment of operational limitations concerning maximum rates of climb and descent, minimum turn radii, and minimum clearance space for take-off and landing. O.C.

A82-20558 **A surveillance airship for the New Zealand environment.** P. W. C. Monk (Airship Industries, Ltd., Isle of Man, England). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 31 p.

A description is presented of a small, non-rigid airship, which may be fueled by a combination of natural gas and liquid petroleum gas, intended to meet the territorial waters patrol requirements that have arisen through the imposition of a 200-mile economic zone around the islands of New Zealand. The non-metallic airship hull is suited for the installation of a 12-ft wide radar antenna, which will at an altitude of 4000 ft detect 11,000 sq ft targets at 100 n.mi. Attention is given to the structural design of the Kevlar-cloth hull, and to the management of thrust between a reciprocating powerplant for stationkeeping and two turboprop engines for 90-knot dash speeds. Performance projections are given for (1) combined weight of power units and fuel vs. range, (2) search capability vs. target area, (3) time on station at 40 knots and 4000 ft, (4) static stability, (5) speed as a percentage of engine power, and (6) lift derived from the hull at varying angles of attack and from the vectoring of the turboprop engines. O.C.

A82-20559 **Skyship 500 - The development of a modern production airship.** R. Munk (Airship Industries, Ltd., London, England). In: Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981. London, Royal Aeronautical Society, 1981. 11 p.

A description is presented of the structure, systems, performance capabilities and possible missions of the Skyship 500 and 600 non-rigid airships. Hull envelope construction is unusual in that it combines a single-ply fabric with the use of longitudinal fabric panels in which the warp of the fabric also runs longitudinally rather than transversely, as has been the case traditionally. Collapsible ballonets are used fore and aft, and helium is employed as the lift gas. The gondola is constructed from Kevlar-reinforced epoxy, and incorporates vectorable ducted propellers driven by reciprocating engines on each side. A production-costs breakdown is given for all structural components and systems, and disposable-load figures under two assumed lift volumes are provided. The suitability of the craft is considered for maritime surveillance, ASW and mine sweeping roles. O.C.

A82-20560 **Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980.** Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1981. 58 p.

Topics related to the design, maintenance, operability, and reliability of combat aircraft for the RAF are discussed. Specific attention is paid to front-line maintenance requirements, including the reduction of the numbers of necessary on-hand parts and the turnaround time. Management methods for reliability and maintenance are reviewed, as are particular aircraft design features which enhance operability, such as in the avionics systems. The interface between the procurement agencies, the manufacturers, the design teams, and the end users is explored, noting the effectiveness of contracts with specified reliability and MTBF requirements, and the techniques of producing combat-ready aircraft during peacetime conditions are outlined. M.S.K.

A82-20561 **Design for operability of military aircraft RAF engineering experience and requirements. I - Thoughts of a squadron engineer.** B. Robson (RAF, London, England). In: Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980. London, Royal Aeronautical Society, 1981. 5 p.

Factors which contribute to aircraft reliability are examined, with emphasis on first-line maintenance requirements. Mobility requirements are met by reducing the total amount of equipment that must be brought to the point of use, while on-board electronic systems checks, redundancy, and the ease of repairability are essential to reducing the amount of spares necessary on-hand. Reliability can be considered in terms of ease of repair external to combat damage, and resistance to foreign object damage, in addition to fault diagnosis procedures to save time in identifying defective components. Maintainability is discussed in terms of cost, manpower, time and equipment, and impinges on the efficiency of turnaround time. It is noted that the standardization of parts and tools have significantly aided the reduction of repair time for various aircraft. M.S.K.

A82-20562 # **Aircraft operability - RAF engineering experience and requirements. II.** D. Williams (RAF, London, England). In: Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980. London, Royal Aeronautical Society, 1981. 6 p.

The procurement cycle, engineering information, and day-to-day nominal operational procedures of combat aircraft maintenance are raviewed to form a basis for requirements for reliability and maintenance. The procurement cycle is outlined, with emphasis on development costs and production costs and timescales. Engineering data are gathered to predict the expected extent and time of repair of nominal breakdowns and operational damage. Specifications for MTBF are promulgated, and plans are defined for ground service testing, built-in test equipment, automatic test equipment, and all factors which consume time before readiness. All necessary components, times, and teams necessary to fulfill maintenance requirements are detailed, and definitions of reliability are set down. Emphasis is placed on tying reliability and maintenance requirements to contractual guarantees. M.S.K.

A82-20563 # **Aircraft design for operability.** H. A. G. Waugh (British Aerospace Public, Ltd., Co., Kingston-on-Thames, Surrey, England). In: Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980. London, Royal Aeronautical Society, 1981. 4 p.

The design of fighter aircraft is examined for modifications necessary in the design process to obtain maximum operability. Noting that aircraft are growing larger and requiring greater thrust, the tendency of organizations to resist change where change is needed is emphasized. Contractual guarantees for reliability and maintenance, performance standards, price, and fixed schedules created a perception of the necessity for changes to occur early in the design process. Changing standards in the middle of the design process also added to the workload and affected the level of understanding between the user and the manufacturer. Continued communications between the procurement agency, the end users, and the manufacturing team is stressed as necessary to achieving the cost, reliability and maintenance, and performance goals for new aircraft. M.S.K.

A82-20564 # **Operability of military aircraft - Avionic design aspects.** D. I. Jackson and G. Belcher (Marconi Avionics, Ltd., Rochester, Kent, England). In: Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980. London, Royal Aeronautical Society, 1981. 6 p.

The design, operability, reliability, and maintenance of avionics computers are discussed, with emphasis on ensuring availability in a combat environment. The characteristic accuracy and complexity of modern digital avionics systems are described in terms of an existing autopilot computer, a stability augmentation computer, and two separate display computers. The computers weigh from 25-38 lb, have from 1850-5000 components, draw from 120-180 W, and feature from 240-2600 internal and external connections, with MTBF ranging from 500-2000 hr. Cooling is accomplished through either cold wall or air blown methods, with the high density electronics mounted on module cards for ease of replacement and enhanced cooling. Increasing use of LSI expands the computing power, lowers the power requirements, and offers the potential for higher reliability. A schematic is provided of a reconfigurable system, and an impetus for standard computer languages is noted. M.S.K.

A82-20565 # **Operability of military aircraft - Some design and cost trends.** J. Fletcher and M. S. Wooding (British Aerospace Public, Ltd., Co., Warton Div., Preston, Lancs., England). In: Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980. London, Royal Aeronautical Society, 1981. 10 p.

Trends, trade-offs, and variabilities in the maintainability, reliability, and survivability of combat aircraft in peacetime conditions are examined. The assurance of quality control before delivery is stressed, while changing components demands are noted to affect the economic continuity of small subcontractor investments in production equipment. A constant feedback is recommended between user operating experience, procurements demands, and designers to support the achievement of performance requirements and reliability, i.e. MTBF. Early, thorough testing of all new components are considered as essential before implementation in aircraft, although the up-front expense is greater. The choice of aircraft stores to minimize weight and size is discussed, along with the placement of arterial passageways to ensure survivability in the case of a strike by employing dispersed pathways and shielding. M.S.K.

A82-20570 Modelling of target radar scattering with application to guidance simulation. S. C. Woolcock (EMI Electronics, Ltd., Wells, Somerset, England). In: Trends in missile guidance design concepts; Proceedings of the Symposium, London, England, January 14, 1981. London, Royal Aeronautical Society, 1981. 30 p. 5 refs.

The complexity of the receivable scattering of radar signals from man-made targets is described, and the parameters which have the greatest influence on guidance are outlined. Target-phase fronts are complicated by multireflector scattering returning from complex surfaces, and angular glint occurs when the received return signal is imbedded in the field of several interference signals from reflective surfaces of the perceived target. Ground-based radars experience fluctuations due to polarization or frequency changes in the transmitted signal, range and aspect changes, environmental influences, and depolarization of scattering. Further discussion is devoted to air-to-air guidance systems radar problems, and features of reflective surfaces of typical targets are examinad. Finally, the analytic modelling of underwater and guidance radars, as well as radar performance parameters, is presented, along with experimental techniques. M.S.K.

A82-20586 MLS flare low elevation angle guidance considerations. R. J. Kelly and E. F. C. LaBerge (Bendix Corp., Communications Div., Baltimore, MD). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 11.1.1-11.1.5. 6 refs.

Aircraft executing an automatic flare maneuver require vertical guidance information to the autopilot at very low altitudes just prior to touchdown. MLS provides the vertical guidance by combining, in the aircraft flare computer, flare elevation angle information with distance measured by DME to determine aircraft height above the runway. This paper addresses the system design considerations for the flare maneuver guidance, giving attention to accuracy requirements, error sources, antenna design considerations, the airborne signal processor, simulation studies, receiver bench tests, and field tests. Since MLS flare guidance accuracy requirements in the presence of ground multipath exceed that provided by the natural resolution of the scanning beam, it is demonstrated that, by using single edge processing and selected antenna height, a + or - 2-foot flare guidance accuracy can be achieved over the touchdown zone. B.J.

A82-20588 Experimental measurement of the low angle terrain scattering interference environment. J. E. Evans and D. F. Sun (MIT, Lexington, MA). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 11.3.1-11.3.5. 17 refs. FAA-sponsored research.

The paper presents the results of an experimental study whose aim was to obtain a better quantitative understanding of low angle microwave propagation phenomena needed to assess the potential for improved elevation tracking performance. The experimental data were obtained with a 26-lambda L-band array and a 57-lambda C-band array at a variety of sites in eastern Massachusetts with vegetated and/or rolling terrain. The data were analyzed using the maximum likelihood and maximum entropy methods. It is found that these modern spectral estimation methods, especially the maximum entropy method, can be effectively used for ground reflection elevation multipath characterization. The angular spectra observed to date can be qualitatively and quantitatively predicted by a model based on specular reflections from tilted flat plates. B.J.

A82-20589 Comparison of various elevation angle estimation techniques. J. E. Evans and D. F. Sun (MIT, Lexington, MA). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 11.4.1-11.4.5. 8 refs. FAA-sponsored research.

Distributions of multipath scattered power are used to compare several elevation angle estimation techniques: (1) conventional monopulse (CM); (2) off-boresight monopulse (OBM); (3) double null monopulse (DNM); (4) single edge processing (SEP) as used for flare processing in the MLS; and (5) a maximum entropy (ME) technique based estimator. The techniques were applied to several identical data sets, both synthetic and field measured. It is found that the ME technique appeared to yield the best performance if a sufficient number of sensor samples was available. The DNM and SEP appeared to work much better than the CM or OBM for the synthetic data cases. However, in the field measurement results, the DNM and OBM appeared to give similar performance and the SEP performed notably poorer than the other techniques. B.J.

A82-20590 Tracking of low-altitude targets by a combined X/Ka-band radar system. L. J. Klaver (Hollandse Signaalapparaten, Hengelo, Netherlands). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 11.5.1-11.5.5. 6 refs.

A historical account is given of how SIGNAAL arrived at a solution to the problem of tracking low-flying targets by a combined X/Ka-band radar system, while suppressing the image effect. In this system, target detection is performed by a normal search radar, and acquisition by the X-band tracking radar. With sufficient video quality, target tracking occurs in the Ka-band. B.J.

A82-20601 # NAVSTAR global positioning systems. J. Reynolds and T. McCabe (USAF, Space Div., Los Angeles Air Force Station, CA). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 21.1.1-21.1.6.

A NAVSTAR system overview is presented. Consideration is then given to concept validation results, Phase I test results, full scale engineering development, test planning, Phase III production and deployment, and applications. B.J.

A82-20615 # Laser communications via an atmospheric link. R. S. Mason (USAF, Space Div., Los Angeles Air Force Station, CA). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 27.1.1-27.1.9. 9 refs.

It is pointed out that interest in communications by laser over either an atmospheric or free space link has existed in the Air Force since the early 70's. The Laser Communications (LaserCom) program is currently in a test and demonstration phase. The Airborne Flight Test System (AFTS) developed in connection with LaserCom is discussed. The transmitter terminal is on board a modified C-135 aircraft. The receiver terminal is located on the ground. The demonstration range is up to 100 km in an altitude window of 33,000-37,000 ft. The airborne laser is a Nd:YAG which operates pulsed, mode-locked, and frequency doubled. The operating wavelength is 5320 A. Typical output power is 150 mW, linearly polarized. The pump source is a potassium arc-type lamp, driven at 250 W. The lamp is recognized as the limiting lifetime component of the system. G.R.

A82-20656 Land navigation with a low cost GPS receiver. K. P. Yiu, R. Eschenbach, and F. Lee (Hewlett-Packard Laboratories, Palo Alto, CA). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 55.3.1-55.3.7. 5 refs.

The Navstar Global Positioning System (GPS) is a satellite-based radio navigation system that will provide extremely accurate three-dimensional position fixes and timing information to properly equipped users anywhere on or near the earth. Civil applications of GPS are mostly limited to either air or marine navigation. In 1977, an investigation was initiated with the objective to prove the feasibility of land navigation with a low cost, single channel, single frequency GPS receiver based on the C/A code only. A GPS receiver was built and static and dynamic tests were conducted. An accuracy of 20 meters was obtained. It was found that the low-cost navigation algorithms used provide adequate and acceptable performance for land navigation. The receiver performance has been excellent even under the adverse environments, such as downtown San Francisco and San Francisco International Airport. G.R.

A82-20672 **The influence of technology advances on integrated CNI avionics.** R. A. Reilly and C. R. Ward (ITT, ITT Avionics Div., Nutley, NJ). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 61.3.1-61.3.6.

Attention is given to an integrated communication, navigation, and identification avionics (ICNIA) architecture which represents an attempt to overcome current-day tactical avionics problems in a highly cost effective manner. This architecture uses a wideband, agile, programmable transversal filter, as a key element of the design. The use of such a device as a preselector filter reduces the input bandwidth from approximately 400 MHz to 5 MHz, which is the spectrum bandwidth of a Joint Tactical Information Distribution System (JTIDS) pulse. Under digital control, the filter is capable of switching tuning frequencies in less than six nanoseconds. This rapid tuning feature makes it possible for a single filter to scan all of a selected set of frequencies in the L-band region within the total delay time of the tapped delay line in the transversal filter. Expected benefits of ICNIA are related to gains with respect to size, weight, cost, as well as performance. G.R.

A82-20684 **Relay-augmented data links in an interference environment.** C. E. Cook (Mitre Corp., Bedford, MA). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 63.6.1-63.6.5. Contract No. F19628-79-C-0001.

Use of communications relays is examined as a means of improving the operation of line-of-sight links in an interference environment. Expressions are derived that define optimum relay locations and number of relays. The relationships are functions of system and interference parameters, such as effective radiated power (EFP) ratios and processing gain, as well as of distances from the source transmitter and destination receiver to the noise source position. Bounds on flight path orbits of airborne relays are derived. Results obtained can be applied to the analysis of trade-offs among the various design factors when communications links are subject to interference. This can include the assessment of fixed constraints, such as the number of relays, upper limits on ERP and processing gain, or lower limits on data rate. An example is presented that illustrates the effectiveness of a relay in creating a communications corridor in the presence of multiple interference sources. (Author)

A82-20695 **An analysis of antijam communication requirements in fading media.** J. D. Oetting and A. E. Durling (Booz, Allen and Hamilton, Inc., Bethesda, MD). In: NTC '80; National Telecommunications Conference, Houston, TX, November 30-December 4, 1980, Conference Record. Volume 4. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 69.3.1-69.3.5. 6 refs.

The paper discusses the effects of jamming in a multipath propagation environment in which both the desired signal and the jamming signal are subject to Rice or Rayleigh fading. The distribution of the ratio of two independent Rician random variables is calculated, and this result is related to the evaluation of the required processing gain for the case of air-to-air or air-to-ground communication in a hostile electronic environment. An example of a specific jamming scenario is employed to illustrate how these results can be used to estimate the required processing gain of an airborne UHF AJ communication system. (Author)

A82-20728 # **Padé approximation applied to flow past thin airfoils.** S. N. Venkatarangan and G. Narendran (Indian Institute of Technology, Madras, India). *Journal of Mathematical and Physical Sciences*, vol. 14, Oct. 1980, p. 485-489.

Padé approximations derived from nonuniform solutions of flows around elliptic and Joukowski airfoils are examined. Off-diagonal Padé approximants are chosen for the flow past elliptic airfoils and poles are obtained. A perturbation expansion is defined for flow past a Joukowski type airfoil, and nondiagonal Padé approximants are used to accommodate the stagnation point at the leading edge. Comparisons of the values obtained are made with values obtained by the Lighthill method. M.S.K.

A82-20742 * # **Improved plasma sprayed MCrAlY coatings for aircraft gas turbine applications.** F. J. Pennisi and D. K. Gupta (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *American Vacuum Society, International Conference for Metallurgical Coatings, San Francisco, CA, Apr. 6-10, 1981, Paper.* 17 p. 11 refs. Contract No. NAS3-21730.

Eighteen plasma sprayed coating systems, nine based on the NiCoCrAlY chemistry and nine based on the CoCrAlY composition, were evaluated to identify coating systems which will provide equivalent or superior life to that shown by the electron beam physical vapor deposited NiCoCrAlY and CoCrAlY coatings respectively. NiCoCrAlY-type coatings were examined on a single crystal alloy and the CoCrAlY based coatings were optimized on the B1900 + Hf alloy. Cyclic burner rig oxidation and hot corrosion and tensile ductility tests were used to evaluate the various coating candidates. For the single crystal alloy, a low pressure chamber plasma sprayed NiCoCrAlY + Si coating exhibited a 2X oxidation life improvement at 1121 C (2050 F) over the vapor deposited NiCoCrAlY material while showing equivalent tensile ductility. A silicon modified low pressure chamber plasma sprayed CoCrAlY coating was found to be more durable than the baseline vapor deposited CoCrAlY coating on the B1900 + Hf alloy. (Author)

A82-20743 * # **Power system design optimization using Lagrange multiplier techniques.** Y. Yu (Xerox Corp., El Segundo, CA) and F. C. Lee (Virginia Polytechnic Institute and State University, Blacksburg, VA). *Power Conversion International Conference, Munich, West Germany, Sept. 14, 1981, Paper.* 18 p. 8 refs. Contract No. NAS3-21051.

An optimization technique using the Lagrange Multiplier Method is proposed to facilitate design of switching power converter systems. The essence of the optimization is to identify the optimal battery voltage level and switching frequency along with the detailed converter design so that the total system weight including the battery and the packaged converter is minimized, and concurrently all specified power circuit performances are satisfied. (Author)

A82-20751 **Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980.** Symposium sponsored by the Society of Flight Test Engineers. Lancaster, CA, Society of Flight Test Engineers, 1980. 451 p.

Flight testing procedures were discussed in terms of F-18 carrier suitability testing, the suitability of using JP-8 fuel for U.S. combat aircraft assigned to NATO forces, and icing test programs for the F-16 and for helicopters. Methods of instrumenting a test airplane were examined, as well as the development of a self-contained flight test data acquisition system. Attention was given to fuel conservation data bases for general aviation aircraft, to flight testing the airborne cruise missile, and testing the Jetwing STOL research aircraft. Tests of the Tornado advanced avionics system were described, as were tests of a jet-powered sailplane, flight tests of effect, and flyover noise level tests. Finally, size reduction of flight test instrumentation and simulator data test instrumentation were considered, and data processing for flight tests and real-time telemetry were reviewed. M.S.K.

A82-20752 **Initial F-18 carrier suitability testing.** J. W. Hakanson (McDonnell Douglas Corp., Patuxent River, MD). In:

Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980.
Lancaster, CA, Society of Flight Test Engineers, 1980, p. 1-1 to 1-14.

Sea Trials results are reported for carrier basing of the F-18 Hornet, and the instrumentation characteristics are described. Complete ground tests, simulations, and drop tests were performed before the carrier tests, and catapult launches were immediately successful. EMC, deck handling/operation, instrumentation, and data system tests are outlined, noting that real-time data was transmitted to the manufacturer. Thirty-two catapults and 32 arrested landings were completed onboard a carrier, with little pilot compensation for burble and no unintentional bolters. Further trials established startability with the APU, engine crossbleed, and the low and high pressure huffer, use of six different catapults, compatability with shipboard operations, and the need for a fix of the lower nose wheel spin-up speed to alleviate loads on the repeatable release holdback springs. M.S.K.

A82-20753 **F-16 ground and inflight icing testing.** C. M. Core, Jr. (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 3-1 to 3-35. 13 refs.

The discovery of icing problems in the F-16 variable inlet vanes, the fixes and the tests necessary to correct the problem, and the design of further tests to assure that military anti-icing specifications are met are discussed. The icing problem was detected during the AF qualifications programs when a second stage glime ice test flown within an ice cloud produced from a tanker aircraft caused damage in nine stages of the fan blades. Subsequent decisions were made to heat the airframe inlet strut, retrofit a three position anti-ice switch into existing F-16s, and improve the icing test procedures and in particular the quality of the ice. Further icing observed in an operational status led to a test program to investigate the effectiveness of electrically heating the inlet strut and moving the anti-ice sensor probe forward. Suggestions are offered for more accurate military specifications for defining ice and ice survival conditions. M.S.K.

A82-20754 **Helicopter icing spray system.** D. Belte (U.S. Army, Aviation Engineering Flight Activity, Edwards AFB, CA). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980.
Lancaster, CA, Society of Flight Test Engineers, 1980, p. 4-1 to 4-18. 8 refs.

The U.S. Army has used a CH-47C as an airborne spray tanker since 1973 for helicopter qualification testing in icing conditions. The initial icing cloud it produced was found to consist of much larger diameter drops than natural clouds, and problems existed in uniformity and control of its liquid water content. A program was undertaken in 1979 to modify the system to generate a spray plume more closely resembling a natural cloud. This effort included ground and icing wind tunnel evaluation of spray atomizers, a flight survey of turbulence behind the spray aircraft, and in-flight evaluation of atomizer spray characteristics. Modifications were incorporated, and the new system was used for icing tests in 1980. Evaluation of the new spray cloud characteristics shows a vastly improved drop size distribution and a more homogeneous liquid water content, closely resembling that of a natural cloud. (Author)

A82-20755 **JP-8 fuel conversion evaluation.** R. A. Stambovsky (USAF, Flight Test Center, Edwards AFB, CA). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 6-1 to 6-32. 26 refs.

The test results of determining the operability of the OV-10A, F-5, and A-37B aircraft on both JP-4 and JP-8 fuel to assure compatibility with NATO fuels are reported. Air starts, throttle transients, low temperature tests, thrust stand tests, weight and balance, and smoke evaluations were performed, using on and off trim conditions. Technical specifications were developed for the airstart envelope, preheating procedures, and fuel control gravity settings when using the NATO F-34 (JP-8) fuel. JP-8 is a kerosene type fuel with a higher specific gravity and flash point than JP-4 fuel, leading to safer handling but a greater weight penalty and more limited airstart features. Low temperature starts were within the manual described limits, as were throttle techniqes and center-of-gravity shifts. M.S.K.

A82-20756 * **Development of a simple, self-contained flight test data acquisition system.** R. R. L. Renz, R. Clarke, and J. Roskam (Kansas, University, Lawrence, KS). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 8-1 to 8-22. 16 refs. NASA-supported research.

The system concepts and the flight test program results for a NASA designed in-flight data acquisition system are described. The system draws power from a rechargeable battery pack and intrudes on the aircraft systems only with a total pressure probe, a static pressure probe, and control position transducers, which are simply taped to the frame. A 4000 byte microcomputer forms the heart of the data recording system for cassette tape storage, and is expansion coupled to an eight-bit interactive microcomputer which interfaces with a transducer package for 16-channel demultiplexing. The transducers, ranges, and accuracies are listed, and a five/sec data acquisition rate minimum requirement is noted, although a 10/sec rate is used. The system components are detailed, along with the control and data processing procedures, and the results of dynamic flight testing are presented. M.S.K.

A82-20757 **General aviation fuel conservation in the 1980's.** G. R. Bromley (Beech Aircraft Corp., Wichita, KS). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980.
Lancaster, CA, Society of Flight Test Engineers, 1980, p. 9-1 to 9-22.

Techniques for conserving fuel in-flight are given from a flight engineer's point-of-view, noting that aircraft designs will increasingly incorporate cleaner aerodynamics and better engine-to-airframe matching. The effects of wind and temperature at various altitudes and fuel consumption in ascent and descent are considered, and methods for determining maximum range airspeeds are developed, particularly for choosing long-range cruise airspeeds. Specific charts are presented for private pilots in general aviation aircraft, relating wind, no-wind, and tailwind conditions as regards to fuel consumption. M.S.K.

A82-20759 * **Determining performance parameters of general aviation aircraft.** G. Bull and P. D. Bridges (Mississippi State University, Mississippi State, MS). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 12-1 to 12-16. 6 refs. Grant No. NAG1-3.

A method for determining propeller efficiency and drag from flight tests, using relatively simple instrumentation, is under development at Mississippi State University. Flight test data from several simple maneuvers are combined to produce sufficient information to determine the desired parameters. Information obtained from the transient response of airspeed to a step change in power or drag in level flight is utilized. Theory is developed and results of preliminary computer studies and preliminary flight test are presented. (Author)

A82-20760 **Tornado-avionic development testing.** E. K. Obermeier (Messerschmitt-Bölkow-Blohm GmbH, Manching, West Germany). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 13-1 to 13-17.

The developmental testing of navigation and terrain following subsystem of the avionics system in the Tornado all-weather combat aircraft are described. Navigation data supplied by inertial navigation, Doppler radar, SAHR, ADC, and sensor data are fed to the main computer through a Kalman filter. The system is hierarchical and reverts to successively lower navigation modes in case of damage to the primary equipment. Quantified flight tests were made during 100 nm flights around the terrain near the air base and the radar tracking data was evaluated for deviation from a preset flight path and for the number of fix points contained in photographs from forward and downward looking cameras. The terrain following subsystem ensures a safe flightpath down to 200 ft altitude, and was evaluated by photographs of the ground and by radar altimeter data. The instrumentation monitoring routing is described, and modifications to correct deficiencies are indicated. M.S.K.

A82-20761 **Design, development and flight testing of a jet powered sailplane.** B. S. Smith (Caproni Vizzola Costruzioni Aeronautiche S.p.A., Vizzola Ticino, Italy). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 14-1 to 14-17. 15 refs.

The design and development of the tadpole-shaped, turbojet powered A21 powered glider are discussed. The necessity of broadening the fuselage to house the jet led to the use of two wheels on the central core structure, which furnishes greater runway handling stability. An aspect ratio of 25.65 is used for the all-metal wings, and an engine 0.3 m in diameter, 0.61 m long, and weighing 30 kg was installed to provide take-off thrusts of 100 kg. A bifurcated exhaust was fitted to avoid having the exhaust impinge on the tail section, and the engine compartment was lined with steel and titanium as a heat limiter. The plane has been flown at speeds up to 190 knots at altitudes exceeding 33,000 ft without experiencing flutter. M.S.K.

A82-20762 **Performance flight test evaluation of the Ball-Bartoe JW-1 Jetwing STOL research aircraft.** R. D. Kimberlin (Tennessee, University, Tullahoma, TN). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 16-1 to 16-20.

The initial steps of the flight test program for the Ball-Bartoe JW-1 Jetwing aircraft are reported. The jet wing vents all engine air through the front of the wing and ejects it over the top of the wing through a slot nozzle which extends 70% of the full wing span. A Coanda flap is mounted at the trailing edge of the blown wing section, and a smaller wing is mounted above the slot nozzle to provide thrust augmentation. The initial series of tests, which followed 78 previous flight tests, comprised pilot familiarization flights, airspeed calibration, thrust calibration, and V-gamma maps. Sawtooth climbs were found to facilitate data collection due to longitudinal instability in level acceleration, and thrust losses amounting to 15-20% were experienced from the ducting. Further design iteration to reduce the ducting thrust losses is indicated. M.S.K.

A82-20763 * **Analysis of flight test measurements in ground effect.** E. K. Parks (Arizona, University, Tucson, AZ) and R. C. Wingrove (NASA, Ames Research Center, Aircraft Guidance and Navigation Branch, Moffett Field, CA). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 17-1 to 17-26. 13 refs.

Three sources of errors, introduced into the air-data measurements of altitude and airspeed as a result of ground proximity, are evaluated. It is shown that the primary error results from ground constraint of the wing lifting pattern. Smaller errors result from constraint of the flow over the fuselage and of the engine exhaust. Equations are derived to provide corrections for the three error contributions. The equations are general and can be applied to airplanes of different geometries operating in different conditions. Applications illustrating different types of flight operations (takeoff and landing) are presented using CV-990 data. Applications illustrating the effect of different static orifice locations (fuselage and nose-boom) are presented with YC-15 data. Finally, an application to trajectory reconstruction is illustrated using DC-10 data. (Author)

A82-20764 **A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research.** G. Bennett (Mississippi State University, Mississippi State, MS). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 18-1 to 18-15. 8 refs.

The impact of rapidly rising fuel prices upon future general aviation aircraft requirements is explored. The current configuration of the fiberglass XV-11A aircraft is presented and it is shown that the aircraft can become a cost effective testbed for fuel efficient general aviation aircraft configurations. Several suitable research tasks for the aircraft are defined. A low cost method to produce master wing molds is proposed. (Author)

A82-20765 **A comprehensive flight test flyover noise program.** J. W. Vogel (Lockheed-California Co., Flight Analysis Dept., Palmdale, CA). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 19-1 to 19-19.

Preliminary results from a program to develop noise prediction methods from static tests which are applicable to flyover noise levels are presented. The program was developed to provide a data base for future certification, customer requirements, and engine modifications, and involved a Lockheed L-1011 with a Rolls-Royce RB.211 engine. Noise level modifications were observed to be possible by altering the power plant components, the airframe, the effects of the jet-flow on the flaps, and forward velocity. Flyovers were performed over microphones on the ground at heights of 300 and 600 feet at various speeds and with the flaps in varying positions, taking into consideration different configurations of climb or descent. Engine noise was found to dominate in the rear arc while airframe noises were dominant in the forward arc, and either flap or landing gear deployment enhanced the sound levels by up to 8 dB. M.S.K.

A82-20766 **Size reduction flight test airborne data systems.** J. W. Gierer (McDonnell Aircraft Co., St. Louis, MO). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 20-1 to 20-7.

A redesign of flight test data gathering systems to fit into the removable avionics areas of the F-18 aircraft is outlined. The use of low-power digital data recorders offers a size reduction of 2.2:1, with connections being accomplished by means of aircraft style connectors, lowering the number of connectors, and multiplexing where possible. A system design is presented which features subsystems for local and remote control panels, 8 MHz bandwidth helical scan recording on each channel, and time division multiplexing. Other aspects include a 28 V dc transformer rectifier, electronic packaged video, film, flutter excitation, and signal conditioning equipment, a 40 W transmitter, and low-power ICs. The system is intended for use on eight of the nine test F-18 aircraft. M.S.K.

A82-20767 **Data systems organization - A change for the better.** R. D. Samuelson (McDonnell Aircraft Co., St. Louis, MO). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 21-1 to 21-7.

The implementation of a data systems organization at McDonnell Aircraft is described in terms of the project and departmental bases for the F-15 program. Key objectives of the flight test reorganization comprised strengthened control over data and instrumentation programs, combination of data and instrumentation operations to broaden individual responsibilities and increase efficiency, manage the data system development and the test support activities separately, combine data and instrumentation design activities, and combine supporting laboratories and supply operations where feasible. The data systems were divided into a design and development branch, an operations branch, and a processing and support branch, with respective subsections. The system carried through to F-18 development and resulted in a reduction of 20% in total expenditures. M.S.K.

A82-20768 **Simulator data test instrumentation - Flight test challenge of the eighties.** W. L. Curtice, III (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 22-1 to 22-22.

The development of a Simulator Data Test Instrumentation System (SDTIS) to compare flight test data with results from simulator tests is examined. The SDTIS features 180 channels of digital or analog signal data, TV camera, audio from voice recordings, in-field automatic data reduction and analysis. The problem of matching appropriate cues in response to pilot control actions in the simulator are explored, including the time of aircraft response. The SDTIS allows the matching of the simulator response data regarding time, magnitude, and accuracy against flight data from the aircraft which is simulated. The simulator signals recorded comprise analog signals, digital signals, motion sensors, a g-suit pressure sensor, external-follow-up sensors, control force sensors, and TV cameras. All signals are formatted through a data encoder/decoder, and the necessity for maintaining up-to-date flight test data bases for simulator fidelity measurements is stressed. M.S.K.

A82-20769 **The Boeing Flight Test Data System 1980.** G. J. Zanatta (Boeing Commercial Airplane Co., Seattle, WA). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 23-1 to 23-15.

The Boeing Flight Test Data System is reviewed, with particular attention to the testing of the 757/767 aircraft. The System provides calibration, conditioning, monitoring, recording, extraction, analysis, manipulation, and reporting of data from aircraft tests. The data gathering system is based on pulse code modulation technology, with data routing and switching allowing up to 800 samples/sec. The airborne data analysis and monitor system is outlined, as is the ground analysis, telemetry analysis, and data processing ground stations. The interactive mainframe data base provides access for software users for data base applications, test data processing, and scientific programs. Provisions are made for floppy disk storage for on-board comparisons. The interactive process of engineer-to-computer eliminates manual data searches or searches for test data requirements. M.S.K.

A82-20770 **Instrumentation remote 'mini' ground station.** J. Nixon (Boeing Commercial Airplane Co., Seattle, WA). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 24-1 to 24-7.

The methods of decentralizing the data processing for individual, remote aircraft testing at Boeing, and still making the central processing station available to the instrumentation engineer are described. A preflight instrumentation package is developed before testing, checked, and placed on-line with a ready signal to the central processing computer via a remote terminal CRT. The ready response yields a return of a mylar tape to program the ROMs for data acquisition, thus eliminating any ground traffic for flight test information materials. The system can operate from anywhere a modem system can be used, and it is noted that three systems are intended as mobile units, for carriage to areas where remote access is required. M.S.K.

A82-20771 **Color graphics based real-time telemetry processing system.** T. M. Randall (Lockheed-Georgia Co., Engineering Data Systems Dept., Marietta, GA). In: Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980. Lancaster, CA, Society of Flight Test Engineers, 1980, p. 25-1 to 25-15.

Features of the Lockheed real-time telemetry data processing system for monitoring flight test data acquisition and performing interactive analyses of test results are detailed. All calibration, correction, and conversion to engineering units are performed by the on-board PCM acquisition system, and the main man/machine interface on the ground is a raster scan color graphics display terminal. A scrolled time history format has been developed for use in the testing of the stretch C-141B, and data from tests is subject to analysis two to three minutes after test completion. The system eliminates trial-and-error data acquisition and piecemeal data processing, resulting in increased efficiency and attendant lowered costs, provided that appropriate software is available to utilize the system. M.S.K.

A82-20792 * # **Flow visualization using a computerized data acquisition system.** R. Gallington and G. Sisson (U.S. Air Force Academy, Colorado Springs, CO). In: International Symposium on Flow Visualization, Bochum, West Germany, September 9-12, 1980, Preprints of Contributed Papers. Bochum, West Germany, Ruhr-Universität Bochum, 1981, p. 134-141. 5 refs. NASA-supported research.

A computer-driven traversing mechanism combined with mass data storage, data reduction programs, and general-purpose graphics programs permits a visualization of complex flows. A unique seven-hole probe is used which permits reasonably accurate measurements of all average flow properties if the local flow angle does not exceed 80 degrees. A description is given of the wake of a lifting canard surface as this wake passes over a wing. The flow includes concentrated and dissipating vortices, large regions of reduced total pressure, and local flow angles up to 60 deg. All these features can be clearly seen and accurately located in the graphical output. C.R.

A82-20803 # **Visualization of flow separation and separated flows with the aid of hydrogen bubbles.** H. Bippes (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Experimentelle Strömungsmechanik, Göttingen, West Germany). In: International Symposium on Flow Visualization, Bochum, West Germany, September 9-12, 1980, Preprints of Contributed Papers. Bochum, West Germany, Ruhr-Universität Bochum, 1981, p. 225-230.

Experiments using the hydrogen bubble technique to investigate flow separation and separated flows on inclined wings and bodies are reported. The hydrogen-producing cathode was displaced until a location of interest can be found. The stability and the decay of trailing edge vortices shed from the tips of a rectangular wing at incidence was studied, and the flow was found to separate close to the point of maximum thickness. An axial velocity component was also observed, with a velocity close to the wing that was larger than the velocity of the oncoming flow. In a study of slender bodies the separation of the counter-rotating vortex pair became unstable, and at larger angles of incidence the lifting up of the vortex moved upstream, and another vortex layer separated downstream. On slender wings, the vortex breakdown manifested in a sudden burst. M.S.K.

A82-20811 # **Visualization of laminar separation by oil film method.** T. Ishihara, T. Kobayashi, and M. Iwanaga (Tokyo, University, Tokyo, Japan). In: International Symposium on Flow Visualization, Bochum, West Germany, September 9-12, 1980, Preprints of Contributed Papers. Bochum, West Germany, Ruhr-Universität Bochum, 1981, p. 304-308.

The effectiveness of using the oil film method for flow visualization was experimentally tested, with particular regard being given to the limited lines. A test cylinder was coated with light oil or machine oil adulterated with carbon powder and set in a transparent water channel at flows from 10-25 cm/sec. Photographs were taken, and a dye injection technique was used to repeat the same-tests. Two limited lines were observed in the oil flow patterns and in the dye injection, and were found to fluctuate simultaneously. The mean values of the limited lines were also observed to attain a constant value, but only after the passage of a certain period of time. M.S.K.

A82-20813 # **Flow field around an oscillating airfoil.** Y. Oshima (Ochanomizu University, Tokyo, Japan) and A. Natsume (Tokyo, University, Tokyo, Japan). In: International Symposium on Flow Visualization, Bochum, West Germany, September 9-12, 1980, Preprints of Contributed Papers. Bochum, West Germany, Ruhr-Universität Bochum, 1981, p. 315-319. 6 refs.

The wake pattern, the trailing edge flow, and the separated vortex at the leading edge of an oscillating airfoil are discussed, and observed flow patterns are compared with numerical predictions. A NACA 0012 airfoil was affixed to an acrylic plate and heaving and pitching motions were induced. The angle of attack was varied, the half-pitch angle was 10 deg, the oscillation period was 2-5 sec, and the speed of the cart carrying the test object through a tank of water yielded Re between 400-1200. Both the reduced frequency and the reduced heaving amplitude were calculated, and films were taken of each test. The flowfield near the trailing edge was made visible by means of electrolysis and aluminum dust methods. The separation point moved toward the front of the airfoil with increasing angle-of-attack. M.S.K.

A82-20874 * # **Advanced subsonic transport propulsion.** D. L. Nored, C. C. Ciepluch, R. Chamberlin, E. T. Meleason, and G. A. Kraft (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, ASCE, ATRIF, and TRB, International Air Transportation Conference, Atlantic City, NJ, May 26-28, 1981, AIAA Paper 81-0811.* 30 p. 5 refs.

Examination of future subsonic commercial aircraft propulsion trends begins with a brief review of the current NASA Energy Efficient Engine (E3) Project. Included in this review are the factors that influenced the design of these turbofan engines and the advanced technology incorporated in them to reduce fuel consumption and improve environmental characteristics. In addition, factors such as the continuing spiral in fuel cost, that could influence future aircraft propulsion systems beyond those represented by the E3 engines, are also discussed. Advanced technologies that will address these influencing factors and provide viable future propulsion systems are described. And finally, the potential importance of other propulsion system types, such as geared fans and turboshaft engines, is presented. (Author)

A82-20981 **Bolted field repair of graphite/epoxy wing skin laminates.** R. E. Bohlmann, G. D. Renieri (McDonnell Aircraft Co., St. Louis, MO), and M. Libeskind (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Joining of composite materials; Proceedings of the Symposium, Minneapolis, MN, April 16, 1980. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 97-116. Contract No. N62269-78-C-0272.

Mechanically fastened field repair techniques have been developed for graphite/epoxy skins damaged at or near substructure members and used to repair AV-8B and F-18 wing skin laminates. Damages of up to 101.6 mm in diameter have been repaired by mechanically fastening a titanium patch to the laminate using blind fasteners in single shear, with access only to the outside surface. The design goal of 0.004 mm/mm for a repaired graphite/epoxy wing skin laminate was attained for static strength and for residual strength tests after four lifetimes of spectrum fatigue. V.L.

A82-20982 **Improving composite bolted joint efficiency by laminate tailoring.** J. R. Eisenmann and J. L. Leonhardt (General Dynamics Corp., Fort Worth, TX). In: Joining of composite materials; Proceedings of the Symposium, Minneapolis, MN, April 16, 1980. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 117-130.

An approach to laminate tailoring is presented which makes it possible to uncouple the local bearing capacity from the influence of the laminate axial strain level in a composite bolted joint. This is achieved by partitioning the laminate into two distinct regions: the primary region, which contains a high percentage of 0-deg plies and thus carries a high percentage of the overall axial load, and the bearing region, which contains no 0-deg plies and thus carries only a small portion of the overall axial load. As a result, the bearing region is insensitive to the amount of axial load in the joint and can continue to serve the function of introducing the bolt loads in the laminate even at high axial strains. In validation tests, a 24% increase in weight efficiency and a 60-70% increase in axial strain level were typically obtained when the tailored joint concept was adopted in place of the conventional approach. V.L.

A82-21189 **Airbus Industrie - The year of progress.** K. Regelin. *Interavia*, vol. 37, Jan. 1982, p. 35-39.

At the end of March 1982, the first A310 will take off from Airbus Industrie's Toulouse base. The completion of a one-year flight test program is expected to lead to full certification of the aircraft for airline operations by Mar. 31, 1983. Airbus Industrie claims to have developed the most advanced airliner wing. Compared with the already efficient wing of the A300, the span of the smaller A310 is only 2% shorter. However, the wing area has been reduced by approximately 16%. The resulting higher aspect ratio improves aerodynamic efficiency, while the increased thickness-to-chord ratio reduces weight. Attention is given to the aircraft design, the two-man versus three-man crew issue, the electronic flight instrumentation, the digital Automatic Flight System, the aircraft production plan, design details regarding the three slat sections on each wing, and Airbus Industrie's confidence in further market growth. G.R.

A82-21190 **Boeing's bigger narrowbody.** B. Rek. *Interavia*, vol. 37, Jan. 1982, p. 43-46.

After the termination of 707 production, the biggest production airliner remaining with the classic Boeing six-abreast fuselage is the 180/200-seat 757 twinjet. The first flight of the 757 is scheduled for Feb. 26, 1982. Two engines are currently being considered for use with the 757. Improved technology coupled with a rigorous weight reduction program has made possible significant improvements in fuel efficiency. It is planned to offer a 240,000 lb gross-weight version of the 757 which will be capable of U.S. coast-to-coast range. The single-aisle 757 is regarded as part of a larger program which includes the 767 as well. The 'configuration cab' contains flight deck features which will be common to the 757 and 767. Other common features include the Flight Management System, the Thrust Management Computer, and the Inertial Reference System. Attention is also given to the test program and the 757 market prospects. G.R.

A82-21191 **A new look at the Tupolev Tu-26 'Backfire'.** G. Lafon. *Interavia*, vol. 37, Jan. 1982, p. 78, 79.

The Soviet Air Force has now four types of aircraft with variable-sweep wings in service, including the Sukhoi Su-17/20/22 Fitter and MIG-23/27 Flogger fighters, the Su-24 Fencer strike aircraft, and the Tu-26 Backfire bomber. The characteristics of the Backfire bomber are compared with those of an equivalent design with fixed wings. It is pointed out that the 55 deg swept wing, with a leading edge which goes sonic at Mach 1.75, is not sufficiently swept for supersonic cruising. High sweep must be intended primarily for transonic/supersonic dash. The powerplant is believed to include two reheated Kuznetsov turbofans, as used in the Tu-144 supersonic transport (SST). It is estimated that with an SST powerplant Backfire will be capable to fly at speeds of about Mach 0.85 at sea level, Mach 1.2 at 20,000 ft, and Mach 1.7 at 40,000 ft. Aspects of subsonic performance are also discussed, taking into account a comparison with the U.S. B-1. G.R.

A82-21243 **ALF502 - Plugging the turbofan gap.** R. Whitaker. *Flight International*, vol. 121, Jan. 30, 1982, p. 237-241.

The development history, mechanical design and performance capabilities of the ALF502 turbofan engine are presented. The high-bypass design is based on the T55 turboshaft engine's core, yields low noise and low fuel consumption, and achieves good maintainability by means of a modular construction that comprises separate fan, accessory gearbox, gas producer, and combustor turbine elements. Only three special tools are needed for module changes, and an initial mean time between overhauls of 4000 hours is estimated. Because of the moderate temperatures and pressures for which the engine is designed, it is expected to meet the ICAO's 1983 emission regulations with respect to smoke, CO, hydrocarbons and nitrogen oxides. The engine has been selected for use in the Challenger business aircraft, and is presently employed in the BAe 146. O.C.

A82-21260 **AV-8B Harrier II.** R. Braybrook. *Air International*, vol. 22, Feb. 1982, p. 64-69, 102.

Design improvements, operating characteristics, and performance data of the AV-8B Harrier II V/STOL aircraft are discussed. The Harrier is a joint U.S.-UK development for use by the navies and by the USMC, who have added new combat maneuvers to take advantage of the engine nozzle deflectors for low speed maneuverability. The wing area has been extended to 230 sq ft from the AV-8A 201 sq ft, and the aircraft now has single slotted flaps, a supercritical airfoil, 7500 lb fuel capacity, and carbon fiber main structure, flaps, and ailerons. The nav-attack system includes an ASN-130 inertial navigator, HUD, and AYK-14 mission computer, pod-mounted advanced self-protection system, an all-weather landing system, and an angle-rate bombing system, which uses lasers and TV trackers for locking on a target. Deliveries will begin in Oct. 1983. M.S.K.

A82-21373 * # **We have just begun to create efficient transport aircraft.** D. J. Maglieri and S. M. Dollyhigh (NASA, Langley Research Center, Aeronautical Systems Div., Hampton, VA). *Astronautics and Aeronautics*, vol. 20, Feb. 1982, p. 26-38. 21 refs.

Factors affecting the cost-effectiveness and economics of the air transportation industry are reviewed. The delivery of more fuel-efficient aircraft and eventual total replacement in the 1990's by fleets of advanced aircraft are seen to offset rising fuel costs. Better airport operations are perceived to eliminate fuel-costly delays due to overcrowded runways, lack of available carriers, and maintenance of aircraft in holding patterns. Noise reduction research will lower the lawsuit costs from noise pollution, and the introduction of advanced turbofans for long, short, and medium range flights, advanced commuter planes, and advanced SSTs offering projected 50% increases in current aircraft efficiencies are seen to be limited only by the airlines' ability to provide purchase financing, rather than by a lack of available new technology. M.S.K.

A82-21374 * # **The outlook for advanced transport aircraft.** J. M. Leavens, Jr., R. D. Schaufele (Douglas Aircraft Co., Long Beach, CA), R. T. Jones (NASA, Ames Research Center, Moffett Field, CA), J. E. Steiner (Boeing Co., Seattle, WA), R. Beteille (AirBus Industrie, Blagnac, Haute-Garonne, France), G. A. Titcomb (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT), J. F. Coplin (Rolls-Royce, Ltd., London, England), B. H. Rowe (General Electric Co., Aircraft Engine Group, Cincinnati, OH), D. J. Lloyd-Jones (American Airlines, Inc., Fort Worth, TX), and W. J. Overend (Delta Air Lines, Inc., Atlanta, GA). *Astronautics and Aeronautics*, vol. 20, Feb. 1982, p. 39-62, 79.

The technological advances most likely to contribute to advanced aircraft designs and the efficiency, performance, and financial considerations driving the development directions for new aircraft are reviewed. Fuel-efficiency is perceived as the most critical factor for any new aircraft or component design, with most gains expected to come in areas of propulsion, aerodynamics, configurations, structural designs and materials, active controls, digital avionics, laminar flow control, and air-traffic control improvements. Any component area offers an efficiency improvement of 3-12%, with a maximum of 50% possible with a 4000 m range aircraft. Advanced turboprops have potential applications in short and medium haul subsonic aircraft, while a fuel efficient SST may be possible by the year 2000. Further discussion is devoted to the pivoted oblique wing aircraft, lightweight structures, and the necessity for short payback times. M.S.K.

A82-21375 * # **CAD/CAM approach to improving industry productivity gathers momentum.** R. E. Fulton (NASA, Langley Research Center, Hampton, VA). *Astronautics and Aeronautics*, vol. 20, Feb. 1982, p. 64-70. 18 refs.

Recent results and planning for the NASA/industry Integrated Programs for Aerospace-Vehicle Design (IPAD) program for improving productivity with CAD/CAM methods are outlined. The industrial group work is being mainly done by Boeing, and progress has been made in defining the designer work environment, developing requirements and a preliminary design for a future CAD/CAM system, and developing CAD/CAM technology. The work environment was defined by conducting a detailed study of a reference design process, and key software elements for a CAD/CAM system have been defined, specifically for interactive design or experiment control processes. Further work is proceeding on executive, data management, geometry and graphics, and general utility software, and dynamic aspects of the programs being developed are outlined. M.S.K.

A82-21386 **Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size.** E. E. Uthe, B. M. Morley, and N. B. Nielsen (SRI International Atmospheric Science Center, Menlo Park, CA). *Applied Optics*, vol. 21, Feb. 1, 1982, p. 460-463. 12 refs. Research supported by SRI International.

Observations were made of a dense smoke plume downwind from a forest fire using the ALPHA-1 two-wavelength downward-looking airborne lidar system. Facsimile displays were derived which depict plume dimensions, boundary layer height, and underlying terrain elevations. Results show significantly greater plume attenuation at 0.53-micron wavelengths than at 1.06-micron wavelengths, which indicates about 0.1-micron mean particle diameters, or the presence of gaseous constituents that absorb the visible radiation. D.L.G.

A82-21391 * **Calculation of sensitivity derivatives in thermal problems by finite differences.** R. T. Haftka and D. S. Malkus (Illinois Institute of Technology, Chicago, IL). *International Journal for Numerical Methods in Engineering*, vol. 17, Dec. 1981, p. 1811-1821. 13 refs. Grant No. NsG-1266.

The optimum design of a structure subject to temperature constraints is considered. When mathematical optimization techniques are used, derivatives of the temperature constraints with respect to the design variables are usually required. In the case of large aerospace structures, such as the Space Shuttle, the computation of these derivatives can become prohibitively expensive. Analytical methods and a finite difference approach have been considered in studies conducted to improve the efficiency of the calculation of the derivatives. The present investigation explores two possibilities for enhancing the effectiveness of the finite difference approach. One procedure involves the simultaneous solution of temperatures and derivatives. The second procedure makes use of the optimum selection of the magnitude of the perturbations of the design variables to achieve maximum accuracy. G.R.

A82-21474 **Gateway diversity and competition in international air transportation.** W. B. Tye (Putnam, Hayes and Bartlett, Inc., Cambridge, MA). *Transportation*, vol. 10, Dec. 1981, p. 345-356.

Because of the existence of 'limited designation' gateways, i.e., gateways for international air travel where entry by U.S. flag carriers is limited (in many cases to only one carrier), the U.S. Civil Aeronautics Board (CAB) has announced a policy of 'gateway competition'. This policy seeks to maximize inter-gateway competition as a goal of the carrier selection process. The paper reviews the rationale and history of this policy and the economic principles of gateway competition. After addressing exceptions where gateway competition does not enhance competitive goals, the issue of how to enforce the credibility of the bidding process in route awards is addressed. The paper concludes by identifying circumstances where competitive objectives are not advanced through application of the principal gateway competition. (Author)

A82-21586 **Institute of Navigation, Annual Meeting, 36th, U.S. Naval Postgraduate School, Monterey, CA, June 23-26, 1980, Proceedings.** Washington, DC, Institute of Navigation, 1981. 143 p. Members, $30.; nonmembers, $35.

Papers are presented on the optimal processing of GPS signals, a perspective on the civil use of GPS, the application of strapdown inertial technology to attitude and heading reference system requirements, the emerging need for improved helicopter navigation, and flight control strategies for performance computers. Attention is also given to a systems approach to the design of wind shear avionics, an empirical investigation of an evaluation of Loran-C for nonprecision approach applications, the GPS evaluator, and calibrated and uncalibrated inertial navigation system performance in valid and jammed GPS environments. B.J.

A82-21587 # **Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments.** A. J. Brockstein and R. J. Grethel (Litton Industries, Guidance and Control Systems Div., Woodland Hills, CA). In: Institute of Navigation, Annual Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 2-10. 10 refs.

INS performance improvement that can be obtained in a jammed environment after calibration of INS instruments with GPS is compared with uncalibrated INS performance. In addition, gimbaled vs. strapdown INS performance is compared for two trajectories (field test conditions) during jammed and valid operations. It is shown that INS performance can be significantly enhanced during extended periods of GPS outage by prejam INS calibration using GPS. In addition, it is shown that strapdown systems are more difficult to calibrate than gimbaled systems since the major position contributors (gyros) are less observable for a maneuvering trajectory. In addition, the lack of gravity compensation in the strapdown system causes the gyro g-sensitive drift effect to be a major error source. B.J.

A82-21588 # **The Global Positioning System Evaluator.** S. Z. Stein (Intermetrics, Inc., Dayton, OH) and G. Pennett (USAF, Wright-Patterson AFB, OH). In: Institute of Navigation, Annual

Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 11-16.

The Global Positioning System Evaluator (GPSE) is a test facility for GPSE user equipment which presents the user with the RF signals, inertial measurement, and barometric altimeter data it would sense in a wide range of environments. Testing in the GPSE environment exhibits several advantages over flight testing. In addition to the obvious cost benefits and repeatability of simulator testing, the GPSE can simulate a wide range of dynamics (up to 2100 m/s velocity, 30 g acceleration) and simulates a full 24-satellite configuration (a satellite-selection algorithm is used to choose optimum satellite geometries), allowing real-time segments of up to 10 hours duration. This paper describes GPSE model implementation and presents the system performance characteristics. B.J.

A82-21589 # **A perspective on civil use of GPS.** W. C. Euler (Magnavox Advanced Products and Systems Co., Torrance, CA). In: Institute of Navigation, Annual Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 33-39. 19 refs.

It is noted that, while the GPS development program has made remarkable progress, the case for civilian users has advanced only marginally. The absence of a concrete policy regarding access, accuracy, and user charges has resulted in conservatism on the part of the affected government agencies as well as industry. It is suggested that the development of a firm national policy for the civil use of Navstar is essential to optimize the planning and equipment evolution to be carried out by affected government agencies, civil users, and equipment manufacturers. B.J.

A82-21590 # **The application of strapdown inertial technology to Attitude and Heading Reference System requirements.** G. W. Gilster (Litton Industries, Guidance and Control Systems Div., Woodland Hills, CA). In: Institute of Navigation, Annual Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 48-56.

The LR-80 AHRS (Attitude and Heading Reference System) for the YAH-64 advanced attack helicopter is described. The LR-80 offers a unique AHRS solution in that it employs a strapdown inertial navigation mechanization and provides 'dynamically exact' measurement of vehicle maneuvers. A competitive system cost is achieved by the use of automatic self-calibration techniques, Doppler damping, and application of the inherent virtues of a strapdown mechanization which minimizes electromechanical complexity. The system configuration and design features are described, and flight test results for representative helicopter mission conditions are presented, showing the combined Doppler/AHRS navigation results obtained. Also considered are other potential applications for the system, including missiles and other aircraft, and the flexibility for integration with other navigation aids. B.J.

A82-21591 # **The emerging need for improved helicopter navigation.** N. T. Fujisaki (FAA, Washington, DC). In: Institute of Navigation, Annual Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 57-64. 6 refs.

The paper reviews significant helicopter trends and the new complexion of resultant navigation requirements. Programs aimed at immediate problems are considered along with long-term plans to improve helicopter navigation. The essential elements of the FAA helicopter R&D effort are described, and potential areas for future work are also considered (including integrated cockpit system development). B.J.

A82-21592 # **Helicopters and Navstar/GPS.** G. A. Gilbert (Glen A. Gilbert and Associates, Inc., Washington, DC). In: Institute of Navigation, Annual Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 65-70.

The elements of an ideal helicopter navigation system are described and evaluated in relation to GPS. Proposed system architecture is presented and principal elements are discussed; and a concept validation program is outlined. This program could lead into an advanced (fourth generation) air traffic control system which would serve not only helicopters but all civil aviation together with military aircraft in the common NAS. Transition to this system would begin in the mid 1980's, with full operational capability in place by the mid 1990's. B.J.

A82-21593 # **Systems approach to the design of wind shear avionics.** N. J. Cafarelli (Automation Industries, Inc., Wheaton, MD) and J. P. McVicker (FAA, Systems Research and Development Service, Washington, DC). In: Institute of Navigation, Annual Meeting, 36th, Monterey, CA, June 23-26, 1980, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 99-103.

The FAA Wind Shear Program Office has completed an analytical investigation of the wind shear phenomenon, with emphasis on threat definition and the detection and avoidance of atmospheric anomalies. This paper summarizes some of these activities and suggests relevant information categories that should be considered in the design of a wind shear avionics system. These categories are: (1) predictive information, which defines specific characteristics and magnitude of an atmospheric anomaly prior to penetration; (2) anticipatory information, which establishes the existence of an atmospheric anomaly prior to penetration, but does not define its characteristics; and (3) reactive information, which defines the characteristics and magnitude of an atmospheric anomaly during penetration. The advantages and limitations of each information category are considered, along with some representative implementations. B.J.

A82-21597 **The case for helicopter hoisting.** W. J. Maddox, Jr. (Arabian Helicopters, Ltd., Dhahran, Saudi Arabia). *Vertiflite*, vol. 28, Jan.-Feb. 1982, p. 16-19.

Helicopter crew training and operations for hoisting personnel while hovering over offshore oilfields and over tankers, and for personnel transport to and from work in the Persian Gulf area are described. Personnel hoisting by commercial helicopters is noted to be illegal in the U.S., while oil company helicopter crews receive training for such operations in Louisiana. A 15-ft clear zone is needed for off-the-deck hoisting when landing cannot be achieved, and most work done in the Near East zone comprises delivery of harbor pilots to their craft. The pilot nominally approaches from the upwind side of a ship or platform to provide a safety margin in case of a power-out condition, and flights are limited to two passengers. Improvements are suggested for better ship identification lights and better lighted landing and hoist areas. M.S.K.

A82-21629 † **Studies on the stability of thin-walled shells with cutouts /Review/. I (Ob issledovaniiakh ustoichivosti tonkostennykh obolochek s vyrezami /Obzor/. I).** I. N. Preobrazhenskii. *Problemy Prochnosti*, Jan. 1982, p. 21-32. 50 refs. In Russian.

A82-21636 † **Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy (Dispersiia i temperaturno-silovaia zavisimost' kharakteristik zharoprochnosti splava dlia diskov GTD).** E. P. Golubovskii, I. P. Bulygin, and F. V. Iushakova. *Problemy Prochnosti*, Jan. 1982, p. 68-73. In Russian.

Experimental data are presented on the time-to-failure dispersion (under uniaxial tension and under stress concentration), long-term plasticity, and time of accumulation of a specified amount of creep strain (0.2 and 0.5%) for disk alloy EP109VD. It is shown that the dispersion of high-temperature strength characteristics changes in accordance with the vibration decay law as the time to failure increases. Empirical equations are derived which can be used to calculate the bounds of long-term strength, long-term plasticity, and creep for given fracture probabilities. V.L.

A82-21848 **Very high speed integrated circuits: Into the second generation. II - Entering Phase 1.** J. Martin (National Semiconductor Corp., Santa Clara, CA). *Military Electronics/Countermeasures*, vol. 8, Jan. 1982, p. 60-63, 65, 66.

The intended applications of the Very High Speed Integrated Circuits (VHSIC) chips and technologies fall into four basic categories. These categories are related to current operational systems which could be improved through VHSIC technologies without change in performance, the addition of new performance features to existing systems, planned upgrades of existing systems through the use of VHSIC technologies, and new systems which could not be developed without the use of VHSIC technology. Attention is given to system design evolution, aspects of technology insertion, advantages related to standardization, applications related to the development of the next generation Advance Tactical Fighter aircraft, the improvement of reliability, and technology transfer issues. G.R.

A82-21897 **Process monitor helps make jet engines reliable.** *Materials Evaluation*, vol. 40, Feb. 1982, p. 159, 160.

A microprocessor-controlled general-purpose process monitor has been developed for automatic testing of jet engine components, in particular wheels or disks of compressors and turbines from 10 to 30 inches in diameter, at speeds up to 60,000 rpm. Load-cycle fatigue-life tests are performed in six spin pits and are automatically controlled within a range defined by low-speed and high-speed setpoints set by the operator. A complete cycle, from low speed to high speed and back to low, may be completed in less than a minute for a small part and in up to 5 min for a large one. V.L.

A82-21900 **Low-frequency eddy current inspection of aircraft structure.** D. J. Hagemaier and A. P. Steinberg (Douglas Aircraft Co., Long Beach, CA). *Materials Evaluation*, vol. 40, Feb. 1982, p. 206-210. 5 refs.

Low-frequency eddy-current inspection is used to detect fatigue cracks emanating from fastener holes in a wing spar cap and shear-lip in thin multiple-layered structures. It is shown that the technique is useful for detecting subsurface cracks in aluminum structures up to 8.9 mm thick at 100 Hz. The low-frequency eddy current method is also shown to be capable of detecting cracks that are not detectable by X-ray radiography, in particular, shear-lip cracks oriented at 45 deg to the X-ray beam. V.L.

A82-21941 # **Analytical control law for desirable aircraft lateral handling qualities.** H. Ohta (Nagoya University, Nagoya, Japan), P. N. Nikiforuk, and M. M. Gupta (Saskatchewan, University, Saskatoon, Canada). *Journal of Guidance, Control and Dynamics*, vol. 5, Jan.-Feb. 1982, p. 79-85. 8 refs. Natural Sciences and Engineering Research Council of Canada Grants No. A-5625; No. A-1080.

A model-matching technique is used to synthesize a control law which augments the lateral dynamics of an aircraft. The feedback and feedforward gains are derived in terms of the lateral stability derivatives and the control law is designed to satisfy specified lateral handling criteria. The augmented plant has specified lateral characteristic poles and a decoupled transfer function matrix between the aileron and rudder angles as inputs and the bank and sideslip angles as outputs. Approximate relationships are derived between the basic and augmented stability derivatives and presented in tabular form. The feedback gains are determined using the augmented derivatives. Simulation examples for three different flight conditions of a STOL aircraft are given to illustrate and substantiate the effectiveness of the control law. (Author)

A82-22027 # **FAA/NWS aviation route forecast /ARF/ development.** T. R. Mitchell (Mitre Corp., McLean, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0013.* 10 p. 15 refs.

It has been recommended that greater emphasis be placed on the mass dissemination of aviation weather data, because a study of such data is important in planning a safe, expeditious flight. An approach which can provide such a mass dissemination of weather data on a cost-effective basis is considered. According to this approach, pilots could partially 'brief themselves' by directly accessing a computer data base of geographically-retrievable weather messages. Access would be by Direct User Access Terminals (DUAT's) or, alternatively, by using Touchtone telephone tones for providing input to the system and a Voice Response System (VRS) for output. To demonstrate the concepts and resolve the uncertainties, a prototype development program was undertaken. A real-time textual aviation weather data base and DUAT retrieval capabilities were developed on a network of minicomputers. Attention is given to the need for aviation route forecasts (ARF) and aspects of ARF development. G.R.

A82-22028 # **A perspective of computational aerodynamics from the viewpoint of airplane design applications.** L. R. Miranda (Lockheed-California Co., Computational Aerodynamics Dept., Burbank, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0018.* 18 p. 56 refs.

A survey of the use of computational aerodynamics as a tool for airplane design is presented. Some general characteristics and requirements of the airplane design process are discussed and particular attention is given to those computer code characteristics that will enhance the effectiveness of computational aerodynamics. The various elements that are needed in a computer code in order to numerically simulate flows for practical applications are identified. The nature of each one of these elements and how it is impacted by considerations of effectiveness are discussed. The most commonly used approaches are reviewed and to what degree they are able to meet the needs of the airplane designer is pointed out. Problem areas are highlighted; present efforts to solve these problems are examined and, in some cases, alternative approaches are indicated. (Author)

A82-22045 * # **Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics.** J. M. Luckring, W. E. Schoonover, Jr., and N. T. Frink (NASA, Langley Research Center, Transonic Aerodynamics Div., Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0095.* 18 p. 33 refs.

Free Vortex Sheet theory has been applied to a variety of configurations for the estimation of three-dimensional pressure distributions for wings developing separation-induced leading-edge vortex flows. Correlations with experiment show reasonable estimates for the effects of compressibility, side-slip, side edges, swept-wing blast-induced loads, and leading-edge vortex flaps. Theoretical studies expand upon these correlations to show general aerodynamic trends. Consideration is also given to simple, yet effective techniques which expedite convergence and therefore reduce computational expense. (Author)

A82-22046 # **Wing-canard aerodynamics at transonic speeds - Fundamental considerations on minimum drag spanloads.** W. H. Mason (Grumman Aerospace Corp., Bethpage, NY). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0097.* 10 p. 30 refs. Research supported by the Grumman Aerospace Corp.

Current methods for drag minimization minimize only the induced drag portion of the total drag. For many advanced supersonic aircraft, these methods are not valid when considering the transonic maneuver case. This paper describes an approximate method which extends the drag minimization schemes to include transonic wave drag and viscous drag, and then demonstrates the importance of these contributions when performing aerodynamic design at transonic maneuvering conditions. Typical results show both a reduction in total drag and a shift in the minimum drag center of gravity when these additional drag sources are included in the analysis. Another important consideration in canard-wing design is the canard wake modeling choice. In the second section of the paper, the results of two model problems provide a quantitative measure of the potential errors arising from various wake models. (Author)

A82-22052 * # **Alleviation of the subsonic pitch-up of delta wings.** D. M. Rao (Vigyan Research Associates, Inc., Hampton, VA) and T. D. Johnson, Jr. (Kentron Technical Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0129.* 10 p. 7 refs. NASA-supported research.

A 'pylon vortex generator' concept has been proposed for alleviating the subsonic pitch-up instability of highly swept supersonic-cruise wings. Fixed at a part-span location, this leading-edge device utilizes the lateral velocity component in the flow approaching the swept leading edge to generate a streamwise vortex, opposite in sense to the tip vortex. The vortex-induced downwash outboard of the device serves to control the leading-edge stall development in the wing-tip regions. Wind-tunnel results on 60-deg and 74-deg flat-plate delta wings are presented to illustrate the operation of the pylon vortex generator in modifying the spanwise leading-edge separation characteristics resulting in effective alleviation of the pitch-up. (Author)

A82-22054 # **Isolated nacelle performance - Measurement and simulation.** J. L. Crook, D. P. Nelson, R. H. Wiley, and W. M. Presz, Jr. (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0134.* 10 p. 16 refs.

Results are presented from isolated flow through nacelle model tests which were conducted to acquire reliable data for computational nacelle performance prediction verification. The data includes static external and internal pressures, boundary layer rakes, hot film transition measurements, and momentum drag measurements. External surface pressure coefficients are compared against inviscid analytical predictions from state of the art transonic potential flow codes including non-conservative potential, conservative potential, and Euler solvers. Comparisons are made for free stream Mach numbers in the range of 0.71 to 0.84 and mass flow ratios between 0.54 and 0.80. Viscous predictions from an integral boundary layer technique are compared to measured transition location. Nacelle drag components are compared to an inviscid viscous analysis including pressure drag, additive drag, skin friction drag and total momentum loss. These analyses are shown to accurately predict nacelle drag, and drag trends with flow conditions and contour variations. (Author)

A82-22060 # **Basic studies of the flow fields of airfoil-flap-spoiler systems.** S. Bodapati, K. Karamcheti (Stanford University, Stanford, CA), and M. D. Mack (Boeing Commercial Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0173.* 10 p. 6 refs.

Spoilers are used as lateral controls, speed brakes and lift dumpers during various stages of flight. The wakes created by the spoilers interact with horizontal tail and may cause buffet. A theoretical and experimental investigation has been undertaken at Stanford University to study steady and fluctuating flow fields of airfoil-flap-spoiler systems. A series of experiments have been conducted to investigate steady and fluctuating boundary layers, wakes and pressures. The results are being analyzed in conjunction with the unsteady Schlieren photographs and will be reported in different papers. Here a complete investigation relating various aspects including the design philosophy, instrumentation and data acquisition and analysis techniques will be reported and typical results will be discussed. (Author)

A82-22074 * # **High angle-of-attack characteristics of three-surface fighter aircraft.** M. A. Croom, S. B. Grafton, and L. T. Nguyen (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0245.* 11 p. 6 refs.

As part of a research program aimed at providing information on the high angle-of-attack characteristics of three-surface fighter concepts incorporating a close-coupled canard, an investigation is being conducted on two specific configurations based on the F-18 and F-15 designs. The study configurations are being subjected to a wide range of tests including wind-tunnel tests, dynamic model tests, and piloted simulation. This paper summarizes the results obtained to date in this study. High-alpha results in the areas of static stability, damping, and control characteristics are reviewed and some of the more significant aerodynamic phenomena are identified. (Author)

A82-22077 * # **Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts.** J. C. Wai, H. Yoshihara (Boeing Co., Seattle, WA), and W. K. Abeyounis (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0255.* 16 p. 8 refs. Research supported by the Boeing Co; Contract No. NAS1-15887.

A transonic small perturbation method has been developed for the analysis of general wing-fuselage-nacelle-pylon configurations with powered jet exhausts. Finite difference successive line relaxation algorithm is used to solve the small disturbance potential equation in conservative form. The nacelle tangency condition and the jet exhaust plume contact conditions are fulfilled in a quasi-cylindrical fashion on a surface fitting the Cartesian grid. The pylon tangency condition is treated in a quasi-planar manner as for the wing. Viscous displacement effects on the wing are modeled by suitable shape changes including the placement of a viscous ramp at the base of the shock. Computed results of a transport configuration show satisfactory correlation with test data. (Author)

A82-22079 # **A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions.** R. A. Cooke and J. C. Mabberley (Royal Aircraft Establishment, Flight Systems Dept., Farnborough, Hants., England). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0261.* 5 p.

The paper describes an initial simulator trial which will assess a very wide-angle head-up display and a thermal imaging system optimized for ground attack missions. An air-to-ground simulator developed for the trial is discussed in detail and results of early experiments are presented. It is found that the displayed image, general flight cues, and cockpit environment are realistic in terms of pilot operation and behavior, and thus, the facility described provides a valuable tool for assessing various trade-offs between system configurations and performance. V.L.

A82-22081 * # **Aerodynamic characteristics of airfoils with ice accretions.** M. B. Bragg and G. M. Gregorek (Ohio State University, Columbus, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0282.* 15 p. 19 refs. Grant No. NAG3-28.

Results of a wind tunnel test to evaluate the performance of an airfoil with simulated rime ice are presented with theoretical comparisons. A NACA 65A413 airfoil was tested in the OSU 6 x 22 inch Transonic Airfoil Wind Tunnel at a Reynolds number near three million and Mach numbers from 0.20 to 0.80. The model was tested in four configurations to determine the aero-dynamic effects of the roughness and shape of a rime ice accretion. The simulated rime ice shape was obtained analytically using a time-stepping dry ice accretion computer code. Lift, drag, moment coefficients, and pressure distributions for the clean and simulated rime ice cases are reported. The measured degradation in airfoil performance is compared to an analytical method which uses existing airfoil analysis computer codes with empirical corrections for the surface roughness. A discussion of the empirical surface roughness correction and uses of other airfoil computer methods is included. (Author)

A82-22082 # **A split coefficient/locally monotonic scheme for multishocked supersonic flow.** J. E. Daywitt, D. J. Szostowski (General Electric Co., Re-Entry Systems Div., Philadelphia, PA), and D. A. Anderson (Iowa State University of Science and Technology, Ames, IA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0287.* 14 p. 27 refs. Research sponsored by the General Electric Co.; Contract No. F04701-78-C-0104.

A new finite difference technique is developed for solving three-dimensional, steady, inviscid, supersonic, equilibrium real-gas flows with embedded shock waves. The technique employs the split coefficient matrix (SCM) method to solve the gasdynamic equations in the form of decoupled compatibility relations. In the SCM technique the coefficient matrices are split according to the sign of their eigenvalues. The derivatives associated with each split coefficient matrix are approximated by one-sided difference operators consistent with signal propagation paths. Results demonstrate that problems of conventional finite difference methods with non-orthogonal grids are alleviated in the SCM approach. In addition, solutions obtained using the SCM technique show that strong cross-flow gradients, including cross-flow shocks, can be accurately computed. To treat flows containing embedded stream-wise shock waves the SCM technique is replaced, at grid points detected to be in the vicinity of a shock, by the monotonic self-adjusting hybrid/artificial compression method (ACM). The governing equations are cast in conservation-law form in the shock-capturing ACM approach with damping terms added to eliminate post-shock oscillations. Stream-wise shocks of sufficient strength to cause conventional shock-capturing methods to fail are resolved using the combined SCM/ACM technique. (Author)

A82-22083 # **Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3.** W. J. Yanta, D. W. Ausherman, and E. R. Hedlund (U.S. Navy, Naval Surface Weapons Center, Silver Spring, MD). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0289.* 11 p. 9 refs. Navy-sponsored research.

Three-dimensional boundary layer measurements were carried out on a 7 deg semi-vertex angle sharp cone for angles of attack of 0, 2 and 4 deg in the NSWC Supersonic Tunnel number 2 at a freestream Reynolds number of 2.3 x 10 to the 6th/ft. (7.0 x 10 to the 5th/m). Included were measurements of the mean U, V, and W velocity components for seven circumferential locations around the body and one axial station. These were obtained using a three-dimensional laser Doppler velocimeter. The flow was investigated in both the viscous and inviscid portions of the flow field, yielding information about the velocity profile behavior in both regions. In addition, skin friction measurements were made with a surface mounted Preston probe at five axial stations along the cone. The effects of angle of attack and body roll position on the three-dimensional boundary layer profiles and skin friction are discussed. (Author)

A82-22091 # **Propulsion system controls design and simulation.** E. Tjonneland and C. M. Carlin (Boeing Military Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0322.* 27 p. 11 refs.

A propulsion system real-time simulation facility was developed for the design, analysis, simulation and evaluation of propulsion control systems. The functional requirements for the facility, the implementation of these requirements, and the utilization of the facility in advanced control technology programs is described. A hybrid approach to plant simulation permits realization of the desired levels of portability, flexibility, computational accuracy, and reliability. Control development tools have been integrated into a facility to support the development of digital propulsion control systems as well as their integration with airframe control systems. The success of controls and simulation development depends largely on the attention to the detailed work tasks, and much of the computational technology has already been transferred to automated interactive minicomputer work methods. J.F.

A82-22094 * # **Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack.** O. A. Kandil, L.-C. Chu, and T. Tureaud (Old Dominion University, Norfolk, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0351.* 14 p. 20 refs. Grant No. NsG-1560; Contract No. N62269-80-C-0704.

Steady and unsteady Nonlinear Hybrid Vortex (NHV) method, for low aspect ratio wings at large angles of attack, is developed. The method uses vortex panels with first-order vorticity distribution (equivalent to second-order doublet distribution) to calculate the induced velocity in the near field using closed form expressions. In the far field, the distributed vorticity is reduced to concentrated vortex lines and the simpler Biot-Savart's law is employed. The method is applied to rectangular wings in steady and unsteady flows without any restriction on the order of magnitude of the disturbances in the flow field. The numerical results show that the method accurately predicts the distributed aerodynamic loads and that it is of acceptable computational efficiency. (Author)

A82-22096 * # **Store separation from cavities at supersonic flight speeds.** R. L. Stallings, Jr. (NASA, Langley Research Center, High-Speed Aerodynamics Div., Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0372.* 6 p. 5 refs.

An experimental investigation has been conducted to determine the aerodynamic characteristics of a typical wing-control missile configuration during separation from a box-type cavity having depth to length ratios (D/L) ranging from 0.088 to 0.225. The cavity was located in a splitter plate that spanned the low Mach number test section of the Langley Unitary Plan Wind Tunnel. Aerodynamic characteristics are presented for Mach 2.36 and a free-stream unit Reynolds number of 2,000,000/ft. For the shallow cavity (D/L = 0.088), large interactions existed between the cavity and the flat plate flow field, which resulted in unfavorable separation characteristics for the missile model. For the deep cavity (D/L = 0.225), the flat plate flow field essentially bridged the cavity, resulting in minor interactions and favorable separation characteristics for the missile model. (Author)

A82-22110 # **Aerodynamic characteristics of maneuvering flaps.** B. Fang, B. Hu, H. Wang, and Y. Zhang (Shengyang Aircraft Corp., People's Republic of China). *Acta Aeronautica et Astronautica Sinica,* vol. 2, Sept. 1981, p. 1-13. In Chinese, with abstract in English.

Results of wind tunnel tests on the effects of aircraft maneuvering flaps are reported, specifically for reducing drag, and for the effects of the flap span, the flap chord, the strake, and the wing planform on the aerodynamics of the maneuvering flap. The matching of leading edge and trailing edge flaps, and the improvement in large angle of attack flying due to the presence of maneuvering flaps are discussed. Maneuvering flaps allow control of the flow separation and decrease drag at large angles of attack, and expand the buffet boundary and decrease the buffet intensity. Methods of incorporating the effects of the maneuvering flaps into the design of the aircraft structure and the control system are indicated. M.S.K.

A82-22111 # **Numerical calculation of lift, moment coefficient and dynamic stability derivatives on sideslipping wings in unsteady supersonic flows.** G. Zhang (Nanjing Aeronautical Institute, Nanjing, People's Republic of China). *Acta Aeronautica et Astronautica Sinica,* vol. 2, Sept. 1981, p. 14-22. In Chinese, with abstract in English.

This paper presents a numerical solution of unsteady supersonic flows for sideslipping wings by means of the characteristic lines network method of unsteady supersonic sources distributed on the wing plane. This paper provides the oscillating mode of undulatory, pitching-and-rolling harmonic oscillations of the wings with sideslip angles, and the methods to calculate its lift, moment coefficient, and dynamic stability derivatives. The dynamic stability derivatives of a typical wing with sideslip angle equal to zero were worked out both by analytical formula in conformity with the conventional quasi-stationary theory and by the present method, and were compared and examined. The results show that the present method is satisfactory. (Author)

A82-22112 # **Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust.** G. Wen (Beijing University, Beijing, People's Republic of China) and Z. Sun (Air Force Laboratory, People's Republic of China). *Acta Aeronautica et Astronautica Sinica,* vol. 2, Sept. 1981, p. 23-30. In Chinese, with abstract in English.

The effects of unsteady subsonic aerodynamic forces on the wing-body-tail configuration and the interference effects between the components are examined numerically. A small angle of attack and a weak shock is assumed, and a linear method for the moving vortex finite element solution is employed to solve an initial boundary value problem of the wave equation. A set of algebraic equations is solved at each time interval, and numerical calculations are performed for various blast orientations, elevation angles, and different complex planforms. The derived lift coefficients for wing-body configurations are found to match experimental data, while convergence was not obtained for the complex planform for the variations of lift and moment coefficients. M.S.K.

A82-22120 # **The simulation study on a redundant flight control system.** D. Xue (Institute of Automatic Flight Control, People's Republic of China). *Acta Aeronautica et Astronautica*

Sinica, vol. 2, Sept. 1981, p. 84-93. In Chinese, with abstract in English.

The results of a simulation study of a triple redundant flight control system are reported. The system featured the capability of fail-operation and employed three on-line signal selectors, six off-line comparators, and an active standby servomechanism. The signal selector consisted of operational amplifiers, and the triplex system involved the selection of an intermediate voltage transmitted among three input signals. All failure signals were isolated and neglected, while a servo loop was employed to compare a servo model with the active-standby servomechanism. The signal selectors, comparators, and servomechanism provided adequate performance, within the bounds that the active-standby servomechanism be limited to control functions which accept small failure transients. M.S.K.

A82-22198 † **The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels (Primenenie metoda Doplerovskoi spektroskopii dlia issledovaniia kharakteristik polidispersnosti emul'sionnoi vody i tverdykh mikroprimesei v aviatoplivakh).** A. N. Korolevich, T. V. Oleinik, and A. Ia. Khairullina. *Zhurnal Prikladnoi Spektroskopii*, vol. 35, Dec. 1981, p. 1016-1023. 11 refs. In Russian.

The feasibility of using Doppler spectroscopy to determine drop sizes of emulsion water and particle sizes of solid microimpurities in kerosene flow through a pipe is confirmed. Measured Doppler spectra are used to reconstruct particle size distribution functions for fractions of microparticles beginning with 2 microns. The method makes possible the rapid continuous monitoring of the disperse phase in aviation fuel and may be suitable in the automated analysis of multicomponent disperse media. B.J.

A82-22209 # **Rotating stall in blade rows operating in shear flow.** T. Sekido (Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan), I. Sasaki, and H. Takata (Tokyo, University, Tokyo, Japan). *JSME, Bulletin*, vol. 24, Dec. 1981, p. 2074-2081.

The nature of the unsteady small perturbations in a sheared mean flow with a linear velocity profile is investigated. The results are used to analyze the actuator-disk of a rotating stall in three-dimensional blade rows which are placed in cartesian coordinates and are exposed to a spanwise shear flow. It is assumed that the blades have no twist and that the aerofoil section does not vary with radius. The axial velocity is continuous everywhere on the actuator plane, and the exit flow angle is constant as well as independent of both the inlet flow angle and the spanwise position. The total pressure loss is assumed to arise through the blade row, and is related to the flow by the total pressure loss coefficient. It is shown that the three-dimensional effect in shear flow greatly changes the nature of the rotating stall. Spanwise distribution of the disturbances of the rotating stall in shear flow is also examined. J.F.

A82-22222 **Can low-speed jet noise be predicted (Peut-on prédire le bruit d'un jet quelconque de faible fitesse).** J. M. Fitremann (Ecole Nationale Supérieure de Mécanique, Nantes, France). *(Association Aéronautique et Astronautique de France, Colloque d'Acoustique Aéronautique, 7th, Ecole Centrale de Lyon, Ecully, Rhône, France, Nov. 4, 5, 1980.) Revue d'Acoustique*, vol. 14, no. 58, 1981, p. 145-152. 18 refs. In French.

Attempts to analytically define the noise emitted by a turbulent jet and the refraction of noise off the surface of an aircraft are discussed. Modeling turbulent flow for a given geometry is nominally accomplished by applications of theories of radiation and turbulent shear flow, and of three-dimensional refraction phenomena. Turbulent flow is calculated from average flow, energy, dissipation, and time and length scales, with reference to known flows, and by making quadruple correlations; stress, mixed, algebraic, and linear diffusion models are possible. Turbulent spectral quantities are calculated at discrete points volumetrically, and the spatial and temporal characteristics are quantified as the acoustic spectra diverge from the main flow. Inhomogeneous radiation is described by Lighthill's theory. Nonlinear propagation phenomena are quantified in terms of fields of average velocities or densities, of simple or nonlinear, multiple diffusion, for random fluctuations in amplitude and phase, and from spectral broadening of pure frequencies during refraction. M.S.K.

A82-22240 * **Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel.** J. H. Worstell and S. R. Daniel (Colorado School of Mines, Golden, CO). *Fuel*, vol. 60, June 1981, p. 481-484. 30 refs. Grant No. NsG-3122.

The influence of substituted pyridines, pyrroles, indoles, and quinolines on the storage stability of conventional Jet A turbine fuel is evaluated. Significant increases in the amount of deposit formed in accelerated storage tests are found upon addition of these compounds at levels as low as one ppm nitrogen. While the effect is correlated with basicity of the nitrogen compound within a given compound class, the correlation does not hold between classes (pyridines, quinolines, etc.). Steric hindrance at the nitrogen atom greatly inhibits deposit promotion. The characteristics, but not the elemental composition, of deposits vary with the identity of the added nitrogen compound and with deposition temperature. (Author)

A82-22241 * **Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel.** K. E. Dahlin, S. R. Daniel, and J. H. Worstell (Colorado School of Mines, Golden, CO). *Fuel*, vol. 60, June 1981, p. 477-480. 24 refs. Grant No. NsG-3122.

The development of reasonably precise techniques for the measurement of storage stability of jet aviation fuel is described. Lewis bases, extracted by ligand-exchange from a coal-derived liquid, are shown to adversely affect storage stability (as determined by an accelerated storage test) when added to Jet A turbine fuel. JFTOT results suggesting slight decreases in thermal stability of fuel 'spiked' (i.e., contaminated with a measured quantity of reagent) with extract are reported. Addition to Jet A turbine fuel of individual heterocyclic nitrogen compounds is shown to produce comparable decreases in storage stability. (Author)

A82-22245 # **Aerodynamic evaluation of winglets for transport aircraft.** J. A. Dahlin (Douglas Aircraft Co., Long Beach, CA). *American Institute of Aeronautics and Astronautics, Fluid and Plasma Dynamics Conference, 14th, Palo Alto, CA, June 23-25, 1981, Paper 81-1215.* 7 p. 8 refs.

The applications of winglets to new and existing transport aircraft are discussed. The calculation of induced drag of highly nonplanar lifting configurations (i.e. wing/winglet combinations) using the Trefftz-Plane (far-field) method is substantiated. Further, it is established that the method of surface pressure integration to calculate induced drag characteristics is unreliable. A trade study evaluating the effects of winglet dihedral and span on induced drag and wing root-bending-moment characteristics is presented. The effect of wing loading on winglet performance and the resulting implications to existing transport aircraft is discussed. Comparisons of predicted and measured (wind tunnel and flight) induced drag improvements due to winglet and wing-tip extensions are presented for the KC-135 and DC-10 aircraft. (Author)

STAR ENTRIES

N82-16042*# Boeing Vertol Co., Philadelphia, Pa.

PREDESIGN STUDY FOR A MODERN 4-BLADED ROTOR FOR THE NASA ROTOR SYSTEMS RESEARCH AIRCRAFT

H. E. Bishop, J. E. Burkam, R. C. Hemingway, C. N. Keys, K. E. Smith, J. H. Smith, and J. A. Staley Jan. 1981 312 p refs
(Contract NAS2-10689)
(NASA-CR-166153) Avail: NTIS HC A14/MF A01 CSCL 01B

Trade-off study results and the rationale for the final selection of an existing modern four-bladed rotor system that can be adapted for installation on the Rotor Systems Research Aircraft (RSRA) are reported. The results of the detailed integration studies, parameter change studies, and instrumentation studies and the recommended plan for development and qualification of the rotor system is also given. Its parameter variants, integration on the RSRA, and support of ground and flight test programs are also discussed. Author

N82-16043*# Hughes Helicopters, Culver City, Calif.

PRE-DESIGN STUDY FOR A MODERN FOUR-BLADED ROTOR FOR THE ROTOR SYSTEM RESEARCH AIRCRAFT (RSRA) Final Report

Charles W. Hughes and Andrew H. Logan Mar. 1981 140 p refs
(Contract NAS2-10690)
(NASA-CR-166154) Avail: NTIS HC A07/MF A01 CSCL 10A

Various candidate rotor systems were compared in an effort to select a modern four-bladed rotor for the RSRA. The YAH-64 rotor system was chosen as the candidate rotor system for further development for the RSRA. The process used to select the rotor system, studies conducted to mate the rotor with the RSRA and provide parametric variability, and the development plan which would be used to implement these studies are presented. Drawings are included. A.R.H.

N82-16046*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.

SUMMARY OF THEORETICAL CONSIDERATIONS AND WIND TUNNEL TESTS OF AN AERODYNAMIC SPOILER FOR STALL PROOFING A GENERAL AVIATION AIRPLANE

Howard L. Chevalier Jan. 1982 55 p refs
(Grant NsG-1407)
(NASA-CR-165100) Avail: NTIS HC A04/MF A01 CSCL 01A

An airplane stall proofing system utilizing a spoiler was investigated for application on a low wing airplane representative of typical general aviation aircraft. Tests of the full scale airplane were conducted in the NASA Langley 30 x 60 foot full scale wind tunnel. The test velocity was 86 feet per second, corresponding to a Reynolds number of 2.20 million. The stall proofing capability of the spoiler is shown and a theoretical approach to the design of the spoiler and analysis of the spoiler's contribution to the airplane's trim and longitudinal stability is verified. Controlled spoiler deployment in a narrow angle of attack range, 4 degrees, immediately preceding the stall angle will stall proof the airplane. The results also show some of the limitations of flight tests to determine spoiler deployment rate for good handling qualities. M.G.

N82-16049*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

APPLICATION OF IMAGE PROCESSING TECHNIQUES TO FLUID FLOW DATA ANALYSIS

Charles C. Giamati 1981 16 p Presented at the 11th Ann. Computer Output Microfilm (COMtec) Conf., Lincolnshire, Ill., 24-26 Feb. 1981
(NASA-TM-82760; F-1081) Avail: NTIS HC A02/MF A01 CSCL 01A

The application of color coding techniques used in processing remote sensing imagery to analyze and display fluid flow data is discussed. A minicomputer based color film recording and color CRT display system is described. High quality, high resolution images of two-dimensional data are produced on the film recorder. Three dimensional data, in large volume, are used to generate color motion pictures in which time is used to represent the third dimension. Several applications and examples are presented. System hardware and software is described. M.G.

N82-16050# National Aerospace Lab., Tokyo (Japan).

SOME EXPERIMENTAL INVESTIGATIONS ON TRANSONIC FLUTTER CHARACTERISTICS OF THIN PLATE WING MODELS WITH SWEPTBACK AND TAPERED TIPS

Eiichi Nakai Sep. 1981 49 p refs In JAPANESE; ENGLISH summary
(NAL-TR-682; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Some experimental investigations on the transonic flutter characteristics were conducted using thin plate cantilevered wing models with sweptback tapered tips, which were elastically supported at the root, in the NAL 0.6m x 0.6m transonic blowdown wind tunnel for flutter testing in the range of Mach numbers from 0.804 to 1.171. The wing models have the tip planform of sweptback angles of 35 degrees at the leading edge and 30 degrees at 1/4 chord line, and an aspect ratio of 1.017 and a taper ratio of 0.6. It is concluded that the flutter boundaries of the wing models have been obtained and the boundaries expressed by the 'experimental flutter speed coefficient' are characterized as having minimum values at around Mach number 1.0. It is also concluded that the considerable increase in the flutter instability area is caused by the decrease in the stiffness of the elastic support at the root of the model. Author

N82-16054# Federal Aviation Administration, Oklahoma City, Okla. Civil Aeromedical Inst.

THE PREVALENCE OF VISUAL DEFICIENCIES AMONG 1979 GENERAL AVIATION ACCIDENT AIRMEN

J. R. Dille and C. F. Booze, Jr. Jul. 1981 10 p refs
(AD-A106489; FAA-AM-81-14) Avail: NTIS HC A02/MF A01 CSCL 01/2

Analyses of the accident experience of pilots who were monocular, did not meet (even the liberal) vision standards, had color vision defects and no operational restrictions, or wore contact lenses, have shown higher-than-expected accident experience in previous studies. However, no causal role had been assigned by accident investigators and reexamination of the records failed to show any obvious pattern or relationship between the defects and the accidents. In the present study of 1979 accidents, the relatively small number of pilots with aphakia and artificial lens implants, as well as the total eye pathology population, had significantly higher accident rates, but the monocular pilots did not. Again, no causal role had been ascribed. Some associations are debatable, but there is no clear recurring problem. There are still unresolved questions about the consistent operational performance of monocular pilots, those who are not fully corrected to 20/20 distant visual acuity bilaterally, airmen with near vision deficiencies only who are not required to wear corrective glasses, those without fusion, and several with appreciable pathology who have 20/20 corrected central visual acuity but about whom we know very little concerning their dynamic, peripheral, depth or accommodative function. Author (GRA)

N82-16055# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

A GENERALIZED ESCAPE SYSTEM SIMULATION COMPUTER PROGRAM: A USER'S MANUAL Final Report

Louis A. DAulerio, Kathleen M. Breakey (Computer Sciences Corp., Huntington Valley, Pa.), Shirley W. Trimble (Computer Sciences Corp., Huntington Valley, Pa.), and Bruce Waldron (Computer Sciences Corp., Huntington Valley, Pa.) Aug. 1981 105 p
(Contract N62269-78-C-0191)
(AD-A106152; NADC-81224-60) Avail: NTIS HC A06/MF A01 CSCL 01/3

The Generalized Escape System Simulation Computer Program was developed to simulate the operation of various ejection seats

The program generates a three dimensional trajectory of the ejection seat and its occupant, and is intended to be used in the evaluation of ejection seat design and performance. The program is written in FORTRAN IV and is highly structured for ease of modification and updating. This report outlines the steps necessary to succesfully execute the program. Author (GRA)

N82-16056# Army Research and Technology Labs., Fort Eustis, Va. Applied Technology Lab.

TEST AND EVALUATION OF IMPROVED AIRCREW RESTRAINT SYSTEMS

G. T. Singley, III Sep. 1981 352 p refs
(DA Proj. 1L1-62209-AH-76)
(AD-A107576; USAAVRADCOM-TR-81-D-27) Avail: NTIS HC A16/MF A01 CSCL 01/3

US Army aviation accident data shows that a majority of all injuries in attack helicopters could have been avoided if these aircraft had been equipped with crashworthy seat and restraint systems. The compactness of the cockpit and the close proximity of mission equipment to the aircrew in attack and scout helicopters pose serious crash impact hazards. Although not desirable from a crashworthiness standpoint, operational considerations may dictate that mission equipment and structure be located within the occupant's crash impact motion envelope, particularly for his head. The cockpit can be delethalized further when the improved restraint is complemented by padding potential strike surfaces in the cockpit; making contact surfaces frangible; and providing weapon system sights with frangibility, telescoping, and/or swing-away features. This report presents the results of an effort to test and compare the potential of several aircrew restraint systems to reduce the crash impact motion envelope of helicopter aircrewmen. Author (GRA)

N82-16057# Department of Energy, Washington, D. C.

SYMPOSIUM ON COMMERCIAL-AVIATION ENERGY-CONSERVATION STRATEGIES

1981 373 p refs Proceedings of Symp. on Commercial Aviation Energy Conserv. Strategies, Washington, D.C., 2-3 Apr. 1981 Sponsored in part by FAA, Washington, D.C.
(DE81-028406; CONF-8104103) Avail: NTIS HC A16/MF A01

Energy conservation strategies applicable to commercial aviation are presented. General topics discussed include Federal and industry conservation programs such as flight operations, air traffic control, engineering and maintenance, and corporate management strategies. Included is a discussion of possible future actions. DOE

N82-16058# National Transportation Safety Board, Washington, D. C. Bureau of Technology.

SPECIAL INVESTIGATION REPORT. SEARCH AND RESCUE PROCEDURES AND ARMING OF EMERGENCY LOCATOR TRANSMITTER: AIRCRAFT ACCIDENT NEAR MICHIGAN CITY, INDIANA, 7 DECEMBER, 1980

11 Aug. 1981 19 p
(PB81-249427; NTSB-SIR-81-2) Avail: NTIS HC A02/MF A01 CSCL 01B

A special investigation of the circumstances surrounding the crash of a Beechcraft E-90, near Michigan City, Indiana, on December 7, 1980 and of the search and rescue activities following the accident, and the associated operation of the aircraft's emergency locator transmitter (ELT) is presented. As a result of not following proper notification procedures, coordination oversights, and communicaton gaps, the search for the missing aircraft was significantly hampered. The actual crash site was not reached by search personnel until nearly 4 hours after the crash. Some or all of the aircraft's four occupants, who died of hypothermia, probably survived the original crash. Examination of the ELT switch revealed that it was in the OFF position. A rescue could have been effected if the proper authorities had been notified and given the aircraft's last known position. GRA

N82-16059* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SPECTRALLY BALANCED CHROMATIC LANDING APPROACH LIGHTING SYSTEM Patent

Wendell D. Chase, inventor (to NASA) Issued 22 Sep. 1981 10 p Filed 10 Dec. 1976 Supersedes N77-12031 (15 - 03, p 0286)
(NASA-Case-ARC-10990-1; US-Patent-4,291,294; US-Patent-Appl-SN-749420; US-Patent-Class-340-26; US-Patent-Class-244-114R) Avail: US Patent and Trademark Office CSCL 17G

Red warning lights delineate the runway approach with additional blue lights juxtaposed with the red lights such that the red lights are chromatically balanced. The red/blue point light sources result in the phenomenon that the red lights appear in front of the blue lights with about one and one-half times the diameter of the blue. To a pilot observing these lights along a glide path, those red lights directly below appear to be nearer than the blue lights. For those lights farther away seen in perspective at oblique angles, the red lights appear to be in a position closer to the pilot and hence appear to be above the corresponding blue lights. This produces a very pronounced three dimensional effect referred to as chromostereopsis which provides valuable visual cues to enable the pilot to perceive his actual position above the ground and the actual distance to the runway. Official Gazette of the U.S. Patent and Trademark Office

N82-16060*# Analytical Mechanics Associates, Inc., Hampton, Va.

TERMINAL AREA AUTOMATIC NAVIGATION, GUIDANCE, AND CONTROL RESEARCH USING THE MICROWAVE LANDING SYSTEM (MLS). PART 3: A COMPARISON OF WAYPOINT GUIDANCE ALGORITHMS FOR RNAV/MLS TRANSITION Final Report

Samuel Pines Washington NASA Jan. 1982 87 p refs
(Contract NAS1-15116)
(NASA-CR-3512; AMA-81-7) Avail: NTIS HC A05/MF A01 CSCL 17G

The results of an investigation carried out for the Langley Research Center Terminal Configured Vehicle Program are presented. The investigation generated and compared three path update algorithms designed to provide smooth transition for an aircraft guidance system from DME, VORTAC, and barometric navaids to the more precise MLS by modifying the desired 3-D flight path. The first, called the Zero Cross Track, eliminates the discontinuity in cross track and altitude error by designating the first valid MLS aircraft position as the desired first waypoint, while retaining all subsequent waypoints. The discontinuity in track angle is left unaltered. The second, called the Tangent Path also eliminates the discontinuity in cross track and altitude and choose a new desired heading to be tangent to the next oncoming circular arc turn. The third, called the Continued Track eliminates the discontinuity in cross track, altitude and track angle by accepting the current MLS position and track angle as the desired ones and recomputes the location of the next waypoint. A method is presented for providing a waypoint guidance path reconstruction which treats turns of less than, and greater than, 180 degrees in a uniform manner to construct the desired path. Author

N82-16063# Lincoln Lab., Mass. Inst. of Tech., Lexington.

ATCRBS UPLINK ENVIRONMENT MEASUREMENT NEAR JACKSONVILLE, FLORIDA

F. Nagy, Jr. 25 Sep. 1981 124 p
(Contracts F19628-80-C-0002; DOT-FA72WAI-261; FAA Proj. 052-241-04)
(AD-A108053; ATC-94; FAA-RD-80-70) Avail: NTIS HC A06/MF A01 CSCL 17/7

Airborne measurements of the Air Traffic Control Radar Beacon System (ATCRBS) 1030 MHz uplink environment are described. Measurements were made using the AMF, a special purpose airborne sensor-recorder, during a 23 May 1979 flight in the greater Jacksonville, Florida area. The 2-way flight covered the 450 nm coastline between Fayetteville (NC) and Vero Beach (FL) first at 10,000 then at 25,000 feet. Data recorded at 61 locations have been analyzed to plot combined pulse, interrogation and suppression rates for all locations and individual rates, received powers and angles for 37 locations. Fifty-nine ground interrogators were detected and a list included serves as an all-interrogator/all location (59 x 37) visibility matrix. PRI/PRF distributions of interrogations received are shown at three selected measurement locations. A pulse-by-pulse plot of over 50 Mode 4 interrogations shows their effect on a typical transponder. A worst location is examined for peak instantaneous interrogation rates capable of causing transponder reply-rate limiting (RRL), desensitization and track loss. Durations and periods of recurrence of synchronous jamming for 23 near-equal scan periods are computed. Probabilities or multiple mainbeam coincidences (multi-PRF jamming) are also calculated. Airborne (AMF) and ground based (FAA En-route) coverages are compared, and reported operational problems (target splits, lost tracks, poor coverage) are addressed. Author

N82-16067# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

AIRCRAFT POSITION MEASUREMENT USING LASER BEACON OPTICS M.S. Thesis - Princeton Univ.

Steven G. Webb 1981 107 p refs
(AD-A107973; AFIT-CI-81-58T) Avail: NTIS HC A06/MF A01 CSCL 17/7

The development of a system to precisely measure the relative position between two aircraft in-flight utilizing a laser beacon, an optical detector array, and on-board microprocessing is examined. The laser beacon board, mounted on the helicopter, consists of two orthogonal fan-shaped narrow width beams, which rotate at a constant four revolutions per second and have fields of view approaching 166 degrees. The photodiode transmits the detected beams, as pulses, to an electronics system where they pass through a band-pass filter and are converted into digital pulses for signal processing. The laser pulses are detected in the presence of background solar interference through optical spectral filtering of the incident light and electronic filtering of the photodiode signal. Initial tests of the laser beacon and the detector optics have demonstrated the potential for their use as elements of a relative position measurement system. GRA

N82-16068*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SPIN TESTS OF A SINGLE-ENGINE, HIGH-WING LIGHT AIRPLANE

Eric C. Stewart, William T. Suit, Thomas M. Moul, and Philip W. Brown Jan. 1982 93 p refs
(NASA-TP-1927; L-14305) Avail: NTIS HC A05/MF A01 CSCL 01C

The airplane has a relatively steep spin mode (low angle of attack) with a high load factor and high velocity. The airplane recovers almost immediately after any deviation from the prospin control positions, except for one maneuver with reduced flexibility in the elevator control system. T.M.

N82-16069*# Nielsen Engineering and Research, Inc., Mountain View, Calif.

INTEGRATION OF A CODE FOR AEROELASTIC DESIGN OF CONVENTIONAL AND COMPOSITE WINGS INTO ACSYNT, AN AIRCRAFT SYNTHESIS PROGRAM Final Report, 1972 - 1974

Joseph Mullen, Jr. Ames Research Center, Calif. NASA May 1976 143 p refs
(Contract NAS2-6558)
(NASA-CR-137805) Avail: NTIS HC A07/MF A01 CSCL 01C

A comparison of program estimates of wing weight, material distribution, structural loads and elastic deformations with actual Northrop F-5A/B data is presented. Correlation coefficients obtained using data from a number of existing aircraft were computed for use in vehicle synthesis to estimate wing weights. The modifications necessary to adapt the WADES code for use in the ACSYNT program are described. Basic program flow and overlay structure is outlined. An example of the convergence of the procedure in estimating wing weights during the synthesis of a vehicle to satisfy F-5 mission requirements is given. A description of inputs required for use of the WADES program is included. T.M.

N82-16070*# Lockheed-Georgia Co., Marietta.

TURBOPROP CARGO AIRCRAFT SYSTEMS STUDY

J. C. Muehlbauer, J. G. Hewell, Jr., S. P. Lindenbaum, C. C. Randall, N. Searle, and R. G. Stone, Jr. Nov. 1981 232 p refs
(Contract NAS1-15708)
(NASA-CR-165813; LG81ER0222) Avail: NTIS HC A11/MF A01 CSCL 01C

The effects of using advanced turboprop propulsion systems to reduce the fuel consumption and direct operating costs of cargo aircraft were studied, and the impact of these systems on aircraft noise and noise prints around a terminal area was determined. Parametric variations of aircraft and propeller characteristics were investigated to determine their effects on noiseprint areas, fuel consumption, and direct operating costs. From these results, three aircraft designs were selected and subjected to design refinements and sensitivity analyses. Three competitive turbofan aircraft were also defined from parametric studies to provide a basis for comparing the two types of propulsion. S.L.

N82-16071# Aeronautical Research Labs., Melbourne (Australia)

RESONANCE TESTS ON A PIPER PA-32R TAILPLANE BEFORE AND AFTER DAMAGE Technical Memo, Feb. - Jul. 1980

A. Goldman and B. Quinn Apr. 1981 16 p ref
(AD-A106273; ARL/STRUC-TM-328) Avail: NTIS HC A02/MF A01 CSCL 01/3

Investigations have been carried out, on the tailplane of a Piper PA-32R aircraft, to determine the effect of damage, in the form of a split in the underside skin, on the modes of vibration of the tailplane. Details and results of the investigations are described. Author (GRA)

N82-16072# Rockwell International Corp., El Segundo, Calif. Aircraft Div.

CONFIGURATION DEVELOPMENT SYSTEM/NAVAIR REPORT Final Report

Daniel Paul Raymer 26 May 1981 8 p
(Contract N00019-80-C-0439)
(AD-A106727; NA-81-290) Avail: NTIS HC A02/MF A01 CSCL 01/3

A fixed price level of effort was performed to install Rockwell's Configuration Development System (CDS) at the Naval Air Systems Command (NAVAIR) facility in Washington, D.C. (Crystal City). Installation of CDS permits NAVAIR the capability to conceptually design aircraft concepts on an interactive graphics terminal and also perform conceptual analysis and concept iteration. Under the contract, the CDS system was converted to run on a VAX 11-780 computer. Program modifications were implemented to allow a greater degree of device-independence, especially for terminal input/output. Also, the CDS program was tested and debugged, the command interpreter was improved, and some additional capabilities were developed. The manual was rewritten including the addition of training materials for classroom and hands-on instruction. Finally, the system was installed and users were trained. Author (GRA)

N82-16073# Aeronautical Research Labs., Melbourne (Australia).

GROUND CALIBRATION OF A STRAIN-GAUGED CT-4A AIRCRAFT (1979)

R. P. Carey and S. P. Costolloe Apr. 1981 53 p refs
(AD-A107847; ARL/SRUC-TM-330) Avail: NTIS HC A04/MF A01 CSCL 01/3

A strain gauged CT-4A aircraft was calibrated for external loadings as a supplement to flight testing. The loading has been described and the outputs from regression analyses on the strain/load data have been tabulated. Author (GRA)

N82-16074# Army Aviation Engineering Flight Activity, Edwards AFB, Calif.

ICE PHOBICS BLADE TRACKING AND COMPARISON OF VIBRATION ANALYSIS TECHNIQUES Final Report, Jun. 1979 - Mar. 1980

William Y. Abbott, Floyd I. Dominick, and Stuart Arthur May 1981 64 p refs
(AD-A108121; USAAEFA-79-86) Avail: NTIS HC A04/MF A01 CSCL 01/3

The United States Army Aviation Engineering Flight Activity conducted an evaluation of two vibration measuring devices, the Chadwick-Helmuth VIBREX and the Scientific-Atlanta Vibration Signature Recorder, as flight test instrumentation. During the course of those evaluations, it was determined that the Dow Corning E2460-40-1 (redesignated E2978-46) ice phobic coating applied to the rotor blades of a UH-1H helicopter, did not induce undesirable vibrations. It was also concluded that the VIBREX may be used as test instrumentation if the frequencies of interest are already known, and the Scientific-Atlanta device provides good 'quick look' spectral vibration data. Author (GRA)

N82-16075* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

SYSTEM FOR PROVIDING AN INTEGRATED DISPLAY OF INSTANTANEOUS INFORMATION RELATIVE TO AIRCRAFT ATTITUDE, HEADING, ALTITUDE, AND HORIZONTAL SITUATION Patent

Robert James, inventor (to NASA) (James and Associates, Lancaster, Calif.) Issued 11 Aug. 1981 19 p Filed 30 May 1979 Supersedes N79-24988 (17 - 16, p 2074) Sponsored by NASA
(NASA-Case-FRC-11005-1; US-Patent-4,283,705; US-Patent-Appl-SN-043942; US-Patent-Class-340-27NA;

US-Patent-Class-73-178R) Avail: US Patent and Trademark Office CSCL 01D

A display device is disclosed which is particularly suited for providing the pilot of an aircraft with combined inflight altitude, heading, altitude, and horizontal situation information previously available only by using two or three devices providing separate displays. The preferred embodiment combines a commonly used and commercially available flight director-type device for providing a display in combination with a miniature aircraft supported for angular displacement from a vertical orientation to indicate heading error, or heading offset, and an extended course deviation indicator bar which projects into juxtaposition with the miniature aircraft for providing a true picture of the aircraft's horizontal situation relative to a selective VOR, ILS, or MLS course.

Official Gazette of the U.S. Patent and Trademark Office

N82-16076*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THREAT PERCEPTION WHILE VIEWING SINGLE INTRUDER CONFLICTS ON A COCKPIT DISPLAY OF TRAFFIC INFORMATION
Stephen R. Ellis and Everett Palmer Jan. 1982 17 p refs
(NASA-TM-81341; A-8798) Avail: NTIS HC A02/MF A01 CSCL 01D

Subjective estimates of the threat posed by a single intruder aircraft were determined by showing pilots photographs of a cockpit display of traffic information. The time the intruder was away from the point of minimum separation was found to be the major determinant of the perception of threat. When asked to choose a maneuver to reduce the conflict, pilots selected maneuvers with a bias toward those that would have kept the intruders in sight had they been visible out the cockpit window.

Author

N82-16077# Boeing Commercial Airplane Co., Seattle, Wash.
AIRCRAFT ALERTING SYSTEMS STANDARDIZATION STUDY. VOLUME 2: AIRCRAFT ALERTING SYSTEM DESIGN GUIDELINES Final Report
B. L. Berson, D. A. Po-Chedley, G. P. Boucek, D. C. Hanson, M. F. Leffler, and R. L. Wasson Jan. 1981 186 p refs
(Contract DOT-FA79WA-4268)
(AD-A106732; D6-49976TN; FAA-RD-81-38-vol-2) Avail: NTIS HC A09/MF A01 CSCL 01/4

This report is one of a series of documented studies directed to the improvement and standardization of aircraft alerting systems. The purpose of the study was to develop and validate, through simulation, functional design criteria that can be used in designing effective aircraft alerting systems. The major objectives of this phase of the study were to: resolve system component questions; validate the two candidate system/concepts by comparison to a representative baseline system, for both the pilot and flight engineer stations; evaluate presentation media and display formats for time-critical warnings; and develop guidelines for the design of alerting systems. This document presents a set of design guidelines directed to the improvement and standardization of aircraft alerting systems. The objective of the guidelines is not to define a simple hardware design that each manufacturer must use, but rather to provide functional design criteria that can be used to develop effective alerting systems, and to promote standardization within the industry.

GRA

N82-16079# TRW Defense and Space Systems Group, Redondo Beach, Calif.
DIGITAL AVIONICS INFORMATION SYSTEM (DAIS): DEVELOPMENT AND DEMONSTRATION Final Report, 1 Oct. 1978 - 31 Jul. 1981
M. J. Cook, R. C. Mason, J. L. Stautberg, L. E. Self, R. L. Ellison, and M. J. Strathman Wright-Patterson AFB, Ohio AFWAL Sep. 1981 201 p
(Contract F33615-78-C-1502; AF Proj. 2052)
(AD-A107906; AFWAL-TR-81-1165) Avail: NTIS HC A10/MF A01 CSCL 09/2

The Digital Avionics Information System (DAIS) represents a significant advance in the technology of avionics system architecture. DAIS is a total systems concept, exploiting standardization, modularity, and application independent executive software to provide a system architecture adaptable to many aircraft, missions, and avionics configurations and fully capable of accommodating new advances in technology. These fundamental system characteristics are described in this report; the specific system features which provide these characteristics and attributes are presented.

GRA

N82-16080*# United Technologies Research Center, East Hartford, Conn.
RESEARCH AND DEVELOPMENT PROGRAM FOR NONLINEAR STRUCTURAL MODELING WITH ADVANCED TIME-TEMPERATURE DEPENDENT CONSTITUTIVE RELATIONSHIPS Final Report
Kevin P. Walker 25 Nov. 1981 187 p refs
(Contract NAS3-22055)
(NASA-CR-165533; PWA-5700-50) Avail: NTIS HC A09/MF A01 CSCL 21E

Results of a 20-month research and development program for nonlinear structural modeling with advanced time-temperature constitutive relationships are reported. The program included: (1) the evaluation of a number of viscoplastic constitutive models in the published literature; (2) incorporation of three of the most appropriate constitutive models into the MARC nonlinear finite element program; (3) calibration of the three constitutive models against experimental data using Hastelloy-X material; and (4) application of the most appropriate constitutive model to a three dimensional finite element analysis of a cylindrical combustor liner louver test specimen to establish the capability of the viscoplastic model to predict component structural response.

M.D.K.

N82-16081*# Pratt and Whitney Aircraft Group, East Hartford, Conn.
STUDY OF CONTROLLED DIFFUSION STATOR BLADING. 1. AERODYNAMIC AND MECHANICAL DESIGN REPORT
E. Canal, B. C. Chisholm, D. Lee, and D. A. Spear Jan. 1981 97 p refs
(Contract NAS3-22008)
(NASA-CR-165500; PWA-5698-28) Avail: NTIS HC A05/MF A01 CSCL 21E

Pratt & Whitney Aircraft is conducting a test program for NASA in order to demonstrate that a controlled-diffusion stator provides low losses at high loadings and Mach numbers. The technology has shown great promise in wind tunnel tests. Details of the design of the controlled diffusion stator vanes and the multiple-circular-arc rotor blades are presented. The stage, including stator and rotor, was designed to be suitable for the first-stage of an advanced multistage, high-pressure compressor.

Author

N82-16083*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPARISON OF ACOUSTIC DATA FROM A 102 MM CONIC NOZZLE AS MEASURED IN THE RAE 24-FOOT WIND TUNNEL AND THE NASA AMES 40- BY 80-FOOT WIND TUNNEL
A. Atencio, Jr. and J. McKie (Royal Aircraft Establishment, England) Jan. 1982 23 p refs
(NASA-TM-81343; A-8801) Avail: NTIS HC A02/MF A01 CSCL 21E

A cooperative program between the Royal Aircraft Establishment (RAE), England, and the NASA Ames Research Center was initiated to compare acoustic measurements made in the RAE 24-foot wind tunnel and in the Ames 40- by 80-foot wind tunnel. The acoustic measurements were made in both facilities using the same 102 mm conical nozzle supplied by the RAE. The nozzle was tested by each organization using its respective jet test rig. The mounting hardware and nozzle exit conditions were matched as closely as possible. The data from each wind tunnel were independently analyzed by the respective organization. The results from these tests show good agreement. In both facilities, interference with acoustic measurement is evident at angles in the forward quadrant.

Author

N82-16084*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NASA RESEARCH ACTIVITIES IN AEROPROPULSION
John F. McCarthy, Jr. and Richard J. Weber 1982 30 p refs
Presented at the 24th Ann. Conf. on Aviation and Astronautics, Tel Aviv, Israel, 17-18 Feb. 1982
(NASA-TM-82786; E-1113) Avail: NTIS HC A03/MF A01 CSCL 21E

NASA is responsible for advancing technologies related to air transportation. A sampling of the work at NASA's Lewis Research Center aimed at improved aircraft propulsion systems is described. Particularly stressed are efforts related to reduced noise and fuel consumption of subsonic transports. Generic work in specific disciplines are reviewed including computational analysis, materials, structures, controls, diagnostics, alternative fuels, and high-speed propellers. Prospects for variable cycle engines are also discussed. Author

N82-16085# Ford Motor Co., Dearborn, Mich.
BRITTLE MATERIALS DESIGN, HIGH TEMPERATURE GAS TURBINE Final Report, 1 Jul. 1971 - 31 Aug. 1979
Arthur F. McLean and Eugene A. Fisher Mar. 1981 232 p refs
(Contract DAAG46-71-C-0162; DARPA Order 1849)
(AD-A106670; AMMRC-TR-81-14) Avail: NTIS HC A11/MF A01 CSCL 21/5

A goal of 200 hours of engine rig demonstrations for representative duty cycle temperatures in a regenerated vehicular gas turbine was chosen, with uncooled ceramic components to operate at least 25 hours at 2500 F, beyond the temperatures possible with uncooled metal components. The total systems approach included major efforts in ceramic design, materials development, fabrication process development, and test and evaluation methodology. Progress was made in each of these areas during the course of the program. For example, the strength of reaction bonded silicon nitride (RBSN) used in the stator and rotor blades was more than tripled. By the end of the program, 200 hours of duty cycle durability on turbine test rigs (between 1930 F - 2500 F) was attained on RBSN stationary components including stators, nose cones and turbine rotor tip shrouds. Similarly, 200 hours of duty cycling on test rigs was attained with reaction sintered SiC combustors and stators. GRA

N82-16086# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Turbine Engine Div.
A COMPUTER PROGRAM FOR VARIABLE-GEOMETRY SINGLE-STAGE AXIAL COMPRESSOR TEST DATA ANALYSIS (UD0400) Interim Report, 1 Jun. 1980 - 31 May 1981
C. Herbert Law Sep. 1981 147 p refs
(AF Proj. 2307)
(AD-A106676; AFWAL-TR-81-2078) Avail: NTIS HC A07/MF A01 CSCL 21/5

This report describes a computer program that is designed for the analysis of single-stage axial compressor data. The axisymmetric flow of a thermally perfect compressible fluid is assumed, and the streamline curvature method of solution is employed. Details of the blade geometry may be computed or input, and a detailed account of the flow through the blading may be obtained. The analysis is limited to a single-stage compressor, but inlet guide vanes may be included. Variable geometry is permitted in both the inlet guide vanes and the stator vanes. An option in the analysis is to match computed and experimental static pressures at any radius by varying annulus blockage or relative flow deviation angles. Author (GRA)

N82-16087*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
AN INVESTIGATION OF AUTOMATIC GUIDANCE CONCEPTS TO STEER A VTOL AIRCRAFT TO A SMALL AVIATION FACILITY SHIP
J. A. Sorensen, T. Goka, A. V. Phatak, and S. F. Schmidt Jul. 1980 253 p refs
(Contract NAS2-10288)
(NASA-CR-152407) Avail: NTIS HC A12/MF A01 CSCL 01C

A detailed system model of a VTOL aircraft approaching a small aviation facility ship was developed and used to investigate several approach guidance concepts. A preliminary analysis of the aircraft-vessel landing guidance requirements was conducted. The various subelements and constraints of the flight system are described including the landing scenario, lift fan aircraft, state rate feedback flight control, MLS-based navigation, sea state induced ship motion, and wake turbulence due to wind-over-deck effects. These elements are integrated into a systems model with various guidance concepts. Guidance is described in terms of lateral, vertical, and longitudinal axes steering modes and approach and landing phases divided by a nominal hover (or stationkeeping) point defined with respect to the landing pad. The approach guidance methods are evaluated, and the two better steering concepts are studied by both single pass and Monte Carlo statistical simulation runs. Four different guidance concepts are defined for further analysis for the landing phase of flight. J.M.S.

N82-16088*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AUTOMATION OF ON-BOARD FLIGHTPATH MANAGEMENT
Heinz Erzberger Dec. 1981 22 p refs
(NASA-TM-84212; A-8809) Avail: NTIS HC A02/MF A01 CSCL 07C

The status of concepts and techniques for the design of onboard flight path management systems is reviewed. Such systems are designed to increase flight efficiency and safety by automating the optimization of flight procedures onboard aircraft. After a brief review of the origins and functions of such systems, two complementary methods are described for attacking the key design problem, namely, the synthesis of efficient trajectories. One method optimizes en route, the other optimizes terminal area flight; both methods are rooted in optimal control theory. Simulation and flight test results are reviewed to illustrate the potential of these systems for fuel and cost savings. J.M.S.

N82-16089*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
A PROGRAM TO EVALUATE A CONTROL SYSTEM BASED ON FEEDBACK OF AERODYNAMIC PRESSURE DIFFERENTIALS Final Report
David W. Levy, Paul Finn, and Jan Roskam Dec. 1981 205 p refs
(Grant NAG4-5)
(NASA-CR-163466; KU-FRL-490-2) Avail: NTIS HC A10/MF A01 CSCL 01C

The use of aerodynamic pressure differentials to position a control surface is evaluated. The system is a differential pressure command loop, analogous to a position command loop, where the surface is commanded to move until a desired differential pressure across the surface is achieved. This type of control is more direct and accurate because it is the differential pressure which causes the control forces and moments. A frequency response test was performed in a low speed wind tunnel to measure the performance of the system. Both pressure and position feedback were tested. The pressure feedback performed as well as position feedback implying that the actuator, with a break frequency on the order of 10 Rad/sec, was the limiting component. Theoretical considerations indicate that aerodynamic lags will not appear below frequencies of 50 Rad/sec, or higher. S.L.

N82-16090*# Goodyear Aerospace Corp., Akron, Ohio.
STUDY OF GROUND HANDLING CHARACTERISTICS OF A MARITIME PATROL AIRSHIP Contractor Final Report, Oct. 1980 - Mar. 1981
Mar. 1981 280 p refs
(Contract NAS2-10448)
(NASA-CR-166253; GER-16948) Avail: NTIS HC A13/MF A01 CSCL 01E

Mooring concepts appropriate for maritime patrol airship (MPA) vehicles are investigated. The evolution of ground handling systems and procedures for all airship types is reviewed to ensure that appropriate consideration is given to past experiences. A tri-rotor maritime patrol airship is identified and described. Wind loads on a moored airship and the effects of these loads on vehicle design are analyzed. Several mooring concepts are assessed with respect to the airship design, wind loads, and mooring site considerations. Basing requirements and applicability of expeditionary mooring also are addressed. Author

N82-16091*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CALIBRATION OF THE AMES ANECHOIC FACILITY. PHASE 1: SHORT RANGE PLAN Final Report, Dec. 1980
David Hickey, Paul T. Soderman, K. Karamcheti, S. P. Koutsoyannis, R. Hopkins, and B. McLachlan Dec. 1980 128 p refs
Prepared in cooperation with Stanford Univ., Calif.
(NASA-TM-84081) Avail: NTIS HC A07/MF A01 CSCL 14B

A calibration was made of the acoustic and aerodynamic characteristics of a small, open-jet wind tunnel in an anechoic room. The jet nozzle was 102 mm diameter and was operated subsonically. The anechoic-room dimensions were 7.6 m by 5.5 m by 3.4 m high (wedge tip to wedge tip). Noise contours in the chamber were determined by various jet speeds and exhaust collector positinns. The optimum nozzle/collector separation from an acoustic standpoint was 2.1 m. Jet velocity profiles and turbulence levels were measured using pressure probes and hot wires. The jet was found to be symmetric, with no unusual characteristics. The turbulence measurements were hampered by oil mist contamination of the airflow. Author

N82-16092*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RESEARCH THROUGH SIMULATION

James L. Copeland, comp. [1982] 30 p refs
(NASA-Facts-125) Avail: NTIS HC A03/MF A01 CSCL 14B

The design of the computer operating system at Langley Research Center allows for concurrent support of time-critical simulations and background analytical computing on the same machine. Signal path interconnections between computing hardware and flight simulation hardware is provided to allow up to six simulation programs to be in operation at one time. Capabilities and research applications are discussed for the: (1) differential maneuvering simulator; (2) visual motion simulator; (3) terminal configured vehicle simulator; (4) general aviation aircraft simulator; (5) general purpose fixed based simulator; (6) transport simulator; (7) digital fly by wire simulator; (8) general purpose fighter simulator; and (9) the roll-up cockpit. The visual landing display system and graphics display system are described and their simulator support applications are listed. A.R.H.

N82-16093# Southwest Research Inst., San Antonio, Tex. Mobile Energy Div.

DEVELOPMENT OF THE AUTOMATED AFAPL ENGINE SIMULATOR TEST FOR LUBRICANT EVALUATION Final Technical Report, 1 May 1978 - 1 Jan. 1981

B. B. Baber, M. L. Valtierra, and J. E. Eichelberger Wright-Patterson AFB, Ohio AFWAL May 1981 104 p refs
(Contract F33615-78-C-2012; AF Proj. 3048)
(AD-A106126; SWRI-MED-119; AFWAL-TR-81-2022) Avail: NTIS HC A06/MF A01 CSCL 14/2

A description of an automated gas turbine engine simulator, designated the AFAPL engine simulator, and a discussion of the test results obtained using the simulator are presented. The No. 4-5 bearing compartment areas of a J57 turbine engine are used as the basic hardware for the simulator. The simulator is driven by a variable-speed drive system, through the accessory drive gearbox, providing simulator mainshaft speeds up to 10,000 rpm. Electrical resistance heaters are used to heat the air surrounding the oil-wetted areas within the No. 4-5 bearing compartment areas. The temperatures, pressures, and rpm are automatically controlled at predetermined levels and monitored throughout the 9120-6000 rpm speed cycling sequences and the soakback periods by a Hewlett-Packard mini-computer system, which is also programmed to automatically draw 5-hr interval test-oil samples, control test-oil sump level, provide safety shut-off protection, as well as print out and plot test information generated during each individual test. Simulator results obtained on eight turbine engine lubricants, for which full-scale engine data are available, show a very good correlation of the deposit ratings obtained using the AFAPL engine simulator and the deposit ratings from full-scale engine tests. Author (GRA)

N82-16094# Florida Inst. of Tech., Melbourne. Dept. of Electrical and Computer Engineering.

IMPLEMENTATION OF THE RECOMMENDATIONS MADE ON THE TECHNICAL REPORT TITLED ANALYSIS OF ADVANCED SIMULATOR FOR PILOT TRAINING Final Report

John Hadjilogiou Jun. 1981 111 p
(Grant AF-AFOSR-0120-81; AF Proj. 2313)
(AD-A106779; AFOSR-81-0704TR) Avail: NTIS HC A06/MF A01 CSCL 14/2

This study which was conducted to implement some of the recommendations made on the technical report titled 'Analysis of Advanced Simulator for Pilot Training'. The final report specify guidelines for writing custom micro-programs routine for the 32/75 computer. It includes the hardware feature of the digital system with special emphasis on micro-program control section. The micro-instruction format is analyzed in detail to allow the reader to follow the example of the SEL report reproduced on the Appendices. GRA

N82-16095# Aeronautical Research Labs., Melbourne (Australia).

PROGRAMS FOR THE TRANSONIC WIND TUNNEL DATA PROCESSING INSTALLATION. PART 9: PRESSURE MEASUREMENTS UPDATED

J. B. Willis May 1981 16 p refs
(AD-A106271; ARL/AERO-TM-329) Avail: NTIS HC A02/MF A01 CSCL 09/2

It is now ten years since the original pressure measurement program for the transonic wind tunnel PDP 8/I data processing installation was written. During this period considerable changes have been made, and this memorandum describes the current program. Author (GRA)

N82-16096# Aeronautical Research Labs., Melbourne (Australia).

CURRENT PRESSURE MEASURING SYSTEM IN THE TRANSONIC WIND TUNNEL

J. B. Willis May 1981 16 p ref
(AD-A106272; ARL/AERO-TM-328) Avail: NTIS HC A02/MF A01 CSCL 14/2

A simple system for wind tunnel pressure measurements is described. It is intended for use with Scanivalves, a minicomputer and stagger scans at a preset, variable rate. The scan may be started and stopped under program control, and all Scanivalves are automatically homed at the end of the computer initiated scan. Scanivalve number, port number, and four digits representing the measured pressure are displayed and provided for the minicomputer. Author (GRA)

N82-16097# Aeronautical Research Labs., Melbourne (Australia).

A VERSATILE DATA ACQUISITION SYSTEM FOR A LOW SPEED WIND TUNNEL

W. F. L. Sear, C. W. Sutton, and J. F. Harvey Nov. 1980 54 p
(AD-A106269; ARL/AERO-155; AR-002-248) Copyright. Avail: Issuing Activity CSCL 14/2

A data acquisition system for the Aeronautical Research Laboratories Low Speed Wind Tunnel is described. The system is versatile and simple to operate. Illuminated press button switches connect selected data sources with the addresses automatically generated within the system. Provision also exists for external addressing by a dedicated minicomputer. Author (GRA)

N82-16099# Tactical Air Warfare Center, Eglin AFB, Fla.

QOT AND E OF THE F-16 20MM AMMUNITION LOADING SYSTEM'S ABILITY TO UPLOAD/DOWNLOAD A-7D AIRCRAFT Final Report

27 Oct. 1981 8 p
(AD-A108007) Avail: NTIS HC A02/MF A01 CSCL 19/1

The purpose of this qualification operational test and evaluation (QOT and E) was to evaluate the ability of the F-16 20mm ALS to upload/download A-7D aircraft. Testing included uploading/downloading of 20mm ammunition on A-7D aircraft during normal day-to-day operations and during simulated combat conditions. A portion of the test was conducted with load crews wearing chemical warfare defense ensembles (CWDE). Specific Objectives are: Operational Effectiveness - to assess the capability of the F-16 ALS to upload/download ammunition into/from the A-7D aircraft; to assess the interoperability of the ALS with both the A-7D gun system and the modified replenisher, and to assess the capability of the modified replenisher to replenish the loader. Operational Suitability - Specific suitability objectives were not evaluated during this test. On site observations of some suitability areas (equipment failures, technical data, human factors, and chemical defense) were performed. GRA

N82-16100# Transportation Research Board, Washington, D.C. Commission on Sociotechnical Systems.

AIR SERVICE, AIRPORT ACCESS AND FUTURE TECHNOLOGY

Samuel Ewer Eastman, Frank LaMagna, Edward M. Whitlock, Mark Gorstein, and Richard Tilles 1981 60 p refs
(PB82-105958; TRB/TRR-803; ISBN-0-309-03717-2; ISSN-0361-1981; LC-81-14158) Avail: NTIS HC A04/MF A01; paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, D.C. 20418 CSCL 01B

Contents: (1) economic regulation of air service to small communities: origins of Airline Deregulation Act of 1978; (2) response to terminal access problems at American and United Airlines--John F. Kennedy International Airport; (3) automating the delivery of ground transportation information; (4) airport access--case study of a remote terminal operation; (5) airport geometric compatibility of future aircraft; (6) flight simulators; (7) gravitational-cueing system--an enhancement of aircraft flight simulation; and (8) laser system for visual simulation. GRA

N82-16176*# TRW, Inc., Cleveland, Ohio.

FABRICATION OF BORON/ALUMINUM FAN BLADES FOR SCR ENGINES Final Report, Jun. 1976 - Jun. 1980

G. S. Doble Mar. 1981 49 p refs
(Contract NAS3-20360)

(NASA-CR-165294; ER-7891-F) Avail: NTIS HC A03/MF A01 CSCL 11D

The fabrication of boron/aluminum fan blades for the F-404 Supersonic Cruise Research prototype engine by rapid air bonding of fully dense monotapes is described, and the fan blades evaluated. The F-404 configuration is representative of a low aspect ratio advanced design blade with supersonic capability. Dovetail pull tests of this geometry, which substituted boron/aluminum for titanium, suggested that excessive shear stresses were present in the root. A re-designed blade, incorporating a titanium tang and root, was fabricated by hot isostatic pressing. Blades appeared well bonded but the airfoil contained sizable areas of deformation and identification from the alumina grain used as a pressure transmitting medium. The use of hot isostatic pressing with a formed steel encapsulator should eliminate this problem. J.D.H.

N82-16178*# Boeing Commercial Airplane Co., Seattle, Wash.
ENVIRONMENTAL EXPOSURE EFFECTS ON COMPOSITE MATERIALS FOR COMMERCIAL AIRCRAFT Interim Technical Report, Nov. 1977 - Jul. 1981
Martin N. Gibbins and Daniel J. Hoffman Washington NASA Jan. 1982 129 p refs
(Contract NAS1-15148)
(NASA-CR-3502; D6-51227) Avail: NTIS HC A07/MF A01 CSCL 11D

The effects of environmental exposure on composite materials are studied. The environments considered are representative of those experienced by commercial jet aircraft. Initial results have been compiled for the following material systems: T300/5208, T300/5209 and T300/934. Specimens were exposed on the exterior and interior of Boeing 737 airplanes of three airlines, and to continuous ground level exposure at four locations. In addition specimens were exposed in the laboratory to conditions such as: simulated ground-air-ground, weatherometer, and moisture. Residual strength results are presented for specimens exposed for up to two years at three ground level exposure locations and on airplanes from two airlines. Test results are also given for specimens exposed to the laboratory simulated environments. Test results indicate that short beam shear strength is sensitive to environmental exposure and dependent on the level of absorbed moisture. S.L.

N82-16182*# Rensselaer Polytechnic Inst., Troy, N. Y. School of Engineering.
COMPOSITE STRUCTURAL MATERIALS Semiannual Progress Report, 30 Apr. - 30 Sep. 1981
George S. Ansell, Robert G. Loewy, and Stephen E. Wiberly Dec. 1981 164 p refs Sponsored in part by Air Force
(Grant NGL-33-018-003)
(NASA-CR-165121; SAR-41) Avail: NTIS HC A08/MF A01 CSCL 11D

Physical properties of fiber reinforced composites; structural concepts and analysis; manufacturing; reliability; and life prediction are subjects of research conducted to determine the long term integrity of composite aircraft structures under conditions pertinent to service use. Progress is reported in (1) characterizing homogeneity in composite materials; (2) developing methods for analyzing composite materials; (3) studying fatigue in composite materials; (4) determining the temperature and moisture effects on the mechanical properties of laminates; (5) numerically analyzing moisture effects; (6) numerically analyzing the micromechanics of composite fracture; (7) constructing the 727 elevator attachment rib; (8) developing the L-1011 engine drag strut (CAPCOMP 2 program); (9) analyzing mechanical joints in composites; (10) developing computer software; and (11) processing science and technology, with emphasis on the sailplane project. A.R.H.

N82-16385# Dynamic Science, Phoenix, Ariz.
ADVANCED RECORDER DESIGN AND DEVELOPMENT Final Report, Jun. 1977 - Feb. 1981
Carroll D. Thatcher Feb. 1981 192 p refs
(Contract DOT-HS-7-01640)
(PB81-244105; DOT-HS-805914) Avail: NTIS HC A09/MF A01 CSCL 13L

A prototype crash recorder measuring and storing time histories of vehicle lateral and longitudinal accelerations, during a collision was designed, fabricated, and subjected to environmental tests. The recorder features low cost accelerometers, signal conditioning circuitry, A/D converter, microprocessor and digital storage. Accelerometer outputs are continuously sampled and stored in digital memory. The microprocessor monitors Delta V and compares it to a selectable criterion. When Delta V exceeds the criterion recent acceleration time histories are permanently stored in memory. The stored signals include acceleration data prior to and subsequent to the crash event. Methods of implementing the recorder including discussion of distribution in vehicle fleets, data retrieval, including hardware and software, and data processing software are provided. DOE

N82-16655*# MCS, Inc., Boulder, Colo.
NUMERICAL AND FLIGHT SIMULATOR TEST OF THE FLIGHT DETERIORATION CONCEPT Interim Report
John McCarthy and Vern Norviel Washington NASA Jan. 1982 37 p refs
(Contract NAS8-33458)
(NASA-CR-3500; M-370) Avail: NTIS HC A03/MF A01 CSCL 04B

Manned flight simulator response to theoretical wind shear profiles was studied in an effort to calibrate fixed-stick and pilot-in-the-loop numerical models of jet transport aircraft on approach to landing. Results of the study indicate that both fixed-stick and pilot-in-the-loop models overpredict the deleterious effects of aircraft approaches when compared to pilot performance in the manned simulator. Although the pilot-in-the-loop model does a better job than does the fixed-stick model, the study suggests that the pilot-in-the-loop model is suitable for use in meteorological predictions of adverse low-level wind shear along approach and departure courses to identify situations in which pilots may find difficulty. The model should not be used to predict the success or failure of a specific aircraft. It is suggested that the pilot model be used as part of a ground-based Doppler radar low-level wind shear detection and warning system. T.M.

N82-16759# Radio Technical Commission for Aeronautics, Washington, D. C.
SOFTWARE CONSIDERATIONS IN AIRBORNE SYSTEMS AND EQUIPMENT CERTIFICATION
18 Nov. 1981 67 p refs
(RTCA/DO-178) Avail: NTIS HC A04/MF A01 CSCL 09B

A disciplined approach to avionics software design, development, testing, configuration management, and documentation is presented. Guidance is provided for different levels of criticality of the functions for which the software is designed. The need for software modification by manufacturers and users is considered, together with its impact on pre- and post-certification configuration management and documents. Methods alternative to the techniques recommended here may be used if equivalence is shown. A glossary of terms is provided. J.D.H.

N82-16800* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
MULTIPLE PURE TONE ELIMINATION STRUT ASSEMBLY Patent
Frank W. Burcham, inventor (to NASA) Issued 17 Nov. 1981 4 p Filed 11 Sep. 1980 Supersedes N80-32393 (18 - 23, p 3094)
(NASA-Case-FRC-11062-1; US-Patent-4,300,656; US-Patent-Appl-SN-185869; US-Patent-Class-181-214) Avail: US Patent and Trademark Office CSCL 20A

An acoustic noise elimination assembly is disclosed which has a capability for disrupting the continuity of fields of sound pressures forwardly projected from fans or rotors of a type commonly found in the fan or compressor first stage for air-breathing engines, when operating at tip speeds in the supersonic range. The assembly includes a tubular cowl defining a duct for delivering an air stream axially into the intake for a jet engine. A sound barrier, defined by a number of intersecting flat plates or struts has a line of intersection coincidant with a longitudinal axis of the tubular cowl, which serves to disrupt the continuity of rotating fields of multiple pure tonal components of noise.

Official Gazette of the U.S. Patent and Trademark Office

N82-16801*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Annual Progress Report
Carl H. Gerhold Jan. 1982 39 p refs
(Grant NAG1-11)
(NASA-CR-165102; APR-2) Avail: NTIS HC A03/MF A01 CSCL 20A

Progress in the refinement and evaluation of an analytical jet shielding model are summarized. The model consists of a point noise source impinging on a cylinder of heated flow in which the temperature and velocity are uniform across the cross section of the jet. The shielding jet is infinite in extent along the jet axis and the radius of the jet is constant. The analytical model was compared to experimental data for a point noise source impinging on an ambient temperature, subsonic jet and on a subsonic simulated hot jet using helium as the flow medium. Results of these comparisons are discussed. M.D.K.

N82-16802*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Semiannual Progress Report
Carl H. Gerhold 30 Jun. 1981 26 p refs
(Grant NAG1-11)
(NASA-CR-165103) Avail: NTIS HC A03/MF A01 CSCL 20A

Development of jet noise source model, and comparison to experiments with a point noise source are summarized. The refinement of the noise source is expected to resolve discrepancies noted between previous analytical results with a point noise source model and experimental results for twin-jet shielding. Comparison of the analytical model with experimental program which include shielding of a point noise source by a jet and twin jet shielding are also made. The comparisons should serve to define more completely the mechanisms of shielding M.D.K.

N82-16803*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Annual Progress Report
Carl H. Gerhold 31 Dec. 1980 38 p refs
(Grant NAG1-11)
(NASA-CR-165104) Avail: NTIS HC A03/MF A01 CSCL 20A

An analytical model a three-dimensional model, of twin-jet shielding, consisting of a point noise source impinging on a cylinder of heated flow in which the temperature and flow velocity are uniform across the cross-section is discussed. Wave equations are given for the regions outside the flow and within the flow cylinder and solutions are matched at the jet boundary under the conditions of continuity of pressure and continuity of the vortex sheet. The model was analyzed to identify mechanisms of transmission and diffraction which control sheilding in the shadow of the shielding jet. It was found that in the zone of the shadow region dominates, shielding is relatively insensitive to variations of such parameters as Mach Number and spacing ratio, but in the zone in which diffraction dominates; shielding is more sensitive to variations in Mach Number, jet temperature and spacing ratio. M.D.K.

N82-16804*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING Semiannual Progress Report
Carl H. Gerhold 6 Jun. 1980 18 p refs
(Grant NAG1-11)
(NASA-CR-165105) Avail: NTIS HC A02/MF A01 CSCL 20A

The development of an analytical model, an aircraft noise prediction computer program, to estimate the shielding of one jet by an adjacent jet in a twin jet configuration, is discussed. Noise estimations included consideration not only of noise sources on the aircraft, but also of the propagation path between source and receiver. A three-dimensional case is considered in which noise source is a discrete frequency point source at rest with respect to the jet axis. The shielding jet is assumed to be a cylinder of heated flow in which the temperature and flow velocity profiles are constant across the jet. The effect on shielding of the orientation of the emitting jet with respect to the shielding jet was investigated. Forward and backward scattering phenomena as well as the influence of jet flow speed were also investigated. M.D.K.

N82-16805*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING DEVELOPMENT OF A 3-DIMENSIONAL MODEL Progress Report
Carl H. Gerhold 4 Nov. 1980 24 p refs Sponsored by NASA
(NASA-CR-165106) Avail: NTIS HC A02/MF A01 CSCL 20A

The solution for a point source impinging on a cylinder of heated flow is presented. The indefinite integral is solved approximately using a saddle of point method. Comparison of the three-dimensional model to a previously obtained two-dimensional model of twin jet noise indicate the the approximate solution of the integral is valid. The model was analyzed to differentiate among the mechanims of shielding. Zone in which diffraction and transmission dominate are identified. The model was found to compare to experimental shielding results. M.D.K.

N82-16806*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
ANALYTICAL STUDY OF TWIN-JET SHIELDING TWO-DIMENSIONAL MODEL
Carl H. Gerhold 15 Aug. 1980 17 p refs
(Grant NAG1-11)
(NASA-CR-165107) Avail: NTIS HC A02/MF A01 CSCL 20A

The development of an analytical model to estimate the shielding of one jet by an adjacent jet in a twin jet configuration is discussed in relation to aircraft generated noise. The azimuthal redistribution of sound defining the shadow zone is investigated. Wave equations were solved in the plane normal to the jet axis to estimate the diffraction and reflection of sound by a heated, cylindrical jet. Thus, the noise source considered is essentially a line source assumed to emit at discrete frequency and at rest with respect to the shielding jet which is assumed to be a cylinder of heated flow in which the temperature is constant across the jet. Results show that the sound pressure decreases rapidly with frequency beyond the onset of the shielding to a minimum value. Results also show that increasing the spacing between the source and the jet shifts the curves toward higher frequencies. M.D.K.

N82-16807*# Bolt, Beranek, and Newman, Inc., Canoga Park, Calif.
COMMUNITY SENSITIVITY TO CHANGES IN AIRCRAFT NOISE EXPOSURE Final Report
S. Fidell, R. Horonjeff, S. Teffeteller, and K. Pearsons NASA Dec. 1981 122 p refs
(Contract NAS1-14611)
(NASA-CR-3490; BBN-4212) Avail: NTIS HC A06/MF A01 CSCL 20A

Interviews were conducted in the vicinity of Burbank Airport during a four month period during which a counterbalanced series of changes in aircraft noise exposure occurred due to runway repairs. Another interview was undertaken approximately one year after completion of the initial runway repairs. Noise measurements were made in conjunction with administration of a brief questionnaire to a near exhaustive sample of residents in four airport neighborhoods. The magnitude and direction of change of annoyance with aircraft noise exposure corresponded closely to the actual changes in physical exposure. Estimates were made of time constants for the rate of change of attitudes toward aircraft noise. S.L.

NR2-16808*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NOISE OF THE SR-3 PROPELLER MODEL AT 2 DEG AND 4 DEG ANGLE OF ATTACK
James H. Dittmar and Robert J. Jeracki Dec. 1981 30 p refs
(NASA-TM-82738; E-1051) Avail: NTIS HC A03/MF A01 CSCL 20A

The noise effect of operating supersonic tip speed propellers at angle of attack with respect to the incoming flow was determined. Increases in the maximum blade passage noise were observed for the propeller operating at angle of attack. The noise increase was not symmetrical with one wall of the wind tunnel having significantly more noise increase than the other wall. This was apparently the result of the rotational direction of the propeller. The lack of symmetry of the noise at angle of attack to the use of oppositely rotating propellers on opposite sides of an airplane fuselage as a way of minimizing the noise due to operation at angle of attack. J.D.H.

N82-16809*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SHOCK WAVE APPROACH TO THE NOISE OF SUPERSONIC PROPELLERS
James H. Dittmar and Edward J. Rice Dec. 1981 19 p refs
(NASA-TM-82752; E-1068) Avail: NTIS HC A02/MF A01

CSCL 20A

To model propeller noise expected for a turboprop aircraft, the pressure ratio across the shock at the propeller tip was calculated and compared with noise data from three propellers. At helical tip Mach numbers over 1.0, using only the tip shock wave, the model gave a fairly good prediction of the noise for a bladed propeller and for a propeller swept for aerodynamic purposes. However for another propeller, which was highly swept and designed to have noise cancellations from the inboard propeller sections, the shock strength from the tip over predicted the noise. In general the good agreement indicates that shock theory is a viable method for predicting the noise from these supersonic propellers but that the shock strengths from all of the blade sections need to be properly included. M.G.

N82-16810*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
PREDICTION OF SOUND RADIATION FROM DIFFERENT PRACTICAL JET ENGINE INLETS Semiannual Status Report, 1 Jun. 1981 - 1 Dec. 1981
Ben T. Zinn and William L. Moyer 1982 127 p refs
(Grant NAG3-67)
(NASA-CR-165120) Avail: NTIS HC A07/MF A01 CSCL 20A

The computer codes necessary for this study were developed and checked against exact solutions generated by the point source method using the NASA Lewis QCSEE inlet geometry. These computer codes were used to predict the acoustic properties of the following five inlet configurations: the NASA Langley Bellmouth, the NASA Lewis JT15D-1 Ground Test Nacelle, and three finite hyperbolic inlets of 50, 70 and 90 degrees. Thirty-five computer runs were done for the NASA Langley Bellmouth. For each of these computer runs, the reflection coefficient at the duct exit plane was calculated as was the far field radiation pattern. These results are presented in both graphical and tabular form with many of the results cross plotted so that trends in the results verses cut-off ratio (wave number) and tangential mode number may be easily identified. Author

N82-16834# Pacific Northwest Lab., Richland, Wash.
DEVELOPMENT OF IN-CAN MELTING PROCESS AND EQUIPMENT, 1979 AND 1980
L. L. Petkus, D. E. Larson, W. J. Bjorklund, and L. K. Holton Sep. 1981 46 p refs
(Contract DE-AC06-76RL-01830)
(DE82-001050; PNL-3957) Avail: NTIS HC A03/MF A01

Nonradioactive process testing continued with the in-can melter as part of an investigation into the applicability of this vitrification process to various calcined high level and incinerator ash radioactive wastes. How waste composition and canister fins affect in-can melter capacity and how waste composition affects glass quality were examined. Process performance proved to be generally satisfactory. Pilot scale in-can melter runs were performed with synthetic, nonradioactive, high level wastes to produce eight canisters of glass. The synthetic waste processed included high level wastes as well as transuranic ash waste. Full scale in-can melter runs using nonradioactive materials were also conducted, producing ten canisters of glass. In the full scale in-can melter furnace the baffles separating the six heating zones were removed because of baffle warping. A remotely operated section connecting the spray calciner to the canister was tested. Some problems were encountered with calcine plugging. DOE

N82-16850# HTL Industries, Inc., Duarte, Calif. Advanced Technology Div.
TEST AND EVALUATION OF UV FIBER OPTICS FOR APPLICATION FOR AIRCRAFT FIRE DETECTOR SYSTEMS Final Report, 23 May 1980 - 23 Mar. 1981
Dayton, Ohio AFWAL Jun. 1981 58 p refs
(Contract F33615-80-C-2042; AF Proj. 3048)
(AD-A106129; AFWAL-TR-81-2049) Avail: NTIS HC A04/MF A01 CSCL 17/5

It was found that in the U.V. solar blind region, there are severe limitations on the field of view obtainable in Fiber Optic coupled systems. These restrictions are such as to make further consideration of the wide angle system concept unprofitable. This effectively limits the use of such systems in fire detection to applications where the precise location of a flame can be predicted. It is concluded that the performance of optical fibers in the U.V. solar blind wavelengths is such that the trade-off gains proposed in AFAPL-TR-78-84 cannot be realized in practice. Author (GRA)

N82-16927*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Management Services Office.
FISCAL YEAR 1981 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS
Sarah S. Thacker, comp. Oct. 1981 70 p
(NASA-TM-82445) Avail: NTIS HC A04/MF A01 CSCL 05B

This bibliography lists approximately 503 formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY-1981. It also includes papers of MSFC contractors. Citations announced in the NASA scientific and technical information system are noted. N.W.

N82-17081*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RESEARCH AND TECHNOLOGY ANNUAL REPORT, 1981 Annual Report, 1981
1981 44 p
(NASA-TM-81333; A-8744) Avail: NTIS HC A03/MF A01 CSCL 05A

Various research and technology activities at Ames Research Center are described. Highlights of these accomplishments indicate the Center's varied and highly productive research efforts for 1981. Author

N82-17082# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
FLIGHT DYNAMICS TECHNOLOGY DEVELOPMENT: STRUCTURES AND DYNAMICS, VEHICLE EQUIPMENT/SUBSYSTEMS, FLIGHT CONTROL AND AEROMECHANICS
Dec. 1980 87 p Supersedes AFFDL-TR-79-3133
(AD-A096636; AFWAL-TR-80-3144; AFFDL-TR-79-3133) Avail: NTIS HC A05/MF A01 CSCL 05/1

The document presents an overview of the four Technical Planning Objectives (TPO) and supporting data for each. These are extracted from the technical plan of the Flight Dynamics Laboratory (FDL). Information is largely based on FDL fiscal 1982 technology plan omitting specific funding and timing information of an 'Official Use Only' nature. Technical objectives are described for the technical areas of Structures and Dynamics, Vehicle Equipment/Subsystems, Flight Control and Aeromechanics. Points of contact for more information in each of the areas are identified. GRA

N82-17066# Institute for Defense Analyses, Arlington, Va. Program Analysis Div.
BUILT-IN-TEST EQUIPMENT REQUIREMENTS WORKSHOP. WORKSHOP PRESENTATION Final Report, 1 Oct. 1980 - 28 Feb. 1981
Aug. 1981 235 p refs Workshop held at Arlington, Va., 11-13 Feb. 1981
(Contract MDA903-79-C-0320)
(AD-A107842; AD-E500460; IDA-P-1600) Avail: NTIS HC A11/MF A01 CSCL 09/3

A workshop was held for the purpose of assessing progress and problems in specifying and testing Built-In-Test (BIT) used in complex electronic equipment. The workshop's principal recommendation is that the current specification and test approach be broadened to include all capabilities associated with the detection and isolation of faults. Current practices generally address only a narrow subset of these capabilities, namely, BIT. The workshop participants defined this broad capability as '100 Percent Diagnostics.' The diagnostic capability is considered to have two components--'automatic' and 'manual.' The automatic component consists of BIT or semi-automatic BIT with technical manuals, while the manual component consists of personnel using logic, external test equipment and/or manual test procedures. Observations on current experience with BIT, recommendations to improve specification and testing of '100 Percent Diagnostics' that can be put into practice in the near term, and proposed research areas are presented. GRA

N82-17086# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
TACTICAL AIRBORNE DISTRIBUTED COMPUTING AND NETWORKS
Oct. 1981 415 p refs Partly in ENGLISH and FRENCH Meeting held in Roros, Norway, 22-25 Jun. 1981
(AGARD-CP-303; ISBN-92-835-0302-3) Avail: NTIS HC A18/MF A01

Distributed processing and its application to avionic systems are discussed.

N82-17087# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
DISTRIBUTED DATA PROCESSING: WHAT IS IT?
Philip H. Enslow, Jr. *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs

(Contract N00014-79-C-0873)
Avail: NTIS HC A18/MF A01

Distributed processing is presented as the means to obtain improvements in a number of areas of system performance. Utilizing a list of these desired improvements as the motivational factors, the key design characteristics of systems that delivers a major proportion of these improvements are presented. J.D.H.

N82-17088# Ferranti Ltd., Bracknell (England). Computer Systems Div.
THE EFFECT OF INCREASINGLY MORE COMPLEX AIRCRAFT AND AVIONICS ON THE METHOD OF SYSTEM DESIGN
J. T. Martin *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 5 p

Avail: NTIS HC A18/MF A01

The evolution of aircraft and their associated avionics is described. The evolutionary progress is considered as starting from a simple low speed aircraft with rudimentary flight instruments and sighting systems, through the interconnection of some of these systems and progressing to recent avionic systems with centralized digital computing. It is shown how the changes in aircraft systems, from the simple analog connection of a few systems, through the analog sensor/interface box/centralized digital system, to the sensor producing digital outputs/interface box/centralized digital system, have produced comparatively small changes in the methodology used for the design of these systems. The move to systems containing distributed processing interconnected by digital highways is shown to be revolutionary rather than evolutionary and to require a new approach to the system design problem so as to reap the maximum advantage from the available computing capability. Author

N82-17089# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.
A TUTORIAL ON DISTRIBUTED PROCESSING IN AIRCRAFT/AVIONICS APPLICATIONS
Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p

Avail: NTIS HC A18/MF A01

An overview of the state of the art in real time distributed processing as applied to aircraft/avionics is presented. Definitions and concepts are presented starting with the total aircraft as a real time distributed computer-controlled system. The relationship of aircraft mission and avionic system architectures is discussed. Overall system architectural considerations are identified and their impact upon a real time distributed computer-controlled system is detailed. A top-down hierarchical, architectural structure is presented. This top-down structuring is described in terms of the logical functional decomposition of the system as follows: total aircraft/avionic system partitioning of aircraft/avionic subsystems, interconnect bus structure (network), system-wide processing architecture, subsystems definition, and computer systems. Author

N82-17092# Elektronik-System G.m.b.H., Munich (West Germany).
FUNCTIONAL VERSUS COMMUNICATION STRUCTURES IN MODERN AVIONIC SYSTEMS
K. Brammer and A. Weimann *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 11 p refs

Avail: NTIS HC A18/MF 01

The implications of the increase in functional and communication interfaces on avionic system structures are analyzed. Especially the passage from functional design to implemented communication structure of the airborne electronic system is scrutinized. The distributed organization of an avionic system, the realization of which is greatly simplified by bus type intrasystem signal transmission, is compared to the conventional hierarchical system organization. Advantages and drawbacks of both organizations are reviewed especially with respect to interface efficiency, cabling requirements, and the typical topology of avionic systems. J.D.H.

N82-17097# Naval Air Systems Command, Washington, D. C. Control and Guidance Research and Technology Group.
ECONOMIC CONSIDERATIONS FOR REAL-TIME NAVAL AIRCRAFT/AVIONICS DISTRIBUTED COMPUTER CONTROL SYSTEMS
Bernard A. Zempolich *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p

Avail: NTIS HC A18/MF A01

Economic considerations for Distributed Computer Control Systems (DCCS) are discussed. Centralized, distributed and federated processing architectures are used as the primary set of systems alternatives from which economic factors are developed. The economic impact of subsequent logistic support for standardized computer hardware and software versus non-standard products is identified. System considerations such as reliability, maintainability, availability, built-in-test, fault tolerance, and redundancy are examined from the standpoint of resources available to design and develop the DCCS, and also from the viewpoint of economic impact of failure of the DCCS to perform as expected. The economic impact of external factors such as the rate of technology advancement, technology independence, limited production runs, and the general lack of economic leverage upon the market are examined and related to the life-cycle support requirements of the DCCS. Author

N82-17104# Boeing Military Airplane Development, Seattle, Wash. Digital Flight Controls Research Dept.
STAGE-STATE RELIABILITY ANALYSIS TECHNIQUE
Alan D. Stern *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p refs

Avail: NTIS HC A18/MF A01

An advanced flight control system reliability analysis technique must properly account for the defined success criteria, redundancy level, redundancy management, technique, system dependencies, and failure detection coverage. The stage state reliability analysis technique properly accounts for these factors. It is also computationally simple such that triplex redundant systems have been analyzed using an early 1970's desktop computer. This method is well suited for analysis by the system architect. The process begins with a system block diagram showing all element connections. A success logic diagram is then written reflecting all possible success states. The probability of success equation is written directly from the logic diagram and evaluated by substituting the probability expression for each system element. Multiple success criteria can be applied to one problem formulation simply by deleting those states which do not satisfy the success criterion. Author

N82-17106*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
METHODOLOGY FOR MEASUREMENT OF FAULT LATENCY IN A DIGITAL AVIONIC MINIPROCESSOR
John C. McGough, Fred Swern, and Salvatore J. Bavuso *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 18 p refs Prepared in cooperation with Bendix Corp., Teterboro, N.J.

(Contract NAS1-15946)
Avail: NTIS HC A18/MF A01 CSCL 01D

Using a gate level emulation of a typical avionics miniprocessor, fault injection experiments were performed to (1) determine the time to detect a fault by comparison monitoring, (2) forecast a program's ability to detect faults and (3) validate the fault detection coverage of a typical self test program. To estimate time to detect, six programs ranging in complexity from 6 to 147 instructions, were emulated. Each program was executed repetitively in the presence of a single stuck at fault at a gate node or device pin. Detection was assumed to occur whenever the computed outputs differed from the corresponding outputs of the same program executed in a nonfaulted processor. Histograms of faults detected versus number of repetitions to detection were tabulated. Using a simple model of fault detection, which was based in an analog with the selection of balls in an um, distributions of time to detect were computed and compared

with those obtained empirically. A self test program of 2,000 executable instructions was designed expressly for the study. The only requirement imposed on the design was that it should achieve 95% coverage. The program was executed in the presence of a single stuck-at fault at a gate node on device pin. The proportion of detected faults are tabulated. In all experiments faults were selected at random over gate nodes or device pins.
Author

N82-17106*# SRI International Corp., Menlo Park, Calif. Computer Science Lab.
HIERARCHICAL SPECIFICATION OF THE SIFT FAULT TOLERANT FLIGHT CONTROL SYSTEM
P. M. Melliar-Smith and Richard L. Schwartz *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 15 p refs
(Contract NAS1-15428)
Avail: NTIS HC A18/MF A01 CSCL 01B

The specification and mechanical verification of the Software Implemented Fault Tolerance (SIFT) flight control system is described. The methodology employed in the verification effort is discussed, and a description of the hierarchical models of the SIFT system is given. To meet the objective of NASA for the reliability of safety critical flight control systems, the SIFT computer must achieve a reliability well beyond the levels at which reliability can be actually measured. The methodology employed to demonstrate rigorously that the SIFT computer meets as reliability requirements is described. The hierarchy of design specifications from very abstract descriptions of system function down to the actual implementation is explained. The most abstract design specifications can be used to verify that the system functions correctly and with the desired reliability since almost all details of the realization were abstracted out. A succession of lower level models refine these specifications to the level of the actual implementation, and can be used to demonstrate that the implementation has the properties claimed of the abstract design specifications.
Author

N82-17107# Litton Technische Werke, Freiburg (West Germany).
RECONFIGURATION: A METHOD TO IMPROVE SYSTEMS REALIABILITY
J. Szlachta *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p

Avail: NTIS HC A18/MF A01

A system with hardware and software reconfiguration capabilities was developed to improve the reliability of a flight-augmentation computer. The system consists of a network of n redundant computers, linked via m serial buses. A two computer processing units and two or more input/output drivers. A fault in one of the components of the redundant computers causes a hardware reconfiguration which replaces the faulty component by its still functioning twin. If a redundant computer fails altogether, all tasks allocated to it are transferred to one of the still working computers of the network. This is made possible by loading dormant copies of the tasks into at least one other computer of the initial system. These dormant copies are periodically supplied with the program status of the active copy.
Author

N82-17108# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
A RECONFIGURABLE CHANGE NETWORK FOR DISTRIBUTED PROCESS CONTROL [RESEAU D'ECHANGE RECONFIGURABLE POUR CONTROLE DE PROCESSUS REPARTI]
Ch. Meraud and B. Meurel (Societe Anonyme de Telecommunications) *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p refs In FRENCH

Avail: NTIS HC A18/MF A01

A highly reliable, high output system of change is described which permits decentralized exchange between the diverse equipment onboard an aircraft or other type of vehicle in order to integrate and reconfigure the functions, no matter how critical. Very large scale integration and fiber optics which are insensitive to electromagnetic perturbations made possible a performing decentralized solution by incorporating intelligence in a universal type linking module called the subsystem interface. For the traditionally programmed mechanism for generating change, a dynamic mechanism immediately adapted to modification, is substituted which permits a great degree of synchronization.
Transl. by A.R.H.

N82-17114# Hughes Aircraft Co., Fullerton, Calif.
NEXT GENERATION MILITARY AIRCRAFT WILL REQUIRE HIERARCHICAL/MULTILEVEL INFORMATION TRANSFER SYSTEMS
James W. McCuen *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 8 p refs

Avail: NTIS HC A18/MF A01

Changes in avionic subsystems and mission roles of next generation aircraft require new concepts in data transfer. New aircraft need total airframe/weapon system integration which means new approaches must be developed for the interconnection of avionic subsystems. Effort has begun to develop a Military Standard (MIL-STD) which will define the requirements for a high speed data bus network. The standard shall characterize a higher order information transfer system (ITS) that will interconnect avionic systems, that contain their own multiplex ITS, into a fully integrated data complex. The higher order ITS shall employ an operational protocol that will provide subsystems and common sensors, independence and fault isolation by distributed control of the common data bus.
Author

N82-17115# Bendix Corp., Teterboro, N. J. Flight Systems Div.
SIFT: AN ULTRA-RELIABLE AVIONIC COMPUTING SYSTEM
Kurt Moses *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 10 p

Avail: NTIS HC A18/MF A01

Software implemented fault tolerance (SIFT) is an ultra-reliable computing system which is based on a multiprocessor architecture that achieves fault tolerance by replicating computing tasks among processing units. Error detection and system configuration are performed by software to maintain the operational integrity of the computing system. The high speed inter-computer communication system required for operation realized by dedicated serial links arrayed in a star connection. Software algorithms are used for failure detection by means of voting, failure isolation to the faulty processor, and reconfiguration after fault detection. Frame synchronization between processors is employed to reduce data skew and minimize false alarms. The architecture of SIFT, its hardware implementation, and the test stand used for evaluation. Potential applications of this technique to current and anticipated ultra-reliable electrical flight control systems are given. A.R.H.

N82-17117# Royal Aircraft Establishment, Farnborough (England).
INTEGRATED CONTROL OF MECHANICAL SYSTEM FOR FUTURE COMBAT AIRCRAFT
G. W. Wilcock, P. A. Lancaster, and C. Moxey *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 16 p refs Prepared in cooperation with British Aerospace, Warton Sponsored in part by Procurement Executive MOD

Avail: NTIS HC A18/MF A01

Various techniques for the application of digital control to aircraft utility systems were investigated. It is shown that the prefered approach utilizes a number of distributed processors and terminals that interface with the utility components. Analysis performed to data shows a weight saving of approximately 100 Kg (i.e., 50%), and a pilot workload reduction of the order of 4:1, may be achieved in a twin engine combat aircraft. A.R.H.

N82-17119# McDonnell Aircraft Co., St. Louis, Mo.
F/A-18A TACTICAL AIRBORNE COMPUTATIONAL SUBSYSTEM
T. V. McTigue *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 14 p refs

Avail: NTIS HC A18/MF A01

The F/A-18A Hornet tactical computer subsystem consists of two central mission computers and a number of distributed processors embedded in various sensor and display subsystems. This distributed processing system is interconnected by and communicates over a MIL-STD-1553A serial 1 MHz command/response multiplex network. The distributed processing system architecture is discussed and the rationale is presented for the partitioning of the computational tasks between the central mission computers and the distributed processors embedded in the sensor subsystems. The salient features of the central mission computer and the distributed processors are discussed along with a description of the functional operation of the interconnecting MIL-STD-1553A multiplex communications system. The development process for the Operational Flight Program (OFP) for the Central mission computers is described and the support facilities which were used for the software integration and validation are discussed. A.R.H.

N82-17120# Naval Weapons Center, China Lake, Calif. F-18 Facility Branch.

F/A-18 WEAPONS SYSTEM SUPPORT FACILITIES

Thomas F. O'Neill *In* AGARD Tactical Airborne Distributed Computing and Networks Oct. 1981 7 p

Avail: NTIS HC A18/MF A01

The U.S. Navy is currently acceptance-testing the McDonnell Douglas F/A-18 aircraft. Since the F/A-18 is so much more complex than any aircraft current deployed, more sophisticated support tools will be required. The main support tool is to be a weapons system support facility including all of the hardware and software necessary to test, modify, and validate all of the avionics hardware, software, and firmware. A distributed processing approach is used in the facility, which contains several minicomputers and super minicomputers. Author

N82-17121*# Hughes Helicopters, Culver City, Calif.

BLADE PLANFORM FOR A QUIET HELICOPTER Final Report

D. S. Janaki Ram Sep. 1980 31 p refs
(NASA Order A-65550B)
(NASA-CR-166256; T-35584) Avail: NTIS HC A03/MF A01 CSCL 01C

The effects of blade planform and tip speed on noise and performance for a Hughes 500 C rotor system were studied. A cursory examination of the effects of such planform shapes as regular, inverse, and no taper on the noise and performance of the rotor was conducted. It was found that a constant width wide chord planform at tower tip speed provided the best performance and lowest noise. The tapered planforms had lower performance figures due to the reduced solidity. However, some noise reductions were achieved. R.J.F.

N82-17122*# McDonnell-Douglas Corp., St. Louis, Mo.

TESTS OF A D VENTED THRUST DEFLECTING NOZZLE BEHIND A SIMULATED TURBOFAN ENGINE Final Report

T. L. Watson Washington NASA Jan. 1982 139 p refs
(Contract NAS3-21733)
(NASA-CR-3508; MDC-A6930) Avail: NTIS HC A07/MF A01 CSCL 01A

A D vented thrust deflecting nozzle applicable to subsonic V/STOL aircraft was tested behind a simulated turbofan engine in the verticle thrust stand. Nozzle thrust, fan operating characteristics, nozzle entrance conditions, and static pressures were measured. Nozzle performance was measured for variations in exit area and thrust deflection angle. Six core nozzle configurations, the effect of core exit axial location, mismatched core and fan stream nozzle pressure ratios, and yaw vane presence were evaluated. Core nozzle configuration affected performance at normal and engine out operating conditions. Highest vectored nozzle performance resulted for a given exit area when core and fan stream pressure were equal. Its is concluded that high nozzle performance can be maintained at both normal and engine out conditions through control of the nozzle entrance Mach number with a variable exit area. E.A.K.

N82-17123# National Aerospace Lab., Tokyo (Japan).

A NEW METHOD OF ESTIMATING THE LATERAL WALL EFFECT ON THE AIRFOIL INCIDENCE DUE TO THE SUCTION AT SIDE WALLS

Hideo Sawada, Seizo Sakakibara, Mamoru Sato, Hiroshi Kanda, and Toshio Karasawa Aug. 1981 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-680; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The velocity component is approximated from the pressure difference across the plates by the aid of an experimental equation which states that the normal velocity component to a porous plate induced by the pressure difference across the plate is proportional to the square root of the pressure difference. In this method, the proportional constant number need not be known. An experiment was carried out in which the pressure in a suction box, one side of which consisted of a porous plate, was set at various values in this experiment. The lift coefficient of an airfoil model changed with the variation of the pressure in the suction box even at the same uniform flow speed and the same incidence. The unique value of the lift coefficient was determined from several such lift coefficients at the same incidence. The corrected lift coefficient curve obtained is very close to one obtained in a test section with fully solid side walls. T.M.

N82-17124# National Aerospace Lab., Tokyo (Japan). STOL Aircraft Project Group.

SURVEYS OF FLOW-FIELD AROUND EMPENNAGE OF THE NAL STOL-RESEARCH-AIRCRAFT MODEL

Jul. 1981 80 p refs In JAPANESE; ENGLISH summary
(NAL-TR-677; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

The flow field around the empennage for the STOL landing were measured. The down wash angle, the side wash angle, and the dynamic pressure at the aerodynamic center of the empennage were obtained by linear interpolation at the two sections perpendicular to the free steam. Effects of the engine thrust coefficient and the two types of vortex generator on the flow field, and the directional stability in the case of an inner engine becoming inoperative, were studied. E.A.K.

N82-17125# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering.

EXPERIMENTAL STUDY OF DELTA WING LEADING-EDGE DEVICES FOR DRAG REDUCTION AT HIGH LIFT M.S. Thesis

Thomas Dwight Johnson, Jr. Dec. 1980 139 p refs
Avail: NTIS HC A07/MF A01

Future fighter aircraft requirements specify efficient supersonic cruise and high-g maneuverability at high lift. The slender delta wing meets the first requirement but has large lift induced drag increments at high lift. One method to alleviate the drag is to control the flow at the wind leading edge (LE) by means of small LE devices, so as to maintain locally attached flow to higher angles of attack and thus increase the level of aerodynamic thrust. The devices selected for evaluation were the fence, slot, pylon-type vortex generator (VG), and sharp leading-edge extension (SLEE). These devices were tested on a 60 deg flatplate delta (with blunt LE) in the Langley Research Center (NASA) 7- by 10-foot high-speed tunnel at low-speed and to angles of attack of 28 degrees. Balance and static pressure measurements were taken. The results indicate that all the devices have significant drag reduction capability and improved longitudinal stability while a slight loss of lift and increased cruise drag occurred. T.M.

N82-17126*# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.

EXPERIMENTAL TRIM DRAG VALUES FOR CONVENTIONAL AND SUPERCRITICAL WINGS M.S. Thesis

Peter Fredric Jacobs Dec. 1981 165 p refs Sponsored by NASA
(NASA-CR-166500) Avail: NTIS HC A08/MF A01 CSCL 01A

Supercritical wings were studied to determine whether they incur higher trim drag values at cruise conditions than wide body technology wings. Relative trim drag increments were measured in an experimental wind tunnel investigation. The tests utilized high aspect ratio supercritical wing and a wide body wing in conjunction with five different horizontal tail configurations, mounted on a representative wide body fuselage. The three low tail configurations and two T tail configurations were chosen to measure the effects on horizontal tail size, location, and camber on the trim drag increments for the two wings. The increase in performance (lift to drag ratio) for supercritical wing over the wide body wing was 11 percent for both the optimum low tail and T tail configurations. S.L.

N82-17127# Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.

ROLL UP MODEL FOR ROTOR WAKE VORTICES, PART 5

Maarten Landahl Stockholm Aeronautical Research Inst. of Sweden 13 Nov. 1981 28 p refs
(Contract NE-5081-014)
(ASRL-TR-194-4; FFA-HU-2262-Pt-5) Avail: NTIS HC A03/MF a01

Conservation of momentum and energy is used to estimate the core size of a rolled-up vortex from a propeller or rotor blade tip. A simplified planar model due to Prandtl is employed to determine the strength, position, and vore size of the rolled-up vortices. This model is valid when the number of blades is large such that the distance between the wake vortex sheets is much less than the diameter of the rolled-up vortex spirals. The vortex is assumed to have a core of constant vorticity (Rankine vortex). Three dimensionality is then accounted for by modeling the actual spiral wake vortex as a row of regularly spaced vortex rings. The core diameter is found to be about 40 percent of this distance, with a slight decrease with increase in spacing-to-diameter ratio. The core velocity is found to increase with increased spacing from 0.5 of the wake velocity at zero spacing to about 0.7 of the wake velocity at a spacing of three times the wake radius. Author

N82-17128# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

THEORY AND EXPERIMENT IN UNSTEADY AERODYNAMICS

H. Bergh, H. Tijdemann, and R. J. Zwaan 11 Dec. 1980 26 p refs Presented at Aeroelastic Colloq., Goettingen, West Germany, 24 Sep. 1980

(NLR-MP-80046-U) Avail: NTIS HC A03/MF A01

A historical review is given of the role of theory and experiment in investigations of unsteady aerodynamics. Author

N82-17129# National Aerospace Lab., Amsterdam (Netherlands). Dept. of Aeroelasticity.

A WIND TUNNEL STUDY OF THE FLUTTER CHARACTERISTICS OF A SUPERCRITICAL WING

R. Houwink, A. N. Kraan, and R. J. Zwaan 28 Jan. 1981 10 p refs Presented at 22nd SDM/Dyn. Specialists Conf., Atlanta, 6-10 Apr. 1981 Sponsored by Netherlands Agency for Aerospace Programs Prepared in cooperation with Royal Netherlands Aircraft Factories Fokker, Amsterdam

(NLR-MP-81002-U) Avail: NTIS HC A02/MF a01

A wind-tunnel flutter test on a supercritical wing model is described. Objectives of the test were to investigate the transonic dip and to enable comparison with calculated flutter characteristics in which a quasi-three dimensional transonic theory was used. The beginning of a transonic dip was measured and a satisfactory agreement with theory could be found. An additional flutter instability in the bottom of the transonic dip could be correlated with the loose of transition strip effectivity at low Reynolds numbers. Author

N82-17131# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.

DEVELOPMENT OF A COMPUTER BASED PRESENTATION OF NON-STEADY HELICOPTER ROTOR FLOWS Interim Report, 1 Jul. 1979 - 30 Apr. 1981

Henry R. Velkoff and Richard R. Navarro Sep. 1981 121 p refs

(Contract DAAG29-79-C-0074)

(AD-A108107; ARO-14142.6-EX; OSURF-761646/711999) Avail: NTIS HC A06/MF A01 CSCL 01/3

A system to measure the non-steady velocities in the model rotor wake was modified to provide velocity data in a form more useful to the user of the data. Hot wire angle parameters were modified so as to provide better correlations by using cosine law in place of the usual K-squared technique common in hot-wire anemometry. The results of the non-steady measurements were presented in the form of motion pictures of the non-steady computer generated vector plots. Author (GRA)

N82-17132# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.

ROTOR FLOW RESEARCH IN LOW SPEED HELICOPTER FLIGHT Final Report, 1 Jul. 1979 - 30 Apr. 1981

Henry R. Velkoff Sep. 1981 24 p refs

(Contract DAAG29-79-C-0074)

(AD-A107873; ARO-14142.7-EX) Avail: NTIS HC A02/MF A01 CSCL 20/4

Measurements of helicopter rotor wake flow were made at low advance ratio. Both steady and non-steady data were taken in the wake using 3-D hot-film anemometry. Emphasis was placed on the presentation of the data. Motion pictures were obtained from the computer plots of the experimental velocity data.

Author (GRA)

N82-17133# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.

NON-STEADY VELOCITY MEASUREMENT OF THE WAKE OF A HELICOPTER ROTOR AT LOW ADVANCE RATIOS Interim Report, 1 Jul. 1979 - 30 Apr. 1981

H. R. Velkoff and H. Terkel Sep. 1981 127 p refs

(Contract DAAG29-79-C-0074)

(AD-A107722; ARO-14142.5-EX; OSURF-761646/711999) Avail: NTIS HC A07/MF A01 CSCL 20/4

A system was developed which could measure the instantaneous velocities in the wake of a model helicopter rotor operating at low advance ratios. A three-wire hot film probe was mounted on a traverse and placed at many positions in the wake. The output of the probe was fed into an on-line computer operating in an interactive mode. Computer generated vector plots were made of both time averaged velocities and instantaneous velocities for the case of mu = 0.06.

Author (GRA)

N82-17134# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.

EXPERIMENTAL VERIFICATION OF AN AERODYNAMIC PARAMETER OPTIMIZATION PROGRAM FOR WIND TUNNEL TESTING Final Report, Oct. 1980 - Sep. 1981

Richard L. Palko and Margaret Anne Crawford AEDC Nov. 1981 32 p refs

(AD-A107727; AEDC-TR-81-23) Avail: NTIS HC A03/MF A01 CSCL 20/4

The optimization algorithm developed for the SOFT wing program has been revised to make it more applicable for use in routine wind tunnel testing. The algorithm modification removed some unused routines and simplified the control input requirements. The modified optimization algorithm was demonstrated in the 1-ft transonic Aerodynamic Wind Tunnel (1T) using a 3-degree-of-freedom model. The test Mach number was 0.8. The algorithm was successfully demonstrated for all three optimization runs attempted. These included minimization of drag coefficient for a specified coefficient of lift, maximization of lift coefficient for a specified coefficient of drag, and maximization of lift-to-drag ratio for a specified coefficient of drag.

Author (GRA)

N82-17136# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Aeronautics and Aerospace Dept.

FINITE DIFFERENCE COMPUTATION OF THE CONICAL FLOW FIELD OVER A DELTA WING

L. Vigevano Aug. 1981 56 p refs

(VKI-TN-140) Avail: NTIS HC A04/MF A01

A numerical approach using finite differences applied to a nonlinear governing equation was adopted in order to introduce compressibility effects in a model of the vertical flow past a sharp leading edge on a delta wing. A conical line vortices model was adapted to a through field computation. From numerical experiments, criteria for the representation of a mathematical vortex in a finite difference scheme are derived Comparison of the numercial results with the Brown and Michael analytical solution shows that the first order scheme employed preserves satisfactory accuracy in the prediction of the wing loads.

Author (ESA)

N82-17137*# Textron Bell Helicopter, Fort Worth, Tex.

ASSESSMENT OF HISTORICAL AND PROJECTED SEGMENTS OF US AND WORLD CIVIL AND MILITARY ROTORCRAFT MARKETS 1960 - 1990 Contractor Report, 2 Aug. 1981

William J. Yates 2 Aug. 1981 203 p

(Contract NAS2-10404)

(NASA-CR-166151) Avail: NTIS HC A10/MF A01 CSCL 05C

The future military and civil worldwide market potential for current and future rotorcraft configurations was assessed. Comparisons by region, mission, civil or military, etc., are made for both historial and forecast data. A comprehensive historical data base was utilized to determine historical and future trends. Consideration was given to socio-political, economic, and technological factors in determining future trends. Author

N82-17138# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.

AIRCRAFT ACCIDENT REPORT - UNIVERSAL AIRWAYS, INC., BEECH 65-A80/EXCALIBUR CONVERSION, N100UV, NEAR MADISONVILLE, TEXAS, JULY 2, 1981

17 Dec. 1981 25 p

(NTSB-AAR-81-17) Avail: NTIS HC A02/MF A01

About 1230 Central Daylight Time, on July 2, 1981, a Universal Airways, Inc. Beech 65-A80, N100UV, crashed into an open, level field about 7 nautical miles east southeast of Madisonville, Texas. Witnesses heard a small explosion and saw the aircraft descend from a dark cloud; the wings and the empennage were not attached during the observed portion of the aircraft's descent. The pilot and the two passengers were killed. The aircraft was destroyed. The National Transportation Safety Board determines that the probable cause of the accident was a pilot induced airframe overload following loss of aircraft control which resulted in the structural breakup of the aircraft. The reason(s) for the loss of aircraft control could not be determined. Contributing to the loss of control was the pilot's lack of instrument proficiency in multiengine aircraft. R.J.F

N82-17139# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
AIRCRAFT ICING AVOIDANCE AND PROTECTION
9 Sep. 1981 16 p
(PB82-108135; NTSB-SR-81-1) Avail: NTIS HC A02/MF A01 CSCL 01C

The problems of aircraft icing from the standpoint of icing statistics, the meteorological factors which cause icing, the certification of aircraft by the FAA for the flight into known icing conditions, and the forecasting of icing conditions are investigated. It is noted that icing accidents are a problem primarily for general aviation aircraft and that in addition to the accidental losses due to icing, there are significant operational losses due to inadequacies in the weather forecasting system. The problems revealed can be alleviated, but in order to do so new technology will have to be developed based upon a better understanding of ice formation and improvements in the quality of icing forecasts. GRA

N82-17142*# Analytical Mechanics Associates, Inc., Hampton, Va.
TERMINAL AREA AUTOMATIC NAVIGATION, GUIDANCE, AND CONTROL RESEARCH USING THE MICROWAVE LANDING SYSTEM (MLS). PART 2: RNAV/MLS TRANSITION PROBLEMS FOR AIRCRAFT Final Report
Samuel Pines Washington, D.C. NASA Jan. 1982 139 p refs
(Contract NAS1-15116)
(NASA-CR-3511; AMA-80-12-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 17G

The problems in navigation and guidance encountered by aircraft in the initial transition period in changing from distance measuring equipment, VORTAC, and barometric instruments to the more precise microwave landing system data type navaids in the terminal area are investigated. The effects of the resulting discontinuities on the estimates of position and velocity for both optimal (Kalman type navigation schemes) and fixed gain (complimentary type) navigation filters, and the effects of the errors in cross track, track angle, and altitude on the guidance equation and control commands during the critical landing phase are discussed. A method is presented to remove the discontinuities from the navigation loop and to reconstruct an RNAV path designed to land the aircraft with minimal turns and altitude changes. B.W.

N82-17144# Mitre Corp., McLean, Va. Metrek Div.
REQUIREMENTS FOR INSTRUMENT APPROACHES TO CONVERGING RUNWAYS
L. C. Newman, W. J. Swedish, and T. N. Shimi Sep. 1981 116 p refs
(Contract DTFA01-81-C-10001)
(AD-A108075; MTR-81W230; FAA-EM-82-4) Avail: NTIS HC A06/MF A01 CSCL 01/2

This document discusses the technical issues relevant to converging approaches and examines the feasibility of conducting instrument approaches as a means of increasing airport capacity. The main considerations in the analysis were: runaway geometry; missed approach paths; and pilot acceptance. A safety analysis was conducted to determine requirements and control procedures to provide protection against: random lateral variation from the missed approach path; Heading blunder; and rare and unexpected events. Requirements for final and missed approach are presented as are strategies for applying these requirements to airports with a wide variety of converging runway geometries. Preliminary recommended procedures are presented for conducting independent instrument approaches to Category I minima. GRA

N82-17146# Systems Control, Inc., Palo Alto, Calif.
DIFFERENTIAL OMEGA SYSTEM DEVELOPMENT AND EVALUATION Final Report, 27 Aug. 1977 - 15 Aug. 1981
T. M. Watt, L. E. Abrams, and F. G. Karkalik Washington FAA Aug. 1981 105 p refs
(Contract DOT-FA75WA-3662)
(AD-A107857; FAARD-81-69) Avail: NTIS HC A06/MF A01 CSCL 17/7

This report describes a development and evaluation program for Differential Omega in general aviation. The program was a cooperative venture between the FAA and Transport Canada. SCT performed system design, program management, and flight test on behalf of the FAA. Tracor, Inc. provided modified Omega airborne receivers under subcontract to SCT. Flight tests took place in Alaska aboard a Convair 580 provided by the FAA. Monitor stations were located in Anchorage and at Deadhorse. The most definitive results were obtained from flight tests conducted in October 1980 and February 1981. Important results included: (a) data-link range varied from 44 nm to 198 nm, (b) random component of navigation error was 0.25 nm, 2-D RMS, (c) range decorrelation error was about 2 nm over a distance of 550 nm, (d) transient response of the system-following aircraft procedure turns was characterized by a positional overshoot of about 1.5 nm, followed by a monotonically decreasing error with a two-minute time constant. Recommendations are made for improving system performance. Author (GRA)

N82-17148# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
ACTIVE BEACON COLLISION AVOIDANCE LOGIC EVALUATION. VOLUME 2: COLLISION AVOIDANCE (BCAS) THREAT PHASE Final Report, Apr. 1979 - Jun. 1980
A. Adkins, J. Thomas, B. Billmann, and J. Windle Sep. 1981 59 p refs
(FAA Proj. 052-241-320)
(AD-A107805; FAA-CT-80-51-2-Vol-2; FAA-RD-80-125-2) Avail: NTIS HC A04/MF A01 CSCL 01/2

The purpose of this project was to evaluate and refine the April 1979 version of the Beacon Collision Avoidance System (BCAS) logic prior to Active BCAS prototype flight testing. The April 1979 version of the BCAS logic added changes to support multiple aircraft conflict resolution, Conflict Indicator Register (CIR) interfacing and new surveillance logic interfacing. The results of the first phase of the Active BCAS logic, evaluating the Air Traffic Control Radar Beacon System (ATCRBS) threat phase, identified several improvements that should be made to the BCAS logic. These improvements were incorporated into the logic prior to beginning the second phase, the BCAS equipped threat phase. The second phase was conducted from September to November 1979 and was designed to evaluate the BCAS performance against BCAS equipped threats. The results are presented in this report. Several logic improvements have been identified. These changes have been implemented in both the threat logic and the BCAS command coordination logic (CIR logic). In general, BCAS performance for equipped threats was not as sensitive to vertical rate tracker noise as in the ATCRBS threat case. Resolution performance has been improved through a reduction in undesirable BCAS alarms and by reducing excessive separation with the inclusion of a projected vertical miss distance (VMD) filter for equipped threats. A better method of selecting threat volume parameters has been incorporated. GRA

N82-17149# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
INVESTIGATION OF WILCOX MODEL 585B VERY HIGH FREQUENCY OMNIDIRECTIONAL RADIO RANGE (VOR) SYSTEM, PART 3 Final Report, Mar. 1980 - Feb. 1981
Wayne E. Bell Oct. 1981 53 p refs
(FAA Proj. 041-305-830)
(AD-A107855; FAA-CT-81-46; FAA-RD-81-52; ACT-100) Avail: NTIS HC A04/MF A01 CSCL 17/7

A three-part investigation of the Wilcox 585B Very High Frequency Omnidirectional Radio Range (VOR) System was conducted. In Part 1, the magnitude of the ground error was reduced by modification and suitable adjustment of antenna element lengths of the field detector. In Part 2, investigation developed an acceptable calibration procedure for system 30 hertz (Hz) modulation. Obtaining compatible 30 Hz modulation reading between aircraft (far-field) and edge of counterpoise (near-field) measurements was an additional requirement. In Part 3, tests resolved any discrepancies in the tuning adjustments prescribed by the manufacturer's equipment manuals. This report, which is the last in a series of three, contains an outline of the tests and procedures for setting the lengths of the adjustable field detector elements, a recommended procedure for obtaining compatible near-field and airborne 30 Hz modulation readings, and recommended changes to the manufacturer antenna tuning procedures in order that the system meet required operational tolerances. Author (GRA)

N82-17150# Air Navigation Services, Inc., Westerngrund (West Germany).
AERONAUTICAL INFORMATION DATA SUBSYSTEM (AIDS): A GROUND-BASED COMPONENT OF AIR NAVIGATION SERVICES SYSTEMS
Frank W. Fischer 1981 5 p Presented at 11th AIDS Symp., Cologne, 22-24 Sep. 1981 Sponsored by DFVLR
Avail: NTIS HC A02/MF A01

The construction of an air navigation services information data base for internal and external use (airspace users before and during flight) of internally and externally produced information data is advocated. A data bank, which holds all current operational information data, controls the data switching and processing machine which constitutes the data communication subsystem. Benefits of AIDS include costs in data compiling and the provision of precise data for air traffic control, flight planning or rescue operations. Apart from the airlines, AIDS is of most use to general aviation operators. Author (ESA)

N82-17151*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
USE OF OPTIMIZATION TO PREDICT THE EFFECT OF SELECTED PARAMETERS ON COMMUTER AIRCRAFT PERFORMANCE Progress Report
Valana L. Wells and Richard S. Shevell Feb. 1982 45 p refs
(Grant NAG1-202)
(NASA-CR-168439) Avail: NTIS HC A03/MF A01 CSCL 01C

The relationships between field length and cruise speed and aircraft direct operating cost were determined. A gradient optimizing computer program was developed to minimize direct operating cost (DOC) as a function of airplane geometry. In this way, the best airplane operating under one set of constraints can be compared with the best operating under another. A constant 30-passenger fuselage and rubberized engines based on the General Electric CT-7 were used as a baseline. All aircraft had to have a 600 nautical mile maximum range and were designed to FAR part 25 structural integrity and climb gradient regulations. Direct operating cost was minimized for a typical design mission of 150 nautical miles. For purposes of C sub L sub max calculation, all aircraft had double-slotted flaps but with no Fowler action. T.M.

N82-17152*# Goodyear Aerospace Corp., Akron, Ohio.
PRELIMINARY DESIGN STUDY OF A HYBRID AIRSHIP FOR FLIGHT RESEARCH
Ronald G. E. Browning Jul. 1981 286 p refs
(Contract NAS2-10777)
(NASA-CR-166246; GER-17016) Avail: NTIS HC A13/MF A01 CSCL 01C

The feasibility of using components from four small helicopters and an airship envelope as the basis for a quad-rotor research aircraft was studied. Preliminary investigations included a review of candidate hardware and various combinations of rotor craft/airship configurations. A selected vehicle was analyzed to assess its structural and performance characteristics. Author

N82-17153*# Lockheed-California Co., Burbank.
SYSTEMS STUDY OF TRANSPORT AIRCRAFT INCORPORATING ADVANCED ALUMINUM ALLOYS Final Report
I. Frank Sakata Jan. 1982 187 p refs
(Contract NAS1-16434)
(NASA-CR-165820; LR-29984) Avail: NTIS HC A09/MF A01 CSCL 01C

A study was performed to quantify the potential benefits of utilizing advanced aluminum alloys in commercial transport aircraft and to define the effort necessary to develop fully the alloys to a viable commercial production capability. The comprehensive investigation (1) established realistic advanced aluminum alloy property goals to maximize aircraft systems effectiveness (2) identified performance and economic benefits of incorporating the advanced alloy in future advanced technology commercial aircraft designs (3) provided a recommended plan for development and integration of the alloys into commercial aircraft production (4) provided an indication of the timing and investigation required by the metal producing industry to support the projected market and (5) evaluate application of advanced aluminum alloys to other aerospace and transit systems as a secondary objective. The results of the investigation provided a roadmap and identified key issues requiring attention in an advanced aluminum alloy and applications technology development program. Author

N82-17154* Textron Bell Helicopter, Fort Worth, Tex.
CORRELATING MEASURED AND PREDICTED INPLANE STABILITY CHARACTERISTICS FOR AN ADVANCED BEARINGLESS ROTOR Final Report
William H. Weller Jan. 1982 72 p refs
(Contract NAS2-10772)
(NASA-CR-166280; Rept-699-099-046) Avail: NTIS HC A04/MF A01 CSCL 01C

The experimental data were obtained from hover tests for a scaled model of an advanced bearingless main rotor. Both isolated rotor and ground resonance conditions were tested. Test parameters included blade built-in cone and sweep angles, rotor inplane structural damping, pitch link location and fuselage structural damping. Analytical results for the conditions tested were obtained using current Bell Helicopter analyses. In addition, variations in the analytical models were made to assess their impact on the correlation between computed and measured results. Results are presented in tabular and graphical form. T.M.

N82-17155# Arinc Research Corp., Santa Ana, Calif.
TECHNOLOGY OVERVIEW FOR ADVANCED AIRCRAFT ARMAMENT SYSTEM PROGRAM
H. Rosenberg, R. Brooks, J. Aldermen, K. Bramen, G. OBryan, and G. Wright May 1981 284 p refs
(Contract N60530-80-C-0270)
(AD-A107680; Rept-1789-01-1-2406) Avail: NTIS HC A13/MF A01 CSCL 01/3

Presented herein are overviews of state-of-the-art technologies applicable to the Stores Management System and Suspension and Release Equipment of the Advanced Aircraft Armament System. Technology briefs are presented for selected areas, and references are made to detailed sources of desired information. Author (GRA)

N82-17156# Arinc Research Corp., Santa Ana, Calif.
STANDARDIZATION STUDY FOR ADVANCED AIRCRAFT ARMAMENT SYSTEM PROGRAM
Larry J. Graham and William G. Schulz May 1981 103 p refs
(Contract N60530-80-C-0339)
(AD-A107681; Rept-1783-01-1-2405) Avail: NTIS HC A06/MF A01 CSCL 01/3

Results of a 9-month study of standardization criteria and characteristics are presented that may be effectively applied to the Advanced Aircraft Armament System (AAAS) Program. System elements feasibly for standardization are identified. Standardization characteristics for those feasible elements are developed for various levels of standardization (subsystem, module, piece part) and standardization approaches (horizontal, vertical, area, functional, logistical, and cooperative). Alternative standardization characteristics are also postulated and recommendations are formulated for application to the AAAS Program. Author (GRA)

N82-17157# Hochschule der Bundeswehr, Munich (West Germany). Fachbereich Luft- und Raumfahrttechnik.
OPTIMAL DOLPHIN HANG GLIDER FLIGHT [OPTIMALER DELPHIN-SEGELFLUG]
E. D. Dickmanns Mar. 1981 71 p refs In GERMAN
Avail: NTIS HC A04/MF A01

Time minimal gliding flight in vertical air currents is discussed. If the vertical current wavelength is large as opposed to the trajectory oscillation taken by an airplane, an optimal flight with approximately n sub z = 1 can be obtained. In short vertical currents the dynamic warming up maneuver in the downwind gives great advantages. During the transition local conditions may interfere. Two fundamentally different control maneuvers of equal value to the sail functions are described. Transl. by E.A.K.

N82-17158# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
THE ARMED HELICOPTER IN AIR TO AIR MISSIONS
Emil Weiland 1981 18 p Presented at Royal Aeronautical Soc. Rotorcraft Section Symp., London, 4 Feb. 1981
(MBB-UD-317-81-O) Avail: NTIS HC A02/MF A01

The antihelicopter-helicopter must be superior in performance and agility. The basic vehicle must be supplemented by a specialized armament demonstrating a combination of guns and fire and forget air to air missiles. In order to ensure a system superior to the possible enemy gunship, the helicopter needs to be designed to take full advantage of the inherent performance and agility potential of the basic helicopter elements. The agility aspect of the rotorcraft inherent characteristics of the major rotorcraft components are discussed and a possibility for a practical solution is indicated. Author

N82-17160# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.

DESIGN MANUAL FOR IMPACT DAMAGE TOLERANT AIRCRAFT STRUCTURE

John G. Avery (Boeing Military Airplane Co., Seattle) Oct. 1981 230 p refs Sponsored in part by Dept. of Defense
(AGARD-AG-238; ISBN-92-835-1403-3) Avail: NTIS HC A11/MF A01

The structural design information is grouped into three major sections: description of projectile threats; analysis methods for predicting structural response to projectile impact; and design guidelines for impact tolerance. The hydrodynamic ram effect and aircraft engine disintegration are highlighted.

N82-17161# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

DESCRIPTION OF PROJECTILE THREATS

In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 1-24 refs

Avail: NTIS HC A11/MF A01

Evaluating the degradation of aircraft structure resulting from projectile impact requires a knowledge of the threat and encounter conditions. This is necessary in understanding the failure mechanisms and structure response modes induced by the various types of threats. Projectile types, important encounter parameters, and typical terminal effects are discussed. Information that is helpful in understanding the analysis of structural response to impact and the design guidelines for impact damage tolerance is presented. T.M.

N82-17162# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

ANALYSIS METHODS FOR PREDICTING STRUCTURAL RESPONSE TO PROJECTILE IMPACT

In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 27-44

Avail: NTIS HC A11/MF A01

Analysis methods and data available for predicting the response of metal and fiber composite structure to projectile impact are presented. The analysis methods discussed are applicable to impacts from small arms projectiles, missile warhead fragments, and the fragmentation and blast effects of high-explosive projectiles. The responses addressed include penetration capability, damage size and type, strength degradation of damaged structure, and internal load redistribution. T.M.

N82-17163# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

ANALYSIS METHODS FOR BALLISTIC DAMAGE SIZE AND TYPE

In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 45-78

Avail: NTIS HC A11/MF A01

The parameters which influence the size and character of projectile impact damage are described. Predicting damage size is the first step is assessing the structural capability of impacted structure, since damage size determines net section strength loss, stiffness loss, and the flaw size for failure analysis. The discussion is organized according to projectile type as follows: non-exploding projectiles; high explosive projectiles; and engine debris projectiles. Within each projectile category the responses of both metallic and fiber composite structure are discussed. The effects of fluid pressure in causing damage, a phenomenon known as hydrodynamic ram, are discussed. T.M.

N82-17164# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

DAMAGE FROM HIGH EXPLOSIVE (HE) PROJECTILES

In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 79-135 refs

Avail: NTIS HC A11/MF A01

The structural damage done by HE projectiles (20- to 30-mm, for example) is the result of multiple fragment penetrations and internal blast pressures, acting separately and in combination. The fragments are created as the metal casing surrounding the explosive bursts due to the intense pressures generated by the detonation. Fragment damage degrades structural strength and stiffness, and blast pressures added to the existing flight loads can cause excessive deformations and element failures. The nature and extent of structural damage from HE projectile fragments and blast pressure depend upon these variables: material type and thickness; projectile size and delay characteristics; striking velocity and obliquity; distance from detonation to impacted structure (standoff); and internal volume of structural cell and extent of venting. The significance of each of these variables is discussed. Qualitative descriptions of HE projectile damage in metallic and fiber composite structure are presented followed by a discussion of damage prediction analysis techniques for blast and fragments. T.M.

N82-17165# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

DAMAGE FROM ENGINE DEBRIS PROJECTILES

In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 136-139

Avail: NTIS HC A11/MF A01

The effects of uncontained projectile emanating from an engine and subsequently striking an adjacent portion of the airframe are assessed. The effects are treated the same as for effects resulting from nonexploding military projectiles. There is an important distinction, however, in that the engine debris projectile is typically an irregular fragment (as opposed to a bullet), behaving more like a warhead fragment or the fragments generated from a high-explosive projectile. T.M.

N82-17166# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

HYDRODYNAMIC RAM DAMAGE

In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 140-152

Avail: NTIS HC A11/MF A01

Hydrodynamic ram is a phenomenon that may cause extensive structural failure of aircraft fuel cells when they are subjected to ballistic impact. During impact and penetration of the fuel cell, intense pressure waves are generated within the liquid by the projectile. The response of the fuel cell to this pressure loading varies according to its construction. For example, the walls of an integral fuel cell are formed by the aicraft skin, which is usually constructed of high-strength metal designed to withstand normal flight loads. This type of structure can fail catastrophically in response to hydrodynamic ram pressure loading due to fracturing of the walls of the cell. Self-sealing fuel cells can also be defeated due to hydrodynamic ram by gross tearing of the material or by misalignment of the wound edges, thereby defeating the self-sealing process. Both of these effects become increasingly severe as fuel cells become smaller, or projectile kinetic energies increase. An analysis method to predict hydrodynamic ram pressures generated by small arms ammunition was developed. The analysis method is based on the conversion of projectile kinetic energy to pressure field energy and includes the effects of reflections from the tank walls. T.M.

N82-17167# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

EFFECTS OF CYCLIC LOADING ON PROJECTILE IMPACT DAMAGE

In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 153-157

Avail: NTIS HC A11/MF A01

The cyclic loading induced during flight can influence the severity of existing impact damage by initiating fatigue cracks at the damage site, subsequent crack sharpening or blunting and crack growth. There can be significant time dependent changes in the residual strength of the structure due to these alterations in the size and character of the impact damage. Projectile produce a wide variety of damage types, including cracks, holes, tears, large determination, even totally severed structural elements. The response of the damaged structure when exposed to cyclic loads reflects this wide variety of structural damage. For example, the cyclic loading can result in immediate growth when the projectile damage is a crack. There may be, however, a time (number of cycles) devoted to crack nucleation. Several important aspects of the fatigue response of impact damaged structure are described in terms of crack initiation and extension. An approach which basically consists of assuming immediate fatigue crack initiation at the damage site, and then applying conventional crack growth analysis is suggested. T.M.

N82-17168# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
STIFFNESS DEGRADATION OF IMPACT DAMAGED STRUCTURE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 159-160

Avail: NTIS HC A11/MF A01

Stiffness reduction in impact damaged structural elements can be important from two standpoints. The first is the alteration of load distribution within the structure, potentially causing overloading and failure of undamaged elements. The second area of potential concern is the residual stiffners of major structural components, since stiffness degradation may lead to instability and control inadequacy. These two topics are discussed, however, there are few verified analysis methods for predicting stiffness degradation associated with ballistic damage. Both of these stiffness degradation effects, but particularly the latter, become increasingly significant as the extent of the inflicted damage becomes larger. Stiffness degradation may well be a problem for HE projectile impacts, but it is generally insignificant with small arms. T.M.

N82-17169# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
STRENGTH DEGRADATION OF IMPACT DAMAGED STRUCTURE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 161-194

Avail: NTIS HC A11/MF A01

Projectile damage destroys a portion of the load carrying capability of the structure, alters the distribution of internal loads, and introduces a flaw which may cause failure by locally disturbing the stress field. The latter effect is most significant with regard to the relatively small damage induced by small arms projectile and dispersed warhead or engine debris fragments. High explosive projectiles can often create damage of sufficient size to substantially degrade structural performance by all three effects. Estimating the residual strength of structure damaged by projectile impact is a major step in predicting structural capability. The analysis methods presented for evaluating strength capability are organized according to structural complexity: analysis of monolithic panels; analysis of multiple load path panels; and analysis of multielement structure. The application of conventional and modified fracture mechanics analysis to ballistic damaged panels is discussed. The extension of these approaches to the requirements of panels having discrete stiffening members are discussed. T.M.

N82-17170# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ANALYSIS OF MULTIPLE LOAD PATH PANELS CONTAINING IMPACT DAMAGE
In its Design Manual for Impact Damage Tolerant Aircraft Struct. Oct. 1981 p 195-209

Avail: NTIS HC A11/MF A01

Many structural configurations cannot be represented as monolithic panels in assessing strength degradation from impact damage. The wings of transport aircraft, for example, often consist of skin with riveted stiffeners. The stiffeners can provide damage containment or crack assessment capability that is not considered in element residual strength analysis. Since the crack arrestment capability can significantly improve the residual strength of damaged structure, the stiffening must be included in the analysis. The response of stiffened panels to projectile damage, and available analytical techniques for residual strength prediction, are discussed. T.M.

N82-17171# McDonnell Aircraft Co., St. Louis, Mo.
CORROSION CONTROL TEST METHOD FOR AVIONIC COMPONENTS Final Report, 27 Sep. 1979 - 27 May 1981
A. W. Morris 25 Sep. 1981 60 p refs
(AD-A108061; NADC-81174-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

The program objective was to develop an accelerated laboratory corrosion test capable of simulating the severe corrosive effects of an aircraft carrier deployment environment. The current standard 5% salt fog test is not severe enough to simulate the carrier environment, thus limiting its usefulness in forecasting corrosion failures. To provide test standards, representative electrical and electronic units were exposed on an oil burning carrier during a 9 month tropical cruise and on a nuclear carrier during a 10 month tropical cruise. A series of laboratory tests were run to identify corrosion environments which provide good correlation with actual carrier results. The tests were also judged on their ability to promote moisture related electrical failures. During the final phase of the program, 25 electronic and electrical components were exposed to the two most promising test methods. The selected test method is a modification of the NADC sulfur dioxide salt fog test. It utilizes a much higher exposure temperature and a dilute substitute ocean water solution for fog generation. In one week this test method produces both corrosion damage and electrial failures that correlate with the condition of the test articles exposed for nine to ten months on an aircraft carrier. Author (GRA)

N82-17172# Systran Corp., Dayton, Ohio.
DIGITAL AVIONICS INFORMATION SYSTEM (DAIS) DOCUMENTATION Final Report, Aug. 1979 - Jun. 1981
F. Forster and R. Gregory Wright-Patterson AFB, Ohio AFWAL Sep. 1981 97 p
(Contract F33615-79-C-1818; AF Proj. 2052)
(AD-A108000; AFWAL-TR-81-1162) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report covers the work performed by SYSTRAN Corporation in providing Configuration control, technical editing and generation of documentation for the DAIS Program Branch. This effort encompassed the following functions: (1) maintaining the DAIS library, (2) generating certain specifications, plans, drawings and/or test reports, (3) performing configuration audits per MIL-STD-1521, (4) assuring that DAIS documents conformed to MIL-STD-490 and 483, (5) technical editing and configuration control over all DAIS documentation. The DAIS documentation effort was highly successful and could set an example for other R&D programs on how to properly document their efforts in MIL-STD format. Author (GRA)

N82-17173# Naval Research Lab., Washington, D. C.
FUNCTION SPECIFICATIONS FOR THE A-7E FUNCTION DRIVER MODULE Interim Report
P. C. Clements 27 Nov. 1981 177 p refs
(XF21242101)
(AD-A107922) Avail: NTIS HC A09/MF A01 CSCL 09/2

As part of the experimental redesign of the flight software for the Navy's A-7E aircraft, software modules were designed to encapsulate the characteristics of the behavioral requirements of the system. The purpose of these Function Driver modules is to allow the remainder of the software to remain unchanged when the required system behavior is modified without associated hardware changes. This document specifies the behavior of the system without regard to specific hardware devices. This report contains an explanation of the standard organization of each functional description, a description of the review procedures, specifications for all of the functional aspects of the A-7E software, and a set of indices and cross-references to help integrate this module with the rest of the system. As well as serving as development and maintenance documentation for the A-7E redesign, this document is intended to serve as a model for other people interested in applying our documentation and structuring techniques to other software projects. Author (GRA)

N82-17174*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
CF6 JET ENGINE PERFORMANCE IMPROVEMENT: HIGH PRESSURE TURBINE ROUNDNESS
W. D. Howard and W. A Fasching Jan. 1982 136 p refs
(Contract NAS3-20629)
(NASA-CR-165555; R82AEB115) Avail: NTIS HC A07/MF A01 CSCL 21E

An improved high pressure turbine stator reducing fuel consumption in current CF6-50 turbofan engines was developed. The feasibility of the roundness and clearance response improvements was demonstrated. Application of these improvements will result in a cruise SFC reduction of 0.22 percent for new engines. For high time engines, the improved roundness and response characteristics results in an 0.5 percent reduction in cruise SFC. A basic life capability of the improved HP turbine stator in over 800 simulated flight cycles without any sign of significant distress is shown. E.A.K.

N82-17176# Pratt and Whitney Aircraft Group, West Palm Beach, Fla.

DAMAGE TOLERANT DESIGN FOR COLD-SECTION TURBINE ENGINE DISKS Final Report, Aug. 1977 - Feb. 1981

C. H. Cook, H. E. Johnson, and C. E. Spaeth Wright-Patterson AFB, Ohio AFWAL Jun. 1981 243 p
(Contract F33615-77-C-2064; AF Proj. 3066)
(AD-A107863; PWA-FR-14442; AFWAL-TR-81-2045) Avail: NTIS HC A11/MF A01 CSCL 21/5

This report describes the development, test evaluation, and refinement of a Damage Tolerant Design System for cold-section turbine engine disks. To substantiate the Design System the 42-month effort included the design and test of a functional replacement 2nd-stage fan disk for the F100 engine. This disk would be able to support a 0.030-inch crack for three maintenance intervals without a rapid fracture failure. The program was totally successful and resulted in a disk design that was three pounds heavier than the Bill of Material (B/M) disk but had over ten times the B/M life even with a 0.030-inch crack in the bolthole and a 0.020 inch elox crack starter in the rim slot. Included in this report are the design criteria and rationale used in creation of the damage tolerant configuration, the testing and analysis methodology, and results as well as recommendations for application and improvements. GRA

N82-17177# Strategic Air Command, Offutt AFB, Nebr. Aircraft Engineering Div.

MAINTENANCE POSTURE FOR QUICK START Final Report

John M. Connolly 12 Aug. 1981 46 p
(AD-A107553: SAC/LGME-ER-P-328) Avail: NTIS HC A03/MF A01 CSCL 12/5

Quick start is an aircraft modification which installed cartridge starters on all engines of the B-52G/H and non-fan KC-135 aircraft. Routine peacetime use of the modification was suspended due to an excessive amount of smoke and toxic gases created by the cartridge exhaust. The SAC Aircraft Engineering Division then investigated respiratory and eye protection for ground crew personnel. As an interim solution, they found that an aircraft firefighter's smoke mask connected to a Mine Safety Appliance Corp Type N model SW as filter canister adequately protects the user. To minimize the crew chief's exposure to the smoke cloud, the Division designed and tested a roll-over chock, evaluated a wireless interphone communication system, and implemented alert B-52 battery engine starts. With these new concepts, response timing is only limited to aircrew checklist items and engine start time. GRA

N82-17178# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

THROUGH FLOW CALCULATIONS IN AXIAL TURBOMACHINES

C. Hirsch, ed. (Vrije Universiteit, Brussels) and J. D. Denton, ed. (Cambridge Univ.) Oct. 1981 330 p refs
(AGARD-AR-175) Avail: NTIS HC A15/MF A01

The objectives were to review the existing information on blade performance and wall effect prediction, and to extend this information by systematic application of numerical methods to representative geometries. Only axial turbomachines were examined and they were split into a turbine sub-group and a compressor sub-group. Axial turbine performance predicted included an examination of the influence of correlations and computational procedures on the prediction of overall efficiency. A comprehensive survey of the various loss and deviation mechanisms was conducted for the compressor sub-group.

N82-17180# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

INFLUENCE OF CORRELATIONS AND COMPUTATIONAL METHODS ON THE PREDICTION OF OVERALL EFFICIENCY

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 29-31 refs

Avail: NTIS HC A15/MF A01

The process of designing a gas turbine or a steam turbine begins with an evaluation of the influence of component design parameters on the overall cost. For both the steam turbine and the gas turbine, energy costs are rapidly increasing and component efficiency is therefore a primary design objective. For the aircraft gas turbine, the weight of the component influences the fuel consumption and is therefore also an important energy cost consideration. Turbine efficiency predictions, together with information which influence the weight and cost, were obtained from flow field calculations which define the thermodynamic properties and velocity triangles throughout the turbine. These computational methods may be full span through flow calculations which predict the fluid properties from the hub to the tip between each blade row or they may be mean line calculations. In either case they are dependent upon loss and deviation models for their effectiveness in the efficiency optimization stage of the design process. The loss and deviation correlations which are in common use by steam turbine and gas turbine manufacturers are frequently developed internally and are maintained as proprietary information. The overall efficiency predictions which are discussed are therefore limited to results obtained using the correlations built into the methods which are described. T.M.

N82-17183# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

THE TWO STAGE AERO ENGINE TURBINE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 69-83 ref

Avail: NTIS HC A15/MF A01

The turbine was a model of the H.P. and I.P. stages of an aircraft gas turbine with the two rotors running at different speeds. It was 'cold flow' tested using air at 420 K and 2.95 bar. Both hot wire and pressure probe instrumentation was used with radial and circumferential traverses after each blade row. The through-flow program used to provide sample results is based on a method of solution for axisymmetric and steady flow in axial turbomachines; it solves the complete radial equilibrium equation - acounting for enthalpy and entropy gradients and streamline curvature effects - in a specified number of stations ahead of and after the blade rows. An orthogonal curvilinear system of coordinates, having the meridional coordinates coincident with the generatrices of the flow stream surfaces, is used in the solution. Overall predicted efficiency is 89.1% of the measured results. T.M.

N82-17186# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SURVEY ON DIFFUSION FACTORS AND PROFILE LOSSES

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 115-126 refs

Avail: NTIS HC A15/MF A01

Emphasis is placed upon the development of stage and blade design procedure that will replace the simple loss prediction techniques in use today. These techniques are difficult to apply to real machine design because extensive iterative hub-to-tip, blade-to-blade, and boundary-layer flow calculation is needed. Parametric studies with blade-to-blade flow and boundary layer calculation codes were examined which attempt to refine the diffusion factor concept and loss correlation at design as well as off-design compressor operation. The codes begin to demonstrate how the flow parameters (including Mach- and Re-number) and the details of blade geometry interact to produce performance characteristics. T.M.

N82-17188# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

END-WALL BOUNDARY LAYER CALCULATION METHODS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 137-150 refs

Avail: NTIS HC A15/MF A01

The end-wall boundary layer (EWBL) approach to secondary losses is based on the integration of the pitch-averaged three-dimensional boundary layers along the hub and tip walls, with extra assumptions for the blade force defect terms. From there an efficiency drop is calculated including secondary flow effects, as well as blockage. The method allows in principle for the influence of inlet blockage, clearance, axial gap, aspect ratio and other parameters to be included through their effect on the end-wall boundary layers. From the knowledge of the velocity profiles inside the boundary layers, the full radial variations of incidence and turning can be predicted by coupling a radial equilibrium calculation to the EWBL calculation. T.M.

N82-17189# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

CORRELATION FOR SECONDARY FLOWS AND CLEARANCE EFFECTS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 151-165 refs

Avail: NTIS HC A15/MF A01

It is concluded that correlations obtained from straight cascade data will at least provide correct trends for the effect of clearance in compressors. With cascade data, the effect of variation of blade circulation with span is not known. This will cause problems if spanwise distributed correction for losses and angle are to be considered. For turbine, it is well known that for secondary flow effect the loss level as obtained from cascade data may differ of an order of magnitude from the machine losses. This is linked most probably to the effect of relative motion when passing from nozzle to rotor or vice-versa. In compressors this effect tends to bring back the end-wall boundary layer to a more collateral state, and the difference might be somewhat less. T.M.

N82-17190# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

EFFECTS OF REYNOLDS NUMBER AND TURBULENCE LEVEL ON AXIAL CASCADE PERFORMANCE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 164-170 refs

Avail: NTIS HC A15/MF A01

A semiempirical theory was developed which will predict the behavior of the shear layer across a laminar separation bubble. The method is proposed for two dimensional incompressible flow and is applicable down to short bubble bursting. The method can be used to predict the length of the laminar bubble, the bursting Reynolds number, and the development of the shear layer through the separated region. As such, it is a practical method for calculating the profile losses of axial compressor and turbine cascade in the presence of laminar separation bubbles. It can also be used to predict the abrupt leading edge stall associated with thin airfoil sections. The predictions made by the method are compared with the available experimental data. T.M.

N82-17191# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SURVEY ON THE EFFECT OF BLADE SURFACE ROUGHNESS ON COMPRESSOR PERFORMANCE

In its Through Flow Calculation in Axial Turbomachines Oct. 1981 p 171-180 refs

Avail: NTIS HC A15/MF A01

Analysis of limited experimental data reveals that critical roughness Reynolds number of compressor blades manufactured with typical present day methods as forging/etching and electrochemical machining are around 90 and therefore very close to sand type roughness if roughness height is based on the largest peaks. Modern high pressure ratio engines suffer from blade surface roughness in the back stages of the compression system. Surface quality needed to keep the flow hydrodynamically smooth exceeds considerably the best present day quality achievable, thus limiting the potential efficiency gain at high Reynolds number flight conditions, i.e., essentially low level flight conditions. L.F.M.

N82-17192# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

PART SPAN DAMPER LOSS PREDICTION FOR TRANSONIC AXIAL FAN ROTORS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 181-183 refs

Avail: NTIS HC A15/MF A01

For off design conditions, the maximum loss due to the damper and region of influence at design point are calculated and these values are used as reference quantities for all off design calculations. The point of intersection of a constant throttle or area operating line through the design point with a speed line defines the reference point where the PSD loss is minimum. From this point the suction surface incidence at the damper location is determined from experimental data or off design analysis code. Then the damper maximum loss region of influence is calculated for any point on the speed line by taking the difference in suction surface incidence at that point and the reference incidence. To minimize damper loss, several things should be taken into consideration. Both approaches agree on the following: the damper should be as thin as possible so as to minimize the area influenced; the damper should be located as near to the hub as possible; work input should be minimized at the PSD location. Correlation of experimental results shows further that damper trailing and leading edge thickness should be as sharp as possible. L.F.M.

N82-17193# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

DEVIATION/TURNING ANGLE CORRELATIONS

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 184-211 refs

Avail: NTIS HC A15/MF A01

In the past, compressor through flow solutions used substantial input from experimental measurements made in actual fan and compressor flow messages or in flows simulating real compressor conditions. For example, almost total reliance was placed on experimentally supported methods for estimation of fluid turning angles in individual blade rows. Compressor design is, as a result, heavily dependent on the quality of the experiment and data correlations associated with these methods. The three principal currently used prediction methods for flow turning angle were developed during the period 1945 to 1960. One of these methods directly predicts fluid turning angles in terms of cascade geometry and aerodynamic parameters. The others predict the exit flow deviation angle, defined as the angle between the average exit flow direction and the direction of a line tangent to the blade section camber line at the trailing edge. There has been no substantial modernization of these deviation/turning angle procedures since 1960, while during this time the methods have been widely applied to airfoil section profiles and in aerodynamic regimes far outside the limits suggested by the original derivations and data correlations. A discussion of these problems is presented. L.F.M.

N82-17194# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AXIAL COMPRESSOR STALL AND SURGE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 212-213 refs

Avail: NTIS HC A15/MF A01

The so called surge line evaluation is an extremely complex area, which deserves in itself full attention. The intention here was only to define the problem. The existing methods of prediction do not take the real physics of the flow into account, and cannot explain or consider or identify all the parameters of importance. They are however quick and useful for the range in which they have been calibrated, but are mostly not available in public literature. A more generalized use of the pseudoend wall boundary layer approach seems interesting. Satisfactory solutions will come however only from the logical approach of instability detection, second flow regime and system response characterization, for which solid elements are now in hand but require further development. L.F.M.

N82-17195# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

SUMMARY OF ANSWERS TO THE QUESTIONNAIRE

In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 214-218 refs

Avail: NTIS HC A15/MF A01

To ascertain better the state of the art, a questionnaire bearing on particular points raised by the general survey paper of Hirsch was prepared and distributed to industry and research groups. Questions concerning compressor loss correlations, flow turning correlations, and secondary and clearance effects were asked. Answers were received from six countries and a summary is presented. L.F.M.

N82-17196# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
SINGLE STAGE TRANSONIC COMPRESSOR AND EQUIVALENT PLANE CASCADE
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 221-228 refs

Avail: NTIS HC A15/MF A01

The working group 12 activities cover primarily turbomachinery off design performance prediction, however include also blade to blade calculation on relevant test cases to get more information on those basic flow phenomena that affect flow losses and turning in blade rows. One of the test cases selected is the DFVLR single stage transonic compressor that was tested in great detail with the results well documented, particularly intrablade velocity data of the rotor are available from extensive flow studies with laser velocimetry. The data allow to compare blade to blade calculations to actual transonic compressor flow. Additionally to the rotor tests the rotor blade section at 45% span was investigated in the DFVLR transonic cascade windtunnel. L.F.

N82-17197# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
BBC/SULZER. 4 STAGE TRANSONIC COMPRESSOR
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 229-244
Avail: NTIS HC A15/MF A01

Tests were performed on the BBC/SULZER 4 stage Transonic Compressor. The overall performance map and some traverse of stagnation pressure and temperature at compressor outlet are presented. L.F.M.

N82-17198# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
RESULTS OF CALCULATIONS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 245-246 ref

Avail: NTIS HC A15/MF A01

The types of calculations were performed by various participants, each using his own method for through flow calculations and blade to blade calculations. The Working Group's task was to demonstrate that the use of systematic blade to blade calculations could provide a support for the confirmation of an existing correlation or the development of a new one. It is believed that the present development and state of the numerical tools available in order to compute complex flow structures, should be used more and more extensively in order to develop a deeper understanding of the flow mechanism of loss production and of turning. L.F.M.

N82-17199# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE THROUGH FLOW CALCULATIONS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 247-268 refs

Avail: NTIS HC A15/MF A01

Through flow calculations of three test cases were performed by various authors belonging to industrial or research organizations. The four-stage transonic compressor, the two-stage compressor, and the single stage compressor are discussed. L.F.M.

N82-17200# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
EVALUATION OF PROFILE LOSS PREDICTIONS BASED ON DIFFUSION FACTORS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 269-280 refs

Avail: NTIS HC A15/MF A01

A comparison between theoretically predicted and measured profile losses was made, in order to evaluate the precision of the different prediction methods. These prediction methods are based on the relation between suction side diffusion and profile losses. The evaluation concerns as well the prediction of diffusion factor as predicted values of profile losses. It is further shown that these correlations are not universally valid for all blade shapes and that some correlations perform as well at design as at off design if the suction side diffusion is correctly predicted. Author

N82-17201# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AXIAL-FLOW TURBOMACHINE THROUGH FLOW CALCULATION METHODS
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 285-306 refs

Avail: NTIS HC A15/MF A01

Through flow calculation methods are considered to be computational techniques for prediction of fluid velocities and thermodynamic properties at designated locations in the internal flow path of a turbomachine. The objectives are to trace the development of several classes of through flow calculation, to suggest the importance of understanding the assumptions underlying representative examples of each class, and to outline the principal problems in application of through flow methods to current axial-flow compressors and turbines. L.F.M.

N82-17202# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
BLADE-TO-BLADE COMPUTATIONS AND BOUNDARY LAYER CORRECTIONS IN AXIAL COMPRESSORS AND TURBINES
In its Through Flow Calculations in Axial Turbomachines Oct. 1981 p 307-326 refs

Avail: NTIS HC A15/MF A01

The number of inviscid calculation methods available today is quite impressive, and they allow an accurate prediction of inviscid incompressible, subsonic compressible and transonic flow. Recent progress has also resulted in a remarkable decrease of required computational effort, which makes them even more attractive to industrial applications. However, as these methods do not account for viscosity, the field of application is quite restricted, and good predictions can be obtained only for flow configurations where viscous effects can be neglected (e.g., turbines and low loaded compressor cascades). A similar conclusion can be drawn about boundary layer methods, with a limitation on shock boundary layer interaction, where complete solutions still require a large amount of computational effort. The combination of these two types of calculations started quite recently, and a lot of progress can be expected in the near future. Improvements which can be expected from a better combination of these two types of calculations will be more important than an improvement in the inviscid calculations. Based on the present state of the art concerning shock boundary layer interaction calculations, it appears that integral or inverse methods are the best suited to industrial calculations. However, in view of the considerable efforts currently made towards the development of the Navier-Stokes equation solution, it is more likely that, in the near future, this method will lead to more reasonable computation times and permit practical applications. L.F.M.

N82-17203# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HELICOPTER PROPULSION SYSTEMS
Sep. 1981 277 p refs Partly in ENGLISH, partly in FRENCH Meeting held in Toulouse, 11-14 May 1981
(AGARD-CP-302; ISBN-92-835-0299-X) Avail: NTIS HC A13/MF A01

Component technology for turboshaft engines and transmissions, inlet protection systems, engine-airframe dynamic compatibility, and future requirements are described.

N82-17204# Textron Bell Helicopter, Fort Worth, Tex.
HELICOPTER PROPULSION SYSTEMS: PAST, PRESENT AND FUTURE
Robert R. Lynn and Gordon E. Holbrook *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs

Avail: NTIS HC A13/MF A01

Helicopter propulsion systems are reviewed, and it is noted that helicopter development is paced to a major extent by the power plant. Power available, reliability, fuel consumption, power-to-weight ratio, and life cycle costs are key parameters. The application of emerging technologies such as microelectronics, ceramics and other new materials and approaches, and the continuing refinement of the aerodynamics and dynamics of gas turbine power plants are discussed and noted to result in a significant benefit to the helicopter and its operator. Important airframe-propulsion system interface requirements are given, and the need is discussed for new innovative certification procedures that provide for emergency operation with acceptable economics. Finally, future propulsion system capabilities are projected and their dramatic benefit for the helicopter noted. Author

N82-17205# Societe Turbomeca, Bordes (France).
DEVELOPMENT TEST PROGRAMS ADAPTED TO HELICOPTER ENGINES [PROGRAMMES D'ESSAIS DE DEVELOPMENT ADAPTES AUX MOTEURS D'HELICOPTERES]
J. Fresco *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p In FRENCH

Avail: NTIS HC A13/MF A01

The path to follow in a general program of engine development is shown with constraints of various kinds. There are regulatory requirements established by laws of navigability for civil aviation engines, and particular technical specifications for military aviation engines. Requirements of an operational order happen to be juxtaposed to precedents which are set by the different types of usages envisioned: flight profiles of various missions, and the environmental conditions likely to be encountered. This second factor is particularly important for a helicopter turbine because of the different utilizations and environmental conditions compared to a jet or turboprop engine. To address all these requirements, a test program must be built which, among others, takes into consideration this group of sometimes contradictory constraints in order to obtain certification and as well as to bring about development and operation without major risk. Specific tests for a helicopter turbine are examined with emphasis on the MAKILA program turbine which is on the AS-332 super PUMA. Transl. by A.R.H.

N82-17206# Army Aviation Research and Development Command, St. Louis, Mo.
AIRCRAFT TURBINE ENGINE DEVELOPMENT: CURRENT PRACTICES AND NEW PRIORITIES
Charles C. Crawford, Jr. and William J. Crawford, III (GE, Lynn, Mass.) *In* AGARD Helicopter Propulsion Systems Sep. 1981 8 p
Avail: NTIS HC A13/MF A01

The T700 engine program was conducted during the 1970's and is representative of recent practices employed in the development of turboshaft engines for U.S. military application. The engine, which is in the 1,600 horsepower class, recently entered service in the twin engine U.S. Army UH-60A Black Hawk helicopter. The T700's field introduction follows an extensive program of technology demonstration, development, qualification and maturity. Requirements applied in the T700 program and associated benefits, challenges and penalties are surveyed. Suggested improvements for future programs are offered, and technology needs revealed during T700 development are identified. Post-qualification maturity testing, which was conducted to provide early exposure of high time failure modes, is described. Program features which are important for development costs payback are summarized. J.D.H.

N82-17207# Ministry of Defence, London (England). Directorate of Engine Technology.
FUTURE TECHNOLOGY AND REQUIREMENTS FOR HELICOPTER ENGINES
M. D. Paramour and M. J. Sapsard *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs

Avail: NTIS HC A13/MF A01

The design considerations and technology needed to meet possible future operational requirements are discussed and the relevant technological work being carried out or supported by the UK Ministry of Defence (Procurement Executive) is described. Also considered are the tradeoffs which become necessary in seeking a suitable solution to conflicting needs. Finally the sizes of engines required to meet likely aircraft applications are examined. J.D.H.

N82-17208# Rolls-Royce Ltd., Leavesden (England).
MECHANICAL ADVANCES IN THE DESIGN OF SMALL TURBOSHAFT ENGINES
J. Dominy and K. J. Hart *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p

Avail: NTIS HC A13/MF A01

Mechanical components have a significant influence on the efficiency of a small gas turbine engine. Some of the performance losses associated with the design of the power transmission and internal air system are defined and discussed. Improvements in engine efficiency must be considered in conjunction with cost, reliability and size or weight. Many of the problems considered are applicable to gas turbines in general but become acute in small engines due to the adverse effects of scale on many components design parameters. To meet the increasing demand for more efficient powerplants the mechanical research engineer must improve the analysis of mechanical component behavior to produce optimized engine designs. Author

N82-17209# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
ADVANCED COMPONENT DEVELOPMENT DESIGN BASIS FOR NEXT GENERATION MEDIUM POWER HELICOPTER ENGINES
Jean Hourouziadis and Horst B. Kreiner *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p refs

Avail: NTIS HC A13/MF A01

Assuming an optimized thermodynamic cycle, engine components requiring intensive research and development efforts to produce a mature and reliable production engine are identified. Aerodynamic and structural data from rig and demonstrator test programs are presented. J.D.H.

N82-17210# Societe Turbomeca, Bordes (France).
THE INFLUENCE OF NEW TURBINE TECHNOLOGIES ON THEIR COMPONENTS [INFLUENCE DES NOUVELLES TECHNOLOGIES DES TURBINES SUR LEURS COMPOSANTS]
M. Giraud and H. Loustalet *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p In FRENCH

Avail: NTIS HC A13/MF A01

The interdependence of the turbine engine with that of its components is considered as well as the objectives for developing future helicopter engines with average power. The classic design of an engine is used to show that a new architecture is required in order to reduce costs and increase reliability. The engine architecture has a strong impact on the technology and performance of its components and this places imposes on the designer new technologies for construction. High pressure turbines, reverse flow combustion chambers, and axial and centrifugal compressors are discussed. Transl. by A.R.H.

N82-17211# Avco Lycoming Div., Stratford, Conn. Preliminary Design and Advanced Programs.
AERODYNAMIC COMPONENTS FOR SMALL TURBOSHAFT ENGINES
J. W. Schrader and W. F. Schneider *In* AGARD Helicopter Propulsion Systems Sep. 1981 15 p

Avail: NTIS HC A13/MF A01

Future developments of advanced helicopter engines are projected from an aerothermodynamic viewpoint. Cycles for engines aiming at lower specific fuel consumption, improved power lapse rates, and implementation of contingency ratings are discussed. These cycles include nonregenerative and regenerative cycles. Design trends are presented for the major engine aerodynamic components. Author

N82-17212# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
REGENERATIVE HELICOPTER ENGINES: ADVANCES IN PERFORMANCE AND EXPECTED DEVELOPMENT PROBLEMS
H. Grieb and W. Klussmann *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p ref Sponsored by Ministry of Defence of the Federal Republic of Germany

Avail: NTIS HC A13/MF A01

On the basis of modern engine component technology, including and emphasizing recent progress in high temperature heat exchanger technology, a conventional and a regenerative helicopter engine in the 900 kW power class are compared in design, performance and life cycle costs. The comparison shows that the installation properties of the two engines are roughly the same. The variable power turbine, being an indispensable part of a regenerative engine, leads to an extremely favorable transient behaviour with a moderate influence of severe cyclic loading on hot-part lifetime. No significant difference exists in infrared (IR) emission at part load, due to the design of the IR suppressor for the same exhaust temperature at maximum power. The life-cycle costs of a future fleet of attack helicopters equipped with regenerativad engines can be lower than with conventional engines. J.D.H.

N82-17213# Westland Helicopters Ltd., Hayes (England).
LUBRICATION BREAKDOWN BETWEEN GEAR TEETH
B. A. Shotter *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p
Avail: NTIS HC A13/MF A01

Damage to gear teeth attributable to lubrication failure is an important failure mode. Detailed observations of the early stages of breakdown suggest that one may not be dealing with a single process: hence great care is necessary when drawing conclusions from observing a damaged pair of gears. A study of a number of these critical areas and discussion about others highlights the complexity of the problem. J.D.H.

N82-17214# Sikorsky Aircraft, Stratford, Conn.
ADVANCED TRANSMISSION COMPONENT DEVELOPMENT
Kenneth M. Rosen and Harold K. Frint *In* AGARD Helicopter Propulsion Systems Sep. 1981 17 p refs

Avail: NTIS HC A13/MF A01

Design innovations in helicopter gearbox development which permit high temperature operation at increased speeds without degrading strength or weight goals are discussed. One avenue of investigation, which shows promising strength or weight advantages, is high contact ratio gearing. The means taken to obtain a high contact ratio tends to produce an inherently weaker tooth and reliance must be placed on the multiple load-sharing feature of this design to achieve an advantage over low contact ratio gears. The appropriate consideration which must be addressed in the design stage to achieve optimum results is described. To provide high temperature capability, two UH-60A helicopter main transmission housings were fabricated from a stainless steel alloy to replace the conventional magnesium alloy casing. Design details and fabrication procedures are discussed. J.D.H.

N82-17215# Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate (Italy).
DESIGN CRITERIA OF THE A 129 HELICOPTER DRIVE SYSTEM
A. Garavaglia and G. Gattinoni *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p

Avail: NTIS HC A13/MF A01

The design philosophy of the Agusta-A 129 drive system which is developed to meet the modern requirements for a light helicopter in the antitank role with night and day fighting capability are discussed. The stringent requirements of system layout and achieving low weight, high life, maximum reliability, survivability and ballistic tolerance, through integrated system design, modular concepts, use of redundant system and dry run capability are outlined. E.A.K.

N82-17216# Service Techniques des Programmes Aeronautiques, Paris (France).
HELICOPTER DEVELOPMENT IN FRANCE [LE DEVELOPPEMENT DES HELICOPTERES EN FRANCE]
Daniel Berthault *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p In FRENCH

Avail: NTIS HC A13/MF A01

For the French helicopter industry, the last two decades correspond to a period of rapid growth. The national armed forces were supplied with significant quantities of good quality military equipment well adapted to their operational objectives. Considerable successes were met in the sale for exploration of military helicopters as well as other machines for civilian use, which were developed by taking account of market requirements. These were often classed in a very favorable manner in relation to the products of competitors. The essential characteristics of helicopter development in France during this period are traced. The lines of direction and the modality of action taken by various public services in this regard are analyzed. By defining future needs and the centers of action, perspectives for the future are outlined. Transl. by A.R.H.

N82-17217# Societe Nationale Industrielle Aerospatiale, Marignane (France.)
HELICOPTER AIR INLETS [ENTREES D'AIR D'HELICOPTERES]
A. Vuillet *In* AGARD Helicopter Propulsion Systems Sep. 1981 9 p refs In FRENCH

Avail: NTIS HC A13/MF A01

Because of engine architecture, air inlets on low and medium tonnage helicopters are located behind the rotor head, which makes feeding very difficult. This is particularly the case of the Ecureuil AS 350 and the Dauphin SA 365 which are equipped with new generation engines. These turbines have axial or annular intakes behind which the reductor is located beside either the blast pipe or the compressor. An indepth study of the air intakes from the project stage can permit their design with a minimum of unlucky repercussions on the power supplied by the engine, on the layer of the device, and on risks to pumping. For this reason, such a study is needed to reduce the delays and costs of operating such an intake in flight. Methods used at Aerospatial and results obtained on different devices are described. Transl. by A.R.H.

N82-17218# Westland Helicopters Ltd., Yeovil (England).
INTAKE DESIGN WITH PARTICULAR REFERENCE TO ICE PROTECTION AND PARTICLE SEPARATORS
P. A. H. Brammer and D. J. Rabone *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p ref

Avail: NTIS HC A13/MF A01

Total environmental protection for helicopter engines is discussed. The problems associated with different environments and intake systems which are used to give protection against particular environments are outlined. Three intake systems for evaluation in natural environments are proposed. E.A.K.

N82-17219# Societe Nationale Industrielle Aerospatiale, Marignane (France.)
THE DISTRESS REGIME ON THE BIMOTORED HELICOPTER [REGIME DE DETRESSE SUR HELICOPTERE BIMOTEUR]
J. P. Dedieu, M. Russier, and H. Dabbadie (Societe Turbomeca, Bordes, France) *In* AGARD Helicopter Propulsion Systems Sep. 1981 8 p refs In FRENCH

Avail: NTIS HC A13/MF A01

The trend toward bimotorization of civil and military helicopters raises the question of choice of power level for each engine in order to obtain acceptable performance in case of engine trouble, particularly at very low speed. The use of a distress regime to obtain a very high power level, for a short time, once in the life of an engine seems to be an interesting and promising approach. The relation between the levels of distress power and parameters related to the use of the helicopter, takeoff, mass, ceiling, and operating cost are considered for the case of a bimotored helicopter of average weight. The perspectives of homologization and the civil certification of such a regime on real technology engines are examined. Transl. by A.R.H.

N82-17220# Boeing Vertol Co., Philadelphia, Pa.
ENGINE/DRIVE/AIRFRAME COMPATIBILITY: A WAY OF LIFE
Carl Albrecht *In* AGARD Helicopter Propulsion Systems Sep. 1981 7 p refs
Avail: NTIS HC A13/MF A01

Engine/drive/airframe compatibility in development stages or during production of a new design were studied. Various compatibility encounters on Boeing Vertol helicopters, analyses, solutions as effected by current technology and engine/airframe manufacturer relationships and dynamic interface items are discussed. E.A.K.

N82-17221# Pisa Univ. (Italy). Ist. di Macchine.
PROBLEMS OF ENGINE RESPONSE DURING TRANSIENT MANEUVERS
Dino Dini *In* AGARD Helicopter Propulsion Systems Sep. 1981 14 p refs
Avail: NTIS HC A13/MF A01

Helicopter transition flight regime and extreme flight maneuvers which determine abrupt variation of the rotor drag torque during each revolution, and the corresponding effects on the engine are discussed. Repeated surging and the attendant transient torsional loads from the engine cause damage to the airframe components. The angular rotor acceleration, cyclically variable, influences the turbine gas producer rotor speed, introducing flow distortions and aeromechanical effects in all the engine. It is found that periodic and inertial blade loading has serious consequences to discs and shaft to which the blades are attached. The higher harmonics of the excitation over the discs provokes relevant flexural modes of forced vibration. Operation in transient rating with pitch increase or decrease has the greatest effect on the helicopter flight performance, owing to the power application capability and the fuel control system adaptability. It is shown that to obtain sufficient engine/airframe dynamic compatibility, aircraft developments have to incorporate technical advances, which include harmonic integrated controls for propulsion and flight systems. E.A.K.

N82-17222# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
HELICOPTER PROPULSIONS SYSTEMS. 1: VIBRATION PREVENTION SYSTEMS ON HELICOPTERS 2: PROBLEM OF NOISE IN THE CABIN
Gerard Genoux and Henri-James Marze *In* AGARD Helicopter Propulsion Systems Sep. 1981 19 p refs

Avail: NTIS HC A13/MF A01
Two different facets of the propulsion system/structure interaction are presented. The first interaction deals with low frequency vibration associated with the operation of the main rotor. These problems are either mechanical material fatigue and stressing or related to comfort. Implementation for reduction excitations and filtration of their transfer from the source to the cabin are described. The second interaction type is cabin noise associated with the operation of the reduction gear box. The vibratory energy generated at the gears propagates all the way to the passengers via the air and the structure. Cutting the intensity of transmission noise sources, the energy transfer between such sources and the structure and the energy radiation from the structure to the passengers is discussed. E.A.K.

N82-17223# Rolls-Royce Ltd., Leavesden (England).
AN ALTERNATIVE APPROACH TO ENGINEERING STRUCTURES USING MONITORING SYSTEMS
D. Lewis *In* AGARD Helicopter Propulsion Systems Sep. 1981 11 p
Avail: NTIS HC A13/MF A01
The micro processor based engine monitoring system (EMS) which reevaluates the rating structure and presents limitations to the pilots is discussed. The EMS system allows the achievement of a better relationship between the demonstrated capability of the engine and the authorized release for in service use. This is a first step to be followed later by a change of the qualification test to a more representative form in which the EMS gives a more tangible link between bench test and customer operation. This allows better use of the engine to be made for the short time/high power requirements giving a more efficient engine performance at cruise conditions. E.A.K.

N82-17224*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPONENT RESEARCH FOR FUTURE PROPULSION SYSTEMS
C. L. Walker (Army Propulsion Lab., Cleveland, Ohio), G. J. Weden (Army Propulsion Lab., Cleveland, Ohio), and J. Zuk *In* AGARD Helicopter Propulsion Systems Sep. 1981 12 p refs

Avail: NTIS HC A13/MF A01 CSCL 21E
The factors affecting the helicopter market for the past, present, and future are reviewed. Acquisition cost, mission reliability, life cycle cost and civil and military aspects are reviewed. The potential for advanced vehicle configurations with substantial improvements in energy efficiency, operating economics, and characteristics to satisfy the demands of the future market are identified. Advanced propulsion systems required to support these vehicle configurations and the component technology for the engine systems are discussed. The selection of components in areas of economics and efficiency is considered. E.A.K.

N82-17225# Ministry of Defence, Bonn (West Germany).
FUTURE REQUIREMENTS FOR HELICOPTER PROPULSION SYSTEMS
H.-G. Bree and G. Backmann *In* AGARD Helicopter Propulsion Systems Sep. 1981 13 p refs

Avail: NTIS HC A13/MF A01
The measurements for single or twin engine systems are discussed. The trend to more sophisticated engines is reviewed in the light of diminishing resources of materials and fuel. Expected future economic conditions make it mandatory to counteract the increase of life cycle cost experienced in most of today's military systems. Means to reduce LCC are discussed. E.A.K.

N82-17226# National Aeronautical Establishment, Ottawa (Ontario). Flight Research Lab.
AN INVESTIGATION OF MULTI-AXIS ISOMETRIC SIDE-ARM CONTROLLERS IN A VARIABLE STABILITY HELICOPTER
M. Sinclair and M. Morgan Aug. 1981 25 p ref
(AD-A106759; NAE-LR-606; NRC-19629) HC A02/MF A01 CSCL 01/4
The test aircraft was the NAE Airborne Simulator, an extensively modified Bell Model 205A-1, and the evaluation flights encompassed a wide range of demanding tasks from hover maneuvering and transitions to cruising flight, to nap-of-the-earth flight and precision IFR tracking. The isometric control systems included several two-handed and one-handed configurations with force-pedals for directional control, and one fully-integrated system which provided full control of the helicopter with either hand. T.M.

N82-17227# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical Computer and Systems Engineering.
PARALLEL COMPUTATION FOR DEVELOPING NONLINEAR CONTROL PROCEDURES Final Report, 1 Sep. 1977 - 30 Sep. 1979
Howard Kaufman and Richard Travassos Jul. 1981 238 p refs
(Grant AF-AFOSR-3418-77; AF Proj. 2307)
(AD-A107914; AFWAL-TR-81-3016) Avail: NTIS HC A11/MF A01 CSCL 09/2
Efforts since 1 October 1978 have been concerned with the application of the developed parallel optimization procedures to the design of non-linear flight control systems. Consideration has been given to the advantages to be gained from the direct use of the non-linear equations of motion and to the potential for rapid on-line optimization in response to tracked parameter changes and/or changes in the mission objectives. To date, based upon the non-linear longitudinal equations for the F-8, it has been shown that parallel optimization procedures alone can reduce the time required for optimization by at least 30% and that the direct use of the nonlinear (rather than the linearized) equations of motion does indeed improve attitude control. A study of further incorporation of parallelism into the basic utility routines such as integration and matrix manipulation has shown that the convergence time for a representative optimal control computation can be reduced by a factor of 20. Thus, it was concluded that incorporation of parallel computers might indeed permit online control computation and/or adaptation. To this effect possible architectural structures for such computers have also been studied. GRA

N82-17228*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
SCALE-MODEL STUDIES FOR THE IMPROVEMENT OF FLOW PATTERNS OF A LOW-SPEED TUNNEL Final Report, 1 Mar. - 31 May 1981
P. Stephen Barna Jan. 1982 46 p refs
(Grant NsG-1563)
(NASA-CR-169413) Avail: NTIS HC A03/MF A01 CSCL 14B
Parameters affecting the performance of a scale model V/STOL wind tunnel were measured. These included: (1) static pressure variation around the closed tunnel circuit as affected by the application of various screens; (2) pressure rise and radial distribution of flow through the fan; (3) variation of screen parameters and screen location affecting the flow; and (4) effects of multiple screens on the velocity distribution in the fourth diffuser. In these tests the fan was driven through a long shaft by an externally situated 11,190-W (15-HP) motor equipped to turn at 4 speeds. B.W.

N82-17229# Mitre Corp., McLean, Va.
SURVEY OF 101 US AIRPORTS FOR NEW MULTIPLE

N82-17232

INSTRUMENT APPROACH CONCEPTS
L. C. Newman, T. N. Shimi, and W. J. Swedish Sep. 1981 85 p refs
(Contract DOT-FA01-81-C-10001)
(AD-A107812; MTR-81W234; FAA-EM-82-3) Avail: NTIS HC A05/MF A01 CSCL 01/5

Several new concepts for multiple instrument approaches have been proposed to improve capacity and reduce delays at U.S. airports. The concepts include: dependent parallel approaches at reduced runway spacing; independent parallel approaches at reduced runway spacing; converging approaches; and triple approaches. One of the runways involved may be a separate short runway for general aviation and commuter traffic. A survey of 101 top U.S. airports was performed to determine the potential for applying the concepts to the existing runways. Specific applications of each relevant concept are provided. Calculations were performed for the top 30 U.S. air carrier airports to determine the actual delay improvement which could be expected to result from application of the multiple-approach concepts. Additionally, some general results are obtained for the remaining 71 airports. Author (GRA)

N82-17232# European Space Agency, Paris (France).
A SIMPLE HYBRID VISUAL SIMULATION FOR RESEARCH FLIGHT SIMULATORS
Friedrich Erdmann and Eckhard Biertuempel Nov. 1981 46 p refs Transl. into ENGLISH of "Eine einfache hybride Sichtsimulation fuer Forschungsflugsimulatoren" Rept. DFVLR-Mitt-80-13 Brunswick, Jul. 1980
(ESA-TT-690; DFVLR-Mitt-80-13) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 14.40

The basic theory of the system is described together with its realization with general purpose computers (digital-analog). The images generated consist of contour lines of the object. A contour line brightness control (depth screwing) is employed to produce a stereoscopic effect. The applicability of the method is demonstrated using runway, target and horizon symbols and combinations of these symbols. Different scenarios can be simulated in this way. Author (ESA)

N82-17338# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
SUPERPLASTIC ALUMINUM EVALUATION Final Report, 16 Apr. 1979 - 31 Dec. 1980
M. W. Mahoney and C. W. Hamilton Wright-Patterson AFB, Ohio AFWAL Jun. 1981 203 p refs Sponsored in part by Delaware Univ.
(Contract F33615-79-C-3218, AF Proj. 2401)
(AD-A107760; SC5214.34FR; AFWAL-TR-81-3051) Avail: NTIS HC A10/MF A01 CSCL 11/6

With the development of a process to produce fine grain aluminum alloys, it is now possible to superplastically form (SPF) structural aircraft components. This document presents results from several important areas which are considered to be critical to providing a realistic assessment of the technical and economic potential for superplastic forming structures using a high strength 7475 aluminum alloy. Areas of study included (1) the evaluation of structural applications; (2) the determination of superplastic forming limits; (3) a microstructural study of cavities formed during superplastic deformation; (4) the application of hydrostatic gas pressures to suppress cavitation, and (5) the effect of superplastic deformation on subsequent service properties. Author (GRA)

N82-17342# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France)
CORROSION FATIGUE
Oct. 1981 92 p refs Presented at the 52nd Meeting of the AGARD Struct. and Mater. Panel, Cesme, Turkey, 5-10 Apr. 1981
(AGARD-CP-316; ISBN-92-835-1402-5) Avail: NTIS HC A05/MF A01

The objectives, scope, and technical requirements of a cooperative program for corrosion fatigue testing and prevention/aircraft environment simulation fatigue testing are presented. An overview of current and supplemental programs designed to assess current protection systems for aircraft structures is also given.

N82-17343# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
MECHANISMS OF CORROSION FATIGUE
D. J. Duquette *In* AGARD Corrosion Fatigue Oct. 1981 12 p refs Sponsored in part by Office of Naval Research

Avail: NTIS HC A05/MF A01

An overview of experimental variables which are considered critical to understanding the mechanisms of corrosion fatigue of high strength aluminum alloys is presented. Based on this overview, an examination of previously proposed mechanisms is attempted. These models include anodic dissolution, surface energy reduction, and hydrogen embrittlement. It is concluded that hydrogen embrittlement of process zones at alloy surfaces (for crack initiation) and at crack tips (for crack propagation) best explains observed results. A general model of corrosion fatigue of these alloys is proposed. This model suggests that the nature of the naturally formed oxide film on aluminum alloys may be a critical factor. Chemical or mechanical damage of the film allows hydrogen ingress. The presence of second phase particles which may act as sinks for dislocation transported hydrogen, may also be a necessary prerequisite to significant amounts of reduction in fatigue resistance associated with corrosion. Author

N82-17344# Toronto Univ. (Ontario). Dept. of Mechanical Engineering.
FRACTURE MECHANICS BASED MODELLING OF THE CORROSION FATIGUE PROCESS
David W. Hoeppner, Douglas Mann, and J. Weeks *In* AGARD Corrosion Fatigue Oct. 1982 17 p refs Sponsored in part by NSERC and Dept. of Energy, Mines and Resources of Canada

Avail: NTIS HC A05/MF A01

Corrosion fatigue of structural elements involves a synergism between cyclic load and a chemical environment involving both time and temperature as rate-controlling parameters. The development of rational life prediction methods is hampered by both the lack of mechanistic understanding, the large number of corrosion-fatigue synergisms, and the inadequacies of fracture mechanics based models in both pre mode I fatigue cracking and initial mode I cracking. Aspects of mechanisms related to the formulation of corrosion fatigue life prediction models are discussed in relation to micromechanical modelling based on fracture mechanics. Emphasis was placed on the formation of mode I fatigue cracks from pits, and fretting surface damage. A discussion of the needs in this area is presented. It is believed that with further analytical and experimental information the models presented can be verified and provide useful guidance to engineers and scientists attempting to deal with corrosion and fretting fatigue. Author

N82-17345# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Central Lab.
CORROSION FATIGUE BEHAVIOUR OF SOME ALUMINIUM ALLOYS
D. Aliaga and E. Budillon *In* AGARD Corrosion Fatigue Oct. 1981 12 p
Avail: NTIS HC A05/MF A01

An evaluation of corrosion fatigue strength of aluminum alloys currently used in the aeronautical industry was made. Crack propagation was evaluated in various different environments (dry argon, wet air, salt water). The effect of frequency, of test specimen thickness, and of ratio R (R = Kmin/Kmax) were investigated. And the effect of these various environments on the endurance limit of 10 to the 7th power cycles was likewise studied and some surface protections evaluated. The intent of the survey was to compare the response in fatigue of various aluminum alloys used in the aeronautical construction. The environments studied were the following: dry argon, wet air and salt-water. They were retained so as to simulate and amplify the more or less aggressive nature of these environments in which aircraft can find themselves both on the ground or in the air. The two major aspects of corrosion fatigue namely crack initiation and crack propagation were studied with an emphasis on in-service behaviour. As far as crack initiation is concerned some surface treatments and protections currently used in aeronautics were examined in various environmental conditions. M.D.K.

N82-17346# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
FLIGHT-BY-FLIGHT CORROSION FATIGUE TESTS
Walter Schuetz *In* AGARD Corrosion Fatigue Oct. 1981 10 p refs
Avail: NTIS HC A05/MF A01

Corrosion fatigue tests should be conducted under realistic load sequences especially for tests with riveted specimens because the rare high loads of the spectrum may loosen the fasteners, damaging the corrosion protection system and therefore rendering it ineffective. Possibly this does not happen in constant amplitude tests because the loads may not be high enough to crack the protection system. This was the reasoning behind the test program carried out with flight-by-flight tests. Tests were carried out with two aluminum alloys typical for use in modern and in faying aircraft respectively, namely 7475-T 761 and 7075-T6. The sheet materials were exchanged between two laboratories so that both would use materials of the same heats. The specimens used differed, however, in the corrosion protection systems and in the manufacturing of the specimens by different firms. A project status report is made. M.D.K.

N82-17349# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AIRCRAFT CORROSION
Aug. 1981 194 p refs Partly in ENGLISH, partly in FRENCH Meeting held in Cesme, Turkey, 5-10 Apr. 1981
(AGARD-CP-315; ISBN-92-835-0298-1) Avail: NTIS HC A09/MF A01

Corrosion resistant materials and protection systems for aircraft are addressed. The incidence of corrosion of aircraft structures under varying environmental conditions is discussed. Maintenance, cost factors, education and retraining, and the communication link among the designers, manufacturers and the research community are among the topics covered.

N82-17350# Atlantic Fleet, Norfolk, Va.
US NAVAL FLEET AIRCRAFT CORROSION
G. T. Browne *In* AGARD Aircraft Corrosion Aug. 1981 15 p

Avail: NTIS HC A09/MF A01

Water entry and its associated corrosion problems were minimized. A method for sealing environmental connectors without degrading wire quick disconnect capability was incorporated by sealing the back connector shell rubber grommet with clear room temperature vulcanizing silicone type sealant. The screw holes and equipment lids were also sealed in a similar manner. Drain holes were located and drilled in nonstructural areas at low points to remove trapped water and eliminate the corrosive agents. Hidden corrosion was detected by nondestructive inspection methods during rework. These include ultrasonic, X-ray and eddy current inspection and neutron radiography on double skin areas and on areas behind stringers, etc., where corrosion is caused by moisture entrapment. Stress corrosion cracking in high strength components was discovered occasionally. Standard fleet corrosion maintenance is accomplished in accordance with procedures provided in technical manuals. Paint and corrosion removal procedures and tools are discussed. N.W.

N82-17351# Royal Air Force, Dereham (England). Central Servicing and Development Establishment.
DETECTION AND PREVENTION OF CORROSION IN ROYAL AIR FORCE AIRCRAFT
C. R. Pye *In* AGARD Aircraft Corrosion Aug. 1981 10 p

Avail: NTIS HC A09/MF A01

The problems that sometimes are created by corrosion in Royal Air Force aircraft are outlined. The problem of the harsh environment facing some military aircraft is described, and some of the materials used in aircraft construction are considered. Corrosion prevention and rectification is also discussed briefly. Some typical examples of corrosion damage found during service are illustrated, and the nondestructive testing methods used for detecting corrosion are described. These methods include visual inspection, eddy current techniques, ultrasonic techniques and X-radiography. The use of neutron radiography and other future developments is also considered. Service methods of removing corrosion and re-protecting the aircraft are mentioned. Finally the need for the manufacturer to consider corrosion at the aircraft design stage is considered. N.W.

N82-17352# British Airways, Middlesex (England). Aircraft Engineering (Structures).
AN AIRLINE VIEW OF THE CORROSION PROBLEM
R. G. Mitchell *In* AGARD Aircraft Corrosion Aug. 1981 11 p

Avail: NTIS HC A09/MF A01

Although the corrosion phenomenon is well understood by aircraft manufacturers and operators alike, most current aircraft types continue to exhibit many of the fundamental corrosion defects shown by earlier designs. It is estimated that the total annual cost to IATA member airlines is around $100 million based on 1976 operations. Environmental and maintenance effects are important and should be fully understood in their importance in minimizing corrosive attack. In addition to the more common forms, filiform corrosion and microbiological contamination present hazards to aircraft operating in certain areas of the world. Temporary water displacing fluids are becoming common in their use, and subject to certain limitations are providing valuable short term protection. The FAA design rules require the effects of corrosion to be considered at the design stage which should result in an improved product for the operator. In addition the IATA document Guidance Material on Design and Maintenance Against Corrosion of Aircraft Structures specifies practices which should also improve the overall product. Author

N82-17353# Middle East Technical Univ., Ankara (Turkey).
SOME OBSERVATIONS ON THE CORROSION OF AIRCRAFT AT THE AIR FORCE BASE IN BANDIRMA, TURKEY
M. Doruk *In* AGARD Aircraft Corrosion Aug. 1981 8 p

Avail: NTIS HC A09/MF A01

The types and the causes of corrosion which have been observed primarily on aircraft of Type F-5A in Turkey are studied. Visual inspection showed many locations of concentration of corrosion. The vertical stabilizer attach angle (alloy 7075-T6) fails through exfoliation corrosion and galvanic attack in the bolt holes. Galvanic corrosion has also been observed around the jaw bolts under the main wings. Another case of exfoliation attack has been found on the uplock support rib (Alloy 7075-T6 or 7079-T6) in the main landing gear well. Damage in the honeycomb assembly which appears as a debonding between the honeycomb structure and the top plate has been regarded as a serious problem. Corrosion damage is attributed to the high corrosiveness of the atmosphere of Air Force Base laden with sea salt and polluted from industries in the neighborhood. Author

N82-17354# Technical Univ. of Istanbul (Turkey).
ON THE CORROSION PROBLEMS OF THE TAF F-5 AIRCRAFT
A. Inalhan *In* AGARD Aircraft Corrosion Aug. 1981 1 p

Avail: NTIS HC A09/MF A01

Corrosion problems of the F-5 aircraft in Turkey are examined. The importance of atmospheric effects are disputed. The investigation and conclusions are recounted. N.W.

N82-17355# Service Techniques des Programmes Aeronautiques, Paris (France).
THE EXPERIENCE OF CORROSION ON FRENCH MILITARY AERODYNES [L'EXPERIENCE DE LA CORROSION SUR AERODYNES MILITAIRES FRANCAIS]
Melle M. Hurat *In* AGARD Aircraft Corrosion Aug. 1981 9 p In FRENCH
Avail: NTIS HC A09/MF A01

Several examples of corrosion occurring in French military aircraft in detail, e.g., honeycomb sections and metal-to-metal adhesively bonded structures were described. Information about the various measures which were taken to diminish the problem was given. The manufacturing specifications do not take care of all protection requirements. Furthermore, the paint systems which are applied are not the best available, or they have been applied in the wrong way. Bad sealing also occurs frequently. Other preventive measures, e.g., water displacing fluids, can given additional, short term, protection. N.W.

N82-17356# KLM Royal Dutch Airlines, Amsterdam (Netherlands).
DESIGN AND MAINTENANCE AGAINST CORROSION OF AIRCRAFT STRUCTURES
H. J. Versteegen and M. J. M. Versteeg *In* AGARD Aircraft Corrosion Aug. 1981 7 p

Avail: NTIS HC A09/MF A01

The publication 'Guidence Material on Design and Maintenance against Corrosion of Aircraft Structures' is reviewed. A greater understanding among manufacturers and airline managements of the magnitude of the corrosion problems and the need for measures to be taken at the design stage is considered. The best available anti-corrosion design knowledge in critical areas as a basic standard is addressed. The guidelines cover basic requirements, including material choice, design principles and manufacturing procedures. Furthermore, they cover the critical areas including origin of problems, design objectives and protective requirements. They are supplemented by an appendix giving a detailed acceptable means of compliance. N.W.

N82-17357# Michigan State Univ., East Lansing. Dept. of Metallurgy, Mechanics, and Materials Science.

FORECASTING CORROSION DAMAGE AND MAINTENANCE COSTS FOR LARGE AIRCRAFT

R. Summitt and F. Fink *In* AGARD Aircraft Corrosion Aug. 1981 11 p refs Sponsored by AF

Avail: NTIS HC A09/MF A01

Studies relating environmental and operational factors of large aircraft to corrosion damage were conducted. They provide a basis for predicting maintenance costs and for logistics decisions. The studies included: (1) an Environmental corrosion severity index, based on pollutant and weather factors; (2) an atmospheric testing program to determine environmental corrosiveness; and (3) analysis of corrosion maintenance experience in aircraft systems. Results are discussed. M.D.K.

N82-17358# Royal Aircraft Establishment, Farnborough (England). Materials Dept.

CORROSION CONTROL MEASURES FOR MILITARY AIRCRAFT: PRESENT UK REQUIREMENTS AND FUTURE DEVELOPMENTS

V. C. R. McLoughlin *In* AGARD Aircraft Corrosion Aug. 1981 15 p refs

Avail: NTIS HC A09/MF A01

The philosophy behind selection of aircraft metallic materials based on resistance to corrosion and behind mandatory requirements for processes and materials used in the protection of aircraft structures is discussed. The impact of legislation, current and future, aimed at protecting the environment is reported. The necessity for finding replacements for cadmium, chromates, and various metal finishing operations used in aircraft construction is discussed in terms of both protecting the environment and corrosion control methods used in the aircraft industry. M.D.K.

N82-17359# Aeritalia S.p.A., Torino (Italy). G.V.C. Labs.

CORROSION PREVENTION METHODS DEVELOPED FROM DIRECT EXPERIENCE WITH AEROSPACE STRUCTURES

M. Scolaris *In* AGARD Aircraft Corrosion Aug. 1981 18 p

Avail: NTIS HC A09/MF A01

Some examples of various types of corrosion experienced during hardware service are reviewed and the significant remedial action adopted first to repair and then to eliminate the problem are presented. The changes in design incorporated during design development as a function of the experience and technical knowledge acquired are also presented. Examples of effective protection validated through service life and present trends for effective corrosion prevention are also illustrated. Author

N82-17360# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).

CORROSION PREVENTION MEASURES USED IN THE CONSTRUCTION OF AN AIRCRAFT AIRFRAME: THE CASE OF 2014 AND 2214 ALLOYS [SOLUTIONS PREVENTIVES UTILISEES CONTRE LA CORROSION LORS DE LA CONSTRUCTION D'UNE CELLULE D'AVION. CAS DES ALLIAGES 2014 ET 2214]

J. Bevalot *In* AGARD Aircraft Corrosion Aug. 1981 14 p In FRENCH

Avail: NTIS HC A09/MF A01

Discussions of practical aircraft corrosion problems are presented. Aluminum alloy 2214 is evaluated in terms of its resistance to stress corrosion and its excellent fatigue properties. Heat treatment, aging at 173 C instead of 153 C, and the use of wet sandblasting techniques are discussed in terms of maintaining fatigue resistance while increasing resistance to stress corrosion. M.D.K.

N82-17361# Naval Air Development Center, Warminster, Pa.

RECENT DEVELOPMENTS IN MATERIALS AND PROCESSES FOR AIRCRAFT CORROSION CONTROL

Sara J. Ketcham and John J. DeLuccia *In* AGARD Aircraft Corrosion Aug. 1981 9 p refs

Avail: NTIS HC A09/MF A01

Advances in materials and processes for aircraft corrosion control currently in use and those under development in the laboratory for future use are described. Areas covered are corrosion preventive compounds, organic and inorganic coatings, alloy selection and heat treatments. Available materials highlighted are water displacing compounds, sealant primers, aluminum alloys 7050 and 7010 including a state-of-the-art report on the use of exfoliation and stress corrosion resistant tempers. Materials under development that offer promise of contributing to future advances include water displacing paints, flexible primer, crack arrestment compounds, powder metallurgy, aluminum alloys and substitutes for cadmium plating. Author

N82-17362# Systems Research Labs., Inc., Dayton, Ohio.

NEW CONCEPTS IN MULTIFUNCTIONAL CORROSION FOR AIRCRAFT AND OTHER SYSTEMS

M. Khobaib and F. W. Vahldiek *In* AGARD Aircraft Corrosion Aug. 1981 13 p refs

Avail: NTIS HC A09/MF A01

Multifunctional nonchromate inhibitors were developed for a Rinse Facility to reduce corrosion maintenance costs by removing corrosive contaminants from aircraft which operate in aggressive environments such as marine environments. These inhibitor systems are low cost, water soluble, nontoxic formulations which are effective against general corrosion, localized corrosion, and environmentally assisted crack growth under conditions of stress corrosion and corrosion fatigue. Extensive polarization, immersion, and galvanic-coupling experiments were conducted to determine effectiveness. A borax-nitrite-based inhibitor containing small additions of nitrate, silicate, phosphate, and mercaptobenzothiazole was found to provide excellent corrosion protection for high strength aluminum and steel alloys used in aerospace applications and for copper-bearing alloys used in electronic components and in parts of the Rinse Facility. Envionmental effects upon crack-growth rates of aluminum and high strength steel alloys were eliminated, reducing the rates in corrosion fatigue as compared to those obtained in air. A test program using these inhibitors is described. Tracking of maintenance costs and corrosion damage in being conducted to determine the effectiveness of the inhibited rinse in reducing corrosion costs. M.D.K.

N82-17363# Naval Air Development Center, Warminster, Pa.

CORROSION IN NAVAL AIRCRAFT ELECTRONIC SYSTEMS

Irving S. Shaffer *In* AGARD Aircraft Corrosion Aug. 1981 12 p refs

Avail: NTIS HC A09/MF A01

Naval aircraft electronic equipment suffer frequently from the effects of moisture and corrosion. The critical design features which have led to excessive susceptibility to these failure modes are described. Several examples are cited of inadequately protected equipment located in aircraft installations where they were subjected to repeated moisture intrusion during rainstorms, low level flights over water and high pressure fresh water washdowns. The specific deterioration effects that occurred on the various components that make up the avionic systems are presented. Maintenance data summaries are included to denote further the corrosion problem severity. Corrective measures in design, testing and maintenance are also discussed. Author

N82-17364# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).

CORROSION PROTECTION SCHEMES FOR AIRCRAFT STRUCTURES: SOME EXAMPLES FOR THE CORROSION BEHAVIOUR OF Al ALLOYS

Henri Lajain *In* AGARD Aircraft Corrosion Aug. 1981 16 p

Avail: NTIS HC A09/MF A01

A summary of the main groups of aircraft surface protection procedures frequently applied is presented. In addition, some examples are given on the corrosive behavior of aluminum alloys. Information is also given on novel nondestructive test methods serving to recognize corrosion within the scope of aircraft maintenance. The following requirements which must be imposed with regard to the performance and quality of the surface protection are considered and discussed: (1) the potential differences of the materials used are to be kept as low as possible, i.e., constructive measures must be taken; (2) prevention of any local element activity by providing insulating protective coatings, i.e., by preventing a current; (3) inhibition by providing cover layers (e.g., chromate passivation); and (4) introducing layers which act as so-called sacrificial anodes. M.D.K.

N82-17377# Swedlow, Inc., Garden Grove, Calif.
TRANSPARENT POLYOLEFIN FILM ARMOR Final Report, 30 Mar. 1976 - 28 Feb. 1981
Ralph Shelton Watertown, Mass AMMRC Aug. 1981 264 p refs
(Contract DAAG46-76-C-0034)
(AD-A107562; SI-ER-1001; AMMRC-TR-81-41) Avail: NTIS HC A12/MF A01 CSCL 19/4

The general objective of this project was to determine the optimum processing conditions for the large scale conversion, by molding and laminating of oriented polyolefin film into fragment resistant transparent armor suitable for Army aircraft glazing applications. The manufacturing process must produce a laminate with sufficient adhesion to resist debonding during thermal cycling and yet react as a laminar structure during ballistic impact.
Author (GRA)

N82-17401# Chevron Research Co., Richmond, Calif.
REFINING AND UPGRADING OF SYNFUELS FROM COAL AND OIL SHALES BY ADVANCED CATALYTIC PROCESSES Interim Report
R. F. Sullivan, D. J. ORear, and H. A. Frumkin Sep. 1981 319 p refs
(Contracts DE-AC22-76ET-10532; EF-76-C-01-2315)
(DE82-001127; DOE/ET-10532/T3; FE-2315-61; IR-5) Avail: NTIS HC A14/MF A01

Two coal syncrudes derived from Illinois No. 6 and Wyodak coals were refined in a extensive program which included pilot plant and laboratory studies. These studies demonstrated that advanced, commercial petroleum technology can be used to refine these syncrudes to gasoline, jet, diesel and heating fuels. The coal syncrudes have a low hydrogen content, compared to petroleum, and high concentrations of oxygen and nitrogen impurities. These syncrudes are a blend of two coal distillates boiling between C sub 5 and 680 F. Consequently, they contain no residual and have about 95% boiling in the gasoline or diesel fuel ranges. With these properties, an appropriate way to refine the syncrudes is by hydroprocessing. Hydroprocessing yields a volume of finished products which is almost equivalent to the original volume of syncrude. In addition, the heteroatoms are ultimately removed as sulfur and salable ammonia. The engineering studies provided estimates of the refining costs. DOE

N82-17459# Open Univ., Milton (England). Energy Research Group.
EVALUATION OF THE DESIGN, CONSTRUCTION AND OPERATION OF A GAS FUELED ENGINE DRIVEN HEAT PUMP
C. A. Phillips Jan. 1981 76 p refs
(ERG-034) Avail: NTIS HC A05/MF A01

The design, construction, testing, and evaluation of a gas fueled engine driven heat pump are considered. The heat pump, using air as its source of heat is driven by a 360 cc single cylinder marine engine converted to run on natural gas. The unit was built, installed in a laboratory, and underwent intensive performance testing. The heat pump works well and justifies the design assumptions made, having allowed for a poor performance from the particular engine used. At 6 C (ambient) an output of 14 kW with an overall efficiency or C.O.P. (total heat output/gas input) of 1.1 was achieved. Results compare favorably with a seasonal efficiency of a gas boiler of around 0.65 to 0.70. J.M.S.

N82-17468# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
[SCIENTIFIC REPORT OF THE FLUID MECHANICS RESEARCH DEPARTMENT] Annual Report, 1980
1980 105 p refs
Avail: NTIS HC A06/MF A01

Research in theoretical and experimental fluid mechanics, propulsion technology, acoustics, and aerodynamic design is reported. Boundary layer flow, high speed train aerodynamics, cryogenic wind tunnels, compressors, helicopter interior noise, and aircraft design are among the topics described. Test facilities computational methods and experimental procedures are outlined. Author (ESA)

N82-17477# National Aerospace Lab., Tokyo (Japan).
A VELOCITY VECTOR MEASURING SYSTEM WITH 13 ASYMMETRIC WEDGE TYPE YAWMETERS
Teruomi Nakaya, Hideo Hoshio, and Masayoshi Noguchi Jun. 1981 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-674; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

In order to survey the flow field around the empennage of the NAL STOL research aircraft model in the 6m low speed wind tunnel, a velocity vector measuring system with 13 asymmetric wedge type yawmeters was developed. The rotational angle of the 13 probes and the setting angle of this system are automatically controlled following the sequence previously programmed into a minicomputer system. The hardware, control modes, data reduction, and data processing are described. The accuracy of the flow angle measurement turned out to be satisfactory, but measurements of dynamic pressure and static pressure were less accurate. An example of measurements taken of the flow field around the empennage of the STOL research aircraft model is included. A.R.H.

N82-17478*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
DEVELOPMENT OF A SIMPLE, SELF-CONTAINED FLIGHT TEST DATA ACQUISITION SYSTEM Progress Report
Ronald R. L. Renz Feb. 1981 208 p refs
(Grant NsG-4019)
(NASA-CR-168438; KU-FRL-407-6) Avail: NTIS HC A10/MF A01 CSCL 14B

A low cost flight test data acquisition system, applicable to general aviation airplanes, was developed which meets criteria for doing longitudinal and lateral stability analysis. Th package consists of (1) a microprocessor controller and data acquisition module; (2) a transducer module; and (3) a power supply module. The system is easy to install and occupies space in the cabin or baggage compartment of the airplane. All transducers are contained in these modules except the total pressure tube, static pressure air temperature transducer, and control position transducers. The NASA-developed MMLE program was placed on a microcomputer on which all data reduction is done. The flight testing program undertaken proved both the flight testing hardware and the data reduction method to be applicable to the current field of general aviation airplanes. A.R.H.

N82-17482# Spectron Development Labs., Inc., Costa Mesa, Calif.
DEVELOPMENT AND LABORATORY TESTING OF A THERMAL EMISSION VELOCIMETER FOR APPLICATION TO AN EROSION NOSE TIP TEST FACILITY Final Report, Jul. 1979 - Nov. 1980
James D. Trolinger and M. J. Houser Wright-Patterson AFB, Ohio AFWAL Aug. 1981 23 p refs
(Contracts F33615-76-C-3146; F33615-79-C-3030; AF Proj. 2404)
(AD-A107713; SDL-80-6526; AFWAL-TR-81-3080) Avail: NTIS HC A02/MF A01 CSCL 14/2

A thermal emission velocimeter concept was explored and a system was developed for use in measuring particle velocities up to 5,000 meters per second in a reentry erosion facility. The particles, ranging from 10 to 100 micrometers in diameter, are generated to study reentry nose tip erosion and ablation. The approach passively utilizes optical components of a laser transit anemometer coupled to a microprocessor data management system. The system was laboratory tested and has inherent characteristics which should produce quality data in the severe and noisy environment of a reentry test facility. The system sensitivity has been calculated to measure velocity of micrometer sized particles whose temperature are minimally 1700 K.
Author (GRA)

N82-17483# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
A DURABLE, INTERMEDIATE TEMPERATURE, DIRECT READING HEAT FLUX TRANSDUCER FOR MEASUREMENTS IN CONTINUOUS WIND TUNNELS Final Report, 1 Oct. 1980 - 30 Jun. 1981
C. T. Kidd AEDC Nov. 1981 66 p refs
(AD-A107729; AEDC-TR-81-19) Avail: NTIS

HC A04/MF A01 CSCL 14/2

The design and development of a high durability, intermediate service temperature (< or = 600 F), direct reading transducer for the measurement of aerodynamic heating in the continuous wind tunnels of the von Karman Gas Dynamics Facility is described. This transducer operates on the axial temperature gradient or Schmidt-Boelter measurement concept. Considerable emphasis is placed upon the practical use of finite-element, two-dimensional heat conduction code for analysis of gage behavior rather than the indiscriminate use of invalid exact mathematical solutions. Laboratory evaluation and calibration of prototype transducers at ambient temperature levels varying from 70 to 500 F are discussed. Results of wind tunnel aerodynamic heating measurements using limited numbers of prototype Schmidt-Boelter gages are presented. Recommendations for future work efforts with regard to further development and testing of this measurement concept are discussed. Author (GRA)

N82-17513 British Aerospace Aircraft Group, Warton (England). Materials and Development Dept.

THE ULTRASONIC INSPECTION OF C.F.C.

R. Wilson 7 Jul. 1981 12 p

(MDR-0465) Avail: Issuing Activity

Four carbon fiber composite sine wave spars, produced using various manufacturing techniques, were inspected ultrasonically. Procedures used for examining the web and the flanges are described. A quality representative test piece must be produced containing artificial defects of a known size in order to further NDI development work on these spars. A.R.H.

N82-17597# Southwest Research Inst., San Antonio, Tex. Dept. of Mining Technology.

STUDY OF AIR COMPRESSOR HAZARDS IN UNDERGROUND AND SURFACE MINES Open File Report, Nov. 1979 - Jan. 1981

Martin B. Treuheft and B. Chope Dial Jan. 1981 93 p refs

(Contract DI-BM-JO-10006)

(PB82-105164; BM-OFR-122-81) Avail: NTIS HC A05/MF A01 CSCL 08I

Air compressor hazards in mines are analyzed and guidelines for eliminating fires, explosions, and their operational hazards that can result when compressors are used in coal and metal nonmetal mining applications are presented. Government data bases and reports for mine accident are reviewed and examined. Foreign and domestic standards, regulations, and codes governing air compressor usage are discussed and compared industry trends toward air compressor usage are considered and their impact on compressor safety is analyzed. Recommendations are directed toward MSHA, mine management, and the Bureau of Mines regarding their involvement in accident reporting and prevention. GRA

N82-17638# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.

ROTOR MODEL FOR THE VERIFICATION OF COMPUTATIONAL METHODS Final Report

J. H. Argyris, W. Aicher, F. Karl, W. Kuemmerle, and M. Mueller 1980 66 p refs Sponsored in cooperation with International Energy Agency

(Contract BMFT-ET-4086-A)

(ISD-275; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

A windmill rotor model with 7.3 m rotor diameter was constructed in order to test a data acquisition/transmission system and computational models. Data, e.g., strains, angles, linear movements, accelerations, are measured at the rotor, digitized, and transmitted optoelectronically. Measurements of rotor blade dynamic response to cyclic gravity loading are compared with theoretical values. Deviation between measurements and calculations is 11%. Author (ESA)

N82-17639# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.

STATIC INVESTIGATIONS OF ROTOR BLADES UNDER DEADWEIGHT AND DURING STATIONARY OPERATION Final Report

J. H. Argyris, K. A. Braun, and B. Kirchgaessner 1980 62 p refs Transl. into ENGLISH of "Statische untersuch. von rotorblaettern unter eigengewicht und im stationaeren betrieb" Rept. ISD-243 Stuttgart Univ., Stuttgart, 1979 57 p Original report in GERMAN previously announced as N82-17639 Sponsored in cooperation with International Energy Agency

(Contract BMFT-ET-4086-A)

(ISD-269; ISD-243; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

Several rotorblades of a horizontal axis windmill are studied both nonoperating under deadweight, and under quasi-stationary loading with constant forces at rated operation, the blades of which have flap and lead-lag freedom as well as flap-pitch coupling. With a suitable mass distribution it is possible to reduce the blade bending moments in the flap direction drastically. The use of aircraft construction materials is considered. Carbon fiber reinforced plastic is the most suitable. Most of the blade models are investigated without lag hinge. The coning angle of rated operation assumed for the layout is reduced considerably for the blade models with lead-lag freedom in order to obtain sufficient centrifugal stiffness in the lag direction. Author (ESA)

N82-17640# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.

STABILITY AND RESPONSE TO GRAVITY OF THE FLAP LAG MOTION FOR A RIGID ROTOR BLADE WITH FLAP-PITCH COUPLING Final Report

J. H. Argyris and B. Kirchgaessner 1980 59 p refs Transl. into ENGLISH of "Stabilitaet und schwerkraftresponse der schlag-schwenkbewegung eines starren rotorblattes mit blattwinkelrueckssteuerung" Rept. ISD-244 Stuttgart Univ., Stuttgart, 1979 80 p Original report in GERMAN announced as N80-30949 Sponsored in cooperation with International Energy Agency

(Contract BMFT-ET-4086-A)

(ISD-270; ISD-244; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

The coupled flap lag motion of a single, rigid rotor blade of a wind energy converter with flap and lag hinges and a coupling of the angle of attack with the flap motion is investigated. The equations of motion are developed under the assumption of linearized quasi-stationary aerodynamic forces. Static and dynamic stability of the coupled flap and lag motion are investigated. The equations are integrated for different cases under cyclic gravitational forces in order to estimate the importance of nonlinear terms and of the error resulting from the linearization of the conservative system. The nonlinear terms can be neglected, as can the effects of cyclic stiffness resulting from gravitational force. Results for nonlinearities arising from aerodynamic forces are inconclusive. Author (ESA)

N82-17641# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.

DYNAMIC ANALYSIS OF A ROTOR BLADE WITH FLAP AND LAG FREEDOM AND FLAP-PITCH COUPLING Final Report

J. H. Argyris, K. A. Braun, and B. Kirchgaessner 1980 103 p refs Transl. into ENGLISH of "Dyn. anal. eines rotorblattes mit schlagfreiheit, schwenkreiheit u. blattwinkelrueckssteuerung" Rept. ISD-258 Stuttgart Univ., Stuttgart, 1979 95 p Original report in GERMAN previously announced as N80-30950 Sponsored in cooperation with International Energy Agency

(Contract BMFT-ET-4086-A)

(ISD-271; ISD-258; ISSN-0170-6071) Avail: NTIS HC A06/MF A01

For a windmill rotor blade, a linearized system of differential equations of motion is developed, using a finite element idealization of linearized quasi-stationary aerodynamic forces. Constant rotational speed and a rigidly supported hub are assumed. For two rotor blade models, which differ only in their stiffness in lag direction, the complex eigenfrequencies are calculated. The dynamic response of the rotor blades is computed for cyclic gravity loads at rated operation, for a gust, and, in one case, for the tower wake. From the deformation of the structure the stresses at selected points along the blade are calculated. Torque and rotor thrust are determined for one model. Additional stiffness improves stability and lead-lag angles. The coning angle is excellently stabilized by the flap-pitch coupling. Author (ESA)

N82-17642# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.

STATIC AND DYNAMIC INVESTIGATIONS FOR THE MODEL OF A WIND ROTOR Final Report

J. H. Argyris, K. A. Braun, B. Kirchgaessner, and R. Walther 1980 71 p refs Transl. into ENGLISH of "Statische und dyn. untersuch. and einem windrotormodell" Rept. ISD-259 Stuttgart Univ., Stuttgart, Jun. 1979 69 p Original report in GERMAN

previously announced as N81-12626 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-272; ISD-259; ISSN-0170-6071) Avail: NTIS HC A04/MF A01

A wind rotor was constructed in order to test a data acquisition/transfer system which collects experimental data from the operating model and displays it on a screen. The comparison between the experimental data and the model results is used to check the applied computation methods. The static and dynamic analyses of the rotor model are considered. An 11% difference between experimental and model results is shown. A response problem with variable stiffness in time which arose during the dynamic analysis is solved by setting the structural stiffness constant over small time intervals, diagonalizing the time interval considered and integrating. After integration the solutions of the generalized degrees of freedom are transformed back into the physical system, using the time interval eigenvectors.
Author (ESA)

N82-17643# Stuttgart Univ. (West Germany). Inst. fuer Statik und Dynamik.
LOADING CYCLES AND MATERIAL DATA FOR THE LAYOUT OF A WIND TURBINE OF SPECIAL HUB CONCEPT Final Report
J. H. Argyris and K. A. Braun 1980 38 p refs Transl. into ENGLISH of "Lastwechselzahlen und materialwerte fuer die auslegung einer windturbine spezieller nabenkonstruktion" Rept. ISD-260 Stuttgart Univ., Stuttgart, Jun. 1979 38 p Original report in GERMAN previously announced as N81-12627 Sponsored in cooperation with International Energy Agency
(Contract BMFT-ET-4086-A)
(ISD-273; ISD-260; ISSN-0170-6071) Avail: NTIS HC A03/MF A01

The number of loading cycles of a rotor blade was estimated in order to assess allowable blade stress. Fatigue strengths and allowable stresses are calculated for aeronautic construction materials. Using wind data, the number of starts and stops was estimated. With a guess for the number of revolutions necessary to reach stationary operation from standstill, the number of loading cycles was determined, using the blade aerodynamics. The number of operational hours gives the number of loading cycles for rated operation. Rotation speeds of 1.67 and 2 rad/sec are considered. For 1.67, the number of loading cycles during stationary operation = 2.06 x 10 to the 8th power; during starts and cut offs = 357,000. For 2 rad/sec, results are 2.47 x 10 to the 8th power and 463,000. Stress values, expressed in installed power/sqmm, are: aluminum alloy = 98; stainless steel = 294; glass fiber reinforced plastic = 98; and carbon fiber reinforced plastic = 147.
Author (ESA)

N82-17664*# Old Dominion Univ., Norfolk, Va. Dept. of Economics.
ENERGY ENVIRONMENT STUDY Final Report, 16 May 1980 - 15 Mar. 1981
Raymond Strangways Dec. 1981 123 p refs
(Contract NAG1-66)
(NASA-CR-168458) Avail: NTIS HC A06/MF A01 CSCL 13B

The international demand for and supply of oil between the years 1980 and 2000 is assessed and future world oil prices and their implications for the price of jet fuel are estimated. Three critical questions are investigated: (1) how long will the world supply of oil continue to keep pace with its demand under likely trends in its use and discovery; (2) at what price will demand and supply clear the world oil market; (3) what does the analysis imply about the price of jet fuel. Projection of oil price is based upon supply and demand, which is consistent with microeconomic analysis.
E.A.K.

N82-17665# Committee on Commerce, Science, and Transportation (U. S. Senate).
NOISE IMPACT ON COMMUNITIES FROM AIRCRAFT
Washington GPO 1981 40 p Hearing before the Comm. on Com., Sci., and Transportation, 97th Congr., 1st Sess., 10 Feb. 1981
(GPO-80-617) Avail: Committee on Commerce, Science, and Transportation

The environmental and noise pollution problems of Cannon International Airport in Reno, Nevada are discussed. Restrictions imposed by the Federal government and the airport management on flight into and out of the airport were reviewed. Near-by urban development projects are described and the impact of airport traffic on them was evaluated. Discussion focused on the balance of economic development brought about by the airport and the rights of residents to enjoy a comfortable environment.
T.M.

N82-17679*# Case Western Reserve Univ., Cleveland, Ohio.
INVESTIGATION AND EVALUATION OF A COMPUTER PROGRAM TO MINIMIZE THREE-DIMENSIONAL FLIGHT TIME TRACKS Final Report, 15 Sep. 1980 - 12 Aug. 1981
Frederic I. Parke 12 Aug. 1981 150 p
(Grant NAG3-101)
(NASA-CR-168419) Avail: NTIS HC A07/MF A01 CSCL 09B

The program for the DC 8-D3 flight planning was slightly modified for the three dimensional flight planning for DC 10 aircrafts. Several test runs of the modified program over the North Atlantic and North America were made for verifying the program. While geopotential height and temperature were used in a previous program as meteorological data, the modified program uses wind direction and speed and temperature received from the National Weather Service. A scanning program was written to collect required weather information from the raw data received in a packed decimal format. Two sets of weather data, the 12-hour forecast and 24-hour forecast based on 0000 GMT, are used for dynamic processes in testruns. In order to save computing time only the weather data of the North Atlantic and North America is previously stored in a PCF file and then scanned one by one.
R.J.F.

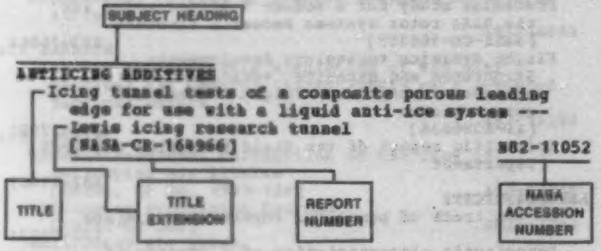
N82-17887# Ohio State Univ., Columbus. Computer Graphics Research Group.
TERRAIN MODEL ANIMATION Final Report, 1 Dec. 1979 - 15 Oct. 1980
John L. Booker, Charles Csuri, Robert Marshall, and Roger Wilson Sep. 1981 48 p
(Contract N61339-80-C-0008)
(AD-A107911; NAVTRAEQUIPC-80-C-0008-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

Procedure models are used to combine fundamental data elements in the creation of unified objects comprising the terrain model. A procedure model to generate trees of various species was implemented. Interactive techniques were developed to generate mountains. An analysis was made of the performance of a Z-buffer display algorithm. Test results are included in the report.
Author (GRA)

SUBJECT INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 148)* MAY 1982

Typical Subject Index Listing


SUBJECT HEADING
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966]
N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-7 AIRCRAFT
Function specifications for the A-7E Function Driver module
[AD-A107922] N82-17173
ABLATION
Development and laboratory testing of a thermal emission velocimeter for application to an erosion nose tip test facility
[AD-A107713] N82-17482
ACCELEROMETERS
Advanced recorder design and development
[PB81-244105] N82-16385
ACCIDENT INVESTIGATION
Accidents of surface effect ships and hydrofoil craft --- Russian book
A82-18899
ACCIDENT PREVENTION
Accidents of surface effect ships and hydrofoil craft --- Russian book
A82-18899
Study of air compressor hazards in underground and surface mines
[PB82-105164] N82-17597
ACOUSTIC MEASUREMENT
Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel
[NASA-TM-81343] N82-16083
Analytical study of twin-jet shielding
[NASA-CR-165102] N82-16801
Analytical study of twin-jet shielding
[NASA-CR-165103] N82-16802
Analytical study of twin-jet shielding
[NASA-CR-165104] N82-16803
Analytical study of twin-jet shielding two-dimensional model
[NASA-CR-165107] N82-16806
Prediction of sound radiation from different practical jet engine inlets
[NASA-CR-165120] N82-16810
ACOUSTIC PROPAGATION
Analytical study of twin-jet shielding
[NASA-CR-165105] N82-16804
ACOUSTIC PROPERTIES
Prediction of sound radiation from different practical jet engine inlets
[NASA-CR-165120] N82-16810
ACTUATOR DISKS
Rotating stall in blade rows operating in shear flow
A82-22209

Damage tolerant design for cold-section turbine engine disks
[AD-A107863] N82-17176
ADAPTIVE CONTROL
The use of adaptive control for helicopter trajectories in search operations
A82-19065
AERIAL RECONNAISSANCE
Offshore uses of the airship
A82-20553
Studies of modern technology airships for maritime patrol applications
A82-20554
The airship - Its application and promotional activity
A82-20555
The uses of airships in the Royal Navy
A82-20556
A surveillance airship for the New Zealand environment
A82-20558
AERODYNAMIC BALANCE
Experimental trim drag values for conventional and supercritical wings
[NASA-CR-168500] N82-17126
AERODYNAMIC CHARACTERISTICS
A simplified wing procedure in connection with the lifting line theory and the doublet-lattice method
A82-19195
Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow
A82-19197
Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model
[AIAA PAPER 81-2609] A82-19201
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[AIAA PAPER 81-2612] A82-19203
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[AIAA PAPER 81-2627] A82-19210
Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft
[AIAA PAPER 81-2647] A82-19216
Aerodynamics of a transport aircraft-type wing-fuselage assembly
[ONERA, TP NO. 1981-122] A82-19730
Aerodynamic characteristics of waveriders at subsonic flight speeds
A82-19810
A perspective of computational aerodynamics from the viewpoint of airplane design applications
[AIAA PAPER 82-0018] A82-22028
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[AIAA PAPER 82-0255] A82-22077
Aerodynamic characteristics of airfoils with ice accretions
[AIAA PAPER 82-0282] A82-22081
Aerodynamic characteristics of maneuvering flaps
A82-22110
Aerodynamic evaluation of winglets for transport aircraft
[AIAA PAPER 81-1215] A82-22245
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091
Theory and experiment in unsteady aerodynamics
[NLR-MP-80046-U] N82-17128

AERODYNAMIC COEFFICIENTS
- A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls [NAL-TR-680] N82-17123
- Experimental verification of an aerodynamic parameter optimization program for wind tunnel testing [AD-A107727] N82-17134

AERODYNAMIC CONFIGURATIONS
- Analysis of an ideal-fluid flow past a finite-thickness wing A82-19813
- Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics [AIAA PAPER 82-0095] A82-22045
- Preliminary design study of a hybrid airship for flight research [NASA-CR-166246] N82-17152
- The armed helicopter in air to air missions [MBB-UD-317-81-0] N82-17158

AERODYNAMIC DRAG
- Determining performance parameters of general aviation aircraft A82-20759
- Wing-canard aerodynamics at transonic speeds - Fundamental considerations on minimum drag spanloads [AIAA PAPER 82-0097] A82-22046
- Experimental trim drag values for conventional and supercritical wings [NASA-CR-168500] N82-17126

AERODYNAMIC FORCES
- Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust A82-22112

AERODYNAMIC HEAT TRANSFER
- A durable, intermediate temperature, direct reading heat flux transducer for measurements in continuous wind tunnels [AD-A107729] N82-17483

AERODYNAMIC HEATING
- A durable, intermediate temperature, direct reading heat flux transducer for measurements in continuous wind tunnels [AD-A107729] N82-17483

AERODYNAMIC INTERFERENCE
- Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft [AIAA PAPER 81-2631] A82-19212
- Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust A82-22112

AERODYNAMIC LOADS
- On the track of practical forward-swept wings A82-19071
- Study of ground handling characteristics of a maritime patrol airship [NASA-CR-166253] N82-16090
- Flight dynamics technology development: Structures and dynamics, vehicle equipment/subsystems, flight control and aeromechanics [AD-A096636] N82-17082
- Loading cycles and material data for the layout of a wind turbine of special hub concept [ISD-273] N82-17643

AERODYNAMIC NOISE
- Analytical study of twin-jet shielding [NASA-CR-165102] N82-16801

AERODYNAMIC STABILITY
- Alleviation of the subsonic pitch-up of delta wings [AIAA PAPER 82-0129] A82-22052
- Numerical calculation of lift, moment coefficient and dynamic stability derivatives on sideslipping wings in unsteady supersonic flows A82-22111
- Correlating measured and predicted inplane stability characteristics for an advanced bearingless rotor [NASA-CR-166280] N82-17154

AERODYNAMIC STALLING
- An experimental study of separated flow on a finite wing [AIAA PAPER 81-1882] A82-20293
- Summary of theoretical considerations and wind tunnel tests of an aerodynamic spoiler for stall proofing a general aviation airplane [NASA-CR-165100] N82-16046
- Spin tests of a single-engine, high-wing light airplane [NASA-TP-1927] N82-16068

AERODYNAMICS
- Technical evaluation report of the AGARD Fluid Dynamics Panel Symposium on computation of viscous-inviscid interactions [ONERA, TP NO. 1981-116] A82-19733
- Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft [NASA-CR-166153] N82-16042
- Flight dynamics technology development: Structures and dynamics, vehicle equipment/subsystems, flight control and aeromechanics [AD-A096636] N82-17082
- Scientific report of the Fluid Mechanics Research Department N82-17469

AEROELASTICITY
- On the track of practical forward-swept wings A82-19071
- Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows [ASME PAPER 81-DET-122] A82-19337
- Integration of a code for aeroelastic design of conventional and composite wings into ACSYNT, an aircraft synthesis program --- wing aeroelastic design (WADES) [NASA-CR-137805] N82-16069
- Correlating measured and predicted inplane stability characteristics for an advanced bearingless rotor [NASA-CR-166280] N82-17154

AERONAUTICAL ENGINEERING
- NASA research activities in aeropropulsion [NASA-TM-82788] N82-16084
- Fiscal year 1981 scientific and technical reports, articles, papers, and presentations [NASA-TM-82445] N82-16927
- Scientific report of the Fluid Mechanics Research Department N82-17469

AEROSPACE ENGINEERING
- Computer graphics for quality assurance A82-20276
- Design for operability of military aircraft RAF engineering experience and requirements. I - Thoughts of a squadron engineer A82-20561
- Aircraft operability - RAF engineering experience and requirements. II A82-20562
- Data systems organization - A change for the better --- flight test data acquisition A82-20767
- CAD/CAM approach to improving industry productivity gathers momentum A82-21375
- Research and technology annual report, 1981 [NASA-TM-81333] N82-17081

AEROSPACE INDUSTRY
- Graphics in numerical control - The user's challenge A82-20277

AEROSPACE SYSTEMS
- Analytical prediction of aerospace vehicle vibration environments [ASME PAPER 81-DET-29] A82-19305
- Flight dynamics technology development: Structures and dynamics, vehicle equipment/subsystems, flight control and aeromechanics [AD-A096636] N82-17082

AEROTHERMOELASTICITY
- Calculation of sensitivity derivatives in thermal problems by finite differences A82-21391

AH-64 HELICOPTER
- The application of strapdown inertial technology to Attitude and Heading Reference System requirements --- for YAH-64 advanced attack helicopter A82-21590

Pre-design study for a modern four-bladed rotor for the Rotor System Research Aircraft (RSRA) --- integrating the YAH-64 main rotor
[NASA-CR-166154] N82-16043

AIR BREATHING ENGINES
Multiple pure tone elimination strut assembly --- air breathing engines
[NASA-CASE-FRC-11062-1] N82-16800

AIR COOLING
Transient two-dimensional temperature distributions in air-cooled turbine blades
A82-18893
Impingement cooling of concave surfaces of turbine airfoils
A82-18894

AIR DEFENSE
SIMATE - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars
A82-19256

AIR INTAKES
Three-dimensional calculation of the flow in helicopter air intakes
[ONERA, TP NO. 1981-124] A82-19740
Helicopter Propulsion Systems
[AGARD-CP-302] N82-17203
Helicopter air inlets
N82-17217

AIR LAW
Consequences of American airline deregulation - Legislative theory in a concrete example
A82-19947

AIR NAVIGATION
Tornado-avionic development testing
A82-20760
Institute of Navigation, Annual Meeting, 36th, U.S. Naval Postgraduate School, Monterey, CA, June 23-26, 1980, Proceedings
A82-21586
The emerging need for improved helicopter navigation
A82-21591
Helicopters and Navstar/GPS
A82-21592
A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions
[AIAA PAPER 82-0261] A82-22079
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 2: RNAV/MLS transition problems for aircraft
[NASA-CR-3511] N82-17142
Aeronautical Information Data Subsystem (AIDS): A ground-based component of air navigation services systems
N82-17150

AIR POLLUTION
On the Corrosion problems of the TAF F-5 aircraft
N82-17354

AIR TRAFFIC
New life for an 'old' body - Vienna's master plan for revitalization
A82-20172
Threat perception while viewing single intruder conflicts on a cockpit display of traffic information
[NASA-TM-81341] N82-16076

AIR TRAFFIC CONTROL
Airport radar systems --- Russian book
A82-18975
The significance of electronics for air traffic control at the present time and in the future
A82-19649
Consequences of American airline deregulation - Legislative theory in a concrete example
A82-19947
Movement in Category III conditions --- all weather air traffic operations
A82-20221
The FS2 RAE Bedford civil flight research programme --- on components and system integration for optimum ATC
A82-20519
Helicopters and Navstar/GPS
A82-21592
ATCRBS uplink environment measurement near Jacksonville, Florida
[AD-A100053] N82-16063
Aircraft position measurement using laser beacon optics
[AD-A107973] N82-16067
Investigation of Wilcox model 585B very high frequency omnidirectional radio range (VOR) system, part 3
[AD-A107855] N82-17149
Aeronautical Information Data Subsystem (AIDS): A ground-based component of air navigation services systems
N82-17150

AIR TRANSPORTATION
The city and aviation --- Russian book
A82-18896
Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports
A82-19001
The marketing, organisation and financing of aeromedical evacuation by a motoring organisation
A82-19002
Survey of aeromedical evacuation in Italy
A82-19003
The network of civilian air rescue in Germany
A82-19004
Ambulance helicopter in the Stockholm archipelago
A82-19005
Military assistance to safety and traffic /MAST/
A82-19006
Aerial ambulance service in Australia
A82-19007
Flying doctor service in East Africa
A82-19008
Air ambulance systems in the Republic of South Africa
A82-19009
The situation of air rescue in Argentina
A82-19010
Aeromedical evacuation in New Zealand
A82-19011
A comparative study on mechanical vibration and noise during patient transportation
A82-19013
Design requirements for modern rescue helicopters
A82-19020
Aircraft for secondary long range emergency ambulance flight
A82-19021
We have just begun to create efficient transport aircraft
A82-21373
Gateway diversity and competition in international air transportation
A82-21474
The emerging need for improved helicopter navigation
A82-21591
FAA/NWS aviation route forecast /ARF/ development
[AIAA PAPER 82-0013] A82-22027
NASA research activities in aeropropulsion
[NASA-TM-82788] N82-16084
Air service, airport access and future technology
[PB82-105958] N82-16100

AIR WATER INTERACTIONS
Structure and variability of the Alboran Sea frontal system
A82-20447

AIRBORNE EQUIPMENT
Airborne measurements with a sensitive high resolution 90 GHz radiometer
A82-18940
Mapping in tropical forests - A new approach using the laser APR --- Airborne Profile Recorder
A82-20407
Laser communications via an atmospheric link
A82-20415
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size
A82-21386

AIRBORNE SURVEILLANCE RADAR
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations
A82-19858

AIRBORNE/SPACEBORNE COMPUTERS
- KC-135 avionics modernization hot bench - An evaluation of requirements and design for the future A82-19244
- Radar environment simulation for software test A82-19245
- The significance of electronics for air traffic control at the present time and in the future A82-19649
- The impact of increasing energy costs upon the design philosophy of avionic fuel management systems A82-20517
- Thrust management - Current achievements and future developments A82-20520
- MLS flare low elevation angle guidance considerations A82-20586
- Tornado-avionic development testing A82-20760
- Hierarchical specification of the SIFT fault tolerant flight control system N82-17106
- Reconfiguration: A method to improve systems realiability N82-17107
- Integrated control of mechanical system for future combat aircraft N82-17117
- F/A-18A tactical airborne computational subsystem N82-17119
- Development of a simple, self-contained flight test data acquisition system [NASA-CR-168438] N82-17478

AIRCRAFT ACCIDENT INVESTIGATION
- Special investigation report. Search and rescue procedures and arming of emergency locator transmitter: Aircraft accident near Michigan City, Indiana, 7 December, 1980 [PB81-249427] N82-16058
- Resonance tests on a Piper PA-32R tailplane before and after damage [AD-A106273] N82-16071
- Aircraft accident report - Universal Airways, Inc., Beech 65-A80/Excalibur Conversion, N100UV, near Madisonville, Texas, July 2, 1981 [NTSB-AAR-81-17] N82-17138

AIRCRAFT ACCIDENTS
- Airworthiness of helicopter transmissions A82-20541
- The prevalence of visual deficiencies among 1979 general aviation accident airmen [AD-A106489] N82-16054
- Test and evaluation of improved aircrew restraint systems [AD-A107576] N82-16056
- Special investigation report. Search and rescue procedures and arming of emergency locator transmitter: Aircraft accident near Michigan City, Indiana, 7 December, 1980 [PB81-249427] N82-16058
- Resonance tests on a Piper PA-32R tailplane before and after damage [AD-A106273] N82-16071
- Advanced recorder design and development [PB81-244105] N82-16385
- Aircraft accident report - Universal Airways, Inc., Beech 65-A80/Excalibur Conversion, N100UV, near Madisonville, Texas, July 2, 1981 [NTSB-AAR-81-17] N82-17138

AIRCRAFT ANTENNAS
- Broader bandwidth for thin conformal antennas A82-19069
- Leaky wave antenna using an inverted strip dielectric waveguide --- for aircraft application A82-19552

AIRCRAFT CARRIERS
- Initial F-18 carrier suitability testing A82-20752

AIRCRAFT COMMUNICATION
- An analysis of antijam communication requirements in fading media A82-20695

AIRCRAFT CONFIGURATIONS
- Tactical STOL moment balance through innovative configuration technology [AIAA PAPER 81-2615] A82-19204
- Application of thrust vectoring for STOL [AIAA PAPER 81-2616] A82-19205
- Sea based support aircraft alternatives [AIAA PAPER 81-2649] A82-19217
- Control law development for a close-coupled canard, relaxed static stability fighter [AIAA PAPER 82-0180] A82-19784
- Analysis of flight test measurements in ground effect A82-20763
- A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research A82-20764
- Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts [AIAA PAPER 82-0255] A82-22077

AIRCRAFT CONSTRUCTION MATERIALS
- On the track of practical forward-swept wings A82-19071
- Conductive prepregs for lightning strike protection on aircraft A82-20523
- Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades A82-20524
- Skyship 500 - The development of a modern production airship A82-20559
- A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research A82-20764
- Composite structural materials --- fiber reinforced composites for aircraft structures [NASA-CR-165121] N82-16182
- Detection and prevention of corrosion in Royal Air Force aircraft N82-17351
- Corrosion control measures for military aircraft: Present UK requirements and future developments N82-17358

AIRCRAFT CONTROL
- Automatic controlled terrain following flights A82-18920
- Control law development for a close-coupled canard, relaxed static stability fighter [AIAA PAPER 82-0180] A82-19784
- Analytical control law for desirable aircraft lateral handling qualities A82-21941

AIRCRAFT DESIGN
- Aircraft electrical equipment - Design and operation --- Russian book A82-18998
- On the track of practical forward-swept wings A82-19071
- Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model [AIAA PAPER 81-2609] A82-19201
- Thrust-induced effects on low-speed aerodynamics of fighter aircraft [AIAA PAPER 81-2612] A82-19203
- Tactical STOL moment balance through innovative configuration technology [AIAA PAPER 81-2615] A82-19204
- STOL capability impact on advanced tactical aircraft design [AIAA PAPER 81-2617] A82-19206
- Quiet Short-Haul Research Aircraft - The first 3 years of flight research [AIAA PAPER 81-2625] A82-19209
- Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability [AIAA PAPER 81-2629] A82-19211
- Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft [AIAA PAPER 81-2647] A82-19216
- Sea based support aircraft alternatives [AIAA PAPER 81-2649] A82-19217
- Design features of a sea-based multipurpose V/STOL, STOVL, and STOL aircraft in a support role for the U.S. Navy [AIAA PAPER 81-2650] A82-19218
- Flexibility is offered by XV-15 tilt-rotor concept A82-19300

Design of the composite spar-wingskin joint
A82-20128

The prospects for liquid hydrogen fueled aircraft
A82-20137

Graphics in numerical control - The user's challenge
A82-20277

The future of integrated CAD/CAM systems - The Boeing perspective
A82-20278

Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981
A82-20513

Design possibilities for improved fuel efficiency of civil transport aircraft
A82-20514

The FS2 RAE Bedford civil flight research programme --- on components and system integration for optimum ATC
A82-20519

Airships and their maritime applications; Proceedings of the Sympcsium, London, England, March 10, 1981
A82-20551

An introduction to the airship
A82-20552

Offshore uses of the airship
A82-20553

Studies of modern technology airships for maritime patrol applications
A82-20554

The airship - Its application and promotional activity
A82-20555

The uses of airships in the Royal Navy
A82-20556

Airworthiness of airships
A82-20557

A surveillance airship for the New Zealand environment
A82-20558

Skyship 500 - The development of a modern production airship
A82-20559

Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980
A82-20560

Design for operability of military aircraft RAF engineering experience and requirements. I - Thoughts of a squadron engineer
A82-20561

Aircraft design for operability
A82-20563

Operability of military aircraft - Avionic design aspects
A82-20564

Operability of military aircraft - Some design and cost trends
A82-20565

Determining performance parameters of general aviation aircraft
A82-20759

Design, development and flight testing of a jet powered sailplane
A82-20761

Airbus Industrie - The year of progress
A82-21189

Boeing's bigger narrowbody
A82-21190

A new look at the Tupolev Tu-26 'Backfire'
A82-21191

AV-8B Harrier II
A82-21260

We have just begun to create efficient transport aircraft
A82-21373

The outlook for advanced transport aircraft
A82-21374

A perspective of computational aerodynamics from the viewpoint of airplane design applications
[AIAA PAPER 82-0018] A82-22028

Wing-canard aerodynamics at transonic speeds - Fundamental considerations on minimum drag spanloads
[AIAA PAPER 82-0097] A82-22046

Isolated nacelle performance - Measurement and simulation
[AIAA PAPER 82-0134] A82-22054

Aerodynamic evaluation of winglets for transport aircraft
[AIAA PAPER 81-1215] A82-22245

Configuration Development System/NAVAIR Report
[AD-A106727] N82-16072

The effect of increasingly more complex aircraft and avionics on the method of system design
N82-17088

A tutorial on distributed processing in aircraft/avionics applications
N82-17089

Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-168439] N82-17151

Preliminary design study of a hybrid airship for flight research
[NASA-CR-166246] N82-17152

Systems study of transport aircraft incorporating advanced aluminum alloys
[NASA-CR-165820] N82-17153

Aircraft Corrosion
[AGARD-CP-315] N82-17349

Scientific report of the Fluid Mechanics Research Department
N82-17469

AIRCRAFT ENGINES

Analysis of selected VTOL concepts for a civil transportation mission
[AIAA PAPER 81-2655] A82-19220

Development of a correlated finite element dynamic model of a complete aero engine
[ASME PAPER 81-DET-74] A82-19326

A history of aircraft piston engine lubricants
A82-19622

The history of aviation turbine lubricants
A82-19624

Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading
A82-19928

A comprehensive flight test flyover noise program
A82-20765

Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874

Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093

Test and evaluation of UV fiber optics for application for aircraft fire detector systems
[AD-A106129] N82-16850

Damage from engine debris projectiles
N82-17165

Maintenance posture for quick start
[AD-A107553] N82-17177

AIRCRAFT EQUIPMENT

Aircraft electrical equipment - Design and operation --- Russian book
A82-18990

Helicopters - Night operations
A82-19017

Procurement of the new flight and tactics simulators - Experience, problems, meaning
[DGLR PAPER 81-095] A82-19266

Simulation of modern radar installations in full-mission flight and tactics simulators
[DGLR PAPER 81-103] A82-19272

Size reduction flight test airborne data systems
A82-20766

System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation
[NASA-CASE-FRC-11005-1] N82-16075

Test and evaluation of UV fiber optics for application for aircraft fire detector systems
[AD-A106129] N82-16850

Built-in-test Equipment Requirements Workshop. Workshop presentation
[AD-A107842] N82-17085

Corrosion control test method for avionic components
[AD-A108061] N82-17171

Corrosion in naval aircraft electronic systems
N82-17363

AIRCRAFT FUELS

Trends in aviation fuels and lubricants; Proceedings of the West Coast International Meeting, Seattle, WA, August 3-6, 1981
A82-19621

Aviation turbine fuel properties and their trends A82-19623
The prospects for liquid hydrogen fueled aircraft A82-20137
Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981 A82-20513
Design possibilities for improved fuel efficiency of civil transport aircraft A82-20514
The impact of increasing energy costs upon the design philosophy of avionic fuel management systems A82-20517
A surveillance airship for the New Zealand environment A82-20558
JP-8 fuel conversion evaluation A82-20755
General aviation fuel consevation in the 1980's A82-20757
The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels A82-22198
Symposium on commercial-aviation energy-conservation strategies [DE81-028406] N82-16057

AIRCRAFT GUIDANCE
MLS flare low elevation angle guidance considerations A82-20586
Automation of on-board flightpath management [NASA-TM-84212] N82-16088
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 2: RNAV/MLS transition problems for aircraft [NASA-CR-3511] N82-17142

AIRCRAFT HAZARDS
Test and evaluation of UV fiber optics for application for aircraft fire detector systems [AD-A106129] N82-16850
Aircraft icing avoidance and protection [PB82-108135] N82-17139

AIRCRAFT INDUSTRY
Airbus Industrie - The year of progress A82-21189
Helicopter development in France N82-17216
Corrosion prevention measures used in the construction of an aircraft airframe: The case of 2014 and 2214 alloys N82-17360

AIRCRAFT INSTRUMENTS
Advanced recorder design and development [PB81-244105] N82-16385
Economic considerations for real-time naval aircraft/avionics distributed computer control systems N82-17097

AIRCRAFT LANDING
STOL capability impact on advanced tactical aircraft design [AIAA PAPER 81-2617] A82-19206
An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship [NASA-CR-152407] N82-16087

AIRCRAFT MAINTENANCE
Digital avionics - Advances in maintenance designs [AIAA 81-2240] A82-20294
The application of condition monitoring --- commercial helicopter in-service maintenance A82-20542
On-site vibration measurement, dynamic tracking and balancing A82-20545
Helicopter transmission philosophy - The way ahead A82-20546
Design for operability of military aircraft RAF engineering experience and requirements. I - Thoughts of a squadron engineer A82-20561
Aircraft operability - RAF engineering experience and requirements. II A82-20562
Aircraft design for operability A82-20563
Operability of military aircraft - Avionic design aspects A82-20564
Operability of military aircraft - Some design and cost trends A82-20565
Aircraft Corrosion [AGARD-CP-315] N82-17349
US Naval fleet aircraft corrosion N82-17350
Detection and prevention of corrosion in Royal Air Force aircraft N82-17351
An airline view of the corrosion problem N82-17352
Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey N82-17353
The experience of corrosion on French military aerodynes N82-17355
Design and maintenance against corrosion of aircraft structures N82-17356

AIRCRAFT MANEUVERS
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration [AIAA PAPER 81-2620] A82-19207
An analytical technique for the analysis of airplane spin entry and recovery [AIAA PAPER 82-0243] A82-19786
Simulator data test instrumentation - Flight test challenge of the eighties A82-20768
Aerodynamic characteristics of maneuvering flaps A82-22110

AIRCRAFT MODELS
Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack [AIAA PAPER 81-2621] A82-19208
Aerodynamics of a transport aircraft-type wing-fuselage assembly [ONERA, TP NO. 1981-122] A82-19738
An independent view of where civil simulation should be headed --- training simulators for civil aircraft A82-20537
Analytical study of twin-jet shielding [NASA-CR-165102] N82-16801
Analytical study of twin-jet shielding [NASA-CR-165103] N82-16802
Analytical study of twin-jet shielding [NASA-CR-165104] N82-16803
Analytical study of twin-jet shielding [NASA-CR-165105] N82-16804
Analytical study of twin-jet shielding development of a 3-dimensional model [NASA-CR-165106] N82-16805
Analytical study of twin-jet shielding two-dimensional model [NASA-CR-165107] N82-16806

AIRCRAFT NOISE
The city and aviation --- Russian book A82-18898
A comparative study on mechanical vibration and noise during patient transportation A82-19013
Ground reflection effects in aircraft noise measurements A82-19970
Comparison of aircraft and ground vehicle noise levels in front and backyards of residences A82-20058
Helicopter transmission philosophy - The way ahead A82-20546
We have just begun to create efficient transport aircraft A82-21373
Community sensitivity to changes in aircraft noise exposure [NASA-CR-3490] N82-16807
A shock wave approach to the noise of supersonic propellers [NASA-TM-82752] N82-16809
Blade planform for a quiet helicopter [NASA-CR-166256] N82-17121

Noise impact on communities from aircraft
[GPO-80-617] N82-17655
AIRCRAFT PARTS
A CAD/CAM graphics system with relative datums and tolerances
[ASME PAPER 81-DET-108] A82-19333
Engine/drive/airframe compatibility: A way of life N82-17220
Corrosion prevention methods developed from direct experience with aerospace structures N82-17359
AIRCRAFT PERFORMANCE
Operational and performance aspects of fuel management in civil aircraft A82-20518
Studies of modern technology airships for maritime patrol applications A82-20554
The airship - Its application and promotional activity A82-20555
A surveillance airship for the New Zealand environment A82-20558
Skyship 500 - The development of a modern production airship A82-20559
Aircraft design for operability A82-20563
Determining performance parameters of general aviation aircraft A82-20759
AV-8B Harrier II A82-21260
The outlook for advanced transport aircraft A82-21374
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-168439] N82-17151
AIRCRAFT PILOTS
Helicopters - Night operations A82-19017
The simulator and the airline pilot A82-20527
The prevalence of visual deficiencies among 1979 general aviation accident airmen
[AD-A106409] N82-16054
AIRCRAFT PRODUCTION
The future of integrated CAD/CAM systems - The Boeing perspective A82-20278
The aircraft manufacturer's needs as a simulator user A82-20530
Systems study of transport aircraft incorporating advanced aluminum alloys
[NASA-CR-165820] N82-17153
AIRCRAFT RELIABILITY
Airworthiness of helicopter transmissions A82-20541
The application of condition monitoring --- commercial helicopter in-service maintenance A82-20542
Helicopter transmission philosophy - The way ahead A82-20546
Airworthiness of airships A82-20557
Design for operability of military aircraft RAF engineering experience and requirements. I - Thoughts of a squadron engineer A82-20561
Aircraft operability - RAF engineering experience and requirements. II A82-20562
Aircraft design for operability A82-20563
Operability of military aircraft - Avionic design aspects A82-20564
Operability of military aircraft - Some design and cost trends A82-20565
Process monitor helps make jet engines reliable A82-21897
AIRCRAFT SAFETY
Conductive prepregs for lightning strike protection on aircraft A82-20523
Minimum cost performance monitoring of turboshaft engines A82-20544
Airworthiness of airships A82-20557
The case for helicopter hoisting A82-21597
Test and evaluation of improved aircrew restraint systems
[AD-A107576] N82-16056
AIRCRAFT STABILITY
Control law development for a close-coupled canard, relaxed static stability fighter
[AIAA PAPER 82-0180] A82-19784
AIRCRAFT STRUCTURES
A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading A82-20509
Performance flight test evaluation of the Ball-Bartoe JW-1 Jetwing STOL research aircraft A82-20762
AV-8B Harrier II A82-21260
Calculation of sensitivity derivatives in thermal problems by finite differences A82-21391
Low-frequency eddy current inspection of aircraft structure A82-21900
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-3502] N82-16170
Design Manual for impact damage tolerant aircraft structure
[AGARD-AG-238] N82-17160
Description of projectile threats N82-17161
Analysis methods for predicting structural response to projectile impact N82-17162
Analysis methods for ballistic damage size and type N82-17163
Damage from High explosive (HE) projectiles N82-17164
Hydrodynamic ram damage N82-17166
Effects of cyclic loading on projectile impact damage N82-17167
Stiffness degradation of impact damaged structure N82-17168
Analysis of multiple load path panels containing impact damage N82-17170
Superplastic aluminum evaluation
[AD-A107760] N82-17338
Corrosion Fatigue --- conferences
[AGARD-CP-316] N82-17342
Mechanisms of corrosion fatigue --- of high strength aluminum alloys N82-17343
Flight-by-flight corrosion fatigue tests N82-17348
Design and maintenance against corrosion of aircraft structures N82-17356
Corrosion prevention methods developed from direct experience with aerospace structures N82-17359
Corrosion prevention measures used in the construction of an aircraft airframe: The case of 2014 and 2214 alloys N82-17360
Recent developments in materials and processes for aircraft corrosion control N82-17361
New concepts in multifunctional corrosion for aircraft and other systems N82-17362
Corrosion protection schemes for aircraft structures: Some examples for the corrosion behaviour of Al alloys N82-17364
The ultrasonic inspection of C.F.C. --- carbon fiber sine wave spars
[NDB-0465] N82-17513

AIRCRAFT WAKES

Flow visualization using a computerized data acquisition system A82-20792

Flow field around an oscillating airfoil A82-20813

AIRFIELD SURFACE MOVEMENTS

Movement in Category III conditions --- all weather air traffic operations A82-20221

AIRFOIL PROFILES

Impingement cooling of concave surfaces of turbine airfoils A82-18894

Experimental studies of the Eppler 61 airfoil at low Reynolds numbers [AIAA PAPER 82-0345] A82-19796

Flow field around an oscillating airfoil A82-20813

AIRFOILS

Boundary layer transition and separation on a compressor rotor airfoil A82-20299

Aerodynamic characteristics of airfoils with ice accretions [AIAA PAPER 82-0282] A82-22081

Some experimental investigations on transonic flutter characteristics of thin plate wing models with sweptback and tapered tips [NAL-TR-682] N82-16050

A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls [NAL-TR-680] N82-17123

AIRFRAMES

Design requirements for modern rescue helicopters A82-19020

Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft [AIAA PAPER 81-2631] A82-19212

Modal analysis using helicopter dynamic test data [ASME PAPER 81-DET-30] A82-19306

A comprehensive flight test flyover noise program A82-20765

Engine/drive/airframe compatibility: A way of life N82-17220

AIRLINE OPERATIONS

The procurement of flight simulators at the German Lufthansa [DGLR PAPER 81-093] A82-19268

Consequences of American airline deregulation - Legislative theory in a concrete example A82-19947

Movement in Category III conditions --- all weather air traffic operations A82-20221

Ground movement control and guidance - Cat. 3 operations experience in Air Inter A82-20222

A European airline's future simulator requirements A82-20536

Air service, airport access and future technology [PB82-105958] N82-16100

Aircraft Corrosion [AGARD-CP-315] N82-17349

An airline view of the corrosion problem N82-17352

Design and maintenance against corrosion of aircraft structures N82-17356

AIRPLANE PRODUCTION COSTS

Aircraft operability - RAF engineering experience and requirements. II A82-20562

AIRPORT PLANNING

The city and aviation --- Russian book A82-18898

New life for an 'old' body - Vienna's master plan for revitalization A82-20172

AIRPORTS

Airport radar systems --- Russian book A82-18975

Comparison of aircraft and ground vehicle noise levels in front and backyards of residences A82-20058

Gateway diversity and competition in international air transportation A82-21474

Air service, airport access and future technology [PB82-105958] N82-16100

Community sensitivity to changes in aircraft noise exposure [NASA-CR-3490] N82-16807

Requirements for instrument approaches to converging runways [AD-A108075] N82-17144

Survey of 101 US airports for new multiple instrument approach concepts --- runways [AD-A107812] N82-17229

Noise impact on communities from aircraft [GPO-80-617] N82-17655

AIRSHIPS

Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981 A82-20551

An introduction to the airship A82-20552

Offshore uses of the airship A82-20553

Studies of modern technology airships for maritime patrol applications A82-20554

The airship - Its application and promotional activity A82-20555

The uses of airships in the Royal Navy A82-20556

Airworthiness of airships A82-20557

A surveillance airship for the New Zealand environment A82-20558

Skyship 500 - The development of a modern production airship A82-20559

Study of ground handling characteristics of a maritime patrol airship [NASA-CR-166253] N82-16090

Preliminary design study of a hybrid airship for flight research [NASA-CR-166246] N82-17152

AIRSPEED

Use of optimization to predict the effect of selected parameters on commuter aircraft performance [NASA-CR-168439] N82-17151

ALGORITHMS

Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 3: A comparison of waypoint guidance algorithms for RNAV/MLS transition [NASA-CR-3512] N82-16060

ALKENES

Transparent polyolefin film armor [AD-A107562] N82-17377

ALL-WEATHER LANDING SYSTEMS

Movement in Category III conditions --- all weather air traffic operations A82-20221

ALUMINUM ALLOYS

A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading A82-20509

Multi-parameter yield zone model for predicting spectrum crack growth A82-20510

Crack growth behavior of center-cracked panels under random spectrum loading A82-20511

Random spectrum fatigue crack life predictions with or without considering load interactions A82-20512

Low-frequency eddy current inspection of aircraft structure A82-21900

Systems study of transport aircraft incorporating advanced aluminum alloys [NASA-CR-165820] N82-17153

Superplastic aluminum evaluation [AD-A107760] N82-17338

Mechanisms of corrosion fatigue --- of high strength aluminum alloys N82-17343

Corrosion fatigue behaviour of some aluminium alloys N82-17345

Flight-by-flight corrosion fatigue tests N82-17348
Corrosion prevention measures used in the construction of an aircraft airframe: The case of 2014 and 2214 alloys N82-17360
Recent developments in materials and processes for aircraft corrosion control N82-17361
Corrosion protection schemes for aircraft structures: Some examples for the corrosion behaviour of Al alloys N82-17364

AMBULANCES
Ambulance helicopter in the Stockholm archipelago A82-19005
Aerial ambulance service in Australia A82-19007
Flying doctor service in East Africa A82-19008
Air ambulance systems in the Republic of South Africa A82-19009
Aeromedical evacuation in New Zealand A82-19011
Aircraft for secondary long range emergency ambulance flight A82-19021

AMMUNITION
QOT and E of the F-16 20mm ammunition loading system's ability to upload/download A-7D aircraft [AD-A108007] N82-16099

ANALOG SIMULATION
Official recognition and the significance of simulators for safe flight operations [DGLR PAPER 81-094] A82-19271

ANALOG TO DIGITAL CONVERTERS
Current pressure measuring system in the transonic wind tunnel [AD-A106272] N82-16096

ANECHOIC CHAMBERS
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan [NASA-TM-84081] N82-16091

ANGLE OF ATTACK
Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack [AIAA PAPER 81-2621] A82-19208
Thrust modulation methods for a subsonic V/STOL aircraft [AIAA PAPER 81-2633] A82-19213
High angle-of-attack characteristics of three-surface fighter aircraft --- canard-wing-horizontal tail configuration for greater stability and control [AIAA PAPER 82-0245] A82-22074
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3 [AIAA PAPER 82-0289] A82-22083
Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack [AIAA PAPER 82-0351] A82-22094

ANODIZING
Corrosion fatigue behaviour of some aluminium alloys N82-17345

ANTENNA ARRAYS
Broader bandwidth for thin conformal antennas A82-19069
Analysis and tolerance study of an array antenna for a new generation of secondary radars A82-19521

ANTENNA COMPONENTS
Airborne measurements with a sensitive high resolution 90 GHz radiometer A82-18940

ANTENNA DESIGN
Octave bandwidth dual polarized antenna A82-18934
Broader bandwidth for thin conformal antennas A82-19069

ANTENNA RADIATION PATTERNS
Leaky wave antenna using an inverted strip dielectric waveguide --- for aircraft application A82-19552

ANTISUBMARINE WARFARE AIRCRAFT
Sea based support aircraft alternatives [AIAA PAPER 81-2649] A82-19217

Training in the flight and tactics simulator of the Navy Flight Squadron 3 'Graf Zeppelin' [DGLR PAPER 81-109] A82-19273

APPLICATIONS OF MATHEMATICS
Analytical study of twin-jet shielding [NASA-CR-165102] N82-16801

APPROACH
Spectrally balanced chromatic landing approach lighting system [NASA-CASE-ARC-10990-1] N82-16059

ARCHITECTURE (COMPUTERS)
A tutorial on distributed processing in aircraft/avionics applications N82-17089
Economic considerations for real-time naval aircraft/avionics distributed computer control systems N82-17097
Stage-state reliability analysis technique N82-17104

ARCTIC REGIONS
VTOL as it applies to resource development in the Canadian north [AIAA PAPER 81-2640] A82-19215

ARMOR
Transparent polyolefin film armor [AD-A107562] N82-17377

AROMATIC COMPOUNDS
The sooting tendency of fuels containing polycyclic aromatics in a research combustor [AIAA PAPER 82-0299] A82-19791

ARRESTING GEAR
Test and evaluation of improved aircrew restraint systems [AD-A107576] N82-16056

ATMOSPHERIC ATTENUATION
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations A82-19858

ATMOSPHERIC EFFECTS
On the Corrosion problems of the TAF F-5 aircraft N82-17354
New concepts in multifunctional corrosion for aircraft and other systems N82-17362
Corrosion in naval aircraft electronic systems N82-17363

ATMOSPHERIC OPTICS
Laser communications via an atmospheric link A82-20615

ATTACK AIRCRAFT
Tactical Radar Threat Generator system A82-18903

ATTITUDE INDICATORS
A velocity vector measuring system with 13 asymmetric wedge type yawmeters --- measuring flow distribution around the empennage of STOL models [NAL-TR-674] N82-17477

AUTOMATIC CONTROL
Integrated control of mechanical system for future combat aircraft N82-17117
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 2: RNAV/MLS transition problems for aircraft [NASA-CR-3511] N82-17142

AUTOMATIC FLIGHT CONTROL
Automatic controlled terrain following flights A82-18920
Digital avionics - Advances in maintenance designs [AIAA 81-2240] A82-20294
Operational and performance aspects of fuel management in civil aircraft A82-20518
The FS2 RAE Bedford civil flight research programme --- on components and system integration for optimum ATC A82-20519
Thrust management - Current achievements and future developments A82-20520
The effects on simulators of advances in aircraft technology A82-20533

The simulation study on a redundant flight control system A82-22120

An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship [NASA-CR-152407] N82-16087

Automation of on-board flightpath management [NASA-TM-84212] N82-16088

A program to evaluate a control system based on feedback of aerodynamic pressure differentials [NASA-CR-163466] N82-16089

AUTOMATIC LANDING CONTROL

Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing A82-20297

MLS flare low elevation angle guidance considerations A82-20586

Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 3: A comparison of waypoint guidance algorithms for RNAV/MLS transition [NASA-CR-3512] N82-16060

AUTOMATION

Automation in flight simulation of data handling and validation testing A82-20532

AVIONICS

Octave bandwidth dual polarized antenna A82-18934

KC-135 avionics modernization hot bench - An evaluation of requirements and design for the future A82-19244

Digital avionics - Advances in maintenance designs [AIAA 81-2240] A82-20294

The aircraft manufacturer's needs as a simulator user A82-20530

The effects on simulators of advances in aircraft technology A82-20533

Operability of military aircraft - Avionic design aspects A82-20564

The influence of technology advances on integrated CNI avionics --- Integrated Communication, Navigation, and Identification Avionics for military aircraft A82-20672

Tornado-avionic development testing A82-20760

Size reduction flight test airborne data systems A82-20766

Systems approach to the design of wind shear avionics A82-21593

Very high speed integrated circuits: Into the second generation. II - Entering Phase 1 A82-21848

Digital Avionics Information System (DAIS): Development and demonstration [AD-A107906] N82-16079

Software considerations in airborne systems and equipment certification [RTCA/DO-178] N82-16759

Tactical Airborne Distributed Computing and Networks [AGARD-CP-303] N82-17086

The effect of increasingly more complex aircraft and avionics on the method of system design N82-17088

A tutorial on distributed processing in aircraft/avionics applications N82-17089

Functional versus communication structures in modern avionic systems N82-17092

Economic considerations for real-time naval aircraft/avionics distributed computer control systems N82-17097

Methodology for measurement of fault latency in a digital avionic miniprocessor N82-17105

Next generation military aircraft will require hierarchical/multilevel information transfer systems --- packet switching N82-17114

SIFT: An ultra-reliable avionic computing system N82-17115

Integrated control of mechanical system for future combat aircraft N82-17117

F/A-18A tactical airborne computational subsystem N82-17119

F/A-18 weapons system support facilities N82-17120

Technology overview for advanced aircraft armament system program [AD-A107680] N82-17155

Corrosion control test method for avionic components [AD-A108061] N82-17171

Digital Avionics Information System (DAIS) documentation [AD-A108000] N82-17172

Function specifications for the A-7E Function Driver module [AD-A107922] N82-17173

US Naval fleet aircraft corrosion N82-17350

AXIAL FLOW

Survey on the effect of blade surface roughness on compressor performance N82-17191

Results of calculations N82-17198

The through flow calculations N82-17199

Evaluation of profile loss predictions based on diffusion factors N82-17200

Axial-flow turbomachine through flow calculation methods N82-17201

AXIAL FLOW TURBINES

Dynamic response of blades and vanes to wakes in axial turbomachinery [ASME PAPER 81-DET-33] A82-19307

Endwall boundary layer flows and losses in an axial turbine stage A82-20298

Through flow calculations in axial turbomachines [AGARD-AR-175] N82-17178

Influence of correlations and computational methods on the prediction of overall efficiency N82-17180

The two stage aero engine turbine N82-17183

Part span damper loss prediction for transonic axial fan rotors N82-17192

Axial compressor stall and surge N82-17194

Summary of answers to the questionnaire N82-17195

Single stage transonic compressor and equivalent plane cascade N82-17196

Blade-to-blade computations and boundary layer corrections in axial compressors and turbines N82-17202

AXIAL STRAIN

Improving composite bolted joint efficiency by laminate tailoring A82-20982

B

BACKGROUND NOISE

Relay-augmented data links in an interference environment A82-20684

BACKWASH

Surveys of flow-field around empennage of the NAL STOL-research-aircraft model [NAL-TR-677] N82-17124

BALANCING

Application of the principle of reciprocity to flexible rotor balancing [ASME PAPER 81-DET-49] A82-19311

BALLISTICS

Transparent polyolefin film armor [AD-A107562] N82-17377

BANDWIDTH
  Recent developments in military telemetry A82-18908
BEAM WAVEGUIDES
  Leaky wave antenna using an inverted strip dielectric waveguide --- for aircraft application A82-19552
BEARINGS (DIRECTION)
  System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation [NASA-CASE-FRC-11005-1] N82-16075
BEARINGLESS ROTORS
  Correlating measured and predicted inplane stability characteristics for an advanced bearingless rotor [NASA-CR-166280] N82-17154
BEECHCRAFT AIRCRAFT
  Aircraft accident report - Universal Airways, Inc., Beech 65-A80/Excalibur Conversion, N1008V, near Madisonville, Texas, July 2, 1981 [NTSB-AAR-81-17] N82-17138
BIBLIOGRAPHIES
  Fiscal year 1981 scientific and technical reports, articles, papers, and presentations [NASA-TM-82445] N82-16927
BIOLOGY
  An airline view of the corrosion problem N82-17352
BLADE TIPS
  Roll up model for rotor wake vortices, part 5 [ASRL-TR-194-4] N82-17127
BLAST LOADS
  Damage from High explosive (HE) projectiles N82-17164
BODY-WING AND TAIL CONFIGURATIONS
  Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust A82-22112
  Experimental trim drag values for conventional and supercritical wings [NASA-CR-168500] N82-17126
BODY-WING CONFIGURATIONS
  Aerodynamics of a transport aircraft-type wing-fuselage assembly [ONERA, TP NO. 1981-122] A82-19738
  Design of the composite spar-wingskin joint A82-20128
BOEING 747 AIRCRAFT
  The future of integrated CAD/CAM systems - The Boeing perspective A82-20278
  Advanced simulation --- in commercial aviation A82-20535
BOEING 757 AIRCRAFT
  Graphics in numerical control - The user's challenge A82-20277
  Boeing's bigger narrowbody A82-21190
BOEING 767 AIRCRAFT
  Boeing's bigger narrowbody A82-21190
BOLTS
  Bolted field repair of graphite/epoxy wing skin laminates A82-20981
  Improving composite bolted joint efficiency by laminate tailoring A82-20982
  Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey N82-17353
BOMBER AIRCRAFT
  Simulation of modern radar installations in full-mission flight and tactics simulators [DGLR PAPER 81-103] A82-19272
  A new look at the Tupolev Tu-26 'Backfire' A82-21191
  Forecasting corrosion damage and maintenance costs for large aircraft N82-17357
  Corrosion control measures for military aircraft: Present UK requirements and future developments N82-17358
  Corrosion prevention methods developed from direct experience with aerospace structures N82-17359
BOMBING EQUIPMENT
  Technology overview for advanced aircraft armament system program [AD-A107680] N82-17155
  Standardization study for advanced aircraft armament system program [AD-A107681] N82-17156
BONDING
  Fabrication of boron/aluminum fan blades for SCR engines [NASA-CR-165294] N82-16176
BOUNDARY LAYER CONTROL
  Experimental study of delta wing leading-edge devices for drag reduction at high lift --- conducted in Langley 7- by 10-foot high speed tunnel N82-17125
BOUNDARY LAYER FLOW
  Endwall boundary layer flows and losses in an axial turbine stage A82-20298
  Blade-to-blade computations and boundary layer corrections in axial compressors and turbines N82-17202
BOUNDARY LAYER SEPARATION
  Visualization of laminar separation by oil film method A82-20811
BOUNDARY LAYER STABILITY
  Basic studies of the flow fields of airfoil-flap-spoiler systems [AIAA PAPER 82-0173] A82-22060
  Surveys of flow-field around empennage of the NAL STOL-research-aircraft model [NAL-TR-677] N82-17124
BOUNDARY LAYER TRANSITION
  Boundary layer transition and separation on a compressor rotor airfoil A82-20299
BRISTOL-SIDDELEY BS 53 ENGINE
  A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation [AIAA PAPER 81-2663] A82-19221
BRITTLE MATERIALS
  Brittle materials design, high temperature gas turbine [AD-A106670] N82-16085
BROADBAND
  Broader bandwidth for thin conformal antennas A82-19069
BUBBLE TECHNIQUE
  Visualization of flow separation and separated flows with the aid of hydrogen bubbles A82-20803

C

C BAND
  X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations A82-19858
C-135 AIRCRAFT
  KC-135 avionics modernization hot bench - An evaluation of requirements and design for the future A82-19244
CALIBRATING
  R.F. calibrators for Doppler radars A82-18917
  Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments A82-21587
  Ground calibration of a strain-gauged CT-4A aircraft (1979) [AD-A107847] N82-16073
  Numerical and flight simulator test of the flight deterioration concept [NASA-CR-3500] N82-16655
CANARD CONFIGURATIONS
  Control law development for a close-coupled canard, relaxed static stability fighter [AIAA PAPER 82-0180] A82-19784
  Flow visualization using a computerized data acquisition system A82-20792

Wing-canard aerodynamics at transonic speeds - Fundamental considerations on minimum drag spanloads
[AIAA PAPER 82-0097] A82-22046
High angle-of-attack characteristics of three-surface fighter aircraft --- canard-wing-horizontal tail configuration for greater stability and control
[AIAA PAPER 82-0245] A82-22074

CANS
Development of in-can melting process and equipment, 1979 and 1980
[DE82-001050] N82-16834

CARBON FIBER REINFORCED PLASTICS
The ultrasonic inspection of C.F.C. --- carbon fiber sine wave spars
[MDR-0465] N82-17513

CARET WINGS
Aerodynamic characteristics of waveriders at subsonic flight speeds
A82-19810

CARGO AIRCRAFT
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070

CARRIER FREQUENCIES
R.F. calibrators for Doppler radars
A82-18917

CASCADE FLOW
Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows
[ASME PAPER 81-DET-122] A82-19337
Correlation for secondary flows and clearance effects
N82-17189
Effects of Reynolds number and turbulence level on axial cascade performance
N82-17190

CASTOR OIL
A history of aircraft piston engine lubricants
A82-19622

CATALYTIC ACTIVITY
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401

CAVITATION FLOW
Visualization of flow separation and separated flows with the aid of hydrogen bubbles
A82-20803

CERAMICS
Brittle materials design, high temperature gas turbine
[AD-A106670] N82-16085

CERTIFICATION
Official recognition and the significance of simulators for safe flight operations
[DGLR PAPER 81-094] A82-19271
The Boeing Flight Test Data System 1980
A82-20769
Software considerations in airborne systems and equipment certification
[RTCA/DO-178] N82-16759

CHANNELS (DATA TRANSMISSION)
Tactical Airborne Distributed Computing and Networks
[AGARD-CP-303] N82-17086
Next generation military aircraft will require hierarchical/multilevel information transfer systems --- packet switching
N82-17114

CHECKOUT
Built-in-test Equipment Requirements Workshop. Workshop presentation
[AD-A107842] N82-17085
F/A-18 weapons system support facilities
N82-17120

CHIPS (ELECTRONICS)
Very high speed integrated circuits: Into the second generation. II - Entering Phase 1
A82-21848

CIRCULAR CYLINDERS
Visualization of laminar separation by oil film method
A82-20811

CIVIL AVIATION
The city and aviation --- Russian book
A82-18898
Airport radar systems --- Russian book
A82-18975
The network of civilian air rescue in Germany
A82-19004
Analysis of selected VTOL concepts for a civil transportation mission
[AIAA PAPER 81-2655] A82-19220
The procurement of flight simulators at the German Lufthansa
[DGLR PAPER 81-093] A82-19268
Design possibilities for improved fuel efficiency of civil transport aircraft
A82-20514
The FS2 RAE Bedford civil flight research programme --- on components and system integration for optimum ATC
A82-20519
Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981
A82-20526
Advanced simulation --- in commercial aviation
A82-20535
An independent view of where civil simulation should be headed --- training simulators for civil aircraft
A82-20537
Gateway diversity and competition in international air transportation
A82-21474
The emerging need for improved helicopter navigation
A82-21591
FAA/NWS aviation route forecast /ARF/ development
[AIAA PAPER 82-0013] A82-22027
Symposium on commercial-aviation energy-conservation strategies
[DE81-028406] N82-16057
Assessment of historical and projected segments of US and World civil and military rotorcraft markets 1960 - 1990
[NASA-CR-166151] N82-17137
Development test programs adapted to helicopter engines
N82-17205

CLEARANCES
Correlation for secondary flows and clearance effects
N82-17189

CLUTTER
Sanctuary radar --- with digital processor for Doppler filtering and pulse compression
A82-18906

COAL DERIVED LIQUIDS
Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel
A82-22241
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401

COAL LIQUEFACTION
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401

COASTAL WATER
A surveillance airship for the New Zealand environment
A82-20558

COCKPIT SIMULATORS
Simulation of advanced cockpits
A82-19259
Data base generation for digital external view systems
[DGLR PAPER 81-101] A82-19270
A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions
[AIAA PAPER 82-0261] A82-22079

COCKPITS
Threat perception while viewing single intruder conflicts on a cockpit display of traffic information
[NASA-TM-81341] N82-16076

COCKS
Surveys of flow-field around empennage of the NAL STOL-research-aircraft model
[NAL-TR-677] N82-17124

COLD FLOW TESTS
The two stage aero engine turbine
N82-17183

COLLIMATION
- Analysis and tolerance study of an array antenna for a new generation of secondary radars A82-19521

COLLISION AVOIDANCE
- Threat perception while viewing single intruder conflicts on a cockpit display of traffic information [NASA-TM-81341] N82-16076
- Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase [AD-A107805] N82-17148

COLOR
- Spectrally balanced chromatic landing approach lighting system [NASA-CASE-ARC-10990-1] N82-16059

COLOR CODING
- Application of image processing techniques to fluid flow data analysis [NASA-TM-82760] N82-16049

COMBUSTION CHAMBERS
- Fuel property effects on radiation intensities in a gas turbine combustor A82-19966
- Dilution jet behavior in the turn section of a reverse flow combustor [AIAA PAPER 82-0192] A82-20291

COMBUSTION PRODUCTS
- The sooting tendency of fuels containing polycyclic aromatics in a research combustor [AIAA PAPER 82-0299] A82-19791
- Fuel property effects on radiation intensities in a gas turbine combustor A82-19966

COMMERCIAL AIRCRAFT
- Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing A82-20297
- Operational and performance aspects of fuel management in civil aircraft A82-20518
- The application of condition monitoring --- commercial helicopter in-service maintenance A82-20542
- Symposium on commercial-aviation energy-conservation strategies [DE81-028406] N82-16057
- Use of optimization to predict the effect of selected parameters on commuter aircraft performance [NASA-CR-168439] N82-17151
- Aircraft Corrosion [AGARD-CP-315] N82-17349

COMPATIBILITY
- Engine/drive/airframe compatibility: A way of life N82-17220

COMPETITION
- Gateway diversity and competition in international air transportation A82-21474

COMPONENT RELIABILITY
- Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines [AD-A106732] N82-16077
- Research and development program for non-linear structural modeling with advanced time-temperature dependent constitutive relationships [NASA-CR-165533] N82-16080
- Corrosion control test method for avionic components [AD-A108061] N82-17171
- Component research for future propulsion systems N82-17224

COMPOSITE MATERIALS
- Pactec V - Plastics technology advances/1980 update; Proceedings of the Fifth Annual Pacific Technical Conference, Los Angeles, CA, February 26-28, 1980. Volume 3 A82-20521
- Environmental exposure effects on composite materials for commercial aircraft [NASA-CR-3502] N82-16178

COMPOSITE STRUCTURES
- Design of the composite spar-wingskin joint A82-20128
- Composite structural materials --- fiber reinforced composites for aircraft structures [NASA-CR-165121] N82-16182

COMPRESSOR BLADES
- Optimal shape design of turbine blades [ASME PAPER 81-DET-128] A82-19342
- Rotating stall in blade rows operating in shear flow A82-22209
- Survey on diffusion factors and profile losses N82-17186
- Survey on the effect of blade surface roughness on compressor performance N82-17191
- Deviation/turning angle correlations N82-17193
- BBC/Sulzer. 4 stage transonic compressor N82-17197
- Evaluation of profile loss predictions based on diffusion factors N82-17200

COMPRESSOR EFFICIENCY
- End-wall boundary layer calculation methods N82-17188
- Effects of Reynolds number and turbulence level on axial cascade performance N82-17190
- Survey on the effect of blade surface roughness on compressor performance N82-17191
- BBC/Sulzer. 4 stage transonic compressor N82-17197
- Evaluation of profile loss predictions based on diffusion factors N82-17200

COMPRESSOR ROTORS
- Boundary layer transition and separation on a compressor rotor airfoil A82-20299

COMPRESSORS
- Study of air compressor hazards in underground and surface mines [PB82-105164] N82-17597

COMPUTATION
- The through flow calculations N82-17199
- Blade-to-blade computations and boundary layer corrections in axial compressors and turbines N82-17202

COMPUTATIONAL FLUID DYNAMICS
- Technical evaluation report of the AGARD Fluid Dynamics Panel Symposium on computation of viscous-inviscid interactions [ONERA, TP NO. 1981-116] A82-19733
- Aerodynamics of a transport aircraft-type wing-fuselage assembly [ONERA, TP NO. 1981-122] A82-19738
- Three-dimensional calculation of the flow in helicopter air intakes [ONERA, TP NO. 1981-124] A82-19740
- Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions [AIAA PAPER 82-0352] A82-19797
- Real gas flows over complex geometries at moderate angles of attack [AIAA PAPER 82-0392] A82-19801
- Pade approximation applied to flow past thin airfoils A82-20728
- A perspective of computational aerodynamics from the viewpoint of airplane design applications [AIAA PAPER 82-0018] A82-22028
- Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics [AIAA PAPER 82-0095] A82-22045
- Isolated nacelle performance - Measurement and simulation [AIAA PAPER 82-0134] A82-22054
- A split coefficient/locally monotonic scheme for multishocked supersonic flow [AIAA PAPER 82-0287] A82-22082
- Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack [AIAA PAPER 82-0351] A82-22094
- Finite difference computation of the conical flow field over a delta wing [VKI-TN-140] N82-17135

Through flow calculations in axial turbomachines
[AGARD-AR-175] N82-17178
Influence of correlations and computational methods on the prediction of overall efficiency
N82-17180
The two stage aero engine turbine
N82-17183
Survey on diffusion factors and profile losses
N82-17186
COMPUTER GRAPHICS
Simulation of advanced cockpits
A82-19259
Requirements regarding digital external view systems for full mission flight and tactics simulators
[DGLR PAPER 81-100] A82-19267
Data base generation for digital external view systems
[DGLR PAPER 81-101] A82-19270
A CAD/CAM graphics system with relative datums and tolerances
[ASME PAPER 81-DET-108] A82-19333
Computer graphics for quality assurance
A82-20276
Graphics in numerical control - The user's challenge
A82-20277
The future of integrated CAD/CAM systems - The Boeing perspective
A82-20278
Color graphics based real-time telemetry processing system
A82-20771
Flow visualization using a computerized data acquisition system
A82-20792
Configuration Development System/NAVAIR Report
[AD-A106727] N82-16072
Development of a computer based presentation of non-steady helicopter rotor flows
[AD-A108107] N82-17131
Terrain model animation
[AD-A107911] N82-17887
COMPUTER NETWORKS
Real-Time Simulation Computation System --- for digital flight simulation of research aircraft
A82-19260
Reconfiguration: A method to improve systems realiability
N82-17107
A reconfigurable change network for distributed process control
N82-17108
SIFT: An ultra-reliable avionic computing system
N82-17115
F/A-18A tactical airborne computational subsystem
N82-17119
COMPUTER PROGRAMMING
Programs for the transonic wind tunnel data processing installation. Part 9: Pressure measurements updated
[AD-A106271] N82-16095
COMPUTER PROGRAMS
Utilization of hybrid computational equipment for the simulation of parachute system flight
A82-19234
KC-135 avionics modernization hot bench - An evaluation of requirements and design for the future
A82-19244
CAD/CAM approach to improving industry productivity gathers momentum
A82-21375
A generalized escape system simulation computer program: A user's manual
[AD-A106152] N82-16055
Research and development program for non-linear structural modeling with advanced time-temperature dependent constitutive relationships
[NASA-CR-165533] N82-16080
Software considerations in airborne systems and equipment certification
[RTCA/DO-178] N82-16759
Prediction of sound radiation from different practical jet engine inlets
[NASA-CR-165120] N82-16810
Function specifications for the A-7E Function Driver module
[AD-A107922] N82-17173
Results of calculations
N82-17198
Investigation and evaluation of a computer program to minimize three-dimensional flight time tracks
[NASA-CR-168419] N82-17879
COMPUTER SYSTEMS DESIGN
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079
Distributed data processing: What is it?
N82-17087
The effect of increasingly more complex aircraft and avionics on the method of system design
N82-17088
Stage-state reliability analysis technique
N82-17104
Digital Avionics Information System (DAIS) documentation
[AD-A108000] N82-17172
COMPUTER SYSTEMS PERFORMANCE
Distributed data processing: What is it?
N82-17087
COMPUTER SYSTEMS PROGRAMS
Methodology for measurement of fault latency in a digital avionic miniprocessor
N82-17105
Hierarchical specification of the SIFT fault tolerant flight control system
N82-17106
COMPUTER SYSTEMS SIMULATION
Methodology for measurement of fault latency in a digital avionic miniprocessor
N82-17105
COMPUTERIZED DESIGN
A fuel control system designers approach to gas turbine engine computer model validation
A82-19253
A CAD/CAM graphics system with relative datums and tolerances
[ASME PAPER 81-DET-108] A82-19333
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351
Computer graphics for quality assurance
A82-20276
Graphics in numerical control - The user's challenge
A82-20277
The future of integrated CAD/CAM systems - The Boeing perspective
A82-20278
CAD/CAM approach to improving industry productivity gathers momentum
A82-21375
Integration of a code for aeroelastic design of conventional and composite wings into ACSYNT, an aircraft synthesis program --- wing aeroelastic design (WADES)
[NASA-CR-137805] N82-16069
Configuration Development System/NAVAIR Report
[AD-A106727] N82-16072
A computer program for variable-geometry single-stage axial compressor test data analysis (UD0400)
[AD-A106676] N82-16086
Parallel computation for developing nonlinear control procedures
[AD-A107914] N82-17227
COMPUTERIZED SIMULATION
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[AIAA PAPER 81-2663] A82-19221
Utilization of hybrid computational equipment for the simulation of parachute system flight
A82-19234
KC-135 avionics modernization hot bench - An evaluation of requirements and design for the future
A82-19244
Radar environment simulation for software test
A82-19245
SIMATR - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars
A82-19256
Simulation of advanced cockpits
A82-19259

Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing A82-20297

A perspective of computational aerodynamics from the viewpoint of airplane design applications [AIAA PAPER 82-0018] A82-22028

Isolated nacelle performance - Measurement and simulation [AIAA PAPER 82-0134] A82-22054

A generalized escape system simulation computer program: A user's manual [AD-A106152] N82-16055

Research through simulation --- simulators and research applications at Langley [NASA-FACTS-125] N82-16092

Implementation of the recommendations made on the technical report titled analysis of advanced simulator for pilot training [AD-A106779] N82-16094

Analytical study of twin-jet shielding [NASA-CR-165105] N82-16804

A simple hybrid visual simulation for research flight simulators [ESA-TT-690] N82-17232

Terrain model animation [AD-A107911] N82-17887

CONFERENCES

Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports A82-19001

Trends in aviation fuels and lubricants; Proceedings of the West Coast International Meeting, Seattle, WA, August 3-6, 1981 A82-19621

Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981 A82-20513

Pactec V - Plastics technology advances/1980 update; Proceedings of the Fifth Annual Pacific Technical Conference, Los Angeles, CA, February 26-28, 1980. Volume 3 A82-20521

Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981 A82-20526

Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980 A82-20540

Airships and their maritime applications; Proceedings of the Symposium, London, England, March 10, 1981 A82-20551

Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980 A82-20560

Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980 A82-20751

Institute of Navigation, Annual Meeting, 36th, U.S. Naval Postgraduate School, Monterey, CA, June 23-26, 1980, Proceedings A82-21500

Symposium on commercial-aviation energy-conservation strategies [DE81-028406] N82-16057

Corrosion Fatigue --- conferences [AGARD-CP-316] N82-17342

Aircraft Corrosion [AGARD-CP-315] N82-17349

CONICAL FLOW

Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow A82-19197

Finite difference computation of the conical flow field over a delta wing [VKI-TN-140] N82-17135

CONICAL NOZZLES

Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel [NASA-TM-81343] N82-16083

CONSOLES

Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators [DGLR PAPER 81-097] A82-19269

CONTROL EQUIPMENT

Current pressure measuring system in the transonic wind tunnel [AD-A106272] N82-16096

CONTROL SIMULATION

The use of adaptive control for helicopter trajectories in search operations A82-19065

Modelling of target radar scattering with application to guidance simulation A82-20570

Propulsion system controls design and simulation [AIAA PAPER 82-0322] A82-22091

The simulation study on a redundant flight control system A82-22120

CONTROL STICKS

Ground calibration of a strain-gauged CT-4A aircraft (1979) [AD-A107847] N82-16073

CONTROL SURFACES

A program to evaluate a control system based on feedback of aerodynamic pressure differentials [NASA-CR-163466] N82-16089

CONTROL THEORY

An application of total synthesis to robust coupled design --- turbojet engine control A82-19061

Parallel computation for developing nonlinear control procedures [AD-A107914] N82-17227

CONTROLLABILITY

Analytical control law for desirable aircraft lateral handling qualities A82-21941

Stiffness degradation of impact damaged structure N82-17168

CONTROLLERS

An investigation of multi-axis isometric side-arm controllers in a variable stability helicopter [AD-A106759] N82-17226

CONVERGENCE

Requirements for instrument approaches to converging runways [AD-A108075] N82-17144

CONVERGENT NOZZLES

Pressure dependence of jet noise and silencing of blow-offs A82-20266

CORNER FLOW

Dilution jet behavior in the turn section of a reverse flow combustor [AIAA PAPER 82-0192] A82-20291

CORROSION

Aircraft Corrosion [AGARD-CP-315] N82-17349

US Naval fleet aircraft corrosion N82-17350

An airline view of the corrosion problem N82-17352

Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey N82-17353

On the Corrosion problems of the TAF F-5 aircraft N82-17354

The experience of corrosion on French military aerodynes N82-17355

Design and maintenance against corrosion of aircraft structures N82-17356

CORROSION PREVENTION

Corrosion Fatigue --- conferences [AGARD-CP-316] N82-17342

Mechanisms of corrosion fatigue --- of high strength aluminum alloys N82-17343

Fracture mechanics based modelling of the corrosion fatigue process
N82-17344
Corrosion fatigue behaviour of some aluminium alloys
N82-17345
Flight-by-flight corrosion fatigue tests
N82-17348
Detection and prevention of corrosion in Royal Air Force aircraft
N82-17351
Forecasting corrosion damage and maintenance costs for large aircraft
N82-17357
Corrosion control measures for military aircraft: Present UK requirements and future developments
N82-17358
Corrosion prevention methods developed from direct experience with aerospace structures
N82-17359
Corrosion prevention measures used in the construction of an aircraft airframe: The case of 2014 and 2214 alloys
N82-17360
Recent developments in materials and processes for aircraft corrosion control
N82-17361
New concepts in multifunctional corrosion for aircraft and other systems
N82-17362
Corrosion in naval aircraft electronic systems
N82-17363
Corrosion protection schemes for aircraft structures: Some examples for the corrosion behaviour of Al alloys
N82-17364

CORROSION RESISTANCE
Corrosion control test method for avionic components
[AD-A108061] N82-17171

COST EFFECTIVENESS
Cost efficiency versus objective fidelity in flight simulation
[DGLR PAPER 81-104] A82-19264

COST REDUCTION
The impact of increasing energy costs upon the design philosophy of avionic fuel management systems
A82-20517
Operational and performance aspects of fuel management in civil aircraft
A82-20518

COUPLED MODES
On the formulation of coupled/uncoupled dynamics analyses of blade-disc assemblies
[ASME PAPER 81-DET-126] A82-19340
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling
[ISD-270] N82-17640
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling
[ISD-271] N82-17641

CRACK CLOSURE
A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading
A82-20509

CRACK INITIATION
Effects of cyclic loading on projectile impact damage
N82-17167
Corrosion fatigue behaviour of some aluminium alloys
N82-17345

CRACK PROPAGATION
Methods and models for predicting fatigue crack growth under random loading --- Book
A82-20506
A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading
A82-20509
Multi-parameter yield zone model for predicting spectrum crack growth
A82-20510
Crack growth behavior of center-cracked panels under random spectrum loading
A82-20511
Random spectrum fatigue crack life predictions with or without considering load interactions
A82-20512

Low-frequency eddy current inspection of aircraft structure
A82-21900
Corrosion fatigue behaviour of some aluminium alloys
N82-17345

CRASHES
Advanced recorder design and development
[PB81-244105] N82-16385
Aircraft accident report - Universal Airways, Inc., Beech 65-A80/Excalibur Conversion, N1000V, near Madisonville, Texas, July 2, 1981
[NTSB-AAR-81-17] N82-17138

CREEP RUPTURE STRENGTH
Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy
A82-21636

CRITICAL TEMPERATURE
Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093

CROSS FLOW
Experimental investigation of a jet inclined to a subsonic crossflow
[AIAA PAPER 81-2610] A82-19202

CRYOGENIC WIND TUNNELS
A progress report on the European Transonic Wind Tunnel Project
[ONERA, TP NO. 1981-121] A82-19737

CYCLIC LOADS
A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading
A82-20509
Process monitor helps make jet engines reliable
A82-21897
Effects of cyclic loading on projectile impact damage
N82-17167
Rotor model for the verification of computational methods
[ISD-275] N82-17638
Loading cycles and material data for the layout of a wind turbine of special hub concept
[ISD-273] N82-17643

D

DAMAGE
Damage tolerant design for cold-section turbine engine disks
[AD-A107863] N82-17176
Lubrication breakdown between gear teeth
N82-17213

DAMAGE ASSESSMENT
Analysis methods for ballistic damage size and type
N82-17163
Damage from High explosive (HE) projectiles
N82-17164
Damage from engine debris projectiles
N82-17165
Forecasting corrosion damage and maintenance costs for large aircraft
N82-17357

DAMPERS (VALVES)
Part span damper loss prediction for transonic axial fan rotors
N82-17192

DAMPING
Subsonic and transonic roll damping measurements on Basic Finner --- finned missile calibration model
A82-19958

DATA ACQUISITION
Development of a simple, self-contained flight test data acquisition system
A82-20756
Data systems organization - A change for the better --- flight test data acquisition
A82-20767
Color graphics based real-time telemetry processing system
A82-20771
Flow visualization using a computerized data acquisition system
A82-20792
Programs for the transonic wind tunnel data processing installation. Part 9: Pressure measurements updated
[AD-A106271] N82-16095

A versatile data acquisition system for a low speed wind tunnel [AD-A106269] N82-16097
Development of a simple, self-contained flight test data acquisition system [NASA-CR-168438] N82-17478

DATA BASES
Data base generation for digital external view systems [DGLR PAPER 81-101] A82-19270
Aeronautical Information Data Subsystem (AIDS): A ground-based component of air navigation services systems N82-17150

DATA LINKS
Microwave communications to remotely piloted vehicles A82-18911
Laser communications via an atmospheric link A82-20615
Relay-augmented data links in an interference environment A82-20684

DATA MANAGEMENT
The Boeing Flight Test Data System 1980 A82-20769
Instrumentation remote 'mini' ground station A82-20770

DATA PROCESSING
Instrumentation remote 'mini' ground station A82-20770
Color graphics based real-time telemetry processing system A82-20771
A versatile data acquisition system for a low speed wind tunnel [AD-A106269] N82-16097
Tactical Airborne Distributed Computing and Networks [AGARD-CP-303] N82-17086
Distributed data processing: What is it? N82-17087

DATA REDUCTION
Simulator data test instrumentation - Flight test challenge of the eighties A82-20768

DATA SYSTEMS
Automation in flight simulation of data handling and validation testing A82-20532
Data systems organization - A change for the better --- flight test data acquisition A82-20767
The Boeing Flight Test Data System 1980 A82-20769
Instrumentation remote 'mini' ground station A82-20770

DATA TRANSMISSION
The significance of electronics for air traffic control at the present time and in the future A82-19649

DC 10 AIRCRAFT
Investigation and evaluation of a computer program to minimize three-dimensional flight time tracks [NASA-CR-168419] N82-17879

DEICERS
Ice phobics blade tracking and comparison of vibration analysis techniques [AD-A108121] N82-16074

DELTA WINGS
Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow A82-19197
Aerodynamic characteristics of waveriders at subsonic flight speeds A82-19810
Alleviation of the subsonic pitch-up of delta wings [AIAA PAPER 82-0129] A82-22052
Experimental study of delta wing leading-edge devices for drag reduction at high lift --- conducted in Langley 7- by 10-foot high speed tunnel N82-17125
Finite difference computation of the conical flow field over a delta wing [VKI-TN-140] N82-17135

DEMAND (ECONOMICS)
Energy environment study [NASA-CR-168458] N82-17654

DEPOSITION
Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel A82-22240

DESIGN ANALYSIS
Design criteria for a miss distance radar A82-18904
Airborne measurements with a sensitive high resolution 90 GHz radiometer A82-18940
A study of potentially low cost millimetre-wave radiometric sensors A82-18942
Boundary layer transition and separation on a compressor rotor airfoil A82-20299
Pre-design study for a modern four-bladed rotor for the Rotor System Research Aircraft (RSRA) --- integrating the YAH-64 main rotor [NASA-CR-166154] N82-16043
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report [NASA-CR-165500] N82-16081
Brittle materials design, high temperature gas turbine [AD-A106670] N82-16085
Deviation/turning angle correlations N82-17193
Single stage transonic compressor and equivalent plane cascade N82-17196
Results of calculations N82-17198

DETECTION
Test and evaluation of UV fiber optics for application for aircraft fire detector systems [AD-A106129] N82-16850

DICKE RADIOMETERS
A study of potentially low cost millimetre-wave radiometric sensors A82-18942
Radiometric measurements at 80 GHz A82-18943

DIELECTRICS
Leaky wave antenna using an inverted strip dielectric waveguide --- for aircraft application A82-19552

DIFFERENTIAL PRESSURE
A program to evaluate a control system based on feedback of aerodynamic pressure differentials [NASA-CR-163466] N82-16089

DIFFUSION
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report [NASA-CR-165500] N82-16081
Survey on diffusion factors and profile losses N82-17186
Evaluation of profile loss predictions based on diffusion factors N82-17200

DIGITAL COMPUTERS
Simulation of advanced cockpits A82-19259
Properties of the new flight and tactics simulators [DGLR PAPER 81-106] A82-19265

DIGITAL RADAR SYSTEMS
Tactical Radar Threat Generator system A82-18903
Sanctuary radar --- with digital processor for Doppler filtering and pulse compression A82-18906
Simulation of modern radar installations in full-mission flight and tactics simulators [DGLR PAPER 81-103] A82-19272

DIGITAL SIMULATION
Real-Time Simulation Computation System --- for digital flight simulation of research aircraft A82-19260
Requirements regarding digital external view systems for full mission flight and tactics simulators [DGLR PAPER 81-100] A82-19267
The effects on simulators of advances in aircraft technology A82-20533

DIGITAL SYSTEMS
Data base generation for digital external view systems
[DGLR PAPER 81-101] A82-19270
Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing
A82-20297
Operability of military aircraft - Avionic design aspects
A82-20564
Propulsion system controls design and simulation
[AIAA PAPER 82-0322] A82-22091
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079
Digital Avionics Information System (DAIS) documentation
[AD-A108000] N82-17172
DIGITAL TECHNIQUES
Digital avionics - Advances in maintenance designs
[AIAA 81-2240] A82-20294
Tactical Airborne Distributed Computing and Networks
[AGARD-CP-303] N82-17086
Integrated control of mechanical system for future combat aircraft
N82-17117
DILUTION
Dilution jet behavior in the turn section of a reverse flow combustor
[AIAA PAPER 82-0192] A82-20291
DIPOLE ANTENNAS
Octave bandwidth dual polarized antenna
A82-18934
DISPLAY DEVICES
Data base generation for digital external view systems
[DGLR PAPER 81-101] A82-19270
System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation
[NASA-CASE-FRC-11005-1] N82-16075
Threat perception while viewing single intruder conflicts on a cockpit display of traffic information
[NASA-TM-81341] N82-16076
Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines
[AD-A106732] N82-16077
DISTANCE MEASURING EQUIPMENT
MLS flare low elevation angle guidance considerations
A82-20586
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 3: A comparison of waypoint guidance algorithms for RNAV/MLS transition
[NASA-CR-3512] N82-16060
DISTRIBUTED PARAMETER SYSTEMS
Tactical Airborne Distributed Computing and Networks
[AGARD-CP-303] N82-17086
Distributed data processing: What is it?
N82-17087
The effect of increasingly more complex aircraft and avionics on the method of system design
N82-17088
A tutorial on distributed processing in aircraft/avionics applications
N82-17089
Functional versus communication structures in modern avionic systems
N82-17092
Economic considerations for real-time naval aircraft/avionics distributed computer control systems
N82-17097
A reconfigurable change network for distributed process control
N82-17108
Integrated control of mechanical system for future combat aircraft
N82-17117
F/A-18A tactical airborne computational subsystem
N82-17119
F/A-18 weapons system support facilities
N82-17120
DOCUMENTS
Design and maintenance against corrosion of aircraft structures
N82-17356
DOPPLER RADAR
Design criteria for a miss distance radar
A82-18904
R.F. calibrators for Doppler radars
A82-18917
DOWNWASH
Surveys of flow-field around empennage of the NAL STOL-research-aircraft model
[NAL-TR-677] N82-17124
DRAG REDUCTION
Three-dimensional calculation of the flow in helicopter air intakes
[CNERA, TP NO. 1981-124] A82-19740
Wing-canard aerodynamics at transonic speeds - Fundamental considerations on minimum drag spanloads
[AIAA PAPER 82-0097] A82-22046
Aerodynamic characteristics of maneuvering flaps
A82-22110
Experimental study of delta wing leading-edge devices for drag reduction at high lift --- conducted in Langley 7- by 10-foot high speed tunnel
N82-17125
DROP SIZE
Helicopter icing spray system
A82-20754
DYNAMIC MODELS
Development of a correlated finite element dynamic model of a complete aero engine
[ASME PAPER 81-DET-74] A82-19326
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351
DYNAMIC RESPONSE
Dynamic response of blades and vanes to wakes in axial turbomachinery
[ASME PAPER 81-DET-33] A82-19307
Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl
[ASME PAPER 81-DET-55] A82-19314
An investigation of dual mode phenomena in a mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347
A parametric study of dynamic response of a discrete model of turbomachinery bladed disk
[ASME PAPER 81-DET-137] A82-19349
Numerical and flight simulator test of the flight deterioration concept
[NASA-CR-3500] N82-16655
Analysis methods for predicting structural response to projectile impact
N82-17162
CF6 jet engine performance improvement: High pressure turbine roundness
[NASA-CR-165555] N82-17174
Problems of engine response during transient maneuvers
N82-17221
Rotor model for the verification of computational methods
[ISD-275] N82-17638
DYNAMIC STRUCTURAL ANALYSIS
Modal analysis using helicopter dynamic test data
[ASME PAPER 81-DET-30] A82-19306
Development of a correlated finite element dynamic model of a complete aero engine
[ASME PAPER 81-DET-74] A82-19326
Natural frequencies of rotating bladed discs using clamped-free blade modes
[ASME PAPER 81-DET-124] A82-19338
On the formulation of coupled/uncoupled dynamics analyses of blade-disc assemblies
[ASME PAPER 81-DET-126] A82-19340
Investigation of vibration of shrouded turbine blades
[ASME PAPER 81-DET-129] A82-19343
Study of ground handling characteristics of a maritime patrol airship
[NASA-CR-166253] N82-16090
Design manual for impact damage tolerant aircraft structure
[AGARD-AG-238] N82-17160

Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling [ISD-271] N82-17641

Static and dynamic investigations for the model of a wind rotor [ISD-272] N82-17642

E

EARTH RESOURCES

VTOL as it applies to resource development in the Canadian north [AIAA PAPER 81-2640] A82-19215

ECONOMIC ANALYSIS

Economic considerations for real-time naval aircraft/avionics distributed computer control systems N82-17097

ECONOMIC FACTORS

Economic considerations for real-time naval aircraft/avionics distributed computer control systems N82-17097

Energy environment study [NASA-CR-168458] N82-17654

EDDY CURRENTS

Low-frequency eddy current inspection of aircraft structure A82-21900

EJECTION SEATS

A generalized escape system simulation computer program: A user's manual [AD-A106152] N82-16055

EJECTORS

Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability [AIAA PAPER 81-2629] A82-19211

Technology overview for advanced aircraft armament system program [AD-A107680] N82-17155

ELASTIC SHELLS

Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading A82-19928

ELECTRIC CONNECTORS

Corrosion in naval aircraft electronic systems N82-17363

ELECTRIC EQUIPMENT

Aircraft electrical equipment - Design and operation --- Russian book A82-18998

ELECTRIC POWER SUPPLIES

Aircraft electrical equipment - Design and operation --- Russian book A82-18998

Power system design optimization using Lagrange multiplier techniques A82-20743

ELECTRO-OPTICS

Simulation of advanced cockpits A82-19259

ELECTROCHEMISTRY

Corrosion protection schemes for aircraft structures: Some examples for the corrosion behaviour of Al alloys N82-17364

ELECTROMAGNETIC INTERFERENCE

Relay-augmented data links in an interference environment A82-20684

ELECTRONIC AIRCRAFT

Very high speed integrated circuits: Into the second generation. II - Entering Phase 1 A82-21848

ELECTRONIC CONTROL

The significance of electronics for air traffic control at the present time and in the future A82-19649

Energy management in military combat aircraft A82-20515

The control of aircraft gas turbines for fuel economy A82-20516

The impact of increasing energy costs upon the design philosophy of avionic fuel management systems A82-20517

Thrust management - Current achievements and future developments A82-20520

ELECTRONIC COUNTERMEASURES

Octave bandwidth dual polarized antenna A82-18934

An analysis of antijam communication requirements in fading media A82-20695

ELECTRONIC EQUIPMENT

The significance of electronics for air traffic control at the present time and in the future A82-19649

ELECTRONIC EQUIPMENT TESTS

Built-in-test Equipment Requirements Workshop. Workshop presentation [AD-A107842] N82-17085

ELECTRONIC WARFARE

Properties of the new flight and tactics simulators [DGLR PAPER 81-106] A82-19265

ELEVATION ANGLE

MLS flare low elevation angle guidance considerations A82-20586

Experimental measurement of the low angle terrain scattering interference environment A82-20588

Comparison of various elevation angle estimation techniques A82-20589

EMBRITTLEMENT

Mechanisms of corrosion fatigue --- of high strength aluminum alloys N82-17343

EMERGENCIES

Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports A82-19001

The marketing, organisation and financing of aeromedical evacuation by a motoring organisation A82-19002

Survey of aeromedical evacuation in Italy A82-19003

The network of civilian air rescue in Germany A82-19004

Aerial ambulance service in Australia A82-19007

Flying doctor service in East Africa A82-19008

Air ambulance systems in the Republic of South Africa A82-19009

The situation of air rescue in Argentina A82-19010

Aeromedical evacuation in New Zealand A82-19011

Helicopter secondary applications for neurotraumatic emergencies A82-19015

Helicopters - Night operations A82-19017

The helicopter in rescue operations in high-mountain areas A82-19019

Application of the ABC helicopter to the emergency medical service role [AIAA PAPER 81-2653] A82-19219

EMERGENCY LOCATOR TRANSMITTERS

Special investigation report. Search and rescue procedures and arming of emergency locator transmitter: Aircraft accident near Michigan City, Indiana, 7 December, 1980 [PB81-249427] N82-16056

ENERGY CONSERVATION

Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981 A82-20513

General aviation fuel conservation in the 1980's A82-20757

Symposium on commercial-aviation energy-conservation strategies [DE81-028406] N82-16057

ENERGY TRANSFER

Prediction of aircraft interior noise using the statistical energy analysis method [ASME PAPER 81-DET-102] A82-19332

ENGINE AIRFRAME INTEGRATION
Helicopter Propulsion Systems [AGARD-CP-302] N82-17203

ENGINE CONTROL
An application of total synthesis to robust coupled design --- turbojet engine control A82-19061
Energy management in military combat aircraft A82-20515
The control of aircraft gas turbines for fuel economy A82-20516
Propulsion system controls design and simulation [AIAA PAPER 82-0322] A82-22091

ENGINE DESIGN
A fuel control system designers approach to gas turbine engine computer model validation A82-19253
Development of a correlated finite element dynamic model of a complete aero engine [ASME PAPER 81-DET-74] A82-19326
A CAD/CAM graphics system with relative datums and tolerances [ASME PAPER 81-DET-108] A82-19333
The impact of increasing energy costs upon the design philosophy of avionic fuel management systems A82-20517
Advanced subsonic transport propulsion [AIAA PAPER 81-0811] A82-20874
ALF502 - Plugging the turbofan gap A82-21243
Influence of correlations and computational methods on the prediction of overall efficiency N82-17180
Helicopter Propulsion Systems [AGARD-CP-302] N82-17203
The influence of new turbine technologies on their components N82-17210
Aerodynamic components for small turboshaft engines N82-17211
Evaluation of the design, construction and operation of a gas fueled engine driven heat pump [ERG-034] N82-17459
Scientific report of the Fluid Mechanics Research Department N82-17469

ENGINE FAILURE
Process monitor helps make jet engines reliable A82-21897
Damage from engine debris projectiles N82-17165

ENGINE INLETS
Three-dimensional calculation of the flow in helicopter air intakes [ONERA, TP NO. 1981-124] A82-19740
Prediction of sound radiation from different practical jet engine inlets [NASA-CR-165120] N82-16810

ENGINE MONITORING INSTRUMENTS
Process monitor helps make jet engines reliable A82-21897
An alternative approach to engineering structures using monitoring systems N82-17223

ENGINE NOISE
Multiple pure tone elimination strut assembly --- air breathing engines [NASA-CASE-FRC-11062-1] N82-16800
Analytical study of twin-jet shielding [NASA-CR-165102] N82-16801
Analytical study of twin-jet shielding [NASA-CR-165103] N82-16802
Analytical study of twin-jet shielding [NASA-CR-165104] N82-16803
Analytical study of twin-jet shielding [NASA-CR-165105] N82-16804
Analytical study of twin-jet shielding development of a 3-dimensional model [NASA-CR-165106] N82-16805
Analytical study of twin-jet shielding two-dimensional model [NASA-CR-165107] N82-16806

ENGINE PARTS
Helicopter Propulsion Systems [AGARD-CP-302] N82-17203
Mechanical advances in the design of small turboshaft engines N82-17208
Advanced component development design basis for next generation medium power helicopter engines N82-17209
Aerodynamic components for small turboshaft engines N82-17211

ENGINE STARTERS
Maintenance posture for quick start [AD-A107553] N82-17177

ENGINE TESTS
Development of the automated AFAPL engine simulator test for lubricant evaluation [AD-A106128] N82-16093
Development test programs adapted to helicopter engines N82-17205

ENVIRONMENT SIMULATION
Radar environment simulation for software test A82-19245
Helicopter icing spray system A82-20754

ENVIRONMENTAL TESTS
The Global Positioning System Evaluator --- facility for testing in simulated wide range environments A82-21588
Environmental exposure effects on composite materials for commercial aircraft [NASA-CR-3502] N82-16178
Forecasting corrosion damage and maintenance costs for large aircraft N82-17357

EQUATIONS OF MOTION
An analytical technique for the analysis of airplane spin entry and recovery [AIAA PAPER 82-0243] A82-19786

EQUIPMENT SPECIFICATIONS
Advanced recorder design and development [PB81-244105] N82-16385

ERROR ANALYSIS
Methodology for measurement of fault latency in a digital avionic miniprocessor N82-17105

ERROR DETECTION CODES
Methodology for measurement of fault latency in a digital avionic miniprocessor N82-17105

ESTIMATING
Comparison of various elevation angle estimation techniques A82-20589

EUROPEAN AIRBUS
Airbus Industrie - The year of progress A82-21189

EVACUATING (TRANSPORTATION)
Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports A82-19001
The marketing, organisation and financing of aeromedical evacuation by a motoring organisation A82-19002
Survey of aeromedical evacuation in Italy A82-19003
The network of civilian air rescue in Germany A82-19004
Ambulance helicopter in the Stockholm archipelago A82-19005
Military assistance to safety and traffic /MAST/ A82-19006
Aerial ambulance service in Australia A82-19007
Flying doctor service in East Africa A82-19008
Air ambulance systems in the Republic of South Africa A82-19009
The situation of air rescue in Argentina A82-19010
Aeromedical evacuation in New Zealand A82-19011
Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas A82-19018

The helicopter in rescue operations in high-mountain areas A82-19019
Aircraft for secondary long range emergency ambulance flight A82-19021

EVALUATION
Investigation and evaluation of a computer program to minimize three-dimensional flight time tracks [NASA-CR-168419] N82-17879

EXHAUST EMISSION
Analysis of flight test measurements in ground effect A82-20763

EXPLOSIONS
Strength degradation of impact damaged structure N82-17169

EXPLOSIVE DEVICES
Damage from High explosive (HE) projectiles N82-17164

EXTERNAL STORE SEPARATION
Store separation from cavities at supersonic flight speeds [AIAA PAPER 82-0372] A82-22096

EXTERNAL STORES
Technology overview for advanced aircraft armament system program [AD-A107680] N82-17155
Standardization study for advanced aircraft armament system program [AD-A107681] N82-17156

EXTREMELY HIGH FREQUENCIES
Tracking of low-altitude targets by a combined X/Ka-band radar system A82-20590

EYE DISEASES
The prevalence of visual deficiencies among 1979 general aviation accident airmen [AD-A106489] N82-16054

F

F-5 AIRCRAFT
Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey N82-17353
On the Corrosion problems of the TAF F-5 aircraft N82-17354

F-8 AIRCRAFT
Piloted simulation of an on-board trajectory optimization algorithm A82-20296

F-15 AIRCRAFT
Data systems organization - A change for the better --- flight test data acquisition A82-20767

F-16 AIRCRAFT
F-16 ground and inflight icing testing A82-20753

F-18 AIRCRAFT
Initial F-18 carrier suitability testing A82-20752
Size reduction flight test airborne data systems A82-20766
F/A-18A tactical airborne computational subsystem N82-17119
F/A-18 weapons system support facilities N82-17120

F-27 AIRCRAFT
Aircraft for secondary long range emergency ambulance flight A82-19021

FABRICATION
A CAD/CAM graphics system with relative datums and tolerances [ASME PAPER 81-DET-108] A82-19333
Fabrication of boron/aluminum fan blades for SCR engines [NASA-CR-165294] N82-16176

FAIL-SAFE SYSTEMS
The simulation study on a redundant flight control system A82-22120

FAILURE MODES
Lubrication breakdown between gear teeth N82-17213
Corrosion in naval aircraft electronic systems N82-17363

FAN BLADES
Fabrication of boron/aluminum fan blades for SCR engines [NASA-CR-165294] N82-16176

FAR ULTRAVIOLET RADIATION
Test and evaluation of UV fiber optics for application for aircraft fire detector systems [AD-A106129] N82-16850

FASTENERS
Improving composite bolted joint efficiency by laminate tailoring A82-20982
Flight-by-flight corrosion fatigue tests N82-17348

FATIGUE (MATERIALS)
Effects of cyclic loading on projectile impact damage N82-17167
Corrosion Fatigue --- conferences [AGARD-CP-316] N82-17342
Mechanisms of corrosion fatigue --- of high strength aluminum alloys N82-17343
Fracture mechanics based modelling of the corrosion fatigue process N82-17344
Flight-by-flight corrosion fatigue tests N82-17348
Corrosion prevention measures used in the construction of an aircraft airframe: The case of 2014 and 2214 alloys N82-17360
Loading cycles and material data for the layout of a wind turbine of special hub concept [ISD-273] N82-17643

FATIGUE LIFE
Random spectrum fatigue crack life predictions with or without considering load interactions A82-20512
Bolted field repair of graphite/epoxy wing skin laminates A82-20981

FATIGUE TESTS
Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades A82-20524
Process monitor helps make jet engines reliable A82-21897

FAULT TOLERANCE
Hierarchical specification of the SIFT fault tolerant flight control system N82-17106
SIFT: An ultra-reliable avionic computing system N82-17115

FEED SYSTEMS
Helicopter air inlets N82-17217

FEEDBACK CONTROL
An application of total synthesis to robust coupled design --- turbojet engine control A82-19061
The use of adaptive control for helicopter trajectories in search operations A82-19065
A program to evaluate a control system based on feedback of aerodynamic pressure differentials [NASA-CR-163466] N82-16089

FEEDERS
QOT and E of the F-16 20mm ammunition loading system's ability to upload/download A-7D aircraft [AD-A108007] N82-16099

FIBER COMPOSITES
Fabrication of boron/aluminum fan blades for SCR engines [NASA-CR-165294] N82-16176

FIBER OPTICS
Test and evaluation of UV fiber optics for application for aircraft fire detector systems [AD-A106129] N82-16850

FIBER ORIENTATION
Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades A82-20524

FIBER REINFORCED COMPOSITES
Composite structural materials --- fiber reinforced composites for aircraft structures [NASA-CR-165121] N82-16182

FIGHTER AIRCRAFT
Automatic controlled terrain following flights A82-18920
Thrust-induced effects on low-speed aerodynamics of fighter aircraft [AIAA PAPER 81-2612] A82-19203
Tactical STOL moment balance through innovative configuration technology [AIAA PAPER 81-2615] A82-19204
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration [AIAA PAPER 81-2620] A82-19207
Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack [AIAA PAPER 81-2621] A82-19208
Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft [AIAA PAPER 81-2631] A82-19212
Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft [AIAA PAPER 81-2647] A82-19216
SIMATR - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars A82-19256
Control law development for a close-coupled canard, relaxed static stability fighter [AIAA PAPER 82-0180] A82-19784
Energy management in military combat aircraft A82-20515
Aircraft design for operability A82-20563
High angle-of-attack characteristics of three-surface fighter aircraft --- canard-wing-horizontal tail configuration for greater stability and control [AIAA PAPER 82-0245] A82-22074
New concepts in multifunctional corrosion for aircraft and other systems N82-17362
Corrosion in naval aircraft electronic systems N82-17363
Transparent polyolefin film armor [AD-A107562] N82-17377

FINANCE
The marketing, organisation and financing of aeromedical evacuation by a motoring organisation A82-19002

FINITE DIFFERENCE THEORY
Calculation of sensitivity derivatives in thermal problems by finite differences A82-21391
A split coefficient/locally monotonic scheme for multishocked supersonic flow [AIAA PAPER 82-0287] A82-22082
Finite difference computation of the conical flow field over a delta wing [VKI-TN-140] N82-17135
Axial-flow turbomachine through flow calculation methods N82-17201

FINITE ELEMENT METHOD
Transient two-dimensional temperature distributions in air-cooled turbine blades A82-18893
Development of a correlated finite element dynamic model of a complete aero engine [ASME PAPER 81-DET-74] A82-19326
Investigation of vibration of shrouded turbine blades [ASME PAPER 81-DET-129] A82-19343
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust A82-22112
Research and development program for non-linear structural modeling with advanced time-temperature dependent constitutive relationships [NASA-CR-165533] N82-16080
Axial-flow turbomachine through flow calculation methods N82-17201

FINNED BODIES
Subsonic and transonic roll damping measurements on Basic Finner --- finned missile calibration model A82-19958

FINS
Ground calibration of a strain-gauged CT-4A aircraft (1979) [AD-A107847] N82-16073

FIRE CONTROL
Radar environment simulation for software test A82-19245
Technology overview for advanced aircraft armament system program [AD-A107680] N82-17155
Standardization study for advanced aircraft armament system program [AD-A107681] N82-17156

FIRES
Test and evaluation of UV fiber optics for application for aircraft fire detector systems [AD-A106129] N82-16850

FLAPPING HINGES
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling [ISD-270] N82-17640
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling [ISD-271] N82-17641

FLAPS (CONTROL SURFACES)
Aerodynamic characteristics of maneuvering flaps A82-22110

FLEXIBLE BODIES
Balancing of flexible rotors by the complex modal method [ASME PAPER 81-DET-46] A82-19310
Application of the principle of reciprocity to flexible rotor balancing [ASME PAPER 81-DET-49] A82-19311

FLEXIBLE WINGS
Optimal dolphin hang glider flight N82-17157

FLIGHT ALTITUDE
System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation [NASA-CASE-FRC-11005-1] N82-16075

FLIGHT CHARACTERISTICS
Quiet Short-Haul Research Aircraft - The first 3 years of flight research [AIAA PAPER 81-2625] A82-19209
AV-8B Harrier II A82-21260

FLIGHT CONDITIONS
Helicopters - Night operations A82-19017
Properties of the new flight and tactics simulators [DGLR PAPER 81-106] A82-19265

FLIGHT CONTROL
The control of aircraft gas turbines for fuel economy A82-20516
Flight dynamics technology development: Structures and dynamics, vehicle equipment/subsystems, flight control and aeromechanics [AD-A096636] N82-17082
Stage-state reliability analysis technique N82-17104
Hierarchical specification of the SIFT fault tolerant flight control system N82-17106
Reconfiguration: A method to improve systems realiability N82-17107
An investigation of multi-axis isometric side-arm controllers in a variable stability helicopter [AD-A106759] N82-17226
Parallel computation for developing nonlinear control procedures [AD-A107914] N82-17227

FLIGHT CREWS
The case for helicopter hoisting A82-21597

FLIGHT HAZARDS
  Accidents of surface effect ships and hydrofoil craft --- Russian book
  A82-18899
  The simulator and the airline pilot
  A82-20527
  Airworthiness of airships
  A82-20557
FLIGHT INSTRUMENTS
  Development of a simple, self-contained flight test data acquisition system
  A82-20756
  Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines
  [AD-A106732] N82-16077
FLIGHT MECHANICS
  Flight dynamics technology development: Structures and dynamics, vehicle equipment/subsystems, flight control and aeromechanics
  [AD-A096636] N82-17082
FLIGHT OPERATIONS
  Analysis of flight test measurements in ground effect
  A82-20763
FLIGHT OPTIMIZATION
  General aviation fuel conservation in the 1980's
  A82-20757
FLIGHT PATHS
  Automation of on-board flightpath management
  [NASA-TM-84212] N82-16088
FLIGHT PLANS
  Investigation and evaluation of a computer program to minimize three-dimensional flight time tracks
  [NASA-CR-168419] N82-17879
FLIGHT RECORDERS
  Advanced recorder design and development
  [PB81-244105] N82-16385
FLIGHT SAFETY
  Official recognition and the significance of simulators for safe flight operations
  [DGLR PAPER 81-094] A82-19271
  The significance of electronics for air traffic control at the present time and in the future
  A82-19649
  The use of flight simulators in l'Armee de l'Air
  A82-20528
  Systems approach to the design of wind shear avionics
  A82-21593
  Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase
  [AD-A107805] N82-17148
FLIGHT SIMULATION
  A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
  [AIAA PAPER 81-2663] A82-19221
  Utilization of hybrid computational equipment for the simulation of parachute system flight
  A82-19234
  Real-Time Simulation Computation System --- for digital flight simulation of research aircraft
  A82-19260
  Cost efficiency versus objective fidelity in flight simulation
  [DGLR PAPER 81-104] A82-19264
  Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
  [DGLR PAPER 81-097] A82-19269
  Piloted simulation of an on-board trajectory optimization algorithm
  A82-20296
  Advanced simulation --- in commercial aviation
  A82-20535
  Analytical control law for desirable aircraft lateral handling qualities
  A82-21941
  A simple hybrid visual simulation for research flight simulators
  [ESA-TT-690] N82-17232
FLIGHT SIMULATORS
  A terminal guidance simulator for evaluation of millimeter wave seekers
  A82-18937
  Experience with flight simulators - Training effectiveness-future developments
  [DGLR PAPER 81-110] A82-19263
  Properties of the new flight and tactics simulators
  [DGLR PAPER 81-106] A82-19265
  Procurement of the new flight and tactics simulators - Experience, problems, meaning
  [DGLR PAPER 81-095] A82-19266
  Requirements regarding digital external view systems for full mission flight and tactics simulators
  [DGLR PAPER 81-100] A82-19267
  The procurement of flight simulators at the German Lufthansa
  [DGLR PAPER 81-093] A82-19268
  Official recognition and the significance of simulators for safe flight operations
  [DGLR PAPER 81-094] A82-19271
  Simulation of modern radar installations in full-mission flight and tactics simulators
  [DGLR PAPER 81-103] A82-19272
  Training in the flight and tactics simulator of the Navy Flight Squadron 3 'Graf Zeppolin'
  [DGLR PAPER 81-109] A82-19273
  Report covering experience obtained at the German Lufthansa with respect to training involving the use of flight simulators
  A82-19274
  Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981
  A82-20526
  The simulator and the airline pilot
  A82-20527
  The use of flight simulators in l'Armee de l'Air
  A82-20528
  The aircraft manufacturer's needs as a simulator user
  A82-20530
  Automation in flight simulation of data handling and validation testing
  A82-20532
  The effects on simulators of advances in aircraft technology
  A82-20533
  Advanced simulation --- in commercial aviation
  A82-20535
  A European airline's future simulator requirements
  A82-20536
  An independent view of where civil simulation should be headed --- training simulators for civil aircraft
  A82-20537
  Simulator data test instrumentation - Flight test challenge of the eighties
  A82-20768
  Implementation of the recommendations made on the technical report titled analysis of advanced simulator for pilot training
  [AD-A106779] N82-16094
  Numerical and flight simulator test of the flight deterioration concept
  [NASA-CR-3500] N82-16655
  A simple hybrid visual simulation for research flight simulators
  [ESA-TT-690] N82-17232
FLIGHT TEST INSTRUMENTS
  Development of a simple, self-contained flight test data acquisition system
  [NASA-CR-168438] N82-17479
FLIGHT TESTS
  Flexibility is offered by XV-15 tilt-rotor concept
  A82-19300
  An analytical technique for the analysis of airplane spin entry and recovery
  [AIAA PAPER 82-0243] A82-19786
  Automation in flight simulation of data handling and validation testing
  A82-20532
  Laser communications via an atmospheric link
  A82-20615
  Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980
  A82-20751
  Initial F-18 carrier suitability testing
  A82-20752

F-16 ground and inflight icing testing
A82-20753
Development of a simple, self-contained flight test data acquisition system
A82-20756
Determining performance parameters of general aviation aircraft
A82-20759
Tornado-avionic development testing
A82-20760
Design, development and flight testing of a jet powered sailplane
A82-20761
Performance flight test evaluation of the Ball-Bartoe JW-1 Jetwing STOL research aircraft
A82-20762
Analysis of flight test measurements in ground effect
A82-20763
A comprehensive flight test flyover noise program
A82-20765
Size reduction flight test airborne data systems
A82-20766
Data systems organization - A change for the better --- flight test data acquisition
A82-20767
Simulator data test instrumentation - Flight test challenge of the eighties
A82-20768
The Boeing Flight Test Data System 1980
A82-20769
Instrumentation remote 'mini' ground station
A82-20770
Color graphics based real-time telemetry processing system
A82-20771
Aerodynamic evaluation of winglets for transport aircraft
[AIAA PAPER 81-1215] A82-22245
Differential Omega system development and evaluation
[AD-A107857] N82-17146
Development test programs adapted to helicopter engines
N82-17205
An investigation of multi-axis isometric side-arm controllers in a variable stability helicopter
[AD-A106759] N82-17226

FLIGHT TIME
Investigation and evaluation of a computer program to minimize three-dimensional flight time tracks
[NASA-CR-168419] N82-17879

FLIGHT TRAINING
Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas
A82-19018
Properties of the new flight and tactics simulators
[DGLR PAPER 81-106] A82-19265
Procurement of the new flight and tactics simulators - Experience, problems, meaning
[DGLR PAPER 81-095] A82-19266
Official recognition and the significance of simulators for safe flight operations
[DGLR PAPER 81-094] A82-19271
Training in the flight and tactics simulator of the Navy Flight Squadron 3 'Graf Zeppelin'
[DGLR PAPER 81-109] A82-19273
Report covering experience obtained at the German Lufthansa with respect to training involving the use of flight simulators
A82-19274
The use of flight simulators in l'Armee de l'Air
A82-20528
The aircraft manufacturer's needs as a simulator user
A82-20530
A European airline's future simulator requirements
A82-20536

FLIR DETECTORS
A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions
[AIAA PAPER 82-0261] A82-22079

FLOW CHARACTERISTICS
Analysis of an ideal-fluid flow past a finite-thickness wing
A82-19813
Development of a computer based presentation of non-steady helicopter rotor flows
[AD-A108107] N82-17131
Rotor flow research in low speed helicopter flight
[AD-A107873] N82-17132
Survey on diffusion factors and profile losses
N82-17186

FLOW DISTORTION
Measurement of the influence of flow distortions on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348

FLOW DISTRIBUTION
Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions
[AIAA PAPER 82-0352] A82-19797
Ultrasonic method for flow field measurement in wind tunnel tests
A82-20054
An experimental study of separated flow on a finite wing
[AIAA PAPER 81-1882] A82-20293
Endwall boundary layer flows and losses in an axial turbine stage
A82-20298
Flow field around an oscillating airfoil
A82-20813
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics
[AIAA PAPER 82-0095] A82-22045
Basic studies of the flow fields of airfoil-flap-spoiler systems
[AIAA PAPER 82-0173] A82-22060
Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack
[AIAA PAPER 82-0351] A82-22094
Surveys of flow-field around empennage of the NAL STOL-research-aircraft model
[NAL-TR-677] N82-17124
Scale-model studies for the improvement of flow patterns of a low-speed tunnel
[NASA-CR-169413] N82-17228
A velocity vector measuring system with 13 asymmetric wedge type yawmeters --- measuring flow distribution around the empennage of STOL models
[NAL-TR-674] N82-17477

FLOW GEOMETRY
Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801
A computer program for variable-geometry single-stage axial compressor test data analysis (UD0400)
[AD-A106676] N82-16086

FLOW MEASUREMENT
Ultrasonic method for flow field measurement in wind tunnel tests
A82-20054
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3
[AIAA PAPER 82-0289] A82-22083
Single stage transonic compressor and equivalent plane cascade
N82-17196
Axial-flow turbomachine through flow calculation methods
N82-17201

FLOW STABILITY
Technical evaluation report of the AGARD Fluid Dynamics Panel Symposium on computation of viscous-inviscid interactions
[ONERA, TP NO. 1981-116] A82-19733

FLOW VELOCITY
The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory
A82-19198
Endwall boundary layer flows and losses in an axial turbine stage
A82-20298
The two stage aero engine turbine
N82-17183
End-wall boundary layer calculation methods
N82-17188

FLOW VISUALIZATION
- Experimental studies of the Eppler 61 airfoil at low Reynolds numbers [AIAA PAPER 82-0345] A82-19796
- Endwall boundary layer flows and losses in an axial turbine stage A82-20298
- Boundary layer transition and separation on a compressor rotor airfoil A82-20299
- Flow visualization using a computerized data acquisition system A82-20792
- Visualization of flow separation and separated flows with the aid of hydrogen bubbles A82-20603
- Visualization of laminar separation by oil film method A82-20811
- Application of image processing techniques to fluid flow data analysis [NASA-TM-82760] N82-16049

FLUID FILMS
- Visualization of laminar separation by oil film method A82-20811

FLUID FLOW
- Application of image processing techniques to fluid flow data analysis [NASA-TM-82760] N82-16049

FLUTTER
- Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows [ASME PAPER 81-DET-122] A82-19337

FLUTTER ANALYSIS
- Theory and experiment in unsteady aerodynamics [NLR-MP-80046-U] N82-17128

FOG
- Ground movement control and guidance - Cat. 3 operations experience in Air Inter A82-20222

FORECASTING
- Energy environment study [NASA-CR-168458] N82-17654

FORESTS
- Mapping in tropical forests - A new approach using the laser APR --- Airborne Profile Recorder A82-20407

FORTRAN
- A generalized escape system simulation computer program: A user's manual [AD-A106152] N82-16055

FRACTURE MECHANICS
- Fracture mechanics based modelling of the corrosion fatigue process N82-17344

FRAGMENTATION
- Damage from engine debris projectiles N82-17165

FRAGMENTS
- Damage from engine debris projectiles N82-17165

FRANCE
- Helicopter development in France N82-17216

FREQUENCY MODULATION
- R.F. calibrators for Doppler radars A82-18917

FRETTING CORROSION
- Fracture mechanics based modelling of the corrosion fatigue process N82-17344

FUEL CELLS
- Hydrodynamic ram damage N82-17166

FUEL COMBUSTION
- Fuel property effects on radiation intensities in a gas turbine combustor A82-19966

FUEL CONSUMPTION
- Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL [AIAA PAPER 81-2637] A82-19214
- Energy management and its impact on avionics; Proceedings of the Symposium, London, England, March 19, 1981 A82-20513
- Design possibilities for improved fuel efficiency of civil transport aircraft A82-20514
- Energy management in military combat aircraft A82-20515
- The control of aircraft gas turbines for fuel economy A82-20516
- The impact of increasing energy costs upon the design philosophy of avionic fuel management systems A82-20517
- Operational and performance aspects of fuel management in civil aircraft A82-20518
- Thrust management - Current achievements and future developments A82-20520
- Studies of modern technology airships for maritime petrol applications A82-20554
- General aviation fuel consevation in the 1980's A82-20757
- A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research A82-20764
- Advanced subsonic transport propulsion [AIAA PAPER 81-0811] A82-20874
- Boeing's bigger narrowbody A82-21190
- We have just begun to create efficient transport aircraft A82-21373
- Symposium on commercial-aviation energy-conservation strategies [DE81-028406] N82-16057
- Turboprop cargo aircraft systems study [NASA-CR-165813] N82-16070
- NASA research activities in aeropropulsion [NASA-TM-82788] N82-16084
- CF6 jet engine performance improvement: high pressure turbine roundness [NASA-CR-165555] N82-17174

FUEL CONTAMINATION
- The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels A82-22198

FUEL CONTROL
- A fuel control system designers approach to gas turbine engine computer model validation A82-19253

FUEL FLOW
- Minimum cost performance monitoring of turboshaft engines A82-20544

FUEL OILS
- Energy environment study [NASA-CR-168458] N82-17654

FUEL PRODUCTION
- Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes [DE82-001127] N82-17401

FUEL TESTS
- JP-8 fuel conversion evaluation A82-20755
- Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel A82-22240

FUEL-AIR RATIO
- The sooting tendency of fuels containing polycyclic aromatics in a research combustor [AIAA PAPER 82-0299] A82-19791

FULL SCALE TESTS
- NAVSTAR global positioning systems A82-20601

FUSELAGES
- Boeing's bigger narrowbody A82-21190

G

GAS FLOW
- A progress report on the European Transonic Wind Tunnel Project [ONERA, TP NO. 1981-121] A82-19737

Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801
A split coefficient/locally monotonic scheme for multishocked supersonic flow
[AIAA PAPER 82-0287] A82-22082
GAS TURBINE ENGINES
A fuel control system designers approach to gas turbine engine computer model validation
A82-19253
A CAD/CAM graphics system with relative datums and tolerances
[ASME PAPER 81-DET-108] A82-19333
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351
The history of aviation turbine lubricants
A82-19624
The control of aircraft gas turbines for fuel economy
A82-20516
Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy
A82-21636
Research and development program for non-linear structural modeling with advanced time-temperature dependent constitutive relationships
[NASA-CR-165533] N82-16080
Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093
Influence of correlations and computational methods on the prediction of overall efficiency
N82-17180
The two stage aero engine turbine
N82-17183
Helicopter Propulsion Systems
[AGARD-CP-302] N82-17203
Helicopter propulsion systems: Past, present and future
N82-17204
Aircraft turbine engine development: Current practices and new priorities
N82-17206
Future technology and requirements for helicopter engines
N82-17207
Mechanical advances in the design of small turboshaft engines
N82-17208
Advanced component development design basis for next generation medium power helicopter engines
N82-17209
Aerodynamic components for small turboshaft engines
N82-17211
Regenerative helicopter engines: Advances in performance and expected development problems
N82-17212
Evaluation of the design, construction and operation of a gas fueled engine driven heat pump
[ERG-034] N82-17459
GAS TURBINES
Fuel property effects on radiation intensities in a gas turbine combustor
A82-19966
Brittle materials design, high temperature gas turbine
[AD-A106670] N82-16085
GEAR TEETH
Helicopter Propulsion Systems
[AGARD-CP-302] N82-17203
Lubrication breakdown between gear teeth
N82-17213
Advanced transmission component development
N82-17214
GEARS
Advanced transmission component development
N82-17214
GENERAL AVIATION AIRCRAFT
Analytical prediction of aerospace vehicle vibration environments
[ASME PAPER 81-DET-29] A82-19305
Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980
A82-20751
General aviation fuel conservation in the 1980's
A82-20757
Determining performance parameters of general aviation aircraft
A82-20759
A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research
A82-20764
Summary of theoretical considerations and wind tunnel tests of an aerodynamic spoiler for stall proofing a general aviation airplane
[NASA-CR-165100] N82-16046
Spin tests of a single-engine, high-wing light airplane
[NASA-TP-1927] N82-16068
Aircraft icing avoidance and protection
[PB82-108135] N82-17139
GLASS FIBER REINFORCED PLASTICS
Conductive prepregs for lightning strike protection on aircraft
A82-20523
Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades
A82-20524
A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research
A82-20764
GLAZES
Transparent polyolefin film armor
[AD-A107562] N82-17377
GLIDE PATHS
Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing
A82-20297
Optimal dolphin hang glider flight
N82-17157
GLIDERS
Design, development and flight testing of a jet powered sailplane
A82-20761
GLOBAL POSITIONING SYSTEM
NAVSTAR global positioning systems
A82-20601
Land navigation with a low cost GPS receiver
A82-20656
Institute of Navigation, Annual Meeting, 36th, U.S. Naval Postgraduate School, Monterey, CA, June 23-26, 1980, Proceedings
A82-21586
Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments
A82-21587
The Global Positioning System Evaluator --- facility for testing in simulated wide range environments
A82-21588
A perspective on civil use of GPS
A82-21589
Helicopters and Navstar/GPS
A82-21592
GRAPHITE-EPOXY COMPOSITES
Bolted field repair of graphite/epoxy wing skin laminates
A82-20981
Improving composite bolted joint efficiency by laminate tailoring
A82-20982
GRAVITATIONAL EFFECTS
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling
[ISD-270] N82-17640
GROUND BASED CONTROL
Ground movement control and guidance - Cat. 3 operations experience in Air Inter
A82-20222
GROUND EFFECT (AERODYNAMICS)
Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model
[AIAA PAPER 81-2609] A82-19201
Ground reflection effects in aircraft noise measurements
A82-19970

Analysis of flight test measurements in ground effect A82-20763

GROUND EFFECT (COMMUNICATIONS)
- Experimental measurement of the low angle terrain scattering interference environment A82-20588

GROUND HANDLING
- Study of ground handling characteristics of a maritime patrol airship [NASA-CR-166253] N82-16090

GROUND SUPPORT EQUIPMENT
- New life for an 'old' body - Vienna's master plan for revitalization A82-20172

GROUND SUPPORT SYSTEMS
- Aeronautical Information Data Subsystem (AIDS): A ground-based component of air navigation services systems N82-17150
- Scientific report of the Fluid Mechanics Research Department N82-17469

GROUND TESTS
- F-16 ground and inflight icing testing A82-20753

GUST LOADS
- Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust A82-22112

H

HANG GLIDERS
- Optimal dolphin hang glider flight N82-17157

HARRIER AIRCRAFT
- AV-8B Harrier II A82-21260

HAZARDS
- Study of air compressor hazards in underground and surface mines [PB82-105164] N82-17597

HEAD-UP DISPLAYS
- A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions [AIAA PAPER 82-0261] A82-22079

HEAT FLUX
- A durable, intermediate temperature, direct reading heat flux transducer for measurements in continuous wind tunnels [AD-A107729] N82-17483

HEAT MEASUREMENT
- A durable, intermediate temperature, direct reading heat flux transducer for measurements in continuous wind tunnels [AD-A107729] N82-17483

HEAT PUMPS
- Evaluation of the design, construction and operation of a gas fueled engine driven heat pump [ERG-034] N82-17459

HELICOPTER CONTROL
- The use of adaptive control for helicopter trajectories in search operations A82-19065
- The application of strapdown inertial technology to Attitude and Heading Reference System requirements --- for YAH-64 advanced attack helicopter A82-21590
- Helicopters and Navstar/GPS A82-21592
- An investigation of multi-axis isometric side-arm controllers in a variable stability helicopter [AD-A106759] N82-17226

HELICOPTER DESIGN
- Soviet helicopter construction /2nd revised and enlarged edition/ --- Russian book A82-18874
- Design requirements for modern rescue helicopters A82-19020
- Application of the ABC helicopter to the emergency medical service role [AIAA PAPER 81-2653] A82-19219
- Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades A82-20524
- Helicopter transmission philosophy - The way ahead A82-20546
- The emerging need for improved helicopter navigation A82-21591
- Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft [NASA-CR-166153] N82-16042
- The armed helicopter in air to air missions [MBB-UD-317-81-0] N82-17158
- Design Criteria of the A 129 helicopter drive system N82-17215
- Helicopter development in France N82-17216
- Helicopter propulsions systems. 1: Vibration prevention systems on helicopters 2: Problem of noise in the cabin N82-17222
- Future requirements for helicopter propulsion systems N82-17225

HELICOPTER ENGINES
- A fuel control system designers approach to gas turbine engine computer model validation A82-19253
- Three-dimensional calculation of the flow in helicopter air intakes [ONERA, TP NO. 1981-124] A82-19740
- Minimum cost performance monitoring of turboshaft engines A82-20544
- Helicopter Propulsion Systems [AGARD-CP-302] N82-17203
- Helicopter propulsion systems: Past, present and future N82-17204
- Development test programs adapted to helicopter engines N82-17205
- Aircraft turbine engine development: Current practices and new priorities N82-17206
- Future technology and requirements for helicopter engines N82-17207
- Mechanical advances in the design of small turboshaft engines N82-17208
- Advanced component development design basis for next generation medium power helicopter engines N82-17209
- The influence of new turbine technologies on their components N82-17210
- Aerodynamic components for small turboshaft engines N82-17211
- Regenerative helicopter engines: Advances in performance and expected development problems N82-17212
- Helicopter air inlets N82-17217
- Intake design with particular reference to ice protection and particle separators N82-17218
- The distress regime on the bimotored helicopter N82-17219
- Engine/drive/airframe compatibility: A way of life N82-17220
- Problems of engine response during transient maneuvers N82-17221
- An alternative approach to engineering structures using monitoring systems N82-17223
- Component research for future propulsion systems N82-17224
- Future requirements for helicopter propulsion systems N82-17225

HELICOPTER PERFORMANCE
- Soviet helicopter construction /2nd revised and enlarged edition/ --- Russian book A82-18874
- Helicopter secondary applications for neurotraumatic emergencies A82-19015

Helicopters - Night operations A82-19017

Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas A82-19018

The helicopter in rescue operations in high-mountain areas A82-19019

The case for helicopter hoisting A82-21597

Problems of engine response during transient maneuvers N82-17221

An alternative approach to engineering structures using monitoring systems N82-17223

Component research for future propulsion systems N82-17224

HELICOPTER PROPELLER DRIVE

Application of the principle of reciprocity to flexible rotor balancing [ASME PAPER 81-DET-49] A82-19311

Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980 A82-20540

Airworthiness of helicopter transmissions A82-20541

Helicopter transmission philosophy - The way ahead A82-20546

Helicopter Propulsion Systems [AGARD-CP-302] N82-17203

Lubrication breakdown between gear teeth N82-17213

Advanced transmission component development N82-17214

Design Criteria of the A 129 helicopter drive system N82-17215

Engine/drive/airframe compatibility: A way of life N82-17220

Future requirements for helicopter propulsion systems N82-17225

HELICOPTER WAKES

Development of a computer based presentation of non-steady helicopter rotor flows [AD-A108107] N82-17131

Rotor flow research in low speed helicopter flight [AD-A107873] N82-17132

Non-steady velocity measurement of the wake of a helicopter rotor at low advance ratios [AD-A107722] N82-17133

HELICOPTERS

Ambulance helicopter in the Stockholm archipelago A82-19005

Aerial ambulance service in Australia A82-19007

Air ambulance systems in the Republic of South Africa A82-19009

Modal analysis using helicopter dynamic test data [ASME PAPER 81-DET-30] A82-19306

The application of condition monitoring --- commercial helicopter in-service maintenance A82-20542

Quick learning diagnostics --- helicopter vibration analysis and component condition monitoring A82-20543

On-site vibration measurement, dynamic tracking and balancing A82-20545

Helicopter icing spray system A82-20754

Test and evaluation of improved aircrew restraint systems [AD-A107576] N82-16056

Blade planform for a quiet helicopter [NASA-CR-166256] N82-17121

Assessment of historical and projected segments of US and World civil and military rotorcraft markets 1960 - 1990 [NASA-CR-166151] N82-17137

HETEROCYCLIC COMPOUNDS

Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel A82-22240

HIERARCHIES

Hierarchical specification of the SIFT fault tolerant flight control system N82-17106

HIGH PRESSURE

CF6 jet engine performance improvement: High pressure turbine roundness [NASA-CR-165555] N82-17174

HIGH STRENGTH ALLOYS

Superplastic aluminum evaluation [AD-A107760] N82-17338

HOLOGRAPHIC INTERFEROMETRY

An investigation of dual mode phenomena in a mistuned bladed-disk [ASME PAPER 81-DET-133] A82-19347

HOMING DEVICES

A terminal guidance simulator for evaluation of millimeter wave seekers A82-18937

HONEYCOMB STRUCTURES

Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey N82-17353

The experience of corrosion on French military aerodynes N82-17355

HORIZONTAL ORIENTATION

Static investigations of rotor blades under deadweight and during stationary operation [ISD-269] N82-17639

HORIZONTAL TAIL SURFACES

Basic studies of the flow fields of airfoil-flap-spoiler systems [AIAA PAPER 82-0173] A82-22060

High angle-of-attack characteristics of three-surface fighter aircraft --- canard-wing-horizontal tail configuration for greater stability and control [AIAA PAPER 82-0245] A82-22074

Ground calibration of a strain-gauged CT-4A aircraft (1979) [AD-A107847] N82-16073

HOT CORROSION

Improved plasma sprayed MCrAlY coatings for aircraft gas turbine applications A82-20742

HOT PRESSING

Fabrication of boron/aluminum fan blades for SCR engines [NASA-CR-165294] N82-16176

HOT-FILM ANEMOMETERS

Rotor flow research in low speed helicopter flight [AD-A107873] N82-17132

Non-steady velocity measurement of the wake of a helicopter rotor at low advance ratios [AD-A107722] N82-17133

HOVERING

Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model [AIAA PAPER 81-2609] A82-19201

HUMAN FACTORS ENGINEERING

Spectrally balanced chromatic landing approach lighting system [NASA-CASE-ARC-10990-1] N82-16059

Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines [AD-A106732] N82-16077

HUMAN REACTIONS

Community sensitivity to changes in aircraft noise exposure [NASA-CR-3490] N82-16807

Noise impact on communities from aircraft [GPO-80-617] N82-17655

HYBRID COMPUTERS

Utilization of hybrid computational equipment for the simulation of parachute system flight A82-19234

HYDRAULIC EQUIPMENT

Surveys of flow-field around empennage of the NAL STOL-research-aircraft model [NAL-TR-677] N82-17124

HYDROCARBON COMBUSTION

The sooting tendency of fuels containing polycyclic aromatics in a research combustor [AIAA PAPER 82-0299] A82-19791

Fuel property effects on radiation intensities in a gas turbine combustor A82-19966

HYDROCRACKING
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401
HYDRODYNAMIC RAM EFFECT
Hydrodynamic ram damage
N82-17166
HYDROFOILS
Accidents of surface effect ships and hydrofoil craft --- Russian book
A82-18899
HYDROGEN FUELS
The prospects for liquid hydrogen fueled aircraft
A82-20137
HYDROGENATION
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401
HYPERSONIC FLIGHT
Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow
A82-19197
HYPERSONIC FLOW
Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801
HYPERVELOCITY IMPACT
Description of projectile threats
N82-17161
Hydrodynamic ram damage
N82-17166

I

ICE FORMATION
F-16 ground and inflight icing testing
A82-20753
Helicopter icing spray system
A82-20754
Aerodynamic characteristics of airfoils with ice accretions
[AIAA PAPER 82-0282] A82-22081
Aircraft icing avoidance and protection
[PB82-108135] N82-17139
Intake design with particular reference to ice protection and particle separators
N82-17218
ICE PREVENTION
Ice phobics blade tracking and comparison of vibration analysis techniques
[AD-A108121] N82-16074
Aircraft icing avoidance and protection
[PB82-108135] N82-17139
IDEAL FLUIDS
Analysis of an ideal-fluid flow past a finite-thickness wing
A82-19813
IMAGE PROCESSING
Application of image processing techniques to fluid flow data analysis
[NASA-TM-82760] N82-16049
IMAGE RESOLUTION
Airborne measurements with a sensitive high resolution 90 GHz radiometer
A82-18940
IMAGING TECHNIQUES
Application of image processing techniques to fluid flow data analysis
[NASA-TM-82760] N82-16049
IMPACT DAMAGE
Design Manual for impact damage tolerant aircraft structure
[AGARD-AG-238] N82-17160
Description of projectile threats
N82-17161
Analysis methods for predicting structural response to projectile impact
N82-17162
Analysis methods for ballistic damage size and type
N82-17163
Damage from High explosive (HE) projectiles
N82-17164
Damage from engine debris projectiles
N82-17165
Hydrodynamic ram damage
N82-17166
Effects of cyclic loading on projectile impact damage
N82-17167
Stiffness degradation of impact damaged structure
N82-17168
Strength degradation of impact damaged structure
N82-17169
Analysis of multiple load path panels containing impact damage
N82-17170
IMPACT STRENGTH
Strength degradation of impact damaged structure
N82-17169
Analysis of multiple load path panels containing impact damage
N82-17170
IMPACT TOLERANCES
Design Manual for impact damage tolerant aircraft structure
[AGARD-AG-238] N82-17160
Analysis methods for predicting structural response to projectile impact
N82-17162
IMPURITIES
The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels
A82-22198
IN-FLIGHT MONITORING
The application of condition monitoring --- commercial helicopter in-service maintenance
A82-20542
Quick learning diagnostics --- helicopter vibration analysis and component condition monitoring
A82-20543
Minimum cost performance monitoring of turboshaft engines
A82-20544
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168438] N82-17478
INCOMPRESSIBLE FLOW
Unsteady lifting-line theory with applications
[AIAA PAPER 82-0354] A82-19798
Effects of Reynolds number and turbulence level on axial cascade performance
N82-17190
INDICATING INSTRUMENTS
System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation
[NASA-CASE-FRC-11005-1] N82-16075
INDUSTRIAL SAFETY
Study of air compressor hazards in underground and surface mines
[PB82-105164] N82-17597
INELASTIC STRESS
Research and development program for non-linear structural modeling with advanced time-temperature dependent constitutive relationships
[NASA-CR-165533] N82-16080
INERTIAL NAVIGATION
Institute of Navigation, Annual Meeting, 36th, U.S. Naval Postgraduate School, Monterey, CA, June 23-26, 1980, Proceedings
A82-21586
Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments
A82-21587
INERTIAL REFERENCE SYSTEMS
The application of strapdown inertial technology to Attitude and Heading Reference System requirements --- for YAH-64 advanced attack helicopter
A82-21590
INFINITE SPAN WINGS
The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory
A82-19198
INFORMATION SYSTEMS
Systems approach to the design of wind shear avionics
A82-21593

Digital Avionics Information System (DAIS): Development and demonstration [AD-A107906] N82-16079
Aeronautical Information Data Subsystem (AIDS): A ground-based component of air navigation services systems N82-17150
Digital Avionics Information System (DAIS) documentation [AD-A108000] N82-17172

INLET FLOW
Thrust modulation methods for a subsonic V/STOL aircraft [AIAA PAPER 81-2633] A82-19213

INLET NOZZLES
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle [AIAA PAPER 81-2627] A82-19210

INSPECTION
The ultrasonic inspection of C.F.C. --- carbon fiber sine wave spars [MDR-0465] N82-17513

INSTRUMENT APPROACH
Requirements for instrument approaches to converging runways [AD-A108075] N82-17144
Survey of 101 US airports for new multiple instrument approach concepts --- runways [AD-A107812] N82-17229

INSTRUMENT ERRORS
Analysis of flight test measurements in ground effect A82-20763

INSTRUMENT LANDING SYSTEMS
Ground movement control and guidance - Cat. 3 operations experience in Air Inter A82-20222
Requirements for instrument approaches to converging runways [AD-A108075] N82-17144
Investigation of Wilcox model 585B very high frequency omnidirectional radio range (VOR) system, part 3 [AD-A107855] N82-17149

INTAKE SYSTEMS
Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft [AIAA PAPER 81-2631] A82-19212
Helicopter Propulsion Systems [AGARD-CP-302] N82-17203
Intake design with particular reference to ice protection and particle separators N82-17218

INTERACTIVE CONTROL
Data base generation for digital external view systems [DGLR PAPER 81-101] A82-19270
The future of integrated CAD/CAM systems - The Boeing perspective A82-20278

INTERFACES
Functional versus communication structures in modern avionic systems N82-17092
Engine/drive/airframe compatibility: A way of life N82-17220

INTERFERENCE
Ground reflection effects in aircraft noise measurements A82-19970

INTERNATIONAL LAW
Offshore uses of the airship A82-20553

INTERNATIONAL TRADE
Energy environment study [NASA-CR-168458] N82-17654

INTERPROCESSOR COMMUNICATION
Functional versus communication structures in modern avionic systems N82-17092
A reconfigurable change network for distributed process control N82-17108
Next generation military aircraft will require hierarchical/multilevel information transfer systems --- packet switching N82-17114
SIFT: An ultra-reliable avionic computing system N82-17115

INVISCID FLOW
Technical evaluation report of the AGARD Fluid Dynamics Panel Symposium on computation of viscous-inviscid interactions [ONERA, TP NO. 1981-116] A82-19733

J

JAMMING
Relay-augmented data links in an interference environment A82-20684
An analysis of antijam communication requirements in fading media A82-20695
Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments A82-21587

JET AIRCRAFT
Experience with flight simulators - Training effectiveness-future developments [DGLR PAPER 81-110] A82-19263
JP-8 fuel conversion evaluation A82-20755
Design, development and flight testing of a jet powered sailplane A82-20761
Symposium on commercial-aviation energy-conservation strategies [DE81-028406] N82-16057
Multiple pure tone elimination strut assembly --- air breathing engines [NASA-CASE-FRC-11062-1] N82-16800
Forecasting corrosion damage and maintenance costs for large aircraft N82-17357
Corrosion control measures for military aircraft: Present UK requirements and future developments N82-17358
Corrosion prevention methods developed from direct experience with aerospace structures N82-17359

JET AIRCRAFT NOISE
Can low-speed jet noise be predicted A82-22222
Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel [NASA-TM-81343] N82-16083
Analytical study of twin-jet shielding [NASA-CR-165102] N82-16801
Analytical study of twin-jet shielding [NASA-CR-165103] N82-16802
Analytical study of twin-jet shielding [NASA-CR-165104] N82-16803
Analytical study of twin-jet shielding [NASA-CR-165105] N82-16804
Analytical study of twin-jet shielding development of a 3-dimensional model [NASA-CR-165106] N82-16805
Analytical study of twin-jet shielding two-dimensional model [NASA-CR-165107] N82-16806

JET ENGINE FUELS
The sooting tendency of fuels containing polycyclic aromatics in a research combustor [AIAA PAPER 82-0299] A82-19791
Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel A82-22240
Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel A82-22241
Energy environment study [NASA-CR-168458] N82-17654

JET ENGINES
Process monitor helps make jet engines reliable A82-21897
Prediction of sound radiation from different practical jet engine inlets [NASA-CR-165120] N82-16810
CF6 jet engine performance improvement: High pressure turbine roundness [NASA-CR-165555] N82-17174

JET EXHAUST
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[AIAA PAPER 82-0255] A82-22077
JET FLOW
Pressure dependence of jet noise and silencing of blow-offs
A82-20266
Dilution jet behavior in the turn section of a reverse flow combustor
[AIAA PAPER 82-0192] A82-20291
Analytical study of twin-jet shielding
[NASA-CR-165102] N82-16801
Analytical study of twin-jet shielding
[NASA-CR-165103] N82-16802
Analytical study of twin-jet shielding
[NASA-CR-165104] N82-16803
Analytical study of twin-jet shielding
[NASA-CR-165105] N82-16804
Analytical study of twin-jet shielding development of a 3-dimensional model
[NASA-CR-165106] N82-16805
Analytical study of twin-jet shielding two-dimensional model
[NASA-CR-165107] N82-16806
JET IMPINGEMENT
Impingement cooling of concave surfaces of turbine airfoils
A82-18894
Experimental investigation of a jet inclined to a subsonic crossflow
[AIAA PAPER 81-2610] A82-19202
JOINTS (JUNCTIONS)
Design of the composite spar-wingskin joint
A82-20128
Improving composite bolted joint efficiency by laminate tailoring
A82-20982
JOURNAL BEARINGS
Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl
[ASME PAPER 81-DET-55] A82-19314
JP-8 JET FUEL
JP-8 fuel conversion evaluation
A82-20755

K

KEVLAR (TRADEMARK)
Skyship 500 - The development of a modern production airship
A82-20559

L

LAGRANGE MULTIPLIERS
Power system design optimization using Lagrange multiplier techniques
A82-20743
LAMINAR BOUNDARY LAYER
Visualization of laminar separation by oil film method
A82-20811
LAMINATES
On the track of practical forward-swept wings
A82-19071
Design of the composite spar-wingskin joint
A82-20128
Bolted field repair of graphite/epoxy wing skin laminates
A82-20981
Improving composite bolted joint efficiency by laminate tailoring
A82-20982
Fabrication of boron/aluminum fan blades for SCR engines
[NASA-CR-165294] N82-16176
Transparent polyolefin film armor
[AD-A107562] N82-17377
LANDING AIDS
Ground movement control and guidance - Cat. 3 operations experience in Air Inter
A82-20222
LARGE SPACE STRUCTURES
Fiscal year 1981 scientific and technical reports, articles, papers, and presentations
[NASA-TM-82445] N82-16927
LASER ANEMOMETERS
Development and laboratory testing of a thermal emission velocimeter for application to an erosion nose tip test facility
[AD-A107713] N82-17482
LASER APPLICATIONS
Mapping in tropical forests - A new approach using the laser APR --- Airborne Profile Recorder
A82-20407
Laser communications via an atmospheric link
A82-20615
LASER RANGER/TRACKER
Aircraft position measurement using laser beacon optics
[AD-A107973] N82-16067
LATERAL CONTROL
Analytical control law for desirable aircraft lateral handling qualities
A82-21941
LATERAL STABILITY
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123
LEADING EDGE FLAPS
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics
[AIAA PAPER 82-0095] A82-22045
LEADING EDGES
Alleviation of the subsonic pitch-up of delta wings
[AIAA PAPER 82-0129] A82-22052
Experimental study of delta wing leading-edge devices for drag reduction at high lift --- conducted in Langley 7- by 10-foot high speed tunnel
N82-17125
LEWIS BASE
Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel
A82-22241
LIFE CYCLE COSTS
Component research for future propulsion systems
N82-17224
LIFT
Application of thrust vectoring for STOL
[AIAA PAPER 81-2616] A82-19205
Unsteady lifting-line theory with applications
[AIAA PAPER 82-0354] A82-19798
The design of compact asymmetric maximum-thrust nozzles for a given lift force
A82-19814
Numerical calculation of lift, moment coefficient and dynamic stability derivatives on sideslipping wings in unsteady supersonic flows
A82-22111
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123
LIFT DRAG RATIO
Experimental study of delta wing leading-edge devices for drag reduction at high lift --- conducted in Langley 7- by 10-foot high speed tunnel
N82-17125
LIGHT AIRCRAFT
An analytical technique for the analysis of airplane spin entry and recovery
[AIAA PAPER 82-0243] A82-19786
LIGHTNING
Conductive prepregs for lightning strike protection on aircraft
A82-20523
LIGNITE
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401
LINE OF SIGHT COMMUNICATION
Relay-augmented data links in an interference environment
A82-20684
LINEAR SYSTEMS
An application of total synthesis to robust coupled design --- turbojet engine control
A82-19061

LIQUID FUELS
Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel
A82-22241

LIQUID HYDROGEN
The prospects for liquid hydrogen fueled aircraft
A82-20137

LOAD DISTRIBUTION (FORCES)
A practical approach to systems mode analysis --- for disc-blade-shroud assemblies
[ASME PAPER 81-DET-130] A82-19344
Analysis methods for predicting structural response to projectile impact
N82-17162
Stiffness degradation of impact damaged structure
N82-17168
Analysis of multiple load path panels containing impact damage
N82-17170

LOADING OPERATIONS
QOT and E of the F-16 20mm ammunition loading system's ability to upload/download A-7D aircraft
[AD-A108007] N82-16099

LOADS (FORCES)
Flight-by-flight corrosion fatigue tests
N82-17348

LOFTING
Computer graphics for quality assurance
A82-20276

LOGIC DESIGN
Stage-state reliability analysis technique
N82-17104
Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase
[AD-A107805] N82-17148

LONG TERM EFFECTS
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-3502] N82-16178

LONGITUDINAL STABILITY
Summary of theoretical considerations and wind tunnel tests of an aerodynamic spoiler for stall proofing a general aviation airplane
[NASA-CR-165100] N82-16046

LOW ALTITUDE
Tracking of low-altitude targets by a combined X/Ka-band radar system
A82-20590
A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions
[AIAA PAPER 82-0261] A82-22079

LOW ASPECT RATIO WINGS
An experimental study of separated flow on a finite wing
[AIAA PAPER 81-1882] A82-20293

LOW COST
Minimum cost performance monitoring of turboshaft engines
A82-20544

LOW SPEED
Can low-speed jet noise be predicted
A82-22222
A versatile data acquisition system for a low speed wind tunnel
[AD-A106269] N82-16097

LOW SPEED WIND TUNNELS
Experimental studies of the Eppler 61 airfoil at low Reynolds numbers
[AIAA PAPER 82-0345] A82-19796
Scale-model studies for the improvement of flow patterns of a low-speed tunnel
[NASA-CR-169413] N82-17228

LUBRICANT TESTS
Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093

LUBRICANTS
Trends in aviation fuels and lubricants; Proceedings of the West Coast International Meeting, Seattle, WA, August 3-6, 1981
A82-19621
The history of aviation turbine lubricants
A82-19624

LUBRICATING OILS
A history of aircraft piston engine lubricants
A82-19622
Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093

LUBRICATION
Lubrication breakdown between gear teeth
N82-17213

M

MACH NUMBER
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3
[AIAA PAPER 82-0289] A82-22083

MAINTENANCE
Maintenance posture for quick start
[AD-A107553] N82-17177
Forecasting corrosion damage and maintenance costs for large aircraft
N82-17357

MAN MACHINE SYSTEMS
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269

MANAGEMENT METHODS
Design and maintenance against corrosion of aircraft structures
N82-17356

MANEUVERABILITY
The armed helicopter in air to air missions
[MBB-UD-317-81-0] N82-17158

MANUAL CONTROL
An investigation of multi-axis isometric side-arm controllers in a variable stability helicopter
[AD-A106759] N82-17226

MARINE ENVIRONMENTS
Offshore uses of the airship
A82-20553
The airship - Its application and promotional activity
A82-20555

MARKET RESEARCH
A perspective on civil use of GPS
A82-21589
Assessment of historical and projected segments of US and World civil and military rotorcraft markets 1960 - 1990
[NASA-CR-166151] N82-17137

MARKETING
The marketing, organisation and financing of aeromedical evacuation by a motoring organisation
A82-19002

MATERIAL BALANCE
Balancing of flexible rotors by the complex modal method
[ASME PAPER 81-DET-46] A82-19310

MATHEMATICAL MODELS
Analytical prediction of aerospace vehicle vibration environments
[ASME PAPER 81-DET-29] A82-19305
A parametric study of dynamic response of a discrete model of turbomachinery bladed disk
[ASME PAPER 81-DET-137] A82-19349
Can low-speed jet noise be predicted
A82-22222
Finite difference computation of the conical flow field over a delta wing
[VKI-TN-140] N82-17135

MECHANICAL PROPERTIES
Composite structural materials --- fiber reinforced composites for aircraft structures
[NASA-CR-165121] N82-16182

MEDICAL EQUIPMENT
Aircraft for secondary long range emergency ambulance flight
A82-19021

MEDICAL PERSONNEL
Flying doctor service in East Africa
A82-19008

MEDICAL SERVICES
Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports
A82-19001

The marketing, organisation and financing of aeromedical evacuation by a motoring organisation A82-19002
Survey of aeromedical evacuation in Italy A82-19003
The network of civilian air rescue in Germany A82-19004
Ambulance helicopter in the Stockholm archipelago A82-19005
Military assistance to safety and traffic /MAST/ A82-19006
Aerial ambulance service in Australia A82-19007
Flying doctor service in East Africa A82-19008
Air ambulance systems in the Republic of South Africa A82-19009
The situation of air rescue in Argentina A82-19010
Aeromedical evacuation in New Zealand A82-19011
A comparative study on mechanical vibration and noise during patient transportation A82-19013
Helicopter secondary applications for neurotraumatic emergencies A82-19015
Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas A82-19018
The helicopter in rescue operations in high-mountain areas A82-19019
Aircraft for secondary long range emergency ambulance flight A82-19021
Application of the ABC helicopter to the emergency medical service role [AIAA PAPER 81-2653] A82-19219

MEDITERRANEAN SEA
Structure and variability of the Alboran Sea frontal system A82-20447

MELTING
Development of in-can melting process and equipment, 1979 and 1980 [DE82-001050] N82-16834

METAL BONDING
The experience of corrosion on French military aerodynes N82-17355

METAL COATINGS
Improved plasma sprayed MCrAlY coatings for aircraft gas turbine applications A82-20742

METAL FATIGUE
Methods and models for predicting fatigue crack growth under random loading --- Book A82-20506
A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading A82-20509
Low-frequency eddy current inspection of aircraft structure A82-21900

METAL SURFACES
Impingement cooling of concave surfaces of turbine airfoils A82-18894

METEOROLOGICAL RADAR
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations A82-19858

METEOROLOGICAL SERVICES
FAA/NWS aviation route forecast /ARF/ development [AIAA PAPER 82-0013] A82-22027

MICROPROCESSORS
Energy management in military combat aircraft A82-20515
The control of aircraft gas turbines for fuel economy A82-20516
Advanced recorder design and development [PB81-244105] N82-16385

MICROPROGRAMMING
Implementation of the recommendations made on the technical report titled analysis of advanced simulator for pilot training [AD-A106779] N82-16094

MICROWAVE EQUIPMENT
Microwave systems for radar guided missiles A82-18936

MICROWAVE LANDING SYSTEMS
Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing A82-20297
MLS flare low elevation angle guidance considerations A82-20586
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 3: A comparison of waypoint guidance algorithms for RNAV/MLS transition [NASA-CR-3512] N82-16060
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 2: RNAV/MLS transition problems for aircraft [NASA-CR-3511] N82-17142

MICROWAVE RADIOMETERS
Airborne measurements with a sensitive high resolution 90 GHz radiometer A82-18940
A study of potentially low cost millimetre-wave radiometric sensors A82-18942
Radiometric measurements at 80 GHz A82-18943

MICROWAVE SCATTERING
Experimental measurement of the low angle terrain scattering interference environment A82-20588

MICROWAVE TRANSMISSION
Microwave communications to remotely piloted vehicles A82-18911
Microwave systems for radar guided missiles A82-18936

MILITARY AIRCRAFT
Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability [AIAA PAPER 81-2629] A82-19211
Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981 A82-20526
The uses of airships in the Royal Navy A82-20556
Design for military aircraft operability; Proceedings of the Symposium, London, England, February 7, 1980 A82-20560
Design for operability of military aircraft RAF engineering experience and requirements. I - Thoughts of a squadron engineer A82-20561
Aircraft operability - RAF engineering experience and requirements. II A82-20562
Operability of military aircraft - Avionic design aspects A82-20564
Operability of military aircraft - Some design and cost trends A82-20565
Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980 A82-20751
Test and evaluation of improved aircrew restraint systems [AD-A107576] N82-16056
Detection and prevention of corrosion in Royal Air Force aircraft N82-17351

MILITARY AVIATION
Assessment of historical and projected segments of US and World civil and military rotorcraft markets 1960 - 1990 [NASA-CR-166151] N82-17137

MILITARY HELICOPTERS
Military assistance to safety and traffic /MAST/
A82-19006
ASW and weapon system simulation with reference to the Nimrod MR Mk2 maritime crew trainer
A82-20531
The armed helicopter in air to air missions
[MBB-UD-317-81-O] N82-17158
Development test programs adapted to helicopter engines
N82-17205

MILITARY OPERATIONS
Design Criteria of the A 129 helicopter drive system
N82-17215
Future requirements for helicopter propulsion systems
N82-17225

MILITARY TECHNOLOGY
Recent developments in military telemetry
A82-18908

MILLIMETER WAVES
A study of potentially low cost millimetre-wave radiometric sensors
A82-18942
Tracking of low-altitude targets by a combined X/Ka-band radar system
A82-20590

MINERAL OILS
A history of aircraft piston engine lubricants
A82-19622

MINES (EXCAVATIONS)
Study of air compressor hazards in underground and surface mines
[PB82-105164] N82-17597

MINICOMPUTERS
Current pressure measuring system in the transonic wind tunnel
[AD-A106272] N82-16096
A versatile data acquisition system for a low speed wind tunnel
[AD-A106269] N82-16097
Methodology for measurement of fault latency in a digital avionic miniprocessor
N82-17105

MISS DISTANCE
Design criteria for a miss distance radar
A82-18904

MISSILE CONFIGURATIONS
Store separation from cavities at supersonic flight speeds
[AIAA PAPER 82-0372] A82-22096

MISSILE CONTROL
Microwave systems for radar guided missiles
A82-18936
A terminal guidance simulator for evaluation of millimeter wave seekers
A82-18937
Subsonic and transonic roll damping measurements on Basic Finner --- finned missile calibration model
A82-19958
Modelling of target radar scattering with application to guidance simulation
A82-20570
Store separation from cavities at supersonic flight speeds
[AIAA PAPER 82-0372] A82-22096

MISSILE TRAJECTORIES
Design criteria for a miss distance radar
A82-18904

MODULES
Function specifications for the A-7E Function Driver module
[AD-A107922] N82-17173

MOLDING MATERIALS
Transparent polyolefin film armor
[AD-A107562] N82-17377

MOLDS
Transparent polyolefin film armor
[AD-A107562] N82-17377

MOORING
Study of ground handling characteristics of a maritime patrol airship
[NASA-CR-166253] N82-16090

MOTION PERCEPTION
Cost efficiency versus objective fidelity in flight simulation
[DGLR PAPER 81-104] A82-19264

MOTION PICTURES
Terrain model animation
[AD-A107911] N82-17887

MOVING TARGET INDICATORS
Airport radar systems --- Russian book
A82-18975

MRCA AIRCRAFT
Requirements regarding digital external view systems for full mission flight and tactics simulators
[DGLR PAPER 81-100] A82-19267
Tornado-avionic development testing
A82-20760

MULTIPATH TRANSMISSION
Comparison of various elevation angle estimation techniques
A82-20589
An analysis of antijam communication requirements in fading media
A82-20695

MULTIPLEXING
F/A-18A tactical airborne computational subsystem
N82-17119

MULTIPROCESSING (COMPUTERS)
Tactical Airborne Distributed Computing and Networks
[AGARD-CP-303] N82-17086

N

NACELLES
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[AIAA PAPER 81-2627] A82-19210
Isolated nacelle performance - Measurement and simulation
[AIAA PAPER 82-0134] A82-22054
Test and evaluation of UV fiber optics for application for aircraft fire detector systems
[AD-A106129] N82-16850

NASA PROGRAMS
Research and technology annual report, 1981
[NASA-TM-81333] N82-17081

NATURAL GAS
Evaluation of the design, construction and operation of a gas fueled engine driven heat pump
[ERG-034] N82-17459

NAVIER-STOKES EQUATION
Blade-to-blade computations and boundary layer corrections in axial compressors and turbines
N82-17202

NAVIGATION AIDS
System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation
[NASA-CASE-FRC-11005-1] N82-16075
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 2: RNAV/MLS transition problems for aircraft
[NASA-CR-3511] N82-17142
Aeronautical Information Data Subsystem (AIDS): A ground-based component of air navigation services systems
N82-17150

NAVSTAR SATELLITES
NAVSTAR global positioning systems
A82-20601
Land navigation with a low cost GPS receiver
A82-20656
A perspective on civil use of GPS
A82-21589
Helicopters and Navstar/GPS
A82-21592

NAVY
Initial F-18 carrier suitability testing
A82-20752

NETWORK CONTROL
A reconfigurable change network for distributed process control
N82-17108

NETWORK SYNTHESIS
Aircraft electrical equipment - Design and operation --- Russian book
A82-18998
Power system design optimization using Lagrange multiplier techniques
A82-20743

NEUROLOGY
Helicopter secondary applications for neurotraumatic emergencies A82-19015
NEVADA
Noise impact on communities from aircraft [GPO-80-617] N82-17655
NICKEL ALLOYS
Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy A82-21636
NIGHT FLIGHTS (AIRCRAFT)
Helicopters - Night operations A82-19017
NITROGEN COMPOUNDS
Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel A82-22240
NOISE INTENSITY
Comparison of aircraft and ground vehicle noise levels in front and backyards of residences A82-20058
NOISE MEASUREMENT
Ground reflection effects in aircraft noise measurements A82-19970
Noise of the SR-3 propeller model at 2 deg and 4 deg angle of attack [NASA-TM-82738] N82-16808
NOISE POLLUTION
Noise impact on communities from aircraft [GPO-80-617] N82-17655
NOISE PREDICTION
Pressure dependence of jet noise and silencing of blow-offs A82-20266
NOISE PREDICTION (AIRCRAFT)
Analytical prediction of aerospace vehicle vibration environments [ASME PAPER 81-DET-29] A82-19305
Prediction of aircraft interior noise using the statistical energy analysis method [ASME PAPER 81-DET-102] A82-19332
A comprehensive flight test flyover noise program A82-20765
Can low-speed jet noise be predicted A82-22222
Turboprop cargo aircraft systems study [NASA-CR-165813] N82-16070
A shock wave approach to the noise of supersonic propellers [NASA-TM-82752] N82-16809
NOISE PROPAGATION
Prediction of aircraft interior noise using the statistical energy analysis method [ASME PAPER 81-DET-102] A82-19332
Helicopter propulsions systems. 1: Vibration prevention systems on helicopters 2: Problem of noise in the cabin N82-17222
NOISE REDUCTION
Sanctuary radar --- with digital processor for Doppler filtering and pulse compression A82-18906
Design requirements for modern rescue helicopters A82-19020
Comparison of aircraft and ground vehicle noise levels in front and backyards of residences A82-20058
NASA research activities in aeropropulsion [NASA-TM-82788] N82-16084
Multiple pure tone elimination strut assembly --- air breathing engines [NASA-CASE-FRC-11062-1] N82-16800
Blade planform for a quiet helicopter [NASA-CR-166256] N82-17121
Helicopter propulsions systems. 1: Vibration prevention systems on helicopters 2: Problem of noise in the cabin N82-17222
NOISE SPECTRA
Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel [NASA-TM-81343] N82-16083
Analytical study of twin-jet shielding [NASA-CR-165102] N82-16801
NONDESTRUCTIVE TESTS
Low-frequency eddy current inspection of aircraft structure A82-21900
US Naval fleet aircraft corrosion N82-17350
Detection and prevention of corrosion in Royal Air Force aircraft N82-17351
NOSE TIPS
Development and laboratory testing of a thermal emission velocimeter for application to an erosion nose tip test facility [AD-A107713] N82-17402
NOTCH TESTS
Crack growth behavior of center-cracked panels under random spectrum loading A82-20511
NOZZLE DESIGN
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle [AIAA PAPER 81-2627] A82-19210
The design of compact asymmetric maximum-thrust nozzles for a given lift force A82-19814
NOZZLE EFFICIENCY
The design of compact asymmetric maximum-thrust nozzles for a given lift force A82-19814
NOZZLE FLOW
Experimental investigation of a jet inclined to a subsonic crossflow [AIAA PAPER 81-2610] A82-19202
NOZZLE GEOMETRY
Tests of a D vented thrust deflecting nozzle behind a simulated turbofan engine [NASA-CR-3508] N82-17122
NOZZLE THRUST COEFFICIENTS
The design of compact asymmetric maximum-thrust nozzles for a given lift force A82-19814
Tests of a D vented thrust deflecting nozzle behind a simulated turbofan engine [NASA-CR-3508] N82-17122
NUMERICAL ANALYSIS
Results of calculations N82-17196
The through flow calculations N82-17199
NUMERICAL CONTROL
Graphics in numerical control - The user's challenge A82-20277
Propulsion system controls design and simulation [AIAA PAPER 82-0322] A82-22091

O

OCEANOGRAPHIC PARAMETERS
Structure and variability of the Alboran Sea frontal system A82-20447
OFFSHORE PLATFORMS
The case for helicopter hoisting A82-21597
OILS
Visualization of laminar separation by oil film method A82-20811
OMEGA NAVIGATION SYSTEM
Differential Omega system development and evaluation [AD-A107857] N82-17146
ONBOARD DATA PROCESSING
Piloted simulation of an on-board trajectory optimization algorithm A82-20296
Size reduction flight test airborne data systems A82-20766
The Boeing Flight Test Data System 1980 A82-20769
Automation of on-board flightpath management [NASA-TM-84212] N82-16088
An alternative approach to engineering structures using monitoring systems N82-17223

OPERATING COSTS
Operability of military aircraft - Some design and cost trends
A82-20565
We have just begun to create efficient transport aircraft
A82-21373
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-168439] N82-17151
An airline view of the corrosion problem
N82-17352
OPERATING SYSTEMS (COMPUTERS)
Research through simulation --- simulators and research applications at Langley
[NASA-FACTS-125] N82-16092
OPERATOR PERFORMANCE
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269
OPTICAL COMMUNICATION
Laser communications via an atmospheric link
A82-20615
OPTICAL RADAR
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size
A82-21386
OPTICAL WAVEGUIDES
Test and evaluation of UV fiber optics for application for aircraft fire detector systems
[AD-A106129] N82-16850
OPTIMIZATION
Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl
[ASME PAPER 81-DET-55] A82-19314
Optimal shape design of turbine blades
[ASME PAPER 81-DET-128] A82-19342
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351
Power system design optimization using Lagrange multiplier techniques
A82-20743
Experimental verification of an aerodynamic parameter optimization program for wind tunnel testing
[AD-A107727] N82-17134
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-168439] N82-17151
Parallel computation for developing nonlinear control procedures
[AD-A107914] N82-17227
OSCILLATING FLOW
The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory
A82-19196
Flow field around an oscillating airfoil
A82-20813
OXIDATION RESISTANCE
Improved plasma sprayed MCrAlY coatings for aircraft gas turbine applications
A82-20742

P

PACKET SWITCHING
Next generation military aircraft will require hierarchical/multilevel information transfer systems --- packet switching
N82-17114
PACKET TRANSMISSION
Tactical Airborne Distributed Computing and Networks
[AGARD-CP-303] N82-17086
PADE APPROXIMATION
Pade approximation applied to flow past thin airfoils
A82-20728
PAINTS
The experience of corrosion on French military aerodynes
N82-17355
PANELS
Analysis of multiple load path panels containing impact damage
N82-17170
PARACHUTE DESCENT
Utilization of hybrid computational equipment for the simulation of parachute system flight
A82-19234
PARALLEL FLOW
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19214
PARALLEL PROCESSING (COMPUTERS)
Parallel computation for developing nonlinear control procedures
[AD-A107914] N82-17227
PARAMETER IDENTIFICATION
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070
PARAMETERIZATION
Experimental verification of an aerodynamic parameter optimization program for wind tunnel testing
[AD-A107727] N82-17134
PARTICLE PRECIPITATION
Intake design with particular reference to ice protection and particle separators
N82-17218
PARTICLE SIZE DISTRIBUTION
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size
A82-21386
PATIENTS
A comparative study on mechanical vibration and noise during patient transportation
A82-19013
PCM TELEMETRY
Recent developments in military telemetry
A82-18908
Color graphics based real-time telemetry processing system
A82-20771
PERFORATED SHELLS
Studies on the stability of thin-walled shells with cutouts /Review/. I
A82-21629
PERFORMANCE PREDICTION
Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft
[AIAA PAPER 81-2647] A82-19216
Multi-parameter yield zone model for predicting spectrum crack growth
A82-20510
Random spectrum fatigue crack life predictions with or without considering load interactions
A82-20512
Through flow calculations in axial turbomachines
[AGARD-AR-175] N82-17178
Influence of correlations and computational methods on the prediction of overall efficiency
N82-17180
Part span damper loss prediction for transonic axial fan rotors
N82-17192
Axial compressor stall and surge
N82-17194
Summary of answers to the questionnaire
N82-17195
Single stage transonic compressor and equivalent plane cascade
N82-17196
The through flow calculations
N82-17199
Evaluation of profile loss predictions based on diffusion factors
N82-17200
Blade-to-blade computations and boundary layer corrections in axial compressors and turbines
N82-17202
PERFORMANCE TESTS
Prediction of aircraft interior noise using the statistical energy analysis method
[ASME PAPER 81-DET-102] A82-19332
Conductive prepregs for lightning strike protection on aircraft
A82-20523

NAVSTAR global positioning systems A82-20601
Performance flight test evaluation of the Bell-Bartoe JW-1 Jetwing STOL research aircraft A82-20762
The Global Positioning System Evaluator --- facility for testing in simulated wide range environments A82-21588
Single stage transonic compressor and equivalent plane cascade N82-17196
BBC/Sulzer. 4 stage transonic compressor N82-17197

PHASE MODULATION
R.F. calibrators for Doppler radars A82-18917

PHASE SHIFT
R.F. calibrators for Doppler radars A82-18917

PHOTOMAPPING
Mapping in tropical forests - A new approach using the laser APR --- Airborne Profile Recorder A82-20407

PILOT PERFORMANCE
Cost efficiency versus objective fidelity in flight simulation [DGLR PAPER 81-104] A82-19264
Threat perception while viewing single intruder conflicts on a cockpit display of traffic information [NASA-TM-81341] N82-16076
Numerical and flight simulator test of the flight deterioration concept [NASA-CR-3500] N82-16655

PILOT TRAINING
Tactical Radar Threat Generator system A82-18903
Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas A82-19018
Experience with flight simulators - Training effectiveness-future developments [DGLR PAPER 81-110] A82-19263
Cost efficiency versus objective fidelity in flight simulation [DGLR PAPER 81-104] A82-19264
Procurement of the new flight and tactics simulators - Experience, problems, meaning [DGLR PAPER 81-095] A82-19266
The procurement of flight simulators at the German Lufthansa [DGLR PAPER 81-093] A82-19268
Official recognition and the significance of simulators for safe flight operations [DGLR PAPER 81-094] A82-19271
Training in the flight and tactics simulator of the Navy Flight Squadron 3 'Graf Zeppelin' [DGLR PAPER 81-109] A82-19273
Report covering experience obtained at the German Lufthansa with respect to training involving the use of flight simulators A82-19274
The simulator and the airline pilot A82-20527
The use of flight simulators in l'Armee de l'Air A82-20528
The aircraft manufacturer's needs as a simulator user A82-20530
ASW and weapon system simulation with reference to the Nimrod MR Mk2 maritime crew trainer A82-20531
Advanced simulation --- in commercial aviation A82-20535
Implementation of the recommendations made on the technical report titled analysis of advanced simulator for pilot training [AD-A106779] N82-16094

PIPER AIRCRAFT
Resonance tests on a Piper PA-32R tailplane before and after damage [AD-A106273] N82-16071

PISTON ENGINES
A history of aircraft piston engine lubricants A82-19622

PITCHING MOMENTS
Tactical STOL moment balance through innovative configuration technology [AIAA PAPER 81-2615] A82-19204
Alleviation of the subsonic pitch-up of delta wings [AIAA PAPER 82-0129] A82-22052

PITTING
Fracture mechanics based modelling of the corrosion fatigue process N82-17344

PLASMA SPRAYING
Improved plasma sprayed NCrAlY coatings for aircraft gas turbine applications A82-20742

PLASTIC DEFORMATION
Superplastic aluminum evaluation [AD-A107760] N82-17338

PLASTICS
Pactec V - Plastics technology advances/1980 update; Proceedings of the Fifth Annual Pacific Technical Conference, Los Angeles, CA, February 26-28, 1980. Volume 3 A82-20521

PLUMES
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size A82-21386

POLICIES
A perspective on civil use of GPS A82-21589

POLLUTION CONTROL
Noise impact on communities from aircraft [GPO-80-617] N82-17655

POLYMERIC FILMS
Transparent polyolefin film armor [AD-A107562] N82-17377

POSITION INDICATORS
Aircraft position measurement using laser beacon optics [AD-A107973] N82-16067

POTENTIAL FLOW
Analysis of an ideal-fluid flow past a finite-thickness wing A82-19813
Boundary layer transition and separation on a compressor rotor airfoil A82-20299
Pade approximation applied to flow past thin airfoils A82-20728
Isolated nacelle performance - Measurement and simulation [AIAA PAPER 82-0134] A82-22054

POTENTIAL THEORY
The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory A82-19198

POWER EFFICIENCY
Evaluation of the design, construction and operation of a gas fueled engine driven heat pump [ENG-034] N82-17459

POWER SUPPLY CIRCUITS
L-band power generation in the General Electric solid-state radar A82-18914
Power system design optimization using Lagrange multiplier techniques A82-20743

PREDICTION ANALYSIS TECHNIQUES
Methods and models for predicting fatigue crack growth under random loading --- Book A82-20506
Prediction of sound radiation from different practical jet engine inlets [NASA-CR-165120] N82-16810
Deviation/turning angle correlations N82-17193

PREPREGS
Conductive prepregs for lightning strike protection on aircraft A82-20523

PRESSURE DEPENDENCE
Pressure dependence of jet noise and silencing of blow-offs A82-20266

PRESSURE DISTRIBUTION
Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow A82-19197
Experimental investigation of a jet inclined to a subsonic crossflow [AIAA PAPER 81-2610] A82-19202
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics [AIAA PAPER 82-0095] A82-22045

PRESSURE DRAG
Part span damper loss prediction for transonic axial fan rotors N82-17192

PRESSURE EFFECTS
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls [NAL-TR-680] N82-17123

PRESSURE MEASUREMENT
Programs for the transonic wind tunnel data processing installation. Part 9: Pressure measurements updated [AD-A106271] N82-16095
Current pressure measuring system in the transonic wind tunnel [AD-A106272] N82-16096

PRESSURE REDUCTION
Part span damper loss prediction for transonic axial fan rotors N82-17192

PRINTED CIRCUITS
Broader bandwidth for thin conformal antennas A82-19069

PROBABILITY THEORY
Stage-state reliability analysis technique N82-17104

PROCUREMENT MANAGEMENT
Procurement of the new flight and tactics simulators - Experience, problems, meaning [DGLR PAPER 81-095] A82-19266

PROCUREMENT POLICY
The procurement of flight simulators at the German Lufthansa [DGLR PAPER 81-093] A82-19268

PRODUCT DEVELOPMENT
NAVSTAR global positioning systems A82-20601

PRODUCTION COSTS
Skyship 500 - The development of a modern production airship A82-20559

PRODUCTIVITY
CAD/CAM approach to improving industry productivity gathers momentum A82-21375

PROGRAM VERIFICATION (COMPUTERS)
F/A-18 weapons system support facilities N82-17120

PROJECT MANAGEMENT
Data systems organization - A change for the better --- flight test data acquisition A82-20767
Flight dynamics technology development: Structures and dynamics, vehicle equipment/subsystems, flight control and aeromechanics [AD-A096636] N82-17082

PROJECTILE CRATERING
Analysis methods for ballistic damage size and type N82-17163

PROJECTILES
Design Manual for impact damage tolerant aircraft structure [AGARD-AG-238] N82-17160
Description of projectile threats N82-17161
Analysis methods for predicting structural response to projectile impact N82-17162
Analysis methods for ballistic damage size and type N82-17163
Damage from High explosive (HE) projectiles N82-17164
Damage from engine debris projectiles N82-17165
Effects of cyclic loading on projectile impact damage N82-17167
Stiffness degradation of impact damaged structure N82-17168
Strength degradation of impact damaged structure N82-17169

PROPELLANT PROPERTIES
Aviation turbine fuel properties and their trends A82-19623

PROPELLER BLADES
Roll up model for rotor wake vortices, part 5 [ASRL-TR-194-8] N82-17127

PROPELLER EFFICIENCY
Determining performance parameters of general aviation aircraft A82-20759
Turboprop cargo aircraft systems study [NASA-CR-165813] N82-16070

PROPELLERS
Noise of the SR-3 propeller model at 2 deg and 4 deg angle of attack [NASA-TM-82738] N82-16808
A shock wave approach to the noise of supersonic propellers [NASA-TM-82752] N82-16809

PROPULSION
NASA research activities in aeropropulsion [NASA-TM-82768] N82-16084

PROPULSION SYSTEM CONFIGURATIONS
Helicopter propulsion systems: Past, present and future N82-17204
Aircraft turbine engine development: Current practices and new priorities N82-17206
Future technology and requirements for helicopter engines N82-17207
Advanced component development design basis for next generation medium power helicopter engines N82-17209
Component research for future propulsion systems N82-17224
Future requirements for helicopter propulsion systems N82-17225

PROPULSION SYSTEM PERFORMANCE
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation [AIAA PAPER 81-2663] A82-19221
Operational and performance aspects of fuel management in civil aircraft A82-20518
Advanced subsonic transport propulsion [AIAA PAPER 81-0811] A82-20874
Propulsion system controls design and simulation [AIAA PAPER 82-0322] A82-22091
Influence of correlations and computational methods on the prediction of overall efficiency N82-17180
Survey on the effect of blade surface roughness on compressor performance N82-17191
Axial compressor stall and surge N82-17194
Helicopter propulsion systems: Past, present and future N82-17204
Aircraft turbine engine development: Current practices and new priorities N82-17206
Future technology and requirements for helicopter engines N82-17207
Mechanical advances in the design of small turboshaft engines N82-17208
Advanced component development design basis for next generation medium power helicopter engines N82-17209
Aerodynamic components for small turboshaft engines N82-17211
Regenerative helicopter engines: Advances in performance and expected development problems N82-17212
Advanced transmission component development N82-17214

Helicopter propulsions systems. 1: Vibration prevention systems on helicopters 2: Problem of noise in the cabin
N82-17222

PROPULSIVE EFFICIENCY
The design of compact asymmetric maximum-thrust nozzles for a given lift force
A82-19814
Design possibilities for improved fuel efficiency of civil transport aircraft
A82-20514
Airbus Industrie - The year of progress
A82-21189
Mechanical advances in the design of small turboshaft engines
N82-17208
The distress regime on the bimotored helicopter
N82-17219

PROTECTIVE COATINGS
Corrosion prevention measures used in the construction of an aircraft airframe: The case of 2014 and 2214 alloys
N82-17360
Recent developments in materials and processes for aircraft corrosion control
N82-17361
New concepts in multifunctional corrosion for aircraft and other systems
N82-17362
Corrosion in naval aircraft electronic systems
N82-17363
Corrosion protection schemes for aircraft structures: Some examples for the corrosion behaviour of Al alloys
N82-17364

PROTOTYPES
A progress report on the European Transonic Wind Tunnel Project
[ONERA, TP NO. 1981-121] A82-19737

PSEUDORANDOM SEQUENCES
Land navigation with a low cost GPS receiver
A82-20656

PULSE COMPRESSION
Sanctuary radar --- with digital processor for Doppler filtering and pulse compression
A82-18906

Q

QUALITY CONTROL
Computer graphics for quality assurance
A82-20276
Operability of military aircraft - Some design and cost trends
A82-20565

QUIET ENGINE PROGRAM
Quiet Short-Haul Research Aircraft - The first 3 years of flight research
[AIAA PAPER 81-2625] A82-19209

R

RADAR ANTENNAS
L-band power generation in the General Electric solid-state radar
A82-18914
Analysis and tolerance study of an array antenna for a new generation of secondary radars
A82-19521

RADAR APPROACH CONTROL
L-band power generation in the General Electric solid-state radar
A82-18914
Airport radar systems --- Russian book
A82-18975
Survey of 101 US airports for new multiple instrument approach concepts --- runways
[AD-A107812] N82-17229

RADAR ATTENUATION
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations
A82-19058

RADAR BEACONS
ATCRBS uplink environment measurement near Jacksonville, Florida
[AD-A108053] N82-16063
Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (RCAS) threat phase
[AD-A107805] N82-17140

RADAR BEAMS
Analysis and tolerance study of an array antenna for a new generation of secondary radars
A82-19521

RADAR EQUIPMENT
Airport radar systems --- Russian book
A82-18975
Radar environment simulation for software test
A82-19245
Simulation of modern radar installations in full-mission flight and tactics simulators
[DGLR PAPER 81-103] A82-19272

RADAR HOMING MISSILES
Microwave systems for radar guided missiles
A82-18936

RADAR MAPS
Simulation of modern radar installations in full-mission flight and tactics simulators
[DGLR PAPER 81-103] A82-19272

RADAR MEASUREMENT
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size
A82-21386

RADAR SCATTERING
Modelling of target radar scattering with application to guidance simulation
A82-20570
Comparison of various elevation angle estimation techniques
A82-20589

RADAR TARGETS
Tactical Radar Threat Generator system
A82-18903
Design criteria for a miss distance radar
A82-18904
Modelling of target radar scattering with application to guidance simulation
A82-20570

RADAR TRACKING
Tactical Radar Threat Generator system
A82-18903
Microwave communications to remotely piloted vehicles
A82-18911
Experimental measurement of the low angle terrain scattering interference environment
A82-20588
Comparison of various elevation angle estimation techniques
A82-20589
Tracking of low-altitude targets by a combined X/Ka-band radar system
A82-20590

RADAR TRANSMITTERS
L-band power generation in the General Electric solid-state radar
A82-18914

RADIANT FLUX DENSITY
Fuel property effects on radiation intensities in a gas turbine combustor
A82-19966

RADIO BEACONS
Investigation of Wilcox model 585B very high frequency omnidirectional radio range (VOR) system, part 3
[AD-A107855] N82-17149

RADIO FREQUENCY INTERFERENCE
Experimental measurement of the low angle terrain scattering interference environment
A82-20588

RADIO NAVIGATION
The influence of technology advances on integrated CNI avionics --- Integrated Communication, Navigation, and Identification Avionics for military aircraft
A82-20672

RADIO RECEIVERS
Land navigation with a low cost GPS receiver
A82-20656

RADIO RELAY SYSTEMS
Relay-augmented data links in an interference environment
A82-20684

RADIO TELEMETRY
Recent developments in military telemetry
A82-18908
RADIOACTIVE WASTES
Development of in-can melting process and equipment, 1979 and 1980
[DE82-001050] N82-16834
RANDOM LOADS
Methods and models for predicting fatigue crack growth under random loading --- Book
A82-20506
Multi-parameter yield zone model for predicting spectrum crack growth
A82-20510
Crack growth behavior of center-cracked panels under random spectrum loading
A82-20511
Random spectrum fatigue crack life predictions with or without considering load interactions
A82-20512
REAL GASES
Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801
REAL TIME OPERATION
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[AIAA PAPER 81-2663] A82-19221
Simulation of advanced cockpits
A82-19259
Real-Time Simulation Computation System --- for digital flight simulation of research aircraft
A82-19260
Piloted simulation of an on-board trajectory optimization algorithm
A82-20296
Color graphics based real-time telemetry processing system
A82-20771
Research through simulation --- simulators and research applications at Langley
[NASA-FACTS-125] N82-16092
RECIPROCAL THEOREMS
Application of the principle of reciprocity to flexible rotor balancing
[ASME PAPER 81-DET-49] A82-19311
RECONNAISSANCE AIRCRAFT
Study of ground handling characteristics of a maritime patrol airship
[NASA-CR-166253] N82-16090
RECTANGULAR WINGS
The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory
A82-19198
An experimental study of separated flow on a finite wing
[AIAA PAPER 81-1882] A82-20293
REDUNDANCY
Stage-state reliability analysis technique
N82-17104
Reconfiguration: A method to improve systems realiability
N82-17107
REFINING
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401
REFRACTED WAVES
Can low-speed jet noise be predicted
A82-22222
REGENERATION (ENGINEERING)
Regenerative helicopter engines: Advances in performance and expected development problems
N82-17212
REINFORCEMENT (STRUCTURES)
Analysis of multiple load path panels containing impact damage
N82-17170
RELIABILITY ANALYSIS
Stage-state reliability analysis technique
N82-17104
Methodology for measurement of fault latency in a digital avionic miniprocessor
N82-17105
Hierarchical specification of the SIFT fault tolerant flight control system
N82-17106
Reconfiguration: A method to improve systems realiability
N82-17107
REMOTE CONSOLES
Instrumentation remote 'mini' ground station
A82-20770
REMOTELY PILOTED VEHICLES
Microwave communications to remotely piloted vehicles
A82-18911
RENDEZVOUS TRAJECTORIES
Piloted simulation of an on-board trajectory optimization algorithm
A82-20296
RESCUE OPERATIONS
Survey of aeromedical evacuation in Italy
A82-19003
The network of civilian air rescue in Germany
A82-19004
Ambulance helicopter in the Stockholm archipelago
A82-19005
Military assistance to safety and traffic /MAST/
A82-19006
The situation of air rescue in Argentina
A82-19010
Aeromedical evacuation in New Zealand
A82-19011
Helicopter secondary applications for neurotraumatic emergencies
A82-19015
Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas
A82-19018
The helicopter in rescue operations in high-mountain areas
A82-19019
Design requirements for modern rescue helicopters
A82-19020
The case for helicopter hoisting
A82-21597
Special investigation report. Search and rescue procedures and arming of emergency locator transmitter: Aircraft accident near Michigan City, Indiana, 7 December, 1980
[PB81-249427] N82-16058
RESEARCH
Research and technology annual report, 1981
[NASA-TM-81333] N82-17081
RESEARCH AIRCRAFT
Quiet Short-Haul Research Aircraft - The first 3 years of flight research
[AIAA PAPER 81-2625] A82-19209
Real-Time Simulation Computation System --- for digital flight simulation of research aircraft
A82-19260
Performance flight test evaluation of the Ball-Bartoe JW-1 Jetwing STOL research aircraft
A82-20762
Preliminary design study of a hybrid airship for flight research
[NASA-CR-166246] N82-17152
RESEARCH AND DEVELOPMENT
Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft
[AIAA PAPER 81-2647] A82-19216
High angle-of-attack characteristics of three-surface fighter aircraft --- canard-wing-horizontal tail configuration for greater stability and control
[AIAA PAPER 82-0245] A82-22074
RESEARCH PROJECTS
The FS2 RAE Bedford civil flight research programme --- on components and system integration for optimum ATC
A82-20519
RESIDENTIAL AREAS
Comparison of aircraft and ground vehicle noise levels in front and backyards of residences
A82-20058
RESONANCE TESTING
Resonance tests on a Piper PA-32R tailplane before and after damage
[AD-A106273] N82-16071
RESONANT FREQUENCIES
Natural frequencies of rotating bladed discs using clamped-free blade modes
[ASME PAPER 81-DET-124] A82-19338

Resonance tests on a Piper PA-32R tailplane before and after damage
[AD-A106273] N82-16071

RESOURCES MANAGEMENT
VTOL as it applies to resource development in the Canadian north
[AIAA PAPER 81-2640] A82-19215

RETROFITTING
JP-8 fuel conversion evaluation
A82-20755

REVERSED FLOW
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19214
Dilution jet behavior in the turn section of a reverse flow combustor
[AIAA PAPER 82-0192] A82-20291

REYNOLDS NUMBER
Experimental studies of the Eppler 61 airfoil at low Reynolds numbers
[AIAA PAPER 82-0345] A82-19796
Effects of Reynolds number and turbulence level on axial cascade performance
N82-17190
Survey on the effect of blade surface roughness on compressor performance
N82-17191

RIBS (SUPPORTS)
Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey
N82-17353

RIGID ROTORS
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling
[ISD-270] N82-17640
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling
[ISD-271] N82-17641

ROBUSTNESS (MATHEMATICS)
An application of total synthesis to robust coupled design --- turbojet engine control
A82-19061

ROCKET FLIGHT
Fiscal year 1981 scientific and technical reports, articles, papers, and presentations
[NASA-TM-82445] N82-16927

ROLLING MOMENTS
Subsonic and transonic roll damping measurements on Basic Finner --- finned missile calibration model
A82-19958

ROTARY STABILITY
Correlating measured and predicted inplane stability characteristics for an advanced bearingless rotor
[NASA-CR-166280] N82-17154

ROTARY WINGS
Design requirements for modern rescue helicopters
A82-19020
Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades
A82-20524
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042
Pre-design study for a modern four-bladed rotor for the Rotor System Research Aircraft (RSRA) --- integrating the YAH-64 main rotor
[NASA-CR-166154] N82-16043
Ice phobics blade tracking and comparison of vibration analysis techniques
[AD-A108121] N82-16074
Blade planform for a quiet helicopter
[NASA-CR-166256] N82-17121
Roll up model for rotor wake vortices, part 5
[ASRL-TR-194-4] N82-17127
Development of a computer based presentation of non-steady helicopter rotor flows
[AD-A108107] N82-17131
Rotor flow research in low speed helicopter flight
[AD-A107873] N82-17132
Non-steady velocity measurement of the wake of a helicopter rotor at low advance ratios
[AD-A107722] N82-17133

ROTATING DISKS
Natural frequencies of rotating bladed discs using clamped-free blade modes
[ASME PAPER 81-DET-124] A82-19338
On the formulation of coupled/uncoupled dynamics analyses of blade-disc assemblies
[ASME PAPER 81-DET-126] A82-19340
An investigation of dual mode phenomena in a mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347
Measurement of the influence of flow distortions on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348
A parametric study of dynamic response of a discrete model of turbomachinery bladed disk
[ASME PAPER 81-DET-137] A82-19349

ROTATING STALLS
Rotating stall in blade rows operating in shear flow
A82-22209
Axial compressor stall and surge
N82-17194

ROTOR AERODYNAMICS
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report
[NASA-CR-165500] N82-16081
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling
[ISD-271] N82-17641
Static and dynamic investigations for the model of a wind rotor
[ISD-272] N82-17642

ROTOR BLADES (TURBOMACHINERY)
Natural frequencies of rotating bladed discs using clamped-free blade modes
[ASME PAPER 81-DET-124] A82-19338
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report
[NASA-CR-165500] N82-16081
Part span damper loss prediction for transonic axial fan rotors
N82-17192
Deviation/turning angle correlations
N82-17193
Static investigations of rotor blades under deadweight and during stationary operation
[ISD-269] N82-17639
Loading cycles and material data for the layout of a wind turbine of special hub concept
[ISD-273] N82-17643

ROTOR SPEED
Problems of engine response during transient maneuvers
N82-17221

ROTOR SYSTEMS RESEARCH AIRCRAFT
Pre-design study for a modern four-bladed rotor for the Rotor System Research Aircraft (RSRA) --- integrating the YAH-64 main rotor
[NASA-CR-166154] N82-16043

ROTORCRAFT AIRCRAFT
The emerging need for improved helicopter navigation
A82-21591
Assessment of historical and projected segments of US and World civil and military rotorcraft markets 1960 - 1990
[NASA-CR-166151] N82-17137
Preliminary design study of a hybrid airship for flight research
[NASA-CR-166246] N82-17152

ROTORS
Balancing of flexible rotors by the complex modal method
[ASME PAPER 81-DET-46] A82-19310
Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl
[ASME PAPER 81-DET-55] A82-19314
Rotor model for the verification of computational methods
[ISD-275] N82-17638
Loading cycles and material data for the layout of a wind turbine of special hub concept
[ISD-273] N82-17643

ROUTES
FAA/NWS aviation route forecast /ARF/ development
[AIAA PAPER 82-0013] A82-22027

RUN TIME (COMPUTERS)
Utilization of hybrid computational equipment for the simulation of parachute system flight
A82-19234

RUNWAY CONDITIONS
Community sensitivity to changes in aircraft noise exposure
[NASA-CR-3490] N82-16807

RUNWAY LIGHTS
Spectrally balanced chromatic landing approach lighting system
[NASA-CASE-ARC-10990-1] N82-16059
RUNWAYS
Requirements for instrument approaches to converging runways
[AD-A108075] N82-17144
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-168439] N82-17151
Survey of 101 US airports for new multiple instrument approach concepts --- runways
[AD-A107812] N82-17229

S

SADDLE POINTS (GAME THEORY)
Analytical study of twin-jet shielding development of a 3-dimensional model
[NASA-CR-165106] N82-16805
SAFETY DEVICES
Test and evaluation of improved aircrew restraint systems
[AD-A107576] N82-16056
SAFETY FACTORS
Consequences of American airline deregulation - Legislative theory in a concrete example
A82-19947
SAFETY MANAGEMENT
Study of air compressor hazards in underground and surface mines
[PB82-105164] N82-17597
SATELLITE NAVIGATION SYSTEMS
A perspective on civil use of GPS
A82-21589
SCALE MODELS
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration
[AIAA PAPER 81-2620] A82-19207
Scale-model studies for the improvement of flow patterns of a low-speed tunnel
[NASA-CR-169413] N82-17228
Rotor model for the verification of computational methods
[ISD-275] N82-17638
SCANNERS
Current pressure measuring system in the transonic wind tunnel
[AD-A106272] N82-16096
SCENE ANALYSIS
Terrain model animation
[AD-A107911] N82-17887
SE-210 AIRCRAFT
Ground movement control and guidance - Cat. 3 operations experience in Air Inter
A82-20222
SEA WATER
Structure and variability of the Alboran Sea frontal system
A82-20447
US Naval fleet aircraft corrosion
N82-17350
Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey
N82-17353
SEALERS
US Naval fleet aircraft corrosion
N82-17350
SEALING
The experience of corrosion on French military aerodynes
N82-17355
SEARCHING
Special investigation report. Search and rescue procedures and arming of emergency locator transmitter: Aircraft accident near Michigan City, Indiana, 7 December, 1980
[PB81-249427] N82-16058
SECONDARY FLOW
End-wall boundary layer calculation methods
N82-17188
Correlation for secondary flows and clearance effects
N82-17189
SECONDARY RADAR
Analysis and tolerance study of an array antenna for a new generation of secondary radars
A82-19521
SEPARATED FLOW
Experimental studies of the Eppler 61 airfoil at low Reynolds numbers
[AIAA PAPER 82-0345] A82-19796
An experimental study of separated flow on a finite wing
[AIAA PAPER 81-1882] A82-20293
Visualization of flow separation and separated flows with the aid of hydrogen bubbles
A82-20803
Store separation from cavities at supersonic flight speeds
[AIAA PAPER 82-0372] A82-22096
SERVOMECHANISMS
The simulation study on a redundant flight control system
A82-22120
SET THEORY
Stage-state reliability analysis technique
N82-17104
SHAFTS (MACHINE ELEMENTS)
Application of the principle of reciprocity to flexible rotor balancing
[ASME PAPER 81-DET-49] A82-19311
SHALE OIL
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401
SHAPED CHARGES
Analysis methods for predicting structural response to projectile impact
N82-17162
SHARP LEADING EDGES
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3
[AIAA PAPER 82-0289] A82-22083
SHEAR FLOW
Rotating stall in blade rows operating in shear flow
A82-22209
SHEAR LAYERS
Effects of Reynolds number and turbulence level on axial cascade performance
N82-17190
SHELL STABILITY
Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading
A82-19928
Studies on the stability of thin-walled shells with cutouts /Review/. I
A82-21629
SHIELDING
Analytical study of twin-jet shielding
[NASA-CR-165102] N82-16801
Analytical study of twin-jet shielding
[NASA-CR-165103] N82-16802
Analytical study of twin-jet shielding
[NASA-CR-165104] N82-16803
Analytical study of twin-jet shielding
[NASA-CR-165105] N82-16804
Analytical study of twin-jet shielding development of a 3-dimensional model
[NASA-CR-165106] N82-16805
Analytical study of twin-jet shielding two-dimensional model
[NASA-CR-165107] N82-16806
SHOCK WAVES
A split coefficient/locally monotonic scheme for multishocked supersonic flow
[AIAA PAPER 82-0287] A82-22082
A shock wave approach to the noise of supersonic propellers
[NASA-TM-82752] N82-16809
SHORT HAUL AIRCRAFT
Quiet Short-Haul Research Aircraft - The first 3 years of flight research
[AIAA PAPER 81-2625] A82-19209
SHORT TAKEOFF AIRCRAFT
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[AIAA PAPER 81-2612] A82-19203
Tactical STOL moment balance through innovative configuration technology
[AIAA PAPER 81-2615] A82-19204

Application of thrust vectoring for STOL [AIAA PAPER 81-2616] A82-19205
STOL capability impact on advanced tactical aircraft design [AIAA PAPER 81-2617] A82-19206
Quiet Short-Haul Research Aircraft - The first 3 years of flight research [AIAA PAPER 81-2625] A82-19209
Sea based support aircraft alternatives [AIAA PAPER 81-2649] A82-19217
Design features of a sea-based multipurpose V/STOL, STOVL, and STOL aircraft in a support role for the U.S. Navy [AIAA PAPER 81-2650] A82-19218
Performance flight test evaluation of the Ball-Bartoe JW-1 Jetwing STOL research aircraft A82-20762
Analytical control law for desirable aircraft lateral handling qualities A82-21943
Surveys of flow-field around empennage of the NAL STOL-research-aircraft model [NAL-TR-677] N82-17124
A velocity vector measuring system with 13 asymmetric wedge type yawmeters --- measuring flow distribution around the empennage of STOL models [NAL-TR-674] N82-17477

SHRAPNEL
Strength degradation of impact damaged structure N82-17169

SHROUDED TURBINES
Investigation of vibration of shrouded turbine blades [ASME PAPER 81-DET-129] A82-19343
A practical approach to systems mode analysis --- for disc-blade-shroud assemblies [ASME PAPER 81-DET-130] A82-19344

SIGNAL DETECTORS
Aircraft position measurement using laser beacon optics [AD-A107973] N82-16067

SIGNAL FADING
An analysis of antijam communication requirements in fading media A82-20695

SIGNAL MEASUREMENT
Experimental measurement of the low angle terrain scattering interference environment A82-20588

SIGNAL PROCESSING
Sanctuary radar --- with digital processor for Doppler filtering and pulse compression A82-18906
Microwave systems for radar guided missiles A82-18936
Comparison of various elevation angle estimation techniques A82-20589
Simulator data test instrumentation - Flight test challenge of the eighties A82-20768
Aircraft position measurement using laser beacon optics [AD-A107973] N82-16067

SIGNAL TRANSMISSION
Microwave communications to remotely piloted vehicles A82-18911
Land navigation with a low cost GPS receiver A82-20656

SIGNATURE ANALYSIS
On-site vibration measurement, dynamic tracking and balancing A82-20545

SILICON CARBIDES
Brittle materials design, high temperature gas turbine [AD-A106670] N82-16085

SILICON NITRIDES
Brittle materials design, high temperature gas turbine [AD-A106670] N82-16085

SILICONES
US Naval fleet aircraft corrosion N82-17350

SIMULATORS
Research through simulation --- simulators and research applications at Langley [NASA-FACTS-125] N82-16092
Development of the automated AFAPL engine simulator test for lubricant evaluation [AD-A106128] N82-16093

SIZE (DIMENSIONS)
Size reduction flight test airborne data systems A82-20766

SKIN (STRUCTURAL MEMBER)
Design of the composite spar-wingskin joint A82-20128

SLENDER CONES
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3 [AIAA PAPER 82-0289] A82-22083

SMALL PERTURBATION FLOW
Rotating stall in blade rows operating in shear flow A82-22209

SMOKE
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size A82-21386

SOLID STATE DEVICES
L-band power generation in the General Electric solid-state radar A82-18914

SOLIDIFICATION
Development of in-can melting process and equipment, 1979 and 1980 [DE82-001050] N82-16834

SOLVENT REFINED COAL
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes [DE82-001127] N82-17401

SOOT
The sooting tendency of fuels containing polycyclic aromatics in a research combustor [AIAA PAPER 82-0299] A82-19791

SOUND PRESSURE
Pressure dependence of jet noise and silencing of blow-offs A82-20266

SOUND PROPAGATION
Ultrasonic method for flow field measurement in wind tunnel tests A82-20054
A comprehensive flight test flyover noise program A82-20765

SPACE ENVIRONMENT SIMULATION
The Global Positioning System Evaluator --- facility for testing in simulated wide range environments A82-21580

SPACE EXPLORATION
Fiscal year 1981 scientific and technical reports, articles, papers, and presentations [NASA-TM-82445] N82-16927

SPACE SHUTTLE ORBITERS
Analytical prediction of aerospace vehicle vibration environments [ASME PAPER 81-DET-29] A82-19305

SPACE SHUTTLES
Research and technology annual report, 1981 [NASA-TM-81333] N82-17081

SPACE TRANSPORTATION SYSTEM
Fiscal year 1981 scientific and technical reports, articles, papers, and presentations [NASA-TM-82445] N82-16927

SPACECRAFT STRUCTURES
Calculation of sensitivity derivatives in thermal problems by finite differences A82-21391

SPECIFICATIONS
Hierarchical specification of the SIFT fault tolerant flight control system N82-17106

SPECTROSCOPIC ANALYSIS
The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels A82-22198

SPIN DYNAMICS
An analytical technique for the analysis of airplane spin entry and recovery [AIAA PAPER 82-0243] A82-19786

SPIN TESTS
Spin tests of a single-engine, high-wing light
airplane
[NASA-TP-1927] N82-16068
SPOILERS
Basic studies of the flow fields of
airfoil-flap-spoiler systems
[AIAA PAPER 82-0173] A82-22060
Summary of theoretical considerations and wind
tunnel tests of an aerodynamic spoiler for stall
proofing a general aviation airplane
[NASA-CR-165100] N82-16046
SPRAYED COATINGS
Improved plasma sprayed MCrAlY coatings for
aircraft gas turbine applications
A82-20742
SPRAYERS
Helicopter icing spray system
A82-20754
SPREAD SPECTRUM TRANSMISSION
The influence of technology advances on integrated
CNI avionics --- Integrated Communication,
Navigation, and Identification Avionics for
military aircraft
A82-20672
STABILITY DERIVATIVES
Analytical control law for desirable aircraft
lateral handling qualities
A82-21941
Numerical calculation of lift, moment coefficient
and dynamic stability derivatives on
sideslipping wings in unsteady supersonic flows
A82-22111
STABILIZERS (FLUID DYNAMICS)
Some observations on the corrosion of aircraft at
the air force base in Bandirma, Turkey
N82-17353
STANDARDIZATION
Standardization study for advanced aircraft
armament system program
[AD-A107681] N82-17156
STATIC LOADS
Static investigations of rotor blades under
deadweight and during stationary operation
[ISD-269] N82-17639
STATIC STABILITY
Control law development for a close-coupled
canard, relaxed static stability fighter
[AIAA PAPER 82-0180] A82-19784
STATIC TESTS
Design features of a sea-based multipurpose
V/STOL, STOVL, and STOL aircraft in a support
role for the U.S. Navy
[AIAA PAPER 81-2650] A82-19218
A comprehensive flight test flyover noise program
A82-20765
Static investigations of rotor blades under
deadweight and during stationary operation
[ISD-269] N82-17639
Static and dynamic investigations for the model of
a wind rotor
[ISD-272] N82-17642
STATISTICAL ANALYSIS
Prediction of aircraft interior noise using the
statistical energy analysis method
[ASME PAPER 81-DET-102] A82-19332
STEADY FLOW
Steady and unsteady nonlinear hybrid vortex method
for lifting surfaces at large angles of attack
[AIAA PAPER 82-0351] A82-22094
STEAM TURBINES
Influence of correlations and computational
methods on the prediction of overall efficiency
N82-17180
STIFFNESS
Stiffness degradation of impact damaged structure
N82-17168
STORAGE STABILITY
Deposit formation in liquid fuels. II - The effect
of selected compounds on the storage stability
of Jet A turbine fuel
A82-22240
Deposit formation in liquid fuels. I - Effect of
coal-derived Lewis bases on storage stability of
Jet A turbine fuel
A82-22241
STORMS (METEOROLOGY)
X-band vs C-band aircraft radar - The relative
effects of beamwidth and attenuation in severe
storm situations
A82-19858
STRAIN GAGES
Ground calibration of a strain-gauged CT-4A
aircraft (1979)
[AD-A107847] N82-16073
STRAPDOWN INERTIAL GUIDANCE
Calibrated and uncalibrated inertial navigation
system performance in valid and jammed global
positioning system environments
A82-21587
The application of strapdown inertial technology
to Attitude and Heading Reference System
requirements --- for YAH-64 advanced attack
helicopter
A82-21590
STRESS ANALYSIS
Automated calculation of the stressed state of
shell systems under asymmetrical mechanical and
thermal loading
A82-19928
Multi-parameter yield zone model for predicting
spectrum crack growth
A82-20510
Crack growth behavior of center-cracked panels
under random spectrum loading
A82-20511
Random spectrum fatigue crack life predictions
with or without considering load interactions
A82-20512
STRESS CONCENTRATION
Ground calibration of a strain-gauged CT-4A
aircraft (1979)
[AD-A107847] N82-16073
STRESS CORROSION CRACKING
Corrosion Fatigue --- conferences
[AGARD-CP-316] N82-17342
Mechanisms of corrosion fatigue --- of high
strength aluminum alloys
N82-17343
Fracture mechanics based modelling of the
corrosion fatigue process
N82-17344
Corrosion prevention methods developed from direct
experience with aerospace structures
N82-17359
Recent developments in materials and processes for
aircraft corrosion control
N82-17361
New concepts in multifunctional corrosion for
aircraft and other systems
N82-17362
STRESS INTENSITY FACTORS
Multi-parameter yield zone model for predicting
spectrum crack growth
A82-20510
Crack growth behavior of center-cracked panels
under random spectrum loading
A82-20511
STRESS-STRAIN RELATIONSHIPS
Studies on the stability of thin-walled shells
with cutouts /Review/. I
A82-21629
STRESSED-SKIN STRUCTURES
Bolted field repair of graphite/epoxy wing skin
laminates
A82-20981
STRIP TRANSMISSION LINES
Leaky wave antenna using an inverted strip
dielectric waveguide --- for aircraft application
A82-19552
STRUCTURAL ANALYSIS
Quick learning diagnostics --- helicopter
vibration analysis and component condition
monitoring
A82-20543
Research and development program for non-linear
structural modeling with advanced
time-temperature dependent constitutive
relationships
[NASA-CR-165533] N82-16080
Strength degradation of impact damaged structure
N82-17169
STRUCTURAL DESIGN
Optimal shape design of turbine blades
[ASME PAPER 81-DET-128] A82-19342

Calculation of sensitivity derivatives in thermal problems by finite differences
A82-21391
Design Manual for impact damage tolerant aircraft structure
[AGARD-AG-238] N82-17160
STRUCTURAL DESIGN CRITERIA
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042
STRUCTURAL ENGINEERING
Pre-design study for a modern four-bladed rotor for the Rotor System Research Aircraft (RSRA) --- integrating the YAH-64 main rotor
[NASA-CR-166154] N82-16043
STRUCTURAL FAILURE
Airworthiness of helicopter transmissions
A82-20541
Quick learning diagnostics --- helicopter vibration analysis and component condition monitoring
A82-20543
Hydrodynamic ram damage
N82-17166
Strength degradation of impact damaged structure
N82-17169
STRUCTURAL STABILITY
Stiffness degradation of impact damaged structure
N82-17168
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling
[ISD-270] N82-17640
STRUCTURAL STRAIN
Analysis methods for predicting structural response to projectile impact
N82-17162
STRUCTURAL VIBRATION
A comparative study on mechanical vibration and noise during patient transportation
A82-19013
Analytical prediction of aerospace vehicle vibration environments
[ASME PAPER 81-DET-29] A82-19305
Investigation of vibration of shrouded turbine blades
[ASME PAPER 81-DET-129] A82-19343
An investigation of dual mode phenomena in a mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347
Measurement of the influence of flow distortions on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351
Quick learning diagnostics --- helicopter vibration analysis and component condition monitoring
A82-20543
On-site vibration measurement, dynamic tracking and balancing
A82-20545
Ice phobics blade tracking and comparison of vibration analysis techniques
[AD-A108121] N82-16074
STRUCTURAL WEIGHT
Optimal shape design of turbine blades
[ASME PAPER 81-DET-128] A82-19342
Integration of a code for aeroelastic design of conventional and composite wings into ACSYNT, an aircraft synthesis program --- wing aeroelastic design (WADES)
[NASA-CR-137805] N82-16069
STRUTS
Multiple pure tone elimination strut assembly --- air breathing engines
[NASA-CASE-FRC-11062-1] N82-16300
SUBSONIC AIRCRAFT
Thrust modulation methods for a subsonic V/STOL aircraft
[AIAA PAPER 81-2633] A82-19213
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust
A82-22112
SUBSONIC FLOW
Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows
[ASME PAPER 81-DET-122] A82-19337
Aerodynamic characteristics of waveriders at subsonic flight speeds
A82-19810
SUBSONIC SPEED
Subsonic and transonic roll damping measurements on Basic Finner --- finned missile calibration model
A82-19958
SUCTION
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123
SUPERCRITICAL WINGS
Experimental trim drag values for conventional and supercritical wings
[NASA-CR-168500] N82-17126
A wind tunnel study of the flutter characteristics of a supercritical wing
[NLR-MP-81002-U] N82-17129
SUPERHIGH FREQUENCIES
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations
A82-19858
Tracking of low-altitude targets by a combined X/Ka-band radar system
A82-20590
SUPERPLASTICITY
Superplastic aluminum evaluation
[AD-A107760] N82-17338
SUPERSONIC AIRCRAFT
STOL capability impact on advanced tactical aircraft design
[AIAA PAPER 81-2617] A82-19206
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19214
A new look at the Tupolev Tu-26 'Backfire'
A82-21191
Alleviation of the subsonic pitch-up of delta wings
[AIAA PAPER 82-0129] A82-22052
SUPERSONIC FLIGHT
Store separation from cavities at supersonic flight speeds
[AIAA PAPER 82-0372] A82-22096
SUPERSONIC FLOW
Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows
[ASME PAPER 81-DET-122] A82-19337
Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801
A split coefficient/locally monotonic scheme for multishocked supersonic flow
[AIAA PAPER 82-0287] A82-22082
Numerical calculation of lift, moment coefficient and dynamic stability derivatives on sideslipping wings in unsteady supersonic flows
A82-22111
A shock wave approach to the noise of supersonic propellers
[NASA-TM-82752] N82-16809
SUPERSONIC NOZZLES
The design of compact asymmetric maximum-thrust nozzles for a given lift force
A82-19814
Analytical study of twin-jet shielding
[NASA-CR-165102] N82-16801
SUPERSONIC SPEEDS
Noise of the SR-3 propeller model at 2 deg and 4 deg angle of attack
[NASA-TM-82738] N82-16808
SUPERSONIC WIND TUNNELS
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration
[AIAA PAPER 81-2620] A82-19207
SUPPLYING
Energy environment study
[NASA-CR-168458] N82-17654

SURFACE COOLING
Impingement cooling of concave surfaces of turbine airfoils
A82-18894
SURFACE EFFECT SHIPS
Accidents of surface effect ships and hydrofoil craft --- Russian book
A82-18899
SURFACE NAVIGATION
Land navigation with a low cost GPS receiver
A82-20656
SURFACE ROUGHNESS EFFECTS
Survey on the effect of blade surface roughness on compressor performance
N82-17191
SWEPT FORWARD WINGS
On the track of practical forward-swept wings
A82-19071
SWEPT WINGS
Analysis of an ideal-fluid flow past a finite-thickness wing
A82-19813
SWEPTBACK WINGS
Some experimental investigations on transonic flutter characteristics of thin plate wing models with sweptback and tapered tips
[NAL-TR-682] N82-16050
SYNTHETIC FUELS
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401
SYSTEM EFFECTIVENESS
Experience with flight simulators - Training effectiveness-future developments
[DGLR PAPER 81-110] A82-19263
Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments
A82-21587
The Global Positioning System Evaluator --- facility for testing in simulated wide range environments
A82-21588
SYSTEMS ENGINEERING
A fuel control system designers approach to gas turbine engine computer model validation
A82-19253
A progress report on the European Transonic Wind Tunnel Project
[ONERA, TP NO. 1981-121] A82-19737
Systems approach to the design of wind shear avionics
A82-21593
Propulsion system controls design and simulation
[AIAA PAPER 82-0322] A82-22091
Research and technology annual report, 1981
[NASA-TM-81333] N82-17081
SYSTEMS INTEGRATION
Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing
A82-20297
The FS2 RAE Bedford civil flight research programme --- on components and system integration for optimum ATC
A82-20519
The influence of technology advances on integrated CNI avionics --- Integrated Communication, Navigation, and Identification Avionics for military aircraft
A82-20672
Next generation military aircraft will require hierarchical/multilevel information transfer systems --- packet switching
N82-17114
Integrated control of mechanical system for future combat aircraft
N82-17117
SYSTEMS SIMULATION
Radar environment simulation for software test
A82-19245
Real-Time Simulation Computation System --- for digital flight simulation of research aircraft
A82-19260
The simulation study on a redundant flight control system
A82-22120
F/A-18 weapons system support facilities
N82-17120

T

TABLES (DATA)
BBC/Sulzer. 4 stage transonic compressor
N82-17197
TACAN
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 3: A comparison of waypoint guidance algorithms for RNAV/MLS transition
[NASA-CR-3512] N82-16060
TAIL ASSEMBLIES
Resonance tests on a Piper PA-32R tailplane before and after damage
[AD-A106273] N82-16071
Experimental trim drag values for conventional and supercritical wings
[NASA-CR-168500] N82-17126
TARGET ACQUISITION
Tracking of low-altitude targets by a combined X/Ka-band radar system
A82-20590
TARGET RECOGNITION
Radiometric measurements at 80 GHz
A82-18943
TECHNOLOGICAL FORECASTING
We have just begun to create efficient transport aircraft
A82-21373
The outlook for advanced transport aircraft
A82-21374
Very high speed integrated circuits: Into the second generation. II - Entering Phase 1
A82-21848
Air service, airport access and future technology
[PB82-105958] N82-16100
Flight dynamics technology development: Structures and dynamics, vehicle equipment/subsystems, flight control and aeromechanics
[AD-A096636] N82-17082
Next generation military aircraft will require hierarchical/multilevel information transfer systems --- packet switching
N82-17114
Helicopter development in France
N82-17216
TECHNOLOGY ASSESSMENT
Broader bandwidth for thin conformal antennas
A82-19069
Sea based support aircraft alternatives
[AIAA PAPER 81-2649] A82-19217
Thrust management - Current achievements and future developments
A82-20520
The effects on simulators of advances in aircraft technology
A82-20533
The influence of technology advances on integrated CNI avionics --- Integrated Communication, Navigation, and Identification Avionics for military aircraft
A82-20672
Airbus Industrie - The year of progress
A82-21189
The outlook for advanced transport aircraft
A82-21374
CAD/CAM approach to improving industry productivity gathers momentum
A82-21375
Systems study of transport aircraft incorporating advanced aluminum alloys
[NASA-CR-165820] N82-17153
Technology overview for advanced aircraft armament system program
[AD-A107680] N82-17155
Summary of answers to the questionnaire
N82-17195
TECHNOLOGY TRANSFER
A perspective on civil use of GPS
A82-21589
TECHNOLOGY UTILIZATION
VTOL as it applies to resource development in the Canadian north
[AIAA PAPER 81-2640] A82-19215
Application of the ABC helicopter to the emergency medical service role
[AIAA PAPER 81-2653] A82-19219

Computer graphics for quality assurance A82-20276

The application of strapdown inertial technology to Attitude and Heading Reference System requirements --- for YAH-64 advanced attack helicopter A82-21590

TEMPERATURE CONTROL

Calculation of sensitivity derivatives in thermal problems by finite differences A82-21391

TEMPERATURE DISTRIBUTION

Transient two-dimensional temperature distributions in air-cooled turbine blades A82-18893

TEMPERATURE MEASUREMENT

A study of potentially low cost millimetre-wave radiometric sensors A82-18942

Dilution jet behavior in the turn section of a reverse flow combustor [AIAA PAPER 82-0192] A82-20291

TENSILE STRESS

Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy A82-21636

TERMINAL BALLISTICS

Description of projectile threats N82-17161

Analysis methods for predicting structural response to projectile impact N82-17162

Analysis methods for ballistic damage size and type N82-17163

Damage from High explosive (HE) projectiles N82-17164

TERMINAL FACILITIES

New life for an 'old' body - Vienna's master plan for revitalization A82-20172

TERMINAL GUIDANCE

A terminal guidance simulator for evaluation of millimeter wave seekers A82-18937

Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 3: A comparison of waypoint guidance algorithms for RNAV/MLS transition [NASA-CR-3512] N82-16060

An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship [NASA-CR-152407] N82-16087

TERRAIN

Terrain model animation [AD-A107911] N82-17887

TERRAIN FOLLOWING AIRCRAFT

Automatic controlled terrain following flights A82-18920

TEST CHAMBERS

Calibration of the Ames Anechoic Facility. Phase 1: Short range plan [NASA-TM-84081] N82-16091

TEST EQUIPMENT

Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 27-29, 1980 A82-20751

Development of a simple, self-contained flight test data acquisition system A82-20756

Simulator data test instrumentation - Flight test challenge of the eighties A82-20768

TEST FACILITIES

Sanctuary radar --- with digital processor for Doppler filtering and pulse compression A82-18906

Helicopter icing spray system A82-20754

The Boeing Flight Test Data System 1980 A82-20769

Instrumentation remote 'mini' ground station A82-20770

The Global Positioning System Evaluator --- facility for testing in simulated wide range environments A82-21588

Development and laboratory testing of a thermal emission velocimeter for application to an erosion nose tip test facility [AD-A107713] N82-17482

THERMAL FATIGUE

Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy A82-21636

THERMAL PROTECTION

Calculation of sensitivity derivatives in thermal problems by finite differences A82-21391

THERMAL STABILITY

Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel A82-22241

THERMAL STRESSES

Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading A82-19928

THERMODYNAMIC CYCLES

Aerodynamic components for small turboshaft engines N82-17211

THERMODYNAMIC EFFICIENCY

The influence of new turbine technologies on their components N82-17210

The distress regime on the bimotored helicopter N82-17219

THERMOVISCOELASTICITY

Research and development program for non-linear structural modeling with advanced time-temperature dependent constitutive relationships [NASA-CR-165533] N82-16080

THIN AIRFOILS

Pade approximation applied to flow past thin airfoils A82-20728

THIN WALLED SHELLS

Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading A82-19928

Studies on the stability of thin-walled shells with cutouts /Review/. I A82-21629

THIN WINGS

Some experimental investigations on transonic flutter characteristics of thin plate wing models with sweptback and tapered tips [NAL-TR-682] N82-16050

THREAT EVALUATION

Threat perception while viewing single intruder conflicts on a cockpit display of traffic information [NASA-TM-81341] N82-16076

THREE DIMENSIONAL BOUNDARY LAYER

Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3 [AIAA PAPER 82-0289] A82-22083

THREE DIMENSIONAL FLOW

Three-dimensional calculation of the flow in helicopter air intakes [ONERA, TP NO. 1981-124] A82-19740

Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions [AIAA PAPER 82-0352] A82-19797

Flow visualization using a computerized data acquisition system A82-20792

A split coefficient/locally monotonic scheme for multishocked supersonic flow [AIAA PAPER 82-0287] A82-22082

Analytical study of twin-jet shielding development of a 3-dimensional model [NASA-CR-165100] N82-16805

THRUST AUGMENTATION

Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability [AIAA PAPER 81-2629] A82-19211

Performance flight test evaluation of the Ball-Bartoe JW-1 Jetwing STOL research aircraft A82-20762

THRUST CONTROL
Thrust modulation methods for a subsonic V/STOL aircraft
[AIAA PAPER 81-2633] A82-19213
Thrust management - Current achievements and future developments
A82-20520
THRUST DISTRIBUTION
Tests of a D vented thrust deflecting nozzle behind a simulated turbofan engine
[NASA-CR-3508] N82-17122
THRUST REVERSAL
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[AIAA PAPER 81-2612] A82-19203
STOL capability impact on advanced tactical aircraft design
[AIAA PAPER 81-2617] A82-19206
THRUST VECTOR CONTROL
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[AIAA PAPER 81-2612] A82-19203
Tactical STOL moment balance through innovative configuration technology
[AIAA PAPER 81-2615] A82-19204
Application of thrust vectoring for STOL
[AIAA PAPER 81-2616] A82-19205
STOL capability impact on advanced tactical aircraft design
[AIAA PAPER 81-2617] A82-19206
Design features of a sea-based multipurpose V/STOL, STOVL, and STOL aircraft in a support role for the U.S. Navy
[AIAA PAPER 81-2650] A82-19218
TILT ROTOR AIRCRAFT
Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model
[AIAA PAPER 81-2609] A82-19201
Analysis of selected VTOL concepts for a civil transportation mission
[AIAA PAPER 81-2655] A82-19220
Flexibility is offered by XV-15 tilt-rotor concept
A82-19300
TOLERANCES (MECHANICS)
Analysis and tolerance study of an array antenna for a new generation of secondary radars
A82-19521
Damage tolerant design for cold-section turbine engine disks
[AD-A107863] N82-17176
TORSIONAL VIBRATION
Helicopter propulsions systems. 1: Vibration prevention systems on helicopters 2: Problem of noise in the cabin
N82-17222
TRACKING RADAR
SIMATR - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars
A82-19256
TRADEOFFS
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042
TRAINING ANALYSIS
Report covering experience obtained at the German Lufthansa with respect to training involving the use of flight simulators
A82-19274
TRAINING DEVICES
Procurement of the new flight and tactics simulators - Experience, problems, meaning
[DGLR PAPER 81-095] A82-19266
Training in the flight and tactics simulator of the Navy Flight Squadron 3 'Graf Zeppelin'
[DGLR PAPER 81-109] A82-19273
TRAINING SIMULATORS
Experience with flight simulators - Training effectiveness-future developments
[DGLR PAPER 81-110] A82-19263
Cost efficiency versus objective fidelity in flight simulation
[DGLR PAPER 81-104] A82-19264
Properties of the new flight and tactics simulators
[DGLR PAPER 81-106] A82-19265
Requirements regarding digital external view systems for full mission flight and tactics simulators
[DGLR PAPER 81-100] A82-19267
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269
Report covering experience obtained at the German Lufthansa with respect to training involving the use of flight simulators
A82-19274
Experience and needs of civil and military flight simulator users; Proceedings of the Flight Simulation Symposium, London, England, April 7, 8, 1981
A82-20526
The simulator and the airline pilot
A82-20527
ASW and weapon system simulation with reference to the Nimrod MR Mk2 maritime crew trainer
A82-20531
Advanced simulation --- in commercial aviation
A82-20535
TRAJECTORIES
A generalized escape system simulation computer program: A user's manual
[AD-A106152] N82-16055
TRAJECTORY CONTROL
The use of adaptive control for helicopter trajectories in search operations
A82-19065
TRAJECTORY OPTIMIZATION
Piloted simulation of an on-board trajectory optimization algorithm
A82-20296
Automation of on-board flightpath management
[NASA-TM-84212] N82-16088
TRANSDUCERS
Current pressure measuring system in the transonic wind tunnel
[AD-A106272] N82-16096
A durable, intermediate temperature, direct reading heat flux transducer for measurements in continuous wind tunnels
[AD-A107729] N82-17483
TRANSIENT HEATING
Transient two-dimensional temperature distributions in air-cooled turbine blades
A82-18893
TRANSIENT RESPONSE
Problems of engine response during transient maneuvers
N82-17221
TRANSMISSION EFFICIENCY
Microwave systems for radar guided missiles
A82-18936
TRANSMISSIONS (MACHINE ELEMENTS)
Helicopter transmissions; Proceedings of the Symposium, London, England, February 6, 1980
A82-20540
Airworthiness of helicopter transmissions
A82-20541
Helicopter transmission philosophy - The way ahead
A82-20546
Helicopter Propulsion Systems
[AGARD-CP-302] N82-17203
Advanced transmission component development
N82-17214
TRANSOCEANIC FLIGHT
Consequences of American airline deregulation - Legislative theory in a concrete example
A82-19947
Gateway diversity and competition in international air transportation
A82-21474
TRANSONIC COMPRESSORS
BBC/Sulzer. 4 stage transonic compressor
N82-17127
The through flow calculations
N82-17199
TRANSONIC FLOW
Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions
[AIAA PAPER 82-0352] A82-19797
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[AIAA PAPER 82-0255] A82-22077
Deviation/turning angle correlations
N82-17193

Single stage transonic compressor and equivalent
plane cascade
N82-17196
TRANSONIC FLUTTER
Some experimental investigations on transonic
flutter characteristics of thin plate wing
models with sweptback and tapered tips
[NAL-TR-682] N82-16050
A wind tunnel study of the flutter characteristics
of a supercritical wing
[NLR-MP-81002-U] N82-17129
TRANSONIC SPEED
Subsonic and transonic roll damping measurements
on Basic Finner --- finned missile calibration
model
A82-19958
Wing-canard aerodynamics at transonic speeds -
Fundamental considerations on minimum drag
spanloads
[AIAA PAPER 82-0097] A82-22046
TRANSONIC WIND TUNNELS
A progress report on the European Transonic Wind
Tunnel Project
[ONERA, TP NO. 1981-121] A82-19737
Aerodynamics of a transport aircraft-type
wing-fuselage assembly
[ONERA, TP NO. 1981-122] A82-19738
Programs for the transonic wind tunnel data
processing installation. Part 9: Pressure
measurements updated
[AD-A106271] N82-16095
Current pressure measuring system in the transonic
wind tunnel
[AD-A106272] N82-16096
TRANSPORT AIRCRAFT
Analysis of selected VTOL concepts for a civil
transportation mission
[AIAA PAPER 81-2655] A82-19220
Aerodynamics of a transport aircraft-type
wing-fuselage assembly
[ONERA, TP NO. 1981-122] A82-19738
The prospects for liquid hydrogen fueled aircraft
A82-20137
Digital avionics - Advances in maintenance designs
[AIAA 81-2240] A82-20294
Design possibilities for improved fuel efficiency
of civil transport aircraft
A82-20514
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20674
Airbus Industrie - The year of progress
A82-21189
We have just begun to create efficient transport
aircraft
A82-21373
The outlook for advanced transport aircraft
A82-21374
Aerodynamic evaluation of winglets for transport
aircraft
[AIAA PAPER 81-1215] A82-22245
Symposium on commercial-aviation
energy-conservation strategies
[DE81-028406] N82-16057
Systems study of transport aircraft incorporating
advanced aluminum alloys
[NASA-CR-165820] N82-17153
TRAVELING WAVES
A practical approach to systems mode analysis ---
for disc-blade-shroud assemblies
[ASME PAPER 81-DET-130] A82-19344
TROPICAL REGIONS
Mapping in tropical forests - A new approach using
the laser APR --- Airborne Profile Recorder
A82-20407
TUNING
An investigation of dual mode phenomena in a
mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347
TUPOLEV AIRCRAFT
A new look at the Tupolev Tu-26 'Backfire'
A82-21191
TURBINE BLADES
Transient two-dimensional temperature
distributions in air-cooled turbine blades
A82-18893
Impingement cooling of concave surfaces of turbine
airfoils
A82-18894
Aeroelastic characteristics of a cascade of
mistuned blades in subsonic and supersonic flows
[ASME PAPER 81-DET-122] A82-19337
On the formulation of coupled/uncoupled dynamics
analyses of blade-disc assemblies
[ASME PAPER 81-DET-126] A82-19340
Optimal shape design of turbine blades
[ASME PAPER 81-DET-128] A82-19342
Investigation of vibration of shrouded turbine
blades
[ASME PAPER 81-DET-129] A82-19343
Measurement of the influence of flow distortions
on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348
Endwall boundary layer flows and losses in an
axial turbine stage
A82-20298
Improved plasma sprayed MCrAlY coatings for
aircraft gas turbine applications
A82-20742
TURBINE ENGINES
Aviation turbine fuel properties and their trends
A82-19623
Helicopter Propulsion Systems
[AGARD-CP-302] N82-17203
Development test programs adapted to helicopter
engines
N82-17205
The influence of new turbine technologies on their
components
N82-17210
Helicopter air inlets
N82-17217
TURBINE WHEELS
Optimum journal bearing parameters for minimum
rotor unbalance response in synchronous whirl
[ASME PAPER 81-DET-55] A82-19314
Natural frequencies of rotating bladed discs using
clamped-free blade modes
[ASME PAPER 81-DET-124] A82-19338
An investigation of dual mode phenomena in a
mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347
Dispersion and temperature-force dependence of the
high-temperature strength characteristics of a
gas-turbine-engine disk alloy
A82-21636
TURBINES
Roll up model for rotor wake vortices, part 5
[ASRL-TR-194-4] N82-17127
TURBOCOMPRESSORS
A computer program for variable-geometry
single-stage axial compressor test data analysis
(UD0400)
[AD-A106676] N82-16086
Through flow calculations in axial turbomachines
[AGARD-AR-175] N82-17178
Survey on diffusion factors and profile losses
N82-17186
End-wall boundary layer calculation methods
N82-17186
Correlation for secondary flows and clearance
effects
N82-17189
Effects of Reynolds number and turbulence level on
axial cascade performance
N82-17190
Axial compressor stall and surge
N82-17194
Summary of answers to the questionnaire
N82-17195
Single stage transonic compressor and equivalent
plane cascade
N82-17196
BBC/Sulzer. 4 stage transonic compressor
N82-17197
Results of calculations
N82-17198
The through flow calculations
N82-17199
Axial-flow turbomachine through flow calculation
methods
N82-17201
Blade-to-blade computations and boundary layer
corrections in axial compressors and turbines
N82-17202

TURBOFAN ENGINES
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19214
Energy management in military combat aircraft
A82-20515
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874
ALF502 - Plugging the turbofan gap
A82-21243
Tests of a D vented thrust deflecting nozzle behind a simulated turbofan engine
[NASA-CR-3508] N82-17122
CF6 jet engine performance improvement: High pressure turbine roundness
[NASA-CR-165555] N82-17174
Damage tolerant design for cold-section turbine engine disks
[AD-A107863] N82-17176
TURBOJET ENGINES
An application of total synthesis to robust coupled design --- turbojet engine control
A82-19061
TURBOMACHINE BLADES
Dynamic response of blades and vanes to wakes in axial turbomachinery
[ASME PAPER 81-DET-33] A82-19307
A practical approach to systems mode analysis --- for disc-blade-shroud assemblies
[ASME PAPER 81-DET-130] A82-19344
A parametric study of dynamic response of a discrete model of turbomachinery bladed disk
[ASME PAPER 81-DET-137] A82-19349
TURBOPROP AIRCRAFT
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070
A shock wave approach to the noise of supersonic propellers
[NASA-TM-82752] N82-16809
TURBOSHAFTS
Minimum cost performance monitoring of turboshaft engines
A82-20544
Design Criteria of the A 129 helicopter drive system
N82-17215
TURBULENCE
Effects of Reynolds number and turbulence level on axial cascade performance
N82-17190
TURBULENT JETS
Pressure dependence of jet noise and silencing of blow-offs
A82-20266
Can low-speed jet noise be predicted
A82-22222
TURBULENT WAKES
Dynamic response of blades and vanes to wakes in axial turbomachinery
[ASME PAPER 81-DET-33] A82-19307
TWO DIMENSIONAL FLOW
Effects of Reynolds number and turbulence level on axial cascade performance
N82-17190
TWO STAGE TURBINES
The two stage aero engine turbine
N82-17183

U

ULTRAHIGH FREQUENCIES
L-band power generation in the General Electric solid-state radar
A82-18914
ULTRASONIC TESTS
Ultrasonic method for flow field measurement in wind tunnel tests
A82-20054
The ultrasonic inspection of C.F.C. --- carbon fiber sine wave spars
[MDR-0465] N82-17513
UNCOUPLED MODES
On the formulation of coupled/uncoupled dynamics analyses of blade-disc assemblies
[ASME PAPER 81-DET-126] A82-19340
UNSTEADY FLOW
Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions
[AIAA PAPER 82-0352] A82-19797
Unsteady lifting-line theory with applications
[AIAA PAPER 82-0354] A82-19798
Basic studies of the flow fields of airfoil-flap-spoiler systems
[AIAA PAPER 82-0173] A82-22060
Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack
[AIAA PAPER 82-0351] A82-22094
Numerical calculation of lift, moment coefficient and dynamic stability derivatives on sideslipping wings in unsteady supersonic flows
A82-22111
Theory and experiment in unsteady aerodynamics
[NLR-MP-80046-U] N82-17128
UNSWEPT WINGS
Unsteady lifting-line theory with applications
[AIAA PAPER 82-0354] A82-19798
UPGRADING
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401
UPLINKING
ATCRBS uplink environment measurement near Jacksonville, Florida
[AD-A108053] N82-16063
URBAN PLANNING
The city and aviation --- Russian book
A82-18898
Noise impact on communities from aircraft
[GPO-80-617] N82-17655
URBAN TRANSPORTATION
Comparison of aircraft and ground vehicle noise levels in front and backyards of residences
A82-20058
USER REQUIREMENTS
A versatile data acquisition system for a low speed wind tunnel
[AD-A106269] N82-16097

V

V/STOL AIRCRAFT
Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model
[AIAA PAPER 81-2609] A82-19201
Experimental investigation of a jet inclined to a subsonic crossflow
[AIAA PAPER 81-2610] A82-19202
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration
[AIAA PAPER 81-2620] A82-19207
Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack
[AIAA PAPER 81-2621] A82-19208
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[AIAA PAPER 81-2627] A82-19210
Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability
[AIAA PAPER 81-2629] A82-19211
Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft
[AIAA PAPER 81-2631] A82-19212
Thrust modulation methods for a subsonic V/STOL aircraft
[AIAA PAPER 81-2633] A82-19213
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19214
Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft
[AIAA PAPER 81-2647] A82-19216
Sea based support aircraft alternatives
[AIAA PAPER 81-2649] A82-19217
Design features of a sea-based multipurpose V/STOL, STOVL, and STOL aircraft in a support role for the U.S. Navy
[AIAA PAPER 81-2650] A82-19218
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[AIAA PAPER 81-2663] A82-19221
AV-8B Harrier II
A82-21260
Scale-model studies for the improvement of flow patterns of a low-speed tunnel
[NASA-CR-169413] N82-17228

VANES
Dynamic response of blades and vanes to wakes in axial turbomachinery
[ASME PAPER 81-DET-33] A82-19307
VARIABILITY
Structure and variability of the Alboran Sea frontal system
A82-20447
VARIABLE SWEEP WINGS
A new look at the Tupolev Tu-26 'Backfire'
A82-21191
VELOCITY DISTRIBUTION
Roll up model for rotor wake vortices, part 5
[ASRL-TR-194-4] N82-17127
The two stage aero engine turbine
N82-17183
End-wall boundary layer calculation methods
N82-17188
VELOCITY MEASUREMENT
Experimental investigation of a jet inclined to a subsonic crossflow
[AIAA PAPER 81-2610] A82-19202
Non-steady velocity measurement of the wake of a helicopter rotor at low advance ratios
[AD-A107722] N82-17133
A velocity vector measuring system with 13 asymmetric wedge type yawmeters --- measuring flow distribution around the empennage of STOL models
[NAL-TR-674] N82-17477
Development and laboratory testing of a thermal emission velocimeter for application to an erosion nose tip test facility
[AD-A107713] N82-17482
VERTICAL AIR CURRENTS
Optimal dolphin hang glider flight
N82-17157
VERTICAL TAKEOFF AIRCRAFT
VTOL as it applies to resource development in the Canadian north
[AIAA PAPER 81-2640] A82-19215
Analysis of selected VTOL concepts for a civil transportation mission
[AIAA PAPER 81-2655] A82-19220
An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship
[NASA-CR-152407] N82-16087
VHF OMNIRANGE NAVIGATION
Investigation of Wilcox model 585B very high frequency omnidirectional radio range (VOR) system, part 3
[AD-A107855] N82-17149
VHSIC (CIRCUITS)
Very high speed integrated circuits: Into the second generation. II - Entering Phase 1
A82-21848
VIBRATION DAMPING
Balancing of flexible rotors by the complex modal method
[ASME PAPER 81-DET-46] A82-19310
VIBRATION EFFECTS
Resonance tests on a Piper PA-32R tailplane before and after damage
[AD-A106273] N82-16071
VIBRATION MEASUREMENT
Measurement of the influence of flow distortions on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348
On-site vibration measurement, dynamic tracking and balancing
A82-20545
Ice phobics blade tracking and comparison of vibration analysis techniques
[AD-A108121] N82-16074
VIBRATION METERS
On-site vibration measurement, dynamic tracking and balancing
A82-20545
VIBRATION MODE
Modal analysis using helicopter dynamic test data
[ASME PAPER 81-DET-30] A82-19306
Investigation of vibration of shrouded turbine blades
[ASME PAPER 81-DET-129] A82-19343
A practical approach to systems mode analysis --- for disc-blade-shroud assemblies
[ASME PAPER 81-DET-130] A82-19344
An investigation of dual mode phenomena in a mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347
Measurement of the influence of flow distortions on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348
A wind tunnel study of the flutter characteristics of a supercritical wing
[NLR-MP-81002-U] N82-17129
VIBRATION TESTS
Modal analysis using helicopter dynamic test data
[ASME PAPER 81-DET-30] A82-19306
VIBRATIONAL STRESS
Dynamic response of blades and vanes to wakes in axial turbomachinery
[ASME PAPER 81-DET-33] A82-19307
VISCOPLASTICITY
Research and development program for non-linear structural modeling with advanced time-temperature dependent constitutive relationships
[NASA-CR-165533] N82-16080
VISCOUS FLOW
Technical evaluation report of the AGARD Fluid Dynamics Panel Symposium on computation of viscous-inviscid interactions
[ONERA, TP NO. 1981-116] A82-19733
VISIBLE SPECTRUM
Spectrally balanced chromatic landing approach lighting system
[NASA-CASE-ARC-10990-1] N82-16059
VISION
The prevalence of visual deficiencies among 1979 general aviation accident airmen
[AD-A106489] N82-16054
VISUAL CONTROL
Spectrally balanced chromatic landing approach lighting system
[NASA-CASE-ARC-10990-1] N82-16059
VITRIFICATION
Development of in-can melting process and equipment, 1979 and 1980
[DE82-001050] N82-16834
VORTEX BREAKDOWN
Flow field around an oscillating airfoil
A82-20813
VORTEX GENERATORS
Alleviation of the subsonic pitch-up of delta wings
[AIAA PAPER 82-0129] A82-22052
Experimental study of delta wing leading-edge devices for drag reduction at high lift --- conducted in Langley 7- by 10-foot high speed tunnel
N82-17125
VORTEX SHEETS
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics
[AIAA PAPER 82-0095] A82-22045
VORTICES
Aerodynamic characteristics of waveriders at subsonic flight speeds
A82-19810
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics
[AIAA PAPER 82-0095] A82-22045
Roll up model for rotor wake vortices, part 5
[ASRL-TR-194-4] N82-17127
Finite difference computation of the conical flow field over a delta wing
[VKI-TN-140] N82-17135
VORTICITY
Roll up model for rotor wake vortices, part 5
[ASRL-TR-194-4] N82-17127
VORTICITY EQUATIONS
Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack
[AIAA PAPER 82-0351] A82-22094
VULCANIZING
US Naval fleet aircraft corrosion
N82-17350

W

WALL FLOW
End-wall boundary layer calculation methods
N82-17188

WALL PRESSURE
- A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls [NAL-TR-680] N82-17123

WARFARE
- SIMATE - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars A82-19256

WARHEADS
- Analysis methods for predicting structural response to projectile impact N82-17162

WARNING SYSTEMS
- Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines [AD-A106732] N82-16077
- Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase [AD-A107805] N82-17148

WASTE DISPOSAL
- Development of in-can melting process and equipment, 1979 and 1980 [DE82-001050] N82-16834

WASTE TREATMENT
- Development of in-can melting process and equipment, 1979 and 1980 [DE82-001050] N82-16834

WATER
- The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels A82-22198
- An airline view of the corrosion problem N82-17352
- The experience of corrosion on French military aerodynes N82-17355

WATERPROOFING
- Recent developments in materials and processes for aircraft corrosion control N82-17361

WAVE REFLECTION
- Ground reflection effects in aircraft noise measurements A82-19970

WAVEGUIDE ANTENNAS
- Leaky wave antenna using an inverted strip dielectric waveguide --- for aircraft application A82-19552

WEAPON SYSTEMS
- Tactical Radar Threat Generator system A82-18903
- ASW and weapon system simulation with reference to the Nimrod MR Mk2 maritime crew trainer A82-20531

WEAPONS DELIVERY
- Recent developments in military telemetry A82-18908
- Application of thrust vectoring for STOL [AIAA PAPER 81-2616] A82-19205

WEAR TESTS
- Corrosion fatigue behaviour of some aluminium alloys N82-17345
- Flight-by-flight corrosion fatigue tests N82-17348

WEATHER FORECASTING
- FAA/NWS aviation route forecast /ARF/ development [AIAA PAPER 82-0013] A82-22027
- Aircraft icing avoidance and protection [PB82-108135] N82-17139

WEIGHT REDUCTION
- Optimal shape design of turbine blades [ASME PAPER 81-DET-128] A82-19342
- Power system design optimization using Lagrange multiplier techniques A82-20743
- Boeing's bigger narrowbody A82-21190

WIDEBAND COMMUNICATION
- The influence of technology advances on integrated CNI avionics --- Integrated Communication, Navigation, and Identification Avionics for military aircraft A82-20672

WIND EFFECTS
- Optimal dolphin hang glider flight N82-17157

WIND PROFILES
- Numerical and flight simulator test of the flight deterioration concept [NASA-CR-3500] N82-16655

WIND SHEAR
- Systems approach to the design of wind shear avionics A82-21593
- Numerical and flight simulator test of the flight deterioration concept [NASA-CR-3500] N82-16655

WIND TUNNEL APPARATUS
- A progress report on the European Transonic Wind Tunnel Project [ONERA, TP NO. 1981-121] A82-19737
- A versatile data acquisition system for a low speed wind tunnel [AD-A106269] N82-16097
- A durable, intermediate temperature, direct reading heat flux transducer for measurements in continuous wind tunnels [AD-A107729] N82-17483

WIND TUNNEL CALIBRATION
- Calibration of the Ames Anechoic Facility. Phase 1: Short range plan [NASA-TM-84081] N82-16091

WIND TUNNEL MODELS
- Some experimental investigations on transonic flutter characteristics of thin plate wing models with sweptback and tapered tips [NAL-TR-682] N82-16050

WIND TUNNEL TESTS
- Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack [AIAA PAPER 81-2621] A82-19208
- Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle [AIAA PAPER 81-2627] A82-19210
- Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft [AIAA PAPER 81-2631] A82-19212
- Thrust modulation methods for a subsonic V/STOL aircraft [AIAA PAPER 81-2633] A82-19213
- Design features of a sea-based multipurpose V/STOL, STOVL, and STOL aircraft in a support role for the U.S. Navy [AIAA PAPER 81-2650] A82-19218
- Subsonic and transonic roll damping measurements on Basic Finner --- finned missile calibration model A82-19958
- Ultrasonic method for flow field measurement in wind tunnel tests A82-20054
- Alleviation of the subsonic pitch-up of delta wings [AIAA PAPER 82-0129] A82-22052
- Isolated nacelle performance - Measurement and simulation [AIAA PAPER 82-0134] A82-22054
- Aerodynamic characteristics of airfoils with ice accretions [AIAA PAPER 82-0282] A82-22081
- Store separation from cavities at supersonic flight speeds [AIAA PAPER 82-0372] A82-22096
- Aerodynamic characteristics of maneuvering flaps A82-22110
- Aerodynamic evaluation of winglets for transport aircraft [AIAA PAPER 81-1215] A82-22245
- Summary of theoretical considerations and wind tunnel tests of an aerodynamic spoiler for stall proofing a general aviation airplane [NASA-CR-165100] N82-16046
- Some experimental investigations on transonic flutter characteristics of thin plate wing models with sweptback and tapered tips [NAL-TR-682] N82-16050
- Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report [NASA-CR-165500] N82-16081

Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel
[NASA-TM-81343] N82-16083
Experimental verification of an aerodynamic parameter optimization program for wind tunnel testing
[AD-A107727] N82-17134
A velocity vector measuring system with 13 asymmetric wedge type yawmeters --- measuring flow distribution around the empennage of STOL models
[NAL-TR-674] N82-17477

WIND TUNNELS
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091
A versatile data acquisition system for a low speed wind tunnel
[AD-A106269] N82-16097

WINDMILLS (WINDPOWERED MACHINES)
Rotor model for the verification of computational methods
[ISD-275] N82-17638
Static investigations of rotor blades under deadweight and during stationary operation
[ISD-269] N82-17639
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling
[ISD-270] N82-17640
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling
[ISD-271] N82-17641
Static and dynamic investigations for the model of a wind rotor
[ISD-272] N82-17642

WINDPOWERED GENERATORS
Loading cycles and material data for the layout of a wind turbine of special hub concept
[ISD-273] N82-17643

WING CAMBER
Experimental trim drag values for conventional and supercritical wings
[NASA-CR-168500] N82-17126

WING LOADING
Wing-canard aerodynamics at transonic speeds - Fundamental considerations on minimum drag spanloads
[AIAA PAPER 82-0097] A82-22046
Integration of a code for aeroelastic design of conventional and composite wings into ACSYNT, an aircraft synthesis program --- wing aeroelastic design (WADES)
[NASA-CR-137805] N82-16069
Ground calibration of a strain-gauged CT-4A aircraft (1979)
[AD-A107847] N82-16073

WING NACELLE CONFIGURATIONS
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[AIAA PAPER 82-0255] A82-22077

WING OSCILLATIONS
A simplified wing procedure in connection with the lifting line theory and the doublet-lattice method
A82-19195
The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory
A82-19198
Unsteady lifting-line theory with applications
[AIAA PAPER 82-0354] A82-19798
Flow field around an oscillating airfoil
A82-20813
Numerical calculation of lift, moment coefficient and dynamic stability derivatives on sideslipping wings in unsteady supersonic flows
A82-22111

WING PANELS
Bolted field repair of graphite/epoxy wing skin laminates
A82-20981

WING PLANFORMS
A simplified wing procedure in connection with the lifting line theory and the doublet-lattice method
A82-19195
Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions
[AIAA PAPER 82-0352] A82-19797
Blade planform for a quiet helicopter
[NASA-CR-166256] N82-17121

WING PROFILES
Analysis of an ideal-fluid flow past a finite-thickness wing
A82-19813
High angle-of-attack characteristics of three-surface fighter aircraft --- canard-wing-horizontal tail configuration for greater stability and control
[AIAA PAPER 82-0245] A82-22074

WING SLOTS
Experimental study of delta wing leading-edge devices for drag reduction at high lift --- conducted in Langley 7- by 10-foot high speed tunnel
N82-17125

WINGLETS
Aerodynamic evaluation of winglets for transport aircraft
[AIAA PAPER 81-1215] A82-22245

WINGS
Integration of a code for aeroelastic design of conventional and composite wings into ACSYNT, an aircraft synthesis program --- wing aeroelastic design (WADES)
[NASA-CR-137805] N82-16069
Theory and experiment in unsteady aerodynamics
[NLR-MP-80046-U] N82-17128
Experimental verification of an aerodynamic parameter optimization program for wind tunnel testing
[AD-A107727] N82-17134

WORKLOADS (PSYCHOPHYSIOLOGY)
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269

X

XV-11A AIRCRAFT
A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research
A82-20764

XV-15 AIRCRAFT
Flexibility is offered by XV-15 tilt-rotor concept
A82-19300

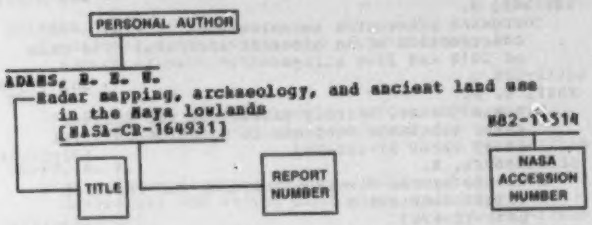
Y

YAW
A velocity vector measuring system with 13 asymmetric wedge type yawmeters --- measuring flow distribution around the empennage of STOL models
[NAL-TR-674] N82-17477

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 148)* MAY 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ABBOTT, W. Y.
Ice phobics blade tracking and comparison of vibration analysis techniques
[AD-A108121] N82-16074

ABEYOUNIS, W. K.
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[AIAA PAPER 82-0255] A82-22077

ABRAMS, L. R.
Differential Omega system development and evaluation
[AD-A107857] N82-17146

ADKINS, A.
Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase
[AD-A107805] N82-17148

AHMADI, A. R.
Unsteady lifting-line theory with applications
[AIAA PAPER 82-0354] A82-19798

AICHER, W.
Rotor model for the verification of computational methods
[ISD-275] N82-17638

ALBRECHT, C.
Engine/drive/airframe compatibility: A way of life N82-17220

ALDERMAN, J.
Technology overview for advanced aircraft armament system program
[AD-A107680] N82-17155

ALIAGA, D.
Corrosion fatigue behaviour of some aluminium alloys N82-17345

ALLEN, J.
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19214

ALVERYD, A.
Ambulance helicopter in the Stockholm archipelago A82-19005

ANDERSON, D. A.
A split coefficient/locally monotonic scheme for multishocked supersonic flow
[AIAA PAPER 82-0287] A82-22082

ANSELL, G. S.
Composite structural materials
[NASA-CR-165121] N82-16182

AOYAGI, K.
Experimental investigation of a jet inclined to a subsonic crossflow
[AIAA PAPER 81-2610] A82-19202
Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability
[AIAA PAPER 81-2629] A82-19211

ARGYRIS, J. H.
Rotor model for the verification of computational methods
[ISD-275] N82-17638
Static investigations of rotor blades under deadweight and during stationary operation
[ISD-269] N82-17639
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling
[ISD-270] N82-17640
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling
[ISD-271] N82-17641
Static and dynamic investigations for the model of a wind rotor
[ISD-272] N82-17642
Loading cycles and material data for the layout of a wind turbine of special hub concept
[ISD-273] N82-17643

ARKIND, K. D.
Broader bandwidth for thin conformal antennas A82-19069

ARP, H.
Mapping in tropical forests - A new approach using the laser APR A82-20407

ARTHUR, S.
Ice phobics blade tracking and comparison of vibration analysis techniques
[AD-A108121] N82-16074

ATENCIO, A., JR.
Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel
[NASA-TM-81343] N82-16083

ATHOTT, H. H.
Aeromedical evacuation: Results, analysis, developments; International Aeromedical Evacuation Congress, 1st, Munich, West Germany, September 16-19, 1980, Reports A82-19001

AUER, L. M.
Helicopter secondary applications for neurotraumatic emergencies A82-19015

AUMILLER, B.
Airborne measurements with a sensitive high resolution 90 GHz radiometer A82-18940

AUSHERMAN, D. W.
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3
[AIAA PAPER 82-0289] A82-22083

AVERY, J. G.
Design Manual for impact damage tolerant aircraft structure
[AGARD-AG-238] N82-17160

AZAGOURY, N.
The use of adaptive control for helicopter trajectories in search operations A82-19065

AZUMA, T.
Balancing of flexible rotors by the complex modal method
[ASME PAPER 81-DET-46] A82-19310

B

BADER, B. B.
Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093

BACKMANN, G.
Future requirements for helicopter propulsion systems
N82-17225

BAILEY, D. B.
Studies of modern technology airships for maritime patrol applications
A82-20554

BALKE, H.-J.
Properties of the new flight and tactics simulators
[DGLR PAPER 81-106] A82-19265
Procurement of the new flight and tactics simulators - Experience, problems, meaning
[DGLR PAPER 81-095] A82-19266

BANKS, D. W.
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[AIAA PAPER 81-2612] A82-19203

BARADAT, J.
The effects on simulators of advances in aircraft technology
A82-20533

BARNA, P. S.
Scale-model studies for the improvement of flow patterns of a low-speed tunnel
[NASA-CR-169413] N82-17228

BARVINSKII, A. P.
Aircraft electrical equipment - Design and operation
A82-18998

BATES, R. W.
A study of potentially low cost millimetre-wave radiometric sensors
A82-18942

BAVUSO, S. J.
Methodology for measurement of fault latency in a digital avionic miniprocessor
N82-17105

BECKMANN, J.
Measurement of the influence of flow distortions on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348

BEDROSSIAN, H.
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351

BEEBY, W.
The future of integrated CAD/CAM systems - The Boeing perspective
A82-20278

BELCHER, G.
Operability of military aircraft - Avionic design aspects
A82-20564

BELL, W. H.
Investigation of Wilcox model 585B very high frequency omnidirectional radio range (VOR) system, part 3
[AD-A107855] N82-17149

BELLAMY, R. A.
Development of a correlated finite element dynamic model of a complete aero engine
[ASME PAPER 81-DET-74] A82-19326

BELTE, D.
Helicopter icing spray system
A82-20754

BENNETT, G.
A study of the suitability of the all fiberglass XV-11A aircraft for fuel efficient general aviation flight research
A82-20764

BENNETT, J. C.
Development of a correlated finite element dynamic model of a complete aero engine
[ASME PAPER 81-DET-74] A82-19326

BERDNIK, B. I.
The city and aviation
A82-18898

BERGH, H.
Theory and experiment in unsteady aerodynamics
[NLR-MP-80046-U] N82-17128

BERSON, B. L.
Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines
[AD-A106732] N82-16077

BERTHAULT, D.
Helicopter development in France
N82-17216

BETEILLE, R.
The outlook for advanced transport aircraft
A82-21374

BEVALOT, J.
Corrosion prevention measures used in the construction of an aircraft airframe: The case of 2014 and 2214 alloys
N82-17360

BHAT, R. B.
Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl
[ASME PAPER 81-DET-55] A82-19314

BIERTUEMPFEL, R.
A simple hybrid visual simulation for research flight simulators
[ESA-TT-690] N82-17232

BILLING, T.
R.F. calibrators for Doppler radars
A82-18917

BILLMANN, B.
Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase
[AD-A107805] N82-17148

BIPPES, H.
Visualization of flow separation and separated flows with the aid of hydrogen bubbles
A82-20803

BISHOP, H. E.
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042

BJORKLUND, W. J.
Development of in-can melting process and equipment, 1979 and 1980
[DE82-001050] N82-16834

BODAPATI, S.
Basic studies of the flow fields of airfoil-flap-spoiler systems
[AIAA PAPER 82-0173] A82-22060

BOHLMANN, R. E.
Bolted field repair of graphite/epoxy wing skin laminates
A82-20981

BOIZARD, B.
Three-dimensional calculation of the flow in helicopter air intakes
[ONERA, TP NO. 1981-124] A82-19740

BOOKER, J. L.
Terrain model animation
[AD-A107911] N82-17887

BOOZE, C. F., JR.
The prevalence of visual deficiencies among 1979 general aviation accident airmen
[AD-A106489] N82-16054

BORLAND, C. J.
Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions
[AIAA PAPER 82-0352] A82-19797

BORODACH, A. I.
The city and aviation
A82-18898

BOTMAN, S.
Dynamic response of blades and vanes to wakes in axial turbomachinery
[ASME PAPER 81-DET-33] A82-19307

BOUCEK, G. P.
Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines
[AD-A106732] N82-16077

BOWLES, J. V.
Analysis of selected VTOL concepts for a civil transportation mission
[AIAA PAPER 81-2655] A82-19220

BRADFIELD, G. W.
Design features of a sea-based multipurpose V/STOL, STOVL, and STOL aircraft in a support role for the U.S. Navy
[AIAA PAPER 81-2650] A82-19218

BRAGG, M. B.
Aerodynamic characteristics of airfoils with ice accretions
[AIAA PAPER 82-0282] A82-22081
BRAMAN, K.
Technology overview for advanced aircraft armament system program
[AD-A107680] N82-17155
BRAMER, G. B. J.
Aircraft for secondary long range emergency ambulance flight
A82-19021
BRAMMER, K.
Functional versus communication structures in modern avionic systems
N82-17092
BRAMMER, F. A. H.
Intake design with particular reference to ice protection and particle separators
N82-17218
BRAUN, K. A.
Static investigations of rotor blades under deadweight and during stationary operation
[ISD-269] N82-17639
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling
[ISD-271] N82-17641
Static and dynamic investigations for the model of a wind rotor
[ISD-272] N82-17642
Loading cycles and material data for the layout of a wind turbine of special hub concept
[ISD-273] N82-17643
BRAYBROOK, R.
AV-8B Harrier II
A82-21260
BREAKEY, K. M.
A generalized escape system simulation computer program: A user's manual
[AD-A106152] N82-16055
BREE, H. G.
Future requirements for helicopter propulsion systems
N82-17225
BREWER, G. D.
The prospects for liquid hydrogen fueled aircraft
A82-20137
BRIDGES, P. D.
Determining performance parameters of general aviation aircraft
A82-20759
BRISMAR, B.
Ambulance helicopter in the Stockholm archipelago
A82-19005
BROCKSTEIN, A. J.
Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments
A82-21587
BROMLEY, G. R.
General aviation fuel consevation in the 1980's
A82-20757
BROOKS, R.
Technology overview for advanced aircraft armament system program
[AD-A107680] N82-17155
BROWN, P. W.
Spin tests of a single-engine, high-wing light airplane
[NASA-TP-1927] N82-16068
BROWNE, G. T.
US Naval fleet aircraft corrosion
N82-17350
BROWNING, R. G. R.
Preliminary design study of a hybrid airship for flight research
[NASA-CR-166246] N82-17152
BUDILLON, E.
Corrosion fatigue behaviour of some aluminium alloys
N82-17345
BUEHLER, C.
Helicopters - Night operations
A82-19017
BULL, G.
Determining performance parameters of general aviation aircraft
A82-20759
BULYGIN, I. P.
Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy
A82-21636
BURCHAM, F. W.
Multiple pure tone elimination strut assembly
[NASA-CASE-FRC-11062-1] N82-16800
BURKAM, J. E.
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042
BURNS, J. P.
Mapping in tropical forests - A new approach using the laser APR
A82-20407
BURNS, T. F.
Experimental studies of the Eppler 61 airfoil at low Reynolds numbers
[AIAA PAPER 82-0345] A82-19796

C

CAFARELLI, N. J.
Systems approach to the design of wind shear avionics
A82-21593
CALAPODAS, N.
Modal analysis using helicopter dynamic test data
[ASME PAPER 81-DET-30] A82-19306
CALISE, A. J.
Piloted simulation of an on-board trajectory optimization algorithm
A82-20296
CANAL, E.
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report
[NASA-CR-165500] N82-16081
CARBONE, R. E.
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations
A82-19858
CAREY, R. P.
Ground calibration of a strain-gauged CT-4A aircraft (1979)
[AD-A107847] N82-16073
CARLIN, C. M.
Propulsion system controls design and simulation
[AIAA PAPER 82-0322] A82-22091
CARRODUS, J. A.
An independent view of where civil simulation should be headed
A82-20537
CHACON, A.
The use of adaptive control for helicopter trajectories in search operations
A82-19065
CHAMBERLIN, R.
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874
CHANG, J. B.
Methods and models for predicting fatigue crack growth under random loading
A82-20506
Random spectrum fatigue crack life predictions with or without considering load interactions
A82-20512
CHASE, W. D.
Spectrally balanced chromatic landing approach lighting system
[NASA-CASE-ARC-10990-1] N82-16059
CHENEY, R. E.
Structure and variability of the Alboran Sea frontal system
A82-20447
CHENG, J.
Impingement cooling of concave surfaces of turbine airfoils
A82-18854
CHERNIKOV, V. I.
The city and aviation
A82-18898
CHEVALIER, H. L.
Summary of theoretical considerations and wind tunnel tests of an aerodynamic spoiler for stall proofing a general aviation airplane
[NASA-CR-165100] N82-16046

CHISHOLM, B. C.
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report
[NASA-CR-165500] N82-16081

CHU, L.-C.
Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack
[AIAA PAPER 82-0351] A82-22094

CIEPLUCH, C. C.
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874

CLARK, J. A.
Fuel property effects on radiation intensities in a gas turbine combustor
A82-19966

CLARKE, R.
Development of a simple, self-contained flight test data acquisition system
A82-20756

CLEMENTS, P. C.
Function specifications for the A-7E Function Driver module
[AD-A107922] N82-17173

COCHRANE, J. A.
Quiet Short-Haul Research Aircraft - The first 3 years of flight research
[AIAA PAPER 81-2625] A82-19209

CONNOLLY, J. H.
Maintenance posture for quick start
[AD-A107553] N82-17177

COOK, C. E.
Relay-augmented data links in an interference environment
A82-20684

COOK, C. H.
Damage tolerant design for cold-section turbine engine disks
[AD-A107863] N82-17176

COOK, M. J.
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079

COOKE, R. A.
A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions
[AIAA PAPER 82-0261] A82-22079

COPE, R. D.
Design of the composite spar-wingskin joint
A82-20128

COPELAND, J. L.
Research through simulation
[NASA-FACTS-125] N82-16092

COPLIN, J. F.
The outlook for advanced transport aircraft
A82-21374

CORE, C. M., JR.
F-16 ground and inflight icing testing
A82-20753

COSTOLLOE, S. P.
Ground calibration of a strain-gauged CT-4A aircraft (1979)
[AD-A107847] N82-16073

CRAMPAGNE, R.
Leaky wave antenna using an inverted strip dielectric waveguide
A82-19552

CRAWFORD, C. C., JR.
Aircraft turbine engine development: Current practices and new priorities
N82-17206

CRAWFORD, M. A.
Experimental verification of an aerodynamic parameter optimization program for wind tunnel testing
[AD-A107727] N82-17134

CRAWFORD, W. J., III
Aircraft turbine engine development: Current practices and new priorities
N82-17206

CREEKMORE, R.
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[AIAA PAPER 81-2663] A82-19221

CRISTIANI, S. J.
KC-135 avionics modernization hot bench - An evaluation of requirements and design for the future
A82-19244

CROOK, J. L.
Isolated nacelle performance - Measurement and simulation
[AIAA PAPER 82-0134] A82-22054

CROOM, M. A.
High angle-of-attack characteristics of three-surface fighter aircraft
[AIAA PAPER 82-0245] A82-22074

CSURI, C.
Terrain model animation
[AD-A107911] N82-17887

CURRY, W. H.
Utilization of hybrid computational equipment for the simulation of parachute system flight
A82-19234

CURTICE, W. L., III
Simulator data test instrumentation - Flight test challenge of the eighties
A82-20768

D

DABBADIE, H.
The distress regime on the bimotored helicopter
N82-17219

DAHLIN, J. A.
Aerodynamic evaluation of winglets for transport aircraft
[AIAA PAPER 81-1215] A82-22245

DAHLIN, K. E.
Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel
A82-22241

DALTON, A. T.
The application of condition monitoring
A82-20542

DANIEL, S. R.
Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel
A82-22240

Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel
A82-22241

DARLOW, M. S.
Application of the principle of reciprocity to flexible rotor balancing
[ASME PAPER 81-DET-49] A82-19311

DAULERIO, L. A.
A generalized escape system simulation computer program: A user's manual
[AD-A106152] N82-16055

DAVIS, J. W.
Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades
A82-20524

DAYWITT, J. E.
A split coefficient/locally monotonic scheme for multishocked supersonic flow
[AIAA PAPER 82-0287] A82-22082

DEDIEU, J. P.
The distress regime on the bimotored helicopter
N82-17219

DEL MAR, A.
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269

DELUCCIA, J. J.
Recent developments in materials and processes for aircraft corrosion control
N82-17361

DENTON, J. D.
Through flow calculations in axial turbomachines
[AGARD-AR-175] N82-17178

DI FAUSTO, M.
Analysis and tolerance study of an array antenna for a new generation of secondary radars
A82-19521

DIAL, R. C.
Study of air compressor hazards in underground and surface mines
[PB82-105164] N82-17597

DIBLEY, H. P. K.
Operational and performance aspects of fuel management in civil aircraft
A82-20518

DICKMANNS, E. D.
Optimal dolphin hang glider flight
N82-17157

DILLE, J. R.
The prevalence of visual deficiencies among 1979 general aviation accident airmen
[AD-A106489] N82-16054

DINI, D.
Problems of engine response during transient maneuvers
N82-17221

DISTELMAIER, H.
Cost efficiency versus objective fidelity in flight simulation
[DGLR PAPER 81-104] A82-19264

DITTMAR, J. H.
Noise of the SR-3 propeller model at 2 deg and 4 deg angle of attack
[NASA-TM-82738] N82-16808
A shock wave approach to the noise of supersonic propellers
[NASA-TM-82752] N82-16809

DOBLAR, R. A.
Structure and variability of the Alboran Sea frontal system
A82-20447

DOBLE, G. S.
Fabrication of boron/aluminum fan blades for SCR engines
[NASA-CR-165294] N82-16176

DOBRZYNSKI, W. M.
Ground reflection effects in aircraft noise measurements
A82-19970

DODGE, L. G.
The sooting tendency of fuels containing polycyclic aromatics in a research combustor
[AIAA PAPER 82-0299] A82-19791

DOERFEL, G.
Cost efficiency versus objective fidelity in flight simulation
[DGLR PAPER 81-104] A82-19264

DOLLYHIGH, S. M.
We have just begun to create efficient transport aircraft
A82-21373

DOMINICK, F. I.
Ice phobics blade tracking and comparison of vibration analysis techniques
[AD-A108121] N82-16074

DOMINY, J.
Mechanical advances in the design of small turboshaft engines
N82-17208

DORUK, M.
Some observations on the corrosion of aircraft at the air force base in Bandirma, Turkey
N82-17353

DRAIGOR, M. D.
Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading
A82-19928

DRING, R. P.
Boundary layer transition and separation on a compressor rotor airfoil
A82-20299

DUDEK, K. P.
An application of total synthesis to robust coupled design
A82-19061

DUDLEY, M. D.
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration
[AIAA PAPER 81-2620] A82-19207

DUDLEY, M. R.
Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model
[AIAA PAPER 81-2609] A82-19201

DUNSMORE, S. R. B.
Microwave communications to remotely piloted vehicles
A82-18911

DUQUETTE, D. J.
Mechanisms of corrosion fatigue
N82-17343

DURLING, A. E.
An analysis of antijam communication requirements in fading media
A82-20695

DURSTON, D. A.
Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft
[AIAA PAPER 81-2647] A82-19216

DZIUBZYNSKI, R.
A simplified wing procedure in connection with the lifting line theory and the doublet-lattice method
A82-19195

E

EASTMAN, S. E.
Air service, airport access and future technology
[PB82-105958] N82-16100

ECKARD, G. J.
Tactical STOL moment balance through innovative configuration technology
[AIAA PAPER 81-2615] A82-19204

EICHELBERGER, J. E.
Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093

EISENMANN, J. R.
Improving composite bolted joint efficiency by laminate tailoring
A82-20902

ELLIS, S. R.
Threat perception while viewing single intruder conflicts on a cockpit display of traffic information
[NASA-TM-81341] N82-16076

ELLISON, R. L.
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079

ELSTON, S. T.
Development of a correlated finite element dynamic model of a complete aero engine
[ASME PAPER 81-DET-74] A82-19326

ENGLE, R. M., JR.
Crack growth behavior of center-cracked panels under random spectrum loading
A82-20511

ENGLER, R. H.
Ultrasonic method for flow field measurement in wind tunnel tests
A82-20054

ENSLOW, P. H., JR.
Distributed data processing: What is it?
N82-17087

ERDMANN, F.
A simple hybrid visual simulation for research flight simulators
[ESA-TT-690] N82-17232

ERZBERGER, H.
Automation of on-board flightpath management
[NASA-TM-84212] N82-16080

ESCHENBACH, R.
Land navigation with a low cost GPS receiver
A82-20656

EULER, H. C.
A perspective on civil use of GPS
A82-21589

EVANS, J. E.
Experimental measurement of the low angle terrain scattering interference environment
A82-20588
Comparison of various elevation angle estimation techniques
A82-20589

EVANS, R. E.
A fuel control system designers approach to gas turbine engine computer model validation
A82-19253

F

FALARSKI, M. D.
Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model
[AIAA PAPER 81-2609] A82-19201
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration
[AIAA PAPER 81-2620] A82-19207

FANG, B.
Aerodynamic characteristics of maneuvering flaps
A82-22110

FASCHING, W. A.
CF6 jet engine performance improvement: High pressure turbine roundness
[NASA-CR-165555] N82-17174

FAULKNER, L. L.
Prediction of aircraft interior noise using the statistical energy analysis method
[ASME PAPER 81-DET-102] A82-19332

FEDOROVA, E. T.
Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading
A82-19928

FERNANDEZ, B.
The use of adaptive control for helicopter trajectories in search operations
A82-19065

FETTER, J. L.
Real-Time Simulation Computation System
A82-19260

FIDELL, S.
Community sensitivity to changes in aircraft noise exposure
[NASA-CR-3490] N82-16807

FINK, F.
Forecasting corrosion damage and maintenance costs for large aircraft
N82-17357

FINN, P.
A program to evaluate a control system based on feedback of aerodynamic pressure differentials
[NASA-CR-163466] N82-16089

FISCHER, F. W.
Aeronautical Information Data Subsystem (AIDS): A ground-based component of air navigation services systems
N82-17150

FISHER, E. A.
Brittle materials design, high temperature gas turbine
[AD-A106670] N82-16085

FITREMANN, J. M.
Can low-speed jet noise be predicted
A82-22222

FLEMING, F. L.
Sanctuary radar
A82-18906

FLETCHER, J.
Operability of military aircraft - Some design and cost trends
A82-20565

FLORA, G.
The helicopter in rescue operations in high-mountain areas
A82-19019

FORSTER, F.
Digital Avionics Information System (DAIS) documentation
[AD-A108000] N82-17172

FOSTER, J. D.
Analysis of selected VTOL concepts for a civil transportation mission
[AIAA PAPER 81-2655] A82-19220

FRESCO, J.
Development test programs adapted to helicopter engines
N82-17205

FRIEDMAN, R.
Aviation turbine fuel properties and their trends
A82-19623

FRINK, N. T.
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics
[AIAA PAPER 82-0095] A82-22045

FRINT, H. K.
Advanced transmission component development
N82-17214

FRUMKIN, H. A.
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401

FUJISAKI, N. T.
The emerging need for improved helicopter navigation
A82-21591

FULTON, R. E.
CAD/CAM approach to improving industry productivity gathers momentum
A82-21375

G

GALLINGTON, R.
Flow visualization using a computerized data acquisition system
A82-20792

GARAVAGLIA, A.
Design Criteria of the A 129 helicopter drive system
N82-17215

GATTINONI, G.
Design Criteria of the A 129 helicopter drive system
N82-17215

GE, I.
Transient two-dimensional temperature distributions in air-cooled turbine blades
A82-18893

GEBHART, J. L.
Tactical Radar Threat Generator system
A82-18903

GEMMA, W. R.
Military assistance to safety and traffic /MAST/
A82-19006

GENKIN, G. I.
Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading
A82-19928

GENOUX, G.
Helicopter propulsions systems. 1: Vibration prevention systems on helicopters 2: Problem of noise in the cabin
N82-17222

GERHOLD, C. H.
Analytical study of twin-jet shielding
[NASA-CR-165102] N82-16801
Analytical study of twin-jet shielding
[NASA-CR-165103] N82-16802
Analytical study of twin-jet shielding
[NASA-CR-165104] N82-16803
Analytical study of twin-jet shielding
[NASA-CR-165105] N82-16804
Analytical study of twin-jet shielding development of a 3-dimensional model
[NASA-CR-165106] N82-16805
Analytical study of twin-jet shielding two-dimensional model
[NASA-CR-165107] N82-16806

GIAMATI, C. C.
Application of image processing techniques to fluid flow data analysis
[NASA-TM-82760] N82-16049

GIANSANTE, N.
Modal analysis using helicopter dynamic test data
[ASME PAPER 81-DET-30] A82-19306

GIBBINS, M. N.
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-3502] N82-16178

GIBBS, S. E.
Microwave communications to remotely piloted vehicles
A82-18911

GIBBER, J. W.
Size reduction flight test airborne data systems
A82-20766

GILBERT, G. A.
Helicopters and Navstar/GPS
A82-21592

GILSTER, G. W.
The application of strapdown inertial technology to Attitude and Heading Reference System requirements
A82-21590

GIRAUD, M.
The influence of new turbine technologies on their components
N82-17210

GLASS, B.
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269

GODFREY, M. F.
Microwave systems for radar guided missiles
A82-18936

GOKA, T.
An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship
[NASA-CR-152407] N82-16087

GOLDMAN, A.
Resonance tests on a Piper PA-32R tailplane before and after damage
[AD-A106273] N82-16071

GOLUD, J.
SIMATR - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars
A82-19256

GOLUBOVSKII, E. P.
Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy
A82-21636

GORSTEIN, M.
Air service, airport access and future technology
[PB82-105958] N82-16100

GOTT, V. W.
Computer graphics for quality assurance
A82-20276

GRAFTON, S. B.
High angle-of-attack characteristics of three-surface fighter aircraft
[AIAA PAPER 82-0245] A82-22070

GRAHAM, L. J.
Standardization study for advanced aircraft armament system program
[AD-A107681] N82-17156

GREBER, I.
Dilution jet behavior in the turn section of a reverse flow combustor
[AIAA PAPER 82-0192] A82-20291

GREELEY, D. M.
SIMATR - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars
A82-19256

GREGOREK, G. M.
Aerodynamic characteristics of airfoils with ice accretions
[AIAA PAPER 82-0282] A82-22081

GREGORY, R.
Digital Avionics Information System (DAIS) documentation
[AD-A108000] N82-17172

GRETHEL, R. J.
Calibrated and uncalibrated inertial navigation system performance in valid and jammed global positioning system environments
A82-21587

GRIEB, H.
Regenerative helicopter engines: Advances in performance and expected development problems
N82-17212

GRIESBACH, J. C.
Mapping in tropical forests - A new approach using the laser APR
A82-20407

GRIGORENKO, IA. N.
Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading
A82-19928

GRUENER, K.
Airborne measurements with a sensitive high resolution 90 GHz radiometer
A82-18940

GUE, K.
Transient two-dimensional temperature distributions in air-cooled turbine blades
A82-18893

GUELDENPFENNIG, F.
Requirements regarding digital external view systems for full mission flight and tactics simulators
[DGLR PAPER 81-100] A82-19267

GUPTA, D. K.
Improved plasma sprayed NCrAlY coatings for aircraft gas turbine applications
A82-20742

GUPTA, N. K.
Analytical control law for desirable aircraft lateral handling qualities
A82-21941

H

HADJILOGIOU, J.
Implementation of the recommendations made on the technical report titled analysis of advanced simulator for pilot training
[AD-A106779] N82-16094

HAFTKA, R. T.
Calculation of sensitivity derivatives in thermal problems by finite differences
A82-21391

HAGEMAIER, D. J.
Low-frequency eddy current inspection of aircraft structure
A82-21900

HAKANSON, J. W.
Initial F-18 carrier suitability testing
A82-20752

HALYO, N.
Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing
A82-20297

HANNS, J. E.
Application of thrust vectoring for STOL
[AIAA PAPER 81-2616] A82-19205

HAMILTON, C. W.
Superplastic aluminum evaluation
[AD-A107760] N82-17338

HANSON, D. C.
Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines
[AD-A106732] N82-16077

HARPSTER, W. T.
Tactical Radar Threat Generator system
A82-18903

HART, K. J.
Mechanical advances in the design of small turboshaft engines
N82-17208

HARVEY, J. F.
A versatile data acquisition system for a low speed wind tunnel
[AD-A106269] N82-16097

HASS, W.-D.
The procurement of flight simulators at the German Lufthansa
[DGLR PAPER 81-093] A82-19268

HEDLUND, E. R.
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3
[AIAA PAPER 82-0289] A82-22083

HEGER, R.
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269

HEMINWAY, R. C.
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042

HERTZ, T. J.
On the track of practical forward-swept wings
A82-19071

HESSEL, A.
Automatic controlled terrain following flights
A82-18920

HEWELL, J. G., JR.
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070

HICKEY, D.
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091

HILDEBRAND, P. H.
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations
A82-19858
HILL, W. G.
Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model
[AIAA PAPER 81-2609] A82-19201
HIRSCH, C.
Through flow calculations in axial turbomachines
[AGARD-AR-175] N82-17178
HITCHCOCK, L.
Simulation of advanced cockpits
A82-19259
HOEPPNER, D. W.
Fracture mechanics based modelling of the corrosion fatigue process
N82-17344
HOFFMAN, D. J.
Environmental exposure effects on composite materials for commercial aircraft
[NASA-CR-3502] N82-16178
HOLBROOK, G. E.
Helicopter propulsion systems: Past, present and future
N82-17204
HOLDER, P. A. R.
R.F. calibrators for Doppler radars
A82-18917
HOLTON, L. K.
Development of in-can melting process and equipment, 1979 and 1980
[DE82-001050] N82-16834
HOPKINS, R.
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091
HORNER, W. D.
Radar environment simulation for software test
A82-19245
HORONJEFF, R.
Community sensitivity to changes in aircraft noise exposure
[NASA-CR-3490] N82-16807
HOSHIO, H.
A velocity vector measuring system with 13 asymmetric wedge type yawmeters
[NAL-TR-674] N82-17477
HOUROUZIADIS, J.
Advanced component development design basis for next generation medium power helicopter engines
N82-17209
HOUSER, B. J.
Development and laboratory testing of a thermal emission velocimeter for application to an erosion nose tip test facility
[AD-A107713] N82-17482
HOUWINK, R.
A wind tunnel study of the flutter characteristics of a supercritical wing
[NLR-MP-81002-U] N82-17129
HOWARD, W. D.
CF6 jet engine performance improvement: High pressure turbine roundness
[NASA-CR-165555] N82-17174
HOWELL, G.
Analysis of data from a wind tunnel investigation of a large-scale model of a highly maneuverable supersonic V/STOL fighter - STOL configuration
[AIAA PAPER 81-2620] A82-19207
HU, B.
Aerodynamic characteristics of maneuvering flaps
A82-22110
HUDSON, C. M.
Methods and models for predicting fatigue crack growth under random loading
A82-20506
HUDSON, R. E., JR.
STOL capability impact on advanced tactical aircraft design
[AIAA PAPER 81-2617] A82-19206
HUESCHEN, R. M.
Development of a digital integrated automatic landing system /DIALS/ for steep approach and landing
A82-20297
HUETTNER, C. H.
Advanced simulation
A82-20535
HUGHES, C. W.
Pre-design study for a modern four-bladed rotor for the Rotor System Research Aircraft (RSRA)
[NASA-CR-166154] N82-16043
HUNT, P. J.
Movement in Category III conditions
A82-20221
HUNTER, I. H.
Endwall boundary layer flows and losses in an axial turbine stage
A82-20298
HURET, M. N.
The experience of corrosion on French military aerodynes
N82-17355

I

IINUMA, K.
The airship - Its application and promotional activity
A82-20555
INALHAN, A.
On the Corrosion problems of the TAF F-5 aircraft
N82-17354
ISHIHARA, T.
Visualization of laminar separation by oil film method
A82-20811
IUSHAKOVA, F. V.
Dispersion and temperature-force dependence of the high-temperature strength characteristics of a gas-turbine-engine disk alloy
A82-21636
IWANAGA, S.
Visualization of laminar separation by oil film method
A82-20811
IZAKSON, A. M.
Soviet helicopter construction /2nd revised and enlarged edition/
A82-18874

J

JACKSON, D. I.
Operability of military aircraft - Avionic design aspects
A82-20564
JACOBS, P. F.
Experimental trim drag values for conventional and supercritical wings
[NASA-CR-168500] N82-17126
JAGGER, D. H.
Design possibilities for improved fuel efficiency of civil transport aircraft
A82-20514
JAMES, R.
System for providing an integrated display of instantaneous information relative to aircraft attitude, heading, altitude, and horizontal situation
[NASA-CASE-FRC-11005-1] N82-16075
JERACKI, R. J.
Noise of the SR-3 propeller model at 2 deg and 4 deg angle of attack
[NASA-TM-82738] N82-16808
JOHNSON, H. R.
Damage tolerant design for cold-section turbine engine disks
[AD-A107863] N82-17176
JOHNSON, T. D., JR.
Alleviation of the subsonic pitch-up of delta wings
[AIAA PAPER 82-0129] A82-22052
Experimental study of delta wing leading-edge devices for drag reduction at high lift
N82-17125
JOHNSON, W. S.
Multi-parameter yield zone model for predicting spectrum crack growth
A82-20510
JONES, D. I. G.
A parametric study of dynamic response of a discrete model of turbomachinery bladed disk
[ASME PAPER 81-DET-137] A82-19349

JONES, R. T.
The outlook for advanced transport aircraft
A82-21374
JONES, R. W.
The FS2 RAE Bedford civil flight research programme
A82-20519

K

KANDA, H.
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123
KANDIL, O. A.
Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack
[AIAA PAPER 82-0351] A82-22094
KARAMCHETI, K.
Basic studies of the flow fields of airfoil-flap-spoiler systems
[AIAA PAPER 82-0173] A82-22060
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091
KARASAWA, T.
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123
KARKALIK, F. G.
Differential Omega system development and evaluation
[AD-A107857] N82-17146
KARL, F.
Rotor model for the verification of computational methods
[ISD-275] N82-17638
KAUFMAN, H.
Parallel computation for developing nonlinear control procedures
[AD-A107914] N82-17227
KAZA, K. R. V.
Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows
[ASME PAPER 81-DET-122] A82-19337
KELLY, R. J.
MLS flare low elevation angle guidance considerations
A82-20586
KERLEY, R. V.
A history of aircraft piston engine lubricants
A82-19622
KETCHAM, S. J.
Recent developments in materials and processes for aircraft corrosion control
N82-17361
KEYS, C. N.
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042
KHAIRULLINA, A. IA.
The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels
A82-22198
KHAMZAEV, A. D.
Analysis of an ideal-fluid flow past a finite-thickness wing
A82-19813
KHOBAIB, M.
New concepts in multifunctional corrosion for aircraft and other systems
N82-17362
KHOROSHILOV, V. N.
Automated calculation of the stressed state of shell systems under asymmetrical mechanical and thermal loading
A82-19928
KIDD, C. T.
A durable, intermediate temperature, direct reading heat flux transducer for measurements in continuous wind tunnels
[AD-A107729] N82-17483
KIELB, R. E.
Aeroelastic characteristics of a cascade of mistuned blades in subsonic and supersonic flows
[ASME PAPER 81-DET-122] A82-19337
KIM, M. D.
Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801
KIMBERLIN, R. D.
Performance flight test evaluation of the Ball-Bartoe JW-1 Jetwing STOL research aircraft
A82-20762
KIRCHGAESSNER, B.
Static investigations of rotor blades under deadweight and during stationary operation
[ISD-269] N82-17639
Stability and response to gravity of the flap lag motion for a rigid rotor blade with flap-pitch coupling
[ISD-270] N82-17640
Dynamic analysis of a rotor blade with flap and lag freedom and flap-pitch coupling
[ISD-271] N82-17641
Static and dynamic investigations for the model of a wind rotor
[ISD-272] N82-17642
KLAVER, L. J.
Tracking of low-altitude targets by a combined X/Ka-band radar system
A82-20590
KLEIN, R. W.
Control law development for a close-coupled canard, relaxed static stability fighter
[AIAA PAPER 82-0180] A82-19784
KLINGNER, D.
Problems pertaining to aeronautical technology in the case of rescue operations with helicopters in mountainous areas
A82-19018
KLUSSMANN, W.
Regenerative helicopter engines: Advances in performance and expected development problems
N82-17212
KNIPPLE, R.
The history of aviation turbine lubricants
A82-19624
KOBAYASHI, T.
Visualization of laminar separation by oil film method
A82-20811
KOENIG, D. G.
Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability
[AIAA PAPER 81-2629] A82-19211
KOROLEVICH, A. N.
The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels
A82-22198
KOROTKIN, I. M.
Accidents of surface effect ships and hydrofoil craft
A82-18899
KOUTSOYANNIS, S. P.
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091
KOZLOVA, F. G.
Aircraft electrical equipment - Design and operation
A82-18998
KRAAN, A. N.
A wind tunnel study of the flutter characteristics of a supercritical wing
[NLR-MP-81002-U] N82-17129
KRAFT, G. A.
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874
KREIDER, H. D.
Advanced component development design basis for next generation medium power helicopter engines
N82-17209
KREMPSKI, R. E.
STOL capability impact on advanced tactical aircraft design
[AIAA PAPER 81-2617] A82-19206
KRYTER, K. D.
Comparison of aircraft and ground vehicle noise levels in front and backyards of residences
A82-20058

KUEMMERLE, W.
Rotor model for the verification of computational methods
[ISD-275] N82-17638
KUGLER, G.
The network of civilian air rescue in Germany
A82-19004
KUO, P. S.
On the formulation of coupled/uncoupled dynamics analyses of blade-disc assemblies
[ASME PAPER 81-DET-126] A82-19340

L

LABERGE, E. F. C.
MLS flare low elevation angle guidance considerations
A82-20586
LAFON, G.
A new look at the Tupolev Tu-26 'Backfire'
A82-21191
LAJAIN, H.
Corrosion protection schemes for aircraft structures: Some examples for the corrosion behaviour of Al alloys
N82-17364
LAMAGNA, F.
Air service, airport access and future technology
[PB82-105958] N82-16100
LANCASTER, J. D.
A CAD/CAM graphics system with relative datums and tolerances
[ASME PAPER 81-DET-108] A82-19333
LANCASTER, P. A.
Integrated control of mechanical system for future combat aircraft
N82-17117
LANDAHL, M.
Roll up model for rotor wake vortices, part 5
[ASRL-TR-194-4] N82-17127
LAPINS, M.
Control law development for a close-coupled canard, relaxed static stability fighter
[AIAA PAPER 82-0180] A82-19784
LARSON, D. E.
Development of in-can melting process and equipment, 1979 and 1980
[DE82-001050] N82-16834
LAVERY, G. T.
The simulator and the airline pilot
A82-20527
LAW, C. H.
A computer program for variable-geometry single-stage axial compressor test data analysis (UD0400)
[AD-A106676] N82-16086
LE BALLEUR, J. C.
Technical evaluation report of the AGARD Fluid Dynamics Panel Symposium on computation of viscous-inviscid interactions
[ONERA, TP NO. 1981-116] A82-19733
LEAVENS, J. M., JR.
The outlook for advanced transport aircraft
A82-21374
LEE, D.
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report
[NASA-CR-165500] N82-16081
LEE, D. J.
The control of aircraft gas turbines for fuel economy
A82-20516
LEE, F.
Land navigation with a low cost GPS receiver
A82-20656
LEE, F. C.
Power system design optimization using Lagrange multiplier techniques
A82-20743
LEFFLER, M. F.
Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines
[AD-A106732] N82-16077
LEMARCHAL, F.
The use of flight simulators in l'Armee de l'Air
A82-20528
LEONHARDT, J. L.
Improving composite bolted joint efficiency by laminate tailoring
A82-20982
LEVINE, L. S.
Application of the ADC helicopter to the emergency medical service role
[AIAA PAPER 81-2653] A82-19219
LEVY, B. B.
SIMATR - An air battle simulation of the USAF Tactical Air Control System /TACS/ with Advanced Tactical Radars
A82-19256
LEVY, D. W.
A program to evaluate a control system based on feedback of aerodynamic pressure differentials
[NASA-CR-163466] N82-16089
LEWIS, C. H.
Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801
LEWIS, D.
An alternative approach to engineering structures using monitoring systems
N82-17223
LI, P.-Z.
Pressure dependence of jet noise and silencing of blow-offs
A82-20266
LIBESKIND, M.
Bolted field repair of graphite/epoxy wing skin laminates
A82-20981
LIEBIG, K.
The situation of air rescue in Argentina
A82-19010
LIGHTFOOT, R. N.
VTOL as it applies to resource development in the Canadian north
[AIAA PAPER 81-2640] A82-19215
LINDENBAUM, S. P.
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070
LIPPAY, A. L.
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269
LIPPERT, G. O. F.
Air ambulance systems in the Republic of South Africa
A82-19009
LIPSHITZ, A.
Dilution jet behavior in the turn section of a reverse flow combustor
[AIAA PAPER 82-0192] A82-20291
LIST, U.
Data base generation for digital external view systems
[DGLR PAPER 81-101] A82-19270
LIU, K.-W.
Random spectrum fatigue crack life predictions with or without considering load interactions
A82-20512
LLOYD-JONES, D. J.
The outlook for advanced transport aircraft
A82-21374
LOEWY, R. G.
Composite structural materials
[NASA-CR-165121] N82-16182
LOGAN, A. H.
Pre-design study for a modern four-bladed rotor for the Rotor System Research Aircraft (RSRA)
[NASA-CR-166154] N82-16043
LOUSTALET, H.
The influence of new turbine technologies on their components
N82-17210
LUCKRING, J. M.
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics
[AIAA PAPER 82-0095] A82-22045
LUIDENS, R. W.
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19214

LYNN, R. R.
Helicopter propulsion systems: Past, present and future
N82-17204
LYONS, J. W.
Energy management in military combat aircraft
A82-20515

M

MA, D.-Y.
Pressure dependence of jet noise and silencing of blow-offs
A82-20266
MABBERLEY, J. C.
A simulator assessment of a wide field of view head-up display for presenting a FLIR sensor image during low level navigation and ground attack missions
[AIAA PAPER 82-0261] A82-22079
MABRY, J. H.
Graphics in numerical control - The user's challenge
A82-20277
MACBAIN, J. C.
An investigation of dual mode phenomena in a mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347
MACK, M. D.
Basic studies of the flow fields of airfoil-flap-spoiler systems
[AIAA PAPER 82-0173] A82-22060
MADDOX, W. J., JR.
The case for helicopter hoisting
A82-21597
MAGLIERI, D. J.
We have just begun to create efficient transport aircraft
A82-21373
MAHONEY, M. W.
Superplastic aluminum evaluation
[AD-A107760] N82-17338
MALKUS, D. S.
Calculation of sensitivity derivatives in thermal problems by finite differences
A82-21391
MANN, D.
Fracture mechanics based modelling of the corrosion fatigue process
N82-17344
MANNI, C.
Survey of aeromedical evacuation in Italy
A82-19003
MARLER, W. E.
A CAD/CAM graphics system with relative datums and tolerances
[ASME PAPER 81-DET-108] A82-19333
MARSHALL, R.
Terrain model animation
[AD-A107911] N82-17887
MARTIN, J.
Very high speed integrated circuits: Into the second generation. II - Entering Phase 1
A82-21848
MARTIN, J. T.
The effect of increasingly more complex aircraft and avionics on the method of system design
N82-17088
MARTORELLA, R. P.
Control law development for a close-coupled canard, relaxed static stability fighter
[AIAA PAPER 82-0180] A82-19784
MARTZ, J. W.
The aircraft manufacturer's needs as a simulator user
A82-20530
MARZE, H. J.
Helicopter propulsions systems. 1: Vibration prevention systems on helicopters 2: Problem of noise in the cabin
N82-17222
MARZOLINI, R. G. A.
Recent developments in military telemetry
A82-18908
MASON, R. C.
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079
MASON, R. S.
Laser communications via an atmospheric link
A82-20615
MASON, W. H.
Wing-canard aerodynamics at transonic speeds - Fundamental considerations on minimum drag spanloads
[AIAA PAPER 82-0097] A82-22086
MAUREL, D.
A reconfigurable change network for distributed process control
N82-17108
MCCABE, T.
NAVSTAR global positioning systems
A82-20601
MCCARTHY, J.
Numerical and flight simulator test of the flight deterioration concept
[NASA-CR-3500] N82-16655
MCCARTHY, J. F., JR.
NASA research activities in aeropropulsion
[NASA-TM-82788] N82-16084
MCCUEN, J. W.
Next generation military aircraft will require hierarchical/multilevel information transfer systems
N82-17114
MCGOUGH, J. C.
Methodology for measurement of fault latency in a digital avionic miniprocessor
N82-17105
MCKIE, J.
Comparison of acoustic data from a 102 mm conic nozzle as measured in the RAE 24-foot wind tunnel and the NASA Ames 40- by 80-foot wind tunnel
[NASA-TM-81343] N82-16083
MCKINNON, M.
Flight simulation consoles, aid or obstruction - Objective evaluation of control consoles of modern flight and tactics simulators
[DGLR PAPER 81-097] A82-19269
MCLACHLAN, B.
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091
MCLEAN, A. F.
Brittle materials design, high temperature gas turbine
[AD-A106670] N82-16085
MCLOUGHLIN, V. C. R.
Corrosion control measures for military aircraft: Present UK requirements and future developments
N82-17350
MCTIGUE, T. V.
F/A-18A tactical airborne computational subsystem
N82-17119
MCVICKER, J. P.
Systems approach to the design of wind shear avionics
A82-21593
MEIER, J.
A European airline's future simulator requirements
A82-20536
MELEASON, E. T.
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874
MELLIAR-SMITH, P. M.
Hierarchical specification of the SIFT fault tolerant flight control system
N82-17106
MELNIKOV, B. N.
The city and aviation
A82-18898
MEMERY, J. P.
A CAD/CAM graphics system with relative datums and tolerances
[ASME PAPER 81-DET-108] A82-19333
MERAUD, C.
A reconfigurable change network for distributed process control
N82-17108
MEYER, W. L.
Prediction of sound radiation from different practical jet engine inlets
[NASA-CR-165120] N82-16810

MIHALOEW, J. R.
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[AIAA PAPER 81-2663] A82-19221

MILLARD, S. E.
Radiometric measurements at 80 GHz
A82-18943

MILLER, G. K., JR.
An analytical technique for the analysis of airplane spin entry and recovery
[AIAA PAPER 82-0243] A82-19786

MILLER, V. R.
Prediction of aircraft interior noise using the statistical energy analysis method
[ASME PAPER 81-DET-102] A82-19332

MINECK, D. W.
Digital avionics - Advances in maintenance designs
[AIAA 81-2240] A82-20294

MINTER, E. A.
Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack
[AIAA PAPER 81-2621] A82-19208

MIRANDA, L. R.
A perspective of computational aerodynamics from the viewpoint of airplane design applications
[AIAA PAPER 82-0018] A82-22028

MITCHELL, B. G.
An airline view of the corrosion problem
N82-17352

MITCHELL, T. R.
FAA/NWS aviation route forecast /ARF/ development
[AIAA PAPER 82-0013] A82-22027

MOERDER, D. D.
Piloted simulation of an on-board trajectory optimization algorithm
A82-20296

MONK, P. W. C.
A surveillance airship for the New Zealand environment
A82-20558

MOREL, J. P.
A progress report on the European Transonic Wind Tunnel Project
[ONERA, TP NO. 1981-121] A82-19737

MORGAN, M.
An investigation of multi-axis isometric side-arm controllers in a variable stability helicopter
[AD-A106759] N82-17226

MORLEY, B. M.
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size
A82-21386

MORRIS, A. W.
Corrosion control test method for avionic components
[AD-A108061] N82-17171

MOSES, C. A.
The sooting tendency of fuels containing polycyclic aromatics in a research combustor
[AIAA PAPER 82-0299] A82-19791

MOSES, K.
SIFT: An ultra-reliable avionic computing system
N82-17115

MOUL, T. M.
Spin tests of a single-engine, high-wing light airplane
[NASA-TP-1927] N82-16068

MOWFORTH, E.
An introduction to the airship
A82-20552

MOXEY, C.
Integrated control of mechanical system for future combat aircraft
N82-17117

MUEHLBAUER, J. C.
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070

MUELLER, H.
Rotor model for the verification of computational methods
[ISD-275] N82-17638

MUELLER, T. J.
Experimental studies of the Eppler 61 airfoil at low Reynolds numbers
[AIAA PAPER 82-0345] A82-19796

MULLEN, J., JR.
Integration of a code for aeroelastic design of conventional and composite wings into ACSYNT, an aircraft synthesis program
[NASA-CR-137805] N82-16069

MUNK, R.
Skyship 500 - The development of a modern production airship
A82-20559

MURTHY, H. S.
Subsonic and transonic roll damping measurements on Basic Finner
A82-19958

MUSZYNSKA, A.
A parametric study of dynamic response of a discrete model of turbomachinery bladed disk
[ASME PAPER 81-DET-137] A82-19349

N

NAEGELI, D. W.
The sooting tendency of fuels containing polycyclic aromatics in a research combustor
[AIAA PAPER 82-0299] A82-19791

NAGY, F., JR.
ATCRBS uplink environment measurement near Jacksonville, Florida
[AD-A108053] N82-16063

NAKAI, E.
Some experimental investigations on transonic flutter characteristics of thin plate wing models with sweptback and tapered tips
[NAL-TR-682] N82-16050

NAKAYA, T.
A velocity vector measuring system with 13 asymmetric wedge type yawmeters
[NAL-TR-674] N82-17477

NARENDRAN, G.
Pade approximation applied to flow past thin airfoils
A82-20728

NASTASE, A.
Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow
A82-19197

NATSUME, A.
Flow field around an oscillating airfoil
A82-20813

NAVARRO, R. R.
Development of a computer based presentation of non-steady helicopter rotor flows
[AD-A108107] N82-17131

NELMS, W. P.
Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft
[AIAA PAPER 81-2631] A82-19212
Concept definition and aerodynamic technology studies for single-engine V/STOL fighter/attack aircraft
[AIAA PAPER 81-2647] A82-19216

NELSON, D. P.
Isolated nacelle performance - Measurement and simulation
[AIAA PAPER 82-0134] A82-22054

NEWMAN, J. C., JR.
A crack-closure model for predicting fatigue crack growth under aircraft spectrum loading
A82-20509

NEWMAN, L. C.
Requirements for instrument approaches to converging runways
[AD-A108075] N82-17144
Survey of 101 US airports for new multiple instrument approach concepts
[AD-A107812] N82-17229

NGUYEN, L. T.
High angle-of-attack characteristics of three-surface fighter aircraft
[AIAA PAPER 82-0245] A82-22074

NICOLAI, C.
Octave bandwidth dual polarized antenna
A82-18934

NIEDERMAYER, E. J.
Airworthiness of airships
A82-20557

NIELSEN, N. B.
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size
A82-21386

NIGHTINGALE, S. J.
A study of potentially low cost millimetre-wave radiometric sensors
A82-18942

NIKIFORUK, P. N.
Analytical control law for desirable aircraft lateral handling qualities
A82-21941

NIVERT, L. J.
Studies of modern technology airships for maritime patrol applications
A82-20554

NIXON, J.
Instrumentation remote 'mini' ground station
A82-20770

NOGUCHI, H.
A velocity vector measuring system with 13 asymmetric wedge type yawmeters
[NAL-TR-674] N82-17477

NORED, D. L.
Advanced subsonic transport propulsion
[AIAA PAPER 81-0811] A82-20874

NORVIEL, V.
Numerical and flight simulator test of the flight deterioration concept
[NASA-CR-3500] N82-16655

NOWAK, M.
A simplified wing procedure in connection with the lifting line theory and the doublet-lattice method
A82-19195

O

OBERMEIER, E. K.
Tornado-avionic development testing
A82-20760

OBRYAN, G.
Technology overview for advanced aircraft armament system program
[AD-A107680] N82-17155

OETTING, J. D.
An analysis of antijam communication requirements in fading media
A82-20695

OGARKOV, V. N.
Airport radar systems
A82-18975

OHTA, H.
Analytical control law for desirable aircraft lateral handling qualities
A82-21941

OLNINIK, T. V.
The use of Doppler spectroscopy to study the characteristics of the polydisperse characteristics of emulsion water and solid microimpurities in aviation fuels
A82-22198

ONEILL, T. F.
F/A-18 weapons system support facilities
N82-17120

OREAR, D. J.
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401

ORTEGA, J. C.
Comparison of aircraft and ground vehicle noise levels in front and backyards of residences
A82-20058

OSHIMA, Y.
Flow field around an oscillating airfoil
A82-20813

OVEREND, W. J.
The outlook for advanced transport aircraft
A82-21374

OYE, R. A.
X-band vs C-band aircraft radar - The relative effects of beamwidth and attenuation in severe storm situations
A82-19858

P

PADELLEC, L.
Leaky wave antenna using an inverted strip dielectric waveguide
A82-19552

PADILLA, C.
The use of adaptive control for helicopter trajectories in search operations
A82-19065

PADILLA, R.
The use of adaptive control for helicopter trajectories in search operations
A82-19065

PALKO, R. L.
Experimental verification of an aerodynamic parameter optimization program for wind tunnel testing
[AD-A107727] N82-17134

PALMER, E.
Threat perception while viewing single intruder conflicts on a cockpit display of traffic information
[NASA-TM-81341] N82-16076

PARAMOUR, M. D.
Future technology and requirements for helicopter engines
N82-17207

PARKE, F. I.
Investigation and evaluation of a computer program to minimize three-dimensional flight time tracks
[NASA-CR-168419] N82-17879

PARKS, E. K.
Analysis of flight test measurements in ground effect
A82-20763

PATZ, G. L.
Conductive prepregs for lightning strike protection on aircraft
A82-20523

PAULSON, J. W., JR.
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[AIAA PAPER 81-2612] A82-19203

PEARSONS, K.
Community sensitivity to changes in aircraft noise exposure
[NASA-CR-3490] N82-16807

PELOSI, G.
Analysis and tolerance study of an array antenna for a new generation of secondary radars
A82-19521

PENNETT, G.
The Global Positioning System Evaluator
A82-21508

PENNISI, F. J.
Improved plasma sprayed NCrAlY coatings for aircraft gas turbine applications
A82-20742

PEREVEZENTSEV, L. T.
Airport radar systems
A82-18975

PETKUS, L. L.
Development of in-can melting process and equipment, 1979 and 1980
[DE82-001050] N82-16834

PHATAK, A. V.
An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship
[NASA-CR-152407] N82-16087

PHILLIPS, C. A.
Evaluation of the design, construction and operation of a gas fueled engine driven heat pump
[ENG-034] N82-17459

PHELPS, H.
The helicopter in rescue operations in high-mountain areas
A82-19019

PHOENIX, B.
Application of structural optimization technique to reduce the external vibrations of a gas-turbine engine
[ASME PAPER 81-DET-143] A82-19351

PIERSOL, A. G.
Analytical prediction of aerospace vehicle vibration environments
[ASME PAPER 81-DET-29] A82-19305

PINES, S.
  Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 3: A comparison of waypoint guidance algorithms for RNAV/MLS transition [NASA-CR-3512] N82-16060
  Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 2: RNAV/MLS transition problems for aircraft [NASA-CR-3511] N82-17142
PIPES, R. B.
  Design of the composite spar-wingskin joint A82-20128
PISANO, A.
  Ground effect hover characteristics of a large-scale twin tilt-nacelle V/STOL model [AIAA PAPER 81-2609] A82-19201
PLATE, K.
  The significance of electronics for air traffic control at the present time and in the future A82-19649
PO-CHEDLEY, D. A.
  Aircraft alerting systems standardization study. Volume 2: Aircraft alerting system design guidelines [AD-A106732] N82-16077
POTH, G. E.
  Tactical STOL moment balance through innovative configuration technology [AIAA PAPER 81-2615] A82-19204
PREOBRAZHENSKII, I. N.
  Studies on the stability of thin-walled shells with cutouts /Review/. I A82-21629
PRESZ, W. M., JR.
  Isolated nacelle performance - Measurement and simulation [AIAA PAPER 82-0134] A82-22054
PRICE, D. B.
  Piloted simulation of an on-board trajectory optimization algorithm A82-20296
PRIESTLEY, R. T.
  Sea based support aircraft alternatives [AIAA PAPER 81-2649] A82-19217
PYE, C. R.
  Detection and prevention of corrosion in Royal Air Force aircraft N82-17351

Q

QUEAU, J. P.
  Optimal shape design of turbine blades [ASME PAPER 81-DET-128] A82-19342
QUINN, B.
  Resonance tests on a Piper PA-32R tailplane before and after damage [AD-A106273] N82-16071
QUINTO, P. F.
  Thrust-induced effects on low-speed aerodyramics of fighter aircraft [AIAA PAPER 81-2612] A82-19203

R

RABONE, D. J.
  Intake design with particular reference to ice protection and particle separators N82-17218
RAM, D. S. J.
  Blade planform for a quiet helicopter [NASA-CR-166256] N82-17121
RANDALL, C. C.
  Turboprop cargo aircraft systems study [NASA-CR-165813] N82-16070
RANDALL, T. M.
  Color graphics based real-time telemetry processing system A82-20771
RANKEN, M. B. F.
  Offshore uses of the airship A82-20553
RAO, D. M.
  Alleviation of the subsonic pitch-up of delta wings [AIAA PAPER 82-0129] A82-22052
RAO, J. S.
  Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl [ASME PAPER 81-DET-55] A82-19314
RAWLINGS, R. C.
  The FS2 RAE Bedford civil flight research programme A82-20519
RAYMER, D. P.
  Configuration Development System/NAVAIR Report [AD-A106727] N82-16072
REGELIN, K.
  Airbus Industrie - The year of progress A82-21189
REILLY, R. A.
  The influence of technology advances on integrated CNI avionics A82-20672
REISING, J. M.
  Simulation of advanced cockpits A82-19259
REK, B.
  Boeing's bigger narrowbody A82-21190
RENIERI, G. D.
  Bolted field repair of graphite/epoxy wing skin laminates A82-20901
RENZ, R. R. L.
  Development of a simple, self-contained flight test data acquisition system A82-20756
  Development of a simple, self-contained flight test data acquisition system [NASA-CR-168438] N82-17478
REYNOLDS, J.
  NAVSTAR global positioning systems A82-20601
RICE, E. J.
  A shock wave approach to the noise of supersonic propellers [NASA-TM-82752] N82-16809
RICKETTS, R. H.
  On the track of practical forward-swept wings A82-19071
RIDDLE, D. W.
  Quiet Short-Haul Research Aircraft - The first 3 years of flight research [AIAA PAPER 81-2625] A82-19209
RIDDLEBAUGH, S. M.
  Dilution jet behavior in the turn section of a reverse flow combustor [AIAA PAPER 82-0192] A82-20291
RIZZETTA, D. P.
  Numerical solution of three-dimensional unsteady transonic flow over wings including inviscid/viscous interactions [AIAA PAPER 82-0352] A82-19797
ROBSON, B.
  Design for operability of military aircraft RAF engineering experience and requirements. I - Thoughts of a squadron engineer A82-20561
RODE, R.
  Automatic controlled terrain following flights A82-18920
ROLAND-BILLECART, MR.
  Ground movement control and guidance - Cat. 3 operations experience in Air Inter A82-20222
ROPELEWSKI, R. R.
  Flexibility is offered by XV-15 tilt-rotor concept A82-19300
ROSEN, K. M.
  Advanced transmission component development N82-17214
ROSENBERG, H.
  Technology overview for advanced aircraft armament system program [AD-A107680] N82-17155
ROSKAM, J.
  Development of a simple, self-contained flight test data acquisition system A82-20756
  A program to evaluate a control system based on feedback of aerodynamic pressure differentials [NASA-CR-163466] N82-16089
ROSSITER, K. O.
  Radiometric measurements at 80 GHz A82-18943

ROTH, S. P.
A real time Pegasus propulsion system model for VSTOL piloted simulation evaluation
[AIAA PAPER 81-2663] A82-19221

ROWE, B. H.
The outlook for advanced transport aircraft
A82-21374

ROWLEY, S.
Aerial ambulance service in Australia
A82-19007
A comparative study on mechanical vibration and noise during patient transportation
A82-19013

RUDD, J. L.
Crack growth behavior of center-cracked panels under random spectrum loading
A82-20511

RUFFE, L. I.
Design criteria for a miss distance radar
A82-18904

RUGGIERI, G.
Survey of aeromedical evacuation in Italy
A82-19003

RUSSIER, B.
The distress regime on the bimotored helicopter
N82-17219

RUSSO, P.
Octave bandwidth dual polarized antenna
A82-18934

RYLOV, A. I.
The design of compact asymmetric maximum-thrust nozzles for a given lift force
A82-19814

S

SAIN, M. K.
An application of total synthesis to robust coupled design
A82-19061

SAITO, S.
Balancing of flexible rotors by the complex modal method
[ASME PAPER 81-DET-46] A82-19310

SAITTO, A.
Analysis and tolerance study of an array antenna for a new generation of secondary radars
A82-19521

SAKAKIBARA, S.
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123

SAKATA, I. F.
Systems study of transport aircraft incorporating advanced aluminum alloys
[NASA-CR-165820] N82-17153

SAMUELSON, R. D.
Data systems organization - A change for the better
A82-20767

SANKAR, T. S.
Optimum journal bearing parameters for minimum rotor unbalance response in synchronous whirl
[ASME PAPER 81-DET-55] A82-19314

SAPSARD, M. J.
Future technology and requirements for helicopter engines
N82-17207

SARAVANAMUTTOO, H. I. H.
Minimum cost performance monitoring of turboshaft engines
A82-20544

SARREMEJEAN, A.
Leaky wave antenna using an inverted strip dielectric waveguide
A82-19552

SASAKI, I.
Rotating stall in blade rows operating in shear flow
A82-22209

SATO, H.
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123

SAWADA, H.
A new method of estimating the lateral wall effect on the airfoil incidence due to the suction at side walls
[NAL-TR-680] N82-17123

SCARPETTA, R.
Octave bandwidth dual polarized antenna
A82-18934

SCHAFER, R. M.
An application of total synthesis to robust coupled design
A82-19061

SCHANO, E.
New life for an 'old' body - Vienna's master plan for revitalization
A82-20172

SCHATZLE, P. R.
Utilization of hybrid computational equipment for the simulation of parachute system flight
A82-19234

SCHAUFELE, R. D.
The outlook for advanced transport aircraft
A82-21374

SCHMIDT, D. W.
Ultrasonic method for flow field measurement in wind tunnel tests
A82-20934

SCHMIDT, S. F.
An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship
[NASA-CR-152407] N82-16087

SCHMITT, V.
Aerodynamics of a transport aircraft-type wing-fuselage assembly
[ONERA, TP NO. 1981-122] A82-19738

SCHNEIDER, W. F.
Aerodynamic components for small turboshaft engines
N82-17211

SCHOONOVER, W. E., JR.
Recent advances in applying Free Vortex Sheet theory to the estimation of vortex flow aerodynamics
[AIAA PAPER 82-0095] A82-22045

SCHRADER, J. W.
Aerodynamic components for small turboshaft engines
N82-17211

SCHUETZ, W.
Flight-by-flight corrosion fatigue tests
N82-17348

SCHULZ, W. G.
Standardization study for advanced aircraft armament system program
[AD-A107681] N82-17156

SCHWARTZ, R. L.
Hierarchical specification of the SIFT fault tolerant flight control system
N82-17106

SCOLARIS, M.
Corrosion prevention methods developed from direct experience with aerospace structures
N82-17359

SEAR, W. F. L.
A versatile data acquisition system for a low speed wind tunnel
[AD-A106269] N82-16097

SEARLE, E.
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070

SEKIDO, T.
Rotating stall in blade rows operating in shear flow
A82-22209

SELBY, G. E.
Radiometric measurements at 80 GHz
A82-18943

SELF, L. R.
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079

SHAFFER, I. S.
Corrosion in naval aircraft electronic systems
N82-17363

SHAW, H.
The uses of airships in the Royal Navy
A82-20556

SHELTON, R.
Transparent polyolefin film armor
[AD-A107562] N82-17377

SHEVELL, R. S.
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-168839] N82-17151

SHIMI, T. N.
Requirements for instrument approaches to converging runways
[AD-A108075] N82-17144
Survey of 101 US airports for new multiple instrument approach concepts
[AD-A107812] N82-17229

SHIRK, M. H.
On the track of practical forward-swept wings
A82-19071

SHLIEN, J.
Automation in flight simulation of data handling and validation testing
A82-20532

SHOTTER, B. A.
Helicopter transmission philosophy - The way ahead
A82-20546
Lubrication breakdown between gear teeth
N82-17213

SHVETS, A. I.
Aerodynamic characteristics of waveriders at subsonic flight speeds
A82-19810

SINCLAIR, M.
An investigation of multi-axis isometric side-arm controllers in a variable stability helicopter
[AD-A106759] N82-17226

SINGLEY, G. T., III
Test and evaluation of improved aircrew restraint systems
[AD-A107576] N82-16056

SISSON, G.
Flow visualization using a computerized data acquisition system
A82-20792

SLEEPER, G. B.
L-band power generation in the General Electric solid-state radar
A82-18914

SMALLEY, A. J.
Application of the principle of reciprocity to flexible rotor balancing
[ASME PAPER 81-DET-49] A82-19311

SMELTZER, D. B.
Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft
[AIAA PAPER 81-2631] A82-19212

SMITH, B. S.
Design, development and flight testing of a jet powered sailplane
A82-20761

SMITH, J. F.
Experience with flight simulators - Training effectiveness-future developments
[DGLR PAPER 81-110] A82-19263

SMITH, J. H.
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042

SMITH, K. E.
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042

SNYDER, P. K.
Experimental investigation of a jet inclined to a subsonic crossflow
[AIAA PAPER 81-2610] A82-19202

SODERMAN, P. T.
Calibration of the Ames Anechoic Facility. Phase 1: Short range plan
[NASA-TM-84081] N82-16091

SORENSEN, J. A.
An investigation of automatic guidance concepts to steer a VTOL aircraft to a small aviation facility ship
[NASA-CR-152407] N82-16087

SPAETH, C. E.
Damage tolerant design for cold-section turbine engine disks
[AD-A107863] N82-17176

SPEAR, D. A.
Study of controlled diffusion stator blading. 1. Aerodynamic and mechanical design report
[NASA-CR-165500] N82-16081

SPENCE, P. W.
A practical approach to systems mode analysis
[ASME PAPER 81-DET-130] A82-19344

STAHL, W.
Use of high conical flow theory for the determination of the pressure distribution on the wave rider and its agreement with experimental results for supersonic flow
A82-19197

STALEY, J. A.
Predesign study for a modern 4-bladed rotor for the NASA rotor systems research aircraft
[NASA-CR-166153] N82-16042

STALLINGS, R. L., JR.
Store separation from cavities at supersonic flight speeds
[AIAA PAPER 82-0372] A82-22096

STAMBOVSKY, R. A.
JP-8 fuel conversion evaluation
A82-20755

STANGE, W. Q.
An investigation of dual mode phenomena in a mistuned bladed-disk
[ASME PAPER 81-DET-133] A82-19347

STAUTBERG, J. L.
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079

STEIN, S. Z.
The Global Positioning System Evaluator
A82-21588

STEINBERG, A. P.
Low-frequency eddy current inspection of aircraft structure
A82-21900

STEINER, J. E.
The outlook for advanced transport aircraft
A82-21374

STERN, A. D.
Stage-state reliability analysis technique
N82-17804

STEVENS, V. C.
Quiet Short-Haul Research Aircraft - The first 3 years of flight research
[AIAA PAPER 81-2625] A82-19209

STEWART, E. C.
Spin tests of a single-engine, high-wing light airplane
[NASA-TP-1927] N82-16068

STEWART, D. N.
Quick learning diagnostics
A82-20543

STOLL, F.
Large-scale wind tunnel tests of a sting-supported V/STOL fighter model at high angles of attack
[AIAA PAPER 81-2621] A82-19208
Application of thrusting ejectors to tactical aircraft having vertical lift and short-field capability
[AIAA PAPER 81-2629] A82-19211

STONE, R. G., JR.
Turboprop cargo aircraft systems study
[NASA-CR-165813] N82-16070

STRANGWAYS, R.
Energy environment study
[NASA-CR-168458] N82-17654

STRATHMAN, M. J.
Digital Avionics Information System (DAIS): Development and demonstration
[AD-A107906] N82-16079

STURM, N.
Control law development for a close-coupled canard, relaxed static stability fighter
[AIAA PAPER 82-0180] A82-19784

SUIT, W. T.
Spin tests of a single-engine, high-wing light airplane
[NASA-TP-1927] N82-16068

SULLIVAN, R. F.
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes
[DE82-001127] N82-17401

SUMMITT, R.
Forecasting corrosion damage and maintenance costs for large aircraft
N82-17357

SUN, D. F.
Experimental measurement of the low angle terrain scattering interference environment
A82-20588

Comparison of various elevation angle estimation techniques
A82-20589

SUN, X.
Transient two-dimensional temperature distributions in air-cooled turbine blades
A82-18893

SUN, Z.
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to travelling gust
A82-22112

SUNDSRUD, G. J.
Fatigue behavior of selected non-woven fiber composites for helicopter rotor blades
A82-20524

SUTTON, C. W.
A versatile data acquisition system for a low speed wind tunnel
[AD-A106269] N82-16097

SUTTON, R. C.
Tactical STOL moment balance through innovative configuration technology
[AIAA PAPER 81-2615] A82-19204

SWAMINATHAN, S.
Real gas flows over complex geometries at moderate angles of attack
[AIAA PAPER 82-0392] A82-19801

SWEDISH, W. J.
Requirements for instrument approaches to converging runways
[AD-A108075] N82-17144
Survey of 101 US airports for new multiple instrument approach concepts
[AD-A107812] N82-17229

SWERN, F.
Methodology for measurement of fault latency in a digital avionic miniprocessor
N82-17105

SZABOSSI, B.
Random spectrum fatigue crack life predictions with or without considering load interactions
A82-20512

SZLACHTA, J.
Reconfiguration: A method to improve systems realiability
N82-17107

SZOSTOWSKI, D. J.
A split coefficient/locally monotonic scheme for multishocked supersonic flow
[AIAA PAPER 82-0287] A82-22082

T

TADROS, R. N.
Dynamic response of blades and vanes to wakes in axial turbomachinery
[ASME PAPER 81-DET-33] A82-19307

TAKATA, H.
Rotating stall in blade rows operating in shear flow
A82-22209

TAYLOR, L. W., JR.
An analytical technique for the analysis of airplane spin entry and recovery
[AIAA PAPER 82-0243] A82-19786

TEFFETELLER, S.
Community sensitivity to changes in aircraft noise exposure
[NASA-CR-3490] N82-16807

TERKEL, H.
Non-steady velocity measurement of the wake of a helicopter rotor at low advance ratios
[AD-A107722] N82-17133

THACKER, S. S.
Fiscal year 1981 scientific and technical reports, articles, papers, and presentations
[NASA-TM-82445] N82-16927

THATCHER, C. D.
Advanced recorder design and development
[PB81-244105] N82-16385

THICK, J.
The history of aviation turbine lubricants
A82-19624

THOMAS, J.
Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase
[AD-A107805] N82-17148

THRIFT, P. R.
The impact of increasing energy costs upon the design philosophy of avionic fuel management systems
A82-20517

TIJDEMAN, H.
Theory and experiment in unsteady aerodynamics
[NLR-MP-80046-U] N82-17128

TILLES, R.
Air service, airport access and future technology
[PB82-105958] N82-16100

TITCOMB, G. A.
The outlook for advanced transport aircraft
A82-21374

TJONNELAND, E.
Propulsion system controls design and simulation
[AIAA PAPER 82-0322] A82-22091

TRAVASSOS, R.
Parallel computation for developing nonlinear control procedures
[AD-A107914] N82-17227

TREUHAFT, M. B.
Study of air compressor hazards in underground and surface mines
[PB82-105164] N82-17597

TRIGG, H. E.
On-site vibration measurement, dynamic tracking and balancing
A82-20545

TRIMBLE, S. W.
A generalized escape system simulation computer program: A user's manual
[AD-A106152] N82-16055

TROLINGER, J. D.
Development and laboratory testing of a thermal emission velocimeter for application to an erosion nose tip test facility
[AD-A107713] N82-17482

TROMPETTE, P.
Optimal shape design of turbine blades
[ASME PAPER 81-DET-128] A82-19342

TURDATU, S.
The velocity potential for the harmonically oscillating, rectangular wing with semiinfinite span in nonlinear theory
A82-19190

TORRAUD, T.
Steady and unsteady nonlinear hybrid vortex method for lifting surfaces at large angles of attack
[AIAA PAPER 82-0351] A82-22094

TURNEY, G. E.
Comparison of two parallel/series flow turbofan propulsion concepts for supersonic V/STOL
[AIAA PAPER 81-2637] A82-19218

TYE, W. B.
Gateway diversity and competition in international air transpportation
A82-21474

U

UTHE, E. E.
Airborne lidar measurements of smoke plume distribution, vertical transmission, and particle size
A82-21386

V

VAHLDIEK, F. W.
New concepts in multifunctional corrosion for aircraft and other systems
N82-17362

VALTIERRA, M. L.
Development of the automated AFAPL engine simulator test for lubricant evaluation
[AD-A106128] N82-16093

VELKOFF, H. R.
Development of a computer based presentation of non-steady helicopter rotor flows
[AD-A108107] N82-17131
Rotor flow research in low speed helicopter flight
[AD-A107873] N82-17132
Non-steady velocity measurement of the wake of a helicopter rotor at low advance ratios
[AD-A107722] N82-17133

VENKATARANGAN, S. N.
Pade approximation applied to flow past thin
airfoils
A82-20728

VERSTEEG, K. J. H.
Design and maintenance against corrosion of
aircraft structures
N82-17356

VERSTEEGEN, H. J.
Design and maintenance against corrosion of
aircraft structures
N82-17356

VIGEVANO, L.
Finite difference computation of the conical flow
field over a delta wing
[VKI-TN-140] N82-17135

VINALL, P. D.
Airworthiness of helicopter transmissions
A82-20541

VOGEL, J. W.
A comprehensive flight test flyover noise program
A82-20765

VORONIN, V. I.
Aerodynamic characteristics of waveriders at
subsonic flight speeds
A82-19810

VOSS, G.
Official recognition and the significance of
simulators for safe flight operations
[DGLR PAPER 81-094] A82-19271

VUILLET, A.
Helicopter air inlets
N82-17217

W

WACHTER, J.
Investigation of vibration of shrouded turbine
blades
[ASME PAPER 81-DET-129] A82-19343
Measurement of the influence of flow distortions
on the blade vibration amplitude in an air turbine
[ASME PAPER 81-DET-135] A82-19348

WAGNER, W. J.
Ultrasonic method for flow field measurement in
wind tunnel tests
A82-20054

WAI, J. C.
Transonic perturbation analysis of
wing-fuselage-nacelle-pylon configurations with
powered jet exhausts
[AIAA PAPER 82-0255] A82-22077

WALDECK, E. J. J.
Aircraft for secondary long range emergency
ambulance flight
A82-19021

WALDRON, B.
A generalized escape system simulation computer
program: A user's manual
[AD-A106152] N82-16055

WALKER, C. L.
Component research for future propulsion systems
N82-17224

WALKER, K. P.
Research and development program for non-linear
structural modeling with advanced
time-temperature dependent constitutive
relationships
[NASA-CR-165533] N82-16080

WALTHER, R.
Static and dynamic investigations for the model of
a wind rotor
[ISD-272] N82-17642

WANG, B.
Impingement cooling of concave surfaces of turbine
airfoils
A82-18894

WANG, H.
Aerodynamic characteristics of maneuvering flaps
A82-22110

WARD, C. R.
The influence of technology advances on integrated
CNI avionics
A82-20672

WASSON, R. L.
Aircraft alerting systems standardization study.
Volume 2: Aircraft alerting system design
guidelines
[AD-A106732] N82-16077

WATSON, T. L.
Tests of a D vented thrust deflecting nozzle
behind a simulated turbofan engine
[NASA-CR-3508] N82-17122

WATT, T. H.
Differential Omega system development and evaluation
[AD-A107857] N82-17146

WAUGH, H. A. G.
Aircraft design for operability
A82-20563

WEBB, S. G.
Aircraft position measurement using laser beacon
optics
[AD-A107973] N82-16067

WEBER, H. H.
Consequences of American airline deregulation -
Legislative theory in a concrete example
A82-19947

WEBER, R. J.
NASA research activities in aeropropulsion
[NASA-TM-82788] N82-16084

WEDEN, G. J.
Component research for future propulsion systems
N82-17224

WEEKS, J.
Fracture mechanics based modelling of the
corrosion fatigue process
N82-17344

WEILAND, E.
Design requirements for modern rescue helicopters
A82-19020
The armed helicopter in air to air missions
[MBB-UD-317-81-O] N82-17158

WEIMANN, A.
Functional versus communication structures in
modern avionic systems
N82-17092

WEISSHAAR, T. A.
On the track of practical forward-swept wings
A82-19071

WEITEMEIER, D.
Ultrasonic method for flow field measurement in
wind tunnel tests
A82-20054

WELLER, W. H.
Correlating measured and predicted inplane
stability characteristics for an advanced
bearingless rotor
[NASA-CR-166280] N82-17154

WELLS, K.
ASW and weapon system simulation with reference to
the Nimrod MR Mk2 maritime crew trainer
A82-20531

WELLS, V. L.
Use of optimization to predict the effect of
selected parameters on commuter aircraft
performance
[NASA-CR-168439] N82-17151

WEN, G.
Numerical computation of unsteady subsonic
aerodynamic forces on wing-body-tail exposed to
travelling gust
A82-22112

WENDT, G.
Report covering experience obtained at the German
Lufthansa with respect to training involving the
use of flight simulators
A82-19274

WERNER, H. G.
Simulation of modern radar installations in
full-mission flight and tactics simulators
[DGLR PAPER 81-103] A82-19272

WESTON, J. L.
Thrust management - Current achievements and
future developments
A82-20520

WHITAKER, A. J.
The marketing, organisation and financing of
aeromedical evacuation by a motoring organisation
A82-19002

WHITAKER, P.
ALF502 - Plugging the turbofan gap
A82-21243

WHITLOCK, E. M.
Air service, airport access and future technology
[PB82-105958] N82-16100

WHITTEN, P. D.
Application of thrust vectoring for STOL
[AIAA PAPER 81-2616] A82-19205

WIBERLY, S. E.
Composite structural materials
[NASA-CR-165121] N82-16182
WIDNALL, S. E.
Unsteady lifting-line theory with applications
[AIAA PAPER 82-0354] A82-19798
WILBY, J. F.
Analytical prediction of aerospace vehicle vibration environments
[ASME PAPER 81-DET-29] A82-19305
WILCOCK, G. W.
Integrated control of mechanical system for future combat aircraft
N82-17117
WILDHEIM, S. J.
Natural frequencies of rotating bladed discs using clamped-free blade modes
[ASME PAPER 81-DET-124] A82-19338
WILEY, R. H.
Isolated nacelle performance - Measurement and simulation
[AIAA PAPER 82-0134] A82-22054
WILLIAMS, D.
Aircraft operability - RAF engineering experience and requirements. II
A82-20562
WILLIAMS, K. R.
Studies of modern technology airships for maritime patrol applications
A82-20554
WILLIAMS, R. C.
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[AIAA PAPER 81-2627] A82-19210
WILLIAMS, T. L.
Airframe effects on top-mounted inlet systems for VSTOL fighter aircraft
[AIAA PAPER 81-2631] A82-19212
WILLIS, J. B.
Programs for the transonic wind tunnel data processing installation. Part 9: Pressure measurements updated
[AD-A106271] N82-16095
Current pressure measuring system in the transonic wind tunnel
[AD-A106272] N82-16096
WILLIS, B. J.
Sanctuary radar
A82-18906
WILSON, R.
The ultrasonic inspection of C.F.C.
[MDR-0465] N82-17513
Terrain model animation
[AD-A107911] N82-17887
WILSON, S. B., III
Analysis of selected VTOL concepts for a civil transportation mission
[AIAA PAPER 81-2655] A82-19220
WINDLE, J.
Active beacon collision avoidance logic evaluation. Volume 2: Collision avoidance (BCAS) threat phase
[AD-A107805] N82-17140
WINGROVE, R. C.
Analysis of flight test measurements in ground effect
A82-20763
WINKELMANN, A. E.
An experimental study of separated flow on a finite wing
[AIAA PAPER 81-1882] A82-20293
WISNER, K. L.
A terminal guidance simulator for evaluation of millimeter wave seekers
A82-18937
WITSMEER, A. J.
A terminal guidance simulator for evaluation of millimeter wave seekers
A82-18937
WOLFS, H.
Investigation of vibration of shrouded turbine blades
[ASME PAPER 81-DET-129] A82-19343
WOOD, A. H.
Flying doctor service in East Africa
A82-19008
WOODINGS, R. S.
Operability of military aircraft - Some design and cost trends
A82-20565
WOODREY, R. W.
Application of thrust vectoring for STOL
[AIAA PAPER 81-2616] A82-19205
WOOLCOCK, S. C.
Modelling of target radar scattering with application to guidance simulation
A82-20570
WOOLLETT, R. R.
Thrust modulation methods for a subsonic V/STOL aircraft
[AIAA PAPER 81-2633] A82-19213
WORSTELL, J. H.
Deposit formation in liquid fuels. II - The effect of selected compounds on the storage stability of Jet A turbine fuel
A82-22200
Deposit formation in liquid fuels. I - Effect of coal-derived Lewis bases on storage stability of Jet A turbine fuel
A82-22201
WORTH, R. J.
Aeromedical evacuation in New Zealand
A82-19011
WRIGHT, G.
Technology overview for advanced aircraft armament system program
[AD-A107680] N82-17155

X

XUE, D.
The simulation study on a redundant flight control system
A82-22120

Y

YACKLE, A. R.
Sea based support aircraft alternatives
[AIAA PAPER 81-2649] A82-19217
YANTA, W. J.
Measurements of a three-dimensional boundary layer on a sharp cone at Mach 3
[AIAA PAPER 82-0289] A82-22083
YATES, W. J.
Assessment of historical and projected segments of US and World civil and military rotorcraft markets 1960 - 1990
[NASA-CR-166151] N82-17137
YBARRA, A. H.
Low speed testing of the inlets designed for a tandem-fan V/STOL nacelle
[AIAA PAPER 81-2627] A82-19210
YIU, K. F.
Land navigation with a low cost GPS receiver
A82-20656
YOSHIHARA, H.
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[AIAA PAPER 82-0255] A82-22077
YU, Y.
Power system design optimization using Lagrange multiplier techniques
A82-20783

Z

ZAITSEV, A. A.
Analysis of an ideal-fluid flow past a finite-thickness wing
A82-19813
ZANATTA, G. J.
The Boeing Flight Test Data System 1980
A82-20769
ZELENKOV, A. V.
Airport radar systems
A82-18975
ZEMPOLICH, B. A.
A tutorial on distributed processing in aircraft/avionics applications
N82-17089

Economic considerations for real-time naval aircraft/avionics distributed computer control systems
N82-17097

ZHANG, G.
Numerical calculation of lift, moment coefficient and dynamic stability derivatives on sideslipping wings in unsteady supersonic flows
A82-22111

ZHANG, Y.
Aerodynamic characteristics of maneuvering flaps
A82-22110

ZIELKE, J.
Training in the flight and tactics simulator of the Navy Flight Squadron 3 'Graf Zeppelin'
[DGLR PAPER 81-109] A82-19273

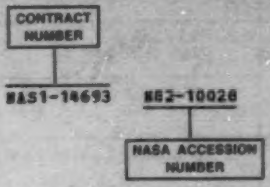
ZINN, B. T.
Prediction of sound radiation from different practical jet engine inlets
[NASA-CR-165120] N82-16810

ZUK, J.
Component research for future propulsion systems
N82-17224

ZWAAN, R. J.
Theory and experiment in unsteady aerodynamics
[NLR-MP-80046-U] N82-17128
A wind tunnel study of the flutter characteristics of a supercritical wing
[NLR-MP-81002-U] N82-17129

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

- AF PROJ. 2052
  - N82-16079
  - N82-17172
- AF PROJ. 2307
  - N82-16086
  - N82-17227
- AF PROJ. 2313
  - N82-16094
- AF PROJ. 2401
  - N82-17338
- AF PROJ. 2404
  - N82-17482
- AF PROJ. 3048
  - N82-16093
  - N82-16850
- AF PROJ. 3066
  - N82-17176
- AF-AFOSR-0120-81
  - N82-16094
- AF-AFOSR-3418-77
  - N82-17227
- BMFT-ET-4086-A
  - N82-17638
  - N82-17639
  - N82-17640
  - N82-17641
  - N82-17642
  - N82-17643
- DA PROJ. 1L1-62209-AH-76
  - N82-16056
- DAAG29-79-C-0074
  - N82-17131
  - N82-17132
  - N82-17133
- DAAG46-71-C-0162
  - N82-16083
- DAAG46-76-C-0034
  - N82-17377
- DARPA ORDER 1849
  - N82-16085
- DE-AC06-76RL-01830
  - N82-16834
- DE-AC22-76ET-10532
  - N82-17401
- DI-BM-JO-10006
  - N82-17597
- DITC-95T79-00058
  - A82-19253
- DOT-FA01-81-C-10001
  - N82-17229
- DOT-FA72WAI-261
  - N82-16063
- DOT-FA75WA-3662
  - N82-17146
- DOT-FA79WA-4266
  - N82-16077
- DOT-HS-7-01640
  - N82-16385
- DTFA01-81-C-10001
  - N82-17144
- EF-76-C-01-2315
  - N82-17401
- FAA PROJ. 041-305-830
  - N82-17149
- FAA PROJ. 052-241-04
  - N82-16063
- FAA PROJ. 052-241-320
  - N82-17148
- F04701-78-C-0104
  - A82-22082
- F19628-79-C-0001
  - A82-20604
- F19630-80-C-0002
  - N82-16063
- F33615-76-C-3145
  - N82-17482
- F33615-77-C-2064
  - N82-17176
- F33615-77-C-3121
  - A82-20512
- F33615-77-C-3132
  - A82-20128
- F33615-78-C-1502
  - N82-16079
- F33615-78-C-2012
  - N82-16093
- F33615-79-C-1818
  - N82-17172
- F33615-79-C-3030
  - N82-17482
- F33615-79-C-3218
  - N82-17338
- F33615-80-C-2042
  - N82-16850
- MDA903-79-C-0320
  - N82-17085
- NAG1-3 A82-20759
- NAG1-11 N82-16801
  - N82-16802
  - N82-16803
  - N82-16804
  - N82-16806
- NAG1-66 N82-17654
- NAG1-202 N82-17151
- NAG3-28 A82-22081
- NAG3-67 N82-16810
- NAG3-101 N82-17879
- NAG4-5 N82-16089
- NASA ORDER A-65550B
  - N82-17121
- NAS1-12754 A82-20297
- NAS1-14611 A82-19305
  - N82-16807
- NAS1-15116 A82-20297
  - N82-16060
  - N82-17142
- NAS1-15148 N82-16178
- NAS1-15426 A82-19303
- NAS1-15428 N82-17106
- NAS1-15708 N82-16070
- NAS1-15887 A82-22077
- NAS1-15946 N82-17105
- NAS1-16434 N82-17153
- NAS1-16636 A82-19784
- NAS2-8558 N82-16069
- NAS2-10288 N82-16087
- NAS2-10404 N82-17137
- NAS2-10448 N82-16090
- NAS2-10689 N82-16042
- NAS2-10690 N82-16043
- NAS2-10762 A82-19797
- NAS2-10772 N82-17154
- NAS2-10777 N82-17152
- NAS3-20360 N82-16176
- NAS3-20629 N82-17174
- NAS3-21051 A82-20743
- NAS3-21730 A82-20742
- NAS3-21733 N82-17122
- NAS3-22008 N82-16081
- NAS3-22055 N82-16080
- NAS5-22832 A82-19305
- NAS8-33458 N82-16655
- NAS9-15231 A82-19305
- NB-5061-014 N82-17127
- NGL-33-018-003
  - N82-16182
- NGR-22-009-818
  - A82-19798
- NSERC-A-1080 A82-21941
- NSERC-A-5625 A82-21941
- NSERC-A-7104 A82-19314
- NSF ATM-78-27420
  - A82-19858
- NSG-1266 A82-21391
- NSG-1407 N82-16046
- NSG-1419 A82-19796
- NSG-1560 A82-22094
- NSG-1563 N82-17328
- NSG-1570 A82-20293
- NSG-3122 A82-22240
  - A82-22241
- NSG-4019 N82-17478
- N00014-79-C-0475
  - A82-19061
- N00014-79-C-0873
  - N82-17087
- N00019-80-C-0489
  - N82-16072
- N60530-80-C-0270
  - N82-17155
- N60530-80-C-0339
  - N82-17156
- N61339-80-C-0008
  - N82-17887
- N62269-78-C-0191
  - N82-16055
- N62269-78-C-0272
  - A82-20981
- N62269-80-C-0704
  - A82-22094
- USDR-7-07-83-V001
  - A82-19858
- XF21242101 N82-17173
- 505-09-31 N82-16076
- 505-32-2A N82-16081
- 505-32-72 N82-16084
- 505-34-11-11 N82-16088
- 505-41-13-03 N82-16068
- 505-42-11 N82-17154
- 505-42-62 N82-17122
- 530-02-11 N82-17137
- 535-03-12 N82-16808
  - N82-16809

1. Report No. NASA-SP-7037 (148)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle AERONAUTICAL ENGINEERING A Continuing Bibliography (Supplement 148)		5. Report Date May 1982
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C.		11. Contract or Grant No.
		13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 512 reports, articles and other documents introduced into the NASA scientific and technical information system in April 1982.

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified - Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 171	22. Price* $5.00HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NASA SP-7037(149)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 149)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in May 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141 093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 418 reports, journal articles, and other documents originally announced in May 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	– 1/	– 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

Price Code	North American Price	Foreign Price
N01	30.00	45.00

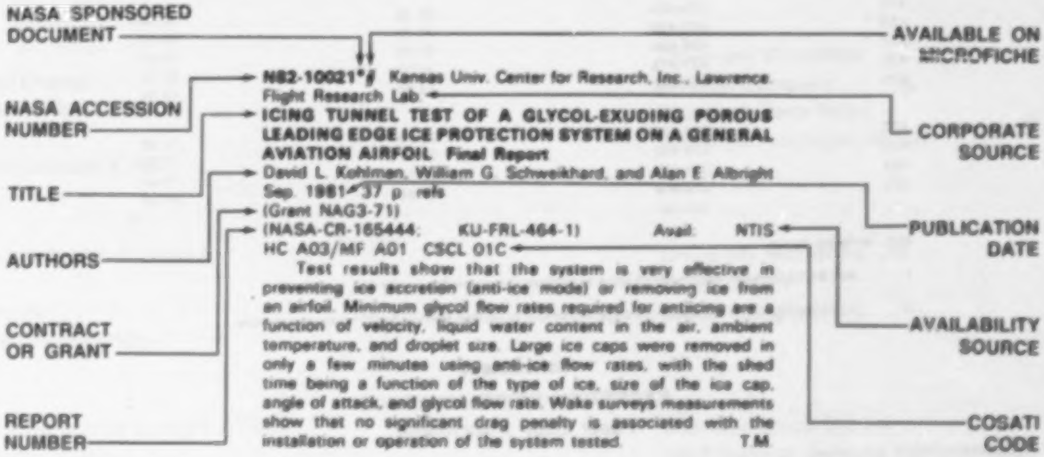
TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) 217
STAR ENTRIES (N82-10000) 245

Subject Index A-1
Personal Author Index B-1
Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*

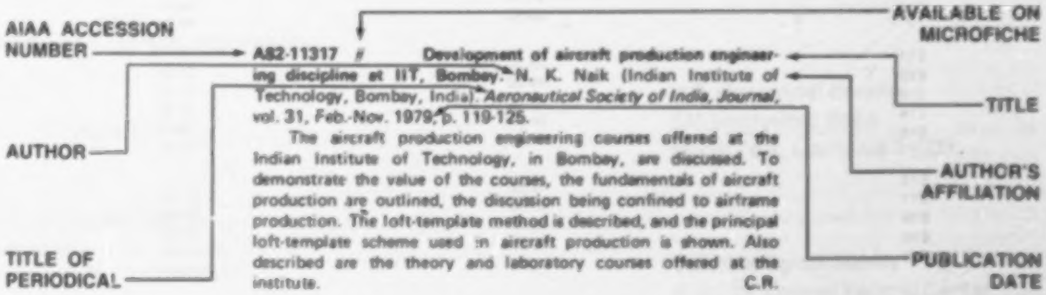


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHORS
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for anticing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AUTHOR
TITLE OF PERIODICAL
AVAILABLE ON MICROFICHE
TITLE
AUTHOR'S AFFILIATION
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 149)

JUNE 1982

IAA ENTRIES

A82-22396 † **Analysis and optimization of control systems in piloted flight vehicles (Analiz i optimizatsiia sistem upravleniia pilotiruemykh letatel'nykh apparatov).** G. I. Ryl'skii. Moscow, Izdatel'stvo Mashinostroenie, 1981. 200 p. 156 refs. In Russian.

An analysis is given of the activity of a human operator in the control systems of piloted flight vehicles and of the possibility of describing this activity mathematically. A classification is suggested, and an analysis made, of recent mathematical models describing human activity in these systems. Attention is given to the advantages of the models that use queuing theory, and these models are used in elaborating techniques for determining characteristics of the operator's work. C.R.

A82-22407 † **Utilization of radio equipment at airports and on airways (Ekspluatatsiia radiooborudovaniia aerodromov i trass).** A. A. Kuznetsov and V. I. Dubrovskii. Moscow, Izdatel'stvo Transport, 1981. 224 p. 26 refs. In Russian.

The organization of navigation aids and air traffic control in civil aviation is briefly considered. Problems of technical and economic planning, the organization of support and maintenance, and the collection and processing of reliability data pertaining to air navigation and ATC equipment are also considered. Specific attention is given to the utilization characteristics of radio navigation and ATC systems; ATC radar stations; automated ATC; display equipment; and methods and models for the utilization of radio navigation and ATC systems. B.J.

A82-22880 **Complete guide to Rutan homebuilt aircraft.** D. Downie and J. Downie. Blue Ridge Summit, PA, Tab Books, Inc., 1981. 288 p. $8.95.

The development history of a group of home-built sport aircraft characterized by canard configurations and non-metallic construction is presented, from the time that the designer, Burt Rutan, who won an AIAA award for his thesis on roll-yaw coupling started the project to the flight testing of the four-passenger, push/pull propeller Defiant aircraft. Incorporating the canard in order to exploit both its inherent stall-limiting function and its direct-lift generation at low incidence during short takeoffs and landings, the two designs featured are (1) the plywood-structure VariViggen, and (2) the more highly developed VariEze/Long-EZ, whose structure is of fiberglass cloth-reinforced self-curing epoxy layups over pre-shaped styrofoam. Additional material on aircraft construction and performance at the hands of the designer and dozens of his hobbyist-clients is also presented. O.C.

A82-22881 **Computer-generated images for simulators - The cost of technology.** G. C. Larson. *Air Force Magazine*, vol. 65, Feb. 1982, p. 54-59.

The effectiveness, capabilities, and prospects for computer-controlled flight simulators suitable for combat flight training are examined. Current devices offer a wraparound imagery, multiple crewmember interface, and separate cockpit coordinated displays suitable for developing teamwork among pilots of different aircraft. The simulators are equipped with realistic cockpits, an instructor's station with full control and recording equipment, a data base with simulator dynamics and ability to translate actions into real-time responses, and a visual system which displays a scene that could be expected in the real world. Mechanical limitations are defined by the cost of memory and processing speed necessary for edge generation, the formation of geometric shapes and solids closely resembling real world objects, and texturing has shown promise for defining recognizable areas by rectangular areas which overlap in a fashion acceptable to a human field of vision. M.S.K.

A82-22896 # **Lineup of the IM-series aircraft-derivative gas turbines.** K. Takeo (Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan). *IHI Engineering Review*, vol. 14, Oct. 1981, p. 36-42. 5 refs.

The development of the IM-series of aircraft derivative gas turbines is reviewed. The discussion begins with the IM1500 GL engine, having an output at turbine coupling of 11,100 kW and a thermal efficiency of 26.8%, first used as an industrial gas generator in 1968. Principal characteristics of the IM2000 and IM2500 are then discussed: the output and thermal efficiency of these two models are given as 12,800 kW and 33.5% and 19,300 kW and 35.1%, respectively. Fundamental specifications of the power turbines are described, and the flowpath design is presented. The construction and mechanical design of the engine are described, and results of creep-rupture, high temperature fatigue, and vibratory stress tests are given. Finally, the IM5000 power turbine, with an output of 38,000 kW and an efficiency of 38.4% is described. It is also shown how heat in the high-temperature exhaust gases from the turbines can be used in waste heat recovery systems to improve the total plant efficiency. J.F.

A82-22898 # **History of the sweptback wing (Geschichte des Pfeilflügels).** H. Ludwieg (Aerodynamische Versuchsanstalt, Institut für experimentelle Strömungsmechanik, Göttingen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Aachen, West Germany, May 11-14, 1981, Paper 81-070.* 15 p. 10 refs. In German.

The history of sweptback wings which make use of the sweepback to alter the effective Mach number is reviewed. Principles of the sweptback wing and its effects are discussed for subsonic flight with high Mach numbers, supersonic flight with a subsonic leading edge, and supersonic flight with a supersonic leading edge. The historical development is traced from the first sweptback wing model in 1939 for the Gottinger high speed wind tunnel to various fighter aircraft including the Messerschmitt 262 and Heinkel designs. Results of wind tunnel tests for various angles of sweepback are presented. D.L.G.

A82-22902 **The use of dynamic mock-ups in the design of advanced systems.** M. L. Gravely (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) and L. Hitchcock (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Human Factors Society, Annual Meeting, 24th, Los Angeles, CA, October 13-17, 1980, Proceedings. Santa Monica, CA, Human Factors Society, Inc., 1980, p. 5-8.

The advantages of using dynamic mock-ups in advanced system design are discussed in terms of the USAF's Digital Avionic Information System (DAIS) Program and the Navy's Advanced Integrated Display System (AIDS) Cockpit Development Program. Experienced pilots are employed to judge the acceptability of slide projector displays for radar, low-light level television, and alphanumeric and vector graphic formats. Cost effectiveness is achieved by lowering software costs, minimizing time in constructing the mock-up, and high reliability-low maintenance features. The cockpit layout is set up once the required tasks and the number of multifunction controls are known, and variations on the instrumentation set-up are tested repeatedly. The AIDS concept allows remote location of a slide projector for closed circuit television display of various instrument configurations in different situations, and selected displays are chosen for full scale simulation. M.S.K.

A82-22906 **Combined multisensor displays.** A. J. Josefowitz, R. A. North (Honeywell Systems and Research Center, Minneapolis, MN), and J. Trimble (U.S. Navy, Office of Naval Research, Arlington, VA). In: Human Factors Society, Annual Meeting, 24th, Los Angeles, CA, October 13-17, 1980, Proceedings. Santa Monica, CA, Human Factors Society, Inc., 1980, p. 17-21. Contract No. N00014-77-C-0684.

The use of combined multisensor displays which result from preprocessing of various sensor data for shape coding in a display is discussed in terms of lowering the pilot's workload. A Forward Looking Infrared (FLIR) radar display was selected as the background for combinations with other sensor displays in trials of suitability, with color coded close, intermediate, and far range conditions. Test subjects were 32 right-handed males who performed point of impact, target detection, and tracking tasks. The variables were processed in univariate and multivariate analyses of combined and uncombined display types, and individual display comparisons by pairs. The combined displays were found to enhance the time-sharing of tasks with other crewmembers and the accurate detection of targets. Color coding is recommended to be of secondary value, with some results showing that colors actually slow response times. M.S.K.

A82-22974 **Direct comparison of community response to road traffic noise and to aircraft noise.** F. L. Hall, S. E. Birnie, S. M. Taylor, and J. E. Palmer (McMaster University, Hamilton, Ontario, Canada). *Acoustical Society of America, Journal*, vol. 70, Dec. 1981, p. 1690-1698. 23 refs. Research supported by the Transport Canada and Natural Sciences and Engineering Research Council of Canada.

Previous efforts to synthesize information on community responses to various noise sources have been forced to rely on a variety of surveys conducted in different countries over a number of years. Data collected recently around Toronto International Airport provide a direct comparison of response to two sources, based on 673 interviews of persons exposed to a variety of levels of both aircraft and road traffic noise. The results of that analysis do not support the assumption that response to these two noise sources is the same. For the same value of the 24-h energy-averaging metric, a greater percentage of the sample is highly annoyed by aircraft noise than by road traffic noise. Possible reasons for this contradiction of the results of a previous synthesis of noise surveys are discussed. (Author)

A82-23027 **GTD terrain reflection model applied to ILS glide scope.** R. Luebbers, V. Ungvichian, and L. Mitchell (Ohio University, Athens, OH). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, Jan. 1982, p. 11-20. 20 refs. USAF-supported research; U.S. Department of Transportation Contract No. FA7WA-3549.

A terrain reflection model based on the geometrical theory of diffraction is described which (1) can accommodate any piecewise linear terrain profile, (2) requires less computer time than physical optics models, (3) is capable of including transverse terrain effects, and (4) determines the reflected fields with all important diffraction and blockage effects included. The model's approach to the calculation of the reflected magnetic fields consists of a geometrical process by which the existence and the reflection and/or diffraction points of the rays are determined, and a mathematical process by which the magnitude and phase of the corresponding electric field at the receiver location are evaluated. O.C.

A82-23029 **Sensitivity reduction by double perfect model following.** T. Okada, M. Kihara, and K. Motoyama (Defense Academy, Yokosuka, Kanagawa, Japan). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, Jan. 1982, p. 29-38. 12 refs.

A double perfect model following (DPMF) system is proposed which uses two models: one is used to define the desirable response and the other is used to reduce sensitivity to parameter perturbation. The concept is shown and methods of model selection and controller synthesis are discussed, followed by numerical examples and an aircraft control example which demonstrate performance of the DPMF concept. It is shown that the DPMF system can be less sensitive than a nominally equivalent single perfect model following (SPMF) system and that sensitivity reduction is enhanced by proper selection of the model. It is also shown that the sensitivity of multi-input systems can be reduced componentwise or blockwise by using a decoupled type model. (Author)

A82-23031 # **Stereographic projection in the National Airspace System.** R. G. Mulholland and D. W. Stout (FAA, Technical Center, Atlantic City, NJ). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, Jan. 1982, p. 48-57. 10 refs.

Consideration is given to the calculation of stereographic representations of airborne targets from observations of slant range, azimuth, and altitude in a multiple radar tracking system. Emphasis is placed upon the translation of the accuracy of the surveillance information into the stereographic plane. Applications include air traffic control operations in which calculations must be performed repeatedly in real time for numerous targets without overtaxing available computational resources. (Author)

A82-23037 * **Methodology for multiaircraft minimum noise impact landing trajectories.** G. Cook, I. D. Jacobson, R. Cheng, and R. Melton (Virginia, University, Charlottesville, VA). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, Jan. 1982, p. 131-146. 14 refs. Grant No. NsG-1509.

The problem of optimizing landing trajectories with respect to noise impact index is addressed. In contrast with previous work, multilandings are considered. In order to make the problem tractable the trajectories are specified in functional form with certain parameters left free for selection by the optimization methods. Constraint of aircraft dynamic behavior, trajectory separation, pilot workload, passenger comfort, and maximum noise intensity all enter into the determination of what is an allowable trajectory. A version of the quasi-Newton iterative procedure is used to determine the optimum parameter values. The results show improvement in noise impact to the airport considered and the potential for even greater improvement at many airports. (Author)

A82-23225 **Linear alpha-ray altimeter (Lineinyi alpha radiatsionnyi vysotomer).** P. S. Kamenov, D. N. Vasilev, and E. N. Vapirev (Sofiiski Universitet, Sofia, Bulgaria). *Iadrena Energiia*, no. 15, 1981, p. 24-28. 8 refs. In Russian.

The paper describes an alpha-ray altimeter which employs scintillation detection and achieves linearity between the number of counts per unit time and the altitude. The design of the altimeter is described, and experimental results are presented. Causes of errors and nonlinearities are analyzed, and ways to reduce them are discussed. B.J.

A82-23227 # **Aircraft parameter identification in the presence of atmospheric turbulence.** H. Okubo (Osaka Prefecture University, Sakai, Japan), T. Kanou (Kawasaki Heavy Industries, Ltd., Akashi, Japan), and M. Kobayakawa (Kyoto University, Kyoto, Japan). *Kyoto University, Faculty of Engineering, Memoirs*, vol. 43, July 1981, p. 364-375. 7 refs.

The paper investigates a method for the identification of unknown parameters in the dynamics of an aircraft, using flight data which are affected by random disturbances due to wind gusts. Two general algorithms, the maximum likelihood (ML) method and the extended Kalman filter (EKF) technique, along with a combination of the algorithms are examined for capability by numerical simulations. The ML algorithm requires no a priori information on the initial parameter estimates, while the EKF algorithm computes an on-line estimate of the parameter in real time, has a smaller program size, and requires less computational time and memory than the former. The combined use of the two algorithms gives a useful method for an on-line parameter estimation, using the ML algorithm as a start-up procedure, and processing the remaining data sequentially with the EKF technique. D.L.G.

A82-23250 † **Improving the accuracy of the estimates of surfactant content in jet fuels (Povyshenie tochnosti otsenki soder-**

zhenila par v reaktivnykh toplivakh). A. F. Gorenkov, V. S. Stepanenko, and V. A. Saleev. *Khimiia i Tekhnologiia Topliv i Masel,* no. 2, 1982, p. 38-39. In Russian.

Surface processes associated with the interaction between jet fuels and water are investigated with a view to increasing the accuracy of the estimates of surfactant content in jet fuels. It is shown that when analyzing water-fuel interaction, it is essential that the meniscus condition and the presence of drops on the test cylinder walls be taken into account. In view of this, modifications to the standard jet fuel quality control procedure are proposed. V.L.

A82-23309 **Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings.** Arlington, VA, Air Traffic Control Association, 1980. 204 p.

Developments towards higher levels of ATC automation are considered along with the requirements for reduced IFR separations on final approach, an analysis of system problems using aviation safety reporting system data, and specification issues and problems in connection with air traffic control computer replacement. Attention is given to maintenance concepts for the 1980's, approaches for reducing reflections on the front surface of air traffic control displays, the price of safety, general aviation in the future ATC system, the utilization of the helicopter's versatility to improve the ATC system, the human element, international plans concerning ATC-related developments, and challenges and issues for the future. Technological developments are discussed, taking into account distributed data processing modeling for future ATC systems, lightweight ATC systems, the Discrete Address Beacon System, voice communications, and a Microwave Landing System simulation. G.R.

A82-23311 **The requirements for reduced IFR separations on final approach.** W. J. Swedish (MITRE Corp., Metrek Div., McLean, VA). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 39-43. U.S. Department of Transportation Contract No. FA80WA-4370.

This paper examines the factors which affect the feasibility of reducing IFR standards from a minimum of 3.0 nmi to 2.5 or 2.0 nmi. For those aircraft pairs which are not restricted by wake vortices, separation reduction is likely to be limited by the rate at which aircraft must go around to avoid simultaneous runway occupancy. The runway occupancy performance required to avoid an unacceptable increase in the go-around rate is determined. The impacts of ATC improvements such as metering and spacing on the runway occupancy requirements and on the controller's decision-making workload are then presented. Alternating arrivals to close-spaced parallel runways are discussed as one means to avoid the constraints of runway occupancy and, possibly, wake vortices. Lastly, it is proposed that further research on reduced separations should address a single specific airport, in order to narrow the range of variables and thereby facilitate the identification of problems and solutions. (Author)

A82-23312 **Analysis of system problems using aviation safety reporting system data.** R. L. Grayson (Battelle Columbus Laboratories, Mountain View, CA). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 45-48.

The Aviation Safety Reporting System (ASRS) was inaugurated in 1976 as the result of an interagency agreement between the FAA and NASA. It was designed as a confidential, voluntary reporting system to enable individual users or observers of the National Aviation System to record hazardous occurrences or to report conditions which might adversely affect aviation safety. A description is presented of the system operation, the characteristics of the data base compiled by the system as the principal information source, and the ways in which the system has helped in defining and clarifying various aviation system problems. G.R.

A82-23313 **Air Traffic Control computer replacement - Specification issues and problems.** T. L. Hannan and M. E. Paris (FAA, Washington, DC). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 51-56.

The foundation of today's Air Traffic Control (ATC) system is the ATC specialist, who is supported by ATC automation systems and automated radar terminal systems. According to many ATC experts, however, the computer will become the foundation of the future ATC system. The transition to the future ATC system will be gradual. The extent to which decision-making processes will be accomplished automatically will increase until significant elements of the ATC process are controlled by the computer. Attention is given to an ATC Computer Replacement System which is suited for the evolutionary transition process. In the form of its initial implementation, the new system must be compatible with the ongoing ATC system. But it must also be capable of meeting future ATC functional requirements as it evolves toward automated decision-making. The considered requirements are examined in an attempt to define the scope of the ATC computer replacement acquisition. G.R.

A82-23314 **Reducing reflections on the front surface of air traffic control displays.** J. W. Aschenbach (FAA, Technical Center, Atlantic City, NJ). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 65-71. 5 refs.

Problems related to the occurrence of surface reflections on the FAA's en route air traffic control displays have become more serious in connection with the installation of the near vertical stroke-writing display in the air route traffic control centers. New investigations were initiated to see if it was feasible to raise the display background level, in order to mask reflections and to further reduce the sources of plan view display screen reflections through more modifications to the lighting. A study was conducted with the objective to find a method of decreasing the reflectivity of the front surfaces of the display itself. By eliminating the extra panel on the front of the display and by etching and coating the outside surface of the CRT with a multilayer dielectric thin film, it was possible to produce a display with very little glare. G.R.

A82-23315 **NAS system load - Utilization of the DARC system.** E. P. Schmidt (FAA, Hampton, GA). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 73-78.

In connection with an unexpectedly large increase in air traffic volume, there is a growing threat that ATS requirements might exceed the processing capacity of the NAS En Route 9020 computer systems. An investigation is conducted concerning the feasibility of providing an interim solution to the problem by means of an approach based on the utilization of existing hardware allocations. The approach would employ the Direct Access Radar Channel (DARC) system as an associative processor to the NAS 9020 system. DARC is specified to provide a parallel radar data path for use in the event of catastrophic failure of the prime channel, and during planned down time of the NAS 9020 system. G.R.

A82-23316 **Utilizing the helicopter's versatility to improve the ATC system.** A. G. B. DeLucien and F. D. Smith (Pacer Systems, Inc., Arlington, VA). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 89-96. 14 refs.

This paper presents an overview of certain operating environments of civilian helicopters, and summarizes selected performance-maneuver envelopes of those models certified for operation under instrument flight rules (IFR). It discusses how the capabilities and limitations which are unique to these vehicles can be used to improve the capability, and expand the capacity, of the Air Traffic Control (ATC) system. Helicopter-oriented technical issues which will impact future changes to the system are identified. The paper concludes that as controllers become increasingly aware of related helicopter characteristics and operating environments, and take advantage of them, the effect would be to reduce controller workload; and to increase the capacity, expand the functional capabilities, and enhance the overall versatility of the ATC system. (Author)

A82-23317 **International plans for civil and military coordination.** P. J. Gray (RAF, National Air Traffic Services, London, England). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 105-108.

Attention is given to a review of the common aims of the civil and military controller, certain conflicts of interest inherent in the function of civil and military air traffic control, and the resolution of conflicts related to the existence of national bounderies in Western Europe. In connection with the finite nature of air space, it is found to be important that, in an allocation of the utilization of this space, the needs and characteristics of all users, civil and military, must be taken into consideration. In the UK, integrated civil and military staffs at HQ and field levels are used to ensure that no one user interest is permitted to unfairly predominate. In the wider European context civil and military coordination and cooperation prevails within Eurocontrol, and perhaps most successfully, at NATO CEAC (Committee for European Airspace Coordination). G.R.

A82-23318 **Operational air traffic in the Federal Republic of Germany.** F.-W. von Schlichtkrull (Bundeswehr, Frankfurt am Main, West Germany). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 111-117.

Aspects of traffic volume are considered, taking into account the number of civil and military aircraft flights for 1979. For an appropriate evolution of the performance involved in controlling the total number of flights reported (3,950,000), the geographic size of the Federal Republic of Germany must be taken into account, giving attention also to regulations which exclude military aircraft from an area near the iron curtain border. Military operational air traffic can be divided into three categories, including uncontrolled military flights, military air traffic under the control of air defense units, and military air traffic handled by Air Traffic Services. The high air traffic density leads to special problems which are partly related to midair collision hazards. Approaches for solving these problems are discussed, taking into account a separation in space for flights of different traffic categories, and an employment of advanced control methods. G.R.

A82-23319 **Distributed data processing modeling for future ATC systems.** R. R. Jones (Hughes Aircraft Co., Fullerton, CA). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 125-131.

The use of distributed processing procedures makes it feasible to reduce the processor cost, and to increase, at the same time, maintainability and reliability. Other advantages are related to the convenience of system expansion by means of added capabilities. The utilization of distributed data processing benefits for air traffic control systems (ATC) is considered, taking into account the use of a rigorous analytic technique for a determination of optimal operational configurations. The analytic technique selected is simulation modeling. This approach makes use of a Distributed Data Processing Model (DDPM) coupled with a Design Analysis System (DAS). The considered approach has been employed extensively to design many complex systems similar in scope and nature to ATC systems. A description is presented of the DDPM and the DAS, giving attention to the use of these techniques in an application involving an ATC system. G.R.

A82-23320 **ATC automation - A look forward: Technology/architecture.** L. M. Reppert (Texas Instruments, Inc., Dallas, TX). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 133-136.

It is pointed out that ATC automation is going through a revolutionary evolution due to major technological advances in such areas as microprocessors and memories. A reasonable projection prediction for the 80's and 90's would specify a high utilization of distributive computer architecture implemented with simple/high technology hardware. The considered evolution will require a system which is functional-task oriented, repartitionable, and modular. Using distributed computer architecture and available microprocessor and memory technologies, ATC system designers can perform all the required functions and implement the system in a highly efficient and cost effictive manner which inherently provides the desired characteristics taking into account modularity, recoverability, high data integrity, ultra-high reliability, and computer-aided maintainability. G.R.

A82-23321 **Lightweight ATC systems.** R. Bonitch (Eaton Corp., AIL Div., Farmingdale, NY). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 139-144.

The problem of tactical ATC system implementation has been considered, taking into account the generation of light-weight and low-cost equipment which can provide advanced ATC capabilities for forward command posts, tactical command centers, and low traffic density applications, such as remote airfields and oil rigs. The considered systems are based on microprocessor technology. This technology makes it possible to utilize recent advances related to signal processing, antenna development, and plasma displays. Attention is given to the development of the Small Plasma Automated Radar Terminal Area Navigation System (SPARTAN) and its military version, the Very Lightweight Air Traffic Management Equipment (VLATME). The advantages of the employed ac plasma displays are related to light weight, low operating voltage (200 volts), and sustained memory. G.R.

A82-23322 **Discrete Address Beacon System /DABS/.** P. D. Hodgkins (FAA, Washington, DC). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 147-155.

In connection with the results of a study conducted in 1969, recommendations had been made to upgrade the Air Traffic Control System. These recommendations became the basic system requirements for DABS. The recommendations had been concerned with the development of three new systems, including an improved surveillance system for the eventual replacement of the present Secondary Surveillance Radar (SSR), a digital air/ground data link communication system, and a ground-based collision avoidance system. Probably the most significant characteristic of the DABS is that it is a direct extension of and fully compatible with the SSR or the ATC Radar Beacon System (ATCRBS), as it is referred to in the U.S. Although primarily a surveillance system, DABS is also a communications and ground-based collision avoidance system designed with sufficient capacity to accommodate expected air traffic growth well into the next century. G.R.

A82-23323 **A Microwave Landing System simulation.** R. P. Spengler and R. W. Zoladz (Computer Sciences Corp., Pomona, NJ). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings. Arlington, VA, Air Traffic Control Association, 1980, p. 157-162.

Computer software is being developed for a series of experiments involving the simulation of Microwave Landing System (MLS) operations. The purpose of these experiments is to identify, or at least obtain advanced warning of, potential problem areas in an MLS implementation. The MLS simulation model is divided into three phases. Each phase represents a different level of avionics and thus provides capabilities for different approach paths. Emphasis is placed on the ATC communications and the various approach geometries. The MLS is an air derived system in which ground based equipment transmits accurate approach information to a receiver on board the aircraft. Azimuth, elevation, and ranging elements comprise the system operating in the microwave band (approximately 5000 megahertz). With MLS, aircraft can enter the approach area from various directions and speeds and fly toward separate approach gates. G.R.

A82-23324 **Voice communications - The vital link.** R. E. Hustead (Litton Industries, Amecom Div., College Park, MD). In: Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings.

Arlington, VA, Air Traffic Control Association, 1980, p. 165-168.

Voice communications provides the vital link among controllers and between controllers and aircrews. Communications systems presently in use provide voice communications via three links, including intercom (between different air traffic controllers), interphone (between different sites), and radio (between the air traffic controller and the pilots). It is pointed out that current communications systems at must air traffic control facilities are generally outdated, inflexible, and difficult to maintain. Attention is given to needs for a new voice communication system which is able to handle the peak loads of air traffic that the facility will encounter. Amecom's Integrated Voice Communications Systems satisfies these needs and is available now. The system has been designed specifically for tne Air Traffic Control environment. Aspects of system operation are discussed in some detail. G.R.

A82-23368 **Fighters - Tomorrow's terminology.** G. Warwick. *Flight International*, vol. 121, Feb. 6, 1982, p. 291, 292, 301, 302.

Consideration is given to the technological features under study for integration into fighter aircraft designs over the course of the 1990s. These features include: (1) fly-by-wire and fly-by-light active electronic controls, which will permit the modification of flight characteristics through reprogramming of software control laws; (2) the use of primary, directional-reinforced composite structures that will aeroelastically deform in flight to increase aerodynamic efficiency; (3) the improvement of wing aerodynamics through the downstream effect of canards; (4) the use of conformal stores carriages to reduce drag by as much as 60%; (5) the generation of direct lift force control by means of coordinated wing/canard control surface actuation; and (6) the vectoring of engine exhaust nozzles to increase lift and manuuverability. O.C.

A82-23369 **Boeing's big, quiet 737-300.** B. Sweetman. *Flight International*, vol. 121, Feb. 13, 1982, p. 353-356.

A description is given of the modifications made on the precursor 737-200 commercial aircraft design to yield the 737-300, which include: (1) greater wing and horizontal stabilizer spans; (2) fuselage extensions totalling 104 in; (3) leading edge slat airfoil redesign; (4) the incorporation of adhesive bonding construction techniques and more advanced aluminum alloys for longer service life; and most importantly, (5) a new engine installation that will accomodate either CFM 56-3 or RJ-500 turbofans. The modified aircraft is expected to meet FAR 36 Stage 3 noise limits, and to be more fuel-efficient than its predecessor. In the context of the present commercial aircraft market, the 737-300 represents a transitional design which will be replaced by a novel, 150-passenger short-haul aircraft. O.C.

A82-23426 **Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, February 11, 12, 1981, Collection of Papers.** Conference supported by the Technion - Israel Institute of Technology, Israel Ministry of Defence, Ministry of Transport, et al. Haifa, Israel, Technion - Israel Institute of Technology, 1981. 251 p.

Topics significant to modern aircraft design and performance, design and efficiency, and to control logic were examined. Flow past an airfoil in a supersonic stream was discussed, as were drag reduction by means of an active boundary layer thickening, the aerodynamic characteristics of an axisymmetric configuration with transverse jets in the base plane, and coherent structure of the turbulent boundary layer in the lateral direction. A general similarity solution of the transonic equation in the physical plane was presented, and perturbations to unidirectional turbulent flow due to small lateral mean velocity gradients were studied. Discussions were devoted to the evaluation of stiffened shell characteristics from imperfection measurements, to fixed gain controller design for aircraft, and to a time finite element discretization of Hamilton's law. M.S.K.

A82-23439 # **Low grade fuels for turbo and jet engines.** B. Gal-Or, E. Zahavi, and A. Burcat (Technion - Israel Institute of Technology, Haifa, Israel). In: Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, February 11, 12, 1981, Collection of Papers. Haifa, Israel, Technion - Israel Institute of Technology, 1981, p. 170-180.

In connection with the energy crisis, a program has been initiated to reexamine the design methodologies and the expected performance characteristics of turbo and jet engines in the light of the higher temperatures and reduced durability that would result from the increasing use of low-grade, high-aromatic aircraft fuels. The discussion focuses on the first phase of the program which includes simulated computer studies of the maximum flame temperatures exptected in jet engine combustors with different fuels under various operating conditions such as takeoff, cruise, and idle performance at various altitudes and Mach numbers. General parameters are proposed for the comparison of alternative fuels in terms of the maximum flame temperatures and the combustion products distributions. V.L.

A82-23441 # **Fixed gain controller design for aircraft.** Y. Baram and D. Eidelman (Tel Aviv University, Tel Aviv, Israel). In: Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, February 11, 12, 1981, Collection of Papers. Haifa, Israel, Technion - Israel Institute of Technology, 1981, p. 211-218. 8 refs. Grant No. AF-AFOSR-80-0178.

A method for designing fixed-gain controllers for systems with large parameter variation is presented, with particular attention to the problem of designing non-adaptive back-up control systems for high performance aircraft. The approach, based on minmax information criteria, is used to design a fixed-gain controller and a state estimator for a given aircraft, and is shown to provide good performance qualities. (Author)

A82-23444 **YF-16 design concept and philosophy.** H. J. Hillaker (General Dynamics Corp., Fort Worth, TX). *(Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, Feb. 11, 12, 1981.) Israel Journal of Technology*, vol. 19, no. 1-2, 1981, p. 3-18.

The design objective of the original YF-16 was to maximize the usable maneuverability and agility of the aircraft in the air combat arena at a mission radius of 500 n.mi. This objective was to be achieved within a flyaway cost of 3 million dollars per unit. To this end, emphasis was placed on small size and low weight/cost, on advanced technologies, and on design/aerodynamic innovations. The key configuration elements that offered clear superiority in terms of maximum lift, directional stability, drag-at-lift, and inlet flow field were bottom inlet, wing-body blending, variable camber, and single vertical tail. New wing planforms which are being tested on F-16, will allow even greater capabilities while retaining the low-cost concept. A single turbofan engine provides the best balance of combat capability and mission radius for the lowest weight. V.L.

A82-23470 **Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning (Verbesserung der Treibstoffökonomie durch Fliegen mit zulässiger rückwärtiger Schwerpunktlage).** M. Caspari and D. Kricke (Gesellschaft für Internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der Zivilen Luftfahrt*, vol. 17, no. 3, 1981, p. 142-146. In German.

The relationship between balance, stability, and maneuverability is established, and means of minimizing the moment of an aircraft's horizontal stabilizers and elevators to conserve energy are discussed. Requirements and peculiarities of INTERFLUG aircraft are described, and current techniques to save fuel by achieving a higher rearward center-of-gravity positioning are discussed. Particular attention is given to the retention of rearward center-of-gravity positioning in the IL-62/IL-62M aircraft. Calculations show that procedures exist to achieve a rearward center-of-gravity positioning of 33%, which would result in a minimum fuel savings of 4.1% at 185 g/km. J.F.

A82-23603 **High-frequency monitoring of surface layers of metals.** A. L. Dorofeev, N. P. Kalinin, and V. D. Ostapenko (Kalinin Carburetor Plant, Perm, USSR). *(Defektoskopiia*, Apr. 1981, p. 34-40.) *Soviet Journal of Nondestructive Testing*, vol. 17, no. 4, Dec. 1981, p. 268-272. Translation.

A high-performance electromagnetic device working at 100-500

MHz is reported. Main trends in tests on the effects of the electrical conductivity, the gap, the closeness to edges, and the presence of microcracks on the parameters of the device are established. A reduction in the quality factor is observed when the transducer is placed on a part with a defect, which causes a reduction in the amplitude or even a halt to the oscillation, indicating that simple self-excited flaw detectors working at elevated frequencies can be made with high sensitivity to surface defects. D.L.G.

A82-23678 **On the sonic fatigue life estimation of skin structures at room and elevated temperatures.** S. Maekawa (Kawasaki Heavy Industries, Ltd., Gifu, Japan). *Journal of Sound and Vibration*, vol. 80, Jan. 8, 1982, p. 41-58. 15 refs.

The Monte Carlo method of nonlinear response analysis and a fatigue life estimation scheme based on a rheological model have been used to estimate the sonic fatigue life of heated skin structures. Calculations for a skin-stringer panel are compared with experimental data and it is found that, with properly selected fatigue notch factor, the analysis provides fairly accurate estimate of the acoustic fatigue life. The effects of temperature, static pressure, and oil canning on the acoustic fatigue life are discussed. V.L.

A82-23751 **Welding technology for the aerospace industry; Proceedings of the Conference, Las Vegas, NV, October 7, 8, 1980.** Conference sponsored by the American Welding Society. Miami, FL, American Welding Society, 1981. 183 p.

The conference focused on the welding processes most important to future commercial and military aeronautic framework design and construction, aircraft hardware reclamation, and materials evaluation. Processes covered include diffusion welding, laser welding, electron beam welding, superplastic forming, keyhole plasma arc welding, inertia welding, and resistance welding. Other topics include weldability of critical materials and alternatives, welding supports such as adaptive controls, digital arc welding programmers, and the application of fracture control. Finally, repair welding is discussed. V.L.

A82-23753 **Novel approaches to electron beam welding machine utilization.** F. S. Pogorzelski (McDonnell Aircraft Co., St. Louis, MO). In: Welding technology for the aerospace industry; Proceedings of the Conference, Las Vegas, NV, October 7, 8, 1980. Miami, FL, American Welding Society, 1981, p. 41-53.

Several applications that require unique and novel approaches to the utilization of electron-beam welding equipment for profitable production are discussed. One of the applications is the welding of F-15 pylon posts fabricated from annealed Ti-6Al-4V die forging. A 100% penetration first weld pass in a tapered thickness butt joint is produced using a chart programmer set up with the plot of the high voltage required versus position along the length of the tapered joint; the programmer is coupled to the power-stat of the electron-beam welding machines so that the welding power is increased automatically to the proper value as the welding gun traverses from the thick to the thin section of the joint. Electron-beam welding of F-15 wing skin 'kick rib' machined from a solid plate of Ti-6Al-4V and the development of a blind tracking device for electron-beam welding are also discussed. V.L.

A82-23754 **Diffusion bonding in superplastic forming/diffusion bonding.** J. R. Williamson (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: Welding technology for the aerospace industry; Proceedings of the Conference, Las Vegas, NV, October 7, 8, 1980. Miami, FL, American Welding Society, 1981, p. 55-83. 8 refs.

Mechanisms of the superplastic forming/diffusion bonding process are discussed with reference to the fabrication of titanium structures for aerospace applications. Primary factors affecting diffusion bonding are examined including process variables such as pressure, temperature, and time, and material variables such as surface roughness, surface cleanliness, and grain size. Two additional factors become important because of the nature of the process. When forming must occur prior to bonding, it is necessary to maintain surfaces to be bonded in a noncontaminated, nonoxidized condition. Secondly, when a maskant is used for selective diffusion bonding, it is important to insure that the maskant does not interfere with diffusion bonding in the adjacent nonmasked areas. V.L.

A82-23755 **Aluminum and its alloys - Weldability.** I. B. Robinson (Kaiser Aluminum and Chemical Corp., Pleasanton, CA). In: Welding technology for the aerospace industry; Proceedings of the Conference, Las Vegas, NV, October 7, 8, 1980. Miami, FL, American Welding Society, 1981, p. 85-108. 14 refs.

Non-heat-treatable and heat-treatable aluminum alloys are examined with reference to their behavior during welding and their fusion weldability. It is shown that with existing aluminum alloys, the properties of fusion welded joints can be improved by minimizing the effective heat input and by using postweld heat treatments. High-intensity welding sources can provide greater penetration and narrower welds for higher strengths. However, poor fusion weldability of many high-strength alloys is due to their composition and microstructure, and great improvements in weldability and strength would require new alloys. The use of solid-state welding techniques in conjunction with heat treatment minimizes the problems of heat damage and offers possibilities of higher-strength welds in high-strength alloys. V.L.

A82-23757 **Welding for low-cost advanced titanium airframe structures.** R. W. Messler, Jr. and C. A. Paez (Grumman Aerospace Corp., Bethpage, NY). In: Welding technology for the aerospace industry; Proceedings of the Conference, Las Vegas, NV, October 7, 8, 1980. Miami, FL, American Welding Society, 1981, p. 123-138.

The fabrication of F-14 wing center section and other wing and fuselage parts, which relies heavily on electron beam welding, is described to demonstrate that welding is a valuable, versatile, and widely available technique for building low-cost advanced titanium structures for modern airframes. The advantages of welding include improved structural efficiency, improved material utilization, expanded near-net-shape processing capability, and structural optimization. To be most beneficial, the welding processes employed should provide high joint efficiencies for static and fatigue loading, high quality, low distortion and shrinkage, and high welding speeds or deposition rates to minimize welding labor intensity. V.L.

A82-23771 # **Material/structure degradation due to fretting and fretting-initiated fatigue.** D. W. Hoeppner (Toronto, University, Toronto, Canada). *(Canadian Aeronautics and Space Institute, Annual General Meeting, Montreal, Canada, May 11, 1981.) Canadian Aeronautics and Space Journal*, vol. 27, 3rd Quarter, 1981, p. 213-221. 6 refs.

The causes, effects, and possible remedies for fretting fatigue are examined. Fretting occurs on the surfaces of two objects in contact and in relative motion to one another, and results in either corrosion or wear, surface stress concentrations or surface and subsurface stresses, or component failure. Models of a fretting damage threshold are reviewed, noting that once the threshold has been crossed, no further fretting damage is of concern because fatigue cracks are proceeding from the fret-induced damage. Specific areas and components subject to fretting damage on aircraft airframes, transmissions, engines, and shafting are provided, and measures to reduce fretting have included vibration elimination, slip prevention, and sealing off the part from the atmosphere. Further techniques for individual cases are indicated. M.S.K.

A82-23772 # **A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum.** W. Wallace (National Aeronautical Establishment, Structures and Materials Laboratory, Ottawa, Canada), M. C. de Malherbe (Carleton University, Ottawa, Canada), and J. C. Beddoes. *(Canadian Aeronautics and Space Institute, Annual General Meeting, Montreal, Canada, May 11, 1981.) Canadian Aeronautics and Space Journal*, vol. 27, 3rd Quarter, 1981, p. 222-232. 7 refs. Research supported by the Natural Sciences and Engineering Research Council of Canada.

A study on the potentials of retrogression and reaging (RRA) aerospace aluminum alloys in the 7000 series to gain the T73 temper and T6 strength levels is reported. The investigation covered the determination of the form of the RRA reactions in 7075-T6 Al by using hardness, yield strength, and electrical conductivity measurements, a wider range of temperatures and times which would allow thicker specimens to be treated, and confirmed the improved stress corrosion resistance. Fittings were heat treated in silicone oil baths, subjected to computer controlled servo-hydraulic tests, tested for stress corrosion crack growth rates, and treated with seawater solutions. No relation was found between stress corrosion and yield strength, and the RRA treatment produced crack growth rates similar to the T73 alloy with T6 strength. Additionally, the stress corrosion resistance of 7075 Al aged to or beyond the T6 condition was found proportional to the electrical conductivity of the material. M.S.K.

A82-23774 # **F/A-18 weapon system development.** M. J. Tkach (McDonnell Aircraft Co., St. Louis, MO). *(Canadian Aeronautics and Space Institute, Flight Test Symposium, Cold Lake, Alberta, Canada, Mar. 31-Apr. 1, 1981.) Canadian Aeronautics and Space Journal*, vol. 27, 3rd Quarter, 1981, p. 242-252.

The design and operation of the F/A-18 cockpit, controls, avionics displays, and weapons systems control are described. The cockpit is equipped with three head-down 5 in. x 5 in. CRTs, an up-front control for communication, navigation, and identification purposes, and an HUD. The pilot needs to move his head only 22 deg from the HUD to the up-front control, while the HUD displays navigation and weapon delivery information, both air-to-air and air-to-ground. A Hands On Throttle and Switching has switches on the stick and throttle for pilot control of the weapons, sensors, and displays during time-critical periods, in addition to control of the radar modes. All AIM-7 and -9 missile firings to date have resulted in hits, while the lack of traditional airspeed indicators, coupled with the quiet cockpit and new maneuvering flaps have caused problems in maintaining airspeed control, with rectification difficult due to the complexity of the electronics. M.S.K.

A82-23826 * # **Design of supercritical swept wings.** P. Garabedian and G. McFadden (New York University, New York, NY). *AIAA Journal*, vol. 20, Mar. 1982, p. 289-291. 11 refs. Grants No. NGR-33-015-201; No. NSG-1579.

Computational fluid dynamics are used to discuss problems inherent to transonic three-dimensional flow past supercritical swept wings. The formulation for a boundary value problem for the flow past the wing is provided, including consideration of weak shock waves and the use of parabolic coordinates. A swept wing code is developed which requires a mesh of 152 x 10 x 12 points and 200 time cycles. A formula for wave drag is calculated, based on the idea that the conservation form of the momentum equation becomes an entropy inequality measuring the drag, expressible in terms of a small-disturbance equation for a potential function in two dimensions. The entropy inequality has been incorporated in a two-dimensional code for the analysis of transonic flow over airfoils. A method of artificial viscosity is explored for optimum pressure distributions with design, and involves a free boundary problem considering speed over only a portion of the wing. M.S.K.

A82-23828 # **Oscillating supersonic/hypersonic wings at high incidence.** W. H. Hui, M. F. Platzer (U.S. Naval Postgraduate School, Monterey, CA), and E. Yourouкos. *AIAA Journal*, vol. 20, Mar. 1982, p. 299-304. 11 refs.

An approximate analytic method is developed for predicting the aerodynamic stability of oscillating supersonic/hypersonic flat wings at a mean angle of attack. It uses the known exact unsteady unified supersonic/hypersonic flow solution for a two-dimensional flat plate plus the strip theory approximation to obtain the formulas for the stability derivatives. They are applicable for wings of arbitrary planform shape at arbitrary angles of attack provided the shock wave is attached to the leading edge of the wing. Good agreement is obtained with existing theories in various special cases. The formulas for stability derivatives given here become exact in the Newtonian limit. (Author)

A82-24001 # **Reliability centered maintenance /RCM/.** F. S. Nowlan (United Air Lines, Inc., Chicago, IL). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 4 p.

Inherent reliability characteristics of transport aircraft are described, and principles of reliability-centered maintenance (RCM) are discussed. Airworthiness regulations are noted to be directed at failure events that have not yet occurred, but which theoretical analyses indicate have an unacceptable probability of happening. Specific requirements are communicated to engineers, and compliance results in either no occurrence of failure, or sufficient redundancy of performance to offset failure. RCM procedures involve component inspection at specified intervals, part overhaul before the failure interval is approached, discarding parts before the failure life is passed, and finding failures in hidden-function items which crewmembers may not have noticed. On-condition tasks are given higher priority, followed by a rework task and then a discard task. The effects on safety of the aircraft is the measure of the task hierarchy. M.S.K.

A82-24002 # **A310 - Design for maintenance.** R. Cutler (Airbus Industrie, Blagnac, Haute-Garonne, France). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 17 p.

The way in which Airbus Industrie deals with maintenance during the design phase is described, noting that by giving maintenance the attention it merits, its proportion of direct operating costs is kept to a minimum. Aircraft design is continuously subjected to a maintainability and reliability (M & R) review in order to ensure optimum trade-offs between M & R and other goals. This review process comprises five steps: (1) apportioning M & R goals to systems, components, etc., as required; (2) reviewing in-service experience to identify past problems and areas having the greatest potential for development; (3) evaluating design using M & R analytical techniques to identify questionable areas; (4) holding review meetings with designers and equipment suppliers to determine what improvements can be made; and (5) holding management progress review meetings to assess overall M & R performance in relation to goals, highlighting areas where goal attainment is unlikely, and specifying further actions. C.R.

A82-24003 # **Development of maintenance programmes through the functional, structural and flight test phases.** R. E. Grigg (British Aerospace Public, Ltd., Co., Weybridge, Surrey, England). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 9 p.

Methods employed by British Aerospace to develop minimized maintenance plans for use by airline mechanics are described, with particular regard to the B. Ae. 146. The 146 was designed for simplicity with constraints imposed by maintenance cost targets and monitoring to meet contractual commitments. All systems were monitored at component levels, and the occurrence of full mock-up with real hardware initiated the development of maintenance schedules. A logic analysis procedure was used to determine cost effective maintenance programs by scheduling maintenance on parts which affect safety and operational economy, and defined the tasks to be performed. Failure modes were defined for each functional component and a probability level of acceptance before catastrophic failure was set. Further steps included flight development maintenance monitoring, task monitoring, the establishment of servicing locations, design of a structural inspection program, and the definition of structure life and inspection goals. M.S.K.

A82-24004 # **Air cooled engine test facilities.** G. F. Dawson (Industrial Acoustics Co., Ltd., Staines, Middx., England). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 6 p.

The equipment and instrumentation of an operating comprehensive acoustic test facility for aircraft are described. Specifications include air cooling and the capability of handling a reheat engine with a back-on-the-bed time of 30 min after engine shut-off. The facility is totally demountable, yet includes an acoustic enclosure, an intake silencer, and augmentor tube, a primary diffuser, a secondary suppressor, a plenum chamber, exhaust splitter elements, an exhaust stack, and a weather-proofed and sound-insulated control room. Prerigged engines are mounted on the test bed over a trolley prewired and connected for all pneumatic and electronic parameters. Engine test time is reduced by 50% over conventional testing methods due to an instantaneous computerized display of test results, automatic input and logging of data, audible and visual alarm systems, diagnostic checking procedures, and manual reversion capabilities on the controls. M.S.K.

A82-24005 # **Maintenance objectives for future aircraft.** J. G. Borger. *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 8 p.

Maintenance requirements for airline operations are discussed, noting the need for simpler designs which enhance maintenance procedures while still maintaining increasing fuel efficiency. Equipment redundancy is useful for safe operation with failed components, and modularizing aircraft parts has permitted on-line monitoring and replacement operations to maintain aircraft in flight-ready status with minimum delays due to repairs. The advent of advanced electronics has enhanced maintenance procedures in some cases, while in others the complexity of the monitoring system has led to greater down time. Higher performance engines degrade in performance after little more than a year's use, but refurbishment guided by high test stand acceptance standards, has improved engine removal rates. Finally, designing for reliability, ease of inspection and removal, and for in-flight potential problem indication are recommended. M.S.K.

A82-24006 # **Airworthiness regulation: What is our strategy - What are the issues.** M. C. Beard (FAA, Office of Airworthiness, Washington, DC). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 6 p.

The importance of international standards in the design, manufacture, and maintenance is stressed in view of the increase of the leasing, charter, and exchange of aircraft across national boundaries. Another trend noted in calling for international standards is the fact that the components of any given aircraft are, to an increasing extent, designed and manufactured in several different countries. C.R.

A82-24007 **Reliable power.** J. M. S. Keen (Rolls-Royce, Ltd., Derby, England). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 20 p.

Current Rolls-Royce engines are reviewed, with specific attention given to the implementation of a three-shaft concept for the modular development of engine thrust increases and fuel consumption decreases. The RB-211 three-shaft concept is reviewed, noting the development followed design goals of a short rigid engine with a minimum number of variables and cooled turbine stages. The E-4 engine employs a wide chord fan blade without snubbers and blends the turbine and bypass duct exhaust flows for passage through a single, final nozzle. Comprehensive access ports have been designed into the big fan engines, along with chip detectors in the oil system and vibration monitoring equipment for on-condition maintenance. Reliability management has resulted in the modular nature of the engines, featuring engine breakdown into separate, self-contained components, with comprehensive use records serving to notify when specific parts are due for inspection or replacement. M.S.K.

A82-24008 # **What the operator wants.** J. Meline. *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 6 p.

The design and manufacturing goals of aerospace industries for supplying airlines which have formed cooperative pools of maintenance and overhaul facilities and resources are examined. The manufacturers have gained feedback from the pooled labor forces who work on the increasingly standardized stocks of components in the common repair facilities, and are enabled to design-in improved features allowing easier and more thorough maintenance. Introduction of a new aircraft in any one fleet immediately introduces the vehicle to all maintenance personnel in the pool. The ATLAS group is noted to currently maintain a total fleet of 437 aircraft, and member agencies coordinate shared time to meet overhaul requirements. Differences in on-condition maintenance and overhaul grouping of work is described, and the benefits of pooling the most qualified personnel are emphasized. M.S.K.

A82-24009 # **The way ahead for helicopter maintenance.** W. E. Morris (Westland Helicopters, Ltd., Yeovil, Somerset, England). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 9 p.

The progress made by a British helicopter company in improving maintainability and reliability (M & R) is surveyed. Among the practices that have been found to be significant are the following: (1) maintaining a comprehensive data bank on M & R that is linked with customer data banks; (2) mathematical modeling of the life cycle costs; (3) improving the ability to diagnose sources of vibration without detriment to the operational availability of the helicopter; and (4) introducing check out systems that record in-flight defects and malfunctions, thereby simplifying maintenance programming. C.R.

A82-24010 # **The inter-relation between design, construction and maintenance.** J. M. Ramsden. *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 5 p.

Methods of improving inspection and maintenance procedures, especially to compensate for an emphasized rise in poor workmanship during construction phases, are outlined. An improvement in detail design, to simplify and correctly place aircraft components, is recommended, as is better education of specialists in features of fasteners and electronics. On-line monitoring has become possible with self-checking, multiple probes for nearly all functional on-board equipment. The need to improve tires and brake systems to cope with increasing landing weights and speeds is noted, as is a necessity to integrate electronic systems and provide protection from disconnects due to the operating environment. Further suggestions are made for the elimination of corrosion, improvements in inspectability, and the need to measure in-service aerodynamics, and the demise of the U.S. Civil Aeronautics Board is mentioned as an erosion of the airline industry's data base. M.S.K.

A82-24011 # **MSG-3 structures.** S. Schofield (British Airways, Hounslow, Middx., England). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 5 p.

The paper describes the philosophy and methodology used to develop the aircraft structures maintenance program contained and recently published in the ATA Airline/Manufacturer Maintenance Program Planning Document MSG-3. Particular consideration is given to the evolution of a separate logic analysis for structures; the consequence of failure evaluation; the separate assessment of the different forms of structural damage; the detectability of damage; the establishment of a continuing structural program for the life of the aircraft; fleet leader/age exploration inspections and the role of the manufacturer in the continuing structure program. B.J.

A82-24012 # **Monitoring engine wear by oil analysis.** D. F. Sermin (Applied Research Laboratories of Florida, Inc., Hialeah, FL). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 5 p.

The application of spectroscopic techniques to the detection of metal particles in engine oils as an identifier and predictor of specific component wear and incipient failure is described. The current rotrode technique involves physically taking an oil sample for electrical discharge vaporization and subsequent spectrography. A succeeding step identifies the concentration computer calibrated graph. Inaccuracies in the method had led to the development of wear element contraction determination by the use of inductively coupled plasma excitation. The sample is introduced to the plasma within a quartz tube surrounded by a coil of wire which creates the magnetic field. The oil is nebulized and passed through a tube into the plasma, where the atoms dissociate and create individual optical spectra in the 7000-10,000 K heat. The method yields results within 1% of the signal value detected, or within 1 ppm. M.S.K.

A82-24014 # **MSG-3 overview.** R. Valeika (Pan American World Airways, Inc., New York, NY). *International Aircraft Maintenance Engineering Exhibition and Conference, Zurich, Switzerland, Feb. 10-12, 1981, Paper.* 4 p.

The paper surveys experience with programs developed in the framework of the ATA Airline/Manufacturer Maintenance Program Planning Document MSG-3. After a brief review of experience with MSG-1/2, attention is given to MSG-3 development, and to maintenance programs developed for systems, powerplants, and structures within the MSG-3 context. B.J.

A82-24022 * # **Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance.** W. H. Greene and J. Sobieszczanski-Sobieski (NASA, Langley Research Center, Hampton, VA). *(AIAA, ASME, ASCE, and AHS, Structures, Structural Dynamics and Materials Conference, 21st, Seattle, WA, May 12-14, 1980, AIAA Paper 80-0724.) Journal of Aircraft,* vol. 19, Mar. 1982, p. 228-234. 12 refs.

A procedure for sizing an airframe for flutter-free performance is demonstrated on a large, flexible supersonic transport aircraft. The procedure is based on using a two-level reduced basis or modal techniqus for reducing the computational cost of performing the repetitive flutter analyses. The supersonic transport aircraft exhibits complex dynamic behavior, has a well-known flutter problem and requires a large finite-element model to predict the vibratory and flutter response. Flutter-free designs are produced with small mass increases relative to the wing structural weight and aircraft payload. In view of the ability of the resizing procedure to handle this supersonic transport configuration, it seems likely that the method could be used for many other aircraft. (Author)

A82-24023 # **Static pressure in the slipstream of a propeller.** G. Schouten (Delft, Technische Hogeschool, Delft, Netherlands). *Journal of Aircraft,* vol. 19, Mar. 1982, p. 251-253. 9 refs.

Prompted by the paradoxical implication of existing theory that static pressure in the slipstream of an active propeller would exceed the static pressure in the fluid outside the slipstream, a consistent theory is developed which yields a static pressure more plausibly tending to the freestream pressure. The theory adapts the flat trailing vortex sheet model to a propeller with a finite number of blades which moves at a finite velocity. O.C.

A82-24025 **Air transport in the 21st century.** K. G. Wilkinson. *Aerospace* (UK), vol. 9, Jan. 1982, p. 18-23. 8 refs.

Trends in aircraft design into the 21st century are discussed, based on the driving need for higher fuel efficiency and alternative fuels. Noting that fuel presently accounts for 30% of air transportation, results of an international study on the world energy supply and growth are used to present several scenarios of future aerospace operations. Global energy is projected to be provided from renewables and nuclear, coal and gas, and oil, each group producing 1/3 of the world energy demands, with aerospace consuming 3% of the total oil consumed. Advances in aerodynamics from NASA studies, in lightweight synthetic materials, in active controls, and in propulsion systems are outlined, with mention made of the CO2 contribution to a global rise in temperature. The development of nuclear technology and the availability of nuclear fuels is contrasted against the environmental costs of using hydrocarbon fuels, and the necessity of developing a hydrogen-based fuel economy is emphasized. M.S.K.

A82-24065 **Nuvigational aids on-board the Concorde (Les moyens de navigation du Concorde).** F. Vicens (Compagnie Nationale Air France, Paris, France). *Navigation (Paris),* vol. 30, Jan. 1982, p. 25-39. In French.

The differences of navigational instrumentation on the Concorde from subsonic aircraft due to transonic and supersonic flight regimes are described. Speed classes at different heights are defined for optimal flight operations, with each minute of error from the most direct route causing an extra 100 kg of fuel to be consumed. The Concorde is equipped with an inertial navigation system (INS), automatic direction finder, distance measuring equipment, VOR, and a ground warning system. The INS gathers altitude information, guidance and navigation data, and coupled compass stabilization information with reference to the magnetic pole. The Air Data Computer gathers aerodynamic and meteorological information, including altitude and vertical airspeed, from sensors mounted on the nose, and further guidance is aided by radio compass readings (Automatic Directional Finder) and two systems of radio altimetry. M.S.K.

A82-24066 **The birth of precision DME (La naissance du DME de précision).** O. Carel (Direction Générale à l'Aviation Civile, Paris, France). *Navigation (Paris),* vol. 30, Jan. 1982, p. 53-65. 6 refs. In French.

The requirements, design, and deployment of precision distance measuring equipment (DME) for implementation at French civil airports is described. The system is intended to equal the performance levels of military landing systems, and furnish coordinates at 20 nm distance with a landing aperture of plus or minus 80 deg. The DME permits curved approaches, thereby ameliorating flights over some urban areas, and offers the possibility of totally replacing radioaltimetry as an approach guide. Polar coordinates are transmitted with an accuracy of 250 m, which is matched by the transverse accuracy, while altimeter readings are made with a 30 m error. Methods of obtaining the precision measurements are presented, along with analyses of exponential damping, fabrication of the system, the presence of second or third impulses, and methods of interlocking the impulses, along with a demonstration of a 200 channel dual mode system. M.S.K.

A82-24077 # **Recent developments in wing with stores flutter suppression.** R. Destuynder (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Deutsche Gesellschaft für Luft- und Raumfahrt and Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, International Symposium on Aeroelasticity, Nuremberg, West Germany, Oct. 5-7, 1981.) ONERA, TP* no. 1981-145, 1981. 11 p.

Active flutter suppression calculations and wind tunnel tests were performed for the case of a half-scale model of the Mirage F-1 fighter wing, equipped with three underwing stores whose distribution has been modified to make flutter occur in the wind tunnel's Mach 0.80-0.94 transonic regime. Flutter control was achieved with a numerical control law designed to induce wing aerodynamic stiffness by means of a control surface. Further studies were conducted on nonlinearities due to the static aerodynamic characteristics of the control surface at high subsonic Mach numbers, and the influence of phase and gain variations on the control law. The results derived demonstrate the possibility of flutter control on military aircraft operating at high Mach numbers. O.C.

A82-24245 **Recent improvements in aircraft Ni-Cd cells.** R. Bonnaterre, J. Leonardi, and P. Oliva (Société des Accumulateurs Fixes et de Traction, Bordeaux, France). In: Power sources 8: Research and development in non-mechanical electrical power sources; Proceedings of the Twelfth International Symposium, Brighton, England, September 1980. London, Academic Press, 1981, p. 459-468; Discussion, p. 469.

It is noted that the reliability, power performance, and durability of the alkaline Ni-Cd batteries used in such advanced technical fields as aeronautics and high-speed trains are becoming increasingly important. A new aircraft battery generation created to respond to such requirements is described. Increased reliability and durability result from the development and use of a new graft copolymer membrane, the properties of which are discussed. The use of the new membrane and the optimization of the electromechanical parameters of the cell design have significantly improved the power characteristics of Ni-Cd aircraft batteries. In particular, eliminating the 'potential well' phenomenon in low-temperature, high-rate discharges has led to substantial power gains for low-temperature aircraft starts. C.R.

A82-24301 **Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings.** Conference sponsored by the Society of British Aerospace Companies. London, Society of British Aerospace Companies, Ltd., 1981. 713 p. $59.50.

Among the aircraft transparency design, testing and analysis topics covered are: (1) transparency development needs for military aircraft in the 1980s, (2) an aircraft transparency design guide, (3) deficiencies and constraints affecting the design of cockpit transparencies and enclosures, (4) bird strikes, (5) windshield system structural enhancement, (6) aircraft transparency bird impact analysis using the MAGNA computer program, (7) stretched acrylic transparency materials, (8) transport aircraft transparencies, and (9) impact resistance test methods. Also considered are (10) abrasion-resistant coatings for aircraft, (11) the role of finite element analysis in the design of birdstrike-resistant transparencies, and (12) the effects of bird orientation on load profile and damage level. O.C.

A82-24302 **Transparency development needs for military aircraft in the 1980's.** N. C. Moore. In: Conference on Aerospace

Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 3-13.

Attention is given to the improvement and optimization of overall transparency configurations in military aircraft. A number of areas for development effort are identified. These include (1) the achievement of undistorted views from helicopter transparencies, (2) the need for distortionless, near-360-deg vision from fixed wing strike aircraft windscreens and canopies, (3) the reduction of transparency-induced cockpit noise, (4) the lowering of glint phenomena through transparency surface reflectivity reduction, (5) the design of alternative windscreen washers and wipers, (6) the reduction of strike aircraft combat losses due to pilot injury, by means of transparent armor, (7) emergency repair schemes under battle conditions, and (8) nuclear effects due to overpressure, flash and thermal effects, and radiation levels. O.C.

A82-24303 **Deficiencies and constraints that affect the design of cockpit enclosures and transparencies.** J. H. Lawrence, Jr. (Douglas Aircraft Co., Long Beach, CA). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 15-24.

Maximum-visibility cockpit enclosure and transparency design problems are considered in light of experience with the development of the DC-10, in which these design considerations were addressed by means of a systems approach. The strongest constraint is shown to be the aerodynamic shaping of the aircraft, which, because of the slopes and shapes required, may be unacceptable to the pilot on the grounds of distortion and can increase the difficulty of designing such subsystems as the electrical, anti-icing, and rain removal. Attention is also given the inadequacies of glass-acrylic laminates under cyclic loading, thermal cycling and contact with moisture, the seals and mounting of the transparencies in their support structures, and up/down-left/right charts for both minimum recommended vision and the captain's binocular vision envelope. O.C.

A82-24304 **Fuel-efficient windshields for transport, commuter and business aircraft.** G. L. Wiser (Sierracin Corp., Sylmar, CA). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 25-95. 34 refs.

The effects of weight and drag reduction measures involving windshields and their associated structures and systems on fuel efficiency are explored. It is shown that the incorporation of these techniques can save up to 80,000 gallons of fuel/year per aircraft in wide-body commercial aircraft applications, and 12,000 gallons/year per aircraft in the case of commuter designs. The alternatives considered include (1) flat glass windshields, (2) curved glass windshields, (3) curved high-strength glass windshields, (4) structurally-integrated curved windshields, (5) curved stretched acrylic windshields, (6) curved, chemically-strengthened glass windshields, and such associated systems as temperature controllers and rain removal. O.C.

A82-24305 **Transparencies - What an aircraft designer should know.** P. J. Sharp (Lucas Aerospace, Ltd., Luton, Beds., England). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings.
London, Society of British Aerospace Companies, Ltd., 1981, p. 97-111.

The effect of windscreen lay-back angle on aircraft weight, energy requirements and optical characteristics are quantified for a typical, small jet aircraft, and the problems associated with the electrical deicing of irregular areas are examined. Weight effects are due to the load-transfer requirements of pressurized cabin transparencies. Additional factors considered are bird strikes, windscreen visual distortion, heating element positioning, and certification criteria. O.C.

A82-24306 **Transparency design decisions - Assessing their impact on visual performance.** R. G. Eggleston and L. V. Genco (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, OH). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 113-128.

The efficiency of aircraft transparency designs is considered as an information system in which the scene, transparency and pilot are separate elements. A transparency may alter the scene visible to a pilot in four ways: refraction, reflection, absorption and transmission. These are the bases for such common transparency optical degradation problems as (1) distortion, (2) multiple imaging, (3) rainbowing, (4) volume and surface haze, (5) internal reflections, and (6) transmission loss. The contribution to each of these defects by transparency slant, flatness, single or compound curvature, material, thickness, absorption characteristics, scratch resistance, UV resistance, and monolithic or laminated construction, are correlated in tabular form along with observer and scene factors that may contribute to the quality or degradation of performance. O.C.

A82-24307 **Aircraft transparency design guide.** L. Moosman (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH) and J. H. Lawrence, Jr. (Douglas Aircraft Co., Long Beach, CA). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 129-139.

The 'Guidelines for the Design of Aircraft Windshield/Canopy Systems' is a design manual which serves as a single source for all requirements, data and systems recommendations relevant to the development of aircraft transparencies. The guide covers: (1) management of transparencies and related subsystems design; (2) the transparency/aircraft configuration relationship, (3) vision and optical design; (4) structural design and analysis; (5) bird impacts; (6) materials; (7) environmental design; (8) combat exposure design; (9) maintainability; (10) reliability; and (11) transparency design verification and quality assurance requirements. The data from which this compilation of requirements was derived include FAR 25, SAE AS580, and the Air Force Systems Command Design Handbook. O.C.

A82-24308 **A new angular deviation measurement device for aircraft transparencies.** H. L. Task, R. G. Eggleston, and L. V. Genco (USAF, Human Engineering Div., Wright-Patterson AFB, OH). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 141-147.

An optoelectronic angular deviation measurement device incorporating a CCD array, which offers accuracy, repeatability and ease of operation while occupying a much smaller volume than long-throw laser devices of comparable performance, is described. The instrument's resolution is 0.07 mrad, and F-16 windscreen measurements have been found to compare favorably with data produced by alternative techniques. The device is to be used in characterizing distortion levels in such transparency-incorporating systems as head-up displays. O.C.

A82-24309 **Portable transparency optical test system /P-TOTS/.** L. V. Genco, R. G. Eggleston, and H. L. Task (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, OH). In: Conference on Aerospace Transparencies, London, England), September 8-10, 1980, Proceedings.
London, Society of British Aerospace Companies, Ltd., 1981, p. 149-160.

The Portable Transparency Optical Test System (P-TOTS) described is a novel device for the collection of visual and optical data from installed transparencies, including the evaluation of time-dependent changes in optical quality. Although P-TOTS has to date been employed in the birefringence, distortion, binocular distortion, multiple image and haze characterization of F-111 windscreens, the device may be adapted to other aircraft through a mounting-fixture change estimated to cost $4000. O.C.

A82-24310 **Abrasion resistant coated plastic products for aircraft.** W. F. Fischer and W. C. Harbison (Swedlow, Inc., Garden Grove, CA). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings.
London, Society of British Aerospace Companies, Ltd., 1981, p. 185-204. 10 refs.

Experimental results concerning the use of the application of abrasion-resistant coatings to polycarbonate and acrylic transparencies in architectural and ground-transportation installations are correlated to the use of such coatings on aircraft transparencies. A failure theory is substantiated through a combination of the experimental data with separate results of accelerated testing. A silica-filled polysiloxane coating is shown to offer the greatest resistance to abrasion. The failure mode of the coatings is generally mechanical degradation, consisting of cracking or microcracking from repeated tensile elongation/compression associated with thermal, moisture gain/loss and flexural cycling. O.C.

A82-24311 **Proposed method for abrasion testing transparent plastics and coatings.** A. J. Bunja (Texstar Corp., Texstar Plastics, Grand Prairie, TX). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 205-213.

An examination is presented of methods for the abrasion testing of transparent plastics and coatings, with attention to the preparation and interpretation of the Taber Abraser and Falling Sand tests. A test methodology is described which allows the testing of all materials and coatings irrespective of hardness, and in which the entire sample surface is exposed to the abrading action. The larger area thereby measured yields more representative results, which are shown to be highly reproducible. Test results data are presented in tabular form. O.C.

A82-24312 **Windshield system structural enhancement.** R. J. Speelman, R. H. Walker, and R. L. Peterson (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 217-243. 22 refs.

Transparency technology investigations with emphases on improved birdstrike resistance and longer service life are being conducted by the Air Force Flight Dynamics Laboratory. In addition to supporting such existing systems as the T-38, F-16 and F-111, a technical base is emerging for the development of new transparencies which includes: (1) computer-aided design procedures for birdstrike structural analysis; (2) birdstrike hazard risk prediction techniques; (3) design procedures for the integration of birdstrike protection and large field-of-view capabilities with high-temperature operation; (4) design procedures for consideration of ballistic fragment impact resistance; (5) testing procedures for improved correlation between laboratory and field performance; and (6) a transparency system design-guideline manual. O.C.

A82-24313 # **An analytical methodology to predict potential aircraft losses due to canopy birdstrikes.** J. C. Halpin, J. M. Griffin, and K. T. Jackson, Jr. (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 245-271.

An analysis for the projection of birdstrike damage is presented in which data for the F-4 aircraft is used as a basis for the development of a model and the F-16 is used for verification. After determining the operational impact rate (OIR), a kinetic energy matrix is calculated and a line representing the expected canopy capability is drawn through this matrix. The canopy capability line from the kinetic energy matrix is then superposed on the birdstrike matrix, and the birdstrike number is derived by summing the appropriate values from the matrix. If the failure mode is deflection rather than penetration, critical areas corresponding to certain kinetic energy levels must be determined and then used to recalculate the expected birdstrike matrix. O.C.

A82-24314 **The role of finite element analysis in the design of birdstrike resistant transparencies.** B. S. West (Dayton, University, Dayton, OH). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 273-295. 8 refs. Contracts No. F33615-75-C-3134; No. F33615-76-C-3103; No. F33615-80-C-3401.

The Materially and Geometrically Nonlinear dynamics Analysis problems (MAGNA) finite element code, for the efficient analysis of crew enclosure structures during bird impact, is described. The design variables typically incorporated into parametric design data in the code are: (1) transparency stiffness, which depends on material, configuration and thickness; (2) support structure stiffness; (3) load location; (4) load magnitude; and (5) edge member configuration. Transparency edge member integrity has proved to be critical to the birdstrike resistance of aircraft transparency/support systems. Computer run time increases by more than an order of magnitude if the parametric study is conducted using all available nonlinear options rather than linear elastic analysis. Several sample analyses are presented to demonstrate the linear and nonlinear solution capabilities of the MAGNA program. O.C.

A82-24315 **Aircraft transparency bird impact analysis using the MAGNA computer program.** R. E. McCarty (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 297-313. 14 refs.

The MAGNA computer program is shown to realistically simulate the nonlinear dynamic structural response of aircraft transparencies to birdstrike loading. It is not yet possible, however, to accurately predetermine the loads resulting from bird impact on very flexible transparencies, due to the fact that the magnitude of the loads and the surface area and time period over which they act strongly depend on the dynamic response of the transparency. MAGNA is especially applicable to relatively stiff transparencies, in which the effects of load-response coupling may be ignored, and may prove useful in the analysis of any problem involving the response of a structure subject to static or transient loads. O.C.

A82-24316 **The effects of bird orientation on load profile and damage level.** A. Challita and B. S. West (Dayton, University, Dayton, OH). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 315-338. 7 refs. Contract No. F33615-78-C-3402.

A number of programs have been initiated with the aim to increase the birdstrike resistance of aircraft and their components. A description is presented of specific programs with two basic objectives. One objective is related to a characterization of the loads generated during birdstrike to use as input to the modern finite element structural analysis codes which are currently used as a transparency design tool. The second objective involves the evaluation of the testing procedures employed to evaluate the level of birdstrike protection afforded by a given flight hardware system. Of three orientations tested, end-on orientation was found to be as critical, or more critical, than the other orientations. Side-on orientation was the least critical orientation. During end-on birdstrike testing, pitch and yaw would tend to decrease critically. G.R.

A82-24317 **Acrylic - A timely review.** K. G. Granger (Swedlow, Inc., Garden Grove, CA). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 341-354, 356, 357.

The review is concerned with the use of acrylics in applications related to aircraft transparencies, taking into account the principal aircraft grades of acrylic. Main qualities of acrylics with respect to the considered applications include its ability to maintain excellent strength, transparency, and clarity in environments which comparatively quickly cause deterioration in other transparent plastics. For aircraft glazings applications, only glass is superior to acrylic in terms of weatherability, solvent resistance, and surface hardness. However, glass is inferior to plastics in connection with greater weight, failure mode, and relative difficulties with respect to the formation of aerodynamic shapes. A number of case histories are discussed which demonstrate the advantages of a use of acrylic. Attention is also given to the proposed laminated F-16 canopy design and the development of modified acrylics. G.R.

A82-24318 **Lucas stretched acrylic.** D. B. Bell (Lucas Aerospace, Ltd., Luton, Beds., England). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 359-368.

Selection criteria for the pressing processes in manufacturing stretched acrylic from as-cast billets at the Lucas facility are discussed. Advantages of a press over gripping around the edges include more parallel surfaces, better yield from the material, and the avoidance of sheet splitting which sometimes occurs when the material is stretched. Specifications for stretched acrylic are discussed, and the facility is described, including a discussion of the stretching press and the grinding/polishing machines. The planned expansion of the facility is also discussed, which includes the introduction of a pre-heater and additional polishing machines. D.L.G.

A82-24319 **Problems associated with the quality assurance of stretched acrylic sheet.** R. L. Worsdall (Ministry of Defence /Procurement Executive/, Material Quality Assurance Directorate, London, England). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 371-397.

A description is presented of special problems arising in connection with an application of a manufacturer for Type Approval of a material intended for defense-related uses, taking into account the approaches employed to solve these problems. The material involved was stretched acrylic sheet. There were differences between test results obtained in the laboratories of the manufacturer and the Materials Quality Assurance Directorate. The differences were, in particular, observed in thermal relaxation studies, and increased as the thickness of the sheets examined became progressively larger. In an investigation of the reasons for these differences, it was found that in the conduction of thermal relaxation studies the temperature control is important and the moisture content is critical. An important factor is also the position from which the sample is taken in the sheet. G.R.

A82-24320 **The effects of absorbed moisture upon the physical properties of stretched acrylic materials.** A. J. Mason (British Aerospace Public, Ltd., Co., Materials Laboratory, Weybridge, Surrey, England). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 399-416. Research supported by the Ministry of Defence (Procurement Executive).

It is noted that stretched acrylic materials are often preferred to 'as-cast' acrylics for the manufacture of aircraft transparencies owing to their superior craze and crack propagation resistance. However, the service performance of stretched acrylics can be affected by their operational environment. The effects of absorbed moisture upon various physical properties of stretched acrylic materials, including thermal relaxation, surface shrinkback, solvent craze resistance, crack propagation resistance, and surface hardness, are described. It is pointed out that the base stock material and method of stretching may also influence physical properties. These have been assessed by including in the evaluation three materials that have been manufactured from two base stock materials and produced by two manufacturing techniques. C.R.

A82-24323 **The development of high strength light-weight windshields for the new generation of Boeing 757 and 767 airliners.** R. W. Wright (Triplex Safety Glass Co., Ltd., Aircraft and Special Products Div., Birmingham, England). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 533-548.

Windshields based on multilaminate construction and electroconductive coatings were introduced in the 1970s on such aircraft as the Concorde, A300B, de Havilland Canada Dash 7, and Boeing 747. In all, more than 20,000 hours of flight have been recorded. The way in which this technology is being adapted to meet the needs of the new Boeing 757 and 767 aircraft, where weight saving and reliability are fundamental requirements, is discussed. A description is also given of design, development and qualification test features. C.R.

A82-24324 **D.C.9 windshield - Effect of attachment retorque.** J. Christensen (Scandinavian Airlines System, Copenhagen, Denmark). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 549-562.

Reference is made to a paper by Christensen (1978) propounding a theory related to the influence of attachment method on failures for D.C. 8-60 and D.C.9 winshields. The experience of regular retorquing of attachment fasteners on Scandinavian Airlines System aircraft is reported. It is noted that this has had a marked effect on reducing windshield failures. Further expected improvements are discussed. C.R.

A82-24325 **B.A.C. One-Eleven flight deck glazing product improvement.** J. F. Russell (British Aerospace Public, Ltd., Co., Weybridge, Surrey, England). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p.563-576.-

The modifications described include recessed bus-bars, fiberglass chip retarders, and the introduction of additional interlayer plies of a new material, all for the windshield. Another modification involved moving the de-mist film on the side windows from one glass ply to another. It is noted that, altogether, these modifications have led to a doubling of the windshield MTBF in eight years and to a great improvement in the side windows. C.R.

A82-24326 **Concorde glazings - 5 years of Mach 2 service.** W. P. C. Soper and R. A. Brown (British Aerospace Public, Ltd., Co., Bristol, England). In: Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings. London, Society of British Aerospace Companies, Ltd., 1981, p. 577-601.

A description is provided of the level of achievement obtained with respect to the transparencies of the Concorde project. Aircraft operating conditions are considered. It is pointed out that the transparency configuration was conceived such that the aircraft would key into the normal operating pattern of conventional jet transport traffic and that no preferential treatment would be needed. The visor panels of the aircraft are discussed, taking into account the current visor panel construction, aspects of cyclic testing, flight testing, alternative panel designs, and in-service performance. Attention is also given to the forward main windscreen, the D.V. and aft side windows, and the Series aircraft cabin window. G.R.

A82-24338 # **Air transportation of handicapped persons (Le transport aérien des handicapés).** E. Mapelli (Iberia Lineas Aéreas de España, Madrid, Spain). In: Annals of air and space law. Volume 5. Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1980, p. 171-188. 16 refs. In French.

Various legal aspects of the air transportation of handicapped persons are reviewed. Consideration is given to the rights and obligations of passengers as they pertain to the handicapped, the physical ability of passengers to travel on aircraft and the right of carriers to exclude the handicapped, obligations of the carrier in relation to the handicapped passenger, and carrier liability in relation to the injury of a handicapped passenger. B.J.

A82-24354 **The coupling of electromagnetic interference into aircraft systems.** R. V. Pankhurst (Aeroplane and Armament Experimental Establishment, Boscombe Down, Wilts., England). In: Conference on Electromagnetic Compatibility, Southampton, England, September 16-18, 1980, Proceedings. London, Institution of Electronic and Radio Engineers, 1980, p. 117-128.

Results of tests performed to determine the electromagnetic transfer function for complete aircraft from 100 kHz to 250 MHz are presented. The current distribution within the wiring bundle is shown along with the effect of end terminations, and attention is given to the variability between aircraft of the same type and aircraft of different types. Also considered are the developing overall picture of these induced currents and the implications of these results for future clearance work as well as for the usefulness of this information to aircraft systems and equipment designers. B.J.

A82-24355 **The variation of induced currents in aircraft wiring.** P. M. Newton (Ministry of Defence /Procurement Executive/, London, England). In: Conference on Electromagnetic Compatibility, Southampton, England, September 16-18, 1980, Proceedings. London, Institution of Electronic and Radio Engineers, 1980, p. 129-134.

The paper examines the use of the bulk current method to measure the variation of induced currents in aircraft wiring due to the operation of onboard transmitters and the variation of the RF environment. The measurement method is described and typical results of aircraft samples to date are discussed. Results to date have shown that current varies by a factor of three and the RF environment on the average by a factor of two. B.J.

A82-24357 **MIL-STD 1553B - Aircraft EM environmental susceptibility effects.** G. Gerbi and E. R. Totto (Aeritalia S.p.A., Turin, Italy). In: Conference on Electromagnetic Compatibility, Southampton, England, September 16-18, 1980, Proceedings. London, Institution of Electronic and Radio Engineers, 1980, p. 147-155.

The subject of this paper is the technology applied to aircraft to minimize EMI in the installation of MIL-STD-1553B digital transmission links. The electromagnetic interference generators normally installed on aircraft are considered, and the susceptibility of a typical MIL-STD-1553B data link is investigated. Experimental tests and computer aided analysis using the SEMCAP program, which have been performed for simple geometrical coupling models, are described. The results of this work give practical indications about the influence of mechanical and electrical harness parameters on EMC aspects of the aircraft installation of MIL-STD-1553B digital transmission lines. A good architecture for digital data link installations is also discussed. (Author)

A82-24358 **Materials aspects of aircraft EMC design.** M. W. Baskerville and J. Brettle (Plessey Research /Caswell/, Ltd., Allen Clark Research Centre, Towcester, Northants., England). In: Conference on Electromagnetic Compatibility, Southampton, England, September 16-18, 1980, Proceedings. London, Institution of Electronic and Radio Engineers, 1980, p. 157-170. Research supported by the Ministry of Defence (Procurement Executive).

The effect of materials, construction methods, and corrosion protection schemes on the dc and RF impedance of structural and electrical joints in aircraft is considered. The development of the theory and practice of making resistance measurements in large structures is examined in the light of a survey of bond resistance measurements in service aircraft. It is shown that the resistance of structural and electrical bonds in aircraft is critically dependent on a number of variables, including the type of fastener used, materials, and conditions of the relevant surfaces. It is possible to choose a set of variables which give a low bond resistance which is constant with time even when exposed to corrosion conditions. B.J.

A82-24359 **EMC clearance of modern military aircraft.** I. P. Macdiarmid and D. M. Wormstone (British Aerospace Public, Ltd., Co., Military Aircraft Div., Warton, Lancs., England). In: Conference on Electromagnetic Compatibility, Southampton, England, September 16-18, 1980, Proceedings. London, Institution of Electronic and Radio Engineers, 1980, p. 171-182. Research supported by the British Aerospace Public, Ltd., Co.

An approach to EMC testing which was recently adopted on a production version of a modern strike aircraft is described. The procedure involved: a quantitative assessment of the switching transients occurring on bus bars and selected signal lines; an interaction test whereby each potentially susceptible system must be observed while other systems are operated in their most emissive modes; a study of the safety margin of the compatibility of aircraft systems with intentional onboard transmitters; an investigation of the compatibility of the aircraft systems with the external RF environment; a quantitative assessment of the extent of data corruption at transducer-computer interfaces due to onboard emissive sources; and an in-depth compatibility study of all onboard RF equipment. The methods used and the results obtained were considered adequate to provide an assessment of the EMC of the onboard systems; however, it is noted that the demonstration of compatibility could be improved in certain areas. B.J.

A82-24361 **The testing of aircraft under near field conditions.** M. Elliott (Aeroplane and Armament Experimental Establishment, Boscombe Down, Wilts., England). In: Conference on Electromagnetic Compatibility, Southampton, England, September 16-18, 1980, Proceedings. London, Institution of Electronic and Radio Engineers, 1980, p. 199-206.

Although the HF band is of considerable interest in external field EMC testing, the environment in a typical trials facility is highly complex in this frequency range. This is due to operation in the near field region of the transmitting antenna, the proximity of the ground, and the presence of the fields scattered by the object under test. This problem was investigated by comparing the surface currents induced by three near field sources and one far field source on a cylinder which modeled the aircraft. The effects of the orientation of the cylinder on the measured magnetic and electric components of the field are examined, and optimum positions and methods of field measurements are discussed. B.J.

A82-24371 **Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980.** Conference sponsored by Institution of Mechanical Engineers. London, Mechanical Engineering Publications, Ltd. (I Mech E Conference Publications 1980-8), 1980. 51 p. $30.

Papers are presented on the problems encountered by the incorporation of computer-aided design and computer-aided manufacturing (CAD/CAM) systems into the process industries, such as aircraft manufacture and chemical production, in Britain. Attention is given to the use of CAD graphics by a mechanical engineering firm, the successful management of CAD, the use of CAD/CAM electronic data transfer to integrate geographically distributed aircraft production, experience with computer-aided building design system in an architectural firm, the acceptance of interactive graphics by industry, and the relation between the financial productivity impact of CAD/CAM and labor relations. O.C.

A82-24373 **CAD/CAM in British Aerospace - Aircraft Group.** J. S. Rawlins (British Aerospace Public, Ltd., Co., Aircraft Group, Kingston-on-Thames, Surrey, England). In: Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980. London, Mechanical Engineering Publications, Ltd., 1980, p. 27-34.

The use of computer-aided design and computer-aided manufacturing (CAD/CAM) techniques in aspects of aircraft structure geometry and electrical system definition is described for the case of the BAe 146 commuter aircraft. The use of electronic design and production data transfer is especially important in aircraft industry projects of the kind described because of the geographical distribution of component fabrication and assembly facilities. Emphasis is put on the ability of a CAD/CAM system to make information promptly available, from the conceptual design to the in-service product support stages, without need for manual transcription before distribution. O.C.

A82-24376 **Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981.** Congress sponsored by the Society of Automotive Engineers. Warrendale, PA, Society of Automotive Engineers, Inc., 1981. 90 p. $18.
(SAE SP-500)

The design, testing, maintenance, requirements, and future needs for aircraft power supplies were covered. Specific attention was given to design considerations of DC-Link aircraft generator systems and to cost of ownership advantages such as weight reduction and maintainability with a shared-oil system. Considerations for the design of variable speed, constant frequency (VSCF) generators are presented, and advanced generating systems technology was discussed. The effect of critical design parameters on the selection of a VSCF system was examined, along with the evolution and development of high voltage (270 V), dc aircraft electric systems and packaging the VSCF system for a military aircraft environment. Finally, the development of an aircraft electric system test facility was detailed. M.S.K.

A82-24377 **Design considerations of DC-Link aircraft generation systems.** M. A. Rosswurm (Westinghouse Electric Corp., Aerospace Electrical Div., Lima, OH). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p.1-15.

Design considerations in the development of the DC-Link VSCF electrical power systems for aircraft are presented, along with component descriptions, functional details, applications to the AV8-B and F-5G, and comparisons to alternate methods of power generation. The DC-Link system is compared with constant speed drive and cycloconverter energy systems, and the major components of the DC-Link system are shown to be a generator module, power electronics module, and the generator control module, which as a system yield a constant frequency output and employ transistorized switching. Specific descriptions are provided of the power transistors, the inverter power pole, the commutating diodes, and the base drive circuit. Operational characteristics such as the inverter waveform, neutral forming transformer and power stage sensing are considered, and functions of the generator control unit and inverter drive logic module are outlined. M.S.K.

A82-24378 **Cost of ownership advantages with a shared oil system.** R. C. VanNocker and W. A. Carmine (General Electric Co., Binghamton, NY). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p.17-21.

The benefits and system features of coupling the aircraft gearbox oil to the generator cooling system are outlined. It is noted that in a constant speed drive system, weight, maintainability, and life cycle costs are aided by avoiding redundant oil pumping facilities. The shared system is favored when generator functions won't contaminate the oil, pose no risk to the gearbox, and do not command the use of excessive amounts of oil. A dry cavity concept is described, which features heat exchangers completely isolated from any generator electrical components, and the use of the shared system on the F/A-18 is mentioned. The addition of the shared-oil module alters the maintenance concept from on-condition to a scheduled maintenance procedure, and an ultimate repair and maintenance cost figure of $2.70 per flight hr is derived. M.S.K.

A82-24379 **High speed VSCF generator design consideration.** T. L. Ho (Westinghouse Electric Corp., Aerospace Electrical Div., Lima, OH). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 23-33.

The employment of computer aided design (CAD) for VSCF generator design is examined, specifically with regard to thermal, stress, and dynamic analyses. Thermal analysis is accomplished through an iteration of a series of design modifications, and examples are presented for the design of inverter semiconductor stacks, a diode rectifier assembly, and a power pole assembly. Finite element programs are implemented in a structural analysis, focusing attention on weight reduction and stress concentration at specified speeds, and procedures are outlined for applications to an inverter cover plate and to a high speed rotor. Dynamic study comprises model analysis by a finite element method and a critical speed analysis of the rotating system by means of turbomachine dynamics programs, serving to define the structural stability of the system. M.S.K.

A82-24380 **Advanced generating system technology.** R. J. Kennett (Lucas Aerospace, Ltd., Electrical Div., Hemel Hempstead, Herts., England). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 35-41. Research supported by the Ministry of Defence (Procurement Executive) and Department of Industry.

A design approach to the achievement of a maximum specific output of an aircraft 400 Hz ac 2-pole generator with operation at 24,000 rpm is presented. Locating the field assembly inside a nonmagnetic shaft eliminated mechanical conflicts and allowed an inherently stiff rotor, permitted flooding the rectifiers with cooling oil to reduce temperature gradients, and porting to the stator to minimize drag losses and avoid insulation erosion. The rectifiers were moved toward the shaft axis, and interconnection with the main exciter was arranged to neutralize centrifugal forces on the rectifier connection. The rotor shaft is used to provide maximum support for the stressed elements along the length of the alternator, which has a single coil. Weight reduction is also provided over four-pole machines, and bearing life is protected by a low rotating mass and elimination of mechanical unbalance. Operation and maintenance are reviewed. M.S.K.

A82-24381 **The effect of critical design parameters on the selection of a VSCF system.** D. S. Yorksie and W. E. Hyvarinen (Westinghouse Electric Corp., Aerospace Electrical Div., Lima, OH). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 43-50.

A decision model of the critical design criteria for applications of either cycloconverter or DC-Link variable speed, constant frequency (VSCF) electric power generators onboard aircraft are examined. Power switching and controlling techniques and components are described for each type of generator, noting the advent of advanced high-power switching transistors. Critical parameters of choice include the system rating, cooling method and temperature, efficiency, weight, location, and gearbox speed and range. Each parameter is explored for effect in different applications, and it is concluded that rating, cooling temperature, efficiency, and weight are the most critical parameters. A fifth element is added to the four most critical criteria, and comprises system-specific features which customize the decision model to the application under consideration. M.S.K.

A82-24382 **Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States.** J. D. Segrest (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) and W. W. Cloud (Lockheed-California Co., Burbank, CA). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 51-63. 10 refs.

The system concept of high voltage dc power systems for aircraft applications is reviewed, with regard to the state-of-the-art in the hardware available. The history of dc system use is outlined, noting the continually increasing demand of higher voltage levels. Mention is also made of the inherent unsatisfactory lifetime levels of current constant speed 400 Hz power devices with respect to future aircraft. Cycloconverter and DC-Link power generating systems are subject to complex designs and display a poor power factor, wave form distortion, and EM incompatibility. Brushless dc motors are available for engine mounting, and provide 270 V dc, which offers high reliability, high efficiency, light weight, power continuity, fuel economy, and personnel safety. Existing systems and advanced systems are outlined, with operational performance and requirements, including the need to develop solid-state load controllers for over 50 amps power load. M.S.K.

A82-24383 **Packaging the VSCF system for an aircraft engine environment.** D. D. Pollard and G. E. Krajci (Westinghouse Electric Corp., Aerospace Electrical Div., Lima, OH). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981. Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p. 65-76.

The integration of microprocessor modules, high power semiconductor arrays, and a high-speed generator to form a compact, low-weight variable speed constant frequency (VSCF) power system is described. With specific consideration of military systems, envelope concerns are defined as the allowable space and shape, power and logic electrical interfaces, coolant/lubricant lines and interfaces, and maintainability. Military aircraft are noted to require dense packaging, have common disconnect mechanisms, and allow removal of the entire system at once. Sensitive components are sealed off from the environment and vibrations, and thermal control is provided by air-oil and fuel-oil heat exchangers. Operation without oil flow is feasible for short periods of time due to the thermal inertia, and installations in the F-5G and AV-8B aircraft are detailed. M.S.K.

A82-24384 **Aircraft electric system development and test facilities.** D. Cousins (Sundstrand Corp., Rockford, IL). In: Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981.
Warrendale, PA, Society of Automotive Engineers, Inc., 1981, p.77-88.

Specialized capabilities, requirements, and design considerations for a facility to construct electric power systems for aircraft are described. A test area is provided for development and qualification testing of aircraft generating systems, along with a multistand complex for accelerated life testing, and a facility for electronic and electric products. Individual test cells are required for examining the performance of test generators during specified voltage drops and impedance. Further provision is made for testing prime movers, gearboxes, generator feeders, control consoles, load systems, and main and auxiliary load controls. Instrumentation is dedicated to both test stand consoles and from multichannel data acquisition system recorders and displays. Finally, electromagnetic compatibility testing is accomplished by examining radiated and conducted EM interference and by exposure to EM pulses. M.S.K.

A82-24385 **Wind and temperature database for flight planning.** H. C. True and D. E. Winer (FAA, Office of Environment and Energy, Washington, DC). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811068*. 8 p. 17 refs.

The importance of timely and accurate wind and temperature data to flight planning and aircraft fuel conservation is pointed out. Recent advances in meteorological data measurement make it possible to obtain the required information. Attention is given to aspects of flight planning, the existing observation network, an atmospheric model, fuel considerations, wind and temperature observation technology, the potential of satellite based wind observation systems, and the dissemination of observations to aviation flight planners. It is found to be technically and economically feasible to create a wind and temperature database for flight planning based on the Prototype Regional Observation and Forecasting System 'profiler'. G.R.

A82-24386 * **Airline flight planning - The weather connection.** R. Steinberg (NASA, Lewis Research Center, Cleveland, OH). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811067*. 12 p.

The history of airline flight planning is briefly reviewed. Over half a century ago, when scheduled airline services began, weather data were almost nonexistent. By the early 1950's a reliable synoptic network provided upper air reports. The next 15 years saw a rapid growth in commercial aviation, and airlines introduced computer techniques to flight planning. The 1970's saw the development of weather satellites. The current state of flight planning activities is analyzed. It is found that accurate flight planning will require meteorological information on a finer scale than can be provided by a synoptic forecast. Opportunities for a new approach are examined, giving attention to the available options, a mesoscale numerical weather prediction model, limited area fine mesh models, man-computer interactive display systems, the use of interactive techniques with the present upper air data base, and the implementation of interactive techniques. G.R.

A82-24387 * **Integration of energy management concepts into the flight deck.** S. A. Morello (NASA, Washington, DC). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811066*. 10 p. 7 refs.

The rapid rise of fuel costs has become a major concern of the commercial aviation industry, and it has become mandatory to seek means by which to conserve fuel. A research program was initiated in 1979 to investigate the integration of fuel-conservative energy/flight management computations and information into today's and tomorrow's flight deck. One completed effort within this program has been the development and flight testing of a fuel-efficient, time-based metering descent algorithm in a research cockpit environment. Research flights have demonstrated that time guidance and control in the cockpit was acceptable to both pilots and ATC controllers. Proper descent planning and energy management can save fuel for the individual aircraft as well as the fleet by helping to maintain a regularized flow into the terminal area. G.R.

A82-24388 **Application of damage tolerance technology to type certification.** T. Swift (FAA, Washington, DC). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811062*. 20 p. 29 refs.

An attempt is made to clarify some of the questions related to the FAA philosophy which are currently being raised by manufacturers in attempting to comply with recently amended regulations for aircraft structures. A description is presented of opinions related to good damage tolerance design practice, and fracture analysis methodology. In general, an evaluation of the structure, under typical load and environmental spectra must show that catastrophic failure due to fatigue, corrosion, or accidental damage will be avoided throughout the operational life of the aircraft. Attention is given to a damage tolerance evaluation, aircraft utilization, the selection of critical elements, aspects of stress spectra development, environmental effects, and fracture toughness data. G.R.

A82-24389 **Certification of civil composite aircraft structure.** J. R. Soderquist (FAA, Office of Airworthiness, Washington, DC). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811061*. 10 p. 19 refs.

The certification of composite civil aircraft structures is shown to require a common, allowable material property data base in which the chemical characterization of the resin through the use of high pressure liquid chromatography and Fourier transform infrared spectroscopy is employed. In addition, improved damage-tolerance techniques and tougher material systems must be developed to allow higher design strain levels. Significant benefits can be derived from the continued operation of a composite structure in the post-buckled regime, provided that investigations continue into environmental effects, combined loading states, curvature, variations in skin thickness and impact damage effects. It is recommended that a portable nondestructive inspection technique be devised for use in field repairs. O.C.

A82-24392 **Design technology for improved performance retention in turbofan engines.** D. L. Seiwert (General Electric Co., Fairfield, CT). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811056*. 10 p.

General causes of performance loss in large turbofan engines after long time field use are examined, and programs whose objectives are to maximize engine performance retention are described. Advanced design concepts to produce significant improvement in performance retention of commercial turbofan engines are presented, and factors which cause clearance changes between rotating and static components are discussed. Engine generated and externally applied loads, and operating technique effects are addressed, and evaluation techniques for design verification including laser optics are described. Performance retention items include a substantially improved high pressure turbine shroud material, which reduces distortion and thereby avoids rubs. D.L.G.

A82-24393 **RB 211 powerplant deterioration - Review of current situation and lessons learned.** A. G. Collins (Rolls-Royce, Ltd., London, England). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811053*. 6 p.

The factors which cause aircraft engines to lose performance in a service environment are briefly examined. It is pointed out that in the case of the RB 211 engine many of the fundamental causes of deterioration are avoided or minimized in connection with basic engine design features. The -22B was the first of the RB 211 family of engines to enter service. Major causes of RB 211-22B deterioration were related to the accumulation of dirt on compressors, the distortion of HP NGV support rings, increased leakages in powerplant area, and erosion of turbine tip sealing segments. By suitable modifications of the engine design it was possible to eliminate the observed causes of engine deterioration in the RB211-524. Problems concerning engine deterioration observed in connection with RB 211-524 operation will be corrected in the RB 211-535 by the introduction of appropriate improvements. G.R.

A82-24394 **Management of powerplant maintenance and restoration programs for fuel conservation.** C. Reid (General Electric

Co., Fairfield, CT). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811052.* 15 p.

Powerplant operational and maintenance procedures are reviewed to minimize fuel consumption and total operating costs of existing large turbofan engines. Recommendations are made to reduce the rate of on-wing performance deterioration and to define cost effective performance refurbishment. Measures being taken to increase fuel and cost savings include the development of performance diagnostic/analytical systems to permit better management control of engine operating costs. On-wing performance retention can be improved by the observance of line maintenance and operational procedures minimizing the impact of the major causes of performance deterioration, such as increased clearances, erosion, contamination and leakage. D.L.G.

A82-24395 **Airline fuel saving through JT9D engine refurbishment.** J. W. Allison and D. R. Weisel (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811051.* 12 p.

Since the JT9D engine entered airline service in 1970, increase in the price of jet fuel made it imperative to devise refurbishment procedures for in-service engines to improve their fuel economy. Developments leading to performance recovery and improvement of the engine are related to fan leading edge rework, and the one degree open first stator. Factors responsible for engine performance recovery and retention include also operational procedures, test configuration, and prevention of aircraft system pneumatic leakage. Attention is given to the fan strip panel concentric grinding tool, a properly repaired combustor with recently developed 'S-16' fuel nozzles, recommended refurbishment additions, operational procedures to maximize performance retention, a test configuration, and inspection techniques. G.R.

A82-24396 **Airworthiness considerations in the design of commercial transport aircraft.** J. R. Koch (Lockheed-California Co., Burbank, CA). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811039.* 14 p. 8 refs.

Design requirements and development, and the maintenance practices required in the certification of commercial transport aircraft and in the ensuring of their continuous airworthiness in operation, are considered with attention to: (1) airworthiness philosophy and criteria; (2) the evolutionary character of design development; (3) the scope of development testing; and (4) the enlistment of manufacturer, operator and regulatory agency in airworthiness assurance throughout an aircraft's operational life. Also considered are the airworthiness regulation revisions and technological advances that have resulted in changes in the substantiation of airworthiness, especially in the case of structures. O.C.

A82-24397 **Designing for continued airworthiness - General aviation.** C. A. Rembleske (Beech Aircraft Corp., Wichita, KS). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811038.* 8 p.

The Air Commerce Act of 1926 became the first piece of U.S. legislation which provided a basis for the writing of airworthiness standards for aircraft. The contents of the Air Commerce Regulations are briefly discussed. In connection with the technological developments of a rapidly growing industry, the regulations became more complex. Beginning in 1974, FAA introduced the term 'continued airworthiness'. Continuing airworthiness can be defined as keeping the aircraft flying safely and functioning properly over an indefinite period. Attention is given to the airframe, the propulsion system, basic flight instruments, vital hydraulic lines, fuel systems, electrical systems, and problems of wear and tear. G.R.

A82-24398 **The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/.** V. M. Marti, J. Woods, Jr. (McDonnell Aircraft Co., St. Louis, MO), and W. F. Swartz (USAF, Wright Aeronautical Laboratories, Dayton, OH). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811036.* 17 p.

The purpose of technology demonstration is to reduce the risk associated with developing an advanced operational system by verifying the capability of advanced, and as yet unproven, technologies. Attention is given to today's conditions which require the use of a technology demonstrator aircraft, principally as a precursor to future military tactical aircraft systems. The ingredients of a good technology demonstrator are examined, taking into account the selection of the F-15B aircraft for the technology demonstration of the Integrated Flight and Fire Control (IFFC) program. The IFFC system concept is considered along with the IFFC data acquisition systems, and the IFFC onboard simulation systems. G.R.

A82-24399 **Mission-adaptive wing flight demonstration program.** D. K. Gould (Boeing Co., Seattle, WA). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811035.* 10 p.

It is reported that the design and fabrication of the AFTI/F-111 mission-adaptive wing is nearing completion. The variable-camber airfoil design, unlike conventional wings, possesses no discontinuities from spoilers, flaps or fairings to disturb the flow of air over the wing. The flexible leading edge is continuous from wing root to tip, and the flexible trailing edge is divided into three segments to provide roll control redundancy, permit operation at various sweep-settings of the F-111 variable wing, and to allow spanwise shifting of the aerodynamic load. Wind tunnel and flight simulation tests indicate aerodynamic performance benefits, and the structural capability that has been checked by finite element analysis is in turn verified by tests of a wing section loads and actuation test rig. Flight tests are to begin in late 1982. O.C.

A82-24400 **Quality, quantity, and technology - A perspective on fighter development.** S. K. Jackson, Jr. (General Dynamics Corp., Fort Worth, TX). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811097.* 14 p. 7 refs.

The consequences of long-term technological development on military aircraft unit costs are illustrated, by means of comparisons between the capabilities and costs of such World War II aircraft as the P-51 fighter and B-17 bomber, on the one hand, and the contemporary F-16 fighter, on the other. A detailed historical analysis of the B-17 Schweinfurt raids and the extrapolation of the capabilities of the F-16 to that 1943 scenario shows that, while the modern fighter is able to deliver a greater bomb load with greater accuracy in a greater variety of conditions than the B-17, its cost, as a fraction of GNP, is only 1.6-2.3 times greater than that of the B-17. Similar improvements are demonstrated for the cases of operational readiness and numbers of maintenance personnel, showing that the continuing development of airframes is justified. The development of experimental aircraft is recommended. O.C.

A82-24401 * **Aircraft surface coatings for drag reduction/erosion protection.** R. L. Kreitinger (Boeing Commercial Airplane Co., Renton, WA) and D. B. Middleton (NASA, Langley Research Center, Hampton, VA). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811070.* 16 p. 5 refs.

The laboratory testing of a large number of films and liquid coatings for aircraft drag reduction and erosion protection has led to the identification of elastomeric polyurethanes, which fulfil smoothness, durability and protection requirements while being easily applied to large, compound-curvature areas with standard spray equipment. It was found that an epoxy primer produced a stronger bond between coating and substrate than a wash primer. A drag-reduction value of 0.2% was achieved with a commercially-available elastomeric polyurethane. O.C.

A82-24403 **Future strike fighter options - Concepts and technologies.** P. C. Bavitz (Grumman Aerospace Corp., Bethpage, NY). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811099.* 19 p. 10 refs.

Results are presented from a study of concepts of operation, and the technological capabilities required by them, for future strike fighter weapon systems. The design concepts considered by the study were: (1) a low-altitude, medium-payload twin-turbofan design with mission-adaptive supercritical wing and close-coupled canard; (2) a low-altitude, heavy-payload craft with top-mounted inlets; (3) a high-altitude concept with advanced turbojet engines and Alben-type nozzles, equipped with air-to-ground weapons that are currently in the conceptual-development stage; (4) a high-altitude/dive mission-profile craft possessing high payload/weapon carriage flexibility; (5) an advanced, low radar cross section design incorporating a delta wing planform, flush engine inlets and a top-mounted carriage for WASP weapons; and a gunship with a single, top-mounted turbojet whose primary armament is a GAU-8 30 mm cannon. O.C.

A82-24404 **Technology for quality and quantity in a new fighter.** W. E. Maillard (Northrop Corp., Los Angeles, CA). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811100.* 15 p. 15 refs.

It is demonstrated to be premature, in view of the complex and evolving character of tactical aircraft design problems requiring tradeoffs between system quality and production quantities, to hold a single design concept as superior to alternatives. However, technology application is held to be essential for the mediation of quality and quantity criteria. After identifying such major forces in cost escalation as the compounding of requirements and technology-packing, in response to mission requirement uncertainties over the course of a lengthy design development process, a design approach to lower-cost fighter concepts is introduced and quantitative methods are presented to illustrate potential improvements in the operational capabilities of aircraft in the size and cost range represented by the F-5E and F-16 fighters. O.C.

A82-24405 **Operating flight loads and their effect on engine performance.** R. L. Martin (Boeing Commercial Airplane Co., Renton, WA) and W. J. Olsson (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811071.* 14 p.

Flight loads imposed on high bypass turbofan engines and the response of the engines to these loads are examined. The effects of nacelle angle of attack, aircraft speed, and engine airflow are discussed. Results from an analysis of the NASA JT9D flight load test indicate that aerodynamic loads on the nacelle are the prime cause of cold section clearance closure and rubs; and aerodynamic loads, thrust, and differential thermal expansion cause hot section closure and rubs. Inboard and outboard engines are found to be equally affected by flight maneuvers, and a 0.7% increase in cruise thrust-specific fuel consumption is found to be typical of production aircraft acceptance testing. D.L.G.

A82-24406 **Restoration of performance, Models 727, 737, and 747.** J. C. Baer and W. M. Staab (Boeing Commercial Airplane Co., Seattle, WA). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811072.* 12 p.

A new generation of advanced technology, fuel-efficient jet transports, including the Models 757 and 767 will enter commercial airline service in 1982. Existing fleets of second-generation jet transports still in production, such as the 727, 737, and 747, have useful economic lives which will extend into the 1990s. Because of this longevity and the continual escalation of fuel prices, the economics of these transports will be improved. A description is presented of some of the performance improvement programs. Attention is given to aspects of operational efficiency, the in-flight fuel economy, a maintenance program to preserve low drag characteristics for the aircraft, the elimination of surface roughness, Model 727 drag improvement items, Model 747 improvement items, recently developed items, aerodynamic improvements under study, and propulsion system and flight management system improvements. G.R.

A82-24407 **High temperature engine control electronics.** D. C. Dening (General Electric Co., Syracuse, NY). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811074.* 11 p. Contract No. N00173-79-C-0010.

Integrated injection logic is shown to be operable at temperatures up to 300 C. The logic can thus be used in the digital control mounted on aircraft engines, where it is subjected to high temperatures and severe vibration. The design of integrated injection logic circuits for such high-temperature applications is discussed. Particular attention is given to gate design, to the patterns of interconnection, and to the metallization system employed. Also described is a data input chip for an engine control computer that has been designed for high-temperature applications. C.R.

A82-24408 **Pressure transducer calibration process.** F. Antonazzi, Sr. (Bendix Corp., Energy Controls Div., South Bend, IN). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811076.* 9 p.

It is shown that quartz capsule pressure transducers using a closed loop capacitance bridge can be made highly accurate with virtually identical frequency response by using a calibration process that compensates for the quartz pressure sensor unit-to-unit variations. Digital integration gain scheduling as a function of N count results in a constant loop gain that is independent of pressure level. As a consequence, constant dynamic characteristics are obtained at all pressure levels. It is noted that plug-in pressure transducer units are interchangeable, requiring no select-at-test components or trim adjustments. The software loop closure allows use of a common printed wiring board with identical electrical components for a wide range of pressure transducers. C.R.

A82-24409 **Performance retention features of the PW2037.** J. K. Carriere (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811054.* 14 p.

Studies that have been carried out on the causes of performance deterioration are surveyed, as are descriptions of design and maintenance features for improving performance retention. It is noted that short-term deterioration is caused by flight loads that cause rubbing of blades on seals and consequent loss of module efficiencies. Long-term deterioration derives from erosion of airfoils and seals during ground operation and cyclic-induced thermal distortion of the high-pressure turbine vanes. Design features for improving performance retention include increased case and rotor stiffness, damped bearings on centering springs, a third low rotor bearing, active clearance control, abradable blade tips seals, controlled diffusion airfoils, dirt removal scoop, erosion-resistant compressor outer air seals, improved diffuser and combustor and reduced aspect ratio turbine vanes. C.R.

A82-24410 **Reliability analysis of a dual-redundant engine controller.** E. Gai, J. V. Harrison, and R. H. Luppold (Charles Stark Draper Laboratory, Inc., Cambridge, MA). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811077.* 11 p.

A Markov model is developed for predicting the reliability of a full-authority, dual-redundant aircraft engine controller. The effects of failures on any of the controller's sensors, electronic interface modules, processors and actuators are modeled, as are the consequences of redundancy management decisions. The model's use in performing parameter sensitivity studies and developing quantitative data in support of design trade-offs is described. The effects of scheduled maintenance on the inflight shutdown rate of the engine are assessed. C.R.

A82-24411 **Propulsion multiplexer /PMUX/ system - The missing link.** M. S. Latina and W. W. Hixson (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811078.* 10 p. 7 refs.

The importance placed by commercial airlines on more efficient and reliable engines with lower maintenance costs has led to the use of in-flight engine condition monitoring equipment as part of an airborne integrated data system (AIDS). This monitoring requires that the AIDS receive approximately 25 engine parameter signals. Problems arise in that the integrity of the AIDS input signals from the engine is not the responsibility of a single equipment supplier. To resolve this problem, a centralized, engine-mounted data processing device for the engine signals is proposed. It is pointed out that the unit for this Propulsion Multiplexer System can be divided into three major functional groups: (1) pressure sensors and signal interfaces, (2) digital processor and memory, and (3) serial digital data interface. C.R.

A82-24412 **LAMPS III recovery assist, securing and traversing /RAST/ system.** F. Cracknell (DAF Indal, Ltd., Mississauga, Ontario, Canada). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811080*. 9 p.

The main portions of the RAST system are outlined, with descriptions given of their functions. Some of the ground and flight test experience gained thus far is summarized. The system is shown to meet the requirements of the Light Airborne Multi Purpose System (LAMPS). This latter system depends for its success upon the ability to operate helicopters safely and reliably under weather conditions where the ship roll angles reach about 30 deg and the wave heights reach 13 feet. C.R.

A82-24413 **The use of 'Kapton' polyimide film in aerospace applications.** D. H. Berkebile and D. L. Stevenson (Du Pont de Nemours and Co., Wilmington, DE). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811091*. 9 p.

The principal steps involved in the manufacture of wire and cable insulated with 'Kapton' are described. The latest shop handling techniques are reviewed, among them automated stripping and high-speed marking. Additional aerospace applications in avionics and insulation blankets are discussed. Tables summarizing the performance characteristics of wire insulated with this polyimide film are included. C.R.

A82-24415 **Fighter issues - 2000.** D. R. Kozlowski (McDonnel Douglas Corp., St. Louis, MO). *Society of Automotive Engineers, Aerospace Congress and Exposition, Anaheim, CA, Oct. 5-8, 1981, Paper 811096*. 13 p. 6 refs.

Consideration is given to the design requirements formulated for an advanced tactical fighter (ATF) that will operate in the electronic warfare and nuclear/biological/chemical warfare scenarios anticipated for the year 2000. The performance requirements may be characterized as speed, stealth and STOL (SSS). The SSS criteria have nominal values of (1) Mach 1.8 sustained supersonic speed, with Mach 2.5 as maximum for intercept and chase, (2) less than 0.5 sq m radar cross section, reduction of IR signature and engine exhaust contrail, and electromagnetic emission control, and (3) 1500 feet total required runway length. Attention is given to the problems posed by maintainability and cost-control criteria, as well as the emerging characteristics of air-to-air combat in view of the technological developments expected from potential adversaries. O.C.

A82-24416 **Annual review of fluid mechanics. Volume 14.** Edited by M. Van Dyke (Stanford University, Stanford, CA), J. V. Wehausen (California, University, Berkeley, CA), and J. L. Lumley (Cornell University, Ithaca, NY). Palo Alto, CA, Annual Reviews, Inc., 1982. 463 p. $22.

Applications of fluid mechanics are discussed for the study of strongly nonlinear waves, the topology of three-dimensional separated flows, and the mathematical theory of frontogenesis. Attention is also given to turbulent jets and plumes, gravity currents in the laboratory, atmosphere, and ocean, and to low-gravity fluid flows, specifically for convective flows. The computation of transonic potential flows is considered, as are the strange attractor theory of turbulence, numerical methods in free-surface flows, and the fluid dynamics of heart valves. M.S.K.

A82-24426 **International Conference on Numerical Methods in Fluid Dynamics, 7th, Stanford University, Stanford and Moffett Field, CA, June 23-27, 1980, Proceedings.** Conference supported by NSF, U.S. Air Force, and U.S. Navy. Edited by W. C. Reynolds (Stanford University, Stanford, CA) and R. W. MacCormack (NASA, Ames Research Center, Moffett Field, CA). Berlin and New York, Springer-Verlag (Lecture Notes in Physics. Volume 141), 1981. 493 p. $28.

Topics discussed include polygon transformations in fluid mechanics, computation of three-dimensional horseshoe vortex flow using the Navier-Stokes equations, an improved surface velocity method for transonic finite-volume solutions, transonic flow calculations with higher order finite elements, the numerical calculation of transonic axial turbomachinery flows, and the simultaneous solutions of inviscid flow and boundary layer at transonic speeds. Also considered are analytical solutions for the reflection of unsteady shock waves and relevant numerical tests, reformulation of the method of characteristics for multidimensional flows, direct numerical simulations of turbulent shear flows, the stability and separation of freely interacting boundary layers, computational models of convective motions at fluid interfaces, viscous transonic flow over airfoils, and mixed spectral/finite difference approximations for slightly viscous flows. B.J.

A82-24642 # **On-line control for the regulation of power source in multiple-servo electro-hydraulic systems.** B. N. Suresh (Indian Space Research Organization, Vikram Sarabhai Space Centre, Trivandrum, India), W. L. Green, and D. J. Sanger (Salford, University, Salford, Lancs., England). *American Society of Mechanical Engineers, Winter Annual Meeting, Washington, DC, Nov. 15-20, 1981, Paper 81-WA/DSC-3*. 8 p. 8 refs. Members, $2.00; nonmembers, $4.00.

The efficiency of a multiple-servo electrohydraulic system, in which power can be reduced by means of an on-line self-optimizing control, depends on the selection of the most suitable among five search strategies. The strategies are considered in light of a hydraulic system mathematical model employing two velocity servos whose individual performance is simulated on a computer. Simulation results show that the Simplex is the most useful strategy for on-line implementation in a practical system, where the implementation scheme involves no more than six variables. O.C.

A82-24563 * # **Wide field of view laser beacon system for three-dimensional aircraft position measurement.** L. M. Sweet, R. B. Miles, S. G. Webb, and E. Y. Wong (Princeton University, Princeton, NJ). *American Society of Mechanical Engineers, Winter Annual Meeting, Washington, DC, Nov. 15-20, 1981, Paper 81-WA/DSC-9*. 9 p. 8 refs. Members, $2.00; nonmembers, $4.00. Grant No. NCC2-94.

This paper presents a new wide field of view laser beacon system for measurement, in three dimensions, of aircraft or other remote objects. The system is developed for aircraft collision hazard warning independent of ground-based hardware, as well as for flight research, helicopter-assisted construction and rescue, and robotic manipulation applications. Accurate information describing the relative range, elevation, and azimuth of the aircraft are generated by the sweep of a low-power fan-shaped rotating laser beacon past an array of optical detectors. The system achieves a wide angle of acceptance of laser beacon light through use of compound parabolic concentrators, which collimate the light for spectral filtering to minimize solar interference. An on-board microprocessor system converts the pulse sequence to aircraft position in real time. System reliability and performance are enhanced through narrow pass filtering of the pulse signals, digital logic design to mask spurious signals, and adaptive modulation of trigger threshold levels. (Author)

A82-24565 # **Describing function analysis of nonlinear nose gear shimmy.** T. D. Burton (Washington State University, Pullman, WA). *American Society of Mechanical Engineers, Winter Annual Meeting, Washington, DC, Nov. 15-20, 1981, Paper 81-WA/DSC-20*. 9 p. 10 refs. Members, $2.00; nonmembers, $4.00. Research sponsored by the Boeing Military Airplane Co.

The design of shimmy free nose landing gear is complicated by the action of the gear hydraulic steering system. During shimmy the steering system pressure response results in loads on the gear which are highly nonlinear functions of geat motion. In order to obviate the need for extensive numerical work to analyze geat stability, the describing function method has been used to linearize the steering system response, enabling the stability to be analyzed using linear system techniques. Application of this approach to a representative nose gear/steering system showed the limit cycle amplitudes and stability boundaries of the shimmy motion to be in good agreement with results obtained numerically; the transient response was also predicted reasonably well. (Author)

A82-24566 # **Complete velocity profile and 'optimum' skin friction formulas for the plane wall-jet.** G. P. Hammond (Cranfield Institute of Technology, Cranfield, Beds., England). *American Society of Mechanical Engineers, Winter Annual Meeting, Washing-*

ton, DC, Nov. 15-20, 1981, Paper 81-WA/FE-3. 7 p. 30 refs. Members, $2.00; nonmembers, $4.00. Science Research Council Grants No. B/RG/98590; No. GR/A/44312.

An analytic expression for the complete velocity profile of a plane, turbulent wall-jet in 'stagnant' surroundings is obtained by coupling Spalding's single formula for the inner layer with a sine function for the 'wake component'. This expression is transformed at the velocity maxima to yield an 'optimum log-law' for skin friction. An approximate skin friction formula based on the 'initial conditions' of the wall-jet is also presented. The formulas are generally in good agreement with experimental data. The complete velocity profile does not exhibit the conventional 'law of the wall' behavior and modifications are consequently recommended to the usual treatment of the near-wall region in numerical calculation procedures for wall-jet flows. The use of the 'Clauser plot' method of skin friction measurement is similarly shown to be in error when applied to wall-jets. (Author)

A82-24602 * # **Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts.** K. J. Baumeister (NASA, Lewis Research Center, Cleveland, OH). *American Society of Mechanical Engineers, Winter Annual Meeting, Washington, DC, Nov. 15-20, 1981, Paper 81-WA/NCA-13.* 8 p. 24 refs. Members, $2.00; nonmembers, $4.00.

The cutoff mode instability problem associated with a transient finite difference solution to the wave equation is explained. The steady-state impedance boundary condition is found to produce acoustic reflections during the initial transient, which cause finite instabilities in the cutoff modes. The stability problem is resolved by extending the duct length to prevent transient reflections. Numerical calculations are presented at forcing frequencies above, below, and nearly at the cutoff frequency, and exit impedance models are presented for use in the practical design of turbofan inlets. D.L.G.

A82-24643 **Institute of Navigation, Annual Meeting, 37th, U.S. Naval Academy, Annapolis, MD, June 9-11, 1981, Proceedings.** Washington, DC, Institute of Navigation, 1981. 171 p. Members, $30.; nonmembers, $35.

The performance of a ring laser strapdown marine gyrocompass is considered along with a brief history of the use of marine radar, a marine NAVSTAR GPS receiver, the application of NAVSTAR differential GPS in the civilian community, the applications of a multiplexed GPS user set, and initial FAA tests on the NAVSTAR GPS Z-set. Attention is given to the Federal Radionavigation Plan, scanning strategies for Air Traffic Control radars, the View-Nav system, operational and economic benefits deriving from use of loran-C RNAV, loran-C RNAV in mountainous areas, and an analysis of loran-C system reliability for civil aviation. A description is presented of a strapdown configured land navigation system, aspects of marine simulation, bridge simulation, and an empirical INS difference monitoring procedure used to sequence SSBN NAVAID fixes. G.R.

A82-24644 # **A marine NAVSTAR GPS receiver.** R. E. Maine (Sperry Corp., Sperry Marine Systems, Charlottesville, VA). In: Institute of Navigation, Annual Meeting, 37th, Annapolis, MD, June 9-11, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 54-59.

Attention is given to the design philosophy, construction, programming, testing, and test results of a simplified NAVSTAR Global Positioning System (GPS) receiver for marine applications. The GPS signals are received by an omnidirectional antenna, filtered to reduce out-of-band signal levels, amplified by a low noise preamplifier, and transmitted through a coaxial cable to the interior equipment. The technique used is to stop the code clock as precisely as possible at the occurrence of a timing mark. The GPS front end is considered along with the signal amplitude interface, the receiver gain control, the microcomputer, the phase shift interface, the pseudorandom noise code generator, and a real-time flow chart. A breadboard receiver constructed as described, using largely off-the-shelf components, has been found to acquire and track the experimental satellites quite successfully. G.R.

A82-24645 * # **The application of NAVSTAR differential GPS in the civilian community.** J. Beser and B. W. Parkinson (Intermetrics, Inc., Huntington Beach, CA). In: Institute of Navigation, Annual Meeting, 37th, Annapolis, MD, June 9-11, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 60-74. 11 refs. NASA-sponsored research.

The NAVSTAR Global Positioning System (GPS), currently being developed by the DOD, is a space based navigation system that will provide the user with precise position, velocity, and time information on a 24 hour basis, in all weather conditions and at any point on the globe. The baseline GPS system will provide guaranteed high accuracy to only a limited number of users, mostly the military. The civilian community has to devise a variation of this system to allow for an assured, uninterrupted level of accuracy. Differential GPS provides such a capability. In connection with the conceived possibility of the use of GPS by an enemy, it is found to be necessary to implement a selective availability technical capability. Differential GPS provides an approach for the civilian community to have a guaranteed level of accuracy better than the 250 meters presently planned for GPS. G.R.

A82-24646 # **Scanning strategies for air traffic control radars.** P. R. Mahapatra and D. S. Zrnic (NOAA, National Severe Storms Laboratory, Norman, OK). In: Institute of Navigation, Annual Meeting, 37th, Annapolis, MD, June 9-11, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 100-105. 14 refs. U.S. Department of Transportation Contract No. FA01-80-1-Y-10524.

In connection with a history of weather-related air traffic accidents near terminal areas, it is desirable that air traffic control (ATC) radars possess the capability to detect and identify elements of weather which are hazardous to aviation. To possess the capability of hazardous weather detection in a reliable manner, a radar must employ a scan strategy such that the scan cycle is not so slow as to miss shortlived for fast-growing weather phenomena. The separation of the elevation levels of the scan cycle must be close enough to ensure the detection of storm features which may endanger air traffic. Attention is given to a study conducted to determine the most suitable scanning techniques for ATC radars, taking into account the data base for the study, the photo-interpretation of the multimoment data, the vertical spacing of scan levels, and an investigation of the lifetime of an atmospheric feature by spatial correlation. G.R.

A82-24647 # **Beyond the horizon coverage for air navigation/traffic control.** V. I. Weihe. In: Institute of Navigation, Annual Meeting, 37th, Annapolis, MD, June 9-11, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 106-110. 11 refs.

An important segment of the aircraft population is engaged in routine flights under instrument flight rule conditions at low altitudes beneath and beyond the coverage of the current land-based air traffic control (ATC) aids. If the ATC system were expanded so that it readily accommodated low flying aircraft, many pilots would take advantage of the increased safety thereby made available. Attention is given to the available technical options, the Aring Communication Addressing and Reporting System (ACARS), the addition of airborne nodes to common carrier communications networks, and ATC ground communications network radio link interface subsystems. Approaches suitable for the Gulf of Mexico systems are also considered. G.R.

A82-24648 # **Loran for precise position location - The VIEW-NAV system.** M. Rogoff and P. M. Winkler (Emory University, Atlanta, GA). In: Institute of Navigation, Annual Meeting, 37th, Annapolis, MD, June 9-11, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 111-113.

The VIEW-NAV system consists of a loran receiver which is connected to a digital computer and visual display. The onboard computer is a small rugged and reliable digital processor. Aspects of system operation are discussed, taking into account the calibration of the loran grid and the monitoring of the grid. A description of system performance is also provided, giving attention to a number of tests which have been conducted in Long Island Sound and Chesapeake Bay. When a monitor is employed, errors of as little as a few yards are observed. To obtain reliable and accurate results in critical locations, monitors should be employed in such places. G.R.

A82-24649 # **Loran-C RNAV in mountainous areas.** L. Rzonca (FAA, Technical Center, Atlantic City, NJ). In: Institute of Navigation, Annual Meeting, 37th, Annapolis, MD, June 9-11, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 129-140.

The loran-C kilohertz frequency provides stable ground wave propagation with signal coverage which is not limited to line-of-sight between transmitter and receiver. This feature makes loran-C very attractive for aircraft RNAV between airports located in mountainous terrain or other areas not adequately served by the VOR/DME network. An important part of an airborne loran-C evaluation program currently being conducted consists of loran-C accuracy testing in mountainous areas. The first phase, consisting of flight tests in the state of Vermont, has been completed. A description of these tests is presented, taking into account the equipment, the test scenario, and aspects of data processing. The test results obtained verify the potential of loran-C to provide aircraft navigation guidance under all terrain conditions. However, there appears to be a need for further refinement of hardware and of software techniques. G.R.

A82-24650 # **Analysis of loran-C system reliability for civil aviation.** G. A. Wong (Mitre Corp., McLean, VA). In: Institute of Navigation, Annual Meeting, 37th, Annapolis, MD, June 9-11, 1981, Proceedings. Washington, DC, Institute of Navigation, 1981, p. 141-153. 8 refs.

The considered analysis is concerned with the ability of the loran-C system to provide continuous and usable navigation signals for airborne applications. An overview is provided of the analysis techniques, and a description is presented of the computerized loran-C coverage model which is used extensively in the reliability analysis. The probabilistic approach to reliability analysis is discussed, and the overall methodology for the analysis of loran-C system reliability in the conterminous U.S. is illustrated with the aid of an example. The ultimate objective of the loran-C system reliability assessment is to determine the ground station configuration which would meet the civil aviation reliability requirement in the post-1995 time period. G.R.

A82-24651 **Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers.** Conference sponsored by the American Institute of Aeronautics and Astronautics. New York, American Institute of Aeronautics and Astronautics, 1982. 332 p. Members, $30; nonmembers, 40.

Techniques, modeling, instrumentation, and applications of wind tunnels, wind tunnel apparatus, and models were discussed. The Shuttle testing and data base for aerodynamics predictions are examined, along with comparisons with flight data. Further attention was given to wind tunnel design and features, including tunnel liners, a quiet tunnel, choking valves, and slotted wall test sections. Techniques for instrumentation of boundary layers, surface shear stress measurements in compressible flows, laminar skin friction, and the use of aerodynamic balance systems to measure cross and cross-coupling derivatives are explored. The performance of a computer controlled variable geometry wing is described, along with the development of a self-optimizing flexible technology wing wind tunnel model, improvements in the National Full Scale Facility, and a color video display for flowfield surveys. M.S.K.

A82-24656 * # **Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test.** P. A. Newman, E. C. Anderson, and J. B. Peterson, Jr. (NASA, Langley Research Center, Hampton, VA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 36-47. 26 refs. (AIAA 82-0568)

A contoured, nonporous, wind-tunnel liner has been designed in order to simulate a free-flight infinite yawed-wing, transonic-flow condition about a large-chord, supercritical-section, laminar-flow-control (LFC), swept-wing test panel. The numerical procedure developed for this aerodynamic liner design is based upon the simple idea of streamlining and incorporates several existing transonic and boundary-layer analysis codes. A summary of the entire procedure is presented to indicate: what was done and why, the sequence of steps, and the overall data flow. The liner is being installed in the NASA Langley 8-Foot Transonic Pressure Tunnel (TPT). Test results indicating the aerodynamic performance of the liner are not yet available; thus, the liner design results given here are examples of the calculated requirements and the hardware implementation. (Author)

A82-24657 * # **Mean flow and noise measurements in a Mach 3.5 pilot quiet tunnel.** I. E. Beckwith and W. O. Moore, III (NASA, Langley Research Center, Hampton, VA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 48-70. 30 refs. (AIAA 82-0569)

The use of Mach 3.5 two-dimensional rapid expansion nozzle for wind tunnel testing at supersonic speeds and low noise conditions encountered in high altitude flights is described. The supersonic pilot quiet tunnel is located at the NASA Langley Research Center and a description of the facility is provided, along with instrumentation and noise measurement test data at 30, 50, and 75 psia. The mean pitot pressure distributions, rms noise levels, the effect of unit Reynolds number, wall waviness, wall contaminants, and the effects of closing the bleed valve are analyzed. Typical laminar and turbulent spectra are presented, along with a summary of the effect of slot throat adjustment on the power spectra. Comparisons are made of the power spectra with the bleed valve open and closed, and of the rms fluctuating pressures with levels from conventional nozzles, and the performance capabilities are evaluated for use in transition studies. M.S.K.

A82-24658 * # **The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel.** W. C. Rose (Rose Engineering and Research, Inc., Incline Village, NV), R. D. Hanly, F. W. Steinle, Jr. (NASA, Ames Research Center, Moffett Field, CA), and D. W. Chudyk (Calspan Advanced Technology Center, Buffalo, NY). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 71-86. (AIAA 82-0571)

Tests to determine the flow disturbances effects of four ejectors located in the corners just downstream of the diffuser in the Calspan wind tunnel are described. The flow quality in the nonejector mode is employed as the base-line configuration, and operating parameters are compared with data from other wind tunnels. During tests with the ejectors working, fluctuation levels increased between Mach 0.4-0.6, while temperature and vorticity levels remained constant. The ejector exhibited broad spectrum noise typical of free jet noise, yet static pressure measurements revealed only a slight increase in the broadband rms levels with the ejectors on, indicating negligible disturbances upstream caused by the ejectors. Choking the diffuser eliminated the jet noise, and the use of ejectors in the Mach range considered is concluded to cause no significant degradation in the Calspan tunnel flow quality. M.S.K.

A82-24659 # **An ejector augmented choking valve for the metering and control of inlet and bleed duct flows.** C. H. Boccadoro and B. G. Franco (Northrop Aerosciences Laboratory, Hawthorne, CA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 87-93. 10 refs. (AIAA 82-0575)

The use of a choking valve in wind tunnel inlet-airframe models is described, along with the design of ejectors for augmentation in regulating higher weight flows and for upstream recovery conditions. The choking valve, with a plug insert, is operated by moving a plug in and out of the throat, and is calibrated for weight flow by use of Fliegner's isentropic formula for air. The ejectors are designed to produce the proper back pressure to choke the plug for all weight flows and conditions required. One-dimensional ejector theory is reviewed and determinations are made for the primary pressure, the primary weight flow, and the area ratio for the ejector system to pump a specified weight flow. An optimization process is outlined for fitting an ejector system to a choke valve, and experimental results are reported in regards the effects of the area ratio, mixing length, and the primary pressure ratio. M.S.K.

A82-24660 # **Technical innovations in testing and analysis of heat and pressure models in hypersonic wind tunnels.** H. R.

Carroll (Martin Marietta Aerospace, Denver, CO). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 94-100. 7 refs. (AIAA 82-0578)

Wind tunnel testing and analysis techniques for more cost-effective studies on projects using pressure and heat models to obtain flowfield and aerothermodynamic data in hypersonic flows are presented. Timed photographs were taken of paint melting off the nose of an MX missile model, with the paint actually an emulsified wax which retained the protuberance flow patterns when the test was terminated. Thin skin steel 0.030 in. thick was used on the cone and conic body instrumented with thermocouples and connected to a 260 channel multiplexor for data collection of millivolt output in response to heating and pressure changes due to unsteady shocks and laminar or turbulent flow. Temperature recovery methods in supersonic tunnels are discussed, along with tripping turbulent flow by means of twisted wires. Entropy measurements were accomplished by combining heating and pressure test results, Schlieren photographs, pressure rake data, and earlier data. M.S.K.

A82-24661 # **Slotted wall test section for automotive aerodynamic test facilities.** S. Raimondo and P. J. F. Clark (DSMA International, Inc., Toronto, Canada). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 101-109. 7 refs. (AIAA 82-0585)

The use of slotted walled test sections for automotive facilities was experimentally investigated. The experiments were performed at 1/5-scale, with two test section sizes which correspond to 11 sq m and 8.5 sq m equivalent full-scale facilities. For the vehicle used, the model blockages tested were 16.4 and 21.4% respectively. Among the parameters varied were the slot open-area ratio, the axial position of model within the test section and the amount of plenum flow diverted directly into the test section diffuser. The results obtained will be important to the design of small auto-aero facilities, and showed that accurate model pressure distribution data which do not require blockage corrections can be achieved for both test sections. The importance of properly controlling plenum flow at the downstream end of the test section was evident from the present tests.

(Author)

A82-24663 * # **Transonic wind tunnel wall interference corrections for three-dimensional models.** M. H. Rizk (Flow Research Co., Kent, WA), M. Hafez (Flow Research Co., Kent, WA; George Washington University, Washington, DC), E. M. Murman (Flow Research Co., Kent, WA; MIT, Cambridge, MA), and D. Lovell (NASA, Langley Research Center, Hampton, VA; Flow Research Co., Kent, WA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 120-130. 21 refs. Contract No. NAS1-16262. (AIAA 82-0588)

A procedure for the evaluation of wall interference corrections for three-dimensional models is presented. The Mach number and angle-of-attack corrections require the numerical solution of the potential equation about a simplified representation of the experimental model. Pressure measurements are required near the wind tunnel walls. The correction procedure also requires knowledge of the free-stream Mach number, the model angle of attack, and the lift force experienced by the model. The procedure provides an estimate of the accuracy of the correction. For slender configurations at Mach numbers close to one, the Equivalence Rule formulation is adopted to calculate the wall interference effects. Preliminary results are presented for both general and slender-body configurations.

(Author)

A82-24668 # **Review of support interference in dynamic tests.** L. E. Ericsson and J. P. Reding (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 166-190. 79 refs. (AIAA 82-0594)

A review of existing information about support interference has revealed that the support interference effects are much more severe in dynamic than in static tests. Furthermore, the support interference is aggravated greatly by a boat-tail or dome shaped base, even by modest base shoulder roundness, from what it is for a flat-based model. The general conclusion is that asymmetric stings or sting-strut combinations should be avoided. For slender bodies at low angles of attack a transverse rod comes close to permitting the true dynamically destabilizing effect of a bulbous base to be measured whereas even a very slender sting will distort the near wake effect and produce an unconservatively high measure of the dynamic stability. At intermediate and high angles of attack the sting support is superior to the other support methods, the transverse rod or the strut mounting. In many cases half-model testing provides the means to avoid most of the support interference effects. In some cases, as for a short blunt body such as the Viking configuration, the best approach appears to be to allow sting plunging, using a very slender sting.

(Author)

A82-24669 # **The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives.** D. R. Haberman (Calspan Field Services, Inc., Arnold Air Force Station, TN). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 191-201. 6 refs. (AIAA 82-0595)

Equations of motion and a data reduction method are presented for a dual balance system for measuring dynamic cross and cross-coupling derivatives for aerodynamic models in wind tunnel tests. The balances each weigh 1600 lb, with one to provide forced oscillation, pitch/yaw, and cross flexure as a motion generator, and the other to create pitch/yaw, or roll planes as a load measuring device. Both balances are noted to be similar to a five-component static force balance, and balance deflections are measured by holographic interferometry. The Lagrange method is used to derive the equation of motion in roll, and locations of the center of gravity are calculated from the known balance dimensions. Balance measurements are converted into a force and a moment about a selected reference point by substituting the measured load vectors into the static balance equation. Further consideration is given to roll data reduction and the correction of existing roll data. M.S.K.

A82-24670 # **Cross and cross-coupling derivative measurements on the standard dynamics model at AEDC.** S. M. Coulter and E. J. Marquart (Calspan Field Services, Inc., Arnold Air Force Station, TN). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 202-214. 9 refs. (AIAA 82-0596)

A description of newly developed pitch, yaw, and roll forced-oscillation balance systems is presented. These systems were designed with a particular goal of obtaining cross and cross-coupling derivative measurements at high angles of attack. Results of laboratory and wind tunnel tests (from Mach 0.3 to 1.3) are discussed. Cross and cross-coupling derivatives, direct dynamic, and static data, obtained from testing the Standard Dynamics Model (SDM) are shown for several test conditions. Comparisons to a previously obtained dynamic and static data base for this model show good agreement, verifying the accuracy of the measured parameters. (Author)

A82-24673 # **Development of a self-optimizing flexible technology /SOFT/ transonic wing wind tunnel model.** A. A. McClain and S. Pountney (General Dynamics Corp., Convair Div., San Diego, CA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 230-238. Contract No. N00014-76-C-0742. (AIAA 82-0601)

The SOFT-wing concept automatically adapts the wing shape through computer control. Designing the model to meet the criteria of transonic testing required the investigation and application of innovative techniques. Major design and fabrication features of the model included rectangular hydraulic actuators machined integrally in the spar, highly accurate linear potentiometers, leading- and trailing-edge skins of composite materials, a leading-edge extension mechanism, flexible wing tips, and a self-trimming horizontal stabilizer. It was concluded that an automated model is expensive to develop; however, its productivity reduces test costs significantly, thereby offsetting increased model costs. (Author)

A82-24674 * # **Structural modeling of high Reynolds number wind tunnel models.** S. C. Mehrotra (Vigyan Research Associates, Inc., Hampton, VA) and J. C. Robinson (NASA, Langley Research Center, Hampton, VA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 239-245. Contract No. NAS1-16114. (AIAA 82-0602)

A solid uninstrumented wing and a pressure instrumented wing having a tongue and groove type joint have been structurally modeled by using SPAR Structural Analysis System. The solid wing model can be analyzed by SPAR, using either solid elements or plate elements with reasonable accuracy. The instrumented wing models with tongue and groove joint can be modeled by using solid elements. A solid model representation for the wing with tongue and groove joint can be used for the cases where an error of 6 percent in deflections is acceptable. (Author)

A82-24675 * # **Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels.** E. C. Teague, T. V. Vorburger, F. E. Scire, S. M. Baker, S. W. Jensen (National Bureau of Standards, Washington, DC), B. B. Gloss (NASA, Langley Research Center, Hampton, VA), and C. Trahan. In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 246-251. 6 refs. NASA Order L-4718-B. (AIAA 82-0603)

Current work by the National Bureau of Standards at the NASA National Transonic Facility (NTF) to evaluate the performance of stylus instruments for determining the topography of models under investigation is described along with instrumentation for characterization of the surface microtopography. Potential areas of surface effects are reviewed, and the need for finer surfaced models for the NTF high Reynolds number flows is stressed. Current stylus instruments have a radii as large as 25 microns, and three models with surface finishes of 4-6, 8-10, and 12-15 micro-in. rms surface finishes were fabricated for tests with a stylus with a tip radius of 1 micron and a 50 mg force. Work involving three-dimensional stylus profilometry is discussed in terms of stylus displacement being converted to digital signals, and the design of a light scattering instrument capable of measuring the surface finish on curved objects is presented. M.S.K.

A82-24676 * # **Status and capabilities of the National Full Scale Facility 40- by 80-foot wind tunnel modification.** K. W. Mort, D. F. Engelbert, and J. C. Dusterberry (NASA, Ames Research Center, Moffett Field, CA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 252-272. 30 refs. (AIAA 82-0607)

The background, requirements, and aerodynamic design of the modified NASA Ames 40 x 80 ft wind tunnel are reviewed, along with the systems integration and systems test results. Advancing vehicle sizes and airspeeds required a larger wind tunnel test section and a capability for 100 and 300 knots airspeed simulation. Acoustic mufflers at the inlet and exit of the nonreturn circuit provide noise suppression. The enlarged test section is intended to accomodate the complex flowfields of wings with high lift coefficients, and the drive system is designed with minimum residual swirl. Features of the fan blades are examined, along with characteristics of the test channels, control vanes and louvers, the exit, circuit losses, temperature rises during operation of the nonreturn circuit, and the facility acoustics. Specific construction problems and solutions for the conversion process are outlined, and it is noted that operational status is expected at the end of 1982. M.S.K.

A82-24677 * # **A new facility and technique for two-dimensional aerodynamic testing.** J. B. McDevitt, T. E. Polek, and L. A. Hand (NASA, Ames Research Center, Moffett Field, CA). In: Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 273-295. 6 refs. (AIAA 82-0608)

The design and operational characteristics of a new test leg for the High Reynolds Number Facility at Ames Research Center are presented, and the unique features of a test section for obtaining two-dimensional airfoil data are reviewed. The new facility operates at unit Reynolds numbers ranging from 1,000,000/ft to 30,000,000/ft. Boundary-layer suction panels are used in the test section (16 in. wide by 24 in. high) to minimize side-wall interference effects. Flexible, easily adjustable upper and lower walls allow test-channel area-ruling so as to nullify Mach-number changes induced by mass removal, to correct for longitudinal boundary-layer growth, and to provide contouring compatible with the streamlines of the model in free air. (Author)

A82-24701 **The Agusta's solution of AHS's hypothetical fatigue life problem.** G. Aldinio and P. Alli (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate, Italy). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 15 p. 8 refs.

The Agusta solution to the American Helicopter Society's hypothetical fatigue life problem is presented. The fatigue analysis methodology for dynamic components is based on Miner's rule, which necessitates a proper load survey and some fatigue tests. The component's life is calculated using peak value flight loads, cycle-counted flight loads, the rainflow method, the range-pair-range method, and counting methods. GAG cycles are also discussed. D.L.G.

A82-24703 **The challenge of standardizing fatigue methodology.** B. Altman and J. Pratt (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 14 p. 7 refs.

The Sikorsky methodology is described, and the goal of standardization of fatigue methodology as applied to a hypothetical fatigue problem is discussed. Areas that can be successfully standardized include S/N curve shapes for specific materials, the use or non-use of Goodman corrections, the selection of test steady loads, and the determination of primary frequency. It is concluded that the success with which standardization will set the balance between structural reliability and program costs will depend upon the assessment of the risks involved for the total methodology; a system approach is needed to understand and optimize the risks involved in the total methodology selected and the program advantages. D.L.G.

A82-24704 **Standardization of helicopter fatigue methodology - A manufacturer's view.** J. M. Drees (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 11 p.

It is pointed out that each helicopter company has its own way of determining component lives. As the existence of such differences has created problems for the Army evaluation teams, it has been recommended that standardization of methods be imposed by the Army for future developments. The present investigation is concerned with the question of whether standardization beyond what has already been specified is beneficial from an overall standpoint. It is found that there are a number of aspects which make it difficult to recommend at the present time the introduction of new industry-wide standards. Thus, it appears unlikely that safety will be improved by such standards, because many field failures are caused by factors which are not part of the methodology presently followed. The recommendation is made that an independent 'Helicopter Fatigue Methodology Council' be formed. Feasibility of standardization may be explored as well as many other subjects of common interest during workshop-type meetings. G.R.

A82-24705 **Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft.** H. S. Faust (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 18 p.

A fatigue cracking problem in the aft rotor drive shaft of the CH-46 helicopter is described. The cracking occurred in a pinned joint between two sections of the shaft, at service times below the retirement life indicated by the original fatigue test and life calculations. Crack propagation and strain survey tests are discussed together with their use in defining periodic inspection intervals and joint improvements. In addition, a new stress analysis technique for joints of this type is introduced. (Author)

A82-24706 **Evolution of the Aeroscout.** G. Fossum, II (U.S. Army, Training and Doctrine Command, Fort Monroe, VA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 7 p.

The development of the aerial scout is discussed, taking into account medical evacuation roles assigned to the first helicopters purchased by the Army, the role of the helicopter during the Korean War, the scout/gunship role for the OH-13 helicopter, and scout missions performed in Vietnam. The adaption of helicopter scout tactics for modern combat conditions is considered, giving attention to the need to increase the helicopter's survivability on the mid to high intensity battlefield. The present concept of scout employment calls for the scout to be the integrator of aerial antiarmor firepower of the combined arms team. Four major roles identified are related to operations as air cavalry scout, attack helicopter scout, artillery scout, and an aid to battlefield management. G.R.

A82-24707 **Flight test data acquisition and interpretation.** C. Hutchinson and H. Steinmann (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 18 p.

Data acquisition comprises the selection of measurements, optimization of recording methods, and processing of the measurements for interpretation. Basic measurements are related to the determination of airspeed, altitude, gross weight, the center of gravity, rotor speed, outside air temperature, attitudes, rates, stick positions, and load factor. The complete list of the parameters is dependent on the type of helicopter being tested. However, the intent is to be able to verify the suitability of maneuvers for the flight load survey requirements. Data interpretation considers safety of the test aircraft, load studies, and fatigue life predictions. Variations in operating restrictions, based on fatigue loads, can have dramatic effects on the outcome of the fatigue life assessment. G.R.

A82-24708 **Structural testing of composites with known defects.** P. F. Maloney (Kaman Aerospace Corp., Bloomfield, CT). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 14 p. 5 refs.

In connection with the application of composite materials in primary structural components of production aircraft, an understanding of the significance of typical defects in the material is very important. The present investigation has the objective to make a contribution to such an understanding. Specific experiences discussed are derived from four separate development programs of relatively recent completion. Attention is given to the composite main rotor blade for the AH-1 Cobra helicopter, the composite rotor hub development program, the composite main rotor blade for the circulation control rotor, and the development of a composite blade for a 300 foot diameter wind turbine. A description is presented of salient features of each of these programs, taking into account significant findings relative to defects as they may affect composite materials. G.R.

A82-24709 **A method of determining safe service life for helicopter components.** G. W. McCloud (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 12 p.

It is pointed out that the considered methods have been used by an American helicopter manufacturer for many years and were found to be reliable. In general, these methods follow those outlined in FAA Advisory Circular 20-95. The information required for the determination of the fatigue life of a component includes the fatigue strength characteristics of the component, the stresses associated with normal flight maneuvers, and the frequency of occurrence of those maneuvers. Attention is given to the approaches employed to obtain information regarding the fatigue strength, the operating loads spectrum, a fatigue life calculation, and prospects for improving state-of-the-art procedures. G.R.

A82-24710 **Hughes helicopters - Fatigue life methodology.** J. McDermott (Hughes Helicopters, Inc., Culver City, CA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 20 p.

A description is presented of the approach used by an American helicopter manufacturer in solving a hypothetical fatigue problem. The solution of the problem was undertaken to identify and evaluate the different methodologies existing in the industry. The hypothetical fatigue problem provides loads data, fatigue test data, and defines the spectrum. The required solutions include the calculation of fatigue life using cycle counted data, the calculation of fatigue life using peak loads applied throughout the time slice of duration of maneuver, and the determination of the effect of GAG cycles. The results of the investigation show the importance of the determination of the S-N curve, using either best data fit or standard material curve shape. Assumption of peak cycle loads for duration of maneuver is found to be ultra conservative, leaving out the GAG cycle is unconservative. G.R.

A82-24712 **Flight condition recognition /FCR/ technique.** D. M. Saylor (U.S. Army, Research and Technology Laboratories, Fort Eustis, VA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 7 p.

A U.S. Army contract, entitled 'Structural Integrity Monitoring System' was performed to design, qualify, flight test, and demonstrate the Structural Integrity Recording System (SIRS). SIRS provides a cost-effective method of tracking the accumulation of fatigue damage on critical helicopter dynamic components. The system monitors the variations in fleet utilization on a helicopter-by-helicopter basis for safer and more economical operation. SIRS is a total system comprising an airborne microprocessor-based recorder, a portable flight-line retrieval unit, and a data processing package. Attention is given to the airborne recorder, the transducer package, the retrieval unit, fatigue damage assessment software, flight test programs, aspects of operational test and evaluation, and a flight test program. G.R.

A82-24713 **NDE of composite rotor blades during fatigue testing.** R. Shuford, W. Houghton (U.S. Army, Army Materials and Mechanics Research Center, Watertown, MA), J. R. Mitchell (Becton, Dickinson and Co., Dunegan-Endevco, San Juan Capistrano, CA), and J. W. Sobczak (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 17 p. 11 refs.

A description is presented of progress made in a continuing project concerned with the evaluation of the usefulness of several nondestructive evaluation (NDE) techniques for monitoring flaw initation and growth in composite helicopter rotor blades. The acoustic emission (AE) results indicate minor fatigued damage. It appears, therefore, feasible to project an AE failure curve based on the emissions from periodic proof overloads. This technique could have wide application in new product certification and in-service inspection of composite rotor blades. Indications from the vibrothermography portion of the program suggest that it may provide an excellent method for locating, characterizing, and understanding defect development and growth during cyclic loading of composite structures. Results from the ultrasonic, radiographic and visual examinations indicate that these procedures are very useful for the evaluation of defects in composite rotor blades. G.R.

A82-24714 **Fundamentals of helicopter fatigue life determination.** D. P. Schrage (U.S. Army, Aviation Research and Development Command, St. Louis, MO). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 28 p. 10 refs.

This paper reviews the fundamentals of helicopter fatigue life determination by discussing the sources and definitions of helicopter loads, the relationships between these loads and critical stresses, and helicopter fatigue methodology. Helicopter fatigue methodology is the process by which the various aspects and disciplines are incorporated into a procedure for calculating helicopter fatigue lives. (Author)

A82-24715 **Fatigue test of the typical main rotor controls component.** J. Slack and J. Cernosek (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 17 p.

The general procedure used to qualify a fatigue critical component is illustrated with the aid of a flow chart. The decision regarding the condition of fatigue tests for a particular component is made as soon as practical in a program. The decision takes into consideration the expected fatigue environment on the helicopter. An early diagnosis of potential component fatigue problems is important to prevent certification delays, and costly manufacturing charge requirements. Considerations of the plan of test are discussed, giving attention to the test specimen, the type of test, the test loads, and the test machine. The more important aspects concerning the implementation of the test plan are related to the test set up, the failure analysis, and the feedback requirements. G.R.

A82-24716 **Hypothetical fatigue life problem - Application of Aérospatiale method.** G. Stievenard (Société Nationale Industrielle Aérospatiale, Division Hélicoptères, Marignane, Bouches-du-Rhône, France). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 34 p.

The mean fatigue curve calculation is considered, taking into account the permissible alternating load and the plotting of the unit Wöhler curve. The Wöhler curve makes it possible to calculate, from test results, a mean fatigue curve and a standard deviation representative of the scatter. Attention is given to safe fatigue curve calculation, aspects of flight load determination, the fatigue life calculation using peak value flight loads, a fatigue life calculation using cycle-counted flight loads, and the values for a G.A.G. cycle. It is pointed out that the Wöhler curves for steels loaded without fretting are generally flat and that this results in very high difference in the number of cycles for low variations of loading. G.R.

A82-24717 **The cargo helicopter - A logistical vehicle.** R. L. Stoessner and R. C. Heehn (U.S. Army, Training and Doctrine Command, Fort Monroe, VA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 13 p. 9 refs.

The availability of adequate supplies is a crucial factor for an army engaged in a battle. In the case of highly mobile forces involved in other than light assault missions, supply requirements combined with the factor of time sensitivity dictate the use of air logistics helicopters. The logistical helicopters are considered an integral part of the support command's transportation service. Attention is given to the employment of air transport units providing combat service support from a logistical base to a combat force such as a division or brigade which is operating in an underdeveloped area. The Tactical Mobility Requirements Board report of 1962, laid the foundation for true airmobility of Army Forces. The versatility of the cargo helicopter was demonstrated in Vietnam. However, much of the operational experience gained is not applicable to a mid- or high-intensity combat environment. The air defense threat envelope will require the cargo helicopter to utilize terrain masking to the maximum. G.R.

A82-24718 **Boeing Vertol fatigue life methodology.** G. H. Thompson (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 8 p. 7 refs.

It is pointed out that, with respect to basic philosophy, the fatigue life methodology of the considered American helicopter manufacturer has changed little over the years. Major changes have been only in the mechanics of calculation. High-speed computers are performing the work which once had to be done manually. The life calculation procedure is started by developing the mission profile. This consists of a fatigue loading schedule and flight profile splits. To determine the endurance limit of a helicopter dynamic component, full-scale bench fatigue tests are conducted. The use of the fatigue life methodology is illustrated with the aid of an example involving the solution of a hypothetical fatigue life problem. Attention is given to life calculation without cycle counting, life calculation with cycle counting, and the ground-air-ground condition. G.R.

A82-24719 **Helicopter rotor load prediction.** J. G. Yen (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 10 p. 12 refs.

In the preliminary design of rotor components, the fatigue design loads must be estimated. The methods which have been used for estimating the design loads at Bell Helicopter Textron (BHT) are discussed in this paper. A review of rotor loads prediction methods starting with the empirical method used in the earlier years of helicopter design through the application of the sophisticated computer analysis of today is presented. Examples of correlation of blade and pitch-link loads between flight test and analytical prediction for a two-bladed teetering rotor and a four-bladed hingeless rotor in level flight are shown. Results indicate that the accuracy of analytical prediction depends upon an accurate representation of the rotor structure and the use of state-of-the-art aerodynamics and, to a great extent, the user's knowledge and experience with the analysis. Applications of C81 to predicting loads following blade damage are also discussed briefly. (Author)

A82-24720 **Advanced attack helicopter fatigue testing - Overview.** G. D. Deveaux (Hughes Helicopters, Inc., Test Laboratories, Culver City, CA). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 25-27, 1980, Paper.* 13 p.

A description is presented of tests conducted to study the fatigue life of critical components of the YAH-64 helicopter. In accordance with the Airworthiness Qualification Specification six specimens are required to substantiate a fatigue life of 4500 hours. Constant load amplitude, S-N type testing is used for all component tests with the exception of the gun support structure, where spectrum loading type testing is specified. The components required to be fatigue tested belong to the main rotor group, the tail rotor group, the controls group, the drive system group, and the fuselage. The test loading system is discussed, taking into account the general approach, the actuators, and the air springs. Details regarding the data acquisition system are also provided. G.R.

A82-24803 **Novel metal-ceramics-composite sealing coatings in aircraft engines (Neuartige Metall-Keramik-Verbund-Dichtungsbeläge in Flugtriebwerken).** A. Sickinger and V. Wilms (Motoren- und Turbinen-Union München GmbH, Munich, West Germany). In: Composite materials; Lecture and Discussion Meeting, Constance, West Germany, April 17, 18, 1980, Reports. Oberursel, West Germany, Deutsche Gesellschaft für Metallkunde, 1981, p. 133-140. In German.

Requirements for the enhancement of the performance of aircraft engines and the reduction of fuel consumption make it necessary to operate aircraft engines at higher gas pressures and temperatures. The development of novel metal-ceramics-composite sealing coatings makes it possible to overcome certain problems related to more exacting sealing requirements and greater thermal extension in connection with the new operational conditions. The sealing coating provides a means to compensate for different thermal extensions and manufacturing tolerances existing for rotating and stationary structural components. It is feasible to obtain minimum clearance values and to reduce attrition effects for the rotating component. Other important benefits of the coating are related to its thermal-barrier characteristics. Attention is given to the requirements which the coating has to satisfy, its application by thermal spraying, the coating composition, and some test results. G.R.

A82-24805 **Carbon-fiber composites - A fiber composite material for highly stressed light-construction components (CFK - Ein Faserverbundwerkstoff für hochbelastete Leichtbauteile).** G. Stöffler, W. Scheer, and H. Wurtinger (M.A.N. - Neue Technologie, Munich, West Germany). In: Composite materials; Lecture and Discussion Meeting, Constance, West Germany, April 17, 18, 1980, Reports. Oberursel, West Germany, Deutsche Gesellschaft für Metallkunde, 1981, p. 235-250. 7 refs. In German.

The properties of the basic materials used in fiber-reinforced nonmetallic materials are considered, and the calculation of the strength characteristics of the composite material is discussed, taking into account stresses and fiber orientation in the case of the wing of an aircraft. Attention is given to the elasticity characteristics of a unidirectional layer, a fracture criterion for the unidirectional layer, a computational flow diagram for the calculation of the loading capacity of the composite, the fracture characteristics and the mechanical characteristics of carbon-fiber composites (CFC), and the thermal properties of CFC. A description is presented of examples which illustrate various possibilities for an employment of CFC. G.R.

A82-24814 # **Efficient combinations of numerical techniques applied to aircraft turning performance optimization.** D. Blank and J. Shinar (Technion - Israel Institute of Technology, Haifa, Israel). *Journal of Guidance, Control, and Dynamics,* vol. 5, Mar.-Apr. 1982, p. 124-130. 23 refs.

This paper presents efficient combinations of numerical optimization techniques summarizing their relative merits. Four basic methods handling constraints without penalty functions, are considered: (1) sequential gradient-restoration, (2) quasilinearization, (3) neighboring extremals, and (4) direct shooting. The first two are modifications of algorithms introduced by Miele, avoiding numerical differentiation and eliminating the anchoring effect of the original formulation. The third one is a generalization of an algorithm due to Bryson and Ho. The individual and combined methods are tested by solving the optimization of vertical and three-dimensional turning maneuvers as examples. Results show that an appropriate combination of algorithms reduces the computational effort by more than 50%. (Author)

A82-24825 **Recent developments in materials and processes for aircraft corrosion control.** S. J. Ketcham and J. J. De Luccia (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). *SAMPE Quarterly,* vol. 13, Jan. 1982, p. 32-37. 10 refs.

This paper describes advances in materials and processes for aircraft corrosion control currently in use and those under development in the laboratory for future use. Areas covered are corrosion preventive compounds, organic and inorganic coatings, alloy selection and heat treatments. Available materials highlighted are water displacing compounds, sealant primers, aluminum alloys 7050 and 7010 including a state-of-the-art report on the use of exfoliation and stress corrosion resistant tempers. Materials under development that offer promise of contributing to future advances include water displacing paints, flexible primer, crack arrestment compounds, powder metallurgy, aluminum alloys and substitutes for cadmium plating. (Author)

A82-24892 † **A method for the investigation of gyrostabilization systems (Ob odnom metode issledovaniia sistem giroskopicheskoi stabilizatsii).** L. K. Kuz'mina. In: The direct method in stability theory and its applications. Novosibirsk, Izdatel'stvo Nauka, 1981, p. 195-200. 9 refs. In Russian.

The paper examines gyrostabilization systems whose differential equations of motion include a large parameter. The conditions under which a simplified low-order mathematical model can be used to study such systems are investigated. Results are presented for the example of a single-axis gyrostabilizer. B.J.

A82-24970 **Angle of downwash behind a wing in unsteady flow (Srazovy uhel za neustaiene obtekanym kridlem).** M. Zadnik. *Zpravodaj VZLU,* no. 4, 1981, p. 167-171. 5 refs. In Czech.

The paper presents a method for determining the angle of downwash behind a wing in the plane of symmetry of the aircraft when the circulation about the wing varies periodically with time. The solution is obtained for an inviscid medium on the assumption of the total rollup of the free and starting vortices. The results are presented in the form of a nomogram. B.J.

A82-24972 **The reliability and safety of small passenger aircraft (Problematika spolehlivosti a bezpecnosti maleho dopravniho letounu).** O. Gregr and V. Kahanek. *Zpravodaj VZLU,* no. 4, 1981, p. 189-195. 5 refs. In Czech.

Problems associated with the reliability and safety assurance of small passenger aircraft during certification are discussed. The philosophy of flight safety assessment according to NLGS-2 requirements is described, and the quantitative limits of the probability of an accident due to damage are determined. Methods of aircraft reliability analysis and testing are briefly described. B.J.

A82-24973 **Spoilers or auxiliary flaps (Spoilery nebo pomocna kridelka).** V. Pokorny. *Zpravodaj VZLU,* no. 5, 1981, p. 213-217. In Czech.

The possibilities and advantages of using auxiliary flaps (that part of ailerons or extended flaps controlled by a servo actuator) instead of spoilers for the improvement of lateral control are discussed. It is shown that the auxiliary flaps have definite advantages over spoilers and allow a wider range of application. B.J.

A82-24974 **Oscillations and vibrations of aircraft on runways (Kmitani a vibrace letadel pri pozemnich operacich).** O. Kropac, J. Sprinc, and M. Prochazka. *Zpravodaj VZLU,* no. 5, 1981, p. 219-234. 8 refs. In Czech.

Analytic and experimental studies on the vibration of aircraft on runways are summarized. The aircraft and the runway are considered as interacting components of a dynamic system. This is taken into account in developing a classification of runways according to surface irregularities and the corresponding dynamic response of the aircraft. Attention is given to the motion of the aircraft as a whole, to vibrations of its parts, and to certain special phenomena, particularly the inverse effect of damping. B.J.

A82-25002 **Analysis of the crossed dipole antenna as a model for aircraft in an electromagnetic environment.** R. W. Burton (Colorado, University, Colorado Springs, CO) and R. W. P. King (Harvard University, Cambridge, MA). In: International Symposium on Electromagnetic Waves, Munich, West Germany, August 26-29, 1980, Proceedings. Munich, International U.R.S.I.-Symposium, 1981, p. 311 A/1-311 A/4. 14 refs.

The currents and charges induced on the metallic skin of a crossed dipole antenna immersed in an electromagnetic plane wave field are analyzed experimentally and theoretically for both electrically thin and electrically thick arm diameters over a wide range of arm lengths highlighting critical boundary conditions. An analysis is also carried out of electrically thick cylinders with flat plate cross arms. The boundary conditions at the junction of the crossed dipole with electrically thin arms are developed and correlated with experimental results over a range of arm lengths that clearly define the boundary conditions on charge and current in the junction area. The results are interpreted in terms of the forced and resonant currents directly evolved from an understanding of the electrically thin receiving unit. C.R.

A82-25011 **Calculation and measurement of electric field strength for airborne antennas in the LF/MF range.** R. J. Luebbers and J. Bash (Ohio University, Athens, OH). In: International Symposium on Electromagnetic Waves, Munich, West Germany, August 26-29, 1980, Proceedings. Munich, International U.R.S.I.-Symposium, 1981, p. 334 A/1-334 A/4. 5 refs.

A technique has been developed to calibrate in absolute field strength the loop antenna and associated receiving system for the Automatic Direction Finding equipment for three different aircraft. The calibrated receiving systems are flown at a variety of altitudes over various types of terrains, and field strengths for signals in the desired frequency range are measured. A comparison is made between calculated and measured results, showing good agreement to within a few dB, and confirming the accuracy of both the calibration method and the propagation model. D.L.G.

A82-25060 # **AFWAL turbine engine controls research and development - Present and future.** L. L. Small (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0321.* 7 p. 9 refs.

It is noted that, within the next few years, digital computer-based engine controls will see operational use in both military and commercial applications. Current and planned activities at the Air Force Wright Aeronautical Laboratories in the areas of multivariable control logic, control system integration, and reliability/flight safety are reviewed. C.R.

A82-25113 # **Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data.** W. L. Smith (NOAA, National Earth

Satellite Service, Madison, WI) and F. X. Zhou. *Applied Optics*, vol. 21, Mar. 1, 1982, p. 924-928. 5 refs.

Algorithms are presented which allow fast retrieval of major meteorological parameters from individual radiance measurements, thereby avoiding the time consuming radiative transfer equation inversion process as required for detailed vertical profile determinations. The relative humidity and geopotential thickness patterns from satellite data are shown to be consistent with radiosonde data. The atmospheric stability index, total-totals, calculated from satellite derived relative humidities and geopotential thicknesses is in good agreement with subsequent convective weather. Computer programs based on the proposed algorithms produce contour displays of the humidity, geopotential thickness, and total-totals within 10 min of the ingestion of the satellite data. V.L.

A82-25119 **Aircraft/airport compatibility - A constant challenge for aircraft designers.** W. E. Parsons and M. E. Wilfert (Douglas Aircraft Co., Long Beach, CA). *Exxon Air World*, vol. 34, no. 1, 1982, p. 18-21, 30.

The consideration given during airport planning and aircraft design to the compatibility of the two systems is described, with attention to the impact of design alternatives on direct, indirect and total operating costs through the reduction of ground time for storage and maintenance. Major aspects of existing and planned airport facilities considered during aircraft design include runway length and width, taxiway width, pavement fillets, and pavement strength, along with the location and accessibility of the various servicing points of the aircraft. Emphasis is placed on the avoidance of sequencing in servicing operations, so that lavatory, water, electrical, pneumatic and air conditioning systems may be readied for flight simultaneously. O.C.

A82-25154 * # **The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators.** R. O. Bailey (NASA, Ames Research Center, Moffett Field, CA), M. R. Maraz, and P. E. Hiley (Douglas Aircraft Co., St. Louis, MO). *American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, AIAA Paper 81-2635.* 27 p. 8 refs. Contract No. F33615-77-C-2097.

A wind-tunnel model of a supersonic VSTOL fighter aircraft configuration has been developed for use in the evaluation of airframe-propulsion system aerodynamic interactions. The model may be employed with conventional test techniques, where configuration aerodynamics are measured in a flow-through mode and incremental nozzle-airframe interactions are measured in a jet-effects mode, and with the Compact Multimission Aircraft Propulsion Simulator which is capable of the simultaneous simulation of inlet and exhaust nozzle flow fields so as to allow the evaluation of the extent of inlet and nozzle flow field coupling. The basic configuration of the twin-engine model has a geometrically close-coupled canard and wing, and a moderately short nacelle with nonaxisymmetric vectorable exhaust nozzles near the wing trailing edge, and may be converted to a canardless configuration with an extremely short nacelle. Testing is planned to begin in the summer of 1982. A.L.W.

A82-25213 **Conflicts between random flights in a given area.** S. Ratcliffe and R. L. Ford (Royal Signals and Radar Establishment, Malvern, Worcs., England). *Journal of Navigation*, vol. 35, Jan. 1982, p. 47-71; Discussion, p. 72-74. 18 refs.

The present investigation is concerned with the segregation of air traffic in space and a division of the available sky in various sections to minimize conflicts between the various users. Random air traffic in a bounded volume of airspace outside the controlled airspace is considered. It is assumed that aircraft are all in straight line flight. The constraints make it possible to construct a model whose behavior can be defined quantitatively as an algebraic function of the small number of input parameters. Attention is given to a computer model, two-dimensional traffic, the constraints on the use of airspace, conflicts in three-dimensional airspace, the collision rate as a function of traffic mix, and alarm criteria for an advisory service. G.R.

A82-25216 * # **Advanced electronic displays and their potential in future transport aircraft.** J. J. Hatfield (NASA, Langley Research Center, Hampton, VA). *International Air Transport Association, Technical Symposium on Aviation Technology in the 80's, Montreal, Canada, Dec. 1-4, 1981, Paper.* 26 p. 29 refs.

It is pointed out that electronic displays represent one of the keys to continued integration and improvement of the effectiveness of avionic systems in future transport aircraft. An employment of modern electronic display media and generation has become vital in connection with the increases in modes and functions of modern aircraft. Requirements for electronic systems of future transports are examined, and a description is provided of the tools which are available for cockpit integration, taking into account trends in information processing and presentation, trends in integrated display devices, and trends concerning input/output devices. Developments related to display media, display generation, and I/O devices are considered, giving attention to a comparison of CRT and flat-panel display technology, advanced HUD technology and multifunction controls. Integrated display formats are discussed along with integrated systems and cockpit configurations. G.R.

A82-25323 # **Secondary radar problems - The presence of false echoes (Problemas del radar secundario - Presencia de ecos falsos).** M. G. Duran (Paracuellos del Jarama, Centro de Control de Navegación Aérea, Paracuellos del Jarama, Spain). *IAA/Ingeniería Aeronáutica y Astronáutica*, vol. 34, Jan. 1982, p. 5-10. In Spanish.

Techniques are described for the suppression of false radar echoes due to: (1) lateral lobe radar responses; (2) radar responses out of synchrony with the signals of the radar system; (3) responses corresponding to signals from previous radar repetition periods; (4) responses produced by a split in the number of echoes from a target aircraft; and (5) responses due to reflections. The most frequently used technique for the correction of these false-echo effects is improved side lobe suppression (ISLS), which involves the emission of radar pulse signals from an omnidirectional antenna. Techniques complementing ISLS include the false return elimination device and transponder suppression transmitter. False echo suppression by data processor programming techniques is also described. O.C.

A82-25324 # **Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s (La instrumentación de los 80 /E.F.I.S./).** J. B. Galente. *IAA/Ingeniería Aeronáutica y Astronáutica*, vol. 34, Jan. 1982, p. 18-23. In Spanish.

The development of high-luminosity, high-resolution color coded CRT systems for the display of symbolic and alphanumeric flight data in cabins of 767/757-type commercial aircraft is discussed. These electronic flight instrument systems (EFIS) depend for their effectiveness on the incorporation of two techniques: (1) the shadow mask tube, derived from the trinitron color CRTs in use in radar color display terminals; and (2) stroke writing, in which each CRT electron gun can prolong its excitation of a given screen area under the control of a microprocessor. Progress in the development and experimental validation of these instruments has been so rapid as to allow general aviation use to begin in 1982. The more extensive use of CRTs in an 'all glass cockpit', pending further development, is also considered. O.C.

A82-25325 # **The toll of ILS-preventable aviation accidents (Costo de los accidentes aéreos evitables con ILS).** E. L. Abella. *IAA/Ingeniería Aeronáutica y Astronáutica*, vol. 34, Jan. 1982, p. 31-34. In Spanish.

Based on the statistical analysis of Simpson (1975), observations are presented concerning the aviation accidents which occurred in the U.S. from January 1964 to December 1972, with emphasis on landings. An attempt is made to determine the portion of those landing approach accidents that could have been prevented through the use of IFR procedures of a high degree of precision. Results are presented for the cases of commercial aviation, commuter aviation, and general aviation, and comparisons are made with general aviation VFR accidents. All comparative data are presented in tabular form. Attention is given to the estimation of preventable property losses as well as loss of lives. J.C.

A82-25347 † **Problems of numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles (O zadachakh chislennogo modelirovaniia nestatsionarnykh prostranstvennykh techenii viazkogo gaza v soplakh).** A. T. Fedorchenko. *Zhurnal Vychislitel'noi*

Matematiki i Matematicheskoi Fiziki, vol. 22, Jan.-Feb. 1982, p. 178-196. 26 refs. In Russian.

The paper examines certain general problems involving the use of the complete Navier-Stokes equations for the numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles. Models of porous boundaries are examined, and their acoustic characteristics are investigated. Attention is given to aspects of the control of gasdynamic (especially acoustic) parameters in such flows. As an example, a numerical analysis is presented of axisymmetric unsteady flows of a viscous gas in a region containing a Laval nozzle. B.J.

A82-25363 † **Stability of a three-stage dynamic stand (Ob ustoichivosti trekhstepennogo dinamicheskogo stenda).** N. V. Osadchenko. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela,* Jan.-Feb. 1982, p. 20-27. 10 refs. In Russian.

The small-parameter method is used to derive equations of partial motion components for a three-stage dynamic stand designed for simulating the angular motions of moving objects. The fast-motion stability of the system is analyzed using a previously proposed method whereby the stability problem for three-axis systems is reduced to that for single-axis systems. A matrix interpretation of this method is presented, and stability bounds are determined. V.L.

A82-25499 **Importance of a tactical cargo aircraft in emergency relief (Intérêt d'un avion cargo tactique dans les secours d'urgence).** J. P. Chabanne (Service de Santé pour l'Armée de l'Air, Ecole d'Application; Centre de Recherche de Médecine Aérospatiale, Paris, France) and G. Jacob (Commandement du Transport Aérien Militaire, Vélizy-Villacoublay, Yvelines, France). *Médecine Aéronautique et Spatiale, Médecine Subaquatique et Hyperbare,* vol. 20, no. 79, 1981, p. 210-214. 7 refs. In French.

The use of the C 160 Transall aircraft in emergency relief operations at the site of medical disasters is discussed. Capabilities of the C 160 allow it to be useful for a number of purposes: (1) the transport of medical personnel and equipment into the disaster region; (2) the medical evacuation of the seriously ill and injured; (3) the resupply of the stricken area with food, fuel and medical supplies; (4) the supplementation of communications damaged by the disaster. Despite limitations in range, velocity and capacity, experience in humanitarian relief operations in Peru, Jordan and Nicaragua has shown its capacity to land on uneven terrain and robustness to make the C 160 a valuable tool in disaster intervention. A.L.W.

A82-25510 **Selection of telecommunication equipment - A new approach to the equivalent cost concept (Choix d'investissements en matériels de télécommunications - Une nouvelle approche de la notion de coût équivalent).** M. Minoux (CNET, Paris; CNET, Issy-les-Moulineaux, Hauts-de-Seine, France) and A. Guerard (CNET, Issy-les-Moulineaux, Hauts-de-Seine, France). *Annales des Télécommunications,* vol. 36, Nov.-Dec. 1981, p. 602-612. 5 refs. In French.

In order to apply cost equivalence to the purchase of telecommunication equipment from components with equal functional features, but with different costs and length of payback, an extension of amortization calculations was performed. It is shown that the increase in demand is not necessarily exponential, that the law of variation of optimal cost equivalence can be read directly from the curve of net costs of the equipment under consideration, that actualized costs depend on the criteria of the actual payback period. Each year of functional addition to the operating system is included in the calculations, rather than the projected lifetime. The payback period then becomes the prime criteria for determining the economics of the equipment added incrementally to the capacity of the network. The economics of a linear growth of demand are determined, and then extended to any form of growth with a constant economy-of-scale coefficient. M.S.K.

A82-25538 **Where is cobalt irreplaceable (Wo ist Kobalt unersetzlich).** J. C. Agarwal (Charles River Associates, Inc., Boston, MA). *(International Conference on Cobalt-Metallurgy and Uses, Brussels, Belgium, Nov. 10-13, 1981, Paper.) Metall,* vol. 36, Mar. 1982, p. 292, 293. In German.

It is pointed out that cobalt, at least on a short-term basis, is nearly irreplaceable in connection with certain of its applications, taking into account, in particular, its use in catalysts and in heat-resistant superalloys. Cobalt-containing superalloys are employed in gas turbines and engines, in connection with efforts related to the search for oil reservoirs and their exploitation, and in medical implants. A number of aircraft engines utilize cobalt as alloy component. The irreplaceableness of cobalt on a short-term basis is partly related to the long time required to develop a new aircraft engine. Cobalt is also widely used in the manufacture of permanent magnets. A crucial asset of cobalt with respect to its employment in equipment used for offshore drilling operations is its resistance against hydrogen sulfide and effects of marine climate conditions. Attention is also given to aspects of cobalt production and market trends. G.R.

STAR ENTRIES

N82-18119# Deutsche Gesellschaft fuer Luft- und Raumfahrt, Cologne (West Germany).

SEVENTH EUROPEAN ROTORCRAFT AND POWERED LIFT AIRCRAFT FORUM

1981 951 p refs Proceeding of Conf. Held in Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981 Original contains color illustrations

Avail: NTIS HC A99/MF A01

Aspects of helicopter and turbine rotor are addressed.

N82-18120# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.

DEVELOPMENTS IN ROTARY WING AIRCRAFT AERODYNAMICS

I. C. Cheeseman *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 27 p refs

Avail: NTIS HC A99/MF A01

Developments in helicopter aerodynamics are reviewed, including new blade sections and planforms. Computer modelling of the flow and the need for further work in predicting oscillating loadings are considered. The greater attention being given to the need to reduce drag in forward flight due to extended range and fuel conservation costs is recognized. A forecast of advances is made. N.W.

N82-18121# Massachusetts Inst. of Tech., Cambridge.

A SIMPLIFIED APPROACH TO THE FREE WAKE ANALYSIS OF A HOVERING ROTOR

R. H. Miller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs

Avail: NTIS HC A99/MF A01

Rotor wake geometry and the number of blades are analyzed. Simplified approaches to the free wake aerodynamic analysis of hovering rotors permitting rapid evaluation of rotor aerodynamic characteristics are discussed. Analytical results are compared with existing measurements of blade bound circulation and wake geometry. N.W.

N82-18122# Politecnico di Milano (Italy). Instituto di Ingegneria Aerospaziale.

AN EXPERIMENTAL ANALYSIS OF THE SHAPE OF A ROTOR WAKE

Sergio DePonte and Luigi Vigevano *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 8 p refs

Avail: NTIS HC A99/MF A01

Although the shape of a rotor wake may be described by potential flow methods, to get reasonable calculation costs it is necessary to introduce some simplification in the calculations. In order to check the accuracy and the validity field of the various assumptions a set of experimental data may be a good tool for comparisons. A hot wire technique to detect the presence of the blade wake is presented. N.W.

N82-18123# Tokyo Univ. (Japan).

AN EXTENSION OF THE LOCAL MOMENTUM THEORY TO THE ROTORS OPERATING IN TWISTED FLOW FIELD

Akira Azuma, Ken-Ichi Nasu, and Takatoshi Hayashi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs

Avail: NTIS HC A99/MF A01

The local momentum theory was developed to calculate the dynamic airloading of a helicopter rotor, where the velocity perpendicular to the plane of rotation was assumed to be negligibly low in comparison with the rotating velocity. In the case of propellers or windmills, however, this assumption is no longer adequate, and the flow field seen in the rotor-fixed-coordinate system is noticeably twisted along the span. In order to permit calculation of the induced velocity distribution as well as the airloading of the blade in such a twisted flow field, we have carried out an extension of the local momentum theory. Since our method of calculation is based on the instantaneous circulation distribution rather than the instantaneous momentum balance, it may be called the Local Circulation Method. The present method is also applicable to propellers and windmills in yawed flow. Author

N82-18124# Nanjing Aeronautical Inst. (China).

A SIMPLIFIED METHOD FOR PREDICTING ROTOR BLADE AIRLOADS

Wang Shi-cun and Xu Zhi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 28 p refs

Avail: NTIS HC A99/MF A01

Relations of first two harmonic induced velocities to the lower and same-order harmonic circulations are obtained from the generalized classical vortex theory of the rotor. Then, based on the blade element theory, a closed form of equations for circulation is established and, by taking the flapping condition into account, simplified formulae for predicting rotor blade airloads are set up. In particular, expressions of flapping coefficients are derived, including the effect of variable induced velocity distribution but in terms of blade parameters and flight parameters only. Finally, a calculation of a typical example is made and comparisons of airloads with those from the more accurate numerical solution are shown that the present method is fairly suitable for aerodynamic analysis and preliminary design of helicopters. Author

N82-18125# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastik.

A THREE-DIMENSIONAL APPROACH TO LIFT AND MOMENT COEFFICIENTS OF ROTATING BLADES

Wolfgang Send *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs (For primary

Avail: NTIS HC A99/MF A01

The three dimensional incompressible flow around a thick blade is calculated in the limiting case of an infinitely high Reynolds number. The solution for a four bladed rotor is achieved by interacting the mutual influence of the induced velocities on the blades. Several properties of the three dimensional approach are compared with two dimensional theories. Unsteady results are obtained by combining the quasi-steady flow with the calculation for a given oscillation mode. The integral equation for the flow around the blades is solved by a higher order panel technique for the vorticity vector, continuous on the blade and downstream in the wake. An improper description of the wake integral is evident. The helical wake is substituted by its rectilinear counterpart, for which an analytical description was found. N.W.

N82-18126# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.

A COMPLETE METHOD FOR COMPUTATION OF BLADE MODE CHARACTERISTICS AND RESPONSES IN FORWARD FLIGHT

J. P. Lefrancq and B. Masure *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 9 p

Avail: NTIS HC A99/MF A01

Hypotheses and equations, methods of calculation, and numerical adaptation concerning the dynamics of helicopter rotors are dealt with. Two problems raised by a spinning rotor are also dealt with: determination of natural models qualified by their eigen frequency and damping; and forward flight, using the azimuth method which avoids those difficulties inherent to the modal methods. The calculation process used to improve a rotor while at design stage is illustrated. N.W.

N82-18127# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Aeroelastik.

MODAL CHARACTERISTICS OF ROTOR BLADES: FINITE

ELEMENT APPROACH AND MEASUREMENT BY GROUND VIBRATION TEST
D. Ludwig *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs

Avail: NTIS HC A99/MF A01

The mass and stiffness matrices for a rotating blade are established by the finite element method. The formulation is based on the Lagrange function for combined flapwise bending, chordwise bending, and torsion of twisted nonuniform rotor blades. The element matrices are created by the non-numeric computer program REDUCE. An ordering scheme was introduced to demonstrate which terms may be simplified or neglected. As examples, eigen analyses, with the finite element computer program, are performed for a homogeneous beam and for the nonrotating blade of a wind energy converter. The results of the calculations for the beam are compared with the analytical solutions. The rotor blade of the wind energy converter was tested in a ground vibration test. A short description of the ground vibration test technique and performance is given. N.W.

N82-18129# Westland Helicopters Ltd., Yeovil (England). Dynamics Dept.
A STUDY OF THE TECHNIQUES OF DYNAMIC ANALYSIS OF HELICOPTER TYPE STRUCTURES
G. M. Venn and D. J. Boon *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p

Avail: NTIS HC A99/MF A01

The techniques used in the dynamic analysis of helicopter type structures using finite elements are discussed. A test structure was designed and built which incorporated many design features found in helicopter structures. Experiments were performed on this structure to determine the natural frequencies and normal modes. These experimental results were compared with theoretical finite element results. Altering the build state added one or two extra problems so that these could be studied. The modelling problems investigated were: riveted panel-stringer constructions, deep fabricated beams, discontinuous load paths, bolted joints, honeycomb panels, gearboxes, engine mounts, and engines. The techniques used to model these features are discussed. Problems were found when attempting to compare the theoretical and experimental results. N.W.

N82-18130# Virginia Polytechnic Inst. and State Univ., Blacksburg.
THE EFFECTS OF SLIGHT NON-LINEARITIES ON MODAL TESTING OF HELICOPTER-LIKE STRUCTURES
D. J. Ewins (Imperial College of Science and Technology) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 11 p refs

Avail: NTIS HC A99/MF A01

A comprehensive series of modal tests was made on a specially built test piece designed to simulate many of the characteristics of helicopter structures. These tests identified the presence of a 'slight' degree of nonlinearity and further established that this almost unnoticed effect causes significant discrepancies in the modal properties deduced from measured data. However, systematic analysis of the measurements may be used to isolate the nonlinear effects and to eliminate them from the results. Author

N82-18131# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
PARAMETRIC STUDY OF THE INFLUENCE OF THE ENGINE UPON THE OPERATING COST OF A CIVIL HELICOPTER

Gilbert Beziac, Jean-Pierre Dedieu, and Philippe Cabrit *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 5 p
Avail: NTIS HC A99/MF A01

The influence of engine characteristics (weight, fuel consumption, price, power range) upon the helicopter operating cost were studied. The parametric relationship between the various factors were defined. Several engine alternatives for a medium weight helicopter were compared. The following conclusions were made: (1) a sufficient power reserve is necessary but too high a value is not profitable; (2) the fuel consumption should be the result of a compromise: interest of a low value, engine complexity, reliability; and (3) a substantial increase in helicopter cost effectiveness is obtained thanks to a simultaneous evolution of aircraft and engine. M.D.K.

N82-18132# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
PREDICTION OF OFF-DESIGN PERFORMANCE OF TURBO-SHAFT ENGINES A SIMPLIFIED METHOD
H. Wittenberg *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs

Avail: NTIS HC A99/MF A01

Estimation of the off-design performance of a given gas turbine is generally based on detailed performance characteristics of compressor and turbine(s). An approximate method for the estimation of the off-design behavior of turbojet and turbofan engines was developed using thermodynamic relationships only. The method is based on a matching procedure with generalized mass flow characteristics of the turbine(s) or exhaust nozzle(s). The method was adopted to turbo-shaft engines for this study. Examples are given for an actual engine type. There is fair agreement between the calculated off-design performance and the data derived from the manufacturer's engine brochure. M.D.K.

N82-18133# Rolls-Royce Ltd., Watford (England).
MEASUREMENT TECHNIQUES USED TO ASSESS THE INSTALLED POWER OF A HELICOPTER ENGINE
T. G. Morton *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p Original contains color illustrations

Avail: NTIS HC A99/MF A01

To improve helicopter performance predictions, it is important to quantify any change in engine performance between the test bed and 'as installed' in the aircraft, and to attribute the reasons for any change as accurately as possible. Measurement techniques used to quantify performance for a particular Rolls-Royce Gem Engine installation is discussed. Extra sensors were added to engines in a production Lynx helicopter which was fitted with recorder equipment in the cabin and flown to a defined schedule. If the engine is considered as a thermodynamic unit, the input/output equation must balance. Test point data based on these inlet and exhaust conditions were obtained from both test bed and flight tests. Analysis of results when compared to a thermodynamic model of the engine, shows that the resultant data is very sensitive to the quality of measurements and will quickly show the deviation from predicted characteristics. Author

N82-18134# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
COMPONENT DESIGN AND DEVELOPMENT FOR FUTURE HELICOPTER ENGINES
Jean Hourmouziadis and Horst B. Kreiner *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs
Avail: NTIS HC A99/MF A01

Advances achieved today and results available from both rig and demonstrator test programs for present and future helicopter engines are discussed. These will form the basis for further component improvement required to yield a successful next generation engine. The significance of reduced fuel consumption, improved overall system performance, and reliability are considered in relation to design activity and reaction to changing customer needs. M.D.K.

N82-18135# General Electric Co., Cincinnati, Ohio. Systems and Controls.
THREE-ENGINE CONTROL SYSTEM FOR THE PROTOTYPE EH-101 HELICOPTER
E. A. Chiuchiolo and J. J. Curran *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft 1981 10 p refs

(AEBG-9/81-1568L) Avail: NTIS HC A99/MF A01

The T700 control system configured for installation in the three-engined WG.34A helicopter (prototype for European Helicopter Industries EH-101) provides for a versatile control system which may be operated normally to provide the helicopter propulsion or may be operated as a totally independent system to power airframe avionics and power accessories. It is designed to maintain constant speed for accessories or load share with second and third engines and is independent of position in the aircraft. The total system is automatic and provides not only constant rotor speed but also closely matched torques. Modifications made to the T700 control system to provide the above capabilities are discussed. Discussion of the need for these modifications and the present status of the design is also designed. Author

N82-18136# I.A.M. Rinaldo Piaggio, Finale Ligure (Italy).
ENGINE SUPERFICIAL TEMPERATURE AND INFRARED SIGNATURE
A. M. Ricci, A. N. Allavena, and W. Esposti (I.C.I.T.E., S. Giuliano Milanese, Italy) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p

Avail: NTIS HC A99/MF A01

A system calibration and data processing method was set up to provide spatial information on temperature and a spatially accurate radiant intensity map under different angles. The methodology was developed to evaluate the thermal exchange between engine and engine-cowling and their infrared signature in the 1 - 6 micrometer range in order to evaluate special infrared treatment to reduce infrared emission. The infrared imagery camera was coupled to an analogic/digital data acquisition system. Calibration studies were conducted in an infrared laboratory to provide the absolute calibration on the thermograph in the previously defined spectral range. The results are presented in profiles of temperature and radiance. Author

N82-18137# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
POINT OF VIEW OF A HELICOPTER MANUFACTURER ON AIRWORTHINESS REGULATIONS
Jean Boulet *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 5 p

Avail: NTIS HC A99/MF A01

Helicopter airworthiness regulations are discussed. The need for airworthiness regulations to be drafted and modified through a process of constant consultation between Civil Aviation Authorities and manufacturers is discussed. The need to introduce the concept of probability to be able to come closer to the actual risks and to avoid penalizing aircraft with useless systems and demonstration requirements is also considered. It is suggested that these regulations tend toward one single international set of regulations and one single demonstration of compliance with the regulations. The possibility of reconciling a continuously improved safety level and a progressive reduction in helicopter costs is also considered. M.D.K.

N82-18138# Italian Army General Staff, Rome.
MILITARY REQUIREMENTS: TOO LITTLE OR TOO MUCH
Emidio Valente *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p

Avail: NTIS HC A99/MF A01

Concepts useful for a better understanding of the military requirements, operational requirements for helicopters are discussed. The need for an understanding between military operators of rotary-wing aircraft, helicopter designers, and manufacturers is considered. Two viewpoints are summarized: (1) The helicopter is a weapon system featuring the same indispensability level of all other systems required to integrate the battlefield. (2) The helicopter must be designed to reflect military requirements which cover all those elements likely to condition its operation, this is to say: operational environment, human factor, and economical aspects. The following considerations are recommended for further investigation: (1) whether commercial operators are really affected and (2) whuther solutions can be found which in the end prove to be a saving rather than a deterioration in cost, weight and complexity. M.D.K.

N82-18139# Italian Air Force Pratica di Mare, Rome. Flight Test Centre.
PARAMETRIC CRITERIA AND IMPACT ON DESIGN TRENDS
Roberto dePompeis and Fulvio Gagliardi (Ministry of Defence) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 25 p refs

Avail: NTIS HC A99/MF A01

Laws or trends of typical parameters which contribute to the definition of an 'ideal' specific helicopter which can be used as a reference model and give a nondimensional measure of effectiveness are discussed. Operative requirements, taking into account the main factors affecting missions were transferred into a mathematical model. The procedure was derived from theoretical studies already applied to aircraft selections and consists of three main steps: (1) Effectiveness program; (2) Total operating cost estimation; and (3) Evaluation of effectiveness-cost ratio and optimization of the fleet selection. All costs (manufacturing, maintenance, training, operating, etc.) for the operative life are estimated with a similar methodology and lead to the determination of the effectiveness-cost ratio which may be optimized taking into account the fleet consistency required to fulfill the task.
M.D.K.

N82-18140# Hughes Helicopters, Culver City, Calif.
DESIGN PHILOSOPHY OF THE HUGHES MODEL 600 HELICOPTER
R. S. Taylor *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p

Avail: NTIS HC A99/MF A01

The design philosophy of a new model helicopter, the Hughes model 600X, which took into consideration a number of factors is discussed. The following subjects are discussed and a rationale for the selected approach is given: (1) whuther to grow or develop a totally new configuration. To be cost effective, a growth helicopter would need to produce significant additional advantages which would be offset by the ever present compromises of the old design; (2) how to grow an 'egg', especially one with internal structure; (3) how to replace the old model or is the new model to be produced in addition to the old one; and (4) how is the market potential to be assessed. Details of approaches are presented with reasons for accepting or rejecting each one. Results of market analysis and response of the helicopter public is presented to show the viability of the selected configuration.
M.D.K.

N82-18141# United Technologies Corp., East Hartford, Conn. Aircraft Div.
SH-60B TEST PROGRAM
Frederick J. Silvario *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p

Avail: NTIS HC A99/MF A01

The SEAHAWK Program, a successful helicopter development program, is discussed in detail. The following program tests are described: modifications for shipboard compatibility and mission requirements; preflight ground tests; flight and shakedown testing; evaluation of the pitot-static system and digital computer system; reliability tests and component systems analysis. Failure modes not detected in flight tests or qualifications bench tests, but discovered in testing under service use, are discussed. M.D.K.

N82-18142# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
NAVAL VERSIONS OF THE DAUPHIN AND THE AS 15 TT WEAPON SYSTEM
J. P. Dubreuil *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 10 p

Avail: NTIS HC A99/MF A01

Aerospatiale's Dauphin II helicopter family, initially intended to satisfy civil market demand, is presently subject to development that makes it possible to derive military versions from it. The equipment specific to naval versions whose basic system is the AS 15 TT is discussed in detail. All the arrangements and modifications that were necessary to adapt the N aircraft to naval, rescue and attack missions and which led to the SA 365 F version are discussed. The AS 15 TT and surface vessel system are described in detail. The modifications which affected almost all the constitutive elements and aimed at improving not only performance but also maintenance led to a reduction in fabrication and operation costs. M.D.K.

N82-18143# Westland Helicopters Ltd., Yeovil (England).
ARMY LYNX: PRODUCT DEVELOPMENT MATCHED TO MILITARY COMBAT DEVELOPMENT
D. A. S. Howell *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p

Avail: NTIS HC A99/MF A01

The Lynx helicopter program to date and planned product development related to the evolution of military combat thinking especially the anti-armour role are presented. The background for this product development is the impact of technology in the areas of materials, sensors, armaments and systems, both in the context of the helicopter as a total weapon system and the development of air defense systems that pose a threat to the helicopter in the battlefield scenario. Author

N82-18144# Societe Nationale Industrielle Aerospatiale, La Courneuve (France).

A LIGHT HELICOPTER FOR NIGHT FIRING

J. F. Candau *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p

Avail: NTIS HC A99/MF A01

Structural design criteria and armament system requirements for a flight combat helicopter for night firing are discussed. Helicopter characteristics and performance requirements for night time antitank missions are considered. The following areas of consideration are discussed: piloting, navigation, target seeking, and firing. Operational use, crew organization, and program development are also reviewed. M.D.K.

N82-18145# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

TETHERED ROTORPLATFORMS AND THEIR MISSION POTENTIAL

W. Goeller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 13 p

Avail: NTIS HC A99/MF A01

A definition of tethered rotorplatforms is given and the main objectives that are pursued with these vehicles are presented. A short retrospect on rotorplatform history is given. The Dornier 'Kiebitz' is described. It is designed to lift payloads for battlefield surveillance, air defense, EW or communication to some hundred meters above ground for long mission times. A very small tethered rotorplatform for elevating electro optical sensors of 5 to 10 kg is described. The energy for its flight time of about 70 seconds is stored in a massive momentum ring surounding its rotor. Finally, a proposed rotorplatform with an electric drive system for payloads of about 30 kg for target acquisition and target designation, is also discussed. M.D.K.

N82-18146# Southampton Univ. (England).

WIND TUNNEL INVESTIGATION OF HIGH SPEED ROTOR NOISE

H. Tadghighi and I. C. Cheeseman *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 25 p refs

Avail: NTIS HC A99/MF A01

A high speed model rotor (tip Mach number of 0.75) was developed to investigate tail rotor noise in forward flight conditions. The existing 2.1 by 1.5 m low speed (30 m/sec) closed circuit wind tunnel was modified and utilized to enable acoustic measurements of forward flight to be made. Check tests in the 24 ft anechoic wind tunnel show excellent agreement with the development tests. The model rotor noise data are found to correlate well with full scale helicopter rotor values. Simultaneously recorded aerodynamic performance of the model rotor (blade loading, steady thrust, torque and trimmed moments) is compared with theoretical aeroacoustic treatments. It is concluded that the model rotor accurately simulates full scale rotor aeroacoustic data. J.M.S.

N82-18147*# Army Research and Technology Labs., Moffett Field, Calif. Aeromechanics Lab.

PREDICTION OF BLADE VORTEX INTERACTION NOISE FROM MEASURED BLADE PRESSURE

Yoshiya Nakamura *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 20 p refs Sponsored by NASA

Avail: NTIS HC A99/MF A01 CSCL 01A

The impulsive nature of noise due to the interaction of a rotor blade with a tip vortex is studied. The time signature of this noise is calculated theoretically based on the measured blade surface pressure fluctuation of an operational load survey rotor in slow descending flight and is compared with the simultaneous microphone measurement. Particularly, the physical understanding of the characteristic features of a waveform is extensively studied in order to understand the generating mechanism and to identify the important parameters. The interaction trajectory of a tip vortex on an acoustic planform is shown to be a very important parameter for the impulsive shape of the noise. The unsteady nature of the pressure distribution at the very leading edge is also important to the pulse shape. The theoretical model using noncompact linear acoustics predicts the general shape of interaction impulse pretty well except for peak amplitude which requires more continuous pressure information along the span at the leading edge. Author

N82-18148# Westland Helicopters Ltd., Yeovil (England).

PRELIMINARY THOUGHTS ON HELICOPTER CABIN NOISE PREDICTION METHODS

J. S. Pollard *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 14 p refs

Avail: NTIS HC A99/MF A01

The problems of predicting helicopter cabin noise are discussed with particular reference to the Lynx helicopter. Available methods such as modal analysis adopted for propeller noise prediction do not cope with the higher frequency discrete tone content of helicopter gear noise, with the airborne and structure-borne noise contributions. Statistical energy analysis methods may be the answer but until these are developed, one has to rely on classical noise transmission analysis and transfer function methods. Author

N82-18149# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.

THE MEASUREMENT OF THE MOBILITY OF STRUCTURES AT ACOUSTIC FREQUENCIES

Susan M. Damms *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p refs

Avail: NTIS HC A99/MF A01

The development of a technique to measure the response of structures to vibrational input forces and moments is described. So far, simple structures with known properties have been used but it is intended to apply the technique in the design of an interface which isolates vibrationally the gearbox of a helicopter from the cabin at acoustic frequencies. In a first experiment, no moments were applied. The main object was to demonstrate that measurements could be made on two components of a structure with sufficient accuracy to correctly predict measurements on the assembled structure. The two components were a beam and a dynamic absorber. In a second experiment a special block was attached to a beam to enable forces and moments to be applied and translations and rotations to be measured. The particular mobilities measured were chosen so that they could be easily compared with theory and also with measurements without a block. J.M.S.

N82-18150# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

FLIGHT CHARACTERISTICS DESIGN AND DEVELOPMENT OF THE MBB/KHI BK117 HELICOPTER

H. Huber and T. Masue (Kawasaki Heavy Industries) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 21 p refs

Avail: NTIS HC A99/MF A01

The BK 117 light, twin-engine helicopter was designed to provide high flexibility of operations, attractive performance characteristics, and outstanding handling qualities. Dominant features result from the hingeless rotor system, which provides inherent high control power and high angular velocity damping. Further optimization is achieved through refinement of the fuselage aerodynamic design, and by a proper layout of the empennage configuration, taking into account the interactional aerodynamic phenomena. The particular design features and their impact on the helicopter flight characteristics are described. The results obtained in the areas of static and dynamic stability (longitudinal, lateral directional), control response and maneuver characteristics, aeromechanical stability and loads and vibrations are presented, including correlation of flight test data with computer model simulations. J.M.S.

N82-18151# Politecnico di Milano (Italy). Dipartimento di Ingegneria Aerospaziale.

A GENERAL PURPOSE PROGRAM FOR ROTOR BLADE DYNAMICS

M. Borri, M. Lanz, and P. Mantegazza *In* DGLR Seventh European

Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs

Avail: NTIS HC A99/MF A01

A computer program for rotor blade dynamics capable of dealing both with hinged and hingless rotors, suitable for steady state flight analysis and stability evaluation was developed. Blade motion is represented by finite elements in the space-time domain, covering the span of one or more rotor revolutions, and allowing for different nonlinearities. This method gives a flexible unitary approach for the very different model complexities required by the different design phases, such as the simplest rigid blade schemes, and the more sophisticated ones including nonlinearities arising from large blade flexibilties and large movements in control links. The aerodynamics, at the present development state, considers prescribed wake geometry and blade element theory, including stall and compressibility effects. J.M.S.

N82-18153# National Aerospace Lab., Amsterdam (Netherlands).

A CONTROL MODEL FOR MANEUVERING FLIGHT FOR APPLICATION TO A COMPUTER-FLIGHT TESTING PROGRAM

H. Haveridings *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs

Avail: NTIS HC A99/MF A01

A computer-flight-testing (CFT) program for helicopters to evaluate helicopter dynamics and handling and control qualities is described. The nonlinear six degrees of freedom helicopter model is driven by control inputs generated by a specially developed control model (or 'pseudo pilot') to eliminate problems in estimating control inputs during maneuvering flight. This is an adaptation of a linear optimal control model as used in human factor analysis. The helicopter model is based on two-dimensional strip aerodynamics steady-state rotor blade dynamics using only out-of-plane bending mode shapes, which are suitable for various types of rotor articulation. The 'pilot' model consists of a flight path generation (FPG)-model and a stabilitization (STAB)-model. The FPG-model is based on linearized system dynamics using terminal optimal control, generating both required flight path and the control inputs to achieve it. These controls are input into the helicopter model. The two flight paths are compared, and differences are fed back to the STAB-model to generate corrective control inputs of such a nature that the helicopter-model-generated flight path tracks the required flight path generated by the FPG-model. Also the STAB-model is based on linearized system dynamics. As an example, two flare maneuvers are 'flown', and the results discussed. The pseudo-pilot model performs well, provided that helicopter dynamics do not change much during a specific maneuver. J.M.S.

N82-18154# Westland Helicopters Ltd., Yeovil (England).

THE ROLE OF SIMULATION IN THE DESIGN PROCESS

I. F. Montgomerie and G. C. F. Wyatt *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p

Avail: NTIS HC A99/MF A01

Real-time simulation of helicopters and their avionic systems is discussed. The nature of the problems facing the helicopter and systems designers are reviewed, and the potential benefits accuring from the timely and effective use of simulation are examined. The development of simulation as a design tool over the last two decades are reviewed, and the characteristics of the simulation facilities are described. J.M.S.

N82-18155# Royal Aircraft Establishment, Farnborough (England).

PRELIMINARY INVESTIGATION INTO THE ADDITION OF AUXILIARY LONGITUDINAL THRUST ON HELICOPTER AGILITY

P. J. Legge, P. W. Forestcue (Southampton Univ.), and P. Taylor (Southampton Univ.) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p refs

Avail: NTIS HC A99/MF A01

The agility requirements in specific maneuvers performed by military helicopters are investigated. A simple mathematical simulation of the helicopter accelerating and decelerating longitudinally is used to examine the advantages of cuxiliary thrust. For helicopters operating in the Nap-of-Earth environment the longitudinal acceleration and deceleration performance is shown to be uniquely important. Large improvements in agility, measured by a performance function, are obtained by adding auxiliary thrust. The need for the helicopter to change its attitude is drastically reduced, and the pilot workload improved. The type of flight profile used is also examined, using a nondimensional Froude number. There was no benefit in a 'maximum effort' flight profile, which consequently further improves the pilot workload. Auxiliary thrust improved agility performance by increasing the helicopter's ability to change position while maintaining precise attitude control. J.M.S.

N82-18156# National Defence Academy, Yokosuka (Japan). Dept. of Aeronautical Engineering.

OPTIMUM PERFORMANCE AND WAKE GEOMETRY OF CO-AXIAL ROTOR IN HOVER

Tomoari Nagashima and Kenji Nakanishi *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p refs

Avail: NTIS HC A99/MF A01

Numerical studies to clear out the rotor-wake interference effects on the optimum performance and wake geometry of a coaxial rotor in hover are performed using the generalized momentum theory and the simplified free wake analysis. For applying the momentum concept to the performance predictions of the coaxial rotor system, each wake of rotors and flow fields around them are modeled so as to properly incorporate wake contractions, rotational velocities, and nonlinear mutual interference effects. In case of the free wake analysis, it is approximated by a finite number of discrete circular vortices whose numbers and core radii are deduced from the sensitivity analysis. The numerical results clearly show that the performances and its wake geometries are largely dependent on the axial spacings and the pitch differences between rotors and there are unique combinations of them which could produce the optimum performance. It is also understood that the upwash effect of the contracted upper rotor wake on the lower rotor plays a fundamental role to improve the hover performance with coaxial rotor arrangement. Author

N82-18157# Tokyo Univ. (Japan). Inst. of Interdisciplinary Research.

A NUMERICAL APPROACH TO CO-AXIAL ROTOR AERODYNAMICS

Shigeru Saito and Akira Azuma *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs

Avail: NTIS HC A99/MF A01

In the simple momentum theory, the aerodynamic characteristics of the lower rotor of a coaxial rotor system are usually evaluated under the highly deteriorated conditions caused by the fully developed wake of the upper rotor, specifically under the conditions of hovering flight. Analysis using the Local Momentum Theory not only shows the performance of the lower rotor to be higher than that calculated by the simple momentum theory but also makes it possible to calculate the instantaneous airloading of blades operating in a complex wake system. By introducing the radial shrinkage of the rotor wake, the accuracy of the analysis of blade airloading is further improved. The calculated results are compared with those of wind tunnel tests in both hovering and forward flights. In forward flight, the performance of the lower rotor improves not only with increases in the forward speed but also with increase in the vertical distance between the upper and lower rotors. In hovering flight, the improvement in the performance is not remarkable because the lower rotor is strongly influenced by the upper rotor wake. Author

N82-18158# Institut fuer Flugmechanik, Brunswick (West Germany).

HELICOPTER ROTOR DOWNWASH: RESULTS OF EXPERIMENTAL RESEARCH AT THE DFVLR-ROTOR TEST STAND AND THEIR COMPARISON WITH THEORETICAL RESULTS

B. Junker and H.-J. Langer *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs

Avail: NTIS HC A99/MF A01

System tests and dynamic researches at the rotor test stand were compared with several downwash measurements to demonstrate the dependency between mathematical parameter values and rotor control values, e.g., thrust, advance ratio, and control angles. For comparisons mathematical models like the local momentum theory, and a fixed vortex model were applied. For these experiments a four bladed hingeless rotor and a two bladed See Saw rotor with an advance ratio of up to mu = 0.2 were used. Numerous tests were performed to study the flow field of rotor downwash in different wind tunnels. The measuring equipment for the downwash was set up on both sides of the rotor stand. So it was possible to receive two values at the same time. At first pneumatic probes were applied, that gave acceptable mean values, and then hot-wire probes in X-configuration were used to investigate downwash dynamics in more detail. Measurements were conducted in the x-z-plane. Wind tunnel test results, correlation to the mathematical models, and errors are discussed. J.M.S.

N82-18159*# Ohio State Univ., Columbus. Dept. of Mechanical Engineering.

HOVER TESTS OF A MODEL H-FORCE ROTOR

H. R. Velkoff *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs

(Contract NCA2-OR565-001)

Avail: NTIS HC A99/MF A01

The potential of using tip vanes at the ends of helicopter rotor blades to obtain a controllable H-force is considered. The addition of vanes placed perpendicular to the blade tips can be used to obtain an inplane force. By varying the angle of the vanes, a radial force can be created which can be controllable in azimuth position. Such a force could be used to provide translational motion of the rotor and aircraft without the requirement for rotor tilting. In addition, an H-force generated at high flight speed could be used as a propulsive force in a matter similar to a propeller. The force generated by the vanes could also affect the aircraft's stability characteristics. The H-force could also modify rotor performance in hovering since they could be thought to act as a virtual shroud. Tests were run with a model rotor which has a 6 foot diameter with a 3 inch chord blade. Test data are presented on the effects of various tip-vane configurations on the hovering figure of merit. The extreme sensitivity of the performance to vane arrangement is shown. Author

N82-18160# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

THE PROBLEM OF CALCULATION OF THE FLOW AROUND HELICOPTER ROTOR BLADE TIPS

H. Stahl *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 18 p refs

Avail: NTIS HC A99/MF A01

There are special problems with the theoretical analysis of the flow around helicopter rotor blade tips that are based on the fact that the flow is three dimensional, unsteady, rotational, and on the advancing blade in fast forward flight also transonic. Theories for this problem based upon potential flow theory are presented. Calculations show that this approach can lead to a sufficient discription of the actual flow. Computer programs for the three dimensional steady and the unsteady two dimensional flow past fixed wings were modified for rotating rotor blades. Results are shown. T.M.

N82-18161# Office National d'Etudes et de Recherches Aeronautiques, Paris (France).

APPLICATION OF THE ONER DYNAMIC STALL MODEL TO A HELICOPTER BLADE IN FORWARD FLIGHT

C. T. Tran and D. Falchero (SNIAS, Marignane, France) *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 26 p refs

Avail: NTIS HC A99/MF A01

The model was applied to the case of a helicopter rotor system in forward flight. Aspects of stability and periodic response are described and include: the form of the Floquet modes-subharmonic oscillation and almost periodic oscillation; the evolution of these modes as functions of the rotor advance ratio; the periodic response and aerodynamic force and moment; and a comparison with a quasi-steady aeroelastic calculation showing the effects of unsteady phenomena. T.M.

N82-18162# Royal Aircraft Establishment, Farnborough (England).

SOME UNSTEADY AERODYNAMIC EFFECTS ON HELICOPTER ROTORS

P. G. Wilby, M. J. Riley, and Judith Miller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 14 p refs

Avail: NTIS HC A99/MF A01

Unsteady effects have an important influence on the aerodynamic loading experienced by a helicopter rotor in forward flight. These effects include dynamic stall characteristics with the associated stall delay and large nose-down change in pitching-moment. All unsteady effects must be taken into account when predicting rotor loads, performance and flight envelope. However, the full unsteady effects on the rotor result from simultaneous oscillatory variations of both incidence and Mach number, and it is difficult to study these effects in isolation from the rest of the rotor environment. Empirical methods for modelling these effects, especially dynamic stall characteristics, were developed and incorporated in the rotor loads prediction methods. Results from a program of work involving oscillatory aerofoil tests, flight experiments and unsteady aerodynamic prediction methods are presented. T.M.

N82-18163# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

SEPARATED FLOW AROUND HELICOPTER BODIES

G. Polz and J. Quentin *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs

Avail: NTIS HC A99/MF A01

On the rear part of the helicopter fuselage, flow separation is often unavoidable owing to the shape of the afterbody which is often defined more in accordance with operational requirements (for example cargo door) and with only minor consideration to aerodynamic aspects. Because of the separated flow, an analytical calculation of the flow field using potential flow theory is not possible. After an overview about the separated flow phenomena a method is explained based on a combination of panel methods with boundary layer analysis. In this method the wake flow region is represented by a wake body which consists of a uniformly distributed vorticity. Calculated pressure distributions and flow fields are shown in comparison with wind tunnel test results. The main interest lies in the more downstream part of the wake, which is very important for the tail surface and tail rotor effectiveness. Author

N82-18164# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.

A METHOD OF PREDICTING FUSELAGE LOADS IN HOVER

P. Taylor *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 13 p refs

Avail: NTIS HC A99/MF A01

A computer program called DOWNLOAD was developed in which the fuselage separated flow is modelled using a vortex sheet representation. The vortex sheet model can predict the separated flow pressure distribution provided the separation point is known. Unfortunately, the poor behavior of the vorticity vector in the separation region prevents an accurate prediction of the separation line. DOWNLOAD was applied to three simple fuselage shapes with a simple triangular representation of the rotor downwash. The predicted download values were in the lower region of the figures usually quoted as a percentage of thrust. T.M.

N82-18165# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

IMPACT OF SYSTEMS TECHNOLOGY AND INTEGRATION ON HELICOPTER DESIGN

K. Schymanietz *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 20 p refs

Avail: NTIS HC A99/MF A01

A helicopter design depends on a variety of parameters, criteria and requirements. A new design is generated either by a direct order of a customer or due to industrial investigations in the different fields like market trend studies, application of advanced or new technologies and/or overall efficiency improvements. A complete design includes not only the vehicle design with its main functional groups but also the integration of the systems/equipment concept. In the past a new helicopter design was conducted mainly due to the task for a new vehicle. The fact that - especially in the military field - the impact of systems gets an increasing influence in all design areas, gives an impression of the importance of systems technology and integration in the helicopter design. Future changes in design concepts are considered in terms of the chronological advance in the design of the different system components, new technologies for new systems, e.g., in the field of visionics, and system architecture based on a digital bus connection. T.M.

N82-18166# Army Aviation Research and Development Command, St. Louis, Mo.
REVIEW OF HELICOPTER MAST MOUNTED SIGHT (MMS) BASE MOTION ISOLATION AND LINE-OF-SIGHT (LOS) STABILIZATION CONCEPTS
Daniel P. Schrage *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 16 p refs

Avail: NTIS HC A99/MF A01

Incorporation of a MMS or any precision stabilized pointing system on a helicoper is a complex and interesting dynamic design problem which combines automatic control through a servomechanism with vibration reduction techniques. Generally, the helicopter disturbance inputs to the MMS must be accomodated by a stiffer MMS structure and servo-system. However, weight and cost are usually critical and many benefits could be derived from incorporation of a lightweight vibration isolator. There are important design considerations on both sides of the interface, the airframe and the MMS. A review of these design considerations and several vibration isolation concepts is presented. The need for adequate simulation modeling of this complex dynamic environment is discussed. T.M.

N82-18167# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
MAST MOUNTED VISUAL AIDS
R. D. vonReth *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 24 p refs
Avail: NTIS HC A99/MF A01

Initial flight tests with a spherical mock up, having the same shape, weight and moments of inertia as the actual system were carried out on a Bo 105 with two different rotormast extensions (90 and 120 cm). A vibration survey over most of the Bo 105's flight envelope showed vibrational loads which can be tolerated by the actual system. As a next step the actual stabilized platform with FLIR, TV-camera and laser range finder was installed on the rotormast. In addition several subsystems used for the display of the video images with superimposed symbology are described. For direct comparison purposes three different systems, head up, head down and helmet mounted sight and display were evaluated. The influence of the rotorplane, vibrational loads and meteorological conditions on the performance of the FLIR image is described. T.M.

N82-18168# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
EXPERIMENTAL INVESTIGATION OF VISUAL AIDS FOR HELICOPTERS: LOW LEVEL FLIGHT AT NIGHT AND POOR VISIBILITY
R. Beyer, E. Danneberg, E. Kohnen, and H. Stein *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 15 p refs
Avail: NTIS HC A99/MF A01

The potential and the limitations of advanced display systems for visual aids in helicopters were investigated. A combination of the sensor image and computer generated instrument displays in a head-down display, helmet mounted sight/display and night goggles, were evaluated. The layout of the instrument display is considered assuming transport mission and various display modes are implemented. The visual aids were flight tested in Bo 105 and Bell UH-1D helicopters with particular emphasis on the usefulness of the display modes on flight performance and low level flight performance. T.M.

N82-18169# Litton Systems (Canada) Ltd., Toronto (Ontario). Advance Programs.
THE MULTI MODE MATRIX FLAT PANEL DISPLAY: TECHNOLOGY AND APPLICATIONS
A. Moffat and P. Wright *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 19 p refs
Avail: NTIS HC A99/MF A01

An important aspect of current developments in advanced cockpit design is the introduction of a small number of interactive multi-function electronic displays with digital data processing, in conjunction with a MIL-STD-1553 type of multiplex data bus in an integrated system as opposed to the conventional approach of large numbers of stand-alone electro-mechanical instruments and a variety of different and independent dedicated inputs. Advances in high speed vector graphic display systems based on modular LED flat panel technology and micro-programmable multiprocessor data handling with MIL-STD-1553B compatible interfaces are described. Applications and systems performance are discussed in terms of typical military airborne mission-oriented display image formats and associated hardware and software characteristics. The real-time vector graphic presentations as described include flight control, navigation, communications, engine and fuel management, weapons management, symbolic map, signal communication and other types of real-time cockpit advisory information. T.M.

N82-18170# Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
A REDUNDANCY CONCEPT FOR A DIGITAL CSAS
P. Wuest and M. Keller *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 12 p refs
Avail: NTIS HC A99/MF A01

One of the promises of digital technology is the possibility of implementing more intelligent monitoring techniques, for example, self monitoring methods. Typical redundancy and monitoring concepts, which were realized in aircraft, helicopter and engine control systems were reviewed. A system which was orginally not designed for a helicopter application but which shows all characteristics of a CSAS is described. The system is based on two essentially autonomous computing lanes, each able to provide all the necessary control and monitoring functions. T.M.

N82-18171# Newmark (Louis) Ltd., Croydon (England).
THE INFLUENCE OF SENSOR AND ACTUATOR CHARACTERISTICS ON OVERALL HELICOPTER AFCS DESIGN
S. G. Spreadborough *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p
Avail: NTIS HC A99/MF A01

The overall performance of a flight control system is dependant on the characteristics of: sensors-type and performance; control low computing and logic; actuation-performance, configuration redundancy and authority. The specifications in each of these areas are considered in producing an integrated AFCS design which is compatible with the basic aircraft characteristics. The choice of sensors and the configuration and performance of the actuation, important decisions involving a high level of interdependence with the control law and system logic design, are discussed. T.M.

N82-18172# Institut fuer Flugmechanik, Brunswick (West Germany).
EVALUATION OF THE HELICOPTER LOW AIRSPEED SYSTEM LASSIE
J. Kaletka *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 23 p refs
Avail: NTIS HC A99/MF A01

To evaluate the airspeed sensing capability and the dynamic response characteristics of the system, both flight tests and wind tunnel tests were conducted. The system uses a swivelling pitot static probe designed to operate within rotor downwash in the low airspeed regime and out of downwash for higher speeds. Due to nonlinearities in the sensor transition phase an accurate system characterization is necessary to obtain reliable airspeed data. Flight tests that were conducted to characterize the system for a Bo 105 helicopter are described. The evaluation method and results, showing uncalibrated and calibrated data are discussed in detail. To investigate the dynamic behaviour of the system, dynamic tests in a wind tunnel equipped with a gust generating system were conducted. LASSIE transfer functions were measured for four different wind tunnel speeds. Representative results are shown and discussed. T.M.

N82-18173# Elektronik-System G.m.b.H., Munich (West Germany).
INTEGRATION OF INERTIAL SENSORS IN HELICOPTERS

Volkmar Held *In* DGLR Seventh European Rotorcraft and Powered Lift Aircraft Forum 1981 17 p
Avail: NTIS HC A99/MF A01

The demand for saving weight, volume and especially cost requires new design concepts for avionic systems. In future, highly integrated systems will replace the conventional systems with specific stand-alone equipment for each system function. A concept for the integration of inertial function flight control, sight-stabilization, navigation of a helicopter is presented. A configuration with a minimum number of dislocated inertial sensors is proposed. The system functions are accomplished on system level by integration and multiple use of the sensor signals. It is shown that the navigation functions, attitude and heading can be derived from the flight control and stabilization hardware so that the usually required separate attitude and heading reference system for the navigation is saved. Moreover, the proposed concept provides as an additional function the autonomous initial alignment to north. T.M.

N82-18179*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN ANALYTICAL INVESTIGATION OF THE FREE-TIP ROTOR FOR HELICOPTERS
Robert H. Stroub Feb. 1982 30 p refs
(NASA-TM-81345; A-8806) Avail: NTIS HC A03/MF A01 CSCL 01A

A rotor configuration called the free-tip rotor was analytically investigated for its potential to improve helicopter forward-flight performance characteristics. This rotor differs from a conventional rotor only in the blade tip region. In this configuration, the tip is self-adjusting in pitch with respect to the rest of the blade, in accordance with a moment balance about its pitch axis. With this self-adjusting capability, the resulting pitch motion generates a more uniform airload distribution around the azimuth. Computer math models were used to compare performance characteristics of the free tip rotor with those of a conventional rotor operation at flight speeds from 130 to 160 knots. The results of this analysis indicate that the free-tip rotor improves cruise lift-drag ratio by at least 22%. Author

N82-18183*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPIN-TUNNEL INVESTIGATION OF A 1/13-SCALE MODEL OF THE NASA AD-1 OBLIQUE-WING RESEARCH AIRCRAFT
William L. White and James S. Bowman, Jr. Feb. 1982 28 p ref
(NASA-TM-83236; L-14834) Avail: NTIS HC A03/MF A01 CSCL 01A

The spin and recovery characteristics of a 1/13-scale model of the NASA AD-1 oblique-wing research aircraft at wing-skew positions of 0, 25, 45, and 60 deg (right wing forward) were investigated. Spins were obtained for all wing-skew positions tested. For the unskewed wing position, two spin modes were possible. One spin mode was very steep and recoveries were obtained within 1 turn or less by rudder reversal. The second spin mode was flat and fast; the angle of attack was about 75 deg and the spin rate was about 145 deg/sec (2.5 seconds per turn). For the skewed wing positions, spins were obtained only in the direction of the forward-skewed wing (right wing forward). No spins were obtained to the left when the wing was skewed with the right wing forward. Recoveries should be attempted by deflecting the rudder to full against the spin, the ailerons to full with the spin, and movement of the wings to 0 deg skew. If the wing is skewed, the recovery may not be effected until the wing skew approaches 0 deg. B.W.

N82-18187# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
ON THE CALCULATION OF TRANSONIC BLADE TIP FLOW FOR HELICOPTER ROTORS [ZUR BERECHNUNG DER TRANSSONISCHEN BLATTSPITZENUMSTROEMUNG BEI HUBSCHRAUBERROTOREN]
H. Stahl and V. Mikulla 8 May 1981 27 p refs In GERMAN Presented at DGLR Jahrestagung 1981, Aachen, 12-14 May 1981
(MBB-UD-320-81-O; DGLR-81-025) Avail: NTIS HC A03/MF A01

Blade element theory (two dimensional) based on the rotor calculation program, its radials and its chronological relationship was demonstrated. Blade tip flow is three dimensional and interstationary and the forward moving blade in a fast forward flight becomes transonic. Theories, based on potential theory are proposed, though these do not perform on rotary wings. This method demonstrates the real flow rate. A three dimensional calculation of the aerodynamic characteristics of the fixed wings, was utilized, to show that by introducing a Mach number per gradient along the rotor radius, rotor calculation can be modified. Transl. by E.A.K.

N82-18188# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
ON THE CALCULATION OF SEPARATED FLOW ON HELICOPTER FUSELAGES [ZUR BERECHUNG DER ABGELOESTEN STROENUNG AN HUBSCHRAUBERRUEMPFEN]
G. Polz 11 May 1981 28 p refs In GERMAN Presented at DGLR Jahrestagung 1981, Aachen, 12-14 May 1981
(MBB-UD-321-81-O; DGLR-81-026) Avail: NTIS HC A03/MF A01

Separated flows in helicopters with dead water formation on the fuselage tail were examined. A model was developed which is based on a combination of panel and interface calculation method, which is simulated in the dead water area by a similar circulation coated track alignment body. The point of gravity lies more on the fuselage, which is especially significant for helicopter, because of its effect on tail rotor and tail plane. Results from wind tunnel tests and flight tests are presented. Transl. by E.A.K.

N82-18189# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
INVESTIGATIONS OF THE SEPARATION BEHAVIOR ON AIRFOILS AT HIGH ANGLES OF ATTACK, USING LINEAR LIFT THEORY Thesis - Hochschule der Bundeswehr, Munich [UNTERSUCHUNGEN ZUM ABREISSVERHALTEN VON TRAGFLUEGELN IM HOHEN ANSTELLWINKELBEREICH MIT HILFE DER TRAGLINIENTHEORIE]
Karl-Heinz Haerdtl 1 Nov. 1980 157 p refs In GERMAN
(MBB-FE-122/S/PUB/37; Rept-80/7) Avail: NTIS HC A08/MF A01

Different methods for calculating the lift coefficient of an airfoil wing were examined. The calculation of aerodynamic characteristics of airplanes is of great importance. Complex three dimensional boundary layers, especially for swept back wings with leading edge slats and trailing edges with split flaps which very much effect airfoil flows. Two different methods to calculate three dimensional boundary layers are presented. Transl. by E.A.K.

N82-18190# European Space Agency, Paris (France).
LAMINAR AIRFOILS FOR TRANSPORT AIRCRAFT
Armin Quast Oct. 1981 33 p refs Transl. into ENGLISH of "Laminarprofile fuer verkehrsflugzeuge" Rept. DFVLR-Mitt-80-07 DFVLR, Brunswick, Mar. 1980 33 p
(ESA-TT-680; DFVLR-Mitt-80-07) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8,30

The development of laminar airfoils in order to save fuel by reducing drag is discussed. Laminarization through shaping is considered. Laminar and turbulent boundary layer theory and subjective assessment indicate that laminar airfoils for high Reynolds numbers are feasible, with a 22% fuel saving. The reduced cruising speeds, required, however, decrease passenger comfort, making them more suitable for freight carrying. Author (ESA)

N82-18192# Rockwell International Corp., El Segundo, Calif.
MULTIPLE EJECTION EFFECTS ANALYSIS Final Report, 8 May - 30 Dec. 1980
G. A. Freeman and G. R. Casteel Wright-Patterson AFB, Ohio Air Force Medical Research Labs. Aug. 1981 92 p refs
(Contract F33615-80-C-0519; AF Proj. 7231)
(AD-A108277; NA-80-545; AFAMRL-TR-80-140) Avail: NTIS HC A05/MF A01 CSCL 05/5

Wind tunnel data for the ACES-B1 ejection seat in the presence of the B-1 forebody are documented and analyzed. Significant aerodynamic interactions exist at high speed between dual seats and between seat/forebody. Trajectory data are presented with and without the forebody effect upon the seat. The forebody flow field is shown to increase the human engineering/biomechanical problems during high-speed ejection. Author (GRA)

N82-18193# Douglas Aircraft Co., Inc., Long Beach, Calif.

AIRCREW RESTRAINT AND MOBILITY TEST FIXTURE Final Report

A. Blair McDonald Wright-Patterson AFB, Ohio AMRL Jul. 1981 33 p refs
(Contract F33615-79-C-0522; AF Proj. 7231)
(AD-A108274; AFAMRL-TR-81-27) Avail: NTIS HC A03/MF A01 CSCL 14/2

The next generation combat aircraft with advanced aerodynamic and control features will have combat maneuver capability which will impose multiaxial accelerations on the aircrew. Advanced aircrew systems will be required for restraint, support, and mobility during these combat conditions. New concepts for these systems have been defined, but tests under representative dynamic conditions are necessary to evaluate the effectiveness of these concepts when implemented. Author (GRA)

N82-18194# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

PHYSIOLOGICAL ACCEPTABILITY TESTS OF THE SJU-5/A EJECTION SEAT: SECOND PHYSIOLOGICAL ACCEPTANCE DEMONSTRATION Final Report

William C. Ward, Jr. and Kenneth L. Miller 1 Jul. 1981 23 p refs
(AD-A108688; NADC-81215-60) Avail: NTIS HC A02/MF A01 CSCL 01/3

This program was conducted to evaluate solutions to deficiencies of the F18 Aircraft Martin-Baker SJU-5/A escape system which had been identified during the initial Physiological Acceptability Demonstration (Report No. NADC-79040-60). The proposed solutions evaluated during this program included: incorporation of 'toe guides' on the rudder pedals, relocation of the head rest, modification of the back support, and incorporation of leg garters into the anti-'G' suit. Of these, the head rest and back support still require additional modification. Upon satisfactory correction of the head rest and back support deficiencies, physiological acceptance of the F18 escape system will be recommended for the pilot's station. Author (GRA)

N82-18195# RAND Corp., Santa Monica, Calif.

DISTRIBUTED INTELLIGENCE FOR AIR FLEET CONTROL Interim Report

Randall Steeb, Stephanie Cammerata, Frederick A. Hayes-Roth, Perry W. Thorndyke, and Robert E. Wesson Jun. 1981 59 p refs
(Contract MDA903-78-C-0029; ARPA Order 3640)
(AD-A108611; RAND/R-2728-ARPA; LC-81-13913; ISBN-0-8330-0353-4) Avail: NTIS HC A04/MF A01 CSCL 17/7

Distributed planning and control techniques provide potential advantages over centralized processing in speed, cost, reliability, flexibility, and minimization of long-distance communications for a variety of tasks, including military threat assessment, command and control decisionmaking, disaster relief coordination, and civilian air traffic control. Six different architectures for distribution of control among multiple processors are presented, and the influences of different task environments on each are discussed. The work focuses primarily on the use of distributed planning and control for civilian air traffic control. One architecture, in which each aircraft is controlled by a separate processor, is described in detail in an illustrative scenario. An initial system design is presented in which cooperating 'experts' comprise a processor. These cooperating experts sense or infer aircraft intentions, generate and evaluate plans, control and monitor plan execution, and communicate with other processors. Author (GRA)

N82-18196# Army Missile Command, Redstone Arsenal, Ala. Guidance and Control Directorate.

SOFTWARE FEATURES APPLICABLE TO INERTIAL MEASUREMENT UNIT SELF ALIGNMENT

H. V. White, J. C. Hung, and W. G. Cantrell Dec. 1980 36 p refs
(AD-A108511; AD-E950182; DRSMI/RG-81-11-TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report documents two software features applicable to inertial measurement unit self-alignment. Features are the continuous-time algorithm and the 'scraping' technique. FORTRAN programs for least-square with and without scraping are included. Author (GRA)

N82-18197# Nebraska Univ., Lincoln. Dept. of Electrical Engineering.

IMPROVEMENTS AND EXTENSIONS OF THE GEOMETRICAL DILUTION OF PRECISION (GDOP) CONCEPT FOR SELECTING NAVIGATION MEASUREMENTS Final Report, 1 May 1980 - 1 May 1981

William L. Brogan Wright-Patterson AFB, Ohio AFWAL Sep. 1981 69 p refs
(Contract F33615-80-C-1092; AF Proj. 6095)
(AD-A108607; AFWAL-TR-81-1142) Avail: NTIS HC A04/MF A01 CSCL 17/7

The optimal measurement selection problem was studied for the Global Positioning Satellite system (GPS). The fundamentals of the Geometrical Dilution of Precision (GDOP) concept were briefly reviewed, because GDOP is frequently used to rank the effectiveness of potential measurements. It is shown that GDOP does not always select the best measurements in the sense of minimum mean square navigation error. For this reason weighted least-squares and minimum variance (Kalman filter) methods were used to derive several improved measurement ranking schemes. Nonuniform measurement noise and a prior knowledge about the state are taken into account. Any specified weighted combination of the component error variances can be minimized. Eigenvalue-eigenvector theory was used to derive useful bounds and to provide geometrical insight. A purely algorithmic approach is also presented and applied to a number of representative GPS cases. GRA

N82-18198# European Space Agency, Paris (France).

A POSSIBLE WAY OF SPECIFICALLY CORRECTING LOCATION AND NAVIGATIONAL ERRORS CAUSED BY REFLECTION AND OTHER PROPAGATION ANOMALIES

Fritz Stelzel Jul. 1981 125 p refs Transl. into ENGLISH of "Uber eine Moeglichkeit zur gezielten Korrektur von Ortungs- u. Navigationsfehlern, die durch Reflexionen u. sonstige Ausbreitungsanomalien verursacht werden", Rept. DFVLR-Mitt-79-17 DFVLR, Oberpfaffenhofen, West Germany, May 1979
(ESA-TT-667; DFVLR-Mitt-79-17) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 21,20

Electromagnetic wave propagation in urban areas is discussed in relation to vehicle location. Current methods are reviewed for vehicles on a arbitrary route. Isophase and hyperbola systems are compared. The isophase system is more accurate. A correction procedure for multipath induced errors is presented, based on measuring time signals from four transmitters. The use of measured times in order to reduce location errors caused by propagation anomalies is described. The methods were tested on a simulated city area covered by transmitters on the corners of a 25 km square. Results are inconclusive. Author (ESA)

N82-18199# European Space Agency, Paris (France).

EXTENSION OF PROPORTIONAL NAVIGATION BY THE USE OF OPTIMAL FILTERING AND CONTROL METHODS

Hans-Dieter Joos Aug. 1981 31 p refs Transl. into ENGLISH of "Erweiterung der Proportionalnavigation durch Anwendung optimaler Filterungs- und Regelungsmethoden", Rept. DFVLR-FB-80-10 DFVLR, Oberpfaffenhofen, West Germany, Mar. 1980 38 p
(ESA-TT-683; DFVLR-FB-80-10) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8,30

A suboptimal guidance law for homing missiles, based on quadratic optimal stochastic control theory is investigated. On-line backward integration from final time to actual time is not required. A Kalman-Bucy filter which takes nonlinearity and target maneuvers into account is presented. The model is compared to the conventional and extended proportional navigation systems (simulated on a nonlinear quidance loop model). Positional error behavior improves by 45%. Author (ESA)

N82-18200# European Space Agency, Paris (France).

MIDAIR AND NEAR MIDAIR COLLISIONS ON TWO- AND THREE-DIMENSIONAL CURVILINEAR FLIGHT PATHS

Otto Weber Aug. 1981 119 p refs Transl. into ENGLISH of "Zusammenstoesse und gefaehrliche Begegnungen bei zwei- und dreidimensionalen Kurvenfluegen", Rept. DFVLR-FB-80-13 DFVLR, Brunswick, Mar. 1980 107 p
(ESA-TT-685; DFVLR-FB-80-13) Avail: NTIS HC A06/MF A01; DFVLR, Cologne DM 21

Collision avoidance by the see and avoid concept, advanced secondary radar systems on the ground, and independent electronic systems onboard are discussed. For two and three dimensional stationary turns, basic geometrical and physical aspects of conflict detection are derived and details are given on the apparent size and motion of the other aircraft on the windshield. For conflict warning by means of ground based or onboard electronic systems, a linear track model is used. The predicted minimum distance at the closest approach, the lead times to this event or to the penetration of a zone of protection around the intruder, and the zeta parameter are analyzed as potential conflict criteria. Similarity rules and the separation of three dimensional conflicts into horizontal and vertical problems are treated. Commercial pilots lack special training in optically based risk assessment. Autonomous onboard warning systems do not make the see and avoid concept obsolete. Author (ESA)

N82-18201# National Ocean Survey, Rockville, Md.
UNITED STATES COAST PILOT 9. PACIFIC AND ARCTIC COASTS ALASKA: CAPE SPENCER TO BEAUFORT SEA
Jan. 1981 425 p Revised
(PB82-109562; NOAA-81021105) Avail: NTIS HC A18/MF A01 CSCL 17G

Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. Information is included on navigation regulations, Cape Spencer to Beaufort Sea, Cape Spencer to Cook Inlet, Kodak Island, Alaska Peninsula, Aleutian Islands, Bering Sea and Arctic Ocean. GRA

N82-18202*# McDonnell-Douglas Corp., Long Beach, Calif.
A STUDY TO DEFINE THE RESEARCH AND TECHNOLOGY REQUIREMENTS FOR ADVANCED TURBO/PROPFAN TRANSPORT AIRCRAFT Final Report
Irene M. Goldsmith Feb. 1981 313 p refs
(Contract NAS2-10078)
(NASA-CR-166138; ACEE-16-FR-0016) Avail: NTIS HC A14/MF A01 CSCL 01C

The feasibility of the propfan relative to the turbofan is summarized, using the Douglas DC-9 Super 80 (DS-8000) as the actual operational base aircraft. The 155 passenger economy class aircraft (31,775 lb [14,413 kg] payload), cruise Mach at 0.80 at 31,000 ft (9,450 m) initial altitude, and an operational capability in 1985 was considered. Three propfan arrangements, wing mounted, conventional horizontal tail aft mounted, and aft fuselage pylon mounted are selected for comparison with the DC-9 Super 80 P&WA JT8D-209 turbofan powered aircraft. The configuration feasibility, aerodynamics, propulsion, structural loads, structural dynamics, sonic fatigue, acoustics, weight maintainability, performance, rough order of magnitude economics, and airline coordination are examined. The effects of alternate cruise Mach number, mission stage lengths, and propfan design characteristics are considered. Recommendations for further study, ground testing, and flight testing are included. Author

N82-18203*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SLOTTED VARIABLE CAMBER FLAP Patent Application
Dana G. Andrews, inventor (to NASA) (Boeing Commercial Airplane Co., Seattle) Filed 30 Oct. 1981 13 p Sponsored by NASA
(NASA-Case-LAR-12541-1; US-Patent-Appl-SN-315588) Avail: NTIS HC A02/MF A01 CSCL 01C

Variable camber actuator assemblies broaden the range of speeds at which lift to drag performance is maximized for slotted flap wings. Lift is improved by varying wing camber with rotational flap movements that do not introduce wing slots and induced drag. Forward flaps are secured to forward flange links which extend from, and are a part of, forward flap linkage assemblies. The forward flaps rotate about flap pivots with their rotational displacement controlled by variable camber actuator assemblies located between the forward flaps and the forward flange links. Rear flaps are held relative to the forward flaps by rear flap linkage assemblies which may act independently from the forward flap linkage assemblies and the variable camber actuator assemblies. Wing camber is varied by rotating the flaps with the variable camber actuator assemblies while the flaps are in a deployed or tucked position. Rotating flaps in a tucked position does not introduce significant wing surface discontinuities, and reduces aircraft fuel consumption on most flight profiles. NASA

N82-18204*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DYNAMICS OF AIRCRAFT ANTISKID BRAKING SYSTEMS
John A. Tanner, Sandy M. Stubbs, Robert C. Dreher, and Eunice G. Smith Feb. 1982 100 p refs
(NASA-TP-1959; L-14788) Avail: NTIS HC A05/MF A01 CSCL 01C

A computer study was performed to assess the accuracy of three brake pressure-torque mathematical models. The investigation utilized one main gear wheel, brake, and tire assembly of a McDonnell Douglas DC-9 series 10 airplane. The investigation indicates that the performance of aircraft antiskid braking systems is strongly influenced by tire characteristics, dynamic response of the antiskid control valve, and pressure-torque response of the brake. The computer study employed an average torque error criterion to assess the accuracy of the models. The results indicate that a variable nonlinear spring with hysteresis memory function models the pressure-torque response of the brake more accurately than currently used models. T.M.

N82-18205# Committee on Armed Services (U. S. House).
REVIEW OF DEFENSE-RELATED VERTICAL AND SHORT TAKEOFF AND LANDING (V/STOL) AIRCRAFT PROGRAMS
Walter Z. Collings Washington GPO 1979 206 p refs
Presented to the Comm. on Armed Serv., 96th Congr., 1st Sess., Sep. 1978 Prepared by AIAA, New York
(GPO-55-278) Avail: Committee on Armed Services

A technology review of bases supporting the development of Vertical of Short Takeoff and Landing (V/STOL) aircraft is presented. Representative aircraft were summarized according to their type of lift generation mechanisms. Successes, failures, problems encountered in development, and plans for the future are also presented. Some discussion of the Navy's envisionment/commitment to V/STOL aircraft is also presented. M.D.K.

N82-18206# Rockwell International Corp., Columbus, Ohio. Aircraft Div.
XFV-12A DIAGNOSTIC AND DEVELOPMENT PROGRAMS Summary Report, Jan. 1979 - May 1981
P. M. Bevilaqua and C. P. Combs Nov. 1981 367 p refs
(Contract N00019-73-C-0053)
(AD-A108354; NR81H-50) Avail: NTIS HC A16/MF A01 CSCL 01/3

Activity during the XFV-12A thrust augmenter development program conducted from May 1979 to June 1981 is reported and documented. Diagnostic tests indicated a major source of performance deficiency could be attributed to feed duct/augmenter component interface problems rather than basic augmenter configuration. Interface problems seriously affected both isolated performance and flow quality of the primary augmenter nozzles resulting in significantly low levels of augmentation. A remedial program, the subject of this report, was initiated. The primary objective of this program was to systematically improve the performance of the XFV-12A aircraft's thrust augmenter lift systems. Major emphasis was placed not only on correcting flow deficiencies but also identifying and incorporating improvements in the augmenter design which would increase its performance potential. GRA

N82-18207# General Accounting Office, Washington, D. C.
POTENTIAL REDUCTIONS IN AIRCRAFT OPERATION AND MAINTENANCE COSTS BY USING THRUST COMPUTING SUPPORT EQUIPMENT Report to the Honorable Joseph P. Addabbo, Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives
27 Oct. 1981 17 p
(AD-A108463; GAO/PLRD-82-4) Avail: NTIS HC A02/MF A01 CSCL 01/2

This report addresses the evaluation of thrust measuring equipment. We interviewed Air Force officials and contractor representatives, reviewed documentation pertaining to the key events in the evaluation of the thrust computing system program, reviewed test data and analyses by Air Force and contractor engineers, and observed the operation of the thrust computing system. Our analyses show that the accurate measurement and setting of thrust for installed jet engines is of vital importance not only for aircraft readiness and safety but also for operation and maintenance cost reductions. Although test results indicate that a system is available that can perform such measurements, the services have not been using it. The Air Force has conducted extensive tests that will measure thrust for installed J85-5 engines, but has not implemented a system. The Navy has not performed any tests to determine whether its aircraft jet engines might benefit from such a system. GRA

N82-18208# Institute for Defense Analyses, Arlington, Va. Systems Evaluation Div.
C-5A AUSTERE AIRFIELD OPERATIONAL UTILITY EVALUATION. PHASE 2: OPERATION ON UNPAVED SOIL SURFACES FOLLOWING RAINFALL Final Report
Waldemar O. Breuhaus Oct. 1981 46 p refs
(Contract MDA903-79-C-0018)
(AD-A108597; AD-E500466; IDA-P-A1621; IDA/HQ-81-23896) Avail: NTIS HC A03/MF A01 CSCL 01/3

During the summer of 1980 and the winter of 1980-1981, an Operational Utility Evaluation (OUE) was conducted to determine operating characteristics of the C-5A airplane when taxiing or being towed and off-loaded on unpaved soil surfaces and on snow-covered surfaces. Subsequent to the successful completion of those tests, questions arose concerning the effects of rainfall that wets otherwise adequate bare soil areas to a significant depth. Tests with simulated rainfall of various amounts applied by agricultural sprinkler systems were conducted at March AFB, California, during July 1981. The airplane performed well, though it approached its performance limits in the most severe test conditions. Difficulties were encountered in arriving at a sprinkler system configuration reasonably approximating naturally occurring rainfall, and in arriving at a single simple descriptor to properly characterize the strength of soil in such a complex situation.
GRA

N82-18209# Army Aeromedical Research Lab., Fort Rucker, Ala. Biodynamics Research Div.
VIBRATION LEVELS IN ARMY HELICOPTERS: MEASUREMENT RECOMMENDATIONS AND DATA Final Report
John C. Johnson and David B. Priser Sep. 1981 35 p refs
(DA Proj. 3E1-6277-A-878)
(AD-A106131; USAARL-81-5) Avail: NTIS HC A03/MF A01 CSCL 01/3

Surveys on vibration levels found in currently fielded helicopters were used to prepare a comparative summary of vibration exposure levels at crew stations and of the test methods used to measure these levels. This effort was initiated at the request of the Air Standardization Coordinating Committee (ASCC) Working Party 61 and because of the wide variety of methods used in data capture and instrumentation documentation. Sources of the literature reviewed included technical reports of U.S. Government agencies and papers in open literature. Articles were reviewed based upon three criteria: (1) quantitative description of vibration in currently fielded U.S. Army rotary winged aircraft, (2) article contents are unclassified and available for publication in open literature, (3) article describes human exposure levels of aircraft vibration. Author (GRA)

N82-18210# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Flight Technology Div.
A DIGITAL SIMULATION PROGRAM DESCRIBING THE MOTION OF AN AIRCRAFT UNDERGOING ENGINE FAILURE DURING ITS TAKEOFF GROUND ROLL Final Report, Jun. 1980 - Mar. 1981
Michael J. Miedlar Sep. 1981 77 p refs
(AD-A108420; ASD-TR-81-5030) Avail: NTIS HC A05/MF A01 CSCL 01/2

This report presents a non-interactive 'MIMIC' program developed to generate the time history of an aircraft undergoing an engine failure during its ground roll. The program calculates the forces and moments acting on the aircraft, and uses MIMIC's implicit integration routine to track its motion. The equations and assumptions used are presented and discussed. This report also lists the program and delineates its functions. Author (GRA)

N82-18211# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
THEORETICAL INVESTIGATIONS ON THE INFLUENCE OF DIFFERENT STRAKE, TAIL UNIT, AND CONVENTIONAL HLW ARRANGEMENT AS WELL AS OF CCV ON THE AERODYNAMIC CHARACTERISTICS OF FIGHTER AIRCRAFT CONFIGURATIONS Thesis - Hochschule der Bundeswehr, Munich [THEORETISCHE UNTERSUCHUNGEN UEBER DEN EINFLUSS VON VERSCHIEDENEN STRAKE, ENTENLEITWERKS- UND KONVENTIONELLEN HOEHENLEITWERKSANORDNUNGEN SOWIE VON C.C.V. AUF DIE AERODYNAMISCHEN EIGENSCHAFTEN VON KAMPFFLUGZEUG-KONFIGURATIONEN]
Herbert Klimt, Dieter Oberst, and Walter Schmalhofer 1 Oct. 1980 486 p refs In GERMAN
(MBB-FE-122/S/PUB/36) Avail: NTIS HC A01/MF A01

Linear and nonlinear aerodynamic characteristics for fighter airplane configurations with three separate tail-wing-surface ratios as related to lift coefficients were optimized. The optimal configurations were reduced by 5% for stability and 10% for instability and their lifting responses are compared. Fuselage effect and convergence of aerodynamic factors are also studied.
Transl. by E.A.K.

N82-18212# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
INTERPRETATION AND CONSTRUCTION OF A DYNAMIC SIMILARITY MODEL OF THE A 310 WINGS [AUSLEGUNG UND BAU EINES DYNAMISCH AEHNLICHEN MODELLS DES A 310 FLUEGELS]
H. Hoenlinger 5 May 1981 34 p refs In GERMAN Presented at DGLR-Jahrestagung 1981, Aachen, 11-14 May 1981
(MBB-FE-17/S/PUB/42; DGLR-81-035) Avail: NTIS HC A03/MF A01

The design and construction of a model for directional oscillation flutter for the A-310 wing with supercritical profile is discussed. The rigidity distribution in the model is simulated by a simple metal box. The profile geometry and the mass distribution of the model is copied exactly by a foam structure coated with a fiberglass laminate. A finite element model is used to explain the complicated engine mount, which is supported by a profile beam. Data on rigidity and vibration measurements are included. Transl. by E.A.K.

N82-18213# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
CHARACTERIZATION OF THE AIRBUS HORIZONTAL STABILIZERS OF CFRP CONSTRUCTION AND STRUCTURAL ANALYSIS WITH THE FINITE ELEMENT METHOD [AUSLEGUNG DES AIRBUSSEITENLEITWERKS IN CFK-BAUWISE UND STRUKTURANALYSE MIT DER FINITE-ELEMENTE-METHODE]
Erhard Winkler May 1981 22 p Reprint from "Verarbeiten u. Anwenden kohlenstoffaserverstaerkter kunststoffe" Vereins Deut. Ingr., May 1981 p 181-198 In GERMAN
(MBB-UT-13-81-O) Avail: NTIS HC A02/MF A01

The use of carbon fiber reinforced plastics as a substitute for light weight metals in aircraft construction, which decreases the weight by 30%, is discussed. Environmental parameters, like temperature and humidity must be considered. A construction method with a variety of possibilities to fulfill these requirements and which competes with metal structures is developed. This means either a simplified weight reduction at the same or less cost, or a less costly method for the same or less weight.
Transl. by E.A.K.

N82-18214# European Space Agency, Paris (France).
TENDENCIES IN THE DEVELOPMENT OF SUBSONIC TRANSPORT AIRCRAFT WITH SPECIAL CONSIDERATION OF AERODYNAMICS
Horst Koerner Oct. 1981 42 p refs Transl. into ENGLISH of "Entwicklungstendenzen bei Unterschall-Transportflugzeugen unter besonderer Beruecksichtigung der Aerodynamik", Rept. DFVLR-Mitt-80-15 Brunswick, Jun. 1981 62 p
(ESA-TT-705; DFVLR-Mitt-80-15) Avail: NTIS HC A03/MF A01

Tendencies in subsonic transport aircraft development, specifically due to progress in aerodynamics, are surveyed. Prospective wing profile designs and improved integration of body dimensions are considered, citing examples from the AIRBUS development program. Possible fuel savings through supercritical wing technology and by optimizing reduction in friction drag are also studied. Advantages to be gained by active control, particularly from adaptive wing technology, are reviewed. As a potential application, an unconventional canard configuration, including transonic propellers, for an aircraft in the AIRBUS class is proposed. Author (ESA)

N82-18215 Royal Aircraft Establishment, Farnborough (England).

NEW DEVELOPMENTS IN COCKPIT-HUMAN INTERFACES
E. B. Davies and J. B. Peckham 15 Jun. 1981 16 p Presented at 12th ICAS Congr., Munich, Oct. 1980
(RAE-TM-FS-412; BR80500) Copyright. Avail: Issuing Activity

Touch sensing displays, helmet sights, and direct voice inputs (DVI) are discussed. Cathode ray tubes (CRT) are cheaper than keyboards for touch sensing, but lack tactile differentiation capabilities. For designation tasks, e.g., touching the required radar return, accuracy must be much higher than for keyboarding. Head movement filtering is a problem with helmet sights, since output is delayed if too much filtering is attempted, and accuracy suffers if vibration is ignored. Cuing by LED's is restricted by the number of leads the helmet can incorporate, and CRT's are too heavy. Factors affecting DVI performance include electronic noise on intercoms, microphone to mouth distance, voice changes caused by stress, and the number of commands pilots can remember. Author (ESA)

N82-18216# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN ON BOARD SUPERVISORY SYSTEM FOR APPLICATIONS IN SPACE MISSIONS [UM SISTEMA DE SUPERVISAO DE BORDO PARA APLICACOES EM MISSOES ESPACIAIS]
Jose Carlos Maldonado and Ricardo deAzevedo Mendes Jun. 1981 13 p refs In PORTUGUESE; ENGLISH abstract Presented at the 2nd Natl. Automation Meeting, Salvador, Bahia, Brazil, Jul. 1981
(INPE-2097-RPE/327) Avail: NTIS HC A02/MF A01

The system, developed in the digital and analog system group/program, enables full duplex communication between an onboard and a ground microcomputer, based on a reserved protocol. The system performs the following functions: data acquisition, control, transmission and reception between an onboard payload and a ground station. It also executes housekeeping tasks and telecommand operations. This systems was, in particular, utilized in the balloon mission PEROBA-I. The performance of the system in the mission was satisfactory. T.M.

N82-18217# Hughes Aircraft Co., Canoga Park, Calif.
ANALYSIS OF BUILT-IN-TEST (BIT) FALSE ALARM CONDITIONS Final Technical Report, 24 Jan. 1980 - 28 Feb. 1981
John G. Malcolm and Richard W. Highland Griffiss AFB, N.Y. RADC Aug. 1981 122 p refs
(Contract F30602-80-C-0074; AF Proj. 2338)
(AD-A108752; RADC-TR-81-220) Avail: NTIS HC A06/MF A01 CSCL 14/2

Usefulness of BIT is seriously affected by the presence of false alarms. False alarms can degrade mission effectiveness of systems and contribute to the expenditure of excessive maintenance resources. The objectives of this study were to determine the root causes of the false alarm problem and to develop design guidelines to minimize the occurrence and the effect of false alarms. False alarm rates have been established for the three systems investigated and prediction factors defined. Author (GRA)

N82-18218# Lockheed-Georgia Co., Marietta.
ANALYTICAL STUDY OF COCKPIT INFORMATION REQUIREMENTS Final Report, Oct. 1979 - Nov. 1980
J. D. Caldwell and T. G. Jones Washington FAA Apr. 1981 165 p refs
(Contract DOT-FA79WA-4368)
(AD-A108524; LG80ER0200; FAA/RD-81/4) Avail: NTIS HC A08/MF A01 CSCL 01/3

An assessment is made of cockpit information requirements likely to be imposed on aircraft in the next fifteen years as a result of improvements in the ATC system and in aircraft design. These requirements are analyzed by work centers and include flight control, navigation, collision avoidance, flight management, communications, caution/warning and monitoring, and checklist functions. From a baseline of current requirements and technology, the application of new requirements and technology is analyzed. Three aircraft are hypothesized representing three time periods of technical development. The purpose is to investigate the impact of future ATC changes on differently equipped aircraft. GRA

N82-18219# Arinc Research Corp., Annapolis, Md.
IMPACT OF TECHNOLOGY ON AVIONICS COST TRENDS
Steven Toth, William Lovelace, and Kelly Markin Nov. 1981 84 p
(Contract DTFA-01-80-C-10030)
(AD-A108494; Rept-1378-40-2-2553; FAA-EM-82-6) Avail: NTIS HC A05/MF A01 CSCL 09/3

This study provides an overview of nonmilitary generally aviation and commercial avionics price and cost structures as influenced by technology. It quantifies, computes, and evaluates the unique characteristics and behavior patterns of the industry, especially those that affect the frequency of innovation, the rate of technology diffusion from manufacturer to manufacturer or from product to product, and the anticipated major cost drivers of the future. The report reviews the impact of technology on the cost of avionics during the past 20 years and projects this impact for the next 20 years. This report concentrates on avionics in the low-performance general aviation aircraft category because they are the major components of the avionics industry. Typical units of detailed study are transponders, transceivers, navigation receivers, and course deviation indicators (CDIs). An examination of the price histories of more than twenty equipment families indicates that unit prices have been and are likely to continue increasing at the Producer Price Index (PPI) rate. This rate of price growth results from a balance between costs rising at the Consumer Price Index (CPI) rate and manufacturing cost reductions made possible through the introduction of new technologies. Author (GRA)

N82-18220# National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.
TRENDS IN AIRLINE AVIONICS
F. J. Abbink 13 Mar. 1980 30 p refs Presented at Netherlands Assoc. of Aeron. Engr. Symp. on Develop. in Avionics, Delft, 25 Apr. 1980
(NLR-MP-80013-U) Avail: NTIS HC A03/MF A01

The evolution of aeronautical electronics is described. Trends towards system integration for airliners are indicated. The development of airline avionics specifications by the airlines and constructors is outlined. The design and function of avionics equipment, e.g., navigation aids, are explained. The Aeronautical Radio Incorporated 700 automatic flight system is introduced as an example of a system suited to the next generation of airliners. Radio navigation, communication and identification equipment are controlled by the digital frequency/function selection unit. Automatic flight control and auto-throttle functions are executed by flight control and thrust control computers. Author (ESA)

N82-18221# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
INTEGRATION OF COMPLEX SYSTEMS IN CURRENT AND FUTURE AIRCRAFT PROJECTS FOR THE EXAMPLE OF AVIONICS [INTEGRATION KOMPLEXER SYSTEME IN LAUFENDE UND ZUKUENFTIGE FLUGZEUGPROGRAMME AM BEISPIEL DER AVIONIK]
H. Haeuser 31 Jan. 1980 38 p In GERMAN
(MBB-UH-18-80-O) Avail: NTIS HC A03/MF A01

Equipment for electrical and avionic systems, and special equipment needed in the airplane program were developed. Avionics is defined as: airplane structure, airplane equipment (besides the mechanical system) includes that part of the equipment system which is supported by the electric and electronic system, and construction and general instruments necessary in airplane construction. Avionics enables the supply, transfer, processing, and production (activation) of information for the management of airplane systems, control of airplanes, and the execution of special functions. Transl. by E.A.K.

N82-18222*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF FAN INLET TEMPERATURE DISTURBANCES ON THE STABILITY OF A TURBOFAN ENGINE
Mahmood Abdelwahab Dec. 1981 36 p refs
(NASA-TM-82699; E-982) Avail: NTIS HC A03/MF A01 CSCL 21E

The effects of steady-state and time-dependent fan inlet total temperature disturbances on the stability of a TF30-P-3 turbofan engine were determined. Disturbances were induced by a gaseous-hydrogen-fueled burner system installed upstream of the fan inlet. Data were obtained at a fan inlet Reynolds number index of 0.50 and at a low-pressure-rotor corrected speed of 90 percent of military speed. All tests were conducted with a 80 deg extent of the fan inlet circumference exposed to above-average temperatures. T.M.

N82-18223# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).
FURTHER DEVELOPMENT OF THE TEST CONCEPT OF THE ALPHA JET ENGINE LARZAC 04 [WEITERENTWICKLUNG DES PRUEFKONZEPTES FUER DAS ALPHA-JET-TRIEBWERK LARZAC 04]
Ernst Lerche 1981 33 p In GERMAN Presented at Seminar, Prueftech. und Pruefstandstech., Hannover, 3 Apr. 1981
Avail: NTIS HC A03/MF A01

The test stand for the LARZAC 04 jet unit for the Alpha jet aircraft was developed. The test stand is outlined, and equipment extension, and a maintenance procedure for the driving system are presented. Transl. by E.A.K.

N82-18224# Honeywell Systems and Research Center, Minneapolis, Minn. Aerospace and Defense Group.
INTEGRATED CONTROL DESIGN TECHNIQUES Final Report, Jun. 1979 - Nov. 1980
A. L. Jones, J. K. Mahesh, M. A. Kollodge, D. P. Piedger, E. R. Rang, and K. D. Graham Wright-Patterson AFB, Ohio AFWAL Aug. 1981 314 p refs
(Contract F33615-79-C-3609; AF Proj. 2403)
(AD-A108223; Rept-80SRC82; AFWAL-TR-81-3074) Avail: NTIS HC A14/MF A01 CSCL 01/3

A total systems approach methodology and computer-aided design tool for integrated flight control design and evaluation has been formulated. This methodology is a composition of classical system design steps and system performance, reliability/survivability, packaging and cost evaluation techniques assembled for interactive computer-based execution. The interactive sensor integration program developed under this methodology addresses the sensor requirements of the flight control, guidance and navigation, and weapon delivery functions as directed interactively by the designer and the mission, the system configuration, cost, power, weight, volume constraints and total system performance. The demonstration program contains performance reliability, size, power, weight, cost data for gyros, accelerometers, radars, seekers and air data systems in addition to analysis tools for evaluating navigation system accuracy, probability of target acquisition, and probability of kill for selected targets and weapons.
Author (GRA)

N82-18225# Instituut TNO voor Bouwmaycrialen en Bouwconstructies, Delft (Netherlands).
INVESTIGATION INTO THE UTILITY OF SOME QUICK SETTING CEMENTS FOR RUNWAY REPAIR [ONDERZOEK NAAR DE BRUIKBAARHEID VAN ENKELE SNELVERHARDENDE BINDMIDDELEN VOOR REPARATIE VAN STARTBANEN]
Mar. 1980 39 p refs In DUTCH
(B-80-157/60.7.0157; TDCK-75056) Avail: NTIS HC A03/MF A01

The application of quick setting cements in rapid runway repair was investigated. Needed strength and layer thickness of the hardening material was determined. The following results are reported: (1) it is possible to fill up a hollow space with quick setting cements, even in combination with proper additives like super plastifiers; (2) pressure strength for hardening time is accomplished within one hour; (3) a fast operating method is needed to prevent debinding of cement, continuous mixers for smaller quantities are recommended. Transl. by E.A.K.

N82-18226# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
THE LINK-HILES DRIVER TRAINING SIMULATOR FOR TRACKED VEHICLES: THE EFFECT OF METHOD AND DURATION OF TRAINING ON THE TRANSFER OF TRAINING
K. J. Poll 1980 20 p refs In DUTCH; ENGLISH summary
(Contract A76/KL/148)
(IZF-1980-28; TDCK-75019) Avail: NTIS HC A02/MF A01

Transfer of training through different methods and durations of training from a driving simulator to a task was investigated. In method A the candidates were under strict guidance of the instructor, while in method B the candidates trained more on their own and paid more attention to the integration of the part-tasks. The duration of training was dependant on the performance-level on which the candidate turned over from the simulator to the real tanks. These performance-levels were: the single trial execution of all tasks (low level), having all tasks under control (medium level), and sufficient integration of all part-tasks (high level). From the results it is clear that when the candidates were trained in pairs the mean number of kilometers for the two candidates shows to difference as a function of training method. Although the 'first' candidate needs less kilometers with method B, and 'second' candidate learns more from the 'first' with method A. The number of kilometers on the tank, necessary to pass the final driver's test, is a linear relation as a function of the duration of simulator training.
J.M.S.

N82-18227# Coppin State Coll., Baltimore, Md.
TASK ANALYTIC TECHNIQUES: APPLICATION TO THE DESIGN OF A FLIGHT SIMULATOR INSTRUCTOR/OPERATOR CONSOLE Final Report
Charles D. Sanders Brooks AFB, Tex. Air Force Human Resources Lab. Dec. 1981 21 p refs Prepared for Southeastern Center for Electrical Engineering Education, St. Cloud, Fla. Submitted for publication
(Contract F49620-79-C-0038; AF Proj. 9983)
(AD-A108724; AFHRL-TP-81-38) Avail: NTIS HC A02/MF A01 CSCL 14/2

Instructional Systems Development (ISD) has contributed to the efficiency and low cost of air flight training through the medium of the simulator. Task analysis is a component of ISD, and its application to the improvement of devices such as simulator instructor/operator consoles will continue to enhance the quality of flight training. Task analytic techniques are inextricably interwoven into the design of an instructor/operator console. The application involves the process, persons, and a machine within the context of a flight simulator. The tasks of the instructor and student are primary in the design process. The efficiency and economy of the task analytic process has implications for its use in the future developments of automated flight training.
Author (GRA)

N82-18228# SRI International Corp., Arlington, Va.
EVALUATION OF THE NORTH ISLAND A/C CRASH/RESCUE TRAINING FACILITY
R. S. Alger Aug. 1981 153 p refs
(Contract N00014-80-C-C696; SRI Proj. PYU-1943)
(AD-A108740) Avail: NTIS HC A08/MF A01 CSCL 05/9

Under Executive Order 11752, the Navy and the Air Force began a cooperative effort to develop training facilities that could provide more fire fighting training with less smoke and water pollution. Soon the central issue of pollution control was surrounded by a series of satellite questions that had to be answered before training facilities could be designed, e.g., what type of training is required; how much training should be provided; where should fireman train; and how much departure from the real emergency situation is permissible. Various public and private groups contributed answers. The Naval Air Station, North Island, San Diego, Calif., Aircraft/Crash Fire Rescue Training Facility is the first Navy facility constructed as an outgrowth of this effort to improve training while reducing the environmental impact to an acceptable level. This report evaluates the performance of the North Island facility in a series of environmental and training tests. The scope includes: (1) the evaluation procedure and results; (2) a comparison to other training options; and (3) recommendations for future training activity. GRA

N82-18229# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
BOMB CRATER REPAIR TECHNIQUES FOR PERMANENT AIRFIELDS. REPORT 1: SERIES 1 TESTS Technical Report, Jul. - Nov. 1978
David L. Cooksey Oct. 1981 129 p refs
(AD-A108716; WES/MP/GL-81-12) Avail: NTIS HC A07/MF A01 CSCL 13/2

A test section with six simulated bomb craters was constructed for the purpose of developing an improved field method of repair and restoration of air base runways damaged by enemy attack. The crater repair materials tested in the reconstruction were a high-quality crushed stone, grouted concrete, portland cement concrete (PCC), and asphaltic concrete (AC). The performances of the different materials were evaluated under full-scale load testings with the F-4 and C-141 aircraft loadings. The gravity grout solution and the high-quality crushed stone method performed beyond required coverage levels and seem to be the two high candidate material systems for further research. The solutions were accomplished with the time, manpower, equipment, and performance constraints of operational requirements. GRA

N82-18230# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
INVESTIGATION OF COMPACTION CRITERIA FOR AIRPORT PAVEMENT SUBGRADE SOILS Final Report, Mar. 1978 - Apr. 1981
William N. Brabston Washington, D.C. FAA Oct. 1981 174 p refs
(Contract DOT-FA78WAI-878)
(AD-A108518; WES/TR/GL-81-11; FAA-RD-81-48) Avail: NTIS HC A08/MF A01 CSCL 08/13

A study was conducted to determine the effect of lowering soil density requirements for subgrades under airport pavements. The investigation was primarily a laboratory effort in which molded specimens of three different soil types, compacted to densities at and below those currently specified by FAA criteria, were subjected to repeated axial loadings in a triaxial compression chamber. The primary response parameters of interest were permanent and resilient axial strain. Test results were formulated into a statistical model to predict permanent soil strain based on soil characteristics such as density, clay content, compaction characteristics, and shear strength. The strain model was used to calculate values of permanent soil deformation at the surface of the subgrade for various combinations of soil density. Results of the test indicated that the wide variation in soil response among the three materials tested precluded any general alteration in current FAA compaction criteria. Author (GRA)

N82-18231# Textron Bell Helicopter, Fort Worth, Tex.
ROTORCRAFT FLIGHT SIMULATION COMPUTER PROGRAM C81 WITH DATAMAP INTERFACE. VOLUME 2: PROGRAMMER'S MANUAL Final Report
P. Y. Hsieh Oct. 1981 264 p Supersedes USAAMRDL-TR-76-41A, USAAMRDL-TR-76-41B, and USAAMRDL-TR-76-41C
(Contract DAAK51-79-C-0015; DA Proj. 1L1-62209-AH-76)
(AD-A108294; BHT-699-099-111-Vol-2; USAAVRADCOM-TR-80-D-38B; USAAMRDL-TR-76-41A; USAAMRDL-TR-76-41B; USAAMRDL-TR-76-41C) Avail: NTIS HC A12/MF A01 CSCL 09/2

This report documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAP80. The accompanying program for calculating fully coupled rotor blade mode shapes is called DNAM05, and an associated rotor wake program is called AR9102. The AGAP80 version of C81 was developed by adding some analytical features to the AGAJ76 version and including the ability to generate Data Transfer Files for use by the File Creation Program of DATAMAP. An overview of the computer program capabilities and the principal mathematical models incorporated in the program are given in Volume I of the documentation for the AGAJ76 version of the program. Volume I, the User's Manual, contains detailed information necessary for setting up an input data deck and interpreting the computed data. Volume II, includes a catalog of subroutines and a discussion of programming considerations. GRA

N82-18232# Naval Air Engineering Center, Lakehurst, N.J. Ship Installation Engineering Dept.
INVESTIGATION OF CROSSDECK PENDANT CATAPULT SLOT INTERACTION; PROPOSED CORRECTIVE MEASURES Final Report, Apr. 1978 - Mar. 1979
Alvin Hittner 20 Nov. 1981 56 p ref
(AD-A108149; NAEC-91-7964) Avail: NTIS HC A04/MF A01 CSCL 01/5

This report documents the investigation of the crossdeck pendant failure aboard USS JOHN F. KENNEDY (CV 67) in March 1978, which caused the loss of an F-14A. Included are the results of a survey to determine the scope of the deck pendant/catapult slot interaction problem, testing to confirm the failure sequence, and the evaluation of slot filler devices (buttons) to resolve the problem. Author (GRA)

N82-18233# MGA Research Corp., Buffalo, N.Y.
TEST SITE INSTRUMENTATION STUDY. VOLUME 2: CRASH 1 AND CRASH 2 RAW DATA Final Report, 22 Mar. 1980 - 31 Mar. 1981
Rudy H. Arendt and Patrick M. Miller Jun. 1981 150 p refs
(Contract DOT-HS-8-01936)
(PB82-111832; G22-V-2; DOT-HS-805980-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 13F

The data acquisition and reduction practices at fifteen crash and sled testing facilities which normally produce impact test data for the NHTSA were reviewed. Attention was focused on dynamic response characteristics, instrumentation calibration procedures, filtering techniques, equipment properties and analog to digital conversion techniques. GRA

N82-18327*# Boeing Commercial Airplane Co., Seattle, Wash.
A STUDY OF THE EFFECTS OF LONG-TERM EXPOSURE TO FUELS AND FLUIDS ON THE BEHAVIOR OF ADVANCED COMPOSITE MATERIALS Final Report
E. Y. Tanimoto Aug. 1981 40 p ref
(Contract NAS1-12428)
(NASA-CR-165763; D6-41185-9) Avail: NTIS HC A03/MF A01 CSCL 11D

The periodic testing and evaluation of graphite/epoxy and Kevlar/epoxy material systems after subjecting test specimens to prolonged exposure to several laboratory-controlled environments deemed typical of normal aircraft operations is discussed. It is noted that specimen immersion in water or water-based fluids resulted in the greatest effect on the mechanical properties tested. Also, the environmental fluids showed a tendency to affect Kevlar/epoxy systems at an earlier exposure period than the graphite/epoxy systems. Results also indicate mechanical property strength retention generally being lower for the Kevlar/epoxy systems when compared to the corresponding graphite/epoxy systems in similar environments, after prolonged exposure. B.W.

N82-18348# Naval Weapons Center, China Lake, Calif.
FUEL-RICH PLUME COMBUSTION Annual Progress Report, 1 Oct. 1980 - 30 Sep. 1981
K. C. Schadow, M. J. Lee, and K. C. Wilson 30 Sep. 1981 7 p refs
(AD-A108136) Avail: NTIS HC A02/MF A01 CSCL 21/2

Experiments are being performed using an axisymmetric gas generator ramjet. Axial and radial profiles of pressure, velocity, turbulence intensity, temperature, and species concentration are being determined using non-interference optical diagnostic techniques (laser Doppler velocimeter (LDV)) and intrusive probes. The experimental data are being compared with analytical models developed by Science Application, Inc. (SAI) under an Air Force Office of Scientific Research (AFOSR) contract. An axisymmetric, 5-inch diameter laboratory ramjet combustor was built and checked out. Experiments were initiated using (1) an LDV and a hot-wire anemometer for velocity and turbulence intensity measurements, (2) coated thermocouples for temperature measurement, and (3) a gas chromatograph for analysis of gas samples. GRA

N82-18419# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsberetch.
ELECTROFORMING OF SPACE AND AIRCRAFT STRUCTURES
R. Suchentrunk 1981 9 p refs
(MBB-BB-491-O) Avail: NTIS HC A02/MF A01

Application of electroforming, a production technique for complicated structures, to aircraft and spacecraft structures and components is addressed. The process of electrodeposition is described and the advantages of the electroformed structures are highlighted. Materials suitable for the mandrels and for electrodeposition are discussed emphasizing preferred properties. J.M.S.

N82-18464# Rome Air Development Center, Griffiss AFB, N.Y.
TM/TE POLARIZATION RATIOS IN A SAMPLE OF 30 kHz SFERICS RECEIVED AT ALTITUDES FROM 0 TO 70 km
R. P. Harrison, E. A. Lewis, J. B. Donohoe (Megapulse, Inc.), and J. E. Rasmussen Aug. 1981 17 p refs
(AF Proj. 4600)
(AD-A108182; RADC-TR-81-235) Avail: NTIS HC A02/MF A01 CSCL 20/14

A rocket-borne payload, carrying both veritcal and horizontal magnetic dipole antennas and receiving instrumentation, was flown from Wallops Island, Virginia, to observe the Transverse Electric (TE) and Transverse Magnetic (TM) polarization components of individual sferics at 30 kHz. During the 2-1/2 min flight to apogee at 96 km, 293 individual sferics were observed. Upon applying corrections for difference in azimuthal antenna patterns, it was concluded that the TM noise fields were larger than the

TE fields by about 15 dB near the ground, and approximately equal at 60 km. Author (GRA)

N82-18471# Strategic Air Command, Offutt AFB, Neb. Aircraft Engineering Div.

AN/ALQ-135 TAIL WARNING SYSTEM FOLLOW-ON OPERATIONAL TEST AND EVALUATION Final Report

Vincent M. Jenkins 23 Nov. 1981 5 p
(AD-A108348; SAC/LGME-P-405) Avail: NTIS HC A02/MF A01 CSCL 15/3

This is a study of the reliability and maintainability of the tail warning system (TWS) AN/ALQ-153. This TWS is a solid state pulsed Doppler radar designed to provide warning and initiate countermeasures against threats attacking from the tail of B-52G/H aircraft. Author (GRA)

N82-18483# European Space Agency, Paris (France).

VOLUMETRIC PATTERN PREDICTION OF ANTENNAS ON AIRCRAFT USING THE GEOMETRICAL THEORY OF DIFFRACTION Ph.D. Thesis - Kaiserslautern Univ.

Thomas Jank Oct. 1981 146 p refs Transl. into ENGLISH of "Bestimmung des raeumlichen Strahlungsdiagramms von Antennen auf Flugzeugen mittels des geometrischen Beugungstheorie", Rept. DFVLR-FB-80-01 DFVLR, Oberpfaffenhofen, West Germany, Nov. 1979
(ESA-TT-677; DFVLR-FB-80-01) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 29,90

High frequency radiation patterns of aircraft dipole and slot antennas are calculated using the geometrical theory of diffraction (GTD). A mathematical model of an aircraft is presented. Arbitrary pattern sections are obtained by solving the ray tracing problem for rays which contribute significantly to the total field. Storage techniques and integration methods for the ray tracing problem (a boundary value problem) are discussed. Comparison with measured results obtained from physical models validate the use of the GTD and model. Author (ESA)

N82-18493* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

APPARATUS FOR DAMPING OPERATOR INDUCED OSCILLATIONS OF A CONTROLLED SYSTEM Patent

John W. Edwards and John W. Smith, inventors (to NASA) Issued 3 Nov. 1981 13 p Filed 29 Feb. 1980 Supersedes N80-20488 (18 - 11, p 1409)
(NASA-Case-FRC-11041-1; US-Patent-4,298,833; US-Patent-Appl-SN-126084; US-Patent-Class-318-561; US-Patent-Class-318-620; US-Patent-Class-318-621; US-Patent-Class-318-622) Avail: US Patent and Trademark Office CSCL 09C

Flight control-related apparatus for damping operator induced oscillations of a controlled system responding to an operator controlled signal is described. The device utilizes a lag-lead filter for frequency and amplitude estimation of the control input, and a rectification and smoothing filter for producing a signal proportional to the absolute value of the frequency and amplitude estimate for use in suppression of the control system output signal. In one embodiment, this is accomplished by computing a correction signal in a correction generating section. In a second embodiment, a second rectification and smoothing filter produces a signal proportional to the absolute value of the controlled input signal. A ratio of the outputs of the first and second rectification and smoothing filters is then used in a generator to generate a gain factor k sub q for the control system to reduce the gain of the output signal of the control system, thereby to provide a damped control output signal without rate limiting the controlled element.

Official Gazette of the U.S. Patent and Trademark Office

N82-18503 Royal Aircraft Establishment, Farnborough (England).

A DESIGN FOR A 32-CHANNEL MULTIPLEXER

P. F. Martinson 26 Jan. 1981 35 p refs
(RAE-TM-RAD-NAV-145; BR77700) Copyright. Avail: Issuing Activity

A time scan analog system multiplexer used for recording data during flight trials of unmanned aircraft navigation sensors is described. The 32 inputs are buffered, then multiplexed in groups of 8 onto 4 lines. These four are multiplexed onto one line and the signal passes through the output buffer to the recorder. Aircraft attitude, heading and height are recorded. Signals from a camera and a kinetheodolite tracking system are synchronized. Operating conditions were simulated using a helicopter. Noise and drift are due to the recorder. The multiplexer copes well with signals of several kHz bandwidth (raw data) and signals of a few Hz bandwidth (processed data, test signals). It can be used with any multitrack tape recorder having an FM recording format on at least two tracks. It can be converted for use in a digital telemetry system. Author (ESA)

N82-18553# Thermo Electron Corp., Waltham, Mass.

OPEN-CYCLE VAPOR COMPRESSION HEAT PUMP Annual Progress Report, 1980

Ravi Sakhuja and Frederick E. Becker 5 May 1981 54 p
(Contract GRI-5011-342-0094)
(PB82-110503; TE4224-243-81; GRI-80/0064) Avail: NTIS HC A04/MF A01 CSCL 13A

Recovery and upgrading of low-grade steam or waste heat sources offers a great potential of energy conservation. Thermo Electron is developing an open cycle vapor compression steam heat pump to meet this objective. The system utilizes excess low-pressure steam or that produced from an industrial excess heat source with a waste heat boiler and compresses this steam to the desired pressure level for process use. The compressor is driven by a prime mover such as a gas turbine, gas engine, etc. The prime mover exhaust heat also can be recovered to generate additional process steam. The fuel consumption of this system can be as low as 30 to 50 percent in comparison to a direct-fired boiler over the expected range of process conditions. Simple payback periods as low as one year can be achieved. GRA

N82-18612*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

METAL HONEYCOMB TO POROUS WIREFORM SUBSTRATE DIFFUSION BOND EVALUATION

A. Vary, P. E. Moorhead, and D. R. Hull 1982 12 p refs Presented at the Spring Conf. of the Am. Soc. for Nondestructive Testing, Boston, 22-25 Mar. 1982
(NASA-TM-82793; E-959) Avail: NTIS HC A02/MF A01 CSCL 14D

Two nondestructive techniques were used to evaluate diffusion bond quality between a metal foil honeycomb and porous wireform substrate. The two techniques, cryographics and acousto-ultrasonics, are complementary in revealing variations of bond integrity and quality in shroud segments from an experimental aircraft turbine engine. S.L.

N82-18628# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.

A COMPILATION OF STRESS INTENSITY FACTOR SOLUTIONS FOR FLAWED FASTENER HOLES Final Report, Jun. 1978 - Aug. 1981

A. F. Grandt, Jr. and T. E. Kullgren (US Air Force Academy) Nov. 1981 86 p refs
(AF Proj. 2307; AF Proj. 2418)
(AD-A108753; AFWAL-TR-81-4112) Avail: NTIS HC A05/MF A01 CSCL 20/1

Several sets of stress intensity factor solutions are provided for through-the-thickness, corner, and surface flawed holes. Results are given for both remote tensile and crack face pressure loading. It is suggested that the crack face pressure solutions can be used with the linear superposition method to analyze many other practical crack problems. The superposition technique is demonstrated with several sets of example calculations. Author (GRA)

N82-18803*# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.

AIRCRAFT MEASUREMENTS AND ANALYSIS OF SEVERE STORMS: 1976 FIELD EXPERIMENT Final Report

P. C. Sinclair Feb. 1982 101 p refs
(Grant NsG-5105)
(NASA-CR-168519) Avail: NTIS HC A06/MF A01 CSCL 04B

Severe storm aircraft measurements are documented, as well as the instrumentation and operational features of aircraft mobility capabilities. The measurements and data analyses indicate that the concept of a highly mobile research aircraft capability for obtaining detailed measurements of wind, temperature, moisture, spherics, etc., near and within severe storm systems, forecast 48 hours in advance in a 1000 nm operating radius, is feasible, and was successfully demonstrated. The measurements and analyses reveal several severe storm features and insights with respect to storm air flow circulations and inflow-outflow orientation. Precipitation downdraft air is recirculated back into the updraft core below the scud cloud in both back and front feeder type storms. In a back feeder type storm, the downdraft outflow air ahead of the storm is also recirculated back into the updraft region near cloud base. S.L.

N82-18836# National Oceanic and Atmospheric Administration, Boulder, Colo.
DEVELOPMENT OF A CLEAR AIR RADAR TO DETECT METEOROLOGICAL HAZARDS AT AIRPORTS Final Report, 1 Oct. 1978 - 21 Sep. 1981
R. B. Chadwick, K. P. Moran, W. C. Campbell, K. B. Earnshaw, and T. R. Detman 21 Sep. 1981 113 p refs
(Contract ESD-0-0630; AF Proj. 6670)
(AD-A108236; AFGL-TR-81-0268) Avail: NTIS HC A06/MF A01 CSCL 17/9

To be useful in detecting meteorological hazards such as low-level wind shear near airports, a radar must be able to: (1) detect backscatter from both clear air and rain; (2) operate at short ranges and low elevation angles; and (3) measure Doppler frequencies caused by air motion. The development of a radar with these characteristics is described and the results of testing this radar at airports are presented. Special emphasis is placed on the problems of low elevation angle operation and clutter suppression. The importance of proper siting is pointed out. In addition, it is demonstrated that the radar can readily detect the turbulent wakes of large jet aircraft. Author (GRA)

N82-18920# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
A-7E SOFTWARE MODULE GUIDE Interim Report
K. H. Britton and D. L. Parnas 8 Dec. 1981 36 p refs
(AD-A108649; NRL-MR-4702) Avail: NTIS HC A03/MF A01 CSCL 09/2

This document describes the basic organization of NRL's version of the A-7E onboard flight software. The report describes a structure in which modules have been designed in accordance with the Information Hiding Principle. Because of the larger number of modules that result when this principle is applied, the modules are arranged in a hierarchy. The hierarchy should simplify the task of a maintenance programmer assigned to make a specific modification. The document also describes the principles used in the design of the software. It is intended to be useful both as a guide to the A-7E software and as a model for those developing other software systems. Author (GRA)

N82-18922# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
A PROGRAM TESTING ASSISTANT
David Chapman Nov. 1981 25 p refs
(Contract N00014-80-C-0505)
(AD-A108147; AI-M-651) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper describes the design and implementation of a program testing assistant which aids a programmer in the definition, execution and modification of test cases and executes them automatically when appropriate. It modifies test cases to preserve their usefulness when the program they test undergoes certain types of design changes. The testing assistant acts as a fully integrated part of the programming environment and cooperates with existing programming tools, including a display editor, compiler, interpreter, and debugger. Author (GRA)

N82-18995*# Modern Analysis, Inc., Ridgewood, N. J.
STUDY OF CABIN NOISE CONTROL FOR TWIN ENGINE GENERAL AVIATION AIRCRAFT
R. Vaicaitis and M. Slazak Hampton, Va. NASA. Langley Research Center Feb. 1982 147 p refs
(Contract NAS1-16117)
(NASA-CR-165833; MAI-1) Avail: NTIS HC A07/MF A01 CSCL 20A

An analytical model based on modal analysis was developed to predict the noise transmission into a twin-engine light aircraft. The model was applied to optimize the interior noise to an A-weighted level of 85 dBA. To achieve the required noise attenuation, add-on treatments in the form of honeycomb panels, damping tapes, acoustic blankets, septum barriers and limp trim panels were added to the existing structure. The added weight of the noise control treatment is about 1.1 percent of the total gross take-off weight of the aircraft. B.W.

N82-18996*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ANNOYANCE CAUSED BY PROPELLER AIRPLANE FLYOVER NOISE: PRELIMINARY RESULTS
David A. McCurdy and Clemans A. Powell Dec. 1981 35 p refs
(NASA-TM-83244) Avail: NTIS HC A03/MF A01 CSCL 20A

The annoyance response of people to the noise of propeller airplane flyovers was examined. The specific items of interest were: (1) the annoyance prediction ability of current noise metrics; (2) the effect of tone corrections on prediction ability; (3) the effect of duration corrections on prediction ability; and (4) the effect of 'critical band' corrections on the prediction ability of perceived noise level. Preliminary analyses of the data obtained from two experiments are presented. The first experiment examined 11 propeller airplanes with maximum takeoff weights greater than or equal to 5700 kg. The second experiment examined 14 propeller airplanes weighting 5700 kg or less. Also included in each experiment were five different commercial service jet airplanes. Each airplane noise was presented at D-weighted sound pressure levels of 70, 80, and 90 dB to subjects in a testing room which simulates the outdoor acoustic environment. Subjects judged 108 stimuli in the first experiment and 132 stimuli in the second experiment. Perceived noise level predicted annoyance better than A, D, or E-weighted sound pressure level. Corrections for tones greater than of equal to 500 Hz generally improved prediction ability for the heavier propeller airplanes. B.W.

N82-19084*# National Aeronautics and Space Administration, Washington, D. C.
NASA POCKET STATISTICS
Jan. 1982 70 p
(NASA-TM-84134) Avail: NTIS HC A04/MF A01 CSCL 05A

NASA program goals and objectives, major mission performance, USSR space flights, comparisons of the USA and USSR space records, and selected technical, financial, and manpower data are summarized. N.W.

N82-19132*# National Aeronautics and Space Administration, Washington, D. C.
BIBLIOGRAPHY OF NASA PUBLISHED REPORTS ON GENERAL AVIATION, 1975 TO 1981
Jun. 1981 277 p
(NASA-TM-83307) Avail: NTIS HC A13/MF A01 CSCL 01B

This bibliography lists 478 documents which relate to all heavier-than-air fixed wing aircraft exclusive of military types and those used for commercial air transport. An exception is the inclusion of commuter transport aircraft types within the general aviation category. NASA publications included in this bibliography are: conference publications (CP), reference publications (RP), technical memorandums (TM, TMX), technical notes (TN), technical papers (TP), and contractor reports (CR). In addition, papers and articles on NASA general aviation programs published by technical societies (AIAA, SAE, etc.) are included, as well as those listed in NASA's Scientific and Technical Aerospace Reports (STAR) Journal. Author and subject indexes are also provided to facilitate use of the bibliography. T.M.

N82-19134*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS
Nelson J. Groom, ed. and Ray V. Hood, ed. Feb. 1982 289 p
Proceedings of workshop held in Hampton, Va., 9-10 Jun. 1981
(NASA-CP-2209; L-14965) Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating presentations on the development of electric flight systems for the all-electric aircraft and for spacecraft are presented.

N82-19135*# Lockheed-California Co., Burbank.
ELECTRIC FLIGHT SYSTEMS, OVERVIEW
Michael J. Cronin *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 61-94

Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electric flight systems are presented. Fuel consumption, the power plant assembly, flight control technology, electromechanical actuator systems and components of possible power systems are surveyed. J.D.H.

N82-19136*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
A PROPULSION VIEW OF THE ALL-ELECTRIC AIRPLANE

Robert P. Wagner *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 95-102

Avail: NTIS HC A12/MF A01 CSCL 21E
Materials illustrating a presentation on electric propulsion systems are presented. The electric engine and engine/generator configurations are described and NASA's role outlined. J.D.H.

N82-19137*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
POTENTIAL PROPULSION CONSIDERATIONS AND STUDY AREAS FOR ALL-ELECTRIC AIRCRAFT
Thomas G. Lenox *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 103-112

Avail: NTIS HC A12/MF A01 CSCL 21E
Materials illustrating a presentation on all-electric aircraft propulsion systems are presented. Propulsion system impacts on aircraft design and areas requiring further study are outlined. J.D.H.

N82-19138*# Westinghouse Electric Corp., Lima, Ohio. Air All-Electronics Div.
A LOOK INTO THE FUTURE: THE POTENTIAL OF THE ALL-ELECTRIC SECONDARY POWER SYSTEM FOR THE ENERGY EFFICIENT TRANSPORT
Alan E. King *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 113-124

Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation on the all-electric aircraft power system are presented. The advantages of the system and the planning time table are outlined. J.D.H.

N82-19139*# Sundstrand Aviation-Rockford, Ill.
THE 400-HERTZ CONSTANT-SPEED ELECTRICAL GENERATION SYSTEMS
Richard McClung *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 125-146

Avail: NTIS HC A12/MF A01 CSCL 09C
Materials illustrating a presentation on 400 Hz constant speed generation systems are presented. The system features are outlined, components and functioning described, and display graphics illustrated. J.D.H.

N82-19140*# AiResearch Mfg. Co., Torrance, Calif.
ELECTRIC ECS
Dale O. Moeller *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 147-154

Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation on electric environmental control systems for electric flight systems are presented. Requirements are outlined and schematics presented. J.D.H.

N82-19141*# Hamilton Standard, Windsor Locks, Conn.
ENVIRONMENTAL CONTROL SYSTEMS
Fred M. Rosenbush *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 155-162

Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation on environment control systems for electric flight systems are presented. Schematics and flow diagrams of fresh air source and air conditioning systems, and vapor cycle and air cycle parts lists are presented. J.D.H.

N82-19142*# Honeywell, Inc., Clearwater, Fla.
OVERVIEW OF HONEYWELL ELECTROMECHANICAL ACTUATION PROGRAMS
Charles Wyllie *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 163-187
Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation on electromechanical actuation programs (EMA) are presented. The development history is outlined. Space shuttle flight control systems and the advantages of EMAS, and EMA technology status and development requirements are outlined. J.D.H.

N82-19143*# Rockwell International Corp., Cedar Rapids, Iowa.
DIGITAL FLIGHT CONTROLS
John C. Hall *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 189-212

Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation on digital flight controls for electric flight systems are presented. System architecture and design criteria are outlined, and components described. J.D.H.

N82-19144*# Boeing Commercial Airplane Co., Seattle, Wash.
ELECTRIC FLIGHT SYSTEMS
C. William Clay *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 213-234

Avail: NTIS HC A12/MF A01 CSCL 09C
Materials used to illustrate a presentation on the development of electric flight systems are presented. Systems concepts are outlined. J.D.H.

N82-19145*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENGINE TECHNOLOGY
Anthony C. Hoffman *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 235-240

Avail: NTIS HC A12/MF A01 CSCL 21E
Materials used in a presentation on development of engine technology for electric flight systems are presented. Component and system technology issues, NASA's role, and flight test requirements are outlined. J.D.H.

N82-19146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER SYSTEMS
Robert Finke *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 241-246

Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation of the development of power systems are presented. The technology issues and tradeoffs, the role of NASA, and testing requirements are outlined. J.D.H.

N82-19148*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ELECTROMECHANICAL ACTUATORS
James Bigham *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 253-258

Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation on the development of electromechanical actuators (EMA) for electric flight systems are presented. Technology issues are identified, and major steps relative to EMA development, NASA's role, and a technology procurement plan are outlined. J.D.H.

N82-19149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DIGITAL FLIGHT CONTROLS
Billy Dove *In its* Elec. Flight Systems Feb. 1982 p 259-261

Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating the presentation on digital flight controls are presented. Technology issues, the role of NASA, and steps in the development of flight controls are outlined. J.D.H.

N82-19150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS INTEGRATION
Ray V. Hood *In its* Elec. Flight Systems Feb. 1982 p 263-266
Avail: NTIS HC A12/MF A01 CSCL 01C
Materials illustrating a presentation on the integration of

components and subsystems of electric flight systems are presented. The technology issues are outlined, and near and far term implications of issues affecting the systems integration are outlined. J.D.H.

N82-19154# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
MULTIVARIABLE AIRCRAFT CONTROL BY MANEUVER COMMANDS: AN APPLICATION TO AIR TO SURFACE GUNNERY
Binh DangVu *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 9-19 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 149-159

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Aircraft control where pilot commands are variables directly related to aircraft motion in opposition to deflection angles of control surfaces is described. Linear optimal control theory is applied so as to improve flight qualities and reduce the work load of the pilot. A control system for sideslip, rate of roll, and rate of pitch was tested in numerical simulation and its efficiency for aiming in air-to-surface gunnery was assessed. Results show that control of the rate of pitch is well adapted for cancelling longitudinal aiming devitions, but that control of yaw rate is preferable to roll for cancelling lateral deviations. Another system obtained by integrating the flight control and fire control systems is also suggested. Author (ESA)

N82-19156# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
ELECTRICAL GROUND TESTING OF AIRCRAFT ANTISTATIC PROTECTION
A. Bruere *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 47-56 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 187-196

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Methods of ensuring aircraft protection against electrostatic spurious phenomena are reviewed and a device for ground testing of this protection is described. The equipment provides for checking the surface resistance of antistatic treatments as well as the quality of the electrical connections between the various components of the external structure and the aircraft potential reference point. Problems in electrostatic quality control for aircraft when testing in the presence of a finishing coat of paint are emphasized. The prototype device is depicted while operating and performance principles are explained. Author (ESA)

N82-19158# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
INDUCTION DRIVEN TRANSONIC WIND TUNNEL T2: OPERATION AT ROOM TEMPERATURE AND CRYOGENIC ADAPTATION
A. Mignosi, D. Faulmann, and A. Seraudie *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 63-74 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 203-215

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

The transformation of the induction driven wind tunnel T2 (0.4 m X 0.4 m) into a cryogenic intermittent wind tunnel which uses high pressure air as driving gas and nitrogen as coolant is described. The operating mode and optimization of the wind tunnel for low temperature operation are discussed. Theoretical and experimental aspects of the transformed facilities, i.e., modification of the circuit, thermal insulation techniques, liquid nitrogen injection, startup process, cryogenic operating mode, and expected performance, are presented. Author (ESA)

N82-19160# Network Analysis Corp., Vienna, Va.
NATIONAL AIRSPACE DATA INTERCHANGE NETWORK (NADIN) SUPPORT OF REMOTE MAINTENANCE MONITORING SYSTEM (RMMS) Final Report
Dec. 1981 111 p refs
(Contract DOT-FA79WA-4335)
(AD-A109125; NAC/FR-303J/01; FAA-RD-81-109) Avail: NTIS HC A06/MF A01 CSCL 05/2

National Airspace Data Interchange Network (NADIN) architectural enhancements necessary to support the Remote Maintenance Monitoring System (RMMS) and MMS programs are described. Several alternative approaches are formulated. These alternatives are compared and recommendations are made. It is found that: The NADIN backbone has sufficient capacity to handle initial RMMS traffic at adequate performance levels; An X.25 compatible interface for the NADIN and MPS connection is recommended; Additional frame routing capabilities at the NADIN concentrator and front end processors are required; and Future MPS communications will be best served by a fully distributed packet switched NADIN capable of supporting complete X.25 functions. Author (GRA)

N82-19161# Aeronautical Research Labs., Melbourne (Australia).
AERONAUTICAL RESEARCH LABORATORIES STRUCTURES DIVISION Annual Report, 1979 - 1980
F. H. Hooke, ed. Apr. 1981 46 p
(AD-A109049; ARL/STRUC-NOTE-473) Avail: NTIS HC A03/MF A01 CSCL 01/3

This report describes the functions, organization, staffing, unclassified research activities and ad-hoc investigations in progress in the Structures Division, Aeronautical Research Laboratories during the year 1979/80. Author (GRA)

N82-19167*# Boeing Military Airplane Development, Seattle, Wash.
TRANSONIC PERTURBATION ANALYSIS OF WING-FUSELAGE-NACELLE-PYLON CONFIGURATIONS WITH POWERED JET EXHAUSTS
J. C. Wai, C. C. Sun, and H. Yoshihara Feb. 1982 67 p refs
(Contract NAS1-15687)
(NASA-CR-165852) Avail: NTIS HC A04/MF A01 CSCL 01A

A method using a transonic small disturbance code with successive line over-relaxation is described for treating wing/fuselage configurations with a nacelle/pylon/powered jet. Examples illustrating its use for the NASA transport research model are given. Reasonable test/theory comparisons were obtained. Author

N82-19170*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 1: EXECUTIVE SUMMARY
5 Dec. 1980 115 p refs Workshop held at Palo Alto, Calif., 3-5 Dec. 1980
(NASA-TM-84149) Avail: NTIS HC A06/MF A01 CSCL 01A

This presentation provides an overview of the NASA Rotorcraft Program as an introduction to the technical sessions of the Advanced Rotorcraft Technology Workshop. It deals with the basis for NASA's increasing emphasis on rotorcraft technology, NASA's research capabilities, recent program planning efforts, highlights of its 10-year plan and future directions and opportunities. L.F.M.

N82-19171*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 2: OPERATORS' VIEWS
5 Dec. 1980 111 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84146) Avail: NTIS HC A06/MF A01 CSCL 01A

A special panel of helicopter users give presentations in 12 basic areas of helicopter applications. Development of the helicopter and the needs for future growth are discussed. L.F.M.

N82-19172*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 3: AERODYNAMICS AND STRUCTURES SESSION
4 Dec. 1980 285 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980

(NASA-TM-84147) Avail: NTIS HC A13/MF A01 CSCL 01A

Advanced rotorcraft technology and tilt rotor aircraft were discussed. Rotorcraft performance, acoustics, and vibrations were discussed, as was the use of composite materials in rotorcraft structures. Rotorcraft aerodynamics, specifically the aerodynamic phenomena of a rotating and the aerodynamics of fuselages, was discussed. R.J.F.

N82-19173*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 4: FLIGHT CONTROL AVIONICS SYSTEMS AND HUMAN FACTORS
5 Dec. 1980 149 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84146) Avail: NTIS HC A07/MF A01 CSCL 01A

Helicopter user needs, technology requirements and status, and proposed research and development action are summarized. It is divided into three sections: flight dynamics and control; all weather operations; and human factors. L.F.M.

N82-19181*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF INSTALLATION OF F101 DFE EXHAUST NOZZLES ON THE AFTERBODY-NOZZLE CHARACTERISTICS OF THE F-14 AIRPLANE
David E. Reubush and John R. Carlson Mar. 1982 133 p refs
(NASA-TM-83250; L-14895) Avail: NTIS HC A07/MF A01 CSCL 01A

A wind-tunnel investigation was conducted to determine the effects of F101 DFE (derivative fighter engine) nozzle axial positioning on the afterbody-nozzle longitudinal aerodynamic characteristics of the F-14 airplane. The model was tested in the Langley 16-Foot Transonic Tunnel at Mach numbers from 0.7 to 1.25 and angles of attack from about -2 to 6 degrees. Compressed air was used to simulate nozzle exhaust flow at jet total-pressure ratios from 1 (jet off) to about 8. The results of the investigation show that for subsonic Mach numbers the intermediate cruise nozzle position of the three positions tested resulted in the lowest drag. Author

N82-19194# Bristol Univ. (England). Dept. of Aeronautical Engineering.
THE EFFECT OF A WELL ON THE AERODYNAMICS OF A SPOILER B.S. Thesis
N. A. Cemm and J. J. Ovens Jun. 1981 82 p refs Original contains color illustrations
(BU-268) Avail: NTIS HC A05/MF A01

As an aid to spoiler design, the aerodynamics of a spoiler and its well were investigated. Particular attention was paid to gap and deployment angle. Three different shapes of spoiler and three types of well were tested. All tests were two dimensional, the spoiler being attached to a flat plate at zero incidence. A well was cut into the plate such that the spoiler was flush when not deployed. The Reynolds number was 62,000, based on fence chord. Flow visualization techniques and static pressure measurements were used both along the flat plate and around the spoiler to determine and understand the pressure distribution. Integration of the pressure results shows the normal force distribution. The application of the results to spoiler design is discussed through examples. Author (ESA)

N82-19195 Department of Trade and Industry, London (England).
REPORT OF THE AIR TRAFFIC FORECASTING WORKING PARTY, 1981
Sep. 1981 30 p ref .
Copyright. Avail: Issuing Activity

The U.K. forecasting model (improved by including relative tourist prices as a variable in leisure traffic equations and by refining business traffic specifications) is used to predict air traffic demand in the 1990's. London airports are treated separately. The effects of oil price rises, a channel tunnel, and hotel constraints in London are discussed. An increase of between 28 and 70 million passagers is predicted, i.e., a 2.5% to 5% annual growth rate. Growth rates for domestic traffic are lower than those projected for international traffic so that domestic traffic, which was 28% of the total in 1978, falls by 1995 to 23% on the low scenario and 20% on the high scenario. Author (ESA)

N82-19196*# Little (Arthur D.), Inc., Cambridge, Mass.
AN ASSESSMENT OF THE CRASH FIRE HAZARD OF LIQUID HYDROGEN FUELED AIRCRAFT Final Report
Feb. 1982 132 p refs
(Contract NAS3-22482)
(NASA-CR-165526; ADL-85161) Avail: NTIS HC A07/MF A01 CSCL 01C

The crash fire hazards of liquid hydrogen fueled aircraft relative to those of mission equivalent aircraft fueled either with conventional fuel or with liquefied methane were evaluated. The aircraft evaluated were based on Lockheed Corporation design for 400 passenger, Mach 0.85, 5500 n. mile aircraft. Four crash scenarios were considered ranging from a minor incident causing some loss of fuel system integrity to a catastrophic crash. Major tasks included a review of hazardous properties of the alternate fuels and of historic crash fire data; a comparative hazard evluation for each of the three fuels under four crash scenarios a comprehensive review and analysis and an identification of areas further development work. The conclusion was that the crash fire hazards are not significantly different when compared in general for the three fuels, although some fuels showed minor advantages in one respect or another. R.J.F.

N82-19197# Federal Aviation Administration, Atlantic City, N.J.
ANALYSIS OF A NONLINEAR ALTITUDE TRACKING METHOD Final Report, Sep. - Dec. 1980
Barry R. Billmann Nov. 1981 57 p refs
(FAA Proj. 052-242-320)
(AD-A108878; FAA-CT-81-15; FAA-RD-81-60) Avail: NTIS HC A04/MF A01 CSCL 01/2

This report analyzes the performance of the nonlinear altitude tracker developed for the Active Beacon Collision Avoidance System (BCAS) by Lincoln Laboratory. The tracker is intended for use in the collision avoidance logic of the BCAS system. The nonlinear tracker performance was characterized through comparisons with the previous altitude tracker. The original tracker, used by the collision avoidance logic, was a simplistic alpha-beta tracker. The nonlinear tracker performance evaluation was conducted in three phases: (1) The stand-alone error characteristics of the tracker were obtained. Simulated mode C report sequences were provided directly to the tracker. (2) The nonlinear tracker was integrated directly into the collision avoidance logic. With the use of the Fast-Time Encounter Generator (FTEG), a comparative study of performance with the nonlinear tracker versus the alpha-beta tracker was made. (3) Selected live flight test encounters were used to analyze the relative performance of the alpha-beta tracker versus the nonlinear tracker. The stand-alone analysis revealed that the nonlinear tracker consistently had smaller maximal errors in vertical rate estimation and a smaller transient rate response delay than did the alpha-beta tracker. Both the live flight test encounter simulations and the FTEG scenario simulation indicated that nonlinear tracking often caused an increase in separation for encounters with vertically accelerating threats and reduced occurrences of incorrect command sense choice. Author (GRA)

N82-19198# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
FAA STATISTICAL HANDBOOK OF AVIATION Annual Report, period ending 31 Dec. 1980
31 Dec. 1980 183 p
(AD-A109289) Avail: NTIS HC A09/MF A01 CSCL 01/2

This report presents statistical information pertaining to the Federal Aviation Administration, The National Airspace System, Airports, Airport Activity, U.S. Civil Air Carrier Fleet, U.S. Civil Air Carrier Operating Data, Airmen, General Aviation Aircraft, Aircraft Accidents, and a Glossary of the terms used in this publication. Author (GRA)

N82-19199# Aeronautical Research Labs., Melbourne (Australia).
DISENGAGEMENT OF SAFETY HARNESS BUCKLES - CT4 Report, Aug. - Dec. 1979
S. R. Sarraihe and G. A. Thomas Mar. 1981 25 p
(AD-A109048; ARL/STRUC-NOTE-469) Avail: NTIS HC A02/MF A01 CSCL 13/12

During the crash of a CT4 Airtrainer in August, 1979 both safety harness buckles disengaged. The crash was very severe but the harnesses did not show signs of overloading. After a series of tests it was concluded that the buckles disengaged because of misalignment of the loads onto the buckle. This misalignment may not be represented in the standard test procedures and they may give a false sense of security. New tests are proposed, but further work would be desirable to establish design and test criteria. Author (GRA)

N82-19200 Virginia Univ., Charlottesville.
OPTIMAL AIRCRAFT LANDING PATTERNS FOR MINIMAL NOISE IMPACT Ph.D. Thesis
Robert Chi-Tuan Chang 1981 183 p
Avail: Univ. Microfilms Order No. 8129300

A total system to perform the task of optimizing aircraft landing trajectories with respect to aircraft noise annoyance in the area near airports was developed. The noise annoyance considered was solely due to aircraft. Multiple aircraft on multiple landing paths were studied by the total system developed. While many of the subsystems such as the aircraft noise signature model, annoyance model, optimization methods, etc. already existed, the task was to combine all these together into a single working system. The various subsystems included an annoyance model (aircraft noise signature model, population model, impact intensity weighting function), formulation of aircraft landing paths and constraints, performance measure, and optimization. A single numerical number, noise impact index, which represents the average severity of noise impact over the entire population of a community was adopted as the annoyance index. Dissert. Abstr.

N82-19201# Committee on Science and Technology (U. S. House).
AIRCRAFT COLLISION AVOIDANCE SYSTEMS
Washington GPO 1981 443 p refs Hearings before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 97th Congr. 1st Sess., No. 5, 31 Mar. and 3 Apr. 1981
(GPO-79-431) Avail: Subcommittee on Transportation, Aviation and Materials

Midair collision avoidance systems, especially the beacon collision avoidance system is discussed. Magazine articles, letters, and statements of government and industry personnel are included. R.J.F.

N82-19202# Committee on Science and Technology (U. S. House).
AIR TRAFFIC CONTROL EN ROUTE COMPUTER SYSTEM
Washington GPO 1981 10 p Rept. to accompany H.R. 202 presented by the Comm. on Sci. and Technol., 97th Congr., 1st Sess., 14 Oct. 1981
(GPO-89-008; H-Rept-97-271) Avail: US Capitol, House Document Room

Amendments to the House Resolution requiring the Administrator of the FAA to submit full research and development program planning documentation to the Committee with respect to the modernization and replacement of the en route computer system are presented. Background material included covers the current ATC system as well as the justification, benefits, costs, and acquisition strategy for replacing the computer. It is recommended the FAA establish a mechanism whereby the judgements and experience of operating personnel and users of the air system be included in the en route computer development process. A.R.H.

N82-19203# Mitre Corp., McLean, Va.
ACTIVE BEACON COLLISION AVOIDANCE SYSTEM (BCAS) LOGIC PERFORMANCE DURING OPERATIONAL FLIGHT TESTS Report, 13 Jul. - 9 Sep. 1980
R. A. Tornese and A. L. McFarland Washington FAA Jan. 1981 123 p refs
(Contract DTFA01-81-C-10001)
(AD-A108893; MTR-80/W352; FAA-RD-80-138) Avail: NTIS HC A06/MF A01 CSCL 17/7

Between 13 July and 9 September 1980, operational flight tests of an Active BCAS Experimental Unit (BEU) were conducted. The flight tests included 129 approaches to 28 different airports during 60 hours of flight: 14 unplanned encounters which gave rise to BCAS alerts were recorded. In each of the encounters, the aircraft carrying the BEU came into a conflict with another aircraft entirely by chance. The other aircraft was not associated with the BCAS test program in any way. The primary purpose of the flight tests was to determine how many unplanned alerts would occur during normal flight operations and to assess whether each was a desirable or unwanted alert. In addition, alert correctness, timeliness, and utility were considered along with the potential impact of BCAS on the ATC system. The data was also used to determine approximately the region(s) where desensitization of BCAS threat logic should be applied to limit unwanted alerts. GRA

N82-19205*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VEHICLE TEST REPORT: BATTRONIC PICKUP TRUCK
Theodore W. Price, Thomas W. Shain, Raymond J. Freeman, and Michael F. Pompa 1 Jan. 1982 47 p refs
(Contracts NAS7-100; DE-AI01-78CS-54209)
(NASA-CR-168637; JPL-Pub-82-8; DOE/CS-54209/6) Avail: NTIS HC A03/MF A01 CSCL 13F

An electric pickup truck was tested to characterize certain parameters and to provide baseline data that can be used for the comparison of improved batteries that may be incorporated into the vehicle at a later time. The vehicle tests were concentrated on the electrical drive subsystem; i.e., the batteries, controller, and motor. The tests included coastdowns to characterize the road load and range evaluations for both cyclic and constant speed conditions. A qualitative evaluation of the vehicle's performance was made by comparing its constant speed range performance with other vehicles. S.L.

N82-19206# Canyon Research Group, Inc., Westlake Village, Calif.
DESCENT-RATE CUING FOR CARRIER LANDINGS: EFFECTS OF DISPLAY GAIN, DISPLAY NOISE AND AIRCRAFT TYPE Interim Report, 1 May 1980 - 30 Nov. 1981
Gavan Lintern, Daniel J. Sheppard, and Charles E. Kaul Oct. 1981 42 p refs
(Contract N61339-78-C-0060)
(AD-A108801; TR-81-015; NAVTRAEQUIPCEN-78-C-0060-8) Avail: NTIS HC A03/MF A01 CSCL 01/2

Two studies are reported concerning the utility of modifying a conventional Fresnel Lens Optical Landing System (FLOLS) to include variable-length vertical light arrays, or arrows, in order to provide descent-rate information to pilots making carrier landings. In the first study, the Descent-Rate Cuing (DRC) algorithm incorporated an angular gain to provide glideslope displacement information. The DRC system did not significantly improve glideslope tracking performance. Lineup performance was not adversely affected. The effects of aircraft type and noise on the DRC were also examined. In the second study, the DRC algorithm incorporated a modified linear gain to provide glideslope displacement information. The DRC system consistently reduced glideslope error throughout the approach. Comparison of the data and previous research suggests that a DRC system incorporating a linear gain can produce a strong and consistent improvement in glideslope control in carrier landings. Author (GRA)

N82-19207# Federal Aviation Administration, Atlantic City, N.J.
TRANSPORT AIRCRAFT COCKPIT STANDARDIZATION (FEDERAL AVIATION REGULATIONS PART 25) Final Report
Richard Sulzer Nov. 1981 42 p
(FAA Proj. 161-200-130)
(AD-A108924; FAA-CT-80-54; FAA-EM-81-11) Avail: NTIS HC A03/MF A01 CSCL 01/3

The present status of transport aircraft cockpit standardization was evaluated by examination of regulations and other design practice documents and by interviews with airline pilots and engineers. Flight critical areas most in need of increased standardization were identified as (1) primary flight guidance instrumentation and (2) pilot input keyboards. Additional areas proposed for further industry consultation, possibly leading to further standardization at a future date, include flap, slat, and leading-edge device control and display systems; indicated airspeed (IAS)-Mach indicators; powerplant instrumentation; and electric and hydraulic power diagrams, displays, and controls. The continued use of a mixed metric and English unit measurement plan in both United States and foreign manufactured aircraft is noted, and the incidence of pilot dual qualifications and the need for criteria for digital system software certification are also discussed. GRA

N82-19208# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate of Development and Qualification.
HELICOPTER ICING SPRAY SYSTEM (HISS) NOZZLE IMPROVEMENT EVALUATION Final Report
Daumants Belte Sep. 1981 53 p refs
(AD-A109405; USAAEFA-79-02-2) Avail: NTIS HC A04/MF A01 CSCL 01/2

The U.S. Army Aviation Engineering Flight Activity (USAAEFA) operates a modified CH-47C helicopter as an airborne spray tanker to create a simulated icing test environment. This system was modified to improve its spray cloud characteristics with respect to uniformity of liquid water content (LWC) and reduction of drop size median volumetric diameter (MVD). The existing atomizers on the spray boom assembly were replaced by Sonic Development Corporation model 125-H 'Sonicore' nozzles. A UH-1H helicopter equipped with particle measuring spectrometers conducted in-flight sampling and calibration of a modified HISS spray cloud in conjunction with other helicopter icing tests. Average cross sectional dimensions of the present spray cloud was estimated as 36 ft wide and 8 ft deep. Usable values of cloud LWC in excess of 1 gram per cubic meter with a drop size MVD range of 20 to 35 microns can be generated at a 90 knot airspeed. GRA

N82-19209# Kaman Aerospace Corp., Bloomfield, Conn.
DEVELOPMENT OF MANUFACTURING TECHNOLOGY FOR FABRICATION OF A COMPOSITE HELICOPTER MAIN ROTOR SPAR BY TUBULAR BRAIDING Final Report, Sep. 1978 - Sep. 1980
Mark L. White St. Louis, Mo. Army Aviation Research and Development Command Apr. 1981 81 p refs
(Contract DAAG46-78-C-0070)
(AD-A109377; R-1618; AVRADCOM-TR-81-F-9) Avail: NTIS HC A05/MF A01 CSCL 11/4

Mechanical tubular braiding has been shown to be a viable blade spar manufacturing process in a program which included preliminary design of an improved main rotor blade for the OH-58 helicopter. The blade incorporates an advanced aerodynamic shape and has as its primary structural member a Kevlar 49/epoxy spar fabricated by braiding. Achievement of an analytically acceptable blade and spar design meeting critical structural and dynamic requirements was not hindered by braiding process constraints. Mechanical property tests of flat panels and spar sections exhibited excellent correlation with analytical predictions, substantiating the applicability of normal composite laminate analysis methods and the validity of the specific design. Ballistic testing of spar sections demonstrated superior containment of structural damage compared to composite spars produced by more conventional methods. Manufacturing cost estimates predict a price reduction of 1/3 for the braided spar relative to a similar S-glass/epoxy spar for an OH-58 blade of identical external shape fabricated by orthodox, low-cost technology. Author (GRA)

N82-19210# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
EXPERIENCE DURING THE DEVELOPMENT OF THE GERMAN-JAPANESE HELICOPTER BK 117 [ERFAHRUNGEN WAEHREND DER ENTWICKLUNG DES DEUTSCH-JAPANISCHEN HUBSCHRAUBERS BK 117]
Klaus Szczeponik and Hans Fabian 1981 17 p In GERMAN Presented at DGLR Jahrestagung, Brunwick, 1980
(MBB-UD-318-81-O) Avail: NTIS HC A02/MF A01

The German-Japanese colaboration in building the BK 117 helicopter is described. The exchange of know-how, information dissemination, telecommunication, and technical expertese, are enumerated. It is shown that since international cooperation is possible, the German industries should be able to exchange and cooperate in the development of new products. Transl. by E.A.K.

N82-19211# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
PERSPECTIVES FOR CONTROLLED WEAPONS TECHNOLOGY: REPORT OF THE 90TH HELICOPTER FORUM [PERSPEKTIVEN DER LENKWAFFENTECHNIK FUER DIE 90ER JAHRE VORTRAGE VOR DEM HUBSCHRAUBER FORUM BUECKEBURG]
D. Weis 2 May 1980 13 p In GERMAN Forum held in Bueckeburg, West Germany, 5-7 May, 1980
(MBB-UA-532-80-O) Avail: NTIS HC A02/MF A01

A general forecasting for the essential guided missile system technology in the 1990s is presented. The development of armored guided missiles since its conception in 1955, and an outline of goals and trends of armored defense for the near and far future are presented. Possibilities of acceleration in mission accomplishments of future armored defensive weapon systems are examined. Transl. by E.A.K.

N82-19212# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
A METHOD FOR APPLYING LINEAR OPTIMAL CONTROL THEORY TO THE DESIGN OF A REGULATOR FOR A FLEXIBLE AIRCRAFT
L. J. J. Erkelens and J. L. Simons 31 Mar. 1980 83 p refs Previously announced as NLR-TR-75118-C Sponsored by Directorate of Material Air RNLAF
(NLR-TR-80032-U; NLR-TR-75118-C) Avail: NTIS HC A05/MF A01

A hypothetical control system that provides improved rigid body and structural mode damping of a flexible aircraft in order to improve the riding quality and minimize the wing bending moment during flight in turbulence, is considered. The equations of motion are related to a high performance fighter aircraft with external stores. The feedback gains are determined, using linear optimal control theory. A quadratic optimization criterion, taking into account the normal acceleration at the pilot seat and the wing root bending moment, is used. A number of optimal and suboptimal regulators are calculated. The system performance is expressed in terms of pole location, frequency response, and power spectra for both pilot seat acceleration and wing root bending moment. Aircraft response to a deterministic gust disturbance is presented. Author (ESA)

N82-19213# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
ON THE DESIGN OF SOME AIRFOILS FOR SAILPLANE APPLICATION
L. M. M. Boermans and H. J. W. Selen Apr. 1981 47 p refs Presented at 17th OSTIV Congr., Paderborn, West Germany, 1981
(VTH-LR-326) Avail: NTIS HC A03/MF A01

Airfoils were designed such that, by adding material to the surface, an existing wing could be modified and tested in flight. Wind tunnel experiments on inner and outer wing segments are described, giving information on the quality of actual airfoils achieved in serial production and of the LSL airfoil analysis and design computer program. The characteristics of several modern airfoils used in standard class sailplanes are analyzed and typical differences in the case of smooth surface and of rough leading edge are clarified. Wind tunnel measurements with real insect remains on a wing segment are compared with a well known simulated bug pattern and shown to have greatly different drag characteristics. The application of pneumatic turbulators to reduce the drag of an airfoil is discussed. The computer program was used to modify the wing of an ASW-19B sailplane. Flight tests are satisfactory. Author (ESA)

N82-19214# Bristol Univ. (England). Dept. of Aeronautical Engineering.
A FURTHER STUDY OF HELICOPTER ROTOR PITCH-FLAP-PHASE COUPLING B.S. Thesis
A. East and N. S. Sehmi Jun. 1981 81 p refs
(BU-259) Avail: NTIS HC A05/MF A01

Pitch-flap phase coupling between the blades of a helicopter rotor was studied in order to improve overall aircraft stability. A mathematical model was constructed for the Westland Lynx helicopter, which incorporates a semiarticulated rotor head. Full expressions are derived in a lengthy, but accurate fashion for the blade flapping motion as well as for rotor hub forces and moments. The rotor state defined is believed to be more accurate than that of any previous, known treatment. Pitch-flap phase coupling of the form: blade pitch angle at rotor center line = blade pitch control angle + pitch-flap coupling gain (blade flap angle + pitch-flap-phase coupling lead/lag), is introduced. The effect on the rotor derivatives is given with change in phase lead/lag angle and control gain. A full six degrees of freedom model is extensively used for the study of stability, with the results beset with problems which are discussed. Author (ESA)

N82-19215# Bristol Univ. (England). Dept. of Aeronautical Engineering.
A DESIGN STUDY OF THE MARSHAL B.S. Thesis
D. Suen and G. H. Tan Jun. 1981 55 p refs
(BU-262) Avail: NTIS HC A04/MF A01

The feasibility of a six seat variant of the Britten Sheriff twin-engined aircraft, the Marshal, was studied. Results show that the Marshal, powered by two 200 h.p. engines and at an all-up-weight (AUW) of 3550 lb, can compete in the open market, both in terms of performance and price. No major structural alterations, except on the fuselage to accommodate two additional passengers, are envisaged. This aircraft is expected to be suitable for a touring role. For business flying, a high cruise speed is favored and so a turbocharged version was also considered. The performance level attainable, with two 200 h.p. turbocharged engines, compares well with the competition. However, at an AUW of 3700 lb, certain modifications to the wing are necessary. The indication is that the Marshal is a commercially viable project. Author (ESA)

N82-19216# Bristol Univ. (England). Dept. of Aeronautical Engineering.

DESIGN STUDY INTO A HIGH ENDURANCE MINI-ROTORCRAFT B.S. Thesis

D. A. E. Beedell and J. C. Hendy Jun. 1981 71 p refs
Original contains color illustrations
(BU-265) Avail: NTIS HC A04/MF A01

Competing models in a minirotorcraft competition for maximum endurance with an all up weight no greater than 5 kg, must fly above a height of 5 m within an area 10 m square are discussed. A design in which aerodynamics, stability and control, and mechanical and structural aspects are considered to obtain the size and angular velocity of the rotor for minimum power, while sufficient stability and control for a long flight are still inherent in the overall system is presented. Weights of individual components are also examined. It is found that a rotor mounted engine configuration, with rotor radius about 1.6 m and rotational velocity 4 to 5 revs/sec, with engines half way along the rotors and with Hiller control rotors, is the most promising design. The possible endurance is some 12 hr and hence pilot error and mechanical failure become deciding factors. Author (ESA)

N82-19217*# Mitre Corp., McLean, Va.

A CONCEPT FOR A FUEL EFFICIENT FLIGHT PLANNING AID FOR GENERAL AVIATION Final Report

B. P. Collins, A. L. Haines, and C. J. Wales Washington NASA Mar. 1982 96 p refs
(Contract NAS1-16430)
(NASA-CR-3533; MTR-81W233) Avail: NTIS HC A05/MF A01 CSCL 01D

A core equation for estimation of fuel burn from path profile data was developed. This equation was used as a necessary ingredient in a dynamic program to define a fuel efficient flight path. The resultant algorithm is oriented toward use by general aviation. The pilot provides a description of the desired ground track, standard aircraft parameters, and weather at selected waypoints. The algorithm then derives the fuel efficient altitudes and velocities at the waypoints. B.W.

N82-19218# Institute for Defense Analyses, Arlington, Va.

ASSESSMENT OF AVIONIC EQUIPMENT FIELD RELIABILITY AND MAINTAINABILITY AS FUNCTIONS OF UNIT COST

Mark I. Knapp and Joseph W. Stahl 7 Oct. 1981 24 p refs
Presented at the 16th Ann. Dept. of Defense Cost Analysis Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109373) Avail: NTIS HC A02/MF A01 CSCL 01/3

Pound-for-pound, avionics is generally recognized as the most expensive, complex and sophisticated part of an aircraft. Reliability and maintainability are critical characteristics that influence spares provisioning, maintenance resource requirements, system operational availability and, ultimately, investment and operating costs. Consequently, much attention has been focused upon improving the reliability and maintainability of avionics which, in the past, have been disappointingly low. This paper addresses avionics reliability and maintainability. The analysis was performed last year in partial response to a request of IDA by OASD (C(3)I) to provide information for use by DSARC principals at the Full-Scale Development milestone. Since the 5000 series of DoD Directives and Instructions emphasize analytical comparisons of any new systems under consideration by the DSARC with current, comparable systems, we undertook analyses to determine if there may be one or more historical relationships between field reliability and maintainability and avionic equipment characteristics that would assist in forecasting those attributes GRA

N82-19219# European Space Agency, Paris (France).

EQUIPMENT FOR TESTING AND MEASURING A 'HELMET MOUNTED SIGHT AND DISPLAY' SYSTEM WITH A COUPLED MOVABLE TV CAMERA IN THE FLIGHT SIMULATOR FOR RESEARCH OF THE DFVLR

Friedrich Erdmann, R. Dierke, E. Biertuempel, R. Ehlers, and H. Loehr Nov. 1981 70 p refs Transl. into ENGLISH of "Ein Versuchsaufbau zum Ausmessen eines 'Helmet Mounted Sight/Display' mit Nachgeschaltetem Kameraschwenkrahmen im Forschungsflugsimulator der DFVLR" Rept. DFVLR-Mitt-80-04 DFVLR, Brunswick, Jan. 1980 Original report in GERMAN previously announced as ESA-95301
(ESA-TT-675; DFVLR-Mitt-80-04) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 17,40

A test installation capable of static and dynamic measurements on a helmet mounted sight and display (HMS/D) during simulated helicopter motion, by means of a steerable camera rotation framework was built. The rotation frame is gyro controlled and moves about two axes (in pitch and yaw). The HMS/D generates the helmet line of sight referred to the simulator platform (the aircraft based system) in terms of azimuth and elevation. Through the helmet mounted display, using a semitransparent mirror, an electronically produced cross hair (the helmet mounted sight) is superimposed on the image in the right eye of the pilot. The TV picture is also reflected into his eye, enabling him to aim at a target on the sensor image. Test equipment accuracy is 40 min in azimuth, 20 min in elevation. Author (ESA)

N82-19220*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DILUTION JET BEHAVIOR IN THE TURN SECTION OF A REVERSE FLOW COMBUSTER

Steven M. Riddlebaugh, Abraham Lipshitz (Ahuza, Haifa, Israel), and Isaac Greber (Case Western Reserve Univ., Cleveland, Ohio) Jan. 1982 15 p refs Presented at the 20th Aerospace Sci. Meeting, Orlando, Fla., 10-14 Jan. 1982; sponsored by AIAA
(NASA-TM-82776; E-1107; AIAA-82-0192) Avail: NTIS HC A02/MF A01 CSCL 21E

Measurements of the temperature field produced by a single jet and a row of dilution jets issued into a reverse flow combustor are presented. The temperature measurements are presented in the form of consecutive normalized temperature profiles, and jet trajectories. Single jet trajectories were swept toward the inner wall of the turn, whether injection was from the inner or outer wall. This behavior is explained by the radially inward velocity component necessary to support irrotational flow through the turn. Comparison between experimental results and model calculations showed poor agreement due to the model's not including the radial velocity component. A widely spaced row of jets produced trajectories similar to single jets at similar test conditions, but as spacing ratio was reduced, penetration was reduced to the point where the dilution jet flow attached to the wall. Author

N82-19221*# Garrett Turbine Engine Co., Phoenix, Ariz.

COOLED VARIABLE-AREA RADIAL TURBINE TECHNOLOGY PROGRAM Final Report

G. D. Large and L. J. Meyer Jan. 1982 303 p refs
(Contract NAS3-22004)
(NASA-CR-165408) Avail: NTIS HC A14/MF A01 CSCL 21E

The objective of this study was a conceptual evaluation and design analyses of a cooled variable-area radial turbine capable of maintaining nearly constant high efficiency when operated at a constant speed and pressure ratio over a range of flows corresponding to 50- to 100-percent maximum engine power. The results showed that a 1589K (2400 F) turbine was feasible that would satisfy a 4000-hour duty cycle life goal. The final design feasibility is based on 1988 material technology goals. A peak aerodynamic stage total efficiency of 0.88 was predicted at 100 percent power. Two candidate stators were identified: an articulated trailing-edge and a locally movable sidewall. Both concepts must be experimentally evaluated to determine the optimum configuration. A follow-on test program is proposed for this evaluation. Author

N82-19222*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.78, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 1.82

Royce D. Moore and Lonnie Reid Feb. 1982 112 p refs
(NASA-TP-1974; E-259) Avail: NTIS HC A06/MF A01 CSCL 21E

The overall and blade-element performance of a transonic compressor stage is presented over the stable operating flow range for speeds from 50 to 100 percent of design. The stage was designed for a pressure ratio of 1.82 at a flow 20.2 kg/sec and a tip speed of 455 m/sec. At design speed the stage achieved a peak efficiency of 0.821 at a pressure ratio of 1.817. The stage stall margin at design speed based on conditions at stall and peak efficiency was about 11 percent. Author

N82-19223 Royal Aircraft Establishment, Farnborough (England).
A CRITERION FOR THE PREDICTION OF THE RECOVERY CHARACTERISTICS OF SPINNING AIRCRAFT
T. H. Kerr 1981 24 p refs
(RAE-TN-AERO-2251) Copyright Avail: Issuing Activity

Full scale spinning tests were analyzed in order to produce a recovery estimation method for straight and swept wing aircraft. The rate of rotation about spin axis X wing span/true rate of descent in ft/sec. was estimated from the general layout and loading of the aircraft. Antispin rolling moment coefficient (wind axis) due to the body at a mean incidence of 45 deg and antispin moment due to the movement of the rudder from neutral to fully antispin were calculated. The unbalanced (antispin) rolling moment coefficient is derived. This is plotted against (I- (pitching moment of inertia/rolling moment of inertia)) and whether the aircraft is likely to have a satisfactory spin recovery characteristic is assessed by reference to the empirical boundary tables provided. Data for Spitfire and Hurricane aircraft are provided. Recovery standards improve as pitching moment of inertia/rolling moment of inertia increases. Author (ESA)

N82-19224*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
AN EXPERIMENTAL STUDY OF THE EFFECT OF TAIL CONFIGURATION ON THE SPINNING CHARACTERISTICS OF GENERAL AVIATION AIRCRAFT M.S. Thesis
Mark G. Ballin Mar. 1982 182 p refs
(Grant NAG1-73)
(NASA-CR-168578) Avail: NTIS HC A09/MF A01 CSCL 01C

The feasibility of using static wind tunnel tests to obtain information about spin damping characteristics of an isolated general aviation aircraft tail was investigated. A representative tail section was oriented to the tunnel free streamline at angles simulating an equilibrium spin. A full range of normally encountered spin conditions was employed. Results of parametric studies performed to determine the effect of spin damping on several tail design parameters show satisfactory agreement with NASA rotary balance tests. Wing and body interference effects are present in the NASA studies at steep spin attitudes, but agreement improves with increasing pitch angle and spin rate, suggesting that rotational flow effects are minimal. Vertical position of the horizontal stabilizer is found to be a primary parameter affecting yaw damping, and horizontal tail chordwise position induces a substantial effect on pitching moment. A.R.H.

N82-19225*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATOR STUDY OF VORTEX ENCOUNTERS BY A TWIN-ENGINE, COMMERCIAL, JET TRANSPORT AIRPLANE
Earl C. Hastings, Jr. and Gerald L. Keyser, Jr. Feb. 1982 65 p refs
(NASA-TP-1966; L-14107) Avail: NTIS HC A04/MF A01 CSCL 01C

A simulator study of vortex encounters was conducted for a twin-engine, commercial, jet transport airplane encountering the vortex flow field of a heavy, four-engine, commercial, jet transport airplane in the final-approach configuration. The encounters were conducted with fixed controls and with a pilot using a state-of-the-art, manual-control system. Piloted encounters with the base-line vortex flow field out of ground effect (unattenuated) resulted in initial bank-angle excursions greater than 40 deg, coupled with initial sideslip-angle excursions greater than 10 deg. The severity of these initial upsets was significantly reduced when the vortex center was moved laterally or vertically away from the flight path of the encountering airplane. Smaller reductions occurred when the flow field was attenuated by the flight spoilers on the generating airplane. The largest reduction in the severity of the initial upsets, however, was from aging in ground effect. The severity of the initial upsets of the following airplane was relatively unaffected by the approach speed. Increasing the lift coefficient of the generating airplane resulted in an increase in the severity of the initial upsets. Author

N82-19226*# Boeing Aerospace Co., Kent, Wash.
A STUDY OF FLIGHT CONTROL REQUIREMENTS FOR ADVANCED, WINGED, EARTH-TO-ORBIT VEHICLES WITH FAR-AFT CENTER-OF-GRAVITY LOCATIONS Final Report
Andrew K. Hepler, Howard Zeck, William H. Walker, and Alexander Polack Washington NASA Feb. 1982 121 p
(Contract NAS1-16128)
(NASA-CR-3491) Avail: NTIS HC A06/MF A01 CSCL 01C

Control requirements of Controlled Configured Design Approach vehicles with far-aft center of gravity locations are studied. The baseline system investigated is a fully reusable vertical takeoff/horizontal landing single stage-to-orbit vehicle with mission requirements similar to that of the space shuttle vehicle. Evaluations were made to determine dynamic stability boundaries, time responses, trim control, operational center-of-gravity limits, and flight control subsystem design requirements. Study tasks included a baseline vehicle analysis, an aft center of gravity study, a payload size study, and a technology assessment. Author

N82-19227# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
FLUTTER AND TIME RESPONSE ANALYSES OF THREE DEGREE OF FREEDOM AIRFOILS IN TRANSONIC FLOW Final Report, Nov. 1979 - Dec. 1980
T. Y. Yang and C. H. Chen Wright-Patterson AFB, Ohio AFAWL Aug. 1981 60 p refs
(Grant AF-AFOSR-3523-78; AF Proj. 2307)
(AD-A108987; AFWAL-TR-81-3103) Avail: NTIS HC A04/MF A01 CSCL 20/4

Flutter and time response analyses are performed for a NACA 64A006 conventional and a MBB A-3 supercritical airfoil, both oscillating with plunge, pitch, and aileron pitch d.o.f.'s in small disturbance, transonic flow. The aerodynamic coefficients are calculated using the transonic code LTRAN2-NLR. The effects of various kinds of aeroelastic parameters on flutter speeds for the bending-torsion, bending-aileron, and torsion-aileron branches are studied. The flutter speeds associated with the bending-torsion branch are plotted against Mach number for different parameter values. The flutter speed, the amplitude ratio, and the phase difference at different Mach numbers are plotted against the mass ratio for both of two d.o.f. and a three d.o.f. case. Time-response results are obtained for the NACA 64A006 and the MBB A-3 airfoils at M = 0.85 and 0.765, respectively. Using the same sets of parameter values, the flight speeds used to obtain all the neutrally stable response are very close to the flutter speeds obtained in the flutter analysis. The principle of linear superposition of airloads is used in the flutter analysis but not in the response analysis. Author (GRA)

N82-19228# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
ACTIVE GUST AND MANEUVER LOAD CONTROL CONCEPTS WITH THE EXAMPLE OF THE AIRBUS A300. PART 1: EXPLANATION OF A REGULAR IN THE TIME ZONE OF WIND GUST LOAD DECREASE AND EXAMINATION OF ITS EFFECTIVENESS IN STOCHASTIC GUSTS [AKTIVE BOEEN- UND MANOEVERLASTREGELUNGSKONZEPTE AM BEISPIEL DES AIRBUS A-300. TEILL: AUSLEGUNG EINES REGLERS IM ZEITBEREICH ZUR BOENLASTMINDERUNG UND NACHPRUEFUNG DER WIRKSAMKEIT FUER STOCHASTISCHE BOEEN]
J. Becker, O. Sensburg, and F. Weiss 28 Apr. 1981 60 p refs In GERMAN Presented at DGLR-Jahrestagung 1981, Aachen, 11-14 May, 1981
(MBB-FE-172/S/PUB/39-Pt-1) Avail: NTIS HC A04/MF A01

The development of active control technology and its application to flutter stabilization in aviation as well as maneuvering squall load control in the structural reduction and improvement of flying comfort was investigated. The design of the squall load control, and the plotting of the simulation model for the flexible airplane are examined. Transl. by E.A.K.

N82-19231# Bristol Univ. (England). Dept. of Aeronautical Engineering.
THE PRESSURE SIGNATURE METHOD FOR BLOCKAGE CORRECTIONS, AND ITS APPLICATIONS TO THE INDUSTRIAL WIND TUNNEL B.S. Thesis
A. S. Walker and N. P. Wiseman Jun. 1981 43 p refs
(BU-263) Avail: NTIS HC A03/MF A01

A recent method of correcting for errors due to blockage, applicable to complex shapes and high blockage ratios, was applied to the Aeronautical Engineering Department industrial wind tunnel. A tunnel centerline, source-sink distribution was derived from measured wall pressure signatures. The interference effect of the tunnel walls was calculated; blockage corrections were applied to in-tunnel measurements of forces and pressures. The drag coefficient of a normal flat plate of deliberately high blockage ratio (12%) was measured in the tunnel, then corrected to the value in unconfined flow. This is found to be close to the expected value and indicates that the pressure signature method can be reliably used to correct measurements obtained from models, up to this value of blockage. The effective body implied by the equivalent potential flow was also calculated. This compares well with the known effective body shapes of flat normal plates in confined flow. Author (ESA)

N82-19343# Federal Aviation Administration, Atlantic City, N.J.
WORKSHOP ON MATHEMATICAL FIRE MODELING
Aug. 1981 227 p Workshop held 24-27 Mar. 1981
(AD-A108876; FAA-CT-81-209) Avail: NTIS
HC A11/MF A01 CSCL 01/2

Computerized simulation of aircraft fires is discussed. Cabin fires are emphasized with particular attention given to the study of the flammability of construction materials. Three types of aircraft fires are analyzed: ramp fires, in-flight fires, and post crash fires. Flame spread, heat fluxes, and fire dynamics are discussed.
R.J.F.

N82-19358*# Rockwell International Corp., El Segundo, Calif. Aircraft Operations.
EVALUATION OF SUPERPLASTIC FORMING AND CO-DIFFUSION BONDING OF Ti-6Al-4V TITANIUM ALLOY EXPANDED SANDWICH STRUCTURES Technical Report, May 1979 - Dec. 1980
G. H. Arvin, L. Israeli, J. H. Stolpestad, and G. W. Stacher
Sep. 1981 134 p refs
(Contract NAS1-15788)
(NASA-CR-165827; NA-81-185-1) Avail: NTIS
HC A07/MF A01 CSCL 11F

The application of the superplastic forming/diffusion bonding (SPF/DB) process to supersonic cruise research is investigated. The capability of an SPF/DB titanium structure to meet the structural requirements of the inner wing area of the NASA arrow-wing advanced supersonic transport design is evaluated. Selection of structural concepts and their optimization for minimum weight, SPF/DB process optimization, fabrication of representative specimens, and specimen testing and evaluation are described. The structural area used includes both upper and lower wing panels, where the upper wing panel is used for static compression strength evaluation and the lower panel, in tension, is used for fracture mechanics evaluations. The individual test specimens, cut from six large panels, consist of 39 static specimens, 10 fracture mechanics specimens, and one each full size panel for compression stability and fracture mechanics testing. Tests are performed at temperatures of -54 C (-65 F), room temperature, and 260 C (500 F). B.W.

N82-19391# Naval Ship Research and Development Center, Annapolis, Md. Propulsion and Auxiliary Systems Dept.
FOUNDATIONS FOR COMPUTER SIMULATION OF A LOW PRESSURE OIL FLOODED SINGLE SCREW AIR COMPRESSOR M.S. Thesis - Purdue Univ.
Thomas W. Bein Dec. 1981 122 p refs
(AD-A108230; DTNSRDC/PAS-81/24) Avail: NTIS
HC A06/MF A01 CSCL 13/7

The necessary logic to construct a computer model to predict the performance of an oil flooded, single screw air compressor is developed. The geometric variables and relationships used to describe the general single screw mechanism are developed. The governing equations to describe the processes are developed from their primary relationships. The assumptions used in the development are also defined and justified. The computer model predicts the internal pressure, temperature, and flowrates through the leakage paths throughout the compression cycle of the single screw compressor. The model uses empirical external values as the basis for the internal predictions. The computer values are compared to the empirical values, and conclusions are drawn based on the results. Recommendations are made for future efforts to improve the computer model and to verify some of the conclusions that are drawn. Author (GRA)

N82-19396# Engineering Dynamics International, St. Louis, Mo.
AIRPORT RELATED RESIDENTIAL ACOUSTICAL INSULATION DEMONSTRATION PROJECT: REPORT 1720 Final Report
J. T. Weissenburger, J. C. McBryan, and L. F. Heitkamo Jun. 1981 107 p refs Sponsored by St. Louis Airport Authority, Mo.
(PB82-100777) Avail: NTIS HC A06/MF A01 CSCL 13B

A demonstration project to evaluate the feasibility of retrofit acoustical insulation in single family residences as a possible remedial measure for homes impacted by airport and aircraft noise is described. Six private residences generally located in an area to the east and southeast of Lambert St. Louis International Airport were used. The program involved making before and after noise measurements, selecting contractors, and overseeing the installation of selected acoustical controls, and evaluating the effectiveness of the program. A description of each individual house and measured data pertaining to the house is presented.
GRA

N82-19419# Radio Technical Commission for Aeronautics, Washington, D. C.
FM BROADCAST INTERFERENCE RELATED TO AIRBORNE ILS, VOR AND VHF COMMUNICATIONS
18 Nov. 1981 96 p refs
(RTCA/DO-176; RTCA/SC-141) Avail: NTIS
HC A05/MF A01

Recommendations for controlling the problem of FM broadcast interference with airborne communications are given.

N82-19420# Radio Technical Commission for Aeronautics, Washington, D. C.
INVESTIGATION OF TECHNICAL REQUIREMENTS
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 7-8

Avail: NTIS HC A05/MF A01

Tolerances and standards applicable to FM broadcast stations are given, and minimum performance standards for airborne receiving equipment are identified. Performance standards for ILS localizer receiving equipment, for VOR receiving equipment operating at 108-118 MHz, and for radio communication receiving equipment operating at 117.975-136.000 MHz are considered.
J.D.H.

N82-19421# Radio Technical Commission for Aeronautics, Washington, D. C.
INVESTIGATION OF AIRBORNE VHF COMMUNICATION AND NAVIGATION EQUIPMENT
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 9-22 ref

Avail: NTIS HC A05/MF A01

The Federal Aviation Administration test program investigating the problem of FM broadcast interference is described. The communication signal level to be protected, receiver minimum performance standards, antenna characteristics, and receiver interference tests are described for airborne VHF communications and for ILS and VOR navigation equipment. J.D.H.

N82-19422# Radio Technical Commission for Aeronautics, Washington, D. C.
INVESTIGATION OF THE EFFECTS OF AIRBORNE INSTALLATION FACTORS ON RECEIVER INTERFERENCE
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 23-52

Avail: NTIS HC A05/MF A01

Significant variables which may have an impact on protection criteria are discussed. A rationale for developing voltage limits at a VHF receiver input is presented. A system model consisting of an antenna, transmission line and receiver is developed to define system equations. Distance criteria using model and 100 kW ERP FM broadcast propagation data is developed for various transmission line lengths. J.D.H.

N82-19423# Radio Technical Commission for Aeronautics, Washington, D. C.
FAA/FCC COORDINATION PROCEDURES FOR FM BROADCAST STATIONS
In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 53-60

Avail: NTIS HC A05/MF A01

Procedures for coordination between the Federal Aviation Administration and the Federal Communications Commission are given and their effectiveness evaluated. Recommendations for strengthening the present informal coordination procedures are presented. J.D.H.

N82-19448# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANTENNA (SELECTED ARTICLES)

4 Nov. 1981 84 p refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 p 31-79

(AD-A108174; FTD-ID(RS)T-0940-81) Avail: NTIS HC A04/MF A01 CSCL 20/14

A statistical analysis of field focused systems and the properties of connected vibrator structures was made. The efficiency and input impedance of analyzing and reducing the directive gain and direction dispersion of the main maximum of the beam pattern of a sectional traveling wave antenna were derived and are discussed. An assessment of aircraft capacitive circuit medium wave antennas' efficiency is also presented.

N82-19453# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ASSESSMENT OF AIRCRAFT CAPACITIVE CIRCUIT MEDIUM WAVE ANTENNAS ACCORDING TO THEIR EFFICIENCY

E. O. Brudnyy and L. Ya. Ilnitskiy *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 53-59 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972

Avail: NTIS HC A04/MF A01 CSCL 20/14

A method for assessing aircraft capacitive circuit medium wave antennas according to their efficiency is presented. The measure of efficiency is the product of the antenna capacitance times the active altitude. An expression was obtained which links the antenna efficiency to its geometric dimensions. The suggested method discussed produces the optimal dimensions for aircraft capacitive circuit antennas direction during their designing. Author

N82-19570# National Aerospace Lab., Tokyo (Japan).

ACOUSTIC FATIGUE ENDURANCE TEST OF USB FLAP STRUCTURE MODELS AT ELEVATED TEMPERATURE

Masaaki Sano, Yoshinori Fukimori, Soushiro Iida, Keiji Komatsu, and Koichi Egawa Oct. 1981 59 p refs In JAPANESE; ENGLISH summary

(NAL-TR-683) Avail: NTIS HC A04/MF A01

Five substructural models of upper surface blown flaps were tested to verify the safety of the flap structure during a planned flight evaluation of the NAL-STOL experimental aircraft. All models consisted of the face panel with stringers and ribs rivetted on the backside in shape. Four panels were flat; one had the same curvature as the actual flap structure. Three face panels and stiffeners were of Ti-6Al-4V' the others were of 2024C-T3 alloy. Results of thermal buckling tests, resonant frequencies of all panels, the dynamic and the measurement of dynamic strain response are discussed. All structural models proved strong enough to resist both acoustic and thermal loading. No detectable damage was found on the panel face nor around the rivet holes. Estimated lives based on simulated and experimental strain histories suggest confirmation of the fatigue test results. A.R.H.

N82-19571# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.

PRACTICAL APPLICATIONS OF FRACTURE MECHANICS

Harold Liebowitz, ed. (George Washington Univ.) May 1980 425 p refs

(AGARD-AG-257; ISBN-92-835-1359-2) Avail: NTIS HC A16/MF A01

Practical applications of fracture mechanics for all aspects of aircraft design, manufacture and testing are presented. Although theoretical discussions are included to provide an appreciation of the complexity of the problems involved, the emphasis is on practical examples. Applications to engine components; built-up structures; joints, lugs and fasteners; integral structures and forgings are covered. The affects of stress corrosion and problems of scatter affecting determination of stress concentration factors, fatigue crack propagation and residual strength are discussed. S.L.

N82-19583# Kaman Aerospace Corp., Bloomfield, Conn.

STRUCTURAL SYSTEM IDENTIFICATION TECHNOLOGY VERIFICATION Final Report

N. Giansante, A. Berman, W. G. Flannelly, and E. J. Nagy Ft. Eustis, Va. Army Research and Technology Labs. Nov. 1981 218 p refs

(Contract DAAK51-78-C-0017; DA Proj. 1L1-62209-AH-76) (AD-A109181; R-1631; USAAVRADCOM-TR-81-D-28) Avail: NTIS HC A10/MF A01 CSCL 13/13

Structural system identification is the method of obtaining structural and dynamic mathematical models and improving existing mathematical models using ground vibration test data. The purpose of the subject program was to perform experimental, development, and research work to verify the concepts of structural system identification technology. To accomplish this, system identification techniques were applied to a U. S. Army AH-1G helicopter fuselage to create a mathematical model from ground vibration test data, to improve a reduced model of an existing NASTRAN model of the AH-1G using shake test data, and to test the effectiveness of these new mathematical models in predicting the effects of stiffness and mass changes to the airframe. The results of the program indicate that system identification is a viable and cost-effective technique for developing new models and for improving existing finite-element models of an airframe using ground vibration test data. Author (GRA)

N82-19587# Georgetown Univ., Washington, D.C. Dept. of Civil Mechanical and Environmental Engineering.

FRACTURE AND FATIGUE CHARACTERIZATION OF AIRCRAFT STRUCTURAL MATERIALS UNDER BIAXIAL LOADING Final Scientific Report, 1 Oct. 1976 - 30 May 1980

D. L. Jones and J. Eftis Dec. 1981 204 p refs

(Grant AF-AFOSR-3096-76; AF Proj. 2307)

(AD-A109054; AFOSR-81-0856TR) Avail: NTIS HC A10/MF A01 CSCL 01/3

A general fracture mechanics analysis was performed to examine the influence of biaxial applied loads on the mechanical state of the body. The geometries examined were the single crack and two coplanar cracks with an arbitrary orientation and the cracked shear panel. It was found that the biaxial loads influenced all aspects of the mechanical state of the body, with the exception of the stress intensity factor for a crack oriented parallel to the biaxial load. The extent and nature of the biaxial effect on the crack-tip stress field, stress intensity factor, angle of initial crack extension, crack-tip displacements, elastic strain energy, fracture load and fatigue crack growth rates are all discussed. A biaxial test facility was developed and a considerable number of photoelastic, fracture toughness, and fatigue crack growth rate experiments were performed. Confirmation of the analytical predictions was obtained for the biaxial effects on the crack-tip stress field, the angle of initial crack extension, the fracture load, and the fatigue crack growth rates. The biaxial loads were seen to influence all of these parameters in varying degrees. GRA

N82-19707*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EFFECTS OF REPETITION RATE AND IMPULSIVENESS OF SIMULATED HELICOPTER ROTOR NOISE ON ANNOYANCE

Clemans A. Powell and David A. McCurdy Feb. 1982 59 p refs

(NASA-TP-1969; L-14936) Avail: NTIS HC A04/MF A01 CSCL 20A

Annoyance judgements were obtained for computer generated stimuli simulative of helicopter impulsive rotor noise to investigate effects of repetition rate and impulsiveness. Each of the 82 different stimuli was judged at 3 sound pressure levels by 48 subjects. Impulse repetition rates covered a range from 10 Hz to 115 Hz; crest factors covered a range from 3.2 dB to 19.3 dB. Increases in annoyance with increases in repetition rate were found which were not predicted by common loudness or annoyance metrics and which were independent of noise level. The ability to predict effects of impulsiveness varied between the noise metrics and was found to be dependent on noise level. The ability to predict the effects of impulsiveness was not generally improved by any of several proposed impulsiveness corrections. Instead, the effects of impulsiveness were found to be systematically related to the frequency content of the stimuli. A modified frequency weighting was developed which offers improved annoyance prediction. Author

N82-19944*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF FACILITY VARIATION ON THE ACOUSTIC CHARACTERISTICS OF THREE SINGLE STREAM NOZZLES

Orlando A. Gutierrez 1980 38 p refs Presented at the 100th Meeting of the Acoust. Soc. of Am., Los Angeles, 17-21 Nov. 1980

(NASA-TM-81635; E-646) Avail: NTIS HC A03/MF A01 CSCL 20A

The characteristics of the jet noise produced by three single stream nozzles were investigated statistically at the NASA-Lewis Research Center outdoor jet acoustic facility. The nozzles consisted of a 7.6 cm diameter convergent conical, a 10.2 cm diameter convergent conical and an 8-lobe daisy nozzle with 7.6 cm equivalent diameter flow area. The same nozzles were tested previously at cold flow conditions in other facilities such as the Royal Aircraft Establishment (RAE) 7.3 m acoustic wind tunnel. The acoustic experiments at NASA covered pressure ratios from 1.4 to 2.5 at total temperatures of 811 K and ambient. The data obtained with four different microphone arrays are compared. The results are also compared with data taken at the RAE facility and with a NASA prediction procedure. Author

N82-19945# National Aerospace Lab., Tokyo (Japan). Noise and Emission Research Group.

AERODYNAMIC NOISE GENERATED BY JET WING/FLAP INTERACTIONS OF THE EXTERNAL USB CONFIGURATION OF STOL AIRCRAFT. PART 2: FULL SCALE MODEL EXPERIMENT USING FJR710 TURBOFAN ENGINE

Masataka Maita, Shigemi Shindo, Shin Nakayama, Masakatsu Matsuki, Tadao Torisaki, Mitsuo Morita, Akira Yoshida, Katsumi Takeda, Shizuo Sekine, and Hiroshi Kondo Oct. 1981 26 p refs

(NAL-TR-687T-Pt-2; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Acoustic characteristics of the external upper surface blowing (USB) concept of a propulsive lift configuration were studied by full scale model static experiments. Test components included an FJR710 turbofan engine with an acoustically treated nacelle and a USB wing/flap assembly. These were utilized in conjunction with the ground verification testing of the propulsive systems of the National Aerospace Laboratory Quiet STOL Research Aircraft. Results were compared with the previous 8% scale cold flow model data. The defect of shielding provided by the wing/flap surface on aftradiated turbofan engine noise was studied and some attempts were made to reduce USB noise. Author

N82-19946*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AIRCRAFT NOISE PREDICTION PROGRAM THEORETICAL MANUAL, PART 1

William E. Zorumski Feb. 1982 180 p refs 2 Vol.

(NASA-TM-83199-Pt-1; L-14805-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 20A

Aircraft noise prediction theoretical methods are given. The prediction of data which affect noise generation and propagation is addressed. These data include the aircraft flight dynamics, the source noise parameters, and the propagation effects. R.J.F.

N82-19947*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AIRCRAFT NOISE PREDICTION PROGRAM THEORETICAL MANUAL, PART 2

William E. Zorumski Feb. 1982 296 p refs 2 Vol.

(NASA-TM-83199-Pt-2; L-14805-Pt-2) Avail: NTIS HC A13/MF A01 CSCL 20A

Detailed prediction methods for specific aircraft noise sources are given. These sources are airframe noise, combustion noise, fan noise, single and dual stream jet noise, and turbine noise. Modifications to the NASA methods which comply with the International Civil Aviation Organization standard method for aircraft noise prediction are given. R.J.F.

N82-19952# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

ACOUSTIC MEASUREMENTS OF F100-PW-100 ENGINE OPERATING IN HUSH HOUSE NSN 4920-02-070-2721 Final Report, May - Sep. 1981

Vincent R. Miller, G. A. Plzak, and J. M. Chinn Sep. 1981 58 p refs

(AD-A108814; AFWAL-TM-81-133-FIBE) Avail: NTIS HC A04/MF A01 CSCL 20/1

The purpose of this test program was to measure the acoustic environment in the hush house facility located at Kelly AFB Texas during operation of the F100-PW-100 engine to ensure that engine structural acoustic design limits were not exceeded. The acoustic measurements showed that no sonic fatigue problems are anticipated with the F100-PW-100 engine structure during operation in the hush house. The measured acoustic levels were less than those measured in an existing F100-PW-100 engine wet-cooled noise suppressor, but were increased over that measured during operation on an open test stand. It was recommended that the acoustic load increases measured in this program should be specified in the structural design criteria for engines which will be subjected to hush house operation or defining requirements for associated equipment. Author (GRA)

N82-19956# Loughborough Univ. of Technology (England). Dept. of Transport Technology.

AN EXPERIMENTAL STUDY OF THE EFFECTS OF AN INLET FLOW CONDITIONER ON THE NOISE OF A LOW SPEED AXIAL FLOW FAN

J. Scoles and J. B. Ollerhead Jan. 1981 92 p refs

(Contract AT/2170/049/XR)

(TT-8101) Avail: NTIS HC A05/MF A01

The effects of inflow condition on the noise generated by a 40kW, 560mm diameter, seven blade ducted fan at speeds up to 5000rpm in an anechoic chamber were measured. A 1.25m diameter hemisperical honeycomb flow conditioner (HFC) which could be fitted with an internal gauze liner was used. Fan entry flow was measured by static and rotating hot-wire anemometers. Noise levels in the first few harmonics of blade passing frequency are very sensitive to inflow condition, but the HFC reduces them to a residual level independent of upstream disturbance levels. Broadband noise is reduced (by a smaller amount) at high blade angles and flow rates. No systematic effect of the gauze liner is detected. Experimental difficulties are caused by unsteadiness in the chamber airflow which causes harmonic level fluctuations with amplitudes of up to 10dB. Although the inlet flow conditioner reduces these fluctuations markedly, long term variations reduce confidence in the data. Author (ESA)

N82-19957# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Technische Akustik.

NOISE MEASUREMENTS ON THE HELICOPTER BK 117 DESIGN. WEIGHTED NOISE LEVELS AND INFLUENCE OF AIRSPEED

Wolf R. Splettstoesser, Klaus P. Anders, and Karl-Heinz Spiegel Aug. 1981 93 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-748)

(DFVLR-Mitt-81-18) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 22,95

Noise measurements on the prototype helicopter BK 117 were performed in strict compliance with the proposed International Civil Aviation Organization regulations for noise certification of helicopters. Measurement procedure, noise data acquisition, analysis and reduction as well as applied correction procedures are described. Effective perceived noise levels (EPNL) and other noise descriptors were evaluated and related to the proposed noise limits. Additional level flyover tests with variable airspeed were conducted to investigate the resulting effect on the EPNL and other noise measures. Author (ESA)

N82-19958# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Technische Akustik.

COLLECTION AND EVALUATION OF PROPELLER AIRCRAFT NOISE CERTIFICATION DATA

Manfred Ahlswede and Klaus Peter Anders Aug. 1981 87 p refs In GERMAN; ENGLISH summary

(DFVLR-Mitt-81-20) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 25,20

More than 300 individual noise certification levels were measured for propeller driven airplanes up to 5700 kg takeoff weight and for powered gliders in accordance with the rules and regulations as set forth in International Civil Aviation Organization Annex 16. Information on the airplanes, the engines and the propellers is provided as well as on the prevailing meteorological parameters and the operational parameters together with acoustic data. Of the latter, the measured

A-weighted levels with their 90% confidence limit are listed, the performance correction is given and the certification level as well as the noise-limit are provided. Data are evaluated by plotting the measured A-weighted levels versus the helical blade tip Mach number. Author (ESA)

N82-20126*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GLOBAL POSITIONING SYSTEM TIMING RECEIVERS IN THE DSN

P. A. Clements *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 90-99 refs

Avail: NTIS HC A07/MF A01 CSCL 17G

The system (GPS) is a worldwide navigation system using a constellation of Earth satellites with onboard clocks. The GPS is also usable to transfer time and frequency. Preliminary tests with the breadboard receiver at NBS produced precision in time and frequency transfer between the United States Naval Observatory (USNO) and NBS. JPL's plans to install receivers in the DSN to demonstrate their ability to transfer time and frequency within the DSN and between the DSN and outside agencies are discussed. T.M.

[illegible]

[illegible]

[illegible] MEASUREMENTS [illegible] THE [illegible]

[illegible]

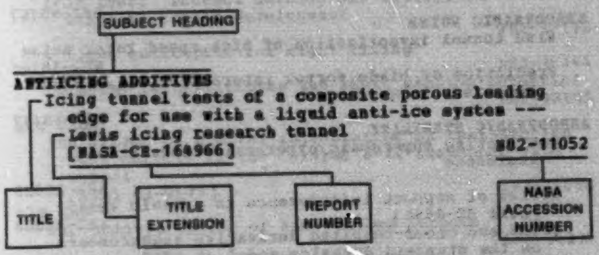
COLLECTION AND [illegible]

[illegible]

SUBJECT INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 149)* JUNE 1982

Typical Subject Index Listing


SUBJECT HEADING
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966]
N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-7 AIRCRAFT
  A-7E software module guide [AD-A108649] N82-18920
ABRASION RESISTANCE
  Transparency design decisions - Assessing their impact on visual performance A82-24306
  Abrasion resistant coated plastic products for aircraft A82-24310
  Proposed method for abrasion testing transparent plastics and coatings A82-24311
AC GENERATORS
  High speed VSCF generator design consideration --- computer aided design for Variable Speed Constant Frequency generator A82-24379
  Advanced generating system technology A82-24380
ACCELERATED LIFE TESTS
  Aircraft electric system development and test facilities A82-24384
  Advanced attack helicopter fatigue testing - Overview A82-24720
ACCELERATION (PHYSICS)
  Aircrew restraint and mobility test fixture [AD-A108274] N82-18193
ACCEPTABILITY
  Physiological acceptability tests of the SJU-5/A ejection seat: Second physiological acceptance demonstration [AD-A108688] N82-18194
ACCIDENT PREVENTION
  Scanning strategies for air traffic control radars A82-24646
  The toll of ILS-preventable aviation accidents A82-25325
ACOUSTIC DUCTS
  Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts [ASME PAPER 81-WA/NCA-13] A82-24602
ACOUSTIC EMISSION
  NDE of composite rotor blades during fatigue testing A82-24713
ACOUSTIC FATIGUE
  On the sonic fatigue life estimation of skin structures at room and elevated temperatures A82-23670
ACOUSTIC IMPEDANCE
  Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts [ASME PAPER 81-WA/NCA-13] A82-24602
ACOUSTIC PROPAGATION
  Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts [ASME PAPER 81-WA/NCA-13] A82-24602
ACOUSTIC PROPERTIES
  Effect of facility variation on the acoustic characteristics of three single stream nozzles [NASA-TM-81635] N82-19944
ACOUSTIC RETROFITTING
  Airport related residential acoustical insulation demonstration project: Report 1720 [PB82-100777] N82-19396
ACRYLIC RESINS
  Acrylic - A timely review A82-24317
  Lucas stretched acrylic A82-24318
  Problems associated with the quality assurance of stretched acrylic sheet A82-24319
  The effects of absorbed moisture upon the physical properties of stretched acrylic materials A82-24320
ACTIVE CONTROL
  Fighters - Tomorrow's terminology A82-23360
  Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts [MBB-FE-172/S/PUB/39-PT-1] N82-19220
ACTUATORS
  The influence of sensor and actuator characteristics on overall helicopter AFCS design N82-18171
  Slotted variable camber flap [NASA-CASE-LAR-12541-1] N82-18203
  Overview of Honeywell electromechanical actuation programs N82-19142
  Electric flight systems N82-19144
  Electromechanical actuators N82-19148
  Electric flight systems integration N82-19150
ADAPTIVE CONTROL
  Mission-adaptive wing flight demonstration program [SAE PAPER 811035] A82-24399
  Apparatus for damping operator induced oscillations of a controlled system --- flight control [NASA-CASE-FRC-11041-1] N82-18493
ADAPTIVE FILTERS
  Apparatus for damping operator induced oscillations of a controlled system --- flight control [NASA-CASE-FRC-11041-1] N82-18493
AEROACOUSTICS
  Acoustic fatigue endurance test of USB flap structure models at elevated temperature [NAL-TR-683] N82-19570

AERODYNAMIC BALANCE
A general purpose program for rotor blade dynamics
N82-18151
AERODYNAMIC CHARACTERISTICS
Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers
A82-24651
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test
[AIAA 82-0568] A82-24656
The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives
[AIAA 82-0595] A82-24669
Status and capabilities of the National Full Scale Facility 40- by 80-foot wind tunnel modification
[AIAA 82-0607] A82-24676
Angle of downwash behind a wing in unsteady flow
A82-24970
Design philosophy of the Hughes model 600 helicopter
N82-18140
Multiple ejection effects analysis
[AD-A108277] N82-18192
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations
[MBB-FE-122/S/PUB/36] N82-18211
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session
[NASA-TM-84147] N82-19172
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-14 airplane
[NASA-TM-83250] N82-19181
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft --- static wind tunnel force measurements
[NASA-CR-168578] N82-19224
AERODYNAMIC COEFFICIENTS
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations
[MBB-FE-122/S/PUB/36] N82-18211
A criterion for the prediction of the recovery characteristics of spinning aircraft
[RAE-TM-AERO-2251] N82-19223
AERODYNAMIC CONFIGURATIONS
Parametric criteria and impact on design trends
N82-18139
The effect of a well on the aerodynamics of a spoiler --- wind tunnel flow visualization and pressure measurement
[BU-268] N82-19194
AERODYNAMIC INTERFERENCE
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663
Optimum performance and wake geometry of co-axial rotor in hover
N82-18156
A numerical approach to co-axial rotor aerodynamics
N82-18157
Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results
N82-18158
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18189
The effect of a well on the aerodynamics of a spoiler --- wind tunnel flow visualization and pressure measurement
[BU-268] N82-19194
AERODYNAMIC LOADS
RB 211 powerplant deterioration - Review of current situation and lessons learned
[SAE PAPER 811053] A82-24393
Operating flight loads and their effect on engine performance
[SAE PAPER 811071] A82-24405
Hypothetical fatigue life problem - Application of Aerospatiale method
A82-24716
Helicopter rotor load prediction
A82-24719
Developments in rotary wing aircraft aerodynamics
N82-18120
Some unsteady aerodynamic effects on helicopter rotors
N82-18162
A method of predicting fuselage loads in hover
N82-18164
Mast mounted visual aids
N82-18167
AERODYNAMIC NOISE
Wind tunnel investigation of high speed rotor noise
N82-18146
Prediction of blade vortex interaction noise from measured blade pressure
N82-18147
AERODYNAMIC STABILITY
Oscillating supersonic/hypersonic wings at high incidence
A82-23828
Review of support interference in dynamic tests
[AIAA 82-0594] A82-24668
Cross and cross-coupling derivative measurements on the standard dynamics model at AEDC
[AIAA 82-0596] A82-24670
A control model for maneuvering flight for application to a computer-flight testing program
N82-18153
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228
AERODYNAMIC STALLING
Application of the ONER dynamic stall model to a helicopter blade in forward flight
N82-18161
Some unsteady aerodynamic effects on helicopter rotors
N82-18162
AERODYNAMICS
International Conference on Numerical Methods in Fluid Dynamics, 7th, Stanford University, Stanford and Moffett Field, CA, June 23-27, 1980, Proceedings
A82-24426
XFV-12A diagnostic and development programs
[AD-A108354] N82-18206
Tendencies in the development of subsonic transport aircraft with special consideration of aerodynamics
[ESA-TT-705] N82-18214
AEROELASTICITY
Fighters - Tomorrow's terminology
A82-23368
Application of the ONER dynamic stall model to a helicopter blade in forward flight
N82-18161
Flutter and time response analyses of three degree of freedom airfoils in transonic flow
[AD-A108987] N82-19227
AERONAUTICAL ENGINEERING
NASA pocket statistics
[NASA-TM-84134] N82-19084
Aeronautical Research Laboratories Structures Division
[AD-A109049] N82-19161
AEROSPACE ENGINEERING
Deficiencies and constraints that affect the design of cockpit enclosures and transparencies
A82-24303
AEROSPACE INDUSTRY
Welding technology for the aerospace industry; Proceedings of the Conference, Las Vegas, NV, October 7, 8, 1980
A82-23751
What the operator wants --- airline cooperation in aircraft maintenance
A82-24008
The use of 'Kapton' polyimide film in aerospace applications
[SAE PAPER 811091] A82-24413

AEROTHERMODYNAMICS
Technical innovations in testing and analysis of heat and pressure models in hypersonic wind tunnels
[AIAA 82-0570] A82-24660
AH-64 HELICOPTER
Advanced attack helicopter fatigue testing - Overview
A82-24720
AIR COOLING
Air cooled engine test facilities
A82-24004
AIR DEFENSE
Army Lynx: Product development matched to military combat development
N82-18143
A light helicopter for night firing
N82-18144
Tethered rotorplatforms and their mission potential
N82-18145
AIR FLOW
The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel
[AIAA 82-0571] A82-24658
AIR LAW
Air transportation of handicapped persons
A82-24338
AIR NAVIGATION
Navigational aids on-board the Concorde
A82-24065
Institute of Navigation, Annual Meeting, 37th, U.S. Naval Academy, Annapolis, MD, June 9-11, 1981, Proceedings
A82-24643
The application of NAVSTAR differential GPS in the civilian community
A82-24645
Beyond the horizon coverage for air navigation/traffic control
A82-24647
Loran for precise position location - The VIEW-NAV system
A82-24648
Analysis of loran-C system reliability for civil aviation
A82-24650
Integration of inertial sensors in helicopters
N82-18173
FAA/FCC coordination procedures for FM broadcast stations
N82-19423
AIR TRAFFIC
Report of the Air Traffic Forecasting Working Party, 1981
N82-19195
FAA statistical handbook of aviation
[AD-A109289] N82-19198
AIR TRAFFIC CONTROL
Utilization of radio equipment at airports and on airways --- Russian book
A82-22407
Stereographic projection in the National Airspace System
A82-23031
Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings
A82-23309
The requirements for reduced IFR separations on final approach
A82-23311
Analysis of system problems using aviation safety reporting system data
A82-23312
Reducing reflections on the front surface of air traffic control displays
A82-23314
Utilizing the helicopter's versatility to improve the ATC system
A82-23316
International [illegible] for civil and military co-ordination
A82-23317
Operational air traffic in the Federal Republic of Germany
A82-23318
Distributed data processing modeling for future ATC systems
A82-23319
Lightweight ATC systems
A82-23321
Discrete Address Beacon System /DABS/
A82-23322
A Microwave Landing System simulation
A82-23323
Voice communications - The vital link
A82-23324
Institute of Navigation, Annual Meeting, 37th, U.S. Naval Academy, Annapolis, MD, June 9-11, 1981, Proceedings
A82-24643
Scanning strategies for air traffic control radars
A82-24646
Beyond the horizon coverage for air navigation/traffic control
A82-24647
Conflicts between random flights in a given area
A82-25213
Distributed intelligence for air fleet control
[AD-A108611] N82-18195
Analytical study of cockpit information requirements
[AD-A108524] N82-18218
National Airspace Data Interchange Network (NADIN) support of Remote Maintenance Monitoring System (RMMS)
[AD-A109125] N82-19160
FAA statistical handbook of aviation
[AD-A109289] N82-19198
Air traffic control en route computer system
[GPO-89-008] N82-19202
AIR TRANSPORTATION
Air Traffic Control computer replacement - Specification issues and problems
A82-23313
Air transport in the 21st century
A82-24025
Air transportation of handicapped persons
A82-24338
Report of the Air Traffic Forecasting Working Party, 1981
N82-19195
AIRBORNE EQUIPMENT
LAMPS III recovery assist, securing and traversing /RAST/ system --- Light Airborne Multi-Purpose System
[SAE PAPER 811080] A82-24412
Integration of complex systems in current and future aircraft projects for the example of avionics
[MBB-UH-18-80-O] N82-18221
FM broadcast interference related to airborne ILS, VOR and VHF communications
[RTCA/DO-176] N82-19419
AIRBORNE/SPACEBORNE COMPUTERS
The use of dynamic mock-ups in the design of advanced systems --- USAF's Digital Avionic Information System and NAVY's Advanced Integrated Display System
A82-22002
High temperature engine control electronics
[SAE PAPER 811074] A82-24407
Loran for precise position location - The VIEW-NAV system
A82-24648
Analysis of loran-C system reliability for civil aviation
A82-24650
Flight condition recognition /FCR/ technique --- microprocessor-based recording for helicopter structural component fatigue damage
A82-24712
A-7E software module guide
[AD-A108649] N82-18920
AIRCRAFT
Flight characteristics design and development of the MBB/KHI BK117 helicopter
N82-18150
AIRCRAFT ACCIDENTS
Operational air traffic in the Federal Republic of Germany
A82-23318
The toll of ILS-preventable aviation accidents
A82-25325

An assessment of the crash fire hazard of liquid hydrogen fueled aircraft [NASA-CR-165526] N82-19196
Aircraft collision avoidance systems [GPO-79-431] N82-19201

AIRCRAFT ANTENNAS
Analysis of the crossed dipole antenna as a model for aircraft in an electromagnetic environment A82-25002
Calculation and measurement of electric field strength for airborne antennas in the LF/HF range A82-25011
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km [AD-A108182] N82-18464
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction [ESA-TT-677] N82-18483
Assessment of aircraft capacitive circuit medium wave antennas according to their efficiency N82-19453

AIRCRAFT BRAKES
Dynamics of aircraft antiskid braking systems --- conducted at the Langley aircraft landing loads and traction facility [NASA-TP-1959] N82-18204

AIRCRAFT CARRIERS
Review of defense-related vertical and short takeoff and landing (V/STOL) aircraft programs [GPO-55-278] N82-18205
Investigation of crossdeck pendant catapult slot interaction; proposed corrective measures [AD-A108149] N82-18232
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type [AD-A108801] N82-19206

AIRCRAFT COMMUNICATION
Voice communications - The vital link A82-23324
Beyond the horizon coverage for air navigation/traffic control A82-24647
Loran-C RNAV in mountainous areas A82-24649
Investigation of the effects of airborne installation factors on receiver interference N82-19422
FAA/FCC coordination procedures for FM broadcast stations N82-19423

AIRCRAFT COMPARTMENTS
Preliminary thoughts on helicopter cabin noise prediction methods N82-18148
The measurement of the mobility of structures at acoustic frequencies N82-18149
Study of cabin noise control for twin engine general aviation aircraft [NASA-CR-165833] N82-18995

AIRCRAFT CONFIGURATIONS
Transparency development needs for military aircraft in the 1980's A82-24302

AIRCRAFT CONSTRUCTION MATERIALS
Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings A82-24301
Aircraft transparency design guide A82-24307
B.A.C. One-Eleven flight deck glazing product improvement A82-24325
Concorde glazings - 5 years of Mach 2 service A82-24326
Materials aspects of aircraft EMC design A82-24358
Aircraft surface coatings for drag reduction/erosion protection [SAE PAPER 811070] A82-24401
Structural testing of composites with known defects A82-24708
Carbon-fiber composites - A fiber composite material for highly stressed light-construction components A82-24805
Recent developments in materials and processes for aircraft corrosion control A82-24825
A study of the effects of long-term exposure to fuels and fluids on the behavior of advanced composite materials [NASA-CR-165763] N82-18327

AIRCRAFT CONTROL
Analysis and optimization of control systems in piloted flight vehicles --- Russian book A82-22398
Sensitivity reduction by double perfect model following --- with application to aircraft control A82-23029
Aircraft parameter identification in the presence of atmospheric turbulence A82-23227
Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, February 11, 12, 1981, Collection of Papers A82-23426
Fixed gain controller design for aircraft A82-23441
F/A-18 weapon system development A82-23774
MIL-STD 1553B - Aircraft EM environmental susceptibility effects A82-24357
Multivariable aircraft control by maneuver commands: An application to air to surface gunnery N82-19154
Transport aircraft cockpit standardization (Federal Aviation regulations part 25) [AD-A108924] N82-19207
A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft --- improving riding quality in fighter aircraft [NLR-TR-80032-U] N82-19212

AIRCRAFT DESIGN
Complete guide to Rutan homebuilt aircraft --- Book A82-22880
History of the sweptback wing [DGLR PAPER 81-070] A82-22898
Fighters - Tomorrow's terminology A82-23368
Boeing's big, quiet 737-300 A82-23369
Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, February 11, 12, 1981, Collection of Papers A82-23426
YF-16 design concept and philosophy A82-23444
Design of supercritical swept wings A82-23826
A310 - Design for maintenance A82-24002
Development of maintenance programmes through the functional, structural and flight test phases A82-24003
Maintenance objectives for future aircraft A82-24005
What the operator wants --- airline cooperation in aircraft maintenance A82-24008
The inter-relation between design, construction and maintenance A82-24010
Air transport in the 21st century A82-24025
Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings A82-24301
Deficiencies and constraints that affect the design of cockpit enclosures and transparencies A82-24303
Fuel-efficient windshields for transport, commuter and business aircraft A82-24304
Transparencies - What an aircraft designer should know A82-24305
Transparency design decisions - Assessing their impact on visual performance A82-24306
Aircraft transparency design guide A82-24307

An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
A82-24313
The role of finite element analysis in the design of birdstrike resistant transparencies
A82-24314
The development of high strength light-weight windshields for the new generation of Boeing 757 and 767 airliners
A82-24323
Materials aspects of aircraft EMC design
A82-24350
CAD/CAM in British Aerospace - Aircraft Group
A82-24373
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24388
Airworthiness considerations in the design of commercial transport aircraft
[SAE PAPER 811039] A82-24396
Designing for continued airworthiness - General aviation
[SAE PAPER 811038] A82-24397
Quality, quantity, and technology - A perspective on fighter development
[SAE PAPER 811097] A82-24400
Future strike fighter options - Concepts and technologies
[SAE PAPER 811099] A82-24403
Technology for quality and quantity in a new fighter
[SAE PAPER 811100] A82-24404
Fighter issues - 2000
[SAE PAPER 811096] A82-24415
Development of a self-optimizing flexible technology /SOFT/ transonic wing wind tunnel model
[AIAA 82-0601] A82-24673
Spoilers or auxiliary flaps
A82-24973
Aircraft/airport compatibility - A constant challenge for aircraft designers
A82-25119
The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators
[AIAA PAPER 82-2635] A82-25154
Advanced electronic displays and their potential in future transport aircraft
A82-25216
Tendencies in the development of subsonic transport aircraft with special consideration of aerodynamics
[ESA-TT-705] N82-18214
Electric Flight Systems
[NASA-CP-2209] N82-19134
Electric flight systems, overview
N82-19135
The 400-Hertz constant-speed electrical generation systems
N82-19139
Engine technology
N82-19145
Power systems
N82-19146
Electromechanical actuators
N82-19148
Aeronautical Research Laboratories Structures , Division
[AD-A109049] N82-19161
Practical applications of fracture mechanics
[AGARD-AG-257] N82-19571

AIRCRAFT DETECTION
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563

AIRCRAFT ENGINES
Lineup of the IM-series aircraft-derivative gas turbines
A82-22896
Reliable power --- Rolls-Royce aircraft engine designs
A82-24007
Monitoring engine wear by oil analysis
A82-24012
Packaging the VSCF system for an aircraft engine environment
A82-24383
RB 211 powerplant deterioration - Review of current situation and lessons learned
[SAE PAPER 811053] A82-24393
High temperature engine control electronics
[SAE PAPER 811074] A82-24407
Performance retention features of the PW2037
[SAE PAPER 811054] A82-24409
Reliability analysis of a dual-redundant engine controller
[SAE PAPER 811077] A82-24410
Propulsion multiplexer /PMUX/ system - The missing link
[SAE PAPER 811078] A82-24411
Novel metal-ceramics-composite sealing coatings in aircraft engines
A82-24803
AFWAL turbine engine controls research and development - Present and future
[AIAA PAPER 82-0321] A82-25050
Where is cobalt irreplaceable
A82-25538
A digital simulation program describing the motion of an aircraft undergoing engine failure during its takeoff ground roll
[AD-A108420] N82-18210
Further development of the test concept of the ALPHA JET engine LARZAC 04
N82-18223
Electric Flight Systems
[NASA-CP-2209] N82-19134
Electric flight systems, overview
N82-19135
A propulsion view of the all-electric airplane
N82-19136
Potential propulsion considerations and study areas for all-electric aircraft
N82-19137
A look into the future: The potential of the all-electric secondary power system for the energy efficient transport
N82-19138
The 400-Hertz constant-speed electrical generation systems
N82-19139
Electric ECS
N82-19140
Environmental Control Systems
N82-19141
Overview of Honeywell electromechanical actuation programs
N82-19142
Digital flight controls
N82-19143
Electric flight systems
N82-19144
Engine technology
N82-19145
Power systems
N82-19146
Electromechanical actuators
N82-19148
Digital flight controls
N82-19149
Electric flight systems integration
N82-19150
Practical applications of fracture mechanics
[AGARD-AG-257] N82-19571
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan --- in an aircraft engine
[TT-8101] N82-19956

AIRCRAFT EQUIPMENT
Recent improvements in aircraft Ni-Cd cells
A82-24245
The coupling of electromagnetic interference into aircraft systems
A82-24354
MIL-STD 1553B - Aircraft EM environmental susceptibility effects
A82-24357
Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981
[SAE SP-500] A82-24376
Design considerations of DC-Link aircraft generation systems
A82-24377
Advanced generating system technology
A82-24380
The effect of critical design parameters on the selection of a VSCF system
A82-24381

Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States A82-24382

Aircraft electric system development and test facilities A82-24384

The cargo helicopter - A logistical vehicle A82-24717

Aircrew restraint and mobility test fixture [AD-A108274] N82-18193

AIRCRAFT FUELS

Low grade fuels for turbo and jet engines A82-23439

An assessment of the crash fire hazard of liquid hydrogen fueled aircraft [NASA-CR-165526] N82-19196

AIRCRAFT HAZARDS

An analytical methodology to predict potential aircraft losses due to canopy birdstrikes A82-24313

The effects of bird orientation on load profile and damage level A82-24316

An assessment of the crash fire hazard of liquid hydrogen fueled aircraft [NASA-CR-165526] N82-19196

Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane [NASA-TP-1966] N82-19225

Workshop on Mathematical Fire Modeling [AD-A108876] N82-19343

AIRCRAFT INDUSTRY

Experience during the development of the German-Japanese helicopter BK 117 [MBB-UD-318-81-O] N82-19210

AIRCRAFT INSTRUMENTS

The multi mode matrix flat panel display: Technology and applications N82-18169

Analytical study of cockpit information requirements [AD-A108524] N82-18218

Integration of complex systems in current and future aircraft projects for the example of avionics [MBB-UH-18-80-O] N82-18221

Transport aircraft cockpit standardization (Federal Aviation regulations part 25) [AD-A108924] N82-19207

AIRCRAFT LANDING

Methodology for multiaircraft minimum noise impact landing trajectories A82-23037

Oscillations and vibrations of aircraft on runways A82-24974

The toll of ILS-preventable aviation accidents A82-25325

Optimal aircraft landing patterns for minimal noise impact N82-19200

Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type [AD-A108801] N82-19206

AIRCRAFT MAINTENANCE

Reliability centered maintenance /RCM/ A82-24001

A310 - Design for maintenance A82-24002

Development of maintenance programmes through the functional, structural and flight test phases A82-24003

Maintenance objectives for future aircraft A82-24005

What the operator wants --- airline cooperation in aircraft maintenance A82-24008

The way ahead for helicopter maintenance A82-24009

The inter-relation between design, construction and maintenance A82-24010

MSG-3 structures --- inspection program for aircraft maintenance A82-24011

MSG-3 overview --- aircraft maintenance program development A82-24014

Cost of ownership advantages with a shared oil system A82-24378

Management of powerplant maintenance and restoration programs for fuel conservation [SAE PAPER 811052] A82-24394

Potential reductions in aircraft operation and maintenance costs by using thrust computing support equipment [AD-A108463] N82-18207

AIRCRAFT MANEUVERS

Utilizing the helicopter's versatility to improve the ATC system A82-23316

Efficient combinations of numerical techniques applied to aircraft turning performance optimization A82-24014

Multivariable aircraft control by maneuver commands: An application to air to surface gunnery N82-19154

AIRCRAFT MODELS

Analysis of the crossed dipole antenna as a model for aircraft in an electromagnetic environment A82-25002

Prediction of off-design performance of turbo-shaft engines a simplified method N82-18132

Measurement techniques used to assess the installed power of a helicopter engine N82-18133

Parametric criteria and impact on design trends N82-18139

Interpretation and construction of a dynamic similarity model of the A 310 wings [MBB-FE-17/S/PUB/42] N82-18212

Design study into a high endurance mini-rotorcraft [BU-265] N82-19216

Structural system identification technology verification [AD-A109181] N82-19583

AIRCRAFT NOISE

Direct comparison of community response to road traffic noise and to aircraft noise A82-22974

Methodology for multiaircraft minimum noise impact landing trajectories A82-23037

Study of cabin noise control for twin engine general aviation aircraft [NASA-CR-165833] N82-18995

Annoyance caused by propeller airplane flyover noise: Preliminary results [NASA-TM-83244] N82-18996

Optimal aircraft landing patterns for minimal noise impact N82-19200

Airport related residential acoustical insulation demonstration project: Report 1720 [PB82-100777] N82-19396

Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance [NASA-TP-1969] N82-19707

Aircraft noise prediction program theoretical manual, part 1 [NASA-TM-83199-PT-1] N82-19946

Aircraft noise prediction program theoretical manual, part 2 [NASA-TM-83199-PT-2] N82-19947

Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed [DFVLR-MITT-81-18] N82-19957

Collection and evaluation of propeller aircraft noise certification data [DFVLR-MITT-81-20] N82-19958

AIRCRAFT PARTS

The inter-relation between design, construction and maintenance A82-24010

Lucas stretched acrylic A82-24318

The Agusta's solution of AHS's hypothetical fatigue life problem A82-24701

A method of determining safe service life for helicopter components A82-24709

Boeing Vertol fatigue life methodology
A82-24718
Advanced attack helicopter fatigue testing - Overview
A82-24720
AIRCRAFT PERFORMANCE
Boeing's big, quiet 737-300
A82-23369
Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, February 11, 12, 1981, Collection of Papers
A82-23426
YF-16 design concept and philosophy
A82-23444
Maintenance objectives for future aircraft
A82-24005
Quality, quantity, and technology - A perspective on fighter development
[SAE PAPER 811097] A82-24400
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406
Fighter issues - 2000
[SAE PAPER 811096] A82-24415
SH-60B test program
N82-18141
C-5A austere airfield operational utility evaluation. Phase 2: Operation on unpaved soil surfaces following rainfall
[AD-A108597] N82-18206
AIRCRAFT PRODUCTION
The inter-relation between design, construction and maintenance
A82-24010
CAD/CAM in British Aerospace - Aircraft Group
A82-24373
Technology for quality and quantity in a new fighter
[SAE PAPER 811100] A82-24404
AIRCRAFT PRODUCTION COSTS
Impact of technology on avionics cost trends
[AD-A108494] N82-18219
AIRCRAFT RELIABILITY
Reliability centered maintenance /RCM/
A82-24001
Airworthiness regulation: What is our strategy - What are the issues
A82-24006
The way ahead for helicopter maintenance
A82-24009
MSG-3 overview --- aircraft maintenance program development
A82-24014
Airworthiness considerations in the design of commercial transport aircraft
[SAE PAPER 811039] A82-24396
Designing for continued airworthiness - General aviation
[SAE PAPER 811038] A82-24397
Reliability analysis of a dual-redundant engine controller
[SAE PAPER 811077] A82-24410
Hypothetical fatigue life problem - Application of Aerospatiale method
A82-24716
The reliability and safety of small passenger aircraft
A82-24972
Point of view of a helicopter manufacturer on airworthiness regulations
N82-18137
Aeronautical Research Laboratories Structures Division
[AD-A109049] N82-19161
AIRCRAFT SAFETY
MSG-3 overview --- aircraft maintenance program development
A82-24014
Designing for continued airworthiness - General aviation
[SAE PAPER 811038] A82-24397
Scanning strategies for air traffic control radars
A82-24646
Standardization of helicopter fatigue methodology - A manufacturer's view
A82-24704
Flight test data acquisition and interpretation
A82-24707
The reliability and safety of small passenger aircraft
A82-24972
Point of view of a helicopter manufacturer on airworthiness regulations
N82-18137
Electrical ground testing of aircraft antistatic protection
N82-19156
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199
Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
[AD-A108893] N82-19203
Workshop on Mathematical Fire Modeling
[AD-A108876] N82-19343
AIRCRAFT SPECIFICATIONS
Point of view of a helicopter manufacturer on airworthiness regulations
N82-18137
Army Lynx: Product development matched to military combat development
N82-18143
A light helicopter for night firing
N82-18144
AIRCRAFT SPIN
Spin-tunnel investigation of a 1/13-scale model of the NASA AD-1 oblique-wing research aircraft
[NASA-TM-83236] N82-18183
A criterion for the prediction of the recovery characteristics of spinning aircraft
[RAE-TM-AERO-2251] N82-19223
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft --- static wind tunnel force measurements
[NASA-CR-163578] N82-19224
AIRCRAFT STABILITY
Aircraft parameter identification in the presence of atmospheric turbulence
A82-23227
AIRCRAFT STRUCTURES
On the sonic fatigue life estimation of skin structures at room and elevated temperatures
A82-23678
Novel approaches to electron beam welding machine utilization
A82-23753
Diffusion bonding in superplastic forming/diffusion bonding
A82-23754
Aluminum and its alloys - Weldability
A82-23755
Material/structure degradation due to fretting and fretting-initiated fatigue
A82-23771
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772
MSG-3 structures --- inspection program for aircraft maintenance
A82-24011
Transparency development needs for military aircraft in the 1980's
A82-24302
Portable transparency optical test system /P-TOTS/
A82-24309
Windshield system structural enhancement
A82-24312
D.C.9 windshield - Effect of attachment retorque
A82-24324
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24308
Certification of civil composite aircraft structure
[SAE PAPER 811061] A82-24309
Standardisation of helicopter fatigue methodology - A manufacturer's view
A82-24704
The effects of slight non-linearities on modal testing of helicopter-like structures
N82-18130
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations
[MBB-FE-122/S/PUB/36] N82-18211
Interpretation and construction of a dynamic similarity model of the A 310 wings
[MBB-FE-17/S/PUB/42] N82-18212

Characterization of the Airbus horizontal stabilizers of CFRP construction and structural analysis with the finite element method
[MBB-UT-13-81-0] N82-18213
A study of the effects of long-term exposure to fuels and fluids on the behavior of advanced composite materials
[NASA-CR-165763] N82-18327
Electroforming of space and aircraft structures
[MBB-BB-491-0] N82-18419
Aeronautical Research Laboratories Structures Division
[AD-A109049] N82-19161
Practical applications of fracture mechanics
[AGARD-AG-257] N82-19571
Structural system identification technology verification
[AD-A109181] N82-19583

AIRCRAFT SURVIVABILITY
Fighter issues - 2000
[SAE PAPER 811096] A82-24415
Evolution of the Aeroscout
A82-24706
Army Lynx: Product development matched to military combat development
N82-18143
A light helicopter for night firing
N82-18144

AIRCRAFT TIRES
Dynamics of aircraft antiskid braking systems --- conducted at the Langley aircraft landing loads and traction facility
[NASA-TP-1959] N82-18204

AIRCRAFT WAKES
The requirements for reduced IFR separations on final approach
A82-23311
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225

AIRFOIL PROFILES
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608] A82-24677
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18189
Laminar airfoils for transport aircraft
[ESA-TT-680] N82-18190
On the design of some airfoils for sailplane application --- additions to existing wings for inflight testing
[VTH-LR-326] N82-19213

AIRFRAME MATERIALS
Fracture and fatigue characterization of aircraft structural materials under biaxial loading
[AD-A109054] N82-19587

AIRFRAMES
Welding for low-cost advanced titanium airframe structures
A82-23757
Material/structure degradation due to fretting and fretting-initiated fatigue
A82-23771
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358

AIRLINE OPERATIONS
Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning
A82-23470
What the operator wants --- airline cooperation in aircraft maintenance
A82-24008
MSG-3 overview --- aircraft maintenance program development
A82-24014
Wind and temperature database for flight planning
[SAE PAPER 811068] A82-24385
Airline flight planning - The weather connection
[SAE PAPER 811067] A82-24386
Integration of energy management concepts into the flight deck
[SAE PAPER 811066] A82-24387

Report of the Air Traffic Forecasting Working Party, 1981
N82-19195

AIRPORT PLANNING
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037
Aircraft/airport compatibility - A constant challenge for aircraft designers
A82-25119

AIRPORTS
Utilization of radio equipment at airports and on airways --- Russian book
A82-22407
Development of a clear air radar to detect meteorological hazards at airports
[AD-A108236] N82-18835
FAA statistical handbook of aviation
[AD-A109289] N82-19198

AIRSPACE
International plans for civil and military co-ordination
A82-23317

AIRSPEED
Evaluation of the helicopter low airspeed system LASSIE
N82-18172
Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed
[DFVLR-MITT-81-18] N82-19957

ALASKA
United States Coast Pilot 9. Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea
[PB82-109562] N82-18201

ALPHA PARTICLES
Linear alpha-ray altimeter
A82-23225

ALTIMETERS
Linear alpha-ray altimeter
A82-23225

ALTITUDE
Analysis of a nonlinear altitude tracking method
[AD-A108878] N82-19197

ALUMINUM ALLOYS
Aluminum and its alloys - Weldability
A82-23755
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772

ANGLE OF ATTACK
Oscillating supersonic/hypersonic wings at high incidence
A82-23828
Review of support interference in dynamic tests
[AIAA 82-0594] A82-24668
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18189

ANTENNA ARRAYS
Antenna (selected articles)
[AD-A108174] N82-19448

ANTENNA DESIGN
Antenna (selected articles)
[AD-A108174] N82-19448

ANTENNA RADIATION PATTERNS
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km
[AD-A108182] N82-18464
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[ESA-TT-677] N82-18483
Antenna (selected articles)
[AD-A108174] N82-19448

ANTENNAS
Assessment of aircraft capacitive circuit medium wave antennas according to their efficiency
N82-19453

ANTIMISSILE DEFENSE
Perspectives for Controlled Weapons Technology: Report of the 90th Helicopter Forum
[MBB-UA-532-80-0] N82-19211

ANTIREFLECTION COATINGS
Reducing reflections on the front surface of air traffic control displays
A82-23314

ANTISKID DEVICES
  Dynamics of aircraft antiskid braking systems --- conducted at the Langley aircraft landing loads and traction facility
  [NASA-TP-1959] N82-18204
APPLICATIONS PROGRAMS (COMPUTERS)
  Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test
  N82-18127
ARCHITECTURE
  Airport related residential acoustical insulation demonstration project: Report 1720
  [PB82-100777] N82-19396
ARCHITECTURE (COMPUTERS)
  ATC automation - A look forward: Technology/architecture
  A82-23320
  Discrete Address Beacon System /DABS/
  A82-23322
ARRESTING GEAR
  Investigation of crossdeck pendant catapult slot interaction; proposed corrective measures
  [AD-A108149] N82-18232
ARTIFICIAL CLOUDS
  Helicopter Icing Spray System (HISS) nozzle improvement evaluation
  [AD-A109405] N82-19208
ASPECT RATIO
  Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
  [NASA-TP-1974] N82-19222
ATMOSPHERIC CIRCULATION
  Aircraft measurements and analysis of severe storms: 1976 field experiment
  [NASA-CR-168519] N82-18803
ATMOSPHERIC SOUNDING
  Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data
  A82-25113
ATMOSPHERIC TEMPERATURE
  Wind and temperature database for flight planning
  [SAE PAPER 811066] A82-24385
ATMOSPHERIC TURBULENCE
  Aircraft parameter identification in the presence of atmospheric turbulence
  A82-23227
ATMOSPHERICS
  TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km
  [AD-A108182] N82-18464
ATTACK AIRCRAFT
  Aircrew restraint and mobility test fixture
  [AD-A108274] N82-18193
AUTOMATED EN ROUTE ATC
  Air Traffic Control computer replacement - Specification issues and problems
  A82-23313
  NAS system load - Utilization of the DARC system
  A82-23315
  ATC automation - A look forward: Technology/architecture
  A82-23320
AUTOMATIC CONTROL
  Three-engine control system for the prototype EH-101 helicopter
  [AESG-9/81-1568L] N82-18135
AUTOMATIC FLIGHT CONTROL
  A control model for maneuvering flight for application to a computer-flight testing program
  N82-18153
AUTOMATIC TRAFFIC ADVISORY AND RESOLUTION
  Conflicts between random flights in a given area
  A82-25213
AUTOMOBILES
  Slotted wall test section for automotive aerodynamic test facilities
  [AIAA 82-0585] A82-24661
AUXILIARY POWER SOURCES
  Electric Flight Systems
  [NASA-CP-2209] N82-19134
  Electric flight systems, overview
  N82-19135
  Electric ECS
  N82-19140
  Electric flight systems integration
  N82-19150
AVIONICS
  The use of dynamic mock-ups in the design of advanced systems --- USAF's Digital Avionic Information System and NAVY's Advanced Integrated Display System
  A82-22902
  The coupling of electromagnetic interference into aircraft systems
  A82-24354
  The variation of induced currents in aircraft wiring
  A82-24355
  EMC clearance of modern military aircraft
  A82-24359
  The testing of aircraft under near field conditions
  A82-24361
  Advanced electronic displays and their potential in future transport aircraft
  A82-25216
  Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s
  A82-25324
  The role of simulation in the design process
  N82-18154
  Integration of inertial sensors in helicopters
  N82-18173
  Impact of technology on avionics cost trends
  [AD-A108094] N82-18219
  Trends in airline avionics
  [NLR-MP-80013-U] N82-18220
  Integration of complex systems in current and future aircraft projects for the example of avionics
  [MBB-UH-10-80-O] N82-18221
  A-7E software module guide
  [AD-A108649] N82-18920
  Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost
  [AD-A109373] N82-19210
AXIAL FLOW TURBINES
  An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan --- in an aircraft engine
  [TT-8101] N82-19956
AXIAL LOADS
  Fracture and fatigue characterization of aircraft structural materials under biaxial loading
  [AD-A109054] N82-19587
AXIAL STRAIN
  Investigation of compaction criteria for airport pavement subgrade soils
  [AD-A108518] N82-18230

B

BASE PRESSURE
  A method of predicting fuselage loads in hover
  N82-18164
BEACON COLLISION AVOIDANCE SYSTEM
  Analysis of a nonlinear altitude tracking method
  [AD-A108878] N82-19197
  Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
  [AD-A108893] N82-19203
BEAUFORT SEA (NORTH AMERICA)
  United States Coast Pilot 9. Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea
  [PB82-109562] N82-18201
BENDING MOMENTS
  A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft --- improving riding quality in fighter aircraft
  [NLR-TR-80032-U] N82-19212
BIBLIOGRAPHIES
  Bibliography of NASA published reports on general aviation, 1975 to 1981
  [NASA-TM-83307] N82-18132
BILLETS
  Lucas stretched acrylic
  A82-24318
BIRD-AIRCRAFT COLLISIONS
  Transparencies - What an aircraft designer should know
  A82-24305
  An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
  A82-24313

The role of finite element analysis in the design of birdstrike resistant transparencies
A82-24314
Aircraft transparency bird impact analysis using the MAGNA computer program
A82-24315
The effects of bird orientation on load profile and damage level
A82-24316

BLADE TIPS
Prediction of blade vortex interaction noise from measured blade pressure
N82-18147
The problem of calculation of the flow around helicopter rotor blade tips
N82-18160
An analytical investigation of the free-tip rotor for helicopters
[NASA-TM-81345] N82-18179
On the calculation of transonic blade tip flow for helicopter rotors
[MBB-UD-320-81-O] N82-18187

BLOWDOWN WIND TUNNELS
Induction driven transonic wind tunnel T2: Operation at room temperature and cryogenic adaptation
N82-19158

BODY-WING CONFIGURATIONS
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167

BOEING 727 AIRCRAFT
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406

BOEING 737 AIRCRAFT
Boeing's big, quiet 737-300
A82-23369
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406

BOEING 747 AIRCRAFT
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406

BOEING 757 AIRCRAFT
The development of high strength light-weight windshields for the new generation of Boeing 757 and 767 airliners
A82-24323

BOLTS
D.C.9 windshield - Effect of attachment retorque
A82-24324

BOMBS (ORDNANCE)
Bomb crater repair techniques for permanent airfields. Report 1: Series 1 tests
[AD-A108716] N82-18229

BOUNDARY LAYER CONTROL
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test
[AIAA 82-0568] A82-24656

BOUNDARY LAYER SEPARATION
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18189

BRAKING
Dynamics of aircraft antiskid braking systems --- conducted at the Langley aircraft landing loads and traction facility
[NASA-TP-1959] N82-18204

BROADCASTING
FM broadcast interference related to airborne ILS, VOR and VHF communications
[RTCA/DO-176] N82-19419
Investigation of technical requirements
N82-19420

C

C-160 AIRCRAFT
Importance of a tactical cargo aircraft in emergency relief
A82-25499

CABIN ATMOSPHERES
Environmental Control Systems
N82-19141

CALIBRATING
Pressure transducer calibration process
[SAE PAPER 811076] A82-24408

CANOPIES
Aircraft transparency design guide
A82-24307
Windshield system structural enhancement
A82-24312
An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
A82-24313
Aircraft transparency bird impact analysis using the MAGNA computer program
A82-24315

CAPACITANCE
Assessment of aircraft capacitive circuit medium wave antennas according to their efficiency
N82-19453

CARBON FIBER REINFORCED PLASTICS
Characterization of the Airbus horizontal stabilizers of CFRP construction and structural analysis with the finite element method
[MBB-UT-13-81-O] N82-18213

CARBON FIBERS
Carbon-fiber composites - A fiber composite material for highly stressed light-construction components
A82-24805

CARGO AIRCRAFT
The cargo helicopter - A logistical vehicle
A82-24717

CATAPULTS
Investigation of crossdeck pendant catapult slot interaction; proposed corrective measures
[AD-A108149] N82-18232

CATHODE RAY TUBES
Reducing reflections on the front surface of air traffic control displays
A82-23314
Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s
A82-25324

CEMENTS
Investigation into the utility of some quick setting cements for runway repair
[B-80-157/60.7.0157] N82-18225

CENTER OF GRAVITY
Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning
A82-23470
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226

CERAMIC COATINGS
Novel metal-ceramics-composite sealing coatings in aircraft engines
A82-24803

CERMETS
Novel metal-ceramics-composite sealing coatings in aircraft engines
A82-24803

CERTIFICATION
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24388
Certification of civil composite aircraft structure
[SAE PAPER 811061] A82-24389
Collection and evaluation of propeller aircraft noise certification data
[DFVLR-MITT-81-20] N82-19958

CH-46 HELICOPTER
Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft
A82-24705

CHARGE COUPLED DEVICES
A new angular deviation measurement device for aircraft transparencies
A82-24308

CIVIL AVIATION
International plans for civil and military co-ordination
A82-23317
Air transportation of handicapped persons
A82-24338
Airline flight planning - The weather connection
[SAE PAPER 811067] A82-24386
Certification of civil composite aircraft structure
[SAE PAPER 811061] A82-24389

The application of NAVSTAR differential GPS in the civilian community
A82-24645
Analysis of loran-C system reliability for civil aviation
A82-24650
The toll of ILS-preventable aviation accidents
A82-25325
Impact of technology on avionics cost trends
[AD-A108494] N82-18219
Trends in airline avionics
[NLR-MP-80013-U] N82-18220
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
FAA statistical handbook of aviation
[AD-A109289] N82-19198
CLEAR AIR TURBULENCE
Development of a clear air radar to detect meteorological hazards at airports
[AD-A108236] N82-18835
CLOCKS
Global positioning system timing receivers in the DSN
N82-20126
COASTS
United States Coast Pilot 9. Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea
[PB82-109562] N82-18201
COBALT
Where is cobalt irreplaceable
A82-25538
COCKPIT SIMULATORS
The role of simulation in the design process
N82-18154
COCKPITS
F/A-18 weapon system development
A82-23774
Deficiencies and constraints that affect the design of cockpit enclosures and transparencies
A82-24303
B.A.C. One-Eleven flight deck glazing product improvement
A82-24325
Integration of energy management concepts into the flight deck
[SAE PAPER 811066] A82-24387
The multi mode matrix flat panel display: Technology and applications
N82-18169
New developments in cockpit-human interfaces
[RAE-TM-FS-412] N82-18215
Analytical study of cockpit information requirements
[AD-A108524] N82-18218
Transport aircraft cockpit standardization (Federal Aviation regulations part 25)
[AD-A108924] N82-19207
COLLISION AVOIDANCE
Discrete Address Beacon System /DABS/
A82-23322
Conflicts between random flights in a given area
A82-25213
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[ESA-TT-685] N82-18200
Aircraft collision avoidance systems
[GPO-79-431] N82-19201
COMBAT
Evolution of the Aeroscout
A82-24706
The cargo helicopter - A logistical vehicle
A82-24717
COMBUSTION CHAMBERS
Fuel-rich plume combustion
[AD-A108136] N82-18349
Dilution jet behavior in the turn section of a reverse flow combuster
[NASA-TM-82776] N82-19220
COMMAND AND CONTROL
A redundancy concept for a digital CSAS
N82-18170
COMMERCIAL AIRCRAFT
Airworthiness considerations in the design of commercial transport aircraft
[SAE PAPER 811039] A82-24396
Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s
A82-25326
Naval versions of the Dauphin and the AS 15 TT weapon system
N82-18142
Impact of technology on avionics cost trends
[AD-A108494] N82-18219
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-33307] N82-19132
FAA statistical handbook of aviation
[AD-A109289] N82-19198
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225
COMMUNICATION EQUIPMENT
Selection of telecommunication equipment - A new approach to the equivalent cost concept
A82-25510
COMMUNICATION NETWORKS
Beyond the horizon coverage for air navigation/traffic control
A82-24647
Selection of telecommunication equipment - A new approach to the equivalent cost concept
A82-25510
National Airspace Data Interchange Network (NADIN) support of Remote Maintenance Monitoring System (RMMS)
[AD-A109125] N82-19160
COMMUNITIES
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974
COMPACTING
Investigation of compaction criteria for airport pavement subgrade soils
[AD-A108518] N82-18230
COMPATIBILITY
Aircraft/airport compatibility - A constant challenge for aircraft designers
A82-25119
COMPONENT RELIABILITY
Material/structure degradation due to fretting and fretting-initiated fatigue
A82-23771
The inter-relation between design, construction and maintenance
A82-24010
Standardization of helicopter fatigue methodology - A manufacturer's view
A82-24704
A method of determining safe service life for helicopter components
A82-24709
Advanced attack helicopter fatigue testing - Overview
A82-24720
COMPOSITE STRUCTURES
Structural testing of composites with known defects
A82-24708
NDE of composite rotor blades during fatigue testing
A82-24713
COMPRESSOR BLADES
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222
COMPRESSOR ROTORS
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222
COMPRESSORS
Open-cycle vapor compression heat pump
[PB82-110503] N82-18553
Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391
COMPUTATION
A complete method for computation of blade mode characteristics and responses in forward flight
N82-18126
COMPUTATIONAL FLUID DYNAMICS
Design of supercritical swept wings
A82-23826
Annual review of fluid mechanics. Volume 14 --- Book
A82-24416

International Conference on Numerical Methods in Fluid Dynamics, 7th, Stanford University, Stanford and Moffett Field, CA, June 23-27, 1980, Proceedings A82-24426
Problems of numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles A82-25347

COMPUTER GRAPHICS
Computer-generated images for simulators - The cost of technology A82-22881
Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980 A82-24371
Integrated control design techniques [AD-A108223] N82-18224

COMPUTER PROGRAMMING
A program testing assistant [AD-A108147] N82-18922

COMPUTER PROGRAMS
A Microwave Landing System simulation A82-23323
Aircraft transparency bird impact analysis using the MAGNA computer program A82-24315
Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test N82-18127
A-7E software module guide [AD-A108649] N82-18920
Transport aircraft cockpit standardization (Federal Aviation regulations part 25) [AD-A108924] N82-19207

COMPUTER SYSTEMS DESIGN
Air Traffic Control computer replacement - Specification issues and problems A82-23313
NAS system load - Utilization of the DARC system A82-23315
ATC automation - A look forward: Technology/architecture A82-23320
Lightweight ATC systems A82-23321
CAD/CAM in British Aerospace - Aircraft Group A82-24373

COMPUTER SYSTEMS PERFORMANCE
NAS system load - Utilization of the DARC system A82-23315
Distributed data processing modeling for future ATC systems A82-23319

COMPUTERIZED DESIGN
Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980 A82-24371
CAD/CAM in British Aerospace - Aircraft Group A82-24373
High speed VSCF generator design consideration --- computer aided design for Variable Speed Constant Frequency generator A82-24379
A marine NAVSTAR GPS receiver A82-24644
Integrated control design techniques [AD-A108223] N82-18224

COMPUTERIZED SIMULATION
GTD terrain reflection model applied to ILS glide scope --- Geometrical Theory of Diffraction A82-23027
Aircraft parameter identification in the presence of atmospheric turbulence A82-23227
A Microwave Landing System simulation A82-23323
Calculation and measurement of electric field strength for airborne antennas in the LF/MF range A82-25011
Developments in rotary wing aircraft aerodynamics N82-18120
A study of the techniques of dynamic analysis of helicopter type structures N82-18129
A method of predicting fuselage loads in hover N82-18164
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 2: Programmer's manual [AD-A108294] N82-18231
Workshop on Mathematical Fire Modeling [AD-A108876] N82-19343
Foundations for computer simulation of a low pressure oil flooded single screw air compressor [AD-A108230] N82-19391

CONCORDE AIRCRAFT
Navigational aids on-board the Concorde A82-24065
Concorde glazings - 5 years of Mach 2 service A82-24326

CONCRETES
Investigation into the utility of some quick setting cements for runway repair [B-80-157/60.7.0157] N82-18225

CONFERENCES
Air Traffic Control Association, Annual Fall Conference, 25th, Arlington, VA, October 19-24, 1980, Proceedings A82-23309
Israel Annual Conference on Aviation and Astronautics, 23rd, Tel Aviv and Haifa, Israel, February 11, 12, 1981, Collection of Papers A82-23426
Welding technology for the aerospace industry; Proceedings of the Conference, Las Vegas, NV, October 7, 8, 1980 A82-23751
Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings A82-24301
Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980 A82-24371
Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981 [SAE SP-500] A82-24376
International Conference on Numerical Methods in Fluid Dynamics, 7th, Stanford University, Stanford and Moffett Field, CA, June 23-27, 1980, Proceedings A82-24426
Institute of Navigation, Annual Meeting, 37th, U.S. Naval Academy, Annapolis, MD, June 9-11, 1981, Proceedings A82-24643
Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers A82-24651
Seventh European Rotorcraft and Powered Lift Aircraft Forum N82-18119
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session [NASA-TM-84147] N82-19172

CONGRESSIONAL REPORTS
Review of defense-related vertical and short takeoff and landing (V/STOL) aircraft programs [GPO-55-278] N82-18205
Aircraft collision avoidance systems [GPO-79-431] N82-19201
Air traffic control en route computer system [GPO-89-008] N82-19202

CONSOLES
Task analytic techniques: Application to the design of a flight simulator instructor/operator console [AD-A108724] N82-18227

CONSTRAINTS
Aircrew restraint and mobility test fixture [AD-A108274] N82-18193

CONTROL CONFIGURED VEHICLES
Mission-adaptive wing flight demonstration program [SAE PAPER 811035] A82-24399
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations [NASA-CR-3491] N82-19226

CONTROL EQUIPMENT
Fixed gain controller design for aircraft A82-23441
F/A-18 weapon system development A82-23774

Fatigue test of the typical main rotor controls component
A82-24715
AFWAL turbine engine controls research and development - Present and future
[AIAA PAPER 82-0321] A82-25050
Three-engine control system for the prototype EH-101 helicopter
[AERG-9/81-1560L] N82-18135
CONTROL STABILITY
A control model for maneuvering flight for application to a computer-flight testing program
N82-18153
Apparatus for damping operator induced oscillations of a controlled system --- flight control
[NASA-CASE-FRC-11041-1] N82-18493
CONTROL THEORY
Analysis and optimization of control systems in piloted flight vehicles --- Russian book
A82-22398
The influence of sensor and actuator characteristics on overall helicopter AFCS design
N82-18171
CONTROL VALVES
An ejector augmented choking valve for the metering and control of inlet and bleed duct flows
[AIAA 82-0575] A82-24659
CONTROLLERS
Fixed gain controller design for aircraft
A82-23441
COOLING SYSTEMS
Cost of ownership advantages with a shared oil system
A82-24378
COORDINATION
FAA/FCC coordination procedures for FM broadcast stations
N82-19423
CORROSION PREVENTION
Recent developments in materials and processes for aircraft corrosion control
A82-24825
CORROSION RESISTANCE
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772
Materials aspects of aircraft EMC design
A82-24358
Aircraft surface coatings for drag reduction/erosion protection
[SAE PAPER 811070] A82-24401
Where is cobalt irreplaceable
A82-25538
COST ANALYSIS
Quality, quantity, and technology - A perspective on fighter development
[SAE PAPER 811097] A82-24400
Technology for quality and quantity in a new fighter
[SAE PAPER 811100] A82-24404
The toll of ILS-preventable aviation accidents
A82-25325
Selection of telecommunication equipment - A new approach to the equivalent cost concept
A82-25510
Impact of technology on avionics cost trends
[AD-A108494] N82-18219
Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost
[AD-A109373] N82-19218
COST EFFECTIVENESS
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
N82-18131
COST REDUCTION
Airline fuel saving through JT9D engine refurbishment
[SAE PAPER 811051] A82-24395
Potential reductions in aircraft operation and maintenance costs by using thrust computing support equipment
[AD-A108463] N82-18207
COUPLING
A further study of helicopter rotor pitch-flap-phase coupling
[BU-259] N82-19214
COWLINGS
Engine superficial temperature and infrared signature
N82-18136
CRACK PROPAGATION
Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft
A82-24705
Fracture and fatigue characterization of aircraft structural materials under biaxial loading
[AD-A109054] N82-19587
CRACKING (FRACTURING)
A compilation of stress intensity factor solutions for flawed fastener holes
[AD-A108753] N82-18620
CRASH LANDING
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199
CRASHES
Test site instrumentation study. Volume 2: Crash 1 and crash 2 raw data
[PB82-111832] N82-18233
An assessment of the crash fire hazard of liquid hydrogen fueled aircraft
[NASA-CR-165526] N82-19196
CRATERS
Bomb crater repair techniques for permanent airfields. Report 1: Series 1 tests
[AD-A108716] N82-18229
CROSS COUPLING
The coupling of electromagnetic interference into aircraft systems
A82-24354
The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives
[AIAA 82-0595] A82-24669
Cross and cross-coupling derivative measurements on the standard dynamics model at AEDC
[AIAA 82-0596] A82-24670
CRUISING FLIGHT
Wind tunnel investigation of high speed rotor noise
N82-18146
A numerical approach to co-axial rotor aerodynamics
N82-18157
CRYOGENIC WIND TUNNELS
Induction driven transonic wind tunnel T2: Operation at room temperature and cryogenic adaptation
N82-19158
CUMULATIVE DAMAGE
Flight condition recognition /FCR/ technique --- microprocessor-based recording for helicopter structural component fatigue damage
A82-24712
CYCLIC LOADS
The Agusta's solution of AHS's hypothetical fatigue life problem
A82-24701
The challenge of standardizing fatigue methodology
A82-24703

D

DATA ACQUISITION
Flight test data acquisition and interpretation
A82-24707
Test site instrumentation study. Volume 2: Crash 1 and crash 2 raw data
[PB82-111832] N82-18233
DATA BASES
Analysis of system problems using aviation safety reporting system data
A82-23312
Collection and evaluation of propeller aircraft noise certification data
[DFVLR-MITT-81-20] N82-19958
DATA LINKS
Discrete Address Beacon System /DABS/
A82-23322
MIL-STD 1553B - Aircraft EM environmental susceptibility effects
A82-24357
DATA MANAGEMENT
Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980
A82-24371

DATA PROCESSING
Distributed data processing modeling for future ATC systems A82-23319
DATA PROCESSING EQUIPMENT
Air traffic control en route computer system [GPO-89-008] N82-19202
DATA RECORDING
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors [RAE-TM-RAD-NAV-145] N82-18503
DATA REDUCTION
Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data A82-25113
Improvements and extensions of the Geometrical Dilution of Precision (GDOP) concept for selecting navigation measurements [AD-A108607] N82-18197
Test site instrumentation study. Volume 2: Crash 1 and crash 2 raw data [PB82-111832] N82-18233
DC 9 AIRCRAFT
D.C.9 windshield - Effect of attachment retorque A82-24324
DC 10 AIRCRAFT
Deficiencies and constraints that affect the design of cockpit enclosures and transparencier A82-24303
DEAD RECKONING
On the calculation of separated flow on helicopter fuselages [MBB-UD-321-81-O] N82-18188
DEFECTS
A compilation of stress intensity factor solutions for flawed fastener holes [AD-A108753] N82-18628
DEFENSE PROGRAM
Review of defense-related vertical and short takeoff and landing (V/STOL) aircraft programs [GPO-55-278] N82-18205
DEICING
Transparencies - What an aircraft designer should know A82-24305
DEMAND (ECONOMICS)
Selection of telecommunication equipment - A new approach to the equivalent cost concept A82-25510
DESCENT
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type [AD-A108801] N82-19206
DESIGN ANALYSIS
YF-16 design concept and philosophy A82-23444
Aircraft transparency design guide A82-24307
Design considerations of DC-Link aircraft generation systems A82-24377
Design technology for improved performance retention in turbofan engines [SAE PAPER 811055] A82-24392
Airworthiness considerations in the design of commercial transport aircraft [SAE PAPER 811039] A82-24396
Designing for continued airworthiness - General aviation [SAE PAPER 811038] A82-24397
Aircraft/airport compatibility - A constant challenge for aircraft designers A82-25119
Design philosophy of the Hughes model 600 helicopter N82-18140
A design study of the Marshal --- lightweight twin-engined aircraft [BU-262] N82-19215
Cooled variable-area radial turbine technology program [NASA-CR-165408] N82-19221
DESIGN TO COST
Task analytic techniques: Application to the design of a flight simulator instructor/operator console [AD-A108724] N82-18227
DETERIORATION
MSG-3 structures --- inspection program for aircraft maintenance A82-24011
RB 211 powerplant deterioration - Review of current situation and lessons learned [SAE PAPER 811053] A82-24393
DIFFUSION WELDING
Diffusion bonding in superplastic forming/diffusion bonding A82-23754
Metal honeycomb to porous wireform substrate diffusion bond evaluation [NASA-TM-82793] N82-18612
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures [NASA-CR-165827] N82-19358
DIGITAL SYSTEMS
Digital flight controls N82-19143
Digital flight controls N82-19149
DIGITAL TECHNIQUES
Computer-generated images for simulators - The cost of technology A82-22881
MIL-STD 1553B - Aircraft EM environmental susceptibility effects A82-24357
Efficient combinations of numerical techniques applied to aircraft turning performance optimization A82-24814
DILUTION
Dilution jet behavior in the turn section of a reverse flow combuster [NASA-TM-82776] N82-19220
DIPOLE ANTENNAS
Analysis of the crossed dipole antenna as a model for aircraft in an electromagnetic environment A82-25002
DIRECT CURRENT
Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States A82-24382
DIRECTIONAL STABILITY
Interpretation and construction of a dynamic similarity model of the A 310 wings [MBB-FE-17/S/PUB/42] N82-18212
DISASTERS
Importance of a tactical cargo aircraft in emergency relief A82-25499
DISCRETE ADDRESS BEACON SYSTEM
Discrete Address Beacon System /DABS/ A82-23322
DISPLAY DEVICES
The use of dynamic mock-ups in the design of advanced systems --- USAF's Digital Avionic Information System and NAVY's Advanced Integrated Display System A82-22902
Combined multisensor displays --- image preprocessing for shape coding to reduce pilot workload A82-22905
Loran for precise position location - The VIEW-NAV system A82-24648
Advanced electronic displays and their potential in future transport aircraft A82-25216
Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s A82-25324
The multi mode matrix flat panel display: Technology and applications N82-18169
Analytical study of cockpit information requirements [AD-A108524] N82-18218
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type [AD-A108801] N82-19206
Transport aircraft cockpit standardization (Federal Aviation regulations part 25) [AD-A108924] N82-19207

DISTANCE MEASURING EQUIPMENT
The birth of precision DME A82-24066
Loran-C RNAV in mountainous areas A82-24649

DISTRIBUTED PARAMETER SYSTEMS
Distributed intelligence for air fleet control [AD-A108611] N82-18195

DOWNWASH
Angle of downwash behind a wing in unsteady flow A82-24970
Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results N82-18158

DRAG REDUCTION
Fuel-efficient windshields for transport, commuter and business aircraft A82-24304
Aircraft surface coatings for drag reduction/erosion protection [SAE PAPER 811070] A82-24401
Developments in rotary wing aircraft aerodynamics N82-18120
Laminar airfoils for transport aircraft [ESA-TT-680] N82-18190
On the design of some airfoils for sailplane application --- additions to existing wings for inflight testing [VTH-LR-326] N82-19213

DRONE AIRCRAFT
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors [RAE-TM-RAD-NAV-145] N82-18503

DUCT GEOMETRY
Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts [ASME PAPER 81-WA/NCA-13] A82-24602

DUCTED FANS
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan --- in an aircraft engine [TT-8101] N82-19956

DUCTED FLOW
An ejector augmented choking valve for the metering and control of inlet and bleed duct flows [AIAA 82-0575] A82-24659

DUPLEX OPERATION
An on board supervisory system for applications in space missions [INPE-2097-RPE/327] N82-18216

DYNAMIC CHARACTERISTICS
A method for the investigation of gyrostabilization systems A82-24892
A study of the techniques of dynamic analysis of helicopter type structures N82-18129

DYNAMIC RESPONSE
Dynamics of aircraft antiskid braking systems --- conducted at the Langley aircraft landing loads and traction facility [NASA-TP-1959] N82-18204
A criterion for the prediction of the recovery characteristics of spinning aircraft [RAE-TM-AERO-2251] N82-19223
Acoustic fatigue endurance test of USB flap structure models at elevated temperature [NAL-TR-683] N82-19570

DYNAMIC STABILITY
Stability of a three-stage dynamic stand A82-25353

DYNAMIC STRUCTURAL ANALYSIS
Aircraft transparency bird impact analysis using the MAGNA computer program A82-24315
High speed VSCF generator design consideration --- computer aided design for Variable Speed Constant Frequency generator A82-24379

DYNAMIC TESTS
Review of support interference in dynamic tests [AIAA 82-0594] A82-24668

E

ECONOMETRICS
Selection of telecommunication equipment - A new approach to the equivalent cost concept A82-25510

EJECTION INJURIES
Physiological acceptability tests of the SJU-5/A ejection seat: Second physiological acceptance demonstration [AD-A108688] N82-18194

EJECTION SEATS
Multiple ejection effects analysis [AD-A108277] N82-18192
Physiological acceptability tests of the SJU-5/A ejection seat: Second physiological acceptance demonstration [AD-A108688] N82-18194

EJECTORS
The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel [AIAA 82-0571] A82-24650

ELECTRIC AUTOMOBILES
Vehicle test report: Battronic pickup truck [NASA-CR-168637] N82-19205

ELECTRIC CONTROL
On-line control for the regulation of power source in multiple-servo electro-hydraulic systems [ASME PAPER 81-WA/DSC-3] A82-24562

ELECTRIC FIELD STRENGTH
Calculation and measurement of electric field strength for airborne antennas in the LF/MF range A82-25011

ELECTRIC FIELDS
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km [AD-A108182] N82-18464

ELECTRIC GENERATORS
Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981 [SAE SP-500] A82-24376
Cost of ownership advantages with a shared oil system A82-24378
The effect of critical design parameters on the selection of a VSCF system A82-24381
Packaging the VSCF system for an aircraft engine environment A82-24383
Aircraft electric system development and test facilities A82-24384
Electric Flight Systems [NASA-CP-2209] N82-19134
A propulsion view of the all-electric airplane N82-19136
Potential propulsion considerations and study areas for all-electric aircraft N82-19137
A look into the future: The potential of the all-electric secondary power system for the energy efficient transport N82-19138
The 400-Hertz constant-speed electrical generation systems N82-19139

ELECTRIC MOTORS
Electric Flight Systems [NASA-CP-2209] N82-19134
Electric flight systems, overview N82-19135
A propulsion view of the all-electric airplane N82-19136
Potential propulsion considerations and study areas for all-electric aircraft N82-19137
A look into the future: The potential of the all-electric secondary power system for the energy efficient transport N82-19138
Electric ECS N82-19140
Environmental Control Systems N82-19141

Overview of Honeywell electromechanical actuation programs N82-19142
Digital flight controls N82-19143
Electric flight systems N82-19144
Engine technology N82-19145
Power systems N82-19146
Electromechanical actuators N82-19148
Digital flight controls N82-19149
Electric flight systems integration N82-19150

ELECTRIC POWER SUPPLIES
Recent improvements in aircraft Ni-Cd cells A82-24245
Aircraft electrical power systems; Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 5-8, 1981 [SAE SP-500] A82-24376
Design considerations of DC-Link aircraft generation systems A82-24377
The effect of critical design parameters on the selection of a VSCF system A82-24381
Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States A82-24382
Aircraft electric system development and test facilities A82-24384

ELECTRIC WIRE
The use of 'Kapton' polyimide film in aerospace applications [SAE PAPER 811091] A82-24413

ELECTRICAL INSULATION
The use of 'Kapton' polyimide film in aerospace applications [SAE PAPER 811091] A82-24413
Electrical ground testing of aircraft antistatic protection N82-19156

ELECTRICAL RESISTIVITY
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum A82-23772
Electrical ground testing of aircraft antistatic protection N82-19156

ELECTRO-OPTICS
A new angular deviation measurement device for aircraft transparencies A82-24308

ELECTRODEPOSITION
Electroforming of space and aircraft structures [MBB-BB-491-0] N82-18419

ELECTROFORMING
Electroforming of space and aircraft structures [MBB-BB-491-0] N82-18419

ELECTROMAGNETIC COMPATIBILITY
Materials aspects of aircraft EMC design A82-24358
EMC clearance of modern military aircraft A82-24359
The testing of aircraft under near field conditions A82-24361

ELECTROMAGNETIC INTERFERENCE
The coupling of electromagnetic interference into aircraft systems A82-24354
The variation of induced currents in aircraft wiring A82-24355
MIL-STD 1553B - Aircraft EM environmental susceptibility effects A82-24357

ELECTROMAGNETIC MEASUREMENT
The testing of aircraft under near field conditions A82-24361
Calculation and measurement of electric field strength for airborne antennas in the LF/MF range A82-25011

ELECTROMAGNETIC NOISE MEASUREMENT
Aircraft electric system development and test facilities A82-24384

ELECTROMAGNETIC WAVE TRANSMISSION
Analysis of the crossed dipole antenna as a model for aircraft in an electromagnetic environment A82-25002
A possible way of specifically correcting location and navigational errors caused by reflection and other propagation anomalies [ESA-TT-667] N82-18198

ELECTROMECHANICAL DEVICES
Overview of Honeywell electromechanical actuation programs N82-19142
Electric flight systems N82-19144
Electromechanical actuators N82-19148

ELECTRON BEAM WELDING
Novel approaches to electron beam welding machine utilization A82-23753

ELECTRONIC CONTROL
Advanced generating system technology A82-24380
The effect of critical design parameters on the selection of a VSCF system A82-24381
Packaging the VSCF system for an aircraft engine environment A82-24383
High temperature engine control electronics [SAE PAPER 811074] A82-24407

ELECTRONIC COUNTERMEASURES
AN/ALQ-135 tail warning system follow-on operational test and evaluation [AD-A108348] N82-18471

ELECTRONIC EQUIPMENT
Analysis of Built-In-Test (BIT) false alarm conditions [AD-A108752] N82-18217

ELECTRONIC EQUIPMENT TESTS
The variation of induced currents in aircraft wiring A82-24355
EMC clearance of modern military aircraft A82-24359
The testing of aircraft under near field conditions A82-24361
Aircraft electric system development and test facilities A82-24384
AN/ALQ-135 tail warning system follow-on operational test and evaluation [AD-A108348] N82-18471
Investigation of airborne VHF communication and navigation equipment N82-19421

ELECTROSTATIC CHARGE
Electrical ground testing of aircraft antistatic protection N82-19156

EMERGENCIES
Importance of a tactical cargo aircraft in emergency relief A82-25099

EMITTERS
Antenna (selected articles) [AD-A108174] N82-19448

ENERGY CONSERVATION
Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning A82-23970
Wind and temperature database for flight planning [SAE PAPER 811068] A82-24385
Integration of energy management concepts into the flight deck [SAE PAPER 811066] A82-24387
Management of powerplant maintenance and restoration programs for fuel conservation [SAE PAPER 811052] A82-24394
Airline fuel saving through JT9D engine refurbishment [SAE PAPER 811051] A82-24395

ENERGY CONSUMPTION
Air transport in the 21st century A82-24025

ENERGY CONVERSION
Open-cycle vapor compression heat pump
[PB82-110563] N82-18553
ENGINE AIRFRAME INTEGRATION
The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators
[AIAA PAPER 82-2635] A82-25154
ENGINE CONTROL
High temperature engine control electronics
[SAE PAPER 811074] A82-24407
Reliability analysis of a dual-redundant engine controller
[SAE PAPER 811077] A82-24410
AFWAL turbine engine controls research and development - Present and future
[AIAA PAPER 82-0321] A82-25050
A redundancy concept for a digital CSAS
N82-18170
ENGINE DESIGN
Lineup of the IM-series aircraft-derivative gas turbines
A82-22896
Low grade fuels for turbo and jet engines
A82-23439
Reliable power --- Rolls-Royce aircraft engine designs
A82-24007
RB 211 powerplant deterioration - Review of current situation and lessons learned
[SAE PAPER 811053] A82-24393
Management of powerplant maintenance and restoration programs for fuel conservation
[SAE PAPER 811052] A82-24394
Airline fuel saving through JT9D engine refurbishment
[SAE PAPER 811051] A82-24395
Performance retention features of the PW2037
[SAE PAPER 811054] A82-24409
Prediction of off-design performance of turbo-shaft engines a simplified method
N82-18132
Component design and development for future helicopter engines
N82-18134
Three-engine control system for the prototype EH-101 helicopter
[AERG-9/81-156JL] N82-18135
Cooled variable-area radial turbine technology program
[NASA-CR-165408] N82-19221
ENGINE FAILURE
Monitoring engine wear by oil analysis
A82-24012
A digital simulation program describing the motion of an aircraft undergoing engine failure during its takeoff ground roll
[AD-A108420] N82-18210
ENGINE INLETS
Effects of fan inlet temperature disturbances on the stability of a turbofan engine
[NASA-TM-82699] N82-18222
ENGINE MONITORING INSTRUMENTS
Monitoring engine wear by oil analysis
A82-24012
Propulsion multiplexer /EMUX/ system - The missing link
[SAE PAPER 811078] A82-24411
ENGINE NOISE
Preliminary thoughts on helicopter cabin noise prediction methods
N82-18148
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-607T-PT-2] N82-19945
ENGINE TESTS
Air cooled engine test facilities
A82-24004
Measurement techniques used to assess the installed power of a helicopter engine
N82-18133
ENVIRONMENT SIMULATION
Helicopter Icing Spray System (HISS) nozzle improvement evaluation
[AD-A109405] N82-19208
ENVIRONMENTAL CONTROL
Electric Flight Systems
[NASA-CP-2209] N82-19134
Electric ECS
N82-19140
Environmental Control Systems
N82-19141
Electric flight systems integration
N82-19150
ENVIRONMENTAL TESTS
The coupling of electromagnetic interference into aircraft systems
A82-24354
The variation of induced currents in aircraft wiring
A82-24355
EMC clearance of modern military aircraft
A82-24359
EPOXY MATRIX COMPOSITES
Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding
[AD-A109377] N82-19209
ERROR ANALYSIS
Analysis of system problems using aviation safety reporting system data
A82-23312
EUROPEAN AIRBUS
A310 - Design for maintenance
A82-24002
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228
EVOLUTION (DEVELOPMENT)
Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States
A82-24382
EXHAUST GASES
Fuel-rich plume combustion
[AD-A108136] N82-18349
EXHAUST NOZZLES
Prediction of off-design performance of turbo-shaft engines a simplified method
N82-18132
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-14 airplane
[NASA-TM-83250] N82-19181
EXHAUST SYSTEMS
Measurement techniques used to assess the installed power of a helicopter engine
N82-18133
Engine superficial temperature and infrared signature
N82-18136
EXPOSURE
A study of the effects of long-term exposure to fuels and fluids on the behavior of advanced composite materials
[NASA-CR-165763] N82-18327
EXTERNALLY BLOWN FLAPS
Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570

F

F-14 AIRCRAFT
Welding for low-cost advanced titanium airframe structures
A82-23757
Investigation of crossdeck pendant catapult slot interaction; proposed corrective measures
[AD-A108149] N82-18232
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-14 airplane
[NASA-TM-83250] N82-19181
F-16 AIRCRAFT
YF-16 design concept and philosophy
A82-23444
A new angular deviation measurement device for aircraft transparencies
A82-24308
F-18 AIRCRAFT
F/A-18 weapon system development
A82-23774

F-100 AIRCRAFT
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721
[AD-A108814] N82-19952
F-111 AIRCRAFT
Mission-adaptive wing flight demonstration program
[SAE PAPER 811035] A82-24399
FABRICATION
Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding
[AD-A109377] N82-19209
FAILURE ANALYSIS
Fatigue test of the typical main rotor controls component
A82-24715
Investigation of crossdeck pendant catapult slot interaction; proposed corrective measures
[AD-A108149] N82-18232
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199
FASTENERS
A compilation of stress intensity factor solutions for flawed fastener holes
[AD-A108753] N82-18628
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199
FATIGUE (MATERIALS)
Material/structure degradation due to fretting and fretting-initiated fatigue
A82-23771
Standardization of helicopter fatigue methodology - A manufacturer's view
A82-24704
Fatigue test of the typical main rotor controls component
A82-24715
Helicopter rotor load prediction
A82-24719
Fracture and fatigue characterization of aircraft structural materials under biaxial loading
[AD-A109054] N82-19507
FATIGUE LIFE
On the sonic fatigue life estimation of skin structures at room and elevated temperatures
A82-23678
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24388
The Agusta's solution of AHS's hypothetical fatigue life problem
A82-24701
The challenge of standardizing fatigue methodology
A82-24703
Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft
A82-24705
A method of determining safe service life for helicopter components
A82-24709
Hughes helicopters - Fatigue life methodology
A82-24710
Fundamentals of helicopter fatigue life determination
A82-24714
Hypothetical fatigue life problem - Application of Aerospatiale method
A82-24716
Boeing Vertol fatigue life methodology
A82-24718
Accustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570
FATIGUE TESTS
The challenge of standardizing fatigue methodology
A82-24703
NDE of composite rotor blades during fatigue testing
A82-24713
Fundamentals of helicopter fatigue life determination
A82-24714
Fatigue test of the typical main rotor controls component
A82-24715
Advanced attack helicopter fatigue testing - Overview
A82-24720
FEEDBACK CONTROL
Sensitivity reduction by double perfect model following --- with application to aircraft control
A82-23029
FERROGRAPHY
Monitoring engine wear by oil analysis
A82-24012
FIBER COMPOSITES
Carbon-fiber composites - A fiber composite material for highly stressed light-construction components
A82-24805
FIBER REINFORCED COMPOSITES
Certification of civil composite aircraft structure
[SAE PAPER 811061] A82-24389
NDE of composite rotor blades during fatigue testing
A82-24713
FIGHTER AIRCRAFT
Fighters - Tomorrow's terminology
A82-23368
An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
A82-24313
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398
Quality, quantity, and technology - A perspective on fighter development
[SAE PAPER 811097] A82-24400
Future strike fighter options - Concepts and technologies
[SAE PAPER 811099] A82-24403
Technology for quality and quantity in a new fighter
[SAE PAPER 811100] A82-24404
Fighter issues - 2000
[SAE PAPER 811096] A82-24415
The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators
[AIAA PAPER 82-2635] A82-25154
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations
[MBB-FE-122/S/PUB/36] N82-18211
FILAMENT WINDING
Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding
[AD-A109377] N82-19209
FINITE DIFFERENCE THEORY
Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts
[ASME PAPER 81-WA/NCA-13] A82-24602
FINITE ELEMENT METHOD
The role of finite element analysis in the design of birdstrike resistant transparencies
A82-24314
High speed VSCF generator design consideration --- computer aided design for Variable Speed Constant Frequency generator
A82-24379
Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test
N82-18127
A study of the techniques of dynamic analysis of helicopter type structures
N82-18129
Interpretation and construction of a dynamic similarity model of the A 310 wings
[MBB-FE-17/S/PUB/42] N82-18212
Characterization of the Airbus horizontal stabilizers of CFRP construction and structural analysis with the finite element method
[MBB-UT-13-81-O] N82-18213
FIRE CONTROL
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398
Multivariable aircraft control by maneuver commands: An application to air to surface gunnery
N82-19154
FIRE DAMAGE
Workshop on Mathematical Fire Modeling
[AD-A108876] N82-19343

FIRE FIGHTING
Evaluation of the North Island A/C crash/rescue training facility
[AD-A108740] N82-18228
FIRE PREVENTION
An assessment of the crash fire hazard of liquid hydrogen fueled aircraft
[NASA-CR-165526] N82-19196
Workshop on Mathematical Fire Modeling
[AD-A108876] N82-19343
FIRST AID
Importance of a tactical cargo aircraft in emergency relief
A82-25499
FLAPPING
A simplified method for predicting rotor blade airloads
N82-18124
A further study of helicopter rotor pitch-flap-phase coupling
[BU-259] N82-19214
FLAPS (CONTROL SURFACES)
Spoilers or auxiliary flaps
A82-24973
FLEXIBLE WINGS
Development of a self-optimizing flexible technology /SOFT/ transonic wing wind tunnel model
[AIAA 82-0601] A82-24673
A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft --- improving riding quality in fighter aircraft
[NLR-TR-80032-U] N82-19212
FLIGHT CHARACTERISTICS
Aircraft parameter identification in the presence of atmospheric turbulence
A82-23227
A complete method for computation of blade mode characteristics and responses in forward flight
N82-18126
Flight characteristics design and development of the MBB/KHI BK117 helicopter
N82-18150
An analytical investigation of the free-tip rotor for helicopters
[NASA-TM-81345] N82-18179
FLIGHT CONDITIONS
Flight condition recognition /FCR/ technique --- microprocessor-based recording for helicopter structural component fatigue damage
A82-24712
FLIGHT CONTROL
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398
A redundancy concept for a digital CSAS
N82-18170
The influence of sensor and actuator characteristics on overall helicopter AFCS design
N82-18171
Integration of inertial sensors in helicopters
N82-18173
Integrated control design techniques
[AD-A108223] N82-18224
Apparatus for damping operator induced oscillations of a controlled system --- flight control
[NASA-CASE-FRC-11041-1] N82-18493
Electric Flight Systems
[NASA-CP-2209] N82-19134
Overview of Honeywell electromechanical actuation programs
N82-19142
Digital flight controls
N82-19143
Digital flight controls
N82-19149
Electric flight systems integration
N82-19150
Multivariable aircraft control by maneuver commands: An application to air to surface gunnery
N82-19154
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226
FLIGHT CREWS
Aircrew restraint and mobility test fixture
[AD-A108274] N82-18193
FLIGHT HAZARDS
The requirements for reduced IFR separations on final approach
A82-23311
FLIGHT INSTRUMENTS
Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s
A82-25324
FLIGHT LOAD RECORDERS
Operating flight loads and their effect on engine performance
[SAE PAPER 811071] A82-24405
Flight test data acquisition and interpretation
A82-24707
Flight condition recognition /FCR/ technique --- microprocessor-based recording for helicopter structural component fatigue damage
A82-24712
FLIGHT MECHANICS
Efficient combinations of numerical techniques applied to aircraft turning performance optimization
A82-24814
FLIGHT OPERATIONS
Operational air traffic in the Federal Republic of Germany
A82-23318
Operating flight loads and their effect on engine performance
[SAE PAPER 811071] A82-24405
FLIGHT OPTIMIZATION
Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning
A82-23470
Efficient combinations of numerical techniques applied to aircraft turning performance optimization
A82-24814
FLIGHT PATHS
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[ESA-TT-685] N82-18200
Optimal aircraft landing patterns for minimal noise impact
N82-19200
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217
FLIGHT PLANS
Wind and temperature database for flight planning
[SAE PAPER 811068] A82-24305
Airline flight planning - The weather connection
[SAE PAPER 811064] A82-24306
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217
FLIGHT SAFETY
Analysis of system problems using aviation safety reporting system data
A82-23312
Operational air traffic in the Federal Republic of Germany
A82-23318
Voice communications - The vital link
A82-23324
Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
[AD-A108893] N82-19203
FLIGHT SIMULATION
Mission-adaptive wing flight demonstration program
[SAE PAPER 811035] A82-24399
The role of simulation in the design process
N82-18154
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 2: Programmer's manual
[AD-A1082[illegible]] N82-18231
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors
[RAE-TM-RAD-NAV-145] N82-18503
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225

FLIGHT SIMULATORS
Task analytic techniques: Application to the design of a flight simulator instructor/operator console
[AD-A108724] N82-18227
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR
[ESA-TT-675] N82-19219
FLIGHT TESTS
F/A-18 weapon system development
A82-23774
LAMPS III recovery assist, securing and traversing /RAST/ system --- Light Airborne Multi-Purpose System
[SAE PAPER 811080] A82-24412
Loran-C RNAV in mountainous areas
A82-24649
Flight test data acquisition and interpretation
A82-24707
Measurement techniques used to assess the installed power of a helicopter engine
N82-18133
SH-60B test program
N82-18141
Evaluation of the helicopter low airspeed system LASSIE
N82-18172
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors
[RAE-TM-RAD-NAV-145] N82-18503
Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
[AD-A108893] N82-19203
FLIGHT TRAINING
Computer-generated images for simulators - The cost of technology
A82-22881
Task analytic techniques: Application to the design of a flight simulator instructor/operator console
[AD-A108724] N82-18227
FLIGHT VEHICLES
Analysis and optimization of control systems in piloted flight vehicles --- Russian book
A82-22398
FLOW DISTRIBUTION
The problem of calculation of the flow around helicopter rotor blade tips
N82-18160
Separated flow around helicopter bodies
N82-18163
A method of predicting fuselage loads in hover
N82-18164
On the calculation of separated flow on helicopter fuselages
[MBB-UD-321-81-O] N82-18188
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225
The pressure signature method for blockage corrections, and its applications to the industrial wind tunnel
[BU-263] N82-19231
FLOW EQUATIONS
A complete method for computation of blade mode characteristics and responses in forward flight
N82-18126
FLOW MEASUREMENT
Evaluation of the helicopter low airspeed system LASSIE
N82-18172
FLOW REGULATORS
An ejector augmented choking valve for the metering and control of inlet and bleed duct flows
[AIAA 82-0575] A82-24659
FLOW VELOCITY
Complete velocity profile and 'optimum' skin friction formulas for the plane wall-jet
[ASME PAPER 81-WA/FE-3] A82-24566
FLUID MECHANICS
Annual review of fluid mechanics. Volume 14 --- Book
A82-24416
FLUTTER
Flutter and time response analyses of three degree of freedom airfoils in transonic flow
[AD-A108987] N82-19227
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228
FLUTTER ANALYSIS
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022
Recent developments in wing with stores flutter suppression
[ONERA, TP NO. 1981-145] A82-24077
FORCED VIBRATION
Cross and cross-coupling derivative measurements on the standard dynamics model at AEDC
[AIAA 82-0596] A82-24670
FORECASTING
Report of the Air Traffic Forecasting Working Party, 1981
N82-19195
FORGING
Practical applications of fracture mechanics
[AGARD-AG-257] N82-19571
FORMING TECHNIQUES
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358
FRACTURE MECHANICS
Practical applications of fracture mechanics
[AGARD-AG-257] N82-19571
Fracture and fatigue characterization of aircraft structural materials under biaxial loading
[AD-A109054] N82-19587
FRACTURE STRENGTH
The effects of absorbed moisture upon the physical properties of stretched acrylic materials
A82-24320
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24388
FREE FLOW
Static pressure in the slipstream of a propeller
A82-24023
FREQUENCY STABILITY
Advanced generating system technology
A82-24380
The effect of critical design parameters on the selection of a VSCF system
A82-24381
Packaging the VSCF system for an aircraft engine environment
A82-24383
FREQUENCY STANDARDS
Global positioning system timing receivers in the DSN
N82-20126
FRESNEL LENSES
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type
[AD-A108801] N82-19206
FRETTING CORROSION
Material/structure degradation due to fretting and fretting-initiated fatigue
A82-23771
FUEL COMBUSTION
Fuel-rich plume combustion
[AD-A108136] N82-18349
FUEL CONSUMPTION
Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning
A82-23470
Fuel-efficient windshields for transport, commuter and business aircraft
A82-24304
Integration of energy management concepts into the flight deck
[SAE PAPER 811066] A82-24387
Management of powerplant maintenance and restoration programs for fuel conservation
[SAE PAPER 811052] A82-24394
Airline fuel saving through JT9D engine refurbishment
[SAE PAPER 811051] A82-24395
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406
Developments in rotary wing aircraft aerodynamics
N82-18120

Parametric study of the influence of the engine upon the operating cost of a civil helicopter
N82-18131
Component design and development for future helicopter engines
N82-18134
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217

FUEL CORROSION
Improving the accuracy of the estimates of surfactant content in jet fuels
A82-23250

FUELS
A study of the effects of long-term exposure to fuels and fluids on the behavior of advanced composite materials
[NASA-CR-165763] N82-18327

FULL SCALE TESTS
Slotted wall test section for automotive aerodynamic test facilities
[AIAA 82-0585] A82-24661
Status and capabilities of the National Full Scale Facility 40- by 80-foot wind tunnel modification
[AIAA 82-0607] A82-24676

FUSELAGES
Flight characteristics design and development of the MBB/KHI BK117 helicopter
N82-18150
Separated flow around helicopter bodies
N82-18163
A method of predicting fuselage loads in hover
N82-18164
On the calculation of separated flow on helicopter fuselages
[MBB-UD-321-81-O] N82-18188
Structural system identification technology verification
[AD-A109181] N82-19583

FUSION WELDING
Aluminum and its alloys - Weldability
A82-23755

G

GAS STREAMS
Dilution jet behavior in the turn section of a reverse flow combuster
[NASA-TM-82776] N82-19220

GAS TURBINE ENGINES
Lineup of the IM-series aircraft-derivative gas turbines
A82-22896
Reliable power --- Rolls-Royce aircraft engine designs
A82-24007
AFWAL turbine engine controls research and development - Present and future
[AIAA PAPER 82-0321] A82-25050
Component design and development for future helicopter engines
N82-18134
Dilution jet behavior in the turn section of a reverse flow combuster
[NASA-TM-82776] N82-19220
Cooled variable-area radial turbine technology program
[NASA-CR-165408] N82-19221

GEAR TEETH
The measurement of the mobility of structures at acoustic frequencies
N82-18149

GEARS
Cost of ownership advantages with a shared oil system
A82-24378

GENERAL AVIATION AIRCRAFT
Designing for continued airworthiness - General aviation
[SAE PAPER 811036] A82-24397
Study of cabin noise control for twin engine general aviation aircraft
[NASA-CR-165833] N82-18995
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
A design study of the Marshal --- lightweight twin-engined aircraft
[BU-262] N82-19215
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft --- static wind tunnel force measurements
[NASA-CR-168578] N82-19224

GEOMETRIC DILUTION OF PRECISION
Improvements and extensions of the Geometrical Dilution of Precision (GDOP) concept for selecting navigation measurements
[AD-A108607] N82-18197

GEOMETRICAL THEORY OF DIFFRACTION
GTD terrain reflection model applied to ILS glide scope --- Geometrical Theory of Diffraction
A82-23027
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[ESA-TT-677] N82-18483

GEOPOTENTIAL HEIGHT
Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data
A82-25113

GLAZES
B.A.C. One-Eleven flight deck glazing product improvement
A82-24325
Concorde glazings - 5 years of Mach 2 service
A82-24326

GLIDE PATHS
GTD terrain reflection model applied to ILS glide scope --- Geometrical Theory of Diffraction
A82-23027

GLIDERS
On the design of some airfoils for sailplane application --- additions to existing wings for inflight testing
[VTH-LR-326] N82-19213

GLOBAL POSITIONING SYSTEM
Institute of Navigation, Annual Meeting, 37th, U.S. Naval Academy, Annapolis, MD, June 9-11, 1981, Proceedings
A82-24683
A marine NAVSTAR GPS receiver
A82-24684
The application of NAVSTAR differential GPS in the civilian community
A82-24685
Improvements and extensions of the Geometrical Dilution of Precision (GDOP) concept for selecting navigation measurements
[AD-A108607] N82-18197
Global positioning system timing receivers in the DSN
N82-20126

GOGGLES
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
N82-18168

GOVERNMENT/INDUSTRY RELATIONS
International plans for civil and military co-ordination
A82-23317

GRAPHITE-EPOXY COMPOSITES
A study of the effects of long-term exposure to fuels and fluids on the behavior of advanced composite materials
[NASA-CR-165763] N82-18327

GROUND BASED CONTROL
Stereographic projection in the National Airspace System
A82-23031

GROUND EFFECT (COMMUNICATIONS)
Loran-C RNAV in mountainous areas
A82-24649

GROUND SPEED
A digital simulation program describing the motion of an aircraft undergoing engine failure during its takeoff ground roll
[AD-A108420] N82-18210

GROUND STATIONS
Analysis of loran-C system reliability for civil aviation
A82-24650

GROUND SUPPORT EQUIPMENT
Analysis of Built-In-Test (BIT) false alarm conditions
[AD-A108752] N82-18217
Further development of the test concept of the ALPHA JET engine LARZAC 04
N82-18223
GROUND TESTS
SH-608 test program
N82-18141
Electrical ground testing of aircraft antistatic protection
N82-19156
GROUND WIND
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228
GUST ALLEVIATORS
A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft --- improving riding quality in fighter aircraft
[NLR-TR-80032-U] N82-19212
GYROSCOPIC STABILITY
Stability of a three-stage dynamic stand
A82-25353
GYROSTABILIZERS
A method for the investigation of gyrostabilization systems
A82-24892

H

HARMONIC MOTION
A simplified method for predicting rotor blade airloads
N82-18124
HARNESSES
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199
HEAD-UP DISPLAYS
A new angular deviation measurement device for aircraft transparencies
A82-24308
HEAT PUMPS
Open-cycle vapor compression heat pump
[PB82-110503] N82-18553
HEAT RESISTANT ALLOYS
Where is cobalt irreplaceable
A82-25538
HEAT TRANSFER
Engine superficial temperature and infrared signature
N82-18136
HEAT TREATMENT
Aluminum and its alloys - Weldability
A82-23755
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772
HELICOPTER CONTROL
A control model for maneuvering flight for application to a computer-flight testing program
N82-18153
A redundancy concept for a digital CSAS
N82-18170
The influence of sensor and actuator characteristics on overall helicopter AFCS design
N82-18171
HELICOPTER DESIGN
LAMPS III recovery assist, securing and traversing /RAST/ system --- Light Airborne Multi-Purpose System
[SAE PAPER 811080] A82-24412
Standardization of helicopter fatigue methodology - A manufacturer's view
A82-24704
Evolution of the Aeroscout
A82-24706
Flight condition recognition /FCR/ technique --- microprocessor-based recording for helicopter structural component fatigue damage
A82-24712
Fatigue test of the typical main rotor controls component
A82-24715
Helicopter rotor load prediction
A82-24719
A study of the techniques of dynamic analysis of helicopter type structures
N82-18129
The effects of slight non-linearities on modal testing of helicopter-like structures
N82-18130
Point of view of a helicopter manufacturer on airworthiness regulations
N82-18137
Military requirements: Too little or too much
N82-18138
Parametric criteria and impact on design trends
N82-18139
Design philosophy of the Hughes model 600 helicopter
N82-18140
SH-608 test program
N82-18141
Naval versions of the Dauphin and the AS 15 TT weapon system
N82-18142
Army Lynx: Product development matched to military combat development
N82-18143
A light helicopter for night firing
N82-18144
Flight characteristics design and development of the MBB/KHI BK117 helicopter
N82-18150
The role of simulation in the design process
N82-18154
Impact of systems technology and integration on helicopter design
N82-18165
The multi mode matrix flat panel display: Technology and applications
N82-18169
Integration of inertial sensors in helicopters
N82-18173
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary
[NASA-TM-84149] N82-19170
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views
[NASA-TM-84148] N82-19171
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
[NASA-TM-84146] N82-19173
Experience during the development of the German-Japanese helicopter BK 117
[MBB-UD-318-81-0] N82-19210
Design study into a high endurance mini-rotorcraft
[BU-265] N82-19216
HELICOPTER ENGINES
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
N82-18131
Measurement techniques used to assess the installed power of a helicopter engine
N82-18133
Component design and development for future helicopter engines
N82-18134
Three-engine control system for the prototype EH-101 helicopter
[AERG-9/81-1568L] N82-18135
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary
[NASA-TM-84149] N82-19170
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views
[NASA-TM-84148] N82-19171
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
[NASA-TM-84146] N82-19173
HELICOPTER PERFORMANCE
Utilizing the helicopter's versatility to improve the ATC system
A82-23316
The Agusta's solution of AHS's hypothetical fatigue life problem
A82-24701
Hughes helicopters - Fatigue life methodology
A82-24710

Fundamentals of helicopter fatigue life determination A82-24714
Hypothetical fatigue life problem - Application of Aerospatiale method A82-24716
The cargo helicopter - A logistical vehicle A82-24717
An analytical investigation of the free-tip rotor for helicopters [NASA-TM-81345] N82-18179
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary [NASA-TM-84149] N82-19170
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views [NASA-TM-84148] N82-19171
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors [NASA-TM-84146] N82-19173

HELICOPTER PROPELLER DRIVE
Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft A82-24705

HELICOPTER TAIL ROTORS
Wind tunnel investigation of high speed rotor noise N82-18146

HELICOPTER WAKES
Seventh European Rotorcraft and Powered Lift Aircraft Forum N82-18119
A simplified approach to the free wake analysis of a hovering rotor N82-18121
An experimental analysis of the shape of a rotor wake N82-18122
Optimum performance and wake geometry of co-axial rotor in hover N82-18156
A numerical approach to co-axial rotor aerodynamics N82-18157

HELICOPTERS
The challenge of standardizing fatigue methodology A82-24703
A method of determining safe service life for helicopter components A82-24709
Boeing Vertol fatigue life methodology A82-24718
The effects of slight non-linearities on modal testing of helicopter-like structures N82-18130
Preliminary thoughts on helicopter cabin noise prediction methods N82-18148
The measurement of the mobility of structures at acoustic frequencies N82-18149
Separated flow around helicopter bodies N82-18163
Mast mounted visual aids N82-18167
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility N82-18168
Evaluation of the helicopter low airspeed system LASSIE N82-18172
An analytical investigation of the free-tip rotor for helicopters [NASA-TM-81345] N82-18179
On the calculation of separated flow on helicopter fuselages [MBB-UD-321-81-O] N82-18188
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors [RAE-TM-RAD-NAV-145] N82-18503
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary [NASA-TM-84149] N82-19170
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views [NASA-TM-84148] N82-19171
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session [NASA-TM-84147] N82-19172
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors [NASA-TM-84146] N82-19173
Structural system identification technology verification [AD-A109181] N82-19583
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance [NASA-TP-1969] N82-19707
Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed [DFVLR-MITT-81-18] N82-19957

HELMET MOUNTED DISPLAYS
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility N82-18168
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR [ESA-TT-675] N82-19219

HIGH FREQUENCIES
The testing of aircraft under near field conditions A82-24361

HIGH SPEED
High speed VSCF generator design consideration --- computer aided design for Variable Speed Constant Frequency generator A82-24379

HIGH STRENGTH
The development of high strength light-weight windshields for the new generation of Boeing 757 and 767 airliners A82-24323

HIGH TEMPERATURE
High temperature engine control electronics [SAE PAPER 811074] A82-24407

HIGH VOLTAGES
Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States A82-24382

HISTORIES
History of the sweptback wing [DGLR PAPER 81-070] A82-22898
NASA pocket statistics [NASA-TM-84134] N82-19084

HOLE GEOMETRY (MECHANICS)
A compilation of stress intensity factor solutions for flawed fastener holes [AD-A108753] N82-18528

HONEYCOMB STRUCTURES
Metal honeycomb to porous wireform substrate diffusion bond evaluation [NASA-TM-82793] N82-18612

HOT-WIRE FLOWMETERS
An experimental analysis of the shape of a rotor wake N82-18122

HOVERING
A simplified approach to the free wake analysis of a hovering rotor N82-18121
Optimum performance and wake geometry of co-axial rotor in hover N82-18156
A numerical approach to co-axial rotor aerodynamics N82-18157
A method of predicting fuselage loads in hover N82-18164

HOVERING STABILITY
Hover tests of a model H-force rotor N82-18159

HUGHES AIRCRAFT
Hughes helicopters - Fatigue life methodology A82-24710

HUMAN FACTORS ENGINEERING
Combined multisensor displays --- image preprocessing for shape coding to reduce pilot workload A82-22905

Point of view of a helicopter manufacturer on airworthiness regulations N82-18137
Multiple ejection effects analysis [AD-A108277] N82-18192

HUMAN PERFORMANCE
Analysis of system problems using aviation safety reporting system data A82-23312

HUMAN REACTIONS
Direct comparison of community response to road traffic noise and to aircraft noise A82-22974

HUMIDITY MEASUREMENT
Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data A82-25113

HYDRAULIC CONTROL
On-line control for the regulation of power source in multiple-servo electro-hydraulic systems [ASME PAPER 81-WA/DSC-3] A82-24562
Describing function analysis of nonlinear nose gear shimmy [ASME PAPER 81-WA/DSC-20] A82-24565

HYPERSONIC FLOW
Oscillating supersonic/hypersonic wings at high incidence A82-23828

HYPERSONIC WIND TUNNELS
Technical innovations in testing and analysis of heat and pressure models in hypersonic wind tunnels [AIAA 82-0578] A82-24660

HYPOTHESES
A complete method for computation of blade mode characteristics and responses in forward flight N82-18126

I

ICE FORMATION
Helicopter Icing Spray System (HISS) nozzle improvement evaluation [AD-A109405] N82-19208

IMAGE PROCESSING
Combined multisensor displays --- image preprocessing for shape coding to reduce pilot workload A82-22905

IMAGING TECHNIQUES
Computer-generated images for simulators - The cost of technology A82-22881

IMPACT DAMAGE
The effects of bird orientation on load profile and damage level A82-24316

IMPACT PREDICTION
An analytical methodology to predict potential aircraft losses due to canopy birdstrikes A82-24313

IMPACT RESISTANCE
The role of finite element analysis in the design of birdstrike resistant transparencies A82-24314

IMPEDANCE MEASUREMENT
Antenna (selected articles) [AD-A108174] N82-19448

IN-FLIGHT MONITORING
Propulsion multiplexer /PMUX/ system - The missing link [SAE PAPER 811078] A82-24411
Flight test data acquisition and interpretation A82-24707
Flight condition recognition /FCR/ technique --- microprocessor-based recording for helicopter structural component fatigue damage A82-24712

INDUSTRIES
Experience during the development of the German-Japanese helicopter BK 117 [MBB-UD-318-81-O] N82-19210

INERTIAL PLATFORMS
Integration of inertial sensors in helicopters N82-18173
Software features applicable to inertial measurement unit self alignment [AD-A108511] N82-18196

INFORMATION DISSEMINATION
Experience during the development of the German-Japanese helicopter BK 117 [MBB-UD-318-81-O] N82-19210

INFORMATION FLOW
Integration of complex systems in current and future aircraft projects for the example of avionics [MBB-UH-18-80-O] N82-18221

INFORMATION MANAGEMENT
Integration of complex systems in current and future aircraft projects for the example of avionics [MBB-UH-18-80-O] N82-18221

INFORMATION SYSTEMS
The use of dynamic mock-ups in the design of advanced systems --- USAF's Digital Avionic Information System and NAVY's Advanced Integrated Display System A82-22902
Analytical study of cockpit information requirements [AD-A108524] N82-18218

INFRARED RADIATION
Engine superficial temperature and infrared signature N82-18136

INLET FLOW
An ejector augmented choking valve for the metering and control of inlet and bleed duct flows [AIAA 82-0575] A82-24659
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan --- in an aircraft engine [IT-8101] N82-19956

INSPECTION
MSG-3 structures --- inspection program for aircraft maintenance A82-24011
MSG-3 overview --- aircraft maintenance program development A82-24014
Analysis of Built-In-Test (BIT) false alarm conditions [AD-A108752] N82-18217

INSTRUCTORS
Task analytic techniques: Application to the design of a flight simulator instructor/operator console [AD-A108724] N82-18227

INSTRUMENT APPROACH
The requirements for reduced IFR separations on final approach A82-23311
A Microwave Landing System simulation A82-23323

INSTRUMENT FLIGHT RULES
The requirements for reduced IFR separations on final approach A82-23311
Utilizing the helicopter's versatility to improve the ATC system A82-23316

INSTRUMENT LANDING SYSTEMS
GTD terrain reflection model applied to ILS glide scope --- Geometrical Theory of Diffraction A82-23027
The toll of ILS-preventable aviation accidents A82-25325
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type [AD-A108801] N82-19206
FM broadcast interference related to airborne ILS, VOR and VHF communications [RTCA/DO-176] N82-19419
Investigation of technical requirements N82-19420
Investigation of airborne VHF communication and navigation equipment N82-19421

INTAKE SYSTEMS
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82 [NASA-TP-1974] N82-19222

INTERACTIVE CONTROL
CAD/CAM in British Aerospace - Aircraft Group A82-24373

INTERFACES
New developments in cockpit-human interfaces [RAE-TM-FS-412] N82-18215
INTERMODULATION
Investigation of the effects of airborne installation factors on receiver interference N82-19422
INTERNATIONAL COOPERATION
Airworthiness regulation: What is our strategy - What are the issues A82-24006
What the operator wants --- airline cooperation in aircraft maintenance A82-24008
Experience during the development of the German-Japanese helicopter BK 117 [MBB-UD-318-81-O] N82-19210
INTERPRETATION
Flight test data acquisition and interpretation A82-24707
INTERPROCESSOR COMMUNICATION
Distributed intelligence for air fleet control [AD-A108611] N82-18195
An on board supervisory system for applications in space missions [INPE-2097-RPE/327] N82-18216

J

JET AIRCRAFT
Transparencies - What an aircraft designer should know A82-24305
Further development of the test concept of the ALPHA JET engine LARZAC 04 N82-18223
JET AIRCRAFT NOISE
Effect of facility variation on the acoustic characteristics of three single stream nozzles [NASA-TM-81635] N82-19944
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721 [AD-A108814] N82-19952
JET CONTROL
Potential reductions in aircraft operation and maintenance costs by using thrust computing support equipment [AD-A108463] N82-18207
JET ENGINE FUELS
Improving the accuracy of the estimates of surfactant content in jet fuels A82-23250
Low grade fuels for turbo and jet engines A82-23439
Airline fuel saving through JT9D engine refurbishment [SAE PAPER 811051] A82-24395
An assessment of the crash fire hazard of liquid hydrogen fueled aircraft [NASA-CR-165526] N82-19196
JET ENGINES
Low grade fuels for turbo and jet engines A82-23439
Air cooled engine test facilities A82-24004
Airline fuel saving through JT9D engine refurbishment [SAE PAPER 811051] A82-24395
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721 [AD-A108814] N82-19952
JET FLOW
Complete velocity profile and 'optimum' skin friction formulas for the plane wall-jet [ASME PAPER 81-WA/FE-3] A82-24566
Dilution jet behavior in the turn section of a reverse flow combuster [NASA-TM-82776] N82-19220
JET PROPULSION
Further development of the test concept of the ALPHA JET engine LARZAC 04 N82-18223
JOINTS (JUNCTIONS)
Practical applications of fracture mechanics [AGARD-AG-257] N82-19571

K

KALMAN FILTERS
Fixed gain controller design for aircraft A82-23401
Extension of proportional navigation by the use of optimal filtering and control methods [ESA-TT-683] N82-18199
KAPTON (TRADEMARK)
The use of 'Kapton' polyimide film in aerospace applications [SAE PAPER 811091] A82-24413
KEVLAR (TRADEMARK)
Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding [AD-A109377] N82-19209

L

LAGRANGE COORDINATES
Modal charecteristics of rotor blades: Finite element approach and measurement by ground vibration test N82-18127
LAMINAR BOUNDARY LAYER
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test [AIAA 82-0568] A82-24656
LAMINAR FLOW AIRFOILS
Laminar airfoils for transport aircraft [ESA-TT-680] N82-18190
LANDING AIDS
The birth of precision DME A82-24068
Development of a clear air radar to detect meteorological hazards at airports [AD-A100236] N82-18835
LANDING GEAR
Describing function analysis of nonlinear nose gear shimmy [ASME PAPER 81-WA/DSC-20] A82-24565
Oscillations and vibrations of aircraft on runways A82-24974
LANDMARKS
United States Coast Pilot 9. Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea [PB82-109562] N82-18201
LASER RANGER/TRACKER
Wide field of view laser beacon system for three-dimensional aircraft position measurement [ASME PAPER 81-WA/DSC-9] A82-24563
LEAD ACID BATTERIES
Vehicle test report: Battronic pickup truck [NASA-CR-168637] N82-19205
LEADING EDGES
History of the sweptback wing [DGLR PAPER 81-070] A82-22898
LEGAL LIABILITY
Air transportation of handicapped persons A82-24338
LIFE CYCLE COSTS
Cost of ownership advantages with a shared oil system A82-24378
LIFT
A three-dimensional approach to lift and moment coefficients of rotating blades N82-18125
Slotted variable camber flap [NASA-CASE-LAR-12541-1] N82-18203
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations [MBB-FE-122/S/PUB/36] N82-18211
LIFT AUGMENTATION
XFV-12A diagnostic and development programs [AD-A108354] N82-18206
LIFT FANS
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine [NAL-TR-687T-PT-2] N82-19945

LIFTING ROTORS
A further study of helicopter rotor pitch-flap-phase coupling
[BU-259] N82-19214

LIGHT AIRBORNE MULTIPURPOSE SYSTEM
LAMPS III recovery assist, securing and traversing /RAST/ system --- Light Airborne Multi-Purpose System
[SAE PAPER 811080] A82-24412

LIGHT AIRCRAFT
Complete guide to Rutan homebuilt aircraft --- Book
A82-22880
The reliability and safety of small passenger aircraft
A82-24972

LIGHT EMITTING DIODES
The multi mode matrix flat panel display: Technology and applications
N82-18169

LIQUID HYDROGEN
An assessment of the crash fire hazard of liquid hydrogen fueled aircraft
[NASA-CR-165526] N82-19196

LIQUIDS
A study of the effects of long-term exposure to fuels and fluids on the behavior of advanced composite materials
[NASA-CR-165763] N82-18327

LOAD TESTS
The effects of bird orientation on load profile and damage level
A82-24316
Operating flight loads and their effect on engine performance
[SAE PAPER 811071] A82-24405
Fundamentals of helicopter fatigue life determination
A82-24714

LOADING MOMENTS
Some unsteady aerodynamic effects on helicopter rotors
N82-18162

LOGIC DESIGN
The influence of sensor and actuator characteristics on overall helicopter AFCS design
N82-18171

LONG TERM EFFECTS
Design technology for improved performance retention in turbofan engines
[SAE PAPER 811055] A82-24392

LONGITUDINAL CONTROL
Preliminary investigation into the addition of auxiliary longitudinal thrust on helicopter agility
N82-18155

LOOP ANTENNAS
Calculation and measurement of electric field strength for airborne antennas in the LF/MF range
A82-25011

LORAN
Institute of Navigation, Annual Meeting, 37th, U.S. Naval Academy, Annapolis, MD, June 9-11, 1981, Proceedings
A82-24643
Loran for precise position location - The VIEW-NAV system
A82-24648

LORAN C
Loran-C RNAV in mountainous areas
A82-24649
Analysis of loran-C system reliability for civil aviation
A82-24650

LOW ASPECT RATIO
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022

LOW COST
Welding for low-cost advanced titanium airframe structures
A82-23757

LUBRICATING OILS
Monitoring engine wear by oil analysis
A82-24012
Cost of ownership advantages with a shared oil system
A82-24378

M

MACH NUMBER
History of the sweptback wing
[DGLR PAPER 81-070] A82-22898

MAGNETIC FIELDS
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km
[AD-A108182] N82-18464

MAINTAINABILITY
Integrated control design techniques
[AD-A108223] N82-18224
Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost
[AD-A109373] N82-19218

MAINTENANCE
Investigation into the utility of some quick setting cements for runway repair
[B-80-157/60.7.0157] N82-18225
Bomb crater repair techniques for permanent airfields. Report 1: Series 1 tests
[AD-A108716] N82-18229

MAN MACHINE SYSTEMS
Analysis and optimization of control systems in piloted flight vehicles --- Russian book
A82-22398
New developments in cockpit-human interfaces
[RAE-TM-FS-412] N82-18215

MANAGEMENT INFORMATION SYSTEMS
National Airspace Data Interchange Network (NADIN) support of Remote Maintenance Monitoring System (RMMS)
[AD-A109125] N82-19160

MANEUVERABILITY
A control model for maneuvering flight for application to a computer-flight testing program
N82-18153
Preliminary investigation into the addition of auxiliary longitudinal thrust on helicopter agility
N82-18155

MANUFACTURING
CAD/CAM in British Aerospace - Aircraft Group
A82-24373
Point of view of a helicopter manufacturer on airworthiness regulations
N82-18137

MARINE ENVIRONMENTS
LAMPS III recovery assist, securing and traversing /RAST/ system --- Light Airborne Multi-Purpose System
[SAE PAPER 811080] A82-24412

MARINE TRANSPORTATION
A marine NAVSTAR GPS receiver
A82-24644

MARKET RESEARCH
Where is cobalt irreplaceable
A82-25538

MASS
Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test
N82-18127

MATERIAL ABSORPTION
The effects of absorbed moisture upon the physical properties of stretched acrylic materials
A82-24320

MATHEMATICAL MODELS
Sensitivity reduction by double perfect model following --- with application to aircraft control
A82-23029
An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
A82-24313
Parametric criteria and impact on design trends
N82-18139
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[ESA-TT-677] N82-18483
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167
Workshop on Mathematical Fire Modeling
[AD-A108876] N82-19343

Aircraft noise prediction program theoretical manual, part 1
[NASA-TM-83199-PT-1] N82-19946
Aircraft noise prediction program theoretical manual, part 2
[NASA-TM-83199-PT-2] N82-19947

MEASURING INSTRUMENTS
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

MECHANICAL ENGINEERING
Lineup of the LM-series aircraft-derivative gas turbines
A82-22896
Design technology for improved performance retention in turbofan engines
[SAE PAPER 811055] A82-24392

MECHANICAL PROPERTIES
Carbon-fiber composites - A fiber composite material for highly stressed light-construction components
A82-24805

MEDICAL SERVICES
Importance of a tactical cargo aircraft in emergency relief
A82-25499

METAL COATINGS
Electroforming of space and aircraft structures
[MBB-BB-491-0] N82-18419

METAL FILMS
High-frequency monitoring of surface layers of metals
A82-23603

METAL FOILS
Metal honeycomb to porous wireform substrate diffusion bond evaluation
[NASA-TM-82793] N82-18612

METAL PARTICLES
Monitoring engine wear by oil analysis
A82-24012

METEOROLOGICAL PARAMETERS
Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data
A82-25113

METEOROLOGICAL RADAR
Scanning strategies for air traffic control radars
A82-24646
Development of a clear air radar to detect meteorological hazards at airports
[AD-A108236] N82-18835

METEOROLOGICAL SERVICES
Wind and temperature database for flight planning
[SAE PAPER 811068] A82-24385
Airline flight planning - The weather connection
[SAE PAPER 811067] A82-24386

MICROCRACKS
High-frequency monitoring of surface layers of metals
A82-23603

MICROPROCESSORS
Lightweight ATC systems
A82-23321
Packaging the VSCF system for an aircraft engine environment
A82-24383

MICROWAVE LANDING SYSTEMS
A Microwave Landing System simulation
A82-23323

MIDAIR COLLISIONS
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[ESA-TT-685] N82-18200
Aircraft collision avoidance systems
[GPO-79-431] N82-19201

MILITARY AIR FACILITIES
International plans for civil and military co-ordination
A82-23317

MILITARY AIRCRAFT
Fixed gain controller design for aircraft
A82-23441
Transparency development needs for military aircraft in the 1980's
A82-24302
Aircraft transparency bird impact analysis using the MAGNA computer program
A82-24315
EMC clearance of modern military aircraft
A82-24359
Naval versions of the Dauphin and the AS 15 TT weapon system
N82-18142
Army Lynx: Product development matched to military combat development
N82-18143
A light helicopter for night firing
N82-18144

MILITARY HELICOPTERS
The way ahead for helicopter maintenance
A82-24009
Structural testing of composites with known defects
A82-24700
The cargo helicopter - A logistical vehicle
A82-24717
Preliminary investigation into the addition of auxiliary longitudinal thrust on helicopter agility
N82-18155
Review of helicopter Mast Mounted Sight (MMS) base motion isolation and Line-of-Sight (LOS) stabilization concepts
N82-18166
Vibration levels in Army helicopters: Measurement recommendations and data
[AD-A108131] N82-18209

MILITARY OPERATIONS
Military requirements: Too little or too much
N82-18138
Naval versions of the Dauphin and the AS 15 TT weapon system
N82-18142
Army Lynx: Product development matched to military combat development
N82-18143

MILITARY TECHNOLOGY
YF-16 design concept and philosophy
A82-23444
Quality, quantity, and technology - A perspective on fighter development
[SAE PAPER 811097] A82-24400
Future strike fighter options - Concepts and technologies
[SAE PAPER 811099] A82-24403
Technology for quality and quantity in a new fighter
[SAE PAPER 811100] A82-24404
Evolution of the Aeroscout
A82-24706
Military requirements: Too little or too much
N82-18138
Tethered rotorplatforms and their mission potential
N82-18145

MISSILE CONTROL
Extension of proportional navigation by the use of optimal filtering and control methods
[ESA-TT-683] N82-18199

MISSILE DEFENSE
Perspectives for Controlled Weapons Technology: Report of the 90th Helicopter Forum
[MBB-UA-532-80-0] N82-19211

MISSILE SYSTEMS
Perspectives for Controlled Weapons Technology: Report of the 90th Helicopter Forum
[MBB-UA-532-80-0] N82-19211

MISSION PLANNING
LAMPS III recovery assist, securing and traversing /RAST/ system --- Light Airborne Multi-Purpose System
[SAE PAPER 811080] A82-24412

MODAL RESPONSE
The effects of slight non-linearities on modal testing of helicopter-like structures
N82-18130

MOISTURE CONTENT
Improving the accuracy of the estimates of surfactant content in jet fuels
A82-23250
The effects of absorbed moisture upon the physical properties of stretched acrylic materials
A82-24320

MOMENTS
A three-dimensional approach to lift and moment coefficients of rotating blades
N82-18125

MOMENTUM THEORY
An extension of the local momentum theory to the rotors operating in twisted flow field
N82-18123

MONOCHROMATORS
Engine superficial temperature and infrared signature
N82-18136

MOTION STABILITY
Describing function analysis of nonlinear nose gear shimmy
[ASME PAPER 81-WA/DSC-20] A82-24565

MOUNTAINS
Loran-C RNAV in mountainous areas
A82-24649

MULTIPLEXING
Propulsion multiplexer /PMUX/ system - The missing link
[SAE PAPER 811078] A82-24411

MX MISSILE
Technical innovations in testing and analysis of heat and pressure models in hypersonic wind tunnels
[AIAA 82-0578] A82-24660

N

NACELLES
RB 211 powerplant deterioration - Review of current situation and lessons learned
[SAE PAPER 811053] A82-24393

NASA PROGRAMS
Integration of energy management concepts into the flight deck
[SAE PAPER 811066] A82-24387
NASA pocket statistics
[NASA-TM-84134] N82-19084

NATIONAL AIRSPACE UTILIZATION SYSTEM
Stereographic projection in the National Airspace System
A82-23031

NAVIGATION
Integrated control design techniques
[AD-A108223] N82-18224

NAVIGATION AIDS
Navigational aids on-board the Concorde
A82-24065
United States Coast Pilot 9. Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea
[PB82-109562] N82-18201

NAVIGATION INSTRUMENTS
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors
[RAE-TM-RAD-NAV-145] N82-18503

NAVSTAR SATELLITES
Institute of Navigation, Annual Meeting, 37th, U.S. Naval Academy, Annapolis, MD, June 9-11, 1981, Proceedings
A82-24643
A marine NAVSTAR GPS receiver
A82-24644
The application of NAVSTAR differential GPS in the civilian community
A82-24645

NEAR FIELDS
The testing of aircraft under near field conditions
A82-24361

NETWORK SYNTHESIS
A marine NAVSTAR GPS receiver
A82-24644

NICKEL CADMIUM BATTERIES
Recent improvements in aircraft Ni-Cd cells
A82-24245

NIGHT FLIGHTS (AIRCRAFT)
A light helicopter for night firing
N82-18144
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
N82-18168

NOISE INTENSITY
Preliminary thoughts on helicopter cabin noise prediction methods
N82-18148

NOISE MEASUREMENT
Mean flow and noise measurements in a Mach 3.5 pilot quiet tunnel
[AIAA 82-0569] A82-24657
Effect of facility variation on the acoustic characteristics of three single stream nozzles
[NASA-TM-81635] N82-19944

NOISE POLLUTION
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974

NOISE PREDICTION (AIRCRAFT)
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037
Study of cabin noise control for twin engine general aviation aircraft
[NASA-CR-165833] N82-18995
Annoyance caused by propeller airplane flyover noise: Preliminary results
[NASA-TM-83244] N82-18996
Aircraft noise prediction program theoretical manual, part 1
[NASA-TM-83199-PT-1] N82-19946
Aircraft noise prediction program theoretical manual, part 2
[NASA-TM-83199-PT-2] N82-19947

NOISE PROPAGATION
Study of cabin noise control for twin engine general aviation aircraft
[NASA-CR-165833] N82-18995

NOISE REDUCTION
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037
Transparency development needs for military aircraft in the 1980's
A82-24302
The measurement of the mobility of structures at acoustic frequencies
N82-18149
Study of cabin noise control for twin engine general aviation aircraft
[NASA-CR-165833] N82-18995
Optimal aircraft landing patterns for minimal noise impact
N82-19200
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721
[AD-A108814] N82-19952
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan --- in an aircraft engine
[TT-8101] N82-19956

NOISE SPECTRA
The measurement of the mobility of structures at acoustic frequencies
N82-18149

NOISE TOLERANCE
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance
[NASA-TP-1969] N82-19707

NONDESTRUCTIVE TESTS
High-frequency monitoring of surface layers of metals
A82-23603
NDE of composite rotor blades during fatigue testing
A82-24713

NONLINEAR FILTERS
Apparatus for damping operator induced oscillations of a controlled system --- flight control
[NASA-CASE-FRC-11041-1] N82-18493

NONLINEAR SYSTEMS
Describing function analysis of nonlinear nose gear shimmy
[ASME PAPER 81-WA/DSC-20] A82-24565
Analysis of a nonlinear altitude tracking method
[AD-A108678] N82-19197

NONLINEARITY
The effects of slight non-linearities on modal testing of helicopter-like structures
N82-18130

NOSE WHEELS
Describing function analysis of nonlinear nose gear shimmy
[ASME PAPER 81-WA/DSC-20] A82-24565

NOZZLE FLOW
Problems of numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles
A82-25347

Effects of installation of F101 DFE exhaust
nozzles on the afterbody-nozzle characteristics
of the F-14 airplane
[NASA-TM-83250] N82-19181
NOZZLE GEOMETRY
Effect of facility variation on the acoustic
characteristics of three single stream nozzles
[NASA-TM-81635] N82-19944
NUMERICAL ANALYSIS
A complete method for computation of blade mode
characteristics and responses in forward flight
N82-18126
NUMERICAL CONTROL
Distributed intelligence for air fleet control
[AD-A108611] N82-18195
Software features applicable to inertial
measurement unit self alignment
[AD-A108511] N82-18196
NUMERICAL FLOW VISUALIZATION
Problems of numerical simulation of unsteady
three-dimensional viscous-gas flows in nozzles
A82-25347
The problem of calculation of the flow around
helicopter rotor blade tips
N82-18160
Separated flow around helicopter bodies
N82-18163

O

OBLIQUE WINGS
Spin-tunnel investigation of a 1/13-scale model of
the NASA AD-1 oblique-wing research aircraft
[NASA-TM-83236] N82-18183
OCEANOGRAPHIC PARAMETERS
United States Coast Pilot 9. Pacific and Arctic
Coasts Alaska: Cape Spencer to Beaufort Sea
[PB82-109562] N82-18201
OH-13 HELICOPTER
Evolution of the Aeroscout
A82-24706
ONBOARD DATA PROCESSING
Propulsion multiplexer /PMUX/ system - The missing
link
[SAE PAPER 811078] A82-24411
Flight test data acquisition and interpretation
A82-24707
An on board supervisory system for applications in
space missions
[INPE-2097-RPE/327] N82-18216
ONBOARD EQUIPMENT
Navigational aids on-board the Concorde
A82-24065
The anatomy of a technology test bed - Integrated
Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398
OPERATING COSTS
Management of powerplant maintenance and
restoration programs for fuel conservation
[SAE PAPER 811052] A82-24394
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406
Aircraft/airport compatibility - A constant
challenge for aircraft designers
A82-25119
Parametric study of the influence of the engine
upon the operating cost of a civil helicopter
N82-18131
Parametric criteria and impact on design trends
N82-18139
Potential reductions in aircraft operation and
maintenance costs by using thrust computing
support equipment
[AD-A108463] N82-18207
OPERATING SYSTEMS (COMPUTERS)
Air traffic control en route computer system
[GPO-89-008] N82-19202
OPERATOR PERFORMANCE
Reducing reflections on the front surface of air
traffic control displays
A82-23314
OPERATORS (PERSONNEL)
Task analytic techniques: Application to the
design of a flight simulator instructor/operator
console
[AD-A108724] N82-18227
OPTICAL MEASUREMENT
A new angular deviation measurement device for
aircraft transparencies
A82-24300
OPTICAL PATHS
GTD terrain reflection model applied to ILS glide
scope --- Geometrical Theory of Diffraction
A82-23027
OPTICAL REFLECTION
Reducing reflections on the front surface of air
traffic control displays
A82-23314
OPTIMAL CONTROL
Analysis and optimization of control systems in
piloted flight vehicles --- Russian book
A82-22398
Sensitivity reduction by double perfect model
following --- with application to aircraft control
A82-23029
Extension of proportional navigation by the use of
optimal filtering and control methods
[ESA-TT-683] N82-18199
Multivariable aircraft control by maneuver
commands: An application to air to surface
gunnery
N82-19154
A method for applying linear optimal control
theory to the design of a regulator for a
flexible aircraft --- improving riding quality
in fighter aircraft
[NLR-TR-80032-U] N82-19212
OPTIMIZATION
Parametric criteria and impact on design trends
N82-18139
A concept for a fuel efficient flight planning aid
for general aviation
[NASA-CR-3533] N82-19217
OSCILLATING FLOW
Developments in rotary wing aircraft aerodynamics
N82-18120
Interpretation and construction of a dynamic
similarity model of the A 310 wings
[MBB-FE-17/S/PUB/42] N82-18212
OSCILLATION DAMPERS
Apparatus for damping operator induced
oscillations of a controlled system --- flight
control
[NASA-CASE-FRC-11041-1] N82-18493

P

PARAMETER IDENTIFICATION
Sensitivity reduction by double perfect model
following --- with application to aircraft control
A82-23029
Aircraft parameter identification in the presence
of atmospheric turbulence
A82-23227
PARAMETERIZATION
Parametric criteria and impact on design trends
N82-18139
PASSENGER AIRCRAFT
Improvement of fuel economy by flying with maximum
rearward center-of-gravity positioning
A82-23470
Development of maintenance programmes through the
functional, structural and flight test phases
A82-24003
Fuel-efficient windshields for transport, commuter
and business aircraft
A82-24304
The reliability and safety of small passenger
aircraft
A82-24972
A study to define the research and technology
requirements for advanced turbo/propfan
transport aircraft
[NASA-CR-166138] N82-18202
PASSENGERS
Air transportation of handicapped persons
A82-24330
PAVEMENTS
Investigation of compaction criteria for airport
pavement subgrade soils
[AD-A108518] N82-18230
PERFORMANCE PREDICTION
Design technology for improved performance
retention in turbofan engines
[SAE PAPER 811055] A82-24392

Performance retention features of the PW2037
[SAE PAPER 811054] A82-24409
Reliability analysis of a dual-redundant engine controller
[SAE PAPER 811077] A82-24410
Helicopter rotor load prediction
A82-24719
Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391
PERFORMANCE TESTS
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608] A82-24677
PERIODIC VARIATIONS
Application of the ONER dynamic stall model to a helicopter blade in forward flight
N82-18161
PHASE ERROR
Antenna (selected articles)
[AD-A108174] N82-19448
PHASE RULE
A further study of helicopter rotor pitch-flap-phase coupling
[BU-259] N82-19214
PHASE VELOCITY
Antenna (selected articles)
[AD-A108174] N82-19448
PHYSICAL FITNESS
Air transportation of handicapped persons
A82-24338
PHYSICAL PROPERTIES
The effects of absorbed moisture upon the physical properties of stretched acrylic materials
A82-24320
PHYSIOLOGICAL EFFECTS
Physiological acceptability tests of the SJU-5/A ejection seat: Second physiological acceptance demonstration
[AD-A108688] N82-18194
PILOT PERFORMANCE
Analysis and optimization of control systems in piloted flight vehicles --- Russian book
A82-22398
Combined multisensor displays --- image preprocessing for shape coding to reduce pilot workload
A82-22905
Transparency design decisions - Assessing their impact on visual performance
A82-24306
PIPES (TUBES)
Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding
[AD-A109377] N82-19209
PITCHING MOMENTS
A further study of helicopter rotor pitch-flap-phase coupling
[BU-259] N82-19214
PLASMA DISPLAY DEVICES
Lightweight ATC systems
A82-23321
PLASTIC AIRCRAFT STRUCTURES
Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings
A82-24301
Abrasion resistant coated plastic products for aircraft
A82-24310
Proposed method for abrasion testing transparent plastics and coatings
A82-24311
Acrylic - A timely review
A82-24317
Problems associated with the quality assurance of stretched acrylic sheet
A82-24319
The effects of absorbed moisture upon the physical properties of stretched acrylic materials
A82-24320
PLASTIC COATINGS
Abrasion resistant coated plastic products for aircraft
A82-24310
Proposed method for abrasion testing transparent plastics and coatings
A82-24311

Aircraft surface coatings for drag reduction/erosion protection
[SAE PAPER 811070] A82-24401
PLUMES
Fuel-rich plume combustion
[AD-A108136] N82-18349
POLARIMETERS
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km
[AD-A108182] N82-18464
POLLUTION CONTROL
Evaluation of the North Island A/C crash/rescue training facility
[AD-A108740] N82-18228
POLYMERIC FILMS
Problems associated with the quality assurance of stretched acrylic sheet
A82-24319
The use of 'Kapton' polyimide film in aerospace applications
[SAE PAPER 811091] A82-24413
PORTABLE EQUIPMENT
Portable transparency optical test system /P-TOTS/
A82-24309
POSITION (LOCATION)
Loran for precise position location - The VIEW-NAV system
A82-24648
A possible way of specifically correcting location and navigational errors caused by reflection and other propagation anomalies
[ESA-TT-667] N82-18198
POSITION ERRORS
The application of NAVSTAR differential GPS in the civilian community
A82-24645
Loran-C RNAV in mountainous areas
A82-24649
A possible way of specifically correcting location and navigational errors caused by reflection and other propagation anomalies
[ESA-TT-667] N82-18198
POSITION INDICATORS
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563
POTENTIAL FLOW
The problem of calculation of the flow around helicopter rotor blade tips
N82-18160
POTENTIAL THEORY
On the calculation of transonic blade tip flow for helicopter rotors
[MBB-UD-320-81-O] N82-18187
POWER CONDITIONING
Advanced generating system technology
A82-24300
Power systems
N82-19146
POWER EFFICIENCY
Recent improvements in aircraft Ni-Cd cells
A82-24245
PRECIPITATION (METEOROLOGY)
Aircraft measurements and analysis of severe storms: 1976 field experiment
[NASA-CR-168519] N82-18803
PRESSING (FORMING)
Lucas stretched acrylic
A82-24318
PRESSURE DISTRIBUTION
Separated flow around helicopter bodies
N82-18163
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167
The effect of a well on the aerodynamics of a spoiler --- wind tunnel flow visualization and pressure measurement
[BU-268] N82-19194
PRESSURE GRADIENTS
The pressure signature method for blockage corrections, and its applications to the industrial wind tunnel
[BU-263] N82-19231
PRESSURE PULSES
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance
[NASA-TP-1969] N82-19707

PRESSURE RATIO
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222
PRESSURE SENSORS
Pressure transducer calibration process
[SAE PAPER 811076] A82-24408
PROCESS CONTROL (INDUSTRY)
Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980
A82-24371
PROCESS HEAT
Open-cycle vapor compression heat pump
[PB82-110503] N82-18553
PRODUCT DEVELOPMENT
Evolution of the Aeroscout
A82-24706
SH-60B test program
N82-18141
Army Lynx: Product development matched to military combat development
N82-18143
A design study of the Marshal --- lightweight twin-engined aircraft
[BU-262] N82-19215
Cooled variable-area radial turbine technology program
[NASA-CR-165408] N82-19221
PRODUCTION ENGINEERING
Managing computer aided design; Proceedings of the Conference, London, England, November 19, 1980
A82-24371
PROGRAM VERIFICATION (COMPUTERS)
A program testing assistant
[AD-A108147] N82-18922
PROJECT MANAGEMENT
A310 - Design for maintenance
A82-24002
PROPAGATION MODES
Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts
[ASME PAPER 81-WA/NCA-13] A82-24602
PROPELLER BLADES
Preliminary thoughts on helicopter cabin noise prediction methods
N82-18148
Study of cabin noise control for twin engine general aviation aircraft
[NASA-CR-165833] N82-18995
PROPELLER FANS
A study to define the research and technology requirements for advanced turbo/propfan transport aircraft
[NASA-CR-166138] N82-18202
PROPELLER SLIPSTREAMS
Static pressure in the slipstream of a propeller
A82-24023
PROPELLERS
An extension of the local momentum theory to the rotors operating in twisted flow field
N82-18123
Annoyance caused by propeller airplane flyover noise: Preliminary results
[NASA-TM-83244] N82-18996
Collection and evaluation of propeller aircraft noise certification data
[DFVLR-MITT-81-20] N82-19958
PROPORTIONAL CONTROL
Extension of proportional navigation by the use of optimal filtering and control methods
[ESA-TT-683] N82-18199
PROPULSION SYSTEM CONFIGURATIONS
A propulsion view of the all-electric airplane
N82-19136
PROPULSION SYSTEM PERFORMANCE
Propulsion multiplexer /PMUX/ system - The missing link
[SAE PAPER 811078] A82-24411
Prediction of off-design performance of turbo-shaft engines a simplified method
N82-18132
Three-engine control system for the prototype EH-101 helicopter
[AERG-9/81-1568L] N82-18135
PROTECTION
Electrical ground testing of aircraft antistatic protection
N82-19156
PROTECTIVE COATINGS
Abrasion resistant coated plastic products for aircraft
A82-24310
PROTOTYPES
Three-engine control system for the prototype EH-101 helicopter
[AERG-9/81-1568L] N82-18135
PSYCHOACOUSTICS
Annoyance caused by propeller airplane flyover noise: Preliminary results
[NASA-TM-83244] N82-18996
PULSE DOPPLER RADAR
Scanning strategies for air traffic control radars
A82-24646
PULSE RATE
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance
[NASA-TP-1969] N82-19707
PYLONS
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167

Q

QUALITY CONTROL
Problems associated with the quality assurance of stretched acrylic sheet
A82-24319
Technology for quality and quantity in a new fighter
[SAE PAPER 811100] A82-24404
QUARTZ TRANSDUCERS
Pressure transducer calibration process
[SAE PAPER 811076] A82-24408

R

RADAR ANTENNAS
Secondary radar problems - The presence of false echoes
A82-25323
RADAR BEACONS
Discrete Address Beacon System /DABS/
A82-23322
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563
Analysis of a nonlinear altitude tracking method
[AD-A100878] N82-19197
RADAR ECHOES
Secondary radar problems - The presence of false echoes
A82-25323
RADAR SCANNING
Scanning strategies for air traffic control radars
A82-24646
RADAR TRACKING
Stereographic projection in the National Airspace System
A82-23031
RADIO ANTENNAS
Calculation and measurement of electric field strength for airborne antennas in the LF/MF range
A82-25011
RADIO ATTENUATION
The coupling of electromagnetic interference into aircraft systems
A82-24354
RADIO COMMUNICATION
Voice communications - The vital link
A82-23324
RADIO EQUIPMENT
Utilization of radio equipment at airports and on airways --- Russian book
A82-22407
RADIO FREQUENCY INTERFERENCE
FM broadcast interference related to airborne ILS, VOR and VHF communications
[RTCA/DO-176] N82-19419
Investigation of technical requirements
N82-19420

Investigation of airborne VHF communication and navigation equipment N82-19421
Investigation of the effects of airborne installation factors on receiver interference N82-19422
FAA/FCC coordination procedures for FM broadcast stations N82-19423

RADIO FREQUENCY SHIELDING
Materials aspects of aircraft EMC design A82-24358

RADIO RECEIVERS
A marine NAVSTAR GPS receiver A82-24644
Loran for precise position location - The VIEW-NAV system A82-24648
A possible way of specifically correcting location and navigational errors caused by reflection and other propagation anomalies [ESA-TT-667] N82-18198
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km [AD-A108182] N82-18464
FM broadcast interference related to airborne ILS, VOR and VHF communications [RTCA/DO-176] N82-19419
Investigation of technical requirements N82-19420
Investigation of the effects of airborne installation factors on receiver interference N82-19422

RADIO RELAY SYSTEMS
Beyond the horizon coverage for air navigation/traffic control A82-24647

RADIO SCATTERING
A possible way of specifically correcting location and navigational errors caused by reflection and other propagation anomalies [ESA-TT-667] N82-18198

RADIO TRANSMITTERS
The variation of induced currents in aircraft wiring A82-24355

RADIOGRAPHY
High-frequency monitoring of surface layers of metals A82-23603

RAIN
C-5A austere airfield operational utility evaluation. Phase 2: Operation on unpaved soil surfaces following rainfall [AD-A108597] N82-18208

RAMJET ENGINES
Fuel-rich plume combustion [AD-A108136] N82-18349

RANGE ERRORS
Stereographic projection in the National Airspace System A82-23031

REAL TIME OPERATION
NAS system load - Utilization of the DARC system A82-23315
A Microwave Landing System simulation A82-23323

RECEIVERS
Global positioning system timing receivers in the DSN N82-20126

REDUNDANCY
A redundancy concept for a digital CSAS N82-18170

REDUNDANT COMPONENTS
Reliability analysis of a dual-redundant engine controller [SAE PAPER 811077] A82-24410

REGULATIONS
Designing for continued airworthiness - General aviation [SAE PAPER 811038] A82-24397
Point of view of a helicopter manufacturer on airworthiness regulations N82-18137

RELIABILITY
Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost [AD-A109373] N82-19218

RELIABILITY ANALYSIS
Reliability centered maintenance /RCM/ A82-24001
Reliability analysis of a dual-redundant engine controller [SAE PAPER 811077] A82-24410
Analysis of loran-C system reliability for civil aviation A82-24650

RELIABILITY ENGINEERING
The inter-relation between design, construction and maintenance A82-24010
Recent improvements in aircraft Ni-Cd cells A82-24245
High temperature engine control electronics [SAE PAPER 811074] A82-24407

REMOTE SENSING
Wide field of view laser beacon system for three-dimensional aircraft position measurement [ASME PAPER 81-WA/DSC-9] A82-24563

REMOTE SENSORS
Combined multisensor displays --- image preprocessing for shape coding to reduce pilot workload A82-22905

REQUIREMENTS
Analytical study of cockpit information requirements [AD-A108524] N82-18218

RESCUE OPERATIONS
LAMPS III recovery assist, securing and traversing /RAST/ system --- Light Airborne Multi-Purpose System [SAE PAPER 811080] A82-24412

RESEARCH AND DEVELOPMENT
Windshield system structural enhancement A82-24312
AFWAL turbine engine controls research and development - Present and future [AIAA PAPER 82-0321] A82-25050

RESEARCH FACILITIES
Aeronautical Research Laboratories Structures Division [AD-A109049] N82-19161

RESPONSE BIAS
Flutter and time response analyses of three degree of freedom airfoils in transonic flow [AD-A108987] N82-19227

REVERSED FLOW
Dilution jet behavior in the turn section of a reverse flow combuster [NASA-TM-82776] N82-19220

REVISIONS
Naval versions of the Dauphin and the AS 15 TT weapon system N82-18142

REYNOLDS NUMBER
A new facility and technique for two-dimensional aerodynamic testing [AIAA 82-0608] A82-24677

RIDING QUALITY
A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft --- improving riding quality in fighter aircraft [NLR-TR-80032-U] N82-19212

RIGID ROTORS
Flight characteristics design and development of the MBB/KHI BK117 helicopter N82-18150
A general purpose program for rotor blade dynamics N82-18151
Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results N82-18158

RIGIDITY
Interpretation and construction of a dynamic similarity model of the A 310 wings [MBB-FE-17/S/PUB/42] N82-18212

ROTARY STABILITY
A further study of helicopter rotor pitch-flap-phase coupling [DU-259] N82-19214

ROTARY WING AIRCRAFT
  Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 2: Programmer's manual [AD-A108294] N82-18231
  Design study into a high endurance mini-rotorcraft [BU-265] N82-19216
ROTARY WINGS
  Structural testing of composites with known defects A82-24708
  Fatigue test of the typical main rotor controls component A82-24715
  Helicopter rotor load prediction A82-24719
  Seventh European Rotorcraft and Powered Lift Aircraft Forum N82-18119
  Developments in rotary wing aircraft aerodynamics N82-18120
  A simplified approach to the free wake analysis of a hovering rotor N82-18121
  An experimental analysis of the shape of a rotor wake N82-18122
  An extension of the local momentum theory to the rotors operating in twisted flow field N82-18123
  A complete method for computation of blade mode characteristics and responses in forward flight N82-18126
  Wind tunnel investigation of high speed rotor noise N82-18146
  Prediction of blade vortex interaction noise from measured blade pressure N82-18147
  A general purpose program for rotor blade dynamics N82-18151
  Optimum performance and wake geometry of co-axial rotor in hover N82-18156
  A numerical approach to co-axial rotor aerodynamics N82-18157
  Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results N82-18158
  Hover tests of a model H-force rotor N82-18159
  The problem of calculation of the flow around helicopter rotor blade tips N82-18160
  Application of the ONER dynamic stall model to a helicopter blade in forward flight N82-18161
  Some unsteady aerodynamic effects on helicopter rotors N82-18162
  An analytical investigation of the free-tip rotor for helicopters [NASA-TM-81345] N82-18179
  On the calculation of transonic blade tip flow for helicopter rotors [MBB-UD-320-81-O] N82-18187
  Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding [AD-A109377] N82-19209
  Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance [NASA-TP-1969] N82-19707
ROTATION
  An extension of the local momentum theory to the rotors operating in twisted flow field N82-18123
ROTOR AERODYNAMICS
  Seventh European Rotorcraft and Powered Lift Aircraft Forum N82-18119
  Developments in rotary wing aircraft aerodynamics N82-18120
  A simplified approach to the free wake analysis of a hovering rotor N82-18121
  An extension of the local momentum theory to the rotors operating in twisted flow field N82-18123
  A simplified method for predicting rotor blade airloads N82-18124
  Hover tests of a model H-force rotor N82-18159
  The problem of calculation of the flow around helicopter rotor blade tips N82-18160
  NASA/FAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session [NASA-TM-84147] N82-19172
  A further study of helicopter rotor pitch-flap-phase coupling [BU-259] N82-19214
  Design study into a high endurance mini-rotorcraft [BU-265] N82-19216
ROTOR BLADES (TURBOMACHINERY)
  NDE of composite rotor blades during fatigue testing A82-24713
  Seventh European Rotorcraft and Powered Lift Aircraft Forum N82-18119
  Developments in rotary wing aircraft aerodynamics N82-18120
  A simplified approach to the free wake analysis of a hovering rotor N82-18121
  An experimental analysis of the shape of a rotor wake N82-18122
  A simplified method for predicting rotor blade airloads N82-18124
  A three-dimensional approach to lift and moment coefficients of rotating blades N82-18125
  A complete method for computation of blade mode characteristics and responses in forward flight N82-18126
  Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test N82-18127
ROTOR LIFT
  A three-dimensional approach to lift and moment coefficients of rotating blades N82-18125
ROTOR SPEED
  An extension of the local momentum theory to the rotors operating in twisted flow field N82-18123
  A simplified method for predicting rotor blade airloads N82-18124
  Wind tunnel investigation of high speed rotor noise N82-18146
ROTOR SYSTEMS RESEARCH AIRCRAFT
  NASA/FAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session [NASA-TM-84147] N82-19172
ROTORCRAFT AIRCRAFT
  Tethered rotorplatforms and their mission potential N82-18145
RUNWAY CONDITIONS
  Oscillations and vibrations of aircraft on runways A82-24974
  C-5A austere airfield operational utility evaluation. Phase 2: Operation on unpaved soil surfaces following rainfall [AD-A108597] N82-18208
  Investigation into the utility of some quick setting cements for runway repair [B-80-157/60.7.0157] N82-18225
  Investigation of compaction criteria for airport pavement subgrade soils [AD-A108518] N82-18230
RUNWAYS
  Bomb crater repair techniques for permanent airfields. Report 1: Series 1 tests [AD-A108716] N82-18229
  Investigation of compaction criteria for airport pavement subgrade soils [AD-A108518] N82-18230

S

S-N DIAGRAMS
Hypothetical fatigue life problem - Application of Aerospatiale method
A82-24716
SAFETY DEVICES
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199
SANDWICH STRUCTURES
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358
SATELLITE SOUNDING
Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data
A82-25113
SCALE MODELS
Spin-tunnel investigation of a 1/13-scale model of the NASA AD-1 oblique-wing research aircraft
[NASA-TM-83236] N82-18183
SCINTILLATION COUNTERS
Linear alpha-ray altimeter
A82-23225
SEALERS
Novel metal-ceramics-composite sealing coatings in aircraft engines
A82-24803
SEALING
Investigation into the utility of some quick setting cements for runway repair
[B-80-157/60.7.0157] N82-18225
SECONDARY RADAR
Secondary radar problems - The presence of false echoes
A82-25323
SELF ADAPTIVE CONTROL SYSTEMS
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228
SELF ALIGNMENT
Software features applicable to inertial measurement unit self alignment
[AD-A108511] N82-18196
SENSITIVITY
Sensitivity reduction by double perfect model following --- with application to aircraft control
A82-23029
SENSORS
The influence of sensor and actuator characteristics on overall helicopter AFCS design
N82-18171
SEPARATED FLOW
Separated flow around helicopter bodies
N82-18163
A method of predicting fuselage loads in hover
N82-18164
On the calculation of separated flow on helicopter fuselages
[MBB-UD-321-81-O] N82-18188
SERVICE LIFE
Boeing's big, quiet 737-300
A82-23369
A method of determining safe service life for helicopter components
A82-24709
Hughes helicopters - Fatigue life methodology
A82-24710
SERVOCONTROL
On-line control for the regulation of power source in multiple-servo electro-hydraulic systems
[ASME PAPER 81-WA/DSC-3] A82-24562
SHAFTS (MACHINE ELEMENTS)
Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft
A82-24705
SHIELDING
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945
SHORT TAKEOFF AIRCRAFT
Review of defense-related vertical and short takeoff and landing (V/STOL) aircraft programs
[GPO-55-278] N82-18205
XFV-12A diagnostic and development programs
[AD-A108354] N82-18206
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary
[NASA-TM-84149] N82-19170
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views
[NASA-TM-84148] N82-19171
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
[NASA-TM-84146] N82-19173
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945
SIDELOBE REDUCTION
Secondary radar problems - The presence of false echoes
A82-25323
SIGNAL PROCESSING
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors
[RAE-TM-RAD-NAV-145] N82-18503
SIGNATURE ANALYSIS
The pressure signature method for blockage corrections, and its applications to the industrial wind tunnel
[BU-263] N82-19231
SIZE DETERMINATION
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022
SKIN (STRUCTURAL MEMBER)
On the sonic fatigue life estimation of skin structures at room and elevated temperatures
A82-23678
SKIN FRICTION
Complete velocity profile and 'optimum' skin friction formulas for the plane wall-jet
[ASME PAPER 81-WA/FE-3] A82-24566
Laminar airfoils for transport aircraft
[ESA-TT-680] N82-18190
SLEDS
Test site instrumentation study. Volume 2: Crash 1 and crash 2 raw data
[PB82-111832] N82-18233
SLENDER BODIES
Review of support interference in dynamic tests
[AIAA 82-0594] A82-24668
SLOTTED WIND TUNNELS
Slotted wall test section for automotive aerodynamic test facilities
[AIAA 82-0585] A82-24661
SOIL MECHANICS
Investigation of compaction criteria for airport pavement subgrade soils
[AD-A108518] N82-18230
SOIL MOISTURE
C-5A austere airfield operational utility evaluation. Phase 2: Operation on unpaved soil surfaces following rainfall
[AD-A108597] N82-18208
SOLID-SOLID INTERFACES
Diffusion bonding in superplastic forming/diffusion bonding
A82-23754
SOUND TRANSMISSION
Preliminary thoughts on helicopter cabin noise prediction methods
N82-18148
SPACE MISSIONS
NASA pocket statistics
[NASA-TM-84134] N82-19084
SPACE TRANSPORTATION
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226
SPACE TUGS
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226

SPACECRAFT CONTROL
An on board supervisory system for applications in space missions
[INPE-2097-RPE/327] N82-18216
SPACECRAFT PERFORMANCE
NASA pocket statistics
[NASA-TM-84134] N82-19084
SPACECRAFT PROPULSION
Electric Flight Systems
[NASA-CP-2209] N82-19134
Electric flight systems, overview
N82-19135
SPACECRAFT STRUCTURES
Electroforming of space and aircraft structures
[MBB-BB-491-0] N82-18419
SPEED CONTROL
High speed VSCF generator design consideration --- computer aided design for Variable Speed Constant Frequency generator
A82-24379
The effect of critical design parameters on the selection of a VSCF system
A82-24381
Packaging the VSCF system for an aircraft engine environment
A82-24383
SPEED INDICATORS
Evaluation of the helicopter low airspeed system LASSIE
N82-18172
SPEED REGULATORS
Three-engine control system for the prototype EH-101 helicopter
[AERG-9/81-1568L] N82-18135
SPIN REDUCTION
A criterion for the prediction of the recovery characteristics of spinning aircraft
[RAE-TM-AERO-2251] N82-19223
SPIN STABILIZATION
Spin-tunnel investigation of a 1/13-scale model of the NASA AD-1 oblique-wing research aircraft
[NASA-TM-83236] N82-18183
SPOILER SLOT AILERONS
Spoilers or auxiliary flaps
A82-24973
SPOILERS
The effect of a well on the aerodynamics of a spoiler --- wind tunnel flow visualization and pressure measurement
[BU-268] N82-19194
SPRAY NOZZLES
Helicopter Icing Spray System (HISS) nozzle improvement evaluation
[AD-A109405] N82-19208
SQUALLS
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228
STABILITY
Effects of fan inlet temperature disturbances on the stability of a turbofan engine
[NASA-TM-82699] N82-18222
STABILITY AUGMENTATION
A redundancy concept for a digital CSAS
N82-18170
STABILITY DERIVATIVES
Cross and cross-coupling derivative measurements on the standard dynamics model at AEDC
[AIAA 82-0596] A82-24670
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft --- static wind tunnel force measurements
[NASA-CR-168578] N82-19224
STABILIZATION
Review of helicopter Mast Mounted Sight (MMS) base motion isolation and Line-of-Sight (LOS) stabilization concepts
N82-18166
Integration of inertial sensors in helicopters
N82-18173
STABILIZED PLATFORMS
Stability of a three-stage dynamic stand
A82-25353
Review of helicopter Mast Mounted Sight (MMS) base motion isolation and Line-of-Sight (LOS) stabilization concepts
N82-18166
Mast mounted visual aids
N82-18167
Software features applicable to inertial measurement unit self alignment
[AD-A108511] N82-18196
STANDARDIZATION
Airworthiness regulation: What is our strategy - What are the issues
A82-24006
The challenge of standardizing fatigue methodology
A82-24703
STANDARDS
Standardization of helicopter fatigue methodology - A manufacturer's view
A82-24704
STATIC AERODYNAMIC CHARACTERISTICS
The effect of a well on the aerodynamics of a spoiler --- wind tunnel flow visualization and pressure measurement
[BU-268] N82-19194
STATIC PRESSURE
Static pressure in the slipstream of a propeller
A82-24023
STATIC TESTS
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945
STATISTICAL ANALYSIS
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974
FAA statistical handbook of aviation
[AD-A109289] N82-19198
STATOR BLADES
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222
STEERING
Describing function analysis of nonlinear nose gear shimmy
[ASME PAPER 81-WA/DSC-20] A82-24565
STEREOSCOPY
Stereographic projection in the National Airspace System
A82-23031
STIFFNESS MATRIX
Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test
N82-18127
STOCKPILING
Where is cobalt irreplaceable
A82-25538
STORMS (METEOROLOGY)
Aircraft measurements and analysis of severe storms: 1976 field experiment
[NASA-CR-168519] N82-18803
STRESS ANALYSIS
Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft
A82-24705
A compilation of stress intensity factor solutions for flawed fastener holes
[AD-A108753] N82-18620
STRESS CONCENTRATION
Material/structure degradation due to fretting and fretting-initiated fatigue
A82-23771
STRESS CORROSION CRACKING
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772
STRESS INTENSITY FACTORS
A compilation of stress intensity factor solutions for flawed fastener holes
[AD-A108753] N82-18620
STRETCH FORMING
Problems associated with the quality assurance of stretched acrylic sheet
A82-24319

STRETCHING
Lucas stretched acrylic
A82-24318

STRUCTURAL ANALYSIS
Development of maintenance programmes through the functional, structural and flight test phases
A82-24003
MSG-3 structures --- inspection program for aircraft maintenance
A82-24011
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24388
Structural modeling of high Reynolds number wind tunnel models
[AIAA 82-0602] A82-24674
Structural testing of composites with known defects
A82-24708

STRUCTURAL DESIGN
Impact of systems technology and integration on helicopter design
N82-18165

STRUCTURAL DESIGN CRITERIA
Design philosophy of the Hughes model 600 helicopter
N82-18140
SH-60B test program
N82-18141

STRUCTURAL ENGINEERING
Aeronautical Research Laboratories Structures Division
[AD-A109049] N82-19161

STRUCTURAL FAILURE
D.C.9 windshield - Effect of attachment retorque
A82-24324
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24388
Fundamentals of helicopter fatigue life determination
A82-24714

STRUCTURAL RELIABILITY
Windshield system structural enhancement
A82-24312

STRUCTURAL WEIGHT
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022

SUBSONIC AIRCRAFT
Tendencies in the development of subsonic transport aircraft with special consideration of aerodynamics
[ESA-TT-705] N82-18214

SUBSONIC WIND TUNNELS
Status and capabilities of the National Full Scale Facility 40- by 80-foot wind tunnel modification
[AIAA 82-0607] A82-24676
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608] A82-24677

SUPERCRITICAL FLOW
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608] A82-24677

SUPERCRITICAL WINGS
Design of supercritical swept wings
A82-23826
Structural modeling of high Reynolds number wind tunnel models
[AIAA 82-0602] A82-24674
Flutter and time response analyses of three degree of freedom airfoils in transonic flow
[AD-A108987] N82-19227

SUPERPLASTICITY
Diffusion bonding in superplastic forming/diffusion bonding
A82-23754
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358

SUPERSONIC AIRCRAFT
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022

SUPERSONIC FLOW
Oscillating supersonic/hypersonic wings at high incidence
A82-23828

SUPERSONIC WIND TUNNELS
Mean flow and noise measurements in a Mach 3.5 pilot quiet tunnel
[AIAA 82-0569] A82-24657

SUPPORT INTERFERENCE
Review of support interference in dynamic tests
[AIAA 82-0594] A82-24668

SURFACE LAYERS
High-frequency monitoring of surface layers of metals
A82-23603
Electroforming of space and aircraft structures
[MBB-BB-491-0] N82-18419

SURFACE REACTIONS
Improving the accuracy of the estimates of surfactant content in jet fuels
A82-23250

SURFACE ROUGHNESS
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

SURFACE TEMPERATURE
Engine superficial temperature and infrared signature
N82-18136

SURFACE VEHICLES
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974

SURFACTANTS
Improving the accuracy of the estimates of surfactant content in jet fuels
A82-23250

SWEPT WINGS
Design of supercritical swept wings
A82-23826
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test
[AIAA 82-0568] A82-24656

SWEPTBACK WINGS
History of the sweptback wing
[DGLR PAPER 81-070] A82-22898
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18189

SYSTEM EFFECTIVENESS
Prediction of off-design performance of turbo-shaft engines a simplified method
N82-18132
Measurement techniques used to assess the installed power of a helicopter engine
N82-18133
Component design and development for future helicopter engines
N82-18134
Assessment of aircraft capacitive circuit medium wave antennas according to their efficiency
N82-19453

SYSTEMS ANALYSIS
Analysis and optimization of control systems in piloted flight vehicles --- Russian book
A82-22398
Analysis of system problems using aviation safety reporting system data
A82-23312
NAS system load - Utilization of the DARC system
A82-23315
Distributed data processing modeling for future ATC systems
A82-23319
A method for the investigation of gyrostabilization systems
A82-24692
SH-60B test program
N82-18141
A light helicopter for night firing
N82-18144
Task analytic techniques: Application to the design of a flight simulator instructor/operator console
[AD-A108724] N82-18227

SYSTEMS ENGINEERING
The use of dynamic mock-ups in the design of advanced systems --- USAF's Digital Avionic Information System and NAVY's Advanced Integrated Display System
A82-22902

Design technology for improved performance retention in turbofan engines
[SAE PAPER 811055] A82-24392
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608] A82-24677
The influence of sensor and actuator characteristics on overall helicopter AFCS design
N82-18171
Transport aircraft cockpit standardization (Federal Aviation regulations part 25)
[AD-A108924] N82-19207

SYSTEMS INTEGRATION
The use of dynamic mock-ups in the design of advanced systems --- USAF's Digital Avionic Information System and NAVY's Advanced Integrated Display System
A82-22902
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398
Impact of systems technology and integration on helicopter design
N82-18165
Integration of inertial sensors in helicopters
N82-18173
Integrated control design techniques
[AD-A108223] N82-18224
Electric flight systems integration
N82-19150
National Airspace Data Interchange Network (NADIN) support of Remote Maintenance Monitoring System (RMMS)
[AD-A109125] N82-19160

T

TAIL ASSEMBLIES
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft --- static wind tunnel force measurements
[NASA-CR-168578] N82-19224

TAKEOFF RUNS
A digital simulation program describing the motion of an aircraft undergoing engine failure during its takeoff ground roll
[AD-A108420] N82-18210

TARGET ACQUISITION
Tethered rotorplatforms and their mission potential
N82-18145

TARGET RECOGNITION
Tethered rotorplatforms and their mission potential
N82-18145

TECHNOLOGICAL FORECASTING
ATC automation - A look forward: Technology/architecture
A82-23320
Fighters - Tomorrow's terminology
A82-23368
Air transport in the 21st century
A82-24025
Fighter issues - 2000
[SAE PAPER 811096] A82-24415
Perspectives for Controlled Weapons Technology: Report of the 90th Helicopter Forum
[MBB-UA-532-80-O] N82-19211

TECHNOLOGY ASSESSMENT
Computer-generated images for simulators - The cost of technology
A82-22881
Reliable power --- Rolls-Royce aircraft engine designs
A82-24007
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398
Boeing Vertol fatigue life methodology
A82-24718
Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s
A82-25324
Review of defense-related vertical and short takeoff and landing (V/STOL) aircraft programs
[GPO-55-278] N82-18205
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary
[NASA-TM-84149] N82-19170
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views
[NASA-TM-84148] N82-19171
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
[NASA-TM-84146] N82-19173

TECHNOLOGY TRANSFER
Impact of systems technology and integration on helicopter design
N82-18165

TECHNOLOGY UTILIZATION
Lightweight ATC systems
A82-23321
Novel approaches to electron beam welding machine utilization
A82-23753

TELEVISION CAMERAS
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR
[ESA-TT-675] N82-19219

TEMPERATURE CONTROL
Problems associated with the quality assurance of stretched acrylic sheet
A82-24319

TEMPERATURE DISTRIBUTION
Engine superficial temperature and infrared signature
N82-18136

TEMPERATURE EFFECTS
Effects of fan inlet temperature disturbances on the stability of a turbofan engine
[NASA-TM-82699] N82-18222

TERRAIN ANALYSIS
GTD terrain reflection model applied to ILS glide scope --- Geometrical Theory of Diffraction
A82-23027

TEST FACILITIES
Air cooled engine test facilities
A82-24004
Aerodynamic Testing Conference, 12th, Williamsburg, VA, March 22-24, 1982, Collection of Technical Papers
A82-24651
Slotted wall test section for automotive aerodynamic test facilities
[AIAA 82-0585] A82-24661
Evaluation of the North Island A/C crash/rescue training facility
[AD-A108740] N82-18228
Test site instrumentation study. Volume 2: Crash 1 and crash 2 raw data
[PB82-111832] N82-18233
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR
[ESA-TT-675] N82-19219
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721
[AD-A108814] N82-19952

TEST STANDS
Stability of a three-stage dynamic stand
A82-25353
Further development of the test concept of the ALPHA JET engine LARZAC 04
N82-18223

TETHERLINES
Tethered rotorplatforms and their mission potential
N82-18145

THEOREMS
A study of the techniques of dynamic analysis of helicopter type structures
N82-18129

THERMAL EXPANSION
Operating flight loads and their effect on engine performance
[SAE PAPER 811071] A82-24405

THERMAL INSULATION
The use of 'Kapton' polyimide film in aerospace applications
[SAE PAPER 811091] A82-24413

THERMAL STRESSES
Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570

THERMODYNAMIC EFFICIENCY
Lineup of the LM-series aircraft-derivative gas turbines
A82-22896

THIN FILMS
High-frequency monitoring of surface layers of metals
A82-23603

THREE DIMENSIONAL BOUNDARY LAYER
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18189

THREE DIMENSIONAL FLOW
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663
Problems of numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles
A82-25347
A three-dimensional approach to lift and moment coefficients of rotating blades
N82-18125
On the calculation of transonic blade tip flow for helicopter rotors
[MBB-UD-320-81-O] N82-18187

THREE DIMENSIONAL MOTION
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563

THRUST AUGMENTATION
XFV-12A diagnostic and development programs
[AD-A108354] N82-18206

THRUST CONTROL
Potential reductions in aircraft operation and maintenance costs by using thrust computing support equipment
[AD-A108463] N82-18207

THRUST MEASUREMENT
Potential reductions in aircraft operation and maintenance costs by using thrust computing support equipment
[AD-A108463] N82-18207

THRUST VECTOR CONTROL
Fighters - Tomorrow's terminology
A82-23368

TILT ROTOR AIRCRAFT
NASA/FAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session
[NASA-TM-84147] N82-19172

TIME DIVISION MULTIPLEXING
A design for a 32-channel multiplexer --- for unmanned aircraft navigation sensors
[RAE-TM-RAD-NAV-145] N82-18503

TIMING DEVICES
Global positioning system timing receivers in the DSN
N82-20126

TITANIUM ALLOYS
Welding for low-cost advanced titanium airframe structures
A82-23757
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358

TOPOGRAPHY
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

TORQUE
D.C.9 windshield - Effect of attachment retorque
A82-24324
Dynamics of aircraft antiskid braking systems --- conducted at the Langley aircraft landing loads and traction facility
[NASA-TP-1959] N82-18204

TRACKED VEHICLES
The Link-Miles driver training simulator for tracked vehicles: The effect of method and duration of training on the transfer of training
[IZF-1980-28] N82-18226

TRACKING (POSITION)
Analysis of a nonlinear altitude tracking method
[AD-A108878] N82-19197

TRACKING NETWORKS
On the calculation of separated flow on helicopter fuselages
[MBB-UD-321-81-O] N82-18188

TRAILING-EDGE FLAPS
Slotted variable camber flap
[NASA-CASE-LAR-12541-1] N82-18203

TRAINING AIRCRAFT
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199

TRAINING DEVICES
Task analytic techniques: Application to the design of a flight simulator instructor/operator console
[AD-A108724] N82-18227

TRAINING EVALUATION
Evaluation of the North Island A/C crash/rescue training facility
[AD-A108740] N82-18228

TRAINING SIMULATORS
Computer-generated images for simulators - The cost of technology
A82-22881
The Link-Miles driver training simulator for tracked vehicles: The effect of method and duration of training on the transfer of training
[IZF-1980-28] N82-18226

TRAJECTORY OPTIMIZATION
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037
Optimal aircraft landing patterns for minimal noise impact
N82-19200

TRANSFER OF TRAINING
The Link-Miles driver training simulator for tracked vehicles: The effect of method and duration of training on the transfer of training
[IZF-1980-28] N82-18226

TRANSHORIZON RADIO PROPAGATION
Beyond the horizon coverage for air navigation/traffic control
A82-24647

TRANSONIC COMPRESSORS
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222

TRANSONIC FLOW
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test
[AIAA 82-0568] A82-24656
On the calculation of transonic blade tip flow for helicopter rotors
[MBB-UD-320-81-O] N82-18187
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167
Flutter and time response analyses of three degree of freedom airfoils in transonic flow
[AD-A108987] N82-19227

TRANSONIC FLUTTER
Recent developments in wing with stores flutter suppression
[ONERA, TP NO. 1981-145] A82-24077

TRANSONIC WIND TUNNELS
The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel
[AIAA 82-0571] A82-24658
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663
Development of a self-optimizing flexible technology /SOFT/ transonic wing wind tunnel model
[AIAA 82-0601] A82-24673
Structural modeling of high Reynolds number wind tunnel models
[AIAA 82-0602] A82-24674
Induction driven transonic wind tunnel T2: Operation at room temperature and cryogenic adaptation
N82-19158

TRANSPARENCE
Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings
A82-24301

Transparency development needs for military aircraft in the 1980's A82-24302
Deficiencies and constraints that affect the design of cockpit enclosures and transparencies A82-24303
Transparencies - What an aircraft designer should know A82-24305
Transparency design decisions - Assessing their impact on visual performance A82-24306
Aircraft transparency design guide A82-24307
A new angular deviation measurement device for aircraft transparencies A82-24308
Portable transparency optical test system /P-TOTS/ A82-24309
Abrasion resistant coated plastic products for aircraft A82-24310
Proposed method for abrasion testing transparent plastics and coatings A82-24311
Windshield system structural enhancement A82-24312
The role of finite element analysis in the design of birdstrike resistant transparencies A82-24314
Aircraft transparency bird impact analysis using the MAGNA computer program A82-24315
Acrylic - A timely review A82-24317
Lucas stretched acrylic A82-24318
The effects of absorbed moisture upon the physical properties of stretched acrylic materials A82-24320

TRANSPORT AIRCRAFT
Reliability centered maintenance /RCM/ A82-24001
Fuel-efficient windshields for transport, commuter and business aircraft A82-24304
Airworthiness considerations in the design of commercial transport aircraft [SAE PAPER 811039] A82-24396
Aircraft surface coatings for drag reduction/erosion protection [SAE PAPER 811070] A82-24401
The cargo helicopter - A logistical vehicle A82-24717
Advanced electronic displays and their potential in future transport aircraft A82-25216
Laminar airfoils for transport aircraft [ESA-TT-680] N82-18190
C-5A austere airfield operational utility evaluation. Phase 2: Operation on unpaved soil surfaces following rainfall [AD-A108597] N82-18208
Tendencies in the development of subsonic transport aircraft with special consideration of aerodynamics [ESA-TT-705] N82-18214
Transport aircraft cockpit standardization (Federal Aviation regulations part 25) [AD-A108924] N82-19207
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane [NASA-TP-1966] N82-19225

TRAVELING WAVES
Antenna (selected articles) [AD-A108174] N82-19448
Assessment of aircraft capacitive circuit medium wave antennas according to their efficiency N82-19453

TRENDS
Trends in airline avionics [NLR-MP-80013-U] N82-18220

TRUCKS
Vehicle test report: Battronic pickup truck [NASA-CR-168637] N82-19205

TURBINE BLADES
Seventh European Rotorcraft and Powered Lift Aircraft Forum N82-18119

TURBINE ENGINES
Cooled variable-area radial turbine technology program [NASA-CR-165408] N82-19221

TURBINE EXHAUST NOZZLES
Prediction of off-design performance of turbo-shaft engines a simplified method N82-18132

TURBOFAN AIRCRAFT
A study to define the research and technology requirements for advanced turbo/propfan transport aircraft [NASA-CR-166138] N82-18202

TURBOFAN ENGINES
Design technology for improved performance retention in turbofan engines [SAE PAPER 811055] A82-24392
Management of powerplant maintenance and restoration programs for fuel conservation [SAE PAPER 811052] A82-24394
Operating flight loads and their effect on engine performance [SAE PAPER 811071] A82-24405
Performance retention features of the PW2037 [SAE PAPER 811054] A82-24409
A study to define the research and technology requirements for advanced turbo/propfan transport aircraft [NASA-CR-166138] N82-18202
Effects of fan inlet temperature disturbances on the stability of a turbofan engine [NASA-TM-82699] N82-18222
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine [NAL-TR-687T-PT-2] N82-19945

TURBOJET ENGINES
Low grade fuels for turbo and jet engines A82-23439

TURBOPROP AIRCRAFT
Engine superficial temperature and infrared signature N82-18136
A study to define the research and technology requirements for advanced turbo/propfan transport aircraft [NASA-CR-166138] N82-18202

TURBOPROP ENGINES
Engine superficial temperature and infrared signature N82-18136
A study to define the research and technology requirements for advanced turbo/propfan transport aircraft [NASA-CR-166138] N82-18202

TURBOSHAFTS
Prediction of off-design performance of turbo-shaft engines a simplified method N82-18132
Measurement techniques used to assess the installed power of a helicopter engine N82-18133

TURBULENT JETS
Complete velocity profile and 'optimum' skin friction formulas for the plane wall-jet [ASME PAPER 81-WA/FE-3] A82-24566

TURNING FLIGHT
Efficient combinations of numerical techniques applied to aircraft turning performance optimization A82-24814
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths [ESA-TT-685] N82-18200

U

UNSTEADY FLOW
Angle of downwash behind a wing in unsteady flow A82-24970
Problems of numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles A82-25347

UPPER SURFACE BLOWING
Acoustic fatigue endurance test of USB flap structure models at elevated temperature [NAL-TR-683] N82-19570

USER MANUALS (COMPUTER PROGRAMS)
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 2: Programmer's manual
[AD-A108294] N82-18231

USER REQUIREMENTS
Military requirements: Too little or too much
N82-18138
NASA/AAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary
[NASA-TM-84149] N82-19170
NASA/AAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views
[NASA-TM-84148] N82-19171
NASA/AAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
[NASA-TM-84146] N82-19173

V

V/STOL AIRCRAFT
The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators
[AIAA PAPER 82-2635] A82-25154

VANES
Hover tests of a model H-force rotor
N82-18159

VARIABLE SWEEP WINGS
Mission-adaptive wing flight demonstration program
[SAE PAPER 811035] A82-24399

VELOCITY DISTRIBUTION
Complete velocity profile and 'optimum' skin friction formulas for the plane wall-jet
[ASME PAPER 81-WA/FE-3] A82-24566

VELOCITY ERRORS
The application of NAVSTAR differential GPS in the civilian community
A82-24645

VERTICAL AIR CURRENTS
Aircraft measurements and analysis of severe storms: 1976 field experiment
[NASA-CR-168519] N82-18803

VERTICAL FLIGHT
Prediction of blade vortex interaction noise from measured blade pressure
N82-18147

VERTICAL TAKEOFF
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226

VERTICAL TAKEOFF AIRCRAFT
Review of defense-related vertical and short takeoff and landing (V/STOL) aircraft programs
[GPO-55-278] N82-18205

VERY HIGH FREQUENCY RADIO EQUIPMENT
FM broadcast interference related to airborne ILS, VOR and VHF communications
[RTCA/DO-176] N82-19419
Investigation of the effects of airborne installation factors on receiver interference
N82-19422

VHF OMNIRANGE NAVIGATION
FM broadcast interference related to airborne ILS, VOR and VHF communications
[RTCA/DO-176] N82-19419
Investigation of technical requirements
N82-19420
Investigation of airborne VHF communication and navigation equipment
N82-19421

VIBRATION
Vibration levels in Army helicopters: Measurement recommendations and data
[AD-A108131] N82-18209

VIBRATION DAMPING
Oscillations and vibrations of aircraft on runways
A82-24974
Review of helicopter Mast Mounted Sight (MMS) base motion isolation and Line-of-Sight (LOS) stabilization concepts
N82-18166

VIBRATION EFFECTS
Hypothetical fatigue life problem - Application of Aerospatiale method
A82-24716

VIBRATION ISOLATORS
The measurement of the mobility of structures at acoustic frequencies
N82-18149

VIBRATION MEASUREMENT
Vibration levels in Army helicopters: Measurement recommendations and data
[AD-A108131] N82-18209
Structural system identification technology verification
[AD-A109181] N82-19583

VIBRATION TESTS
Lineup of the IM-series aircraft-derivative gas turbines
A82-22896
Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test
N82-18127
Vibration levels in Army helicopters: Measurement recommendations and data
[AD-A108131] N82-18209

VIBRATORY LOADS
Mast mounted visual aids
N82-18167

VIDEO EQUIPMENT
Mast mounted visual aids
N82-18167

VISCOUS FLOW
Problems of numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles
A82-25347

VISIBILITY
Deficiencies and constraints that affect the design of cockpit enclosures and transparencies
A82-24303
Transparency design decisions - Assessing their impact on visual performance
A82-24306

VISORS
Concorde glazings - 5 years of Mach 2 service
A82-24326

VISUAL AIDS
Mast mounted visual aids
N82-18167
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
N82-18168

VISUAL FLIGHT
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[ESA-TT-685] N82-18200

VISUAL PERCEPTION
Transparency design decisions - Assessing their impact on visual performance
A82-24306

VOICE COMMUNICATION
Voice communications - The vital link
A82-23324

VOLTAGE GENERATORS
Design considerations of DC-Link aircraft generation systems
A82-24377
Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States
A82-24382

VORTEX SHEETS
A method of predicting fuselage loads in hover
N82-18164

VORTICES
The requirements for reduced IFR separations on final approach
A82-23311
Prediction of blade vortex interaction noise from measured blade pressure
N82-18147
Optimum performance and wake geometry of co-axial rotor in hover
N82-18156
A numerical approach to co-axial rotor aerodynamics
N82-18157
Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results
N82-18158

Simulator study of vortex encounters by a
twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225

W

WALL FLOW
Transonic wind tunnel wall interference
corrections for three-dimensional models
[AIAA 82-0588] A82-24663
WALL JETS
Complete velocity profile and 'optimum' skin
friction formulas for the plane wall-jet
[ASME PAPER 81-WA/FE-3] A82-24566
WALL PRESSURE
The pressure signature method for blockage
corrections, and its applications to the
industrial wind tunnel
[BU-263] N82-19231
WARNING SYSTEMS
AN/ALQ-135 tail warning system follow-on
operational test and evaluation
[AD-A108348] N82-18471
WASTE ENERGY UTILIZATION
Open-cycle vapor compression heat pump
[PB82-110503] N82-18553
WATER
Improving the accuracy of the estimates of
surfactant content in jet fuels
A82-23250
WEAPON SYSTEMS
F/A-18 weapon system development
A82-23774
Future strike fighter options - Concepts and
technologies
[SAE PAPER 811099] A82-24403
Fighter issues - 2000
[SAE PAPER 811096] A82-24415
Naval versions of the Dauphin and the AS 15 TT
weapon system
N82-18142
A light helicopter for night firing
N82-18144
WEAPONS DEVELOPMENT
F/A-18 weapon system development
A82-23774
WEAR TESTS
Monitoring engine wear by oil analysis
A82-24012
Proposed method for abrasion testing transparent
plastics and coatings
A82-24311
WEIGHT REDUCTION
Minimum mass sizing of a large low-aspect ratio
airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022
Fuel-efficient windshields for transport, commuter
and business aircraft
A82-24306
The development of high strength light-weight
windshields for the new generation of Boeing 757
and 767 airliners
A82-24323
Advanced generating system technology
A82-24380
WEIGHTING FUNCTIONS
Noise measurements on the helicopter BK 117
design. Weighted noise levels and influence of
airspeed
[DFVLR-MITT-81-18] N82-19957
WELDABILITY
Aluminum and its alloys - Weldability
A82-23755
WELDED STRUCTURES
Welding for low-cost advanced titanium airframe
structures
A82-23757
WELDING
Welding technology for the aerospace industry;
Proceedings of the Conference, Las Vegas, NV,
October 7, 8, 1980
A82-23751
WELDING MACHINES
Novel approaches to electron beam welding machine
utilization
A82-23753
WHEEL BRAKES
Dynamics of aircraft antiskid braking systems ---
conducted at the Langley aircraft landing loads
and traction facility
[NASA-TP-1959] N82-18204
WIND MEASUREMENT
Wind and temperature database for flight planning
[SAE PAPER 811068] A82-24385
WIND SHEAR
Development of a clear air radar to detect
meteorological hazards at airports
[AD-A108236] N82-18835
WIND TUNNEL APPARATUS
The effect of ejector augmentation on test-section
flow quality in the Calspan 8-ft transonic wind
tunnel
[AIAA 82-0571] A82-24658
An ejector augmented choking valve for the
metering and control of inlet and bleed duct flows
[AIAA 82-0575] A82-24659
Status and capabilities of the National Full Scale
Facility 40- by 80-foot wind tunnel modification
[AIAA 82-0607] A82-24676
WIND TUNNEL CALIBRATION
The pressure signature method for blockage
corrections, and its applications to the
industrial wind tunnel
[BU-263] N82-19231
WIND TUNNEL MODELS
Cross and cross-coupling derivative measurements
on the standard dynamics model at AEDC
[AIAA 82-0596] A82-24670
Development of a self-optimizing flexible
technology /SOFT/ transonic wing wind tunnel model
[AIAA 82-0601] A82-24673
Structural modeling of high Reynolds number wind
tunnel models
[AIAA 82-0602] A82-24674
Evaluation of methods for characterizing surface
topography of models for high Reynolds number
wind-tunnels
[AIAA 82-0603] A82-24675
The design of a wind tunnel VSTOL fighter model
incorporating turbine powered engine simulators
[AIAA PAPER 82-2635] A82-25154
Effects of installation of F101 DFE exhaust
nozzles on the afterbody-nozzle characteristics
of the F-14 airplane
[NASA-TM-83250] N82-19181
WIND TUNNEL NOZZLES
Mean flow and noise measurements in a Mach 3.5
pilot quiet tunnel
[AIAA 82-0569] A82-24657
WIND TUNNEL STABILITY TESTS
Review of support interference in dynamic tests
[AIAA 82-0594] A82-24668
WIND TUNNEL TESTS
History of the sweptback wing
[DGLR PAPER 81-070] A82-22898
Recent developments in wing with stores flutter
suppression
[ONERA, TP NO. 1981-145] A82-24077
Aerodynamic Testing Conference, 12th,
Williamsburg, VA, March 22-24, 1982, Collection
of Technical Papers
A82-24651
Numerical design of the contoured wind-tunnel
liner for the NASA swept-wing LFC test
[AIAA 82-0568] A82-24656
Technical innovations in testing and analysis of
heat and pressure models in hypersonic wind
tunnels
[AIAA 82-0578] A82-24660
Slotted wall test section for automotive
aerodynamic test facilities
[AIAA 82-0585] A82-24661
The use of a multi-degree-of-freedom dual balance
system to measure cross and cross-coupling
derivatives
[AIAA 82-0595] A82-24669
Separated flow around helicopter bodies
N82-18163
Evaluation of the helicopter low airspeed system
LASSIE
N82-18172
Spin-tunnel investigation of a 1/13-scale model of
the NASA AD-1 oblique-wing research aircraft
[NASA-TM-83236] N82-18183

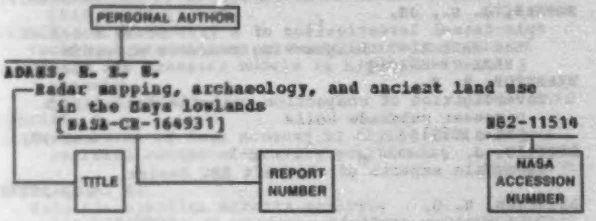
Multiple ejection effects analysis
[AD-A108277] N82-18192
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-14 airplane
[NASA-TM-83250] N82-19181
On the design of some airfoils for sailplane application --- additions to existing wings for inflight testing
[VTH-LR-326] N82-19213
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft --- static wind tunnel force measurements
[NASA-CR-168578] N82-19224
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226
WIND TUNNEL WALLS
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663
The pressure signature method for blockage corrections, and its applications to the industrial wind tunnel
[BU-263] N82-19231
WINDMILLS (WINDPOWERED MACHINES)
An extension of the local momentum theory to the rotors operating in twisted flow field N82-18123
Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test N82-18127
WINDSHIELDS
Conference on Aerospace Transparencies, London, England, September 8-10, 1980, Proceedings A82-24301
Transparency development needs for military aircraft in the 1980's A82-24302
Deficiencies and constraints that affect the design of cockpit enclosures and transparencies A82-24303
Fuel-efficient windshields for transport, commuter and business aircraft A82-24304
Transparencies - What an aircraft designer should know A82-24305
Aircraft transparency design guide A82-24307
A new angular deviation measurement device for aircraft transparencies A82-24308
Proposed method for abrasion testing transparent plastics and coatings A82-24311
Windshield system structural enhancement A82-24312
The role of finite element analysis in the design of birdstrike resistant transparencies A82-24314
The development of high strength light-weight windshields for the new generation of Boeing 757 and 767 airliners A82-24323
D.C.9 windshield - Effect of attachment retorque A82-24324
B.A.C. One-Eleven flight deck glazing product improvement A82-24325
Concorde glazings - 5 years of Mach 2 service A82-24326
WING CAMBER
Slotted variable camber flap
[NASA-CASE-LAR-12541-1] N82-18203
WING FLAPS
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945
WING LOADING
Structural modeling of high Reynolds number wind tunnel models
[AIAA 82-0602] A82-24674

Some unsteady aerodynamic effects on helicopter rotors N82-18162
WING NACELLE CONFIGURATIONS
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167
WING OSCILLATIONS
Oscillating supersonic/hypersonic wings at high incidence A82-23828
Recent developments in wing with stores flutter suppression
[ONERA, TP NO. 1981-145] A82-24077
Application of the ONERA dynamic stall model to a helicopter blade in forward flight N82-18161
WING PLANFORMS
YF-16 design concept and philosophy A82-23444
WING PROFILES
Mission-adaptive wing flight demonstration program
[SAE PAPER 811035] A82-24399
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663
Development of a self-optimizing flexible technology /SOFT/ transonic wing wind tunnel model
[AIAA 82-0601] A82-24673
Structural modeling of high Reynolds number wind tunnel models
[AIAA 82-0602] A82-24674
WING SLOTS
Slotted variable camber flap
[NASA-CASE-LAR-12541-1] N82-18203
WING TIPS
Hover tests of a model H-force rotor N82-18159
An analytical investigation of the free-tip rotor for helicopters
[NASA-TM-81345] N82-18179
On the design of some airfoils for sailplane application --- additions to existing wings for inflight testing
[VTH-LR-326] N82-19213
WINGS
Angle of downwash behind a wing in unsteady flow A82-24970
XFV-12A diagnostic and development programs
[AD-A108354] N82-18206
WIRE CLOTH
Metal honeycomb to porous wireform substrate diffusion bond evaluation
[NASA-TM-82793] N82-18612
WIRING
The variation of induced currents in aircraft wiring A82-24355
WORKLOADS (PSYCHOPHYSIOLOGY)
Combined multisensor displays --- image preprocessing for shape coding to reduce pilot workload A82-22905
Utilizing the helicopter's versatility to improve the ATC system A82-23316

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 149)* **JUNE 1982**

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ABBINK, F. J.
Trends in airline avionics
[NLR-MP-80013-U] N82-18220
ABDELWAHAB, M.
Effects of fan inlet temperature disturbances on the stability of a turbofan engine
[NASA-TM-82695] N82-18222
ABELLA, E. L.
The toll of ILS-preventable aviation accidents
A82-25325
AGARWAL, J. C.
Where is cobalt irreplaceable
A82-25538
AHLSWEDE, M.
Collection and evaluation of propeller aircraft noise certification data
[DFVLR-MITT-81-20] N82-19958
ALDINIO, G.
The Agusta's solution of AHS's hypothetical fatigue life problem
A82-24701
ALGER, R. S.
Evaluation of the North Island A/C crash/rescue training facility
[AD-A108740] N82-18228
ALLAVENA, A. M.
Engine superficial temperature and infrared signature
N82-18136
ALLI, P.
The Agusta's solution of AHS's hypothetical fatigue life problem
A82-24701
ALLISON, J. W.
Airline fuel saving through JT9D engine refurbishment
[SAE PAPER 811051] A82-24395
ALTMAN, P.
The challenge of standardizing fatigue methodology
A82-24703
ANDERS, K. P.
Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed
[DFVLR-MITT-81-19] N82-19957
Collection and evaluation of propeller aircraft noise certification data
[DFVLR-MITT-81-20] N82-19958
ANDERSON, E. C.
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test
[AIAA 82-0568] A82-24656
ANDREWS, D. G.
Slotted variable camber flap
[NASA-CASE-LAR-12541-1] N82-18203
ANTONAZZI, F., SR.
Pressure transducer calibration process
[SAE PAPER 811076] A82-24408
ARENDT, R. H.
Test site instrumentation study. Volume 2: Crash 1 and crash 2 raw data
[PB82-111832] N82-18233
ARVIN, G. H.
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165027] N82-19358
ASCHENBACH, J. W.
Reducing reflections on the front surface of air traffic control displays
A82-23314
AZUMA, A.
An extension of the local momentum theory to the rotors operating in twisted flow field
N82-18123
A numerical approach to co-axial rotor aerodynamics
N82-18157

B

BABB, J. C.
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406
BAILEY, R. O.
The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators
[AIAA PAPER 82-2635] A82-25154
BAKER, S. H.
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675
BALLIN, M. G.
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft
[NASA-CR-168578] N82-19224
BARAM, Y.
Fixed gain controller design for aircraft
A82-23441
BASH, J.
Calculation and measurement of electric field strength for airborne antennas in the LF/HF range
A82-25011
BASKERVILLE, M. W.
Materials aspects of aircraft EMC design
A82-24358
BAUMEISTER, K. J.
Influence of exit impedance on finite difference solutions of transient acoustic mode propagation in ducts
[ASME PAPER 81-WA/NCA-13] A82-24602
BAVITZ, P. C.
Future strike fighter options - Concepts and technologies
[SAE PAPER 811099] A82-24403
BEARD, M. C.
Airworthiness regulation: What is our strategy - What are the issues
A82-26006
BECKER, F. E.
Open-cycle vapor compression heat pump
[PB82-110503] N82-18553

BECKER, J.
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228

BECKWITH, I. E.
Mean flow and noise measurements in a Mach 3.5 pilot quiet tunnel
[AIAA 82-0569] A82-24657

BEDDOES, J. C.
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772

BEEDELL, D. A. E.
Design study into a high endurance mini-rotorcraft
[BU-265] N82-19216

BEIN, T. W.
Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391

BELL, D. B.
Lucas stretched acrylic
A82-24318

BELTE, D.
Helicopter Icing Spray System (HISS) nozzle improvement evaluation
[AD-A109405] N82-19208

BERKEBILE, D. H.
The use of 'Kapton' polyimide film in aerospace applications
[SAE PAPER 811091] A82-24413

BERMAN, A.
Structural system identification technology verification
[AD-A109181] N82-19583

BESER, J.
The application of NAVSTAR differential GPS in the civilian community
A82-24645

BEVILAQUA, P. M.
XFV-12A diagnostic and development programs
[AD-A108354] N82-18206

BEYER, R.
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
N82-18168

BEZIAC, G.
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
N82-18131

BIERTUEMPEL, E.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR
[ESA-TT-675] N82-19219

BIGHAM, J.
Electromechanical actuators
N82-19148

BILLMANN, B. R.
Analysis of a nonlinear altitude tracking method
[AD-A108878] N82-19197

BIRNIE, S. E.
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974

BLANK, D.
Efficient combinations of numerical techniques applied to aircraft turning performance optimization
A82-24814

BOCCADORO, C. H.
An ejector augmented choking valve for the metering and control of inlet and bleed duct flows
[AIAA 82-0575] A82-24659

BOERMANS, L. M. M.
On the design of some airfoils for sailplane application
[VTH-LR-326] N82-19213

BONITCH, R.
Lightweight ATC systems
A82-23321

BONNATERRE, R.
Recent improvements in aircraft Ni-Cd cells
A82-24245

BOON, D. J.
A study of the techniques of dynamic analysis of helicopter type structures
N82-18129

BORGER, J. G.
Maintenance objectives for future aircraft
A82-24005

BORRI, M.
A general purpose program for rotor blade dynamics
N82-18151

BOULET, J.
Point of view of a helicopter manufacturer on airworthiness regulations
N82-18137

BOWMAN, J. S., JR.
Spin-tunnel investigation of a 1/13-scale model of the NASA AD-1 oblique-wing research aircraft
[NASA-TM-83236] N82-18183

BRABSTON, W. N.
Investigation of compaction criteria for airport pavement subgrade soils
[AD-A108518] N82-18230

BRETTLE, J.
Materials aspects of aircraft EMC design
A82-24358

BREUHAUS, W. O.
C-5A austere airfield operational utility evaluation. Phase 2: Operation on unpaved soil surfaces following rainfall
[AD-A108597] N82-18208

BRITTON, K. H.
A-7E software module guide
[AD-A108649] N82-18920

BROGAN, W. L.
Improvements and extensions of the Geometrical Dilution of Precision (GDOP) concept for selecting navigation measurements
[AD-A108607] N82-18197

BROWN, R. A.
Concorde glazings - 5 years of Mach 2 service
A82-24326

BRUDNYY, E. O.
Assessment of aircraft capacitive circuit medium wave antennas according to their efficiency
N82-19453

BRUERE, A.
Electrical ground testing of aircraft antistatic protection
N82-19156

BUNJE, A. J.
Proposed method for abrasion testing transparent plastics and coatings
A82-24311

BURCAT, A.
Low grade fuels for turbo and jet engines
A82-23439

BURTON, R. W.
Analysis of the crossed dipole antenna as a model for aircraft in an electromagnetic environment
A82-25002

BURTON, T. D.
Describing function analysis of nonlinear nose gear shimmy
[ASME PAPER 81-WA/DSC-20] A82-24565

C

CABRIT, P.
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
N82-18131

CALDWELL, J. D.
Analytical study of cockpit information requirements
[AD-A108524] N82-18218

CAMMARATA, S.
Distributed intelligence for air fleet control
[AD-A108611] N82-18195

CAMPBELL, W. C.
Development of a clear air radar to detect meteorological hazards at airports
[AD-A108236] N82-18835

CANDAU, J. F.
A light helicopter for night firing
N82-18144

CANTRELL, W. G.
Software features applicable to inertial measurement unit self alignment
[AD-A108511] N82-18196

CAREL, O.
The birth of precision DME
A82-24066
CARLSON, J. R.
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-14 airplane
[NASA-TM-83250] N82-19181
CARRINE, W. A.
Cost of ownership advantages with a shared oil system
A82-24378
CARRIERE, J. E.
Performance retention features of the PW2037
[SAE PAPER 811054] A82-24409
CARROLL, B. R.
Technical innovations in testing and analysis of heat and pressure models in hypersonic wind tunnels
[AIAA 82-0578] A82-24660
CASPARI, E.
Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning
A82-23470
CASTEEL, G. R.
Multiple ejection effects analysis
[AD-A108277] N82-18192
CENN, N. A.
The effect of a well on the aerodynamics of a spoiler
[BU-268] N82-19194
CERNOSEK, J.
Fatigue test of the typical main rotor controls component
A82-24715
CHABANNE, J. P.
Importance of a tactical cargo aircraft in emergency relief
A82-25499
CHADWICK, R. D.
Development of a clear air radar to detect meteorological hazards at airports
[AD-A108236] N82-18835
CHALLITA, A.
The effects of bird orientation on load profile and damage level
A82-24316
CHANG, R.
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037
CHANG, R. C. Y.
Optimal aircraft landing patterns for minimal noise impact
N82-19200
CHAPMAN, D.
A program testing assistant
[AD-A108147] N82-18922
CHEESEMAN, I. C.
Developments in rotary wing aircraft aerodynamics
N82-18120
Wind tunnel investigation of high speed rotor noise
N82-18146
CHEN, C. H.
Flutter and time response analyses of three degree of freedom airfoils in transonic flow
[AD-A108987] N82-19227
CHINN, J. E.
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721
[AD-A108814] N82-19952
CHIUCHIOLO, E. A.
Three-engine,control system for the prototype EH-101 helicopter
[AEBG-9/81-1568L] N82-18135
CHRISTENSEN, J.
D.C.9 windshield - Effect of attachment retorque
A82-24324
CHUDYK, D. W.
The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel
[AIAA 82-0571] A82-24658
CLARK, P. J. F.
Slotted wall test section for automotive aerodynamic test facilities
[AIAA 82-0565] A82-24661
CLAY, C. W.
Electric flight systems
N82-19144
CLEMENTS, P. A.
Global positioning system timing receivers in the DSN
N82-20126
CLOUD, R. W.
Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States
A82-24382
COLLINGS, W. Z.
Review of defense-related vertical and short takeoff and landing (V/STOL) aircraft programs
[GPO-55-278] N82-18205
COLLINS, A. G.
RB 211 powerplant deterioration - Review of current situation and lessons learned
[SAE PAPER 811053] A82-24393
COLLINS, D. P.
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217
COMBS, C. F.
XFV-12A diagnostic and development programs
[AD-A108354] N82-18206
COOK, G.
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037
COOKSEY, D. L.
Bomb crater repair techniques for permanent airfields. Report 1: Series 1 tests
[AD-A108716] N82-18229
COULTER, S. M.
Cross and cross-coupling derivative measurements on the standard dynamics model at AEDC
[AIAA 82-0596] A82-24670
COUSINS, D.
Aircraft electric system development and test facilities
A82-24384
CRACKNELL, F.
LAMPS III recovery assist, securing and traversing /RAST/ system
[SAE PAPER 811080] A82-24412
CRONIN, M. J.
Electric flight systems, overview
N82-19135
CURRAN, J. J.
Three-engine control system for the prototype EH-101 helicopter
[AEBG-9/81-1568L] N82-18135
CUTLER, R.
A310 - Design for maintenance
A82-24002

D

DAMMS, S. M.
The measurement of the mobility of structures at acoustic frequencies
N82-18149
DANGVU, H.
Multivariable aircraft control by maneuver commands: An application to air to surface gunnery
N82-19154
DANNEBERG, R.
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
N82-18168
DAVIES, E. B.
New developments in cockpit-human interfaces
[BAE-TM-FS-412] N82-18215
DAWSON, G. F.
Air cooled engine test facilities
A82-24004
DE LUCCIA, J. J.
Recent developments in materials and processes for aircraft corrosion control
A82-24025
DE MALHERBE, M. C.
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772

DEDIEU, J. P.
Parametric study of the influence of the engine upon the operating cost of a civil helicopter N82-18131

DELUCIEN, A. G. B.
Utilizing the helicopter's versatility to improve the ATC system A82-23316

DENING, D. C.
High temperature engine control electronics [SAE PAPER 811074] A82-24407

DEPOMPEIS, R.
Parametric criteria and impact on design trends N82-18139

DEPONTE, S.
An experimental analysis of the shape of a rotor wake N82-18122

DESTUYNDER, R.
Recent developments in wing with stores flutter suppression [ONERA, TP NO. 1981-145] A82-24077

DETMAN, T. R.
Development of a clear air radar to detect meteorological hazards at airports [AD-A108236] N82-18835

DEVEAUX, G. D.
Advanced attack helicopter fatigue testing - Overview A82-24720

DIERKE, R.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR [ESA-TT-675] N82-19219

DONOHOE, J. B.
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km [AD-A108182] N82-18464

DOROFEEV, A. L.
High-frequency monitoring of surface layers of metals A82-23603

DOVE, B.
Digital flight controls N82-19149

DOWNIE, D.
Complete guide to Rutan homebuilt aircraft A82-22880

DOWNIE, J.
Complete guide to Rutan homebuilt aircraft A82-22880

DREES, J. M.
Standardization of helicopter fatigue methodology - A manufacturer's view A82-24704

DREHER, R. C.
Dynamics of aircraft antiskid braking systems [NASA-TP-1959] N82-18204

DUBREUIL, J. P.
Naval versions of the Dauphin and the AS 15 TT weapon system N82-18142

DUBROVSKII, V. I.
Utilization of radio equipment at airports and on airways A82-22407

DURAN, M. G.
Secondary radar problems - The presence of false echoes A82-25323

DUSTERBERRY, J. C.
Status and capabilities of the National Full Scale Facility 40- by 80-foot wind tunnel modification [AIAA 82-0607] A82-24676

E

EARNSHAW, K. B.
Development of a clear air radar to detect meteorological hazards at airports [AD-A108236] N82-18835

EAST, A.
A further study of helicopter rotor pitch-flap-phase coupling [BU-259] N82-19214

EDWARDS, J. W.
Apparatus for damping operator induced oscillations of a controlled system [NASA-CASE-FRC-11041-1] N82-18493

EFTIS, J.
Fracture and fatigue characterization of aircraft structural materials under biaxial loading [AD-A109054] N82-19587

EGAWA, K.
Acoustic fatigue endurance test of USB flap structure models at elevated temperature [NAL-TR-683] N82-19570

EGGLESTON, R. G.
Transparency design decisions - Assessing their impact on visual performance A82-24306
A new angular deviation measurement device for aircraft transparencies A82-24308
Portable transparency optical test system /P-TOTS/ A82-24309

EHLERS, R.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR [ESA-TT-675] N82-19219

EIDELMAN, D.
Fixed gain controller design for aircraft A82-23441

ELLIOTT, S.
The testing of aircraft under near field conditions A82-24361

ENGELBERT, D. F.
Status and capabilities of the National Full Scale Facility 40- by 80-foot wind tunnel modification [AIAA 82-0607] A82-24676

ERDMANN, F.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR [ESA-TT-675] N82-19219

ERICSSON, L. E.
Review of support interference in dynamic tests [AIAA 82-0594] A82-24668

ERKELENS, L. J. J.
A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft [NLR-TR-80032-U] N82-19212

ESPOSTI, W.
Engine superficial temperature and infrared signature N82-18136

EWINS, D. J.
The effects of slight non-linearities on modal testing of helicopter-like structures N82-18130

F

FABIAN, H.
Experience during the development of the German-Japanese helicopter BK 117 [MBB-UD-318-81-O] N82-19210

FALCHERO, D.
Application of the ONER dynamic stall model to a helicopter blade in forward flight N82-18161

FAULMANN, D.
Induction driven transonic wind tunnel T2: Operation at room temperature and cryogenic adaptation N82-19158

FAUST, H. S.
Application of fatigue, crack propagation and strain survey testing to the CH-46 aft rotor drive shaft A82-24705

FEDORCHENKO, A. T.
Problems of numerical simulation of unsteady three-dimensional viscous-gas flows in nozzles A82-25347

FINKE, R.
Power systems N82-19146

FISCHER, E. F.
Abrasion resistant coated plastic products for aircraft
A82-24310

FLANNELLY, W. G.
Structural system identification technology verification
[AD-A109181] N82-19583

FORD, R. L.
Conflicts between random flights in a given area
A82-25213

FORESTCUE, P. W.
Preliminary investigation into the addition of auxiliary longitudinal thrust on helicopter agility
N82-18155

FOSSUM, G., II
Evolution of the Aeroscout
A82-24706

FRANCO, B. G.
An ejector augmented choking valve for the metering and control of inlet and bleed duct flows
[AIAA 82-0575] A82-24659

FREEMAN, G. A.
Multiple ejection effects analysis
[AD-A108277] N82-18192

FREEMAN, R. J.
Vehicle test report: Battronic pickup truck
[NASA-CR-168637] N82-19205

FUKIMORI, Y.
Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570

G

GAGLIARDI, F.
Parametric criteria and impact on design trends
N82-18139

GAI, E.
Reliability analysis of a dual-redundant engine controller
[SAE PAPER 811077] A82-24410

GAL-OR, B.
Low grade fuels for turbo and jet engines
A82-23439

GALENTE, J. B.
Electronic flight instrument systems /EFIS/, the instrumentation of the 1980s
A82-25324

GARABEDIAN, P.
Design of supercritical swept wings
A82-23826

GENCO, L. V.
Transparency design decisions - Assessing their impact on visual performance
A82-24306

A new angular deviation measurement device for aircraft transparencies
A82-24308

Portable transparency optical test system /P-TOTS/
A82-24309

GERDI, G.
MIL-STD 1553B - Aircraft EM environmental susceptibility effects
A82-24357

GIANSANTE, N.
Structural system identification technology verification
[AD-A109181] N82-19583

GLOSS, B. B.
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

GOELLER, U.
Tethered rotorplatforms and their mission potential
N82-18145

GOLDSMITH, I. M.
A study to define the research and technology requirements for advanced turbo/propfan transport aircraft
[NASA-CR-166138] N82-18202

GORENKOV, A. F.
Improving the accuracy of the estimates of surfactant content in jet fuels
A82-23250

GOULD, D. K.
Mission-adaptive wing flight demonstration program
[SAE PAPER 811035] A82-24399

GRAHAM, E. D.
Integrated control design techniques
[AD-A108223] N82-18224

GRANDT, A. F., JR.
A compilation of stress intensity factor solutions for flawed fastener holes
[AD-A108753] N82-18628

GRANGER, R. G.
Acrylic - A timely review
A82-24317

GRAVELY, M. L.
The use of dynamic mock-ups in the design of advanced systems
A82-22902

GRAY, P. J.
International plans for civil and military co-ordination
A82-23317

GRAYSON, R. L.
Analysis of system problems using aviation safety reporting system data
A82-23312

GREBER, I.
Dilution jet behavior in the turn section of a reverse flow combuster
[NASA-TM-82776] N82-19220

GREEN, W. L.
On-line control for the regulation of power source in multiple-servo electro-hydraulic systems
[ASME PAPER 81-WA/DSC-3] A82-24562

GREENE, W. H.
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022

GREGR, O.
The reliability and safety of small passenger aircraft
A82-24972

GRIFFIN, J. M.
An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
A82-24313

GRIGG, R. E.
Development of maintenance programmes through the functional, structural and flight test phases
A82-24003

GROOM, N. J.
Electric Flight Systems
[NASA-CP-2209] N82-19134

GUERARD, A.
Selection of telecommunication equipment - A new approach to the equivalent cost concept
A82-25510

GUTIERREZ, O. A.
Effect of facility variation on the acoustic characteristics of three single stream nozzles
[NASA-TM-81635] N82-19944

H

HABERMAN, D. R.
The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives
[AIAA 82-0595] A82-24669

HAERDTL, K. H.
Investigations of the separation behavior on airfoils at high angles of attack, using linear lift theory
[MBB-FE-122/S/PUB/37] N82-18189

HABUSER, H.
Integration of complex systems in current and future aircraft projects for the example of avionics
[MBB-UH-18-80-O] N82-18221

HAFEZ, M.
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663

HAINES, A. L.
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217

HALL, F. L.
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974

HALL, J. C.
Digital flight controls
N82-19143

HALPIN, J. C.
An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
A82-24313

HAMMOND, G. P.
Complete velocity profile and 'optimum' skin friction formulas for the plane wall-jet
[ASME PAPER 81-WA/FE-3]
A82-24566

HAND, L. A.
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608]
A82-24677

HANLY, R. D.
The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel
[AIAA 82-0571]
A82-24658

HANNAN, T. L.
Air Traffic Control computer replacement - Specification issues and problems
A82-23313

HARBISON, W. C.
Abrasion resistant coated plastic products for aircraft
A82-24310

HARRISON, J. V.
Reliability analysis of a dual-redundant engine controller
[SAE PAPER 811077]
A82-24410

HARRISON, R. F.
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km
[AD-A108182]
N82-18464

HASTINGS, E. C., JR.
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966]
N82-19225

HATFIELD, J. J.
Advanced electronic displays and their potential in future transport aircraft
A82-25216

HAVERIDINGS, H.
A control model for maneuvering flight for application to a computer-flight testing program
N82-18153

HAYASHI, T.
An extension of the local momentum theory to the rotors operating in twisted flow field
N82-18123

HAYES-ROTH, F. A.
Distributed intelligence for air fleet control
[AD-A108611]
N82-18195

HEENE, R. C.
The cargo helicopter - A logistical vehicle
A82-24717

HEITKAMO, L. F.
Airport related residential acoustical insulation demonstration project: Report 1720
[PB82-100777]
N82-19396

HELD, V.
Integration of inertial sensors in helicopters
N82-18173

HENDY, J. C.
Design study into a high endurance mini-rotorcraft
[BU-265]
N82-19216

HEPLER, A. K.
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491]
N82-19226

HIGHLAND, R. W.
Analysis of Built-In-Test (BIT) false alarm conditions
[AD-A108752]
N82-18217

HILEY, P. E.
The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators
[AIAA PAPER 82-2635]
A82-25154

HILLAKER, H. J.
YF-16 design concept and philosophy
A82-23444

HITCHCOCK, L.
The use of dynamic mock-ups in the design of advanced systems
A82-22902

HITTNER, A.
Investigation of crossdeck pendant catapult slot interaction; proposed corrective measures
[AD-A108149]
N82-18232

HIXSON, W. N.
Propulsion multiplexer /PMUX/ system - The missing link
[SAE PAPER 811078]
A82-24411

HO, T. L.
High speed VSCF generator design consideration
A82-24379

HODGKINS, P. D.
Discrete Address Beacon System /DABS/
A82-23322

HOENLINGER, H.
Interpretation and construction of a dynamic similarity model of the A 310 wings
[MBB-FE-17/S/PUB/42]
N82-18212

HOEPPNER, D. W.
Material/structure degradation due to fretting and fretting-initiated fatigue
A82-23771

HOFFMAN, A. C.
Engine technology
N82-19145

HOOD, R. V.
Electric Flight Systems
[NASA-CP-2209]
N82-19134
Electric flight systems integration
N82-19150

HOOKE, F. H.
Aeronautical Research Laboratories Structures Division
[AD-A109049]
N82-19161

HOUGHTON, W.
NDE of composite rotor blades during fatigue testing
A82-24713

HOURMOUZIADIS, J.
Component design and development for future helicopter engines
N82-18134

HOWELL, D. A. S.
Army Lynx: Product development matched to military combat development
N82-18143

HSIEH, P. Y.
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 2: Programmer's manual
[AD-A108294]
N82-18231

HUBER, H.
Flight characteristics design and development of the MBB/KHI BK117 helicopter
N82-18150

HUI, W. H.
Oscillating supersonic/hypersonic wings at high incidence
A82-23828

HULL, D. R.
Metal honeycomb to porous wireform substrate diffusion bond evaluation
[NASA-TM-82793]
N82-18612

HUNG, J. C.
Software features applicable to inertial measurement unit self alignment
[AD-A108511]
N82-18196

HUSTEAD, R. E.
Voice communications - The vital link
A82-23324

HUTCHINSON, C.
Flight test data acquisition and interpretation
A82-24707

HYVARINEN, W. E.
The effect of critical design parameters on the selection of a VSCF system
A82-24381

I

IIDA, S.
Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683]
N82-19570

ILNITSKII, L. Y.
Assessment of aircraft capacitive circuit medium wave antennas according to their efficiency
N82-19453

ISRAELI, L.
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358

J

JACKSON, K. T., JR.
An analytical methodology to predict potential aircraft losses due to canopy birdstrikes
A82-24313

JACKSON, S. K., JR.
Quality, quantity, and technology - A perspective on fighter development
[SAE PAPER 811097] A82-24400

JACOB, G.
Importance of a tactical cargo aircraft in emergency relief
A82-25499

JACOBSON, I. D.
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037

JANK, T.
Volumetric pattern prediction of antennas on aircraft using the geometrical theory of diffraction
[ESA-TT-677] N82-18483

JENKINS, V. M.
AN/ALQ-135 tail warning system follow-on operational test and evaluation
[AD-A108348] N82-18471

JENSEN, S. N.
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

JOHNSON, J. C.
Vibration levels in Army helicopters: Measurement recommendations and data
[AD-A108131] N82-18209

JONES, A. L.
Integrated control design techniques
[AD-A108223] N82-18224

JONES, D. L.
Fracture and fatigue characterization of aircraft structural materials under biaxial loading
[AD-A109054] N82-19587

JONES, R. E.
Distributed data processing modeling for future ATC systems
A82-23319

JONES, T. G.
Analytical study of cockpit information requirements
[AD-A108524] N82-18218

JOOS, H. D.
Extension of proportional navigation by the use of optimal filtering and control methods
[ESA-TT-683] N82-18199

JOSEFOWITZ, A. J.
Combined multisensor displays
A82-22905

JUNKER, B.
Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results
N82-18150

K

KANANEK, V.
The reliability and safety of small passenger aircraft
A82-24972

KALETKA, J.
Evaluation of the helicopter low airspeed system LASSIE
N82-18172

KALININ, N. P.
High-frequency monitoring of surface layers of metals
A82-23603

KAMENOV, P. S.
Linear alpha-ray altimeter
A82-23225

KANOH, T.
Aircraft parameter identification in the presence of atmospheric turbulence
A82-23227

KAUL, C. E.
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type
[AD-A108801] N82-19206

KEEN, J. M. S.
Reliable power
A82-24007

KELLER, M.
A redundancy concept for a digital CSAS
N82-18170

KENNETT, R. J.
Advanced generating system technology
A82-24388

KERR, T. H.
A criterion for the prediction of the recovery characteristics of spinning aircraft
[RAE-TM-AERO-2251] N82-19223

KETCHAM, S. J.
Recent developments in materials and processes for aircraft corrosion control
A82-24825

KEYSER, G. L., JR.
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225

KIHARA, M.
Sensitivity reduction by double perfect model following
A82-23029

KING, A. E.
A look into the future: The potential of the all-electric secondary power system for the energy efficient transport
N82-19138

KING, R. W. P.
Analysis of the crossed dipole antenna as a model for aircraft in an electromagnetic environment
A82-25002

KLIMT, H.
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations
[MBB-FE-122/S/PUB/36] N82-18211

KNAPP, M. I.
Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost
[AD-A109373] N82-19218

KOBAYAKAWA, M.
Aircraft parameter identification in the presence of atmospheric turbulence
A82-23227

KOCH, J. R.
Airworthiness considerations in the design of commercial transport aircraft
[SAE PAPER 811039] A82-24396

KOERNER, H.
Tendencies in the development of subsonic transport aircraft with special consideration of aerodynamics
[ESA-TT-705] N82-18214

KOHNEN, E.
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
N82-18168

KOLLODGE, N. A.
Integrated control design techniques
[AD-A108223] N82-18224

KOMATSU, K.
Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570

KONDO, M.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945

KOZLOWSKI, D. R.
Fighter issues - 2000
[SAE PAPER 811096] A82-24415

KRAJCI, G. E.
Packaging the VSCF system for an aircraft engine environment
A82-24303

KREINER, H. D.
Component design and development for future helicopter engines
N82-18134

KREITINGER, R. L.
Aircraft surface coatings for drag reduction/erosion protection
[SAE PAPER 811070] A82-24401

KRICKE, D.
Improvement of fuel economy by flying with maximum rearward center-of-gravity positioning
A82-23470

KROPAC, O.
Oscillations and vibrations of aircraft on runways
A82-24974

KULLGREN, T. E.
A compilation of stress intensity factor solutions for flawed fastener holes
[AD-A108753] N82-18628

KUZMINA, L. K.
A method for the investigation of gyrostabilization systems
A82-24892

KUZNETSOV, A. A.
Utilization of radio equipment at airports and on airways
A82-22407

L

LANGER, H. J.
Helicopter rotor downwash: Results of experimental research at the DFVLR-rotor test stand and their comparison with theoretical results
N82-18158

LANZ, M.
A general purpose program for rotor blade dynamics
N82-18151

LARGE, G. D.
Cooled variable-area radial turbine technology program
[NASA-CR-165408] N82-19221

LARSON, G. C.
Computer-generated images for simulators - The cost of technology
A82-22081

LATINA, N. S.
Propulsion multiplexer /PMUX/ system - The missing link
[SAE PAPER 811078] A82-24411

LAWRENCE, J. H., JR.
Deficiencies and constraints that affect the design of cockpit enclosures and transparencies
A82-24303
Aircraft transparency design guide
A82-24307

LEE, H. J.
Fuel-rich plume combustion
[AD-A108136] N82-18349

LEFRANCQ, J. P.
A complete method for computation of blade mode characteristics and responses in forward flight
N82-18126

LEGGE, P. J.
Preliminary investigation into the addition of auxiliary longitudinal thrust on helicopter agility
N82-18155

LENOX, T. G.
Potential propulsion considerations and study areas for all-electric aircraft
N82-19137

LEONARDI, J.
Recent improvements in aircraft Ni-Cd cells
A82-24245

LERCHE, E.
Further development of the test concept of the ALPHA JET engine LARZAC 04
N82-18223

LEWIS, E. A.
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km
[AD-A108182] N82-18868

LIEBOWITZ, H.
Practical applications of fracture mechanics
[AGARD-AG-257] N82-19571

LINTERN, G.
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type
[AD-A108801] N82-19206

LIPSHITZ, A.
Dilution jet behavior in the turn section of a reverse flow combuster
[NASA-TM-82776] N82-19220

LOEHR, H.
Equipment for testing and measuring a "helmet mounted sight and display" system with a coupled movable TV camera in the flight simulator for research of the DFVLR
[ESA-TT-675] N82-19219

LOVELACE, W.
Impact of technology on avionics cost trends
[AD-A108494] N82-18219

LOVELL, D.
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663

LUDWIEG, H.
History of the sweptback wing
[DGLR PAPER 81-070] A82-22898

LUDWIG, D.
Modal characteristics of rotor blades: Finite element approach and measurement by ground vibration test
N82-18127

LUEBBERS, R.
GTD terrain reflection model applied to ILS glide scope
A82-23027

LUEBBERS, R. J.
Calculation and measurement of electric field strength for airborne antennas in the LF/HF range
A82-25011

LUMLEY, J. L.
Annual review of fluid mechanics. Volume 14
A82-24416

LUPPOLD, R. H.
Reliability analysis of a dual-redundant engine controller
[SAE PAPER 811077] A82-24410

M

MACCORMACK, R. W.
International Conference on Numerical Methods in Fluid Dynamics, 7th, Stanford University, Stanford and Moffett Field, CA, June 23-27, 1980, Proceedings
A82-24426

MACDIARMID, I. P.
EMC clearance of modern military aircraft
A82-24359

MAEKAWA, S.
On the sonic fatigue life estimation of skin structures at room and elevated temperatures
A82-23678

MAHAPATRA, P. R.
Scanning strategies for air traffic control radars
A82-24646

MAHESH, J. K.
Integrated control design techniques
[AD-A108223] N82-18228

MAILLARD, W. E.
Technology for quality and quantity in a new fighter
[SAE PAPER 811100] A82-24404

MAINE, R. E.
A marine NAVSTAR GPS receiver
A82-24644

MAITA, M.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945

MALCOLM, J. G.
Analysis of Built-In-Test (BIT) false alarm conditions
[AD-A108752] N82-18217

MALDONADO, J. C.
An on board supervisory system for applications in space missions
[INPE-2097-RPE/327] N82-18216
MALONEY, P. F.
Structural testing of composites with known defects
A82-24708
MANTEGAZZA, P.
A general purpose program for rotor blade dynamics
N82-18151
MAPELLI, R.
Air transportation of handicapped persons
A82-24338
MARAZ, M. R.
The design of a wind tunnel VSTOL fighter model incorporating turbine powered engine simulators
[AIAA PAPER 82-2635] A82-25154
MARKIN, K.
Impact of technology on avionics cost trends
[AD-A108494] N82-18219
MARQUART, E. J.
Cross and cross-coupling derivative measurements on the standard dynamics model at AEDC
[AIAA 82-0596] A82-24670
MARTI, V. N.
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398
MARTIN, R. L.
Operating flight loads and their effect on engine performance
[SAE PAPER 811071] A82-24405
MARTINSON, P. F.
A design for a 32-channel multiplexer
[RAE-TM-RAD-NAV-105] N82-18503
MASON, A. J.
The effects of absorbed moisture upon the physical properties of stretched acrylic materials
A82-24320
MASUE, T.
Flight characteristics design and development of the MBB/KHI BK117 helicopter
N82-18150
MASURE, B.
A complete method for computation of blade mode characteristics and responses in forward flight
N82-18126
MATSUKI, M.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945
MCBRYAN, J. C.
Airport related residential acoustical insulation demonstration project: Report 1720
[PB82-100777] N82-19396
MCCARTY, R. E.
Aircraft transparency bird impact analysis using the MAGNA computer program
A82-24315
MCCLAIN, A. A.
Development of a self-optimizing flexible technology /SOFT/ transonic wing wind tunnel model
[AIAA 82-0601] A82-24673
MCCLOUD, G. W.
A method of determining safe service life for helicopter components
A82-24709
MCCLUNG, R.
The 400-Hertz constant-speed electrical generation systems
N82-19139
MCCURDY, D. A.
Annoyance caused by propeller airplane flyover noise: Preliminary results
[NASA-TM-83244] N82-18996
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance
[NASA-TP-1969] N82-19707
MCDERMOTT, J.
Hughes helicopters - Fatigue life methodology
A82-24710
MCDEVITT, J. B.
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608] A82-24677
MCDONALD, A. B.
Aircrew restraint and mobility test fixture
[AD-A108274] N82-18193
MCFADDEN, G.
Design of supercritical swept wings
A82-23826
MCFARLAND, A. L.
Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
[AD-A108893] N82-19203
MEHROTRA, S. C.
Structural modeling of high Reynolds number wind tunnel models
[AIAA 82-0602] A82-24674
MELINE, J.
What the operator wants
A82-24008
MELTON, R.
Methodology for multiaircraft minimum noise impact landing trajectories
A82-23037
MENDES, R. D.
An on board supervisory system for applications in space missions
[INPE-2097-RPE/327] N82-18216
MESSLER, R. W., JR.
Welding for low-cost advanced titanium airframe structures
A82-23757
MEYER, L. J.
Cooled variable-area radial turbine technology program
[NASA-CR-165408] N82-19221
MIDDLETON, D. B.
Aircraft surface coatings for drag reduction/erosion protection
[SAE PAPER 811070] A82-24401
MIEDLAR, P. J.
A digital simulation program describing the motion of an aircraft undergoing engine failure during its takeoff ground roll
[AD-A108420] N82-18210
MIGNOSI, A.
Induction driven transonic wind tunnel T2: Operation at room temperature and cryogenic adaptation
N82-19150
MIKULLA, V.
On the calculation of transonic blade tip flow for helicopter rotors
[MBB-UD-320-81-0] N82-18187
MILES, R. B.
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563
MILLER, J.
Some unsteady aerodynamic effects on helicopter rotors
N82-18162
MILLER, K. L.
Physiological acceptability tests of the SJU-5/A ejection seat: Second physiological acceptance demonstration
[AD-A108688] N82-18194
MILLER, P. M.
Test site instrumentation study. Volume 2: Crash 1 and crash 2 raw data
[PB82-111832] N82-18233
MILLER, R. H.
A simplified approach to the free wake analysis of a hovering rotor
N82-18121
MILLER, V. R.
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721
[AD-A108814] N82-19952
MINOUX, M.
Selection of telecommunication equipment - A new approach to the equivalent cost concept
A82-25510
MITCHELL, J. R.
NDE of composite rotor blades during fatigue testing
A82-24713
MITCHELL, L.
GTD terrain reflection model applied to ILS glide scope
A82-23027

MOELLER, D. O.
Electric ECS
N82-19140

MOFFAT, A.
The multi mode matrix flat panel display: Technology and applications
N82-18169

MONTGOMERIE, I. F.
The role of simulation in the design process
N82-18154

MOORE, M. C.
Transparency development needs for military aircraft in the 1980's
A82-24302

MOORE, R. D.
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974]
N82-19222

MOORE, W. O., III
Mean flow and noise measurements in a Mach 3.5 pilot quiet tunnel
[AIAA 82-0569]
A82-24657

MOORHEAD, P. E.
Metal honeycomb to porous wireform substrate diffusion bond evaluation
[NASA-TM-82793]
N82-18612

MOOSMAN, L.
Aircraft transparency design guide
A82-24307

MORAN, K. P.
Development of a clear air radar to detect meteorological hazards at airports
[AD-A108236]
N82-18835

MORELLO, S. A.
Integration of energy management concepts into the flight deck
[SAE PAPER 811066]
A82-24387

MORITA, M.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2]
N82-19945

MORRIS, W. E.
The way ahead for helicopter maintenance
A82-24009

MORT, K. W.
Status and capabilities of the National Full Scale Facility 40- by 80-foot wind tunnel modification
[AIAA 82-0607]
A82-24676

MORTON, T. G.
Measurement techniques used to assess the installed power of a helicopter engine
N82-18133

MOTOYAMA, K.
Sensitivity reduction by double perfect model following
A82-23029

MULHOLLAND, R. G.
Stereographic projection in the National Airspace System
A82-23031

MURMAN, E. M.
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588]
A82-24663

N

NAGASHIMA, T.
Optimum performance and wake geometry of co-axial rotor in hover
N82-18156

NAGY, E. J.
Structural system identification technology verification
[AD-A109181]
N82-19583

NAKAMURA, Y.
Prediction of blade vortex interaction noise from measured blade pressure
N82-18147

NAKANISHI, K.
Optimum performance and wake geometry of co-axial rotor in hover
N82-18156

NAKAYAMA, S.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2]
N82-19945

NASU, K. I.
An extension of the local momentum theory to the rotors operating in twisted flow field
N82-18123

NEWMAN, P. A.
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test
[AIAA 82-0568]
A82-24656

NEWTON, F. B.
The variation of induced currents in aircraft wiring
A82-24355

NORTH, R. A.
Combined multisensor displays
A82-22905

NOWLAN, F. S.
Reliability centered maintenance /RCM/
A82-24001

O

OBERST, D.
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations
[MBB-FE-122/S/PUB/36]
N82-18211

OKADA, T.
Sensitivity reduction by double perfect model following
A82-23029

OKUBO, H.
Aircraft parameter identification in the presence of atmospheric turbulence
A82-23227

OLIVA, P.
Recent improvements in aircraft Ni-Cd cells
A82-24245

OLLERHEAD, J. B.
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan
[TT-8101]
N82-19956

OLSSON, W. J.
Operating flight loads and their effect on engine performance
[SAE PAPER 811071]
A82-24405

OSADCHENKO, N. V.
Stability of a three-stage dynamic stand
A82-25353

OSTAPENKO, V. D.
High-frequency monitoring of surface layers of metals
A82-23603

OWENS, J. J.
The effect of a well on the aerodynamics of a spoiler
[BU-268]
N82-19194

P

PAEZ, C. A.
Welding for low-cost advanced titanium airframe structures
A82-23757

PALMER, J. E.
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974

PANKHURST, R. V.
The coupling of electromagnetic interference into aircraft systems
A82-24354

PARKINSON, B. W.
The application of NAVSTAR differential GPS in the civilian community
A82-24645

PARNAS, D. L.
A-7E software module guide
[AD-A108649]
N82-18920

PARSONS, S. R.
Aircraft/airport compatibility - A constant challenge for aircraft designers A82-25119
PECKHAM, J. B.
New developments in cockpit-human interfaces
[RAE-TM-FS-412] N82-18215
PERIE, M. E.
Air Traffic Control computer replacement - Specification issues and problems A82-23313
PETERSON, J. B., JR.
Numerical design of the contoured wind-tunnel liner for the NASA swept-wing LFC test
[AIAA 82-0568] A82-24656
PETERSON, R. L.
Windshield system structural enhancement A82-24312
PLATZER, M. F.
Oscillating supersonic/hypersonic wings at high incidence A82-23828
PLEDGER, D. P.
Integrated control design techniques
[AD-A108223] N82-18224
PLZAK, G. A.
Acoustic measurements of F100-PW-100 engine operating in hush house NSN 4920-02-070-2721
[AD-A108814] N82-19952
POGORZELSKI, F. S.
Novel approaches to electron beam welding machine utilization A82-23753
POKORNY, V.
Spoilers or auxiliary flaps A82-24973
POLACK, A.
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3451] N82-19226
POLEK, T. E.
A new facility and technique for two-dimensional aerodynamic testing
[AIAA 82-0608] A82-24677
POLL, K. J.
The Link-Miles driver training simulator for tracked vehicles: The effect of method and duration of training on the transfer of training
[IZF-1980-28] N82-18226
POLLARD, D. D.
Packaging the VSCF system for an aircraft engine environment A82-24383
POLLARD, J. S.
Preliminary thoughts on helicopter cabin noise prediction methods N82-18148
POLZ, G.
Separated flow around helicopter bodies N82-18163
On the calculation of separated flow on helicopter fuselages
[MBB-UD-321-81-O] N82-18180
POMPA, M. F.
Vehicle test report: Battronic pickup truck
[NASA-CR-168637] N82-19205
POUNTNEY, S.
Development of a self-optimizing flexible technology /SOFT/ transonic wing wind tunnel model
[AIAA 82-0601] A82-24673
POWELL, C. A.
Annoyance caused by propeller airplane flyover noise: Preliminary results
[NASA-TM-83244] N82-18996
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance
[NASA-TP-1969] N82-19707
PRATT, J.
The challenge of standardizing fatigue methodology A82-24703
PRICE, T. W.
Vehicle test report: Battronic pickup truck
[NASA-CR-168637] N82-19205
PRISER, D. B.
Vibration levels in army helicopters: Measurement recommendations and data
[AD-A108131] N82-18209
PROCHAZKA, E.
Oscillations and vibrations of aircraft on runways A82-24974

Q

QUAST, A.
Laminar airfoils for transport aircraft
[ESA-TT-680] N82-18590
QUENTIN, J.
Separated flow around helicopter bodies N82-18163

R

RAIMONDO, S.
Slotted wall test section for automotive aerodynamic test facilities
[AIAA 82-0585] A82-24661
RAMSDEN, J. M.
The inter-relation between design, construction and maintenance A82-24010
RANG, E. R.
Integrated control design techniques
[AD-A108223] N82-18224
RASMUSSEN, J. E.
TM/TE polarization ratios in a sample of 30 kHz sferics received at altitudes from 0 to 70 km
[AD-A108182] N82-18864
RATCLIFFE, S.
Conflicts between random flights in a given area A82-25213
RAWLINS, J. S.
CAD/CAM in British Aerospace - Aircraft Group A82-24373
REDING, J. P.
Review of support interference in dynamic tests
[AIAA 82-0594] A82-24668
REID, C.
Management of powerplant maintenance and restoration programs for fuel conservation
[SAE PAPER 811052] A82-24394
REID, L.
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222
REMBLESKE, C. A.
Designing for continued airworthiness - General aviation
[SAE PAPER 811038] A82-24397
REPPERT, L. E.
ATC automation - A look forward: Technology/Architecture A82-23320
REUBUSH, D. E.
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-16 airplane
[NASA-TM-83250] N82-19181
REYNOLDS, W. C.
International Conference on Numerical Methods in Fluid Dynamics, 7th, Stanford University, Stanford and Moffett Field, CA, June 23-27, 1980, Proceedings A82-24426
RICCI, A. M.
Engine superficial temperature and infrared signature N82-18136
RIDDLESBAUGH, S. M.
Dilution jet behavior in the turn section of a reverse flow combustor
[NASA-TM-82776] N82-19220
RILEY, M. J.
Some unsteady aerodynamic effects on helicopter rotors N82-18162
RIZK, M. H.
Transonic wind tunnel wall interference corrections for three-dimensional models
[AIAA 82-0588] A82-24663
ROBINSON, I. B.
Aluminum and its alloys - Weldability A82-23755

ROBINSON, J. C.
Structural modeling of high Reynolds number wind tunnel models
[AIAA 82-0602] A82-24674

ROGOFF, M.
Loran for precise position location - The VIEW-NAV system
A82-24648

ROSE, W. C.
The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel
[AIAA 82-0571] A82-24650

ROSENBUSH, F. M.
Environmental Control Systems
N82-19141

ROSSWURM, H. A.
Design considerations of DC-link aircraft generation systems
A82-24377

RUSSELL, J. F.
B.A.C. One-Eleven flight deck glazing product improvement
A82-24325

RYLSKII, G. I.
Analysis and optimization of control systems in piloted flight vehicles
A82-22398

RZONCA, L.
Loran-C RNAV in mountainous areas
A82-24649

S

SAITO, S.
A numerical approach to co-axial rotor aerodynamics
N82-18157

SAKHUJA, R.
Open-cycle vapor compression heat pump
[PB82-110503] N82-18553

SALEEV, V. A.
Improving the accuracy of the estimates of surfactant content in jet fuels
A82-23250

SANDERS, C. D.
Task analytic techniques: Application to the design of a flight simulator instructor/operator console
[AD-A108724] N82-18227

SANGER, D. J.
On-line control for the regulation of power source in multiple-servo electro-hydraulic systems
[ASME PAPER 81-WA/DSC-3] A82-24562

SANO, M.
Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570

SARRAILHE, S. R.
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199

SAYLOR, D. M.
Flight condition recognition /FCR/ technique
A82-24712

SCHADOW, K. C.
Fuel-rich plume combustion
[AD-A108136] N82-18349

SCHEER, W.
Carbon-fiber composites - A fiber composite material for highly stressed light-construction components
A82-24805

SCHMALHOFER, W.
Theoretical investigations on the influence of different strake, tail unit, and conventional HLW arrangement as well as of CCV on the aerodynamic characteristics of fighter aircraft configurations
[MBB-FE-122/S/PUB/36] N82-18211

SCHMIDT, E. P.
NAS system load - Utilization of the DARC system
A82-23315

SCHOFIELD, S.
MSG-3 structures
A82-24011

SCHOUTEN, G.
Static pressure in the slipstream of a propeller
A82-24023

SCHRAGE, D. P.
Fundamentals of helicopter fatigue life determination
A82-24714
Review of helicopter Mast Mounted Sight (MMS) base motion isolation and Line-of-Sight (LOS) stabilization concepts
N82-18166

SCHYMANIETZ, G.
Impact of systems technology and integration on helicopter design
N82-18165

SCIRE, F. E.
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

SCOLES, J.
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan
[TT-8101] N82-19956

SEGREST, J. D.
Evolution and development of high voltage /270 volt/ dc aircraft electric systems in the United States
A82-24382

SEHMI, N. S.
A further study of helicopter rotor pitch-flap-phase coupling
[BU-259] N82-19214

SEIWERT, D. L.
Design technology for improved performance retention in turbofan engines
[SAE PAPER 811055] A82-24392

SEKINE, S.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19985

SELEN, H. J. W.
On the design of some airfoils for sailplane application
[VTH-LR-326] N82-19213

SEND, W.
A three-dimensional approach to lift and moment coefficients of rotating blades
N82-18125

SENSBURG, O.
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228

SERAUDIE, A.
Induction driven transonic wind tunnel T2: Operation at room temperature and cryogenic adaptation
N82-19158

SERRAIS, D. F.
Monitoring engine wear by oil analysis
A82-24012

SHAIN, T. W.
Vehicle test report: Battronic pickup truck
[NASA-CR-168637] N82-19205

SHARP, F. J.
Transparencies - What an aircraft designer should know
A82-24305

SHEPPARD, D. J.
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type
[AD-A108801] N82-19206

SHI-CUN, W.
A simplified method for predicting rotor blade airloads
N82-18124

SHINAR, J.
Efficient combinations of numerical techniques applied to aircraft turning performance optimization
A82-24814

SHINDO, S.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-667T-PT-2] N82-19945

SHUFORD, R.
NDE of composite rotor blades during fatigue testing
A82-24713

SICKINGER, A.
Novel metal-ceramics-composite sealing coatings in aircraft engines
A82-24803

SILVERIO, F. J.
SH-60B test program
N82-18141

SIMONS, J. L.
A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft
[NLR-TR-80032-U] N82-19212

SINCLAIR, P. C.
Aircraft measurements and analysis of severe storms: 1976 field experiment
[NASA-CR-168519] N82-18003

SLACK, J.
Fatigue test of the typical main rotor controls component
A82-24715

SLAZAK, M.
Study of cabin noise control for twin engine general aviation aircraft
[NASA-CR-165833] N82-18995

SMALL, L. L.
AFWAL turbine engine controls research and development - Present and future
[AIAA PAPER 82-0321] A82-25050

SMITH, E. G.
Dynamics of aircraft antiskid braking systems
[NASA-TP-1959] N82-18204

SMITH, F. D.
Utilizing the helicopter's versatility to improve the ATC system
A82-23316

SMITH, J. W.
Apparatus for damping operator induced oscillations of a controlled system
[NASA-CASE-FRC-11041-1] N82-18493

SMITH, W. L.
Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data
A82-25113

SOBCZAK, J. W.
NDE of composite rotor blades during fatigue testing
A82-24713

SOBIESZCZANSKI-SOBIESKI, J.
Minimum mass sizing of a large low-aspect ratio airframe for flutter-free performance
[AIAA PAPER 80-0724] A82-24022

SODERQUIST, J. R.
Certification of civil composite aircraft structure
[SAE PAPER 811061] A82-24389

SOPER, W. P. C.
Concorde glazings - 5 years of Mach 2 service
A82-24326

SPERLMAN, D. J.
Windshield system structural enhancement
A82-24312

SPENGLER, R. P.
A Microwave Landing System simulation
A82-23323

SPIEGEL, K. E.
Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed
[DFVLR-MITT-81-18] N82-19957

SPLETTSTOESSER, W. R.
Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed
[DFVLR-MITT-81-18] N82-19957

SPREADBOROUGH, S. G.
The influence of sensor and actuator characteristics on overall helicopter AFCS design
N82-18171

SPRINC, J.
Oscillations and vibrations of aircraft on runways
A82-24974

STAAB, W. R.
Restoration of performance, Models 727, 737, and 747
[SAE PAPER 811072] A82-24406

STACHER, G. W.
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358

STAHL, B.
The problem of calculation of the flow around helicopter rotor blade tips
N82-18160

On the calculation of transonic blade tip flow for helicopter rotors
[MBB-UD-320-81-O] N82-18187

STAHL, J. W.
Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost
[AD-A109373] N82-19218

STEEB, R.
Distributed intelligence for air fleet control
[AD-A108611] N82-18195

STEIN, W.
Experimental investigation of visual aids for helicopters: Low level flight at night and poor visibility
A82-18168

STEINBERG, R.
Airline flight planning - The weather connection
[SAE PAPER 811067] A82-24386

STEINLE, F. W., JR.
The effect of ejector augmentation on test-section flow quality in the Calspan 8-ft transonic wind tunnel
[AIAA 82-0571] A82-24658

STEINMANN, H.
Flight test data acquisition and interpretation
A82-24707

STELZEL, F.
A possible way of specifically correcting location and navigational errors caused by reflection and other propagation anomalies
[ESA-TT-667] N82-18198

STEPANENKO, V. S.
Improving the accuracy of the estimates of surfactant content in jet fuels
A82-23250

STEVENSON, D. L.
The use of 'Kapton' polyimide film in aerospace applications
[SAE PAPER 811091] A82-24413

STIEVENARD, G.
Hypothetical fatigue life problem - Application of Aerospatiale method
A82-24716

STOEFFLER, G.
Carbon-fiber composites - A fiber composite material for highly stressed light-construction components
A82-24805

STOESSNER, R. L.
The cargo helicopter - A logistical vehicle
A82-24717

STOLPESTAD, J. H.
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358

STOUT, D. W.
Stereographic projection in the National Airspace System
A82-23031

STROUB, R. H.
An analytical investigation of the free-tip rotor for helicopters
[NASA-TM-81345] N82-18179

STUBBS, S. M.
Dynamics of aircraft antiskid braking systems
[NASA-TP-1959] N82-18204

SUCHENTRUNK, R.
Electroforming of space and aircraft structures
[MBB-BB-491-O] N82-18419

SUHR, D.
A design study of the Marshal
[BU-262] N82-19215

SULZER, R.
Transport aircraft cockpit standardization (Federal Aviation regulations part 25)
[AD-A108924] N82-19207

SUN, C. C.
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167

SURESH, B. N.
On-line control for the regulation of power source in multiple-servo electro-hydraulic systems
[ASME PAPER 81-WA/DSC-3] A82-24562

SWARTZ, W. F.
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398

SWEDISH, W. J.
The requirements for reduced IFR separations on final approach
A82-23311

SWEET, L. M.
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563

SWEETMAN, B.
Boeing's big, quiet 737-300
A82-23369

SWIFT, T.
Application of damage tolerance technology to type certification
[SAE PAPER 811062] A82-24388

SZCZEPONIK, K.
Experience during the development of the German-Japanese helicopter BK 117
[MBB-UD-318-81-O] N82-19210

T

TADGHIGHI, H.
Wind tunnel investigation of high speed rotor noise
N82-18146

TAKEDA, K.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945

TAKEO, K.
Lineup of the IM-series aircraft-derivative gas turbines
A82-22896

TAN, G. H.
A design study of the Marshal
[BU-262] N82-19215

TANIMOTO, E. Y.
A study of the effects of long-term exposure to fuels and fluids on the behavior of advanced composite materials
[NASA-CR-165763] N82-18327

TANNER, J. A.
Dynamics of aircraft antiskid braking systems
[NASA-TP-1959] N82-18204

TASK, H. L.
A new angular deviation measurement device for aircraft transparencies
A82-24308

Portable transparency optical test system /P-TOTS/
A82-24309

TAYLOR, P.
Preliminary investigation into the addition of auxiliary longitudinal thrust on helicopter agility
N82-18155

A method of predicting fuselage loads in hover
N82-18164

TAYLOR, R. S.
Design philosophy of the Hughes model 600 helicopter
N82-18140

TAYLOR, S. M.
Direct comparison of community response to road traffic noise and to aircraft noise
A82-22974

TEAGUE, E. C.
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

THOMAS, G. A.
Disengagement of safety harness buckles - CT4
[AD-A109048] N82-19199

THOMPSON, G. H.
Boeing Vertol fatigue life methodology
A82-24718

THORNDYKE, P. W.
Distributed intelligence for air fleet control
[AD-A108611] N82-18195

TKACH, M. J.
F/A-18 weapon system development
A82-23774

TORISAKI, T.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945

TORNESE, R. A.
Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
[AD-A108893] N82-19203

TOTH, S.
Impact of technology on avionics cost trends
[AD-A108494] N82-18219

TOTTO, E. R.
MIL-STD 1553B - Aircraft EM environmental susceptibility effects
A82-24357

TRAHAN, C.
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

TRAN, C. T.
Application of the ONER dynamic stall model to a helicopter blade in forward flight
N82-18161

TRIMBLE, J.
Combined multisensor displays
A82-22905

TRUE, H. C.
Wind and temperature database for flight planning
[SAE PAPER 811068] A82-24385

U

UNGVICHIAN, V.
GTD terrain reflection model applied to ILS glide scope
A82-23027

V

VAICAITIS, R.
Study of cabin noise control for twin engine general aviation aircraft
[NASA-CR-165833] N82-18995

VALEIKA, B.
MSG-3 overview
A82-24014

VALENTE, R.
Military requirements: Too little or too much
N82-18130

VAN DYKE, M.
Annual review of fluid mechanics. Volume 14
A82-24416

VANNOCKER, R. C.
Cost of ownership advantages with a shared oil system
A82-24378

VAPIREV, E. N.
Linear alpha-ray altimeter
A82-23225

VARY, A.
Metal honeycomb to porous wireform substrate diffusion bond evaluation
[NASA-TM-82793] N82-18612

VASILEV, D. N.
Linear alpha-ray altimeter
A82-23225

VELKOFF, H. R.
Hover tests of a model H-force rotor
N82-18159

VENN, G. M.
A study of the techniques of dynamic analysis of helicopter type structures
N82-18129

VICENS, F.
Navigational aids on-board the Concorde
A82-24065

VIGEVANO, L.
An experimental analysis of the shape of a rotor wake
N82-18122

VON SCHLICHTKRULL, F.-W.
Operational air traffic in the Federal Republic of Germany
A82-23318

VONNETS, R. D.
Mast mounted visual aids
N82-18167

VORBURGER, T. V.
Evaluation of methods for characterizing surface topography of models for high Reynolds number wind-tunnels
[AIAA 82-0603] A82-24675

W

WAGNER, R. P.
A propulsion view of the all-electric airplane
N82-19136

WAI, J. C.
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167

WALES, C. J.
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217

WALKER, A. S.
The pressure signature method for blockage corrections, and its applications to the industrial wind tunnel
[BU-263] N82-19231

WALKER, R. H.
Windshield system structural enhancement
A82-24312

WALKER, W. H.
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226

WALLACE, W.
A new approach to the problem of stress corrosion cracking in 7075-T6 aluminum
A82-23772

WARD, W. C., JR.
Physiological acceptability tests of the SJU-5/A ejection seat: Second physiological acceptance demonstration
[AD-A108688] N82-18194

WARWICK, G.
Fighters - Tomorrow's terminology
A82-23368

WEBB, S. G.
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563

WEBER, O.
Midair and near midair collisions on two- and three-dimensional curvilinear flight paths
[ESA-TT-685] N82-18200

WEHAUSEN, J. V.
Annual review of fluid mechanics. Volume 14
A82-24416

WEIHE, V. I.
Beyond the horizon coverage for air navigation/traffic control
A82-24647

WEIS, D.
Perspectives for Controlled Weapons Technology: Report of the 90th Helicopter Forum
[MBB-UA-532-80-O] N82-19211

WEISEL, D. R.
Airline fuel saving through JT9D engine refurbishment
[SAE PAPER 811051] A82-24395

WEISS, P.
Active gust and maneuver load control concepts with the example of the Airbus A300. Part 1: Explanation of a regular in the time zone of wind gust load decrease and examination of its effectiveness in stochastic gusts
[MBB-FE-172/S/PUB/39-PT-1] N82-19228

WEISSENBURGER, J. T.
Airport related residential acoustical insulation demonstration project: Report 1720
[PB82-100777] N82-19396

WESSON, R. B.
Distributed intelligence for air fleet control
[AD-A108611] N82-18195

WEST, D. S.
The role of finite element analysis in the design of birdstrike resistant transparencies
A82-24314

The effects of bird orientation on load profile and damage level
A82-24316

WHITE, R. V.
Software features applicable to inertial measurement unit self alignment
[AD-A108511] N82-18196

WHITE, R. L.
Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding
[AD-A109377] N82-19209

WHITE, W. L.
Spin-tunnel investigation of a 1/13-scale model of the NASA AD-1 oblique-wing research aircraft
[NASA-TM-83236] N82-18183

WILBY, P. G.
Some unsteady aerodynamic effects on helicopter rotors
N82-18162

WILFERT, K. E.
Aircraft/airport compatibility - A constant challenge for aircraft designers
A82-25119

WILKINSON, K. G.
Air transport in the 21st century
A82-24025

WILLIAMSON, J. R.
Diffusion bonding in superplastic forming/diffusion bonding
A82-23754

WILMS, V.
Novel metal-ceramics-composite sealing coatings in aircraft engines
A82-24803

WILSON, K. C.
Fuel-rich plume combustion
[AD-A108136] N82-18349

WINER, D. E.
Wind and temperature database for flight planning
[SAE PAPER 811068] A82-24385

WINKLER, E.
Characterization of the Airbus horizontal stabilizers of CFRP construction and structural analysis with the finite element method
[MBB-UT-13-81-O] N82-18213

WINKLER, P. R.
Loran for precise position location - The VIEW-NAV system
A82-24648

WISEMAN, N. P.
The pressure signature method for blockage corrections, and its applications to the industrial wind tunnel
[BU-263] N82-19231

WISER, G. L.
Fuel-efficient windshields for transport, commuter and business aircraft
A82-24304

WITTENBERG, H.
Prediction of off-design performance of turbo-shaft engines a simplified method
N82-18132

WONG, R. Y.
Wide field of view laser beacon system for three-dimensional aircraft position measurement
[ASME PAPER 81-WA/DSC-9] A82-24563

WONG, G. A.
Analysis of loran-C system reliability for civil aviation
A82-24650

WOODS, J., JR.
The anatomy of a technology test bed - Integrated Flight/Fire Control-I /IFFC I/
[SAE PAPER 811036] A82-24398

WORNSTONE, D. H.
EMC clearance of modern military aircraft
A82-24359

WORSDALL, R. L.
Problems associated with the quality assurance of stretched acrylic sheet
A82-24319

WRIGHT, P.
The multi mode matrix flat panel display: Technology and applications
N82-18169

WRIGHT, R. W.
The development of high strength light-weight windshields for the new generation of Boeing 757 and 767 airliners
A82-24323

WUEST, P.
A redundancy concept for a digital CSAS
N82-18170

WURTINGER, H.
Carbon-fiber composites - A fiber composite material for highly stressed light-construction components
A82-24805

WYATT, G. C. F.
The role of simulation in the design process
N82-18154

WYLLIE, C.
Overview of Honeywell electromechanical actuation programs
N82-19142

Y

YANG, T. Y.
Flutter and time response analyses of three degree of freedom airfoils in transonic flow
[AD-A108987]
N82-19227

YEN, J. G.
Helicopter rotor load prediction
A82-24719

YORKSIE, D. S.
The effect of critical design parameters on the selection of a VSCF system
A82-24381

YOSHIDA, A.
Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2]
N82-19945

YOSHIHARA, H.
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852]
N82-19167

YOUROUKOS, E.
Oscillating supersonic/hypersonic wings at high incidence
A82-23828

Z

ZADNIK, S.
Angle of downwash behind a wing in unsteady flow
A82-24970

ZAHAVI, E.
Low grade fuels for turbo and jet engines
A82-23439

ZECK, H.
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491]
N82-19226

ZHI, X.
A simplified method for predicting rotor blade airloads
N82-18124

ZHOU, F. X.
Rapid extraction of layer relative humidity, geopotential thickness, and atmospheric stability from satellite sounding radiometer data
A82-25113

ZOLADZ, R. W.
A Microwave Landing System simulation
A82-23323

ZORUMSKI, W. E.
Aircraft noise prediction program theoretical manual, part 1
[NASA-TM-83199-PT-1]
N82-19946

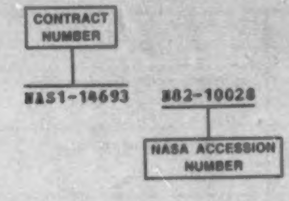
Aircraft noise prediction program theoretical manual, part 2
[NASA-TM-83199-PT-2]
N82-19947

ZRNIC, D. S.
Scanning strategies for air traffic control radars
A82-24646

CONTRACT NUMBER INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 149)* JUNE 1982

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 2307
N82-18628
N82-19227
N82-19587
AF PROJ. 2338
N82-18217
AF PROJ. 2403
N82-18224
AF PROJ. 2418
N82-18628
AF PROJ. 4600
N82-18464
AF PROJ. 6095
N82-18197
AF PROJ. 6670
N82-18835
AF PROJ. 7231
N82-18192
N82-18193
AF PROJ. 9983
N82-18227
AF-AFOSR-80-0178
A82-23441
AF-AFOSR-3096-76
N82-19587
AF-AFOSR-3523-78
N82-19227
ARPA ORDER 3640
N82-18195
AT/2170/049/XR
N82-19956
A76/KL/148 N82-18226
DA PROJ. 1L1-62209-AH-76
N82-18231
N82-19583
DA PROJ. 3E1-6277-A-878
N82-18209
DAAG46-78-C-0070
N82-19209
DAAK51-78-C-0017
N82-19583
DAAK51-79-C-0015
N82-18231
DE-AI01-78CS-54209
N82-19205
DOT-FA7WA-3549
A82-23027
DOT-FA01-80-1-Y-10524
A82-24646
DOT-FA78WAI-876
N82-18230
DOT-FA79WA-4335
N82-19160
DOT-FA79WA-4368
N82-18218
DOT-FA80WA-4370
A82-23311
DOT-HS-8-01936
N82-18233
DTFA-01-80-C-10030
N82-18219
DTFA01-81-C-10001
N82-19203
ESD-0-0630 N82-18835
FAA PROJ. 052-242-320
N82-19197
FAA PROJ. 161-200-130.
N82-19207
F30602-80-C-0074
N82-18217
F33615-75-C-3134
A82-24314
F33615-76-C-3103
A82-24314
F33615-77-C-2097
A82-25154
F33615-78-C-3402
A82-24316
F33615-79-C-0522
N82-18193
F33615-79-C-3609
N82-18224
F33615-80-C-0519
N82-18192
F33615-80-C-1092
N82-18197
F33615-80-C-3401
A82-24314
F49620-79-C-0038
N82-18227
GRI-5011-342-0094
N82-18553
MDA903-78-C-0029
N82-18195
MDA903-79-C-0018
N82-18208
NAG1-73 N82-19224
NASA ORDER L-4718-B
A82-24675
NAS1-12428 N82-18327
NAS1-15788 N82-19358
NAS1-15887 N82-19167
NAS1-16114 A82-24674
NAS1-16117 N82-18995
NAS1-16128 N82-19226
NAS1-16262 A82-24663
NAS1-16430 N82-19217
NAS2-10078 N82-18202
NAS3-22064 N82-19221
NAS3-22482 N82-19196
NAS7-100 N82-19205
NCA2-OR565-001
N82-18159
NCC2-94 A82-24563
NGR-33-015-201
A82-23826
NSG-1509 A82-23037
NSG-1579 A82-23826
NSG-5105 N82-18803
N00014-76-C-0742
A82-24673
N00014-77-C-0684
A82-22905
N00014-80-C-0505
N82-18922
N00014-80-C-0696
N82-18228
N00019-73-C-0053
N82-18206
N00173-79-C-0010
A82-24407
N61339-78-C-0060
N82-19206
SRC-B/RG/98590
A82-24566
SRC-GR/A/44312
A82-24566
SRI PROJ. PYU-1943
N82-18228
505-06-63-03 N82-18183
505-15-22 N82-19220
505-31-43-04 N82-19181
505-32-2A N82-19222
505-32-6A N82-18222
505-32-03-01 N82-19946
N82-19947
505-33-32 N82-18612
505-35-13-01 N82-18996
N82-19707
505-44-33-01 N82-18204
532-03-11 N82-18179
534-02-13-01 N82-19134
534-04-13-80 N82-19217
778-36-05 N82-19205

1. Report No. NASA SP-7037(149)

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle
Aeronautical Engineering
A Continuing Bibliography (Supplement 149)

5. Report Date
June 1982

6. Performing Organization Code

7. Author(s)

8. Performing Organization Report No.

10. Work Unit No.

9. Performing Organization Name and Address
National Aeronautics and Space Administration
Washington, D.C. 20546

11. Contract or Grant No.

13. Type of Report and Period Covered

12. Sponsoring Agency Name and Address

14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 418 reports, articles and other documents introduced into the NASA scientific and technical information system in May 1982.

17. Key Words (Suggested by Author(s))
Aerodynamics
Aeronautical Engineering
Aeronautics
Bibliographies

18. Distribution Statement
Unclassified - Unlimited

19. Security Classif. (of this report) Unclassified

20. Security Classif. (of this page) Unclassified

21. No. of Pages 176

22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NASA SP-7037(150)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 150)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in June 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141 093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering – A Continuing Bibliography* (NASA SP-7037) lists 382 reports, journal articles, and other documents originally announced in June 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service. American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts.* Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 6.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	– 1/	– 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	30.00'	45.00

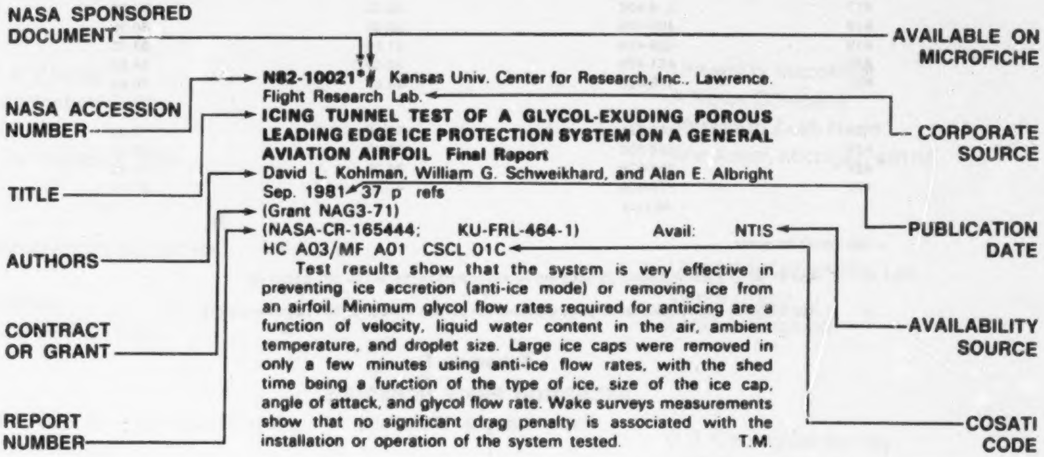
TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) **273**
STAR ENTRIES (N82-10000) **301**

Subject Index **A-1**
Personal Author Index **B-1**
Contract Number Index **C-1**

TYPICAL CITATION AND ABSTRACT FROM *STAR*

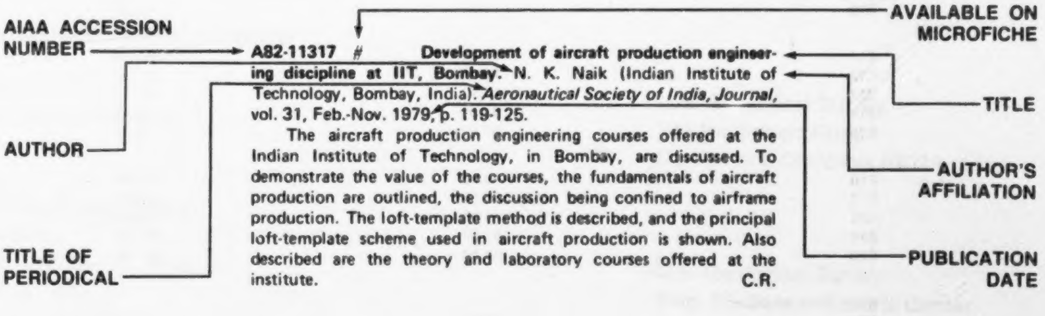


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHORS
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AUTHOR
TITLE OF PERIODICAL
AVAILABLE ON MICROFICHE
TITLE
AUTHOR'S AFFILIATION
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal*, vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 150)

JULY 1982

IAA ENTRIES

A82-25550 **Introduction to the principles of fracture mechanics (Einführung in die Grundlagen der Bruchmechanik).** W. Dander (Wiederaufarbeitungsanlage Karlsruhe Betriebsgesellschaft mbH, Eggenstein-Leopoldshafen, West Germany). *Zeitschrift für Werkstofftechnik*, vol. 13, Feb. 1982, p. 69-76. In German.

The employment of fracture mechanics makes it possible to obtain vital information concerning the operational life of components of rotor and aircraft structures even in cases in which such information cannot be provided in connection with conventional design technology. Basic questions regarding the origin of cracks in material are discussed, taking into account the strength of solid bodies with ideal elastic characteristics, elementary processes leading to crack formation, and aspects of fracture description. Linear-elastic fracture mechanics is considered along with an energy criterion with respect to crack growth, the crack opening displacement, and the J integral method. Attention is given to basic fracture modes, the fracture mechanical equation and specimen configuration used to determine fracture, and the application of fracture mechanics methodology. G.R.

A82-25577 **Integration of multi-sensor navigation data using optimal estimation techniques.** D. B. Reid, W. S. Gesing, B. N. McWilliam (Philip A. Lapp, Ltd., Toronto, Canada), and J. E. Smyth (Canada Center For Remote Sensing, Ottawa, Canada). In: Conference on Decision and Control, 19th, and Symposium on Adaptive Processes, Albuquerque, NM, December 10-12, 1980, Proceedings. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 584, 585. 6 refs.

Optimal filtering and smoothing algorithms are used to obtain precise aircraft position, velocity and attitude information for remote sensing applications by postflight processing of navigation data collected by several sensors. The data from an Inertial Navigation System (INS) is differenced with data obtained from other sensors which may include photogrammetric resections, a microwave ranging system, a barometric altimeter, a radar altimeter, a laser radar, a VLF/OMEGA navigation system and doppler radar to construct error measurements. The measurements are prefiltered to compress the data and are then processed through a Kalman filter to produce estimates of the time-correlated sensor errors. The filtered error estimates are smoothed by processing backwards in time and used to correct the INS data. The track recovery program uses the UDU/T/ covariance factorized form of the filter algorithm and is capable of processing data from any subset of sensors. The residual errors observed in processing real data collected in a number of field tests are less than 1 meter in position and less than 0.03 degrees in attitude. (Author)

A82-25673 **Von Karman and VKI - The first 25 years.** J. J. Ginoux (Institut Von Karman de Dynamique des Fluides, Rhode-Saint-Genèse; Bruxelles, Université Libre, Brussels, Belgium). *Zeitschrift für Flugwissenschaften und Weltraumforschung*, vol. 6, Jan.-Feb. 1982, p. 27-34.

The Von Karman Institute (VKI) was established in October 1956 in the buildings of the aeronautical laboratory of the Belgian Civil Aviation Authority. The history of the laboratory goes back to 1922. The early history of the laboratory is considered, taking into account pioneering work on helicopters carried out between 1930 and 1940, the modernization of aerodynamic testing facilities after World War II, and von Karman's idea to use the laboratory for training students and research workers of the NATO countries in experimental techniques. A description is given of the approaches used to implement von Karman's idea, giving attention to the development of the VKI into the first truly international aerodynamics school. G.R.

A82-25771 **Some thoughts on design optimization of transport helicopters.** W. Z. Stepniewski and L. H. Sloan. *Vertica*, vol. 6, no. 1, 1982, p. 1-17. 12 refs.

A decrease in the total helicopter operating cost per revenue seat-nautical mile C sub rsm can be achieved by reducing total yearly expenditure for helicopter operation and by increasing annual work time, work speed, and number of revenue seats. Design improvements can lessen maintenance ground time. The most important aspect of design optimization with respect to the fuel-cost share in C sub rsm is the assurance of high gross weight to equivalent drag ratio values at the highest possible flying speeds, with lowest possible effect on aircraft purchase and maintenance costs. Among the factors influencing purchase cost are sharing of production costs, technical and organizational level of production facilities, and labor costs. In designing the power plant, maximization efforts should center around hovering and/or vertical climb aspects. Here disk loading appears to be the strongest design parameter. Finally, gains linked to structural weight increases are modest, although gains are higher when fuel costs decrease. C.D.

A82-25772 * **Model helicopter rotor low frequency broadband noise.** N. G. Humbad and W. L. Harris (MIT, Cambridge, MA). *Vertica*, vol. 6, no. 1, 1982, p. 19-35. 19 refs. Grant No. NsG-1583.

The results of an experimental investigation of low frequency broadband noise (LFBN) radiated from model helicopter rotors are presented. The results up to tip Mach number of 0.50 suggest that the peak sound pressure level (SPL) of LFBN appears to follow tip Mach number to a fourth power law and rms velocity of turbulence to a second power law. The experimental results on the effect of tip speed and advance ratio on the peak SPL of LFBN can be explained on the basis of a simple scaling law. However, the experimental results on the effect of blade loading on the peak SPL of LFBN is still not clearly understood. A simple peak SPL scaling law for noise from a helicopter in forward flight encountering a sinusoidal gust is also developed. The trends predicted by the scaling law with the experimental results are found satisfactory for the cases of variation of the peak SPL of LFBN with tip speed and advance ratio. C.D.

A82-25773 **Sensitivity of helicopter aeromechanical stability to dynamic inflow.** G. H. Gaonkar, A. K. Mitra, T. S. R. Reddy (Indian Institute of Science, Bangalore, India), and D. A. Peters (Washington University, St. Louis, MO). *Vertica*, vol. 6, no. 1, 1982, p. 59-75. 14 refs. NSF Grant No. CME-79-06304.

Since aeromechanical instability or 'resonance' of nonarticulated helicopters generally involves low-frequency flap and lead-lag regressing modes as well as a coupled rotor-body pitch or roll mode, it is expected to be appreciably influenced by dynamic inflow. Therefore, a resonance analysis in hover is presented with four objectives concerning (1) the effect of dynamic inflow on air and ground resonance, (2) the adequacy of the equivalent Lock number and drag coefficient to account for the effect, (3) the possible improvement in correlation with recent experimental data, with the inclusion of inflow and (4) a better understanding of the effect of rotor parameters on the resonance phenomena with dynamic inflow.

Dynamic inflow is found to appreciably decrease the damping of body modes, although it increases the damping of the lag regressing mode. The effect can be approximately treated in most cases by the much simpler method of equivalent Lock number and drag coefficient. C.D.

A82-25794 † **Suppression of self-oscillations in open wind tunnels (Podavlenie avtokolebanii v aerodinamicheskikh trubakh s otkrytoi rabochei chast'iu).** M. Iu. Boiarchikova, E. V. Vlasov, A. S. Ginevskii, and A. V. Zosimov. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Zhidkosti i Gaza,* Jan.-Feb. 1982, p. 126-132. In Russian.

A method of self-oscillation suppression for open wind tunnels is described which is based on the reduction of turbulence in subsonic jets by high-frequency acoustic irradiation. It is shown that regular low-frequency oscillations with characteristic Strouhal numbers Sh = fd/V = 0.2-0.7 (where d is the nozzle diameter, V is the flow velocity on the nozzle section, and f is the characteristic frequency of oscillations in the jet or the frequency of acoustic irradiation) can be significantly reduced by the action on the jet of high-frequency acoustic oscillations, whose characteristic frequency corresponds to Strouhal numbers of 2-5. B.J.

A82-25795 † **Conditions of pulsed starting of supersonic wind tunnel diffusors (Usloviia impul'snogo zapuska sverkhzvukovykh diffuzorov aerodinamicheskikh trub).** V. L. Grigorenko. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Zhidkosti i Gaza,* Jan.-Feb. 1982, p. 133-141. 14 refs. In Russian.

A quasi-one-dimensional approach in the framework of an ideal gas is used to study the pulsed starting of nonregulated supersonic wind tunnel diffusors. Relations for determining the optimal pulsed-starting conditions are obtained on the basis of (1) the application of the Chisnell hypothesis to a reversed shock wave propagating along a nonuniform flow; (2) allowance for the interaction of this wave with disturbances reflected from the diffusor; and (3) the assumption of quasi-steady flow at the concluding stage. The starting limit determined in this manner agrees well with numerical calculations. B.J.

A82-25798 † **Allowance for flow nonuniformity in the minimum section in the optimal contouring of the expanding part of a nozzle (Ob uchete neravnomernosti potoka v minimal'nom sechenii pri optimal'nom profilirovanii rasshiriaiushcheisia chasti sopla).** A. N. Kraiko and N. I. Tilliaeva. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Zhidkosti i Gaza,* Jan.-Feb. 1982, p. 184-186. 8 refs. In Russian.

The paper examines the problem of taking into account the actual nonuniform distributions of flow parameters in the minimum section of a Laval nozzle in the maximum-thrust design of its supersonic part for fixed counterpressure and maximum dimensions. Direct calculations show that the replacement of nonuniform distributions by uniform ones, i.e., the use of the plane transition surface assumption (the straight sonic line), produces contours which realize a thrust that is only hundredths of a percent less than the thrust of nozzles contoured for a curved sonic line. B.J.

A82-25874 **The bomber that radar cannot see.** B. Sweetman. *New Scientist,* vol. 93, Mar. 4, 1982, p. 565-568.

The evolution, design features, materials, and missions of the Stealth bomber under development are outlined. The idea of planes invisible to radar originated in the late 1940's with observations that certain aircraft configurations have less discernable radar images than others. High speed Soviet aircraft have tended to negate the use of low-flying, subsonic attack bombers, and the advent of carbon composite materials which absorb radio waves encouraged the creation of aircraft smaller than previous bombers, which can fly at any altitude and require minimum power for ECM because of a low radar profile. Advanced testing is currently under way at the skunk works, with concurrent Stealth technology runs at the perimeters of Soviet radar defenses to ascertain the EW configurations facing the Stealth. M.S.K.

A82-25923 # **A generalized Hill's method for the stability analysis of parametrically excited dynamic systems.** S. T. Noah and G. R. Hopkins (Texas A & M University, College Station, TX). *ASME, Transactions, Journal of Applied Mechanics,* vol. 49, Mar. 1982, p. 217-223. 40 refs.

In the analysis of various dynamical systems, representation of the motion involved frequently leads to a system of second-order linear differential equations with periodic coefficients. Examples include rotors subjected to pulsating torque, the aeroelastic stability of helicopter blades, missiles subjected to pulsating thrusts, and the attitude stability of spinning satellites. The methods available in cases in which the assumption of small variations in the amplitude of the periodic coefficients cannot be justified are essentially based on Floquet's work (1883). Hill utilized Floquet's solution to show that the stability of a second-order differential equation with periodic coefficients could be determined from a single transcendental equation. In the present study, the stability of the null solution for a general coupled system of linear ordinary equations with periodic coefficients is considered. G.R.

A82-25971 † **Inverse heat-transfer problems - Domains of application in the design and testing of technical systems (Obratnye zadachi teploobmena - Oblasti primeneniia pri proektirovanii i ispytaniiakh tekhnicheskikh ob'ektov).** V. P. Mishin and O. M. Alifanov. *Inzhenerno-Fizicheskii Zhurnal,* vol. 42, Feb. 1982, p. 181-192. 39 refs. In Russian.

The application of inverse heat-transfer methods to the design and testing of spacecraft systems is considered. Attention is given to the use of these methods for the development of mathematical thermal models, the design of thermally stressed structures, and the carrying out of model, bench, and flight tests. The planning of thermophysical experiments, with the aim of improving the efficiency of the testing of spacecraft systems, is discussed. B.J.

A82-25995 **Transonic flow past thin wings.** P. Niyogi (Indian Institute of Technology, Kharagpur, India). *Indian Academy of Sciences, Proceedings (Engineering Sciences),* vol. 4, Sept. 1981, p. 347-361. 23 refs.

This paper is devoted to a discussion of steady inviscid transonic flow past thin wings, with subsonic free-stream Mach number of less than 1, by the integral equation method. The integral equation formulation is developed for a thin unsymmetric wing at small incidence. A simple approximate analytical solution is presented for shock-free supercritical flow past a thin symmetric wing at zero incidence. The direct iteration scheme of Niyogi and Chakraborty is then extended to the three-dimensional zero incidence case, which may be used to obtain more accurate solutions for shock-free flows as well as for flows with shocks. The question of the existence and the uniqueness of a solution is studied by means of the Banach contraction mapping principle which establishes the condition of convergence of the direct iteration scheme. (Author)

A82-26025 **Materials and aeronautics.** J. Charnley (Ministry of Defence, London, England). *Aerospace* (UK), vol. 9, Feb. 1982, p. 16-23. 13 refs.

For airframe structural materials there are four essential requirements: low density, high strength, high stiffness, and good corrosion resistance. Aluminum alloys are generally used since they provide high fatigue resistance and tensile strength, are cheap and less susceptible to corrosion than steel. Plastic reinforced with glass or carbon fiber finds use in helicopter blades and airframes. Engines and turbine materials require high-temperature materials and techniques such as single-crystal fabrication. Titanium and nickel alloys are standard in compressor turbine disks. Silicon is used for integrated circuits; piezoelectric materials like quartz or lithium niobate are used in surface acoustic wave devices. Cadmium mercury telluride is a sensitive infrared detector, while yttrium aluminum garnet is useful in laser range finders and target markers. Electroluminescent and liquid crystal displays use polycrystalline powders or thin films of zinc sulfide or organic materials. C.D.

A82-26039 **Optimum three-dimensional flight of a supersonic aircraft.** C.-F. Lin (Applied Dynamics International, Ann Arbor, MI). *Applied Mathematical Modelling,* vol. 6, Apr. 1982, p. 124-129.

Optimum three-dimensional flight of supersonic aircraft is considered, particularly the minimization of flight time, which is important in the climbing and turning performance of a supersonic fighter. General properties of optimum three-dimensional flight are presented, and the maximum principle is used. Optimal control is obtained by a geometrical method using the domain of manoeuverability. (Author)

A82-26044 **AV-8B/Harrier GR.5 - Range, payload and VSTOL.** M. Lambert. *Interavia*, Mar. 1982, p. 224-227.

Harrier II is a compact, relatively lightweight day-and-night fair weather attack aircraft with sufficient maneuverability to escape from existing and expected Soviet interceptors. It is basically subsonic and not fitted with radar, but can push past Mach 1 in a shallow dive even with a large load of external stores. The sustained turn performance is stated to be better than 5 G at 5,000 ft. In a short take-off it can get airborne in 1000 ft. at 28,750 lb carrying more than 5000 lb of internal fuel and 16 Mk 82 bombs, giving a combat radius of 158 nmi. New digital avionics as well as available equipment give Harrier a precise and powerful attack capability. These include the standard US Navy AYK-14 mission computer, the ASN-130 one-box inertial navigator, the Smiths single-color head-up display, a digital air data computer and a radar altimeter. All are interconnected through the standard 1553A multiple digital data bus. Weapons systems include an angle-rate bombing system. C.D.

A82-26045 **Yak-36 Forger - The brand X VTOL fighter.** G. Lafon. *Interavia*, Mar. 1982, p. 228-230.

The design of the Forger, the Soviet Union's first VTOL fighter, presents an enigma. Its wing, with 42 deg sweep on the leading edge and a thickness/chord ratio of five or six percent, is inherently capable of transonic flight, yet all three aerodynamic control surfaces incorporate set-back hinges and trailing edge tabs, clear evidence that the controls are manually operated rather than powered. Manual controls are unsuitable for transonic flight. Forger's poor standard of combat performance is evident in its estimated sustained thrust-limited turn rate of 10 deg/sec at sea level and its maximum specific excess power of 500 ft/sec. A serious limitation on Forger's operational capability is that for any takeoff, the carrier has to steam, albeit slowly, in a direction which generates a light relative wind along the axis of the angled deck. It is concluded that, in spite of Forger's advanced technology for jet-borne flight and thrust management system, it must be employed to guard the Soviet fleets primarily against enemy maritime reconnaissance aircraft. C.D.

A82-26046 **On-board computers save fuel and help ATC.** C. Bulloch. *Interavia*, Mar. 1982, p. 251, 252.

Since 1975, NASA's Langley Research Center, in cooperation with the FAA, has pursued the Terminal Configured Vehicle program, which is concerned with the control and comportment of aircraft in the destination terminal area, from top-of-descent point or later to the conclusion of the landing roll. The program could, through improved airspace utilization, effect a 20 percent reduction in typical short/medium haul block time, which would translate into a 13 percent reduction in direct operating costs. The program concentrates on the cockpit, running experiments in a specially adapted Boeing 737 and Lockheed TriStar L-1011. TCV program experiments at Denver and Dallas-Fort Worth have shown that flight crews backed by automated on-board systems can perform more efficiently in the descent phase from cruise to the pre-approach metering fix point than they could under ATC guidance. Other on-board automation systems concepts are 'distributed control' and 'flow control'. C.D.

A82-26098 **Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/.** E. W. E. Rogers (Royal Aircraft Establishment, Farnborough, Hants., England). *Aeronautical Journal*, vol. 86, Feb. 1982, p. 43-67. 103 refs.

The history of aerodynamics theory is reviewed, beginning from Newton's formulation for the force of a stream on an inclined plane to the present, and future directions for aerodynamics are indicated. The development of the Bernoulli theorem and the Navier-Stokes equation are considered, along with the inclusion of viscid and inviscid flows and Reynolds and Prandtl numbers for flow calculations. Drag and vortices were discovered, together with flow separation, and aerodynamics test facilities were constructed in the 19th century. The work of Lanchester is prominently featured, particularly for the criteria of stable flight. Work in the U.K. in the interval 1910-1945 is outlined. The advent of computers permitted transonic flows to be modeled and aided designers, and future activities are foreseen to concentrate on airframe efficiency, control, maneuvering, and comprise studies in aerodynamics, unsteady aerodynamics, flight dynamics, and rotorcraft aerodynamics. M.S.K.

A82-26121 **Advanced display-control concepts for power plant operation.** D. L. Parks (Boeing Co., Seattle, WA). (*Electric Power Research Institute, U.S. Department of Energy, and IEEE, Symposium on Nuclear Power Systems, 13th, San Francisco, CA, Oct. 21-23, 1981.) IEEE Transactions on Nuclear Science*, vol. NS-29, Feb. 1982, p. 945-951.

This paper illustrates some of the concepts being developed for aerospace systems that are being applied in commercial airplanes and could transfer to nuclear control room applications. The same hardware and software capabilities could be tailored to develop display-control features for nuclear operations. Electronic systems permit integrated formatting to avoid mental syntheses of data from several instruments; they allow the use of multifunction, time-shared displays rather than dedicated ones. Displays can be high or low resolution as conditions require, and messages should be short and readily interpretable regardless of software coding convenience. Multifunction display and switching provide a considerable increase in flexibility. Switch matrices can themselves be mini-displays and appropriate software can make the display 'smart'. Color coding and directional arrows can be used when an emergency requires instant action. Research is ongoing to make use of the voice as a switching method. It is possible to design a simplified monitoring-control display that incorporates multiple systems and parameters. C.D.

A82-26130 **Supercritical flow past symmetrical airfoils.** K.-M. Li and M. Holt (California, University, Berkeley, CA). *Journal of Fluid Mechanics*, vol. 114, Jan. 1982, p. 399-418. 27 refs. Grant No. AF-AFOSR-80-0230.

A numerical method is developed for computing steady supercritical flow about an ellipse at zero angle of attack. The flow is assumed to be two-dimensional, inviscid, isentropic and irrotational. The free-stream Mach number lies in the high subsonic range so that a shock wave occurs locally near the body. The full potential equations are solved by Telenin's method and the 'method of lines'. Smooth interpolating functions are assumed for the unknown flow variables in selected co-ordinate directions. The resulting set of ordinary differential equations is then integrated away from or along the body depending upon whether the flow is smooth or discontinuous. Jump conditions of the governing equations are applied across the shock wave so that it is perfectly sharp. A doublet solution for flow past a closed body is used as the far-field boundary condition. Supercritical flow calculations have been performed for ellipses with thickness ratio of 0.2 and 0.4 at various free-stream Mach numbers. The present results are compared with the shock-capturing method, and good agreement is obtained. (Author)

A82-26176 **Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers.** Barton, Australia, Institution of Engineers (National Conference Publication, No. 80/4), 1981. 590 p.

A review is provided of research and developments in hydraulics in Australasia during the past decade, and aspects of prospecting for wind energy are explored. Power generation from the East Australian current by use of arrays of submerged Darrieus vertical axis turbines is considered along with normal stress measurements for viscoelastic liquids using real time holographic interferometry of the Weissenberg effect, admissibility requirements and the least squares finite element solution for potential flow, two-dimensional solid blockage in a slotted wall wind tunnel, and the dynamic behavior of propeller anemometers. Attention is given to the potential flow signature of a turbulent spot, topographic forcing in nonlinear and linear barotropic models, flow control by secondary injection, friction factors of aqueous electrolyte solutions in pipe flow, the vortex shedding process behind a circular cylinder, and the use of the method of lines for choking flow in a nozzle. G.R.

A82-26181 # **Self streamlining wind tunnels without computers.** N. Pollock (Department of Defence, Aeronautical Research

Laboratories, Victoria, Australia). In: Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers. Barton, Australia, Institution of Engineers, 1981, p. 123-126. 6 refs.

A brief review of wind tunnel wall interference is presented with particular emphasis on 'self correcting' and 'correctable interference' tunnels. Two simple methods of modifying tunnel walls to approximate unconstrained flow streamlines are presented. One method, which requires only very limited computation, involves the use of an analytic expression for the far field flow, and the other, which requires no computation, uses a purely mechanical wall arrangement which deflects appropriately under the applied pressure field. (Author)

A82-26184 # **The dynamic behaviour of propeller anemometers.** P. S. Jackson (Auckland, University, Auckland, New Zealand). In: Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers. Barton, Australia, Institution of Engineers, 1981, p. 139-142. 11 refs.

A model equation is developed to predict the response of propeller anemometers in turbulent flow. The equation is nonlinear, and is shown to describe anemometer motion correctly for the situations which are easily simulated in a wind tunnel. Implications for the measurement of turbulent flows are discussed. (Author)

A82-26194 # **The effect of induced sound on the flow around a rectangular body in a wind tunnel.** M. C. Welsh (Commonwealth Scientific and Industrial Research Organization, Div. of Mechanical Engineering, Melbourne, Australia), R. Parker, and S. A. T. Stoneman (Swansea, University College, Swansea, Wales). In: Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers. Barton, Australia, Institution of Engineers, 1981, p. 275-278. 14 refs.

The changed character of the flow around a thick blunt flat plate in a flow duct containing self induced resonant sound has been examined. It has been established that induced sound can 'feed back' on the vortex shedding process causing a step change in the shedding frequency increasing the Strouhal number for the plate by up to twice its normal value. In this flow state, the leading edge separation bubble reattaches much closer to the plate's leading edge than normal. Vortices are then shed from the position of flow reattachment and are conveyed downstream to form the wake. (Author)

A82-26208 # **Effect of wakes of upstream stator blades on the rotor of an axial flow compressor.** A. R. Oliver (Tasmania, University, Hobart, Australia). In: Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers. Barton, Australia, Institution of Engineers, 1981, p. 385-388. 12 refs. Research supported by the Australian Research Grants Committee.

The effect of stator wakes passing over rotor blades in shifting stagnation points, points of separation and transition as well as the length of transition is discussed. The trailing edge problem is presented. A method of calculating stator wake transport in two dimensional incompressible flow is presented but not concluded for want of knowledge of a viscous trailing edge condition. (Author)

A82-26222 # **An experimental study of steady and quasi-steady jet flaps.** Y. P. Chai and J. M. Simmons (Queensland, University, Brisbane, Australia). In: Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers. Barton, Australia, Institution of Engineers, 1981, p. 521-524. 11 refs.

Measurements of the spread of a steady jet flap are reported, as are uses of the measurements in refining the quasi-steady theory. Also described is the extension of this theory to cases involving pitching and plunging motions. The measured center-line of a steady jet flap is shown to differ significantly from that predicted by inviscid steady theory. Incorporation of the measured center-line into the quasi-steady theory of Simmons and Platzer (1978) improves the agreement with measurements of the frequency response of lift on a fixed airfoil with an oscillating jet flap. Simple extensions of the quasi-steady model to cases of pitching and plunging of a jet-flapped airfoil give predictions of frequency response of lift which have trends consistent with measurements. C.R.

A82-26223 # **Results of recent measurements on an oscillating aerofoil.** K. H. Ly and V. A. L. Chasteau (Auckland, University, Auckland, New Zealand). In: Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers. Barton, Australia, Institution of Engineers, 1981, p. 525-528. 14 refs.

Forces measured on a two-dimensional NACA 0012 aerofoil oscillating at pitch amplitudes up to 34 deg and heave amplitudes up to 0.2 of chord are presented. Reynolds numbers ranged from 70,000 to 330,000 and reduced frequencies of up to 0.45. In pitch, the greatest differences from the theoretical flat plate prediction occurred at the lowest reduced frequencies and larger amplitudes, and were the result of complicated real flow stall effects; results tended to converge to theoretical values for reduced frequencies greater than 0.4. In pure heave, forward thrust occurred for increasing reduced frequencies. The propulsive efficiency is discussed. Dynamic stall angles in pure pitch are also presented. (Author)

A82-26227 # **The vortex flow field generated by a hovering helicopter.** K. R. Reddy (Department of Defence, Aeronautical Research Laboratories, Melbourne, Australia). In: Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers. Barton, Australia, Institution of Engineers, 1981, p. 553-556. 11 refs.

Important vortex elements in the wake of a hovering helicopter are identified on the basis of well established fixed wing theory. The vortex positions are specified using experimental results. To make the problem mathematically simple, Willmer's rectangularisation principle is introduced. Using this wake model, the calculated velocity field and blade loading are compared with available helicopter flight data. The comparison shows that the present simple method yields satisfactory results. (Author)

A82-26298 # **Helicopter rotor performance improvement by utilization of swept back parabolic blade tip.** J. J. Philippe and P. Lafon (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), no. 5, 1981, p. 55, 56. Research supported by the Direction des Recherches, Etudes et Techniques.

Swept back parabolic tips designed to improve the working conditions of an advancing blade by reducing the intensity of the shock waves and the drag associated with such shocks are tested in the S2 wind tunnel at Chalais-Meudon on a three-bladed rotor. The influence of the sole planform of the blade tips on the total aerodynamic performance of the rotor, twist angle and the profiles of the tips remaining identical is investigated, and the performance of the reference rotor with rectangular blades is compared with that of the rotor fitted with swept back parabolic tips. Results show that the blade tip optimized for advancing blade conditions gives an overall improvement in performance. D.L.G.

A82-26299 # **Real time digital filtering test in the S1 continuous wind tunnel at Modane.** J. Appel (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), no. 5, 1981, p. 57-61.

A real time digital filtering test was performed in October 1980 in the S1 wind tunnel at Modane to compare the performances of digital filters programmed at various cut-off frequencies with those of analog filters already in use. Results confirm the interest of low-pass filtering at a very low cut-off frequency for restoring static parameters while the model is performing an angle of attack sweep in continuous mode. At the cut-off frequency of 0.5 Hz, the Keimo analog filters are of good quality since the results they give coincide with those of the digital filters to within 0.0001. D.L.G.

A82-26313 **Torsional vibrations of non-uniform rotating blades with attachment flexibility.** V. T. Nagaraj and N. Sahu (Hindustan Aeronautics, Ltd., Helicopter Design Bureau, Bangalore, India). *Journal of Sound and Vibration*, vol. 80, Feb. 8, 1982, p. 401-411. 8 refs.

The torsional vibrations of non-uniform pretwisted rotating blades are studied by using finite element methods based on both the Rayleigh-Ritz and Galerkin formulations. The apparent differences between the matrices obtained from these formulations are explained and, as obtained by using three different orders of elements, results are presented for blades with flexibly attached roots and for a non-uniform blade representative of a bearingless rotor. A parametric study is carried out to resolve a controversy regarding the relative importance of certain terms in the equations of motion of pretwisted rotating blades. In Appendix I, an exact solution is presented for the torsional vibrations of flexibly attached rotating blades with piecewise constant inertia and elastic properties, which serves as a benchmark solution for the finite element results. (Author)

A82-26318 * **High frequency sound emission from moving point multipole sources embedded in arbitrary transversely sheared mean flows.** M. E. Goldstein (NASA, Lewis Research Center, Cleveland, OH). *Journal of Sound and Vibration*, vol. 80, Feb. 22, 1982, p. 499-522. 25 refs.

Formulas are derived for the high frequency sound emission from moving point multipole sources embedded in an arbitrary unidirectional transversely sheared mean flow. The results are used to study the sound generated by non-axisymmetric turbulent jets. The effect of the asymmetry in both the mean flow and the source distribution is accounted for by a 'circumferential directivity factor', which is easily calculated from the solution of a second order ordinary differential equation in the general case and from an explicit formula when the mean flow is symmetric but the source location is not. This factor is used to assess the potential of employing asymmetric velocity profiles that redirect the sound upward to reduce the noise radiation below the flight path of a jet aircraft. (Author)

A82-26319 * **On the generation of side-edge flap noise.** M. S. Howe (Bolt Beranek and Newman, Inc., Cambridge, MA). *Journal of Sound and Vibration*, vol. 80, Feb. 22, 1982, p. 555-573. 21 refs. NASA-supported research.

A theory is proposed for estimating the noise generated at the side edges of part span trailing edge flaps in terms of pressure fluctuations measured just in-board of the side edge on the upper surface of the flap. Asymptotic formulas are developed in the opposite extremes of Lorentz contracted acoustic wavelength large/small compared with the chord of the flap. Interpolation between these limiting results enables the field shape and its dependence on subsonic forward flight speed to be predicted over the whole frequency range. It is shown that the mean width of the side edge gap between the flap and the undeflected portion of the airfoil has a significant influence on the intensity of the radiated sound. The results indicate that the noise generated at a single side of a full scale part span flap can exceed that produced along the whole of the trailing edge of the flap by 3 dB or more. (Author)

A82-26320 **Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise'.** G. F. Homicz (Calspan Advanced Technology Center, Buffalo, NY). *Journal of Sound and Vibration*, vol. 80, Feb. 22, 1982, p. 575, 576; Authors' Reply, p. 576, 577. 8 refs.

A82-26340 # **Unsteady response of rectangular wings in spanwise uniform shear flow.** M. Kobayakawa (Kyoto University, Kyoto, Japan). *AIAA Journal*, vol. 20, Apr. 1982, p. 471-476. 8 refs.

An unsteady lifting surface theory based on inviscid and incompressible spanwise shear flow is presented. The stream approaching a thin, rectangular wing is assumed to have a linear shear distribution, and a Poisson type equation is defined for the velocity in unsteady cases, and a Laplace equation for steady cases. The lift distribution is calculated and solved by a method of solution by mode functions. The lifting surface technique in potential flow is shown to be applicable for numerical solutions if the Mach number is set at zero. Calculations are also performed for the response functions to sinusoidal heaving oscillations and sinusoidal gust, corresponding to the Theodorsen function and the Sears function, respectively. M.S.K.

A82-26366 * # **Computational fluid dynamics - The coming revolution.** R. A. Graves, Jr. (NASA, Washington, DC). *Astronautics and Aeronautics*, vol. 20, Mar. 1982, p. 20-28, 62. 28 refs.

The development of aerodynamic theory is traced from the days of Aristotle to the present, with the next stage in computational fluid dynamics dependent on superspeed computers for flow calculations. Additional attention is given to the history of numerical methods inherent in writing computer codes applicable to viscous and inviscid analyses for complex configurations. The advent of the superconducting Josephson junction is noted to place configurational demands on computer design to avoid limitations imposed by the speed of light, and a Japanese projection of a computer capable of several hundred billion operations/sec is mentioned. The NASA Numerical Aerodynamic Simulator is described, showing capabilities of a billion operations/sec with a memory of 240 million words using existing technology. Near-term advances in fluid dynamics are discussed. M.S.K.

A82-26367 * # **Lightning detection and ranging.** C. L. Lennon (NASA, Kennedy Space Center, Cocoa Beach, FL) and H. A. Poehler (RCA Service Co., Cocoa Beach, FL). *Astronautics and Aeronautics*, vol. 20, Mar. 1982, p. 29-31. 6 refs.

A lightning detector and ranging (LDAR) system developed at the Kennedy Space Center and recently transferred to Wallops Island is described. The system detects pulsed VHF signals due to electrical discharges occurring in a thunderstorm by means of 56-75 MHz receivers located at the hub and at the tips of 8 km radial lines. Incoming signals are transmitted by wideband links to a central computing facility which processes the times of arrival, using two independent calculations to determine position in order to guard against false data. The results are plotted on a CRT display, and an example of a thunderstorm lightning strike detection near Kennedy Space Center is outlined. The LDAR correctly identified potential ground strike zones and additionally provided a high correlation between updrafts and ground strikes. M.S.K.

A82-26376 **The Model 412 multi-bladed rotor system.** A. W. Meyers, N. B. Phillips, and D. E. Snyder (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadephia, PA, Oct. 22-24, 1980, Paper.* 9 p. 7 refs.

A multibladed soft-inplane main rotor system is being certified for the Bell Model 412 utility helicopter. This rotor system is a third-generation design and is the result of technology developed in earlier multibladed soft-inplane rotor programs. The new rotor was designed to easily retrofit existing helicopters in the field. The design of a fiberglass blade was also included in the program. Torsional loads encountered during the development program were higher than anticipated because of the influence of live twist on rotor response and control loads. Increased trailing edge reflex was used to significantly affect both rotor response and control loads. Bell's technical predictions for the rotor have been confirmed in the development and FAA certification phases of the program. (Author)

A82-26377 **Dynamic stability of low effective flap hinge BMR concepts.** F. J. McHugh, J. A. Staley, and M. W. Sheffler (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 11 p. 6 refs.

The considered Bearingless Main Rotor (BMR) test shows that a five percent effective flap hinge BMR which has acceptable aeroelastic stability characteristics is feasible. Significant advancements regarding the development of the BMR concept will potentially provide a reduction in hub weight, piece parts, and fabrication costs while reducing gust sensitivity and vibratory hub moments. Dual beam and single flex strap designs studied have an equivalent flap hinge offset of approximately five percent of blade radius. The baseline dual beam was found to have a higher level of stability than the single flex strap. G.R.

A82-26378 **Design for the operating environment - Ring-fin tail rotor program.** H. E. Lemont (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 16 p. 6 refs.

Many aircraft accidents involve tail rotor strikes. Replacing the helicopter fin with an airfoil-shaped cross-section ring provides greater safety, increases thrust and lowers noise. Full-scale ground, wind-tunnel, and feasibility flight testing shows that the rotor blade tip vortices educt air around the guard ring by external mixing to produce increased thrust for the same power input and a larger maximum available value. Acoustic data under static thrust conditions show reduced noise levels up to eight dBA by the use of the thrust ring and lowered operating tip speeds. Improved aircraft handling qualities are also indicated by feasibility flight test data. Applying the thrust ring to the main rotor requires a light ring and a relatively small rotor. Lighter transmissions, smaller antitorque devices and a compact construction would be pluses. Negatively, there would be problems with the weight of the ring and unknown factors in aerodynamics, controllability, and stability. C.D.

A82-26379 **The general purpose research rotor - Design features and considerations.** A. Z. Lemnios and R. Jones (Kaman Aerospace Corp., Bloomfield, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980. Paper.* 16 p. 6 refs.

The General Purpose Research Rotor (GPRR) involves an in-depth preliminary design of a configuration which has multifunctional capabilities that can be used to investigate several different optional configurations with minor modifications to the basic structure. It is pointed out that, even with a number of advancements made with respect to airfoil design and tip shapes, significant problems still exist in the development of helicopter rotors. In particular, a better understanding is required of the rotor parameters which affect performance, vibration, noise, and stability. The GPRR provides a configuration which is ideally suited to study the sensitivity of these characteristics to configurational changes. The GPRR is a four-bladed configuration with each blade fabricated from composite materials. Attention is given to a conceptual study, a parametric study, a feasibility study, the evaluation of a selected configuration, and aspects of technological payoffs. G.R.

A82-26380 **Design of higher harmonic control for the ABC.** J. O'Leary and W. Miao (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 11 p. 9 refs.

Attention is given to the vibration characteristics of the ABC helicopter, ABC vibration with higher harmonic control (HHC), an active vibration controller, and the implementation of HHC on the ABC XH-59A helicopter. It is found that HHC is ideal for the ABC helicopter because of its large operational range of rotor speeds and natural interrotor load cancellation. It is feasible to achieve a 90% reduction of vibration through HHC. HHC requirements are in the range of 0.5 to 2 deg depending upon the harmonic frequency of the input. HHC does not alter the interrotor cancellation characteristic of the ABC rotors. The existing interrotor cancellation on the ABC helicopter makes the HHC application easier. G.R.

A82-26381 **CH-46 and CH-47 composite rotor blade lightning protection testing.** G. Heiderscheidt and J. Sarro (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 8 p.

A helicopter composite rotor blade suited to the lightning environment must be able to withstand a single strike of 200,000 amps and multiple strikes of 50,000 amps or less with only minor damage. The main element in the CH-46 and CH-47 lightning protection system is the titanium nosecap. All metal parts of the blade are either shielded by it or conduct to it. A conductive path leads from the cap to the metal rotor hub and then to the other metal sections of the aircraft. High-voltage long-arc tests involved 17 strikes averaging between 10,000 and 12,000 amps peak. Only minor damage occurred, including pitting and loosening of the top bonding strap. Swept-stroke tests involved 100 amp continuing current with 50,000 amp restrike swept from one blade to the next. No significant damage was seen. High current tests, including three 200,000 amp artificial lightning strikes, resulted in bond strips being blown away but no serious damage. C.D.

A82-26382 **A preliminary investigation of Individual Blade-control Independent of a Swashplate.** K. F. Guinn (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 9 p. 11 refs.

A description is presented of the Individual Blade-control Independent of a Swashplate (IBIS) system, taking into account system components and their function. The IBIS fly-by-light control system is a unique concept for controlling the rotor blades of a helicopter of V/STOL aircraft. The concept stresses simplicity and utilization of integrated subsystems which inherently increase reliability while reducing weight and cost. Secondary flight control actuators are not needed with the fly-by-light system since secondary functions such as autopilot and SAS may be implemented simultaneously through the primary control actuators. By proper use of signal limiting, secondary control authority and rate limits may be provided by electronic circuitry instead of by secondary actuators with velocity and stroke limitations. G.R.

A82-26383 * # **Selection of some rotor parameters to reduce pitch-roll coupling of helicopter flight dynamics.** R. T. N. Chen (NASA, Ames Research Center, Moffett Field, CA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 19 p. 21 refs.

The results of a study conducted to investigate further a means of choosing primary rotor parameters to reduce the coupling of longitudinal and lateral flapping in hover and in forward flight are presented. The rotor parameters included - flapping hinge offset, flapping hinge restraint, pitch-flap coupling, and blade Lock number - are known to influence the agility, stability, and operational safety of helicopters. Effects of the nonuniform downwash model of White and Blake on the blade flapping motion are examined, and the theoretical calculation is then correlated with experimental test data. The condition for achieving perfect decoupling of the flapping response due to aircraft pitch and roll rates, which was previously obtained for a hovering rotor, is evaluated in forward flight. The results show that negligible coupling is achieved in forward flight; moreover, there is the additional benefit of a slight reduction in the coupling of the roll rate to coning. It is also indicated that the values of the rotor parameters chosen according to the decoupling condition are moderate and that the flapping motion is stable with the parameters chosen. (Author)

A82-26384 **CH-46 fiberglass rotor blade repair program.** N. Caravasos (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper* 8 p.

This paper discusses the importance of field repair capability of fiberglass rotor blades at the lowest maintenance level. An overview of validated repairs in a controlled environment is presented, including fatigue testing as well as actual repairs - out of the laboratory and in the field by Navy and Marine Corps mechanics. Substantial cost improvement between fiberglass and metal blades was realized because of improved reliability of fiberglass blades requiring less maintenance actions. (Author)

A82-26385 **A survey of U.S. Army helicopter main and tail rotor blade obstacle strikes.** L. T. Burrows (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 8 p.

A description is presented of the results of a survey of main and tail rotor blade obstacle strikes which resulted in damage-causing mishaps. The occurrence of the considered mishaps are partly the consequence of an increased employment of terrain flying tactics. Such tactics are necessary to improve the chances for the survival of helicopters in the mid to high intensity combat environment. In the majority of the mishaps analyzed, the objects most often struck were trees, branches, bushes, or other vegetation. The aircraft considered include the OH-58 Kiowa, the AH-1 Cobra, and the UH-1 Iroquois. Approaches to obstacle strike tolerance are also discussed. G.R.

A82-26386 **The YAH-64A composite flexbeam tail rotor.** D. Banerjee, R. E. Head, R. Marthe (Hughes Helicopters, Inc., Culver

City, CA), and M. Ploudre (U.S. Army, Manufacturing Technology Branch, St. Louis, MO). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 12 p. 9 refs.

A new composite flexbeam tail rotor is being fabricated for the YAH-64 Advanced Attack Helicopter. This rotor builds on the aerodynamic/dynamic and composites manufacturing technology which has been developed over the past several years for hingeless tail rotors. The design of a structurally and dynamically bearingless tail rotor design requires the solution of a number of problems. The problems are discussed along with the approaches developed for their solution. Attention is given to the prototype rotor, tail rotor design refinements, and manufacturing techniques. The flexbeam is considered along with the hub, the pitch case, the blade, the rotor dynamics, and certain key parameters. G.R.

A82-26387 * # **Performance improvements with the free-tip rotor.** R. H. Stroub (NASA, Ames Research Center, Moffett Field, CA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 9 p.

A new rotor configuration called the free-tip rotor was investigated for its potential to improve helicopter forward-flight performance characteristics. This rotor differs from a conventional rotor only in the blade tip region. Free tip is self-adjusting in pitch with respect to the rest of the blade. With this capability, the resulting pitch motion generated a more uniform airload distribution around the azimuth. Computer math models were used to compare performance characteristics of the free-tip rotor with those of a conventional rotor operating at flight speeds from 130 to 160 knots. The free-tip rotor is shown to improve cruise L/DE by at least 22%. (Author)

A82-26388 # **Operational experience with the fiberglass rotor blade.** R. E. Yeend (U.S. Naval Air Systems Command, Arlington, VA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 15 p.

A recently introduced fiberglass rotor blade (FRB) for the Navy/Marine Corps H-46 helicopters resulted in greatly increased mean blade flight hours between maintenance actions, removal to depot, and failure as compared to metal rotor blades. Aircraft flying qualities and performance characteristics were essentially unchanged from those obtained with metal rotor blades. No return to depot was required during reliability demonstration tests. Operational experience showed that in 82,000 total blade flight hours, involving over 500 FRB's, none had to be returned to depot for repair, compared to 464 metal blades in that time span. Of the 18 FRB's that were damaged, 15 were returned to service at the field activity level. Inherent failure that occurred in three blades is not expected to occur in production blades. Problems currently under investigation are titanium sparking during night flight, blade retention pin wear due to ingestion of sand, and corrosion of the lightning protection screen. C.D.

A82-26389 **Design of a composite main rotor blade spar for fabrication by tubular braiding.** M. L. White (Kaman Aerospace Corp., Bloomfield, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 7 p. 8 refs. Army-sponsored research.

Mechanical tubular braiding has been shown to be a viable spar manufacturing process in a program which included preliminary design of an improved main rotor blade for the OH-58 helicopter. The blade incorporates an advanced aerodynamic shape and has as its primary structural member a Kevlar 49/epoxy spar fabricated by braiding. Achievement of an analytically acceptable blade and spar design meeting critical structural and dynamic requirements was not hindered by braiding process constraints. Mechanical property tests of flat panels and spar sections exhibited excellent correlation with analytical predictions, substantiating the applicability of normal composite laminate analysis methods and the validity of the specific design. Ballistic testing of spar sections demonstrated superior containment of structural damage compared to composite spars produced by more conventional methods. Manufacturing cost estimates predict a price reduction of 1/3 for the braided spar over a similar S-glass/epoxy spar fabricated by orthodox, low-cost technology for an OH-58 blade of identical external shape. (Author)

A82-26390 **Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques.** G. Wehnert (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 8 p.

A new lay-up design for the unidirectional graphite/epoxy spar of the tail rotor blade assembly in the Sikorsky BLACK HAWK aircraft simplifies manufacturing while changing none of the spar's physical and structural characteristics. The currently used 321 torpedo plies are replaced by 213 unidirectional one-piece plies laid up alternately at plus or minus 5 degrees to the horizontal. Spar yield is also improved by using press grade graphite with lower epoxy resin content, resulting in more uniform flow characteristics during molding. Consequently, less debulking in the thicker areas is required, porosity is reduced and the cure cycle is simplified because of more repeatable gel characteristics. The quality control employs a fully automated ultrasonic inspection and back-up inspections that distinguish between voids and inclusions on the one hand and porosity on the other with the resultant improved yield. C.D.

A82-26391 **SH-60B Seahawk automatic blade fold system.** C. V. Toner (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 11 p.

An automatic electromechanical blade fold system has been successfully tested as part of the U.S. Navy SH-60B Seahawk antisubmarine helicopter development program. Originally the blade fold systems had been hydraulically powered. However, for the SH-60B program a decision was made to change to an electrically powered system, because it promised inherently higher reliability and potentially lighter weight in a simpler system. Attention is given to system requirements, air vehicle reliability, a system definition, the blade fold, the lag dampers, aspects of pitch lock design, the blade retention bearing, the initial blade fold design, questions of blade unlocking, the fold actuator, the fold hinge detent, lock pin extraction, lock pin sequencing, and questions of fold actuator isolation. G.R.

A82-26392 **The impact of missions on the preliminary design of an ABC rotor.** G. de Simone, R. S. Blauch, and R. A. Fisher (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 19 p. 8 refs.

A number of studies have shown the suitability of the ABC rotor in a wide range of applications which require combinations of high speed flight and low speed agility and efficiency. Studies related to two of the envisaged applications are discussed. An advanced rotor has been derived for a cruise design point and a hover design point. Attempts have been made to chart the impact of airfoils, taper, and twist on the performance of an advanced rotor and a baseline XH-59A geometry rotor. Design trends using the two rotor data bases have been generated for a troop assault mission (high cruise speed requirement) and for an observation mission (high hover time required). G.R.

A82-26393 **Main rotor hub electromagnetic signature reduction.** J. Shostak (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA) and J. Carver (Rockwell International Corp., Tulsa, OK). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 10 p.

A main rotor hub cover was developed to reduce the electromagnetic (EM) signatures of the Army AH-1G/S helicopters' main rotor hub. The signatures addressed in the rotor hub cover design were the radar cross section (RCS), infrared radiation (IR) and visual, with emphasis being placed on RCS reduction. A detailed discussion of the main rotor hub cover development program and its subsequent RCS testing are presented in this paper. The stated program goals established the criteria from which the hub cover evolved. Careful consideration was given to the selection of materials and the cover design for optimization of the electromagnetic signature reduction. Static RCS signature measurements were performed on the rotor hub cover as were subsequent in-flight RCS measurements on the entire helicopter equipped with and without the hub cover. The in-flight measurements were made on an Army AH-1S (production) helicopter whose main rotor system was the same as that of the AH-1G helicopter. (Author)

A82-26394 * Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system. M. Sheffler, J. Staley (Boeing Vertol Co., Philadelphia, PA), and W. Warmbrodt (NASA, Ames Research Center, Moffett Field, CA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 9 p. 9 refs.

The considered investigation was conducted in connection with a contract to design, fabricate, and test a prototype bearingless main rotor (BMR) system. Part of the design process involved an aeroelastic stability investigation in a wind tunnel. Attention is given to a description of model testing, model test results, the description of the full scale wind tunnel configuration, full scale test results, and aspects of correlation with theory. It was found that the complex geometry of the BMR, with 12.5 degrees of nose-up prepitch at the hub and 2.5 degrees of tip-up predroop at the blade attachment clevis, is required to achieve a stable configuration. Subsequent model testing showed that a constrained layer of elastomer material could increase stability at all rotor speeds and collectives tested for a flat strap configuration. G.R.

A82-26395 Rotor preliminary design trade-offs for the Advanced Scout Helicopter. M. P. Scully and R. A. Shinn (U.S. Army, Research and Technology Laboratories, Moffett Field, CA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 21 p.

A description is presented of the Advanced Scout Helicopter (ASH) main rotor design trade-offs required for the selection of rotor diameter, tip speed, blade chord, number of blades, and blade inertia. The rotor design process is a constrained optimization in which both the objective function and the constraints are complicated, nonlinear, and negotiable. The rotor design portion of ASH studies demonstrates the effect of constraints such as autorotation and survivable chord on the design, and shows the importance of developing more realistic versions of these constraints. Attention is given to design objectives, aspects of methodology, design constraints, baseline configurations, and questions of rotor and engine sizing. G.R.

A82-26396 Performance and aeroelastic tradeoffs on recent rotor blade designs. D. P. Schrage and J. A. O'Malley (U.S. Army, Development and Qualification Directorate, St. Louis, MO). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 11 p. 15 refs.

A review is conducted of the performance and aeroelastic requirements of a helicopter rotor blade in both hover and forward flight. It is found that aeroelastic simplifications in rotor blade design are no longer practical if optimal performance is to be achieved. It is necessary to consider airfoil geometric variations. The influence of these variations on drag divergence Mach number at lift coefficients from near zero to near maximum lift and on pitching moments must be properly addressed during the design process. Blade torsional frequency, torsional stiffness, and section pitching moment, are exceedingly important parameters in optimizing performance and control loads. These parameters must, therefore, be adequately represented in analytical models. G.R.

A82-26397 CH-47 fiberglass rotor blade design and fabrication. R. W. Sandford and R. P. Belko (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 11 p.

A fiberglass rotor blade for the CH-47 Chinook helicopter is now in production. It provides interchangeability, improved performance, failsafe construction, minimum inspection and maintenance requirements, maximum field repairability, and 3600 hours depot level reliability. A composite design optimizes blade geometry and features unidirectional material, titanium nosecap, and a unit-fabricated fairing of fiberglass surrounding a nonmetallic honeycomb core. The stainless-steel lag damper bracket is overwound with prestressed fibers. Bench tests were conducted to ensure against buckling of the spar wall and trailing edge, and to evaluate fatigue of the root ends with results showing that the fatigue life objective would be met. Whirl and flight tests confirmed that the blade fiberglass components, damper bracket and windings have essentially unlimited fatigue life. The titanium nosecap fatigue life substantially exceeded the design objective. C.D.

A82-26398 Black Hawk rotor de-icing. J. R. Reilly (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 10 p.

The U.S. Army Black Hawk helicopter is designed to operate in moderate icing conditions. Heating is provided at the engine inlets by engine bleed air and by electrothermal anti-icing elements in the windshield and pitot head. The rotor de-icing system melts the bonding layer of accreted ice, allowing the rest to be shed. A blade heating mat that carries current is integrally built within the leading edge and shielded by dielectric layers. The blades are connected to a distributor which connects to the rotor, which in turn connects to the de-ice controller and detectors. In operation, an off-time heater element responds to a predetermined accumulation of ice by commanding the on-time heater element, which operates until a predetermined ambient temperature is attained. Feedback systems monitor heat distribution and guard against excess current and blade overheating. To conserve power, the two sets of opposing blades are alternately de-iced. In tests, the system consistently produced clean ice shedding over thirty hours of testing. C.D.

A82-26399 Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility. R. R. Pruyn and R. B. Shannon (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 20 p.

Preliminary design studies have identified the best design concepts for four-bladed prop-rotors that must fold for shipboard compatibility. All practical combinations of folding method and hub configuration were evaluated for operational suitability, maintainability, reliability, cost, and developmental risk. Results show that the scissors-folding hingeless rotor is best if the aircraft configuration can accept a prop-rotor folding length of the prop-rotor diameter. For an aircraft configuration that requires the prop-rotor to fold to a length of approximately the rotor radius, a flexure and elastomeric articulated hub is the best choice. (Author)

A82-26400 The Circulation Control Rotor /CCR/ control system. D. R. Barnes (Kaman Aerospace Corp., Bloomfield, CT). *American Helicopter Society, National Specialists Meeting on Rotor System Design, Philadelphia, PA, Oct. 22-24, 1980, Paper.* 10 p. 8 refs.

This paper presents an overview of the XH-2/CCR, Circulation Control Rotor Flight Demonstrator, control system design. The circulation control rotor is a major departure from conventional rotor systems and presents the control system designer with both a new set of options and a new set of challenges. The paper emphasizes the CCR unique components and aspects of the control system. Component selection, sizing, integration and operation are addressed. Specific details of the XH-2/CCR control system are presented. Multicyclic control capability is included. (Author)

A82-26461 # Mach 2.0 rotating arm rain erosion test apparatus. K. W. Foulke (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings. Atlanta, GA, Georgia Institute of Technology, 1980, p. 61-70.

In studies of radome erosion damage involving aircraft operating in Southeast Asia, it was found that the materials, coatings and designs in use could not withstand such an environment. In connection with a search for improved designs and materials, a survey of possible test methods was conducted. It was concluded that a rotating arm would provide the best laboratory simulation of the environment for investigating rain erosion at subsonic and supersonic speeds. The rotating arm offered the advantages of multiple drop impact, sustained exposure time, test samples of acceptable size, low development cost, and reasonable cost per data point for test velocities to Mach 2.0. The rain erosion test apparatus consists of a four-foot radius arm rotating in a steel chamber 10 feet in diameter. G.R.

A82-26462 # **Effects of filler materials upon radome rain erosion performance at subsonic conditions.** E. Greene (IBM Corp., Owego, NY). In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings.
Atlanta, GA, Georgia Institute of Technology, 1980, p. 71-75.

The considered investigation was initiated after premature blistering of the rain erosion coating and radome soft spots were found to occur on some near sonic speed aircraft after relatively low flight time through rain. A rotating arm rain impact test facility was used as the vehicle simulator in the investigation. Attention is given to the results from three series of rain impact tests. It was found that filler materials used between rain erosion coating and radome substrate may conceal surface blemishes or irregularities and provide an attractive surface appearance. However, the tests show that radome performance can be severely degraded in a rain impact environment. G.R.

A82-26464 # **Radome rain damage - An environmental analysis technique.** B. J. Crowe (Flight Systems, Inc., Newport Beach, CA). In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings.
Atlanta, GA, Georgia Institute of Technology, 1980, p. 86-92. 6 refs. Contracts No. F33615-79-C-5036; No. N60530-79-C-0068; No. N00123-79-C-1042.

An environmental analysis technique has been developed for the rapid evaluation of path-cumulative rainfall statistics. Although the analysis assumes intense rainfall concentrations, the results it produces appear to be similar to those for more uniformly distributed rainfall. The accuracy of the technique is somewhat dependent on the character of the storm distribution models assumed, but parametric analyses have enhanced confidence in the general validity of the results to date. With further refinement, and improvements in the data base, it is believed that the considered approach could provide a much needed means for quantitatively evaluating the rain environment limitations of tactical missile radomes. G.R.

A82-26465 # **Radome aerodynamic heating effects on boresight error.** L. B. Weckesser (Johns Hopkins University, Laurel, MD). In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings. Atlanta, GA, Georgia Institute of Technology, 1980, p. 97-101.

Previous studies have shown that aeroheating of a Pyroceram 9606 radome to temperatures as low as 600 F could cause a large enough change in the RF performance of the radome to affect missile performance. The decision was, therefore, made to carry out an experiment in which direct boresight error (BSE) measurements of a heated radome would be obtained. A description is presented of the special radome/antenna support fixture designed and built specifically for this test program. Attention is also given to aspects of general test arrangement, the radome, the test temperatures, and BSE results. G.R.

A82-26467 # **Full scale test facilities for radomes and antenna windows.** A. Ossin and H. J. Readey, Jr. (Martin Marietta Aerospace, Orlando, FL). In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings.
Atlanta, GA, Georgia Institute of Technology, 1980, p. 107-111.

The CONFLOW and Ramburner test facilities, with newly added capability, will provide a variety of environments and capabilities for the aerothermal and electrical evaluation of full-up radome structures, antenna windows, and material screening. The CONFLOW facility is a computer-controlled, continuous flow, hot air generator. A description is given of an investigation which shows that measurements of radome boresight error can be made at the CONFLOW facility with sufficient accuracy for most known applications of interest, provided the seeker under test can be sufficiently isolated from CONFLOW-induced movement. G.R.

A82-26468 # **Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace.** R. K. Frazer (Johns Hopkins University, Laurel, MD). In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings. Atlanta, GA, Georgia Institute of Technology, 1980, p. 112-116. 5 refs.

An experiment has been conducted that used the solar furnace at the Central Receiver Test Facility (CRTF) in Albuquerque, NM, to create flight-like temperatures in three supersonic missile radomes. The radomes tested have a von Karman profile, are made of Pyroceram 9606 about 0.25 in. thick, and have a fineness ratio of 2.1 with a base diameter of 13.5 in. The purpose of this effort was to measure the changes in radome boresight error (BSE) caused by aerodynamic heating. This paper describes the thermal aspects of the experiment, including the facility selection, heat flux survey measurements, temperature measurements made on a calibration radome, and calibration of optical pyrometers. (Author)

A82-26470 # **F-5 Shark Nose Radome - A development overview.** G. W. Scott. In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings.
Atlanta, GA, Georgia Institute of Technology, 1980, p. 128-133.

It is pointed out that the Shark Nose Radome, with its pronounced ellipticity and sharp discontinuity edges on the forward region, gave rise to complex interrelationships between materials, structure, mechanical design, manufacturing process, environmental evaluation, and electromagnetic performance. Because of this, the development and test phases required many iterations, trade-offs, and compromises. Extensive ground and flight tests were carried out. The production model was found to satisfy all specifications and is now being installed on production F-5 aircraft. C.R.

A82-26471 # **Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM.** J. M. Schuchardt, D. J. Kozakoff, D. O. Gallentine, T. N. Long (Georgia Institute of Technology, Atlanta, GA), M. M. Hallum, and B. F. Wilson (U.S. Army, System Simulation and Development Directorate, Redstone Arsenal, AL). In: Symposium on Electromagnetic Windows, 15th, Atlanta, GA, June 18-20, 1980, Proceedings.
Atlanta, GA, Georgia Institute of Technology, 1980, p. 134-141. 8 refs.

The need for rapid collection of missile radome/seeker interaction data in the U.S. Army RFSS facility has led to the development of an instrumentation system by the Georgia Institute of Technology. The system consists of a microcomputer-controlled radome positioner and radome measurements receiver. The positioner can handle radomes with diameters up to 18.0 inches and weights up to approximately 50 pounds. The receiver system operates over an RF frequency range of 0.11-18.0 GHz. A microcomputer system featuring dual floppy disk data storage furnishes a method of intermediate test data storage/buffering. Tests carried out with an actual radome/seeker antenna combination demonstrate the signal processing feature of the receiver's microcomputer. C.R.

A82-26479 † **The relative motion of a particle in the case of exponential changes of the velocity of the medium (Ob otnositel'nom dvizhenii chastitsy pri eksponentsial'nom izmenenii skorosti sredy).** S. V. Ananikov and B. M. Azizov. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 3-6. 13 refs. In Russian.

An analytic solution, expressed by elementary and special functions, is obtained for the relative motion of a particle in a gas flow whose velocity changes exponentially. The case of a single spherical particle in an isothermal gas flow is examined. The analysis is pertinent to the study of combustion processes in jet engines. B.J.

A82-26483 † **The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer (Vliianie formy tela na effektivnost' ego ispol'zovaniia v kachestve stabilizatora plameni).** V. N. Gruzdev, M. M. Nuriev, and A. V. Talantov. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 43-47. In Russian.

Experimental results are presented on flame stabilizers of various shapes with regard to combustion efficiency, flameout limits, and hydraulic resistance. It is found that the replacement of the conventional V-shaped stabilizer by a hydraulically equivalent flat-plate stabilizer makes it possible to reduce the mass of the stabilizer array without reducing the combustion efficiency. B.J.

A82-26486 † **Requirements on modern mathematical models of gas turbine engines. I (Trebovaniia k sovremennym matematicheskim modeliam gazoturbinnykh dvigatelei. I).** E. B. Mats and A. P. Tunakov. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 63-65. 6 refs. In Russian.

Requirements assuring the sufficient accuracy of mathematical models of gas turbine engines are discussed. Consideration is given to the possibility of taking into account the following characteristics: moisture, gas dissociation, changes in the composition and properties of the working fluid, the turbine characteristics, the Reynolds number, changes in the loss coefficient and the combustion efficiency, radial flow nonuniformity, and static-pressure difference. B.J.

A82-26487 † **Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series (Metodika soglasovaniia dvigatelia i samoleta v SAPR-D verkhnego urovnia tsikla 'Apparat').** S. V. Rumiantsev and V. A. Sgilevskii. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 66-70. In Russian.

The theoretical principles underlying engine-airframe integration using a high-level computer-assisted engine design system are presented. The integration approach is described in detail, and a block diagram of the integration system is presented. B.J.

A82-26491 † **Application of combined balancing methods to flexible rotors of aviation gas-turbine engines (Primenenie kombinirovannykh metodov uravnoveshivaniia gibkikh rotorov aviatsionnykh gazoturbinnykh dvigatelei).** A. I. Gleizer. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 81-85. 5 refs. In Russian.

A82-26492 † **Determination of losses in a channel with a sudden expansion behind a diffusor (K voprosu opredeleniia poter' v kanale s vnezapnym rasshireniem, raspolozhennym za diffuzorom).** A. Ia. Dantsyg, N. M. Petrov, and N. N. Ponomarev. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 86-89. In Russian.

An exact and relatively simple method is proposed for determining total-pressure losses in a step diffusor, i.e., a system consisting of a diffusor and a channel with a sudden expansion. This method makes it possible to develop a procedure for analyzing losses in a step diffuser with allowance for gas compressibility in the case of variations of the degree of sudden expansion. B.J.

A82-26494 † **The formation of benzpyrene during the combustion of aviation fuels (K voprosu ob obrazovanii benz/a/pirena pri gorenii aviatsionnykh topliv).** V. P. Lukachev, Iu. A. Knysh, A. A. Gorbatko, and A. V. Ivliev. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 94-96. 5 refs. In Russian.

It has been suggested that the emission of benzpyrene during the combustion of jet-engine fuels should be accompanied by the emission of smoke and carbon monoxide. Experimental results are presented on the emission of benzpyrene during the combustion of kerosene in two aircraft engines. A discrepancy between the benzpyrene emission characteristics is found for the two engines, which is as yet unexplained; in one case, the benzpyrene emission characteristics are proportional to those of smoke and CO, in the other case, they are not. B.J.

A82-26495 † **Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases (K metodike opredeleniia polnoty sgoraniia topliva i toksichnosti vykhlopnykh gazov).** V. P. Lukachev and A. V. Ivliev. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 96-99. In Russian.

Methodological questions relating to the experimental determination of the combustion efficiency of jet-engine fuels and the toxicity of the exhaust gases are discussed. Particular consideration is given to the sampling of combustion products and to the elimination of low-frequency fluctuations of combustion-product composition. B.J.

A82-26496 † **Analysis of the characteristics of a bypass engine, with allowance for variable pressure losses in the channels (Raschet kharakteristik TRDD s uchetom peremennykh poter' davleniia v kanalakh).** B. D. Fishbein. *Aviatsionnaia Tekhnika,* no. 3, 1981, p. 99-102. In Russian.

A82-26500 † **Radio-navigation equipment of aircraft - Devices and operation (Radionavigatsionnoe oborudovanie samoletov - Ustroistvo i ekspluatatsiia).** A. N. Goliak, S. I. Plotkin, and I. F. Koval'chuk. Moscow, Izdatel'stvo Transport, 1981. 248 p. 7 refs. In Russian.

An automatic direction finder is described, taking into account general information, the goniometric system, aspects of control, the automatic tuning system, and operational details. A radio altimeter is also considered, giving attention to the high-frequency measuring device, the amplifier of the difference frequency, the transceiver unit, the altitude indicator, and details regarding the operation of the instrument. Another instrument discussed has been designed to provide air navigation on the basis of a utilization of the international VOR system and the Instrument Landing Systems. Aspects of approach control for the aircraft during landing operations are examined along with questions of instrument control, operational principles, and instrument design. A description is also provided of aircraft radio-navigation equipment employed for an automatic, continuous measurement and indication of the polar coordinates of the aircraft. G.R.

A82-26511 **Automating air-traffic control.** H.-M. D. Toong (MIT, Cambridge, MA) and A. Gupta. *Technology Review,* vol. 85, Apr. 1982, p. 40-49, 54. 5 refs.

The present air-traffic control system based on 1960s technology that uses redundancy to deal with random interruptions of service is being modernized for the 1990s. The system has become increasingly unreliable with obsolete hardware lacking sufficient memory space, and degrading computer response time. The FAA has proposed replacing selected pieces of existing hardware with functionally similar hardware ('rehosting'), but which would increase capacity with minimal software modification. Only basic computer instructions would be required. Communications facilities would be modernized by transmitting computer-generated instructions directly to the aircraft, reducing the involvement of air traffic controllers in this task. By 1996, the entire task of routing air traffic will be done with little human intervention, saving fuel and flying time. The cost of upgrading will be in the vicinity of $300 million, with a factor-of-ten increase over the current computer speed. C.D.

A82-26526 * # **The role of modern control theory in the design of controls for aircraft turbine engines.** J. Zeller, B. Lehtinen, and W. Merrill (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0320.* 32 p. 117 refs.

The development, applications, and current research in modern control theory (MCT) are reviewed, noting the importance for fuel-efficient operation of turbines with variable inlet guide vanes, compressor stators, and exhaust nozzle area. The evolution of multivariable propulsion control design is examined, noting a basis in a matrix formulation of the differential equations defining the process, leading to state space formulations. Reports and papers which appeared from 1970-1982 which dealt with problems in MCT applications to turbine engine control design are outlined, including works on linear quadratic regulator methods, frequency domain methods, identification, estimation, and model reduction, detection, isolation, and accommodation, and state space control, adaptive control, and optimization approaches. Finally, NASA programs in frequency domain design, sensor failure detection, computer-aided control design, and plant modeling are explored. M.S.K.

A82-26536 **A310 - Europe builds on Airbus success.** D. Velupillai. *Flight International,* vol. 121, Feb. 27, 1982, p. 477-484.

Some of the overall problems of the Airbus A310 as well as design details of its new wing are discussed. The wing has the same sweep as the A300 wing and similar slats and flaps. Greater supercriticality was achieved, with consequent reduced airfoil size and thicker section without drag penalty. A 3-D airflow analysis showed that large spanwise changes in airfoil-section were necessary, which in turn demanded extensive double curvature in the lower skin of the inner wing, produced by a new shot-peening technique. 3-D analysis was also used to optimize wing twist along the span and to minimize downward lift generated by the tail-plane during cruise. Detail improvements were made in the leading-edge slats and flaps, the outboard ailerons were eliminated, and other drag clean-ups were made. The spanwise skin-joint is now outboard and will later be eliminated. In the rest of the airframe there is minimum change. The A310 is designed for crack-free life of 20,000 flights, or about 10 years of service. Some comparisons are made with the Boeing 767 and 757 and fuel consumption, production line and cockpit details are also given. C.D.

A82-26537 **Advanced helicopter concepts compete.** G. Warwick. *Flight International,* vol. 121, Mar. 13, 1982, p. 615, 616, 625, 626.

The U.S. Army is defining a tri-Service medium-lift V/STOL aircraft for the early 1990s, with advancing-blade, tilt-rotor, and X-wing concepts among the contenders. One way to increase helicopter speed is to install a pair of coaxial counter-rotating rotors so that all lift is generated on opposing advancing blades. This enables retreating blades to operate at low or zero pitch. Helicopter speed can be increased by avoiding edgewise flow; this is done by tilting the rotors forward into the airflow to become large-diameter propellers and transferring lift to a fixed wing. Speeds of 300 kt at sea level and 350 kt at 20,000 ft are achieved. The key to X-wing is circulation control. The blades have an elliptical section with rounded leading and trailing edges. Air pumped into the hollow blades exits through narrow slots running the length of the upper surface at 6% and 95% chord. Blowing reduces drag and produces lift essentially independent of blade pitch and airflow velocity. Speeds of 500 kt have been attained. C.D.

A82-26538 **From claws to jaws - Tiger into Tigershark.** R. Braybrook. *Air International,* vol. 22, Mar. 1982, p. 111-116, 136-138.

Northrop began considering lightweight low-cost fighters in the early 1950s, building a series leading to the F-5s. These aircraft combined twin-engine safety with straightforward handling characteristics and the infrared guidance missiles gave these aircraft an effective air combat role. The F-5A was a basic fighter that gave poorer nations an introduction to supersonics at low prices, while the F-5E was a more powerful short-range air superiority fighter with ground attack capability. The F-5G Tigershark features the F404 engine with 16,390 lb of afterburning thrust, a flattened nose shape to maintain excellent handling qualities at high angle of attack, enlarged leading edge extension and improved longitudinal control. Much of the operational equipment will be that of the F-5E, but add-on or alternative equipment will soon be available. The first flight is scheduled for September 1982. C.D.

A82-26541 # **Structural design and construction of the New Technology Wing.** M. Flemming. *Dornier-Post* (English Edition), no. 4, 1981, p. 14-18.

The New Technology Wing (NTW) for general aviation aircraft uses milling for the rib flanges as well as the skin/stringer panels, providing a very smooth outside contour which improves the aerodynamic quality of the wing. The need for about 12,000 rivets is eliminated as well as the possibility of leaks that rivets entail. Only about ten percent more milling time is required by the NTW. To compress the rib flange, the usual shot peening method is inadequate. Instead, the flange is formed by two or three applications of a hand compression tool at opposite nodes of the flange all along its length. This technique causes permanent tensile stresses that could cause tension crack corrosion during extended operation. Qualifying tests are therefore envisioned in sensitive materials. No negative effects are expected with respect to fatigue, and tests confirm this. The entire wing is simply assembled and includes a lighter trailing edge box made of fiberglass reinforced plastic sandwich structures with plastic honeycombs. C.D.

A82-26542 # **Experimental program for general aviation.** W. Haberland. *Dornier-Post* (English Edition), no. 4, 1981, p. 19-22.

The New Technology Wing Program involved the design, construction, and testing of a representative wing having a novel aerodynamic profile and slotted flaps to improve maximum lift and L/D ratios, suitable wing edges to reduce induced drag, and wing design allowing cost-efficient production. More than 250 successful test flights have demonstrated 25%-40% improvement in range and 30% reduction in fuel consumption when cruising at 400 km/h, compared to conventional aircraft having the same engines and payload. The tests, which apply to both single-engine and twin-engine planes, showed that the aircraft could climb from high airfields at full payload even when one engine fails. Production cost for the wing box was reduced about 30%. C.D.

A82-26543 # **One year flight testing of the Transonic Wing.** B. Moeken. *Dornier-Post* (English Edition), no. 4, 1981, p. 39-43.

Flight testing of the Dornier Transonic Wing (TW) on the Alpha Jet A1 test bed is described. The experimental version of the TW is characterized by its transonic profile with a large leading-edge radius, a relatively flat surface curvature of the front profile, and a more pronounced camber in the rear profile. The geometrical features of the wing provide higher cruise speed, more lift or payload, and - at higher profile thickness - a correspondingly reduced structural weight and more fuel volume, depending on the design requirement. Industrial and military flight tests were made and showed that the TW provides lower fuel consumption, particularly at high Mach numbers. The TW's radius of action is improved compared to conventional wing designs. Lower corner speed is considerably reduced and upper corner speed is heightened. Stall behavior is excellent. C.D.

A82-26567 * # **Sonic fatigue testing of an advanced composite aileron.** J. Soovere (Lockheed-California Co., Burbank, CA). *(American Institute of Aeronautics and Astronautics, Dynamics Specialists Conference, Atlanta, GA, Apr. 9, 10, 1981, Paper 81-0634.)* *Journal of Aircraft,* vol. 19, Apr. 1982, p. 304-310. Contract No. NAS1-15069.

The sonic fatigue test program to verify the design of the composite inboard aileron for the L-1011 airplane is described. The composite aileron is fabricated from graphite/epoxy minisandwich covers which are attached to graphite/epoxy front spar and ribs, and to an aluminum rear spar with fasteners. The program covers the development of random fatigue data by means of coupon testing and modal studies on a representative section of the composite aileron, culminating in the accelerated sonic fatigue proof test. The composite aileron sustained nonlinear panel vibration during the proof test without failure. Viscous damping coefficients as low as 0.4% were measured on the panels. The effects of moisture conditioning and elevated temperature on the random fatigue life of both undamaged and impact damaged coupons were investigated. The combination of impact damage, moisture, and a 180 F temperature could reduce the random fatigue life by 50%. (Author)

A82-26568 # **Fuel optimal trajectory computation.** J. W. Burrows (Boeing Computer Services Co., Energy Technology Applications Div., Seattle, WA). *Journal of Aircraft,* vol. 19, Apr. 1982, p. 324-329. 8 refs.

Roughly a quarter of the total fuel savings of the new generation of large jet transports will come from the capability of computing fuel optimal flight trajectories between departure point and destination. The shape of the trajectory in the vertical plane is treated here. A simplified mathematical model is described including spline fits to the drag and fuel flow functions. A suboptimal trajectory is found using the maximum principle of optimal control and singular perturbation theory. The inner or boundary-layer solutions are identified as the climb or descent segments of the flight, while the outer solution corresponds to cruise. The inner solutions are expanded to second order in the vicinity of the outer solution to develop cruise control laws for cost-effective responses to altered in-flight conditions. (Author)

A82-26569 # **Wing/control surface flutter analysis using experimentally corrected aerodynamics.** C. D. Turner (North Carolina State University, Raleigh, NC). *Journal of Aircraft,* vol. 19, Apr. 1982, p. 342-344. 11 refs. Research supported by the Beech Aircraft Corp.

In previous studies related to the flutter problem concerning aircraft, it appeared that results based on the use of theoretical unsteady aerodynamics might not always represent the actually existing conditions. In an investigation of the reported difficulties, an analytical flutter model of the experimental model used by Forsching et al (1971) was developed. In order to correct the wing/control surface aerodynamics a matrix method recommended by Rodden was applied to the analytic aerodynamic data. This approach made it possible to use the experimental pressure with the analytical flutter model. Results obtained with the analysis involving the corrected aerodynamics are compared with the data provided by the uncorrected model. G.R.

A82-26620 * **Helicopter vibration suppression using simple pendulum absorbers on the rotor blade.** M.-N. H. Hamouda and G. A. Pierce (Georgia Institute of Technology, Atlanta, GA). *American Helicopter Society, National Specialists Meeting on Helicopter Vibration, Hartford, CT, Nov. 2-4, 1981, Paper.* 15 p. 10 refs. Grant No. NsG-1592.

A design procedure is presented for the installation of simple pendulums on the blades of a helicopter rotor to suppress the root reactions. The procedure consists of a frequency response analysis for a hingeless rotor blade excited by a harmonic variation of spanwise airload distributions during forward flight, as well as a concentrated load at the tip. The structural modeling of the blade provides for elastic degrees of freedom in flap and lead-lag bending plus torsion. Simple flap and lead-lag pendulums are considered individually. Using a rational order scheme, the general nonlinear equations of motion are linearized. A quasi-steady aerodynamic representation is used in the formation of the airloads. The solution of the system equations derives from their representation as a transfer matrix. The results include the effect of pendulum tuning on the minimization of the hub reactions. C.R.

A82-26630 **A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading.** A. U. de Koning (Nationaal Lucht- en Ruimtevaartlaboratorium, Amsterdam, Netherlands). In: Fracture mechanics; Proceedings of the Thirteenth National Symposium, Philadelphia, PA, June 16-18, 1980. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 63-85. 17 refs. Research supported by the Nederlands Instituut voor Vligtuigontwikkeling en Ruimtevaart.

A relatively simple model accounting for load interaction effects as well as for the plane strain to plane stress transition has been developed for the analysis of fatigue crack growth in aluminum alloys. The model is based on an approximate description of the crack closure behavior and can be used to predict effects of crack growth acceleration and retardation observed experimentally under variable-amplitude loading. The model has been used successfully to analyze the effect of parameter variations in a flight simulation load spectrum on the crack growth rate in centrally cracked specimens cut from 7075-T6 sheet material. V.L.

A82-26637 **Fracture mechanics technology applied to individual aircraft tracking.** A. G. Denyer (Rockwell International Corp., El Segundo, CA). In: Fracture mechanics; Proceedings of the Thirteenth National Symposium, Philadelphia, PA, June 16-18, 1980. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 288-302.

A tracking program being prepared for the USAF T-39 Utility Trainer which uses crack growth principles for both durability and damage tolerance life estimates is discussed. The tracking program consists of defining the structural life of aircraft and the corresponding crack growth limits, selecting the critical structural locations to be tracked, collecting flight records from the aircraft fleet, and performing crack growth analysis using the flight records to obtain the accumulated damage and an estimate of the remaining life. A cost-effective crack growth integration technique which makes tracking for durability feasible even if the life is as much as 100,000 hr is presented. V.L.

A82-26639 **Fracture control in ballistic-damaged graphite/epoxy wing structure.** J. G. Avery, S. J. Bradley, and K. M. King (Boeing Military Airplane Co., Seattle, WA). In: Fracture mechanics; Proceedings of the Thirteenth National Symposium, Philadelphia, PA, June 16-18, 1980. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 338-359. 6 refs. DOD-sponsored research.

A graphite/epoxy wing skin configuration has been developed which is capable of sustaining limit load after being hit by a 23-mm high-explosive-incendiary projectile under worst-case damage conditions. The skin configuration consists of a 45-deg cross-ply graphite/epoxy laminate with integral spanwise and chordwise crack-arresting pads formed by adding 0-deg glass/epoxy between the graphite/epoxy plies. The 45-deg orientation provides enhanced battle damage tolerance because of its higher residual strain-to-fracture capability relative to quasi-isotropic 0/+ or - 45/90 laminates. The fracture control approach has been successfully demonstrated for a full-scale component. V.L.

A82-26652 **Evaluation of crack growth gages for service life tracking.** C. R. Saff (McDonnell Aircraft Co., St. Louis, MO) and D. R. Holloway (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). In: Fracture mechanics; Proceedings of the Thirteenth National Symposium, Philadelphia, PA, June 16-18, 1980. Philadelphia, PA, American Society for Testing and Materials, 1981, p. 623-639. 13 refs. Contract No. F42600-78-D-0014.

A82-26820 **Future helicopter technology.** R. B. Lewis, II (U.S. Army, Aviation Research and Development Command, St. Louis, MO). *Vertiflite,* vol. 28, Mar.-Apr. 1982, p. 12-15.

Technological opportunities concerning helicopter developments are related to fuel efficient engines, composite airframes, digital avionics, optical flight controls, and advanced rotor concepts. The Army is currently formulating a comprehensive program for the 1980s and 1990s which will apply these technologies to a new Light Helicopter Family, a new Special Electronic Mission Aircraft, the Advanced Attack Helicopter, and the Modernized Chinook. Particular attention is given to aspects of digital systems integration, developments regarding an employment of composite materials, advances related to engine development, and details of rotor system design. G.R.

A82-26821 **The future of helicopter flight control technology.** R. Zincone (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *Vertiflite,* vol. 28, Mar.-Apr. 1982, p. 16-19.

Major opportunities for significant technological gains by the helicopter industry in the next decade are related to the rapid advances being made in digital microprocessor technology, optical transmission, and advanced control concepts. An investigation is conducted concerning the effects of the new developments on the civil helicopters of the 1990s. The impact of new control system technology is considered, taking into account aspects of improved performance, empennage size, fly-by-wire techniques, and cost effectiveness payoffs related to maintenance. Questions concerning increased pilot productivity and safety through reduced workload are discussed, giving attention to improved handling qualities, advanced cockpit technology, cockpit systems, cockpit controls, improved ride quality, and vibration suppression. Effects of the technologies on operator requirements are also examined. G.R.

A82-26822 **NOTAR.** A. H. Logan (Hughes Helicopters, Inc., Culver City, CA). *Vertiflite,* vol. 28, Mar.-Apr. 1982, p. 20-23.

The single-rotor helicopter owes much of its longevity to the successful use of the tail rotor concept as a means of counteracting the torque induced by the main rotor rotation. However, the tail rotor does have several drawbacks, and recent Army studies have shown that the tail rotor is responsible for 15 percent of all helicopter accidents, placing it second only to engine problems. In connection with efforts to develop an antitorque concept which eliminates the tail rotor, the No-Tail-Rotor (NOTAR) design was created. The new design employs a low pressure air system in place of a tail rotor. NOTAR promises to be a viable alternative to the tail rotor in operation while affording the helicopter pilot identical maneuvering capabilities. Attention is given to details of NOTAR system design, aspects of NOTAR development, and flight tests. G.R.

A82-26866 * **Large scale model measurements of airframe noise using cross-correlation techniques.** W. R. Miller, W. C. Meecham

(California, University, Los Angeles, CA), and W. F. Ahtye (NASA, Ames Research Center, Moffett Field, CA). *Acoustical Society of America, Journal*, vol. 71, Mar. 1982, p. 591-599. 22 refs. NASA-supported research.

Cross-correlation techniques are used to measure the sound radiated by wing/flap airfoil configurations in the NASA-Ames 40 x 80 ft wind tunnel using a 6.7-m semispan model with three deployed flaps. The dominant source of flap noise is identified as the flap side edges, which exceeds that radiated by the midspan region by more than 10 dB. The turbulent surface eddies at the flap side edge have scales on the order of one-half the flap chord. The installation of flap actuator fairings at the flap side edge reduces the noise radiated from that location by 10 to 15 dB. The cross-correlation technique extracts airframe noise radiated by specific surface locations from the tunnel background noise, even when the noise is 25 dB higher than the measured airframe noise level. D.L.G.

A82-26993 # **Aeroelasticity of compressor blades - Subsonic stall flutter.** H. Loiseau and E. Szechenyi (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), Nov.-Dec. 1981, p. 47-56. 6 refs.

Studies carried out at ONERA concerning the aeroelasticity of turbomachine blades are described. Results relating to subsonic and transonic stall flutter are presented, and prediction calculations using experimental data from the wind tunnel are compared with damping and unsteady pressure measurements made in the corresponding compressor. The techniques for measuring the aeroelastic coefficients based on excitation by hydraulic actuators and measurement using transducers are found to be operational and efficient. Unsteady flow simulated in the wind tunnel is found to be well simulated from a quantitative point of view. It is concluded that the unsteady phenomena revealed by the wind tunnel tests are representative of real phenomena in compressors, and the steady flow conditions necessary for stall flutter have been established. D.L.G.

A82-27048 **Modernizing air traffic control in France.** J. de Galard. *Airport Forum*, vol. 11, Feb. 1982, p. 29-34.

A description is given of the Coordonnateur Automatique du Trafic Aérien (CAUTRA) IV ATC system, which has been operating at Brest, France since 1980. CAUTRA IV uses a distributed system architecture, based on Mitra minicomputers, and incorporates as interconnected systems a centralized Initial Flight Plan Data Processing System, a Flight Plan Data Processor, and a Radar Data Processor for each enroute ATC center. There are five redundant data processing sets per center, which may be reconfigured through reconnection by means of a mixing and switching device to all synchronous interfaces supporting operational peripherals and external links. Attention is given to a computerized safety net system integrated into CAUTRA IV that is capable of automatically detecting a large percentage of threatened collisions and informing controllers. O.C.

A82-27049 **IATA's Unit Terminal Concept.** E. B. Tutty (International Air Transport Association, Technical Dept., Montreal, Canada). *Airport Forum*, vol. 11, Feb. 1982, p. 47-50.

An account is given of the airport design and development criteria formulated by the Airport Terminals Advisory Committee (ATAC) of the International Air Transport Association (IATA), which has undertaken studies of terminal units of exceptional design simplicity, smoothness of function and cost-effectiveness. These criteria are to be integrated in the forthcoming IATA Airport Terminals Reference Manual. Attention is given the Unit Terminal Concept, which has been supported by Lufthansa since the 1960s and used in the design of such airports as Cologne/Bonn, Hannover, and Berlin-Tegel with great success due to its ease of adjustment to meet novel requirements through the addition of terminal units as the need arises. O.C.

A82-27050 **The effects of weather on runway operations.** G. N. Steuart (Toronto, University, Toronto, Canada) and A. R. Gray (Urban Transport Development Co., Toronto, Canada). *Airport Forum*, vol. 11, Feb. 1982, p. 60-70. 10 refs. Research supported by the Natural Sciences and Engineering Research Council of Canada.

It is established that all phases of runway operating conditions are more variable in poor than in good weather, and that, although average runway occupancy times may remain unchanged in some deteriorating weather conditions, effective performance is reduced because operations which depend on runway friction are significantly degraded. It is further determined that all aircraft touch down on a given runway at a location that bears a fixed relationship to a specific point, and that the position of this aiming point depends on the relative approach slope and primary exit taxiway location rather than on weather conditions. While pilots often adjust deceleration to compensate for inconvenient exit locations and thereby reduce runway occupancy times in good weather, this practice is not followed in poor weather. O.C.

A82-27068 # **Correlation of wear with oxidation of carbon-carbon composites.** H. W. Chang (Bendix Advanced Technology Center, Columbia, MD). In: Wear of materials 1981; Proceedings of the International Conference, San Francisco, CA, March 30-April 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 544-547. 6 refs.

The wear characteristics of carbon-carbon composites for aircraft brake materials are investigated using an inertial dynamometer. The wear rates are measured in terms of weight loss and thickness reduction. The wear rates in terms of weight loss are in all cases greater than those in terms of thickness reduction over a wide range of braking conditions. This difference is consistent with previous work done under a normal braking condition and, as before, is attributed to the oxidation of carbon on nonfriction surfaces. Good agreement is obtained between the activation energies for oxidation of carbon (29 kcal/mole) and for material loss on nonfriction surfaces (27 kcal/mole). C.R.

A82-27071 * # **Effect of mechanical surface and heat treatments on erosion resistance.** J. Salik and D. H. Buckley (NASA, Lewis Research Center, Cleveland, OH). In: Wear of materials 1981; Proceedings of the International Conference, San Francisco, CA, March 30-April 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 592-596. 8 refs.

The effect of erosion by glass beads and crushed glass and by heat treatments on the erosional resistance of 6061 aluminum alloy and 1045 steel were studied. The aluminum alloy's erosion resistance was found to be insensitive to mechanical surface treatment applied before testing, and was determined to depend on the properties of the work-hardened surface layer; this was also demonstrated for aluminum alloy single crystals. The aluminum alloy heat treatments included annealing, solution, and precipitation. Solution was found to increase erosion resistance but precipitation had the opposite effect. Hardness showed no correlation with erosion resistance for either aluminum alloy steel. The steel tests showed that crushed glass provides an order of magnitude more erosion than glass beads. C.D.

A82-27078 * # **Rub energetics of compressor blade tip seals.** W. F. Laverty (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). In: Wear of materials 1981; Proceedings of the International Conference, San Francisco, CA, March 30-April 1, 1981. New York, American Society of Mechanical Engineers, 1981, p. 714-721. 9 refs. NASA-sponsored research.

The rub mechanics of aircraft gas turbine engine compressor abradable blade tip seals was studied at simulated engine conditions. In 12 statistically planned, instrumented rub tests using single titanium blades and fiber-metal rubstrips the rub velocity, incursion rate, incursion depth, blade thickness, and abradable strength were varied to determine the effects on rub energy, heat split between the blade, rubstrip surface and rub debris, and blade and seal wear. The rub energies were found to be most significantly affected by the incursion rate while rub velocity and blade thickness were of secondary importance. In five additional rub tests using single nickel alloy blades and multiple titanium alloy blades, rub energy and wear effects were found to be similar for titanium and nickel alloy blades while rub energies increased for multiple blades relative to single blade test results. C.D.

A82-27082 # **Communicating critical weather information to pilots.** R. C. Goff (FAA, Technical Center, Atlantic City, NJ). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0016.* 12 p.

Present hazardous weather forecasts are reviewed, along with product generation and information dissemination methods, and system improvements for the 0-2 hr forecast (nowcast) are investigated. The problem of actually detecting or projecting hazardous weather conditions from sensor readings or computer-based cause and effect inferences is regarded as secondary to ensuring that the actual information reaches pilots, air traffic controllers, and aviation meteorologists. Current data gathering systems include rawinsondes, surface networks, weather satellites, and dedicated weather radar. Although subjective assessments of the combined data picture are possible, it is noted that en route weather information is lacking, although partially supplanted by pilot reports of threatening conditions. A high speed national network of nowcasts is being constructed which will provide real time combined weather information available to pilots and covering temporally short hazardous weather. M.S.K.

A82-27083 * # **Numerical solution of Space Shuttle Orbiter flow field.** E. Venkatapathy, J. C. Tannehill (Iowa State University of Science and Technology, Ames, IA), and J. V. Rakich (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0028.* 17 p. 35 refs. Research supported by the Iowa State University of Science and Technology; Grant No. NGR-16-002-038.

The supersonic, viscous laminar flow around the Space Shuttle Orbiter forebody has been computed with a parabolized Navier-Stokes code using a generalized coordinate transformation. The initial solution for the nose part of the Orbiter geometry was obtained with a three-dimensional time-dependent Navier-Stokes solver. It was necessary to employ a wind axis oriented coordinate system to obtain the initial solution with the time-dependent code. The generalized PNS technique used in this study allows the solution to be marched from the given initial data surface to any desired surface downstream. A grid point clustering scheme was employed to accurately describe the body shape by clustering points at the wing tip and at the wing body juncture. The computed heat transfer coefficients, pressure coefficients, and shock shapes are compared with the available experimental data for 0 degrees and 30 degrees angle of attack. (Author)

A82-27086 # **Experimental study of the flowfield of an airfoil with deflected spoiler.** B. G. McLachlan, K. Karamcheti (Stanford University, Stanford, CA), and F. van Leynseele (Boeing Commercial Airplane Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0126.* 9 p. 14 refs. Research supported by the Boeing Commercial Airplane Co.

An experimental study of the flow field generated by a typical two-dimensional airfoil-spoiler configuration is presented, in which subsonic tests ascertained the effects of varying such parameters as spoiler deflection and angle of attack, at Reynolds numbers of 280,000 and 520,000. Data gathered on static surface pressures, wake and boundary layer mean velocities and vortex shedding characteristics show that the spoiler wake is dominated by vortex shedding over a wide range of conditions, in agreement with other bluff body investigations of Strouhal number and base pressure coefficient. O.C.

A82-27087 # **An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle.** F. P. Saheli, R. L. Hanson, and B. F. Kerkham (Boeing Aerospace Co., Seattle, WA). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0130.* 9 p.

The results of a test program conducted to obtain plume temperature, nozzle wall temperature and nozzle flow coefficient data for two-dimensional nozzles, with and without forced mixing, indicate that an 18-lobe mixer achieved nearly complete mixing. Analytical predictions of exit temperature profiles and wall temperatures generated by a three-dimensional viscous flow computer program agreed well with test data for cases with and without the mixer. Although such specific features as the exact location of the peak temperature, in the case of mixer/nozzle simulation, were not predicted, major trends of total temperature distribution were simulated. It is shown by a comparison of measurements of two-dimensional nozzle thrust and flow coefficients with those of a circular nozzle, that the mixing efficiency gain due to the addition of an 18-lobe mixer is greater for the axisymmetric nozzle. (Author)

A82-27093 # **Heavy rain penalties for a flight simulator.** P. Haines and J. K. Luers (Dayton, University, Dayton, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0213.* 19 p. 7 refs.

A set of curves, representing lift and drag performance degradation of aircraft due to airfoil surface roughness effects under heavy rain, is established for application to flight simulators. Experimental data was analyzed to quantify the lift and drag increments of single- and multi-element airfoils, both for cases where distributed roughness elements uniformly cover the entire wing and where roughness elements begin at various locations aft of the leading edge. Simulated airfoil roughness is then related to rainfall rates and frost parameters, so that the performance penalty induced by a given environmental condition can be estimated. Flight simulator test results which include roughness effects may lead to revised procedures for aircraft takeoff, landing, and maneuvers under severe environmental conditions. O.C.

A82-27098 * # **Mathematical modeling of ice accretion on airfoils.** C. D. MacArthur, J. L. Keller, and J. K. Luers (Dayton, University, Dayton, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0284.* 18 p. 8 refs. Grant No. NAG3-65.

The progress toward development of a computer model suitable for predicting icing behavior on airfoils over a wide range of environmental conditions and airfoils shapes is reported. The LEWICE program was formulated to solve a set of equations which describe the physical processes which occur during accretion of ice on an airfoil, including heat transfer in a time dependent mode, with the restriction that the flow must be describable by a two-dimensional flow code. Input data comprises the cloud liquid water content, mean droplet diameter, ambient air temperature, air velocity, and relative humidity. A potential flowfield around the airfoil is calculated, along with the droplet trajectories within the flowfield, followed by local values of water droplet collection efficiency at the impact points. Both glaze and rime ice conditions are reproduced, and comparisons with test results on icing of circular cylinders showed good agreement with the physical situation. M.S.K.

A82-27109 **Quantitative interpretation of recirculated flow visualization by the analysis of video pictures.** P. Calvet, A. Giovannini, P. Hebrard, and G. Toulouse (ONERA, Département de Mécanique et Energétique des Systèmes, Toulouse, France). In: Flow visualization II; Proceedings of the Second International Symposium, Bochum, West Germany, September 9-12, 1980.
Washington, DC, Hemisphere Publishing Corp., 1982, p. 63-68.

The development of a television monitoring system for use in flow visualization studies in a hydrodynamic tunnel constructed at ONERA-CERT is detailed. In order to obtain quantitative results without recourse to large computer storage requirements, electronic coupling was devised between a video camera, microcomputer, and plotter for use in colorimetric and trajectographic experiments. Real-time information of local and time-averaged data was made available of dye tracers brightness or residence time. The wiring possesses four circuits: a reference window, a video experimental window for spatial analysis, scan line analysis for changes of dark-to-light, and a trajectographic circuit connected to a camera and a microcomputer in order to fix a particle position in Cartesian coordinates. Successive images are coded into computer memory for retrieval and analysis. M.S.K.

A82-27114 **More than meets the eye - The oil dot technique.** E. Atraghji (National Aeronautical Establishment, Ottawa, Canada). In: Flow visualization II; Proceedings of the Second International Symposium, Bochum, West Germany, September 9-12, 1980. Washington, DC, Hemisphere Publishing Corp., 1982, p. 619-628. 7 refs.

A numerical model is developed to gain quantitative data on the surface shear stress distribution on an object studied by means of the oil dot technique. Consideration is given to an idealized dot set in motion by a constant shear stress and leaving a streak which in time is described by equations of motion. Viscosity is accounted for by means of a pi theorem. Examples are provided for the flow over an ellipsoid of revolution using lamp black suspended in Blazers oil L, with simultaneous pressure measurements by Preston and pitot tubes. A second trial was performed using lamp black and glycerine on a flat glass plate in a flow of varying Mach number. A nonlinear behavior of the shear stress in relation to the streak length was observed in the first trial, and a proportionality between the length and the shear stress in the second. It is concluded that glycerine is a more suitable streak fluid than the lamp black, and that small magnetic disks can be tried with suitably magnetic bodies. M.S.K.

A82-27126 Fibrous composites in structural design. Edited by E. M. Lenoe, D. W. Oplinger, and J. J. Burke (U.S. Army, Army Materials and Mechanics Research Center, Watertown, MA). New York, Plenum Press, 1980. 883 p. $85.

Developments related to aircraft structures are discussed, taking into account composite aircraft structures, composite wing substructure technology on the AV-8B advanced aircraft, a preliminary design development AV-8B forward fuselage composite structure, a wing fuselage critical component development program, and the development of a preloaded hybrid advanced composite wing pivot fairing. Other topics considered are related to missile and space applications, crashworthiness, impact damage, postbuckling, dynamics response, and special design considerations. Attention is also given to laminate plate theories, edge effects, flaw growth, helicopter applications, composite joints, a reliability/durability analysis, environmental effects, the development of an advanced composite hydrofoil control flap, and advancements in composite material flywheels. G.R.

A82-27127 * Composite aircraft structures. L. F. Vosteen (NASA, Langley Research Center, Hampton, VA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 7-24. 6 refs.

In late 1975, the Aircraft Energy Efficiency (ACEE) program was initiated by NASA in order to accelerate the development of selected technologies which showed promise for substantial improvements in the fuel efficiency of commercial transport aircraft. A description is presented of the status of the composite structure development programs which form one of the six sections of the ACEE program. Six aircraft components are currently being developed under NASA contract by three major transport manufacturers. The components include the upper aft rudder of the Douglas DC-10, the inboard ailerons of the Lockheed L-1011, the elevators of the Boeing 727, the vertical stabilizers for the Lockheed L-1011 and Douglas DC-10, and the horizontal stabilizers of the Boeing 737. It is found that the composite components show a high potential for achieving cost comparability with the metal parts they are designed to replace. G.R.

A82-27128 Composite wing substructure technology on the AV-8B advanced aircraft. M. L. Huttrop (McDonnell Aircraft Co., St. Louis, MO). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 25-40.

Design improvements to the AV-8B V/STOL aircraft to increase the payload-radius capability include a new wing design. New wing design features are related to an increased aspect ratio for better cruise performance, an increased thickness ratio for lighter structure and increased fuel volume, additional store stations, maneuvering flaps with positive circulation, increased aileron and flap travel, and composite structure for reduced weight and unconstrained optimization of the aerodynamic shape of the advanced supercritical airfoil. The wing has one-piece graphite/epoxy skins and a multi-spar substructure with graphite/epoxy sinewave webs. Attention is given to a wing description, aspects of substructure design, sinewave configuration, tooling, design details, corrosion prevention, and nondestructive testing. G.R.

A82-27129 Preliminary design development AV-8B forward fuselage composite structure. J. C. Watson (McDonnell Aircraft Co., St. Louis, MO). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p.41-61.

The AV-8B is a second generation V/STOL aircraft which derives its superior performance from selective improvements to the AV-8A. It has twice the payload radius capability of the AV-8A, improved weapon delivery accuracy, and increased operational readiness. These improvements are being validated by flight demonstrations with two YAV-8B prototype aircraft. The AV-8B combines U.S. V/STOL technology with the proven vectored thrust concept. A new, larger wing has a higher aspect ratio and a supercritical airfoil. The major structural elements of the wing and forward fuselage are of composite materials. The forward fuselage is a conventional single-seat structure with the multiframe and stringer construction. Attention is given to details concerning the composite structure, the repairability of the composite design, the influence of trade studies on the design, a comparison of weights and costs, and fuselage fabrication techniques. G.R.

A82-27130 Wing/fuselage critical component development program. R. W. Walter, R. R. June, J. E. Mooney, and R. A. Hamm (Boeing Co., Seattle, WA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 63-83. Contract No. F33615-77-C-5228.

The employment of advanced composites in modern high performance aircraft has been generally limited to relatively uncomplicated structure and based on substitution design or replacement approaches. The logical and orderly expansion of the use of advanced composites in more complex primary structure will result in additional cost and weight saving. Potential lower acquisition costs can be achieved due to improved low cost manufacturing approaches. The relative insensitivity of advanced composites to fatigue damage can result in longer service life and significantly lower life cycle costs. A summary is presented of the results obtained by an American aircraft manufacturer in an Air-Force sponsored Phase I study program. Attention is given to a structural configuration definition, preliminary structural design and trade studies, and aspects of structural design development. G.R.

A82-27131 Development of a preloaded hybrid advanced composite wing pivot fairing. D. O. Losee, J. F. Willis, and W. L. Zirbes (Rockwell International Corp., Los Angeles, CA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 86-102.

A description is presented of the results of the advanced composite developmental work performed in support of the B-1 Bomber Wing Fairing Design Improvement Program under Air Force contract. This study was performed by an American aerospace company during the 12-month period from August 1976 to August 1977. The wing fairing system for the B-1 bomber consists of a fixed fairing for fuselage/fairing moldline transition, an aft movable fairing for nacelle-to-underwing aerodynamics, aft overwing transition panels, and the forward preloaded wing pivot fairing. Attention is given to the redesign of the preloaded pivot fairings. An advanced composite hybrid glass/epoxy design was developed which indicated a potential weight savings of 47 percent of approximately 800 pounds over the solid fiberglass baseline design used on B-1 RDT and E aircraft 1 through 4. G.R.

A82-27132 Design concepts for composite fuselage structure. C. R. Foreman (Vought Corp., Dallas, TX). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 103-123.

Investigations have been conducted concerning the development of vertical lift concepts in support of the Navy's future generation of V/STOL aircraft. These aircraft will operate from ships considerably smaller and less expensive than current supercarriers. Studies to date have been directed toward two basic types of aircraft, including the subsonic ASW/AEW 'Type A' aircraft, and the Mach 2 fighter 'Type B' aircraft. Composite fuselage development work conducted during the past two years has provided valuable design information. It was found that significant weight savings for use of composite materials versus conventional metal construction in fuselage shell structure can be obtained at low loading intensities, in the minimum gage range. Low fabrication cost design concepts for large, stiffened-panel type fuselage shell structure have been generated, and preliminary testing has been conducted. G.R.

A82-27133 **Advanced composites integral structures meet the challenge of future aircraft systems.** L. M. Lackman, W. L. O'Brien, and M. S. Loyd (Rockwell International Corp., Los Angeles, CA). In: Fibrous composites in structural design.
New York, Plenum Press, 1980, p. 125-144.

In connection with economic considerations, current planning is based, both in the military and in commercial operations, on much longer spans of usage between major new system acquisitions. The continuing development of advanced structural airframe technology is required in order to implement new structural concepts which are superior in cost/weight performance to more conventional structure. These efforts have led logically to the use of advanced composite structural/material concepts. Attention is given to future fighter technology, concepts of advanced integral primary composite structure, aspects of composite material selection, a wing configuration selection study, a substructure-to-cover study, questions of tooling and manufacturing process development, and a test program. G.R.

A82-27138 **Continuous filament advanced composite isogrid - A promising structural concept.** L. W. Rehfield, R. B. Deo (Georgia Institute of Technology, Atlanta, GA), and G. D. Renieri (McDonnell Douglas Astronautics Co., St. Louis, MO). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 215-239. 9 refs. Contract No. F49620-77-C-0077.

It is pointed out that major airframe components are normally plate or shell type structures. Efficiency considerations dictate that the components be stiffened or semimonocoque in construction. The usual approach used to stiffen the components involves the employment of longitudinal stringers and frames or ribs which are orthogonal to the stringers. An alternative approach to stiffening is based on isogrid, which is a concept that employs a repetitive equilateral triangular pattern of stiffening ribs. The name 'isogrid' refers to the fact that the triangular grid behaves in a gross sense as an isotropic material. Unlike orthogonal stiffener grids, isogrid is a stable configuration and may be used with or without attached skin. Attention is given to continuous filament advanced composite isogrid, aspects of material selection, design contraints, and design analysis methodology. G.R.

A82-27139 **A crashworthiness test for composite fuselage structure.** R. L. Foye (U.S. Army, Research and Technology Laboratories, Moffett Field, CA), C. W. Swindlehurst (Martin Marietta Aerospace, Baltimore, MD), and W. T. Hodges (U.S. Army, Structures Laboratory, Hampton, VA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 241-257.

Crashworthiness or crash survival has many aspects, including fuel containment, seat design, landing gear design, flammability, smoke toxicity, flotation equipment, design criteria, and crew escape systems. The present investigation is concerned with the capacity of the fuselage structure to crush near the point of impact, thereby dissipating kinetic energy of the vehicle. Attention is given to the test specimens, the test procedure, and the results of a number of crushing tests of various composite and aluminum structural concepts. Skin/stringer tests for lightly loaded construction show conclusively that, unless energy absorption requirements are a design consideration, conventional sheet/stringer aluminum construction will be superior to composite sheet/stringer construction with regard to compressive energy absorption capacity. G.R.

A82-27141 **Impact resistance of graphite and hybrid configurations.** J. D. Labor and N. M. Bhatia (Northrop Corp., Aircraft Div., Hawthorne, CA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 293-312. 5 refs. Contracts No. F33615-76-C-3142; No. N62269-77-C-0401.

Impact damage in the case of composite materials does not currently involve safety-of-flight concerns for most applications. However, to prevent excessive inspection and repair actions, it is important to consider the effects of impact damage. The present investigation is concerned with low velocity impact studies which were conducted with the aid of instrumented impactors to obtain the force and energy values resulting from the impact. Several geometric configuration variables have been studied, including panel size, impact location, size and shape of the impactor, panel thickness, type of edge supports, and variations in the mass and velocity of the impactor. A separate series of tests was conducted on 1/2-inch thick monolithic panels which are typical of wing structures. Alternate materials were investigated including added plies of more ductile materials and replacement of basic graphite/epoxv tape prepreg with various woven material materials. G.R.

A82-27144 **Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft.** V. Volpe and R. Carri (Grumman Aerospace Corp., Bethpage, NY). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 341-357. 11 refs. Contract No. F33615-77-C-5169.

Tests with a 1/2 scale model of the Advanced Design Composite Aircraft (ADCA) made of graphite/epoxy for the effects of lightning strikes and the development of a mathematical model to define the internal and external coupling for nuclear and EM pulses are reported. The lightning strike portion of the trails determined the attachment points, their distribution, and the frequency of occurrence. Features of the test model are outlined, along with trial procedures which included directions of the emitting electrodes to simulate yaw, pitch, and roll. Each extremity drew an equal number of strikes, and some degradation of the composite structure was observed at locations of multiple strikes. Nuclear EM pulses were examined and it was found that external coupling is concerned only with composite conductivities parallel to the surface, the aircraft is an infinite conductor, and charge and current densities were quantified and are provided. M.S.K.

A82-27145 **Problems and options in advanced composite repair.** S. H. Myhre and R. W. Kiger (Northrop Corp., Aircraft Div., Hawthorne, CA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 359-380. 9 refs. Contract No. F33615-76-C-3017.

The development of composite repair criteria and procedures for aircraft component are reported. The repairs are required to last twice the design life of the aircraft, match the ultimate strength capability, maintain the aerodynamic performance levels, and be enacted at a reasonable cost. The use of portable heating equipment has proven feasible, and repair tests on honeycomb panels accessible on both sides, on one side, a 50-ply laminate damaged 21 plies deep, and a 50-ply laminate accessible on both sides are reviewed. The failure loads, strains, and failure modes of the repaired panels are provided to demonstrate the possibility of returning a damaged composite to full strength. Specific recommendations are offered for patch material and joining, patch configurations, scarf lengths, hole edge peeling, incipient compression failure, wet laminate repair, thick laminate repair, sandwich panel repair, and blind side repair. M.S.K.

A82-27146 **A CAD approach to cost estimating composite aircraft.** R. A. Camin (General Dynamics Corp., Fort Worth, TX). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 381-398. 8 refs.

The current state-of-the-art in aircraft cost estimating centers around vast collections of historical cost data. Probably the greatest deficiency of the current procedure is related to the absence of historical data for new technologies. An American aerospace company has developed a new approach with regard to cost estimation in the case of composite structures. The approach makes extensive use of a data base management system tailored to aircraft design and manufacturing, and interactive graphics techniques. Best described as a deterministic computer-aided design tool, STEP (Structural Technology Evaluation Program) is designed to capitalize on currently available data. Yet it remains sufficiently flexible to accept new data as it becomes available. A detailed description is presented of the methodology STEP uses during each phase of its operation. G.R.

A82-27151 **Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy.** G. L. Roderick (U.S. Army, Structures Laboratory, Hampton, VA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 467-481. 7 refs.

An analysis was developed to predict the cyclic growth of cracks and debonds in cracked metal sheets reinforced with uncracked composite sheets. Inplane and interlaminar stresses, the stress intensity at the crack tip, and the strain-energy-release rate at the

debond front were calculated with complex-variable Green's functions. An incremental analysis was developed that used the stress intensity to predict crack growth and the strain-energy-release rate to predict debond growth. To evaluate this analysis, fatigue tests were conducted on two panels having different thicknesses; each panel consisted of a cracked aluminum sheet bonded to an uncracked boron/epoxy sheet. For both panels, the predicted crack growths agreed with experimental values. In one panel, a significant debond occurred and was predicted by the analysis. In the other panel, the debond was very localized and somewhat smaller than predicted.
C.D.

A82-27152 Application of advanced composite materials to helicopter airframe structures. M. J. Rich (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 483-496. 8 refs.

Under a NASA contract an analytical assessment was made as to the effectiveness of a general application of advanced composites for helicopter airframes. The result of the study concluded that a light gage diagonal tension skin integrated with foam stabilized stringers/frames could result in appreciable weight savings and reduce life cycle costs. The study also indicated that reduced weight/cost might be achieved if a single co-cure could be used and if all Kevlar skins were substituted for graphite/Kevlar in the original design concept. A program initiated under another NASA contract is concerned with the design, the fabrication, and testing of helicopter advanced composite structures. A review is conducted of the progress made in connection with both NASA contracts. G.R.

A82-27153 Design and production of fiberglass helicopter rotor blades. C. E. Covington and P. S. Baumgardner (Bell Helicopter Textron, Fort Worth, TX). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 497-513.

A prototype blade program to explore the potential of composite materials for rotor blades and to establish the necessary design and manufacturing technology for their economical production was conducted. The blade featured spar caps of spanwise oriented unidirectional glass. The fabrication and flight tests are described; results were excellent, the only drawbacks being the low amount of machine-laid structure and the low ballistic damage tolerance. The actual production program is then described, including the tooling, equipment (production orbital pin winding machine, production tube winding machine, compactor, integrally heated blade bonding press), winding techniques, material form, assembly techniques, quality control, qualification, flight, and fatigue tests, fail safety demonstration, environmental, ballistic survivability, and lightning tests. After completion of one-half of qualification testing, an FAA type certificate has been awarded. The blade will have at least a 10,000 hour life. C.D.

A82-27154 Preliminary design of an advanced composite rotor hub for the UH-60A Black Hawk. E. F. Olster (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT) and H. K. Reddick, Jr. (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 515-526. 9 refs. Army-supported research.

A program has been conducted to develop a preliminary design of a composite main rotor hub for the UH-60A Black Hawk helicopter. Graphite/epoxy was the chosen material because of its damage tolerance characteristics, and bolted joints for ballistic safety. A trade-off analysis was made consisting of three candidate hub concepts. The third concept, a configuration consisting of two horizontal flat plates connected by four filament-wound tubes housing elastomeric bearings, was selected for more in-depth design and analysis. Tests done were structural analysis, ballistic vulnerability analysis, damage tolerance assessment, reliability and maintainability assessment, cost assessment, lightning protection assessment, and radar cross section assessment. The damage tolerance of the composite hub was equal to metal for low energy impact damage but not quite as good for high impact, although it met the objectives. Reliability for the composite hub was superior to that of the metal hub. C.D.

A82-27155 Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing. R. H. Finney (Lord Kinematics, Erie, PA) and S. C. Aker (Bell Helicopter Textron, Fort Worth, TX). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 527-541.

A program undertaken to incorporate graphite/epoxy shims in a high-capacity elastomeric radial-journal bearing is discussed. The prime objective is to develop a method of reducing the weight in the helicopter dynamic system. Two different winding patterns are evaluated for the concentric tubular shims: + or - 45 deg, + or - 45 deg, + or - 45 deg, + or - 90 deg. The testing consists of ultimate torsion, ultimate axial and fatigue testing at accelerated loads and motions. The potential hysteresis heating of the elastomer is monitored with thermocouples on the shims and is found not to be a problem. The results of the fatigue tests are compared with previous test results on steel shim and aluminum shim specimens. The life of the bearing is found to be less dependent on the shim material than on the elastomer design and fabrication techniques. C.R.

A82-27156 Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses. L. J. Hart-Smith (Douglas Aircraft Co., Long Beach, CA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 543-574. 18 refs.

Various factors affecting the strength of bolted or riveted joints in advanced composites are discussed qualitatively. The mechanisms associated with each type of failure - tension, bearing, shearout, cleavage, and pull-through - are explained. The work is based mainly on experimental observations from which conclusions are drawn to integrate the study. A simple theory to explain the elastic stress concentrations at loaded bolt holes (in terms of the various geometric parameters) is deduced from experimental and analytical evidence for isotropic materials. Further tests on composite materials are used in deducing correlation factors which relate this theory to the limited, but significant, stress concentration relief observed before failure. C.R.

A82-27158 Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations. G. C. Grimes, L. L. Jeans, and E. Demuts. In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 619-644. 12 refs. Contract No. F33615-75-C-5236.

Results obtained after three years of a five-year research program are summarized. Most of the standard-design bolted joint testing is complete, but this is true of only 50% of the bonded joint testing. The load and environmental spectrum definitions are discussed here, along with the sensitivities observed to date. Areas where problems remain and where significant strides have been made are named, among them test machine development, materials and processes, quality assurance, experimental procedures, and environmental conditioning. Quality level variation is found to have a substantial effect on the test data variations, in some cases overshadowing the load and environmental sensitivity effects. It is reported that the testing of 20 replicate bonded joint specimens, simultaneously, proved to be a problem that was solved by changing the test fixture design. Sensitivity of the bolted joints to load and environmental spectral variations is found to be less than that of the bonded joints. C.R.

A82-27159 Composite fasteners - A compatible joining technique for fibrous composites in structural design. C. Tanis (USAF, Materials Laboratory, Wright-Patterson AFB, OH) and M. Poullos, Jr. (Vought Corp., Dallas, TX). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 645-657. Contract No. F33615-77-C-5050.

A composite fastener program at the Air Force Materials Laboratory to establish and demonstrate a production method for fabricating non-corrosive composite fasteners is presented. The fasteners are suitable for fastening composite-to-composite structures, as well as metal-to-metal structures, and should be cost competitive and reduce overall aircraft weight as compared to metal fasteners. Fastener forming equipment is presented, and applications for helicopter composite structure are reviewed. Metal fastener-composite structure potential problem areas are discussed, including galvanic compatibility to graphite, interference fit, hole edge crushing and vibration damage. D.L.G.

A82-27162 **Statistical analysis methods for characterizing composite materials.** G. H. Lemon, J. M. Norton, and M. E. Waddoups (General Dynamics Corp., Fort Worth, TX). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p.733-759. 19 refs. Research supported by the General Dynamics Independent Research and Development Program and U.S. Air Force.

A strength-bounded wearout model and a method for calculating fleet material allowables are developed. Residual strength evaluation and wearout are noted as necessary for reliable assessment of composite components, and the determination of design allowables is reviewed, especially for the dependence on the Weibull shape factor. Assumptions postulated by fracture kinetics for characterizing wearout include the existence of preexisting flaws, growth in a deterministic manner depending on material, stress, and flaw features, and the critical load being a function of instantaneous flaw state. Lifetime predictions are analyzed, along with ramp loading and static failure, creep loading, and closure. M.S.K.

A82-27163 **Durability evaluation of highly stressed wing box structure.** R. V. Wolff and D. J. Wilkins (General Dynamics Corp., Fort Worth, TX). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 761-769. 11 refs. Contract No. F33615-73-C-5104.

Box beams representing a single cell of a multispar conceptual composite wing for a fighter aircraft were tested for durability and damage tolerance. The beams were fabricated from graphite-epoxy tape with aluminum honeycomb core and steel bolts. The selected load conditions were: (1) a cold subsonic temperature that produced more torsion and (2) a supersonic, hot, wet temperature with more relative bending. Static tests were conducted at room temperature, dry conditions, showing the composite to be competitive with metal. Under cold, subsonic conditions five of twelve beams delaminated, partly because of stacking sequence. Five of these beams failed in compression. Under hot (250 deg F), wet, supersonic conditions, five beams were blistered badly enough to be useless after thirteen weeks, due to the exceeding of the local glass transition temperature because of thermal spiking. One-lifetime fatigue testing under these conditions resulted in failure in compression. It is concluded that the use of current epoxy laminating resins in hot, wet conditions is questionable. C.D.

A82-27167 **Growth of four flaw types in graphite/epoxy composites due to fully reversed fatigue.** K. E. Hofer, Jr. and J. Jollay, Jr. (IIT Research Institute, Chicago, IL). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 831-845. 13 refs. Research supported by the IIT Research Institute, Rockwell International Corp., and U.S. Air Force.

An experimental program is presented, which investigates the serviceability of graphite/epoxy composites in terms of the propagation of flaws due to fully reversed fatigue. Flaws most likely to affect tensile residual strength of the composites are studied, which consist of a hole in a composite panel, an embedded sheet of foreign matter, a ply dropped from the composite, and surface scratches. Ultrasonic tracking of the flaw growth appears to be feasible, with the effect of flaw growth on the tensile residual strengths of both the tested laminate types appearing to be minimal or nonexistent. D.L.G.

A82-27168 **Effects of defects on tension coupons undergoing an accelerated environmental spectrum.** D. Y. Konishi (Rockwell International Corp., Los Angeles, CA). In: Fibrous composites in structural design. New York, Plenum Press, 1980, p. 847-860. 7 refs.

A screening program was done to assess the criticality, or ability to sustain a required tensile load, of the effect of defects, including holes, delaminations, ply separations, and scratches in an advanced composite coupon. A coupon test program is described and the results reported. A test spectrum was used which realistically represented the temperature/moisture environment for the aircraft component. A room temperature/dry spectrum was also used for baseline purposes. The AS3501-5A graphite/epoxy failed at the average stress 88.5 ksi. Room temperature residual strength after two lifetimes of ambient spectrum loading was 83 ksi or 94 percent of static strength. A 0.25 inch hole flaw had 43.5 ksi average static strength. Wet, hot specimens had 49.6 ksi static strength. Other flaw and laminate types had similar results. C.D.

A82-27187 **Advanced medium scale real-time system.** T. N. Tucker (U.S. Army, Washington, DC) and A. L. Kelley (Sangamo Weston, Inc., Sarasota, FL). In: ITC/USA/'80; Proceedings of the International Telemetering Conference, San Diego, CA, October 14-16, 1980. Research Triangle Park, NC, Instrument Society of America, 1980, p. 157-168.

The Real-time Data Acquisition and Processing System (RDAPS), which is being delivered to the U.S. Army for rapid processing of test data at remote sites, is described as a computer-controlled telemetry system that is portable, while having enough capacity to convert data at an up to 50 K word rate to engineering units, and then display selected parameters pertinent to inflight testing decisions. The RDAPS system will be used at Edwards Air Force Base, California, in the airworthiness qualifications of such flight vehicles as advanced helicopters. The system will compile, process and display quantitative test data on stability and control, overall performance, vibration, and stress analysis. O.C.

A82-27188 * **Telemetry Computer System at Wallops Flight Center.** H. Bell (NASA, Wallops Flight Center, Wallops Island, VA) and J. Strock (Sangamo Weston, Inc., Sarasota, FL). In: ITC/USA/'80; Proceedings of the International Telemetering Conference, San Diego, CA, October 14-16, 1980. Research Triangle Park, NC, Instrument Society of America, 1980, p. 169-183.

This paper describes the Telemetry Computer System in operation at NASA's Wallops Flight Center for real-time or off-line processing, storage, and display of telemetry data from rockets and aircraft. The system accepts one or two PCM data streams and one FM multiplex, converting each type of data into computer format and merging time-of-day information. A data compressor merges the active streams, and removes redundant data if desired. Dual minicomputers process data for display, while storing information on computer tape for further processing. Real-time displays are located at the station, at the rocket launch control center, and in the aircraft control tower. The system is set up and run by standard telemetry software under control of engineers and technicians. Expansion capability is built into the system to take care of possible future requirements. (Author)

A82-27209 **Small EHF/SHF airborne SATCOM terminal.** A. L. Johnson (USAF, Avionics Laboratory, Wright-Patterson AFB, OH). In: ITC/USA/'80; Proceedings of the International Telemetering Conference, San Diego, CA, October 14-16, 1980. Research Triangle Park, NC, Instrument Society of America, 1980, p. 419-422.

A fifth-generation airborne microwave satellite communication system currently under development is discussed. The terminal, operating in the EHF and SHF bands, is designed to provide secure, anti-jam communication for the airborne command post fleet of EC-135 aircraft. Among the terminal's characteristics are the following: an air-cooled transmitter, a parabolic dish antenna, intermediate frequencies of 70 and 700 MHz, an uncoded parametric amplifier, a rubidium frequency standard, a weight of 1,200 pounds, and a volume of 18 cu ft. The packaging will allow the terminal to be distributed in available rack space rather than requiring a large integrated rack installation as required in previous microwave systems. The processor-controlled terminal is being designed to minimize the complexity involved in turning on and locking up the SATCOM system. A prestored set of frequency, power level, antenna pointing and Doppler mode will permit the terminal to be brought up automatically in a preprogrammed mode without operator interventions. C.R.

A82-27228 **Selection of optimum antennas for tracking telemetry intrumented airborne vehicles.** A. Sullivan (Electro Magnetic Processes, Inc., Chatsworth, CA). In: ITC/USA/'80; Proceedings of the International Telemetering Conference, San Diego, CA, October 14-16, 1980. Research Triangle Park, NC, Instrument Society of America, 1980, p. 597-607.

A simplified method of developing the link budget to determine the required antenna gain is presented. A heuristic analysis is presented to determine whether a low cost fixed antenna can be used or if a tracking system is required. If a tracking system is required, an analysis is presented to determine whether a single axis tracking system will suffice or a two axis tracking system is required. The pros and cons of single channel monopulse versus conical scan are also presented. Additionally, tracking system acquisition aid techniques are discussed. (Author)

A82-27231 **Terrain reflection effects on data reception from airborne vehicles.** C. W. Chandler. In: ITC/USA/'80; Proceedings of the International Telemetering Conference, San Diego, CA, October 14-16, 1980. Research Triangle Park, NC, Instrument Society of America, 1980, p. 625-630.

It is noted that propagation phenomena, particularly the interference between the direct and terrain reflected waves, strongly affect the path loss between the transmitting and receiving antennas. A method of analysis and computer-drawn patterns are presented to show the multi-lobed character and deep nulls that result in range-altitude coverage. The effects created by the antenna pattern, the type of terrain, and polarization are shown. Attention is also given to applying the results to system design. C.R.

A82-27398 **Studies in the history and theory of development of aviation and rocketry and space science and technology (Issledovaniia po istorii i teorii razvitiia aviatsionnoi i raketnokosmicheskoi nauki i tekhniki).** Edited by B. V. Raushenbakh. Moscow, Izdatel'stvo Nauka, 1981. 264 p. In Russian.

A series of papers is presented on the history and development of aviation and space science and technology. Attention is given to the work of Tsiolkovskii, Kondratuk, Tsander, and Korolev, and to Soviet efforts in rocket engine design, automatic control of spacecraft, and manned space flight. The development of jet engines and aircraft control systems in the Soviet Union is also considered. B.J.

A82-27401 **Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981.** Conference sponsored by the Society for the Advancement of Material and Process Engineering. Azusa, CA, Society for the Advancement of Material and Process Engineering (National SAMPE Technical Conference Series. Volume 13), 1981. 709 p. $60.

Advanced composites materials, applications, processing, and combinations were discussed. Fillers and reinforcements for improved plastics were examined, along with core materials for use with polymer and graphite face sheets, curing process effects on adhesive properties, moisture degradation in composites, and the effects of environmental exposure. Applications and tests of composites and foams for aircraft structures, spacecraft antenna reflectors, solar mirrors, a helicopter fuselage, electronic systems encapsulants, and wings were described. Different mixtures for structural adhesives, metal-to-metal bonding, and polymers based on botanical oils were detailed. Preparation techniques for fiber reinforcements, with radiation curing, for low temperature field repairs, and for thickness control to enhance peel strength were reviewed. M.S.K.

A82-27402 **Flight service evaluation of advanced structures.** C. W. Schneider (Lockheed-Georgia Co., Advanced Structures Dept., Marietta, GA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 1-12. 9 refs.

Extended service tests of composite structures on operational aircraft are reported, specifically for the use of boron and graphite-epoxy materials at Lockheed. Reviews are given of a boron wing tip on a C-141, along with a boron oleo door, boron slats on the C-5A, and a boron-reinforced center wing on a C-130. Graphite structures have been used as C-5 wing-to-body fairing panels, fixed trailing edge panels, and a fairing covering the joint between the center and outer wing. Another program currently involves composite leading edges for the C-141. The composites have all replaced metal materials at a lower cost and have displayed greater durability, to the extent that the metal substructures sometimes corroded beneath the composite components, which showed no signs of wear. The flight program reported had run for 13 yr, with further tests continuing on the C-141 leading edges. M.S.K.

A82-27403 **Damage tolerance and durability design of composite structures for commercial aircraft.** E. Chow and C. Y. Kam (Douglas Aircraft Co., Long Beach, CA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 13-25. 8 refs.

The development of composite structures to the point of acceptability by the FAA for use in commercial aircraft, and to the consideration of composite structures for safety-critical aircraft components is reviewed, based on the experiences at McDonnell Douglas. Secondary structures such as the DC-10 upper aft rudder, vertical stabilizer trailing edge panel, and floor beams, a Kevlar tail cone and fan cowl doors and a Kevlar/polyimide nacelle stang fairing for the DC-9 are described. Current testing includes a nose gear aft door, aileron access panel, and the vertical stabilizer box for the DC-10. Initial tests established the mechanical characteristics of the composites, the structural reliability of the design concepts, and confirmed the structural integrity of the integrated parts. Fibrous composites are noted to differ from metal parts in anisotropy and nonhomogeneity and comprehensive trials to solve problems of potential complex failure modes are recommended. M.S.K.

A82-27404 **Light weight adhesive joining of composite structures.** K. D. Cressy (M & T Chemicals, Inc., Los Angeles, CA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 26-31.

The procedures, characteristics, and performance of adhesively joined composite structures for aircraft parts are outlined. Adhesives are noted to form effective moisture barriers, provide good stress distribution, avoid bimetallic corrosion, and offer fatigue resistance and low cost use. Methods of field repairs are reviewed, and adhesive bonding of aluminum and NOMEX honeycomb aircraft parts have been demonstrated to have an overlap shear strength ranging from 1000-2500 psi. Heat cure epoxy adhesives have shown high compressive strength at 350 F, although maintaining a sufficient rigidity modulus with desirable resilience and toughness above 250 F has caused difficulties. Urethane compounds have been developed which retain strength below -65 F and a peel strength of 150 ppi is projected in applications on aluminum substrates. The thixotropy displayed after initial curing allows gap filling to occur. M.S.K.

A82-27407 **Service sensitivity of polysulfide sealants.** R. J. Stout (General Dynamics Corp., Fort Worth, TX). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 64-76.

Investigations into incidents of sealant chalking and sponging of MIL-S-83430 sealants in Air Force aircraft are reported. The polysulfide sealants began chalking a short time after entering service. Subsequent X-ray spectrographic analyses of chalked and unchalked surfaces revealed the chalk to be a concentration of sealant fillers, mainly calcium carbonate. The chalking was precipitated by fuel extraction of the elastomeric component of the sealant and accelerated by the presence of mercaptans and metallic ions in the fuel. The chalking penetration into the sealant was determined to be of negligible rate. Sealant sponging in fuel test tanks was examined in terms of a thermal history and service use of a fuel-saturated sealant at high temperatures were concluded to cause the sponging. Qualifications tests did not include rapidly increasing temperatures when transition to supersonic speeds occurs with a nearly empty fuel tank. M.S.K.

A82-27412 **A new resin for field repair.** C. B. Delano, A. H. McLeod (Acurex Corp., Aerotherm Div., Mountain View, CA), F. J. Riel (Rohr Industries, Inc., Chula Vista, CA), and R. H. Greer (Rohr Industries, Inc., Riverside, CA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 134-149. Contract No. F33615-79-C-5038.

Progress towards the realization of resins for field repairs of composite materials using temperatures in the ranges 180-200 F and 300 F are reported. A low moisture absorption, two-part epoxy system with commerically available components and good environmental durability was indicated in a screening process, and the epoxy novolac, DEN 438 cured with isophorone diamine was selected for development. Although slow cure at room temperature was possible, heat curing at 160 F was investigated for rapid turnaround possibilities. High and lower temperature cure cycles with aluminum-composite double strap bonds were employed in a series of bond and strength tests. Sustained stress induced negligible reductions in bond strengths, whereas moisture absorption did cause failures at the strap surfaces. Bond strengths remained steady after 500 hr aging at 300 F. A necessity of fabricating a room temperature primer is mentioned. M.S.K.

A82-27414 **Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing.** E. E. Peterson, D. B. Arnold, and M. C. Locke (Boeing Commercial Airplane Co., Seattle, WA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 177-188. 8 refs. USAF-supported research.

Results of an investigation of the relative mechanical properties and environmental durability of square edge metal/metal honeycomb bonded panels with skins processed with phosphoric acid anodize (PAA) and Forest Products Laboratory (FPL) are reported. The PAA process conditions were varied on metal-to-metal shear strength tests and environmental durability was examined, using cyclic room temperature to -67 F conditions. Peel strengths increased at low temperatures and failure analysis revealed no specimen failure interfacially between oxide and primer, while moderate to good filleting to the core enhanced peel strength. Test specimens were all aluminum alloys, and environmental failures occurred between the adhesive and the aluminum core. Finally, variation in the PAA process had negligible effect on the lap-shear strength or the fracture toughness of metal-to-metal bonded joints. M.S.K.

A82-27415 **Characterization of composition variations in a structural adhesive.** K. G. Kibler (General Dynamics Materials Research Laboratory, Fort Worth, TX). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 189-202. 7 refs. Contracts No. F33615-80-G-0007; No. F33615-80-G-0002; No. F33615-80-G-0003.

Attempts to establish correlations between compositional changes, processability, and structural-environmental performance of the 350 F cure structural adhesive RB398 are reported. The program was intended to define material acceptance specifications in terms of composition, formulation, and cure limits as part of the F-16 Technology Modernization Program. RB398 was tested in multiple variations of constituents in physiochemical, performance, and processability trials. High performance liquid chromatography was found to be a suitable method for detecting variations in organic constituents at levels which affect processing or performance. M.S.K.

A82-27423 **Composite control tubes.** S. C. Aker and W. G. O. Sonneborn (Bell Helicopter Textron, Fort Worth, TX). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 280-286.

The design and development of composite material push-pull control tubes to replace aluminum tubes in helicopter flight control systems are described. A three-year development and FAA certification program is discussed, which resulted in a weight savings for tubes of approximately 50% relative to current aluminum designs. Reliable and potentially lower cost hardware that will be fielded in the Bell Helicopter Textron Model 214ST transport helicopter has also been developed by the program. Mechanized manufacturing methods for the production of the tubes are described, and it is shown that inventory simplifications for spares can be achieved by two-piece construction of the tubes. D.L.G.

A82-27424 **The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter.** L. J. Marchinski and R. L. Pinckney (Boeing Vertol Co., Philadelphia, PA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 287-297.

The design, construction and structural evaluation of the composite fuel pods for the commercial Boeing 234 helicopter are presented. The all-composite pods are attached to the airframe structure through vibration isolation devices, and are of sandwich shell design employing KEVLAR and graphite fibers. The all-composite cargo floors used in the commercial 234 are also discussed, which, along with the fuel pods, have proved to be less costly, of lower weight, and easily tailored to requirements. D.L.G.

A82-27429 **Engine industry cost considerations for emerging technologies.** M. A. Siegel (United Technologies Corp., Government Products Div., West Palm Beach, FL). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 358-363.

Aspects related to the successful implementation of new technologies in aircraft engines are examined. The present investigation assumes that the benefits other than cost have been established. The cost factors in product selection cover a wide range of influence encompassing the basic cost of the product or part, the development cost, capitalization to produce the part, and operating costs. The ability to accurately calculate these costs frequently determines acceptance of a new concept and its success in service. Attention is given to materials and processes which have paced the growth of the aircraft and aerospace industry. G.R.

A82-27430 **Manufacturing cost trade-studies in avionics.** B. R. Noton (Battelle Columbus Laboratories, Columbus, OH), J. G. Vecellio (Rockwell International Corp., Avionics and Missiles Group, Cedar Rapids, IA), and R. Remski (Honeywell, Inc., Avionics Div., Minneapolis, MN). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 364-379.

It is becoming increasingly important to arrest and reduce costs at all levels of the aircraft system life-cycle. The 'Manufacturing Cost/Design Guide' (MC/DG) Data Development Program for airframes and avionics provides an opportunity for the designer to study a larger number of alternative design configurations for airframes and avionics to achieve the lowest manufacturing cost. The MC/DG man-hour information is presented in basically three forms. These are lowest-cost processes for the designer, manufacturing methods for multiple discrete parts, and multiple manufacturing methods for single discrete parts. Attention is given to major system design parameters, MC/DG section development for electronics fabrication and assembly, electronic cost-drivers, an integrated example utilizing MC/DG formats for electronics, and fabrication and assembly cost-drivers. G.R.

A82-27432 **An evaluation of several polymers for high density humidity PC coatings.** H. E. Frankel, C. Ray, and F. P. Casto (Fairchild Space and Electronics Co., Germantown, MD). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 399-406.

In the evaluation, one of the most severe environments to which military aircraft is subjected is considered. Attention is given to rapidly changing temperatures at seacoast locations, taking into account situations in which the atmosphere may be laden with industrial or fossil fuel by-products. A urethane coating used for printed wiring boards afforded generally excellent protection. However, in connection with more stringent requirements, particularly with regard to rapidity of high-altitude, high-humidity cycling, it became clear that only either a new type of coating or a much thicker urethane coating could provide the required protection. An experiment was, therefore devised to evaluate the single parameters of imperviousness to moisture, taking into consideration six types of coating. The qualifications of the various coatings are discussed. G.R.

A82-27435 **Transition of aerospace adhesive bonding technology from R&D to operational use.** H. S. Schwartz (USAF, Materials Laboratory, Wright-Patterson AFB, OH). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981.
Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 425-436. 18 refs.

A chronological review is presented of developments in the materials processes and quality assurance aspects of aerospace bonding, and the degree of success in transitioning these developments. Early applications of adhesive bonding technology in aircraft structure exploited intrinsic structural advantages, such as long fatigue life and high stiffness-to-weight ratio. High temperature polymers were later developed for use up to 700 F. Service experience in the 1960s revealed deficiencies in moisture resistance of the epoxy-based adhesive bonding technology for aluminum structures, which led to the development of high durability bonding technology for the aluminum structures in the mid-1970s. Current emphasis is on reliable performance and economical production. D.L.G.

A82-27437 **Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens.** K. K. Knock and M. C. Locke (Boeing Co., Seattle, WA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 445-458. 6 refs.

A82-27446 **Recent developments in materials and processes for aircraft corrosion control.** S. J. Ketcham and J. J. De Luccia (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981. Azusa, CA, Society for the Advancement of Material and Process Engineering, 1981, p. 571-582. 10 refs.

The subjects investigated are primarily useful in considerations related to airframes, although the results may also be applicable to electronic equipment. A number of corrosion preventive, water displacing compounds are considered, taking into account their areas of application. It is pointed out that elastomeric sealants are widely used on naval aircraft to seal out the environment. It is anticipated that the use of these sealants will increase in the future due to their ability to accommodate the dynamic loads imposed on aerospace equipment without cracking. Attention is also given to surface treatments for aluminum alloys, and aspects of alloy selection and treatment. Materials under development are related to a water displacing paint, a flexible primer, the development of an aluminum plating process, phase transfer inhibitors, crack arrestment compounds, and powder metallurgy aluminum alloys. G.R.

A82-27509 † **Problems in the automation of the thermal-stress analysis of flight vehicles (Problemy avtomatizatsii teploprochnostnykh issledovanii letatel'nykh apparatov).** I. F. Obraztsov, O. M. Alifanov, V. S. Kuznetsov, V. I. Lopatin, B. M. Pankratov, and I. M. Ukolov. In: Scientific lectures on aviation and astronautics 1980. Moscow, Izdatel'stvo Nauka, 1981, p. 100-110. In Russian.

The paper examines the devolopment of automated data processing systems for the thermal-stress analysis of flight vehiclus. A hybrid system for the automated processing of thermal-test data is described, and a block diagram of the system is presented. B.J.

A82-27526 † **Strength of the turbine components of a gas-turbine engine under complex loading and associated problems (Prochnost' detalei turbiny GTD v usloviiakh slozhnogo nagruzheniia i sviazannye s nei problemy).** N. D. Kuznetsov. *Problemy Prochnosti,* Mar. 1982, p. 10-14. In Russian.

The corrosion resistance and cyclic strength of the blading and disks of aircraft gas-turbine engines are discussed with emphasis on the effects of the fabrication and assembly process variables. The currently used methods of blading design analysis are examined and their faults are demonstrated by comparing the calculated and experimentally determined resonances of a disk. It is shown that more accurate techniques of vibration analysis can be developed on the basis of dynamic elasticity equations. V.L.

A82-27641 # **Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets.** S. R. Osmer, N. C. Edwards, Jr. (U.S. Coast Guard, Research and Development Center, Groton, CT), and G. L. Hover (Analysis and Technology, Inc., North Stonington, CT). In: International Symposium on Remote Sensing of Environment, 15th, Ann Arbor, MI, May 11-15, 1981, Proceedings. Volume 2. Ann Arbor, MI, Environmental Research Institute of Michigan, 1981, p. 803-810.

Performance detection tests were conducted on two side-looking airborne radar (SLAR) systems to determine the influence certain environment-related and controllable parameters have on SLAR detection of typical search target types. Analysis techniques consisted of binning and plotting the empirical data to compare SLAR detection performance under sets of conditions for demonstrating the influence of the parameters. Environment-related parameters found to influence performance included wind speed and precipitation, and controllable parameters included target size and composition, altitude, antenna polarization and lateral range. D.L.G.

A82-27709 **Optimal target designation techniques.** L. M. Novak (MIT, Lexington, MA). In: Asilomar Conference on Circuits, Systems and Computers, 14th, Pacific Grove, CA, November 17-19, 1980, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 105-112. 6 refs. USAF-DARPA-Army-sponsored research.

This paper presents studies of signal processing techniques for achieving optimal autonomous acquisition of stationary targets located in a moderately intense non-homogeneous radar ground clutter background. The process of target acquisition is comprised of three basic functions: (1) target detection, (2) target selection or designation, and (3) re-acquiring the target for tracking. It is the second of these functions, i.e., autonomous designation of a target, that is the subject of this paper. Theoretical analyses and predictions of the probability of correct target designation for two acquisition search methods are presented and compared with results achieved using real radar imagery. (Author)

A82-27714 * **RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control.** W. R. Dunn (Southern Colorado, University, Pueblo, CO), J. Johnston, and G. Meyer (NASA, Ames Research Center, Moffett Field, CA). In: Asilomar Conference on Circuits, Systems and Computers, 14th, Pacific Grove, CA, November 17-19, 1980, Conference Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 280-286. 9 refs. Grant No. NAG2-2.

Design methodologies for realizing future high authority autoflight control systems are being investigated, taking into account also the study of distributed microcomputer architectures. Attention is given to the redundant asynchronous microprocessor (RAMP) structure. RAMP comprises a connected network of microcomputers which has as input command and sensor information, and which generates servo information to drive actuators, and thrust linkages. Tolerance to hardware failures is achieved by static redundancy. Results of a failed microcomputer are simply rejected. This is done in lieu of dynamic redundancy wherein the distributed computer system performs real time fault detection and reconfiguration of the system. Attention is given to the RAMP network structure and operation, flight control with parallel asynchronous computers, and intermittent fault tolerance. G.R.

A82-27869 **Applications of adaptive control systems.** P. C. Parks (Royal Military College of Science, Shrivenham, Wilts., England), W. Schaufelberger (Zürich, Eidgenössische Technische Hochschule, Zurich, Switzerland), C. Schmid, and H. Unbehauen (Bochum, Ruhr-Universität, Bochum, West Germany). In: Methods and applications in adaptive control; Proceedings of the International

Symposium, Bochum, West Germany, March 20, 21, 1980. Berlin, Springer-Verlag, 1980, p. 161-198. 112 refs.

It is shown through a study of adaptive control applications in the fields of aircraft control systems, industrial process control and electrical drives that, despite the advantages of their sophisticated algorithms, adaptive controls will not be adopted until they are demonstrated to be far superior to classical control techniques. The most successful field of application for adaptive controls has been that of electrical drives, since their system equations and dynamics are well understood and have parasitical vibration modes of high frequency, which can be more easily eliminated in the design process than those encountered in aircraft control. Attention is given to the causes for process industry resistance to adaptive control development, including the complicated dynamic behavior of processes under internal and external disturbances, drifts and parameter changes. O.C.

A82-27876 **AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings.** Conference sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1980. 343 p. Members, $22.50; nonmembers, $30.

Topics considered include TPS management, ATE hardware systems, testing of the next generation commercial airline avionics, testability and built-in test, digital ATG, management information systems for ATE, and propulsion ATE. Attention is also given to system architecture, modular ATE, analog ATE, supporting shipboard electronics, and new and unusual ATE applications. B.J.

A82-27883 **Airline maintenance strategy.** W. Brouwer (KLM Royal Dutch Airlines, Engineering and Maintenance Div., Schiphol Airport, Netherlands). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 38-42.

Problems associated with the maintenance of avionics are discussed, with attention given to the consequences of increases in complexity and reliability, maintenance shop organization, and the role of the technician. The efficiency of LRU removals, the use of automatic test equipment, and the role of software are examined. B.J.

A82-27884 **Airline ATE requirements.** H. E. Harmon (American Airlines, Inc., Dallas, TX). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 43-46.

The general requirements of airline ATE (automatic test equipment) are reviewed, and attention is given to dedicated, modular, general-purpose, and circuit-card ATE. It is noted that maintenance of all-digital avionics will require the full utilization of standardized instrument techniques and the ATLAS test language to accomplish cost effective testing and repair. And it is recommended that airlines effectively communicate these test equipment requirements to the suppliers of future avionics equipment. B.J.

A82-27885 **The role of software in commercial ATE.** G. M. Jenkins (Boeing Computer Services Co., Seattle, WA). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 47-50.

The paper examines the role of software in some specific applications of commercial ATE (automatic test equipment) to the testing of avionics in commercial aircraft. The systems and software used in the Boeing Electronics Test Shop to test units for use in the 707, 727, and 737 aircraft are described. In addition, a new Air Data Computer test station is discussed along with the future use of ATLAS. The role of the software in these systems is considered. B.J.

A82-27886 **The modular ATE.** E. I. Levy (Eastern Air Lines, Inc., Miami, FL). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 51-53.

The Eastern Air Lines concept of modular ATE is presented, with attention given to both hardware and software aspects. Existing maintenance philosophies and the classical ATE are reviewed to show why present concepts are no longer cost effective. Potential problems of the modular ATE concept are examined, and the need for further standardization and close industry cooperation is discussed. B.J.

A82-27887 # **AEWTS - Realistic not futuristic.** D. D. Banks (U.S. Navy, Pacific Missile Test Center, Point Mugu, CA) and D. O. Jacoby (U.S. Naval Air Systems Command, Washington, DC). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 54-59.

The Advanced Electronic Warfare Test Set (AEWTS) program is described, with attention given to AEWTS design considerations, the dual port testing concept, and the operator interface. Phase I studies indicate that AEWTS technical requirements are achievable; in particular it is found that the dual port testing concept is not only realistic and feasible but also cost effective in terms of throughput efficiency. B.J.

A82-27890 # **ATE logistics in the United States Air Force.** R. H. Freeman (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 79-83.

It is noted that the problems and complexities of ATE (automatic test equipment) have a dollar and mission impact that now demands visibility from all levels of USAF management. Several solutions have been proposed to minimize these difficulties. One of the more promising solutions is MATE (Modular Automatic Test Equipment), a cradle-to-grave acquisition methodology approach to ATE. A second solution is to reduce the requirement for ATE by changing USAF maintenance concepts. Both solutions are being actively considered within the USAF for implementation. B.J.

A82-27891 **ATLAS/test data provision for the Tornado ATS - A challenging task.** H. Scheibenzuber (Elektronik-System-Gesellschaft mbH, Munich, West Germany). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 84-89.

The provisions of the ATLAS test specifications/test data for the Line Replaceable Units (LRUs) allocated to the Tornado aircraft Automatic Test System (ATS) are an important part in the development of the maintenance support system of the aircraft. The basic ATLAS/test data requirements include a standard serviceability test and a diagnostic test. LRU test data sheets form the baseline for ATS design and development and consist of four parts: an introduction, LRU test specifications, LRU specific requirements, and LRU interface requirements. The validation of the data is done by checking applicability, structure, syntax and lexicon, compatibility, logic, and diagnostic capability. Engineering support provided includes provision of test sheets, flow charts, and specifications. C.D.

A82-27892 # **Naval Air Systems Command /NAVAIR/ ATE program - Standardized ATE for the carrier environment.** A. W. Rossiter (U.S. Naval Air Systems Command, Washington, DC). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 90-95.

It is pointed out that the principal avionics support equipment goal of the Naval Air Systems Command has been, and remains, to provide timely and effective organic support capability to optimize U.S. aircraft weapon system readiness. A definition is provided of an Automatic Test Equipment (ATE) program that will optimize the avionic repair capability of the shipboard Aircraft Intermediate Maintenance Department. Attention is given to four factors which illustrate the unique nature of carrier support, and the ATE program plan is discussed. The Family of Common ATE is considered, taking into account aspects of general avionics support, inertial navigation system support, electro-optical support, and electronic warfare system support. A Consolidated Support System to meet the advanced support needs of the 1990's is also examined. G.R.

A82-27893 **Configuration management techniques for automatic testing.** R. W. Tobias, G. D. Scherer, and W. H. Kraper (AAI Corp., Baltimore, MD). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 99-104.

The configuration management process as it relates to automatic testing is discussed with reference to a process developed for an automatic test system supporting the P3 ORION long-range patrol aircraft. Attention is given to problems involved in the control of the hardware and software of the three key items: the automatic test system, the unit under test, and the test program test. It is emphasized that the configuration management process relating to each of these three items is critical to the overall success of the maintenance and support process. V.L.

A82-27903 **Pacer Comet II jet engine test system.** A. M. Bishop (Control Data Corp., Professional Services Div., San Antonio, TX). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 199-202.

The ten year evolution of the Pacer Comet system has produced a versatile, 'full-authority', minicomputer based test system which simultaneously controls engine testing in four test cells. This fully automated test system is operational at Kelly, Tinker and Edwards Air Force Bases. The hardware and software evolution are described with particular emphasis on the lessons learned. It will also describe the present software structure, engine test supervisor, interface between executive and UUT software, and the operator interface. Concluding remarks address the human engineering aspect of automation. (Author)

A82-27904 **The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintanance.** R. A. Rio (Mechanical Technology, Inc., Latham, NY). In: AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 203-208.

This paper describes the successful application of an Automated Vibration Diagnostic System (AVID) in the U.S. Air Force's high-volume engine overhaul center at Tinker Air Force Base, OK. The AVID concept to automate troubleshooting procedures for fully-assembled rebuilt engines is addressed. This system extracts high-frequency vibration data from existing standard instrumentation, thereby providing meaningful mechanical information. A growing appreciation on the part of engine overhaul personnel of the power of automated test equipment has enabled these key features to be combined to reduce operating expenses at engine rebuild facilities. (Author)

A82-27920 # **Aerial combat simulation in the U.S. Air Force.** P. A. Cook (USAF, Human Resources Laboratory, Williams AFB, AZ). In: Computer Graphics Symposium, Phoenix, AZ, April 24, 1982, Proceedings. New York, American Institute of Aeronautics and Astronautics, 1982, p. 16-19.

The history, current applications, research programs, and features of future air combat simulators for pilot training are reviewed. The Link system, invented in 1929, provided good cockpit orientation and instrumentation instruction. Current Air Force simulators, specifically those located in Phoenix, AZ, are mounted on six-degrees-of-freedom motion simulators. Seven visual display screens provide a 300 x 140 deg horizontal by vertical field of view, and are configured for A-10 and F-16 fighters. Experiments with pilots trained in simulators and in classrooms for strafing and air-to-ground bombing missions have demonstrated that simulator trained pilots are more proficient in real flights past the seventh mission. Improvements in full combat simulation are reviewed, noting that human eyes are still keener than raster scans, and techniques for improving resolution and developing multiple interactive cockpits are outlined. M.S.K.

A82-27946 **Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set.** J. F. Shaeffer, L. N. Medgyesi-Mitschang (McDonnell Douglas Research Laboratories, St. Louis, MO), J. W. Weber, S. R. Jacobs (McDonnell Aircraft Co., St. Louis, MO), and P. Eisenhauer (U.S. Navy, Naval Coastal Systems Center, Panama City, FL). In: International Symposium on Electromagnetic Compatibility, Baltimore, MD, October 7-9, 1980, Symposium Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1980, p. 254-264. 11 refs. Contract No. N61339-77-C-0094.

A series of flight and bench tests have been carried out in order to determine the origin of interference effects on the Raydist navigation system of the Navy RH-53D minesweeping helicopter during the streaming, towing, and recovery of the minesweeping gear. Two distinct mechanisms have been identified by which the tow cable can cause unwanted effects on the navigation system: (1) a negative corona discharge (Trichel pulses) from the tow cable caused by electrification of the helicopter in the streaming and recovery modes; and (2) interaction of the monopole antenna with the tow cable in the towing mode. V.L.

A82-28015 † **Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions (Raschet temperaturnogo polia okhlazhdaemoi deflektornoi lopatki GTU pri sopriazhennykh granichnykh usloviiakh).** Iu. I. Shvets, A. Sh. Dorfman, O. I. Didenko, and O. D. Lipovetskaia (Akademiia Nauk Ukrainskoi SSR, Institut Tekhnicheskoi Teplofiziki, Kiev, Ukrainian SSR). *Promyshlennaia Teplotekhnika,* vol. 4, Mar.-Apr. 1982, p. 9-14. In Russian.

A high-accuracy method is developed for calculating gas-blade heat transfer coefficients and temperature fields of baffle-cooled gas-turbine-engine blades under conjugated boundary conditions. An example of such calculation is discussed, and it is shown that at some points of the blade the heat transfer coefficients obtained with this method can differ by 40% from coefficients obtained by conventional calculation methods. B.J.

A32-28018 † **Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine (Issledovanie teploobmena v zone vkhodnoi i vykhodnoi kromok okhlazhdaemoi soplovoi lopatki maloraskhodnoi gazovoi turbiny).** Iu. S. Osherov (Nauchno-Proizvodstvennoe Ob'edinenie, Proletarskii Zavod, Leningrad, USSR). *Promyshlennaia Teplotekhnika,* vol. 4, Mar.-Apr. 1982, p. 34-37. 5 refs. In Russian.

Electrocalorimetry was used to study heat transfer near the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine. Relationships are obtained for determining the mean and local values of heat transfer coefficients. The results are pertinent to the development of a cooling method for regions near the leading and trailing edges of nozzle blades. B.J.

A82-28019 † **The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades (Vliianie temperaturno-vremennykh faktorov na povrezhdenie metalla i kharakteristiki vynoslivosti rabochikh lopatok GTD).** V. T. Troshchenko, B. A. Griaznov, I. A. Makovetskaia, O. I. Marusii, and Iu. S. Nalimov (Akademiia Nauk Ukrainskoi SSR, Institut Problem Prochnosti, Kiev, Ukrainian SSR). *Promyshlennaia Teplotekhnika,* vol. 4, Mar.-Apr. 1982, p. 65-68. In Russian.

The endurance of turbine rotor blades was tested after prolonged operation. A significant reduction in blade endurance is revealed after 20,000 hours of operation. The main cause of observed defects was found to be the formation of a sulfur-saturated surface layer. In addition, some of the blades exhibited a reduction in cyclic strength and a displacement of the fatigue-crack-initiation zone from the base of the blade to its center. B.J.

A82-28149 **The status of airport noise prediction, with special reference to the United Kingdom and Europe.** J. B. Large and M. E. House (Southampton, University, Southampton, England). *Noise Control Engineering,* vol. 17, July-Aug. 1981, p. 38-44. 12 refs.

The current status of airport noise prediction is reviewed with reference to both air-to-ground noise and near-ground noise such as noise generated by road traffic, auxiliary power units, engine ground running, approaching aircraft, and aircraft on taxiways and aprons. Methodologies for contour calculation and assessment are outlined, and areas for further study and refinement of procedures are indicated. In particular, the need for greater accuracy is emphasized in assessments made for legislative and statutory purposes. V.L.

A82-28150 **The impact and future direction of aircraft noise certification.** M. J. T. Smith (Rolls-Royce, Ltd., Derby, England). *Noise Control Engineering,* vol. 18, Mar.-Apr. 1982, p. 52-61. 17 refs.

After an historical account of the takeoff and landing noise problems created by the introduction of jet aircraft, and the aircraft noise footprint control requirements formulated by such regulatory bodies as the International Civil Aviation Organization in response to airport community demands, attention is given to the performance parameters determining the contours of aircraft noise footprints and the procedures for their quantification. It is suggested that computed noise contour dimensions be adjusted at the lateral, flyover and approach closure points to more accurately reflect aircraft noise emission characteristics, where presently such effects as shielding, forward speed and lateral attenuation cannot be defined from first principles to the degree of accuracy often assumed. It is emphasized that regulations must recognize aircraft manufacturer's exceeding even the lowest stipulated noise limits, and suitably reward them.
O.C.

A82-28275 **To the root of the problem - Some helicopter research topics.** R. L. Maltby (Royal Aircraft Establishment, Farnborough, Hants., England). *Aerospace (UK),* vol. 9, Mar. 1982, p. 12-18. 10 refs.

A historical review is presented of the development of aircraft which can hover in flight and land vertically, beginning with the autogyro and proceeding through the aerodynamics of helicopter flight. Initial stability problems with the autogyro were overcome by separating the lift and propulsive functions, with a concomitant loss of vertical take-off ability. Glauert's method formulated an account of the edgewise flow of the blades in forward flight and defined the vortices for induced flow theory. Wake calculations were devised to describe the spiral disturbances each blade had to pass through from the preceeding blade's passage. Computers have allowed examination of surface pressures, blade motions, and surface strains in-flight, and wake studies with 17 pressure transducers on a blade of the Puma helicopter are described. Further discussion is given of blade dynamics, flight mechanics, particularly the man-machine interface, and air and ground resonance. M.S.K.

A82-28276 * # **Why twin-fuselage aircraft.** J. C. Houbolt (NASA, Langley Research Center, Hampton, VA). *Astronautics and Aeronautics,* vol. 20, Apr. 1982, p. 26-35. 8 refs.

Operational and design features of twin-fuselage aircraft are outlined, noting capabilities of transporting 100-400 passengers at subsonic speeds at an efficiency of around 190 passenger mi/gal. Wings for two body aircraft are lighter and are designed more from an aerodynamics point of view due to reductions in the bending moment. A 280 passenger configuration would need a 172 ft wingspan, compared to a 155 ft wingspan for a conventional aircraft, but the conventional wings would have a larger area. The higher aspect ratio contributed to the increased efficiency of the twin body operation. A lower wetted fuselage area is calculated for the two body aircraft with passenger capacities over 190, and twin fuselages are shown to have a higher passenger packaging density than double-deck widebodies. Finally, simple compounding of existing aircraft such as the DC-9 into a two-body shape is projected to offer a 1.9 factor increase in passenger mi/gal. M.S.K.

A82-28277 # **Toward VLA air-cargo service.** H. Liese (Dornier GmbH, Friedrichshafen, West Germany). *Astronautics and Aeronautics,* vol. 20, Apr. 1982, p. 36-41.

Trends and design possibilities for very large aircraft (VLA) for transporting containerized cargo are examined. Time losses in current air cargo transport are attributed to repacking necessities, uncoordinated manpower, insufficient personnel and facilities, and too little notification of shipments. Air transport costs more than sea transport, and also cuts the average delivery time by over 80%. It is noted that higher value goods, especially those requiring fast delivery, are shipped by air, for a fee averaging 1.8 that of sea routes. Comparison of conventional air transport to VLA transport of containerized cargo shows that use of VLA would increase air cargo share of containerized cargo to 43% of the total cargo shipped, compared with a present-day 5.9%. Necessities for a successful VLA-based air cargo system are reviewed, including a 1000 ton takeoff weight, sea- and land-basing options, and container interface with ground transport. M.S.K.

A82-28278 # **Very large vehicles - Technology looking for a need.** W. H. Arata, Jr. *Astronautics and Aeronautics,* vol. 20, Apr. 1982, p. 42, 43, 77. 26 refs.

Strategic and commercial incentives for the construction of very large vehicles (VLV) to be used for transporting massive air freight are considered. The acquisition and delivery of raw materials such as Al, beryn, Ti, and Mn, for which the U.S. and Europe are completely dependent on imports, are cited as driving commercial reasons for the development of VLVs. Military employment of a rapid deployment force is noted to depend on transferring troops and supplies to remote spots of the world in short time periods, a situation which would be strongly aided by the presence of Mach 0.8 vehicles in a twin-fuselage configuration capable of carrying 1000 tons. Finally, only the combination of military and commercial demand would be sufficient to ensure the economic viability of the development of VLVs. M.S.K.

A82-28280 * # **Flying qualities - A costly lapse in flight-control design.** D. T. Berry (NASA, Flight Research Center, Edwards, CA). *Astronautics and Aeronautics,* vol. 20, Apr. 1982, p. 54-57, 35.

Generic problems in advanced aircraft with advanced control systems which suffer from control sensitivity, sluggish response, and pilot-induced oscillation tendencies are examined, with a view to improving techniques for eliminating the problems in the design phase. Results of two NASA and NASA/AIAA workshops reached a consensus that flying qualities criteria do not match control system development, control system designers are not relying on past experience in their field, ground-based simulation is relied on too heavily, and communications between flying qualities and control systems engineers need improvement. A summation is offered in that hardware and software have outstripped the pilot's capacity to use the capabilities which new aircraft offer. The flying qualities data base is stressed to be dynamic, and continually redefining the man/machine relationships. M.S.K.

A82-28281 # **VSTOLs - We can build them, but can we sell them.** J. W. Flaig (U.S. Naval Air Systems Command, Washington, DC). *Astronautics and Aeronautics,* vol. 20, Apr. 1982, p. 58-61.

Conclusions regarding the development of a VSTOL wing for the Navy reached at the 2nd AIAA/NASA VSTOL Conference are reviewed. It was noted that a specific mission could not be designated for VSTOL aircraft and, subsequently, funds could not be dedicated to the program on a full-scale development level. Decreasing the margin of greater cost of the VSTOL aircraft to 16% rather than the current 25-30% more than conventional aircraft was recommended, along with finding specific scenarios which favor VSTOL employment. A solution was indicated in that VSTOL aircraft are capable of operating out of degraded field conditions, and also that faster deck cycling is possible. Further arguments favoring the use of VSTOL aircraft such as the AV-8B were that the response time for ground support is less than half that with conventional aircraft, and that VSTOL engines are hard to extinguish. M.S.K.

A82-28311 **US Navy begins slow shuffle towards V/STOL.** *Flight International,* vol. 121, Feb. 20, 1982, p. 419-421.

The US Navy is defining its next fighter/attack aircraft, and it is likely to be a V/STOL type. The design requirements include a sustained speed of Mach 1.6 or better, good STOL performance, high maneuverability, and take-off weight varying from 20,000 lb for VTO to some 40,000 lb for sea-based STO strike. McDonnell-Douglas submitted a vectored-thrust design featuring a turbofan engine producing 34,000 lb with plenum chamber burning, up to Mach 2 speed, VTO weight of 29,840 lb fur 103 nm combat radius. Rockwell and General Dynamics based their designs on thrust augmentors. The former uses ejector flaps; the design augmentation ratio is 1:5:1 for 20,730 lb dry installed thrust, VTO weight is 24,000 lb, STO is 29,400 lb and combat radius is 300 nm. General Dynamics' design is 37,770 lb, 21, 800 lb VTO, Mach 1.6 maximum. The Vought is 25,330 lb VTO with a tandem-fan engine combining low-bypass cruise properties with medium-bypass air flow for V/STOL. C.D.

A82-28312 **Advancing blade flight data gathered.** D. E. Fink. *Aviation Week and Space Technology,* vol. 116, Mar. 29, 1982, p. 42-44, 47.

Stability and maneuverability characteristics gathered during 200 hours of flight tests are given for the XH-59A advancing blade concept (ABC) technology demonstration aircraft, which combines twin counterrotating helicopter rotors for vertical lift with turbojets for high forward speeds. The development of the aircraft is pertinent to both the U.S. Army's 1990s requirement for advanced attack helicopters and the market for intercity commuter aircraft of sufficiently low noise emission characteristics. The control response of the XH-59A in rolling into and out of steep turns is found to be comparable to that of fixed-wing aircraft. The forward thrust available from the auxiliary engines and differential collective of the rotors eliminates the need to pitch the main rotor tilt vector forward for high-speed, level flight. O.C.

A82-28313 **Precision casting for gas turbine engines.** C. W. Foster (Rolls-Royce, Ltd., London, England). *Aircraft Engineering,* vol. 54, Feb. 1982, p. 11-14.

The paper describes the gas turbine casting process in detail. High-temperature creep resistance is the property whose desirability most advances casting and materials technology. Vacuum melting and casting, directionally solidified (DS) casting, equi-axed and single-crystal casting are major developments in the progress of this technology. The vacuum process was used in the RB211-524 engine, while the DS process was employed in more advanced engines of the RB series. Rolls-Royce has built a new demonstration furnace whose melting unit, furnace chamber, withdrawal chamber, vacuum system, casting cycle, and control system are described. The future will bring increasing use of automation, production of more cast-to-size features, single-crystal castings application and process developments that will produce complex internal cooling configurations that are impossible today. C.D.

A82-28318 **An investigation of the swirl in an S-duct.** R. W. Guo and J. Seddon. *Aeronautical Quarterly,* vol. 33, Feb. 1982, p. 25-58. 7 refs.

Measurements are presented of the static pressure, total pressure, swirl and three-dimensional turbulence in the flow through an S-curved rectangular duct mounted in a wind tunnel at different incidences, yaw angles and mass flow ratios. The results show that at high incidence there is a large vortex around an area of flow separation after the first bend and a pair of contra-rotating vortices in the flow after the second bend. The distortion of total pressure at the exit of the S-duct is significantly high, and the corresponding three-dimensional turbulence is up to 16.7%. Appreciation of the existence of this type of flow is important in the field of air intake design for jet aircraft. (Author)

A82-28322 * # **Performance degradation of propeller/rotor systems due to rime ice accretion.** K. D. Korkan (Texas A & M University, College Station, TX), L. Dadone (Boeing Vertol Co., Philadelphia, PA), and R. J. Shaw (NASA, Lewis Research Center, Cleveland, OH). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 20th, Orlando, FL, Jan. 11-14, 1982, Paper 82-0286.* 14 p. Grants No. NAG3-109; No. NAG3-242.

A theoretical model has been established which is applicable to both propeller and helicopter systems that determines the effect of rime ice accretion on the thrust coefficient, power coefficient, and efficiency as a function of time in a natural icing condition. Theoretical comparisons have been made with experimentally determined decrease in propeller thrust coefficient and efficiency for five natural icing conditions with good agreement. The present analytical model is also applicable to the helicopter case, where the method predicts radial and azimuthal rotor blade ice shapes in addition to torque rise as a function of time in a natural icing condition. (Author)

A82-28349 **The characteristics and detection of low level wind shear in the critical phases of flight.** P. D. Simmons. *The Controller,* vol. 21, Mar. 1982, p. 16-18.

Wind shear, defined as a change in wind speed and/or direction per unit distance between two points in the atmosphere, can precipitate a change in aircraft airspeed or other flight characteristic which, in extreme cases, may be uncorrectable by even maximum use of pilot maneuver and power controls. While micro scale shears cause only rapid turbulence and synoptic scale shears change flight conditions more slowly than would be hazardous, meso scale shears at low levels and in either vertical or horizontal directions pose considerable danger to aircraft during their landing glide path. Horizontal wind shear, which is often more powerful than the vertical and effectively reverses wind direction, has been identified as the greater threat. The relationship of wind shear to thunderstorm activity on a global scale is considered. O.C.

A82-28365 # **Effect of contrast on space perception in TV displays of the external scene observed by the pilot (Einfluss des Kontrastes auf die Raumwahrnehmung bei TV-Flugaussensichtdarstellungen).** H. Heising. Wachtberg-Werthhoven, West Germany, Forschungsinstitut für Anthropotechnik (Forschungsinstitut für Anthropotechnik, Bericht, No. 50), 1981. 80 p. 16 refs. In German.

Procedures involving the simulation of the external visual scene perceived by the conductor of a vehicle are, in particular, employed in connection with flight simulation applications for training, research, and development programs. Heising (1977) has reported the development of a simulating device based on a raster formation approach. Every individual image obtained previously in connection with the TV recording of a flight maneuver is modified in such a way that it appears to the person in the simulator in the correct perspective with respect to his position. There are, however, variations in contrast in connection with the image processing operations. An investigation is, therefore, conducted concerning the effects of the contrast changes on space perception. It is found that aspects of positional perception are not affected by the considered contrast variations. It appears, therefore, that the contrast variations do not cause changes with respect to details of space perception. G.R.

A82-28397 **Simple vs. sophisticated TacAir avionics. II - Soviet TacAir avionics technology.** J. Bussert. *Military Electronics/Countermeasures,* vol. 8, Mar. 1982, p. 56-62.

An historical study is presented of Soviet tactical aircraft avionics developments, encompassing radars, ECM ordnance, communications and cockpit instrumentation. It is noted that (1) there has been a marked shift since 1970 from interceptor to ground support aircraft development and production, (2) that ostensibly obsolete electronics such as the MiG-25 vacuum tube-based Foxfire radar may exploit low vulnerability and exceptionally high power levels, and (3) that the simplicity of Soviet avionics design imposes a lower acquisition and maintenance cost burden while increasing reliability and the trainability of crews. It is suggested that the Soviet study of F-14 Phoenix missile systems since the Iranian revolution has been instrumental in the development of a MiG-25 two-seat variant with anti-cruise missile look down/shoot down capability. O.C.

A82-28403 **Real-time failure detection of aircraft engine output sensors.** C. W. de Silva. *Arabian Journal for Science and Engineering,* vol. 7, Jan. 1982, p. 45-53. 9 refs.

The Bayesian approach to hypothesis testing in failure detection is incorporated in a computer algorithm for real-time failure state detection in aircraft engine output sensors, along with a set of hypothesis-conditioned Kalman filters for failed sensor output estimation and associated error covariance matrix determination. Real-time processing incorporating current sensor readings is employed by the algorithm. A decision logic which overcomes analytical difficulties due to inherent aircraft engine nonlinearities is proposed, and an application of the method to a realistic turbojet engine model undergoing simulated output sensor failures furnishes a numerical example. O.C.

A82-28475 † **The use of dynamometer readings for damping of the natural vibrations of twin-rotor gyrocompasses (Pro vikoristannia pokazan' N'iutonometriv dlia dempfiruvannia vlasnikh kohivan' dvorotornikh girokompasiv).** V. M. Kalinovich (Akademiia Nauk Ukrainskoi SSR, Institut Matematiki, Kiev, Ukrainian SSR). *Akademiia Nauk Ukrains'koi SSR, Dopovidi, Seriia A - Fiziko-Matematichni ta Tekhnichni Nauki,* Jan. 1982, p. 43-46. 5 refs. In Ukrainian.

It is demonstrated that a circuit is feasible in which the damping of the natural vibrations of a twin-rotor gyrocompass is realized on the basis of dynamometer measurements. Two versions of the proposed circuit using one or two dynamometers and information on the divergence angle of the gyroscopes are discussed. V.L.

A82-28476 **Improving the crashworthiness of general aviation aircraft by crash injury investigations.** W. R. Kirkham (FAA, Civil Aeromedical Institute, Oklahoma City, OK). *Aviation, Space, and Environmental Medicine,* vol. 53, Apr. 1982, p. 319-325.

An aircraft accident investigation program correlates injuries to occupants with the severity of impacts and structural changes in the crash. Findings brought to the attention of aircraft manufacturers have led to specific aircraft being made more crashworthy. The finding of a failure in a shoulder harness attachment led to the strengthening of the attachment brace. The way a shoulder harness was joined to a lapbelt was modified following a noted failure. The finding of fractures of lapbelt and shoulder harness cable tiedowns led to the use of stronger cables and modification of the installation. Other findings resulted in a shoulder strap guide being placed on an inertia reel and a sidemounted seat being modified. Described also are three seat-related features which, although meeting FAA standards, during the dynamics of a crash may lack desirable energy attenuation. These findings illustrate the value of aircraft crash injury correlations. (Author)

A82-28513 # **Active flutter suppression on an F-4F aircraft.** O. Sensburg, H. Hönlinger (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany), T. E. Noll, and L. J. Huttsell (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *(AIAA, ASME, ASCE, and AHS, Structures, Structural Dynamics and Materials Conference, 21st, Seattle, WA, May 12-14, 1980, AIAA Paper 80-0770.) Journal of Aircraft,* vol. 19, May 1982, p. 354-359. 18 refs.

Extensive research programs have been conducted at Messerschmitt-Bölkow-Blohm (MBB) to investigate the application of active flutter and mode control to achieve increased flutter margins. Such techniques are of special interest for airplanes that already have a full command and stability augmentation system together with fast responding control surface actuators and that carry heavy wing mounted stores. A flutter suppression system (FSS) was installed on the F-4F, and this system was flight tested. The control law was found by applying optimal control theory, thus minimizing the control surface motion due to disturbances and providing the required stability margins. During the test it was found that the dynamic properties of the wing-pylon-store system change considerably with vibration amplitude because of play and preload. (Author)

A82-28514 # **Experimental study of oscillating-wing propulsion.** J. D. DeLaurier (Toronto, University, Toronto, Canada) and J. M. Harris (Battelle Memorial Institute, Columbus, OH). *Journal of Aircraft,* vol. 19, May 1982, p. 368-373. 10 refs. Research supported by the University of Toronto.

In this experimental study of flapping-wing thrust, a wing of 8 in. span and 2 in. chord was oscillated in a low-speed wind tunnel. The driving apparatus produced nearly sinusoidal heaving with superimposed pitching of variable amplitude and phase angle. The flapping frequency range of 0-8 Hz produced reduced frequencies for which flow separation was unlikely to occur, based on the measured static characteristics of the test airfoil (NACA 0012) over the Reynolds number range of interest (25,000-40,000). The average thrusting effort of the wing was measured and plotted in coefficient form against reduced frequency, with pitching amplitude and phase angle as parameters. Comparisons of the results with theoretical predictions and previous experimental work were made. In general, the results show approximately linear dependence of thrust on reduced frequency and best performance at phase angles of 90-120 deg of pitching lagging heaving. Although thrusting effort was produced for all pitching amplitudes, including zero, the highest readings were obtained for the maximum pitching amplitude of 12.1 deg. (Author)

A82-28515 # **Advanced engine technology and its influence on aircraft performance.** U. Olsson (Volvo Flugmotor AB, Trollhattan, Sweden). *Journal of Aircraft,* vol. 19, May 1982, p. 380-384. Research supported by the Swedish Air Material Board.

In order to identify problem areas and to investigate the importance of advanced engine technologies, design studies were made on a hypothetical engine for the mid-1980s. The resulting engine has a turbine inlet temperature of 1800 K, overall pressure ratio of 22.9, and thrust-to-weight ratio of 11.5. Technologies involved include boron-aluminum fan blades, a two-stage flash-vaporizing combustor, tungsten-reinforced turbine blades, and full authority electronic control. In fighter mission simulation studies the engine has been shown to result in aircraft superior to those existing today. (Author)

A82-28518 # **Effect of downwash on the induced drag of canard-wing combinations.** G. F. Butler (Royal Aircraft Establishment, Farnborough, Hants., England). *Journal of Aircraft,* vol. 19, May 1982, p. 410, 411. 7 refs.

The induced drag of canard-wing and wing-tail combinations is calculated for the limiting case in which the downstream surface is located in the Trefftz plane (infinite stagger), but based on the assumption that the loading on each surface is elliptical in isolation. It is shown that additional terms associated with induced circulation effects act to reduce the drag over that calculated using the classical theory. This induced thrust component is shown to be very small for the wing-tail configuration, but significant for the canard-wing layout. In addition, given elliptic loading on the upstream surface, an expression is derived for the loading distribution on the downstream surface which is optimum in the sense that the induced thrust component is maximized. G.R.

A82-28519 # **Aircraft pitch attitude as a performance parameter.** M. E. Eshelby (Cranfield Institute of Technology, Cranfield, Beds., England). *Journal of Aircraft,* vol. 19, May 1982, p. 412-414.

It is pointed out that in transport operations the pitch attitude of the cabin may have an effect on the safety and the comfort of the passengers and the crew. If the angle of the cabin floor to the horizontal is steep, it will present a hazard to passengers and cabin staff moving about the aircraft. It is preferable to maintain as much as possible a near-level cabin pitch attitude throughout the flight. Once the enroute climb is initiated it should be possible to restrict the aircraft body axis system to very small limits. This can be achieved by using the changes in zero-lift incidence with flap setting, and associated changes in zero-lift drag, to determine the relationship between aircraft body attitude and wing incidence and equating the difference to flight path gradient. An analysis of attitude-directed performance is conducted. G.R.

A82-28534 **Automated ultrasonic inspection of adhesive bonded structure.** D. J. Hagemaier (Douglas Aircraft Co., Long Beach, CA). *Materials Evaluation,* vol. 40, Apr. 1982, p. 572-578. 14 refs.

The development of an automated ultrasonic bond inspection device for inspecting adhesively bonded metal-to-metal panels containing voids and porosity is described. Defects are noted to be present in the interface between the adhesive and the sheet metal, in the cured adhesive material, and other types caused during fabrication. A multiprobe adhesive bond inspection technique employing an ultrasonic resonance impedance method was chosen for operation in the immersion mode. The samples were C-scanned at 5 MHz, then again with a modified tester at 300 kHz at varying water paths from 0.025-2.54 mm. Finally, a 166 kHz scan was proven capable of detecting porosity, voids, and unbonds. The results indicate acceptable performance for applications in automated high production rate bonded fuselage inspections. M.S.K.

STAR ENTRIES

N82-20139# Air Force Academy, Colo. Dept. of Aeronautics.
AIR FORCE ACADEMY AERONAUTICS DIGEST FALL/SUMMER 1980 Final Report
A. M. Higgins, ed., E. J. Jumper, ed., J. M. Kempt, ed., and B. J. Gregory, ed. May 1981 149 p refs
(AD-A108338; USAFA-TR-81-4) Avail: NTIS HC A07/MF A01 CSCL 20/4

The digest includes technical papers in the specific areas of aerodynamics, propulsion, experimental instrumentation, biomechanics, engineering education, and aeronautical history. Canard wake measurements, the relation between camber and zero-lift angle of attack, and the early history of the jet engine were examined. T.M.

N82-20140# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
JOURNAL OF AERONAUTICS AND ASTRONOMY
11 Dec. 1981 183 p refs Transl. into ENGLISH from Acta Aeron. et Astronautica Sinika (China), v. 1, no. 1, 1980 104 p
(AD-A109681; FTD-ID(RS)T-0722-81) Avail: NTIS HC A09/MF A01 CSCL 20/4

Articles dealing with aerodynamics and astronomy are presented. Slender wings, axisymmetric bodies, attitude control systems and digital filters are discussed. R.J.F.

N82-20142 Ohio State Univ., Columbus.
AEROELASTIC CHARACTERISTICS OF A MISTUNED BLADED-DISC ASSEMBLY Ph.D. Thesis
Robert Evans Kielb 1981 206 p
Avail: Univ. Microfilms Order No. 8129037

The aeroelastic characteristics of mistuned bladed disc assemblies are studied by analytically modeling the bladed disc and its environment and using these models to conduct parametric studies. These studies have concentrated on the effect of mistuning on the system stability and, to a lesser extent, on the aeroelastic response. Aerodynamic coupling between the blades is investigated. Each blade is modeled as a two degree of freedom oscillator in which the airfoil is permitted to have bending (plunging) and torsional (pitching) motions which are inertially coupled. The disc is focused on and a technique is presented for calculating the free vibration frequencies and mode shapes of a rotating disc with variable thickness and temperature. The resulting model is used to study the dependency of disc modal frequency on the nodal diameter of the mode. Dissert. Abstr.

N82-20143*# McDonnell Aircraft Co., St. Louis, Mo.
TESTS AND ANALYSIS OF A VENTED D THRUST DEFLECTING NOZZLE ON A TURBOFAN ENGINE Final Report, Mar. 1980 - Mar. 1982
E. W. Roseberg Mar. 1982 78 p refs
(Contract NAS2-10564)
(NASA-CR-166279; NAS 1.26:166279; MDC-IR0280) Avail: NTIS HC A05/MF A01 CSCL 21E

The objectives were to: obtain nozzle performance characteristics in and out of ground effects; demonstrate the compatibility of the nozzle with a turbofan engine; obtain pressure and temperature distributions on the surface of the D vented nozzle; and establish a correlation of the nozzle performance between small scale and large scale models. The test nozzle was a boilerplate model of the MCAIR D vented nozzle configured for operation with a General Electric YTF-34-F5 turbofan engine. The nozzle was configured to provide: a thrust vectoring range of 0 to 115 deg; a yaw vectoring range of 0 to 10 deg; variable nozzle area control; and variable spacing between the core exit and nozzle entrance station. Compatibility between the YTF-34-T5 turbofan engine and the D vented nozzle was demonstrated. Velocity coefficients of 0.96 and greater were obtained for 90 deg of thrust vectoring. The nozzle walls remained cool during all test conditions. T.M.

N82-20145*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY INVESTIGATION OF EFFECTS OF HEAVY RAIN ON THE PERFORMANCE OF AIRCRAFT
Otto W. K. Lee Feb. 1982 16 p refs
(NASA-TM-83272; NAS 1.15:83272) Avail: NTIS HC A02/MF A01 CSCL 01C

A guideline was defined for the analysis of flight data to determine the effects of rain on the aerodynamic performance of an aircraft. It distinguishes and separates the effects of horizontal wind shears, downdrafts, gusts at the phugoid frequency, and rain based on various aerodynamic parameters. Flight data from NASA LaRC's TCV B-737 were inconclusive because precipitation rates encountered probably were not high enough. However, the guideline seemed to be valid and can be used on further flight data evaluations. Difficulties in this type of data analysis are discussed. Other indirect influences of rain on the degradation of airplane performance are also considered. Author

N82-20149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LAMINAR FLOW CONTROL. THE RESEARCH AND TECHNOLOGY STUDIES 1981
Dal V. Maddalon, ed. Mar. 1982 135 p refs Proceedings of Conf. held at Dryden Flight Research Center, Edwards, Calif., 17-18 Sep. 1981
(NASA-CP-2218; NAS 1.55:2218; L-15084) Avail: NTIS HC A07/MF A01 CSCL 01A

Laminar flow airfoil design and construction, boundary layer control characteristics, and construction materials and methods are discussed. For individual titles, see N82-20150 through N82-20155.

N82-20150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NASA LANGLEY LAMINAR FLOW CONTROL AIRFOIL EXPERIMENT
W. D. Harvey and J. D. Pride *In its* Laminar Flow Control Mar. 1982 p 1-42 refs

Avail: NTIS HC A07/MF A01 CSCL 01A

The design and construction of an advanced swept supercritical airfoil for commercial aircraft to be tested in a transonic wind tunnel is described. The swept LFC airfoil was designed for a given thickness ratio and lift coefficient, with emphasis placed on high critical Mach number with shock-free flow. It is compatible with satisfactory low speed and buffeting characteristics and minimizing the suction laminarization. Further emphasis was placed on achieving shock-free flow over a wide range of off-design conditions including trailing edge flap control. The requirements and design of the suction system and modifications to the Langley 8 foot transonic pressure tunnel is briefly described. Contouring of nonporous test section walls for free air simulation and flow quality improvements is included. J.D.H.

N82-20151*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STATUS OF NASA ADVANCED LFC AIRFOIL HIGH-LIFT STUDY
Zachary T. Applin *In its* Laminar Flow Control Mar. 1982 p 43-62 refs
Avail: NTIS HC A07/MF A01 CSCL 01A

The design of a high lift system for the NASA advanced LFC airfoil designed by Pfenninger is described. The high lift system consists of both leading and trailing edge flaps. A 3 meter semispan, 1 meter chord wing model using the above airfoil and high lift system is under construction and will be tested in the NASA Langley 4 by 7 meter tunnel. This model will have two separate full span leading edge flaps (0.10c and 0.12c) and one full span trailing edge flap (0.25c). The performance of this high lift system was predicted by the NASA two dimensional viscous multicomponent airfoil program. This program was also used to predict the characteristics of the LFC airfoils developed by the Douglas Aircraft Company and Lockheed-Georgia Aircraft Company. J.D.H.

N82-20152*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Sciences and Mechanics.

STABILITY OF BOUNDARY LAYERS WITH POROUS SUCTION STRIPS: EXPERIMENT AND THEORY
G. A. Reynolds, W. S. Saric, H. L. Reed, and A. H. Nayfeh *In* NASA. Langley Research Center Laminar Flow Control Mar. 1982 p 63-74 ref

(Grants NsG-1608; NsG-1255; Contract N00014-75-C-0381)
Avail: NTIS HC A07/MF A01 CSCL 01A

Low turbulence tunnel experiments on the stability and transition of 2 D boundary layers on flat plates with and without suction are described. A number of general suction cases are discussed. Test results showed that the maximum stabilization occurred when the suction was moved toward the Branch I neutral point. An analytical study of the stability of two dimensional, incompressible boundary layer flows over plates with suction through porous strips was performed. The mean flow was calculated using linearized triple deck, closed form solutions. The stability results of the triple deck theory are shown to be in good agreement with those of the interacting boundary layers. An analytical optimization scheme for the suction configuration was developd. Numerical calculations were performed corresponding to the experimental configurations. In each case, the theory correctly predicts the experimental results. J.D.H.

N82-20153*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROBABILITY OF LAMINAR FLOW LOSS BECAUSE OF ICE CRYSTAL ENCOUNTERS
Richard E. Davis *In its* Laminar Flow Control Mar. 1982 p 75-94 refs
Avail: NTIS HC A07/MF A01 CSCL 01A

A method for combining the cloud detector observation results from the Global Atmospheric Sampling Program (GASP) with Knollenberg probe observations of cloud particle concentration from other programs to derive estimates of the ambient concentration of particles larger than a given size was developed. The method was applied to estimate the probability of encountering particle concentrations which would degrade the performance of laminar flow control (LFC) aircraft. It is concluded that LF loss should occur only about one percent of the time in clear air and that flight within clouds should always result in a significant loss of LF, with 90 percent LF loss occurring about one percent of the time. Preliminary estimates of cloud encounter probability are presented for four airline routes, and conclusions are presented as to the best altitudes for cloud avoidance in extratropical and tropical latitudes. Author

N82-20154*# Rockwell International Corp., Los Angeles, Calif. Aircraft Div.
SPF/DB TITANIUM CONCEPTS FOR STRUCTURAL EFFICIENCY FOI HC
V. E. Wilson *In* NASA. Langley Research Center Laminar Flow Control Mar. 1982 p 95-110

Avail: NTIS HC A07/MF A01 CSCL 01A

Illustrations for a presentation on superplastic forming/diffusion bonding titanium design concepts are presented. Sandwich skin panels with hat section, semicircular corrugation, sine wave, and truss cores are shown. The fabrication of wing panels is illustrated, and applications to the design of advanced variable sweep bombers summarized. J.D.H.

N82-20155*# McDonnell-Douglas Corp., Long Beach, Calif.
SPF/DB TITANIUM LFC POROUS PANEL CONCEPT
Neil R. Williams *In* NASA. Langley Research Center Laminar Flow Control Mar. 1982 p 111-138

Avail: NTIS HC A07/MF A01 CSCL 01A

Illustrations for a presentation demonstrating superplastic forming/diffusion bonding titanium porous panels are presented. Fabrication phases, sandwich panels, load bearing qualities, microstructure, and panel surface after finishing are illustrated. J.D.H.

N82-20156*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STATIC INTERNAL PERFORMANCE OF SINGLE EXPANSION-RAMP NOZZLES WITH THRUST VECTORING AND REVERSING
Richard J. Re and Bobby L. Berrier Mar. 1982 143 p refs
(NASA-TP-1962; L-14902; NAS 1.60:1962) Avail: NTIS HC A07/MF A01 CSCL 01A

The effects of geometric design parameters on the internal performance of nonaxisymmetric single expansion-ramp nozzles were investigated at nozzle pressure ratios up to approximately 10. Forward-flight (cruise), vectored-thrust, and reversed-thrust nozzle operating modes were investigated. B.W.

N82-20157# Transportation Systems Center, Cambridge, Mass. Research and Special Programs Administration.
CHICAGO MONOSTATIC ACOUSTIC VORTEX SENSING SYSTEM. VOLUME 2: DECAY OF B-707 AND DC-8 VORTICES Final Report, Oct. 1976 - Dec. 1979
D. C. Burnham and J. N. Hallock Washington FAA Sep. 1981 136 p refs
(AD-A109518; DOT-TSL-FAA-79-18-Vol-2;
FAA-RD-79-103-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 01/2

A Monostatic Acoustic Vortex Sensing System (MAVSS) was installed at Chicago's O'Hare International Airport to measure the strength and decay of aircraft wake vortices from landing aircraft. The MAVSS consists of an array of acoustic antennas which measure the vertical profile up to 60-m altitude of the vertical component of the wind. The decay in wake vortex strength is measured as the vortex passes over successive antennas in the array. In this volume, the data are analyzed to examine whether landing B-707 and DC-8 aircraft need to be divided into Heavy and non-Heavy categories on the basis of wake vortex hazard. Volume I (published in October 1979) described the MAVSS principles of operation, the hardware developed, and the data reduction methods employed. GRA

N82-20158# Calspan Field Services, Inc., Arnold Air Force Station, Tenn. AEDC Div.
AERODYNAMIC CHARACTERISTICS AND STORE LOADS OF A 1/24 SCALE F-111 AIRCRAFT MODEL WITH THREE EXTERNAL STORE LOADINGS Final Report
C. F. Anderson AEDC Jul. 1981 41 p refs Sponsored by Air Force
(AD-A109449; AEDC-TSR-81-P30) Avail: NTIS HC A03/MF A01 CSCL 02/4

The 1/24 scale F-111 aircraft model was tested in the Aerodynamic Wind Tunnel (4T) to obtain simultaneous measurements of the aircraft and store aerodynamic loads. Static stability and store loads data were obtained at 4 wind sweep angles for Mach numbers from 0.6 to 1.2. The angle of attack was varied from -2 to 24 deg and the angle of sideslip was varied from -10 to 10 deg. Author (GRA)

N82-20159# Committee on Commerce, Science, and Transportation (U. S. Senate).
FUTURE OF GENERAL AND COMMUTER AVIATION TECHNOLOGY AND TRADE
Washington GPO 1981 317 p refs Joint hearing before the Subcomm. on Transportation, Aviation and Materials of the Comm. on Sci. and Technol. and the Subcomm. on Aviation of the Comm. on Commerce, Sci., and Transportation, 97th Congr., 1st Sess., No. 42, 27 Aug. 1981
(GPO-85-832) Avail: Subcomm. on Transportation, Aviation and Materials

Problems affecting the aircraft industry are discussed and include Federal tax laws, interest rates, fuel costs, and government involvement in civil aviation. Aeronautical research programs and the funding that they receive were reviewed. The economic contribution of general aviation is considered and ways in which government can assist the general aviation industries are highlighted. T.M.

N82-20160# Naval Ocean Systems Center, San Diego, Calif. Bioacoustics and Bionics Div.
PROJECT SEA HUNT: A REPORT ON PROTOTYPE DEVELOPMENT AND TESTS Final Report, 1979 - 1980
J. V. Simmons, Jr. Jul. 1981 66 p refs
(AD-A109510; NOSC/TR-746) Avail: NTIS HC A04/MF A01 CSCL 06/7

During FY 79-80, a prototype Sea Hunt system was built and tested. Sea Hunt utilizes trained pigeons carried in a container attached to the underside of a helicopter to locate objects colored red, yellow or orange. Development of hardware and pigeon training methods are presented. Conclusions based on test data are: Sea Hunt improves detection and localization of appropriate targets; the system is reliable and easily serviced and maintained. A recommendation is made to conduct operational field testing of Sea Hunt at a Coast Guard air station. GRA

N82-20161# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

DEVELOPMENT OF AN EJECTION SEAT BALLAST BLOCK FOR THE S-3A AIRCRAFT Final Report

Dan Lorch 4 Nov. 1981 18 p
(AD-A109808; NADC-81272-60) Avail: NTIS
HC A02/MF A01 CSCL 01/3

The purpose of this Ballast Block is to ballast an unoccupied ejection seat in the S-3A aircraft. The block adjusts the mass of the seat and the center of gravity to fall within acceptable limits to prevent rapid seat acceleration and tumbling both of which might cause interference with an ejected occupied seat. Author (GRA)

N82-20162# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

DEVELOPMENT OF A SUPPORTED AIRBAG EJECTION RESTRAINT (SABER) FOR WINDBLAST PROTECTION

Dan Lorch 4 Nov. 1981 22 p refs
(AD-A109807; NADC-81274-60) Avail: NTIS
HC A02/MF A01 CSCL 01/3

This is a preliminary investigation to develop an airbag mounted on an ejection seat. The airbag is designed to deploy during an emergency ejection and may provide both prepositioning of the aircrewman and windblast protection for his upper torso. The airbag is tightly packed on a flexible steel strap which is mounted at the aircrewman's shoulder level. Quick disconnect fittings on either side permit the crewmen to enter the seat: they also disconnect the entire system upon seat/man separation. Author (GRA)

N82-20163# National Oceanic and Atmospheric Administration, Norman, Okla.

DOPPLER RADAR-RESEARCH AND APPLICATION TO AVIATION FLIGHT SAFETY, 1977 - 1979 Final Report

J. T. Lee Jun. 1981 45 p refs
(Contract DOT-FA77WAI-808)
(AD-A109845; FAA-RD-81-79) Avail: NTIS
HC A03/MF A01 CSCL 17/9

Thunderstorm turbulence detection and the display of the turbulence location offer a significant advance toward improvement in flight safety and utilization of critical air space. A cooperative program involving the Federal Aviation Administration, U.S. Air Force's Aeronautical Systems Command, and the National Oceanic and Atmospheric Administration's National Severe Storms Laboratory has been conducted under a code name of 'Rough Rider'. An F-4-C aircraft instrumented to record turbulence, temperature and wind during thunderstorm penetrations has been used to obtain in situ measurements of these parameters concurrently with Doppler and conventional weather radar observations. The results of this program indicate that the Doppler measured radial wind component's spectral width holds promise as a turbulence indicator. Turbulence of the severe or greater nature was always accompanied by spectral widths greater than 4 m/s. A second part of the program was to display forenoted Doppler radar data in real time at a Radar Approach Control office and at an Air Route Traffic Control Center. This display provided an insight into requirements for an operational system. Author (GRA)

N82-20164# Environmental Research and Technology, Inc., Concord, Mass.

DETECTION AND TRACKING ALGORITHM REFINEMENT Final Technical Report

G. B. Gustafson and R. K. Crane Washington DOT Oct. 1981 194 p refs
(Contracts DTFA01-81-Y-10521; NA-81-RAC-00072)
(AD-A109517; ERT-P-8035; FAA-RD-81-80) Avail: NTIS
HC A09/MF A01 CSCL 01/2

A previous aircraft hazard detection algorithm shown to have high detectability but with a high false alarm rate has been modified to improve reliability for aircraft warnings. The derived Doppler parameter tangential (or radial) shear is incorporated as a radar cell attribute and used in the determination of significant hazard. Further modifications to the processing structure allow for radar operation in a non-automatic mode, thereby accommodating arbitrary changes in PRF, integrator type or scan geometry. A revised output format provides a sorted hierarchical list of derived meteorological structures in a form readily adapted to a graphics display. Author (GRA)

N82-20165# Army Test and Evaluation Command, Fort Huachuca, Ariz.

SAFETY (AVIATION MATERIAL) Final Report

18 Jan. 1982 45 p
(AD-A110361) Avail: NTIS HC A03/MF A01 CSCL 01/2

Existing test methodology and techniques necessary to determine the degree to which aviation material meets the safety requirements stated in the requirements documents are discussed. These procedures cover the requirements, aircraft armaments, airframes, ejection seats, and electrical, mechanical, and miscellaneous hazards related to Army aircraft. A guide for laser safety is included. R.J.F.

N82-20166 Ohio Univ., Athens.

UTD TERRAIN REFLECTION MODEL WITH APPLICATION TO ILS GLIDE SLOPE Ph.D. Thesis

Vichate Ungvichian 1981 279 p
Avail: Univ. Microfilms Order No. 8126070

A terrain reflection model based on the uniform theory of diffraction (UTD) is described which can accommodate any piecewise linear terrain profile, requires less computer time than the physical optics models, is capable of including transverse terrain effects, and determines the reflected fields with all important diffraction and blockage effects included. The results when compared to measurements indicate that this UTD model can accurately predict ILS flight path effects due to ground irregularity. Futhermore, the results obtained from this UTD model are compared against the predictions of a previously developed physical optics (PO) model. UTD and PO predictions in most cases agree with one another, but better results are obtained from the UTD model for truncated or severely upsloping terrain. Dissert. Abstr.

N82-20167# Committee on Science and Technology (U. S. House).

AIR TRAFFIC CONTROL EN ROUTE COMPUTER MODERNIZATION

Washington GPO 1981 28 p Report presented by the Subcomm. on Transportation, Aviation, and Materials of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., Aug. 1981
(GPO-82-773) Avail: Subcomm. on Transportation, Aviation, and Materials

The need for full modernization and replacement of the enroute computers is discussed. Interim replacement options are considered. The service life of the current system and the FAA's ability to manage the enroute computer modernization were examined. Anticipated costs and computer outages are presented. It is concluded that proceeding with full modernization is the best way to achieve needed productivity benefits and assure continued safe operation in the enroute airspace. T.M.

N82-20168# Committee on Science and Technology (U. S. House).

FAA AIR TRAFFIC CONTROL COMPUTER MODERNIZATION

Washington GPO 1981 101 p Hearings before the Subcomm. on Transportation, Aviation and Materials of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 13, 16-18 Jun. 1981
(GPO-82-375) Avail: Subcomm. on Transportation, Aviation and Materials

The issues of air traffic safety, the separation of air traffic, and the movement of traffic from one part of the country to another, are discussed. The proposed computer system was examined. Questions concerning whether the current system can be safely operated while a new system is being implemented and whether the overall cost effectiveness of the new system is adequate, are considered. The FAA's plans were reviewed along with its management of the current system. T.M.

N82-20169# Committee on Science and Technology (U. S. House).

AIRCRAFT COLLISION AVOIDANCE AND AIR TRAFFIC SAFETY

Washington GPO 1982 80 p Hearing before the Subcomm. on Transportation Aviation and Materials of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 52, 2 Sep. 1981
(GPO-88-545) Avail: Subcomm. on Transportation, Aviation and Materials

The threat alert and collision avoidance system is examined. The technical and policy aspects of air transportation safety are reviewed. S.L.

N82-20172# Transportation Systems Center, Cambridge, Mass. Research and Special Programs Administration.

STATISTICAL ANALYSIS AND TIME SERIES MODELING OF AIR TRAFFIC OPERATIONS DATA FROM FLIGHT SERVICE STATIONS AND TERMINAL RADAR APPROACH CONTROL FACILITIES: TWO CASE STUDIES Final Report, Oct. 1979 - Sep. 1980

Norman J. Meyerhoff and George H. Wang Washington FAA Oct. 1981 60 p refs
(AD-A109873; TSC-FAA-81-18; DTS-522; DOT-FAA-EM-82-13) Avail: NTIS HC A04/MF A01 CSCL 17/7

Two statistical procedures have been developed to estimate hourly or daily aircraft counts. These counts can then be transformed into estimates of instantaneous air counts. The first procedure estimates the stable (deterministic) mean level of hourly or day of the week patterns by statistical models. The second procedure estimates both deterministic and stochastic periodic (hourly or day of the week) patterns by stochastic time series models. Both statistical procedures have been used to analyze traffic at the St. Louis TRACON and Los Angeles Flight Service Station. This report analyzes hourly variations in operations at the St. Louis TRACON, for each day in four representative months in 1979. It also analyzes daily variations for three months in 1979 of flight plan activity at the Los Angeles FSS. The results of these analyses are given preliminary interpretations, and are available for possible application to other facilities. They are also available for other applications, such as estimation of instantaneous air counts in hubs. GRA

N82-20173# Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.

OPERATIONAL DELAY DAY FORECASTS FOR THE 20 AIR ROUTE TRAFFIC CONTROL CENTERS FOR THE YEAR 1982 THROUGH 2011 Final Report

W. Livingston Jun. 1981 24 p refs
(AD-A109844; FAA-RD-81-93) Avail: NTIS HC A02/MF A01 CSCL 17/7

The effect of forecasts of increased traffic growth at each of the 20 CONUS Air Route Traffic Control Centers has been examined to determine the impact upon processor utilization of the Central Computer Complex at each center. The study assumes continuation of the current operational capabilities and procedures at each center, and is based upon field data collected between June 1980 and January 1981, and the June 1981 forecast of the IFR aircraft handled at the 20 Air Route Traffic Control Centers. Other factors such as channel utilization are not included in this phase of the study. Author (GRA)

N82-20174*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SIMULATION OF THE XV-15 TILT ROTOR RESEARCH AIRCRAFT

Gary B. Churchill (Army Aeromechanics Lab., Moffett Field, Calif.) and Daniel C. Dugan Mar. 1982 23 p refs
(NASA-TM-84222; A-8848; NAS 1.15:84222) Avail: NTIS HC A02/MF A01 CSCL 01C

The effective use of simulation from issuance of the request for proposal through conduct of a flight test program for the XV-15 Tilt Rotor Research Aircraft is discussed. From program inception, simulation complemented all phases of XV-15 development. The initial simulation evaluations during the source evaluation board proceedings contributed significantly to performance and stability and control evaluations. Eight subsequent simulation periods provided major contributions in the areas of control concepts; cockpit configuration; handling qualities; pilot workload; failure effects and recovery procedures; and flight boundary problems and recovery procedures. The fidelity of the simulation also made it a valuable pilot training aid, as well as a suitable tool for military and civil mission evaluations. Simulation also provided valuable design data for refinement of automatic flight control systems. Throughout the program, fidelity was a prime issue and resulted in unique data and methods for fidelity evaluation which are presented and discussed. R.J.F.

N82-20175*# National Aeronautics and Space Administration, Washington, D. C.

FATIGUE ANALYSIS OF COMPOSITE MATERIALS USING THE FAIL-SAFE CONCEPT

G. Stievenard Jan. 1982 11 p Transl. into ENGLISH of AGARD Rept. AGARD-CP-297 (France), Mar. 1981 p 1-15 Translation was announced as N81-26131 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76671; NAS 1.15:76671) Avail: NTIS HC A02/MF A01 CSCL 11D

If R1 is the probability of having a crack on a flight component and R2 is the probability of seeing this crack propagate between two scheduled inspections, the global failure regulation states that this product must not exceed 0.0000001. R.J.F.

N82-20176# Aeronautical Research Labs., Melbourne (Australia).

SEA KING FLIGHT TESTS PITOT-STATIC PROBE AND DIRECTIONAL VANE INSTRUMENTATION

D. T. Hourigan and M. J. Williams Jul. 1981 26 p refs
(AD-A109427; ARL/AERO-TM-332; AR-002-298) Avail: NTIS HC A03/MF A01 CSCL 01/3

A short description is given of the pitot-static pressure probe and vanes mounted on a nose boom for Sea King flight tests. Also described is a probe which was trailed below the aircraft to determine the position error of the boom probe. Results of wind tunnel calibrations of these probes are given. Author (GRA)

N82-20177# Aeronautical Research Labs., Melbourne (Australia).

BOOM PROBE POSITION ERROR CORRECTIONS FOR SEA KING Mk 50 FLIGHT TESTS

M. J. Williams Jul. 1981 34 p refs
(AD-A109428; ARL/AERO-TM-331; AR-002-297) Avail: NTIS HC A03/MF A01 CSCL 01/3

Position error has been determined for a nose-boom mounted pitot static probe installed on a Sea King Mk. 50 helicopter. The error is sensibly constant in the speed range 35 - 110 knots and is unchanged in climb and descent. Corrections to be applied to indicated nose boom values are 7.5 knots in velocity, and up to 80 ft. in altitude. Author (GRA)

N82-20178# Analytical Methods, Inc., Redmond, Wash.

A SURFACE SINGULARITY METHOD FOR ROTORS IN HOVER OR CLIMB Final Report, 29 Mar. 1979 - 30 Sep. 1981

J. Summa and Brian Maskew Dec. 1981 142 p refs
(Contract DAAJ02-76-C-0069; DA Proj. 1F2-62209-AH-76)
(AD-A109687; AMI-8103; USAAVRADCOM-TR-81-D-23) Avail: NTIS HC A07/MF A01 CSCL 20/4

A surface singularity potential flow code, ROTAIR, has been assembled for the calculation of detailed surface pressures on rotors in hover or climb. This method is basically a marriage of two codes: the fixed-wing surface singularity doublet code and the rotor lifting-surface code. The program includes a tip vortex separation model. Also, the rotor tip surface is panelled so that pressures are calculated right around the tip-edge surface. Preliminary calculations have verified the capabilities of the program for computing blade surface properties in the presence of a close-vortex passage. Additionally, calculated pressure distributions compare favorably with experimental data for a low aspect ratio two-bladed rotor, and the calculated circulation distribution is consistent with that computed earlier with the lifting-surface code. Finally, the newly developed far-wake doublet model promises to keep computing efforts practical. Author (GRA)

N82-20179# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

A SHORT TAKEOFF PERFORMANCE COMPUTER PROGRAM Final Report

David Bruce Kobus 25 Nov. 1981 122 p refs
(ZR020302)
(AD-A109861; NADC-81259-60) Avail: NTIS HC A06/MF A01 CSCL 01/3

A short takeoff performance computer program has been developed by NAVAIRDEVCEN to be used for performance estimation and conceptual aircraft design. Author (GRA)

N82-20180*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SIMULATOR STUDY OF A PICTORIAL DISPLAY FOR GENERAL AVIATION INSTRUMENT FLIGHT

James J. Adams Mar. 1982 59 p refs
(NASA-TP-1963; L-14675; NAS 1.60:1963) Avail: NTIS
HC A04/MF A01 CSCL 01D

A simulation study of a computer drawn pictorial display involved a flight task that included an en route segment, terminal area maneuvering, a final approach, a missed approach, and a hold. The pictorial display consists of the drawing of boxes which either move along the desired path or are fixed at designated way points. Two boxes may be shown at all times, one related to the active way point and the other related to the standby way point. Ground tracks and vertical profiles of the flights, time histories of the final approach, and comments were obtained from time pilots. The results demonstrate the accuracy and consistency with which the segments of the flight are executed. The pilots found that the display is easy to learn and to use; that it provides good situation awareness, and that it could improve the safety of flight. The small size of the display, the lack of numerical information on pitch, roll, and heading angles, and the lack of definition of the boundaries of the conventional glide slope and localizer areas were criticized. A.R.H.

N82-20181# Arizona Univ., Tucson. Optical Sciences Center.
DESIGN OF A CATADIOPTRIC VCASS HELMET-MOUNTED DISPLAY Final Report, 15 Feb. 1978 - 15 Sep. 1979
R. A. Buchroeder, G. W. Seeley, and D. Vukobratovich Wright-Patterson AFB, Ohio AFAMRL Nov. 1981 73 p refs
(Contract F33615-78-C-0520; AF Proj. 7184)
(AD-A108431; AFAMRL-TR-81-133) Avail: NTIS
HC A04/MF A01 CSCL 01/3

A new wide-angle, dual-eye, helmet-mounted display has been designed. Two images combine, with a 15 deg. central field overlap, to provide a panoramic display 102 deg. wide by 45 deg. tall, with a resolution to approximately 1000 TV lines per eye. The image-generating device is a miniature 18 mm CRT. The optics, which are symmetrical for both eyes, comprise partially reflective plastic reflectors, five small glass lens elements, and a 2:1 fiber optic magnifier. A 12 mm exit pupil is obtained with enough eye relief to permit the user to wear glasses, with an interpupillary adjustment of 58 to 73 mm. Total weight of the device, not including the Air Force flight helmet type HGU-2A/P upon which it is mounted, is less than 3 pounds. Author (GRA)

N82-20182*# National Aeronautics and Space Administration, Washington, D. C.
CONDITIONS OF GENERATION AND METHODS OF DAMPING THE INLET VORTEX OF A TURBOJET ENGINE
Tadeusz Gajewski Mar. 1982 14 p refs Transl. into ENGLISH from Tech. Lotnicza Astronaut. (Poland), v. 35, no. 11, Nov. 1980 p 5-8 Translation was announced as A81-19442 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76678; NAS 1.15:76678) Avail: NTIS
HC A02/MF A01 CSCL 21E

An aeromechanical analysis of the generation of an inlet vortex in a turbojet engine is presented. Methods for the prevention of vortex generation and methods of vortex damping are described. Author

N82-20184# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Turbine Engine Div.
A RETIREMENT-FOR-CAUSE STUDY OF AN ENGINE TURBINE DISK Final Report, 1975 - 1978
Richard J. Hill, Walter H. Reimann, and Jon S. Ogg Nov. 1981 35 p refs
(AF Proj. 3066)
(AD-A109724; AFWAL-TR-81-2094) Avail: NTIS
HC A03/MF A01 CSCL 21/5

This report describes a procedure which allows for the retirement of turbine engine disks for actual life exhaustion rather than a statistical minimum limit of a population. The procedure is applied to the third stage turbine disk of the TF33 engine for demonstration purposes. The demonstration included detailed stress and fracture analysis in addition to actual spin pit testing. All spin pit testing was done by the Navy at the Naval Propulsion Center. The effort was a technical success but could not be implemented for the TF33 engine for logistic reasons. Author (GRA)

N82-20185# Garrett Corp., Phoenix, Ariz. Pneumatic Systems Div.
DUALCHANNEL FUEL CONTROL PROGRAM, PHASE 2 Final Report, Apr. 1978 - Aug. 1980
John Itamoto Adelphi, Md. HDL Aug. 1981 81 p refs
(Contract N00019-78-G-0288)
(AD-A109715; Rept-41-2710A; HDL-CR-81-288-1) Avail: NTIS HC A05/MF A01 CSCL 21/5

This report presents the results of a program conducted by Garrett to investigate a dual-channel fuel control for gas turbine engines which could be used in military ground vehicles. The program presents a control system with requirements that are deemed necessary to provide a military gas turbine-powered vehicle with battlefield survivability and minimal restriction on the capability of completing the vehicle mission. This study showed that a parallel dissimilar technology backup control was the desirable approach and that fluidics was the ideal technology to perform this function due to its low cost, reliability, immunity to radiation, and ability to perform computation and logic commensurate with the requirements of achieving mission completion with no degradation in the vehicle's battlefield survivability. GRA

N82-20186*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A TRANSLATIONAL VELOCITY COMMAND SYSTEM FOR VTOL LOW SPEED FLIGHT
Vernon K. Merrick Mar. 1982 30 p refs
(NASA-TM-84215; A-8825; NAS 1.15:84215) Avail: NTIS
HC A03/MF A01 CSCL 01C

A translational velocity flight controller, suitable for very low speed maneuvering, is described and its application to a large class of VTOL aircraft from jet lift to propeller driven types is analyzed. Estimates for the more critical lateral axis lead to the conclusion that the controller would provide a jet lift (high disk loading) VTOL aircraft with satisfactory 'hands off' station keeping in operational conditions more stringent than any specified in current or projected requirements. It also seems likely that ducted fan or propeller driven (low disk loading) VTOL aircraft would have acceptable hovering handling qualities even in high turbulence, although in these conditions pilot intervention to maintain satisfactory station keeping would probably be required for landing in restricted areas. Author

N82-20187*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DESIGN CRITERIA FOR FLIGHTPATH AND AIRSPEED CONTROL FOR THE APPROACH AND LANDING OF STOL AIRCRAFT
James A. Franklin, Robert C. Innis, Gordon H. Hardy, and Jack D. Stephenson Mar. 1982 98 p refs
(NASA-TP-1911; NAS 1.60:1911; A-8645) Avail: NTIS
HC A05/MF A01 CSCL 01C

A flight research program was conducted to assess requirements for flightpath and airspeed control for glide-slope tracking during a precision approach and for flare control, particularly as applied to powered-lift, short takeoff and landing (STOL) aircraft. Ames Research Center's Augmentor Wing Research Aircraft was used to fly approaches on a 7.5 deg glide slope to landings on a 30 X 518 m (100 X 1700 ft) STOL runway. The dominant aircraft response characteristics determined were flightpath overshoot, flightpath-airspeed coupling, and initial flightpath response time. The significant contribution to control of the landing flare using pitch attitude was the short-term flightpath response. The limiting condition for initial flightpath response time for flare control with thrust was also identified. It is possible to define flying-qualities design criteria for glide-slope and flare control based on the aforementioned response characteristics. M.D.K.

N82-20188*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SELF-TUNING REGULATORS FOR MULTICYCLIC CONTROL OF HELICOPTER VIBRATION
Wayne Johnson Mar. 1982 50 p refs
(NASA-TP-1996; NAS 1.60:1996; A-8719) Avail: NTIS
HC A03/MF A01 CSCL 01C

A class of algorithms for the multicyclic control of helicopter vibration and loads is derived and discussed. This class is characterized by a linear, quasi-static, frequency-domain model of the helicopter response to control; identification of the helicopter model by least-squared-error or Kalman filter methods; and a minimum variance or quadratic performance function controller. Previous research on such controllers is reviewed. The derivations and discussions cover the helicopter model; the identification problem, including both off-line and on-line (recursive) algorithms; the control problem, including both open-loop and closed-loop feedback; and the various regulator configurations possible within this class. Conclusions from analysis and numerical simulations of the regulators provide guidance in the design and selection of algorithms for further development, including wind tunnel and flight tests. M.G.

N82-20189# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

DEVELOPMENT OF LONGITUDINAL EQUIVALENT SYSTEM MODELS FOR SELECTED US NAVY TACTICAL AIRCRAFT Final Report, 1 Jan. 1980 - 1 Jul. 1981

David E. Bischoff 1 Aug. 1981 86 p refs
(WF41400000)
(AD-A109488; NADC-81069-60) Avail: NTIS
HC A05/MF A01 CSCL 01/3

Frequency response matching techniques were applied to the longitudinal dynamics of five Navy tactical aircraft: the A-6, A-7, S-3, F-14 and F-18, to obtain equivalent system models of their short period response. The pitch rate transfer function was matched with a first order numerator over second order denominator equivalent system model. Freeing the numerator root (L Alpha) in the matching process resulted in large unrealistic values of the numerator term. The variation in L Alpha was reduced by simultaneously matching the pitch rate and normal acceleration transfer functions with the denominators constrained to be equal. The mismatch parameter associated with aircraft configurations which were not amenable to the first over second order equivalent models could be improved by identifying additional roots in the equivalent model. Correlation of the data with the requirements of MIL-F-8785C was straightforward for both short period damping ratio and time delay. Correlation of the frequency requirements, however, required that the control anticipation parameter definition be modified to represent the maximum rather than the initial pitch acceleration response. Author (GRA)

N82-20190# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structures and Dynamics Div.

CATEGORIZATION OF ATMOSPHERIC TURBULENCE IN TERMS OF AIRCRAFT RESPONSE FOR USE IN TURBULENCE REPORTS AND FORECASTS Final Report, Jan. 1979 - Feb. 1980

Elijah W. Turner, Jackie C. Sims, and Andy White Nov. 1981 146 p refs
(AF Proj. 7500)
(AD-A109585; AFWAL-TR-81-3058) Avail: NTIS
HC A07/MF A01 CSCL 01/2

This report describes a method of calculating the gust sensitivity of conventional aircraft and presents gust sensitivity values for a total of 69 military and civilian aircraft. Gust sensitivity is presented in terms of the vertical load factor response of aircraft per foot per second discrete gust. The information is intended to permit organizations engaged in the forecasting of atmospheric turbulence to properly take into consideration the capability of particular aircraft to operate safely in various turbulence levels. The basis for calculating the gust sensitivity is the so called 'gust loads formula' which is a single degree of freedom mathematical model of the aircraft excited by a one-minus-cosine shaped wave form of 25 chord wave length. An empirical equation is used to calculate the aircraft normal force coefficient over the subsonic, transonic, and supersonic airspeed range. Author (GRA)

N82-20191# Army Aviation Research and Development Command, St. Louis, Mo.

INTEGRATION OF CONTROLS AND DISPLAYS IN U.S. ARMY HELICOPTER COCKPITS

J. A. Dasaro and C. T. Elliott Nov. 1981 28 p refs
(AD-A109594; USAAVRADCOM-TR-81-E-4) Avail: NTIS
HC A03/MF A01 CSCL 01/4

The U.S. Army has embarked on a digital avionic program with the immediate goal of developing an integrated avionic system which would eliminate all dedicated communication, navigation, and identification (CNI) control and display units (CDU's) from the cockpit. The CNI equipments were viewed as a well defined set whose control and display functions could be integrated at minimal risk. The integrated CDU developed can be used to in-service or developmental aircraft to alleviate space problems, reduce pilot workload, and increase CNI capability. A four-phase effort consisting of design, hardware fabrication, system integration, and testing was established. A cockpit was synthesized for the BLACK HAWK helicopter in which all crew functions were accomplished using multifunction interactive controls and displays. The results of this effort are presented, together with the status of the hardware currently in fabrication and the Army's plans for bench and flight testing. This exploratory effort is called the Army Digital Avionic System (ADAS). GRA

N82-20192*# National Aeronautics and Space Administration, Washington, D. C.

SONIC WIND TUNNEL OF THE INSTITUTE OF FLUID MECHANICS OF LILLE

G. Gontier Mar. 1982 17 p refs Transl. into ENGLISH from La Recherche Aeronautique (France), no. 10, 1949 p 3-9 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76687; NAS 1.15:76687) Avail: NTIS
HC A02/MF A01 CSCL 14E

A 65 hp wind tunnel with a 40 mm by 240 mm airstream is described. This wind tunnel can achieve speeds in the neighborhood of the speed of sound, both subsonic and supersonic. It is useful in studying the transonic bump technique. The test section is 600 mm long. The side walls are made of transparent glass, and both the upper and lower walls are deformable, each through the use of nine jacks with elastic sleeves. So as to avoid condensation, the airstream's temperature is stabilized by an air exchanger at the temperature of the outside air. The first results for supersonic operation, the distribution of Mach numbers within the airstream between the parallel walls, the value of the use factor, and the diffuser's efficiency are all given. B.W.

N82-20193# Sandia Labs., Albuquerque, N. Mex. Dept. of Engineering Science and Mechanics.

METHODS FOR ANALYSIS OF WIND RIPPLE IN WIND TURBINES

R. E. Akins Apr. 1981 59 p refs
(Contract DE-AC04-76-DP-00789)
(SAND-81-7006) Avail: NTIS HC A04/MF A01

Efficient and economical utilization of wind power requires the ability to measure and ultimately predict the effects fluctuations in the incident wind have on a wind turbine. In order to begin to quantitatively assess these effects, experimental techniques were developed to allow analysis of full-scale performance of wind turbines with particular emphasis on the effects caused by turbulence in the incident wind. R.J.F.

N82-20194# Textron Bell Helicopter, Fort Worth, Tex.

ROTORCRAFT FLIGHT SIMULATION COMPUTER PROGRAM C81 WITH DATAMAP INTERFACE. VOLUME 1: USER'S MANUAL Final Report, Jul. - Dec. 1979

James R. VanGaasbeek Ft. Eustis, Va. Army Research and Technology Lab. Oct. 1981 576 p refs
(Contract DAAK51-79-C-0015, DA Proj. 1L1-62209-AH-76)
(AD-A108246; BHT-699-099-111-Vol-1;
USAAVRADCOM-TR-80-D-38A) Avail: NTIS
HC A25/MF A01 CSCL 01/3

This report documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAP80. The accompanying program for calculating fully-coupled rotor blade mode shapes is called DNAM05, and an associated rotor wake program is called AR9102. The AGAP80 version of C81 was developed by adding some analytical features to the AGAJ76 version, and including the ability to generate Data Transfer Files for use by the File Creation Program of DATAMAP. The User's Manual, contains the detailed information necessary for setting up an input data deck and interpreting the computed data. GRA

N82-20195# Singer Co., Binghamton, N.Y. Link Div.

STUDY AND DESIGN OF HIGH G AUGMENTATION DEVICES FOR FLIGHT SIMULATORS Final Report

Gerald J. Kron, Frank M. Cardullo (MIT), and Laurence R. Young Wright-Patterson AFB, Ohio Air Force Human Resources Lab. Dec. 1981 548 p refs
(Contract F33615-77-C-0055; AF Proj. 6114)
(AD-A109127; AFHRL-TP-80-41) Avail: NTIS
HC A23/MF A01 CSCL 06/19

The physiological effects of accelerated flight are considered to contain perceptual information important to vehicle control and contribute to defining flight envelopes accessible to the pilot.

As such, these effects, or acceptable surrogates thereof, must be considered for inclusion within ground-based devices designed to train pilots for their flight mission. This study investigates the physiological effects of accelerated flight within the cardiovascular musculoskeletal, visual, auditory, tactile, and respiratory systems. The study advances conceptual designs of research-oriented devices thought capable of inducing, in the unaccelerated state, the perception of accelerated flight physiological effects. The authors conclude that one of the most important effects impacting vehicle control and successful mission execution is loss of visual acuity under accelerated flight conditions and propose a dual effect matrixed liquid crystal variable transparency visor to replicate this effect. A math model to simulate the effect is also presented. The study contains a bibliography of 277 references pertinent to accelerated flight physiological effects and equivalent simulation device design. The study presents an appendix containing an annotated bibliography of 133 references. Author (GRA)

N82-20339*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IDENTIFICATION OF MULTIVARIABLE HIGH PERFORMANCE TURBOFAN ENGINE DYNAMICS FROM CLOSED LOOP DATA
Walter Merrill 1982 16 p refs Presented at the 6th IFAC Symp. on Identification and System Parameter Estimation, Washington, D.C., 7-11 Jun. 1982
(NASA-TM-82785; E-1120; NAS 1.15:82785) Avail: NTIS HC A02/MF A01 CSCL 21E

The multivariable instrumental variable/approximate maximum likelihood (IV/AML) method or recursive time-series analysis is used to identify the multivariable (four inputs-three outputs) dynamics of the Pratt and Whitney F100 engine. A detailed nonlinear engine simulation is used to determine linear engine model structures and parameters at an operating point using open loop data. Also, the IV/AML method is used in a direct identification mode to identify models from actual closed loop engine test data. Models identified from simulated and test data are compared to determine a final model structure and parameterization that can predict engine response for a wide class of inputs. The ability of the IV/AML algorithm to identify useful dynamic models from engine test data is assessed. Author

N82-20343# Southampton Univ. (England). Inst. of Sound and Vibration Research.
VIBRATION OF STRUCTURES EXCITED ACOUSTICALLY

B. L. Clarkson *In* AGARD Mod. Data Anal. Tech. in Noise and Vibration Probl. Nov. 1981 p 19-37 refs

Avail: NTIS HC A03/MF A01

The analytical methods available to estimate the response of structures to vibration are developed on the assumption that the structure itself does not change the properties of the incident sound field by any feed back or flutter type mechanism. The normal mode method is used for the majority of the work to estimate the response to any sound field. Special cases considered are jet noise excitation, turbulent boundary layer pressure excitation, and a reverberant field excitation. The alternative traveling wave method is also introduced. J.D.H.

N82-20357*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CRYOGENIC TECHNOLOGY, PART 1
Mar. 1980 273 p refs Conf. held at Hampton, Va., 27-29 Nov. 1979
(NASA-CP-2122-Pt-1; L-13547; NAS 1.55:2122-Pt-1) Avail: NTIS HC A12/MF A01 CSCL 20L

Different engineering problems associated with the design of mechanisms and systems to operate in a cryogenic environment are discussed. The focal point for the entire engineering effort was the design of the National Transonic Facility, which is a closed-circuit cryogenic wind tunnel. The papers covered a variety of mechanical, structural, and systems design subjects including thermal structures insulation systems, noise, seals, and materials. R.J.F.

N82-20358*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CRYOGENIC TECHNOLOGY, PART 2
Mar. 1980 159 p refs Conf. held at Hampton, Va., 27-29 Nov. 1979
(NASA-CP-2122-Pt-2; L-13547; NAS 1.55:2122-Pt-2) Avail: NTIS HC A08/MF A01 CSCL 20L

Proceedings of a conference on the cryogenic technology developed in support of a transonic wind tunnel are given. Papers address tunnel instrumentation and model/sting technology. R.J.F.

N82-20384# Naval Research Lab., Washington, D. C. Space Science Div.
COMPUTER-PROGRAM MODEL FOR PREDICTING HORIZONTALLY AND VERTICALLY POLARIZED VLF ATMOSPHERIC RADIO NOISE AT ELEVATED RECEIVERS Final Report
Francis J. Kelly, J. P. Hauser, and F. J. Rhoads 28 Dec. 1981 22 p refs
(AD-A109448; NRL-8479) Avail: NTIS HC A02/MF A01 CSCL 20/14

A computer program was developed that can predict horizontally and vertically polarized atmospheric radio noise at any altitude or location in the Earth-ionosphere waveguide in the very-low-frequency (VLF) range from 10 to 30 kHz. The new program, HORNS, uses the outputs of two previously written programs, COMPWR and NOISLAN, which predict the vertical electric noise field at the ground. The HORNS program computes all the field components at any altitude using the vertical electric field at the Earth's surface as a basis. Predicted values from several versions of the new model were compared with presently available data. The results are encouraging, but more data are needed to test the model. GRA

N82-20392# Transportation Systems Center, Cambridge, Mass. Research and Special Programs Administration.
TEST PLAN FOR SSR Final Report
Janis Vilcans Washington FAA Oct. 1981 143 p
(AD-A109503; FA-180-PM-81-40; DOT-FAA-RD-81-64; TSC-FAA-81-23) Avail: NTIS HC A07/MF A01 CSCL 17/9

A comprehensive test plan is presented to evaluate the impact of wind and ice loading on the rotation rate stability of a Secondary Surveillance Radar (SSR) antenna used for air traffic control surveillance. Antenna rotation rate variations may introduce errors in the estimate of a position of an intruding aircraft in a passive collision avoidance system used in conjunction with the SSR antenna. The test plan provides a method for determining the statistics of the antenna rotation rate variations. Analytical methods are then presented to assess the effects on CAS performance. The measurement system design, mathematical model development of the antenna system, test data reduction, and analysis programs are presented in detail. Sample calculations of preliminary field data are given and compared with the results obtained from computer simulations. The computer simulations are also intended to predict antenna rotation rate variations at the upper limits of the FAA specified range, which were not generally encountered during normal operations. Author (GRA)

N82-20468# Northrop Corp., Hawthorne, Calif. Aircraft Div.
VORTEX FLOW CORRELATION Final Report, May - Oct. 1980
Gary E. Erickson Wright-Patterson AFB, Ohio AFWAL Jan. 1981 357 p refs
(Contract F33615-80-C-3024; AF Proj. 2307)
(AD-A108725; NOR-80-152; AFWAL-TR-80-3143) Avail: NTIS HC A16/MF A01 CSCL 14/2

Key parameters have been identified which permit correlation of vortex flow simulations in a water tunnel with wind tunnel and flight data. Vortex generation, vortex sheet and core location, and a vortex strength on thin slender wings are accurately represented in a water tunnel due to the insensitivity of separation point location to changes in Reynolds number. The fact that theoretical methods which ignore viscous affects can reasonably predict vortex flow aerodynamics is one indication of the Reynolds number insensitivity of these flow phenomena. For wings and bodies where separation point varies with Reynolds number, the fundamental vortex structure is similar regardless of Reynolds number value since vortices at a distance from the generating surfaces are embedded in essentially irrotational flow. External pressure gradient is an important parameter affecting vortex stability and, although there is yet no theoretical verification that this parameter is the dominant one, vortex burst at higher angles of attack for a given configuration occurs at comparable positions in water tunnels as in wind tunnels and flight. A water tunnel is a powerful diagnostic tool capable of providing high-quality flow visualization of complex fluid flows and insight into the phenomenological aspects of vortex generation, interactions between multiple vortices and aerodynamic surfaces and vortex burst. GRA

N82-20472# Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
EXPERIMENTAL METHODS FOR THE PREDICTION OF THE EFFECT OF VISCOSITY ON PROPELLER PERFORMANCE Ph.D. Thesis
Sukeyuki Kobayashi Jun. 1981 155 p refs
(Contract N00014-76-C-0357; SR0090101)
(AD-A109846; OE-81-7) Avail: NTIS HC A08/MF A01 CSCL 13/10

A Laser Doppler Velocimeter (LDV) was used to perform a propeller wake survey for DTNSRDC propellers 4381 and 4383. Three components of the velocity were measured and from this, the velocity field and the vorticity field were constructed. Through a coordinate transformation, the vorticity field was separated into two parts i.e., trailing vorticity and boundary layer type vorticity in the viscous wake. The data was used for the prediction of propeller blade profile drag (viscous sectional drag). The idea of hypothetical flow by Betz was extended to propeller flow and a formula for the profile drag was derived in terms of velocities, which is suitable for LDV application. The radial distribution of profile drag was computed using the velocity data. It was shown that the value of Cd is close to that of 2-dimensional section at mid-radius range, but becomes substantially lower at inner and outer radii and that it goes up again near the tip and the hub. This trend is consistent with the behavior of profile drag of a finite span wing. Author (GRA)

N82-20544*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VARIABLE RESPONSE LOAD LIMITING DEVICE Patent Application
Dwight D. McSmith, inventor (to NASA) Filed 6 Oct. 1981 18 p
(NASA-Case-LAR-12801-1; US-Patent-Appl-SN-309291) Avail: NTIS HC A02/MF A01 CSCL 13I

An energy absorbing device used as a load limiting member in a structure to control its response to applied loads is described. It functions by utilizing a spool assembly having flanged ends and an interior cavity of sufficiently large diameter to cause it to deform plastically at a prescribed load. In application, the spool is utilized as a pivot point for the legs of an aircraft seat. When properly designed and integrated into the seat arrangement the spool will twist about its axis, deforming plastically when the impact load exceeds the spool yield value. Through this deformation, the spool absorbs the kinetic energy of the movement of the seat at a substantially constant rate, thereby controlling the level of loads transmitted to the seat occupant. By proper sizing and selection of materials, it is possible to control load response in a predictable manner. NASA

N82-20545*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TUBING AND CABLE CUTTING TOOL Patent Application
Dwight D. McSmith and James I. Richardson, inventors (to NASA) Filed 6 Oct. 1981 10 p
(NASA-Case-LAR-12786-1; US-Patent-Appl-SN-309292) Avail: NTIS HC A02/MF A01 CSCL 13I

A hand held hydraulic cutting tool was developed which is particularly useful in deactivating ejection seats in military aircraft rescue operations. The tool consists primarily of a hydraulic system composed of a fluid reservoir, a pumping piston, and an actuator piston. Mechanical cutting jaws are attached to the actuator piston rod. The hydraulic system is controlled by a pump handle. As the pump handle is operated the actuator piston rod is forced outward and thus the cutting jaws are forced together. The frame of the device is a flexible metal tubing which permits easy positioning of the tool cutting jaws in remote and normally inaccessible locations. Bifurcated cutting edges ensure removal of a section of the tubing or cable to thereby reduce the possibility of accidental reactivation of the tubing or cable being severed. NASA

N82-20549# Pace Associates, Inc., Milwaukee, Wis.
HEAVY-DUTY ENGINES ANALYSIS, STUDY 4: A PRELIMINARY MARKET ANALYSIS FOR GAS-TURBINE APPLICATIONS IN THE FARM MARKET
Jul. 1981 18 p refs Prepared for Argonne National Lab.
(Contract W-31-109-eng-38)
(DE82-001758; ANL/CNSV-TM-81) Avail: NTIS HC A02/MF A01

The opportunity for the gas turbine in the farm market and if the market's requirements complement the development of the engine for other markets was analyzed. It was determined that the major applications of gas turbines in the farm equipment market are in two wheel drive and four wheel drive diesel powered tractors. However, the market for gas turbines lies at the heavier end of the spectrum. There is an opportunity for larger quantities of lower horsepower engines because turbine engines for automobiles would be in the same size range. It is suggested that the development of a reliable multifuel turbine combined with a reliable power train capable of meeting the load requirements of the farm tractor is a timely undertaking. Fuel efficiency requirements are balanced by the need for multifuel capability and imposed environmental requirements. DOE

N82-20561*# California Univ., Los Angeles.
APPLICATION OF THE FINITE ELEMENT METHOD TO ROTARY WING AEROELASTICITY Final Report
F. K. Straub and P. P. Friedmann Feb. 1982 232 p refs
(Grant NsG-1578)
(NASA-CR-165854; NAS 1.26:165854; UCLA-ENG-80-81) Avail: NTIS HC A11/MF A01 CSCL 20K

A finite element method for the spatial discretization of the dynamic equations of equilibrium governing rotary-wing aeroelastic problems is presented. Formulation of the finite element equations is based on weighted Galerkin residuals. This Galerkin finite element method reduces algebraic manipulative labor significantly, when compared to the application of the global Galerkin method in similar problems. The coupled flap-lag aeroelastic stability boundaries of hingeless helicopter rotor blades in hover are calculated. The linearized dynamic equations are reduced to the standard eigenvalue problem from which the aeroelastic stability boundaries are obtained. The convergence properties of the Galerkin finite element method are studied numerically by refining the discretization process. Results indicate that four or five elements suffice to capture the dynamics of the blade with the same accuracy as the global Galerkin method. A.R.H.

N82-20566*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ELASTIC-PLASTIC FINITE-ELEMENT ANALYSES OF THERMALLY CYCLED DOUBLE-EDGE WEDGE SPECIMENS
Albert Kaufman and Larry E. Hunt Mar. 1982 31 p refs
(NASA-TP-1973; E-626; NAS 1.60:1973) Avail: NTIS HC A03/MF A01 CSCL 20K

Elastic-plastic stress-strain analyses were performed for double-edge wedge specimens subjected to thermal cycling in fluidized beds at 316 and 1088 C. Four cases involving different nickel-base alloys (IN 100, Mar M-200, NASA TAZ-8A, and Rene 80) were analyzed by using the MARC nonlinear, finite element computer program. Elastic solutions from MARC showed good agreement with previously reported solutions obtained by using the NASTRAN and ISO3DQ computer programs. Equivalent total strain ranges at the critical locations calculated by elastic analyses agreed within 3 percent with those calculated from elastic-plastic analyses. The elastic analyses always resulted in compressive mean stresses at the critical locations. However, elastic-plastic analyses showed tensile mean stresses for two of the four alloys and an increase in the compressive mean stress for the highest plastic strain case. M.G.

N82-20573# Sandia Labs., Albuquerque, N. Mex.
APPROACH TO THE FATIGUE ANALYSIS OF VERTICAL-AXIS WIND-TURBINE BLADES
P. S. Veers Sep. 1981 35 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003193; SAND-81-2130) Avail: NTIS HC A03/MF A01

The stress history of wind turbine blades indicates that a single stress level at each wind speed does not adequately describe the blade stress history and a statistical description is required. Blade stress data from experimental turbines indicate that the Rayleigh probability density function describes the distribution of vibratory stresses at each wind speed. The Rayleigh probability density function allows the distribution of vibratory stresses to be described by the RMS of the stress vs. time signal. With the RMS stress level described for all wind speeds, the complete stress history of the turbine blades is known. Miner's linear cumulative damage rule is used as a basis for summing the fatigue damage over all operating conditions. An analytical expression is derived to predict blade fatigue life. DOE

N82-20746 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Optoelektronik.
RANGEFINDER SYSTEM FOR SLANT RANGE VISIBILITY [WEGE ZUR NETZMAESSIGEN ERFASSUNG DER SCHRAEGSICHT]
Christian Werner *In* Deutscher Wetterdienst Soc. Meteorol. Palatina, 1780-1795 1980 p 60-65 refs In GERMAN; ENGLISH summary

Avail: Issuing Activity

Careful measurement of the slant range visibility is important for safe and regular aircraft landing operations. Measurements are necessary under visibility conditions lower than 1500 m up to an altitude of about 100 m. Many remote sensing methods are known to determine the slant range visibility. A modified laser rangefinder system which uses a simplified slope method is described. The accuracy of this 'Two-Point-Method' is analyzed for several atmospheric conditions. Measurements with a described prototype system are presented. J.M.S.

N82-20811# Systems Control, Inc., West Palm Beach, Fla.
WEATHER DETERIORATION MODELS APPLIED TO ALTERNATE AIRPORT CRITERIA Final Report
Edwin D. McConkey Sep. 1981 103 p
(Contract DOT-FA79NA-6029)
(AD-A108877; FAA-RD-81-92) Avail: NTIS HC A06/MF A01 CSCL 04/2

Flights under Instrument Flight Rules (IFR) require the filing of a flight plan. The flight plan must contain an alternate airport unless certain conditions at the destination are met. These conditions concern the availability of an instrument approach procedure and anticipated meteorological conditions within one hour of the estimated arrival time. Certain other conditions must be met for an airport to qualify as an alternate airport. These conditions also are based on instrument approach procedure availability and forecast meteorological conditions. Relaxation of the current requirements regarding alternate airports could benefit some aircraft operators by improving schedule reliability and reducing the number of weather related departure delays. The investigation quantified the increased risk of ceilings and visibilities being below landing minimums at several cities in the conterminous U.S. if requirements are relaxed. The study methods utilized climatology data and weather deterioration models to calculate the probability of an airport being below precision and non-precision approach minimums. Author (GRA)

N82-20997# Hampton Inst., Va. Dept. of Mathematics and Computer Science.
A DESCRIPTIVE STUDY OF THE APPLICATION OF ANALYSIS OF VARIANCE AND REGRESSION TECHNIQUES IN AN ERROR ANALYSIS PROGRAM FOR TEST DATA OBTAINED IN A 16 FOOT TRANSONIC TUNNEL M.S. Thesis
Daisy Williams Alston Apr. 1981 216 p refs
Avail: NTIS HC A10/MF A01

A mathematical model has been designed that used standard statistical techniques to perform an error analysis of wind tunnel test data. Three separate but dependent computer programs define the procedure necessary for the generation and manipulation of the required data. By applying the methods of least squares, cubic splines, analysis of variance, and regression analysis, the programs calculate and compare experimental data with test control data. The solution of the problem reveals that the nature of the lift and drag coefficient data versus angle of attack vary linearly, therefore the equation of a straight line is sufficient to represent the data. To minimize the residual differences, a third order curve fit, which defines an equation that represents the experimental pressure coefficient data, is used. Calculation of the F-ratios determines the significant components of the 2 x 7 x 5 factorial design and indicates the independent variables that significantly reduce the error factor. M.G.

N82-21031*# Avco Lycoming Div., Stratford, Conn.
YF 102 IN-DUCT COMBUSTOR NOISE MEASUREMENTS WITH A TURBINE NOZZLE, VOLUME 1 Final Report, Sep. 1979 - Mar. 1981
Craig A. Wilson and James M. OConnell Sep. 1981 63 p refs
(Contract NAS3-21974)
(NASA-CR-165562-Vol-1; NAS 1.26:165562-Vol-1; LYC-81-32-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 20A

The internal noise generated by an Avco Lycoming YF-102 engine combustor installed in a test rig was recorded. Two configurations were tested one with and one without the first stage turbine nozzle installed. Acoustic probes and accessories were used. Internal dynamic pressure level measurements were made at ten locations within the combustor. The combustor rig, the test procedures, and data acquisition and reduction systems are described. Tables and plots of narrow band and one third octave band pressure level spectra are included. S.L.

N82-21032*# Avco Lycoming Div., Stratford, Conn.
YF 102 IN-DUCT COMBUSTOR NOISE MEASUREMENTS WITH A TURBINE NOZZLE, VOLUME 2 Final Report
Craig A. Wilson and James M. OConnell Sep. 1981 232 p refs
(Contract NAS3-21974)
(NASA-CR-165562-Vol-2; NAS 1.26:165562-Vol-2; LYC-81-32-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 20A

The internal noise generated by an Avco Lycoming YF-102 engine combustor installed in a test rig was recorded. The one third octave band pressure level spectra is presented. S.L.

N82-21033*# Avco Lycoming Div., Stratford, Conn.
YF 102 IN-DUCT COMBUSTOR NOISE MEASUREMENTS WITH A TURBINE NOZZLE, VOLUME 3 Final Report
Craig A. Wilson and James M. OConnell Sep. 1981 244 p refs
(Contract NAS3-21974)
(NASA-CR-165562-Vol-3; NAS 1.26:165562-Vol-3; LYC-81-32-Vol-3) Avail: NTIS HC A11/MF A01 CSCL 20A

The internal noise generated by an Avco Lycoming YF-102 engine combustor installed in a test rig was recorded. The narrow band pressure level spectra is presented. S.L.

N82-21037*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLUCTUATING PRESSURES ON FAN BLADES OF A TURBOFAN ENGINE: STATIC AND WIND-TUNNEL INVESTIGATIONS
James A. Schoenster Mar. 1982 48 p refs
(NASA-TP-1976; L-14913; NAS 1.60:1976) Avail: NTIS HC A03/MF A01 CSCL 21E

To investigate the fan noise generated from turbofan engines, miniature pressure transducers were used to measure the fluctuating pressure on the fan blades of a JT15D engine. Tests were conducted with the engine operating on an outdoor test stand and in a wind tunnel. It was found that a potential flow interaction between the fan blades and six, large support struts in the bypass duct is a dominant noise source in the JT15D engine. Effects of varying fan speed and the forward speed on the blade pressure are also presented. Author

N82-21041# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ACOUSTIC MEASUREMENTS OF F-4E AIRCRAFT OPERATING IN HUSH HOUSE, NSN 4920-02-070-2721 Final Report, May - Sep. 1981
Vincent R. Miller, G. A. Pizak, and J. M. Chinn Sep. 1981 105 p refs
(AD-A109827; AFWAL-TM-81-84-FIBE/FIBG) Avail: NTIS HC A06/MF A01 CSCL 20/1

The primary purpose of this test program was to measure the acoustic environment in the hush house facility located at Kelly Air Force Base, Texas, during operation of the F-4E aircraft to ensure that aircraft structural acoustic design limits were not exceeded. The acoustic measurements showed that sonic fatigue problems are anticipated with the F-4E aircraft aft fuselage structure during operation in the hush house. The measured acoustic levels were less than those measured in an F-4E aircraft water cooled hush house at Hill AFB in the lower frequencies, but were increased over that measured during ground run up on some areas of the aircraft. It was recommended that the acoustic loads measured in this program should be specified in the structural design criteria for aircraft which will be subjected to hush house operation or defining requirements for associated equipment. Recommendations were also made to increase the fatigue life of the aft fuselage. Author (GRA)

N82-21042# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ACOUSTIC MEASUREMENTS OF F-15 AIRCRAFT OPERATING IN HUSH HOUSE, NSN 4920-02-070-2721 Final Report, May - Sep. 1981
Vincent R. Miller, G. A. Plzak, and J. M. Chinn Sep. 1981 117 p refs
(AD-A109828; AFWAL-TM-81-82-FIBE/FIBG) Avail: NTIS HC A06/MF A01 CSCL 20/1

The purpose of this test program was to measure the acoustic environment in the hush house facility located at Kelly Air Force Base, Texas, during operation of the F-15 aircraft to ensure that aircraft structural acoustic design limits were not exceeded. The acoustic measurements showed that no potential sonic fatigue problems are anticipated with the F-15 aircraft structure during operation in the hush house. However, since these acoustic levels were increased over those measuring during run up on a concrete pad, it is recommended that F-15 equipment qualification levels be checked. The data indicated that the noise field within the hush house is diffuse and that the acoustical energy in the hangar area is radiated from the region between the engine exhaust and the hush house muffler front edge toward the forward part of the hangar. Author (GRA)

N82-21043# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ACOUSTIC MEASUREMENTS OF F-16 AIRCRAFT OPERATING IN HUSH HOUSE, NSN 4920-02-070-2721 Final Report, May - Sep. 1981
Vincent R. Miller, G. A. Plzak, and J. M. Chinn Sep. 1981 110 p refs
(AD-A109829; AFWAL-TM-81-83-FIBE/FIBG) Avail: NTIS HC A06/MF A01 CSCL 20/1

The purpose of this test program was to measure the acoustic environment in the hush house facility located at Kelly Air Force Base, Texas, during operation of the F-16 aircraft to ensure that aircraft structural acoustic design limits were not exceeded. The acoustic measurements showed that no sonic fatigue problems are anticipated with the F-16 aircraft aft fuselage structure during operation in the hush house. The measured acoustic levels were less than those measured in an F-16 aircraft water cooled hush house at Hill AFB, but were increased over that measured during ground run up. It was recommended that the acoustic loads measured in this program should be specified in the structural design criteria for aircraft which will be subjected to hush house operation or defining requirements for associated equipment.
Author (GRA)

N82-21064*# Cornell Univ., Ithaca, N. Y. Dept. of Astronomy.
THE SIXTEEN TO FORTY MICRON SPECTROSCOPY FROM THE NASA LEAR JET Final Technical Report, 1 Oct. 1970 - 31 Oct. 1980
J. R. Houck Mar. 1982 63 p refs
(Grant NGR-33-010-182)
(NASA-CR-168684; NAS 1.26:168684) Avail: NTIS HC A04/MF A01 CSCL 20F

Two cryogenically cooled infrared grating spectrometers were designed, fabricated and used on the NASA Lear Jet Observatory. The first spectrometer was used to measure continuum sources such as dust in H II regions, the galactic center and the thermal emission from Mars, Jupiter, Saturn, and Venus over the 16 to 40 micron spectral range. The second spectrometer had higher resolution and was used to measure ionic spectral lines in H II regions (S III at 18.7 microns). It was later used extensively on NASA C-141 Observatory to make observations of numerous objects including H II regions, planetary nebulae, stars with circumstellar shells, the galactic center and extragalactic objects. The spectrometers are described including the major innovations and a list of the scientific contributions. S.L.

N82-21139*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROCEEDINGS: FIFTH ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS
Dennis W. Camp, ed., Walter Frost, ed. (Tennessee Univ. Space Inst.), and Pamela D. Parsley, ed. Dec. 1981 149 p refs
Workshop held at Tullahoma, Tenn., 30 Mar. - 1 Apr. 1981; sponsored by NASA, NOAA and FAA
(Contract NAS8-32692)
(NASA-CP-2192; NAS 1.55:2192; FAA-RD-81-67) Avail: NTIS HC A07/MF A01 CSCL 01B

Aviation safety, meteorology, air traffic control, training, flight operations, general aviation, and aviation weather research and services were examined in an effort to expand understanding and knowledge of the interaction of the atmosphere with aviation systems, better define and implement services to operators, and to collect and interpret data for establishing operational criteria relating the total meteorological inputs from the atmospheric sciences to the needs of aviation communities. For individual titles, see N82-21140 through N82-21152.

N82-21140*# Federal Aviation Administration, Washington, D.C. Energy Div.
METEOROLOGICAL IMPACT ON AVIATION FUEL EFFICIENCY
David E. Winer and John E. Wesler *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 15-19 refs

Avail: NTIS HC A07/MF A01 CSCL 01C

The connection between fuel consumption and weather data is discussed. Fuel efficient flights creating adequate near real time weather information are examined. The lack of highly resolved real time and near real time wind and temperature data at flight altitudes is investigated. The existing systems, which is based on twice a day balloon observations, supplemented by pilot reports or other occasional data, is not adequate for optimum flight planning. The impacts of upper winds and temperatures on fuel efficiency and flight planning are not widely appreciated and developing new weather products are considered. E.A.K.

N82-21141*# McDonnell-Douglas Electronics Co., St. Charles, Mo.
METEOROLOGICAL INPUTS TO ADVANCED SIMULATORS
Gordon O. Handberg *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 21-25 refs

Avail: NTIS HC A07/MF A01 CSCL 14B

Weather simulation as it is currently implemented and some suggestions and questions considered in future simulator developments are described. Flight simulators represent weather in a considerably broader sense and with an almost limitless capability for future expansion. Realistic weather is important in pilot training simulators. It offers promising opportunity to provide training because it permits an element of environmental control not available in the real world. E.A.K.

N82-21142*# USAir, Pittsburgh, Pa.
OPERATIONAL PROCEDURES RELATIVE TO SEVERE WEATHER
James F. Sullivan *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 26-28

Avail: NTIS HC A07/MF A01 CSCL 01C

Severe weather impact on both safety and the economics of all types of aviation, and reduction of elimination are discussed. The functions and responsibilities of the dispatcher are outlined. All surface weather reports showing inclement weather, SIGMET REPORTS, forecasting turbulence or icing, convective SIGMETS: (1) tornadoes; (2) hail 3/4 of an inch or greater; (3) imbedded thunderstorms; (4) squall lines or (5) an area of level four or greater thunderstorms. This information along with PIREPs of severe weather are relayed to affected flights. It is concluded that operational procedures must be timely and well conceived to assure the least amount of impact on airline operations.
E.A.K.

N82-21143*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
METEOROLOGY IMPACT ON FUTURE AIRCRAFT DESIGN
Joseph W. Stickle *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to

Aviation Systems Dec. 1981 p 29-34

Avail: NTIS HC A07/MF A01 CSCL 01C

Meteorology impact on future aircraft design is discussed. Upcoming changes in both design and operations that will be influenced by the meteorological environment are outlined. Future and more nonconventional designs and meteorological impact brought about by operational changes over the next few years are examined. E.A.K.

N82-21144*# Federal Aviation Administration, Washington, D.C. Systems Research and Development Div.

METEOROLOGY IMPACT ON ATC SYSTEM DESIGN

Frank E. VanDemark *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 35-39

Avail: NTIS HC A07/MF A01 CSCL 17G

The impact of meteorology on air traffic control (ATC) system design for designs, and for cost benefit evaluations is discussed. The myriad of choices for implementation is a problem of great magnitude, given the economic climate of today. Cost versus benefit requires greater emphasis. Expanding and improving weather data acquisition, increasing the speed of weather data transmission and automating those actions that lend themselves to standardization for automated data processing are outlined. Three programs are mentioned: (1) automated weather observations, (2) weather radar and improvements to the national airspace system as related to the handling of weather data; and (3) products. E.A.K.

N82-21145*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

OZONE AND AIRCRAFT OPERATIONS

Porter J. Perkins *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 40-44 refs

Avail: NTIS HC A07/MF A01 CSCL 04A

The cabin ozone problem is discussed. Cabin ozone in terms of health effects, the characteristics of ozone encounters by aircraft, a brief history of studies to define the problem, corrective actions taken, and possible future courses of action are examined. It is suggested that such actions include avoiding high ozone concentrations by applying ozone forecasting in flight planning procedures. E.A.K.

N82-21146*# National Aeronautics and Space Administration. Washington, D. C.

NASA RESEARCH PROGRAMS RESPONDING TO WORKSHOP RECOMMENDATIONS

A. Richard Tobiason *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 58

Avail: NTIS HC A07/MF A01 CSCL 01B

The atmospheric electricity and lightning committee forecasts lightning and dissemination of information on the probability of occurrence. A data source with the F-106 flight program was established. The objective is to improve the detectability of lightning and severe storms and help develop operational avoidance procedures and to study the use of satellite and Doppler radar to detect thunderstorms and forecast the probability of lightning. Three recommendations are made: (1) to establish a national flying lightning laboratory; (2) strike models are considered and to gather strike data; (3) to find the best way to apply electrical field data to operations. E.A.K.

N82-21147*# Naval Research Lab., Washington, D. C.

PROGRESS ON LOW ALTITUDE CLOUD ICING RESEARCH

Richard K. Jeck *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 59-63 refs Prepared in cooperation with Naval Academy

Avail: NTIS HC A07/MF A01 CSCL 04B

The icing environment at altitudes below 10,000 feet were studied. The following questions are asked, are: (1) existing aircraft certification criteria applicable; (2) too stringent on icing for helos; (3) based on accurate data; (4) appropriate for low (10,000 ft) altitudes? The research plan is outlined: review historical icing data, obtain new measurements, collect modern icing data from other groups, and recommend LWC, OAT, and MVD criteria for helicopters. Estimated accuracies and known sources of error are included. It is concluded that the net effect of possible sources of error of both signs is uncertain. E.A.K.

N82-21148*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA/LEWIS RESEARCH CENTER ICING RESEARCH PROGRAM

Peggy L. Evanich *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 64-75

Avail: NTIS HC A07/MF A01 CSCL 01C

Icing requirements for commercial aircraft, light transport and general aviation aircraft, and rotorcraft were studied. The objectives was to: establish the state of the art in aircraft icing, determining the aircraft industry's icing research and technology needs, and recommending both short and long term icing programs to NASA. It is shown that all three categories of aircraft need improved and new ice protection system, icing calculational techniques, icing performance sensitivity on current and modern airfoils, and new and improved icing facilities. The need for a general aviation pilot training film concerning flight into icing conditions is also identified. E.A.K.

N82-21149*# Dayton Univ., Ohio.

EFFECT OF HEAVY RAIN ON AIRCRAFT

James K. Luers *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 76-80

Avail: NTIS HC A07/MF A01 CSCL 01C

A summary on heavy rain effects on aircraft aerodynamics validation of research and some wind shear accidents in which heavy rain were an important factor. Frost formation and what frost does to the lift and drag curves for an airfoil was examined. If frost could cause severe aerodynamic problems for both general aviation and transport aircraft due to its roughness, then heavy rain produce a similar result. The influencing parameters of heavy rain on an aircraft are studied. Sources of aerodynamic roughness due to rain and wind shear and heavy rain accidents are outlined. E.A.K.

N82-21150*# Federal Aviation Administration, Washington, D.C.

PROTOTYPE REGIONAL OBSERVATION AND FORECAST SYSTEM (PROFS)

John W. Hinkelman, Jr. *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 81-85

Avail: NTIS HC A07/MF A01 CSCL 04B

The prototype regional observation and forecast system (PROFS) outputs are demonstrated, functional design specifications to be used to procure and implement operational systems are outlined. Advanced candidate technologies are evaluated as an integral part of the process that leads to these outputs. Evaluation insures that future weather service systems will contain the optimum mix of technologies to be most cost effective in reducing the annual losses and deaths that are directly attributed to severe weather. E.A.K.

N82-21152*# National Center for Atmospheric Research, Boulder, Colo.

THE JOINT AIRPORT WEATHER STUDIES PROJECT

John McCarthy *In* NASA. Marshall Space Flight Center Proc.: 5th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems Dec. 1981 p 91-95

Avail: NTIS HC A07/MF A01 CSCL 04B

A block diagram of the joint airport weather studies program is presented. Background leading to the development of the program is reviewed. Basic studies, aircraft performance, and detection and warning techniques used to develop fine scale structure of thunderstorm dynamics and kinematics in the vicinity of a major airport; effect of thunderstorm low level wind shear on aircraft performance; and development of real time testing of flow level wind shear detection and warning techniques and displays are described. E.A.K.

N82-21153# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA AERONAUTICA ET ASTRONAUTICA SINICA

29 Dec. 1981 224 p Transl. into ENGLISH of Acta Aeron. et Astron. Sinica (China), v. 2, no. 2, 1981 p 1-102
(AD-A110282; FTD-ID(RS)T-1129-81) Avail: NTIS HC A02/MF A01 CSCL 01/3

A collection of articles in aeronautical engineering is presented. Some of the topics discussed are: (1) oscillatory subsonic potential flows around three dimensional bodies and its application in calculating dynamic stability derivatives; (2) interpolation mixed differential method for transonic large distributed symmetrical potential flow around airfoil; (3) calculation of lift and drag characteristics of subsonic wings with winglets; (4) model for predicting overload retardation effect in fatigue crack propagation; (5) J-integral experimental calibration of sheet specimens with single edge notch; (6) design of transonic turbine cascade by hodograph method; (7) three dimensional stress analysis for a shrouded air cooled turbine blade; (8) methods for measuring radar ECCM performance; (9) aiming computation for fighter weapon aiming system; (10) optimum design of nonmoment laminated composite plate. E.A.K.

N82-21154# Societe Nationale Industrielle Aerospatiale, Paris (France). Helicopter Div.

INDUSTRIAL EXPERIENCE IN THE ANGLO-FRENCH HELICOPTER COLLABORATION

J. C. Sieffer 1980 8 p
(SNIAS-811-210-101) Avail: NTIS HC A02/MF A01

Anglo-French helicopter collaboration are summarized. The development of the SA 330 Puma, the SA 341 Gazelle, and the WG 13 Lynx multipurpose helicopter, with three versions for a variety of uses, is covered, and the launching of derivative aircraft (Westland WG 30 and Aerospatiale Super-Puma) is mentioned. The organization and experience of the collaboration are described, with the French and British shares of the work on each helicopter quantified. Sales are reviewed and compared with forecasts. Author (ESA)

N82-21155# Royal Aircraft Establishment, Farnborough (England).

A SUMMARY OF EXPERIMENTAL DATA ON WING CHARACTERISTICS AT TRANSONIC SPEEDS

T. Nonweiler Apr. 1948 42 p refs
(RAE-TN-Aero-1953-S.D.-77) Avail: NTIS HC A03

Dropped and rocket propelled models are tested. American tests give a variation in form drag with thickness at the speed of sound in accordance with the two thirds power law. British tests indicate a constant drag coefficient on frontal area. There is a tendency to reduce drag by introducing taper or reducing aspect ratio on rectangular wings. Results on swept wings are inconsistent but the reduction in drag with sweepback is very pronounced. Tunnel bulge tests indicate that the drag due to lift becomes very large at Mach numbers just below 1. Author (ESA)

N82-21156*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

HELICOPTER ROTOR LOADS USING A MATCHED ASYMPTOTIC EXPANSION TECHNIQUE Final Report

G. Alvin Pierce and Anand R. Vaidyanathan May 1981 125 p refs
(Contract NAS1-16222)
(NASA-CR-165742; NAS 1.26:165742) Avail: NTIS HC A06/MF A01 CSCL 01A

The theoretical basis and computational feasibility of the Van Holten method, and its performance and range of validity by comparison with experiment and other approximate methods was examined. It is found that within the restrictions of incompressible, potential flow and the assumption of small disturbances, the method does lead to a valid description of the flow. However, the method begins to break down under conditions favoring nonlinear effects such as wake distortion and blade/rotor interaction. E.A.K.

N82-21157*# Sikorsky Aircraft, Stratford, Conn.

AEROELASTIC ANALYSIS OF THE ELASTIC GIMBAL ROTOR Report, May 1980 - May 1981

Raymond G. Carlson and Wen-Liu Miao May 1981 102 p refs Prepared for Army Research and Technology Labs.
(Contract DAAK51-80-C-0016)
(NASA-CR-166287; NAS 1.26:166287; USAAVRADCOM-TR-82-A-3; SER-510048) Avail: NTIS HC A06/MF A01 CSCL 01A

An aeroelastic and structural loads analysis of the elastic gimbal rotor (EGR) was conducted. The structural loads analysis of the elastic gimbal rotor indicated that the gimbal spring element is the critical component in the rotor system design, but that practical designs for all components should be achievable. The aeroelastic analysis was conducted using a version of the G400 Rotor Aeroelastic Analysis especially modified to evaluate the EGR. Hover stability showed that a stiff inplane blade was more stable than a soft inplane blade. Stability was sensitive to control system coupling (pitch gimbal coupling), gimbal spring stiffness, and blade frequency placement. Ground resonance analysis showed both soft and stiff inplane rotors to be stable. A limited evaluation of the EGR in forward flight was conducted. Due to G400 analysis limitations, the results were not sufficient to define forward flight stability and stress limits. B.W.

N82-21158*# Vought Corp., Dallas, Tex.

V/STOL TANDEM FAN TRANSITION SECTION MODEL TEST

William E. Simpkin Mar. 1982 156 p refs
(Contract NAS3-22155)
(NASA-CR-165587; NAS 1.26:165587; TR2-53200/2R-53085) Avail: NTIS HC A08/MF A01 CSCL 01A

An approximately 0.25 scale model of the transition section of a tandem fan variable cycle engine nacelle was tested in the NASA Lewis Research Center 10-by-10 foot wind tunnel. Two 12-inch, tip-turbine driven fans were used to simulate a tandem fan engine. Three testing modes simulated a V/STOL tandem fan airplane. Parallel mode has two separate propulsion streams for maximum low speed performance. A front inlet, fan, and downward vectorable nozzle forms one stream. An auxiliary top inlet provides air to the aft fan - supplying the core engine and aft vectorable nozzle. Front nozzle and top inlet closure, and removal of a blocker door separating the two streams configures the tandem fan for series mode operations as a typical aircraft propulsion system. Transition mode operation is formed by intermediate settings of the front nozzle, blocker door, and top inlet. Emphasis was on the total pressure recovery and flow distortion at the aft fan face. A range of fan flow rates were tested at tunnel airspeeds from 0 to 240 knots, and angles-of-attack from -10 to 40 deg for all three modes. In addition to the model variables for the three modes, model variants of the top inlet were tested in the parallel mode only. These lip variables were: aft lip boundary layer bleed holes, and Three position turning vane. Also a bellmouth extension of the top inlet side lips was tested in parallel mode. B.W.

N82-21159*# Flow Simulations, Inc., Sunnyville, Calif.

COMPUTATION OF WING-VORTEX INTERACTION IN TRANSONIC FLOW USING IMPLICIT FINITE DIFFERENCE ALGORITHM Final Report

G. Srinivasan and J. L. Steger Mar. 1981 63 p refs
(Contract NAS2-10474)
(NASA-CR-166251; NAS 1.26:166251) Avail: NTIS HC A04/MF A01 CSCL 01A

An implicit delta form finite difference algorithm for Euler equations in conservation law form was used in preliminary calculations of three dimensional wing vortex interaction. Both steady and unsteady transonic flow wing vortex interactions are computed. The computations themselves are meant to guide upcoming wind tunnel experiments of the same flow field. Various modifications to the numerical method that are intended to improve computational efficiency are also described and tested in both two and three dimensions. Combination of these methods can reduce the overall computational time by a factor of 4. S.L.

N82-21161# Royal Aircraft Establishment, Farnborough (England).

LOW-SPEED MEASUREMENTS OF THE STATIC PRESSURE DISTRIBUTION AND OVERALL FORCES ON A CAMBERED AND A SYMMETRIC MILD GOTHIC WING OF ASPECT RATIO 1.4

P. J. Butterworth and D. G. Dobney London HMSO 22 May 1980 85 p refs
(RAE-TR-80066; RAE-AERO-3482; BR75504) Avail: NTIS HC A05/MF A01

A cambered wing of aspect ratio 1.4 was tested in a low speed wind tunnel to determine its surface static pressure distribution at its designed attached flow incidence for comparison with the theoretical loading. To isolate the effects of camber on the separated flow characteristics of this planform, the corresponding symmetric wing was also included in the test program. The lift, drag and pitching moment characteristics of each wing were measured over a range of Reynolds numbers for comparison with the results of the earlier force tests and those derived by integration of the measured pressure distributions. It is found that at twice the design lift coefficient, the lift-dependent drag of the cambered wing is about 20% lower than that of the symmetric wing due to the favorable shift of the minimum point of the drag caused by the addition of camber. At higher values of the lift coefficient this reduction in lift-dependent drag is less, due to the unfavorably changed shape of the cambered wing's drag polar. Also, flow visualization tests and the form of the measured pressure distribution near the leading edges of the cambered wing at its design incidence confirm that the flow is attached along the leading edges. Author (ESA)

N82-21162# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
AERODYNAMICS PROJECT. SIGNIFICANCE AND DIFFICULTIES IN THE EXPERIMENTAL AND NUMERICAL SIMULATION OF COMPLEX FLOW PROCESSES WITH HIGH REYNOLDS NUMBER AS PART OF AIRCRAFT PROJECTS [PROJEKTAERODYNAMIK. BEDEUTUNG UND PROBLEMATIK VON EXPERIMENTELLEN UND NUMERISCHEN SIMULATIONEN KOMPLEXER STROEMUNGSVORGAENGE MIT GROSSER REYNOLDS-ZAHL FUER DIE PROJEKTENWICKLUNG VON FLUGZEUGEN]
W. Heinzerling 29 May 1980 29 p refs In GERMAN
(MBB-FE-120/S/PUB/33; DGLR-80-028) Avail: NTIS HC A03/MF A01

The importance of aerodynamic simulation in design processes is considered. Simulation as an aid in aircraft development is discussed, revealing fundamental problems posed by the modeling of flow regimes on aircraft configurations. The geometry and complexity of flow mechanics for specific configurations are elaborated. The observance of Reynolds similarity conditions is discussed. Possibilities and limitations of complex aerodynamic simulation are assessed. Numerical, experimental, and high Reynolds number simulation are then evaluated. Results are used in reviewing plans for a European transonic cryogenic wind tunnel. Given an optimal layout, the impact of this facility on the performance and competitiveness of the European aircraft industry is forecast. Author (ESA)

N82-21163# Royal Aircraft Establishment, Farnborough (England).
PRESSURE MEASUREMENTS ON A WING OSCILLATING IN SUPERCRITICAL FLOW
N. C. Lambourne and B. L. Welsh London HMSO 25 Jun. 1979 178 p refs
(RAE-TR-79074; RAE-Struct-BF/B/0783; BR71046) Avail: NTIS HC A09/MF A01

Perturbation pressures were measured on a model wing oscillating in a wind tunnel to study wing flutter under transonic conditions. The half model, which is based on a high aspect ratio wing of modern design could be given a small-amplitude oscillation consisting of rigid body rotation about a swept axis. The unsteady in-phase and in-quadrature pressure distributions were measured at five chordwise stations. Free stream Mach number was varied in stages from 0.60 to 0.86. The measurements were restricted to one value of oscillation frequency which corresponded to frequency parameters, based on mean chord, in the range 0.39 to 0.54. The oscillatory pressure distributions together with the principal oscillatory wing forces and moments obtained by integration are considered in relation to the steady flow pattern over the wing and particularly in relation to the development of transonic mixed flow at the upper surface. The effects arising from the presence of a shock wave are identified and discussed. Some comparisons are made between the measurements and the results of subsonic thin wing theory. Author (ESA)

N82-21164# Royal Aircraft Establishment, Farnborough (England).
PRESSURE DISTRIBUTIONS ON SOME DELTA WINGS AT M = 4
L. C. Squire (Cambridge Univ., Engl.) and K. C. Moore London HMSO 22 May 1980 46 p refs
(RAE-TR-80068; RAE-Aero-3484; BR76040) Avail: NTIS HC A03/MF A01

Complete pressure distributions are presented for a series of delta wings tested through an incidence range at a Mach number of 4. Aspect ratios of models 1 and 3 were 4/3 and 1 respectively, and models 3 to 7, 2/3. The results were integrated to obtain lift and drag coefficients and the values found are in good agreement with the trend from measurements on similar wings at lower Mach numbers. Some of the models were designed to test a possible method of engine/airframe integration. The results show that it is possible to add volume to the rear of the wing without increasing the drag of the forebody, thus confirming the proposed method of integration. Author (ESA)

N82-21166*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FULL-SCALE FLAMMABILITY TEST DATA FOR VALIDATION OF AIRCRAFT FIRE MATHEMATICAL MODELS
Jerome F. Kuminecz and Richard W. Bricker Feb. 1982 874 p refs
(NASA-TM-58244; NAS 1.15:58244) Avail: NTIS HC A99/MF A01 CSCL 01C

Twenty-five large scale aircraft flammability tests were conducted in a Boeing 737 fuselage at the NASA Johnson Space Center (JSC). The objective of this test program was to provide a data base on the propagation of large scale aircraft fires to support the validation of aircraft fire mathematical models. Variables in the test program included cabin volume, amount of fuel, fuel pan area, fire location, airflow rate, and cabin materials. A number of tests were conducted with jet A-1 fuel only, while others were conducted with various Boeing 747 type cabin materials. These included urethane foam seats, passenger service units, stowage bins, and wall and ceiling panels. Two tests were also included using special urethane foam and polyimide foam seats. Tests were conducted with each cabin material individually, with various combinations of these materials, and finally, with all materials in the cabin. The data include information obtained from approximately 160 locations inside the fuselage. Author

N82-21167# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Biomechanical Protection Branch.
EVALUATION OF A PROPOSED MODIFIED F/FB-111 CREW SEAT AND RESTRAINT SYSTEM
James W. Brinkley, James H. Raddin, Jr., Bernard F. Hearon, Lawrence A. McGowan, and Joseph M. Powers Nov. 1981 418 p refs
(AF Proj. 7231)
(AD-A110188; AFAMRL-TR-80-52) Avail: NTIS HC A18/MF A01 CSCL 01/3

A total of 187 human impact tests were performed in the cardinal axes, including vertical (up to 10G, 8.1 m/sec), sideward (up to 8G, 9.2 m/sec), and forward facing (up to 10G, 9.8 m/sec). Subjects were exposed to similar impacts using different seat position adjustments to allow parametric analysis. Measured data included seat acceleration and velocity, head and chest translational acceleration components, triaxial forces acting on the seat pan and footrest, forces acting at the restraint harness attachments, and displacements of various body segments. In vertical impact tests, the forward position of the headrest appeared to cause increased forward acceleration of the head. Vertical impact tests demonstrated increased head accelerations with higher shoulder harness angles. Analysis of restraint loads in sideward impacts showed that more of the lateral support is provided by the lap belt with higher shoulder harness angles. This indicates potentially degraded lateral support of the upper torso with the proposed modification. GRA

N82-21171# Mitre Corp., McLean, Va. Metrek Div.
PRELIMINARY FUNCTIONAL DESCRIPTION OF INTEGRATED FLOW MANAGEMENT
D. L. Adams, Stephen M. Alvania (FAA), Roger Brubaker (FAA), Kerry M. Levin, Richard J. Marek (FAA), M. F. Medeiros (Transportation Systems Center), G. R. Rowland (FAA), and A. N. Sinha Oct. 1981 246 p refs
(Contract DTFA01-81-C-10001)
(AD-A109909; MTR-81W252; FAA-EM-82-7) Avail: NTIS HC A11/MF A01 CSCL 05/1

A preliminary functional description of Integrated Flow Management (IFM) is documented in this report. The objective is to provide a strawman concept so that further IFM development activities will proceed from a common reference point based upon agreement among all related program organizations. The distribution of flow management functions among the various ATC facilities and the related interfacility communications requirements are central issues addressed in this report. A road map projection of the IFM near term evolution through the late 1980s and remaining open issues related to the IFM development are also presented. Author (GRA)

N82-21173# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
JOINT US/USSR MODE S COMPATIBILITY TEST PROGRAM, VOLUME 1 Final Report, 5 Oct. - 30 Oct. 1981
Rodney Guishard and Anatoly Bolshev Oct. 1981 36 p refs 2 Vol.
(FAA Proj. 034-241-510)
(PB82-126616; DOT/FAA-CT-82-16-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 17G

The compatibility of a U.S.S.R. designed transponder with the U.S. Mode S system was investigated. A U.S. transponder was included in these tests for convenient comparison of results. Both bench tests and flight tests were conducted to ascertain compatibility to the U.S. Discrete Address Beacon System (DABS) National Standard of 1978. Radial and orbital flight profiles were used to gather statistical data to draw conclusions about the transponder's performance in conjunction with the Mode S system. Both the methods of conducting these tests and the results obtained are described. GRA

N82-21174# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
JOINT US/USSR MODE S COMPATIBILITY TEST PROGRAM, VOLUME 2 Final Report, 5 Oct.- 30 Oct. 1981
Rodney Guishard and Anatoly Bolshev Oct. 1981 143 p 2 Vol.
(FAA Proj. 034-241-510)
(PB82-126624; DOT/FAA-CT-82-16-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 17G

Data collected during the compatibility tests are presented. These tests included a U.S. transponder for convenience of comparison. It is concluded that the U.S.S.R. mode S transponder operated successfully and is compatible with the U.S. mode S system. Performance of both the U.S. and U.S.S.R. transponders were comparable. T.M.

N82-21175*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
AIRCRAFT INTERROGATION AND DISPLAY SYSTEM: A GROUND SUPPORT EQUIPMENT FOR DIGITAL FLIGHT SYSTEMS
Richard D. Glover Apr. 1982 46 p refs
(NASA-TM-81370; NAS 1.15:81370) Avail: NTIS HC A03/MF A01 CSCL 01D

A microprocessor-based general purpose ground support equipment for electronic systems was developed. The hardware and software are designed to permit diverse applications in support of aircraft flight systems and simulation facilities. The implementation of the hardware, the structure of the software, describes the application of the system to an ongoing research aircraft project are described. T.M.

N82-21176# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
GENERIC TEST BED (GTB) AIRCRAFT Final Report, 1 May 1980 - 1 Oct. 1981
Donald R. Chislaghi, Dennis W. Jarvi, and Steven R. Markman Dec. 1981 61 p refs
(AD-A110335; ASD-TR-81-5036) Avail: NTIS HC A04/MF A01 CSCL 01/3

The Night Attack Workload Steering Group (NAWSG) was requested by HQ AFSC/SD to investigate the need for a Generic Test Bed aircraft and to identify potential candidate aircraft. The team learned a need existed for an aircraft that could perform near the night attack envelope. The aircraft is needed to test, under realistic conditions, both the avionics and their effect on pilot crew workload. The team also identified several potential candidate aircraft that had sufficient cockpit space, volume, cooling and power to permit it to support this mission. Author (GRA)

N82-21177# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate for Development and Qualification.
PRELIMINARY AIRWORTHINESS EVALUATION OF THE UH-1H WITH HOT METAL PLUS PLUME INFRARED SUPPRESSOR AND INFRARED JAMMER Final Report, 16 Jan. - 18 May 1981
Bartholomew D. Picasso, III, John D. Ottomeyer, Loran A. Haworth, and Richard Vincent Jun. 1981 87 p refs
(AD-A110213; USAAEFA-80-06) Avail: NTIS HC A05/MF A01 CSCL 01/2

The Preliminary Airworthiness Evaluation (PAE) of the UH-1H, with the Infrared (IR) Suppressor and AN/ALQ-144 IR Jammer installed, was conducted using a JUH-1H. The initial design cused a degradation in directional stability. The installation was redesigned to reduce the airflow disturbance over the tail rotor and vertical stabilizer. This evaluation was conducted in two phases. Phase 1 was a comparative evaluation of handling qualities of the UH-1H in both the standard and IR suppressor configurations. Phase 2 was primarily a pressure and temperature survey of the IR suppressor configuration. The handling qualities of the UH-1H helicopter were essentially unchanged by the IR suppressor and IR jammer installation tested. The tail boom surface temperatures were higher for the initial design. The metal to metal contact between the engine exhaut ejector and the IR suppressor inner core support struts was identified. Three shortcomings were also identified. GRA

N82-21178# Naval Air Test Center, Patuxent River, Md. Systems Engineering Test Directorate.
ALQ-164 POD/AV-8C ENVIRONMENTAL EVALUATION FLIGHT TEST
Lawrence J. Mertaugh 11 Dec. 1981 152 p
(AD-A110198; NATC-TM-81-109-SY) Avail: NTIS HC A08/MF A01 CSCL 01/3

This report provides the test results of a flight test program conducted to evaluate the environmental conditions to which the ALQ-164 pod is exposed when carried on the AV-8C aircraft. Descriptions are provided of the test program, test equipment, instrumentation, and methods of analysis. The test results include cooling-air mass flow and temperature, vibration levels measured on the pod structure and on the isolator mounted equipment support structure, and pod skin temperature. Test conditions include steady-state conditions throughout the available pod/aircraft flight envelope as well as various vertical takeoff and landing, short takeoff and landing and gun fire operations. Author (GRA)

N82-21179# Systems Technology, Inc., Hawthorne, Calif.
OPTIMAL TERRAIN-FOLLOWING FEEDBACK CONTROL FOR ADVANCED CRUISE MISSILES Final Report
Richard F. Whitbeck and Julian Wolkovitch (Aeronautical Consultant Associates) Jan. 1982 48 p refs
(Contract N00014-79-C-0657)
(AD-A110286) Avail: NTIS HC A03/MF A01 CSCL 18/4

A cruise missile is a vehicle that spends the major portion of its flight at essentially constant altitude and speed. Some cruise missiles are flown at very low altitudes in order to avoid detection. The terrain-following capabilities of such a missile and its guidance system are of importance. It is desirable that the missile should follow closely the contour of the terrain, which may be fixed (Land) or time-varying (ocean waves). A previous study (Ref. 1) demonstrated that optimal control theory could usefully be applied to calculate the best achievable accuracy of terrain-following. Reference 1 showed that, even with an optimal guidance system, terrain-following accuracy was limited by considerations of the cruise missile's inertias, airspeed, and aerodynamic configuration. Author (GRA)

N82-21180# Lockheed-Georgia Co., Marietta.
NUMERICAL AIRCRAFT DESIGN USING 3-D TRANSONIC ANALYSIS WITH OPTIMIZATION. VOLUME 1: EXECUTIVE SUMMARY Final Report, May 1978 - Sep. 1980
A. J. Srokowski, M. E. Lores, and P. Aidala (Grumman Aerospace Corp., Bethpage, N.Y.) Wright-Patterson AFB, Ohio AFWAL Aug. 1981 59 p refs 2 Vol.
(Contract F33615-78-C-3014; AF Proj. 2404)
(AD-A110035; LG81ER0107-Vol-1; AFWAL-TR-81-3091-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 20/4

A detailed summary of the work performed in the Advanced Transonic Technology (ATT) program to incorporate 3-D Transonic computational aerodynamics methods into aircraft design procedures is presented. Existing transonic analysis programs were modified for the design procedure and linked with a numerical optimization program to design wings that are in some sense optimized for a given set of design conditions. The design procedure was validated by applying it in two design case studies. The application of the design procedure in each of these case studies is described in detail. The configurations resulting from these studies were subjected to design verification wind tunnel testing. Comparisons of test data with computed results are presented. GRA

N82-21181# Lockheed-Georgia Co., Marietta.
NUMERICAL AIRCRAFT DESIGN USING 3-D TRANSONIC ANALYSIS WITH OPTIMIZATION, VOLUME 2. PART 1: TRANSPORT DESIGN Final Report, May 1978 - Sep. 1980
A. J. Srokowski, M. E. Lores, R. A. Weed, and P. R. Smith Wright-Patterson AFB, Ohio AFWAL Aug. 1981 187 p refs Prepared in cooperation with Grumman Aerospace Corp., Bethpage, N.Y. 2 Vol.
(Contract F33615-78-C-3014; AF Proj. 2404)
(AD-A110231; LG81ER0107-Vol-2-Pt-1;
AFWAL-TR-81-3091-Vol-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 20/4

The purpose was to develop and validate a new transonic wing design procedure using the numerical optimization technique. The new procedure was used to design both a transport and a fighter configuration. Because the missions and design requirements of a fighter and transport are so different, the design procedure was developed along parallel lines. The results of a transport design case study performed to evaluate the transonic aircraft design procedure developed as part of the Advanced Transonic Technology (ATT) program are presented. A derivative of the C141B aircraft was selected as the design configuration. The design procedure was applied to the baseline configuration and the performance of resulting configuration was then compared to the C141 aircraft. Extensive wind tunnel testing of the design configuration was performed to validate the design procedure. The results of the wind tunnel tests are correlated with computational results generated in the design process. In addition, the evolution of the design procedure and its application in the transport design case study is discussed. GRA

N82-21182# Lockheed-Georgia Co., Marietta.
NUMERICAL AIRCRAFT DESIGN USING 3-D TRANSONIC ANALYSIS WITH OPTIMIZATION, VOLUME 2. PART 2: FIGHTER DESIGN Final Report, May 1978 - Sep. 1980
P. Aidala Wright-Patterson AFB, Ohio AFWAL Aug. 1981 64 p refs Prepared in cooperation with Grumman Aerospace Corp., Bethpage, N.Y.
(Contract F33615-78-C-3014; AF Proj. 2404)
(AD-A110036; LG81ER0107-Vol-2-Pt-2;
AFWAL-TR-81-3091-Vol-2-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 20/4

The results of a fighter design case study performed to evaluate the transonic aircraft design procedure developed as part of the Advanced Transonic Technology (ATT) program are presented. The fighter design is based on the Configuration Design of Advanced Fighters program dual role configuration. Extensive wind tunnel testing of the design configuration was performed to validate the design procedure. The results of the wind tunnel tests are correlated with computational results generated in the design process. The purpose of the ATT program was to develop and validate a new transonic wing design procedure using numerical optimization. The new procedure was used to design both a transport and a fighter configuration. Because the missions and design requirements of a fighter and transport are so different, the design procedure was developed along parallel lines. This is Part 2 of a two-part volume: Part 1 details the transport development, and Part 2 describes the fighter development. There are two other volumes which make up the final report. Volume 1 is an executive summary. It highlights the information that has been presented in detail here. GRA

N82-21183# Lockheed-Georgia Co., Marietta.
NUMERICAL AIRCRAFT DESIGN USING 3-D TRANSONIC ANALYSIS WITH OPTIMIZATION, VOLUME 3. PART 1: USER'S GUIDE TO TRANSPORT DESIGN COMPUTER PROGRAMS Final Report, May 1978 - Sep. 1980
R. A. Weed and A. J. Srokowski Wright-Patterson AFB, Ohio AFWAL Aug. 1981 136 p refs Prepared in cooperation with Grumman Aerospace Corp., Bethpage, N.Y.
(Contract F33615-78-C-3014; AF Proj. 2404)
(AD-A110232; LG81ER0107-Vol-3-Pt-1;
AFWAL-TR-81-3091-Vol-3-Pt-1) Avail: NTIS HC A07/MF A01 CSCL 20/4

This document is the first part of a two part volume of detailed User's Guide for the computer programs of a new transonic wind design procedure. Part 1 presents the User's Guide for the transport design programs produced by Lockheed-Georgia Company and Part 2 presents the User's Guide for the fighter design programs. The purpose of the contract was to develop and validate a new transonic wing design procedure using the numerical optimization technique. The new procedure was used to design both a transport and a fighter configuration. Because the missions and design requirements of a fighter and transport are so different, the design procedure was developed along parallel lines. Lockheed-Georgia Co. developed the transport design procedure, and Grumman Aerospace Corp. developed the fighter design procedures. Users guides for the computer programs used in the transport design case study for the aircraft design procedure developed as part of the Advanced Transonic Technology (ATT) program are presented. These programs include two 3D transonic wing analysis codes linked to a numerical optimizing routine, a two dimensional strip boundary layer program and a wing pylon nacelle interference program. The input data required by each program is described in detail. Samples of the output from each program are presented. Author (GRA)

N82-21184# Lockheed-Georgia Co., Marietta.
NUMERICAL AIRCRAFT DESIGN USING 3-D TRANSONIC ANALYSIS WITH OPTIMIZATION, VOLUME 3. PART 2: USER'S GUIDE TO FIGHTER DESIGN COMPUTER PROGRAM Final Report, May 1978 - Sep. 1980
P. Aidala Wright-Patterson AFB, Ohio AFWAL Aug. 1981 88 p refs Prepared in cooperation with Grumman Aerospace Corp., Bethpage, N.Y.
(Contract F33615-78-C-3014; AF Proj. 2404)
(AD-A110037; LG81ER0107-Vol-3-Pt-2;
AFWAL-TR-81-3091-Vol-3-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 20/4

A User's Guide for the computer code used in the fighter design case study of the Advanced Transonic Technology (ATT) program is presented. The design code includes a 3D transonic wing-body-canard analysis program linked to a numerical optimization routine and a two dimensional strip boundary layer program. The input data required is described in detail and samples of the output are presented. The purpose of the ATT program was to develop and validate a new transonic wing design procedure using the numerical optimization technique. The new procedure was used to design both a transport and a fighter configuration. Because the missions and design requirements of a fighter and transport are so different, the design procedure was developed along parallel lines. Lockheed-Georgia Co. developed the transport design procedure, and Grumman Aerospace Corp. developed the fighter design procedure. This document is the second part of a two-part volume of detailed User's Guides for the computer programs produced by Lockheed-Georgia Company and Grumman Aerospace Corp. of a new transonic wing design procedure. GRA

N82-21185# Messerschmidt-Boelkow G.m.b.H., Munich (West Germany). Unternehmensbereich Drehfluegler.
HELICOPTER VIBRATION CONTROL: A SURVEY
G. Reichert Ottobrunn, West Germany 1 Sep. 1980 31 p refs Presented at 6th European Rotocraft and Powered Lift Aircraft Forum, Bristol, England, 16-19 Sep. 1980
(MBB-UD-302/80-O) Avail: NTIS HC A03/MF A01

Methods for reducing helicopter vibrations are reviewed including structural optimization of the rotor and the whole helicopter, blade and rotor pendulum absorbers, rotor isolation concepts following the antiresonance principle (nodal isolation), and active isolation devices. Vibration characteristics at various speeds and during maneuvers are summarized. The integration of vibration considerations during design and development are shown, including finite element modeling in the detail design phase. Developments in automatic harmonic blade pitch control utilizing closed loop systems are mentioned. Author (ESA)

N82-21186# Messerschmidt-Boelkow G.m.b.H., Munich (West Germany). Unternehmensbereich Drehfluegler.
INVESTIGATIONS OF HELICOPTER STRUCTURAL DYNAMICS AND A COMPARISON WITH GROUND VIBRATION TESTS

J. Stoppel and M. Degener (DFVLR, Goettingen, West Germany) Ottobrun, West Germany 8 Sep. 1980 20 p refs Presented at 6th European Rotorcraft and Powered Lift Aircraft Forum, Bristol, England, 16-19 Sep. 1980 Sponsored by Bundesministerium fuer Forschung und Technologie
(MBB-UD-303/80-O) Avail: NTIS HC A02/MF A01

A BO-105 helicopter was studied using the NASTRAN program applied to one model with 4400 degrees of freedom and a second with 1300 degrees of freedom. Ground vibration tests were performed on an actual helicopter (CO-105) to determining the modal parameters of the structure within a frequency of 56 Hz for comparison with the models. The suspended aircraft was excited by six electrodynamic exciters. Dynamic response was measured by inductive accelerometers. Comparison of model results with test data shows that most all measured natural modes have a corresponding analytical mode. There were 30 measured natural modes up to 60 Hz. Some 40 modes, including the six rigid body modes, were calculated. Only five modes in the high frequency range from 50 to 70 Hz have no equivalent from measurements. Most of the frequencies show very good agreement between measurement and calculation. Less than perfect correlation is seen for the pitching modes, which are influenced mainly by the tail boom. Central processor times on an IBM 360-370 model 3033 were 100 sec and 500 sec for the simple and complex models, respectively. Author (ESA)

N82-21187# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler.
A HINGELESS TAIL ROTOR OF FIBER COMPOSITE CONSTRUCTION AND VIBRATION ISOLATOR SYSTEMS (ARIS, AVIS) FOR HELICOPTERS [GELENKLOSER HECKROTOR IN FASERVERBUND-BAUWEISE UND SCHWINGUNGS-ISOLATIONSSYSTEME (ARIS, ASIS) FUER HUBSCHRAUBER]
G. Reichert 8 Oct. 1980 37 p refs In GERMAN Presented at 2nd Bundesministerium fuer Forsch. und Technol. Statusseminar on Luftfahrtforsch. und Luftfahrttechnol., Garmisch-Partenkirchen, West Germany, 8-9 Oct. 1980
(MBB-UD-311/80-OE) Avail: NTIS HC A03/MF A01

Systems research and development were undertaken in order to reduce cost and improve characteristics of helicopters. An experimental tail rotor development program and methods of reducing airframe vibration are centered on. Definition, construction, and testing of a three-blade and a four-blade tail rotor system are discussed. Two vibration isolator systems (ARIS; AVIS) are next described. Passive and active force isolators were developed and tested in engineering models. It is proposed that all this equipment be subjected to full scale testing in helicopter assemblies. Author (ESA)

N82-21188# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler.
RATIONAL PRODUCTION METHODS FOR THE MANUFACTURE OF HELICOPTER ROTOR BLADES [RATIONELLE FERTIGUNGSVERFAHREN ZUR HERSTELLUNG VON HUBSCHRAUBER-ROTORBLAETTERN]
Klaus Brunsch 8 Oct. 1980 27 p refs In GERMAN Presented at 2nd Bundesministerium fuer Forschung und Technologie Statusseminair Luftfahrtforsch. und Luftfahrttechnol., Garmisch-Partenkirchen, West Germany, 8-9 Oct. 1980
(MBB-UD-312/80-OE) Avail: NTIS HC A03/MF A01

The construction of BO-105/BK 117 rotor blade and the partial mechanization of its production are described. Series production of this rotor blade involves severe tolerances, regarding mass, mass distribution, geometry, mechanical properties, aerodynamics, etc. The necessity of these requirements is explained and consequences on the design of mass manufacturing work stations are pointed out. Development underway to fully automate rotor blade manufacture is then reviewed.
Author (ESA)

N82-21190# Royal Aircraft Establishment, Farnborough (England).
REDUCTION OF STRUCTURAL VIBRATION BY A DYNAMIC ABSORBER
J. M. Williams Dec. 1980 29 p refs
(RAE-TM-AERO-1881; BR77778) Avail: NTIS HC A03/MF A01

The transmission of vibration in dynamic systems is described. An example conswasting of two freely supported elastic plates, connected by a rigid link was studied in connection with helicopter gear boxes and cabins. The addition of a dynamic absorber to such a system can significantly attenuate the transmitted velocities over a chosen narrow frequency band. The harmonic excitation of thin plates is explained. Author (ESA)

N82-21191# National Mechanical Engineering Research Inst., Pretoria (South Africa).
USE OF COMPOSITE MATERIALS FOR HELICOPTER ROTOR BLADES
M. S. Hunt 1980 33 p refs
(PB82-124041; CSIR-ME-1674; ISBN-0-7988-1470-5) Copyright. Avail: NTIS HC A03/MF A01 CSCL 01C

Arguments in favor of the use of fiber reinforced composite materials for helicopter rotor blades are presented. The design and manufacturing techniques developed in an Institute are discussed and some of the results obtained in the structural testing program are given. GRA

N82-21192# British Aerospace Aircraft Group, Preston (England).
SAFRA: CONTROLLED REQUIREMENTS EXPRESSION
D. Y. Forsyth and A. O. Ward Jan. 1980 105 p refs
(BAe-TNAAS-84) Avail: NTIS HC A06/MF A01

A collection of procedures and tools for improving the way in which avionic system and software requirements are derived and validated are described. In the contex of SAFRA, the method of derivation proposed is a technique termed controlled requirements expression (CORE) and the information structure is modelled on an existing standard for requirement specification. The automated aid is the University of Michigan's ISDOS consisting of the problem statement language (PSL) and problem statement analyzer. The diagrammatic notation used in CORE is explained and the representation of the various relationships in the PSL are shown. Examples are depicted for an avionics system.
Author (ESA)

N82-21193*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COLD-AIR PERFORMANCE OF A 15.41-cm-TIP-DIAMETER AXIAL-FLOW POWER TURBINE WITH VARIABLE-AREA STATOR DESIGNED FOR A 75-kW AUTOMOTIVE GAS TURBINE ENGINE Final Report
Kerry L. McLallin, Milton G. Kofskey, and Robert Y. Wong Feb. 1982 33 p refs
(Contract DE-AI01-77CS-51040)
(NASA-TM-82644; E-899; NAS 1.15:82644; DOE/NASA/51040-30) Avail: NTIS HC A03/MF A01 CSCL 21E

An experimental evaluation of the aerodynamic performance of the axial flow, variable area stator power turbine stage for the Department of Energy upgraded automotive gas turbine engine was conducted in cold air. The interstage transition duct, the variable area stator, the rotor, and the exit diffuser were included in the evaluation of the turbine stage. The measured total blading efficiency was 0.096 less than the design value of 0.85. Large radial gradients in flow conditions were found at the exit of the interstage duct that adversely affected power turbine performance. Although power turbine efficiency was less than design, the turbine operating line corresponding to the steady state road load power curve was within 0.02 of the maximum available stage efficiency at any given speed. Author

N82-21194*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY RESULTS ON PERFORMANCE TESTING OF A TURBOCHARGED ROTARY COMBUSTION ENGINE
P. R. Meng, W. J. Rice, H. J. Schock, and D. P. Pringle 1982 24 p refs Presented at the 1982 Soc. of Automotive Engrs. Intern. Congr. and Exposition, Detroit, 22-26 Feb. 1982
(NASA-TM-82772; E-1097; NAS 1.15:82772) Avail: NTIS HC A02/MF A01 CSCL 21E

The performance of a turbocharged rotary engine at power levels above 75 kW (100 hp) was studied. A twin rotor turbocharged Mazda engine was tested at speeds of 3000 to 6000 rpm and boost pressures to 7 psi. The NASA developed combustion diagnostic instrumentation was used to quantify indicated and pumping mean effect pressures, peak pressure, and face to face variability on a cycle by cycle basis. Results of this testing showed that a 5900 rpm a 36 percent increase in power was obtained by operating the engine in the turbocharged configuration. When operating with lean carburetor jets at 105 hp (78.3 kW) and 4000 rpm, a brake specific fuel consumption of 0.45 lbm/lb-hr was measured. B.W.

N82-21195*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ANALYTICAL INVESTIGATION OF NONRECOVERABLE STALL

Leon M. Wenzel and William M. Bruton Feb. 1982 23 p refs
(NASA-TM-82792; E-1126; NAS 1.15:82792) Avail: NTIS HC A02/MF A01 CSCL 21E

A lumped parameter model of the TF34 engine is formulated to study nonrecoverable stall. Features of the model include forward and reverse flow, radial flow in the fan, and variable corrected speed. The purpose of the study is to point out those parameters to which recoverability is highly sensitive but are not well known. Experimental research may then be directed toward identification of the parameters in that category. Compressor performance in the positive flow region and radial flow in the fan are shown to be important but unknown parameters determining recoverability. Other parameters such as compressor performance during reverse flow and in-stall efficiency have relatively small impact on recoverability. Author

N82-21196*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.

ENERGY EFFICIENT ENGINE SHROUDLESS, HOLLOW FAN BLADE TECHNOLOGY REPORT

C. J. Michael Dec. 1981 91 p refs
(Contract NAS3-20646)
(NASA-CR-165586; NAS 1.26:165586; PWA-5594-199) Avail: NTIS HC A05/MF A01 CSCL 21E

The Shroudless, Hollow Fan Blade Technology program was structured to support the design, fabrication, and subsequent evaluation of advanced hollow and shroudless blades for the Energy Efficient Engine fan component. Rockwell International was initially selected to produce hollow airfoil specimens employing the superplastic forming/diffusion bonding (SPF/DB) fabrication technique. Rockwell demonstrated that a titanium hollow structure could be fabricated utilizing SPF/DB manufacturing methods. However, some problems such as sharp internal cavity radii and unsatisfactory secondary bonding of the edge and root details prevented production of the required quantity of fatigue test specimens. Subsequently, TRW was selected to (1) produce hollow airfoil test specimens utilizing a laminate-core/hot isostatic press/diffusion bond approach, and (2) manufacture full-size hollow prototype fan blades utilizing the technology that evolved from the specimen fabrication effort. TRW established elements of blade design and defined laminate-core/hot isostatic press/diffusion bonding fabrication techniques to produce test specimens. This fabrication technology was utilized to produce full size hollow fan blades in which the HIP'ed parts were cambered/twisted/isothermally forged, finish machined, and delivered to Pratt & Whitney Aircraft and NASA for further evaluation. Author

N82-21197*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.

CF6 JET ENGINE DIAGNOSTICS PROGRAM: HIGH PRESSURE COMPRESSOR CLEARANCE INVESTIGATION

M. A. Radomski Jan. 1982 48 p ref
(Contract NAS3-20631)
(NASA-CR-165580; NAS 1.26:165580; R82AEB189) Avail: NTIS HC A03/MF A01 CSCL 21E

The effects of high pressure compressor clearance changes on engine performance were experimentally determined on a CF6 cure engine. The results indicate that a one percent reduction in normalized average clearance, expressed as a fraction of airfoil length, improves compressor efficiency by one percent. Compressor clearances are reduced by the application of rotor bore cooling, insulation of the stator casing, and use of a low coefficient of expansion material in the aft stages. This improvement amounts to a reduction of normalized average clearance of 0.78 percent, relative to CF6-50 compressor, which is equivalent to an improvement in compressor efficiency of 0.78 percent. J.M.S.

N82-21198*# Computing Devices Co., Ottawa (Ontario).

OPTIMIZATION OF THRUST ALGORITHM CALIBRATION FOR COMPUTING SYSTEM (TCS) FOR THRUST THE NASA HIGHLY MANEUVERABLE AIRCRAFT TECHNOLOGY (HIMAT) VEHICLE'S PROPULSION SYSTEM Final Report

M. J. Hamer and R. I. Alexander Dec. 1981 77 p refs
(Contract NAS4-2812)
(NASA-CR-163121; NAS 1.26:16321; A011/FR) Avail: NTIS HC A05/MF A01 CSCL 21E

A simplified gross thrust computing technique for the HiMAT J85-GE-21 engine using altitude facility data was evaluated. The results over the full engine envelope for both the standard engine mode and the open nozzle engine mode are presented. Results using afterburner casing static pressure taps are compared to those using liner static pressure taps. It is found that the technique is very accurate for both the standard and open nozzle engine modes. The difference in the algorithm accuracy for a calibration based on data from one test condition was small compared to a calibration based on data from all of the test conditions. E.A.K.

N82-21199# General Motors Corp., Indianapolis, Ind. Diesel Allison Div.

EXPERIMENTAL INVESTIGATION OF TURBINE ENDWALL HEAT TRANSFER. VOLUME 1: DESCRIPTION OF EXPERIMENTAL HARDWARE AND TEST CONDITIONS Final Report, 1 Aug. 1977 - 31 Aug. 1981

L. D. Hylton, M. S. Mihelc, E. R. Turner, and R. E. York Wright-Patterson AFB, Ohio AFWAL Aug. 1981 147 p ref 3 Vol.
(Contract F33615-77-C-2030; AF Proj. 3066)
(AD-A110332; DDA-EDR-10363-Vol-1;
AFWAL-TR-81-2077-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 21/5

Two turbine cascades were tested at simulated engine conditions to provide a data base of endwall heat transfer data. This data base is intended to be sufficiently complete to provide verification data for refined computational models developed to predict first-stage stator endwall heat transfer in advanced turbine engines. A linear, two dimensional cascade provided the bulk of the data. This cascade provided data to separate the effects of exit Mach number, exit Reynolds number, inlet boundary layer thickness, gas-to-wall temperature ratio, inlet pressure gradients, and inlet temperature gradients. In addition, adiabatic wall temperature and inlet turbulence intensity data are available for this linear cascade runs. A computerized data base was generated. This data base, with its associated software management system, provides the user with relatively easy access to the vast amount of data generated. A full annular, three dimensional cascade was used to acquire data for identifying the radial pressure gradient effects. Tests in the annular cascade were run over a wide range of exit Mach and Reynolds numbers and gas-to-wall temperature ratios, all at levels typical to advanced engines. The facilities, cascade geometry, instrumentation, and data acquisition techniques are discussed, as well as a summary of test conditions and a sample summary data set for both cascades. R.J.F.

N82-21200# Detroit Diesel Allison, Indianapolis, Ind.

EXPERIMENTAL INVESTIGATION OF TURBINE ENDWALL HEAT TRANSFER. VOLUME 2: LINEAR AND ANNULAR CASCADE SUMMARY DATA SETS Final Report, 1 Aug. 1977 - 31 Aug. 1981

L. D. Hylton, M. S. Mihelc, E. R. Turner, and R. E. York Wright-Patterson AFB, Ohio AFWAL Aug. 1981 329 p 3 Vol.
(Contract F33615-77-C-2030; AF Proj. 3066)
(AD-A110333; DDA-EDR-10363-Vol-2;
AFWAL-TR-81-2077-Vol-2) Avail: NTIS HC A15/MF A01 CSCL 21/5

Two turbine cascades were tested at simulated engine conditions to provide a data base of endwall heat transfer data. This data base is intended to be sufficiently complete to provide verification data for refined computational models developed to predict first-stage stator endwall heat transfer in advanced turbine engines. Summary plots of the results of both the linear and the annular cascade test programs are given. The data is sufficient to allow the designer to estimate the endwall cooling levels and to locate areas of high heat transfer rates. R.J.F.

N82-21201# Detroit Diesel Allison, Indianapolis, Ind.

EXPERIMENTAL INVESTIGATION OF TURBINE ENDWALL HEAT TRANSFER. VOLUME 3: DATA BASE SYSTEM Final Report, 1 Aug. 1977 - 31 Aug. 1981

L. D. Hylton, M. S. Mihelc, E. R. Turner, and R. E. York Wright-Patterson AFB, Ohio AFWAL Sep. 1981 61 p 3 Vol.
(Contract F33615-77-C-2030; AF Proj. 3066)
(AD-A110334; DDA-EDR-10363-Vol-3;
AFWAL-TR-81-2077-Vol-3) Avail: NTIS HC A04/MF A01 CSCL 21/5

Two turbine cascades were tested at simulated engine conditions to provide a data base of endwall heat transfer data. This data base is intended to be sufficiently complete to provide verification data for refined computational models developed to predict first-stage stator endwall heat transfer in advanced turbine engines. A linear, two dimensional cascade provided the bulk of the data. This cascade provided data to separate the effects of exit Mach number, exit Reynolds number, inlet boundary layer thickness, gas-to-wall temperature ratio, inlet pressure gradients, and inlet temperature gradients. In addition, adiabatic wall temperature and inlet turbulence intensity data are available for the linear cascade runs. A computerized data base was generated. This data base, with its associated software management system, provides the user with relatively easy access to the vast amount of data generated. A full annular, three dimensional cascade was used to acquire data for identifying the radial pressure gradient effects. Tests in the annular cascade were run over a wide range of exit Mach and Reynolds number and gas-to-wall temperature ratios, all at levels typical of advanced engines. A user's manual is presented. R.J.F.

N82-21202# Department of Energy, Bartlesville, Okla. Energy Technology Center.
THERMODYNAMICS OF ORGANIC COMPOUNDS Final Technical Summary Report, 1 Oct. 1980 - 30 Sep. 1981
N. K. Smith, B. E. Gammon, and William D. Good 1981 24 p refs
(Grant AF-AFOSR-ISSA-00013-81; AF Proj. 2308)
(AD-A110430; AFOSR-82-0023TR) Avail: NTIS HC A02/MF A01 CSCL 21/5

The research effort continues to be focused on high density/high energy hydrocarbons. In cooperation with researchers at Wright-Patterson Air Force Base, heats of combustion are measured for constituents of current ramjet fuels and for finished fuels; meanwhile, pure hydrocarbons are synthesized for heat-of-combustion measurement whose unusual steric or strain energies may contribute to design of high energy/high density fuels of the future. Four pure hydrocarbons studied were selected among the alkylnaphthalenes and indans that may exhibit unusual steric energies. One unusual hydrocarbon, with very high density and a cage-like molecular structure, was also studied. This substance is undergoing preliminary testing as an experimental fuel. Synthesis and purification of hydrocarbons for future study are in progress at Oklahoma State University. New equipment and procedures were developed for application of the differential scanning calorimeter on measurements of heat capacity of fuels and their constituents. Preparation is underway to study the heat of combustion of several special liquid hydrocarbon fuels. GRA

N82-21203# United Technologies Research Center, East Hartford, Conn.
RESEARCH ON TURBINE ROTOR-STATOR AERODYNAMIC INTERACTION AND ROTOR NEGATIVE INCIDENCE STALL Final Report, Mar. 1979 - Nov. 1981
R. P. Dring, H. D. Joslyn, L. W. Hardin, and J. H. Wagner Wright-Patterson AFB, Ohio AFWAL Nov. 1981 107 p refs
(Contract F33615-80-C-2008; AF Proj. 3066)
(AD-A110341; UTRC/R81-915048; AFWAL-TR-81-2114) Avail: NTIS HC A06/MF A01 CSCL 20/4

The aerodynamic interaction between the rotors and stators of a large scale axial turbine stage have been studied experimentally. The data included measurements of the time averaged and instantaneous surface pressures and surface thin film gage output on both the rotor and stator at midspan. The data also included measurement of the stator suction and pressure surface time averaged heat transfer at midspan. The data was acquired with rotor-stator axial gaps of 15% and 65% of axial chord. The upstream potential flow influence of the rotor on the stator was seen as well as the downstream potential flow and wake influences of the stator on the rotor. The second phase of the program was an investigation of the nature of the full-span steady flow over the rotor with incidence varying up to negative incidence stall. Full-span pressure distributions and surface flow visualization were acquired over the entire range of incidence. The data indicated separation-free flow and large radial flows on the pressure surface in the vicinity of design incidence. GRA

N82-21204# Rolls-Royce Ltd., Derby (England). Aero Div.
COATINGS IN THE AERO GAS TURBINE
R. H. Wedge and A. V. Eaves 1980 12 p ref
(PNR-90049) Avail: NTIS HC A02/MF A01

The types of sprayed coatings used are defined, and coating requirements for each section of the gas turbine engine are discussed. Main problem areas are defined as hammer wear at compressor blade (snubber) abutment faces, and turbine blade shroud abutment faces; fretting wear particularly of compressor blade and vane roots rubbing and vane roots rubbing and sliding wear in various applications; the requirement to maintain clearances in gas path seals; and the effects of overheating and thermally cycling turbine parts, particularly rotor blades. The need to restore deliberately overmachined and accidentally overmachined parts is also discussed. Factors to be considered in coating selection are described with particular reference to the application requirements, the types of coating that might be used, and coatings that have proved to give the best results. The relationship between coating performance and cost effectiveness is illustrated with examples. Author (ESA)

N82-21205# Rolls-Royce Ltd., Derby (England).
PROCESS DEVELOPMENT AND EVALUATION OF GAS TURBINE ENGINE COMPONENTS IN IMI 829
R. M. Duncan (IMI Kynoch Ltd.), R. E. Goosey (IMI Kynoch Ltd.), R. H. Jeal, and P. J. Postans 1980 12 p refs
(PNR-90050) Avail: NTIS HC A02/MF A01

Measurements of basic physical properties and mechanical property evaluation of a range of typical gas turbine parts were performed on this titanium alloy (Ti-Al-Sn-Zr-Nb-Mo-Si). It is a near-alpha alloy. It has a density of 4.54 g/cu cm and the alpha + beta/beta transformation temperature is nominally 1015 C. Tensile tests of disk and ring forgings show that: at 20 C the 0.2% proof stress is 30 MPa lower than for IMI 685, but both alloys have similar strength at 540 C. Tensile strength is unaffected by forging route and microstructure, but tensile ductility tends to improve as the grain size decreases. The test results show some scatter but at 20 C the average elongation is 13% with the finest grain size and 8% for the coarsest grain size, and at 540 C the elongations are 15% and 11%, respectively. Creep strength is 20 C superior to IMI 685. Fracture toughness is similar to IMI 685 as are crack growth rates. Author (ESA)

N82-21206# Rolls-Royce Ltd., Derby (England).
THE TESTING AND APPROVAL OF AIRCRAFT ENGINE MOUNTED ACCESSORIES
D. S. Pearson 1980 21 p ref
(PNR-90051) Avail: NTIS HC A02/MF A01

Measurement techniques, data assessment criteria, physical interpretation and laboratory simulation methods applicable to accessory vibration testing are reviewed. The inadequacies of endurance approval testing of accessories by applying undirectional single frequency excitation to simulate engine conditions at a particular shaft speed are shown. A measurement and assessment technique is described which recognizes the effect of multifrequency vibration in three planes. An experimental specification for accessories, based on the technique, is outlined. Case histories of vibration induced accessory failure are cited. Author (ESA)

N82-21207# Rolls-Royce Ltd., Derby (England).
DEVELOPMENTS TO IMPROVE THE NOISE AND COMBUSTION EMISSIONS ON THE FOKKER F28 AIRCRAFT AND ITS ROLLS-ROYCE RB183-555 ENGINES. SECTION 1: DEVELOPMENT OF THE NEW INTERNAL 10-LOBE MIXER
S. L. Sarin (Royal Netherlands Aircraft Factories Fokker), K. Goddard, and N. J. Wilson 1981 15 p
(PNR-90061) Avail: NTIS HC A02/MF A01

Theoretical and practical aspects of exhaust mixer design for turbofan engines are discussed. The effects on fuel consumption and noise reduction of annular and multilobed internal mixers are compared. The production version of a multilobed mixer is described. The lobed mixer reduces total noise by 5.75 dB A and fuel consumption by 4%. The development trends of exhaust mixers, with particular reference to high bypass ratio engines are also discussed. Author (ESA)

N82-21208# Rolls-Royce Ltd., Derby (England).
ENGINES FOR AIR TRANSPORT
A. G. Newton 1981 52 p
(PNR-90066) Avail: NTIS HC A04/MF A01

The status and trends of commercial aircraft transportation systems were reviewed. The characteristics and specific consumption of aviation fuel are emphasized. It is shown that in the next 15 years the fuel consumption of current large fan engines can be reduced by 15%. The quality of fuel will deteriorate relative to today, which will place greater demands on engine design. Further improvements in fuel economy using engines designed for lower specific thrust appear feasible. The development of a full authority digital control system and its effects on fuel consumption are also discussed. Author (ESA)

N82-21209# Rolls-Royce Ltd., Derby (England).
ALLOWING FOR THE WALL BOUNDARY LAYER IN A STAGE OF AN AXIAL COMPRESSOR
N. S. Berestneva, N. A. Kocal, F. G. Kontsevich, and Y. G. Otsechkin Jan. 1981 9 p refs Transl. into ENGLISH from Samoletostr. Tekh. Vozdush. Flota (USSR), no. 43, 1978 p 51-54 In ENGLISH and RUSSIAN
(PNR-90067; Trans-15546; TLT-00815) Avail: NTIS HC A02/MF A01

The geometric characteristics of the tested stage and the grid parameters are given. The coefficient of adiabatic pressure of the stage is taken as 0.26 at a coefficient of consumption of 0.447. The stage is a model of the initial stage of a high pressure compressor. The operation of the stage in the calculated field of input speeds leads to a 3.5 % increase in its maximum efficiency with no influence upon the limit of its operational stability. Author (ESA)

N82-21210# Rolls-Royce Ltd., Derby (England). Noise Technology Div.
THE ROLLS ROYCE ROLE IN AIRCRAFT NOISE REDUCTION
M. J. T. Smith 8 Sep. 1981 17 p refs Submitted for publication
(PNR-90069) Avail: NTIS HC A02/MF A01

Jet turbomachinery, pressure, combustion and aerodynamic noise sources are discussed. General features of reasearch organization and current projects (RBZU-524, RB711-535, RJ500) are outlined. Engine development costs often lead to an emphasis on adopting existing products to new and altered airframes. Author (ESA)

N82-21211# Rolls-Royce Ltd., Derby (England). Dept. of Engineering.
THE MECHANICAL TESTING OF COMPRESSORS AND TURBINES FOR AIRCRAFT GAS TURBINE ENGINES
D. Norris 1981 12 p
(PNR-90070) Avail: NTIS HC A02/MF A01

Ten different engine types, including the RB211 family of engines, and both civil and military applications, are considered. Overspeed, fatigue, bird ingestion, and blade containment are described. Author (ESA)

N82-21212# British Aerospace Aircraft Group, Weybridge (England).
SIMULATION OF TURBOFAN ENGINE MODELS IN THE WEYBRIDGE LOW SPEED WIND TUNNEL
R. F. R. Storey Jun. 1981 7 p
(BAe-Inform-Note-46) Avail: NTIS HC A02/MF A01

A control arrangement for the gas supply to a low speed wind tunnel is suggested. Clean dry nitrogen gas at up to 1500 lb/sq in and 90 C is supplied from a mobile dispenser at 4.2 lb/sec. Gas pressure is reduced to 400 lb/sq in and drives two model turbofan engines. The flow from the dispenser into the models is controlled by servovalves operating hydraulically from pressure transducer signals. Materials and supply sources are listed. Author (ESA)

N82-21213# Aeronautical Research Labs., Melbourne (Australia).
THE STABILITY OF PORTABLE BRIDGES CARRIED ON SLINGS BENEATH HELICOPTERS
N. Matheson Jan. 1980 56 p refs
(ARL/Aero-Rept-154; AR-001-787) Avail: NTIS HC A04/MF A01

Information available concerning the operation of helicopters carrying airportable bridges is reviewed. In addition, a series of wind tunnel tests were made with 1/15 scale models to determine the maximum safe speed for a helicopter carrying two different class 16 bridges, a 16 m (52 ft) clear span, and a 22 m (72 ft) raft, separately on a single hook. The tests indicated that the 16 m (52 ft) bridge can be carried safely at speeds up to 65 knot on a 16 m (53 ft) cable, provided it was slung 5 deg nose up in the static condition, and two small flat fins were attached to the aft end. The raft was carried in two loads, A and B, because of weight limitations. Load A, which consisted mainly of deck boxes and accessories, can be safely carried without fins at speeds up to 60 knot on a 16 m (53 ft) cable provided it was rigged 1 to 2 deg nose up. Load B, which consisted of four ramps and four articulators, can also be carried at 60 knot, but small flat fins were required and it had to be slung 5 deg nose up and carried on a 10 m (33 ft) cable. S.L.

N82-21214# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
DIGITAL COMMAND AUGMENTATION FOR LATERAL-DIRECTIONAL AIRCRAFT DYNAMICS Annual Technical Report, 1 Feb. 1979 - 31 Jan. 1980
David Atzhorn Arlington, Va. ONR May 1981 199 p refs
(Contract N00014-78-C-0257; NR Proj. 300-003)
(AD-A110274; MAE-1511; ONR-CR-300-003-2) Avail: NTIS HC A09/MF A01 CSCL 01/2

Linear-quadratic sampled-data regulator theory is used to design several Type 0 and Type 1 control laws for lateral-directional aircraft dynamics. Control structures are defined for singular command inputs and for control rate outputs; the former allows for precise following of a command whose integral appears in the state vector, while the latter uses both a difference approximation and the Tustin transform to characterize control rate in the discrete-time domain. Type 0 controllers with control rate restraint and equivalent Type 1 controllers are implemented in a microprocessor-based digital flight control system, and flight tests are conducted using Princeton University's Variable-Response Research Aircraft. The control system, entitled CAS-4, offers four combinations of control: direct (unaugmented) control, Type 0 control with both roll rate/sideslip angle and roll rate/lateral acceleration command combinations, and Type 1 control with roll/sideslip angle command. Ground-based hybrid simulation and flight test results show that major closed-loop response features are unaffected by the choice of sampling rate when sampled-data regulator theory is used. Consequently, much lower sampling rates than would normally be expected can be used when control laws are derived in this manner. GRA

N82-21215# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
INFLUENCE OF STRAKES ON COEFFICIENTS OF LONGITUDINAL STABILITY Thesis - Tech. Univ., Munich [EINFLUSS VON STRAKES AUF DIE BEIWERTE DER LAENGSBEWEGUNG]
Gerhard Wolfrum 20 Dec. 1979 190 p refs In GERMAN
(MBB-FE-122/S/PUB/22) Avail: NTIS HC A09/MF A01

In a subsonic wind tunnel the influence on the longitudinal stability of seven different strakes mounted on five basic wings was measured. Size of the strake and lift are directly related, while the aerodynamic drag is determined by the basic wing. The importance of pitch is influenced by the strake in relation with the lift. The efficacy of right strakes on more or less swept back wings against buffeting is particularly strong in the subsonic area. In general, strakes do not influence substantially the outline of the aerodynamic configuration, but their size remains the most important single parameter to obtain longitudinal stability. Author (ESA)

N82-21216# Royal Aircraft Establishment, Farnborough (England).
SOME REMARKS ON BUFFETING
D. G. Mabey Feb. 1981 35 p refs Presented at Von Karman Inst. for Fluid Dyn. Lecture Ser. on Unsteady Airloads and Aeroelastic Probl. in Separated and Transonic Flows, Brussels, 10 Mar. 1981
(RAE-TM-Struct-980; BR78530) Avail: NTIS HC A03/MF A01

Buffeting is defined as the structural response to the aerodynamic excitation produced by separated flows. The aerodynamic excitation produced by bubbles, vortices and transonic flows is discussed. Different buffeting criteria for the wings of fighter and transport aircraft are developed. Methods of predicting the onset and severity of buffeting are reviewed. Typical examples are discussed, in which improvements in wing buffeting are compared with changes in mean force measurements. Buffeting measurements on ordinary models in a cryogenic wind, wind tunnel are analyzed. The measurements confirm that cryogenic tunnels can separate Reynolds number and aeroelastic effects. The frequency parameter must be correct on the model if the aerodynamic excitation does not have a flat spectrum, as at vortex breakdown on a slender wing. Author (ESA)

N82-21217# Royal Aircraft Establishment, Farnborough (England). Structures Dept.

THE APPLICATION OF SUBSONIC THEORETICAL AERODYNAMICS TO ACTIVE CONTROLS

H. C. Garner May 1981 84 p refs
(RAE-TR-81060; RAE-Struct-BF/B/0860; BR80082) Avail: NTIS HC A05/MF A01

Aerodynamic forces for wing and control surface motion with general time dependence in linearized subsonic flow were analyzed. The time domain where quasisteady displacement and rate terms are combined with a residual history term is discussed. An accurate calculation procedure is devised, and results are illustrated for a high respect ratio wing at Mach number 0.8 with trailing edge, leading edge and all moving tip controls. Asymptotic behavior at small and large times and individual control characteristics are compared. The quasisteady approximation is established for hinge moments and is analyzed for lift. The rapid lift response to leading edge control and the sluggish lift response to trailing edge control are explained. The forces in the time domain are confirmed by Fourier transform calculations in the frequency domain, which shows the extent to which the range of frequency can be truncated. The control surface motion to produce a known time dependent force is determined. Author (ESA)

N82-21218# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Aircraft Div.

VIBRATION QUALIFICATION OF EXTERNAL AIRCRAFT STORES AND EQUIPMENT

M. Steininger and G. Haidl 7 Sep. 1981 17 p refs Presented at 53rd AGARD Struct. and Mater. Panel Meeting, Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981
(MBB-FE-173/S/PUB/46) Avail: NTIS HC A02/MF A01

Prediction methods for preliminary assessment of aircraft vibration levels and spectra are described. A dynamic environment simulation for external stores configuration tests is discussed. Standard mounting and excitation techniques are reviewed and mounting rig requirements and shaker capabilities are treated. It is shown that trends in aircraft structural design and operational requirements result in increasing vibration problems.
Author (ESA)

N82-21219# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

DYNAMIC RESPONSE OF A HOT GAS, CONTROL-SURFACE ACTUATOR

Erwin Goellner 1981 72 p refs Reprint from J. of Flight Sci. and Space Res. (Cologne), v. 5, no. 4, Jul./Aug. 1981 p 209-216 In GERMAN; ENGLISH summary Presented at 4th Aachener Fluidtech. Kolloq., Aachen, Mar. 1980
(MBB-UA-599/81-OE; ISSN-0342-068X) Avail: NTIS HC A04/MF A01

The operation of a control surface actuator and its steady state valve characteristics are examined. The linearized transfer functions are calculated under simplified assumptions. Suitable parameters are defined and their influence on the stability of the closed loop is discussed. The response of the closed position control loop is demonstrated. Author (ESA)

N82-21220# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge-Entwicklung.

THEORETICAL LINEAR APPROACH TO THE COMBINED MAN-MANIPULATION SYSTEM IN MANUAL CONTROL OF AN AIRCRAFT

Klaus Brauser 2 Jun. 1981 17 p refs Presented at 17th Ann. Conf. on Manual Control, Los Angeles, 16-18 Jun. 1981
(MBB-FE-301/S/PUB/43) Avail: NTIS HC A02/MF A01

The dynamic characteristics of the pilot control system are studied with a model combining the neuromuscular properties of the man with the physical properties of the control system. The man is assumed to be a quasilinear, time invariant control operator adapted to the operating states of the control system. The frequency domain transfer functions of the man control system and the closed loop pilot aircraft control system are posed. The complete precision man control model must be introduced into the closed loop transfer function to understand standard handling criteria and to derive these criteria directly from human operator properties. Author (ESA)

N82-21222# AAI Corp., Cockeysville, Md. Aeronautical Systems Div.

MINUTES OF PHYSICAL CONFIGURATION AUDIT FOR THE F-16 ELECTRONIC WARFARE TRAINING DEVICE

Dec. 1981 54 p
(Contract F33657-79-C-0820)
(AD-A110321; AAI-ER-11613) Avail: NTIS HC A04/MF A01 CSCL 05/9

A physical configuration audit (PCA) of the F-16 electronic warfare training device was conducted. The purpose was to conduct a formal examination of the built version of the simulator against the technical engineering drawings to establish the simulators product baseline. E.A.K.

N82-21223# Air Force Human Resources Lab., Brooks AFB, Tex.

THE 1981 IMAGE 2 CONFERENCE PROCEEDINGS Final Report

Eric G. Monroe, comp. Nov. 1981 508 p refs Proceedings Held at Brooks AFB, Texas, 10-12 Jun. 1981
(AF Proj. 9983)
(AD-A110226; AFHRL-TR-81-48) Avail: NTIS HC A22/MF A01 CSCL 14/2

These proceedings are a collection of papers presented at the 1981 Image Generation/Display Conference 2. The Image Conference is devoted to issues relevant to the development and use of imagery generated and displayed for visual flight simulation. The purpose of the conference is to provide a forum for presenting and discussing topics concerned with the imagery generated for out of the cockpit and sensor visual flight simulation. The 31 papers presented were compatible with the theme of the conference, including both engineering research/development and behavioral research. In the engineering area, papers covered such topics as computer simulated forward looking infrared and low light level television imagery, computer image generation (CIG) texturing of curved surfaces, shuttle mission simulation, nap of the Earth flight simulation, light valve projectors, lasers in simulation, area of interest displays, tactical combat simulation, sensor simulation, and helmet-mounted displays. Topics in behavioral research included such items as effects of visual and motion cues, identification of targets in CIG displays, psychophysical aspects of visual processing, visual illusions, visually induced self motion, determination of visual cue requirements, visual data base development for terrain flight simulation, transformation realism, and strategies to optimize CIG image content. GRA

N82-21224# Mitre Corp., McLean, Va. Metrek Div.

OVERVIEW OF THE O'HARE RUNWAY CONFIGURATION MANAGEMENT SYSTEM

Richard L. Fain Sep. 1981 52 p refs
(Contract DTFA01-81-C-10001)
(AD-A110137; MTR-81W235; FAA-EM-82-5) Avail: NTIS HC A04/MF A01 CSCL 17/7

The O'Hare Runway Configuration Management System (CMS) is an interactive computer algorithm designed to assist the Assistant Chief of the O'Hare facility in selecting runway configurations which minimize delay. The current version of CMS utilizes a full screen input/output structure to enhance near-term implementation within O'Hare's manual ATC environment. This paper presents an overview of the runway selection logic (including the impacts of transitioning between configurations and balancing demand) and describes the system hardware configuration and the functional responsibilities of the participants in the O'Hare application. The historical development of CMS, future potential enhancements in system logic and system implementation, and application of CMS at other airports are also discussed. Author (GRA)

N82-21226# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF WIND TUNNEL INTERFERENCE DUE TO ANGLE OF ATTACK

Norbert Gruen 29 Aug. 1980 145 p In GERMAN; ENGLISH summary
(MBB-FE-124/S/PUB/34) Avail: NTIS HC A07/MF A01

Using wall pressure measurements, recorded simultaneously with model tests, corrections for model surface pressures are calculated. The difference between experimental wall pressure coefficients and computed free flight pressure coefficient distributions is used as a criterion for the wall interference on the tunnel flow. An evaluation of the wall pressure curves shows that their general shape is predetermined by the empty tunnel and the model support, respectively. Increasing the model angle of attack primarily causes a shift and a change in the gradient of these curves. The calculated free flight pressure coefficients are found to be very small compared to measured values. In order to find the pressure coefficient differences along the tunnel axis, a flow model is established which shows the previously computed differences in pressure coefficients on an imaginary wall at the location of the tunnel wall. The propagation of these disturbances to the tunnel axis is calculated using the finite element method. Results are used to correct measured coefficients for lift, drag and pitching moment. Author (ESA)

N82-21229# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Apparate.
COMPUTER GENERATED IMAGES FOR AIRCRAFT PILOT TRAINING
P. Gueldenpfennig and W. Metze 3 Nov. 1980 19 p refs
(MBB-UA-551/80-OE) Avail: NTIS HC A02/MF A01

The various training tasks envisaged for full mission simulation with a prototype visual system are described and the performance of the system evaluated. The upgrading of the system resulting from this evaluation, and its implementation in the operational simulators, are discussed. Deficiencies were noted in the following areas: scene content due to the limited real time edge processing capability, for the training of ground attack, and takeoff/landing; scene content due to the limited online data base for the training of en route flying; and resolution due to the number of TV lines and raster elements per TV line for the training of ground attack and air-to-air-combat. Author (ESA)

N82-21247# Rolls-Royce Ltd., Derby (England).
TELEMETRY IN AERO ENGINE DEVELOPMENT
A. E. Hubble 1980 19 p
(PNR-90055) Avail: NTIS HC A02/MF A01

The use of an Acurex telemetry system for obtaining in situ strain and temperature measurements of a high pressure compressor rotor disk is described. The transmitter is mounted inside the compressor shaft with an auxiliary supply of cooling air. Calibration techniques of the strain gages, transmitter and receivers are given. Procedures used for selective test bed transmitter frequencies are listed. Laboratory test results for the thermocouple and static strain transmitters show good agreement with manufacturers' data. A comparison with similar battery operated equipment is made. Author (ESA)

N82-21261# Hughes Aircraft Co., Culver City, Calif.
ADVANCED CONCEPTS FOR COMPOSITE STRUCTURE JOINTS AND ATTACHMENT FITTINGS. VOLUME 1: DESIGN AND EVALUATION Final Report, Jul. 1977 - Dec. 1980
J. V. Alexander and R. H. Messinger Nov. 1981 127 p refs 2 Vol.
(Contract DAAJ02-77-C-0076; DA Proj. 1L2-62209-AH-76)
(AD-A110212; HH-80-402-Vol-1;
USAAVRADCOM-TR-81-D-21A) Avail: NTIS
HC A07/MF A01 CSCL 01/3

The purpose of this program was to develop the technology of applying fiber-reinforced composite materials to helicopter joints and attachment fittings that permit disassembly of major components. A generic design methodology approach was used to make the data developed applicable to ongoing and future helicopter programs. A detail design, analysis, and testing program was carried out on the three joint and fitting concepts selected: wrapped tension fittings, gearbox attachment fittings, and seat attachment fittings. The scope of the study included analytical design tools, including finite element computer analysis; fabrication techniques, with special emphasis on weight and cost effectiveness considerations; structural integrity testing, including static, dynamic, failsafe/safe-life, and ballistic tolerance considerations; and nondestructive inspection (NDI) techniques. Author (GRA)

N82-21404 California State Univ., Sacramento.
ANALYSIS OF VERY LOW FREQUENCY OSCILLATIONS IN A RAMJET COMBUSTOR BY USE OF A SENSITIVE TIME LAG MODEL
In APL The 18th JANNAF Combust. Meeting, Vol. 3 Oct. 1981 p 307-316 refs

(Contract F336157-77-C-2004)
Avail: NTIS HC A20 CSCL 21/9

Pressure oscillations in ramjet combustor were investigated. Coaxial dump combustor configurations and on very low frequency oscillations, oscillations in which the acoustic modes of the combustion chamber are not excited was emphasized. The main features of the analysis are: compressible flow in the air inlet system, bulk oscillations in the combustor, and a combustion response characterized by a time lag sensitive to combustor conditions. Two studies were undertaken by using the analytical model: (1) an empirical correlation for the time lag based on steady state performance data was used; (2) consisted of the calculation of stability limits for the time lag and combustor geometry for various sets of operating conditions. Comparison of the analytical stability limits with the experimental results gave time lag values, which are compared with the empirical correlation used in the first study. E.A.K.

N82-21405 McDonnell-Douglas Research Labs., St. Louis, Mo.
FACTORS INFLUENCING VELOCITY DISTRIBUTIONS AT INLET/COMBUSTOR INTERFACES
M. Sajben, T. J. Bogar, J. C. Krutil, and J. T. Salmon *In* APL The 18th JANNAF Combust. Meeting, Vol. 3 Oct. 1981 p 321-331 refs
(Contract F49720-77-C-0082)
Avail: NTIS HC A20 CSCL 21/9

Flows in six nominally two dimensional, supercritical diffusers, to highlight the effects of selected parameters and operating conditions on the velocity distributions at the downstream end are reviewed. The state of the flow at this location has a significant influence on the performance and stability of liquid fuel ramjet burners. The investigated parameters include the diffuser exit area/throat area ratio, the terminal shock strength and the boundary layer thickness before the throat. The terminal shock strength was found to be a major factor. Initial boundary layer thickness had only moderate effects on the efflux conditions. It is suggested that methodology developed for assuring inlet engine compatibility in turbojet propulsion systems could be modified to aid ramjet development. E.A.K.

N82-21406 United Technologies Corp., Sunnyvale, Calif. Chemical Systems Div.
REPORT OF THE JANNAF WORKSHOP ON HIGH FREQUENCY INSTRUMENTATION AND DATA ANALYSIS TECHNIQUES
P. A. Chun (Naval Weapons Center, China Lake, Calif.) and R. S. Brown *In* APL The 18th JANNAF Combust. Meeting, Vol. 3 Oct. 1981 p 333-339 refs Conf. held in New Orleans, 28-29 May 1981
Avail: NTIS HC A20 CSCL 21/9

Pressure oscillations in ramjet combustor, instabilities and transients in ramjet engines and facilities were discussed. The development of ramjets and ramrockets and experience with pressure oscillations in other airborne propulsion systems is examined. Current high frequency instrumentation methods and data analysis practices are reviewed. Guidelines for the consistent and proper use of high frequency response instrumentation on ramjet engine and component testing and data acquisition, recording, analysis, and interpretation techniques are considered. Procedures are presented for obtaining consistent, useful, and repeatable pressure oscillation data. E.A.K.

N82-21424# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.
THE EFFECT OF FUEL COMPOSITION ON GROUNDFALL FROM AIRCRAFT FUEL JETTISONING Final Report, Mar. 1980 - Feb. 1981
Harvey J. Clewell, III Mar. 1981 35 p refs
(AF Proj. 1900)
(AD-A110305; AFESC/ESL-TR-81-13) Avail: NTIS
HC A03/MF A01 CSCL 01/3

A computer model which simulates the evaporation and free-fall of fuel droplets in the atmosphere was used to determine the effect of fuel composition on the nature and extent of ground contamination by fuel discharged from an aircraft in flight. Three fuel compositions were used: (1) JP-4, the standard Air Force jet fuel; (2) Jet A (JP-8), the standard U.S. commercial jet fuel; and (3) Number 2 Diesel Fuel, representing the upper limit for future, broadened-specification fuels from alternative sources. The results of this study indicate that the amount of liquid fuel reaching the ground from the jettisoning of commercial jet fuels is much greater than for JP-4. Moreover, future broadened specification fuels may produce even greater ground contamination when jettisoned. GRA

N82-21483# Naval Air Systems Command, Washington, D. C.
CONFORMAL ANTENNA ARRAY DESIGN HANDBOOK
R. C. Hansen, ed., P. T. Bargeliotes, J. Boersma, Z. W. Chang, K. E. Golden, A. Hessel, W. H. Kummer, R. Mather, H. E. Mueller, and D. C. Pridmore-Brown Sep. 1981 440 p refs
(AD-A110091) Avail: NTIS HC A19/MF A01 CSCL 09/5

A discussion of conformal antenna arrays is divided in the following three categories: low gain antennas for small missiles and artillery rounds; fuselage mounted ECM arrays for aircraft; and electronically scanned arrays covering wide angles. Conforming the array to the surface not only saves space and allows rapid inertialess scan but often is essential for structural reasons L.F.M.

N82-21532*# Douglas Aircraft Co., Inc., Long Beach, Calif.
LAMINAR FLOW CONTROL SPF/DB FEASIBILITY DEMONSTRATION Final Report
R. C. Ecklund and N. R. Williams Oct. 1981 50 p
(Contract NAS1-16425)
(NASA-CR-165818; NAS 1.26:165818) Avail: NTIS HC A03/MF A01 CSCL 20D

The feasibility of applying superplastic forming/diffusion bonding (SPF/DB) technology to laminar flow control (LFC) system concepts was demonstrated. Procedures were developed to produce smooth, flat titanium panels, using thin -0.016 inch sheets, meeting LFC surface smoothness requirements. Two large panels 28 x 28 inches were fabricated as final demonstration articles. The first was flat on the top and bottom sides demonstrating the capability of the tooling and the forming and diffusion bonding procedures to produce flat, defect free surfaces. The second panel was configurated for LFC porous panel treatment by forming channels with dimpled projections on the top side. The projections were machined away leaving holes extending into the panel. A perforated titanium sheet was adhesively bonded over this surface to complete the LFC demonstration panel. The final surface was considered flat enough to meet LFC requirements for a jet transport aircraft in cruising flight. Author

N82-21600# British Aerospace Aircraft Group, Kingston-upon-Thames (England). Ground Test Services Dept.
POSITRON ANNIHILATION
A. Turner Sep. 1980 8 p refs
(BAE-KGT-N-GEN-00996) Avail: NTIS HC A02/MF A01

A nondestructive investigative technique, using positron annihilation, is introduced, and the physics of it are explained. The collision of a positron and an electron under thermal conditions causes the emission of annihilation radiation in the form of two gamma rays. This radiation is detected using lithium drifted germanium or intrinsic germanium detectors. Applications are limited to quality control, where the very small detection area, (0.55 sq mm to a few sq cm) is not impractical, and to monitor areas with a known defect and following the progress of cracks. Whole aircraft or large component, scanning is not possible because of the enormous number of probes required. Author (ESA)

N82-21601# Royal Aircraft Establishment, Farnborough (England).
NON-DESTRUCTIVE INSPECTION AND THE IMPLEMENTATION OF A DAMAGE TOLERANT DESIGN PHILOSOPHY
D. E. W. Stone Feb. 1981 15 p refs
(RAE-TM-Struct-982; BR78531) Avail: NTIS HC A02/MF A01

Increasing demands are being made for more quantitative NDI, but current inspection capabilities are inadequate. It is difficult to compare destructive and NDI data. Corrosion degrades inspection capability; 90% probability of detection of flaws with a 95% confidence bound is necessary, but only a 50% detection probability is attainable, for a 1/2 inch crack size, with a 95% confidence level. The implementation of a damage tolerant design philosophy requires a less subjective judgement to be made than is the case at present. Author (ESA)

N82-21777# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Hearing Bioacoustics and Biomechanics.
ASSESSMENT OF COMMUNITY RESPONSE TO HIGH-ENERGY IMPULSIVE SOUNDS
William J. Galloway Jul. 1981 32 p refs
(AD-A110110) Avail: NTIS HC A03/MF A01 CSCL 20/1

A dose-response relationship between day-night average C-weighted sound level and average degree of community annoyance is proposed for high-energy impulsive sounds. This proposal revises the relationship originally recommended in a NRC-CHABA report (1977) to reflect more recent community response data and additional analyses of previous data. The use of sound level-weighted population as a means for assessing noise impact, as originally proposed by CHABA, is retained in this proposal. Author (GRA)

N82-21788# Rolls-Royce Ltd., Derby (England).
THE IMPACT AND FUTURE DIRECTION OF AIRCRAFT NOISE CERTIFICATION
M. J. T. Smith 1980 29 p refs Presented at 1980 Intern. Conf. on Noise Control Eng., Miami, Dec. 1980
(PNR-90053) Avail: NTIS HC A03/MF A01

The impact of soaring fuel costs and environmental quality pressures is discussed. After a decade of noise legislation, little real improvement has been made. The current growing emphasis on noise footprints has scared manufacturers and operators into believing that a second more powerful certification process at the airport could soon be brought into force. Existing legislation will either be replaced by newer legislation in the nineteen eighties or will become more effective. A better adaptation of existing procedures is suggested which would eliminate the need for secondary controls around airports, the operator and the airport managers judging for themselves the real impact of a new aircraft within the designated route structure. Author (ESA)

N82-21798# Helsinki Univ. of Technology, Espoo (Finland). Inst. of Physics.
ON THE GRAVIMETRIC INVERSION PROBLEM
D. O. Riska 1981 30 p refs
(Rept-129) Avail: NTIS HC A03/MF A01

The multipole expansion series for the gravitational potential and acceleration anomalies on the flat surface of the Earth due to a subterranean body of finite extent are inverted. Explicit formulae for the multipole moments are given in terms of the potential and acceleration components on the surface. Finally a model independent method for the determination of the shape of a starlike body of fixed density from the multipole moments is presented. The results lead to a constructive approach to the inversion problem of gravimetry and also indicate an optimal set of measurement points. Author

N82-21799# Council for Scientific and Industrial Research, Pretoria (South Africa).
ON GEOMORPHOLOGICAL CONVERGENCES. THE CASE OF THE NAMIB DESERT RELIEF (SKELETON COAST AND CENTRAL NAMIB DESERT - SOUTH WEST AFRICA/NAMIBIA)
Uwe Rust 1981 21 p Transl. into ENGLISH from Mitt. der Geograph. Ges. (Munich), v. 64, 1979 p 201-216 Presented at the 42nd German Geographic Meeting, Goettingen, West Germany, 5 Jun. 1979
(CSIR-Trans-1583) Avail: NTIS HC A02/MF A01

Convergence of forms and processes are studied in relation to geomorphological evidence found in the Namib desert. The concept of 'convergence' as a current principle is emphasized. The formation of sharp edged debris by gypsum wedging is compared with the formation of debris by frost wedging in a periglacial environment. In the Namib desert the gypsum wedging which results in material disintegration is linked to gypseous crust formation, and therefore rocks with different genetics can be solidly united by this crust. Important differences between the formative requirements in the Namib desert and in the periglacial environment are mentioned. Time as a factor is very important when it comes to obtaining an understanding of geomorphological convergences. S.L.

N82-22005# Rolls-Royce Ltd., Derby (England). Dept. of Noise Systems.
STANDARDS IN AIRCRAFT NOISE CERTIFICATION
L. R. Bentley 1980 7 p Presented at NPL Conf. on Std. in Acoustics, Teddington, Engl., 8 Oct. 1980
(PNR-90052) Avail: NTIS HC A02/MF A01

The development of the International Civil Aviation Organization and Federal Aviation Agency noise strandards is reviewed and compared. The assessment of the effectiveness of standards by on-site measurements by different organizations, and by distribution of magnetic tapes of measurements is mentioned.

The development of root mean square detectors employing digital techniques has simplified the standardization of detector performance. Atmospheric attenuation effects on certification measurements are outlined and problems caused by reflected sound waves received by the microphone located at the mandatory 1.2 m height are cited. Author (ESA)

N82-22007# Royal Aircraft Establishment, Farnborough (England).

SOME APPLICATIONS OF HARTMANN-TYPE SOURCES IN AIRCRAFT NOISE RESEARCH

T. A. Holbeche and R. W. Jeffrey Nov. 1980 18 p refs
Presented at Spring Meeting of the Inst. of Acoustics, Nottingham, England, Mar. 1975
(RAE-TM-AERO-1877; BR77146) Avail: NTIS HC A02/MF A01

Inflight shielding experiments were performed with a slender delta research aircraft fitted with needle stabilized generators having 19mm diameter driving jets operated from the high pressure turbine of the aircraft engine. Acoustic power output is 1 kW and consists of a strong fundamental 2.9 kHz tone and higher harmonics, discernible above engine noise. Comparative wind tunnel experiments employed quarter-scale versions built to match the tunnel model and these operated at 11 kHz, the output level being well above tunnel backgroung noise. Calibration in an anechoic room shows output to be steady and nearly omnidirectional. Author (ESA)

N82-22096# Rolls-Royce Ltd., Derby (England).

THE BENEFITS OF DATA EXCHANGE

J. R. Fawn 1980 14 p
(PNR-90048) Avail: NTIS HC A02/MF A01

The analysis of operational data and its use in forecasting engine performance is promoted as a cost effective way to identify needed manufacturer engineering action, shop repair policy, and line maintenance policy. Emphasis is placed on the modular large fan engine. The engine manufacturer needs data concerning aircraft utilization, reliability of aircraft, engines, components and systems, as well as safety, engineering and shop data. The need for a standard format is mentioned. A forecasting model for component failure is briefly described for the RB211 engine. Author (ESA)

[illegible]

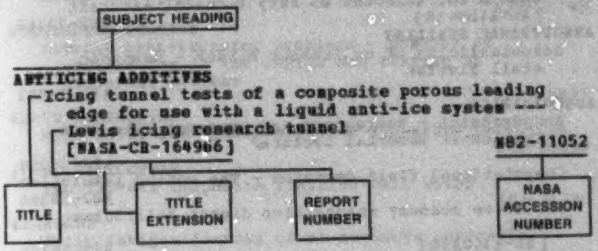
SOME APPLICATIONS OF HARTMANN-TYPE SOURCES IN AIRCRAFT NOISE RESEARCH

[illegible]

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 150)*   JULY 1982

Typical Subject Index Listing


SUBJECT HEADING
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966]
N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ABSORBERS (EQUIPMENT)
Variable response load limiting device --- for aircraft seats
[NASA-CASE-LAR-12801-1] N82-20544

ACCELERATED LIFE TESTS
Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing A82-27155
Effects of defects on tension coupons undergoing an accelerated environmental spectrum A82-27168

ACCELERATION STRESSES (PHYSIOLOGY)
Study and design of high G augmentation devices for flight simulators
[AD-A109127] N82-20195

ACCESSORIES
The testing and approval of aircraft engine mounted accessories --- subject to vibration
[PNR-90051] N82-21206

ACCIDENT PREVENTION
Detection and tracking algorithm refinement
[AD-A109517] N82-20164

ACCURACY
Requirements on modern mathematical models of gas turbine engines. I A82-26406

ACOUSTIC DUCTS
The effect of induced sound on the flow around a rectangular body in a wind tunnel A82-26194
The Rolls Royce role in aircraft noise reduction --- jet engines, acoustic lining
[PNR-90069] N82-21210

ACOUSTIC EXCITATION
Vibration of structures excited acoustically N82-20343

ACOUSTIC MEASUREMENT
Large scale model measurements of airframe noise using cross-correlation techniques A82-26966
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-737 and DC-8 vortices
[AD-A109518] N82-20157
Acoustic measurements of F-4E aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109827] N82-21041
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109828] N82-21042
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109829] N82-21043

ACOUSTIC PROPAGATION
Sonic fatigue testing of an advanced composite aileron
[AIAA PAPER 81-0634] A82-26567

ACTIVE CONTROL
The application of subsonic theoretical aerodynamics to active controls --- aircraft controls
[RAE-TR-81060] N82-21217

ACTUATORS
Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513
Tubing and cable cutting tool
[NASA-CASE-LAR-12706-1] N82-20545
Dynamic response of a hot gas, control-surface actuator --- for an aircraft rudder
[MBB-UA-599/81-OE] N82-21219

ADAPTIVE CONTROL
Applications of adaptive control systems --- to aircraft design, industrial processes and electrical drives A82-27863

ADHESIVE BONDING
Light weight adhesive joining of composite structures A82-27409
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing A82-27414
Characterization of composition variations in a structural adhesive A82-27415
Transition of aerospace adhesive bonding technology from R&D to operational use A82-27435
Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens A82-27437
Automated ultrasonic inspection of adhesive bonded structure A82-28534
Laminar flow control SPF/DB feasibility demonstration
[NASA-CR-165818] N82-21532

AERIAL RECONNAISSANCE
Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets A82-27641

AERIAL RUDDERS
Dynamic response of a hot gas, control-surface actuator --- for an aircraft rudder
[MBB-UA-599/81-OE] N82-21219

AEROACOUSTICS
High frequency sound emission from moving point multipole sources embedded in arbitrary transversely sheared mean flows A82-26318
On the generation of side-edge flap noise A82-26319
Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise' A82-26320

AERODYNAMIC CHARACTERISTICS
Wing/control surface flutter analysis using experimentally corrected aerodynamics A82-26569
Heavy rain penalties for a flight simulator
[AIAA PAPER 82-0213] A82-27093

Preliminary investigation of effects of heavy rain on the performance of aircraft [NASA-TM-83272] N82-20145
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer [AD-A110213] N82-21177
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall [AD-A110341] N82-21203
Digital command augmentation for lateral-directional aircraft dynamics [AD-A110274] N82-21214

AERODYNAMIC COEFFICIENTS
Sensitivity of helicopter aeromechanical stability to dynamic inflow A82-25773
Influence of strakes on coefficients of longitudinal stability [MBB-FE-122/S/PUB/22] N82-21215

AERODYNAMIC CONFIGURATIONS
Rotor preliminary design trade-offs for the Advanced Scout Helicopter A82-26395
Aerodynamic characteristics and store loads of a 1/24 scale F-111 aircraft model with three external store loadings [AD-A109449] N82-20158
Effect of heavy rain on aircraft N82-21149
Minutes of physical configuration audit for the F-16 Electronic Warfare Training Device [AD-A110321] N82-21222

AERODYNAMIC DRAG
Sensitivity of helicopter aeromechanical stability to dynamic inflow A82-25773
Effect of downwash on the induced drag of canard-wing combinations A82-28518
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 2: Fighter design [AD-A110036] N82-21182

AERODYNAMIC FORCES
Results of recent measurements on an oscillating aerofoil A82-26223
Unsteady response of rectangular wings in spanwise uniform shear flow A82-26340

AERODYNAMIC HEATING
Radome aerodynamic heating effects on boresight error A82-26465
Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace A82-26468

AERODYNAMIC INTERFERENCE
Theoretical and experimental investigations of wind tunnel interference due to angle of attack [MBB-FE-124/S/PUB/34] N82-21226

AERODYNAMIC LOADS
The Model 412 multi-bladed rotor system A82-26376
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade A82-26620
A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading A82-26630
Aerodynamic characteristics and store loads of a 1/24 scale F-111 aircraft model with three external store loadings [AD-A109449] N82-20158
A surface singularity method for rotors in hover or climb [AD-A109687] N82-20178
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 2: Fighter design [AD-A110036] N82-21182

AERODYNAMIC NOISE
Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise' A82-26320

AERODYNAMIC STABILITY
Sensitivity of helicopter aeromechanical stability to dynamic inflow A82-25773
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems A82-25923
Development of an ejection seat ballast block for the S-3A aircraft [AD-A109808] N82-20161
Development of longitudinal equivalent system models for selected US Navy tactical aircraft [AD-A109488] N82-20189

AERODYNAMIC STALLING
Aeroelasticity of compressor blades - Subsonic stall flutter A82-26993

AERODYNAMICS
Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/ A82-26096
Computational fluid dynamics - The coming revolution A82-26366
Air Force Academy aeronautics digest Fall/Summer 1980 [AD-A108338] N82-20139
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft [NASA-TP-1911] N82-20187
Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine [NASA-TM-82644] N82-21193

AEROELASTICITY
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems A82-25923
Results of recent measurements on an oscillating aerofoil A82-26223
Performance and aeroelastic tradeoffs on recent rotor blade designs A82-26396
Aeroelasticity of compressor blades - Subsonic stall flutter A82-26993
Aeroelastic characteristics of a mistuned bladed-disc assembly N82-20142
Application of the finite element method to rotary wing aeroelasticity [NASA-CR-165854] N82-20561
Aeroelastic analysis of the elastic gimbal rotor [NASA-CR-166287] N82-21157

AERONAUTICAL ENGINEERING
Von Karman and VKI - The first 25 years A82-25673
Air Force Academy aeronautics digest Fall/Summer 1980 [AD-A108338] N82-20139
Journal of Aeronautics and astronomy [AD-A109681] N82-20140
Future of general and commuter aviation technology and trade [GPO-85-832] N82-20159
Acta Aeronautica et Astronautica Sinica [AD-A110282] N82-21153
The benefits of data exchange --- between airline and engine manufacturer [PNR-90048] N82-22095

AERONAUTICS
Studies in the history and theory of development of aviation and rocketry and space science and technology --- Russian book A82-27398
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems [NASA-CP-2192] N82-21139
Meteorological impact on aviation fuel efficiency N82-21140
Operational procedures relative to severe weather N82-21142
Meteorology impact on future aircraft design N82-21143

AEROSPACE ENGINEERING
Fibrous composites in structural design --- Book
A82-27126
AEROSPACE INDUSTRY
Advanced display-control concepts for power plant operation
A82-26121
Transition of aerospace adhesive bonding technology from R&D to operational use
A82-27435
AEROSPACE MEDICINE
Ozone and aircraft operations
N82-21145
AEROTHERMODYNAMICS
Inverse heat-transfer problems - Domains of application in the design and testing of technical systems
A82-25971
AH-1G HELICOPTER
Main rotor hub electromagnetic signature reduction
A82-26393
AH-64 HELICOPTER
The YAH-64A composite flexbeam tail rotor
A82-26386
AILERONS
Sonic fatigue testing of an advanced composite aileron
[AIAA PAPER 81-0634] A82-26567
AIR BAG RESTRAINT DEVICES
Development of a supported airbag ejection restraint (SABER) for windblast protection
[AD-A109807] N82-20162
AIR CARGO
Toward VLA air-cargo service
A82-28277
AIR COOLING
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109829] N82-21043
AIR FLOW
Sonic wind tunnel of the Institute of Fluid Mechanics of Lille
[NASA-TM-76687] N82-20192
ALQ-164 POD/AV-8C environmental evaluation flight test
[AD-A110198] N82-21178
AIR NAVIGATION
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577
Radio-navigation equipment of aircraft - Devices and operation --- Russian book
A82-26500
RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control
A82-27714
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946
AIR TRAFFIC
Statistical analysis and time series modeling of air traffic operations data from flight service stations and terminal radar approach control facilities: Two case studies
[AD-A109873] N82-20172
AIR TRAFFIC CONTROL
On-board computers save fuel and help ATC
A82-26046
Automating air-traffic control
A82-26511
Modernizing air traffic control in France
A82-27048
Air traffic control en route computer modernization
[GPO-82-773] N82-20167
FAA air traffic control computer modernization
[GPO-82-375] N82-20168
Aircraft collision avoidance and air traffic safety
[GPO-88-545] N82-20169
Operational delay day forecasts for the 20 air route traffic control centers for the year 1982 through 2011
[AD-A109844] N82-20173
Test plan for SSR --- surveillance radar for air traffic control
[AD-A109503] N82-20392
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139
Operational procedures relative to severe weather
N82-21142
Meteorology impact on ATC system design
N82-21144
Preliminary functional description of integrated flow management --- for air traffic control systems
[AD-A109909] N82-21171
Joint US/USSR mode S compatibility test program, volume 1
[PB82-126616] N82-21173
Joint US/USSR mode S compatibility test program, volume 2
[PB82-126624] N82-21174
Overview of the O'Hare Runway configuration management system
[AD-A110137] N82-21224
AIR TRANSPORTATION
Toward VLA air-cargo service
A82-28277
AIRBORNE EQUIPMENT
Small EHF/SHF airborne SATCOM terminal
A82-27209
Selection of optimum antennas for tracking telemetry intrumented airborne vehicles
A82-27228
AIRBORNE SURVEILLANCE RADAR
Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets
A82-27641
AIRBORNE/SPACEBORNE COMPUTERS
On-board computers save fuel and help ATC
A82-26046
AIRCRAFT
The effect of fuel composition on groundfall from aircraft fuel jettisoning
[AD-A110305] N82-21424
AIRCRAFT ACCIDENT INVESTIGATION
Improving the crashworthiness of general aviation aircraft by crash injury investigations
A82-28476
AIRCRAFT ACCIDENTS
A survey of U.S. Army helicopter main and tail rotor blade obstacle strikes
A82-26385
AIRCRAFT ANTENNAS
Terrain reflection effects on data reception from airborne vehicles
A82-27231
Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
[AD-A109448] N82-20384
Conformal antenna array design handbook
[AD-A110091] N82-21483
AIRCRAFT BRAKES
Correlation of wear with oxidation of carbon-carbon composites
A82-27065
AIRCRAFT CARRIERS
Naval Air Systems Command /NAVAIR/ ATE program - Standardized ATE for the carrier environment
A82-27892
AIRCRAFT COMPARTMENTS
Reduction of structural vibration by a dynamic absorber --- helicopter cabins
[RAE-TM-AERO-1881] N82-21190
AIRCRAFT CONFIGURATIONS
Large scale model measurements of airframe noise using cross-correlation techniques
A82-25966
Why twin-fuselage aircraft
A82-28276
AIRCRAFT CONSTRUCTION MATERIALS
Materials and aeronautics
A82-26325
Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques
A82-26[illegible]
CH-47 fiberglass rotor blade design and fabrication
A82-26397
Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft
A82-27144
Application of advanced composite materials to helicopter airframe structures
A82-27152

Composite fasteners - A compatible joining technique for fibrous composites in structural design --- aircraft construction materials A82-27159

Flight service evaluation of advanced structures A82-27402

Damage tolerance and durability design of composite structures for commercial aircraft A82-27403

Light weight adhesive joining of composite structures A82-27404

An evaluation of several polymers for high density humidity PC coatings A82-27432

Recent developments in materials and processes for aircraft corrosion control A82-27446

Laminar Flow Control. The Research and Technology Studies 1981 [NASA-CP-2218] N82-20149

Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation [AD-A110212] N82-21261

AIRCRAFT CONTROL

Yak-36 Forger - The brand X VTOL fighter A82-26045

On-board computers save fuel and help ATC A82-26046

RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control A82-27714

Applications of adaptive control systems --- to aircraft design, industrial processes and electrical drives A82-27869

Active flutter suppression on an F-4F aircraft [AIAA PAPER 80-0770] A82-28513

Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system [NASA-CR-163121] N82-21198

Theoretical linear approach to the combined man-manipulation system in manual control of an aircraft [MBB-FE-301/S/PUB/43] N82-21220

AIRCRAFT DESIGN

The bomber that radar cannot see A82-25874

Inverse heat-transfer problems - Domains of application in the design and testing of technical systems A82-25971

Yak-36 Forger - The brand X VTOL fighter A82-26045

Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/ A82-26098

Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility A82-26399

Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series A82-26487

A310 - Europe builds on Airbus success A82-26536

Structural design and construction of the New Technology Wing A82-26541

Experimental program for general aviation --- wing design, construction and flight testing A82-26542

Composite aircraft structures A82-27127

Composite wing substructure technology on the AV-8B advanced aircraft A82-27128

Preliminary design development AV-8B forward fuselage composite structure A82-27129

Wing/fuselage critical component development program A82-27130

Development of a preloaded hybrid advanced composite wing pivot fairing A82-27131

Design concepts for composite fuselage structure A82-27132

Advanced composites integral structures meet the challenge of future aircraft systems A82-27133

Continuous filament advanced composite isogrid - A promising structural concept A82-27138

A crashworthiness test for composite fuselage structure A82-27139

Damage tolerance and durability design of composite structures for commercial aircraft A82-27403

Why twin-fuselage aircraft A82-28276

Very large vehicles - Technology looking for a need A82-28278

US Navy begins slow shuffle towards V/STOL A82-28311

A short takeoff performance computer program [AD-A109861] N82-20179

Meteorology impact on future aircraft design N82-21143

Meteorology impact on ATC system design N82-21144

Generic Test Bed (GTB) aircraft [AD-A110335] N82-21176

Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary [AD-A110035] N82-21180

Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design [AD-A110231] N82-21181

Non-destructive inspection and the implementation of a damage tolerant design philosophy --- fighter aircraft [RAE-TM-STRUCT-982] N82-21601

AIRCRAFT DETECTION

The bomber that radar cannot see A82-25874

AIRCRAFT ENGINES

Materials and aeronautics A82-26025

Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series A82-26487

Analysis of the characteristics of a bypass engine, with allowance for variable pressure losses in the channels A82-26496

The role of modern control theory in the design of controls for aircraft turbine engines [AIAA PAPER 82-0320] A82-26526

Rub energetics of compressor blade tip seals A82-27078

Engine industry cost considerations for emerging technologies A82-27429

Strength of the turbine components of a gas-turbine engine under complex loading and associated problems A82-27526

Pacer Comet II jet engine test system A82-27903

Real-time failure detection of aircraft engine output sensors A82-28403

Advanced engine technology and its influence on aircraft performance A82-28515

YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1 [NASA-CR-165562-VOL-1] N82-21031

YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2 [NASA-CR-165562-VOL-2] N82-21032

YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3 [NASA-CR-165562-VOL-3] N82-21033

Preliminary results on performance testing of a turbocharged rotary combustion engine [NASA-TM-82772] N82-21194

Analytical investigation of nonrecoverable stall [NASA-TM-82792] N82-21195

Coatings in the aero gas turbine --- sprayed coatings
[PNR-90049] N82-21204
The testing and approval of aircraft engine mounted accessories --- subject to vibration
[PNR-90051] N82-21206
Engines for air transport --- aircraft fuel consumption
[PNR-90066] N82-21208
Telemetry in aero engine development --- from operating engines
[PNR-90055] N82-21247
AIRCRAFT EQUIPMENT
Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176
AIRCRAFT FUEL SYSTEMS
The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter
A82-27424
AIRCRAFT FUELS
The formation of benzpyrene during the combustion of aviation fuels
A82-26494
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases
A82-26495
Full-scale flammability test data for validation of aircraft fire mathematical models
[NASA-TM-58244] N82-21166
Engines for air transport --- aircraft fuel consumption
[PNR-90066] N82-21208
AIRCRAFT HAZARDS
Lightning detection and ranging
A82-26367
Safety (aviation material)
[AD-A110361] N82-20165
Full-scale flammability test data for validation of aircraft fire mathematical models
[NASA-TM-58244] N82-21166
AIRCRAFT INDUSTRY
Future of general and commuter aviation technology and trade
[GPO-85-832] N82-20159
Industrial experience in the Anglo-French helicopter collaboration
[SNIAS-811-210-101] N82-21154
Positron annihilation --- aircraft industry applications; fault detection
[BAR-KGT-N-GEN-00996] N82-21600
The benefits of data exchange --- between airline and engine manufacturer
[PNR-90048] N82-22095
AIRCRAFT INSTRUMENTS
Radio-navigation equipment of aircraft - Devices and operation --- Russian book
A82-26500
Simple vs. sophisticated TacAir avionics. II - Soviet TacAir avionics technology
A82-28397
AIRCRAFT LANDING
The effects of weather on runway operations
A82-27050
The characteristics and detection of low level wind shear in the critical phases of flight
A82-28349
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-767 and DC-8 vortices
[AD-A109518] N82-20157
Rangefinder system for slant range visibility
N82-20746
AIRCRAFT MAINTENANCE
CH-46 fiberglass rotor blade repair program
A82-26384
Problems and options in advanced composite repair
A82-27145
A new resin for field repair
A82-27412
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing
A82-27418
Airline maintenance strategy
A82-27883
Airline ATE requirements
A82-27884
The modular ATE --- for cost effective maintenance of new generation avionics
A82-27886
ATE logistics in the United States Air Force
A82-27890
The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintenance
A82-27904
AIRCRAFT MANEUVERS
Aerial combat simulation in the U.S. Air Force
A82-27920
The stability of portable bridges carried on slings beneath helicopters
[ARL/AERO-REPT-154] N82-21213
AIRCRAFT NOISE
Model helicopter rotor low frequency broadband noise
A82-25772
On the generation of side-edge flap noise
A82-25319
Large scale model measurements of airframe noise using cross-correlation techniques
A82-26966
The status of airport noise prediction, with special reference to the United Kingdom and Europe
A82-28149
The impact and future direction of aircraft noise certification
[PNR-90053] N82-21788
A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
[NASA-TM-82805] N82-21998
Standards in aircraft noise certification
[PNR-90052] N82-22005
AIRCRAFT PARTS
Problems and options in advanced composite repair
A82-27145
Light weight adhesive joining of composite structures
A82-27408
AIRCRAFT PERFORMANCE
Optimum three-dimensional flight of a supersonic aircraft
A82-26039
AV-8B/Harrier GR.5 - Range, payload and VSTOL
A82-26044
Yak-36 Forger - The brand X VTOL fighter
A82-26045
A310 - Europe builds on Airbus success
A82-26536
One year flight testing of the Transonic Wing
A82-26543
The effects of weather on runway operations
A82-27050
Heavy rain penalties for a flight simulator
[AIAA PAPER 82-0213] A82-27093
Advanced engine technology and its influence on aircraft performance
A82-28515
Aircraft pitch attitude as a performance parameter
A82-28519
Preliminary investigation of effects of heavy rain on the performance of aircraft
[NASA-TM-83272] N82-20105
Meteorology impact on future aircraft design
N82-21143
AIRCRAFT PRODUCTION
Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques
A82-26390
Structural design and construction of the New Technology Wing
A82-26541
Rational production methods for the manufacture of helicopter rotor blades --- BO-105 helicopter
[MBB-UD-312/80-OE] N82-21188
AIRCRAFT PRODUCTION COSTS
A CAD approach to cost estimating composite aircraft
A82-27146
Engine industry cost considerations for emerging technologies
A82-27429
Manufacturing cost trade-studies in avionics
A82-27430
AIRCRAFT RELIABILITY
SH-60B Seahawk automatic blade fold system
A82-26391
Fracture mechanics technology applied to individual aircraft tracking --- durability and structural life estimates
A82-26637

Statistical analysis methods for characterizing composite materials
A82-27162
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177

AIRCRAFT SAFETY
Design for the operating environment - Ring-fin tail rotor program
A82-26378
Automating air-traffic control
A82-26511
NOTAR
A82-26822
Doppler radar-research and application to aviation flight safety, 1977 - 1979
[AD-A109845] N82-20163
Detection and tracking algorithm refinement
[AD-A109517] N82-20164
Safety (aviation material)
[AD-A110361] N82-20165
Aircraft collision avoidance and air traffic safety
[GPO-88-545] N82-20169
Variable response load limiting device --- for aircraft seats
[NASA-CASE-LAR-12801-1] N82-20544

AIRCRAFT SPECIFICATIONS
From claws to jaws - Tiger into Tigershark
A82-26538

AIRCRAFT STABILITY
Advancing blade flight data gathered
A82-28312
The stability of portable bridges carried on slings beneath helicopters
[ARL/AERO-REPT-154] N82-21213

AIRCRAFT STRUCTURES
Introduction to the principles of fracture mechanics
A82-25550
Evaluation of crack growth gages for service life tracking
A82-26652
Composite aircraft structures
A82-27127
Continuous filament advanced composite isogrid - A promising structural concept
A82-27138
Impact resistance of graphite and hybrid configurations
A82-27141
Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses
A82-27156
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations --- in fighter aircraft structures
A82-27158
Service sensitivity of polysulfide sealants
A82-27407
Characterization of composition variations in a structural adhesive
A82-27415
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

AIRCRAFT SURVIVABILITY
Operational experience with the fiberglass rotor blade
A82-26388
Fracture control in ballistic-damaged graphite/epoxy wing structure
A82-26639

AIRFIELD SURFACE MOVEMENTS
The effects of weather on runway operations
A82-27050

AIRFOIL PROFILES
Supercritical flow past symmetrical airfoils
A82-26130
An experimental study of steady and quasi-steady jet flaps
A82-26222
One year flight testing of the Transonic Wing
A82-26543
Experimental study of the flowfield of an airfoil with deflected spoiler
[AIAA PAPER 82-0126] A82-27086

AIRFOILS
Results of recent measurements on an oscillating aerofoil
A82-26223
Heavy rain penalties for a flight simulator
[AIAA PAPER 82-0213] A82-27093
Mathematical modeling of ice accretion on airfoils
[AIAA PAPER 82-0284] A82-27098
Experimental study of oscillating-wing propulsion
A82-28514
Progress on low altitude cloud icing research
N82-21147
NASA/Lewis Research Center Icing Research Program
N82-21148

AIRFRAME MATERIALS
Materials and aeronautics
A82-26025
Application of advanced composite materials to helicopter airframe structures
A82-27152

AIRFRAMES
Large scale model measurements of airframe noise using cross-correlation techniques
A82-26966
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept
[NASA-CR-168745] N82-21999
Some applications of Hartmann-type sources in aircraft noise research --- airframe shielding
[RAE-TM-AERO-1877] N82-22007

AIRLINE OPERATIONS
On-board computers save fuel and help ATC
A82-26046
Airline maintenance strategy
A82-27883
The modular ATE --- for cost effective maintenance of new generation avionics
A82-27886
The benefits of data exchange --- between airline and engine manufacturer
[PNR-90048] N82-22095

AIRPORT PLANNING
IATA's Unit Terminal Concept
A82-27049
The status of airport noise prediction, with special reference to the United Kingdom and Europe
A82-28149

AIRPORTS
Weather deterioration models applied to alternate airport criteria
[AD-A108877] N82-20811
The Joint Airport Weather Studies Project
N82-21152

AIRSPACE
Modernizing air traffic control in France
A82-27048

AIRSPEED
Boom probe position error corrections for Sea King Mk 50 flight tests
[AD-A109428] N82-20177
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft
[NASA-TP-1911] N82-20187
The stability of portable bridges carried on slings beneath helicopters
[ARL/AERO-REPT-154] N82-21213

ALGORITHMS
Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system
[NASA-CR-163121] N82-21198

ALLOWANCES
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209

ALLOYS
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566

ALUMINUM ALLOYS
Materials and aeronautics
A82-26025

A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading
A82-26630

Effect of mechanical surface and heat treatments on erosion resistance
A82-27071

Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens
A82-27437

ALUMINUM BORON COMPOSITES

Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy
A82-27151

ANALYSIS OF VARIANCE

A descriptive study of the application of analysis of variance and regression techniques in an error analysis program for test data obtained in a 16 foot transonic tunnel
N82-20997

ANEMOMETERS

The dynamic behaviour of propeller anemometers
A82-26184

ANGLE OF ATTACK

Theoretical and experimental investigations of wind tunnel interference due to angle of attack
[MBB-FE-124/S/PUB/34] N82-21226

ANNEALING

Effect of mechanical surface and heat treatments on erosion resistance
A82-27071

ANNULAR FLOW

Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200

ANODIZING

Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens
A82-27437

ANTENNA ARRAYS

Conformal antenna array design handbook
[AD-A110091] N82-21483

ANTENNA DESIGN

Selection of optimum antennas for tracking telemetry intrumented airborne vehicles
A82-27228

Conformal antenna array design handbook
[AD-A110091] N82-21483

ANTENNA RADIATION PATTERNS

Selection of optimum antennas for tracking telemetry intrumented airborne vehicles
A82-27228

ANTIRADAR COATINGS

The bomber that radar cannot see
A82-25874

ANTISUBMARINE WARFARE AIRCRAFT

SH-60B Seahawk automatic blade fold system
A82-26391

Development of an ejection seat ballast block for the S-3A aircraft
[AD-A109808] N82-20161

APPROACH CONTROL

Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft
[NASA-TP-1911] N82-20187

ASPECT RATIO

A summary of experimental data on wing characteristics at transonic speeds
[RAE-TN-AERO-1953-S.D.-77] N82-21155

Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4 --- in a wind tunnel
[RAE-TR-80066] N82-21161

ASTRONAUTICS

Studies in the history and theory of development of aviation and rocketry and space science and technology --- Russian book
A82-27398

ASTRONOMICAL SPECTROSCOPY

The sixteen to forty micron spectroscopy from the NASA Lear jet
[NASA-CR-168684] N82-21054

ASTRONOMY

Journal of Aeronautics and astronomy
[AD-A109681] N82-20140

ASYMPTOTIC METHODS

Helicopter rotor loads using a matched asymptotic expansion technique
[NASA-CR-165742] N82-21156

ATMOSPHERIC EFFECTS

Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139

Meteorological impact on aviation fuel efficiency
N82-21140

Meteorology impact on ATC system design
N82-21144

Effect of heavy rain on aircraft
N82-21149

Prototype Regional Observation and Forecast System (PROFS)
N82-21150

ATMOSPHERIC ELECTRICITY

NASA research programs responding to workshop recommendations
N82-21146

ATMOSPHERIC ENTRY

Meteorological inputs to advanced simulators
N82-21141

ATMOSPHERIC MODELS

Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
[AD-A109848] N82-20384

ATMOSPHERIC TURBULENCE

Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts
[AD-A109585] N82-20190

ATMOSPHERICS

Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
[AD-A109848] N82-20384

ATTACK AIRCRAFT

AV-8B/Harrier GR.5 - Range, payload and VSTOL
A82-[illegible]044

US Navy begins slow shuffle towards V/STOL
A82-28311

Development of longitudinal equivalent system models for selected US Navy tactical aircraft
[AD-A109488] N82-20189

Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176

AUTOMATED EN ROUTE ATC

Modernizing air traffic control in France
A82-27048

AUTOMATIC CONTROL

Self streamlining wind tunnels without computers
A82-26161

The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintenance
A82-27904

Rational production methods for the manufacture of helicopter rotor blades --- BO-105 helicopter
[MBB-UD-312/80-OE] N82-21188

AUTOMATIC FLIGHT CONTROL

A preliminary investigation of Individual Blade-control Independent of a Swashplate
A82-26382

A translational velocity command system for VTOL low speed flight
[NASA-TM-84215] N82-20186

AUTOMATIC TEST EQUIPMENT

Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471

AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings
A82-27876

Airline maintenance strategy
A82-27883

Airline ATE requirements
A82-27884

The role of software in commercial ATE
A82-27885

The modular ATE --- for cost effective maintenance of new generation avionics
A82-27886

AEWTS - Realistic not futuristic --- Advanced Electronic Warfare Test Set
A82-27887

ATE logistics in the United States Air Force
A82-27890

ATLAS/test data provision for the Tornado ATS - A challenging task
A82-27891

Naval Air Systems Command /NAVAIR/ ATE program - Standardized ATE for the carrier environment
A82-27892

Configuration management techniques for automatic testing
A82-27893

Pacer Comet II jet engine test system
A82-27903

Automated ultrasonic inspection of adhesive bonded structure
A82-28534

Aircraft interrogation and display system: A ground support equipment for digital flight systems
[NASA-TM-81370] N82-21175

AUTOMATION

Automating air-traffic control
A82-26511

Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

AUTOMOBILE ENGINES

Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine
[NASA-TM-82644] N82-21193

Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194

AVIONICS

AV-8B/Harrier GR.5 - Range, payload and VSTOL
A82-26044

Manufacturing cost trade-studies in avionics
A82-27430

Airline maintenance strategy
A82-27883

Airline ATE requirements
A82-27884

The role of software in commercial ATE
A82-27885

The modular ATE --- for cost effective maintenance of new generation avionics
A82-27886

ATLAS/test data provision for the Tornado ATS - A challenging task
A82-27891

Naval Air Systems Command /NAVAIR/ ATE program - Standardized ATE for the carrier environment
A82-27892

Simple vs. sophisticated TacAir avionics. II - Soviet TacAir avionics technology
A82-28397

Aircraft interrogation and display system: A ground support equipment for digital flight systems
[NASA-TM-81370] N82-21175

Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176

SAFRA: Controlled requirements expression --- avionics specification through computer techniques
[BAE-TNAAS-84] N82-21192

AXIAL FLOW TURBINES

Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110341] N82-21203

B

BACKGROUND NOISE

Optimal target designation techniques
A82-27709

BAFFLES

Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015

BALANCING

Application of combined balancing methods to flexible rotors of aviation gas-turbine engines
A82-26491

BALLAST (MASS)

Development of an ejection seat ballast block for the S-3A aircraft
[AD-A109808] N82-20161

BEARINGLESS ROTORS

Dynamic stability of low effective flap hinge BMR concepts
A82-26377

The YAH-64A composite flexbeam tail rotor
A82-26386

Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394

BEARINGS

Aeroelastic analysis of the elastic gimbal rotor
[NASA-CR-166287] N82-21157

BLADE TIPS

Helicopter rotor performance improvement by utilization of swept back parabolic blade tip
A82-26298

Performance improvements with the free-tip rotor
A82-26387

Rub energetics of compressor blade tip seals
A82-27078

CF6 Jet Engine Diagnostics Program: High pressure compressor clearance investigation
[NASA-CR-165580] N82-21197

BLUNT LEADING EDGES

The effect of induced sound on the flow around a rectangular body in a wind tunnel
A82-26194

BO-105 HELICOPTER

Rational production methods for the manufacture of helicopter rotor blades --- BO-105 helicopter
[MBB-UD-312/80-OE] N82-21188

BODY-WING CONFIGURATIONS

Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 1: User's guide to transport design computer programs
[AD-A110232] N82-21183

BOEING AIRCRAFT

Operational experience with the fiberglass rotor blade
A82-26388

The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter
A82-27424

BOEING 737 AIRCRAFT

Full-scale flammability test data for validation of aircraft fire mathematical models
[NASA-TM-58244] N82-21166

BOLTS

Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses
A82-27156

BOMBER AIRCRAFT

The bomber that radar cannot see
A82-25874

BORESIGHT ERROR

Radome aerodynamic heating effects on boresight error
A82-26465

Full scale test facilities for radomes and antenna windows
A82-26467

Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace
A82-26468

BORON REINFORCED MATERIALS

Flight service evaluation of advanced structures
A82-27402

BORON-EPOXY COMPOUNDS

Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy
A82-27151

BOUNDARY LAYER CONTROL

Laminar Flow Control. The Research and Technology Studies 1981
[NASA-CP-2218] N82-20149

Probability of laminar flow loss because of ice crystal encounters
N82-20153

BOUNDARY LAYER SEPARATION
Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26208
BOUNDARY LAYER STABILITY
Stability of boundary layers with porous suction strips: Experiment and theory
N82-20152
BOUNDARY LAYER TRANSITION
Stability of boundary layers with porous suction strips: Experiment and theory
N82-20152
BOUNDARY LAYERS
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209
BOX BEAMS
Durability evaluation of highly stressed wing box structure
A82-27163
BRIDGES (STRUCTURES)
The stability of portable bridges carried on slings beneath helicopters
[ARL/AERO-REPT-154] N82-21213
BUFFETING
Some remarks on buffeting --- of wings, wind tunnel models
[RAE-TM-STRUCT-980] N82-21216
BYPASS RATIO
Analysis of the characteristics of a bypass engine, with allowance for variable pressure losses in the channels
A82-26436

C

CABIN ATMOSPHERES
Ozone and aircraft operations
N82-21145
CAMBERED WINGS
Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4 --- in a wind tunnel
[RAE-TR-80066] N82-21161
CANARD CONFIGURATIONS
Effect of downwash on the induced drag of canard-wing combinations
A82-28518
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 2: Fighter design
[AD-A110036] N82-21182
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 1: User's guide to transport design computer programs
[AD-A110232] N82-21183
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 2: User's guide to fighter design computer program
[AD-A110037] N82-21184
CARBON FIBER REINFORCED PLASTICS
Continuous filament advanced composite isogrid - A promising structural concept
A82-27138
CARBON-CARBON COMPOSITES
Correlation of wear with oxidation of carbon-carbon composites
A82-27068
CARGO AIRCRAFT
Toward VLA air-cargo service
A82-28277
CASCADE FLOW
Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
[AD-A110332] N82-21199
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200
Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201
CASTING
Precision casting for gas turbine engines
A82-28313
CEILINGS (METEOROLOGY)
Weather deterioration models applied to alternate airport criteria
[AD-A108877] N82-20811
CERTIFICATION
The impact and future direction of aircraft noise certification
A82-28150
The impact and future direction of aircraft noise certification
[PNR-90053] N82-21788
Standards in aircraft noise certification
[PNR-90052] N82-22005
CH-46 HELICOPTER
CH-46 and CH-47 composite rotor blade lightning protection testing
A82-26381
CH-46 fiberglass rotor blade repair program
A82-26304
CH-47 HELICOPTER
CH-46 and CH-47 composite rotor blade lightning protection testing
A82-26381
CH-47 fiberglass rotor blade design and fabrication
A82-26397
The stability of portable bridges carried on slings beneath helicopters
[ARL/AERO-REPT-154] N82-21213
CHANNEL FLOW
Determination of losses in a channel with a sudden expansion behind a diffusor
A82-26492
CHECKOUT
Safety (aviation material)
[AD-A110361] N82-20165
CHEMICAL COMPOSITION
The effect of fuel composition on groundfall from aircraft fuel jettisoning
[AD-A110305] N82-21424
CIRCUIT RELIABILITY
Simple vs. sophisticated TacAir avionics. II - Soviet TacAir avionics technology
A82-28397
CIRCULAR TUBES
Composite control tubes
A82-27423
CIRCULATION CONTROL ROTORS
The Circulation Control Rotor /CCR/ control system
A82-26400
CIVIL AVIATION
The future of helicopter flight control technology
A82-26821
Future of general and commuter aviation technology and trade
[GPO-85-832] N82-20159
Air traffic control en route computer modernization
[GPO-82-773] N82-20167
FAA air traffic control computer modernization
[GPO-82-375] N82-20168
The benefits of data exchange --- between airline and engine manufacturer
[PNR-90048] N82-22095
CLEARANCES
CF6 Jet Engine Diagnostics Program: High pressure compressor clearance investigation
[NASA-CR-165580] N82-21197
CLIMBING FLIGHT
A surface singularity method for rotors in hover or climb
[AD-A109687] N82-20178
CLOUD GLACIATION
Progress on low altitude cloud icing research
N82-21147
CLUTTER
Optimal target designation techniques
A82-27709
COCKPIT SIMULATORS
Simulator study of a pictorial display for general aviation instrument flight
[NASA-TP-1963] N82-20180
COCKPITS
The future of helicopter flight control technology
A82-26821
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191
COLLISION AVOIDANCE
Automating air-traffic control
A82-26511

Aircraft collision avoidance and air traffic safety
[GPO-88-545] N82-20169

COMBAT
Aerial combat simulation in the U.S. Air Force
A82-27920

COMBUSTION CHAMBERS
Quantitative interpretation of recirculated flow visualization by the analysis of video pictures
A82-27109
Advanced engine technology and its influence on aircraft performance
A82-28515
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1
[NASA-CR-165562-VOL-1] N82-21031
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2
[NASA-CR-165562-VOL-2] N82-21032
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3
[NASA-CR-165562-VOL-3] N82-21033
Factors influencing velocity distributions at inlet/combustor interfaces
N82-21405
Report of the JANNAF Workshop on High Frequency Instrumentation and Data Analysis Techniques
N82-21406

COMBUSTION EFFICIENCY
The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer
A82-26483
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases
A82-26495
Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194

COMBUSTION PHYSICS
Thermodynamics of organic compounds
[AD-A110430] N82-21202

COMBUSTION PRODUCTS
The formation of benzpyrene during the combustion of aviation fuels
A82-26494
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases
A82-26495

COMFORT
Aircraft pitch attitude as a performance parameter
A82-28519

COMMAND GUIDANCE
A translational velocity command system for VTOL low speed flight
[NASA-TM-84215] N82-20186

COMMERCIAL AIRCRAFT
Damage tolerance and durability design of composite structures for commercial aircraft
A82-27403
The role of software in commercial ATE
A82-27885
Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts
[AD-A109585] N82-20190
NASA/Lewis Research Center Icing Research Program
N82-21148
Engines for air transport --- aircraft fuel consumption
[PNR-90066] N82-21208

COMPATIBILITY
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing
A82-27414
Joint US/USSR mode S compatibility test program, volume 1
[PB82-126616] N82-21173
Joint US/USSR mode S compatibility test program, volume 2
[PB82-126624] N82-21174

COMPONENT RELIABILITY
Problems and options in advanced composite repair
A82-27145
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

COMPOSITE MATERIALS
CH-46 and CH-47 composite rotor blade lightning protection testing
A82-26381
Preliminary design development AV-8B forward fuselage composite structure
A82-27129
Application of advanced composite materials to helicopter airframe structures
A82-27152
Statistical analysis methods for characterizing composite materials
A82-27162
Effects of defects on tension coupons undergoing an accelerated environmental spectrum
A82-27168
Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981
A82-27401
Characterization of composition variations in a structural adhesive
A82-27415
Composite control tubes
A82-27423

COMPOSITE STRUCTURES
Fibrous composites in structural design --- Book
A82-27126
Composite aircraft structures
A82-27127
Composite wing substructure technology on the AV-8B advanced aircraft
A82-27128
Preliminary design development AV-8B forward fuselage composite structure
A82-27129
Wing/fuselage critical component development program
A82-27130
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131
Design concepts for composite fuselage structure
A82-27132
Advanced composites integral structures meet the challenge of future aircraft systems
A82-27133
Continuous filament advanced composite isogrid - A promising structural concept
A82-27138
A crashworthiness test for composite fuselage structure
A82-27139
Problems and options in advanced composite repair
A82-27145
A CAD approach to cost estimating composite aircraft
A82-27146
Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses
A82-27156
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations --- in fighter aircraft structures
A82-27158
Composite fasteners - A compatible joining technique for fibrous composites in structural design --- aircraft construction materials
A82-27159
Durability evaluation of highly stressed wing box structure
A82-27163
Flight service evaluation of advanced structures
A82-27402
Damage tolerance and durability design of composite structures for commercial aircraft
A82-27403
Light weight adhesive joining of composite structures
A82-27404
The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter
A82-27424
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

A hingeless tail rotor of fiber composite construction and vibration isolator systems (ARIS, AVIS) for helicopters --- antiresonance isolator system (aris); active vibration isolator system (avis)
[MBB-UD-311/80-OE] N82-21187

Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation
[AD-A110212] N82-21261

COMPRESSIBLE FLOW

Sonic wind tunnel of the Institute of Fluid Mechanics of Lille
[NASA-TM-76687] N82-20192

Computation of wing-vortex interaction in transonic flow using implicit finite difference algorithm
[NASA-CR-166251] N82-21159

Analysis of very low frequency oscillations in a ramjet combustor by use of a sensitive time lag model
N82-21404

COMPRESSOR BLADES

Aeroelasticity of compressor blades - Subsonic stall flutter
A82-26993

Rub energetics of compressor blade tip seals
A82-27078

COMPRESSOR EFFICIENCY

CF6 Jet Engine Diagnostics Program: High pressure compressor clearance investigation
[NASA-CR-165580] N82-21197

COMPUTATIONAL FLUID DYNAMICS

Transonic flow past thin wings
A82-25995

Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/
A82-26098

Supercritical flow past symmetrical airfoils
A82-26130

Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26208

Unsteady response of rectangular wings in spanwise uniform shear flow
A82-26340

Computational fluid dynamics - The coming revolution
A82-26366

Numerical solution of Space Shuttle Orbiter flow field
[AIAA PAPER 82-0028] A82-27083

More than meets the eye - The oil dot technique
A82-27114

COMPUTER GRAPHICS

Simulator study of a pictorial display for general aviation instrument flight
[NASA-TP-1963] N82-20180

The 1981 Image 2 Conference Proceedings
[AD-A110226] N82-21223

COMPUTER NETWORKS

Telemetry Computer System at Wallops Flight Center
A82-27188

COMPUTER PROGRAMS

The role of software in commercial ATE
A82-27885

A descriptive study of the application of analysis of variance and regression techniques in an error analysis program for test data obtained in a 16 foot transonic tunnel
N82-20997

COMPUTER TECHNIQUES

Computational fluid dynamics - The coming revolution
A82-26366

Automating air-traffic control
A82-26511

SAFRA: Controlled requirements expression --- avionics specification through computer techniques
[BAE-TNAAS-84] N82-21192

COMPUTERIZED DESIGN

Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series
A82-26487

A CAD approach to cost estimating composite aircraft
A82-27146

A short takeoff performance computer program
[AD-A109861] N82-20179

Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 2: User's guide to fighter design computer program
[AD-A110037] N82-21184

COMPUTERIZED SIMULATION

Radome rain damage - An environmental analysis technique
A82-26464

Mathematical modeling of ice accretion on airfoils
[AIAA PAPER 82-0284] A82-27098

Effect of contrast on space perception in TV displays of the external scene observed by the pilot --- German book
A82-28395

Simulation of the XV-15 tilt rotor research aircraft
[NASA-TM-84222] N82-20174

Computer generated images for aircraft pilot training --- MRCA aircraft
[MBB-UA-551/80-OE] N82-21229

CONFERENCES

Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers
A82-26176

Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981
A82-27401

AUTOTESTCON '80; International Automatic Testing Conference, Washington, DC, November 2-5, 1980, Proceedings
A82-27876

Cryogenic Technology, part 1 --- conference proceedings; cryogenic wind tunnel design and instrumentation
[NASA-CP-2122-PT-1] N82-20357

Cryogenic Technology, part 2 --- conference proceedings; cryogenic wind tunnel design and instrumentation
[NASA-CP-2122-PT-2] N82-20358

CONFIGURATION MANAGEMENT

Configuration management techniques for automatic testing
A82-27893

Overview of the O'Hare Runway configuration management system
[AD-A110137] N82-21224

CONGRESSIONAL REPORTS

Future of general and commuter aviation technology and trade
[GPO-85-832] N82-20159

Air traffic control en route computer modernization
[GPO-82-773] N82-20167

FAA air traffic control computer modernization
[GPO-82-375] N82-20168

Aircraft collision avoidance and air traffic safety
[GPO-88-545] N82-20169

CONTAINERS

Toward VLA air-cargo service
A82-28277

CONTROL CONFIGURED VEHICLES

Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513

CONTROL SURFACES

Wing/control surface flutter analysis using experimentally corrected aerodynamics
A82-26569

Influence of strakes on coefficients of longitudinal stability
[MBB-FE-122/S/PUB/22] N82-21215

CONTROL THEORY

The role of modern control theory in the design of controls for aircraft turbine engines
[AIAA PAPER 82-0320] A82-26526

Digital command augmentation for lateral-directional aircraft dynamics
[AD-A110274] N82-21214

CONTROLLABILITY

A translational velocity command system for VTOL low speed flight
[NASA-TM-84215] N82-20186

CONTROLLERS

Self-tuning regulators for multicyclic control of helicopter vibration
[NASA-TP-1996] N82-20188

CONVERGENT-DIVERGENT NOZZLES
Allowance for flow nonuniformity in the minimum section in the optimal contouring of the expanding part of a nozzle A82-25798
COOLING SYSTEMS
Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions A82-28015
Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine A82-28018
CORROSION PREVENTION
Recent developments in materials and processes for aircraft corrosion control A82-27446
CORROSION RESISTANCE
Effect of mechanical surface and heat treatments on erosion resistance A82-27071
An evaluation of several polymers for high density humidity PC coatings A82-27432
Strength of the turbine components of a gas-turbine engine under complex loading and associated problems A82-27526
COST EFFECTIVENESS
Airline ATE requirements A82-27884
The modular ATE --- for cost effective maintenance of new generation avionics A82-27886
AEWTS - Realistic not futuristic --- Advanced Electronic Warfare Test Set A82-27887
ATE logistics in the United States Air Force A82-27890
Simple vs. sophisticated TacAir avionics. II - Soviet TacAir avionics technology A82-28397
COST ESTIMATES
A CAD approach to cost estimating composite aircraft A82-27146
COST REDUCTION
Some thoughts on design optimization of transport helicopters A82-25771
Manufacturing cost trade-studies in avionics A82-27430
COUPLING COEFFICIENTS
Aeroelastic characteristics of a mistuned bladed-disc assembly N82-20142
CRACK CLOSURE
A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading A82-26630
CRACK INITIATION
Introduction to the principles of fracture mechanics A82-25550
CRACK PROPAGATION
Introduction to the principles of fracture mechanics A82-25550
A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading A82-26630
Fracture mechanics technology applied to individual aircraft tracking --- durability and structural life estimates A82-26637
Evaluation of crack growth gages for service life tracking A82-26652
Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy A82-27151
Acta Aeronautica et Astronautica Sinica [AD-A110282] N82-21153
CRASH INJURIES
Improving the crashworthiness of general aviation aircraft by crash injury investigations A82-28476
CRASHWORTHINESS
A crashworthiness test for composite fuselage structure A82-27139
Improving the crashworthiness of general aviation aircraft by crash injury investigations A82-28476
CREEP PROPERTIES
Process development and evaluation of gas turbine engine components in IMI 829 --- titanium alloy [PNR-90050] N82-21205
CREEP STRENGTH
Precision casting for gas turbine engines A82-28313
CRUISE MISSILES
Optimal terrain-following feedback control for advanced cruise missiles [AD-A110286] N82-21179
CRYOGENIC EQUIPMENT
Cryogenic Technology, part 1 --- conference proceedings; cryogenic wind tunnel design and instrumentation [NASA-CP-2122-PT-1] N82-20357
Cryogenic Technology, part 2 --- conference proceedings; cryogenic wind tunnel design and instrumentation [NASA-CP-2122-PT-2] N82-20358
CRYOGENIC WIND TUNNELS
Cryogenic Technology, part 1 --- conference proceedings; cryogenic wind tunnel design and instrumentation [NASA-CP-2122-PT-1] N82-20357
Cryogenic Technology, part 2 --- conference proceedings; cryogenic wind tunnel design and instrumentation [NASA-CP-2122-PT-2] N82-20358
Aerodynamics project. Significance and difficulties in the experimental and numerical simulation of complex flow processes with high Reynolds number as part of aircraft projects --- wind tunnel utilization [MBB-FE-120/S/PUB/33] N82-21162
CUMULATIVE DAMAGE
Radome rain damage - An environmental analysis technique A82-26464
CUTTERS
Tubing and cable cutting tool [NASA-CASE-LAR-12786-1] N82-20545
CUTTING
Tubing and cable cutting tool [NASA-CASE-LAR-12786-1] N82-20545
CYCLIC LOADS
A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading A82-26630

D

DAMAGE ASSESSMENT
Non-destructive inspection and the implementation of a damage tolerant design philosophy --- fighter aircraft [RAE-TM-STRUCT-982] N82-21601
DAMPING
Conditions of generation and methods of damping the inlet vortex of a turbojet engine [NASA-TM-76678] N82-20182
DAMPING TESTS
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept [NASA-CR-168745] N82-21999
DATA ACQUISITION
Advanced medium scale real-time system --- for Army helicopter tests A82-27187
ATLAS/test data provision for the Tornado ATS - A challenging task A82-27891
DATA BASES
Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions [AD-A110332] N82-21199

Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201

DATA CORRELATION
Vortex flow correlation --- water tunnel tests on thin slender wings
[AD-A108725] N82-20468

DATA PROCESSING
Modernizing air traffic control in France
A82-27048
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509
A descriptive study of the application of analysis of variance and regression techniques in an error analysis program for test data obtained in a 16 foot transonic tunnel
N82-20997
Report of the JANNAF Workshop on High Frequency Instrumentation and Data Analysis Techniques
N82-21406

DATA SMOOTHING
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577

DATA SYSTEMS
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191

DECOUPLING
Selection of some rotor parameters to reduce pitch-roll coupling of helicopter flight dynamics
A82-26383

DEFECTS
Growth of four flaw types in graphite/epoxy composites due to fully reversed fatigue
A82-27167
Effects of defects on tension coupons undergoing an accelerated environmental spectrum
A82-27168

DEFLECTORS
Experimental study of the flowfield of an airfoil with deflected spoiler
[AIAA PAPER 82-0126] A82-27086

DEICERS
Black Hawk rotor de-icing
A82-26398

DELTA WINGS
Pressure distributions on some delta wings at M = 4 --- wind tunnel tests
[RAE-TR-80068] N82-21164

DESIGN ANALYSIS
Inverse heat-transfer problems - Domains of application in the design and testing of technical systems
A82-25971
Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility
A82-26399
Sonic fatigue testing of an advanced composite aileron
[AIAA PAPER 81-0634] A82-26567
US Navy begins slow shuffle towards V/STOL
A82-28311

DESIGN TO COST
Advanced composites integral structures meet the challenge of future aircraft systems
A82-27133

DETECTION
NASA research programs responding to workshop recommendations
N82-21146

DIFFERENTIAL EQUATIONS
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems
A82-25923

DIFFRACTION PATTERNS
UTD terrain reflection model with application to ILS glide slope
N82-20166

DIFFUSERS
Determination of losses in a channel with a sudden expansion behind a diffusor
A82-26492

DIFFUSION WELDING
SPF/DB titanium concepts for structural efficiency foi HC
N82-20154
SPF/DB titanium LPC porous panel concept
N82-20155
Laminar flow control SPF/DB feasibility demonstration
[NASA-CR-165818] N82-21532

DIGITAL COMPUTERS
Operational delay day forecasts for the 20 air route traffic control centers for the year 1982 through 2011
[AD-A109844] N82-20173

DIGITAL FILTERS
Real time digital filtering test in the S1 continuous wind tunnel at Modane
A82-26299

DIGITAL NAVIGATION
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191

DIGITAL SYSTEMS
Future helicopter technology
A82-26820
Aircraft interrogation and display system: A ground support equipment for digital flight systems
[NASA-TM-81370] N82-21175
Digital command augmentation for lateral-directional aircraft dynamics
[AD-A110274] N82-21214

DISCRETE ADDRESS BEACON SYSTEM
Joint US/USSR mode S compatibility test program, volume 1
[PB82-126616] N82-21173
Joint US/USSR mode S compatibility test program, volume 2
[PB82-126624] N82-21174

DISPLAY DEVICES
Advanced display-control concepts for power plant operation
A82-26121
Effect of contrast on space perception in TV displays of the external scene observed by the pilot --- German book
A82-28395
Simulator study of a pictorial display for general aviation instrument flight
[NASA-TP-1963] N82-20180
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191
Aircraft interrogation and display system: A ground support equipment for digital flight systems
[NASA-TM-81370] N82-21175
The 1981 Image 2 Conference Proceedings
[AD-A110226] N82-21223

DOPPLER RADAR
Doppler radar-research and application to aviation flight safety, 1977 - 1979
[AD-A109845] N82-20163

DOWNWASH
Effect of downwash on the induced drag of canard-wing combinations
A82-28518

DRAG
Preliminary investigation of effects of heavy rain on the performance of aircraft
[NASA-TM-83272] N82-20185

DUCTED FLOW
An investigation of the swirl in an S-duct
A82-28318

DYNAMIC RESPONSE
The dynamic behaviour of propeller anemometers
A82-26184
Applications of adaptive control systems --- to aircraft design, industrial processes and electrical drives
A82-27869
Vibration of structures excited acoustically
N82-20343
Dynamic response of a hot gas, control-surface actuator --- for an aircraft rudder
[MBB-UA-599/81-OE] N82-21219

DYNAMIC STABILITY
Dynamic stability of low effective flap hinge DHB concepts
A82-26377

DYNAMIC STRUCTURAL ANALYSIS
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems
A82-25923
Vibration qualification of external aircraft stores and equipment
[MBB-FE-173/S/PUB/46] N82-21218
DYNAMOMETERS
The use of dynamometer readings for damping of the natural vibrations of twin-rotor gyrocompasses
A82-28475

E

ECONOMIC ANALYSIS
VSTOLs - We can build them, but can we sell them
A82-28281
EJECTION SEATS
Development of an ejection seat ballast block for the S-3A aircraft
[AD-A109806] N82-20161
Development of a supported airbag ejection restraint (SABER) for windblast protection
[AD-A109807] N82-20162
ELASTIC DAMPING
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394
ELASTIC PROPERTIES
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566
ELASTOMERS
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394
ELECTRIC CONTROL
Applications of adaptive control systems --- to aircraft design, industrial processes and electrical drives
A82-27869
ELECTROMAGNETIC INTERFERENCE
Main rotor hub electromagnetic signature reduction
A82-26393
ELECTROMAGNETIC PULSES
Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft
A82-27144
ELECTROMAGNETIC RADIATION
UTD terrain reflection model with application to ILS guide slope
N82-20166
ELECTROMAGNETIC SHIELDING
CH-46 and CH-47 composite rotor blade lightning protection testing
A82-26381
Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft
A82-27144
ELECTROMECHANICAL DEVICES
SH-60B Seahawk automatic blade fold system
A82-26391
ELECTRONIC AIRCRAFT
Minutes of physical configuration audit for the F-16 Electronic Warfare Training Device
[AD-A110321] N82-21222
ELECTRONIC CONTROL
Advanced display-control concepts for power plant operation
A82-26121
ELECTRONIC COUNTERMEASURES
Acta Aeronautica et Astronautica Sinica
[AD-A110282] N82-21153
ELECTRONIC EQUIPMENT TESTS
Airline maintenance strategy
A82-27883
Airline ATE requirements
A82-27884
The role of software in commercial ATE
A82-27885
The modular ATE --- for cost effective maintenance of new generation avionics
A82-27886
AEWTS - Realistic not futuristic --- Advanced Electronic Warfare Test Set
A82-27887
ATLAS/test data provision for the Tornado ATS - A challenging task
A82-27891
Safety (aviation material)
[AD-A110361] N82-20165
ELECTRONIC MODULES
The modular ATE --- for cost effective maintenance of new generation avionics
A82-27886
ELECTRONIC WARFARE
The bomber that radar cannot see
A82-25874
AEWTS - Realistic not futuristic --- Advanced Electronic Warfare Test Set
A82-27887
Minutes of physical configuration audit for the F-16 Electronic Warfare Training Device
[AD-A110321] N82-21222
ENGINE AIRFRAME INTEGRATION
Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series
A82-26487
ENGINE CONTROL
The role of modern control theory in the design of controls for aircraft turbine engines
[AIAA PAPER 82-0320] A82-26526
ENGINE DESIGN
Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series
A82-26487
The role of modern control theory in the design of controls for aircraft turbine engines
[AIAA PAPER 82-0320] A82-26526
Engine industry cost considerations for emerging technologies
A82-27429
Advanced engine technology and its influence on aircraft performance
A82-28515
Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine
[NASA-TM-82644] N82-21193
Energy efficient engine shroudless, hollow fan blade technology report
[NASA-CR-165586] N82-21196
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209
The benefits of data exchange --- between airline and engine manufacturer
[PNR-90048] N82-22095
ENGINE FAILURE
Analytical investigation of nonrecoverable stall
[NASA-TM-82792] N82-21195
ENGINE INLETS
V/STOL Tandem Fan transition section model test --- in the Lewis Research Center 10-by-10 foot wind tunnel
[NASA-CR-165587] N82-21158
ENGINE NOISE
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1
[NASA-CR-165562-VOL-1] N82-21031
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2
[NASA-CR-165562-VOL-2] N82-21032
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3
[NASA-CR-165562-VOL-3] N82-21033
Fluctuating pressures on fan blades of a turbofan engine: Static and wind-tunnel investigations
[NASA-TP-1976] N82-21037
ENGINE PARTS
Strength of the turbine components of a gas-turbine engine under complex loading and associated problems
A82-27526
Precision casting for gas turbine engines
A82-28313
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566
Process development and evaluation of gas turbine engine components in IMI 829 --- titanium alloy
[PNR-90050] N82-21205

ENGINE TESTS
Pacer Comet II jet engine test system
A82-27903
Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194
CF6 Jet Engine Diagnostics Program: High pressure compressor clearance investigation
[NASA-CR-165580] N82-21197
The mechanical testing of compressors and turbines for aircraft gas turbine engines --- Rolls Royce engines
[PNR-90070] N82-21211

ENVIRONMENT EFFECTS
Radome rain damage - An environmental analysis technique
A82-26464

ENVIRONMENT SIMULATION
Mach 2.0 rotating arm rain erosion test apparatus
A82-26461
Meteorological inputs to advanced simulators
N82-21141

ENVIRONMENTAL TESTS
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations --- in fighter aircraft structures
A82-27158
Effects of defects on tension coupons undergoing an accelerated environmental spectrum
A82-27168
ALQ-164 POD/AV-8C environmental evaluation flight test
[AD-A110198] N82-21178

EPOXY MATRIX COMPOSITES
The YAH-64A composite flexbeam tail rotor
A82-26386
ICOPTER KEVLAR
A82-26389
Light weight adhesive joining of composite structures
A82-27404

EPOXY RESINS
A new resin for field repair
A82-27412

EQUATIONS OF MOTION
The dynamic behaviour of propeller anemometers
A82-26184

ERROR ANALYSIS
A descriptive study of the application of analysis of variance and regression techniques in an error analysis program for test data obtained in a 16 foot transonic tunnel
N82-20997

ESTIMATING
Statistical analysis and time series modeling of air traffic operations data from flight service stations and terminal radar approach control facilities: Two case studies
[AD-A109873] N82-20172

EUROPE
The status of airport noise prediction, with special reference to the United Kingdom and Europe
A82-28149

EUROPEAN AIRBUS
A310 - Europe builds on Airbus success
A82-26536

EXHAUST EMISSION
The formation of benzpyrene during the combustion of aviation fuels
A82-26494

EXHAUST FLOW SIMULATION
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087

EXHAUST GASES
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases
A82-26495

EXHAUST NOZZLES
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156

EXTERNAL STORES
Aerodynamic characteristics and store loads of a 1/24 scale F-111 aircraft model with three external store loadings
[AD-A109449] N82-20158
ALQ-164 POD/AV-8C environmental evaluation flight test
[AD-A110198] N82-21178
Vibration qualification of external aircraft stores and equipment
[MBB-FE-173/S/PUB/46] N82-21218

EXTERNAL SURFACE CURRENTS
ALQ-164 POD/AV-8C environmental evaluation flight test
[AD-A110198] N82-21178

EXTREMELY HIGH FREQUENCIES
Small EHF/SHF airborne SATCOM terminal
A82-27209

F

F-4 AIRCRAFT
Evaluation of crack growth gages for service life tracking
A82-26652
Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513

F-5 AIRCRAFT
From claws to jaws - Tiger into Tigershark
A82-26538

F-28 TRANSPORT AIRCRAFT
Developments to improve the noise and combustion emissions on the Fokker F28 aircraft and its Rolls-Royce RB183-555 engines. Section 1: Development of the new internal 10-Lobe mixer
[PNR-90061] N82-21207

F-111 AIRCRAFT
Aerodynamic characteristics and store loads of a 1/24 scale F-111 aircraft model with three external store loadings
[AD-A109449] N82-20158
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167

FABRICATION
Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques
A82-26390
Energy efficient engine shroudless, hollow fan blade technology report
[NASA-CR-165586] N82-21196

FAIL-SAFE SYSTEMS
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

FAILURE ANALYSIS
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

FAILURE MODES
Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses
A82-27156

FAIRINGS
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131

FASTENERS
Composite fasteners - A compatible joining technique for fibrous composites in structural design --- aircraft construction materials
A82-27159

FATIGUE LIFE
A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading
A82-26630
Fracture mechanics technology applied to individual aircraft tracking --- durability and structural life estimates
A82-26637
Evaluation of crack growth gages for service life tracking
A82-26652
Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy
A82-27151
Growth of four flaw types in graphite/epoxy composites due to fully reversed fatigue
A82-27167
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

FATIGUE TESTS

- Sonic fatigue testing of an advanced composite aileron [AIAA PAPER 81-0634] A82-26567
- Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations --- in fighter aircraft structures A82-27158

FEASIBILITY ANALYSIS

- AEWTS - Realistic not futuristic --- Advanced Electronic Warfare Test Set A82-27887

FEEDBACK CONTROL

- Identification of multivariable high performance turbofan engine dynamics from closed loop data [NASA-TM-82785] N82-20339
- Optimal terrain-following feedback control for advanced cruise missiles [AD-A110286] N82-21179
- Dynamic response of a hot gas, control-surface actuator --- for an aircraft rudder [MBB-UA-599/81-OE] N82-21219

FIBER OPTICS

- A preliminary investigation of Individual Blade-control Independent of a Swashplate A82-26382

FIBER REINFORCED COMPOSITES

- Materials and aeronautics A82-26025
- Fibrous composites in structural design --- Book A82-27126
- Composite aircraft structures A82-27127
- A crashworthiness test for composite fuselage structure A82-27139
- Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses A82-27156
- Use of composite materials for helicopter rotor blades [PB82-124041] N82-21191
- Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation [AD-A110212] N82-21261
- Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept [NASA-CR-168745] N82-21999

FIGHTER AIRCRAFT

- Yak-36 Forger - The brand X VTOL fighter A82-26045
- US Navy begins slow shuffle towards V/STOL A82-28311
- Acoustic measurements of F-4E aircraft operating in hush house, NSN 4920-02-070-2721 [AD-A109827] N82-21041
- Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary [AD-A110035] N82-21180
- Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design [AD-A110231] N82-21181
- Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 1: User's guide to transport design computer programs [AD-A110232] N82-21183
- Vibration qualification of external aircraft stores and equipment [MBB-FE-173/S/PUB/46] N82-21218
- Minutes of physical configuration audit for the F-16 Electronic Warfare Training Device [AD-A110321] N82-21222
- Non-destructive inspection and the implementation of a damage tolerant design philosophy --- fighter aircraft [BAE-TM-STRUCT-982] N82-21601

FILLERS

- Effects of filler materials upon radome rain erosion performance at subsonic conditions A82-26462

FINITE ELEMENT METHOD

- Torsional vibrations of non-uniform rotating blades with attachment flexibility A82-26313
- Vibration of structures excited acoustically N82-20343
- Application of the finite element method to rotary wing aeroelasticity [NASA-CR-165854] N82-20561
- Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens [NASA-TP-1973] N82-20566

FITTINGS

- Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation [AD-A110212] N82-21261

FLAME STABILITY

- The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer A82-26483

FLAMMABILITY

- Full-scale flammability test data for validation of aircraft fire mathematical models [NASA-TM-58244] N82-21166

FLAPPING

- Selection of some rotor parameters to reduce pitch-roll coupling of helicopter flight dynamics A82-26383

FLAPPING HINGES

- Dynamic stability of low effective flap hinge BMR concepts A82-26377

FLAT PLATES

- The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer A82-26483
- Stability of boundary layers with porous suction strips: Experiment and theory N82-20152

FLEXIBLE BODIES

- Application of combined balancing methods to flexible rotors of aviation gas-turbine engines A82-26491

FLIGHT ALTITUDE

- Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system [NASA-CR-163121] N82-21198

FLIGHT CHARACTERISTICS

- Performance improvements with the free-tip rotor A82-26387
- Flying qualities - A costly lapse in flight-control design A82-28280
- Advancing blade flight data gathered A82-28312
- The characteristics and detection of low level wind shear in the critical phases of flight A82-28349

FLIGHT CONDITIONS

- Communicating critical weather information to pilots --- (ZITLE) [AIAA PAPER 82-0016] A82-27082
- Meteorological impact on aviation fuel efficiency N82-21140
- The Joint Airport Weather Studies Project N82-21152
- Generic Test Bed (GTB) aircraft [AD-A110335] N82-21176

FLIGHT CONTROL

- Composite control tubes A82-27423
- Flying qualities - A costly lapse in flight-control design A82-28280
- Real-time failure detection of aircraft engine output sensors A82-28403
- Development of longitudinal equivalent system models for selected US Navy tactical aircraft [AD-A109488] N82-20189
- Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts [AD-A109585] N82-20190

Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191
Operational procedures relative to severe weather
N82-21142
Digital command augmentation for lateral-directional aircraft dynamics
[AD-A110274] N82-21214

FLIGHT HAZARDS
Communicating critical weather information to pilots --- (ZITLE)
[AIAA PAPER 82-0016] A82-27082
The characteristics and detection of low level wind shear in the critical phases of flight
A82-28349
Aircraft pitch attitude as a performance parameter
A82-28519

FLIGHT MECHANICS
Air Force Academy aeronautics digest Fall/Summer 1980
[AD-A108338] N82-20139

FLIGHT OPERATIONS
The effects of weather on runway operations
A82-27050
Operational procedures relative to severe weather
N82-21142

FLIGHT OPTIMIZATION
Fuel optimal trajectory computation
A82-26568

FLIGHT PATHS
Fuel optimal trajectory computation
A82-26568
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft
[NASA-TP-1911] N82-20167

FLIGHT PLANS
Modernizing air traffic control in France
A82-27048
Weather deterioration models applied to alternate airport criteria
[AD-A108877] N82-20811
Meteorological impact on aviation fuel efficiency
N82-21140
Ozone and aircraft operations
N82-21145

FLIGHT SAFETY
Detection and tracking algorithm refinement
[AD-A109517] N82-20164
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139
Operational procedures relative to severe weather
N82-21142
Prototype Regional Observation and Forecast System (PROPS)
N82-21150

FLIGHT SIMULATION
Aerial combat simulation in the U.S. Air Force
A82-27920
Flying qualities - A costly lapse in flight-control design
A82-28280
Effect of contrast on space perception in TV displays of the external scene observed by the pilot --- German book
A82-28395
Simulation of the XV-15 tilt rotor research aircraft
[NASA-TM-84222] N82-20174
Simulator study of a pictorial display for general aviation instrument flight
[NASA-TP-1963] N82-20180
Design of a catadioptric VCASS helmet-mounted display
[AD-A109431] N82-20181
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 1: User's manual
[AD-A108246] N82-20194
Aerodynamics project. Significance and difficulties in the experimental and numerical simulation of complex flow processes with high Reynolds number as part of aircraft projects --- wind tunnel utilization
[MBB-FE-120/S/PUB/33] N82-21162
The 1981 Image 2 Conference Proceedings
[AD-A110226] N82-21223

FLIGHT SIMULATORS
Heavy rain penalties for a flight simulator
[AIAA PAPER 82-0213] A82-27093
Study and design of high G augmentation devices for flight simulators
[AD-A109127] N82-20195
Meteorological inputs to advanced simulators
N82-21141
Computer generated images for aircraft pilot training --- NACA aircraft
[MBB-UA-551/80-OE] N82-21229

FLIGHT TEST VEHICLES
Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176

FLIGHT TESTS
Experimental program for general aviation --- wing design, construction and flight testing
A82-26542
One year flight testing of the Transonic Wing
A82-26543
NOTAM
A82-26822
Advanced medium scale real-time system --- for Army helicopter tests
A82-27187
Flight service evaluation of advanced structures
A82-27402
Advancing blade flight data gathered
A82-28312
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177
A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
[NASA-TM-82805] N82-21998

FLIGHT TIME
Optimum three-dimensional flight of a supersonic aircraft
A82-26039

FLIGHT VEHICLES
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

FLIR DETECTORS
The 1981 Image 2 Conference Proceedings
[AD-A110226] N82-21223

FLOW CHARACTERISTICS
The effect of induced sound on the flow around a rectangular body in a wind tunnel
A82-26194

FLOW DISTORTION
Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise'
A82-26320

FLOW DISTRIBUTION
The vortex flow field generated by a hovering helicopter
A82-26227
Numerical solution of Space Shuttle Orbiter flow field
[AIAA PAPER 82-0028] A82-27083
Experimental study of the flowfield of an airfoil with deflected spoiler
[AIAA PAPER 82-0126] A82-27086
Experimental methods for the prediction of the effect of viscosity on propeller performance
[AD-A109846] N82-20472

FLOW GEOMETRY
Self streamlining wind tunnels without computers
A82-26181
Determination of losses in a channel with a sudden expansion behind a diffusor
A82-26492

FLOW MEASUREMENT
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200

FLOW VELOCITY
An experimental study of steady and quasi-steady jet flaps
A82-26222
The relative motion of a particle in the case of exponential changes of the velocity of the medium
A82-26479

Experimental methods for the prediction of the effect of viscosity on propeller performance [AD-A109846] N82-20472

FLOW VISUALIZATION
Quantitative interpretation of recirculated flow visualization by the analysis of video pictures A82-27109
More than meets the eye - The oil dot technique A82-27114
Vortex flow correlation --- water tunnel tests on thin slender wings [AD-A108725] N82-20468

FLUID DYNAMICS
Von Karman and VKI - The first 25 years A82-25673

FLUID FLOW
Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers A82-26176
Analytical investigation of nonrecoverable stall [NASA-TM-82792] N82-21195

FLUID MECHANICS
Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers A82-26176

FLUIDICS
Dualchannel fuel control program, phase 2 [AD-A109715] N82-20185

FLUTTER
Active flutter suppression on an F-4F aircraft [AIAA PAPER 80-0770] A82-28513
Application of the finite element method to rotary wing aeroelasticity [NASA-CR-165854] N82-20561
Pressure measurements on a wing oscillating in supercritical flow [RAE-TR-79074] N82-21163

FLUTTER ANALYSIS
Wing/control surface flutter analysis using experimentally corrected aerodynamics A82-26569

FLY BY WIRE CONTROL
The future of helicopter flight control technology A82-26821

FOLDING STRUCTURES
SH-60B Seahawk automatic blade fold system A82-26391
Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility A82-26399

FORECASTING
Operational delay day forecasts for the 20 air route traffic control centers for the year 1982 through 2011 [AD-A109844] N82-20173
Ozone and aircraft operations N82-21145

FOREIGN TRADE
Future of general and commuter aviation technology and trade [GPO-85-832] N82-20159

FORMING TECHNIQUES
Laminar flow control SPF/DB feasibility demonstration [NASA-CR-165818] N82-21532

FOURIER SERIES
The application of subsonic theoretical aerodynamics to active controls --- aircraft controls [RAE-TR-81060] N82-21217

FRACTURE MECHANICS
Introduction to the principles of fracture mechanics A82-25550
Fracture mechanics technology applied to individual aircraft tracking --- durability and structural life estimates A82-26637

FRACTURE STRENGTH
Fracture control in ballistic-damaged graphite/epoxy wing structure A82-26639

FREE FLOW
Transonic flow past thin wings A82-25995

FREE VIBRATION
Aeroelastic characteristics of a mistuned bladed-disc assembly N82-20142

FROST
Effect of heavy rain on aircraft N82-21149

FUEL COMBUSTION
The formation of benzpyrene during the combustion of aviation fuels A82-26494
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases A82-26495

FUEL CONSUMPTION
On-board computers save fuel and help ATC A82-26046
Fuel optimal trajectory computation A82-26568
Meteorological impact on aviation fuel efficiency N82-21140
Developments to improve the noise and combustion emissions on the Fokker F28 aircraft and its Rolls-Royce RB183-555 engines. Section 1: Development of the new internal 10-Lobe mixer [PNR-90061] N82-21207
Engines for air transport --- aircraft fuel consumption [PNR-90066] N82-21208

FUEL CONTROL
Dualchannel fuel control program, phase 2 [AD-A109715] N82-20185

FUEL SYSTEMS
Dualchannel fuel control program, phase 2 [AD-A109715] N82-20185

FULL SCALE TESTS
Full scale test facilities for radomes and antenna windows A82-26467

FURNACES
Precision casting for gas turbine engines A82-28313

FUSELAGES
Preliminary design development AV-8B forward fuselage composite structure A82-27129
Design concepts for composite fuselage structure A82-27132
A crashworthiness test for composite fuselage structure A82-27139
The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter A82-27424
Why twin-fuselage aircraft A82-28276
Full-scale flammability test data for validation of aircraft fire mathematical models [NASA-TM-58244] N82-21166

G

GALERKIN METHOD
Torsional vibrations of non-uniform rotating blades with attachment flexibility A82-26313

GAS FLOW
The relative motion of a particle in the case of exponential changes of the velocity of the medium A82-26479
Simulation of turbofan engine models in the Weybridge low speed wind tunnel --- gas supply control [BAE-INFORM-NOTE-46] N82-21212

GAS PRESSURE
Determination of losses in a channel with a sudden expansion behind a diffusor A82-26492

GAS TURBINE ENGINES
Requirements on modern mathematical models of gas turbine engines. I A82-26486
Application of combined balancing methods to flexible rotors of aviation gas-turbine engines A82-26491
Rub energetics of compressor blade tip seals A82-27078

  Strength of the turbine components of a gas-turbine engine under complex loading and associated problems
  A82-27526
  Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
  A82-28015
  The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
  A82-28019
  Precision casting for gas turbine engines
  A82-28313
  Heavy-duty engines analysis, study 4: A preliminary market analysis for gas-turbine applications in the farm market
  [DE82-001758] N82-20549
  Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine
  [NASA-TM-82644] N82-21193
  Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
  [AD-A110332] N82-21199
  Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
  [AD-A110333] N82-21200
  Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
  [AD-A110334] N82-21201
  Coatings in the aero gas turbine --- sprayed coatings
  [PNR-90049] N82-21204
  Process development and evaluation of gas turbine engine components in IMI 829 --- titanium alloy
  [PNR-90050] N82-21205
  The mechanical testing of compressors and turbines for aircraft gas turbine engines --- Rolls Royce engines
  [PNR-90079] N82-21211
  Telemetry in aero engine development --- from operating engines
  [PNR-90055] N82-21247
GAS TURBINES
  Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine
  A82-28018
  Dualchannel fuel control program, phase 2
  [AD-A109715] N82-20185
GENERAL AVIATION AIRCRAFT
  Structural design and construction of the New Technology Wing
  A82-26541
  Experimental program for general aviation --- wing design, construction and flight testing
  A82-26542
  Improving the crashworthiness of general aviation aircraft by crash injury investigations
  A82-28476
  Simulator study of a pictorial display for general aviation instrument flight
  [NASA-TP-1963] N82-20180
  NASA/Lewis Research Center Icing Research Program
  N82-21148
GIMBALS
  Aeroelastic analysis of the elastic gimbal rotor
  [NASA-CR-166287] N82-21157
GLASS
  Effect of mechanical surface and heat treatments on erosion resistance
  A82-27071
GLASS FIBER REINFORCED PLASTICS
  CH-47 fiberglass rotor blade design and fabrication
  A82-26397
  Design and production of fiberglass helicopter rotor blades
  A82-27153
  Composite fasteners - A compatible joining technique for fibrous composites in structural design --- aircraft construction materials
  A82-27159
GLASS FIBERS
  CH-46 fiberglass rotor blade repair program
  A82-26384
  Operational experience with the fiberglass rotor blade
  A82-26388
GLIDE PATHS
  UTD terrain reflection model with application to ILS glide slope
  N82-20166
GRAPHITE-EPOXY COMPOSITES
  Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques
  A82-26390
  Sonic fatigue testing of an advanced composite aileron
  [AIAA PAPER 81-0634] A82-26567
  Fracture control in ballistic-damaged graphite/epoxy wing structure
  A82-26639
  Composite wing substructure technology on the AV-8B advanced aircraft
  A82-27128
  Design concepts for composite fuselage structure
  A82-27132
  Advanced composites integral structures meet the challenge of future aircraft systems
  A82-27133
  Continuous filament advanced composite isogrid - A promising structural concept
  A82-27138
  A crashworthiness test for composite fuselage structure
  A82-27139
  Impact resistance of graphite and hybrid configurations
  A82-27141
  Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft
  A82-27144
  Preliminary design of an advanced composite rotor hub for the UH-60A Black Hawk
  A82-27154
  Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing
  A82-27155
  Durability evaluation of highly stressed wing box structure
  A82-27163
  Growth of four flaw types in graphite/epoxy composites due to fully reversed fatigue
  A82-27167
  Flight service evaluation of advanced structures
  A82-27402
  A new resin for field repair
  A82-27412
  Characterization of composition variations in a structural adhesive
  A82-27415
  Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept
  [NASA-CR-168745] N82-21999
GRAVITATIONAL EFFECTS
  Study and design of high G augmentation devices for flight simulators
  [AD-A109127] N82-20195
GROUND EFFECT (COMMUNICATIONS)
  Terrain reflection effects on data reception from airborne vehicles
  A82-27231
GROUND HANDLING
  IATA's Unit Terminal Concept
  A82-27049
GROUND SUPPORT EQUIPMENT
  Telemetry Computer System at Wallops Flight Center
  A82-27188
  Aircraft interrogation and display system: A ground support equipment for digital flight systems
  [NASA-TM-81370] N82-21175
GUIDE VANES
  Sea King flight tests pitot-static probe and directional vane instrumentation
  [AD-A109427] N82-20176
  YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1
  [NASA-CR-165562-VOL-1] N82-21031
  YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2
  [NASA-CR-165562-VOL-2] N82-21032

YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3
[NASA-CR-165562-VOL-3] N82-21033

GUST LOADS

Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts
[AD-A109585] N82-20190

GYROCOMPASSES

The use of dynamometer readings for damping of the natural vibrations of twin-rotor gyrocompasses
A82-28475

H

HANDBOOKS

Conformal antenna array design handbook
[AD-A110091] N82-21483

HANGARS

Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109828] N82-21042

HARMONIC OSCILLATION

Design of higher harmonic control for the ABC
A82-26380

HARNESSES

Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167

HARRIER AIRCRAFT

AV-8B/Harrier GR.5 - Range, payload and VSTOL
A82-26044

Composite wing substructure technology on the AV-8B advanced aircraft
A82-27128

Preliminary design development AV-8B forward fuselage composite structure
A82-27129

HEAT OF COMBUSTION

Thermodynamics of organic compounds
[AD-A110430] N82-21202

HEAT TRANSFER

Inverse heat-transfer problems - Domains of application in the design and testing of technical systems
A82-25971

Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
[AD-A110332] N82-21199

Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200

Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201

Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110341] N82-21203

HEAT TRANSFER COEFFICIENTS

Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015

Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine
A82-28018

HEAT TREATMENT

Recent developments in materials and processes for aircraft corrosion control
A82-27446

HELICOPTER CONTROL

Sensitivity of helicopter aeromechanical stability to dynamic inflow
A82-25773

Design of higher harmonic control for the ABC
A82-26380

A preliminary investigation of Individual Blade-control Independent of a Swashplate
A82-26382

Selection of some rotor parameters to reduce pitch-roll coupling of helicopter flight dynamics
A82-26383

The Circulation Control Rotor /CCR/ control system
A82-26400

The future of helicopter flight control technology
A82-26821

Composite control tubes
A82-27423

HELICOPTER DESIGN

Some thoughts on design optimization of transport helicopters
A82-25771

The Model 412 multi-bladed rotor system
A82-26376

Design for the operating environment - Ring-fin tail rotor program
A82-26378

SH-60B Seahawk automatic blade fold system
A82-26391

The impact of missions on the preliminary design of an ABC rotor
A82-26392

Rotor preliminary design trade-offs for the Advanced Scout Helicopter
A82-26395

Performance and aeroelastic tradeoffs on recent rotor blade designs
A82-26396

CH-47 fiberglass rotor blade design and fabrication
A82-26397

Advanced helicopter concepts compete
A82-26537

Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
A82-26620

Future helicopter technology
A82-26820

The future of helicopter flight control technology
A82-26821

NOTAR
A82-26822

Application of advanced composite materials to helicopter airframe structures
A82-27152

Design and production of fiberglass helicopter rotor blades
A82-27153

Preliminary design of an advanced composite rotor hub for the UH-60A Black Hawk
A82-27154

Composite control tubes
A82-27423

The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter
A82-27424

To the root of the problem - Some helicopter research topics
A82-28275

Advancing blade flight data gathered
A82-28312

Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

Aeroelastic analysis of the elastic gimbal rotor
[NASA-CR-166287] N82-21157

Helicopter vibration control: A survey
[MBB-UD-302/80-O] N82-21185

Investigations of helicopter structural dynamics and a comparison with ground vibration tests --- using nastran
[MBB-UD-303/80-O] N82-21186

Use of composite materials for helicopter rotor blades
[PB82-124041] N82-21191

Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation
[AD-A110212] N82-21261

HELICOPTER ENGINES

Future helicopter technology
A82-26820

HELICOPTER PERFORMANCE

Helicopter rotor performance improvement by utilization of swept back parabolic blade tip
A82-26298

Design for the operating environment - Ring-fin tail rotor program
A82-26378

Advanced helicopter concepts compete
A82-26537

Performance degradation of propeller/rotor systems due to rime ice accretion
[AIAA PAPER 82-0286] A82-28322

HELICOPTER PROPELLER DRIVE
Main rotor hub electromagnetic signature reduction
A82-26393
Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing
A82-27155

HELICOPTER TAIL ROTORS
Design for the operating environment - Ring-fin tail rotor program
A82-26378
A survey of U.S. Army helicopter main and tail rotor blade obstacle strikes
A82-26385
The YAH-64A composite flexbeam tail rotor
A82-26386
Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques
A82-26390
NOTAR
A82-26822
A hingeless tail rotor of fiber composite construction and vibration isolator systems (ARIS, AVIS) for helicopters --- antiresonance isolator system (aris); active vibration isolator system (avis)
[MBB-UD-311/80-OE] N82-21187

HELICOPTER WAKES
The vortex flow field generated by a hovering helicopter
A82-26227

HELICOPTERS
Project Sea Hunt: A report on prototype development and tests
[AD-A109510] N82-20160
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175
Sea King flight tests pitot-static probe and directional vane instrumentation
[AD-A109427] N82-20176
Boom probe position error corrections for Sea King Mk 50 flight tests
[AD-A109428] N82-20177
Self-tuning regulators for multicyclic control of helicopter vibration
[NASA-TP-1996] N82-20188
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 1: User's manual
[AD-A108246] N82-20194
Application of the finite element method to rotary wing aeroelasticity
[NASA-CR-165854] N82-20561
Progress on low altitude cloud icing research
N82-21147
Helicopter rotor loads using a matched asymptotic expansion technique
[NASA-CR-165742] N82-21156
Aeroelastic analysis of the elastic gimbal rotor
[NASA-CR-166287] N82-21157
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177
Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation
[AD-A110212] N82-21261

HELMET MOUNTED DISPLAYS
Design of a catadioptric VCASS helmet-mounted display
[AD-A109431] N82-20181
The 1981 Image 2 Conference Proceedings
[AD-A110226] N82-21223

HIGH FREQUENCIES
Report of the JANNAF Workshop on High Frequency Instrumentation and Data Analysis Techniques
N82-21406

HIGH TEMPERATURE GASES
Dynamic response of a hot gas, control-surface actuator --- for an aircraft rudder
[MBB-UA-599/81-OE] N82-21219

HILL METHOD
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems
A82-25923

HISTORIES
Computational fluid dynamics - The coming revolution
A82-26366

HOMING DEVICES
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471

HONEYCOMB STRUCTURES
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing
A82-27414

HOVERING
Sensitivity of helicopter aeromechanical stability to dynamic inflow
A82-25773
The vortex flow field generated by a hovering helicopter
A82-26227
A surface singularity method for rotors in hover or climb
[AD-A109687] N82-20178

HOVERING STABILITY
Performance and aeroelastic tradeoffs on recent rotor blade designs
A82-26396

HUBS
Main rotor hub electromagnetic signature reduction
A82-26393
Preliminary design of an advanced composite rotor hub for the UH-60A Black Hawk
A82-27158
Aeroelastic analysis of the elastic gimbal rotor
[NASA-CR-166287] N82-21157

HUMAN FACTORS ENGINEERING
Design of a catadioptric VCASS helmet-mounted display
[AD-A109431] N82-20181

HUMAN REACTIONS
Assessment of community response to high-energy impulsive sounds
[AD-A110110] N82-21777

HUMAN TOLERANCES
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167

HYBRID STRUCTURES
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131
Impact resistance of graphite and hybrid configurations
A82-27141

HYDRAULIC EQUIPMENT
Tubing and cable cutting tool
[NASA-CASE-LAR-12786-1] N82-20545

HYDRAULICS
Australasian Conference on Hydraulics and Fluid Mechanics, 7th, Brisbane, Australia, August 18-22, 1980, Preprints of Papers
A82-26176

HYDROCARBONS
The effect of fuel composition on groundfall from aircraft fuel jettisoning
[AD-A110305] N82-21424

HYDRODYNAMIC COEFFICIENTS
Experimental methods for the prediction of the effect of viscosity on propeller performance
[AD-A109846] N82-20472

HYGRAL PROPERTIES
An evaluation of several polymers for high density humidity PC coatings
A82-27432

I

ICE
Probability of laminar flow loss because of ice crystal encounters
N82-20153

ICE ENVIRONMENTS
NASA/Lewis Research Center Icing Research Program
N82-21148

ICE FORMATION
Mathematical modeling of ice accretion on airfoils
[AIAA PAPER 82-0284] A82-27098
Performance degradation of propeller/rotor systems due to rime ice accretion
[AIAA PAPER 82-0286] A82-28322

NASA/Lewis Research Center Icing Research Program
A82-21148
ICE PREVENTION
Progress on low altitude cloud icing research
N82-21147
IMAGE CONTRAST
Effect of contrast on space perception in TV displays of the external scene observed by the pilot --- German book
A82-28395
IMAGE PROCESSING
Effect of contrast on space perception in TV displays of the external scene observed by the pilot --- German book
A82-28395
IMAGES
The 1981 Image 2 Conference Proceedings
[AD-A110226] N82-21223
IMPACT DAMAGE
Fracture control in ballistic-damaged graphite/epoxy wing structure
A82-26639
Impact resistance of graphite and hybrid configurations
A82-27141
IMPACT RESISTANCE
Impact resistance of graphite and hybrid configurations
A82-27141
IMPACT TESTS
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167
INERTIAL NAVIGATION
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577
INFORMATION FLOW
The benefits of data exchange --- between airline and engine manufacturer
[PNR-90048] N82-22095
INFRARED SPECTROMETERS
The sixteen to forty micron spectroscopy from the NASA Lear jet
[NASA-CR-168684] N82-21054
INFRARED SUPPRESSION
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177
INLET FLOW
Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise'
A82-26320
Conditions of generation and methods of damping the inlet vortex of a turbojet engine
[NASA-TM-76678] N82-20182
INLET NOZZLES
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1
[NASA-CR-165562-VOL-1] N82-21031
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2
[NASA-CR-165562-VOL-2] N82-21032
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3
[NASA-CR-165562-VOL-3] N82-21033
INSTRUMENT APPROACH
Weather deterioration models applied to alternate airport criteria
[AD-A106877] N82-20811
INSTRUMENT LANDING SYSTEMS
UTD terrain reflection model with application to ILS glide slope
N82-20166
Simulator study of a pictorial display for general aviation instrument flight
[NASA-TP-1963] N82-20180
INTERFACES
Factors influencing velocity distributions at inlet/combustor interfaces
N82-21405
INTERNAL COMBUSTION ENGINES
Heavy-duty engines analysis, study 4: A preliminary market analysis for gas-turbine applications in the farm market
[DE82-001758] N82-20549

Analysis of very low frequency oscillations in a ramjet combustor by use of a sensitive time lag model
N82-21404
INTERNATIONAL COOPERATION
Industrial experience in the Anglo-French helicopter collaboration
[SNIAS-811-210-101] N82-21154
INVESTIGATION
Analytical investigation of nonrecoverable stall
[NASA-TM-82792] N82-21195
INVISCID FLOW
Transonic flow past thin wings
A82-25995
ISOTHERMAL FLOW
The relative motion of a particle in the case of exponential changes of the velocity of the medium
A82-26479

J

JAMMING
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177
JET AIRCRAFT
Fuel optimal trajectory computation
A82-26568
Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts
[AD-A109585] N82-20190
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109829] N82-21043
JET AIRCRAFT NOISE
High frequency sound emission from moving point multipole sources embedded in arbitrary transversely sheared mean flows
A82-26318
The impact and future direction of aircraft noise certification
A82-28150
Acoustic measurements of F-4E aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109827] N82-21041
The Rolls Royce role in aircraft noise reduction --- jet engines, acoustic lining
[PNR-90069] N82-21210
Assessment of community response to high-energy impulsive sounds
[AD-A110110] N82-21777
Some applications of Hartmann-type sources in aircraft noise research --- airframe shielding
[RAE-TM-AERO-1877] N82-22007
JET BOUNDARIES
Factors influencing velocity distributions at inlet/combustor interfaces
N82-21405
JET ENGINE FUELS
The formation of benzpyrene during the combustion of aviation fuels
A82-26494
Thermodynamics of organic compounds
[AD-A110430] N82-21202
The effect of fuel composition on groundfall from aircraft fuel jettisoning
[AD-A110305] N82-21424
JET ENGINES
Pacer Comet II jet engine test system
A82-27903
The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintenance
A82-27904
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109828] N82-21042
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109829] N82-21043
CF6 Jet Engine Diagnostics Program: High pressure compressor clearance investigation
[NASA-CR-165580] N82-21197
JET FLAPS
An experimental study of steady and quasi-steady jet flaps
A82-26222

JETTISON SYSTEMS
The effect of fuel composition on groundfall from aircraft fuel jettisoning [AD-A110305] N82-21424

JOINTS (JUNCTIONS)
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations --- in fighter aircraft structures A82-27158
Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation [AD-A110212] N82-21261

JOURNAL BEARINGS
Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing A82-27155

K

KALMAN-SCHMIDT FILTERING
Digital command augmentation for lateral-directional aircraft dynamics [AD-A110274] N82-21214

KEVLAR (TRADEMARK)
ICOPTER KEVLAR A82-26389
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept [NASA-CR-168745] N82-21999

L

L-1011 AIRCRAFT
Sonic fatigue testing of an advanced composite aileron [AIAA PAPER 81-0634] A82-26567

LAMINAR BOUNDARY LAYER
Probability of laminar flow loss because of ice crystal encounters N82-20153

LAMINAR FLOW
Laminar flow control SPF/DB feasibility demonstration [NASA-CR-165818] N82-21532

LAMINAR FLOW AIRFOILS
Laminar Flow Control. The Research and Technology Studies 1981 [NASA-CP-2218] N82-20149
NASA Langley laminar flow control airfoil experiment N82-20150
Status of NASA advanced LFC airfoil high-lift study N82-20151
Stability of boundary layers with porous suction strips: Experiment and theory N82-20152
Probability of laminar flow loss because of ice crystal encounters N82-20153
SPF/DB titanium concepts for structural efficiency foi HC N82-20154
SPF/DB titanium LFC porous panel concept N82-20155

LAMINATES
Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing A82-27155
Acta Aeronautica et Astronautica Sinica [AD-A110282] N82-21153

LASER RANGE FINDERS
Rangefinder system for slant range visibility N82-20746

LEADING EDGE FLAPS
Laminar Flow Control. The Research and Technology Studies 1981 [NASA-CP-2218] N82-20149
Status of NASA advanced LFC airfoil high-lift study N82-20151

LEADING EDGE SLATS
The application of subsonic theoretical aerodynamics to active controls --- aircraft controls [RAE-TR-81060] N82-21217

LEADING EDGES
Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine A82-28018

LEAR JET AIRCRAFT
The sixteen to forty micron spectroscopy from the NASA Lear jet [NASA-CR-168684] N82-21054

LIFE CYCLE COSTS
Manufacturing cost trade-studies in avionics A82-27430

LIFT
Influence of strakes on coefficients of longitudinal stability [MBB-FB-122/S/PUB/22] N82-21215

LIFT AUGMENTATION
An experimental study of steady and quasi-steady jet flaps A82-26222

LIFT DRAG RATIO
Experimental program for general aviation --- wing design, construction and flight testing A82-26542

LIGHTNING
Lightning detection and ranging A82-26367
CH-46 and CH-47 composite rotor blade lightning protection testing A82-26381
Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft A82-27144
NASA research programs responding to workshop recommendations N82-21146

LINEAR PREDICTION
Theoretical linear approach to the combined man-manipulation system in manual control of an aircraft [MBB-FB-301/S/PUB/43] N82-21220

LIQUID COOLING
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721 [AD-A109829] N82-21043

LIQUID FLOW
Factors influencing velocity distributions at inlet/combustor interfaces N82-21405

LIQUID-SOLID INTERFACES
Factors influencing velocity distributions at inlet/combustor interfaces N82-21405

LOAD TESTS
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations --- in fighter aircraft structures A82-27158

LOGISTICS MANAGEMENT
ATE logistics in the United States Air Force A82-27890

LONG RANGE WEATHER FORECASTING
Prototype Regional Observation and Forecast System (PROFS) N82-21150

LONGITUDINAL CONTROL
Development of longitudinal equivalent system models for selected US Navy tactical aircraft [AD-A109488] N82-20189

LONGITUDINAL STABILITY
Influence of strakes on coefficients of longitudinal stability [MBB-FB-122/S/PUB/22] N82-21215

LOW ALTITUDE
Progress on low altitude cloud icing research N82-21147

LOW FREQUENCY BANDS
Model helicopter rotor low frequency broadband noise A82-25772

LOW PASS FILTERS
Real time digital filtering test in the S1 continuous wind tunnel at Modane A82-26299

LOW SPEED
A translational velocity command system for VTOL low speed flight [NASA-TM-84215] N82-20186

LOW SPEED WIND TUNNELS
Experimental study of oscillating-wing propulsion
A82-28514
Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4 --- in a wind tunnel
[BAE-TR-80066] N82-21161
Simulation of turbofan engine models in the Weybridge low speed wind tunnel --- gas supply control
[BAE-INFORM-NOTE-46] N82-21212

M

MAN MACHINE SYSTEMS
Advanced display-control concepts for power plant operation
A82-26121
Theoretical linear approach to the combined man-manipulation system in manual control of an aircraft
[MBB-FE-301/S/PUB/43] N82-21220
MANEUVERABILITY
Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system
[NASA-CR-163121] N82-21198
MANUAL CONTROL
Theoretical linear approach to the combined man-manipulation system in manual control of an aircraft
[MBB-FE-301/S/PUB/43] N82-21220
MANUFACTURING
Rational production methods for the manufacture of helicopter rotor blades --- BO-105 helicopter
[MBB-UD-312/80-OE] N82-21188
MARKET RESEARCH
Heavy-duty engines analysis, study 4: A preliminary market analysis for gas-turbine applications in the farm market
[DE82-001758] N82-20549
MATERIALS SCIENCE
Materials and aeronautics
A82-26025
Technology transfer; Proceedings of the Thirteenth National Technical Conference, Mount Pocono, PA, October 13-15, 1981
A82-27401
MATERIALS TESTS
Mach 2.0 rotating arm rain erosion test apparatus
A82-26461
Effects of filler materials upon radome rain erosion performance at subsonic conditions
A82-26462
MATHEMATICAL MODELS
Requirements on modern mathematical models of gas turbine engines. I
A82-26486
Wing/control surface flutter analysis using experimentally corrected aerodynamics
A82-26569
More than meets the eye - The oil dot technique
A82-27114
Performance degradation of propeller/rotor systems due to rime ice accretion
[AIAA PAPER 82-0286] A82-28322
Identification of multivariable high performance turbofan engine dynamics from closed loop data
[NASA-TM-82785] N82-20339
Analytical investigation of nonrecoverable stall
[NASA-TM-82792] N82-21195
MECHANICAL MEASUREMENT
The mechanical testing of compressors and turbines for aircraft gas turbine engines --- Rolls Royce engines
[PNR-90070] N82-21211
MECHANICAL PROPERTIES
Light weight adhesive joining of composite structures
A82-27404
Characterization of composition variations in a structural adhesive
A82-27415
MEDICAL SCIENCE
Ozone and aircraft operations
N82-21145
METAL BONDING
A new resin for field repair
A82-27412
METAL FATIGUE
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019
METAL SHEETS
Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy
A82-27151
METEOROLOGICAL PARAMETERS
Weather deterioration models applied to alternate airport criteria
[AD-A100877] N82-20811
Meteorological impact on aviation fuel efficiency
N82-21140
Meteorological inputs to advanced simulators
N82-21141
Meteorology impact on future aircraft design
N82-21143
Meteorology impact on ATC system design
N82-21144
Prototype Regional Observation and Forecast System (PROFS)
N82-21150
METEOROLOGICAL RADAR
The Joint Airport Weather Studies Project
N82-21152
METEOROLOGICAL SERVICES
Communicating critical weather information to pilots --- (ZITLE)
[AIAA PAPER 82-0016] A82-27082
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139
METEOROLOGY
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139
MICROCOMPUTERS
RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control
A82-27714
MICROPROCESSORS
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191
MICROWAVE TRANSMISSION
Small EHF/SHF airborne SATCOM terminal
A82-27209
MIDAIR COLLISIONS
Aircraft collision avoidance and air traffic safety
[GPC-88-545] N82-20169
MILITARY AIRCRAFT
Future helicopter technology
A82-26820
An evaluation of several polymers for high density humidity PC coatings
A82-27432
ATE logistics in the United States Air Force
A82-27890
The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintenance
A82-27904
VSTOLs - We can build them, but can we sell them
A82-28281
MILITARY HELICOPTERS
A survey of U.S. Army helicopter main and tail rotor blade obstacle strikes
A82-26385
The impact of missions on the preliminary design of an ABC rotor
A82-26392
Black Hawk rotor de-icing
A82-26398
Advanced helicopter concepts compete
A82-26537
Advanced medium scale real-time system --- for Army helicopter tests
A82-27187
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946

MILITARY TECHNOLOGY
Naval Air Systems Command /NAVAIR/ ATE program - Standardized ATE for the carrier environment
A82-27892
MISSILE CONTROL
Optimal terrain-following feedback control for advanced cruise missiles
[AD-A110286] N82-21179
MISSILE TRACKING
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471
MOTION SIMULATORS
Aerial combat simulation in the U.S. Air Force
A82-27920
MRCA AIRCRAFT
ATLAS/test data provision for the Tornado ATS - A challenging task
A82-27891
MULTIVARIATE STATISTICAL ANALYSIS
Identification of multivariable high performance turbofan engine dynamics from closed loop data
[NASA-TM-82785] N82-20339

N

NASA PROGRAMS
Telemetry Computer System at Wallops Flight Center
A82-27186
NASTRAN
Investigations of helicopter structural dynamics and a comparison with ground vibration tests --- using nastran
[MBB-UD-303/80-0] N82-21186
NATIONAL AVIATION SYSTEM
Air traffic control en route computer modernization
[GPO-82-773] N82-20167
FAA air traffic control computer modernization
[GPO-82-375] N82-20168
NAVIER-STOKES EQUATION
Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/
A82-26098
Numerical solution of Space Shuttle Orbiter flow field
[AIAA PAPER 82-0028] A82-27083
NAVIGATION AIDS
Radio-navigation equipment of aircraft - Devices and operation --- Russian book
A82-26500
RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control
A82-27714
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946
Design of a catadioptric VCASS helmet-mounted display
[AD-A109431] N82-20181
NAVY
VSTOLs - We can build them, but can we sell them
A82-28281
NETWORK CONTROL
Preliminary functional description of integrated flow management --- for air traffic control systems
[AD-A109909] N82-21171
NIGHT FLIGHTS (AIRCRAFT)
Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176
NOISE GENERATORS
On the generation of side-edge flap noise
A82-26319
Some applications of Hartmann-type sources in aircraft noise research --- airframe shielding
[RAE-TM-AERO-1877] N82-22007
NOISE MEASUREMENT
Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
[AD-A109448] N82-20384
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1
[NASA-CR-165562-VOL-1] N82-21031
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2
[NASA-CR-165562-VOL-2] N82-21032
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3
[NASA-CR-165562-VOL-3] N82-21033
Fluctuating pressures on fan blades of a turbofan engine: Static and wind-tunnel investigations
[NASA-TP-1976] N82-21037
A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
[NASA-TM-82805] N82-21998
NOISE POLLUTION
The impact and future direction of aircraft noise certification
A82-28150
Assessment of community response to high-energy impulsive sounds
[AD-A110110] N82-21777
NOISE PREDICTION (AIRCRAFT)
The status of airport noise prediction, with special reference to the United Kingdom and Europe
A82-28149
The impact and future direction of aircraft noise certification
A82-28150
NOISE REDUCTION
Main rotor hub electromagnetic signature reduction
A82-26393
The impact and future direction of aircraft noise certification
A82-28150
Acoustic measurements of F-4E aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109827] N82-21041
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109828] N82-21042
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109829] N82-21043
Developments to improve the noise and combustion emissions on the Fokker F28 aircraft and its Rolls-Royce RB183-555 engines. Section 1: Development of the new internal 10-Lobe mixer
[PNR-90061] N82-21207
The Rolls Royce role in aircraft noise reduction --- jet engines, acoustic lining
[PNR-90069] N82-21210
The impact and future direction of aircraft noise certification
[PNR-90053] N82-21788
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept
[NASA-CR-168745] N82-21999
NONDESTRUCTIVE TESTS
Positron annihilation --- aircraft industry applications; fault detection
[BAE-KGT-R-GEN-00996] N82-21600
Non-destructive inspection and the implementation of a damage tolerant design philosophy --- fighter aircraft
[RAE-TM-STRUCT-982] N82-21601
NONUNIFORM FLOW
Allowance for flow nonuniformity in the minimum section in the optimal contouring of the expanding part of a nozzle
A82-25798
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110341] N82-21203
NOSES (FOREBODIES)
F-5 Shark Nose Radome - A development overview
A82-26470
NOZZLE DESIGN
Allowance for flow nonuniformity in the minimum section in the optimal contouring of the expanding part of a nozzle
A82-25798
NOZZLE FLOW
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156

NOZZLE GEOMETRY
Allowance for flow nonuniformity in the minimum section in the optimal contouring of the expanding part of a nozzle
A82-25798
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156
NOZZLES
Tests and analysis of a vented D thrust deflecting nozzle on a turbofan engine --- conducted at the outdoor aerodynamic research facility of the Ames Research Center
[NASA-CR-166279] N82-20143
NUCLEAR POWER PLANTS
Advanced display-control concepts for power plant operation
A82-26121
NUCLEAR RADIATION
Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft
A82-27144
NUMERICAL CONTROL
Air traffic control en route computer modernization
[GPO-82-773] N82-20167
FAA air traffic control computer modernization
[GPO-82-375] N82-20168
NUMERICAL FLOW VISUALIZATION
Numerical solution of Space Shuttle Orbiter flow field
[AIAA PAPER 82-0028] A82-27083

O

OBSTACLE AVOIDANCE
A survey of U.S. Army helicopter main and tail rotor blade obstacle strikes
A82-26385
OH-58 HELICOPTER
ICOPTER KEVLAR
A82-26389
OPERATING COSTS
Some thoughts on design optimization of transport helicopters
A82-25771
OPTIMAL CONTROL
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577
Optimum three-dimensional flight of a supersonic aircraft
A82-26039
Optimal target designation techniques
A82-27709
Optimal terrain-following feedback control for advanced cruise missiles
[AD-A110286] N82-21179
OPTIMIZATION
Some thoughts on design optimization of transport helicopters
A82-25771
Optimum three-dimensional flight of a supersonic aircraft
A82-26039
Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility
A82-26399
Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary
[AD-A110035] N82-21180
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181
OSCILLATING FLOW
Suppression of self-oscillations in open wind tunnels
A82-25794
Conditions of pulsed starting of supersonic wind tunnel diffusors
A82-25795
OXIDATION
Correlation of wear with oxidation of carbon-carbon composites
A82-27068
OXIDE FILMS
Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens
A82-27437
OZONE
Ozone and aircraft operations
N82-21145
OZONOMETRY
Ozone and aircraft operations
N82-21145

P

P-3 AIRCRAFT
Configuration management techniques for automatic testing
A82-27893
P-531 HELICOPTER
Rotor preliminary design trade-offs for the Advanced Scout Helicopter
A82-26395
PANELS
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept
[NASA-CR-168745] N82-21999
PARAMETER IDENTIFICATION
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577
Identification of multivariable high performance turbofan engine dynamics from closed loop data
[NASA-TM-82785] N82-20339
PARTICLE MOTION
The relative motion of a particle in the case of exponential changes of the velocity of the medium
A82-26479
PASSENGER AIRCRAFT
Why twin-fuselage aircraft
A82-28276
Aircraft pitch attitude as a performance parameter
A82-28519
PENDULUMS
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
A82-26620
PERFORMANCE PREDICTION
Results of recent measurements on an oscillating aerofoil
A82-26223
Performance and aeroelastic tradeoffs on recent rotor blade designs
A82-26396
Advanced composites integral structures meet the challenge of future aircraft systems
A82-27133
Performance degradation of propeller/rotor systems due to rime ice accretion
[AIAA PAPER 82-0286] A82-28322
The benefits of data exchange --- between airline and engine manufacturer
[PNR-90048] N82-22095
PERFORMANCE TESTS
Real time digital filtering test in the S1 continuous wind tunnel at Modane
A82-26299
Effects of filler materials upon radome rain erosion performance at subsonic conditions
A82-26462
Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace
A82-26468
Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194
PHOSPHORIC ACID
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing
A82-27414
Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens
A82-27437
PHYSIOLOGICAL EFFECTS
Study and design of high G augmentation devices for flight simulators
[AD-A109127] N82-20195

PIGEONS
Project Sea Hunt: A report on prototype
development and tests
[AD-A109510] N82-20160
PILOT PERFORMANCE
Effect of contrast on space perception in TV
displays of the external scene observed by the
pilot --- German book
A82-28395
Theoretical linear approach to the combined
man-manipulation system in manual control of an
aircraft
[MBB-FE-301/S/PUB/43] N82-21220
PILOT TRAINING
Aerial combat simulation in the U.S. Air Force
A82-27920
Computer generated images for aircraft pilot
training --- MRCA aircraft
[MBB-UA-551/80-OE] N82-21229
PIPES (TUBES)
Tubing and cable cutting tool
[NASA-CASE-LAR-12786-1] N82-20545
PITCH (INCLINATION)
Selection of some rotor parameters to reduce
pitch-roll coupling of helicopter flight dynamics
A82-26383
Advancing blade flight data gathered
A82-28312
Aircraft pitch attitude as a performance parameter
A82-28519
Influence of strakes on coefficients of
longitudinal stability
[MBB-FE-122/S/PUB/22] N82-21215
PITCHING MOMENTS
Performance and aeroelastic tradeoffs on recent
rotor blade designs
A82-26396
Experimental study of oscillating-wing propulsion
A82-28514
PITOT TUBES
Sea King flight tests pitot-static probe and
directional vane instrumentation
[AD-A109427] N82-20176
Boom probe position error corrections for Sea King
Mk 50 flight tests
[AD-A109428] N82-20177
PLASMA JET WIND TUNNELS
Quantitative interpretation of recirculated flow
visualization by the analysis of video pictures
A82-27109
PLASTIC AIRCRAFT STRUCTURES
The Model 412 multi-bladed rotor system
A82-26376
CH-47 fiberglass rotor blade design and fabrication
A82-26397
Structural design and construction of the New
Technology Wing
A82-26541
Future helicopter technology
A82-26820
Design and production of fiberglass helicopter
rotor blades
A82-27153
PLASTIC PROPERTIES
Elastic-plastic finite-element analyses of
thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566
PNEUMATIC EQUIPMENT
Development of a supported airbag ejection
restraint (SABER) for windblast protection
[AD-A109807] N82-20162
PODS (EXTERNAL STORES)
The design, construction, and performance of
composite fuselage components for the Boeing 234
helicopter
A82-27424
POINT SOURCES
High frequency sound emission from moving point
multipole sources embedded in arbitrary
transversely sheared mean flows
A82-26318
POLYMER MATRIX COMPOSITES
Damage tolerance and durability design of
composite structures for commercial aircraft
A82-27403
POLYMERIC FILMS
An evaluation of several polymers for high density
humidity PC coatings
A82-27432
POLYSULFIDES
Service sensitivity of polysulfide sealants
A82-27407
PORTABLE EQUIPMENT
The stability of portable bridges carried on
slings beneath helicopters
[ARL/AERO-REPT-154] N82-21213
POSITION (LOCATION)
Lightning detection and ranging
A82-26367
Doppler radar-research and application to aviation
flight safety, 1977 - 1979
[AD-A109845] N82-20163
POSITION ERRORS
Boom probe position error corrections for Sea King
Mk 50 flight tests
[AD-A109428] N82-20177
POSITRON ANNIHILATION
Positron annihilation --- aircraft industry
applications; fault detection
[SAE-KGT-N-GEN-00996] N82-21600
POTENTIAL FLOW
Helicopter rotor loads using a matched asymptotic
expansion technique
[NASA-CR-165742] N82-21156
POWER GAIN
Selection of optimum antennas for tracking
telemetry intrumented airborne vehicles
A82-27228
PRECIPITATION (METEOROLOGY)
Preliminary investigation of effects of heavy rain
on the performance of aircraft
[NASA-TM-83272] N82-20145
PRESSURE DISTRIBUTION
Tests and analysis of a vented D thrust deflecting
nozzle on a turbofan engine --- conducted at the
outdoor aerodynamic research facility of the
Ames Research Center
[NASA-CR-166279] N82-20143
Low-speed measurements of the static pressure
distribution and overall forces on a cambered
and a symmetric mild gothic wing of aspect ratio
1.4 --- in a wind tunnel
[RAE-TR-80066] N82-21161
Pressure distributions on some delta wings at M = 4
--- wind tunnel tests
[RAE-TR-80068] N82-21164
Theoretical and experimental investigations of
wind tunnel interference due to angle of attack
[MBB-FE-124/S/PUB/34] N82-21226
PRESSURE MEASUREMENT
An investigation of the swirl in an S-duct
A82-28318
Sea King flight tests pitot-static probe and
directional vane instrumentation
[AD-A109427] N82-20176
Pressure measurements on a wing oscillating in
supercritical flow
[RAE-TR-79074] N82-21163
PRESSURE OSCILLATIONS
Analysis of very low frequency oscillations in a
ramjet combustor by use of a sensitive time lag
model
N82-21404
Report of the JANNAF Workshop on High Frequency
Instrumentation and Data Analysis Techniques
N82-21406
PRESSURE REDUCTION
Determination of losses in a channel with a sudden
expansion behind a diffusor
A82-26492
Analysis of the characteristics of a bypass
engine, with allowance for variable pressure
losses in the channels
A82-26496
PRESSURE REGULATORS
Simulation of turbofan engine models in the
Weybridge low speed wind tunnel --- gas supply
control
[RAE-INFORM-NOTE-06] N82-21212
PRESTRESSING
Development of a preloaded hybrid advanced
composite wing pivot fairing
A82-27131
PROBABILITY DENSITY FUNCTIONS
Approach to the fatigue analysis of vertical-axis
wind-turbine blades
[DE82-003193] N82-20573

PROCESS CONTROL (INDUSTRY)
  Applications of adaptive control systems --- to aircraft design, industrial processes and electrical drives
  A82-27869

PRODUCT DEVELOPMENT
  Energy efficient engine shroudless, hollow fan blade technology report
  [NASA-CR-165586] N82-21196

PRODUCTION ENGINEERING
  Design and production of fiberglass helicopter rotor blades
  A82-27153
  Transition of aerospace adhesive bonding technology from R&D to operational use
  A82-27435
  Rational production methods for the manufacture of helicopter rotor blades --- BO-105 helicopter
  [MBB-UD-312/80-OE] N82-21188

PROPELLER BLADES
  Aeroelastic characteristics of a mistuned bladed-disc assembly
  N82-20142
  Experimental methods for the prediction of the effect of viscosity on propeller performance
  [AD-A109846] N82-20472

PROPELLER EFFICIENCY
  Performance degradation of propeller/rotor systems due to rime ice accretion
  [AIAA PAPER 82-0286] A82-28322

PROPELLER SLIPSTREAMS
  Experimental methods for the prediction of the effect of viscosity on propeller performance
  [AD-A109846] N82-20472

PROPELLERS
  The dynamic behaviour of propeller anemometers
  A82-26184
  A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
  [NASA-TM-82805] N82-21998

PROPULSION SYSTEM CONFIGURATIONS
  Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system
  [NASA-CR-163121] N82-21198

PROTECTIVE COATINGS
  An evaluation of several polymers for high density humidity PC coatings
  A82-27432
  Recent developments in materials and processes for aircraft corrosion control
  A82-27446
  Coatings in the aero gas turbine --- sprayed coatings
  [PMR-90049] N82-21204

PROTOTYPES
  Design and production of fiberglass helicopter rotor blades
  A82-27153

PYRENES
  The formation of benzpyrene during the combustion of aviation fuels
  A82-26494

PYROCERAM (TRADEMARK)
  Radome aerodynamic heating effects on boresight error
  A82-26465

Q

QUALITY CONTROL
  Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques
  A82-26390

R

RADAR ANTENNAS
  Radome aerodynamic heating effects on boresight error
  A82-26465
  Full scale test facilities for radomes and antenna windows
  A82-26467
  Test plan for SSR --- surveillance radar for air traffic control
  [AD-A109503] N82-20392

RADAR CROSS SECTIONS
  The bomber that radar cannot see
  A82-25874

RADAR DETECTION
  The bomber that radar cannot see
  A82-25874
  Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets
  A82-27641
  Optimal target designation techniques
  A82-27709

RADAR SIGNATURES
  Main rotor hub electromagnetic signature reduction
  A82-26393

RADAR TRACKING
  Optimal target designation techniques
  A82-27709
  Detection and tracking algorithm refinement
  [AD-A109517] N82-20164

RADIO ANTENNAS
  Terrain reflection effects on data reception from airborne vehicles
  A82-27231

RADIO NAVIGATION
  Radio-navigation equipment of aircraft - Devices and operation --- Russian book
  A82-26500
  Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
  A82-27946

RADIO RECEIVERS
  Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
  A82-26471
  Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
  [AD-A109448] N82-20384

RADIO TELEMETRY
  Selection of optimum antennas for tracking telemetry intrumented airborne vehicles
  A82-27228

RADIO TRACKING
  Selection of optimum antennas for tracking telemetry intrumented airborne vehicles
  A82-27228

RADOME MATERIALS
  Mach 2.0 rotating arm rain erosion test apparatus
  A82-26461
  Effects of filler materials upon radome rain erosion performance at subsonic conditions
  A82-26462
  Radome rain damage - An environmental analysis technique
  A82-26464
  Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace
  A82-26468
  F-5 Shark Nose Radome - A development overview
  A82-26470

RADOMES
  Radome aerodynamic heating effects on boresight error
  A82-26465
  Full scale test facilities for radomes and antenna windows
  A82-26467
  F-5 Shark Nose Radome - A development overview
  A82-26470
  Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
  A82-26471

RAIN
  Preliminary investigation of effects of heavy rain on the performance of aircraft
  [NASA-TM-83272] N82-20145

RAIN EROSION
  Mach 2.0 rotating arm rain erosion test apparatus
  A82-26461
  Effects of filler materials upon radome rain erosion performance at subsonic conditions
  A82-26462
  Radome rain damage - An environmental analysis technique
  A82-26464

RAIN IMPACT DAMAGE
- Heavy rain penalties for a flight simulator [AIAA PAPER 82-0213] A82-27093

RAINSTORMS
- Effect of heavy rain on aircraft N82-21149

RAMJET ENGINES
- Thermodynamics of organic compounds [AD-A110430] N82-21202
- Analysis of very low frequency oscillations in a ramjet combustor by use of a sensitive time lag model N82-21404
- Factors influencing velocity distributions at inlet/combustor interfaces N82-21405
- Report of the JANNAF Workshop on High Frequency Instrumentation and Data Analysis Techniques N82-21406

RANGEFINDING
- Rangefinder system for slant range visibility N82-20746

RAYLEIGH DISTRIBUTION
- Approach to the fatigue analysis of vertical-axis wind-turbine blades [DE82-003193] N82-20573

RAYLEIGH-RITZ METHOD
- Torsional vibrations of non-uniform rotating blades with attachment flexibility A82-26313

RCA SATCOM SATELLITES
- Small EHF/SHF airborne SATCOM terminal A82-27209

REAL TIME OPERATION
- Real time digital filtering test in the S1 continuous wind tunnel at Modane A82-26299
- Quantitative interpretation of recirculated flow visualization by the analysis of video pictures A82-27109
- Advanced medium scale real-time system --- for Army helicopter tests A82-27187
- Real-time failure detection of aircraft engine output sensors A82-28403

REAL VARIABLES
- The application of subsonic theoretical aerodynamics to active controls --- aircraft controls [RAE-TR-81060] N82-21217

RECIRCULATIVE FLUID FLOW
- Quantitative interpretation of recirculated flow visualization by the analysis of video pictures A82-27109

RECTANGULAR BEAMS
- The YAH-64A composite flexbeam tail rotor A82-26386

RECTANGULAR PLATES
- The effect of induced sound on the flow around a rectangular body in a wind tunnel A82-26194

RECTANGULAR WINGS
- Unsteady response of rectangular wings in spanwise uniform shear flow A82-26340

REGIONS
- Prototype Regional Observation and Forecast System (PROFS) N82-21150

REGRESSION ANALYSIS
- A descriptive study of the application of analysis of variance and regression techniques in an error analysis program for test data obtained in a 16 foot transonic tunnel N82-20997

REGULATIONS
- The impact and future direction of aircraft noise certification [PNR-90053] N82-21788

RELIABILITY ANALYSIS
- Problems and options in advanced composite repair A82-27145

REMOTE SENSORS
- Integration of multi-sensor navigation data using optimal estimation techniques A82-25577

RESCUE OPERATIONS
- Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets A82-27641
- Project Sea Hunt: A report on prototype development and tests [AD-A109510] N82-20160

RESEARCH AND DEVELOPMENT
- Von Karman and VKI - The first 25 years A82-25673
- Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/ A82-26098
- The general purpose research rotor - Design features and considerations A82-26379
- The role of modern control theory in the design of controls for aircraft turbine engines [AIAA PAPER 82-0320] A82-26526
- Transition of aerospace adhesive bonding technology from R&D to operational use A82-27435
- Recent developments in materials and processes for aircraft corrosion control A82-27446
- To the root of the problem - Some helicopter research topics A82-28275

RESIN BONDING
- A new resin for field repair A82-27412

RESIN MATRIX COMPOSITES
- Composite fasteners - A compatible joining technique for fibrous composites in structural design --- aircraft construction materials A82-27159

RESONANT VIBRATION
- The use of dynamometer readings for damping of the natural vibrations of twin-rotor gyrocompasses A82-28475

RESPONSE TIME (COMPUTERS)
- Automating air-traffic control A82-26511

RETIREMENT FOR CAUSE
- A retirement-for-cause study of an engine turbine disk [AD-A109724] N82-20184

REVIEWING
- Transition of aerospace adhesive bonding technology from R&D to operational use A82-27435

RIGID ROTOR HELICOPTERS
- Design of higher harmonic control for the ABC A82-26380

RIGID ROTORS
- The YAH-64A composite flexbeam tail rotor A82-26386

RIVETED JOINTS
- Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses A82-27156

ROCKET VEHICLES
- Studies in the history and theory of development of aviation and rocketry and space science and technology --- Russian book A82-27398

ROLL
- Selection of some rotor parameters to reduce pitch-roll coupling of helicopter flight dynamics A82-26303

ROTARY GYROSCOPES
- The use of dynamometer readings for damping of the natural vibrations of twin-rotor gyrocompasses A82-28475

ROTARY STABILITY
- Dynamic stability of low effective flap hinge BMR concepts A82-26377
- Test plan for SSR --- surveillance radar for air traffic control [AD-A109503] N82-20392

ROTARY WINGS
- Introduction to the principles of fracture mechanics A82-25550
- Model helicopter rotor low frequency broadband noise A82-25772

Helicopter rotor performance improvement by utilization of swept back parabolic blade tip A82-26298
Torsional vibrations of non-uniform rotating blades with attachment flexibility A82-26313
The Model 412 multi-bladed rotor system A82-26376
The general purpose research rotor - Design features and considerations A82-26379
CH-46 and CH-47 composite rotor blade lightning protection testing A82-26381
A preliminary investigation of Individual Blade-control Independent of a Swashplate A82-26382
Selection of some rotor parameters to reduce pitch-roll coupling of helicopter flight dynamics A82-26383
CH-46 fiberglass rotor blade repair program A82-26384
A survey of U.S. Army helicopter main and tail rotor blade obstacle strikes A82-26385
Performance improvements with the free-tip rotor A82-26387
Operational experience with the fiberglass rotor blade A82-26388
ICOPTER KEVLAR A82-26389
SH-60B Seahawk automatic blade fold system A82-26391
The impact of missions on the preliminary design of an ABC rotor A82-26392
Main rotor hub electromagnetic signature reduction A82-26393
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system A82-26394
Rotor preliminary design trade-offs for the Advanced Scout Helicopter A82-26395
Performance and aeroelastic tradeoffs on recent rotor blade designs A82-26396
CH-47 fiberglass rotor blade design and fabrication A82-26397
Black Hawk rotor de-icing A82-26398
The Circulation Control Rotor /CCR/ control system A82-26400
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade A82-26620
NOTAR A82-26822
Design and production of fiberglass helicopter rotor blades A82-27153
A surface singularity method for rotors in hover or climb [AD-A109687] N82-20170
Application of the finite element method to rotary wing aeroelasticity [NASA-CR-165854] N82-20561
Helicopter rotor loads using a matched asymptotic expansion technique [NASA-CR-165742] N82-21156
Aeroelastic analysis of the elastic gimbal rotor [NASA-CR-166287] N82-21157
Computation of wing-vortex interaction in transonic flow using implicit finite difference algorithm [NASA-CR-166251] N82-21159
Rational production methods for the manufacture of helicopter rotor blades --- BO-105 helicopter [MBB-UD-312/80-OE] N82-21188
Use of composite materials for helicopter rotor blades [PB82-124041] N82-21191
ROTATING DISKS
Aeroelastic characteristics of a mistuned bladed-disc assembly N82-20142
A retirement-for-cause study of an engine turbine disk [AD-A109724] N82-20184
ROTOR AERODYNAMICS
Sensitivity of helicopter aeromechanical stability to dynamic inflow A82-25773
The vortex flow field generated by a hovering helicopter A82-26227
Helicopter rotor performance improvement by utilization of swept back parabolic blade tip A82-26298
Design for the operating environment - Ring-fin tail rotor program A82-26378
Performance improvements with the free-tip rotor A82-26387
Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility A82-26399
The Circulation Control Rotor /CCR/ control system A82-26400
Advancing blade flight data gathered A82-28312
A surface singularity method for rotors in hover or climb [AD-A109687] N82-20170
Application of the finite element method to rotary wing aeroelasticity [NASA-CR-165854] N82-20561
ROTOR BLADES
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems A82-25923
CH-46 fiberglass rotor blade repair program A82-26384
ROTOR BLADES (TURBOMACHINERY)
Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise' A82-26320
ROTORCRAFT AIRCRAFT
NASA/Lewis Research Center Icing Research Program N82-21140
ROTORS
Application of combined balancing methods to flexible rotors of aviation gas-turbine engines A82-26491
Preliminary design of an advanced composite rotor hub for the UH-60A Black Hawk A82-27154
Approach to the fatigue analysis of vertical-axis wind-turbine blades [DE82-003193] N82-20573
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall [AD-A110341] N82-21203
RUNWAY CONDITIONS
The effects of weather on runway operations A82-27050
Weather deterioration models applied to alternate airport criteria [AD-A108877] N82-20811
RUNWAYS
Overview of the O'Hare Runway configuration management system [AD-A110137] N82-21224

S

SA-330 HELICOPTER
Industrial experience in the Anglo-French helicopter collaboration [SNIAS-811-210-101] N82-21154
SAFETY DEVICES
Variable response load limiting device --- for aircraft seats [NASA-CASE-LAR-12801-1] N82-20544
SANDWICH STRUCTURES
Impact resistance of graphite and hybrid configurations A82-27141
SPF/DB titanium concepts for structural efficiency for HC N82-20154
SPF/DB titanium LFC porous panel concept N82-20155

SCALING LAWS
Model helicopter rotor low frequency broadband noise A82-25772
SEALS (STOPPERS)
Rub energetics of compressor blade tip seals A82-27078
Service sensitivity of polysulfide sealants A82-27407
SEARCH RADAR
Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets A82-27641
SEAT BELTS
Evaluation of a proposed modified F/FB-111 crew seat and restraint system [AD-A110168] N82-21167
SEATS
Variable response load limiting device --- for aircraft seats [NASA-CASE-LAR-12801-1] N82-20544
Evaluation of a proposed modified F/FB-111 crew seat and restraint system [AD-A110168] N82-21167
SELF ADAPTIVE CONTROL SYSTEMS
Self-tuning regulators for multicyclic control of helicopter vibration [NASA-TP-1996] N82-20188
SELF INDUCED VIBRATION
The effect of induced sound on the flow around a rectangular body in a wind tunnel A82-26194
SELF OSCILLATION
Suppression of self-oscillations in open wind tunnels A82-25794
SENSORS
Real-time failure detection of aircraft engine output sensors A82-28403
SEPARATED FLOW
Some remarks on buffeting --- of wings, wind tunnel models [RAE-TM-STRUCT-980] N82-21216
SERVICE LIFE
Introduction to the principles of fracture mechanics A82-25550
Evaluation of crack growth gages for service life tracking A82-26652
Problems and options in advanced composite repair A82-27145
SHEAR FLOW
High frequency sound emission from moving point multipole sources embedded in arbitrary transversely sheared mean flows A82-26318
Unsteady response of rectangular wings in spanwise uniform shear flow A82-26340
SHEAR STRENGTH
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing A82-27414
SHEAR STRESS
More than meets the eye - The oil dot technique A82-27114
SHIELDING
Some applications of Hartmann-type sources in aircraft noise research --- airframe shielding [RAE-TM-AERO-1877] N82-22007
SHOCK ABSORBERS
Variable response load limiting device --- for aircraft seats [NASA-CASE-LAR-12801-1] N82-20544
SHOCK WAVES
Helicopter rotor performance improvement by utilization of swept back parabolic blade tip A82-26298
SHORT TAKEOFF AIRCRAFT
US Navy begins slow shuffle towards V/STOL A82-28311
A short takeoff performance computer program [AD-A109861] N82-20179
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft [NASA-TP-1911] N82-20187
SIDE-LOOKING RADAR
Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets A82-27641
SIGNAL FADING
Terrain reflection effects on data reception from airborne vehicles A82-27231
SIGNAL PROCESSING
Integration of multi-sensor navigation data using optimal estimation techniques A82-25377
SIGNAL RECEPTION
Terrain reflection effects on data reception from airborne vehicles A82-27231
SIGNAL REFLECTION
GTD terrain reflection model with application to ILS glide slope N82-20166
SIZE DETERMINATION
Rotor preliminary design trade-offs for the Advanced Scout Helicopter A82-26395
SKIN (STRUCTURAL MEMBER)
Fracture control in ballistic-damaged graphite/epoxy wing structure A82-26639
SLENDER WINGS
Vortex flow correlation --- water tunnel tests on thin slender wings [AD-A108725] N82-20468
SLIDING FRICTION
Rub energetics of compressor blade tip seals A82-27078
SOLAR FURNACES
Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace A82-26468
SONIC BOOMS
Assessment of community response to high-energy impulsive sounds [AD-A110110] N82-21777
SOUND PRESSURE
Model helicopter rotor low frequency broadband noise A82-25772
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721 [AD-A109828] N82-21042
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721 [AD-A109829] N82-21043
SOUND PROPAGATION
High frequency sound emission from moving point multipole sources embedded in arbitrary transversely sheared mean flows A82-26318
SOUND TRANSMISSION
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721 [AD-A109828] N82-21042
SPACE PERCEPTION
Effect of contrast on space perception in TV displays of the external scene observed by the pilot --- German book A82-28395
SPACE SHUTTLE ORBITERS
Numerical solution of Space Shuttle Orbiter flow field [AIAA PAPER 82-0028] A82-27083
SPACECRAFT DESIGN
Inverse heat-transfer problems - Domains of application in the design and testing of technical systems A82-25971
SPANWISE BLOWING
Unsteady response of rectangular wings in spanwise uniform shear flow A82-26340
SPECTRAL RESOLUTION
The sixteen to forty micron spectroscopy from the NASA Lear jet [NASA-CR-166604] N82-21054
SPIN TESTS
A retirement-for-cause study of an engine turbine disk [AD-A109724] N82-20184

SPOILERS
Experimental study of the flowfield of an airfoil with deflected spoiler
[AIAA PAPER 82-0126] A82-27086

SPRAYED COATINGS
Coatings in the aero gas turbine --- sprayed coatings
[PNR-90049] N82-21204

STABILITY DERIVATIVES
Aerodynamic characteristics and store loads of a 1/24 scale F-111 aircraft model with three external store loadings
[AD-A109445] N82-20158

STABILIZATION
Test plan for SSR --- surveillance radar for air traffic control
[AD-A109503] N82-20392

STABILIZERS (FLUID DYNAMICS)
The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer
A82-26483

STANDARDIZATION
Naval Air Systems Command /NAVAIR/ ATE program - Standardized ATE for the carrier environment
A82-27892

STANDARDS
Joint US/USSR mode S compatibility test program, volume 1
[PB82-126616] N82-21173
Joint US/USSR mode S compatibility test program, volume 2
[PB82-126624] N82-21174
Standards in aircraft noise certification
[PNR-90052] N82-22005

STARTING
Conditions of pulsed starting of supersonic wind tunnel diffusors
A82-25795

STATIC AERODYNAMIC CHARACTERISTICS
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156

STATIC PRESSURE
An investigation of the swirl in an S-duct
A82-28318
Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4 --- in a wind tunnel
[RAE-TR-80066] N82-21161

STATIC STABILITY
Aerodynamic characteristics and store loads of a 1/24 scale F-111 aircraft model with three external store loadings
[AD-A109449] N82-20158

STATIC TESTS
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156
Fluctuating pressures on fan blades of a turbofan engine: Static and wind-tunnel investigations
[NASA-TP-1976] N82-21037

STATISTICAL ANALYSIS
Radome rain damage - An environmental analysis technique
A82-26464
Statistical analysis methods for characterizing composite materials
A82-27162
Statistical analysis and time series modeling of air traffic operations data from flight service stations and terminal radar approach control facilities: Two case studies
[AD-A109873] N82-20172

STATOR BLADES
Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26206

STATORS
Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine
[NASA-TM-82644] N82-21193
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110341] N82-21203

STEADY FLOW
Transonic flow past thin wings
A82-25995
Supercritical flow past symmetrical airfoils
A82-26130

STEELS
Effect of mechanical surface and heat treatments on erosion resistance
A82-27071

STORMS (METEOROLOGY)
Detection and tracking algorithm refinement
[AD-A109517] N82-20164

STRAIN GAGES
Evaluation of crack growth gages for service life tracking
A82-26652

STRAKES
Influence of strakes on coefficients of longitudinal stability
[MBB-FE-122/S/PUB/22] N82-21215

STREAMLINING
Self streamlining wind tunnels without computers
A82-26181

STRESS ANALYSIS
Torsional vibrations of non-uniform rotating blades with attachment flexibility
A82-26313
Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy
A82-27151
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566
Approach to the fatigue analysis of vertical-axis wind-turbine blades
[DE82-003193] N82-20573

STRESS CONCENTRATION
More than meets the eye - The oil dot technique
A82-27114

STRESS-STRAIN RELATIONSHIPS
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566

STRUCTURAL ANALYSIS
Investigations of helicopter structural dynamics and a comparison with ground vibration tests --- using nastran
[MBB-UD-303/80-O] N82-21186

STRUCTURAL DESIGN
Structural design and construction of the New Technology Wing
A82-26541
One year flight testing of the Transonic Wing
A82-26543
Fibrous composites in structural design --- Book
A82-27126
Composite wing substructure technology on the AV-8B advanced aircraft
A82-27128
Composite fasteners - A compatible joining technique for fibrous composites in structural design --- aircraft construction materials
A82-27159
Damage tolerance and durability design of composite structures for commercial aircraft
A82-27403

STRUCTURAL DESIGN CRITERIA
Composite aircraft structures
A82-27127
Preliminary design development AV-8B forward fuselage composite structure
A82-27129
Wing/fuselage critical component development program
A82-27130
Design concepts for composite fuselage structure
A82-27132
Continuous filament advanced composite isogrid - A promising structural concept
A82-27138
Statistical analysis methods for characterizing composite materials
A82-27162

STRUCTURAL RELIABILITY
Fracture mechanics technology applied to individual aircraft tracking --- durability and structural life estimates A82-26637
Statistical analysis methods for characterizing composite materials A82-27162
Durability evaluation of highly stressed wing box structure A82-27163
STRUCTURAL VIBRATION
Vibration of structures excited acoustically N82-20343
Reduction of structural vibration by a dynamic absorber --- helicopter cabins [RAE-TM-AERO-1881] N82-21190
STRUCTURAL WEIGHT
Some thoughts on design optimization of transport helicopters A82-25771
SUBSONIC AIRCRAFT
Effects of filler materials upon radome rain erosion performance at subsonic conditions A82-26462
SUBSONIC FLOW
An investigation of the swirl in an S-duct A82-28310
Acta Aeronautica et Astronautica Sinica [AD-A110282] N82-21153
The application of subsonic theoretical aerodynamics to active controls --- aircraft controls [RAE-TR-81060] N82-21217
SUBSONIC FLUTTER
Aeroelasticity of compressor blades - Subsonic stall flutter A82-26993
SUBSONIC WIND TUNNELS
Self streamlining wind tunnels without computers A82-26181
Experimental study of the flowfield of an airfoil with deflected spoiler [AIAA PAPER 82-0126] A82-27086
Sonic wind tunnel of the Institute of Fluid Mechanics of Lille [NASA-TM-76687] N82-20192
SUCTION
NASA Langley laminar flow control airfoil experiment N82-20150
Stability of boundary layers with porous suction strips: Experiment and theory N82-20152
SUPERCHARGERS
Preliminary results on performance testing of a turbocharged rotary combustion engine [NASA-TM-82772] N82-21194
SUPERCRITICAL FLOW
Supercritical flow past symmetrical airfoils A82-26130
Pressure measurements on a wing oscillating in supercritical flow [RAE-TR-79074] N82-21163
SUPERCRITICAL WINGS
A310 - Europe builds on Airbus success A82-26536
NASA Langley laminar flow control airfoil experiment N82-20150
SUPERHIGH FREQUENCIES
Small EHF/SHF airborne SATCOM terminal A82-27209
SUPERPLASTICITY
SPF/DB titanium concepts for structural efficiency foi HC N82-20154
SPF/DB titanium LFC porous panel concept N82-20155
SUPERSONIC AIRCRAFT
Optimum three-dimensional flight of a supersonic aircraft A82-26039
Mach 2.0 rotating arm rain erosion test apparatus A82-26461
SUPERSONIC DIFFUSERS
Conditions of pulsed starting of supersonic wind tunnel diffusors A82-25795
SUPERSONIC WIND TUNNELS
Sonic wind tunnel of the Institute of Fluid Mechanics of Lille [NASA-TM-76687] N82-20192
SURFACE DEFECTS
Positron annihilation --- aircraft industry applications; fault detection [BAE-KGT-R-GEN-00996] N82-21600
SURFACE FINISHING
Effect of mechanical surface and heat treatments on erosion resistance A82-27071
Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens A82-27437
SURFACE ROUGHNESS EFFECTS
Heavy rain penalties for a flight simulator [AIAA PAPER 82-0213] A82-27093
SURFACE TO AIR MISSILES
Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace A82-26468
SURVEILLANCE RADAR
Test plan for LSR --- surveillance radar for air traffic control [AD-A109503] N82-20392
SWEEPBACK
A summary of experimental data on wing characteristics at transonic speeds [RAE-TN-AERO-1953-S.D.-77] N82-21155
SWEPT FORWARD WINGS
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 1: User's guide to transport design computer programs [AD-A110232] N82-21183
SWEPT WINGS
A310 - Europe builds on Airbus success A82-26536
NASA Langley laminar flow control airfoil experiment N82-20150
A summary of experimental data on wing characteristics at transonic speeds [RAE-TN-AERO-1953-S.D.-77] N82-21155
SWEPTBACK WINGS
Helicopter rotor performance improvement by utilization of swept back parabolic blade tip A82-26298
SWIRLING
An investigation of the swirl in an S-duct A82-28310
SYMMETRICAL BODIES
Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4 --- in a wind tunnel [RAE-TR-80066] N82-21161
SYSTEM EFFECTIVENESS
The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintenance A82-27904
SYSTEM FAILURES
Real-time failure detection of aircraft engine output sensors A82-28403
SYSTEMS ENGINEERING
Lightning detection and ranging A82-26367
Design of higher harmonic control for the ABC A82-26380
The role of modern control theory in the design of controls for aircraft turbine engines [AIAA PAPER 82-0320] A82-26526
NOTAR A82-26822
SYSTEMS MANAGEMENT
Preliminary functional description of integrated flow management --- for air traffic control systems [AD-A109909] N82-21171
SYSTEMS SIMULATION
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM A82-26471

SYSTEMS STABILITY
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394

T

TABLES (DATA)
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200

TAIL SURFACES
Effect of downwash on the induced drag of canard-wing combinations
A82-28518

TARGET ACQUISITION
Optimal target designation techniques
A82-27709

TECHNOLOGICAL FORECASTING
Future helicopter technology
A82-26820
The future of helicopter flight control technology
A82-26821
Future of general and commuter aviation technology and trade
[GPO-85-832] N82-20159

TECHNOLOGY ASSESSMENT
Advanced composites integral structures meet the challenge of future aircraft systems
A82-27133
Studies in the history and theory of development of aviation and rocketry and space science and technology --- Russian book
A82-27398
Engine industry cost considerations for emerging technologies
A82-27429
Precision casting for gas turbine engines
A82-28313
Simple vs. sophisticated TacAir avionics. II - Soviet TacAir avionics technology
A82-28397
Advanced engine technology and its influence on aircraft performance
A82-28515

TECHNOLOGY TRANSFER
Technology transfer; Proceedings of the Thirteenth National Tecanical Conference, Mount Pocono, PA, October 13-15, 1981
A82-27401

TECHNOLOGY UTILIZATION
Transition of aerospace adhesive bonding technology from R&D to operational use
A82-27435

TELEMETRY
Advanced medium scale real-time system --- for Army helicopter tests
A82-27187
Telemetry Computer System at Wallops Flight Center
A82-27188
Telemetry in aero engine development --- from operating engines
[PNR-90055] N82-21247

TEMPERATURE DISTRIBUTION
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087
Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015
Tests and analysis of a vented D thrust deflecting nozzle on a turbofan engine --- conducted at the outdoor aerodynamic research facility of the Ames Research Center
[NASA-CR-166279] N82-20143

TEMPERATURE EFFECTS
Radome aerodynamic heating effects on boresight error
A82-26465
Service sensitivity of polysulfide sealants
A82-27407
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019

TENSILE STRENGTH
Effects of defects on tension coupons undergoing an accelerated environmental spectrum
A82-27168

TERMINAL CONFIGURED VEHICLE PROGRAM
On-board computers save fuel and help ATC
A82-26046

TERMINAL FACILITIES
IATA's Unit Terminal Concept
A82-27049

TERRAIN ANALYSIS
UTD terrain reflection model with application to ILS glide slope
N82-20166

TEST EQUIPMENT
Mach 2.0 rotating arm rain erosion test apparatus
A82-26461

TEST FACILITIES
Von Karman and VKI - The first 25 years
A82-25673
Full scale test facilities for radomes and antenna windows
A82-26467

THERMAL CYCLING TESTS
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566

THERMAL EXPANSION
Helicopter rotor loads using a matched asymptotic expansion technique
[NASA-CR-165742] N82-21156

THERMAL FATIGUE
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019

THERMAL STRESSES
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

THICKNESS RATIO
A summary of experimental data on wing characteristics at transonic speeds
[RAE-TN-AERO-1953-S.D.-77] N82-21155

THIN WINGS
Transonic flow past thin wings
A82-25995
Vortex flow correlation --- water tunnel tests on thin slender wings
[AD-A108725] N82-20468

THIOLS
Service sensitivity of polysulfide sealants
A82-27407

THREE DIMENSIONAL BOUNDARY LAYER
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 2: User's guide to fighter design computer program
[AD-A110037] N82-21184

THREE DIMENSIONAL FLOW
Computation of wing-vortex interaction in transonic flow using implicit finite difference algorithm
[NASA-CR-166251] N82-21159

THREE DIMENSIONAL MOTION
Optimum three-dimensional flight of a supersonic aircraft
A82-26039

THRUST
Tests and analysis of a vented D thrust deflecting nozzle on a turbofan engine --- conducted at the outdoor aerodynamic research facility of the Ames Research Center
[NASA-CR-166279] N82-20143

THRUST MEASUREMENT
Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system
[NASA-CR-163121] N82-21198

THRUST REVERSAL
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156

THRUST VECTOR CONTROL
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156

THUNDERSTORMS
Doppler radar-research and application to aviation flight safety, 1977 - 1979
[AD-A109845] N82-20163
NASA research programs responding to workshop recommendations
N82-21146
TILT ROTOR AIRCRAFT
Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility
A82-26399
Advanced helicopter concepts compete
A82-26537
TILT WING AIRCRAFT
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131
TIME DEPENDENCE
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019
TIME LAG
Analysis of very low frequency oscillations in a ramjet combustor by use of a sensitive time lag model
N82-21404
TIME SERIES ANALYSIS
Statistical analysis and time series modeling of air traffic operations data from flight service stations and terminal radar approach control facilities: Two case studies
[AD-A109873] N82-20172
Identification of multivariable high performance turbofan engine dynamics from closed loop data
[NASA-TM-82785] N82-20339
TIME SHARING
The role of software in commercial ATE
A82-27885
TITANIUM
SPF/DB titanium concepts for structural efficiency for HC
N82-20154
SPF/DB titanium LFC porous panel concept
N82-20155
Energy efficient engine shroudless, hollow fan blade technology report
[NASA-CR-165586] N82-21196
TITANIUM ALLOYS
Process development and evaluation of gas turbine engine components in IMI 829 --- titanium alloy
[PNR-90050] N82-21205
TOOLS
Tubing and cable cutting tool
[NASA-CASE-LAR-12706-1] N82-20545
TORSIONAL STRESS
The Model 412 multi-bladed rotor system
A82-26376
TORSIONAL VIBRATION
Torsional vibrations of non-uniform rotating blades with attachment flexibility
A82-26313
TOXICITY
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases
A82-26495
TRADEOFFS
Manufacturing cost trade-studies in avionics
A82-27430
TRAILING EDGES
Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine
A82-28018
TRAILING-EDGE FLAPS
On the generation of side-edge flap noise
A82-26319
Laminar Flow Control. The Research and Technology Studies 1981
[NASA-CP-2218] N82-20149
Status of NASA advanced LFC airfoil high-lift study
N82-20151
The application of subsonic theoretical aerodynamics to active controls --- aircraft controls
[RAE-TR-81060] N82-21217
TRAINING SIMULATORS
Aerial combat simulation in the U.S. Air Force
A82-27920
Minutes of physical configuration audit for the F-16 Electronic Warfare Training Device
[AD-A110321] N82-21222
TRAJECTORY OPTIMIZATION
Fuel optimal trajectory computation
A82-26568
TRANSITION FLOW
Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26208
TRANSMITTER RECEIVERS
Small EHF/SHF airborne SATCOM terminal
A82-27209
TRANSONIC FLIGHT
One year flight testing of the Transonic Wing
A82-26543
TRANSONIC FLOW
Transonic flow past thin wings
A82-25995
Acta Aeronautica et Astronautica Sinica
[AD-A110282] N82-21153
Computation of wing-vortex interaction in transonic flow using implicit finite difference algorithm
[NASA-CR-166251] N82-21159
Aerodynamics project. Significance and difficulties in the experimental and numerical simulation of complex flow processes with high Reynolds number as part of aircraft projects --- wind tunnel utilization
[MBB-FE-120/S/PUB/33] N82-21162
Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary
[AD-A110035] N82-21180
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 2: Fighter design
[AD-A110036] N82-21182
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 1: User's guide to transport design computer programs
[AD-A110232] N82-21183
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 2: User's guide to fighter design computer program
[AD-A110037] N82-21184
TRANSONIC SPEED
A summary of experimental data on wing characteristics at transonic speeds
[RAE-TN-AERO-1953-S.D.-77] N82-21155
TRANSONIC WIND TUNNELS
NASA Langley laminar flow control airfoil experiment
N82-20150
Cryogenic Technology, part 1 --- conference proceedings; cryogenic wind tunnel design and instrumentation
[NASA-CP-2122-PT-1] N82-20357
Cryogenic Technology, part 2 --- conference proceedings; cryogenic wind tunnel design and instrumentation
[NASA-CP-2122-PT-2] N82-20358
TRANSPONDERS
Joint US/USSR mode S compatibility test program, volume 1
[PB82-126616] N82-21173
Joint US/USSR mode S compatibility test program, volume 2
[PB82-126624] N82-21174
TRANSPORT AIRCRAFT
Some thoughts on design optimization of transport helicopters
A82-25771
Very large vehicles - Technology looking for a need
A82-28278
Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary
[AD-A110035] N82-21180

Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181

TURBINE BLADES
Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015
Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine
A82-28018
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019
Fluctuating pressures on fan blades of a turbofan engine: Static and wind-tunnel investigations
[NASA-TP-1976] N82-21037
Energy efficient engine shroudless, hollow fan blade technology report
[NASA-CR-165586] N82-21196

TURBINE ENGINES
The role of modern control theory in the design of controls for aircraft turbine engines
[AIAA PAPER 82-0320] A82-26526
A retirement-for-cause study of an engine turbine disk
[AD-A109724] N82-20184
Dualchannel fuel control program, phase 2
[AD-A109715] N82-20185

TURBOCOMPRESSORS
Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26208
Analytical investigation of nonrecoverable stall
[NASA-TM-82792] N82-21195
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209
The mechanical testing of compressors and turbines for aircraft gas turbine engines --- Rolls Royce engines
[PNR-90070] N82-21211

TURBOFAN ENGINES
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087
Tests and analysis of a vented D thrust deflecting nozzle on a turbofan engine --- conducted at the outdoor aerodynamic research facility of the Ames Research Center
[NASA-CR-166279] N82-20143
Identification of multivariable high performance turbofan engine dynamics from closed loop data
[NASA-TM-82785] N82-20339
Fluctuating pressures on fan blades of a turbofan engine: Static and wind-tunnel investigations
[NASA-TP-1976] N82-21037
V/STOL Tandem Fan transition section model test --- in the Lewis Research Center 10-by-10 foot wind tunnel
[NASA-CR-165587] N82-21158
Energy efficient engine shroudless, hollow fan blade technology report
[NASA-CR-165586] N82-21196
Developments to improve the noise and combustion emissions on the Fokker F28 aircraft and its Rolls-Royce RB183-555 engines. Section 1: Development of the new internal 10-Lobe mixer
[PNR-90061] N82-21207
The Rolls Royce role in aircraft noise reduction --- jet engines, acoustic lining
[PNR-90069] N82-21210
Simulation of turbofan engine models in the Weybridge low speed wind tunnel --- gas supply control
[BAE-INFORM-NOTE-46] N82-21212

TURBOJET ENGINES
Analysis of the characteristics of a bypass engine, with allowance for variable pressure losses in the channels
A82-26496
Advanced engine technology and its influence on aircraft performance
A82-28515
Conditions of generation and methods of damping the inlet vortex of a turbojet engine
[NASA-TM-76678] N82-20182
Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system
[NASA-CR-163121] N82-21198

TURBOMACHINE BLADES
Torsional vibrations of non-uniform rotating blades with attachment flexibility
A82-26313
Approach to the fatigue analysis of vertical-axis wind-turbine blades
[DE82-003193] N82-20573

TURBOPROP AIRCRAFT
A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
[NASA-TM-82805] N82-21998

TURBULENCE EFFECTS
Methods for analysis of wind ripple in wind turbines
[SAND-81-7006] N82-20193
Some remarks on buffeting --- of wings, wind tunnel models
[BAE-TM-STRUCT-980] N82-21216

TURBULENT FLOW
The dynamic behaviour of propeller anemometers
A82-26184
On the generation of side-edge flap noise
A82-26319
Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise'
A82-26320
An investigation of the swirl in an S-duct
A82-28318

TURBULENT MIXING
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087

TURBULENT WAKES
Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26208

TWO DIMENSIONAL FLOW
Supercritical flow past symmetrical airfoils
A82-26130
Results of recent measurements on an oscillating aerofoil
A82-26223

TWO PHASE FLOW
The relative motion of a particle in the case of exponential changes of the velocity of the medium
A82-26479

U

ULTRASONIC TESTS
Automated ultrasonic inspection of adhesive bonded structure
A82-28534

UNIFORM FLOW
Unsteady response of rectangular wings in spanwise uniform shear flow
A82-26340

UNITED KINGDOM
The status of airport noise prediction, with special reference to the United Kingdom and Europe
A82-28149

UNSTEADY FLOW
Helicopter rotor loads using a matched asymptotic expansion technique
[NASA-CR-165742] N82-21156

UPSTREAM
Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26208

URETHANES
Full-scale flammability test data for validation of aircraft fire mathematical models
[NASA-TM-58244] N82-21166

USER MANUALS (COMPUTER PROGRAMS)
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 1: User's manual
[AD-A108246] N82-20194
Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201

USER REQUIREMENTS
Airline ATE requirements
A82-27884
SAFRA: Controlled requirements expression --- avionics specification through computer techniques
[SAE-TNAAS-84] N82-21192

UTILITY AIRCRAFT
The Model 412 multi-bladed rotor system
A82-26376

UTILIZATION
Operational delay day forecasts for the 20 air route traffic control centers for the year 1982 through 2011
[AD-A109884] N82-20173

V

V/STOL AIRCRAFT
AV-8B/Harrier GR.5 - Range, payload and VSTOL
A82-26044
Advanced helicopter concepts compete
A82-26537
Design concepts for composite fuselage structure
A82-27132
VSTOLs - We can build them, but can we sell them
A82-28281
V/STOL Tandem Fan transition section model test --- in the Lewis Research Center 10-by-10 foot wind tunnel
[NASA-CR-165587] N82-21158

VARIABLE CYCLE ENGINES
V/STOL Tandem Fan transition section model test --- in the Lewis Research Center 10-by-10 foot wind tunnel
[NASA-CR-165587] N82-21158

VARIABLE THRUST
Experimental study of oscillating-wing propulsion
A82-28514

VELOCITY DISTRIBUTION
The relative action of a particle in the case of exponential changes of the velocity of the medium
A82-26479
Factors influencing velocity distributions at inlet/combustor interfaces
N82-21405

VELOCITY ERRORS
Boom probe position error corrections for Sea King Mk 50 flight tests
[AD-A109420] N82-20177

VENTS
Tests and analysis of a vented D thrust deflecting nozzle on a turbofan engine --- conducted at the outdoor aerodynamic research facility of the Ames Research Center
[NASA-CR-166279] N82-20143

VERTICAL AIR CURRENTS
The characteristics and detection of low level wind shear in the critical phases of flight
A82-28349
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-707 and DC-8 vortices
[AD-A109518] N82-20157

VERTICAL TAKEOFF AIRCRAFT
Yak-36 Forger - The brand X VTOL fighter
A82-26045
US Navy begins slow shuffle towards V/STOL
A82-28311
A short takeoff performance computer program
[AD-A109861] N82-20179
A translational velocity command system for VTOL low speed flight
[NASA-TM-84215] N82-20186
ALQ-164 POD/AV-8C environmental evaluation flight test
[AD-A110198] N82-21178

VIBRATION DAMPING
Suppression of self-oscillations in open wind tunnels
A82-25794
Design of higher harmonic control for the ABC
A82-26380
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394
Application of combined balancing methods to flexible rotors of aviation gas-turbine engines
A82-26491
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
A82-26620
The use of dynamometer readings for damping of the natural vibrations of twin-rotor gyrocompasses
A82-28475
Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513
Self-tuning regulators for multicyclic control of helicopter vibration
[NASA-TP-1996] N82-20108
Reduction of structural vibration by a dynamic absorber --- helicopter cabins
[RAE-TM-AERO-1881] N82-21190

VIBRATION ISOLATORS
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
A82-26620
Helicopter vibration control: A survey
[MBB-UD-302/80-O] N82-21185
A hingeless tail rotor of fiber composite construction and vibration isolator systems (ARIS, AVIS) for helicopters --- antiresonance isolator system (aris); active vibration isolator system (avis)
[MBB-UD-311/80-OE] N82-21187
Reduction of structural vibration by a dynamic absorber --- helicopter cabins
[RAE-TM-AERO-1881] N82-21190

VIBRATION TESTS
The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintenance
A82-27904
ALQ-164 POD/AV-8C environmental evaluation flight test
[AD-A110198] N82-21178
Investigations of helicopter structural dynamics and a comparison with ground vibration tests --- using nastran
[MBB-UD-303/80-O] N82-21186
The testing and approval of aircraft engine mounted accessories --- subject to vibration
[PNR-90051] N82-21206
Vibration qualification of external aircraft stores and equipment
[MBB-FE-173/S/PUB/46] N82-21218

VIBRATIONAL SPECTRA
Aeroelastic characteristics of a mistuned bladed-disc assembly
N82-20142

VIDEO EQUIPMENT
Quantitative interpretation of recirculated flow visualization by the analysis of video pictures
A82-27109

VISCOUS FLOW
Experimental methods for the prediction of the effect of viscosity on propeller performance
[AD-A109846] N82-20472

VISCOUS FLUIDS
More than meets the eye - The oil dot technique
A82-27114

VISIBILITY
Rangefinder system for slant range visibility
N82-20746

VISUAL ACUITY
Study and design of high G augmentation devices for flight simulators
[AD-A109127] N82-20195

VORTEX ALLEVIATION
Conditions of generation and methods of damping the inlet vortex of a turbojet engine
[NASA-TM-76678] N82-20182

VORTEX AVOIDANCE
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-707 and DC-8 vortices
[AD-A109518] N82-20157

VORTEX GENERATORS
The vortex flow field generated by a hovering helicopter
A82-26227
Conditions of generation and methods of damping the inlet vortex of a turbojet engine
[NASA-TM-76678] N82-20182

VORTEX SHEETS
The vortex flow field generated by a hovering helicopter
A82-26227

VORTICES
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-707 and DC-8 vortices
[AD-A109518] N82-20157
Vortex flow correlation --- water tunnel tests on thin slender wings
[AD-A108725] N82-20468

W

WAKES
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-707 and DC-8 vortices
[AD-A109518] N82-20157
WALL FLOW
Self streamlining wind tunnels without computers
A82-26181
Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
[AD-A110332] N82-21199
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200
WALL PRESSURE
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209
WALL TEMPERATURE
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087
WARNING SYSTEMS
Lightning detection and ranging
A82-26367
Detection and tracking algorithm refinement
[AD-A109517] N82-20164
Aircraft collision avoidance and air traffic safety
[GPO-88-545] N82-20169
WASHERS (SPACERS)
Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing
A82-27155
WATER TUNNEL TESTS
Vortex flow correlation --- water tunnel tests on thin slender wings
[AD-A108725] N82-20468
WAVE REFLECTION
Terrain reflection effects on data reception from airborne vehicles
A82-27231
WEAPON SYSTEMS
AV-8B/Harrier GR.5 - Range, payload and VSTOL
A82-26044
WEAR
Correlation of wear with oxidation of carbon-carbon composites
A82-27068
Coatings in the aero gas turbine --- sprayed coatings
[PNR-90049] N82-21204
WEATHER
The effects of weather on runway operations
A82-27050
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139
Operational procedures relative to severe weather
N82-21142
Effect of heavy rain on aircraft
N82-21149
Prototype Regional Observation and Forecast System (PROFS)
N82-21150
WEATHER FORECASTING
Communicating critical weather information to pilots --- (ZITLE)
[AIAA PAPER 82-0016] A82-27082
Weather deterioration models applied to alternate airport criteria
[AD-A108877] N82-20811
NASA research programs responding to workshop recommendations
N82-21146
WEDGES
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566
WEIGHT REDUCTION
Composite control tubes
A82-27423
WELD STRENGTH
A new resin for field repair
A82-27412
WESTLAND AIRCRAFT
Industrial experience in the Anglo-French helicopter collaboration
[SNIAS-811-210-101] N82-21154
WIND DIRECTION
The characteristics and detection of low level wind shear in the critical phases of flight
A82-28349
WIND MEASUREMENT
The dynamic behaviour of propeller anemometers
A82-26184
Methods for analysis of wind ripple in wind turbines
[SAND-81-7006] N82-20193
WIND SHEAR
The characteristics and detection of low level wind shear in the critical phases of flight
A82-28349
Effect of heavy rain on aircraft
N82-21149
The Joint Airport Weather Studies Project
N82-21152
WIND TUNNEL APPARATUS
Conditions of pulsed starting of supersonic wind tunnel diffusors
A82-25795
Cryogenic Technology, part 1 --- conference proceedings; cryogenic wind tunnel design and instrumentation
[NASA-CP-2122-PT-1] N82-20357
Cryogenic Technology, part 2 --- conference proceedings; cryogenic wind tunnel design and instrumentation
[NASA-CP-2122-PT-2] N82-20358
WIND TUNNEL MODELS
Status of NASA advanced LFC airfoil high-lift study
N82-20151
Some remarks on buffeting --- of wings, wind tunnel models
[RAE-TM-STRUCT-980] N82-21216
Theoretical and experimental investigations of wind tunnel interference due to angle of attack
[MBB-FE-124/S/PUB/34] N82-21226
WIND TUNNEL TESTS
Suppression of self-oscillations in open wind tunnels
A82-25794
The effect of induced sound on the flow around a rectangular body in a wind tunnel
A82-26194
Real time digital filtering test in the S1 continuous wind tunnel at Modane
A82-26299
Large scale model measurements of airframe noise using cross-correlation techniques
A82-26966
Aeroelasticity of compressor blades - Subsonic stall flutter
A82-26993
Experimental study of oscillating-wing propulsion
A82-28514
A descriptive study of the application of analysis of variance and regression techniques in an error analysis program for test data obtained in a 16 foot transonic tunnel
N82-20997
Fluctuating pressures on fan blades of a turbofan engine: Static and wind-tunnel investigations
[NASA-TP-1976] N82-21037
V/STOL Tandem Fan transition section model test --- in the Lewis Research Center 10-by-10 foot wind tunnel
[NASA-CR-165587] N82-21158
Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4 --- in a wind tunnel
[RAE-TR-80066] N82-21161

Pressure distributions on some delta wings at M = 4 --- wind tunnel tests
[RAE-TR-80068] N82-21164
A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
[NASA-TM-82805] N82-21998

WIND TUNNEL WALLS
Self streamlining wind tunnels without computers
A82-26181
Sonic wind tunnel of the Institute of Fluid Mechanics of Lille
[NASA-TM-76687] N82-20192
Theoretical and experimental investigations of wind tunnel interference due to angle of attack
[MBB-FE-124/S/PUB/34] N82-21226

WIND TUNNELS
Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/
A82-26098

WIND TURBINES
Methods for analysis of wind ripple in wind turbines
[SAND-81-7006] N82-20193
Approach to the fatigue analysis of vertical-axis wind-turbine blades
[DE82-003193] N82-20573

WIND VARIATIONS
Methods for analysis of wind ripple in wind turbines
[SAND-81-7006] N82-20193

WIND VELOCITY
The characteristics and detection of low level wind shear in the critical phases of flight
A82-28349

WIND VELOCITY MEASUREMENT
The Joint Airport Weather Studies Project
N82-21152

WINDOWS (APERTURES)
Full scale test facilities for radomes and antenna windows
A82-26467

WINDPOWERED GENERATORS
Methods for analysis of wind ripple in wind turbines
[SAND-81-7006] N82-20193

WING LOADING
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131
A surface singularity method for rotors in hover or climb
[AD-A109687] N82-20178

WING OSCILLATIONS
Results of recent measurements on an oscillating aerofoil
A82-26223
Unsteady response of rectangular wings in spanwise uniform shear flow
A82-26340
Wing/control surface flutter analysis using experimentally corrected aerodynamics
A82-26569
Experimental study of oscillating-wing propulsion
A82-28514
Pressure measurements on a wing oscillating in supercritical flow
[RAE-TR-79074] N82-21163

WING PANELS
Flight service evaluation of advanced structures
A82-27402

WING PLANFORMS
Helicopter rotor performance improvement by utilization of swept back parabolic blade tip
A82-26298

WING PROFILES
Composite wing substructure technology on the AV-8B advanced aircraft
A82-27128
A summary of experimental data on wing characteristics at transonic speeds
[RAE-TM-AERO-1953-S.D.-77] N82-21155

WING TIP VORTICES
Computation of wing-vortex interaction in transonic flow using implicit finite difference algorithm
[NASA-CR-166251] N82-21159

WING-FUSELAGE STORES
Wing/fuselage critical component development program
A82-27130

WINGS
Structural design and construction of the New Technology Wing
A82-26541
Experimental program for general aviation --- wing design, construction and flight testing
A82-26542
One year flight testing of the Transonic Wing
A82-26543
Fracture control in ballistic-damaged graphite/epoxy wing structure
A82-26639
Durability evaluation of highly stressed wing box structure
A82-27163
Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary
[AD-A110035] N82-21180
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181
Some remarks on buffeting --- of wings, wind tunnel models
[RAE-TM-STRUCT-980] N82-21216

X

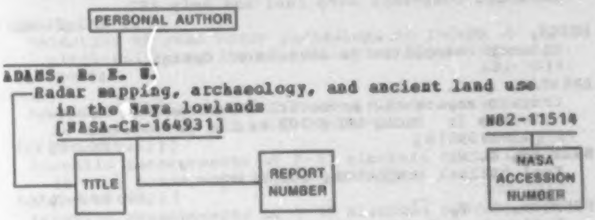
X WING ROTORS
Advanced helicopter concepts compete
A82-26537

XV-15 AIRCRAFT
Simulation of the XV-15 tilt rotor research aircraft
[NASA-TM-84222] N82-20174

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 150)* JULY 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ADAMS, D. L.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171

ADAMS, J. J.
Simulator study of a pictorial display for general aviation instrument flight
[NASA-TP-1963] N82-20180

AHTYE, W. F.
Large scale model measurements of airframe noise using cross-correlation techniques
A82-26966

AIDALA, P.
Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary
[AD-A110035] N82-21180
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 2: Fighter design
[AD-A110036] N82-21182
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 2: User's guide to fighter design computer program
[AD-A110037] N82-21184

AKER, S. C.
Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing
A82-27155
Composite control tubes
A82-27423

AKINS, R. E.
Methods for analysis of wind ripple in wind turbines
[SAND-81-7006] N82-20193

ALEXANDER, J. V.
Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation
[AD-A110212] N82-21261

ALEXANDER, R. I.
Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system
[NASA-CR-163121] N82-21198

ALIFANOV, O. M.
Inverse heat-transfer problems - Domains of application in the design and testing of technical systems
A82-25971
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

ALSTON, D. W.
A descriptive study of the application of analysis of variance and regression techniques in an error analysis program for test data obtained in a 16 foot transonic tunnel
N82-20997

ALVANIA, S. M.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171

ANANIKOV, S. V.
The relative motion of a particle in the case of exponential changes of the velocity of the medium
A82-26479

ANDERSON, C. F.
Aerodynamic characteristics and store loads of a 1/24 scale F-111 aircraft model with three external store loadings
[AD-A109449] N82-20158

APPEL, J.
Real time digital filtering test in the S1 continuous wind tunnel at Modane
A82-26299

APPLIN, Z. T.
Status of NASA advanced LFC airfoil high-lift study
N82-20151

ARATA, W. H., JR.
Very large vehicles - Technology looking for a need
A82-28278

ARNOLD, D. B.
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing
A82-27414

ATRAGHJI, E.
More than meets the eye - The oil dot technique
A82-27114

ATZHORN, D.
Digital command augmentation for lateral-directional aircraft dynamics
[AD-A110274] N82-21214

AVERY, J. G.
Fracture control in ballistic-damaged graphite/epoxy wing structure
A82-26639

AZIZOV, B. M.
The relative motion of a particle in the case of exponential changes of the velocity of the medium
A82-26479

B

BANERJEE, D.
The YAH-64A composite flexbeam tail rotor
A82-26386

BANKS, D. D.
AEWTS - Realistic not futuristic
A82-27887

BARGELIOTES, P. T.
Conformal antenna array design handbook
[AD-A110091] N82-21483

BARNES, D. R.
The Circulation Control Rotor /CCR/ control system
A82-26400

BAUMGARDNER, P. S.
Design and production of fiberglass helicopter rotor blades
A82-27153

BELKO, R. P.
CH-47 fiberglass rotor blade design and fabrication
A82-26397

BELL, N.
Telemetry Computer System at Wallops Flight Center A82-27188
BENTLEY, L. B.
Standards in aircraft noise certification
[PNR-90052] N82-22005
BERESTNEVA, N. S.
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209
BERRIER, B. L.
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156
BERRY, D. T.
Flying qualities - A costly lapse in flight-control design A82-28280
BHATIA, N. M.
Impact resistance of graphite and hybrid configurations A82-27141
BISCHOFF, D. E.
Development of longitudinal equivalent system models for selected US Navy tactical aircraft
[AD-A109488] N82-20189
BISHOP, A. M.
Pacer Comet II jet engine test system A82-27903
BLAUCH, R. S.
The impact of missions on the preliminary design of an ABC rotor A82-26392
BOERSMA, J.
Conformal antenna array design handbook
[AD-A110091] N82-21483
BOGAR, T. J.
Factors influencing velocity distributions at inlet/combustor interfaces N82-21405
BOIARCHIKOVA, N. IU.
Suppression of self-oscillations in open wind tunnels A82-25794
BOLSEEV, A.
Joint US/USSR mode S compatibility test program, volume 1
[PB82-126616] N82-21173
Joint US/USSR mode S compatibility test program, volume 2
[PB82-126624] N82-21174
BRADLEY, S. J.
Fracture control in ballistic-damaged graphite/epoxy wing structure A82-26639
BRAUSER, K.
Theoretical linear approach to the combined man-manipulation system in manual control of an aircraft
[MBB-FE-301/S/PUB/43] N82-21220
BRAYBROOK, R.
From claws to jaws - Tiger into Tigershark A82-26538
BRICKER, R. W.
Full-scale flammability test data for validation of aircraft fire mathematical models
[NASA-TM-58244] N82-21166
BRINKLEY, J. W.
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167
BROUWER, W.
Airline maintenance strategy A82-27883
BROWN, R. S.
Report of the JANNAF Workshop on High Frequency Instrumentation and Data Analysis Techniques N82-21406
BRUBAKER, R.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171
BRUNSCH, K.
Rational production methods for the manufacture of helicopter rotor blades
[MBB-UD-312/80-OE] N82-21188
BRUTON, W. M.
Analytical investigation of nonrecoverable stall
[NASA-TM-82792] N82-21195
BUCHROEDER, R. A.
Design of a catadioptric VCASS helmet-mounted display
[AD-A109431] N82-20181
BUCKLEY, D. H.
Effect of mechanical surface and heat treatments on erosion resistance A82-27071
BULLOCH, C.
On-board computers save fuel and help ATC A82-26046
BURKE, J. J.
Fibrous composites in structural design A82-27126
BURNHAM, D. C.
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-707 and DC-8 vortices
[AD-A109518] N82-20157
BURROWS, J. W.
Fuel optimal trajectory computation A82-26568
BURROWS, L. T.
A survey of U.S. Army helicopter main and tail rotor blade obstacle strikes A82-26385
BUSSERT, J.
Simple vs. sophisticated TacAir avionics. II - Soviet TacAir avionics technology A82-28397
BUTLER, G. F.
Effect of downwash on the induced drag of canard-wing combinations A82-28518
BUTTERWORTH, P. J.
Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4
[RAE-TR-80066] N82-21161

C

CALVET, P.
Quantitative interpretation of recirculated flow visualization by the analysis of video pictures A82-27109
CAMIN, R. A.
A CAD approach to cost estimating composite aircraft A82-27146
CAMP, D. W.
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139
CARAVASOS, N.
CH-46 fiberglass rotor blade repair program A82-26384
CARDULLO, F. M.
Study and design of high G augmentation devices for flight simulators
[AD-A109127] N82-20195
CARLSON, R. G.
Aeroelastic analysis of the elastic gimbal rotor
[NASA-CR-166287] N82-21157
CARRI, R.
Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft A82-27144
CARVER, J.
Main rotor hub electromagnetic signature reduction A82-26393
CASTO, F. P.
An evaluation of several polymers for high density humidity PC coatings A82-27432
CHAI, Y. P.
An experimental study of steady and quasi-steady jet flaps A82-26222
CHANDLER, C. W.
Terrain reflection effects on data reception from airborne vehicles A82-27231

CHANG, H. W.
Correlation of wear with oxidation of carbon-carbon composites
A82-27068

CHANG, Z. W.
Conformal antenna array design handbook
[AD-A110091] N82-21483

CHARNLEY, J.
Materials and aeronautics
A82-26025

CHASTEAU, V. A. L.
Results of recent measurements on an oscillating aerofoil
A82-26223

CHEN, R. T. N.
Selection of some rotor parameters to reduce pitch-roll coupling of helicopter flight dynamics
A82-26383

CHINN, J. M.
Acoustic measurements of F-4E aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109827] N82-21041
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109828] N82-21042
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4520-02-070-2721
[AD-A109829] N82-21043

CHISLAGHI, D. E.
Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176

CHOW, E.
Damage tolerance and durability design of composite structures for commercial aircraft
A82-27403

CHUN, P. A.
Report of the JANNAF Workshop on High Frequency Instrumentation and Data Analysis Techniques
N82-21406

CHURCHILL, G. B.
Simulation of the XV-15 tilt rotor research aircraft
[NASA-TM-84222] N82-20174

CLARKSON, B. L.
Vibration of structures excited acoustically
N82-20343

CLEWELL, H. J., III
The effect of fuel composition on groundfall from aircraft fuel jettisoning
[AD-A110305] N82-21424

COOK, P. A.
Aerial combat simulation in the U.S. Air Force
A82-27920

COVINGTON, C. E.
Design and production of fiberglass helicopter rotor blades
A82-27153

CRANE, R. K.
Detection and tracking algorithm refinement
[AD-A109517] N82-20164

CRESSY, K. D.
Light weight adhesive joining of composite structures
A82-27404

CROWE, D. J.
Radome rain damage - An environmental analysis technique
A82-26464

D

DADONE, L.
Performance degradation of propeller/rotor systems due to rime ice accretion
[AIAA PAPER 82-0286] A82-28322

DANDER, W.
Introduction to the principles of fracture mechanics
A82-25550

DANTSIG, A. IA.
Determination of losses in a channel with a sudden expansion behind a diffusor
A82-26492

DASARO, J. A.
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191

DAVIS, R. E.
Probability of laminar flow loss because of ice crystal encounters
N82-20153

DE GALARD, J.
Modernizing air traffic control in France
A82-27048

DE KONING, A. U.
A simple crack closure model for prediction of fatigue crack growth rates under variable-amplitude loading
A82-26630

DE LUCCIA, J. J.
Recent developments in materials and processes for aircraft corrosion control
A82-27446

DE SILVA, C. N.
Real-time failure detection of aircraft engine output sensors
A82-28403

DE SIMONE, G.
The impact of missions on the preliminary design of an ABC rotor
A82-26392

DEGENER, M.
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
[MBB-UD-303/80-O] N82-21186

DELANO, C. B.
A new resin for field repair
A82-27412

DELAURIER, J. D.
Experimental study of oscillating-wing propulsion
A82-28514

DEMUTS, E.
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations
A82-27158

DENYER, A. G.
Fracture mechanics technology applied to individual aircraft tracking
A82-26637

DEO, R. B.
Continuous filament advanced composite isogrid - A promising structural concept
A82-27138

DIDENKO, O. I.
Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015

DITTMAR, J. H.
A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
[NASA-TM-82805] N82-21998

DOBNEY, D. G.
Low-speed measurements of the static pressure distribution and overall forces on a cambered and a symmetric mild gothic wing of aspect ratio 1.4
[RAE-TR-80066] N82-21161

DORFMAN, A. SH.
Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015

DRING, R. P.
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110381] N82-21203

DUGAN, D. C.
Simulation of the XV-15 tilt rotor research aircraft
[NASA-TM-84222] N82-20174

DUNCAN, R. M.
Process development and evaluation of gas turbine engine components in INI 829
[PNR-90050] N82-21205

DUNN, W. R.
RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control
A82-27714

E

EAVES, A. V.
Coatings in the aero gas turbine
[PNR-90049] N82-21204

ECKLUND, R. C.
Laminar flow control SPF/08 feasibility demonstration
[NASA-CR-165818] N82-21532

EDWARDS, H. C., JR.
Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets
A82-27641

EISENHAUER, P.
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946

ELLIOTT, C. T.
Integration of controls and displays in U.S. Army helicopter cockpits
[AD-A109594] N82-20191

ERICKSON, G. E.
Vortex flow correlation
[AD-A108725] N82-20468

ESHELBY, M. E.
Aircraft pitch attitude as a performance parameter
A82-28519

EVANICH, P. L.
NASA/Lewis Research Center Icing Research Program
N82-21148

F

FAIN, R. L.
Overview of the O'Hare Runway configuration management system
[AD-A110137] N82-21224

FAWN, J. B.
The benefits of data exchange
[PNR-90048] N82-22095

FINK, D. E.
Advancing blade flight data gathered
A82-28312

FINNEY, R. H.
Evaluation of graphite/epoxy shims in a high capacity laminate helicopter bearing
A82-27155

FISHBEIN, B. D.
Analysis of the characteristics of a bypass engine, with allowance for variable pressure losses in the channels
A82-26496

FISHER, R. A.
The impact of missions on the preliminary design of an ABC rotor
A82-26392

FLAIG, J. W.
VSTOLs - We can build them, but can we sell them
A82-28281

FLEMMING, M.
Structural design and construction of the New Technology Wing
A82-26541

FOREMAN, C. R.
Design concepts for composite fuselage structure
A82-27132

FORSYTH, D. Y.
SAFRA: Controlled requirements expression
[BAE-TNAAS-84] N82-21192

FOSTER, C. W.
Precision casting for gas turbine engines
A82-28313

FOULKE, K. W.
Mach 2.0 rotating arm rain erosion test apparatus
A82-26461

FOYE, R. L.
A crashworthiness test for composite fuselage structure
A82-27139

FRANKEL, H. E.
An evaluation of several polymers for high density humidity PC coatings
A82-27432

FRANKLIN, J. A.
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft
[NASA-TP-1911] N82-20187

FRAZER, R. K.
Duplication of radome aerodynamic heating using the Central Receiver Test Facility solar furnace
A82-26468

FREEMAN, E. H.
ATE logistics in the United States Air Force
A82-27890

FRIEDMANN, P. P.
Application of the finite element method to rotary wing aeroelasticity
[NASA-CR-165854] N82-20561

FROST, W.
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139

G

GAJEWSKI, T.
Conditions of generation and methods of damping the inlet vortex of a turbojet engine
[NASA-TM-76678] N82-20182

GALLENTINE, D. O.
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471

GALLOWAY, W. J.
Assessment of community response to high-energy impulsive sounds
[AD-A110110] N82-21777

GAMMON, B. E.
Thermodynamics of organic compounds
[AD-A110430] N82-21202

GAONKAR, G. H.
Sensitivity of helicopter aeromechanical stability to dynamic inflow
A82-25773

GARNER, H. C.
The application of subsonic theoretical aerodynamics to active controls
[RAE-TR-81060] N82-21217

GESING, W. S.
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577

GINEVSKII, A. S.
Suppression of self-oscillations in open wind tunnels
A82-25794

GINOUX, J. J.
Von Karman and VKI - The first 25 years
A82-25673

GIOVANNINI, A.
Quantitative interpretation of recirculated flow visualization by the analysis of video pictures
A82-27109

GLEIZER, A. I.
Application of combined balancing methods to flexible rotors of aviation gas-turbine engines
A82-26491

GLOVER, R. D.
Aircraft interrogation and display system: A ground support equipment for digital flight systems
[NASA-TM-81370] N82-21175

GODDARD, K.
Developments to improve the noise and combustion emissions on the Fokker F28 aircraft and its Rolls-Royce RB183-555 engines. Section 1: Development of the new internal 10-Lobe mixer
[PNR-90061] N82-21207

GOELLNER, E.
Dynamic response of a hot gas, control-surface actuator
[MBB-UA-599/81-OE] N82-21219

GOFF, R. C.
Communicating critical weather information to pilots
[AIAA PAPER 82-0016] A82-27082

GOLDEN, K. E.
Conformal antenna array design handbook
[AD-A110091] N82-21483

GOLDSTEIN, M. E.
High frequency sound emission from moving point multipole sources embedded in arbitrary transversely sheared mean flows
A82-26318

GOLIAK, A. M.
Radio-navigation equipment of aircraft - Devices and operation
A82-26500

GONTIER, G.
Sonic wind tunnel of the Institute of Fluid Mechanics of Lille
[NASA-TM-76687] N82-20192

GOOD, W. D.
Thermodynamics of organic compounds
[AD-A110830] N82-21202

GOOSEY, D. E.
Process development and evaluation of gas turbine engine components in IMI 829
[PNR-90050] N82-21205

GORBATKO, A. A.
The formation of benzpyrene during the combustion of aviation fuels
A82-26494

GRAVES, R. A., JR.
Computational fluid dynamics - The coming revolution
A82-26366

GRAY, A. R.
The effects of weather on runway operations
A82-27050

GREENE, B.
Effects of filler materials upon radome rain erosion performance at subsonic conditions
A82-26462

GREER, R. H.
A new resin for field repair
A82-27412

GREGORY, B. J.
Air Force Academy aeronautics digest Fall/Summer 1980
[AD-A108338] N82-20139

GRIAZNOV, B. A.
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019

GRIGORENKO, V. L.
Conditions of pulsed starting of supersonic wind tunnel diffusors
A82-25795

GRIMES, G. C.
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations
A82-27158

GRUHN, W.
Theoretical and experimental investigations of wind tunnel interference due to angle of attack
[MBB-FE-124/S/PUB/34] N82-21226

GRUZDEV, V. N.
The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer
A82-26483

GUELDENPFENNIG, P.
Computer generated images for aircraft pilot training
[MBB-UA-551/80-OE] N82-21229

GUINN, K. F.
A preliminary investigation of Individual Blade-control Independent of a Swashplate
A82-26382

GUISHARD, R.
Joint US/USSR mode S compatibility test program, volume 1
[PB82-126616] N82-21173
Joint US/USSR mode S compatibility test program, volume 2
[PB82-126624] N82-21174

GUO, R. W.
An investigation of the swirl in an S-duct
A82-28318

GUPTA, A.
Automating air-traffic control
A82-26511

GUSTAFSON, G. B.
Detection and tracking algorithm refinement
[AD-A109517] N82-20164

H

HABERLAND, W.
Experimental program for general aviation
A82-26542

HAGEMAIER, D. J.
Automated ultrasonic inspection of adhesive bonded structure
A82-28534

HAIDL, G.
Vibration qualification of external aircraft stores and equipment
[MBB-FE-173/S/PUB/46] N82-21218

HAINES, P.
Heavy rain penalties for a flight simulator
[AIAA PAPER 82-0213] A82-27093

HALLOCK, J. N.
Chicago monostatic acoustic vortex sensing system. Volume 2: Decay of B-707 and DC-8 vortices
[AD-A109518] N82-20157

HALLUM, M. H.
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471

HAMER, M. J.
Optimization of thrust algorithm calibration for Computing System (TCS) for Thrust the NASA Highly Maneuverable Aircraft Technology (HiMAT) vehicle's propulsion system
[NASA-CR-163121] N82-21198

HAMM, R. A.
Wing/fuselage critical component development program
A82-27130

HAMOUDA, M.-N. H.
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
A82-26620

HANDBERG, G. O.
Meteorological inputs to advanced simulators
N82-21141

HANSEN, R. C.
Conformal antenna array design handbook
[AD-A110091] N82-21483

HANSON, R. L.
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087

HARDIN, L. W.
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110341] N82-21203

HARDY, G. H.
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft
[NASA-TP-1911] N82-20187

HARMON, H. E.
Airline ATE requirements
A82-27884

HARRIS, J. N.
Experimental study of oscillating-wing propulsion
A82-28514

HARRIS, W. L.
Model helicopter rotor low frequency broadband noise
A82-25772

HART-SMITH, L. J.
Mechanically-fastened joints for advanced composites - Phenomenological considerations and simple analyses
A82-27156

HARVEY, W. D.
NASA Langley laminar flow control airfoil experiment
N82-20150

HAUSER, J. P.
Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
[AD-A109448] N82-20384

HAWORTH, L. A.
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177

HEAD, R. E.
The YAH-64A composite flexbeam tail rotor
A82-26386

HEARON, B. F.
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167

HEBRARD, P.
Quantitative interpretation of recirculated flow visualization by the analysis of video pictures
A82-27109

HEIDERSCHEIDT, G.
CH-46 and CH-47 composite rotor blade lightning protection testing
A82-26381

HEINZERLING, W.
Aerodynamics project. Significance and difficulties in the experimental and numerical simulation of complex flow processes with high Reynolds number as part of aircraft projects
[MBB-FE-120/S/PUB/33] N82-21162

HEISING, H.
Effect of contrast on space perception in TV displays of the external scene observed by the pilot
A82-28395

HESSEL, A.
Conformal antenna array design handbook
[AD-A110091] N82-21483

HIGGINS, A. M.
Air Force Academy aeronautics digest Fall/Summer 1980
[AD-A108338] N82-20139

HILL, R. J.
A retirement-for-cause study of an engine turbine disk
[AD-A109724] N82-20184

HINKELMAN, J. W., JR.
Prototype Regional Observation and Forecast System (PROFS)
N82-21150

HODGES, W. T.
A crashworthiness test for composite fuselage structure
A82-27139

HOENLINGER, H.
Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513

HOFER, K. E., JR.
Growth of four flaw types in graphite/epoxy composites due to fully reversed fatigue
A82-27167

HOLBECHE, T. A.
Some applications of Hartmann-type sources in aircraft noise research
[RAE-TM-AERO-1877] N82-22007

HOLLOWAY, D. R.
Evaluation of crack growth gages for service life tracking
A82-26652

HOLT, M.
Supercritical flow past symmetrical airfoils
A82-26130

HOMICZ, G. F.
Comments on 'Nature of inlet turbulence and strut flow disturbances and their effect on turbomachinery rotor noise'
A82-26320

HOPKINS, G. R.
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems
A82-25923

HOUBOLT, J. C.
Why twin-fuselage aircraft
A82-28276

HOUCK, J. R.
The sixteen to forty micron spectroscopy from the NASA Lear jet
[NASA-CR-168684] N82-21054

HOURIGAN, D. T.
Sea King flight tests pitot-static probe and directional vane instrumentation
[AD-A109427] N82-20176

HOUSE, M. E.
The status of airport noise prediction, with special reference to the United Kingdom and Europe
A82-28149

HOVER, G. L.
Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets
A82-27641

HOWE, M. S.
On the generation of side-edge flap noise
A82-26319

HUBBLE, A. E.
Telemetry in aero engine development
[PNR-90055] N82-21247

HUMBAD, N. G.
Model helicopter rotor low frequency broadband noise
A82-25772

HUNT, L. R.
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566

HUNT, M. S.
Use of composite materials for helicopter rotor blades
[PB82-124041] N82-21191

HUTTROP, N. L.
Composite wing substructure technology on the AV-8B advanced aircraft
A82-27128

HUTTSELL, L. J.
Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513

HYLTON, L. D.
Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
[AD-A110332] N82-21199
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200
Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201

I

INNIS, R. C.
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft
[NASA-TP-1911] N82-20187

ITAMOTO, J.
Dualchannel fuel control program, phase 2
[AD-A109715] N82-20185

IVLIEV, A. V.
The formation of benzpyrene during the combustion of aviation fuels
A82-26494
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases
A82-26495

J

JACKSON, P. S.
The dynamic behaviour of propeller anemometers
A82-26184

JACOBS, S. R.
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946

JACOBY, D. O.
AEWTS - Realistic not futuristic
A82-27887

JARVI, D. W.
Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176

JEAL, R. H.
Process development and evaluation of gas turbine engine components in IMI 829
[PNR-90050] N82-21205

JEANS, L. L.
Sensitivity of bonded and bolted joints in composites to load/environmental spectrum variations
A82-27158

JECK, R. K.
Progress on low altitude cloud icing research
N82-21147

JEFFREY, R. W.
Some applications of Hartmann-type sources in aircraft noise research
[RAE-TM-AERO-1877] N82-22007

JENKINS, G. M.
The role of software in commercial ATE
A82-27885

JOHNSON, A. L.
Small EHF/SHF airborne SATCOM terminal
A82-27209

JOHNSON, W.
Self-tuning regulators for multicyclic control of helicopter vibration
[NASA-TP-1996] N82-20188

JOHNSTON, J.
RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control
A82-27714

JOLLAY, J., JR.
Growth of four flaw types in graphite/epoxy composites due to fully reversed fatigue
A82-27167

JONES, R.
The general purpose research rotor - Design features and considerations
A82-26379

JOSLYN, H. D.
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110341] N82-21203

JUMPER, E. J.
Air Force Academy aeronautics digest Fall/Summer 1980
[AD-A108338] N82-20139

JUNE, R. R.
Wing/fuselage critical component development program
A82-27130

K

KALINOVICH, V. N.
The use of dynamometer readings for damping of the natural vibrations of twin-rotor gyrocompasses
A82-28475

KAN, C. Y.
Damage tolerance and durability design of composite structures for commercial aircraft
A82-27403

KARAMCHETI, K.
Experimental study of the flowfield of an airfoil with deflected spoiler
[AIAA PAPER 82-0126] A82-27086

KAUFMAN, A.
Elastic-plastic finite-element analyses of thermally cycled double-edge wedge specimens
[NASA-TP-1973] N82-20566

KELLER, J. L.
Mathematical modeling of ice accretion on airfoils
[AIAA PAPER 82-0284] A82-27098

KELLEY, A. L.
Advanced medium scale real-time system
A82-27187

KELLY, F. J.
Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
[AD-A109448] N82-20384

KEMPF, J. H.
Air Force Academy aeronautics digest Fall/Summer 1980
[AD-A108338] N82-20139

KERKHAM, D. F.
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087

KETCHAM, S. J.
Recent developments in materials and processes for aircraft corrosion control
A82-27446

KIBLER, K. G.
Characterization of composition variations in a structural adhesive
A82-27415

KIELB, R. E.
Aeroelastic characteristics of a mistuned bladed-disc assembly
N82-20142

KIGER, R. W.
Problems and options in advanced composite repair
A82-27145

KING, K. H.
Fracture control in ballistic-damaged graphite/epoxy wing structure
A82-26639

KIRKHAM, W. R.
Improving the crashworthiness of general aviation aircraft by crash injury investigations
A82-28476

KNOCK, K. E.
Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens
A82-27437

KNYSH, IU. A.
The formation of benzpyrene during the combustion of aviation fuels
A82-26494

KOBAYAKAWA, M.
Unsteady response of rectangular wings in spanwise uniform shear flow
A82-26340

KOBAYASHI, S.
Experimental methods for the prediction of the effect of viscosity on propeller performance
[AD-A109846] N82-20472

KOBUS, D. B.
A short takeoff performance computer program
[AD-A109861] N82-20179

KOCAL, N. A.
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209

KOFSKEY, M. G.
Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine
[NASA-TM-82644] N82-21193

KONISHI, D. Y.
Effects of defects on tension coupons undergoing an accelerated environmental spectrum
A82-27168

KONTSEVICH, F. G.
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209

KORKAN, K. D.
Performance degradation of propeller/rotor systems due to rime ice accretion
[AIAA PAPER 82-0286] A82-20322

KOVALCHUK, I. F.
Radio-navigation equipment of aircraft - Devices and operation
A82-26500

KOZAKOFF, D. J.
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471

KRAIKO, A. N.
Allowance for flow nonuniformity in the minimum section in the optimal contouring of the expanding part of a nozzle
A82-25798

KRAPER, W. H.
Configuration management techniques for automatic testing
A82-27893

KRON, G. J.
Study and design of high G augmentation devices for flight simulators
[AD-A109127] N82-20195

KRUTIL, J. C.
Factors influencing velocity distributions at inlet/combustor interfaces
N82-21405

KUMINECZ, J. F.
Full-scale flammability test data for validation of aircraft fire mathematical models
[NASA-TM-58244] N82-21166

KUMMER, W. H.
Conformal antenna array design handbook
[AD-A110091] N82-21463

KUZNETSOV, N. D.
Strength of the turbine components of a gas-turbine engine under complex loading and associated problems
A82-27526

KUZNETSOV, V. S.
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

L

LABOR, J. D.
Impact resistance of graphite and hybrid configurations
A82-27141

LACKMAN, L. M.
Advanced composites integral structures meet the challenge of future aircraft systems
A82-27133

LAFON, G.
Yak-36 Forger - The brand X VTOL fighter
A82-26045

LAFON, P.
Helicopter rotor performance improvement by utilization of swept back parabolic blade tip
A82-26298

LAMBERT, M.
AV-8B/Harrier GR.5 - Range, payload and VSTOL
A82-26044

LAMBOURNE, N. C.
Pressure measurements on a wing oscillating in supercritical flow
[RAE-TR-79074] N82-21163

LAMERIS, J.
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept
[NASA-CR-168745] N82-21999

LARGE, J. B.
The status of airport noise prediction, with special reference to the United Kingdom and Europe
A82-28149

LASAGNA, P. L.
A preliminary comparison between the SR-3 propeller noise in flight and in a wind tunnel
[NASA-TM-82805] N82-21998

LAVERTY, W. F.
Rub energetics of compressor blade tip seals
A82-27078

LEE, J. T.
Doppler radar-research and application to aviation flight safety, 1977 - 1979
[AD-A109845] N82-20163

LEE, O. W. K.
Preliminary investigation of effects of heavy rain on the performance of aircraft
[NASA-TM-83272] N82-20145

LEHTINEN, B.
The role of modern control theory in the design of controls for aircraft turbine engines
[AIAA PAPER 82-0320] A82-26526

LEMNIOS, A. Z.
The general purpose research rotor - Design features and considerations
A82-26379

LEMON, G. H.
Statistical analysis methods for characterizing composite materials
A82-27162

LEMONT, H. E.
Design for the operating environment - Ring-fin tail rotor program
A82-26378

LENNON, C. L.
Lightning detection and ranging
A82-26367

LENOE, E. M.
Fibrous composites in structural design
A82-27126

LEVIN, K. M.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171

LEVY, M. I.
The modular ATE
A82-27886

LEWIS, R. B., II
Future helicopter technology
A82-26820

LI, K.-M.
Supercritical flow past symmetrical airfoils
A82-26130

LIESE, H.
Toward VLA air-cargo service
A82-28277

LIN, C.-F.
Optimum three-dimensional flight of a supersonic aircraft
A82-26039

LIPOVETSKAIA, O. D.
Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015

LIVINGSTON, W.
Operational delay day forecasts for the 20 air route traffic control centers for the year 1982 through 2011
[AD-A109844] N82-20173

LOCKE, M. C.
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing
A82-27414
Correlation of surface characterization of phosphoric acid anodize oxide with physical properties of bonded specimens
A82-27437

LOGAN, A. H.
NOTAR
A82-26822

LOISEAU, H.
Aeroelasticity of compressor blades - Subsonic stall flutter
A82-26993

LONG, T. N.
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471

LOPATIN, V. I.
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

LORCH, D.
Development of an ejection seat ballast block for the S-3A aircraft
[AD-A109808] N82-20161
Development of a supported airbag ejection restraint (SABER) for windblast protection
[AD-A109807] N82-20162

LORES, M. E.
Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary
[AD-A110035] N82-21180
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181

LOSEE, D. O.
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131

LOYD, M. S.
Advanced composites integral structures meet the challenge of future aircraft systems
A82-27133

LUERS, J. K.
Heavy rain penalties for a flight simulator
[AIAA PAPER 82-0213] A82-27093
Mathematical modeling of ice accretion on airfoils
[AIAA PAPER 82-0284] A82-27098
Effect of heavy rain on aircraft
N82-21149

LUKACHEV, V. P.
The formation of benzpyrene during the combustion of aviation fuels
A82-26494
Methodology for determining fuel-combustion efficiency and the toxicity of exhaust gases
A82-26495

LY, K. H.
Results of recent measurements on an oscillating aerofoil
A82-26223

M

MABEY, D. G.
Some remarks on buffeting
[RAE-TM-STRUCT-980] N82-21216

MACARTHUR, C. D.
Mathematical modeling of ice accretion on airfoils
[AIAA PAPER 82-0284] A82-27098

MADDALON, D. V.
Laminar Flow Control. The Research and Technology Studies 1981
[NASA-CP-2218] N82-20149
MAKOVETSKAIA, I. A.
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019
MALTBY, R. L.
To the root of the problem - Some helicopter research topics
A82-28275
MARCHINSKI, L. J.
The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter
A82-27424
MAREK, H. J.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171
MARKMAN, S. R.
Generic Test Bed (GTB) aircraft
[AD-A110335] N82-21176
MARTHE, R.
The YAH-64A composite flexbeam tail rotor
A82-26386
MARUSII, O. I.
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019
MASKEW, B.
A surface singularity method for rotors in hover or climb
[AD-A109687] N82-20178
MATHER, R.
Conformal antenna array design handbook
[AD-A110091] N82-21483
MATHESON, N.
The stability of portable bridges carried on slings beneath helicopters
[ARL/AERO-REPT-154] N82-21213
MATS, E. B.
Requirements on modern mathematical models of gas turbine engines. I
A82-26486
MCCARTHY, J.
The Joint Airport Weather Studies Project
N82-21152
MCCONKEY, E. D.
Weather deterioration models applied to alternate airport criteria
[AD-A108677] N82-20811
MCGOWAN, L. A.
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167
MCHUGH, F. J.
Dynamic stability of low effective flap hinge BMR concepts
A82-26377
MCLACHLAN, B. G.
Experimental study of the flowfield of an airfoil with deflected spoiler
[AIAA PAPER 82-0126] A82-27086
MCLALLIN, K. L.
Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine
[NASA-TM-82644] N82-21193
MCLEOD, A. H.
A new resin for field repair
A82-27412
MCSMITH, D. D.
Variable response load limiting device
[NASA-CASE-LAR-12801-1] N82-20544
Tubing and cable cutting tool
[NASA-CASE-LAR-12786-1] N82-20545
MCWILLIAM, B. N.
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577
MEDEIROS, M. F.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171
MEDGYESI-MITSCHANG, L. N.
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946
MEECHAM, W. C.
Large scale model measurements of airframe noise using cross-correlation techniques
A82-26966
MENG, P. R.
Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194
MERRICK, V. K.
A translational velocity command system for VTOL low speed flight
[NASA-TM-84215] N82-20186
MERRILL, W.
The role of modern control theory in the design of controls for aircraft turbine engines
[AIAA PAPER 82-0320] A82-26526
Identification of multivariable high performance turbofan engine dynamics from closed loop data
[NASA-TM-82785] N82-20339
MERTAUGH, L. J.
ALQ-164 POD/AV-8C environmental evaluation flight test
[AD-A110198] N82-21178
MESSINGER, R. H.
Advanced concepts for composite structure joints and attachment fittings. Volume 1: Design and evaluation
[AD-A110212] N82-21261
METZE, W.
Computer generated images for aircraft pilot training
[MBB-UA-551/80-OE] N82-21229
MEYER, G.
RAMP - A fault tolerant distributed microcomputer structure for aircraft navigation and control
A82-27714
MEYERHOFF, N. J.
Statistical analysis and time series modeling of air traffic operations data from flight service stations and terminal radar approach control facilities: Two case studies
[AD-A109873] N82-20172
MEYERS, A. W.
The Model 412 multi-bladed rotor system
A82-26376
MIAO, W.
Design of higher harmonic control for the ABC
A82-26380
MIAO, W. L.
Aeroelastic analysis of the elastic gimbal rotor
[NASA-CR-166287] N82-21157
MICHAEL, C. J.
Energy efficient engine shroudless, hollow fan blade technology report
[NASA-CR-165586] N82-21196
MIHELC, M. S.
Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
[AD-A110332] N82-21199
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200
Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201
MILLER, V. R.
Acoustic measurements of F-4E aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109827] N82-21041
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109828] N82-21042
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109829] N82-21043
MILLER, W. R.
Large scale model measurements of airframe noise using cross-correlation techniques
A82-26966

MISHIN, V. P.
Inverse heat-transfer problems - Domains of application in the design and testing of technical systems
A82-25971

MITRA, A. K.
Sensitivity of helicopter aeromechanical stability to dynamic inflow
A82-25773

MOKKEN, B.
One year flight testing of the Transonic Wing
A82-26543

MONROE, E. G.
The 1981 Image 2 Conference Proceedings
[AD-A110226] N82-21223

MOONEY, J. E.
Wing/fuselage critical component development program
A82-27130

MOORE, K. C.
Pressure distributions on some delta wings at M = 4
[RAE-TR-80068] N82-21164

MUELLER, H. E.
Conformal antenna array design handbook
[AD-A110091] N82-21483

MYHRE, S. H.
Problems and options in advanced composite repair
A82-27145

N

NAGARAJ, V. T.
Torsional vibrations of non-uniform rotating blades with attachment flexibility
A82-26313

NALIMOV, IU. S.
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019

NAYFEH, A. H.
Stability of boundary layers with porous suction strips: Experiment and theory
N82-20152

NEWTON, A. G.
Engines for air transport
[PNR-90066] N82-21208

NIYOGI, P.
Transonic flow past thin wings
A82-25995

NOAH, S. T.
A generalized Hill's method for the stability analysis of parametrically excited dynamic systems
A82-25923

NOLL, T. E.
Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513

NONWEILER, T.
A summary of experimental data on wing characteristics at transonic speeds
[RAE-TN-AERO-1953-S.D.-77] N82-21155

NORRIS, D.
The mechanical testing of compressors and turbines for aircraft gas turbine engines
[PNR-90070] N82-21211

NORTON, J. M.
Statistical analysis methods for characterizing composite materials
A82-27162

NOTON, B. R.
Manufacturing cost trade-studies in avionics
A82-27430

NOVAK, L. M.
Optimal target designation techniques
A82-27709

NURIEV, N. N.
The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer
A82-26483

O

OBRAZTSOV, I. F.
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

OBRIEN, W. L.
Advanced composites integral structures meet the challenge of future aircraft systems
A82-27133

OCONNELL, J. M.
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1
[NASA-CR-165562-VOL-1] N82-21031
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2
[NASA-CR-165562-VOL-2] N82-21032
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3
[NASA-CR-165562-VOL-3] N82-21033

OGG, J. S.
A retirement-for-cause study of an engine turbine disk
[AD-A109724] N82-20184

OLEARY, J.
Design of higher harmonic control for the ABC
A82-26380

OLIVER, A. R.
Effect of wakes of upstream stator blades on the rotor of an axial flow compressor
A82-26208

OLSSON, U.
Advanced engine technology and its influence on aircraft performance
A82-28515

OLSTER, E. F.
Preliminary design of an advanced composite rotor hub for the UH-60A Black Hawk
A82-27154

OMALLEY, J. A.
Performance and aeroelastic tradeoffs on recent rotor blade designs
A82-26396

OPLINGER, D. W.
Fibrous composites in structural design
A82-27126

OSHEROV, IU. S.
Investigation of heat transfer in the vicinity of the leading and trailing edges of a cooled nozzle blade of a low-consuming gas turbine
A82-28018

OSMER, S. R.
Analysis of side-looking airborne radar /SLAR/ performance in the detection of search and rescue targets
A82-27641

OSSIN, A.
Full scale test facilities for radomes and antenna windows
A82-26467

OTSNCHKIN, Y. G.
Allowing for the wall boundary layer in a stage of an axial compressor
[PNR-90067] N82-21209

OTTOMEYER, J. D.
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177

P

PANKRATOV, B. M.
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

PARKER, R.
The effect of induced sound on the flow around a rectangular body in a wind tunnel
A82-26194

PARKS, D. L.
Advanced display-control concepts for power plant operation
A82-26121

PARKS, P. C.
Applications of adaptive control systems
A82-27869

PARSLEY, P. D.
Proceedings: Fifth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems
[NASA-CP-2192] N82-21139

PEARSON, D. S.
The testing and approval of aircraft engine mounted accessories
[PNR-90051] N82-21206
PERKINS, P. J.
Ozone and aircraft operations
N82-21145
PETERS, D. A.
Sensitivity of helicopter aeromechanical stability to dynamic inflow
A82-25773
PETERSON, E. E.
Compatibility of 350 deg curing honeycomb adhesives with phosphoric acid anodizing
A82-27414
PETROV, E. M.
Determination of losses in a channel with a sudden expansion behind a diffusor
A82-26492
PHILIPPE, J. J.
Helicopter rotor performance improvement by utilization of swept back parabolic blade tip
A82-26298
PHILLIPS, N. B.
The Model 412 multi-bladed rotor system
A82-26376
PICASSO, B. D., III
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177
PIERCE, G. A.
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
A82-26620
Helicopter rotor loads using a matched asymptotic expansion technique
[NASA-CR-165742] N82-21156
PINCKNEY, R. L.
The design, construction, and performance of composite fuselage components for the Boeing 234 helicopter
A82-27424
PLOTKIN, S. I.
Radio-navigation equipment of aircraft - Devices and operation
A82-26500
PLOUDRE, M.
The YAH-64A composite flexbeam tail rotor
A82-26386
PLZAK, G. A.
Acoustic measurements of F-4E aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109827] N82-21041
Acoustic measurements of F-15 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109828] N82-21042
Acoustic measurements of F-16 aircraft operating in hush house, NSN 4920-02-070-2721
[AD-A109829] N82-21043
POEHLER, H. A.
Lightning detection and ranging
A82-26367
POLLOCK, N.
Self streamlining wind tunnels without computers
A82-26181
PONOMAREV, M. N.
Determination of losses in a channel with a sudden expansion behind a diffusor
A82-26492
POSTANS, P. J.
Process development and evaluation of gas turbine engine components in IMI 829
[PNR-90050] N82-21205
POULLOS, M., JR.
Composite fasteners - A compatible joining technique for fibrous composites in structural design
A82-27159
POWERS, J. M.
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167
PRIDE, J. D.
NASA Langley laminar flow control airfoil experiment
N82-20150
PRIDMORE-BROWN, D. C.
Conformal antenna array design handbook
[AD-A110091] N82-21483
PRINGLE, D. P.
Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194
PRUYN, R. R.
Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility
A82-26399

R

RADDIN, J. H., JR.
Evaluation of a proposed modified F/FB-111 crew seat and restraint system
[AD-A110188] N82-21167
RADOMSKI, M. A.
CF6 Jet Engine Diagnostics Program: High pressure compressor clearance investigation
[NASA-CR-165580] N82-21197
RAKICH, J. V.
Numerical solution of Space Shuttle Orbiter flow field
[AIAA PAPER 82-0028] A82-27083
RAUSHENBAKH, B. V.
Studies in the history and theory of development of aviation and rocketry and space science and technology
A82-27398
RAY, C.
An evaluation of several polymers for high density humidity PC coatings
A82-27432
RE, R. J.
Static internal performance of single expansion-ramp nozzles with thrust vectoring and reversing
[NASA-TP-1962] N82-20156
READEY, H. J., JR.
Full scale test facilities for radomes and antenna windows
A82-26467
REARDON, F. H.
Analysis of very low frequency oscillations in a ramjet combustor by use of a sensitive time lag model
N82-21404
REDDICK, H. K., JR.
Preliminary design of an advanced composite rotor hub for the UH-60A Black Hawk
A82-27154
REDDY, K. R.
The vortex flow field generated by a hovering helicopter
A82-26227
REDDY, T. S. R.
Sensitivity of helicopter aeromechanical stability to dynamic inflow
A82-25773
REED, H. L.
Stability of boundary layers with porous suction strips: Experiment and theory
N82-20152
REHFIELD, L. W.
Continuous filament advanced composite isogrid - A promising structural concept
A82-27138
REICHERT, G.
Helicopter vibration control: A survey
[MBB-UD-302/80-O] N82-21185
A hingeless tail rotor of fiber composite construction and vibration isolator systems (ARIS, AVIS) for helicopters
[MBB-UD-311/80-OE] N82-21187
REID, D. B.
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577
REILLY, J. B.
Black Hawk rotor de-icing
A82-26398
REIMANN, W. H.
A retirement-for-cause study of an engine turbine disk
[AD-A109724] N82-20104
RENSKI, H.
Manufacturing cost trade-studies in avionics
A82-27430

RENIERI, G. D.
Continuous filament advanced composite isogrid - A promising structural concept
A82-27138

REYNOLDS, G. A.
Stability of boundary layers with porous suction strips: Experiment and theory
N82-20152

RHOADS, F. J.
Computer-program model for predicting horizontally and vertically polarized VLF atmospheric radio noise at elevated receivers
[AD-A109448] N82-20384

RICE, W. J.
Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194

RICH, M. J.
Application of advanced composite materials to helicopter airframe structures
A82-27152

RICHARDSON, J. I.
Tubing and cable cutting tool
[NASA-CASE-LAR-12786-1] N82-20545

RIEL, F. J.
A new resin for field repair
A82-27412

RIO, R. A.
The United States Air Force Automated Vibration Diagnostics System /AVID/ for improved jet engine maintenance
A82-27904

RODERICK, G. L.
Prediction of cyclic growth of cracks and debonds in aluminum sheets reinforced with boron/epoxy
A82-27151

ROGERS, E. W. E.
Aerodynamics - Retrospect and prospect /The 21st Lanchester Memorial Lecture/
A82-26098

ROSEBERG, E. W.
Tests and analysis of a vented D thrust deflecting nozzle on a turbofan engine
[NASA-CR-166279] N82-20143

ROSSITER, A. W.
Naval Air Systems Command /NAVAIR/ ATE program - Standardized ATE for the carrier environment
A82-27892

ROWLAND, G. R.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171

RUMIANTSEV, S. V.
Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series
A82-26487

S

SAFF, C. R.
Evaluation of crack growth gages for service life tracking
A82-26652

SAHELI, F. P.
An experimental and analytical study of mixing flow of turbofan engine exhaust through circular and 2-dimensional mixer/nozzle
[AIAA PAPER 82-0130] A82-27087

SAHU, N.
Torsional vibrations of non-uniform rotating blades with attachment flexibility
A82-26313

SAJBEN, M.
Factors influencing velocity distributions at inlet/combustor interfaces
N82-21405

SALIK, J.
Effect of mechanical surface and heat treatments on erosion resistance
A82-27071

SALMON, J. T.
Factors influencing velocity distributions at inlet/combustor interfaces
N82-21405

SANDFORD, R. W.
CH-47 fiberglass rotor blade design and fabrication
A82-26397

SARIC, W. S.
Stability of boundary layers with porous suction strips: Experiment and theory
N82-20152

SARIN, S. L.
Developments to improve the noise and combustion emissions on the Fokker F28 aircraft and its Rolls-Royce RB183-555 engines. Section 1: Development of the new internal 10-Lobe mixer
[PNR-90061] N82-21207

SARRO, J.
CH-46 and CH-47 composite rotor blade lightning protection testing
A82-26381

SCHAUFELBERGER, W.
Applications of adaptive control systems
A82-27869

SCHEIBENZUBER, H.
ATLAS/test data provision for the Tornado ATS - A challenging task
A82-27891

SCHERER, G. D.
Configuration management techniques for automatic testing
A82-27893

SCHMID, C.
Applications of adaptive control systems
A82-27869

SCHNEIDER, C. W.
Flight service evaluation of advanced structures
A82-27402

SCHOCK, H. J.
Preliminary results on performance testing of a turbocharged rotary combustion engine
[NASA-TM-82772] N82-21194

SCHOENSTER, J. A.
Fluctuating pressures on fan blades of a turbofan engine: Static and wind-tunnel investigations
[NASA-TP-1976] N82-21037

SCHRAGE, D. P.
Performance and aeroelastic tradeoffs on recent rotor blade designs
A82-26396

SCHUCHARDT, J. M.
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471

SCHWARTZ, H. S.
Transition of aerospace adhesive bonding technology from R&D to operational use
A82-27435

SCOTT, G. W.
F-5 Shark Nose Radome - A development overview
A82-26470

SCULLY, M. P.
Rotor preliminary design trade-offs for the Advanced Scout Helicopter
A82-26395

SEDDON, J.
An investigation of the swirl in an S-duct
A82-28318

SEELEY, G. W.
Design of a catadioptric VCASS helmet-mounted display
[AD-A109431] N82-20181

SENSBURG, O.
Active flutter suppression on an F-4F aircraft
[AIAA PAPER 80-0770] A82-28513

SGILEVSKII, V. A.
Method for engine-airframe integration using a high-level computer-assisted engine design system of the Apparat series
A82-26487

SHAEFFER, J. F.
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946

SHANNON, R. B.
Design optimization of rotor systems for tilt-rotor aircraft that fold for shipboard compatibility
A82-26399

SHAW, R. J.
Performance degradation of propeller/rotor systems due to rime ice accretion
[AIAA PAPER 82-0286] A82-28322

SHAFFLER, H.
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394

SHEFFLER, M. W.
Dynamic stability of low effective flap hinge BMR concepts
A82-26377

SHINN, R. A.
Rotor preliminary design trade-offs for the Advanced Scout Helicopter
A82-26395

SHOSTAK, J.
Main rotor hub electromagnetic signature reduction
A82-26393

SHVETS, IU. I.
Analysis of the temperature field of a baffle-cooled gas-turbine-engine blade under conjugated boundary conditions
A82-28015

SIEFFER, J. C.
Industrial experience in the Anglo-French helicopter collaboration
[SNIAS-811-210-101] N82-21154

SIEGEL, M. A.
Engine industry cost considerations for emerging technologies
A82-27429

SIMMONS, J. E.
An experimental study of steady and quasi-steady jet flaps
A82-26222

SIMMONS, J. V., JR.
Project Sea Hunt: A report on prototype development and tests
[AD-A109510] N82-20160

SIMMONS, P. D.
The characteristics and detection of low level wind shear in the critical phases of flight
A82-28349

SIMPKIN, W. E.
V/STOL Tandem Fan transition section model test
[NASA-CR-165587] N82-21158

SIMS, J. C.
Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts
[AD-A109585] N82-20190

SINHA, A. N.
Preliminary functional description of integrated flow management
[AD-A109909] N82-21171

SLOAN, L. H.
Some thoughts on design optimization of transport helicopters
A82-25771

SMITH, M. J. T.
The impact and future direction of aircraft noise certification
A82-28150
The Rolls Royce role in aircraft noise reduction
[PNR-90069] N82-21210
The impact and future direction of aircraft noise certification
[PNR-90053] N82-21788

SMITH, N. K.
Thermodynamics of organic compounds
[AD-A110430] N82-21202

SMITH, P. R.
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181

SMYTH, J. R.
Integration of multi-sensor navigation data using optimal estimation techniques
A82-25577

SNYDER, D. E.
The Model 412 multi-bladed rotor system
A82-26376

SONNEBORN, W. G. O.
Composite control tubes
A82-27423

SOOVERE, J.
Sonic fatigue testing of an advanced composite aileron
[AIAA PAPER 81-0634] A82-26567

SQUIRE, L. C.
Pressure distributions on some delta wings at M = 4
[RAE-TR-80068] N82-21164

SRINIVASAN, G.
Computation of wing-vortex interaction in transonic flow using implicit finite difference algorithm
[NASA-CR-166251] N82-21159

SMOKOWSKI, A. J.
Numerical aircraft design using 3-D transonic analysis with optimization. Volume 1: Executive summary
[AD-A110035] N82-21180
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 1: User's guide to transport design computer programs
[AD-A110232] N82-21183

STALEY, J.
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394

STALEY, J. A.
Dynamic stability of low effective flap hinge BMR concepts
A82-26377

STEGER, J. L.
Computation of wing-vortex interaction in transonic flow using implicit finite difference algorithm
[NASA-CR-166251] N82-21159

STEININGER, M.
Vibration qualification of external aircraft stores and equipment
[MBB-FE-173/S/PUB/46] N82-21218

STEPHENSON, J. D.
Design criteria for flightpath and airspeed control for the approach and landing of STOL aircraft
[NASA-TP-1911] N82-20187

STEPNIEWSKI, W. Z.
Some thoughts on design optimization of transport helicopters
A82-25771

STEUART, G. N.
The effects of weather on runway operations
A82-27050

STEVENSON, S.
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept
[NASA-CR-168745] N82-21999

STICKLE, J. W.
Meteorology impact on future aircraft design
N82-21143

STIEVENARD, G.
Fatigue analysis of composite materials using the fail-safe concept
[NASA-TM-76671] N82-20175

STONE, D. E. W.
Non-destructive inspection and the implementation of a damage tolerant design philosophy
[RAE-TM-STRUCT-982] N82-21603

STONEMAN, S. A. T.
The effect of induced sound on the flow around a rectangular body in a wind tunnel
A82-26194

STOPPEL, J.
Investigations of helicopter structural dynamics and a comparison with ground vibration tests
[MBB-UD-303/80-0] N82-21186

STOREY, R. F. R.
Simulation of turbofan engine models in the Weybridge low speed wind tunnel
[BAE-INFORM-NOTE-46] N82-21212

STOUT, R. J.
Service sensitivity of polysulfide sealants
A82-27407

STRAUB, F. K.
Application of the finite element method to rotary wing aeroelasticity
[NASA-CR-165854] N82-20561

STREETER, B.
Study of noise reduction characteristics of composite fiber-reinforced panels, interior panel configurations, and the application of the tuned damper concept
[NASA-CR-168745] N82-21999

STROCK, J.
Telemetry Computer System at Wallops Flight Center
A82-27188

STROUD, R. H.
Performance improvements with the free-tip rotor
A82-26387

SULLIVAN, A.
Selection of optimum antennas for tracking telemetry intrumented airborne vehicles
A82-27228

SULLIVAN, J. F.
Operational procedures relative to severe weather
N82-21142

SUMMA, J.
A surface singularity method for rotors in hover or climb
[AD-A109687] N82-20176

SWEETMAN, B.
The bomber that radar cannot see
A82-25874

SWINDLEHURST, C. W.
A crashworthiness test for composite fuselage structure
A82-27139

SZECHENYI, E.
Aeroelasticity of compressor blades - Subsonic stall flutter
A82-26993

T

TALANTOV, A. V.
The effect of the shape of a body on the efficiency of its utilization as a flame stabilizer
A82-26483

TANIS, C.
Composite fasteners - A compatible joining technique for fibrous composites in structural design
A82-27159

TANNEHILL, J. C.
Numerical solution of Space Shuttle Orbiter flow field
[AIAA PAPER 82-0028] A82-27083

TILLIAEVA, N. I.
Allowance for flow nonuniformity in the minimum section in the optimal contouring of the expanding part of a nozzle
A82-25798

TOBIAS, R. W.
Configuration management techniques for automatic testing
A82-27893

TOBIASON, A. R.
NASA research programs responding to workshop recommendations
N82-21146

TOMER, C. V.
SH-60B Seahawk automatic blade fold system
A82-26391

TOONG, H.-M. D.
Automating air-traffic control
A82-26511

TOULOUSE, G.
Quantitative interpretation of recirculated flow visualization by the analysis of video pictures
A82-27109

TROSHCHENKO, V. T.
The effect of temperature-time factors on the metal damage and endurance characteristics of gas-turbine-engine rotor blades
A82-28019

TUCKER, T. N.
Advanced medium scale real-time system
A82-27187

TUNAKOV, A. P.
Requirements on modern mathematical models of gas turbine engines. I
A82-26486

TURNER, A.
Positron annihilation
[BAE-KGT-N-GEN-00996] N82-21600

TURNER, C. D.
Wing/control surface flutter analysis using experimentally corrected aerodynamics
A82-26569

TURNER, E. R.
Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
[AD-A110332] N82-21199
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200
Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201

TURNER, E. W.
Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts
[AD-A109585] N82-20190

TUTTI, E. B.
IATA's Unit Terminal Concept
A82-27049

U

UKOLOV, I. M.
Problems in the automation of the thermal-stress analysis of flight vehicles
A82-27509

UNBEHAUEN, H.
Applications of adaptive control systems
A82-27869

UNGVICHIAN, V.
UTD terrain reflection model with application to ILS glide slope
N82-20166

V

VAIDYANATHAN, A. R.
Helicopter rotor loads using a matched asymptotic expansion technique
[NASA-CR-165742] N82-21156

VAN LEYNSEELE, F.
Experimental study of the flowfield of an airfoil with deflected spoiler
[AIAA PAPER 82-0126] A82-27086

VANDEMARK, F. E.
Meteorology impact on ATC system design
N82-21144

VANGAASBEEK, J. R.
Rotorcraft flight simulation computer program C81 with DATAMAP interface. Volume 1: User's manual
[AD-A108246] N82-20194

VECELLIO, J. G.
Manufacturing cost trade-studies in avionics
A82-27430

VEERS, P. S.
Approach to the fatigue analysis of vertical-axis wind-turbine blades
[DE82-003193] N82-20573

VELUPILLAI, D.
A310 - Europe builds on Airbus success
A82-26536

VENKATAPATHY, E.
Numerical solution of Space Shuttle Orbiter flow field
[AIAA PAPER 82-0028] A82-27083

VILCANS, J.
Test plan for SSR
[AD-A109503] N82-20392

VINCENT, R.
Preliminary airworthiness evaluation of the UH-1H with hot metal plus plume infrared suppressor and infrared jammer
[AD-A110213] N82-21177

VLASOV, E. V.
Suppression of self-oscillations in open wind tunnels
A82-25794

VOLPE, V.
Effects of lightning and nuclear electromagnetic pulse on an advanced composites aircraft
A82-27144

VOSTEEN, L. F.
Composite aircraft structures
A82-27127

VUKOBRATOVICH, D.
Design of a catadioptric VCASS helmet-mounted display
[AD-A109431] N82-20181

W

WADDOUPS, M. E.
Statistical analysis methods for characterizing composite materials
A82-27162
WAGNER, J. H.
Research on turbine rotor-stator aerodynamic interaction and rotor negative incidence stall
[AD-A110341] N82-21203
WALTER, R. W.
Wing/fuselage critical component development program
A82-27130
WANG, G. H.
Statistical analysis and time series modeling of air traffic operations data from flight service stations and terminal radar approach control facilities: Two case studies
[AD-A109873] N82-20172
WARD, A. G.
SAFRA: Controlled requirements expression
[BAE-TMAAS-84] N82-21192
WARMBRODT, W.
Evaluation of the effect of elastomeric damping material on the stability of a bearingless main rotor system
A82-26394
WARWICK, G.
Advanced helicopter concepts compete
A82-26537
WATSON, J. C.
Preliminary design develcpment AV-8B forward fuselage ccmposite structure
A82-27129
WEBER, J. W.
Corona and antenna effects on the RH-53D minesweeping helicopter and Raydist navigation set
A82-27946
WECKESSER, L. B.
Radome aerodynamic heating effects on boresight error
A82-26465
WEDGE, R. H.
Coatings in the aero gas turbine
[PNR-90049] N82-21204
WEED, R. A.
Numerical aircraft design using 3-D transonic analysis with optimization, volume 2. Part 1: Transport design
[AD-A110231] N82-21181
Numerical aircraft design using 3-D transonic analysis with optimization, volume 3. Part 1: User's guide to transport design computer programs
[AD-A110232] N82-21183
WEHNERT, G.
Sikorsky tail rotor - 1980: Advanced manufacturing and quality control techniques
A82-26390
WELSH, B. L.
Pressure measurements on a wing oscillating in supercritical flow
[RAE-TR-79074] N82-21163
WELSH, M. C.
The effect of induced sound on the flow around a rectangular body in a wind tunnel
A82-26190
WENZEL, L. M.
Analytical investigation of nonrecoverable stall
[NASA-TM-82792] N82-21195
WERNER, C.
Rangefinder system for slant range visibility
N82-20746
WESLER, J. E.
Meteorological impact on aviation fuel efficiency
N82-21140
WHITBECK, R. F.
Optimal terrain-following feedback control for advanced cruise missiles
[AD-A110286] N82-21179
WHITE, A.
Categorization of atmospheric turbulence in terms of aircraft response for use in turbulence reports and forecasts
[AD-A109585] N82-20190
WILKINS, D. J.
Durability evaluation of highly stressed wing box structure
A82-27163
WILLIAMS, J. H.
Reduction of structural vibration by a dynamic absorber
[RAE-TM-AERO-1881] N82-21190
WILLIAMS, M. J.
Sea King flight tests pitot-static probe and directional vane instrumentation
[AD-A109427] N82-20176
Boom probe position error corrections for Sea King Mk 50 flight tests
[AD-A109428] N82-20177
WILLIAMS, W. R.
SPF/DB titanium LFC porous panel concept
N82-20155
Laminar flow control SPF/DB feasibility demonstration
[NASA-CR-165818] N82-21532
WILLIS, J. F.
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131
WILSON, B. F.
Automated radome performance evaluation in the Radio Frequency Simulation System /RFSS/ facility at MICOM
A82-26471
WILSON, C. A.
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 1
[NASA-CR-165562-VOL-1] N82-21031
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 2
[NASA-CR-165562-VOL-2] N82-21032
YF 102 in-duct combustor noise measurements with a turbine nozzle, volume 3
[NASA-CR-165562-VOL-3] N82-21033
WILSON, H. J.
Developments to improve the noise and combustion emissions on the Fokker F28 aircraft and its Rolls-Royce RB183-555 engines. Section 1: Development of the new internal 10-Lobe mixer
[PNR-90061] N82-21207
WILSON, V. E.
SPF/DB titanium concepts for structural efficiency foi HC
N82-20154
WINER, D. E.
Meteorological impact on aviation fuel efficiency
N82-21140
WOLFF, R. V.
Durability evaluation of highly stressed wing box structure
A82-27163
WOLFRUM, G.
Influence of strakes on coefficients of longitudinal stability
[MBB-FE-122/S/PUB/22] N82-21215
WOLKOVITCH, J.
Optimal terrain-following feedback control for advanced cruise missiles
[AD-A110286] N82-21179
WONG, R. Y.
Cold-air performance of a 15.41-cm-tip-diameter axial-flow power turbine with variable-area stator designed for a 75-kW automotive gas turbine engine
[NASA-TM-82644] N82-21193

Y

YEEND, R. E.
Operational experience with the fiberglass rotor blade
A82-26388
ICOPTER KEVLAR
A82-26389
YORK, R. E.
Experimental investigation of turbine endwall heat transfer. Volume 1: Description of experimental hardware and test conditions
[AD-A110332] N82-21199
Experimental investigation of turbine endwall heat transfer. Volume 2: Linear and annular cascade summary data sets
[AD-A110333] N82-21200

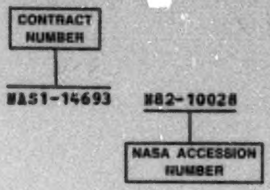
Experimental investigation of turbine endwall heat transfer. Volume 3: Data base system
[AD-A110334] N82-21201
YOUNG, L. R.
Study and design of high G augmentation devices for flight simulators
[AD-A109127] N82-20195

Z

ZELLER, J.
The role of modern control theory in the design of controls for aircraft turbine engines
[AIAA PAPER 82-0320] A82-26526
ZINCONE, R.
The future of helicopter flight control technology
A82-26821
ZIRBES, W. L.
Development of a preloaded hybrid advanced composite wing pivot fairing
A82-27131
ZOSIMOV, A. V.
Suppression of self-oscillations in open wind tunnels
A82-25794

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 1900
N82-21424
AF PROJ. 2307
N82-20468
AF PROJ. 2308
N82-21202
AF PROJ. 2404
N82-21180
N82-21181
N82-21182
N82-21183
N82-21184
AF PROJ. 3066
N82-20184
N82-21199
N82-21200
N82-21201
N82-21203
AF PROJ. 6114
N82-20195
AF PROJ. 7184
N82-20181
AF PROJ. 7231
N82-21167
AF PROJ. 7500
N82-20190
AF PROJ. 9983
N82-21223
AF-AFOSR-ISSA-00013-81
N82-21202
AF-AFOSR-80-0230
A82-26130
DA PROJ. 1F2-62209-AH-76
N82-20178
DA PROJ. 1L1-62209-AH-76
N82-20194
DA PROJ. 1L2-62209-AH-76
N82-21261
DAAJ02-76-C-0069
N82-20178
DAAJ02-77-C-0076
N82-21261
DAAK51-79-C-0015
N82-20194
DAAK51-80-C-0016
N82-21157
DE-AC04-76-DP-00789
N82-20193
DE-AC04-76DP-00789
N82-20573
DE-AI01-77CS-51040
N82-21193
DOT-FA77WAI-808
N82-20163
DOT-FA79NA-6029
N82-20811
DTFA01-81-C-10001
N82-21171
N82-21224
DTFA01-81-Y-10521
N82-20164
FAA PROJ. 034-241-510
N82-21173
N82-21174
F33615-73-C-5104
A82-27163
F33615-75-C-5236
A82-27158
F33615-76-C-3017
A82-27145
F33615-76-C-3142
A82-27141
F33615-77-C-0055
N82-20195
F33615-77-C-2030
N82-21199
N82-21200
N82-21201
F33615-77-C-5050
A82-27159
F33615-77-C-5169
A82-27144
F33615-77-C-5228
A82-27130
F33615-78-C-0520
N82-20181
F33615-78-C-3014
N82-21180
N82-21181
N82-21182
N82-21183
N82-21184
F33615-79-C-5036
A82-26464
F33615-79-C-5038
A82-27412
F33615-80-C-2008
N82-21203
F33615-80-C-3024
N82-20468
F33615-80-G-0002
A82-27415
F33615-80-G-0003
A82-27415
F33615-80-G-0007
A82-27415
F33657-79-C-0820
N82-21222
F42600-78-D-0014
A82-26652
F49620-77-C-0077
A82-27138
F49720-77-C-0082
N82-21405
F336157-77-C-2004
N82-21404
NA-81-RAC-00072
N82-20164
NAG2-2 A82-27714
NAG3-65 A82-27098
NAG3-109 A82-28322
NAG3-242 A82-28322
NASW-3541 N82-20182
N82-20192
NASW-3542 N82-20175
NAS1-15069 A82-26567
NAS1-16222 N82-21156
NAS1-16425 N82-21532
NAS2-10474 N82-21159
NAS2-10564 N82-20143
NAS3-20631 N82-21197
NAS3-20646 N82-21196
NAS3-21974 N82-21031
N82-21032
N82-21033
NAS3-22155 N82-21158
NAS4-2812 N82-21198
NAS8-32692 N82-21139
NCC1-6 N82-21999
NGR-16-002-038
A82-27083
NGR-33-010-182
N82-21054
NR PROJ. 300-003
N82-21214
NSF CHE-79-06304
A82-25773
NSG-1255 N82-20152
NSG-1578 N82-20561
NSG-1583 A82-25772
NSG-1592 A82-26620
NSG-1608 N82-20152
N00014-75-C-0381
N82-20152
N00014-76-C-0357
N82-20472
N00014-78-C-0257
N82-21214
N00014-79-C-0657
N82-21179
N00019-78-G-0288
N82-20185
N00123-79-C-1042
A82-26464
N60530-79-C-0068
A82-26464
N61339-77-C-0094
A82-27946
N62269-77-C-0401
A82-27141
SR0090101 N82-20472
W-31-109-ENG-38
N82-20549
WF41400000 N82-20189
ZR020302 N82-20179
505-31-53-01 N82-20357
505-32-6B N82-20339
505-32-03-04 N82-21037
505-32-68 N82-21195
505-33-22 N82-20566
505-42-13-04 N82-20561
505-42-21 N82-20188
N82-21159
532-02-11 N82-20187
532-04-11 N82-20174
534-01-13-06 N82-20149
534-04-13-64 N82-20145
534-05-00-61-72
N82-21166
535-03-12 N82-21998
778-32-01 N82-21193

1. Report No. NASA SP-7037(150)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Aeronautical Enginnering A Continuing Bibliography (Supplement 150)		5. Report Date July 1982
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		10. Work Unit No.
		11. Contract or Grant No.
12. Sponsoring Agency Name and Address		13. Type of Report and Period Covered
		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 382 reports, articles and other documents introduced into the NASA scientific and technical information system in June 1982.

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified - Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 120	22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NEWARK PUBLIC LIBRARY

NOV 3 1982

U. S. GOVT. PUBS.
DEPOSITORY 376

NASA SP-7037(151)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 151)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in July 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141 093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 362 reports, journal articles, and other documents originally announced in July 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-1/	-2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

Price Code	North American Price	Foreign Price
N01	30.00	45.00

TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) 325

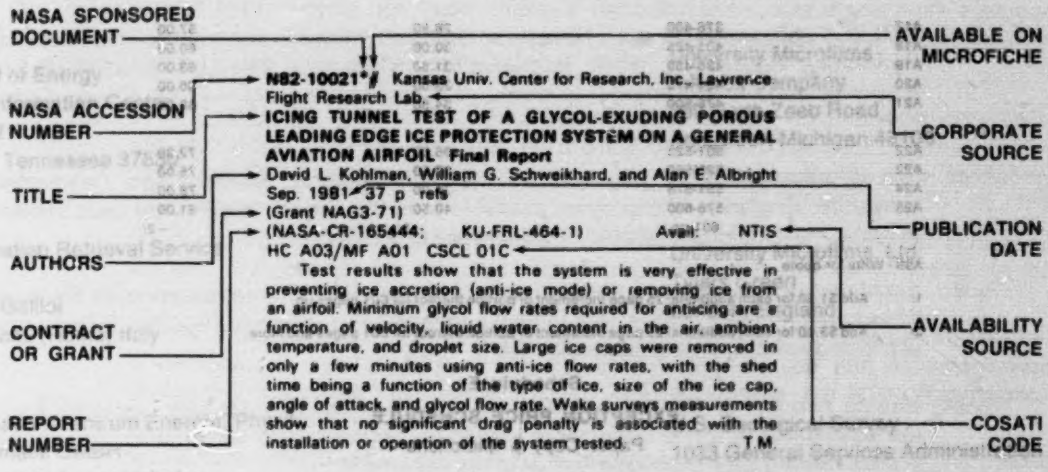
STAR ENTRIES (N82-10000) 343

Subject Index A-1

Personal Author Index B-1

Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*

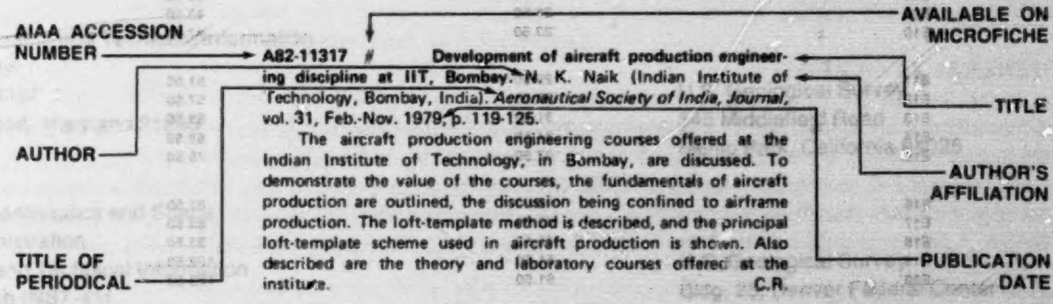


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHORS
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AUTHOR
TITLE OF PERIODICAL
AVAILABLE ON MICROFICHE
TITLE
AUTHOR'S AFFILIATION
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 151)

AUGUST 1982

IAA ENTRIES

A82-28543 **Occurrence of fretting fatigue failures in practice.** P. J. E. Forsyth (Royal Aircraft Establishment, Materials Dept., Farnborough, Hants., England). In: Fretting fatigue. London, Applied Science Publishers, Ltd., 1981, p. 99-125.

The basic characteristics of fretting fatigue are identified and practical engineering situations where fretting fatigue problems can arise are discussed. The discussion includes both commonly observed cases, such as flanges and loaded holes, and less common cases such as that of an aircraft lift strut stabilizing point where aerodynamic vibrations are developed in the member. It is pointed out that once a fretting fatigue failure has occurred in service, remedial measures can be found which will eliminate the problem. However, difficulties still arise in applications where the possibilities of fretting have not been identified at the design stage, and in pin-lug combinations where the engineering variables are difficult to control and where anti-fretting compounds are difficult to maintain in situ. V.L.

A82-28565 * **Finite element thermal analysis of convectively-cooled aircraft structures.** A. R. Wieting (NASA, Langley Research Center, Hampton, VA) and E. A. Thornton (Old Dominion University, Norfolk, VA). In: Numerical methods in heat transfer. Chichester, Sussex, England and New York, Wiley-Interscience, 1981, p. 431-443. 8 refs.

The design complexity and size of convectively-cooled engine and airframe structures for hypersonic transports necessitate the use of large general purpose computer programs for both thermal and structural analyses. Generally, thermal analyses are based on the lumped-parameter finite difference technique, and structural analyses are based on the finite element technique. Differences in these techniques make it difficult to achieve an efficient interface. It appears, therefore, desirable to conduct an integrated analysis based on a common technique. A summary is provided of efforts by NASA concerned with the development of an integrated thermal structural analysis capability using the finite element method. Particular attention is given to the development of conduction/forced-convection finite element methodology and applications which illustrate the capabilities of the developed concepts. G.R.

A82-28587 **The gas turbine engine.** D. Driver, D. W. Hall, and G. W. Meetham (Rolls-Royce, Ltd., Derby, England). In: The development of gas turbine materials. London, Applied Science Publishers, 1981, p. 1-30. 28 refs.

An historical account is given of the developments in gas turbine engine mechanical design which, by increasing operating temperature requirements in their evolution towards greater thrust and lower fuel consumption, have strongly affected the choice of component materials. The desire to reduce powerplant weight, and especially the weight of rotating components, has also been a significant factor in the development of materials. Compressor materials, which were largely aluminum alloy in the earliest gas turbine engines, were supplanted by steels as temperatures rose above 200 C in the early 1950s; the development of high specific strength titanium alloys led to their application to compressor blades and casings after 1960. Combustion chamber and turbine materials have been a succession of increasingly corrosion-resistant nickel-based superalloys. Attention is also given to drive shafts and bearings. O.C.

A82-28590 **Composite materials.** W. N. Turner, J. W. Johnson, and C. G. Hannah (Rolls-Royce, Ltd., Derby, England). In: The development of gas turbine materials. London, Applied Science Publishers, 1981, p. 121-145. 16 refs.

Since the development of the RB 162 engine, composite materials such as glass fiber/epoxy, glass fiber/polyimide, and carbon or graphite fiber/epoxy have displaced conventional metallic components in aircraft gas turbines through a combination of lower weight and superior performance. Applications of such composites include compressor blades and casings, fan blades, nacelle components and thrust reversers. Emphasis is put on the development of pressure-assisted resin injection and the autoclave molding resin system for the successful application of carbon fiber reinforced plastics. The prospective development of high-temperature, metal-matrix composites able to operate above the polymer limit of 300 C is also considered. Such composites will employ alumina, carbon and silicon carbide fibers in the reinforcement of aluminum and titanium alloy matrices. O.C.

A82-28594 **Sheet materials - Fabrication and joining.** B. Hicks (Lucas Aerospace, Ltd., Fabrication Div., Burnley, Lancs., England). In: The development of gas turbine materials. London, Applied Science Publishers, 1981, p. 229-258. 47 refs.

Aircraft gas turbine engine sheet-fabricated components include fan casings, combustion chambers, and bypass and exhaust ducts of often complex shape which must be produced to high standards. Their production sequence typically entails (1) shaping sheet metal parts by bending, drawing, stretch-forming, stamping and roll-forming, with inter-stage annealing and cleaning; (2) the machining of those forgings and castings which are to become an integral part of the fabricated assembly; (3) degreasing, annealing and descaling of the parts in preparation for welding; (4) tungsten argon-arc or resistance welding; and (5) stress-relieving of the welded assembly and final heat treatment. Materials used range from high-temperature superalloys employed in combustors and exhaust ducting to the alloy steels and titanium alloys of air casings and shrouds. Attention is given to the properties of such sheet alloys as Nimonic 75, Hastelloy X, and Jethete M 152. O.C.

A82-28843 **Processing and uses of carbon fibre reinforced plastics.** (Translation of Verarbeiten und Anwenden kohlenstoffaserverstärkter Kunststoffe, Düsseldorf, VDI-Verlag GmbH, 1981.) Düsseldorf, VDI-Verlag GmbH, 1981. 283 p. $61.

After an introductory paper on the processing and uses of carbon fiber reinforced plastics (CRP), consideration is given to high-strength carbon fibers based on polyacrylonitrile, high-modulus carbon fibers made from pitch, the surface treatment of carbon fibers, the nondestructive testing of CRP, and the novel high-strength structure materials family of hollow fiber composites. Also discussed are CRP tension-compression struts, the CRP design and construction of the Alpha-Jet elevator unit, the design and finite element method structural analysis of the Airbus CRP rudder assembly, cardan shafts composed of CRP and mixed laminates, an aluminum/CRP bridge, chopped carbon fiber technology, and the use of carbon fiber reinforced epoxy resin for human implants. O.C.

A82-28848 **Elevator unit for the Alpha-Jet, made from carbon-fibre reinforced plastic.** H. Conen and M. Kaitatzidis (Dornier GmbH, Friedrichshafen, West Germany). In: Processing and uses of carbon fibre reinforced plastics. Düsseldorf, VDI-Verlag GmbH, 1981, p. 151-166. Translation.

A detailed description is given of the design and construction of a carbon fiber-reinforced plastic (CRP) elevator structure for the Alpha-Jet trainer aircraft. The spar box of the elevator unit consists of two continuous CRP shells and 11 metal ribs, and the remainder of the assembly consists of CRP, or glass reinforced plastic, or a combination of the two. Attention is given to comparisons of structural complexity and production costs for the conventional metallic and CRP elevator units, laminate construction details, the stiffening of the spar box shells by means of a supporting sandwich, and preparation of the spar box for autoclaving. A weight saving of 18% has been demonstrated for the CRP structure, which in fatigue tests has exhibited a 20,000 flying hours capability. O.C

A82-28658 **The effect of swirl burner aerodynamics on NOx formation.** T. C. Claypole and N. Syred (University College, Cardiff, Wales). In: Symposium /International/ on Combustion, 18th, Waterloo, Ontario, Canada, August 17-22, 1980, Proceedings. Pittsburgh, PA, Combustion Institute, 1981, p. 81-89. 17 refs. Research supported by the Science Research Council.

When swirl is applied to the combustion air of a burner, a complex, highly turbulent flow field is established which produces very stable flames. There is currently little information available regarding the effect of the swirl on pollutant formation. The current investigation is concerned with the influence of the levels of swirl on the aerodynamics and NOx emissions at constant load. The instantaneous velocities in the experiments are measured by dual beam laser anemometry. The flame is sampled with the aid of a quartz probe. It is found that to establish the source of pollutants in a swirl combustor, it is essential to consider the pollutant mass flow profiles. The recirculation zone, despite elevated temperatures, does not appear to play a major role in the formation of NOx. G.R.

A82-28660 **NOx formation in flat, laminar, opposed jet methane diffusion flames.** W. A. Hahn and J. O. L. Wendt (Arizona, University, Tucson, AZ). In: Symposium /International/ on Combustion, 18th, Waterloo, Ontario, Canada, August 17-22, 1980, Proceedings. Pittsburgh, PA, Combustion Institute, 1981, p. 121-129; Comments, p. 129-131. 18 refs. U.S. Environmental Protection Agency Grant No. R-803715; Contract No. 68-02-2631.

Diffusion flames can play a useful role in the study of the kinetic mechanisms of pollutant formation. A laminar diffusion flame which has a number of useful attributes is the flat laminar opposed jet diffusion flame. Such a flame is established between two coaxial opposed jets, one being fuel only and the other being oxidizer only, impinging on one other. This flame is strained in its own plane, and it can be envisioned as a prototype model for laminar flamelets in turbulent diffusion flames. It is shown that the considered flame, having a given stretching rate, is one dimensional in temperature, concentration, and axial, but not radial, velocity profiles, provided the correct boundary conditions are employed for the velocities of the two incoming jets. G.R.

A82-28692 **The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures.** G. A. Karim, I. Wierzba, M. Metwally, and K. Mohan (Calgary, University, Calgary, Alberta, Canada). In: Symposium /International/ on Combustion, 18th, Waterloo, Ontario, Canada, August 17-22, 1980, Proceedings. Pittsburgh, PA, Combustion Institute, 1981, p. 977-990; Comments, p. 990, 991. 8 refs. Research supported by the National Research Council of Canada, Imperial Oil, Ltd., and University of Calgary.

The purpose is to establish the way in which the presence of a fuel vapor homogeneously dispersed in the surrounding air influences the burning characteristics of the jet flame and the corresponding flammability limits for both co-flowing and contra-flowing surrounding streams in the presence of a pilot jet diffusion flame. A wide range of jet diameters and discharge velocities is employed involving methane or hydrogen at ambient temperature and pressure. Both laminar and turbulent co-flowing streams are considered; the streams involve a range of gaseous fuel-air mixtures and include methane, hydrogen, propane and ethylene. It is shown that the presence of very small concentrations of fuel in the surroundings of the jet flame tends to increase the flame thickness and height and to considerably enhance its stabilization. It is also found that the detected flame spread lean limit of the fuels is essentially independent of the type of jet fuel and the initial jet discharge velocity. C.R.

A82-28738 **The relaxation oscillation in ramjet combustion.** N. Huang (Beijing Institute of Aeronautics and Astronautics, Beijing, People's Republic of China). In: Symposium /International/ on Combustion, 18th, Waterloo, Ontario, Canada, August 17-22, 1980, Proceedings. Pittsburgh, PA, Combustion Institute, 1981, p. 1891-1897. 20 refs.

A mechanism of low frequency relaxation oscillation in ramjet combustion is proposed. Initial pressure disturbances induce combustion instability which results in periodic heat release. Acting as feedback, the periodic heat release boosts the pressure pulsations. The complex shock wave system separating the supersonic and subsonic flows may be replaced by a virtual normal shock which shifts back and forth in the diffuser duct in response to the pulsating pressure. The cold gas column expands or contracts like a buffer plug between the virtual normal shock and the flame front in accordance with the pulsating combustion downstream. This chain of actions and reactions results in a self-excited nonlinear relaxation oscillation with irregular frequency. The proposed mechanism explains quite well the oscillograph obtained from the rig testing of a 220 mm ramjet engine in a free jet of Mach No. 1.94 from a blowdown tunnel. (Author)

A82-28808 **Applications of structural adhesives in production.** W. J. Charles and S. J. Palmer (3M United Kingdom, Ltd., Adhesives, Coatings and Sealants Div., Swansea, Wales). In: Adhesion 5; Proceedings of the Eighteenth Annual Conference on Adhesion and Adhesives, London, England, March 1980. London, Applied Science Publishers, Ltd., 1981, p. 119-131.

A82-28826 **Instruments and installations for meteorological measurements at airports (Pribory i ustanovki dlia meteorologicheskikh izmerenii na aerodromakh).** Edited by L. P. Afinogenov and E. V. Romanov. Leningrad, Gidrometeoizdat, 1981. 296 p. In Russian.

A description is given of the systems and devices which are employed to provide the meteorological information which is needed for the conduction of the flight operations of civil aviation according to the established standards of safety, efficiency, and reliability, taking into account the meteorological conditions at the airport and its environment. Problems and organizational aspects concerning the conduction of meteorological measurements at airports are discussed, giving attention also to the accuracy requirements. The various approaches for determining visibility characteristics are examined along with the equipment employed in the measurements. The determination of wind parameters, atmospheric pressure, temperature, and humidity is also considered. A description is provided of an automatic system which was developed in 1971 for the utilization of automatic procedures in connection with the acquisition, the processing, and the distribution of meteorological data. G.R.

A82-28873 **Tool use in cutting operations involving integral structural components in aircraft construction (Werkzeugeinsatz bei der Zerspanung von Integralbauteilen im Flugzeugbau).** H. Graalmann (Messerschmitt-Bölkow-Blohm GmbH, Augsburg, West Germany). In: Cutting operations for metals (Zerspanung der Metalle). Oberursel, West Germany, Deutsche Gesellschaft für Metallkunde, 1981, p. 97-104. In German.

In connection with the desirability to use lighter and stiffer structural units in aircraft designs, integral constructional approaches have been adopted in the aircraft industry during the last few years. The change involves a replacement of a multitude of small individual sheet metal parts by a few complex integral structural components, which are obtained by suitable machining operations from forgings or plates. The materials used for the production of integral structural components include, in addition to aluminum, also titanium and high-strength steels. However, a number of problems arise in connection with the required metal-cutting operations. Problems related, in particular, to the use of titanium are solved by making use of a new cutting concept involving the use of multiple-spindle machines and special tools. Attention is given to the selection of suitable cutting tools. G.R.

A82-28876 **Cascade converter of dc voltage to ac voltage**

of higher frequency with voltage and frequency stabilization devices (Kaskadnyi preobrazovatel' postoiannogo napriazheniia v peremennoe povyshennoi chastoty s ustroistvami dlia stabilizatsii napriazheniia i chastoty). M. M. Krasnoshapka and I. P. Terekhov (Vysshee Inzhenerno-Aviatsionnoe Voennoe Uchilishche VVS, Kiev, Ukrainian SSR). *Tekhnicheskaia Elektrodinamika,* Jan.-Feb. 1982, p. 56-62. In Russian.

A dc-to-ac cascade converter is presented which consists of a dc motor and an asynchronous motor with a three-phase stator winding and a multiphase rotor winding mounted on a common shaft within the same housing. The experimental converter changes 28 V dc to 200/115 V ac, 400 Hz; it has a power of 800 VA at 6000 rpm and an efficiency of 0.56. The voltage stabilization circuit includes a toroidal winding on the back of the stator, an automatic voltage regulator which controls the magnetization current of the toroidal winding, and a capacitor bank controlled by the magnetization current through a contactor. Frequency is stabilized by an automatic current regulator in the control field coil circuit. V.L.

A82-28932 **A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes.** W. T. Fujimoto and C. R. Saff (McDonnell Aircraft Co., St. Louis, MO). *(Society for Experimental Stress Analysis, International Congress on Experimental Mechanics, 4th, Boston, MA, May 25-30, 1980.) Experimental Mechanics,* vol. 22, Apr. 1982, p. 139-146. 16 refs.

A general two-dimensional crack growth prediction methodology for flawed fastener holes is developed which accounts for the effects of residual stresses due to yielding at the hole edge as well as the changing shape of the flaw. The methodology is based on a slice-synthesis model of the flawed hole which predicts the stress-intensity factor distribution along the periphery of the crack after each increment of advance. Analytic predictions of crack growth rates are found to be in good agreement with test results. It is concluded that the assumption of a constant shape in one-dimensional crack growth prediction schemes can result in highly inaccurate service life estimates. V.L.

A82-28934 **Utility of a probability-density-function curve and F-maps in composite-material inspection.** J. L. Rose, Y. H. Jeong, and M. J. Avioli (Drexel University, Philadelphia, PA). *Experimental Mechanics,* vol. 22, Apr. 1982, p. 155-160.

The principles of probability-density-function analysis are briefly reviewed and its applications to nondestructive testing are discussed with emphasis on composite materials inspection. It is shown that probability-density-function curves can be used to produce feature maps (F-maps) of a composite material which are useful in both quality control and damage assessment. Sample problems involving graphite-polyimide structures and boron-aluminum materials are examined to illustrate the use of probability-density-function curves and F-maps. The concept of inspectability and its role in selecting a manufacturing technology are also discussed. V.L.

A82-28986 # **Prediction of aerodynamically induced vibrations in turbomachinery blading.** D. Hoyniak and S. Fleeter (Purdue University, West Lafayette, IN). In: Fluid/structure interactions in turbomachinery; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 1-8. 14 refs.

To predict the aerodynamically forced response of an airfoil, an energy balance between the unsteady aerodynamic work and the energy dissipated through the airfoil structural and aerodynamic damping is performed. Theoretical zero incidence unsteady aerodynamic coefficients are then utilized in conjunction with this energy balance technique to predict the effects of reduced frequency, inlet Mach number, cascade geometry, and interblade phase angle on the torsion mode aerodynamically forced response of the cascade. In addition, experimental unsteady aerodynamic gust data for flat plate and cambered cascaded airfoils are used together with these theoretical cascade unsteady aerodynamic damping coefficients to indicate the effects of incidence angle and airfoil camber on the forced response of the airfoil cascade. (Author)

A82-28987 * # **Measurement of aerodynamic work during fan flutter.** A. P. Kurkov (NASA, Lewis Research Center, Cleveland, OH). In: Fluid/structure interactions in turbomachinery; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 9-18. 12 refs.
(Previously announced in STAR as N81-25060)

A82-28393 # **The excitation of compressor/duct systems.** R. E. Peacock (U.S. Naval Postgraduate School, Monterey, CA) and D. K. Das (Cranfield Institute of Technology, Cranfield, Beds., England). In: Fluid/structure interactions in turbomachinery; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 71-78. 5 refs. Research sponsored by the Ministry of Defence of England.

A series of experiments is reported in which the flow through a compressor/duct combination was perturbed in a cyclic way. The unsteady flows generated were mapped through the system in the regime of stable compressor operations and the variation of their magnitude evaluated. It was found that in approaching the stability limit the stagnation pressure pulses tended to be magnified and that the position of the stability limit line depended both upon the mean operating point of the compressor and the pulsation characteristics. Further, it was possible to destabilize the system in a surge type manner at any superimposed frequency. (Author)

A82-28994 **Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981.** Meeting sponsored by the American Society of Mechanical Engineers. Edited by J. W. Goodman (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). New York, American Society of Mechanical Engineers (Aerospace Symposia Series. Volume AD-02), 1981. 47 p. Members, $7.00; nonmembers, $14.

Among the topics discussed are the use of the sheet metal weldbonding process in A-10 aircraft production, the structural integrity of an adhesively bonded aircraft fuselage, and the superplastic forming of 7475 aluminum alloy high-strength aircraft structures. Also considered are the development of low-cost titanium alloy structures using blended elemental powder metallurgy, and the techniques of built-up, low-cost advanced titanium alloy aircraft structure manufacture. O.C.

A82-28995 # **Production weldbonding on the A-10 aircraft.** R. L. Rupp, A. Shames (Fairchild Republic Co., Farmingdale, NY), and S. G. Lee (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 1-10. 6 refs. Contract No. F33615-78-C-5121.

The weldbonding process - an energy conservative manufacturing process where the detail parts are fixtured by spotwelding through a structural adhesive with subsequent curing to obtain the strength and fatigue life characteristic of adhesive bonded structure has been production implemented on the A-10. A four-phase program has been conducted to provide near-term service experience and production experience on the A-10 and to define weldbond applicability to fatigue and fracture critical primary aircraft structure and secondary structure by mechanical property and environmental durability testing. The production costs for the first 100 weldbond shipsets are discussed with an analysis of the key cost drivers. Planned production is in excess of 2000 weldbond assemblies. (Author)

A82-28996 # **Structural integrity of an adhesively bonded aircraft fuselage.** D. L. Potter (Douglas Aircraft Co., Long Beach, CA). In: Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 11-17. 11 refs. USAF-sponsored research.

Procedures and test results used in the selection of a surface treatment and adhesive system, and methods for its nondestructive inspection, are described for the case of the Primary Adhesively Bonded Structure Technology (PABST) program. PABST is concerned with evaluating the potential cost savings, weight reductions, and structural integrity improvements that may result from the application of recently developed environment-resistant, 250 F-cure modified epoxy adhesives and their primers. NDI-detected adhesive flaws in the full-scale demonstration component structure, destructively exposed after completion of the test program, showed precise correlation with the Fokker Bondtester Model 70. It is also found that metal crack propagation is contained within the stiffened boundaries of pressurized panels. The damage tolerance and durability of bonded primary structures are shown to be superior to those of mechanically-fastened structures despite the fabrication quality latitude permitted by the PABST program. O.C.

A82-28997 # **SPF of high strength aluminum structures.** F. T. McQuilkin (Rockwell International Corp., North American Aircraft Div., Los Angeles, CA), C. H. Hamilton (Rockwell International Science Center, Thousand Oaks, CA), and J. Waldman (U.S. Army, Research and Development Command, Dover, NJ). In: Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 19-25.

The aluminum alloy 7475 has been shown to exhibit excellent superplastic properties upon thermomechanical processing, allowing the one-step production of complex structures otherwise realizable only through the use of many parts and fasteners. After reviewing the results of tests characterizing elongation as a function of temperature and strain rate, and corresponding measurements of flow stress as a function of strain rate, over the temperature range of 371-516 C, the strain rate sensitivity exponent was determined as a function of temperature strain rate for the selection of optimum forming parameters. The 7475 alloy was then applied to the production of a redesigned T-39 Saberliner forward fuselage bulkhead consisting of a single, complex-formed sheet with four small clips, by contrast to 18 parts and over 100 rivets in conventional form, demonstrating a 36% cost reduction and 22% weight saving. O.C.

A82-28998 # **Development of low-cost titanium structures using blended elemental powder metallurgy.** P. C. Eloff (Imperial Clevite Technology Center, Cleveland, OH). In: Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 27-31. Research supported by Gould, Inc., United Technologies Corp., and Magnavox Government and Industrial Electronics Co.

By using blends of titanium sponge fine powder and elemental or masteralloy powders, powder metallurgy techniques have demonstrated a halving of materials costs by comparison with conventional wrought titanium alloy hardware production. An additional advantage of powder metallurgy in the working of the titanium alloy family in question, which is difficult to machine, is the ability to produce near-net shapes requiring little subsequent machining. The two structural components by which these capabilities are demonstrated are a compressor-stator connecting link for the F-100 turbofan engine, and a warhead body for the Army Stinger ground-to-air missile. The alloy compositions used are Ti-6Al-4V and Ti-6Al-6V-2Sn, respectively. It is suggested that it may be possible to formulate alloys through powder blending which would not be obtainable by means of conventional ingot metallurgy. O.C.

A82-29000 # **Advanced technology DFCS control panel for the L-1011-500.** T. E. Foster (Rockwell International Corp., Collins Air Transport Div., Cedar Rapids, IA). *American Institute of Aeronautics and Astronautics and Institute of Electrical and Electronics Engineers, Digital Avionics Systems Conference, 4th, St. Louis, MO, Nov. 17-19, 1981, AIAA Paper 81-2240.* 8 p.

The design features and development are described of a digital glareshield panel for the digital FCS-240 system that achieves the following design objectives: (1) an efficient interface with the digital FCC's; (2) improved mean time between failures; (3) required aircraft wiring; (4) improved monitoring and fault isolation features; (5) accommodation of new operational features; (6) increased flexibility for configuration changes. Besides providing traditional functions, the panel contains these advanced technology features: gas discharge displays, multifunctional displays, ARINC 429 interfaces, microprocessor control, dual redundant design, monitoring and fault isolation, human factor design, and growth and flexibility accommodation. C.D.

A82-29005 # **A Schwarz-Christoffel method for generating internal flow grids.** K. P. Sridhar (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT) and R. T. Davis (Cincinnati, University, Cincinnati, OH). In: Computers in flow predictions and fluid dynamics experiments; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 35-44. 17 refs.

A new coordinate generation technique, developed by Davis for external flows, is extended to allow for accurate grid generation for a variety of complex internal flow configurations. The approach is based on numerical integration of the Schwarz-Christoffel transformation for polygonal surfaces. It is shown to be second-order accurate with mesh size due to analytic treatment of boundary singularities. The method is flexible enough to allow for treatment of severe internal geometries, for a high degree of control of mesh spacing, and for generation of either orthogonal or nonorthogonal grids. In addition, this technique directly provides the two-dimensional incompressible potential flow solution for internal flows, as well as a simple expression for calculating the grid metric coefficients. Sample cases include symmetric and asymmetric channel, diffuser, and cascade flows. (Author)

A82-29006 * # **Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data.** B. H. Anderson, C. W. Putt, and C. C. Giamati (NASA, Lewis Research Center, Cleveland, OH). In: Computers in flow predictions and fluid dynamics experiments; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 65-72. 12 refs.
(Previously announced in STAR as N81-29782)

A82-29018 # **A computer-controlled oscillation mechanism for unsteady aerodynamics experiments.** J. P. Retelle (U.S. Air Force Academy, Colorado Springs, CO), M. S. Francis (USAF, Office of Scientific Research, Bolling AFB, Washington, DC), and J. E. Keese (USAF, Ballistic Missile Office, Norton AFB, CA). In: Computers in flow predictions and fluid dynamics experiments; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 213-218. 5 refs.

Numerous wind tunnel studies of airfoil dynamic stall have been limited to harmonic model oscillations, but new microcomputers and hybrid servo systems have now been exploited to produce a mechanism which provides a high degree of flexibility in achieving arbitrary model motions in multiple degrees of freedom over a wide range of motion alternatives. An apparatus capable of providing simultaneous motions of an airfoil or wing model in both pitch and translation has been designed and fabricated. Drive motors provide independent motion in two axes under control of servo-translator units which respond to pulse trains generated by a microcomputer using analog position and feedback loops to smooth the pulses. Programs are developed in a higher-level language using a larger disk-based computer system with subsequent downline loading of the program task image through a network communications link to the smaller computer. In addition to a description of the experimental apparatus, the various elements of motion control, including servo-translator dynamic characteristics, software techniques for pulse train generation, and required computer interface circuitry, are discussed. System performance characteristics are also discussed. (Author)

A82-29032 # **Fatigue behavior of adhesively bonded joints.** W. B. Jones, Jr. (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH) and J. Romanko (General Dynamics Corp., Fort Worth, TX). In: 1981 advances in aerospace structures and materials; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 61-65. 5 refs. Contract No. F33615-76-C-5220.

Adhesively bonded metal aircraft structural joints are multicomponent systems, and as such, may display complex fatigue behaviors over the range of loads and environments typically experienced in service. In order to explore the fatigue behavior of the adhesive layer itself, thick-adherend lap-shear joints were fabricated, stress analyzed, and tested. Stress distributions in the adhesive layer were calculated using a finite element program. Instrumented fatigue tests were conducted at several loads, frequencies, humidities and temperatures. Some of these tests were interrupted, and the metal had been chem milled away. Only specimens which had experienced unduly high load amplitudes displayed damage. The damage initiated in the (calculated) high stress regions as interface cracks with scrim plane crazing. The cracks grew, with concurrent reduction in joint stiffness, until cohesive failure occured in the scrim plane. The adhesive material tested is surprisingly tough and resistant to fatigue crack growth. (Author)

A82-29036 # **Effects of moisture on the mechanical properties of glass/epoxy composites.** C. D. Douglas and E. R. Pattie (U.S. Army, Army Materials and Mechanics Research Center, Watertown, MA). In: 1981 advances in aerospace structures and materials; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 91-97. 11 refs.

Data are presented showing the effects of moisture on the mechanical properties of a specific glass/epoxy composite system that is a candidate material for fabrication of Army composite helicopter rotor blades. The test specimens were immersed in distilled water at temperatures of 25, 40, 60, and 80 C. Immersion times were one week, one, two, three, six, and nine months, and one year. Tension testing was then done on an Instron floor-model machine at a contant crosshead speed of 0.127 cm/min, and the tangent modulus was determined. Specimen strength was found to decrease by 60 percent at 80 C immersion, less at lower temperatures. The modulus dropped about 50 percent at 80 C immersion for 90 deg off-axis specimens, less for those that were less off-axis. A coupling agent with high-fiber, low-resin content was found to be superior to other couplers. C.D.

A82-29042 # **Turbulence-excited flapping motion of a rotor blade in hovering flight.** Y. K. Lin (Illinois, University, Urbana, IL) and C. Y. R. Hong. In: 1981 advances in aerospace structures and materials; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981. New York, American Society of Mechanical Engineers, 1981, p. 149-153. 10 refs. Grant No. DAAG29-78-G-0039.

Statistical properties of a randomly vibrating rotor blade under the excitation of turbulence is investigated using a simple model which consists of a rigid blade, centrally hinged, with elastic restraint for the flapping motion. It is shown that turbulence affects the blade motion in two ways, distinguished by two types of terms in the equation of motion. The first type appears in the coefficients, thus causing the dynamic system to change randomly with time. The second type appears among the inhomogeneous terms. A theoretical procedure is proposed in which both effects of the turbulence can be accounted for. Application of the methodology is illustrated by numerical examples. (Author)

A82-29098 * **Addition polyimide adhesives containing various end groups.** A. K. Saint Clair and T. L. Saint Clair (NASA, Langley Research Center, Hampton, VA). *Polymer Engineering and Science*, vol. 22, no. 1, Jan. 1982, p. 9-14. 11 refs.

Addition polyimode oligomers have been synthesized from 3,3 prime, 4,4 prime-benzophenone tetracarboxylic acid dianhydride and 3,3 prime-methylenedianiline using a variety of latent crosslinking groups as end-caps. The nominal 1300 molecular weight imide prepolymers were isolated and characterized for solubility in amide, chlorinated and ether solvents, melt-flow and cure properties, glass transition temperature, and thermal stability on heating in an air atmosphere. Adhesive strengths of the polyimides were obtained both at ambient and elevated temperatures before and after aging at 232 C. Properties of the novel addition polyimides were compared to a known nadic end-capped adhesive, LARC-13. (Author)

A82-29165 * **Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison.** J. M. Fields (NASA, Langley Research Center, Hampton, VA; Southampton, University, Southampton, England) and J. G. Walker (Southampton University, Southampton, England). *Journal of Sound and Vibration*, vol. 81, Mar. 8, 1982, p. 51-80. 24 refs. Research supported by the British Railways; Science Research Council of England Grant No. B/RG/3777/3.

Annoyance expressed in a railway noise survey is compared with that from two road traffic and three aircraft surveys in order to determine whether responses to various types of environmental noise are source-specific. Railway noise is found to be less annoying than other noises at any given high noise level. Railway noise annoyance rises less rapidly with increasing noise level. At high levels, this gap in reactions averages about 10 dB; it ranges from 4 dB to more than 20 dB. The methods used for comparing the surveys are examined. It is found that methodological uncertainties lead to imprecise comparisons and that different annoyance scales yield different estimates of intersurvey differences. C.R.

A82-29256 **Low cost aircrew training devices.** M. A. G. Knight (RAF Support Command, Brampton, Cumb., England). *Aeronautical Journal*, vol. 86, Mar. 1982, p. 98-101. 5 refs.

A description is presented of the simple aids that may be used in the elementary stages of aircrew training, and illustrations are given of their integration with flight simulators and aircraft to constitute a systematic approach to flight training. The techniques described include books and manuals, two-dimensional trainers, cardboard cockpits, suitcase trainers, table top trainers, cockpit procedures and instruments trainers, computer-based trainers, videogames and videodisks. Attention is given to computer-assisted instruction, in which a microcomputer assumes many of the functions of an instructor and a low-cost graphics terminal takes the role of a more complex and detained simulator display. O.C.

A82-29259 **The micro revolution comes to civil air transport.** M. Ryland (British Airways, Heathrow Airport, Middx., England). *Aeronautical Journal*, vol. 86, Mar. 1982, p. 102-108.

A presentation is made of the range of microprocessor applications currently available on civil aircraft, the hardware technology on which these applications are based is reviewed, and the software disciplines and certification procedures pertinent to airborne digital computers are outlined. Attention is given to the application of microcomputer-based systems in the B 757 new-generation airliner, which include flight control computers, flight management computer systems, CRT flight instrumentation, thrust management, air data computation, supervisory engine control, radio navigation and communication equipment control, and electrical generation regulation. It is shown that most problems encountered in applying microcomputers to civil aircraft are software-related. O.C.

A82-29268 **A review of U.S. Air Force research related to airframe and engine materials.** A. H. Rosenstein (USAF, Office of Scientific Research, Bolling AFB, Washington, DC). *Journal of Metals*, vol. 34, Mar. 1982, p. 14-23. 16 refs. USAF-sponsored research.

It is noted that the research addresses the fundamental physical nature of solids most directly relating to mechanical and thermal behavior. This involves an understanding of strengthening mechanisms, fatigue, plasticity, creep, fracture, shock loading, the effect of stress state, the kinetics of phase transformations, lattice imperfections, and the thermal dependence of properties. An important result of this research is information that will lead to improved structural alloys of aluminum, titanium, and nickel and to a thorough understanding of the scientific principles governing their properties and behavior. C.R.

A82-29275 **The investigation of aircraft accidents and incidents - Some recent national and international developments.** A. van Wijk (KLM Royal Dutch Airlines, Schiphol Airport, Netherlands). *Zeitschrift für Luft- und Weltraumrecht*, vol. 31, Mar. 1982, p. 20-55. 75 refs.

In June 1981, an International Civil Aviation Organization (ICAO) Panel of Experts on the General Work Programme of the ICAO Legal Committee recommended that the subject 'Legal Implications of Aircraft Accident and Incident Investigation' deserved consideration as a possible new item to be added to the General Programme of the Legal Committee and that a basic research study should be undertaken by the ICAO Secretariat. A report is provided on developments both at national and international levels connected with the considered subject. Major trends in recent ICAO thinking on the technical side of aircraft and incident investigation procedures are examined, and developments in the U.S. are considered. Resolutions adopted by the European Parliament in relation to air traffic safety issues are also discussed, and attention is given to developments in the Netherlands, Switzerland, Sweden, New Zealand, and Canada. G.R.

A82-29414 Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings. Edited by J. Lincoln. Phoenix, AZ, Arizona Soaring Association, 1981. 120 p.

Features of modern sailplaning, contests, and hang gliding are reviewed. Equipment maintenance and use in sailplanes are discussed, including the calibration of variometers, charging batteries, and types of batteries. Sport hang gliding is described, as is competition tactics and photography. Homebuilt sailplanes are examined from the point of view of a home sailplane builder and a manufacturer of kits, and NASA research relevant to sailplane airfoils is explored. Finally, new concepts in Dolphin Tactics for continuously changing airspeed to maximize performance during a variety of sailplane maneuvers are detailed. M.S.K.

A82-29415 Checking and calibrating variometers in place in the sailplane instrument panel. R. H. Ball. In: Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings. Phoenix, AZ, Arizona Soaring Association, 1981, p. 29-38.

Techniques for calibrating the variometer, pitot total energy compensation, and netto and cruise controls while they are in a glider instrument panel are described. The panel is assumed to feature an altimeter and clock, and further tools recommended are a bottle, a needle valve, a hypodermic syringe, tubing, and fittings. Exact calibration of the variometer in conjunction with the altimeter by setting the pressure equal to 3000 ft using a bottle is described, along with descent rate measurements to assure proper altitude change tracking. Further discussion is given of calibrating a total energy variometer, checking airspeed with an altimeter, the netto compensation principle and calibration, and calibrating the cruise control. Finally, attention is given to altitude errors with a variometer and to best flying speed at various altitudes. M.S.K.

A82-29416 Development of a homebuilt powered sailplane. A. Strojnik. In: Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings. Phoenix, AZ, Arizona Soaring Association, 1981, p. 77-89.

Design and problem solving in the fabrication of the S-2, a 15 m powered sailplane test flown in 1980, are discussed. Weight penalties, the use of a retractable engine to maintain aerodynamic cleanliness, increases in drag due to the presence of an enlarged fuselage area and a propeller, and the normal solution of placing the engine at the rear of a pod-and-boom fuselage are detailed. The S-2 features outrigger wheels on the wingtips, one under the pod, and the steering wheel under the tail. The wings are constant chord with trapezoidal outer 4 ft sections to furnish an elliptical lift distribution at high lift coefficients. A middle wing section is reinforced by a carbon fiber spar, covered in 3-layer fiberglass skins, and shaped into a Wortman airfoil. Young's moduli for the materials are provided. The quality of the wing skin and the precision machining of the propeller are regarded as the two most crucial aspects of the S-2. M.S.K.

A82-29417 * NASA research related to sailplane airfoils. D. M. Somers (NASA, Langley Research Center, Hampton, VA). In: Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings. Phoenix, AZ, Arizona Soaring Association, 1981, p. 99-109. 8 refs.

The theoretical methods and experimental facilities at the NASA Langley Research Center have been employed to conduct investigations of sailplane airfoils. The unique and powerful capabilities of the Eppler Program have been used to design and analyze many airfoils and to smooth several Wortmann airfoils. Wind-tunnel investigations of two sailplane airfoils have been conducted in the Langley low-turbulence pressure tunnel. A procedure for sailplane performance improvement has been outlined. (Author)

A82-29576 Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports (Brand- und Katastrophenbekämpfung aus der Luft; Internationales Wissenschaft-Technisches Symposium, Hanover, West Germany, June 11, 12, 1980, Vorträge). Symposium sponsored by the Bundesministerium für Forschung und Technologie. Melsungen, West Germany, A. Bernecker Verlag, 1981. 242 p. In German. $16.25.

Attention is given to fighting forest fires with the aid of aircraft in the U.S., the fighting of forest fires as a task for the Swiss air force, the current state of technology concerning the fighting of forest fires from the air in Austria, the utilization of agricultural aircraft in economical operations for fighting fires in Israel, and the utilization of aircraft in fighting forest fires in France. The use of 'water bombers' and chemical agents against forest fires is considered along with the employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires, the adaptation and equipment of aircraft for the fighting of forest fires, and the employment of helicopters in Austria in connection with large-scale fires in buildings. Other topics discussed are related to the performance characteristics and employment profiles of the new helicopter BK117, and a comparative evaluation of fire extinguishing agents involving the use of foam. G.R.

A82-29577 # Fighting forest fires with the aid of aircraft in the United States of America (Waldbrandbekämpfung mit Luftfahrzeugen in den Vereinigten Staaten von Amerika). E. W. Keegan (U.S. Forest Service, Washington, DC). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 17-27. In German.

A82-29578 # Fighting forest fires - A task for the Swiss air force (Waldbrandbekämpfung - Eine Aufgabe der Schweizerischen Flugwaffe). R. Salzborn (Schweiger Luftwaffe, Locarno, Switzerland). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 28-33. In German.

Forest fires in the Swiss Alps are considered. It is found that the great majority of all fires is produced by people. The development of a fire as a consequence of lightning is a very rare event. Long-term consequences of forest fires are related to a reduction in the natural capacity of forests to provide protection against avalanches and falling stones. Efforts to fight fires with the aid of aircraft go back to 1962. Fixed-wing aircraft were first utilized in firefighting operations. However, in recent years the use of such aircraft has decreased significantly in connection with the advantages provided by the helicopter for the considered applications. Attention is given to the methods used in firefighting operations conducted with fixed-wing aircraft and with helicopters, taking into account direct approaches and indirect support action. G.R.

A82-29579 # The current state of technology concerning the fighting of forest fires from the air in Austria (Stand der Technik zur Waldbrandbekämpfung aus der Luft in Österreich). T. Angermair (Berufsfeuerwehr, Innsbruck, Austria). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 34-39. In German.

In 1973, difficulties related to the fighting of forest fires by conventional means led in Austria to an investigation of more effective firefighting methods. It was first attempted to provide aircraft to ensure rapid transportation for the men and the equipment needed for the firefighting operations. The helicopter was found to provide significant advantages as a rapid means of transportation, taking into account its capability to convey men and material to and from locations not readily accessible by any other means. The successful solution of all problems related to the envisaged use of the aircraft in firefighting operations was practiced in approximately 300 exercises. Attention is given to the number of aircraft used in Austria for firefighting operations, the employed fire extinguishing agents, the attachment of the containers to the aircraft, financial questions, and details concerning the firefighting operations. G.R.

A82-29580 # **The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel (Die Nutzung landwirtschaftlicher Flugzeuge zur ökonomischen Waldbrandbekämpfung in Israel).** I. Hirsch (Chimavir Services, Tel Aviv, Israel). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 40-43. In German.

The approaches used to protect the coniferous forests of Israel against destruction by forest fires are discussed. The need for such a protection is illustrated by the fact that, in 1979, 2,500,000 trees were destroyed in connection with a total of 500 fires. It had been found that forest fires cannot be effectively controlled on the basis of an exclusive use of ground operations. However, financial considerations made it impossible to obtain for the protection of the forests special aircraft expressly designed for firefighting applications. It was, therefore, decided to utilize aircraft normally used for agricultural applications also for operations related to the fighting of forest fires. Particular attention is given to special approaches which make it possible to apply water for extinguishing fires most effectively from the available aircraft. G.R.

A82-29581 # **The utilization of aircraft in fighting forest fires - French experience (Nutzung der Luftfahrtmittel bei der Waldbrandbekämpfung - Französische Erfahrungen).** H. Balzinger (Ministère de l'Intérieur, Securité Civile, Marignane, Bouches-du-Rhône, France). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 44-52. In German.

Environmental and weather-related conditions in the case of a substantial part of the French forests, taking into account, in particular, coniferous woods, make it necessary to employ aircraft in connection with the protection of these forests against destruction by fire. In 1963, aircraft were used, for the first time in France, in operations related to the fighting of fires in forests. A review is provided of the aircraft available in 1980 for the protection of French forests against destruction by fire, giving attention to light aircraft used in surveillance operations, helicopters, and air tankers. The helicopter can provide a flying command post for the direction of firefighting operations. Other functions of the helicopter are related to its use as a convenient means of transportation in areas with accessibility problems. The air tanker carries water and other agents for an employment in direct firefighting operations from the air. G.R.

A82-29582 # **The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system (Einsatz von Wasserbombern und chemischen Mitteln gegen Waldbrände unter Verwendung eines Erstangriffssystems).** K. B. Marsden (Conair Aviation, Ltd., Abbotsford, British Columbia, Canada). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 66-79. In German.

Fires in the forests, arid lands, and agricultural areas of Western Canada are efficiently controlled by making use of aircraft which drop chemical firefighting agents that remain effective for a long time. The considered approach of fighting fires must be integrated into a coordinated program, involving an early detection of the fire, the availability of aircraft for immediate employment, and the ultimate complete extinction of the fire in connection with ground-based operations. Attention is given to the geographical features of the area of Western Canada, its meteorological characteristics and its vegetation, the design of the employed aircraft, and details regarding the implementation of the considered program. The operations performed by the aircraft are illustrated with the aid of pictures. G.R.

A82-29583 # **The employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires (Einsatz von zwei- und viermotorigen Flugzeugen für den Abwurf der neuesten chemischen Löschmittel bei der Waldbrandbekämpfung).** R. A. Davis (Sis-Q Flying Service, Inc., Santa Rosa, CA). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 88-96. In German.

A82-29584 # **Adaptation and equipment of aircraft for the fighting of forest fires (Anpassung und Ausrüstung von Flugzeugen zur Waldbrandbekämpfung).** R. E. Foy (Aero Union Corp., Chico, CA). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 97-103. In German.

In connection with the selection of an aircraft for aerial firefighting operations, two alternatives have to be considered. An aircraft expressly designed for firefighting applications can be purchased, or an available aircraft designed for civil or military service applications can be acquired with the aim to adapt the aircraft to the requirements which have to be met in connection with the intended future use. Taking into account the high cost of a new aircraft design, it might be preferable, on the basis of economic considerations, to decide in favor of the second alternative. All private firms concerned with the operation of aircraft for the aerial application of fire retardants and fire extinguishing agents in North America use currently surplus civil aircraft or former military aircraft. Attention is given to economic considerations regarding the operations of such aircraft, questions of aircraft suitability for the envisaged applications, and operational details. G.R.

A82-29585 # **The employment of helicopters in Austria in connection with large-scale fires in buildings (Hubschraubereinsätze bei Gebäudegrossbränden in Österreich).** T. Angermair (Berufsfeuerwehr, Innsbruck, Austria). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 139-145. In German.

Special problems concerning rescue operations in the case of large fires in buildings and the fighting of these fires exist in Austria in a very significant number of cases. About one tenth of all Austrians live in high buildings at levels above the 'critical height' of 22 m from the ground. In connection with fires, situations arise in which people are isolated because all possible avenues of retreat have been cut off. The chances for the rescue of people in burning buildings can be significantly improved by supplementing the conventional approaches of the fire department with techniques involving the use of helicopters. It has been found that in the case of pilots experienced in rescue operations in mountainous areas very little additional training is required for the conduction of operations involving the rescue of people in buildings. The conduction of such operations is discussed in detail. G.R.

A82-29586 # **Performance characteristics and employment profiles of the new helicopter BK117 (Leistungsmerkmale und Einsatzprofile des neuen Hubschraubers BK117).** Mr. Schmidt-Bischoffshausen (Messerschmitt-Bölkow-Blohm GmbH, Ottobrunn, West Germany). In: Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports. Melsungen, West Germany, A. Bernecker Verlag, 1981, p. 146-158. In German.

Attention is given to a new helicopter developed jointly by a German aerospace company and a Japanese company. The helicopter can take off and land vertically, has the ability to hover, and can also move slowly in any lateral direction. These flight characteristics have provided for the helicopter a special area of application related to the prevention of fires, the fighting of fires, and protective operations in the case of the occurrence of disasters. Requirements for successful operations involving the fighting of fires are considered, taking into account the importance of an early detection of a fire, the need for an immediate initiation of operations, the achievement of an optimum of operational safety, and design and constructional details. The various types of operations for which the BK117 has been employed are discussed, giving attention to specific data regarding the weight relations in each case. G.R.

A82-29592 **F-15 fighter abilities evaluated.** R. R. Ropelewski. *Aviation Week and Space Technology*, vol. 116, Apr. 26, 1982, p. 39-43, 45, 46.

Modifications, features, and operations of the F-15 in an all weather air-to-ground capability configuration are described. The rear cockpit has been outfitted with four multifunction CRT displays, the mission computer memory has been expanded by 50%, updates in the inertial navigation are now high velocity, and integration of the FLIR and laser ranging system has been accomplished. The total program took a year and a half, and successful demonstration ground strikes are detailed. Specific attention is given to lock-on and forget radar systems and digital menus for calling up enlargements of displayed scenes on the CRT. Images lost during maneuvers could be restored by recycling the computer. The controlled maneuverability of the aircraft is stressed, as are necessities for calibrating the radar systems, proving the sensors, and testing a variety of munitions. M.S.K.

A82-29596 * **Test methodology for evaluation of fireworthy aircraft seat cushions.** D. A. Kourtides and J. A. Parker (NASA, Ames Research Center, Chemical Research Projects Office, Moffett Field, CA). *Journal of Fire and Flammability*, vol. 13, Jan. 1982, p. 56-76. 8 refs. FAA-sponsored research.

Aircraft seat materials were evaluated in terms of their thermal performance. The materials were evaluated using (a) thermogravimetric analysis, (b) differential scanning calorimetry, (c) a modified NBS smoke chamber to determine the rate of mass loss and (d) the NASA T-3 apparatus to determine the thermal efficiency. In this paper, the modified NBS smoke chamber will be described in detail since it provided the most conclusive results. The NBS smoke chamber was modified to measure the weight loss of materials when exposed to a radiant heat source over the range of 2.5 to 7.5 W/cm sq. This chamber has been utilized to evaluate the thermal performance of various heat blocking layers utilized to protect the polyurethane cushioning foam used in aircraft seats. Various kinds of heat blocking layers were evaluated by monitoring the weight loss of miniature seat cushions when exposed to the radiant heat. The effectiveness of aluminized heat blocking systems was demonstrated when compared to conventional heat blocking layers such as neoprene. All heat blocking systems showed good fire protection capabilities when compared to the state-of-the-art, i.e., wool-nylon over polyurethane foam. (Author)

A82-29597 **An evaluation study of aluminide and chromoaluminide coatings on IN-100.** R. Sivakumar (Defence Metallurgical Research Laboratory, Hyderabad, India). *Oxidation of Metals*, vol. 17, Feb. 1982, p. 27-41. 21 refs.

Aluminide and chromoaluminide diffusion coatings on IN-100, a cast Ni-base superalloy, have been investigated under laboratory conditions with reference to their structure and protective properties. The observed differences in the cyclic oxidation and hot corrosion behavior of the coatings are rationalized in terms of the coating chemistry, and in particular, Cr and Al contents in the outer layers. The results obtained provide a way to predict the performance of NiAl-base coatings on Ni-base alloys. V.L.

A82-29659 # **Crossflow shock on the suction side of a flat delta wing with supersonic leading edges.** S. Kubo and T. Fujimoto (Kyoto University, Kyoto, Japan). *(Asian Congress of Fluid Mechanics, 1st, Bangalore, India, Dec. 8-13, 1980). Japan Society for Aeronautical and Space Sciences, Transactions*, vol. 24, Feb. 1982, p. 211-221. 11 refs.

A theoretical investigation is made on the crossflow shock on the suction side of a flat delta wing with supersonic leading edges in a uniform supersonic flow. An extension of the analytic characteristic method is carried out for a three dimensional inviscid flow past a wing. Special care is taken in the treatment of the boundary conditions at the leading edge, at which there is a centered simple expansion wave. A crossflow shock is analyzed on the wing surface. It is found that a weak crossflow shock appears under every condition of the angle of attack and sweepback angle of the leading edge. The location and the strength of the shock are compared with those of available experimental and numerical results. They are compatible with each other within the accuracy of the present analysis. (Author)

A82-29714 **Sea-based remotely piloted vehicles. I - Issues and concepts.** C. Henderson (Institute for Defense Analyses, Alexandria, VA). *Military Electronics/Countermeasures*, vol. 8, Apr. 1982, p. 61-64.

Remotely piloted vehicles (RPVs) in the 10,000-15,000 lb class, equipped with radar and designed to operate from a variety of naval vessels, are proposed as long-range early warning platforms for carrier battle groups. Consideration is given to the inherent potential of RPVs for such missions as command, control and communications (C3), surface surveillance, anti-air warfare, antisubmarine warfare and electronic warfare. It is noted that the RPV payload weight plays an important role in determining the propulsion system thrust required, takeoff and landing modes, and the fuel volume needed for a mission of given duration. While C3 RPVs would be equipped with communication gear and early warning RPVs with powerful search radars, all RPVs would carry data link hardware for command and control and sensor data transmissions. Attention is given to the use of conformal radar arrays, which are shaped to the contour of the aircraft skin. O.C.

A82-29773 **Computational aerodynamics - Its coming of age and its future.** L. R. Miranda (Lockheed-California Co., Burbank, CA). *Lockheed Horizons*, Spring 1982, p. 14-24.

Current capabilities of computational aerodynamics are examined and an attempt is made to assess its future role in aircraft design. Computational aerodynamics is the numerical solution of equations of motion of fluids using digital computers and subsequent simulation of the corresponding aerodynamic flowfields. Simulations are noted to be significant for performance, design, and safety of aircraft. Fields of numerical analysis, aerodynamic theory, and computer technology are combined to produce the numerical simulation, with the projected flowfields being generated by solutions to the Navier-Stokes equations in the form of increasingly closer approximations. Panel methods, a simplified form of the full solution, are explored, and their ability to remain computationally efficient with complex geometries is stressed. Advances in computer technology are foreseen to enhance the option of using full Navier-Stokes equations for high-speed aerodynamic simulations. M.S.K.

A82-29774 **Fuel efficient and Mach 0.8, too.** W. E. Arndt (Lockheed-Georgia Co., Marietta, GA). *Lockheed Horizons*, Spring 1982, p. 26-34.

Principles of propfan technology and problems which must be solved for the introduction of propfans to production aircraft are discussed. The Hamilton-Standard concept, introduced in 1975, includes thin profile, swept-back multiple blades (8-10) suitable for cruise speeds of Mach 0.8 with 15-20% less fuel consumption than currently available with turbofans. Studies in loading fatigue are necessary to determine if the cyclic loading caused by high-speed swept back wings will adversely affect the integrity of composite-material propfans. Additional areas of concern are effects on the aerodynamic efficiency of aircraft induced by the presence of multibladed propfans, and the necessity of adding noise-reducing materials to maintain satisfactory cabin noise levels is a potential weight penalty factor. NASA trials on a converted Jetstar are described, along with possible techniques to reduce near- and farfield noise levels. M.S.K.

A82-29789 **Aerodynamics at the 1981 Le Bourget show (L'aérodynamique au Salon du Bourget 1981).** L. Rosenthal (Centre de Documentation de l'Armement, Paris, France). *L'Aéronautique et l'Astronautique*, no. 92, 1982, p. 37-56. 20 refs. In French.

Applications of the current state of the art in aircraft aerodynamics and general tendencies in the development of the field as manifested at the 23rd International Air and Space Show at Le Bourget in 1981 are considered. Among the new aircraft presented at the show, the most original include the Transavia T 300 Sky Farmer, the Edgley EA7 Optica three-seat observation plane and the NASA Bell XV-15 experimental STOL craft. Configurations receiving significant attention at the show were those with winglets, canards and strakes, especially on military aircraft, leading edge flaps, the remotely piloted HiMAT aircraft and aircraft with forward-swept wings. Developments in propulsion aerodynamics involved air intakes, streamlined and multi-bladed propellers and the prop-fan. The importance of developments in composite materials, propulsion and systems to the realization of these aerodynamic configurations is emphasized. A.L.W.

A82-29792 **Laser gyros - The guiding light.** J. Hecht. *High Technology,* vol. 2, May-June 1982, p. 24, 26-28.

The key advantages of laser gyros over mechanical gyroscopes are the absence of moving parts and lower cost. The laser gyro is a rotation sensor consisting of a rotating ring in which intense monochromatic light going in both directions is generated by the excitation of an active medium in an optical resonator defined by three or more mirrors. Rotating the ring laser changes the effective resonator length so that the frequency of one beam is upshifted and the other downshifted. Turning a typical ring laser by 10 degrees per hour will cause a detectable frequency shift of a few hertz. A number of approaches have been taken to solve the systems's main problem, the tendency of the beams to lock together at the same frequency when the rotation rate is very small. Optical fiber gyros may find use in systems where cost and compactness rather than accuracy are the chief consideration. C.D.

A82-29793 **Future auto engines - Competition heats up.** C. Rain. *High Technology,* vol. 2, May-June 1982, p. 39-47.

The conventional internal combustion engine will remain an important factor in future automobile engines because it is perfectly suited to the widely varying conditions of city and highway driving, and engineers continue to eke out design advances. Diesels will continue to make strong gains in the near term because of their fuel economy advantage, but their emissions and fuel requirement problems are serious. Stratified charge engines could challenge the diesel because they satisfy governmental goals and would require the lowest retooling costs. Their multifuel capability gives them long-term viability. The gas turbine and the Stirling offer the best fuel economies and are clean-burning, and both run on a wide range of fuels. The Stirling requires engineering to improve its power density and to cut costs, while the gas turbine needs a breakthrough in durable high-temperature ceramics. C.D.

A82-29800 **Handling air freight in the 1980s - Meeting the challenge.** P. L. Peoples and V. Sweetland (Boeing Commercial Airplane Co., Renton, WA). *Aircraft Engineering,* vol. 54, Mar. 1982, p. 7-10.

Flight hardware and ground system development areas which are necessary to meet the expected growth in air cargo in the 1980 decade are reviewed. Boeing has undertaken studies involving full-scale mock-ups of the 767 and 757 and various cargo loads to attempt optimization of cargo pallets, container shapes, and handling procedures in moving freight. The large cargo-handling capacity of the 747 is outlined, noting the commonality designed into the cargo configurations for the 767 and 747. Freight and baggage handling procedures have been observed to have divergent requirements, although the LD-4 pallet offers an opportunity for the most efficient loading of either. Cargo and baggage packaging within standardized modules for loading on pallets is asserted to offer 95-97% space utilization. M.S.K.

A82-29820 † **The stressed state of a parachute canopy during opening (Napriazhennoe sostoianie kupola parashiuta pri raskrytii).** G. N. Gaiubov (Tashkentskii Politekhnicheskii Institut, Tashkent, Uzbek SSR). *Akademiia Nauk Uzbekskoi SSR, Doklady,* no. 1, 1982, p. 12-14. 5 refs. In Russian.

A82-29826 † **Optimization of measurements in the state estimation of systems using the least squares method (Optimizatsiia sostava ispol'zuemykh izmerenii v zadachakh otsenivaniia sostoianiia sistem metodom naimen'shikh kvadratov).** L. G. Ambartsumov. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 3-6. 5 refs. In Russian.

Problems of the state estimation of aircraft systems are characterized by a large quantity of information to be processed. This results in an increase in the cost of computations, a decrease in the reliability of the results, and an increase in data processing time. For this reason it is necessary to limit the number of measurements. This paper gives a mathematical formulation and examines the characteristics of the optimization of the number and character of measurements made in the problem of state estimation using the least squares method in the case of an arbitrary matrix of measurements. B.J.

A82-29827 † **The stability of maneuverable flight vehicles (K ustoichivosti manevrennykh letatel'nykh apparatov).** A. B. Aminov. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 7-11. 5 refs. In Russian.

A method is developed for obtaining the region of asymptotic stability in the coefficient space of the nonlinear differential equations of the perturbed motion of a maneuverable flight vehicle. As an example, an analysis is presented of the stability of the longitudinal motion of a flight vehicle with large attack-angle deviations. B.J.

A82-29828 † **Comparison of light aircraft with strutted and cantilever wings (Sravnenie legkikh samoletov s podkosnym i svobodnonesushchim krylom).** A. A. Badiagin. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 11-17. 5 refs. In Russian.

A general formula for the analysis of the mass of strutted and cantilever wings of light aircraft is proposed. Optimal aspect ratio is analyzed, and a formula for determining the maximum flight velocity of a strutted-wing aircraft is presented. The strutted wing is found to be somewhat more cost effective than the cantilever wing. B.J.

A82-29829 † **Design principles of a computer-aided design system (Printsipy postroeniia sistemy mashinnogo konstruirovanniia).** Iu. V. Davydov, A. A. Zazhigin, and V. A. Osipov. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 17-22. 11 refs. In Russian.

The structure and basic features of a computer system for the design of flight vehicles are described. Particular attention is given to mathematical models for the description of wing contours, the determination of external loads, strength analyses, the determination of the geometric characteristics of the components, the graphics system, and the formation of control programs. The input and output parameters of each module of the system are discussed. B.J.

A82-29831 † **Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours (Issledovanie metoda aerodinamicheskogo kontura s upravliaiushchimi funktsiiami v vide gladkikh obvodov postoiannogo znaka).** R. Kh. Akhatov and V. A. Osipov. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 27-31. In Russian.

A modified aerodynamic-contour method is developed which is based on the use of a control function in the form of smooth contours of constant sign. This makes it possible to obtain a mathematical model for a profile curve with normalized constancy of sign and a wide range of variation of the input information. The method is convenient for controlling profile shape and produces a considerable savings in machine time. B.J.

A82-29832 † **Estimation of the performance of nonstationary discontinuous control systems for flight vehicles (Otsenka effektivnosti nestatsionarnykh razryvnykh sistem upravleniia letatel'nykh apparatov).** E. A. Kuklev. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 37-41. In Russian.

The paper examines a linear dynamic system with discontinuous controls conditioned by changes in the operational modes of the system at random moments of time. An analytical method is proposed for determining the averaged values of the performance functionals of the system, with allowance for a finite number of discontinuities. B.J.

A82-29834 † **Analysis of a multihinged empennage with allowance for shear strain (Raschet mnogosharnirnogo opereniia s uchetom deformatsii sdviga).** V. A. Pavlov and V. A. Furtnoi. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 46-51. In Russian.

A method for analyzing a multihinged empennage is presented, wherein the shear displacements included in the resolvent compatibility equations are determined by the Timoshenko method. Analysis results are presented on the empennage of an actual aircraft, and the necessity of taking into account shear strain of the control surface and stabilizer in their own plane is found to be confirmed. B.J.

A82-29836 † The stability of monocoque panels under bending (Ustoichivost' panelei kessona pri izgibe). V. I. Shalashilin, O. B. Lozhkin, and V. A. Nagaev. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 60-65. In Russian.

An analysis is presented of the elastic stability of cylindrical monocoque panels under bending. The critical loading conditions are investigated, and the selection of parameter values for the discrete transverse reinforcement is considered. B.J.

A82-29837 † Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications (O primenenii bezrazmernogo kriteriia transportnoi effektivnosti v otsenkakh modifikatsii samoletov). V. N. Sheptunov. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 65-70. 6 refs. In Russian.

A dimensionless criterion of transport efficiency (defined as the ratio of aircraft performance to energy consumed in cruising flight) is proposed, and its possible applications are considered. The relationship between transport efficiency and cost efficiency is established, and a method is developed for estimating the cost efficiency of aircraft design solutions and modifications on the basis of the relationship between the dimensionless criterion and transport costs. A numerical example is discussed. B.J.

A82-29838 † Zone loading of flight-vehicle structures (Zonnoe nagruzhenie konstruktsii letatel'nykh apparatov). V. S. Azarin and B. L. Patsenker. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 71-73. 5 refs. In Russian.

A82-29841 † Analysis of shells of straight-wing type (K raschetu obolochek tipa priamogo kryla). S. N. Bulatov and P. N. Kurochka. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 80-83. In Russian.

Obraztsov's (1966, 1973) approach is used to develop a method for the analysis of variable-thickness shells of arbitrary cross section. The resolvent system is obtained by means of the Lagrange variational principle. The solutions are obtained in the form of expansions whose first terms correspond to the hypothesis of plane sections, while the other terms take into account displacements caused by warping. B.J.

A82-29844 † Thermal stability analysis for conical shells with variable parameters (Raschet termoprochnosti konicheskikh obolochek s peremennymi parametrami). V. R. Kotel'nikov. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 90-93. In Russian.

A method based on an approximate solution of an integral elasticity equation is proposed for analyzing, at an early design stage, thermoelastic stress-strain state of thin-walled conical shells with variable parameters. The proposed method is demonstrated in a case involving analysis of the effect of the wall thickness profile on the stress-strain state of a shell for specified temperature distributions. It is shown that thinning of the shell in the direction of the larger base results in increased stresses and shifting of the maximum stresses to the region of higher temperatures. It is therefore recommended that the wall increase in thickness toward the larger base. V.L.

A82-29845 † Determination of an optimal control program for an aircraft power plant during climb (Opredelenie optimal'noi programmy upravleniia silovoi ustanovkoi samoleta na uchastke razgona-nabora vysoty). O. K. Iugov. *Aviatsionnaia Tekhnika,* no. 4, 1981, p. 96-98. In Russian.

The paper examines the development of an optimal control program for an aircraft power plant during climb on the basis of a criterion of minimum fuel consumption. Theoretical results obtained using this approach are presented, and attention is given to the validity of the assumption of the constant flight weight of aircraft at subsonic and supersonic speeds in calculating longitudinal acceleration loading during climb. B.J.

A82-29871 # Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I (Uskok wiatru - Dzialanie na samolot, srodki zmniejszajace zagrozenie. I). J. M. Morawski and T. Smolicz (Instytut Lotnictwa, Warsaw, Poland). *Technika Lotnicza i Astronautyczna,* vol. 37, Apr. 1982, p. 5, 6. In Polish.

The effect of abrupt changes in wind velocity and direction on the trajectory and aerodynamic stability of aircraft are examined and possible counter measures, including flying techniques and the use of special devices, are suggested. Expressions are presented for calculating the downward drift angle and the effect of horizontal wind currents. V.L.

A82-29872 # Analysis of changes in the gas-dynamic parameters of a gas-turbine helicopter engine during acceleration (Analiza przebiegu parametrow gazodynamicznych i mocy turbinowego silnika smiglowcowego podczas przyspieszania). E. Jaworski. *Technika Lotnicza i Astronautyczna,* vol. 37, Apr. 1982, p. 13-17. In Polish.

Changes in the gas-dynamic parameters of a gas-turbine engine during acceleration are analyzed using the results of a mathematical model for the engine transients. The parameters examined include compressor and rotor rpm, compression ratio and air flow rate, margin of stability, turbine inlet temperature, excess air ratio, turbine pressure drop, and engine power. The effects of the working medium inertia and mass and heat accumulation on the transient processes in the engine are also discussed. V.L.

A82-29880 † Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle (Chislennoe issledovanie kolebatel'noi relaksatsii pri turbulentnom smeshenii strui v sverkhzvukovom sople). A. V. Lavrov and V. A. Pospelov (Leningradskii Politekhnicheskii Institut, Leningrad, USSR). *Inzhenerno-Fizicheskii Zhurnal,* vol. 42, Apr. 1982, p. 586-592. 23 refs. In Russian.

The turbulent boundary layer equations are used to examine gasdynamic and physical processes in the nozzle and resonator of a CO2 gasdynamic laser with selective thermal excitation. In order to verify the adequacy of the proposed mathematical model of the laser, a comparison is made with experimental data for various values of stagnation temperature and pressure; good agreement between theoretical and experimental results is found. The effects of the composition of the secondary jet, and stagnation temperature and pressure on specific energy output are investigated. It is shown that, at high pressures and temperatures, sufficiently high specific outputs can be obtained only in the case of optimal CO2 concentration in the secondary jet. B.J.

A82-29923 Air Traffic Flow Management and Air Traffic Flow Control (Air Traffic Flow Management und Air Traffic Flow Control). R. Küttner (Gesellschaft für Internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 17, no. 4, 1981, p. 172-177. 7 refs. In German.

The growth in the volume of air traffic and the concentration of air traffic in certain areas and during certain time periods have caused operational difficulties for a number of area control centers (ACC) and approach control offices (APP) in the German Democratic Republic. These difficulties are related to an insufficient capacity of ACC and APP to cope with peak traffic demands, because, in connection with economic considerations, it is often not possible to design installations for peak demands. Two approaches are used to reduce the considered difficulties as much as possible. The approach of Air Traffic Flow Management (ATFM) involves the assignment of a certain flight to a specific time slot. There are generally no delays, if the resulting requirements are met. The approach of Air Traffic Flow Control is only employed if the ATFM process is unsuitable. Air Traffic Flow Control specifies the number of aircraft which can enter per unit of time. G.R.

A82-29924 Flight simulators (Flugsimulatoren). G. Westphal (Gesellschaft für Internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 17, no. 4, 1981, p. 180-189. 5 refs. In German.

Simulation involves the employment of models. A 'model' is a material or a conceptual system which corresponds to the object to be simulated on the basis of certain analogies. Flight simulators are concerned with the simulation of conditions and events occurring during the flight of an aircraft. With respect to their employment, the simulators can be divided into devices for research and for training. Research simulators make it possible to achieve an optimum design for the man-machine system in the cockpit of modern aircraft. The reasons for the employment of flight simulators in the training programs for the pilots of airlines are discussed, taking into account also the various subsystems used in the simulator. Particular attention is given to the cockpit, the computer, and the system providing a simulation of the visual scene. G.R.

A82-29925 **New processes and methods of technical diagnostics and prognostics in the case of the engine NK-8-4. II (Neue Verfahren und Methoden der technischen Diagnostik und Prognostik beim Triebwerk NK-8-4. II).** S. Jung (Gesellschaft für Internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 17, no. 4, 1981, p. 193-195. In German.

A82-30004 **Composite bonds improve thermal integrity.** A. Kleider (U.S. Army, Avionics Laboratory, Fort Monmouth, NJ), J. T. Johnson (Westinghouse Defense and Electronic Systems Center, Baltimore, MD), and R. L. Kolek (Westinghouse Electric Corp., Marine Div., Sunnyvale, CA). *ManTech Journal,* vol. 6, no. 3, 1981, p. 37-41. Army-supported research.

Production process considerations which, once solved, permitted fabrication of 1000 parts/yr of stabilized line-of-sight gimbals for aircraft electrooptical systems and sensors are discussed. A thermal sample was fabricated of composites to evaluate the expansion characteristics for mating bearings to the bore with resultant constant friction and stiffness values over the operating temperature range. Titanium rings were chosen to interface with the outer bearing race, and a series of thermal cycles were performed in order to test the bonds. Procedures of a design change and implementation are outlined, noting the final design called for 121 parts, some formed with expandable internal mandrels. Curing conditions for the fiber composite structures are detailed, including formation of the base plate stiffener ring. The gimbal produced features a 33% weight savings over previous gimbals. M.S.K.

A82-30076 **Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1 - Structures and materials. Part 2 - Structural dynamics and design engineering.** Conference sponsored by AIAA, ASME, ASCE, and AHS. New York, American Institute of Aeronautics and Astronautics, 1982. Pt. 1, 532 p.; pt. 2, 645 p. Price of two parts, members, $100.; nonmembers, $125.

An integration scheme to determine the dynamic response of a launch vehicle with several payloads is considered along with aeroelastic characteristics of the Space Shuttle external tank cable trays, the structural design of integral tankage for advanced space transportation systems, and optimum damping locations for structural vibration control. Attention is given to a damage induced aeroelastic failure mode involving combination and parametric resonant instabilities of lifting surfaces, passive damping mechanisms in large space structures, an automated technique for improving modal test/analysis correlation, pressure measurements on twin vertical tails in buffeting flow, and a wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing. Other topics explored are related to the active control of aeroelastic divergence, stress constraints in optimality criteria design, and damage tolerant design using collapse techniques. G.R.

A82-30087 * # **Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites.** J. R. Kerr and J. F. Haskins (General Dynamics Corp., Convair Div., San Diego, CA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 101-108. Contract No. NAS1-12308. (AIAA 82-0657)

Thermal effects on tensile strengths of advanced composite systems have been determined for exposure times of 100 to 50,000 hours (5.7 years). Exposures were conducted at both ambient and reduced pressures at two temperatures for each composite. At the completion of the various aging periods, specimens were removed from the specially constructed aging furnaces, visually examined, and tensile tested at elevated temperature. After tensile testing, many of the thermal aging specimens were examined using a scanning electron microscope. Results of these studies are presented, and the changes in properties and the degradation mechanisms during high-temperature aging are discussed and illustrated using metallographic techniques. (Author)

A82-30091 # **A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means.** T. Renshaw, K. Wongwiwat, and A. Serrantonio (Fairchild Republic Co., Farmingdale, NY). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 137-144. (AIAA 82-0661)

An employment of the ultrasonic welding process in aircraft assembly operations might possibly lead to an achievement of very significant cost and weight reductions. A development program has been in progress with the objective to realize the potentials of the ultrasonic welding process for aircraft production. The present investigation represents an extension of studies reported by Renshaw and Serrantonio (1980). It had been found that large, single overlap joints made with ultrasonic spotwelds could be loaded to sheet stresses above the yield strength. Tests conducted in the current investigation cover series of interlayer situations which can exist in the assembly of aircraft. Fatigue data are also reported for the joints. Other types of joints than ultrasonically welded ones were also prepared and tested in order to develop directly comparable static and fatigue properties. Weight and cost comparisons are included. G.R.

A82-30096 # **Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft.** R. E. McCarty and R. A. Smith (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 197-205. 15 refs. (AIAA 82-0705)

The nonlinear static response to a concentrated load on the inner surface of the student pilot canopy for the T-38 aircraft has been predicted using the MAGNA (Materially and Geometrically Nonlinear Analysis) finite element computer program. The analyses conducted were intended to simulate the impingement on the canopy inner surface of a breaker located on the student pilot ejection seat. Criteria for defining fracture of the canopy were selected and work required to fracture the canopy was then determined from computed nonlinear load-displacement curves. The static load and work required to fracture two proposed bird-resistant designs for the T-38 student canopy were compared to those required to fracture the current design. It is concluded that transparency penetration for emergency crew escape via ejection seat breaker impingement on the T-38 student canopy is probably not feasible for a 0.68 in. thick monolithic stretched acrylic bird-resistant design. The same mode of transparency penetration might prove feasible for a 0.40 in. thick monolithic polycarbonate bird resistant design. (Author)

A82-30099 * # **Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures.** P. J. Klich and C. E. Cockrell (NASA, Langley Research Center, Systems Engineering Div., Hampton, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 223-230. 9 refs. (AIAA 82-0708)

The compressor driving the flow in the National Transonic Facility, which is nearing completion at the Langley Research Center, has 25 fiberglass blades. E-glass cloth with a pre-impregnated epoxy resin has been selected as the material for the fan blades because of its low cost, high damping, and fatigue resistance. A complete characterization is presented of this fan blade fiberglass system at temperatures of 367 K, room temperature, and 89 K. The characterization test results suggest that the material follows the general trends of metals and other glass-reinforced plastics at cryogenic temperatures. A slight diminution in strength was observed at the elevated temperature. The tests included the following: tensile, compression, fatigue, inplane shear, interlaminar shear, thermal expansion, creep, and thermal cycle. C.R.

A82-30102 # **Damping and stiffness of aligned discontinuous fiber reinforced polymer composites.** R. F. Gibson, C. T. Sun, and S. K. Chaturvedi (Florida, University, Gainesville, FL). In:

Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 247-255. 24 refs. Research supported by the University of Florida. (AIAA 82-0712)

This paper describes recent analytical and experimental efforts to determine the effects of fiber aspect ratio, fiber spacing, and the visco-elastic properties of constituent materials on the damping and stiffness of aligned discontinuous fiber reinforced polymer matrix composites. This includes the analysis of trade-offs between damping and stiffness as the above parameters are varied. Two different analytical models show that there is an optimum fiber aspect ratio for maximum damping, and that the predicted optimum aspect ratios lie in the range of actual aspect ratios for whiskers and microfibers. Experimental data for E-glass/epoxy specimens is presented for comparison with predictions. (Author)

A82-30107 # **Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method.** T. Nishioka and S. N. Atluri (Georgia Institute of Technology, Atlanta, GA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 287-300. 24 refs. Grant No. AF-AFOSR-81-0057. (AIAA 82-0742)

A new alternating method for the analysis of a quarter-elliptical corner crack is developed. The completely general analytical solution for an embedded crack, in an infinite solid, subject to arbitrary crack-face tractions, is implemented in the present alternating method. The present finite element alternating method results in an inexpensive procedure for routine evaluation of accurate stress intensity factors for flawed structural components. The present alternating method is applied to the analyses of various shapes of quarter-elliptical corner cracks (1) in a brick subject to remote tension, (2) emanating from a hole in finite-thickness plates, subject to remote tension as well as bearing pressure, and (3) emanating from a pin hole in aircraft attachment lugs subject to simulated pin loading. The results for the problem (1) and (2) are compared with those available in literature. For the problem (3) the stress intensity factors, and their parametric variations for the corner cracks of various shapes are presented. (Author)

A82-30109 # **737 graphite-epoxy horizontal stabilizer certification.** J. E. McCarty, R. W. Johnson, and D. R. Wilson (Boeing Commercial Airplane Co., Seattle, WA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 307-322. 12 refs. (AIAA 82-0745)

The 737 graphite-epoxy horizontal stabilizer was developed as part of the NASA/ACEE Advanced Composite Structures Program, which was initiated in July 1977. Certification requirements were completed in February 1982. The 737 graphite-epoxy horizontal stabilizer, which represents a weight savings of 21.6 percent, will be the first major component of aircraft primary structure to be certified for commercial airline service. The approach taken to obtain certification is considered. This approach complies with FAA regulations while maintaining the philosophy that commercial aircraft structures are certified by structural analysis and supporting test evidence. G.R.

A82-30114 * # **Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane.** D. E. Hill (Deere and Co., Moline, IL) and J. R. Baumgarten (Iowa State University of Science and Technology, Ames, IA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 369-373. 6 refs. Grant No. NsG-1605. (AIAA 82-0753)

It is pointed out that pneumatic tires have a large effect on the overall landing characteristics of an aircraft. The dynamic response upon landing and steering are crucial to the safety of the vehicle and the occupants. The present investigation has the objective to compare experimentally determined strains on an inner tube in contact with a flat plate with numerical values obtained on the basis of a finite element prediction, taking into account an employment of the Structural Analysis of General Shells (STAGS). The obtained results suggest that the clamped boundary condition utilized in the STAGS calculation is not exactly simulated by the employed test setup. G.R.

A82-30116 # **Flight qualification of composite structures at AMD-BA.** D. Chaumette (Avions Marcel Dassault-Breguet Aviation, Saint-Cloud, Hauts-de-Seine, France). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 381-390. (AIAA 82-0755)

A brief description is provided of the different programs conducted in a French aerospace company, taking into account composite materials employed in the Mirage III rudder, the Mirage F1 horizontal stabilizer, the Mir F1 aileron, the Falcon 50 aileron, and the fin, the rudder, and the elevons of the Mirage 2000. Attention is also given to the introduction of a very new technology in connection with the development of the Super-Mirage 4000, an experimental Alpha Jet empennage, and the Falcon 10 wing. The design of the Falcon 10 wing utilizes integrally stiffened carbon-fiber panels. G.R.

A82-30117 # **On the characterization of damages in graphite-epoxy composites.** S. V. Hanagud and R. G. Clinton, Jr. (Georgia Institute of Technology, Atlanta, GA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 391-404. 39 refs. (AIAA 82-0757)

Flaws are created in graphite-epoxy composites when they are exposed to an environment of high moisture and elevated temperature. The possibility of nondestructively identifying these flawed states and quantitatively estimating the flaws have been attempted by the measurement and analysis of acoustic emission events, counts per events and amplitude distribution. In particular cross ply woven composite laminates have been studied in undamaged and damaged states. Techniques and methods of standardizing the test procedures have also been discussed. (Author)

A82-30118 * # **Environmental and high strain rate effects on composites for engine applications.** C. C. Chamis and G. T. Smith (NASA, Lewis Research Center, Cleveland, OH). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 405-419. 9 refs. (AIAA 82-0758)

The complex environmental and loading conditions experienced by many turbine engine components impose severe durability and damage tolerance requirements for component materials. Programs are being conducted to establish the structural performance of composite materials under anticipated engine operating environments. A description is presented of the results obtained in connection with several of these programs. A comparison of predicted and measured hygrothermal effects is considered along with hygrothermal effects on defect growth, high strain rate effects on composite mechanical properties, dynamic stress intensity factors for composites, and the indentation laws for composite impact analysis. G.R.

A82-30119 # **A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport.** D. V. Finkle and J. S. Wilson (Lockheed-Georgia Co., Marietta, GA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 429-434. USAF-supported research. (AIAA 82-0760)

The Aircraft Operational Suitability Program (AOSP) is a computerized system which provides the United States Air Force a means by which to assess the impact of day-to-day aircraft operations on structural inspection schedules and structural life reserve hours for the C-5A. The AOSP uses data generated by the C-5A individual aircraft fracture tracking system and features operations via remote computer terminal hookups. Specific operations of the AOSP include evaluations of the relative severity of proposed missions and the impact of proposed missions on established structural inspection and modification schedules. (Author)

A82-30125 # **High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide.** P. R. DiGiovanni and D. Paterson (Raytheon Co., Missile Systems Div., Bedford, MA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1. New York, American Institute of Aeronautics and Astronautics, 1982, p. 487-492. 5 refs. (AIAA 82-0711)

Tensile tests were conducted on 0 deg unidirectionally reinforced Celion 6000 graphite fibers in PMR 15 polyimide matrix. Tensile strengths for coupons subjected to short and long term uniform temperatures were obtained. Thick coupons, heated on one side to produce significant transient through thickness temperature gradients, were tested and compared to the strength of specimens with uniform temperature distributions. All coupons were radiantly heated and reached maximum test temperatures within 15 sec. Tensile loads were applied to the coupons after 15 sec of elevated temperature exposure. Loading rates were selected so that specimen failures occurred within a maximum of 45 sec after reaching the test temperature. Results indicate that significant tensile strength remains beyond the material post cure temperature. (Author)

A82-30137 # **An automated technique for improving modal test/analysis correlation.** D. T. Grossman (McDonnell Aircraft Co., St. Louis, MO). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 68-76. 7 refs. (AIAA 82-0640)

An automated technique for adjusting individual mass and stiffness elements to improve the correlation of analytical frequency and mode shape data with ground vibration test results is described. Perturbation formulae are used to calculate derivatives of a 'correlation coefficient' representing the overall similarity of the analytical and experimental results. A special iterative routine is developed to maximize this quantity and thus improve the overall correlation. The technique allows the user to take advantage of engineering judgment, produces physically realizable answers, and does not require the starting values of the variables to be near the final answers. Sample results are given. (Author)

A82-30138 # **Pressure measurements on twin vertical tails in buffeting flow.** W. E. Triplett (McDonnell Aircraft Co., St. Louis, MO). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 77-83. USAF-sponsored research. (AIAA 82-0641)

Buffeting pressures were measured on the vertical tail surfaces of a 13 percent F-15 model in a low-speed wind tunnel. Test variables included dynamic pressure, aircraft angle-of-attack, vertical tail incidence and rudder deflection. Pressure transducers were flush mounted on rigid and flexible tails. Steady and unsteady pressures were obtained from the transducers at levels as low as 0.1 percent full scale. The steady pressures were integrated for aerodynamic coefficients and the unsteady pressures were reduced to spectral densities. The pressures are maximum at approximately 22 deg angle-of-attack and are significantly affected by tail flexibility. (Author)

A82-30139 # **A wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing.** W. F. Grosser (Lockheed-Georgia Co., Marietta, GA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 84-93. (AIAA 82-0642)

Wind-tunnel research test data indicate that flutter characteristics at transonic speeds may be different for each supercritical airfoil configuration. Therefore, high-speed flutter testing for limited structural parameters may be inadequate. Models with sectionalized airfoils provide an economical construction method for easily varying important flutter parameters, while testing smooth-skin models is an expensive and difficult way to conduct parametric studies. A wind-tunnel test was performed to evaluate the effects of sectionalized model construction on aerodynamic behavior in the transonic speed range. The results indicate that sectionalized airfoils may not significantly affect supercritical flutter aerodynamics. (Author)

A82-30140 * # **Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests.** C. L. Ruhlin, J. J. Watson, R. H. Ricketts, and R. V. Doggett, Jr. (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 94-101. 7 refs. (AIAA 82-0644)

Four subcritical response methods were evaluated for on-line use in transonic wind-tunnel tests where the flutter model is excited solely by airstream turbulence. The methods were: randomdec, power-spectral-density, peak-hold, and cross-spectrum. Subcritical response data were obtained during tests in the Langley Transonic Dynamics Tunnel of a cantilevered flutter model wing. The test procedure was to maintain a constant Mach number and increase the dynamic pressure (q) in incremental steps. The four methods provided damping trends by which the flutter mode could be tracked and extrapolated to a flutter-onset q. A hard flutter point was obtained at M = 0.82. The peak-mold and cross-spectrum methods gave reliable results and could be most readily used for on-line testing. (Author)

A82-30141 # **Test demonstration of digital control of wing/store flutter.** E. H. Johnson, C. Hwang, W. S. Pi, D. F. Kesler, D. S. Joshi (Northrop Corp., Aircraft Div., Hawthorne, CA), and C. A. Harvey (Honeywell, Inc., Minneapolis, MN). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 102-110. 8 refs. Contract No. F33615-80-C-3217. (AIAA 82-0645)

Methods of digital control have been applied to the demonstration of the suppression of wing/store flutter. Digital control laws were developed by applying a modified Jordan canonical transformation to a state variable formulation of a control law synthesized originally for an analog system. After performing a real time simulation of the digital control system at Northrop's Hawthorne facilities, the system was tested in the Transonic Dynamics Tunnel at the NASA Langley Research Center. The results of the test showed that the performance of the digital controller was comparable to that of analog controllers. Attention during the test was focused on the insertion of adequate antialiasing filters, the effects of sample time and on the compensation for phase lags introduced by the digital control process. (Author)

A82-30142 # **Flutter of forward swept wings, analyses and tests.** T. A. Weisshaar, T. A. Zeiler (Purdue University, West Lafayette, IN), T. J. Hertz, and M. H. Shirk (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 111-121. 20 refs. (AIAA 82-0646)

The forward swept wing body-freedom flutter phenomenon and the Flight Dynamics Laboratory test program to investigate this phenomenon are discussed. Subsonic wind tunnel flutter tests of a variable sweep, forward swept wing model incorporating the rigid body fuselage pitch degree of freedom are conducted, and results illustrate the effects of flutter speed of static margin, wing sweep and composite wing stiffness. The phenomenon occurs well below the fixed root wing divergence speed, and the primary cause of instability is found to be a coupling between the short period and the wing fundamental bending mode. At the onset of body freedom flutter, significant amounts of pitch, plunge and bending motion are present in the aeroelastic and flight mechanics modes. Both decreasing aircraft static margin and decreasing the streamwise angle of attack in the fundamental wing bending mode tend to increase the body-freedom flutter speed. D.L.G.

A82-30143 * # Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing. E. C. Yates, Jr., E. C. Wynne, and M. G. Farmer (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 122-144. 19 refs. (AIAA 82-0647)

The effects of angle of attack between 0 and 4 degrees were studied. The results indicate that increasing angle of attack from zero can produce substantial changes in the transonic flutter characteristics that are favorable or unfavorable depending on Mach number and angle of attack. The bottom of the transonic flutter-boundary 'bucket' is shown to occur at lower Mach number as angle of attack increases. These flutter results correlate well with the effects of Mach number and angle of attack on aerodynamic behavior, especially on the development of transonic flow phenomena. The calculated flutter characteristics are in good agreement with the experimental data at zero angle of attack, but at nonzero angles of attack the experiments show sharply declining and backward-turning transonic flutter boundaries that are not indicated by the calculations. These may be caused by variations in static aeroelastic deformation. C.D.

A82-30144 # Integrated structural analysis and design support for advanced launch vehicles. D. G. Wong, R. D. Bousquet, and C. R. Fuller (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 145-150. 5 refs. (AIAA 82-0675)

The paper discusses a system incorporating the latest developments in computer hardware and software, conceived in accordance with a five year plan initiated to support future advanced launch vehicle programs at the Lockheed Missiles and Space Company. Engineering requirements for the integrated system forming the basis for the department upgrades are presented. Software attributes are discussed, including program modularity, data management, and programming standards. Hardware attributes are also presented, and include system definition and design, communication network links, and various graphical capabilities. D.L.G.

A82-30145 # Bonded aluminum honeycomb - Aircraft flight surface primary structure application. T. R. Logan (Boeing Commercial Airplane Co., Seattle, WA) and U. Soudak (Israel Aircraft Industries, Ltd., Tel Aviv, Israel). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 151-156. 9 refs. (AIAA 82-0676)

The first phase is discussed of a detail design and testing program undertaken to establish cost and weight data for a point-design application and to provide a basis for full-scale development and certification of a bonded aluminum honeycomb empennage structural box. The baseline design is a built-up, mechanically fastened skin/stringer configuration. Structural design goals, inherent advantages and principal constraints of the bonded design are given. Design allowables, optimum design, and substructure arrangement are discussed in detail. A preliminary study demonstrates a significant 9.9 to 14.7 percent weight saving and a 20 percent part count reduction. Potential overall manufacturing cost reduction is estimated at 40 percent. C.D.

A82-30146 * # Design considerations and experiences in the use of composite material for an aeroelastic research wing. C. V. Eckstrom (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA) and C. V. Spain (Kentron Technical Center, Hampton, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 157-165. 15 refs. (AIAA 82-0678)

Experiences in using composite skin material on an aeroelastic research wing used in flight flutter testing are described. Significant variations in skin shear modulus due to stress and temperature were encountered with the original fiberglass laminate skin designed to minimize wing torsional stiffness. These variations along with the sensitivity of wing torsional stiffness to the skin-to-frame attachment method complicated the structural model vibration mode predictions. A wing skin redesign with different fiber orientation and a reduction in the amount of skin-to-frame bonding resulted in more predictable modal characteristics without sacrificing design objectives. Design and modeling considerations for future applications are discussed. (Author)

A82-30147 # Durability and damage tolerance control plans for USAF aircraft. M. A. Landy and O. L. Smithers (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 166-174. 20 refs. (AIAA 82-0679)

A set of disciplined, integrated procedures involving a number of a contractor's functional organizations is necessary if the requirements for a durable and damage tolerant structure are to be met. To this end, the Air Force requires that Durability and Damage Tolerance Control Plans (DADTCPs) be developed and implemented during aircraft development and manufacturing. DADTCPs define all tasks necessary to ensure that the final product meets Air Force durability and damage tolerance requirements. Various aspects to DADTCPs will be discussed in this paper. The foundation for a generalized model outlining the tasks in a DADTCP will be presented. Examples from existing DADTCPs will be used to illustrate elements of the generalized model. (Author)

A82-30150 # Rigid body-structural mode coupling on a forward swept wing aircraft. G. D. Miller, J. H. Wykes, and M. J. Brosnan (Rockwell International Corp., El Segundo, CA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 201-208. 10 refs. (AIAA 82-0683)

Physical causes of rigid/body wing bending flutter of forward swept wing (FSW) aircraft are discussed, and potential solutions to the phenomenon for a Rockwell design of an FSW demonstrator are considered. The use of active controls technology to design a flutter suppression system in controling the flutter on the demonstrator is discussed, including the integration of the active system with the complete aircraft design to obtain lightweight structure while maintaining strength requirements, structural dynamic stability, and rigid body stability. Improvements in flying qualities, ride qualities and reduction in the gust loads as a result of the active control system are demonstrated. Inertial coupling in addition to wind sweep is found to be a dominant variable causing the phenomenon. D.L.G.

A82-30151 # Active control of aeroelastic divergence. R. R. Chipman, A. M. Zislin, and C. Waters (Grumman Aerospace Corp., Bethpage, NY). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 209-219. 15 refs. (AIAA 82-0684)

On forward-swept-wing aircraft, aerodynamic destiffening of the primary wing-bending mode can cause coupling with the short-period mode, potentially resulting in a low-frequency dynamic instability. For a clamped wing, this coupled mechanism degenerates into conventional static wing divergence. Studies of a fundamental analytical model of this mechanism show that active control of the clamped wing is possible only through the use of displacement feedback. Control laws for the clamped wing are evaluated and also assessed when body freedom is restored. Additionally, control laws are synthesized directly for a more refined representation of the unrestrained vehicle. CCV configurations are not considered. (Author)

A82-30153 * # Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9. R. W. Hess, E. C. Wynne, and F. W. Cazier (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2.

New York, American Institute of Aeronautics and Astronautics, 1982, p. 234-242. 7 refs. (AIAA 82-0686)

Static and unsteady pressures were measured on a 50.45 degree clipped delta wing in the Langley Transonic Dynamics Tunnel with Freon as the test medium. Data taken at M = 0.9 is presented for static and oscillatory deflections of the trailing edge control surface and for the wing in pitch. Comparisons of the static measured data are made with results computed using the Bailey-Ballhaus small disturbance code. (Author)

A82-30155 # **Transonic time-response analysis of three D.O.F. conventional and supercritical airfoils.** T. Y. Yang (Purdue University, West Lafayette, IN) and J. T. Batina. In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 256-266. 30 refs. (AIAA 82-0688)

Aeroelastic time-response analyses are performed for two conventional airfoils, NACA 64A006 and NACA 64A010, and one supercritical airfoil MBB A-3, in small disturbance transonic flow. Response results for forces and displacements were obtained by simultaneously integrating the structural equations of motion with the unsteady aerodynamic forces computed using two transonic codes: LTRAN2-NLR (improved version of LTRAN2 by Houwink and van der Vooren of NLR, the Netherlands) and USTS (Unsteady Transonic Small Perturbation code by Isogai of NAL, Japan). Three d.o.f.'s, plunge, pitch, and aileron pitch, are considered. Flutter analyses are first performed and the results are used as a guideline for time-response parameter selection. Time-response results are presented showing that for each case the flight speed used to obtain neutrally stable responses is either exactly or nearly the same as the flutter speed determined in the separate flutter analysis. Effect of response amplitudes is investigated. Applicability and limitations of the two transonic codes are evaluated, compared, and discussed. Transonic time-response behavior of these airfoils is physically interpreted, discussed, and comparisons are made. (Author)

A82-30156 * # **Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings.** W. Whitlow, Jr. and R. M. Bennett (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 267-276. 12 refs. (AIAA 82-0689)

A method for including elastic effects in steady, transonic wing analysis is presented. Since the aerodynamic theory is nonlinear, the method requires the coupling of two iterative processes - an aerodynamic analysis and a structural analysis. A full potential analysis code, FL022, is combined with a linear structural analysis to yield aerodynamic load distributions on and deflections of elastic wings. This method was used to analyze an aeroelastically-scaled wind tunnel model of a proposed executive-jet transport wing and an aeroelastic research wing. The results are compared with the corresponding rigid-wing analyses, and some effects of elasticity on the aerodynamic loading are noted. (Author)

A82-30157 * # **Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications.** P. Guruswamy (Informatics, Inc., Palo Alto, CA) and P. M. Goorjian (NASA, Ames Research Center, Moffett Field, CA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 277-289. 20 refs. (AIAA 82-0690)

Comparisons were made of computed and experimental data in three-dimensional unsteady transonic aerodynamics, including aeroelastic applications. The computer code LTRAN3, which is based on small-disturbance aerodynamic theory, was used to obtain the aerodynamic data. A procedure based on the U-g method was developed to compute flutter boundaries by using the unsteady aerodynamic coefficients obtained from LTRAN3. The experimental data were obtained from available NASA publications. All the studies were conducted for thin, unswept, rectangular wings with circular-arc cross sections. Numerical and experimental steady and unsteady aerodynamic data were compared for a wing with an aspect ratio of 3 and a thickness ratio of 5% at Mach numbers of 0.7 and 0.9. Flutter data were compared for a wing with an aspect ratio of 5. Two thickness ratios, 6% at Mach numbers of 0.715, 0.851, and 0.913, and 4% at Mach number of 0.904, were considered. Based on the unsteady aerodynamic data obtained from LTRAN3, flutter boundaries were computed; they were compared with those obtained from experiments and the code NASTRAN, which uses linear aerodynamics. (Author)

A82-30161 # **Analysis of aircraft dynamic behavior in a crash environment.** G. Wittlin (Lockheed-California Co., Burbank, CA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 316-325. 20 refs. Army-sponsored research. (AIAA 82-0694)

Differences in the crash environments and design aspects which influence occupant survivability in military and commercial aircraft are discussed. Available analytical techniques for assessing structural behavior during a crash are described. The application of a hybrid technique in assessing aircraft structural behavior and trends in crash environments is provided. Representative mathematical simulations of aircraft crash tests and correlation with light fixed-wing and rotary-wing aircraft test results are shown. The results of a recent FAA/NASA sponsored research program involving the review of transport accidents from 1964-79 and the formulation of potential crash scenarios to be considered with future analysis and test verification are presented. Current and future analytical model studies to ascertain the crash dynamics of large transports are also discussed. (Author)

A82-30162 * # **Bird impact analysis package for turbine engine fan blades.** M. S. Hirschbein (NASA, Lewis Research Center, Cleveland, OH). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 326-334. 8 refs. (AIAA 82-0696)

A computer program has been developed to analyze the gross structural response of turbine engine fan blades subjected to bird strikes. The program couples a NASTRAN finite element model and modal analysis of a fan blade with a multi-mode bird impact analysis computer program. The impact analysis uses the NASTRAN blade model and a fluid jet model of the bird to interactively calculate blade loading during a bird strike event. The analysis package is computationaly efficient, easy to use and provides a comprehensive history of the gross structual blade response. Example cases are presented for a representative fan blade. (Author)

A82-30168 * # **Damage tolerant design using collapse techniques.** R. T. Haftka (Virginia Polytechnic Institute and State University, Blacksburg, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 383-386. 13 refs. Grant No. NAG1-168. (AIAA 82-0718)

A new approach to the design of structures for improved global damage tolerance is presented. In its undamaged condition the structure is designed subject to strength, displacement and buckling constraints. In the damaged condition the only constraint is that the structure will not collapse. The collapse load calculation is formulated as a maximization problem and solved by an interior extended penalty function. The design for minimum weight subject to constraints on the undamaged structure and a specified level of the collapse load is a minimization problem which is also solved by a penalty function formulation. Thus the overall problem is of a nested or multilevel optimization. Examples are presented to demonstrate the difference between the present and more traditional approaches. (Author)

A82-30169 # **Shape optimization of fiber reinforced composites.** S. V. Hanagud, A. Chattapadhyay, and L. Karlovitz (Georgia Institute of Technology, Atlanta, GA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2.

New York, American Institute of Aeronautics and Astronautics, 1982, p. 387-396. 5 refs. (AIAA 82-0719)

In this paper, the problem of the shape optimization in a fiber reinforced composite has been considered. The shape optimization can be interpreted as the problem of the optimum fiber distribution. In particular, the design of a long cylindrical rod that is subjected to torsion has been discussed. The problem has been formulated as a dual or min-max problem with appropriate constraints. The resulting Lagrange multipliers have been identified with physical parameters by performing the needed variations. The design procedure has been discussed by considering the examples of the torsion of a rod of a circular, a square and a rectangular cross section. (Author)

A82-30171 * # **Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet.** C. L. Ruhlin (NASA, Langley Research Center, Loads and Aeroelasticity Div., Hampton, VA), F. J. Rauch, Jr., and C. Waters (Grumman Aerospace Corp., Engineering Dept., Bethpage, NY). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 407-415. 18 refs. (AIAA 82-0721)

The scaled flutter model was a 1/6.5-size, semispan version of a supercritical wing (SCW) proposed for an executive-jet-transport airplane. The model was tested cantilever-mounted with a normal wingtip, a wingtip with winglet, and a normal wingtip ballasted to simulate the winglet mass properties. Flutter and aerodynamic data were acquired at Mach numbers from 0.6 to 0.95. The measured transonic flutter speed boundary for each wingtip configuration had roughly the same shape with a minimum flutter speed near M = 0.82. The winglet addition and wingtip mass ballast decreased the wing flutter speed by about 7 and 5%, respectively; thus, the winglet effect on flutter was more a mass effect than an aerodynamic effect. Flutter characteristics calculated using a doublet-lattice analysis (which included interference effects) were in good agreement with the experimental results up to M = 0.82. Comparisons of measured static aerodynamic data with predicted data indicated that the model was aerodynamically representative of the airplane SCW. (Author)

A82-30172 # **Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates.** S. J. Hollowell (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) and J. Dugundji (MIT, Cambridge, MA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 416-426. 17 refs. Contract No. F33615-77-C-5155. (AIAA 82-0722)

An analytical and experimental investigation was conducted to determine the aeroelastic flutter and divergence behavior of unswept, rectangular wings simulated by graphite/epoxy, cantilevered plates with varying amounts of bending-torsion stiffness coupling. The analytical approach incorporated a Rayleigh-Ritz energy formulation and unsteady, incompressible two-dimensional aerodynamic theory. Flutter and divergence velocities were obtained using the V-g method and compared to results of low-speed wind tunnel tests. Stall flutter behavior was also examined experimentally. There was good agreement between analytical and experimental results. Wings with negative stiffness coupling exhibited divergence, while positive coupling delayed the onset of stall flutter. (Author)

A82-30173 # **Application of optimal control techniques to aircraft flutter suppression and load alleviation.** C. Hwang and W. S. Pi (Northrop Corp., Aircraft Div., Hawthorne, CA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 427-438. 14 refs. Contract No. F33615-80-C-3217. (AIAA 82-0724)

Optimal control techniques were applied to design the reduced order controllers for the purpose of aircraft flutter suppression and load alleviation. Special attention was given to the multiple input, multiple output (MIMO) system, to which the classical feedback control theory cannot be conveniently applied. Using the optimal control approach, a number of control laws were designed for the YF-17 flutter suppression model. The relative performances of these control laws and previously synthesized control laws were evaluated analytically. In a wind tunnel entry using the flutter suppression model, one of the newly developed control laws was mechanized and successfully demonstrated. (Author)

A82-30176 # **Flutter analysis using nonlinear aerodynamic forces.** T. Udea and E. H. Dowell (Princeton University, Princeton, NJ). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 462-481. 11 refs. Grant No. AF-AFOSR-81-0123. (AIAA 82-0728)

The nonlinear effects of transonic aerodynamic forces on the flutter boundary of a typical section airfoil are studied. The flutter speed dependence on amplitude is obtained by utilizing a novel variation of the describing function method which takes into account the first fundamental harmonic of the nonlinear oscillatory motion. By using an aerodynamic describing function, traditional flutter analysis methods may still be used while including the effects of aerodynamic nonlinearities. The aerodynamic forces are computed by the LTRAN2 aerodynamic code for NACA 64A006 and NACA 64A010 airfoils. (Author)

A82-30177 # **Feedback control of a cantilever wing in steady airflow.** L. Meirovitch and L. Silverberg (Virginia Polytechnic Institute and State University, Blacksburg, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 482-488. (AIAA 82-0729)

A method for the active flutter suppression of a cantilever wing in steady airflow is presented. The wing undergoes bending and torsional vibrations. The control forces are generated by leading-edge or trailing-edge flaps. Only the flutter modes are targetted for control, while the remaining modes are left uncontrolled. Because of inherent structural damping in the wing, however, motion in these modes decays exponentially with time. A numerical example is presented. (Author)

A82-30179 # **Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems.** S. G. Sadler, J. Corrigan, and J. G. Yen (Bell Helicopter Textron, Fort Worth, TX). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 503-513. 13 refs. (AIAA 82-0731)

A method has been developed which allows a nonisotropic rotating structure to be coupled with a nonisotropic nonrotating structure such that the system's coupled equations of motion have a time-invariant mass matrix. The modeling requirements for this method are defined and the analytical approach is developed using physical degrees of freedom to describe the motions of both the rotating and the nonrotating components. Extensions to component modal synthesis methods are given for a typical component modal method, and also for a more recently developed method which retains only physical degrees of freedom at the component interfaces. The method is developed for both time-domain and frequency-domain solutions. Demonstration of the method for helicopter coupled rotor/airframe dynamic analysis including a two-bladed teetering rotor are presented. (Author)

A82-30182 * # **On the dynamic collapse of a column impacting a rigid surface.** J. M. Housner and N. F. Knight, Jr. (NASA, Langley Research Center, Structures and Dynamics Div., Hampton, VA). In: Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2. New York, American Institute of Aeronautics and Astronautics, 1982, p. 530-541. 24 refs. (AIAA 82-0735)

Results are presented of an analytical investigation on the dynamic collapse of an elastic periodically supported column. The column has an attached mass at one end and impacts a rigid surface with prescribed velocity and angle of incidence at the other end. A first-order approximate nonlinear analysis is developed in which it is assumed that only first-order nonlinear terms need be retained.

Differential equations are derived and solved numerically by explicit time integration in order to determine specific ranges of the basic nondimensional parameters for which the response characteristics are markedly different. To assess modeling sophistication relative to prediction accuracy, a comparison is made of the results from this approximate analysis with those of a finite element computer code based on a convected coordinate formulation. C.D.

A82-30193 * # **Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method.** E. C. Yates, Jr., H. J. Cunningham, R. N. Desmarais (NASA, Langley Research Center, Hampton, VA), W. A. Silva, and B. Drobenko. *AIAA, ASME, ASCE, and AHS, Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, AIAA Paper 82-0727.* 20 p. 20 refs.

Several applications of the steady, oscillatory, and unsteady subsonic and supersonic aerodynamics (SOUSSA) computer program to wings with steady and oscillatory motion, including flutter, are discussed. The program employs a generalized Green's function to the full, time-dependent potential-flow equation to obtain an integral equation for the velocity potential at any point in a flow, even points on a body or whole bodies in a flow. Aerodynamic calculations are provided for two rectangular wings, a clipped-tip delta wing, and two swept wings with and without a fuselage. The number and distribution of the finite element panels are varied in order to demonstrate the convergence of the results. The results are shown to be close to those of lifting-surface theory, and further applications with bodies having deformities, arbitrary shapes, motions, and deformations are indicated. M.S.K.

A82-30294 **A giant step toward composite helicopters.** M. M. Schwartz and G. Jacaruso (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Machinist,* Mar. 1982, p. 133-140.

The design goals and performance achievements of the UH60A Black Hawk helicopter Composite Rear Fuselage (CRF) structure's development are described, with emphasis on the use of computer-assisted interactive design techniques and on the fabrication and assembly methods used to produce this graphite-reinforced epoxy structure, which is 6 ft high, 8 ft wide, and 9 ft long. The metallic form of the rear fuselage is composed of 1203 parts, divided into 88 assemblies, with 17,000 fasteners. By contrast, the CRF comprises 459 detail parts, 23 assemblies and less than 6000 fasteners. Weight savings of 10% and manufacturing cost reductions of 30% have been demonstrated. Attention is given to the cutting and kitting of prepreg details, their preforming and pre-layup, frame and bulkhead fabrication, and the fabrication of the upper-center skin assembly. O.C.

A82-30311 **Improvements to secondary radar for air traffic control.** R. C. Bowes (Royal Signals and Radar Establishment, Malvern, Worcs., England). *Journal of Navigation,* vol. 35, May 1982, p. 193-204. Research supported by the Civil Aviation Authority.

The civil use of secondary surveillance radar (SSR), which is the prime sensor for the control of the aircraft, is described. The use of SSR in air-traffic control is detailed, and comparisons with primary radar are made. The prevention of sidelobe interrogations and the processing of SSR replies are explained. The two main types of problems with SSR, self-interference effects and reflected signals, are discussed. Additional topics of discussion are monopulse direction finding, which enables an accurate azimuth measurement to be obtained from a single reply, and selective address SSR, which helps solve the SSR garble problem. C.D.

A82-30312 **The reliability of height and identity data.** H. Gent (Royal Signals and Radar Establishment, Malvern, Worcs., England). *Journal of Navigation,* vol. 35, May 1982, p. 204-219. Research sponsored by the Civil Aviation Authority.

The nature and extent of secondary surveillance radar (SSR) errors are discussed with a description of the Mode A and Mode C codes, and a concrete example of error is given. Investigation shows that short-period Mode C and Mode A errors are equally likely, each occurring in about 1 plot in 5000, with neither airborne nor ground equipment being wholly responsible. Pulse error counts are made for both modes, and a comparison with garble shows that while the latter occurs more frequently, it can be anticipated while data errors cannot. Examples of persistent as opposed to short-period errors are also discussed, with the two types for Mode C showing very similar behavior. The airborne equipment was found to be at fault in all errors that cannot be explained as simple pulse code errors. The introduction of Mode S will reduce the incidence of data errors. C.D.

A82-30313 **Secondary radar for airborne collision avoidance.** S. Ratcliffe. *Journal of Navigation,* vol. 35, May 1982, p. 220-239. 14 refs.

Cooperative collision avoidance systems, passive beacon collision avoidance systems (BCAS), and active radar systems are discussed for civil aviation. The detection of collision risk is treated mathematically. The trajectory of a possible threat as plotted in the range/range rate phase plane is discussed, and the range/range-rate logic is quantitatively studied. Parameters are given for the sensitivity levels at which BCAS is operative. The use of height and height-rate data is described, and the operation of the collision avoidance system is analyzed. Finally, the resolution advisory register, which ensures compatibility between BCAS advisories, is discussed. C.D.

A82-30314 **Magnetic anomalies as a reference for ground-speed and map-matching navigation.** C. Tyren. *Journal of Navigation,* vol. 35, May 1982, p. 242-254.

The use of the earth's magnetic field for ground referenced motion and position measurements is discussed. A magnetic terrain-navigation concept is set forth, and its sensor configuration, data processing and data storage unit, and navigation data interface unit are discussed. The navigational accuracy of the system is assessed; one particular advantage of terrain navigation systems is that ground-speed accuracy is independent of vehicle speed until speeds are reached at which the sensors and/or computer operations are too slow to track the vehicle path. The system is therefore excellent at low speeds and can advantageously be used for hovering operations. The results of field tests indicate that the feasibility of both ground-speed and map-matching methods is indeed promising. C.D.

A82-30675 **Aviation gear drives and reducers: Handbook (Aviatsionnye zubchatye peredachi i reduktory: Spravochnik).** Edited by E. B. Vulgakov. Moscow, Izdatel'stvo Mashinostroenie, 1981. 576 p. In Russian.

The book contains data on the geometry, kinematics, design, manufacture, and testing of aviation gear drives and reducers. In particular, consideration is given to the geometrical analysis of involute cylindrical gear drives, gear drive strength and dynamics, splined joints, analysis of torsional and flexural vibrations, and computer-aided design of gear drives. Other topics discussed include materials, chemical and heat treatment, tolerances, and quality assurance during the manufacture of gears, experimental testing techniques, and principal defects. Attention is also given to the design of helicopter reduction gears, overrunning clutches, lubricants for reduction gears, and cost-effectiveness of gear manufacture. V.L.

A82-30697 † **Gas turbine engines used in aviation: Design and construction of components /5th revised and enlarged edition/ (Aviatsionnye gazoturbinnye dvigateli: Konstruktsiia i raschet detalei /5th revised and enlarged edition/).** G. S. Skubachevskii. Moscow, Izdatel'stvo Mashinostroenie, 1981. 552 p. 113 refs. In Russian.

The principles underlying the design of gas turbine engines are expounded. The operating conditions of the various engine compartments, and parts thereof, are considered. Attention is also given to manufacturing processes and the proper choice of materials. Examples of calculations for determining the strength and vibration of the principal engine components are included. C.R.

A82-31048 **Chem-Braze abradable seal practical.** M. Levy (U.S. Army, Army Materials and Mechanics Research Center, Watertown, MA). *ManTech Journal,* vol. 6, no. 2, 1981, p. 9-12. Army-supported research.

An improved Chem-Braze bonding system for attaching sintered abradable seals to titanium, steel, and nickel base compressor blade tip shrouds has been developed. The system incorporates glycerin to prevent premature evaporation which prolongs working life and allows adequate time to attach abradable seals to engine hardware. The system has demonstrated its viability with attachment involving simple mechanical fixturing and curing and removal facilitated by chemical stripping, and all operations are relatively fast and inexpensive. Optimum inhibitor concentration was found to be 10 percent. Optimum drying time, cure cycle, proper chemical stripping technique, and inexpensive tooling techniques were also determined. A preliminary cost analysis shows a 74 percent saving compared to attachment with gold-nickel braze. C.D.

A82-31057 **Aircraft cabin air ozone contamination and compliance with regulations.** J. F. Leach, G. R. Robinson (British Aerospace Public Ltd., Co., Filton, Avon, England), and F. J. Sandalls (Atomic Energy Research Establishment, Environmental and Medical Sciences Div., Didcot, Oxon, England). *Atmospheric Environment,* vol. 16, no. 5, 1982, p. 1021-1026. 9 refs. Research supported by the Department of Transport/Department of the Environment and Department of Industry.

Fifteen cabin air ozone measurements made in Concorde are ranked in order and plotted as log-normal and extreme value cumulative probability distributions. It is shown that the log-normal distribution gives adequate accuracy for regulatory purposes and one-sided tolerance limits may be used for statistical methods of compliance with any regulatory limit. Similarly it is shown that compliance by ozone destruction ratio may be difficult due to the extreme stratification of ozone in the lower stratosphere. (Author)

A82-31121 # **Optimal control and estimation for strapdown seeker guidance of tactical missiles.** P. L. Vergez and J. R. McClendon (USAF, Armament Laboratory, Eglin AFB, FL). *Journal of Guidance, Control, and Dynamics,* vol. 5, May-June 1982, p. 225, 226.

An extended Kalman filter is developed that explicitly accounts for the major error sources in a strapdown system and estimates the state information required by an advanced guidance system. The selected guidance law is derived from linear quadratic Gaussian theory, the only assumption being that the missile has instantaneous response and complete control over its acceleration. The filter processes the noise from the strapdown seeker and estimates the information needed by the guidance law referenced to the missile's body-fixed coordinate system. A detailed six-degree-of-freedom simulation of a generic bank-to-turn short range air-to-air missile was used to evaluate the guidance and estimation algorithm developed for the study. C.D.

A82-31125 * # **Comment on 'Optimal control via mathematical programming'.** L. J. Wood (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *Journal of Guidance, Control, and Dynamics,* vol. 5, May-June 1982, p. 318, 319; Authors' Reply, p. 319. 16 refs. Contract No. NAS7-100.

A82-31179 **Combat training imagery.** *Flight International,* vol. 121, Apr. 24, 1982, p. 1048-1050.

The CT-5 is a computer-generated image (CGI) using raster scan that provides a daylight system design for sophisticated military applications. The imagery includes a formation of F-16s, a CH-46 helicopter, a KC-135, and a sea data-base. Backgrounds are realistically depicted. The CT-5 uses a PDP-11 general-purpose minicomputer connected to the simulator computer and image processor, which consists of the viewpoint processor and the channel processor. There is also a series of display processors, and scanline computation is replaced by area computation. Extra channels and more display processors can be added. C.D.

A82-31290 **The helicopter Navstar GPS test program.** R. D. Till (FAA, Technical Center, Washington, DC). *Vertiflite,* vol. 28, May-June 1982, p. 22-25.

The use of the Navstar Global Positioning System (GPS) for helicopter navigation is reviewed. The GPS system has a space segment with a contingent of 18-24 satellites in 12 hr circular orbits with 2 hr coverage by four satellites over selected areas, a user segment with a receiver/processer, and a control segment composed of four monitor stations. Ephemeris data on satellite location is relayed through the control segments to a Master Control station at Vandenberg AFB. The use of four satellites involves the solution of four equations for three-dimensional requirements and for the user clock bias. Civilian use is thus far limited to a coarse/acquisition code at a signal level of -133 dB. A total of 17 flight hours of tests with civilian craft have been flown to test the system, with the helicopter tests covering the total system cross track error, the flight technical error, and the along track error. Operational status is scheduled for 1984. M.S.K.

A82-31426 # **New materials fly better and cheaper.** *Mechanical Engineering,* vol. 104, May 1982, p. 20-26.

The types of advanced, high-performance fibers and their advantages are described, and the process of forming composites is outlined. The use of composites in present and future commercial and military aircraft, including the Learfan 2100 and the Space Shuttle Discovery, is discussed. Special attention is given to metallic and ceramic materials of the future. C.D.

A82-31602 † **The maximum flying range problem for an aircraft (O zadache poleta letatel'nogo apparata na maksimal'nuiu dal'nost').** V. I. Borzov and T. R. Igonina. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela,* Mar.-Apr. 1982, p. 20-24. 5 refs. In Russian.

The maximum flying range problem is examined in terms of the motion of the center of mass of an aircraft in a vertical plane. By using methods based on the theory of differential equations with singular perturbations, the maximum flying range problem is reduced to that of solving a boundary-value problem. The applicability of the proposed model is investigated, and the particular case of the maximum flying range in gliding is examined. V.L.

A82-31603 † **Stability and self-oscillations of coaxial rotors (Ob ustoichivosti i avtokolebaniiakh soosnykh rotorov).** E. L. Pozniak. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Tverdogo Tela,* Mar.-Apr. 1982, p. 38-45. 9 refs. In Russian.

An analysis is presented of the stability and stable self-oscillations induced by viscosity-type nonconservative forces in the material of the shaft in a system of two coaxial rotors supported by a rigid damped frame. The range of stability is studied as a function of the rotor velocities and directions and as a function of damping in the bearings of the frame. A quasi-Galerkin method is used to determine frequencies, amplitudes, and modes for single-frequency as well as multifrequency self-oscillations. The stability of the obtained solutions is investigated. B.J.

A82-31643 † **Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines (Vliianie ekspluatatsionnoi narabotki na mekhanicheskie svoistva materialov i nesushchuiu sposobnost' elementov rotorov GTD).** V. L. Akhremenko (Akademiia Nauk Ukrainskoi SSR, Institut Problem Prochnosti, Kiev, Ukrainian SSR). *Problemy Prochnosti,* Apr. 1982, p. 53-55. 5 refs. In Russian.

Experiments have been conducted to investigate changes in the mechanical properties of turbine alloys EI698, EI961, EI437BUVD, and AL4 following long-term service under actual operating conditions. It is found that ductility and impact toughness are most sensitive to damage, whereas the load-bearing capacity of gas-turbine rotors changes insignificantly in the course of service life and, therefore, cannot be used as a damage criterion. V.L.

A82-31669 **Distributed airborne array concepts.** B. D. Steinberg (Pennsylvania, University, Philadelphia, PA) and E. Yadin (Interspec, Inc., Philadelphia, PA). *IEEE Transactions on Aerospace and Electronic Systems,* vol. AES-18, Mar. 1982, p. 219-227. 19 refs. Grant No. AF-AFOSR-78-3688.

The improvement in SNR and detection range due to distributing an antenna array throughout the airframe and skin of an aircraft is examined. SNR formulas for three system configurations are presented and compared with that of a conventional, monostatic radar. Examples given in the paper show detection range increases as large as a factor of 4. Three additional potential advantages of the distributed array are an increase in spatial signal processing capability, an improvement in azimuthal resolution, and a potential reduction in transmitter power for fixed radar performance so as to reduce the probability of intercept. (Author)

STAR ENTRIES

N82-22144# Royal Aircraft Establishment, Farnborough (England).

THE ROYAL AIRCRAFT ESTABLISHMENT: 100 YEARS OF RESEARCH

A. J. Smith 2 Oct. 1981 33 p refs Presented at 1981 Aviation Lighting Sem., Williamsburg, Virginia, 9-13 Nov., 1981; sponsored by Illuminating Engineering Society of North America (RAE-TM-FS-432; BR80894) Copyright. Avail: NTIS HC A03/MF A01

The work of the Royal Aircraft Establishment (RAE) from its days as His Majesty's Balloon factory to modern times is summarized. Early setbacks to aircraft production included the 1909 War Office declaration that the airplane had no military value. The First World War changed this opinion and the interwar years saw an expansion which bore fruit in the development of the gyro gun sight, stabilized bomb sight and high speed aerial reconnaissance during World War 2. The tapered ladder effect used in airfield approach lighting systems was developed after the war, along with subsonic and supersonic wind tunnels. Recent projects involving the RAE include Concorde, Earth resources satellites, and head-up displays. Author (ESA)

N82-22145# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

LA RECHERCHE AEROSPATIALE, BI-MONTHLY BULLETIN NUMBER 1981-5, SEPTEMBER - OCTOBER 1981

Claude Sevestre, ed. ESA Feb. 1982 63 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-5, Sep. - Oct. 1981 Sponsored by ESA
(ESA-TT-725) Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Advances in aerospace engineering are reviewed. Flow theory and computation are considered. Signal processing algorithms are presented. Structural analysis of composite materials is discussed. Two wind tunnel investigations, helicopter rotor performance measurement and testing a digital filtering system, are also described.

N82-22151# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

HELICOPTER ROTOR PERFORMANCE IMPROVEMENT BY UTILIZATION OF SWEPT-BACK PARABOLIC BLADE TIP

J. J. Philippe and P. Lafon *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-5, Sep. - Oct. 1981 (ESA-TT-725) Feb. 1982 p 55-56 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-5, Sep. - Oct. 1981

Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A sweptback parabolic tip was designed so as to improve the working conditions of an advancing blade by reducing the intensity of the shock waves which arise and the drag associated with such shocks. The design is based on the computated pressure distribution on a helicopter blade in the fundamental case of a nonlifting rotor. The results of the computations clearly show the advantages of using this geometry for a rotor blade tip. Results of tests on such tips, performed in a wind tunnel on a three bladed rotor, demonstrate an overall improvement in the performance of the rotor. Author (ESA)

N82-22152# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

REAL TIME DIGITAL FILTERING TEST IN THE S1 CONTINUOUS WIND TUNNEL AT MODANE

J. Appel *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-5, Sep. - Oct. 1981 (ESA-TT-725) Feb. 1982 p 57-61 ref Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-5, Sep. - Oct. 1981
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A set of real time digital filters was used in a wind tunnel during testing of a transport aircraft model. The performance of the digital filters, programmed at various cutoff frequencies, was compared with that of analog filters already in use. Ten measuring channels, permitting computation of three aerodynamic coefficients for the model, were recorded. The operating principle of the real time digital filters is described. Results confirm the interest of low pass filtering at a very low cutoff frequency for restoring static parameters while a model is performing an angle of attack sweep in continuous mode. Author (ESA)

N82-22153# National Aerospace Lab., Amsterdam (Netherlands). Div. of Structures and Materials.

REVIEW OF AERONAUTICAL FATIGUE INVESTIGATIONS IN THE NETHERLANDS, MARCH 1979 - FEBRUARY 1981

J. B. deJonge Feb. 1981 43 p refs Presented at the 17th ICAF Conf., Noordwijkerhout, Netherlands, 18-19 May 1981
(NLR-MP-81006-U) Avail: NTIS HC A03/MF A01

Reports on aeronautical fatigue investigations are reviewed. The reports are cited in a subject index, covering: loads; flight simulation testing, procedures and evaluation; fatigue investigations; prediction of crack initiation and crack propagation; damage tolerance and residual strength; materials evaluation; inspection methods and service failure analysis; fatigue of aircraft materials; fatigue of laminates; fatigue of joints; and prediction of residual strength of stiffened panels. Author (ESA)

N82-22154# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

DYNAMIC ENVIRONMENTAL QUALIFICATION TECHNIQUES

Dec. 1981 245 p refs Partly in ENGLISH; one in FRENCH Proceedings of the 53rd Meeting of the Structures and Mater. Panel, Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981
(AGARD-CP-318; ISBN-92-835-0306-6) Avail: NTIS HC A11/MF A01

The state of the art of dynamic qualification techniques and test methods for military aircraft with external stores are reviewed, including consideration of the rationale and interpretation of existing standards. The determination of environmental inputs from various sources and their application to specific aircraft and store configurations, including helicopters, are covered. Presentations were also given on the development of vibration analysis techniques and the evaluation of possible improvements in prediction methods and establishment of criteria.

N82-22155# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Combined Environments Test Group.

DEVELOPMENT AND USE OF DYNAMIC QUALIFICATION STANDARDS FOR AIR FORCE STORES

Alan H. Burkhard and Otto F. Maurer *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 7 p refs
see N82-22154 13-01)
Avail: NTIS HC A11/MF A01

The cataloging and standardization act for the standardization of items, materials, and engineering practices in the defense industry is discussed. Formal procedures for generating, updating, and utilization of these documents are presented. The advantages of standardization leading to simplification of procurement, development, and production processes by fostering uniformity, direct comparability, interchangeability of standardized objects are outlined. The state of the art of test techniques and procedures are considered. E.A.K.

N82-22158# British Aerospace Aircraft Group, Preston (England). Specialist Functions, Stress Office.

QUALIFICATION OF EQUIPMENT FOR GUNFIRE INDUCED VIBRATION

A. Peacock *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 22 p refs
Avail: NTIS HC A11/MF A01

A method to ensure that the Tornado MK1 aircraft equipment withstand gunfire induced vibrations is described. The derivation of test spectra from rig and aircraft measurements is explained. Test failures and in-service malfunctions are reviewed. A comparison with Mil specification is made. E.A.K.

N82-22159# General Dynamics/Fort Worth, Tex.
DYNAMIC QUALIFICATION TESTING OF F-16 EQUIPMENT
H. E. Nevius and W. J. Brignac *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 15 p

Avail: NTIS HC A11/MF A01

Vibration prediction methods and qualification test procedures are presented for F-16 equipment. Measured vibration levels are also compared to the predictions. The most severe vibratory environment is produced by the muzzle blast pressure during gunfiring. Gunfiring vibration was measured during the YF-16 prototype program which indicated a correlation between vibration levels and distance from the gun port. Vibration data are presented verifying this relationship. Nongunfiring random vibration test levels are shown for F-16 airframe zones. The prediction procedures were based on a relationship between vibration and dynamic pressure using measured data from other aircraft. Vibration levels were measured on fuselage mounted stores. Other measured dynamic environments are presented which include wing tip missile response to store ejection from wing pylons and to jet wake encounter, and buffet response at high-angles-of-attack. Author

N82-22160# McDonnell-Douglas Corp., St. Louis, Mo. Structural Dynamics Sect.
DEVELOPMENT OF VIBRATION QUALIFICATION TEST SPECTRA FOR THE F-15 AIRCRAFT
G. R. Waymon *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 19 p refs

Avail: NTIS HC A11/MF A01

The vibration test spectra used for an F-15 Eagle were based on analytical predictions combined with measured data from similar aircraft. The low frequency vibration below approximately 50 Hertz results primarily from aircraft response to gusts, buffet, landing, and taxi excitation. Vibration at higher frequencies is primarily associated with acoustical excitation and gunfire. The airplane was divided into regions of comparable vibration levels. The test levels were derived using the predicted spectra and applying factors to define a performance and an endurance test. The F-15 flight measured data were used to update these predictions for the present test spectra. Author

N82-22161# British Aerospace Aircraft Group, Kingston-upon-Thames (England).
EQUIPMENT VIBRATION QUALIFICATION FOR HARRIER AND HAWK AIRCRAFT
D. C. Thorby *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 7 p refs

Avail: NTIS HC A11/MF A01

Equipment for later versions of the Harrier and all versions of the Hawk aircraft were cleared for flight vibration using test procedures based on the current British Standard. The rationale used in applying this Specification, and the flight vibration test procedures are briefly outlined from a practical viewpoint. Author

N82-22162# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
ACOUSTIC NOISE TEST AS PART OF THE DYNAMIC QUALIFICATION PROGRAM IN AEROSPACE
G. Bayerdoerfer *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 7 p
Avail: NTIS HC A11/MF A01

The mechanisms of noise generation for the purpose of acoustic qualification tests are described. Special emphasis is given to the modal density of acoustic noise fields in enclosures, such as reverberation chambers. A test program shows that for small components a sufficient modal density can be achieved in relatively small test chambers. Where applicable small chambers are favorable because of the lower test costs. Author

N82-22164# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany). Abt. Dynamik/Aeroelastik.
AIRCRAFT FUEL TANK SLOSH AND VIBRATION TEST

Helmut Zimmermann *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 11 p

Avail: NTIS HC A11/MF A01

A dynamic qualification test for a subsonic and a supersonic external drop tank for a European fighter is presented. The test rig and the specimens are described and the measuring results are discussed. It is shown that for the supersonic tank as well as for the subsonic tank a certain slosh angle an eigenfrequency of the rig increases the amplitudes at the excitation position and the accelerations on the tank. For the subsonic tank it seems that an eigenfrequency is excited for the nose down position of the tank. The qualification requirements are examined. It is proposed that instead of using an arbitrary vibration amplitude and frequency for excitation, frequency ranges and amplitudes which are averaged out of flight measurements at the tank attachment points on the aircraft be used and that the demand for a certain input amplitude at the top of the attachment bulkheads and an output amplitude at the bottom of the attachment bulkheads be deleted. E.A.K.

N82-22165# Army Aviation Research and Development Command, St. Louis, Mo. Structures and Aeromechanics Div.
THE STRUCTURAL DYNAMIC INTERFACE REQUIRED FOR DEVELOPING HELICOPTER TARGET ACQUISITION SYSTEMS
Sam T. Crews *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 9 p refs

Avail: NTIS HC A11/MF A01

A brief description of the helicopter vibration environment is given. Two development programs were used as examples to show how vibration sensitive target acquisition systems can be interfaced to a helicopter. The systems are the Target Acquisition Data System/Pilot Night Vision System mounted to the nose of the Army's new Advanced Attack Helicopter and the Stand-Off Target Acquisition System mounted underneath the Army's BLACK HAWK helicopter. The qualification strategy and specific testing performed and to be performed are included. Author

N82-22166# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
APPROACH IN DYNAMIC QUALIFICATION OF LIGHT HELICOPTER STORES AND EQUIPMENTS
D. Braun and J. Stoppel *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 8 p refs

Avail: NTIS HC A11/MF A01

Problems occurring in connection with the dynamic qualification of equipment and external stores for light military helicopters are evaluated. Special features of the helicopter vibratory environment are discussed. Some general recommendations for the procedure of dynamic qualification for use with helicopters are given. The approach for dynamic qualification of relatively heavy equipment is presented using the example of combining the MBB BO 105 helicopter with HOT anti-tank missile launchers. To obtain a basic understanding of the dynamic behavior of the helicopter with external stores preliminary dynamic calculations were made. Shake tests were done with the separated external stores and flight test vibration measurements were obtained. Test results are presented with regard to the harmonic main rotor excitation. M.D.K.

N82-22167# Westland Helicopters Ltd., Yeovil (England). Dynamics Dept.
THE DYNAMIC QUALIFICATION OF EQUIPMENT AND EXTERNAL STORES FOR USE WITH ROTARY WINGED AIRCRAFT
G. M. Venn *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 11 p
Avail: NTIS HC A11/MF A01

The dynamic regime imposed on helicopter-borne stores and equipment, highlighting the differences between the rotary and fixed-wing environments are outlined. The need for helicopter requirements to be addressed in particular is discussed. The influence of a number of contributory factors to the dynamic environment arising from varying military applications covering both land and sea operation is also discussed. The dynamic criteria for design and testing are given, explaining the particular influence of discrete sinusoidal forcing on the helicopter environment. The evolution of these standards and their consolidation through flight and service experience is explained. Some views on the future development of dynamic qualification criteria for rotary-winged aircraft are also outlined. M.D.K.

N82-22168# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. of Aeroelasticity.

APPLICATION OF MODAL SYNTHESIS TECHNIQUES FOR THE DYNAMIC QUALIFICATION OF WINGS WITH STORES

E. Breitbach *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 22 p refs

Avail: NTIS HC A11/MF A01

Dynamic qualification as well as flutter clearance of modern combat aircraft were studied using modal coupling methods. Emphasis was placed on how to deal with special phenomena due to nonlinearities, in particular combinations of backlash and dry friction, in the connecting parts between wing, pylon and store which may significantly infringe on the validity of the linear mathematical models as used in ground and flight vibration testing. M.D.K.

N82-22169# Boeing Military Airplane Development, Seattle, Wash. Structural Dynamics Dept.

STOL AIRCRAFT STRUCTURAL VIBRATION PREDICTION FROM ACOUSTIC EXCITATION

B. F. Dotson and J. Pearson (AFWAL) *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 20 p refs

Avail: NTIS HC A11/MF A01

A method was developed to improve environment vibration prediction methods, particularly in the lower frequency range where high acoustic excitation is expected on STOL aircraft. A rigorous mathematical spectral analysis approach was used which simulated the structure with finite element models (FEM) and used measured and calculated acoustic input data for the forcing function. Calculated and measured vibrations levels were compared on a medium sized Upper Surface Blowing (USB) STOL aircraft. The development of a method for prediction of the external acoustic environment of USB flap-type STOL aircraft was also accomplished. The method compares favorably with actual measurements and represents a significant improvement in acoustic prediction methods for aircraft with USB type flaps. The method includes scaling factors for engine size, thrust, aircraft size, and other parameters. Finally, noise and vibration levels were predicted on a small STOL aircraft and later compared to measured data. Author

N82-22170# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.

GUNFIRE BLAST PRESSURE PREDICTIONS

R. M. Munt, A. J. Perry, and S. A. Moorse *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 20 p refs

Avail: NTIS HC A11/MF A01

A scheme for predicting the blast pressures from aircraft guns is presented which extends existing theory. The predictions correlate well with some experimental measurements of gun blast pressures in free space. Blast pressures were also measured experimentally on a surface in the vicinity of the muzzle of a 7.62 mm rifle but these could only be satisfactorily predicted in regions where the classical theory of regular reflection of shock waves could be applied. These results are discussed in relation to the surface blast pressures from aircraft mounted guns. Author

N82-22171# Grumman Aerospace Corp., Bethpage, N.Y.

DEVELOPMENT OF A TAPED RANDOM VIBRATION TECHNIQUE FOR ACCEPTANCE TESTING

John Devitt, Richard Pokallus, Joseph Popolo, and Eugene Baird *In* AGARD Dyn. Environ. Qualification Tech. Dec. 1981 6 p

Avail: NTIS HC A11/MF A01

The use of random vibration as a screen for latent workmanship problems normally found in avionic equipment, proven to be significantly more effective than the sinusoidal form of excitation normally employed. This was demonstrated and is now required for acceptance testing by various DoD agencies. The results of a program to develop an economical technique for generating random vibration utilizing an audio tape deck indicate that compensating factors can be developed to account for the variations that exist in generically identical equipment. Using these factors, synthetic random tapes were generated. Author

N82-22172# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

MAINTENANCE IN SERVICE OF HIGH TEMPERATURE PARTS

Jan. 1982 162 p refs Meeting held at Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981

(AGARD-CP-317) Avail: NTIS HC A08/MF A01

The problem areas in the inspection, repair, and life extension and prediction of gas turbine engine parts are addressed.

N82-22173# Ministry of Defence, London (England).

MILITARY MAINTENANCE POLICIES AND PROCEDURES FOR HIGH-TEMPERATURE PARTS. WILL THEY BE ADEQUATE?

R. B. G. Hedgecock *In* AGARD Maintenance in Serv. of High Temp. Parts Jan. 1982 7 p refs

Avail: NTIS HC A08/MF A01

The problems involved in developing engine parts maintenance policies which incorporate life estimation, inspection, repair and containment of costs are examined. Computer-based engine usage monitoring systems and a low cycle fatigue counter are described along with assembled and unassembled engine inspection procedures and repair techniques. 3.

N82-22174# Dayton Univ., Ohio. Graduate Materials Engineering Program.

ENGINE DEPOT MAINTENANCE REPAIR TECHNOLOGY

James A. Snide and William J. Schulz (AFWAL) *In* AGARD Maintenance in Serv. of High Temp. Parts Jan. 1982 19 p refs

Avail: NTIS HC A08/MF A01

The scope and mission of the two USAF engine Air Logistics Centers are described. The various processes and organizational structure to identify repair technology requirements are discussed. Approaches to transition and implementation of new technology into a repair depot environment are described. Specific examples of technology developments described are: braze repair, laser metrology, electrophoretic, coatings, sputtered MCrAlY overlay coating and inlet guide vane vibration damping. Author

N82-22175# Naval Aircraft Materials Lab., Fleetlands (England).

MAINTENANCE PROBLEMS IN GAS TURBINE COMPONENTS AT THE ROYAL NAVAL AIRCRAFT YARD, FLEETLANDS

F. J. Plumb *In* AGARD Maintenance in Serv. of High Temp. Parts Jan. 1982 13 p refs

Avail: NTIS HC A08/MF A01

The work of the engine repair facility at Fleetlands and the major problems found in the overhaul and repair of helicopter and marine gas turbines are discussed. Remedies for component reserviceability, developments to obtain longer service lives, and the techniques employed are discussed. Author

N82-22176# KLM Royal Dutch Airlines, Amsterdam (Netherlands). Propulsion Systems Dept.

MAINTENANCE EXPERIENCE WITH CIVIL AERO ENGINES

J. Ph. Stroobach *In* AGARD Maintenance in Serv. of High Temp. Parts Jan. 1982 3 p

Avail: NTIS HC A08/MF A01

The trends in high temperature parts maintenance concept developments are reviewed, indicating the constant activities to optimize the maintenance cost of the propulsion system. As a result of the escalating trends in material and fuel prices, the presently applied maintenance concepts require a more sophisticated condition control in order to comply with the need to find the optimum operating time of each individual engine. With the introduction of the new generation of civil aircraft (Airbus A310) a mutual goal between the engine manufacturer and the airline was defined to develop mathematical programs, based on actual recorded conditions, in order to control the behavior of the engine, aiming at an optimum use of the propulsion system. M.G.

N82-22177# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.

ENGINE COMPONENT RETIREMENT FOR CAUSE

J. A. Harris, Jr., C. G. Annis, Jr., M. C. VanWanderham, and D. L. Sims *In* AGARD Maintenance in Serv. of High Temp. Parts

Jan. 1982 9 p refs

Avail: NTIS HC A08/MF A01

An engine part retirement for cause (RFC) procedure is discussed which would allow safe utilization of the full life capacity of each individual component. Since gas turbine rotor components are prime candidates and are among the most costly of engine components, adoption of a RFC maintenance philosophy could result in substantial engine systems life cycle cost savings. Two major technical disciplines must be developed and integrated to realize these cost savings: fracture mechanics and nondestructive evaluation. The methodology and development activity required to integrate these disciplines that provide a viable RFC system for use on military gas turbine engines is discussed. The potential economic benefits of its application to a current engine system are also illustrated. M.G.

N82-22179# Rolls-Royce Ltd., Derby (England). Dept. of Materials Engineering.

DEFECTS AND THEIR EFFECT ON THE BEHAVIOR OF GAS TURBINE DISCS

Robert H. Jeal *In* AGARD Maintenance in Serv. of High Temp. Parts Jan. 1982 15 p

Avail: NTIS HC A08/MF A01

Unless the method used to life fatigue critical components like gas turbine discs allows assessment of defect presence and behavior, the risk of serious failure is dramatically increased. A method is discussed where defect behavior can be assessed as part of a total life approach to disc behavior prediction and is explained together with the effects of differing defect types. Such an approach gives realistic manufacturing standards and controls and leads directly to an 'on condition life' approach. Author

N82-22180# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

THE INFLUENCE OF PROTECTIVE TREATMENT ON THE MECHANICAL PROPERTIES OF SUPERALLOY PARTS [INFLUENCE DES TRAITEMENTS DE PROTECTION SUR LES PROPRIETES MECANIQUES DES PIECES EN SUPERALLIAGE]

J. M. Hauser, C. Duret, and R. Pichoir *In* AGARD Maintenance in Serv. of High Temp. Parts Jan. 1982 11 p refs In FRENCH

Avail: NTIS HC A08/MF A01

The high temperature environment of aircraft turbine engines requires the use of protective coatings for engine parts. These coatings are particularly necessary when the composition of the superalloys used and associated heat treatment are chosen in order to obtain the best mechanical properties. The durability of these components is determined not only by the mechanical properties of the protected heat resistance alloys, but equally by the resistance of the coating to oxidation and corrosion. To restore this protection can pose diverse problems and, in certain cases, constitute an additional factor in reducing fatigue life. These aspects are considered and illustrated by results obtained from aluminium coatings applied to IN 100 and IN 738LC superalloys. Factors inherent i to t elaboration of the protection are also considered. Transl. by A.R.H.

N82-22185# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).

REPAIR AND REGENERATION OF TURBINE BLADES, VANES AND DISCS

H. Huff and J. Wortmann *In* AGARD Maintenance in Serv. of High Temp. Parts Jan. 1982 7 p refs

Avail: NTIS HC A08/MF A01

The repair of incipiently cracked turbine components is essentially limited to non-rotating parts. Repairs to rotating parts are carried out on low-stressed areas, such as seals, only. In this case, weld build-up has proved to be a suitable process. Stator vanes can be high-temperature brazed following reduction annealing. However, problems are encountered when it comes to making sure of the complete removal of oxides. A highly promising method for increasing the reliability of turbine blades that have been in service lies in their regeneration by heat treatment or HIP-processing. Results to date are so positive that the use of regenerated blades may be a reality in the near future. However, a prerequisite for the use of these repair procedures is a guarantee of reliability and a knowledge of the stresses that occur during operation. A.R.H.

N82-22187# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

COMBAT AIRCRAFT MANOEUVRABILITY

Dec. 1981 242 p refs In ENGLISH and FRENCH Proceedings of the Flight Mechanics Panel Symp., Florence, 5-8 Oct. 1981 (AGARD-CP-319; ISBN-92-835-0304-X) Avail: NTIS HC A11/MF A01

The symposium reviewed the operational requirements for combat aircraft maneuverability, technical prospects for maneuverability improvements, and prediction and assessment methods and their value.

N82-22188# Service Techniques des Programmes Aeronautiques, Paris (France). Section Etudes Generales.

A REVIEW OF RECENT AGARD SYMPOSIA ON THE ANGLE OF MANEUVERABILITY OF COMBAT AIRCRAFT [RETROSPECTIVE DE RECENTS SYMPOSIUMS AGARD SOUS L'ANGLE DE LA MANOEUVRABILITE DES AVIONS DE COMBAT]

Jean-Michel Duc (Service des Recherches/Groupe 6) and Michel Vergne *In* AGARD Combat Aircraft Maneuverability Dec. 1981 50 p refs In FRENCH

Avail: NTIS HC A11/MF A01

The notion of maneuverability, in terms of flight mechanics, as it was treated at meetings of the Fluid Dynamics and Fluid Mechanics Panels during the past ten years is reviewed. Each point discussed is illustrated by graphics taken from previously cited AGARD proceedings. Operational needs, hopes for improvement, methods for prediction, and methods for evaluation of flight qualities at high incidence are examined. A.R.H.

N82-22189# Royal Netherlands Air Force, Soesterberg.

REVIEW OF PRACTICAL EXPERIENCE ON COMBAT AIRCRAFT MANEUVERABILITY

A. W. Henni *In* AGARD Combat Aircraft Maneuverability Dec. 1981 8 p

Avail: NTIS HC A11/MF A01

Based upon practical experience in both air to air and air to ground operations with F-84F, F-104G, and NF-5 fighter aircraft, an assessment is given of the importance of combat aircraft maneuverability. In air to ground operations the effect of limited maneuverability on tactics is treated in terms of speed/altitude and maneuverability requirements during ingress/egress and weapon delivery, in relation to attack effectiveness and survivability against enemy defenses. For air to air operations the parameters that influence the outcome of a maneuvering flight are identified. The relation between maneuverability and tactics is discussed. It is concluded that the impact of maneuveriabilty on mission effectiveness becomes less prominent at increasing total number of air to air capable aircraft, fighting in a limited airspace. Dependent on the type of operation, desirable improvements in maneuverability are discussed with emphasis on turn performance (at low speeds), rapid speed changes and direct force generation. In this context human tolerance limits are taken into account. It is stressed that the main problems confronting a fighter pilot in the Central European environment are not related to maneuverability but to the availability of military subsystems. M.G.

N82-22190# Naval Air Systems Command, Washington, D. C.

THE MILITARY FLYING QUALITIES SPECIFICATION, A HELP OR A HINDRANCE TO GOOD FIGHTER DESIGN

Ralph C. AHarrah and Robert J. Woodcock (AFWAL, Wright-Patterson AFB, Ohio) *In* AGARD Combat Aircraft Maneuverability Dec. 1981 13 p refs

Avail: NTIS HC A11/MF A01

Based on experience with Air Force and Naval aircraft, the current qualities specification is evaluated for application to a future fighter design. Analog and digital fly by wire flight control system having multiple redundancy levels and significant control law variation are discussed. Some specific observations are shared on the following topics with regard to the flying qualities in general and the specification in particular time delays, force commands, forward loop integration, high gains, signal blending, equivalent systems, pilot location, high angle of attack, roll performance, and systems integration. In addition, some general observations are made on the use of MIL-P-8785B, and a Navy conducted survey on the effectiveness of the flying qualities specification is discussed. M.G.

N82-22191# Systems Technology, Inc., Hawthorne, Calif.
DEVELOPMENT OF A TENTATIVE FLYING QUALITIES CRITERION FOR AIRCRAFT WITH INDEPENDENT CONTROL OF SIX DEGREES OF FREEDOM: ANALYSIS AND FLIGHT TEST
Roger H. Hoh, Thomas T. Myers, and Irving L. Ashkenas *In* AGARD Combat Aircraft Maneuverability Dec. 1981 12 p refs
(Contract F33615-78-C-3616)
Avail: NTIS HC A11/MF A01

A tentative flying qualities specification for aircraft having direct force effectors that allow independent control over the horizontal and vertical degrees of freedom is presented. Since the primary problem with developing flying qualities for such aircraft is their unconventional responses as reflected in a very incomplete data base. A limited flight test of a direct force control (OFC) aircraft was performed. The requirements are based on fundamental aspects of OFC pilot/vehicle dynamics to insure universal applicability. A bandwidth hypothesis is described which makes the fundamental assumption that the primary factor in the pilot's evaluation of a DFC mode is his ability to exert tight control to minimize errors and thereby achieve improved closed loop tracking performance. The bandwidth is a measure of the maximum frequency at which such closed loop tracking can take place without threatening stability. It follows that airplanes capable of operating at a large value of bandwidth will have superior performance. M.G.

N82-22192# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
EXPERIMENTAL FLIGHT TEST PROGRAMS FOR IMPROVING COMBAT AIRCRAFT MANEUVERABILITY BY MANEUVER FLAPS AND PYLON SPLIT FLAPS
D. Jacob, D. Welte, and H. Wonnenberg *In* AGARD Combat Aircraft Maneuverability Dec. 1981 11 p refs

Avail: NTIS HC A11/MF A01

Two flight test programs with the Alpha-Jet as test vehicles are described. In the first program the standard wing of the aircraft was replaced by a transonic wing with maneuver flaps. Wind tunnel and flight test results are presented which show the increase in performance and maneuverability based on the improved drag polars and buffet limits. In the second program pylon split flaps were to provide flat turn and side step maneuvers by an alternating deflection of the four left or right split flaps. A drag modulation mode is relized by symmetrical deflection of all eight flaps. M.G.

N82-22193*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
MULTIVARIABLE CLOSED LOOP CONTROL ANALYSIS AND SYNTHESIS FOR COMPLEX FLIGHT SYSTEMS
David K. Schmidt *In* AGARD Combat Aircraft Maneuverability Dec. 1981 13 p refs

(Grants NAG4-1; AF-AFOSR-0042-72)
Avail: NTIS HC A11/MF A01

A flight control system analysis and synthesis method is presented that is intended to be especially suitable for application to vehicles exhibiting complex dynamic characteristics. For such vehicles quantitative handling qualities specifications are not usually available. Howver, handling qualities objectives are specifically introduced in this method via the hypothesis of correlation between pilot ratings and the objective function of an optimal control model of the human pilot. Further, since augmentation and pilot operate in parallel, simultaneous determination of the augmentation and pilot model gains is required. Desirable augmented dynamics are obtained for a variety of complex systems and the method is experimentally verified in the case of simple pilot damper gain selection for optimum pitch tracking performance. M.G.

N82-22194# General Dynamics/Fort Worth, Tex. Engineering Div.
INTEGRATION OF AVIONICS AND ADVANCED CONTROL TECHNOLOGY
M. E. Waddoups and C. A. Anderson *In* AGARD Combat Aircraft Maneuverability Dec. 1981 4 p

Avail: NTIS HC A11/MF A01

Two seemingly exclusive requirements, low cost tactical fighters and night under the weather operations, are being merged by means of advanced technology. The key operational problem is forced by the extremely difficult timeline for low altitude, high speed, air to surface weapon delivery. The inherent economy of single seat operation can be developed by automation. The key technological problems are caused by the lack of volume in a small fighter. In order to achieve automation of the required tasks, flight path control and sensor interfaces must be developed. Based upon emerging hardware and software technology, flight control and avionic subsystems can be optimized and integrated to achieve capability previously unavailable to small fighters. R.J.F.

N82-22195# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.
ENHANCED PILOTING CONTROL THROUGH COCKPIT FACILITIES AND A.C.T.
D. J. Walker (British Aerospace P.L.C., Brough, U.K.) and P. W. J. Fullam *In* AGARD Combat Aircraft Maneuverability Dec. 1981 6 p refs
Avail: NTIS HC A11/MF A01

Total loop control, advanced cockpits, and other aspects of advanced flight control technology are discussed. General maneuvering, force sidestick, depressed roll axis, a nonlinear pitch controller and carefree maneuvering are discussed. R.J.F.

N82-22196*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE DEVELOPMENT OF CRYOGENIC WIND TUNNELS AND THEIR APPLICATION TO MANEUVERING AIRCRAFT TECHNOLOGY
E. C. Polhamus and R. F. Boyden *In* AGARD Combat Aircraft Maneuverability Dec. 1981 12 p refs

Avail: NTIS HC A11/MF A01

The cryogenic wind tunnel and its potential for advancing maneuvering aircraft technology is discussed. A brief overview of the cryogenic wind tunnel concept and the capabilities and status of the Langley cryogenic facilities is given, as is a review of the considerations leading to the selection of the cryogenic concept such as capital and operating costs of the tunnel, model and balance construction implications, and test condition. Typical viscous, compressibility and aeroelastic effects encountered by maneuvering aircraft are illustrated and the unique ability of the cryogenic wind tunnels to isolate and investigate these parameters while simulating full scale conditions is discussed. The status of the Langley cryogenic wind tunnel facilities is reviewed and their operating envelopes described in relation to maneuvering aircraft research and development requirements. The status of cryogenic testing technology specifically related to aircraft maneuverability studies including force balances and buffet measurement techniques is discussed. Included are examples of research carried out in the Langley 0.3 meter transonic cryogenic wind tunnel to verify the various techniques. R.J.F.

N82-22197# Institut de Mecanique des Fluides de Lille (France).
STATE OF THE ART AND RECENT PERSPECTIVES ON THE STUDY OF THE LOSS OF CONTROL AND SPIN [ETAT DE L'ART ET PERSPECTIVES NOUVELLES RELATIVES A L'ETUDE DE LA PERTE DE CONTROLE ET DES VRILLES]

M. G. Vanmansart and D. R. Tristrant *In* AGARD Combat Aircraft Maneuverability Dec. 1981 18 p refs In FRENCH; ENGLISH summary

Avail: NTIS HC A11/MF A01

Some experimental and analysis methods which contribute to aircraft behavior prediction at high angles and during stall-spin are discussed. A brief review of the methods, their limitations and the expected results, is given, illustrated with a few examples. R.J.F.

N82-22198# Office National d'Etudes et de Recherches

Aerospatiales, Paris (France).
APPLICATION OF THE THEORY OF BIFURCATIONS TO THE STUDY OF THE LOSS OF CONTROL IN COMBAT AIRCRAFT [APPLICATION DE LA THEORIE DES BIFURCATIONS A L'ETUDE DES PERTES DE CONTROLE SUR AVION DE COMBAT]
Phillipe Guicheteau *In* AGARD Combat Aircraft Maneuverability Dec. 1981 13 p refs In FRENCH

Avail: NTIS HC A11/MF A01

Aircraft motion can be described in a rigorous manner by a nonlinear differential system, depending on parameters, joining variables of state (incidence, side-slip, speed ...) and variable control (positioning of rudders) by means of equations of flight mechanics and an aerodynamic model. The proposed method consists of determining the stability limits of the system, and of predicting the evolution of that which becomes unstable. It is based on the theory of bifurcation of nonlinear differential systems. A.R.H.

N82-22199# Vought Corp., Dallas, Tex. Aerodynamics Div.
PREDICTIONS OF AERODYNAMIC CHARACTERISTICS OF HIGHLY MANEUVERABLE CONFIGURATIONS
W. B. Brooks and T. D. Beatty *In* AGARD Combat Aircraft Maneuverability Dec. 1981 6 p refs

Avail: NTIS HC A11/MF A01

The ability of a variety of currently available methods to predict the lateral/directional characteristics of arbitrary configurations is discussed. The programs surveyed generally had either nonlinear or arbitrary body capability, but not both. Published comparisons between the hypersonic arbitrary body program and experimental data suggested a direct extension of the commonly used Allen-Jorgenson cross flow analogy to arbitrary bodies. Though useful, this extension of the Allen-Jorgenson method did not include dynamic pressure losses on aft lifting surfaces. An examination of a nonlinear approach which computes the forces on a combined body/separated region contour and corrects these forces by an empirical momentum deficit in the separated region was begun. For axisymmetric bodies the method reduces to the standard Allen-Jorgenson cross flow approach. Two potentially major advantages over the Allen-Jorgenson method are that the method does provide a model for predicting body fin interaction and that the method is extendable to arbitrary bodies. R.J.F.

N82-22200# British Aerospace Aircraft Group, Preston (England). Aerodynamics Dept.
AEROELASTIC TAILORING FOR CONTROL AND PERFORMANCE: ARE REQUIREMENTS COMPATIBLE?
D. Booker *In* AGARD Combat Aircraft Maneuverability Dec. 1981 4 p refs
Avail: NTIS HC A11/MF A01

The variations of camber and twist along a wing required for optimum performance in low 'g' (cruise) and high 'g' (combat) flight are discussed. It is shown that a wing with active leading edge and trailing edge maneuverer devices scheduled with angle of attack, and structurally tailored to control aeroelastic bending and torsion, can approach optimum performance. However the torsional stiffness of such a wing may be too low for satisfactory roll control at high airspeeds in supersonic flight. Some compromise to performance is implied if torsional stiffness has to be increased to provide adequate control capability. Author

N82-22201# Northrop Corp., Hawthorne, Calif. Aircraft Div.
TAIL CONFIGURATIONS FOR HIGHLY MANEUVERABLE COMBAT AIRCRAFT
W. E. Fellers, W. S. Bowman, and P. T. Wooler *In* AGARD Combat Aircraft Maneuverability Dec. 1981 18 p

Avail: NTIS HC A11/MF A01

The drag due to lift, maximum lift, and stability and control characteristics of tailless, canard, and aft tail configurations of highly maneuverable combat aircraft, using both aerodynamic surfaces and vectored thrust for pitch control are evaluated. The same low aspect ratio wing planform was used on all the configurations. Control configured vehicle concepts were employed. Variable wing camber employing leading edge and trailing edge flaps was used to reduce profile drag. The center of gravity was located as far aft as allowed by the stability and control criteria, in order to reduce subsonic and supersonic trim drag. The critical pitch control criterion was found to be the providing of adequate nose down pitch acceleration in the angle of attack region near maximum lift. The aft center of gravity limits for both tailless and canard configurations without pitch thrust vectoring were required to be forward of the optimum location for minimum subsonic maneuver trim drag. The aft tail configuration was not limited in this manner. In addition it could attain a higher subsonic maximum lift. It also had a greater design flexibility since the aft center of gravity limit could be influenced by the tail area. For these reasons it was the preferred configuration. B.W.

N82-22202# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
EVALUATION OF AIRCRAFT IN SIMULATED COMBAT: COMPUTER AGAINST COMPUTER OR COMPUTER AGAINST HUMAN PILOT [EVALUATION D'AVIONS EN COMBAT SIMULE CALCULATEUR CONTRE CALCULATEUR OU CALCULATEUR CONTRE PILOTE HUMAIN]
J. Pedotti and Y. Hignard (Centre Electronique de l'Armement) *In* AGARD Combat Aircraft Maneuverability Dec. 1981 14 p refs In FRENCH
Avail: NTIS HC A11/MF A01

A program was developed for simulating one aircraft in combat with another. The adaptive logic of aerial maneuvers (LAMA) program was validated by theoretical studies and by pilot/model tests on the CELAR simulator. The program permits either an entirely numerical model or a simulation of interactive hostility against a pilot on a simulator. Not only does the program provide a means for studying new weapons systems, it also provides a hostile performer for training pilots. A.R.H.

N82-22203# Grumman Aerospace Corp., Bethpage, N.Y. Research Dept.
THE ASSESSMENT OF AIRCRAFT COMBAT EFFECTIVENESS USING A NEW COMPUTATIONAL METHOD
Michael Falco and Gilbert Carpenter *In* AGARD Combat Aircraft Maneuverability Dec. 1981 11 p refs Sponsored in part by Army Aviation Research and Development Command

Avail: NTIS HC A11/MF A01

A computational method for the assessment of aircraft combat effectiveness in the design concept phase is discussed. The approach employs a stochastic learning method, in conjunction with dynamic simulation, to derive aircraft maneuver strategies in the form of a feedback control based upon a discretized set of threat visual or warning system cues. The derived strategies maximize either survival probability of kill probability in the one on one setting. Computational results are presented for selected aircraft designs in missile and gun combat. B.W.

N82-22204# McDonnell-Douglas Corp., St. Louis, Mo. Operations Analysis Dept.
EVALUATION OF DIRECT FORCE MODE FIGHTERS BY COMBAT SIMULATION
C. H. Guthrie *In* AGARD Combat Aircraft Maneuverability Dec. 1981 13 p
Avail: NTIS HC A11/MF A01

Advanced fighter concepts which have been significantly influenced by air combat simulation are discussed. Both man in the loop and digital combat simulation are excellent tools for developing and screening advanced fighter concepts. One important application is the evaluation of fighters with high authority aerodynamic and propulsive controls. Manned and digital air combat simulations showed that high authority controls substantially increase combat effectiveness when used both for enhance large scale maneuverability and for automatic pointing of the fuselage. Digital simulation showed that fighters with high authority direct force modes require lower sustained load factors than conventional designs for a constant level of effectiveness in close in combat. Therefore, fighters with direct force modes can be lighter and less expensive than conventional aircraft. In a manned simulation of close in combat, single fighters with several levels of aerodynamic and propulsion control authority were flown against two threat fighters of equal instantaneous sustained turn rate capability and with identical avionics and armament. For the fighter configured with the highest authority controls, many measures of engagement control and effectiveness were double those of the conventional (baseline) fighter. B.W.

N82-22205# British Aerospace Aircraft Group, Preston (England).

THE STUDY OF COMBAT AIRCRAFT MANEUVERABILITY BY AIR TO AIR COMBAT SIMULATION
A. G. Barnes *In* AGARD Combat Aircraft Maneuverability Dec. 1981 9 p
Avail: NTIS HC A11/MF A01

Air to air combat by ground based simulation and its contribution to the design, development and operational use of combat aircraft is evaluated. The merits of different aircraft/missile combinations can be assessed under controlled conditions with pilot involvement. Parameters which influence maneuverability, such as sustained turn rate, attained turn rate, and SEP can be easily varied, and translated into combat success. The relative importance of these parameters are discussed in the light of experimental results. S.W.

N82-22206*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
AERODYNAMIC PERFORMANCE OF SLENDER WINGS WITH SEPARATED FLOWS Technical Report, period ending 31 Dec. 1981
C. Subba Reddy Mar. 1982 64 p refs
(Grant NsG-1561)
(NASA-CR-168768; NAS 1.26:168768) Avail: NTIS HC A04/MF A01 CSCL 01A

The aerodynamic performance of low aspect ratio sweptback wings with vortex flows was numerically investigated using the free vortex sheet method. The models studied included flat, cambered, strake, and leading edge flapped wings of different planforms. The theoretical results predicted by the method were compared with the existing experimental data wherever available; and the code capabilities and limitations were explored. Also the effects of the wing thickness, fuselage, leading edge flap and multiple vortex modeling on the aerodynamic characteristics were studied. Author

N82-22207*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL INVESTIGATION OF THE POWERED LOW-SPEED LONGITUDINAL AERODYNAMICS OF THE VECTORED-ENGINE-OVER (VEO) WING FIGHTER CONFIGURATION
John W. Paulson, Perry D. Whitten (General Dynamics Corp., Fort Worth, Tex.), and Stephen C. Stumpfl (AFWAL) Mar. 1982 274 p refs
(NASA-TM-83263; NAS 1.15:83263) Avail: NTIS HC A12/MF A01 CSCL 01A

A wind-tunnel investigation incorporating both static and wind-on testing was conducted in the Langley 4- by 7-Meter Tunnel to determine the effects of vectored thrust along with spanwise blowing on the low-speed aerodynamics of an advanced fighter configuration. Data were obtained over a large range of thrust coefficients corresponding to takeoff and landing thrust settings for many nozzle configurations. The complete set of static thrust data and the complete set of longitudinal aerodynamic data obtained in the investigation are presented. These data are intended for reference purposes and, therefore, are presented without analysis or comment. The analysis of the thrust-induced effects found in the investigation are not discussed. Author

N82-22209*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering, Aeronautical Engineering and Mechanics.
INVESTIGATION OF PASSIVE SHOCK WAVE-BOUNDARY LAYER CONTROL FOR TRANSONIC AIRFOIL DRAG REDUCTION Final Report, 1 Oct. 1979 - 30 Sep. 1981
H. T. Nagamatsu, W. B. Brower, Jr., L. Bahi, and J. Ross Apr. 1982 204 p refs
(Grant NsG-1624)
(NASA-CR-168844; NAS 1.26:168844) Avail: NTIS HC A10/MF A01 CSCL 01A

The passive drag control concept, consisting of a porous surface with a cavity beneath it, was investigated with a 12-percent-thick circular arc and a 14-percent-thick supercritical airfoil mounted on the test section bottom wall. The porous surface was positioned in the shock wave/boundary layer interaction region. The flow circulating through the porous surface, from the downstream to the upstream of the terminating shock wave location, produced a lambda shock wave system and a pressure decrease in the downstream region minimizing the flow separation. The wake impact pressure data show an appreciably drag reduction with the porous surface at transonic speeds. To determine the optimum size of porosity and cavity, tunnel tests were conducted with different airfoil porosities, cavities and flow Mach numbers. A higher drag reduction was obtained by the 2.5 percent porosity and the 1/4-inch deep cavity. T.M.

N82-22211*# Boeing Commercial Airplane Co., Seattle, Wash.
AERODYNAMIC ANALYSIS OF VTOL INLETS AND DEFINITION OF A SHORT, BLOWING-LIP INLET Final Report
J. Syberg and A. L. Jones Apr. 1982 61 p refs
(Contract NAS3-22369)
(NASA-CR-165617; NAS 1.26:165617; D6-51418) Avail: NTIS HC A04/MF A01 CSCL 01A

The results indicated that, without boundary layer control, either a very long inlet or an inlet with a very high contraction ratio lip will be required to meet the stringent design requirements. It is shown that active boundary layer control is an effective means of preventing separation and that a significant reduction in inlet size can be achieved by removing only a small amount of bleed in the throat region of the inlet. A short, blowing-lip model was designed and fabricated. This model features an adjustable, blowing slot located near the hilite on the windward side of the inlet. T.M.

N82-22212# National Aerospace Lab., Tokyo (Japan). Noise and Emission Research Group.
AERODYNAMIC CHARACTERISTICS OF THE EXTERNAL USB POWERED LIFT SYSTEM USING SIDE FENCES FOR ENHANCEMENT OF COANDA FLOW ATTACHMENT
Masataka Maita, Hirotoshi Fujieda, and Shigemi Shindo Oct. 1981 20 p refs
(NAL-TR-686T; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The fundamental aspects concerning the effect of side fences on powered lift augmentation for the external upper surface blowing (USB) propulsive-lift configuration, as ascertained by wind tunnel experiment, are presented. From the comparisons of aerodynamic performances made of configurations using side fences and of those using either vortex generators or using no special devices, it is concluded that the USB propulsive-lift concept using side fences for enhancement of engine exhaust flow attachment has promising potential for attaining very high and efficient powered lift performances. M.G.

N82-22213*# Bihrle Applied Research, Inc., Jericho, N. Y.
ANALYSIS OF ROTARY BALANCE DATA FOR THE F-15 AIRPLANE INCLUDING THE EFFECT OF CONFORMAL FUEL TANKS
Billy Barnhart Washington NASA Apr. 1982 71 p refs
(Contract NAS1-16205)
(NASA-CR-3479; NAS 1.26:3479) Avail: NTIS HC A04/MF A01 CSCL 01A

F-15 rotary balance data was analyzed, and the influence of control deflections, Reynolds number and airplane components, i.e., body, wing, horizontal and vertical tails, as well as conformal tanks, on the aerodynamics up to 90 degrees angle of attack are discussed. Steady state spin mode predictions using these data are presented, which show excellent correlation with spin tunnel and flight test results. Generally, the data shows damped yawing moment slopes with rotation at all angles of attack, and good control effectiveness. Differences in the rotary aerodynamics due to the addition of conformal tanks are minimal. The small differences in the region of the flat spin do, however, indicate that the resulting spin mode would be slightly flatter and faster for a conformal tank equipped airplane. The addition of conformal tanks make the airplane more departure susceptible. S.L.

N82-22217*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF NACELLES ON AERODYNAMIC CHARACTERISTICS OF AN EXECUTIVE-JET MODEL WITH SIMULATED, PARTIAL-CHORD, LAMINAR-FLOW-CONTROL WING GLOVE
Richard L. Campbell Apr. 1982 104 p refs
(NASA-TM-83271; L-14982; NAS 1.15:83271) Avail: NTIS HC A06/MF A01 CSCL 01A

Tests were conducted in the Langley High-Speed 7- by 10-Foot Tunnel using a 1/10-scale model of an executive jet to examine the effects of the nacelles on the wing pressures and model longitudinal aerodynamic characteristics. For the present investigation, each wing panel was modified with a simulated, partial-chord, laminar-flow-control glove. Horizontal-tail effects were also briefly examined. The tests covered a range of Mach numbers from 0.40 to 0.82 and lift coefficients from 0.20 to 0.55. Oil-flow photographs of the wing at selected conditions are included. Author

N82-22223# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Entwurfsaerodynamik.

DRAG REDUCTION USING PNEUMATIC TURBULATORS

Karl-Heinz Horstmann and Armin Quast Sep. 1981 54 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-743)

(DFVLR-FB-81-33) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 11,40

Reduction of the additional drag, caused by laminar separation bubbles in airfoils and fuselages at Reynolds numbers below 5 million, was investigated theoretically and experimentally. By blowing from a row of holes located at the separation line, the laminar bubble is destroyed and drag is reduced considerably. Drag reduction due to blowing is naturally smaller at lower Reynolds numbers, the bubbles being smaller. The Reynolds number range with low section drag increases if pneumatic turbulators are used in the profile design. Author (ESA)

N82-22224# National Aerospace Lab., Amsterdam (Netherlands). Flight Dynamics Div.

AEROELASTIC PROPERTIES OF WINGS IN TRANSONIC FLOW

R. J. Zwaan 24 Feb. 1981 51 p refs Presented at Lecture Ser. on Unsteady Airloads and Aeroelastic Probl. in Separated and Transonic Flow, Rhode-St.-Genese, Belgium, 9-13 Mar. 1981

(NLR-MP-81005-U) Avail: NTIS HC A04/MF A01

Literature on transonic flutter characteristics of wings, especially the transonic dip phenomenon in the flutter boundaries, was reviewed. The transonic dip occurs most distinctly with sweptback wings. The dip is caused by the phase lag of the lift due to the fundamental wing bending mode and corresponds to a single-mode flutter mechanism. The dip can be predicted qualitatively using methods for inviscid transonic unsteady air loads. Quasi-steady transonic methods are not wholly reliable. The dip becomes relatively deeper with increasing wing-to-air mass ratio. The dip can become more pronounced for a supercritical wing than for a conventional wing. The dip occurs at design conditions as well as off-design conditions. In case of flow separation, a narrow dip which depends strongly on boundary layer conditions and the spatial distribution of the separated flow can occur. Author (ESA)

N82-22225# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.

AEROSPATIALE SURVEY OF WIND TUNNEL TESTING OF SMALL AND LARGE SCALE ROTORS

J. P. Silvani and A. Vuillet Paris 1981 17 p refs Presented at the 7th European Rotocraft And Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany 8-11 Sep. 1981; sponsored by DFVLR, Cologne

(SNIAS-821-210-107) Avail: NTIS HC A02/MF A01

Wind tunnel tests on Mach scaled rotors (1/10 and 1/3) capable of a wide range of shaft angle settings are summarized. The 1/3 model hub is fitted with a swashplate, general and cyclic inputs. Continuous conversion of a tilt rotor was achieved. Speeds > 500 km/hr were attained with conventional rotors. During autorotation high lift coefficients are obtained without major drag penalties. The OA family 2-D airfoils characteristic improvements were checked. Results show good behaviour throughout the entire rotor flight envelope; a 3% improvement on the rotor figure of merit at nominal thrust in hover; a 9% power improvement at nominal thrust and 300 km/hr in level fight; and 12% maximum thrust improvement at stall. Author (ESA)

N82-22227*# Douglas Aircraft Co., Inc., Long Beach, Calif.

TRANSPORT AIRCRAFT ACCIDENT DYNAMICS Final Technical Report, 11 Feb. 1980 - Mar. 1982

A. Cominsky Atlantic City FAA Mar. 1982 178 p (Contract NAS1-16111)

(NASA-CR-165850; FAA-RD-74-12; NAS 1.26:165850) Avail: NTIS HC A09/MF A01 CSCL 01C

A study was carried out of 112 impact survivable jet transport aircraft accidents (world wide) of 27,700 kg (60,000 lb.) aircraft and up extending over the last 20 years. This study centered on the effect of impact and the follow-on events on aircraft structures and was confined to the approach, landing and takeoff segments of the flight. The significant characteristics, frequency of occurrence and the effect on the occupants of the above data base were studied and categorized with a view to establishing typical impact scenarios for use as a basis of verifying the effectiveness of potential safety concepts. Studies were also carried out of related subjects such as: (1) assessment of advanced materials; (2) human tolerance to impact; (3) merit functions for safety concepts; and (4) impact analysis and test methods. Author

N82-22228*# Boeing Aerospace Co., Houston, Tex.

A SYSTEM SAFETY MODEL FOR DEVELOPMENTAL AIRCRAFT PROGRAMS

Emil J. Amberboy and Robert L. Stokeld Washington NASA Apr. 1982 84 p refs

(Contract NAS2-10361)

(NASA-CR-3534; NAS 1.26:3534) Avail: NTIS HC A05/MF A01 CSCL 01C

Basic tenets of safety as applied to developmental aircraft programs are presented. The integration of safety into the project management aspects of planning, organizing, directing and controlling is illustrated by examples. The basis for project management use of safety and the relationship of these management functions to 'real-world' situations is presented. The rationale which led to the safety-related project decision and the lessons learned as they may apply to future projects are presented. N.W.

N82-22229# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Flugverkehrswissenschaft.

DEVELOPMENTAL POSSIBILITIES AND RESTRICTIONS IN AIR TRANSPORT

Aug. 1981 91 p In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-744)

(DFVLR-Mitt-81-9) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 16,20

The possibilities of creating or maintaining an efficient air transport system in the present political, economical and technical situation were assessed. Future developments in demand and supply in commercial air transport and questions related to transport policy, airport planning and supply organization of air carriers are discussed.

N82-22230# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Flugverkehrswissenschaft.

DEVELOPMENTAL POSSIBILITIES IN CIVIL AVIATION IN THE FEDERAL REPUBLIC OF GERMANY [ENTWICKLONGSMOEGLICHKEITEN IM GEWERBLICHEN LUFTVERKEHR DER BUNDESREPUBLIK DEUTSCHLAND]

H.-G. Nuesser *In its* Develop. Possibilities and Restrictions in Air Transport Aug. 1981 p 11-46 In GERMAN

Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 16,20

The results of a prognosis was made on the evolution of air traffic until the year 2000 in Germany. Travel motives, flight type, region, season and traffic paths are forecasted. Data are used to derive the required evolution in the supply of passenger and cargo flights. The forecast includes a 5% annual increase in passenger traffic, reaching in the year 2000 a total number of some 765,000 starts and take offs at a seating capacity of about 60%. Forecasts for individual airports are also included. Author (ESA)

N82-22232# Flughafen G.m.b.H., Hamburg (West Germany).

TRAFFIC INTRASTRUCTURE: CAN PLANNING STILL BE CARRIED THROUGH [VERKEHRSINFRASTRUKTUR: IST PLANUNG NOCH DURCHSTEZBAR?]

U. Christiansen *In* DFVLR Develop. Possibilities and Restrictions in Air Transport Aug. 1981 p 61-66 In GERMAN

Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 16,20

The problems facing German airport authorities in planning either to extend existing, or to create new airports are analyzed. In addition to the growing environmental awareness by the public, the procedures for approval at various administrative and juridical

levels are identified as the major reason for the considerable delays encountered in recent projects. Several proposals are formulated for simplification and shortening these procedures.
Author (ESA)

N82-22236# National Transportation Safety Board, Washington, D. C.

SPECIAL INVESTIGATION REPORT: EVACUATION OF UNITED AIRLINES DC-8-61, SKY HARBOR INTERNATIONAL AIRPORT, PHOENIX, ARIZONA, DECEMBER 29, 1980

9 Sep. 1981 29 p refs
(PB82-115619; NTSB-SIR-81-4) Avail: NTIS HC A03/MF A01 CSCL 01B

On December 29, 1980, United Airlines Charter Flight 5820, a DC-8-61, with 238 passengers and a crew of 9, was evacuated at Sky Harbor International Airport, Phoenix, Arizona, when the failure of the rear landing gear bogie beam resulted in a fire in the aircraft's right main landing gear. The cockpit crew was erroneously advised of an engine fire by the airport tower and began emergency shutdown procedures. The captain initiated the evacuation after all electrical power had been shut down and the public address and cabin interphone systems were without power. Therefore, the second officer had to give the evacuation orders to passengers and flight attendants by 'word of mouth'. As a result of its special investigation and its previous work on the subject of evacuations, the Safety Board has made recommendations to the Federal Aviation Administration to improve the availability of emergency communication equipment and to promote its use. GRA

N82-22237# National Transportation Safety Board, Washington, D. C.

REVIEW OF ROTORCRAFT ACCIDENTS 1977-1979

11 Aug. 1981 59 p
(PB82-115601; NTSB-AAS-81-1) Avail: NTIS HC A04/MF A01 CSCL 01B

Accident data on the rotorcraft, pilots and operating environment which may be most useful to designers, manufacturers, operators and regulators are presented. Tables and graphs presenting accident statistics, cause/factors, rotorcraft make and model data, pilot experience and weather conditions are included. GRA

N82-22238*# Ohio State Univ., Columbus.

A TACTUAL DISPLAY AID FOR PRIMARY FLIGHT TRAINING Final Report, 1 Jul. 1975 - 15 Dec. 1978

Richard D. Gilson Jul. 1979 76 p refs
(Contract NAS2-8954)
(NASA-CR-166242; NAS 1.26:166242) Avail: NTIS HC A05/MF A01 CSCL 01D

A means of flight instruction is discussed. In addition to verbal assistance, control feedback was continously presented via a nonvisual means utilizing touch. A kinesthetic-tactile (KT) display was used as a readout and tracking device for a computer generated signal of desired angle of attack during the approach and landing. Airspeed and glide path information was presented via KT or visual heads up display techniques. Performance with the heads up display of pitch information was shown to be significantly better than performance with the KT pitch display. Testing without the displays showed that novice pilots who had received tactile pitch error information performed both pitch and throttle control tasks significantly better than those who had received the same information from the visual heads up display of pitch during the test series of approaches to landing. Author

N82-22239*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EFFECTS OF CABLE GEOMETRY AND AIRCRAFT ATTITUDE ON THE ACCURACY OF A MAGNETIC LEADER CABLE SYSTEM FOR AIRCRAFT GUIDANCE DURING ROLLOUT AND TURNOFF

W. Thomas Bundick Apr. 1982 32 p refs
(NASA-TP-1978; L-14975; NAS 1.60:1978) Avail: NTIS HC A03/MF A01 CSCL 17G

A theoretical analysis of a single wire magnetic leader cable system for aircraft rollout and turnoff guidance was performed to determine the errors produced by the leader cable installation geometry and aircraft attitude. It was found that errors in the measurement of lateral displacement from the cable are smaller than errors in the measurement of aircraft heading and that both errors are smallest at or near the cable. Author

N82-22240*# California Univ., Berkeley. Inst. of Transportation Studies.

MEASURES TO INCREASE AIRFIELD CAPACITY BY CHANGING AIRCRAFT RUNWAY OCCUPANCY CHARACTERISTICS

Geoffrey D. Gosling, Abid Kanafani, and Stephen L. M. Rockaday Dec. 1981 218 p refs
(Grant NAG2-19)
(NASA-CR-168841; NAS 1.26:168841; UCB-ITS-RR-81-7) Avail: NTIS HC A10/MF A01 CSCL 17G

Airfield capacity and aircraft runway occupancy characteristics were studied. Factors that caused runway congestion and airfield crowding were identified. Several innovations designed to alleviate the congestion are discussed. Integrated landing management, the concept that the operation of the final approach and runway should be considered in concert, was identified as underlying all of the innovations. R.J.F.

N82-22241# Aeronautical Research Labs., Melbourne (Australia).

STRAPDOWM INERTIAL NAVIGATION SYSTEMS: AN ALGORITHM FOR ATTITUDE AND NAVIGATION COMPUTATIONS

R. B. Miller 1981 33 p refs
(ARL/Sys-Rept-23; AR-002-265) Avail: NTIS HC A03/MF A01

Vehicle attitude is maintained through quaternions, which are updated by a modified third order method. The navigation part of the algorithm uses a split frame technique whereby body related quantities are evaluated in body axis coordinates, and navigation frame related quantities are evaluated in navigation axis coordinates. The algorithm is partitioned into three sections which are performed at different rates according to the application. T.M.

N82-22242# Royal Aircraft Establishment, Farnborough (England).

AIRFIELD VISUAL AIDS RESEARCH AT THE ROYAL AIRCRAFT ESTABLISHMENT

A. J. Smith 2 Oct. 1981 29 p refs Presented at the 1981 Aviation Lighting Sen., Williamsburg, Virginia, 9-13 Nov. 1981; Sponsored by Illuminating Engineering Society of North America
(RAE-TM-FS-431; BR80893) Avail: NTIS HC A03/MF A01

The precision approach path indicator (PAPI) is described and helicopter lighting aids are discussed. The PAPI system indicates correct glide slope at ranges > 10 km under good visibility conditions and provides information up to 300 m from touchdown. Two color light projector units, consisting of three simple optical projectors side by side in a box, tell the pilot if he is too high, too low, or on slope by the combination of red and white lights. Trials show that it can be used by a wide range of civil and military aircraft, e.g., the VC-10, small private airplanes, or helicopters. A mathematical model which predicts what pilots can see when landing in fog was used in order to optimize proposed approach lighting patterns for helicopters. If the lighting pattern is 730 m long, initial contact is possible at altitudes > 100 m. Lighting trials show that red stop bar lighting and green taxiway centerline need further improvement.
Author (ESA)

N82-22243*# Aeronautical Research Associates of Princeton, Inc., N. J.

ANALYSIS AND FLIGHT EVALUATION OF A SMALL, FIXED-WING AIRCRAFT EQUIPPED WITH HINGED PLATE SPOILERS

John W. Olcott, Edward Sackel, and David R. Ellis Sep. 1981 161 p refs
(Contract NAS2-5589)
(NASA-CR-166247; NAS 1.26:166247) Avail: NTIS HC A08/MF A01 CSCL 01C

The results of a four phase effort to evaluate the application of hinged plate spoilers/dive brakes to a small general aviation aircraft are presented. The test vehicle was a single engine light aircraft modified with an experimental set of upper surface spoilers and lower surface dive brakes similar to the type used on sailplanes. The lift, drag, stick free stability, trim, and dynamic response characteristics of four different spoiler/dive brake configurations were determined. Tests also were conducted, under a wide range of flight conditions and with pilots of various experience levels, to determine the most favorable methods of spoiler control and to evaluate how spoilers might best be used during the approach and landing task. The effects of approach path angle, approach airspeed, and pilot technique using throttle/spoiler integrated control were investigated for day, night, VFR, and IFR approaches and landings. The test results indicated that spoilers offered significant improvements in the vehicle's performance and flying qualities for all elements of the approach and landing task, provided a suitable method of control was available. Author

N82-22244*# Sinacori (John B.) Associates, Hollister, Calif.
CONCEPTUAL DESIGN STUDY OF A VISUAL SYSTEM FOR A ROTORCRAFT SIMULATOR AND SOME ADVANCES IN PLATFORM MOTION UTILIZATION Final Report
John B. Sinacori Aug. 1980 33 p refs
(Contract NAS2-10278)
(NASA-CR-166322; NAS 1.26:166322) Avail: NTIS HC A03/MF A01 CSCL 14B

A conceptual design of a visual system for a rotorcraft flight simulator is presented. Also, drive logic elements for a coupled motion base for such a simulator are given. The design is the result of an assessment of many potential arrangements of electro-optical elements and is a concept considered feasible for the application. The motion drive elements represent an example logic for a coupled motion base and is essentially an appeal to the designers of such logic to combine their washout and braking functions. Author

N82-22245*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A LINEAR DECOMPOSITION METHOD FOR LARGE OPTIMIZATION PROBLEMS. BLUEPRINT FOR DEVELOPMENT
Jaroslaw Sobieszczanski-Sobieski Feb. 1982 61 p refs
(NASA-TM-83248; NAS 1.15:83248) Avail: NTIS HC A04/MF A01 CSCL 01C

A method is proposed for decomposing large optimization problems encountered in the design of engineering systems such as an aircraft into a number of smaller subproblems. The decomposition is achieved by organizing the problem and the subordinated subproblems in a tree hierarchy and optimizing each subsystem separately. Coupling of the subproblems is accounted for by subsequent optimization of the entire system based on sensitivities of the suboptimization problem solutions at each level of the tree to variables of the next higher level. A formalization of the procedure suitable for computer implementation is developed and the state of readiness of the implementation building blocks is reviewed showing that the ingredients for the development are on the shelf. The decomposition method is also shown to be compatible with the natural human organization of the design process of engineering systems. The method is also examined with respect to the trends in computer hardware and software progress to point out that its efficiency can be amplified by network computing using parallel processors. B.W.

N82-22246*# National Aeronautics and Space Administration, Washington, D. C.
REVOLUTION IN AIRPLANE CONSTRUCTION? GROB G110: THE FIRST MODERN FIBER GLASS COMPOSITION AIRPLANE SHORTLY BEFORE ITS MAIDEN FLIGHT
R. Dorpinghaus Mar. 1982 19 p Transl. into ENGLISH from Aerokurier (West Germany), no. 12, Dec. 1981 p 1550-1555 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76705; NAS 1.15:76705) Avail: NTIS HC A02/MF A01 CSCL 01C

A single engine two passenger airplane, constructed completely from fiber reinforced plastic materials is introduced. The cockpit, controls, wing profile, and landing gear are discussed. Development of the airframe is also presented. S.L.

N82-22247*# National Aeronautics and Space Administration, Washington, D. C.
SOCATA: TB 20 TRINIDAD GIVEN GERMAN DEBUT
B. Malzbender Mar. 1982 13 p Transl. into ENGLISH from Aerokurier (West Germany), no. 12, Dec. 1981 p 1543, 1546-1547 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76706; NAS 1.15:76706) Avail: NTIS HC A02/MF A01 CSCL 01C

Pilot impressions gained in a first flight in the 250 HP single engine TB 20 prototype aircraft are presented along with aircraft specifications. A.R.H.

N82-22248*# Systems Technology, Inc., Hawthorne, Calif.
FUNCTIONAL REQUIREMENTS FOR THE MAN-VEHICLE SYSTEMS RESEARCH FACILITY
Warren F. Clement, R. Wade Allen, Robert K. Heffley, Wayne F. Jewell, Henry R. Jex, Duane T. McRuer, Ted M. Schulman, and Robert L. Stapleford Oct. 1980 221 p refs
(Contract NAS2-10400)
(NASA-CR-166315; NAS 1.26:166315; TR-1156-3) Avail: NTIS HC A10/MF A01 CSCL 01C

The NASA Ames Research Center proposed a man-vehicle systems research facility to support flight simulation studies which are needed for identifying and correcting the sources of human error associated with current and future air carrier operations. The organization of research facility is reviewed and functional requirements and related priorities for the facility are recommended based on a review of potentially critical operational scenarios. Requirements are included for the experimenter's simulation control and data acquisition functions, as well as for the visual field, motion, sound, computation, crew station, and intercommunications subsystems. The related issues of functional fidelity and level of simulation are addressed, and specific criteria for quantitative assessment of various aspects of fidelity are offered. Recommendations for facility integration, checkout, and staffing are included. A.R.H.

N82-22249*# Systems Technology, Inc., Hawthorne, Calif.
TECHNICAL APPROACHES FOR MEASUREMENT OF HUMAN ERRORS Final Report
Warren F. Clement, Robert K. Heffley, Wayne F. Jewell, and Duane T. McRuer May 1980 140 p refs
(Contract NAS2-10400)
(NASA-CR-166314; NAS 1.26:166314; STI-TR-1156-2) Avail: NTIS HC A07/MF A01 CSCL 01C

Human error is a significant contributing factor in a very high proportion of civil transport, general aviation, and rotorcraft accidents. The technical details of a variety of proven approaches for the measurement of human errors in the context of the national airspace system are presented. Unobtrusive measurements suitable for cockpit operations and procedures in part of full mission simulation are emphasized. Procedure, system performance, and human operator centered measurements are discussed as they apply to the manual control, communication, supervisory, and monitoring tasks which are relevant to aviation operations. S.L.

N82-22250*# Systems Technology, Inc., Hawthorne, Calif.
A THEORY OF HUMAN ERROR Final Report
Duane T. McRuer, Warren F. Clement, and R. Wade Allen May 1980 91 p refs
(Contract NAS2-10400)
(NASA-CR-166313; NAS 1.26:166313; STI-TR-1156-1) Avail: NTIS HC A05/MF A01 CSCL 01C

Human error, a significant contributing factor in a very high proportion of civil transport, general aviation, and rotorcraft accidents is investigated. Correction of the sources of human error requires that one attempt to reconstruct underlying and contributing causes of error from the circumstantial causes cited in official investigative reports. A validated analytical theory of the input-output behavior of human operators involving manual control, communication, supervisory, and monitoring tasks which are relevant to aviation operations is presented. This theory of behavior, both appropriate and inappropriate, provides an insightful basis for investigating, classifying, and quantifying the needed cause-effect relationships governing propagation of human error. B.W.

N82-22251*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PERFORMANCE TESTING OF A MAIN ROTOR SYSTEM FOR A UTILITY HELICOPTER AT 1/4 SCALE
John D. Berry (Army Aviation Research and Development Command, Langley, Va.) Apr. 1982 49 p refs
(DA Proj. 1L1-61102-AH-45)
(NASA-TM-83274; L-15015; NAS 1.15:83274; AVRADCOM-TR-82-B-3) Avail: NTIS HC A03/MF A01 CSCL 01C

Two rotor systems for the UH-1 helicopter were tested in hover and forward flight. The baseline system was a dynamically scaled model of the current rotor system, while the other system was designed for advanced performance. In hover out of ground effect, the advanced rotor system shows improvements up to 10 percent in the figure of merit and improvements in thrust up to 7 percent. In forward flight, the advanced rotor system demonstrated reductions in required torque throughout the range of conditions tested, with reductions up to 17 percent occurring at the higher advance ratios and higher lift values tested. T.M.

N82-22252*# Hydraulic Research Textron, Valencia, Calif.
AN ELECTRONIC CONTROL FOR AN ELECTROHYDRAULIC ACTIVE CONTROL LANDING GEAR FOR THE F-4 AIRCRAFT Final Report
Irving Ross Washington Apr. 1982 92 p refs
(Contract NAS1-16420)
(NASA-CR-3552; NAS 1.26:3552; HR-74600000) Avail: NTIS HC A05/MF A01 CSCL 01C

A controller for an electrohydraulic active control landing gear was developed for the F-4 aircraft. A controller was modified for this application. Simulation results indicate that during landing and rollout over repaired bomb craters the active gear effects a force reduction, relative to the passive gear, or approximately 70%. S.L.

N82-22253# British Aerospace Aircraft Group, Weybridge (England).
TAILOR-MADE STRUCTURES; TODAY, AND TOMORROW: NEW MATERIALS, AN EXPLORATORY INVESTIGATION INTO THEIR POTENTIAL USE
W. J. Bird 16 Apr. 1980 48 p
(BAe-SDW-65/A/104/005) Avail: NTIS HC A03/MF A01

The use of fiber/matrix combinations, e.g. in a nonmetallic airplane, is discussed. The development of fiber/matrix structures is hindered by an absence of design experience, designers whose experience is in metallics rather than textiles, the conservative structures employed, and production times for fiber components. A modular tooling system is proposed. The structural feasibility of the aircraft is established by examining the possibility of constructing VC-10 components in fiber/matrix materials. Author (ESA)

N82-22254# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
A COMPLETE METHOD FOR COMPUTATION OF BLADE MODE CHARACTERISTICS AND RESPONSES IN FORWARD FLIGHT
J. P. Lefrancq and B. Masure Paris 1981 10 p refs Presented at 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany 8-11 Sep. 1981; sponsored by DFVLR, Cologne
(SNIAS-821-210-101) Avail: NTIS HC A02/MF A01

The modal approach to rotor dynamic behavior is outlined, and an azimuth method is presented. The azimuth method applies to stabilized flights, in particular those in which rotor configuration is considered repeatable after one revolution. Excitation occurs at rotor frequency (R+F) or at multiples of it. Rotor behavior is developed in a Fourier series of which basic frequency is R+F. The series terms are considered negligible beyond the nth harmonic. Development coefficient counts show that (2n+1) successive positions (azimuths), regularly spread over the revolution, can describe rotor behavior. Accuracy depends on the number n of harmonics retained. The n number selection depends on computer capacity. Author (ESA)

N82-22255# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
NAVAL VERSIONS OF THE DAUPHIN AND THE AS 15 TT WEAPON SYSTEM
J. P. Dubreuil Paris 1981 11 p Presented at the 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981; sponsored by DFVLR, Cologne
(SNIAS-821-210-104) Avail: NTIS HC A02/MF A01

Modifications needed to adapt the Dauphin N helicopter for naval rescue and attack missions are outlined. The antisurface vessel weapon system is described. Maximum continuous engine power is increased from 437 to 468 kW, takeoff power from 492 to 552. Pressure refueling is possible in-flight or on-ground. Blades and fin fold. A hydraulic mooring harpoon is located between the two wheels of the main landing gear. A radar system, adopted from army versions, provides overall accuracy > 3% of distance covered. The tail assembly is watertight. The AS 15 TT has a range > 15 km, is roll stabilized, has a 30 kg warhead, and flies a few m above the surface, descending near the target just before impact. Author (ESA)

N82-22256# Societe Nationale Industrielle Aerospatiale, La Courneuve (France). Helicopter Div.
A LIGHT HELICOPTER FOR NIGHT FIRING
J. F. Candau Paris 1981 19 p Presented at the 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981; sponsored by DFVLR, Cologne
(SNIAS-821-210-105) Avail: NTIS HC A02/MF A01

An antitank helicopter suitable for night operation over difficult terrain is described. A Dauphin helicopter, equipped with HOT missiles, is treated with low IR reflectance paint and antireflective coating of glazed areas. Jet exhaust is deviated, engine cowlings reduce IR emission. Targets are sought by a passive system of thermal imagery. Outside surroundings are viewed via a nocturnal vision device operating on the light intensification principle. The navigation system is self-contained. The missile is guided by a localizer coupled to, and harmonized with a thermal camera, mounted on a gyrostabilized platform. Tanks are detected up to 4 km and identified up to 2 km. Author (ESA)

N82-22257# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
CONCEPT STUDIES OF AN ADVANCED COMPOSITE HELICOPTER FIN
A. Desmonceaux and M. Torres Paris 1981 13 p Presented at the 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981; sponsored by DFVLR, Cologne
(SNIAS-821-210-106) Avail: NTIS HC A02/MF A01

A composite fin and fan in fin assembly was developed for the Dauphin 2. The structure is made of epoxy resin preimpregnated Kevlar or graphite, single or two direction fiber cloths. A single block construction is used in heavily loaded areas or areas stabilized through a sharp curvature. A sandwich construction with Nomex honeycomb filler is used where loads are less. Static tests and theoretical studies show that maximum thrust is increased by 40% compared with a similar weight metal structure. Production costs are reduced by eliminating a great number of parts and assemblies. Operating costs are lowered by abolishing corrosion risks and improving maintenance through the simpler design. The fail safe composites increase safety. Author (ESA)

N82-22258# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.
TAIL ROTOR STUDIES FOR SATISFACTORY PERFORMANCE: STRENGTH AND DYNAMIC BEHAVIOR
G. Blachere and F. dAmbra Paris 1981 13 p refs Presented at 7th European Rotocraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany 8-11 Sep. 1981; sponsored by DFVLR, Cologne
(SNIAS-821-210-108) Avail: NTIS HC A02/MF A01

Flexbeam, teetered, cantilevered and semirigid two bladed rotors were studied in flight, on whirl test stands and theoretically. The blades are compared with conventional helicopter blades. For 2 ton helicopters, the tested blades have fewer parts, and weigh less than conventional ones. Blade life is increased, manufacturing and maintenance costs are lowered. For 8 ton helicopters, similar improvements were achieved, but at the expense of larger control forces and limited lifetime for the flexbeam. Author (ESA)

N82-22259# Institut de Mecanique des Fluides de Lille (France).
APPLICATION OF KALMAN FILTERING TO THE KINEMATIC RECONSTRUCTION OF FREE FLIGHT OF CATAPULTED AIRCRAFT MODELS IN THE LABORATORY [APPLICATION DU FILTRAGE DE KALMAN A LA RESTITUTION DE LA CINEMATIQUE DES MAQUETTES D'AVION CATAPULTEES EN VOL LIBRE EN LABORATOIRE]
P. Coton 30 Jun. 1980 15 p In FRENCH
(IMFL-80-26; IMFL-8214) Avail: NTIS HC A02/MF A01

A Kalman filtering procedure was developed in order to improve results obtained with a catapult and aircraft model. Application of this procedure is criticized. It is concluded that the procedure as it stands is unreliable. Reconfiguration of the filtering system is recommended. A protocol of tests intended to determine acceptable performance of the system is presented. Author (ESA)

N82-22260# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Helicopter Div.
CONTROLS AND DISPLAYS FOR ALL-WEATHER OPERATION OF HELICOPTERS
R. D. vonReth 3 Apr. 1981 19 p refs
(MBB-UD-319-81-O) Avail: NTIS HC A02/MF A01

Various mission requirements for all weather operations are reviewed. In particular some of the most important features for military applications are outlined. Some of the basic relations between increasing display sophistication and increasing control sophistication are discussed. Also the influence of various functions on the degree of control automation as it seems desirable for future systems under the aspect of men machine interaction are taken into consideration. The controls and displays arrangement of some representative helicopters of presently operational helicopters are described. An outline of the goals and results of some experimental and research programs is given. The characteristics of presently operational helicopters are compared with the technologically feasible solutions taking into account some of the economic constraints as initial cost, operational cost and reliability. In an outlook at the future some basic requirements for the controls and the displays operation are established. J.M.S.

N82-22262*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE ROLE OF MODERN CONTROL THEORY IN THE DESIGN OF CONTROLS FOR AIRCRAFT TURBINE ENGINES
J. Zeller, B. Lehtinen, and W. Merrill 1982 17 p refs Presented at 12th Aerospace Sci. Conf., Orlando, Fla., 11-14 Jan. 1982; sponsored by AIAA
(NASA-TM-82815; E-1162; NAS 1.15:82815) Avail: NTIS HC A02/MF A01 CSCL 21E

Accomplishments in applying Modern Control Theory to the design of controls for advanced aircraft turbine engines were reviewed. The results of successful research programs are discussed. Ongoing programs as well as planned or recommended future thrusts are also discussed. Author

N82-22263*# Cessna Aircraft Co., Wichita, Kans. Pawnee Div.
ADVANCED GENERAL AVIATION COMPARATIVE ENGINE/AIRFRAME INTEGRATION STUDY Final Report, Jan. 1980 - Sep. 1981
George L. Huggins and David R. Ellis Sep. 1981 133 p refs
(Contract NAS3-22221)
(NASA-CR-165564; NAS 1.26:165564; Cessna-AD-217) Avail: NTIS HC A07/MF A01 CSCL 21E

The NASA Advanced Aviation Comparative Engine/Airframe Integration Study was initiated to help determine which of four promising concepts for new general aviation engines for the 1990's should be considered for further research funding. The engine concepts included rotary, diesel, spark ignition, and turboprop powerplants; a conventional state-of-the-art piston engine was used as a baseline for the comparison. Computer simulations of the performance of single and twin engine pressurized aircraft designs were used to determine how the various characteristics of each engine interacted in the design process. Comparisons were made of how each engine performed relative to the others when integrated into an airframe and required to fly a transportation mission. Author

N82-22264*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
ENERGY EFFICIENT ENGINE EXHAUST MIXER MODEL TECHNOLOGY
H. Kozlowski and M. Larkin Jun. 1981 186 p refs
(Contract NAS3-20646)
(NASA-CR-165459; NAS 1.26:165459; PWA-5594-164) Avail: NTIS HC A09/MF A01 CSCL 21E

An exhaust mixer test program was conducted to define the technology required for the Energy Efficient Engine Program. The model configurations of 1/10 scale were tested in two phases. A parametric study of mixer design options, the impact of residual low pressure turbine swirl, and integration of the mixer with the structural pylon of the nacelle were investigated. The improvement of the mixer itself was also studied. Nozzle performance characteristics were obtained along with exit profiles and oil smear photographs. The sensitivity of nozzle performance to tailpipe length, lobe number, mixer penetration, and mixer modifications like scalloping and cutbacks were established. Residual turbine swirl was found detrimental to exhaust system performance and the low pressure turbine system for Energy Efficient Engine was designed so that no swirl would enter the mixer. The impact of mixer/plug gap was also established, along with importance of scalloping, cutbacks, hoods, and plug angles on high penetration mixers. M.D.K.

N82-22265*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
ADVANCED LOW-EMISSIONS CATALYTIC-COMBUSTOR PROGRAM, PHASE 1 Final Report
G. J. Sturgess Jun. 1981 158 p refs
(Contract NAS3-20821)
(NASA-CR-159656; NAS 1.26:159656; PWA-5589-19; ESL-TR-79-23) Avail: NTIS HC A08/MF A01 CSCL 21E

Six catalytic combustor concepts were defined, analyzed, and evaluated. Major design considerations included low emissions, performance, safety, durability, installations, operations and development. On the basis of these considerations the two most promising concepts were selected. Refined analysis and preliminary design work was conducted on these two concepts. The selected concepts were required to fit within the combustor chamber dimensions of the reference engine. This is achieved by using a dump diffuser discharging into a plenum chamber between the compressor discharge and the turbine inlet, with the combustors overlaying the prediffuser and the rear of the compressor. To enhance maintainability, the outer combustor case for each concept is designed to translate forward for accessibility to the catalytic reactor, liners and high pressure turbine area. The catalytic reactor is self-contained with air-cooled canning on a resilient mounting. Both selected concepts employed integrated engine-starting approaches to raise the catalytic reactor up to operating conditions. Advanced liner schemes are used to minimize required cooling air. The two selected concepts respectively employ fuel-rich initial thermal reaction followed by rapid quench and subsequent fuel-lean catalytic reaction of carbon monoxide, and, fuel-lean thermal reaction of some fuel in a continuously operating pilot combustor with fuel-lean catalytic reaction of remaining fuel in a radially-staged main combustor. Author

N82-22267*# United Technologies Research Center, East Hartford, Conn.
INVESTIGATION OF SOOT AND CARBON FORMATION IN SMALL GAS TURBINE COMBUSTORS Final Report
T. J. Rosfjord Apr. 1982 54 p refs
(Contract NAS3-22524)
(NASA-CR-167853; NAS 1.26:167853; UTRC-R82-915387-16) Avail: NTIS HC A04/MF A01 CSCL 21E

An investigation of hardware configurations which attempt to minimize carbon and soot-production without sacrificing performance in small gas turbine combustors was conducted. Four fuel injectors, employing either airblast atomization, pressure atomization, or fuel vaporization techniques were combined with nozzle air swirlers and injector sheaths. Eight configurations were screened at sea-level takeoff and idle test conditions. Selected configurations were focused upon in an attempt to quantify the influence of combustor pressure, inlet temperature, primary zone operation, and combustor loading on soot and carbon formation. Cycle tests were also performed. It was found that smoke emission levels depended on the combustor fluid mechanics, the atomization quality of the injector and the fuel hydrogen content. R.J.F.

N82-22268*# Beech Aircraft Corp., Wichita, Kans.
ADVANCED GENERAL AVIATION ENGINE/AIRFRAME INTEGRATION STUDY
Leon A. Zmroczek Mar. 1982 131 p refs
(Contract NAS3-22220)
(NASA-CR-165565; NAS 1.26:165565) Avail: NTIS HC A07/MF A01 CSCL 21E

A comparison of the in-airframe performance and efficiency of the advanced engine concepts is presented. The results indicate that the proposed advanced engines can significantly improve the performance and economy of general aviation airplanes. The engine found to be most promising is the highly advanced version of a rotary combustion (Wankel) engine. The low weight and fuel consumption of this engine, as well as its small size, make it suited for aircraft use. T.M.

N82-22269*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.77, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 2.05

Royce D. Moore and Lonnie Reid Apr. 1982 116 p refs
(NASA-TP-2001; E-334; NAS 1.60:2001) Avail: NTIS HC A06/MF A01 CSCL 21E

The overall and blade-element performance of a transonic compressor stage is presented over the stable operating range for speeds from 50 to 100 percent of design. The stage was designed for a pressure ratio of 2.05 at a flow of 20.2 kg/sec and a tip speed of 455 m/sec. At design speed the rotor and stage achieved peak efficiencies of 0.849 and 0.831, respectively, at the minimum flow condition. The stage stall point occurred at a flow higher than the design flow. Author

N82-22270# Rolls-Royce Ltd., Derby (England).

RB211 POWERPLANT DETERIORATION: REVIEW OF CURRENT SITUATION AND LESSONS LEARNED

Aloc G. Collins 1981 5 p
(PNR-90073) Avail: NTIS HC A02/MF A01

The need for high temperatures in the engine cycle of gas turbine aircraft engines was demonstrated; the effects of thermal barrier coatings (TBC) on component life, cooling air requirements, and turbine entry temperature (TET) are discussed. Experience with the RB211, Olympus 593, and Pegasus engines illustrates the usefulness of TBCs consisting of zirconia based ceramics with nickel or cobalt bond coats. Life improvements > 50% are directly attributable to TBCs on combustor walls, vaporizing fuel injectors, and discharge nozzles. Airfoil coatings survive 150 hr RB211-524 tests at higher than normal TET. Author (ESA)

N82-22271# Rolls-Royce Ltd., Derby (England).

THE CONTRIBUTION OF THERMAL BARRIER COATINGS TO IMPROVEMENTS IN THE LIFE AND PERFORMANCE OF GAS TURBINE COMPONENTS

S. J. Hartropp, D. A. Marsh, and G. W. Meetham 1981 11 p
(PNR-90076) Avail: NTIS HC A02/MF A01

Ceramic coatings significantly increase the lives of components in high temperature environments by insulating metal substrates from a hot gas stream. The need for high temperatures in gas turbine engines, and the opportunities for and requirements from thermal barrier coatings are covered. Bench and service engine evaluation and analysis of tested parts from which the features of successful coating systems were derived, are presented. Author (ESA)

N82-22272# Rolls-Royce Ltd., Derby (England).

DEVELOPMENT OF A CORRELATED FINITE ELEMENT DYNAMIC MODEL OF A COMPLETE AERO ENGINE

R. A. Bellamy, J. C. Bennett, and S. T. Elston 1981 10 p refs
(PNR-90081) Copyright. Avail: NTIS HC A02/MF A01

The accuracy of the dynamic model of the RB211 engine and nacelle was tested. Model descriptions of load/deflection behavior, natural frequencies, and mode shapes were compared with shake tests and modal analyses. Modal analysis was carried out by a frequency response analyzer which used an incremental sine technique and a minicomputer based system that input a random signal to the shaker, operating on transducer measurements with a software Fourier transform in order to achieve the frequency response functions. Correlation between the results is excellent. Author (ESA)

N82-22273# Societe Nationale Industrielle Aerospatiale, Marignane (France.) Helicopter Div.

PARAMETRIC STUDY OF THE INFLUENCE OF THE ENGINE UPON THE OPERATING COST OF A CIVIL HELICOPTER

Gilbert Beziac, Jean-Pierre Dedieu, and Philippe Cabrit Paris 1981 6 p Presented at 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany 8-11 Sep. 1981; sponsored by DFVLR, Cologne
(SNIAS-827-210-102) Avail: NTIS HC A02/MF A01

The influence of engine characteristics (weight, fuel consumption, price, power range) upon helicopter operating cost was studied. The parametric relationship between gross weight, weight of airframe with crew but without engines, engine weight, and fuel weight was defined. An 850 hp engine was made more powerful by increasing turbine inlet temperature through the cooling of the high pressure turbine and by increasing pressure ratio. Analysis shows that a sufficient power reserve is necessary, but too high a value penalizes operating cost. This confirms the interest of having a super emergency rating on civil helicopter engines. Low fuel consumption should be the result of a compromise with level of complexity since high complexity increases the engine cost and can reduce reliability. Simultaneous evolution of aircraft and engine increases cost effectiveness. Author (ESA)

N82-22274# Rolls-Royce Ltd., Derby (England).

ENCOUNTERS WITH SURGE: SOME EXPERIENCES OF DEVELOPMENT OF AXIAL COMPRESSORS FOR AERO GAS TURBINES

A. B. McKenzie Mar. 1981 35 p
(PNR-90071) Avail: NTIS HC A03/MF A01

Rolls Royce jet engine development is traced. The Avon was the first. Its design pressure ratio is 6.15, corresponding to a design temperature rise of 20 C per stage in each of 12 stages. The first stage entry diameter ratio is 0.5, lower than contemporary compressors. In the Avon RA14, surge, precipitated when a number of stages stalled, was eliminated by progressively increasing the stagger of the last six rotor blade rows by 1 deg to 6 deg. In the Conway, a bypass provides a permanent bleed from the low pressure compressor. The bleed becomes an increasing proportion of total flow as speed is reduced. This eliminates surge problems when the engine is throttled back at high forward speed. In the Tyne, the removal of the hub section permits a higher surge pressure ratio. In the RB211, a handling bleed with a variable input is placed between the compressors. Author (ESA)

N82-22275# Rolls-Royce Ltd., Derby (England).

RELIABLE POWER

J. M. S. Keen Feb. 1981 21 p Presented at Intern. Aircraft Maintenance Eng. Exhibition and Conf., Zurich, Feb. 1981
(PNR-90078) Avail: NTIS HC A02/MF A01

The Rolls Royce RB211 engine design is reviewed. The three shaft concept increases engine thrust and cuts fuel consumption. The highest thrust version of the RB211 cuts fuel consumption of Boeing 747's by 17%. The 535E4 blends turbine and bypass flows in a buried nozzle within a longer cowl. The resultant gases are exhausted through a single final nozzle. This device provides an automatic rematching of the engine cycle at climb ratings, thereby saving fuel and reducing turbine entry temperature. Reverse thrust is increased by up to 38% relative to an unmixed engine. The on-condition maintenance policy reduces costs without reducing safety. The reliability management program ensures the most cost effective maintainance schedule. Author (ESA)

N82-22276# Rolls-Royce Ltd., Derby (England).

FUEL EFFICIENCY ENGINES FOR LARGE TRANSPORT AIRCRAFT

D. J. Parfitt 27 Mar. 1981 27 p Presented at Aeron. Soc. of India Conf., Bombay, 27 Mar. 1981
(PNR-90082; MISC-555) Avail: NTIS HC A03/MF A01

The next generation of Rolls Royce aircraft engines is discussed, especially their fuel consumption. For the RB211, improvements on the order of 15% in fuel consumption relative to the initial service standard are planned. Large fan engines are expected to remain technology leaders in the long-term. Fuel savings on the order of 10% to 15% are feasible, using low specific thrust designs. Noise and exhaust emission improvements are predicted. Advanced wing designs and the use of lightweight composite materials, linked with full authority digital control systems, enhance engine performance. Liquid hydrogen is suggested as a replacement for kerosene, because of its high heating value. Author (ESA)

N82-22277# Rolls-Royce Ltd., Derby (England).

COLLABORATIVE DEVELOPMENT OF AERO-ENGINES

G. M. Lewis 1981 9 p
(PNR-90083) Avail: NTIS HC A02/MF A01

European cooperation in aircraft engine development is described, using the Olympus and RB199 projects as examples. The management structure was based on the integration of existing teams in the partner companies. Author (ESA)

N82-22278# Rolls-Royce Ltd., Derby (England).

MULTI-MISSION V/STOL WITH VECTORED THRUST ENGINES

W. J. Lewis and P. Simpkin 1981 10 p
(PNR-90086) Avail: NTIS HC A02/MF A01

The use of V / STOL aircraft in European conflicts is discussed. Conventional aircraft were assumed to be inoperative within 370 km of the main battle area because of the destruction of runways. Achievable bomb delivery rate of subsonic V/STOL aircraft, and available combat air patrol time and the number of aircraft required in order to maintain a standing patrol of supersonic aircraft were considered. If the Harrier concept is adapted, a single vectored thrust engine with plenum chamber burning on two front nozzles, and a single rear nozzle, then the V/STOL aircraft is well suited to supersonic and subsonic air superiority and strike roles. Author (ESA)

N82-22279# Rolls-Royce Ltd., Derby (England).

DIRECTIONAL SOLIDIFICATION: PROJECT B2 Final Report

C. Lecomte-Mertens, M. Lamberigts, and D. Coutsouradis May 1981 108 p refs Transl. into ENGLISH of Rept. no. TLT-00818A, Centre de Rech. Metal. (Belgium) Partly in ENGLISH and FRENCH
(PNR-90088; Trans-15572/TLT-00818A) Avail: NTIS HC A06/MF A01

Thermal fatigue of Mar-M-002 nickel alloy blades with an equiaxial or columnar (directional) structure, precision cast in the laboratory, was evaluated. Their thermal fatigue is compared with that of nickel alloy blades obtained elsewhere. Creep resistance of the Mar-M-002 structures was tested. The influence of chemical composition, grain orientation, microstructural fineness, the presence of carbides, and morphology was determined by metallography. Crack length is always greater in blades treated at 1100 C than in those treated at 1000 C. Blade geometry is the predominant factor in thermal fatigue. Crack resistance, in ascending order is: large solid blade (laboratory); small solid blade (outside supplier); small hollow blade (industrial). The metallographic structure is not a suitable criterion for differentiating between the thermal shock behavior of equaxial blades and that of columnar blades. Author (ESA)

N82-22280*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

CONTROL LAW DESIGN TO MEET CONSTRAINTS USING SYNPAC-SYNTHESIS PACKAGE FOR ACTIVE CONTROLS

William M. Adams, Jr. and Sherwood H. Tiffany Jan. 1982 16 p refs Presented at the Joint Automatic Control Conf., Charlottesville, Va., 17-19 Jun. 1981
(NASA-TM-83264; NAS 1.15:83264) Avail: NTIS HC A02/MF A01 CSCL 01C

Major features of SYNPAC (Synthesis Package for Active Controls) are described. SYNPAC employs constrained optimization techniques which allow explicit inclusion of design criteria (constraints) in the control law design process. Interrelationships are indicated between this constrained optimization approach, classical and linear quadratic Gaussian design techniques. Results are presented that were obtained by applying SYNPAC to the design of a combined stability augmentation/gust load alleviation control law for the DAST ARW-2. Author

N82-22281*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

AN ANALYSIS OF A NONLINEAR INSTABILITY IN THE IMPLEMENTATION OF A VTOL CONTROL SYSTEM

Jeanine M. Weber Mar. 1982 65 p refs
(NASA-TM-84220; A-8840; NAS 1.15:84220) Avail: NTIS HC A04/MF A01 CSCL 01C

The contributions to nonlinear behavior and unstable response of the model following yaw control system of a VTOL aircraft during hover were determined. The system was designed as a state rate feedback implicit model follower that provided yaw rate command/heading hold capability and used combined full authority parallel and limited authority series servo actuators to generate an input to the yaw reaction control system of the aircraft. Both linear and nonlinear system models, as well as describing function linearization techniques were used to determine the influence on the control system instability of input magnitude and bandwidth, series servo authority, and system bandwidth. Results of the analysis describe stability boundaries as a function of these system design characteristics. A.R.H.

N82-22282# National Aerospace Lab., Tokyo (Japan).

EXPERIMENT ON ACTIVE FLUTTER SUPPRESSION OF A CANTILEVER WING

Takao Kikuchi and Hae Kyong Lee Dec. 1981 10 p refs In JAPANESE; ENGLISH summary
(NAL-TR-690; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

An experiment on active flutter suppression of a cantilever wing with the control surface at the wing tip is described. The experiment was done in a low subsonic wind tunnel. The deflection of the wing was measured by strain gages located near the root of the wing. The aileron was driven by a servomotor. Comparison was made between the present and previous results. It is concluded that the coefficients of the control law may have a different effect on the stability of the two- and three-dimensional models. Author

N82-22284*# National Aeronautics and Space Administration, Washington, D. C.

STUDIES ON WIND TUNNEL STRAIGHTENERS

F. Schultz-Grunow and K. Wieghardt Mar. 1982 16 p refs Transl. into ENGLISH from Luftfahrtforschung (West Germany), v. 17, no. 3, 20 Mar. 1940 p 82-86 Transl. by Kanner (Leo) Associates, Redwood City, Calif. original doc. prep. by Kaiser-Wilhelm Inst. for Flow Research, Goettingen (West Germany)
(Contract NASw-3541)
(NASA-TM-76689; NAS 1.15:76689) Avail: NTIS HC A02/MF A01 CSCL 14B

Tests using small-scale straighteners are reported. The studies allowed conclusions on the most favorable depth relationships, flow conditions behind the straightener and on the drag. The ways an obliquely hitting airflow is deflected by a straightener are examined. In addition the flow drag was measured and the manner in which the individual air columns emanating from the holes unite to form a homogeneous speed field was investigated. N.W.

N82-22285# National Inst. for Aeronautics and Systems Technology, Pretoria (South Africa).

DESIGN OF DYNAMICALLY-SCALED, ASYMMETRICAL WIND TUNNEL MODELS

M. E. Beyers 6 Aug. 1981 18 p refs
(NIAST-78/18) Avail: NTIS HC A02/MF A01

Dynamically scaled models are used in aerodynamic studies, notably in aircraft/store or stage separation studies. Techniques were developed for the design of free flight models in three general categories: dynamic stability free flight models, high maneuverability models optimized for nonoscillatory motion studies, and dynamic separation models. Dynamic scaling with fully simulated mass asymmetries play an important part in each of the three categories, particularly when nonplanar motions are simulated. The method is implemented in a 'FORTRAN IV DSAM'. S.L.

N82-22296# Research Inst. of National Defence, Umea (Sweden). Huvudavdelning 4.

RADIAK SIMULATOR FOR AIRCRAFT INSTRUMENTS [RADIAKSIMULATOR FOER FLYGINDIKERING]

Goeran Hulten, Melker Nordstrand, and Thomas Ulvsand Jun. 1981 30 p ref In SWEDISH
(FOA-C-40136-A3) Avail: NTIS HC A03/MF A01

An intensimeter no. 23 was used to detect radiation from aircraft. A simulator which could be programmed to give different time controlled simulated lapses was added to the equipment. The missions programmed into the memory included indications along a road, over an area and spot indications. Testing was performed at the Army Helicopter school in Boden under realistic conditions. Results indicate that this type of simulation is useful in training aircraft indication personnel. M.D.K.

N82-22314*# Boeing Commercial Airplane Co., Seattle, Wash.

THE 737 GRAPHITE COMPOSITE FLIGHT SPOILER FLIGHT SERVICE EVALUATION Annual Report, May 1980 - Apr. 1981

Randy L. Coggeshall Feb. 1982 50 p refs
(Contract NAS1-11668)
(NASA-CR-165826; NAS 1.26:165826; D6-37330; AR-7) Avail: NTIS HC A03/MF A01 CSCL 11D

A flight service report was prepared which covers the flight service experience of 111 graphite epoxy spoilers on 737 transport aircraft and related ground based environmental exposure of graphite epoxy material specimens. Spoilers were installed on 28 aircraft representing seven major airlines operating throughout the world. Tests of removed spoilers after the seventh year of service continue to indicate modest changes in composite strength properties. Two spoilers were tested, one with 6 and one with 7 years of service, and both had residual strengths that fall within the original static strength scatter band. Both these units had typical service included discrepancies when tested. Based on visual, ultrasonic, and destructive inspection there continues to be no evidence of moisture migration into the honeycomb core and no core corrosion in the deployed units. M.D.K.

N82-22315*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DEVELOPMENT AND DEMONSTRATION OF MANUFACTURING PROCESSES FOR FABRICATING GRAPHITE/LARC 160 POLYIMIDE STRUCTURAL ELEMENTS Final Report

R. K. Frost, J. S. Jones, P. J. Dynes, and D. H. Wykes Dec. 1981 499 p refs

(Contract NAS1-15371)

(NASA-CR-165809; NAS 1.26:165809) Avail: NTIS HC A21/MF A01 CSCL 11D

The development and demonstration of manufacturing technologies for the structural application of Celion graphite/LARC-160 polyimide composite material is discussed. Process development and fabrication of demonstration components are discussed. Process development included establishing quality assurance of the basic composite material and processing, nondestructive inspection of fabricated components, developing processes for specific structural forms, and qualification of processes through mechanical testing. Demonstration components were fabricated. The demonstration components consisted of flat laminates, skin/stringer panels, honeycomb panels, chopped fiber compression moldings, and a technology demonstrator segment (TDS) representative of the space shuttle aft body flap. R.J.F.

N82-22316*# Lockheed-California Co., Burbank.

FLIGHT SERVICE EVALUATION OF KEVLAR-49 EPOXY COMPOSITE PANELS IN WIDE-BODIED COMMERCIAL TRANSPORT AIRCRAFT Annual Flight Service Report

Robert H. Stone Jan. 1982 56 p refs

(Contract NAS1-11621)

(NASA-CR-165841; NAS 1.26:165841) Avail: NTIS HC A04/MF A01 CSCL 11D

Kevlar-49 fairing panels, installed as flight service components on three l-1011's, were inspected after 8 years service. The fairings had accumulated a total of 62,000 hours, with one ship set having 20,850 hours service. Kevlar-49 components were found to be performing satisfactorily in service with no major problems. The only defects noted were minor impact damage, a few minor disbonds and a minor degree of fastener hole fraying and elongation. The service history to date indicates that Kevlar-49 epoxy composite materials have satisfactory service characteristica for use in aircraft secondary structures. R.J.F.

N82-22324# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).

SERVICE LIFE INVESTIGATION OF A SAILPLANE WING OF CFRP CONSTRUCTION

C. Kensche 1981 33 p refs In GERMAN; ENGLISH summary Presented at 17th OSTIV Congr., Paderborn-Haxterberg, West Germany, 26 May - 6 Jun. 1981

Avail: NTIS HC A03/MF A01

A sailplane wing of CFRP design was investigated to guarantee a higher stress level and longer service life than with glass fiber reinforced plastics and to define admissible design for the glider industry. Fatigue tests were run according to a block program. The residual wing strength was also tested. Periodic measurements are used to observe stiffness behavior during simulated service life. No change in stiffness is observed during the tests. Stress enhancement of 400 N/sq mm is admissible which increases service life from 3000 to 6000 hr. Author (ESA)

N82-22348# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

CRITICAL METALS CONSERVATION, RECYCLING AND SUBSTITUTION

E. F. Bradley (Pratt and Whitney Aircraft) Jan. 1982 23 p Presented at the 53rd Meeting of the AGARD Struct. and Mater. Panel, Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981

(AGARD-R-693; ISBN-92-835-1412-2) Avail: NTIS HC A02/MF A01

Critical metals are reviewed relative to their current importance to the aerospace industry. The roles of conservation, recycling, substitution, stockpiling and market place operations are analyzed. Technologies are discussed relative to their effects on the critical metals, and finally, suggestions are presented for meeting material supply problems. S.L.

N82-22358# Rolls-Royce Ltd., Derby (England).

POWDER METALLURGICAL INNOVATIONS FOR IMPROVED HOT SECTION ALLOYS IN AERO-ENGINE APPLICATIONS

P. Wildgoose, N. G. Turner, H. F. Davies, B. J. Helliwell, R. Ubank, and H. Harrison 1980 27 p refs

(PNR-90072) Avail: NTIS HC A03/MF A01

The state of the art in powder material and processes, for aircraft engine combustor, blade, and disk alloys, was reviewed. Processes developed in the 1970's include: gas atomization of superalloy powder for critical rotating parts; rotating electrode atomization for titanium powder in similar components; controled thermomechanical processing of attrited powders in order to produce superalloy sheet and airfoil parts; and plasma sprayed gas atomized powder for hot section overlay and thermal barrier coatings. Development in titanium powder metallurgy is hampered by difficulties in obtaining clean powder. Properties equivalent to a conventionally processed product are obtained in current alloys, with possible cost advantages. Author (ESA)

N82-22360# National Aerospace Lab., Amsterdam (Netherlands). Div. of Structures and Materials.

ENGINEERING PROPERTY COMPARISONS OF 7050-T73651, 7010-T7651 AND 7010-T73651 ALUMINUM ALLOY PLATE

L. Schra and W. G. J. tHart Dec. 1980 33 p refs Submitted for publication

(NLR-MP-80047-U) Avail: NTIS HC A03/MF A01

The strength, stress corrosion resistance, fracture toughness and fatigue crack propagation resistance under flight simulation loading of aluminum alloys was tested. Standard tensile, notch, center cracked and flight simulation tests were performed. In order to study stress corrosion crack initiation, tuning fork type specimens were clamped to a wheel which immersed them in a 3.5% aqueous NaCl solution for 10 min/hr. Testing lasted for two months. Results show that both 7050 and 7010 are high strength deep hardening alloys with only minor differences in crack tolerance properties. The fracture toughness of both alloys is equivalent, while 7050 possesses slightly better resistances to stress corrosion cracking and fatigue crack propagation under flight simulation loading. Author (ESA)

N82-22362# Transportation Research Board, Washington, D.C.

PAVEMENT MANAGEMENT AND REHABILITATION OF PORTLAND CEMENT CONCRETE PAVEMENTS

Charles V. Zegeer, Kenneth R. Agent, Rolands L. Rizenbergs, P. C. Curtayne, T. Scullion, R. Daryl Pedigo, W. Ronald Hudson, Freddy L. Roberts, M. A. Karan, Ralph Haas et al 1981 79 p refs

(PB82-131384; TRB/TRR-814; ISBN-0-309-03255-5; ISSN-0361-1981; LC-81-18882) Avail: NTIS HC A05/MF A01; HC also available from Transportation Research Board, 2102 Constitution Ave., NW, Washington, D.C. 20418 CSCL 13B

Pavement management and rehabilitation projects and techniques are discussed. The following topics are discussed: economic analyses and dynamic programming in resurfacing project selection; implementation of an urban pavement management system; pavement performance modeling for pavement management; illustration of pavement management: from data inventory to priority analysis; rehabilitation of concrete pavements by using portland cement concrete overlays; pavement management study: Illinois tollway pavement overlays; resurfacing of plain jointed-concrete pavements; design procedure for premium composite pavement; model study of anchored pavement; prestressed concrete overlay at O'Hare International Airport: in-service evaluation; and, bonded portland cement concrete resurfacing. GRA

N82-22398*# Ohio State Univ., Columbus. Dept. of Electrical Engineering.

GTD ANALYSIS OF AIRBORNE ANTENNAS RADIATING IN THE PRESENCE OF LOSSY DIELECTRIC LAYERS Semiannual Report
R. G. Rojas-Teran and W. D. Burnside Aug. 1981 113 p refs
(Grant NsG-1498)
(NASA-CR-168770; NAS 1.26:168770; ESL-710964-8) Avail: NTIS HC A06/MF A01 CSCL 20N

The patterns of monopole or aperture antennas mounted on a perfectly conducting convex surface radiating in the presence of a dielectric or metal plate are computed. The geometrical theory of diffraction is used to analyze the radiating system and extended here to include diffraction by flat dielectric slabs. Modified edge diffraction coefficients valid for wedges whose walls are lossy or lossless thin dielectric or perfectly conducting plates are developed. The width of the dielectric plates cannot exceed a quarter of a wavelength in free space, and the interior angle of the wedge is assumed to be close to 0 deg or 180 deg. Systematic methods for computing the individual components of the total high frequency field are discussed. The accuracy of the solutions is demonstrated by comparisons with measured results, where a 2 lambda by 4 lambda prolate spheroid is used as the convex surface. A jump or kink appears in the calculated pattern when higher order terms that are important are not included in the final solution. The most immediate application of the results presented here is in the modelling of structures such as aircraft which are composed of nonmetallic parts that play a significant role in the pattern. S.L.

N82-22478*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A PORTABLE, LOW-COST FLIGHT-DATA MEASUREMENT AND RECORDING SYSTEM
Robert J. Miller Mar. 1982 18 p refs
(NASA-TM-84229; A-8871; NAS 1.15:84229) Avail: NTIS HC A02/MF A01 CSCL 14E

The design of and the experience with an inexpensive, hand-portable, onboard data system used to record four parameters in the final portion of the landing approach and touchdown of an airplane are described. The system utilized a high-quality audio tape recorder and amateur photographic equipment with accessory circuitry rather than specialized instrumentation to given satisfactory results. Author

N82-22499# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
PROTOTYPE FLYWHEEL SPIN TESTING PROGRAM Final Report, 21 Mar. 1980 - 15 Apr. 1981
D. W. Rabenhorst and W. O. Wilkinson Apr. 1981 59 p refs
Prepared for California Univ., Livermore. Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(UCRL-15381; SDO-5988) Avail: NTIS HC A04/MF A01

Flywheels were spin tested to determine for each flywheel (1) the rotational speed at flywheel failure and (2) within the capability of the facility, the initiation and mode of failure of the flywheel. The flywheel tested ranged in size from 12.0 to 24.0 inches diameter; in weight from 5.0 to 28.5 pounds, and in energy at failure up to 711 watt hours. M.D.K.

N82-22808# National Aerospace Lab., Amsterdam (Netherlands). Wetenschappelijke Diensten Hoofdafdel.
CALCULATION OF THE CONTRIBUTIONS OF AIR TRAFFIC AND ROAD TRAFFIC TO AIR POLLUTION IN THE REGION OF SCHIPHOL AIRPORT IN 1974
J. J. Tiggelaar Oct. 1981 51 p refs In DUTCH; ENGLISH summary Sponsored by Netherlands Ministerie van Volksgezondheid en Milieuhygiene
(NLR-TR-77100-U) Avail: NTIS HC A04/MF A01

Annual and quarterly averages of CO, NOx and CxHy concentrations in the Schiphol airport region are calculated using a mathematical model. The method models traffic into a set of line and point sources with constant emission. For CO and NOx the road traffic contribution to air pollution is largest, while for CxHy the air traffic contribution is largest. The measurements suggest that other sources contribute at least as much to global air pollution as do road and air traffic. Author (ESA)

N82-22848*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE 1981 DIRECT STRIKE LIGHTNING DATA
Felix L. Pitts and Mitchel E. Thomas Mar. 1982 40 p refs
(NASA-TM-83273; NAS 1.15:83273) Avail: NTIS HC A03/MF A01 CSCL 04B

Data waveforms obtained during the 1981 direct strike lightning tests, utilizing the NASA F-106B aircraft specially instrumented for lightning electromagnetic measurements are presented. The aircraft was operated in a thunderstorm environment to elicit strikes. Electromagnetic field data were recorded for both attached lightning and free field excitation of the aircraft. N.W.

N82-22947*# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
THE ROLE OF COHERENT STRUCTURES IN THE GENERATION OF NOISE FOR SUBSONIC JETS Yearly Progress Report, 1 Nov. 1980 - 31 Oct. 1981
Gerald L. Morrison 5 Apr. 1982 109 p refs
(Grant NAG1-112)
(NASA-CR-168764; NAS 1.26:168764) Avail: NTIS HC A06/MF A01 CSCL 20A

The coherent structure in high Reynolds number (184,000 to 262,000), Mach number 0.6 to 0.8 axisymmetric cold air jets exhausting at atmospheric pressure was studied. The mean flow and the statistical time averaged turbulence properties were measured. Spectra showed a very broad frequency content which shifted towards the lower frequencies as the flow progressed downstream. Axial wave number measurements indicate that the axial wave number-frequency relationship was the same for a wide range of Mach (0.3 to 2.5) and Reynolds (3,700 to over 200,000) numbers. Measurements of the azimuthal mode numbers show that several modes from n = -3 to +3 exist simultaneously in various quantities that the different frequencies studied. Acoustic measurements were made in the near field of the Mach number 0.6 jet. Sound pressure level contours showed that noise appeared to be radiated from a location near the end of the potential core. Directivity plots revealed that the spectra of this noise shifted towards higher frequencies as the angle from the jet axis increased. It was also found that mid-band excitation frequencies produced an increase in full spectrum noise. M.G.

N82-22949*# Kentron International, Inc., Hampton, Va.
PROGRAM FOR NARROW-BAND ANALYSIS OF AIRCRAFT FLYOVER NOISE USING ENSEMBLE AVERAGING TECHNIQUES
Doreen Gridley Mar. 1982 70 p refs
(Contract NAS1-16000)
(NASA-CR-165867; NAS 1.26:165867) Avail: NTIS HC A04/MF A01 CSCL 20A

A package of computer programs was developed for analyzing acoustic data from an aircraft flyover. The package assumes the aircraft is flying at constant altitude and constant velocity in a fixed attitude over a linear array of ground microphones. Aircraft position is provided by radar and an option exists for including the effects of the aircraft's rigid-body attitude relative to the flight path. Time synchronization between radar and acoustic recording stations permits ensemble averaging techniques to be applied to the acoustic data thereby increasing the statistical accuracy of the acoustic results. Measured layered meteorological data obtained during the flyovers are used to compute propagation effects through the atmosphere. Final results are narrow-band spectra and directivities corrected for the flight environment to an equivalent static condition at a specified radius. R.J.F.

N82-22952*# Bolt, Beranek, and Newman, Inc., Canoga Park, Calif.
ANALYTICAL PREDICTION OF THE INTERIOR NOISE FOR CYLINDRICAL MODELS OF AIRCRAFT FUSELAGES FOR PRESCRIBED EXTERIOR NOISE FIELDS. PHASE 2: MODELS FOR SIDEWALL TRIM, STIFFENED STRUCTURES AND CABIN ACOUSTICS WITH FLOOR PARTITION
L. D. Pope and E. G. Wilby Apr. 1982 212 p refs
(Contract NAS1-15782)
(NASA-CR-165869; NAS 1.26:165869) Avail: NTIS HC A10/MF A01 CSCL 20A

An airplane interior noise prediction model is developed to determine the important parameters associated with sound transmission into the interiors of airplanes, and to identify apropriate noise control methods. Models for stiffened structures, and cabin acoustics with floor partition are developed. Validation studies are undertaken using three test articles: a ring stringer stiffened cylinder, an unstiffened cylinder with floor partition,

and ring stringer stiffened cylinder with floor partition and sidewall trim. The noise reductions of the three test articles are computed using the heoretical models and compared to measured values. A statistical analysis of the comparison data indicates that there is no bias in the predictions although a substantial random error exists so that a discrepancy of more than five or six dB can be expected for about one out of three predictions.
S.L.

N82-22953# National Aerospace Lab., Tokyo (Japan). Noise and Emission Research Group.
AERODYNAMIC NOISE GENERATED BY JET-WING/FLAP INTERACTIONS OF THE EXTERNAL USB CONFIGURATION OF STOL AIRCRAFT. PART 1: EIGHT PERCENT SCALE COLD-FLOW MODEL ANALYSIS
Masataka Maita and Shigemi Shindo Oct. 1981 29 p refs
(NAL-TR-685T; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

The acoustic characteristics of the external upper surface blowing (USB) concept of a powered high lift system (PHLS) were studied experimentally using an 8%-scale static cold flow model. Observations of exhaust jet flow attachment and spreading characteristics on wing/flap surface were also carried out using several flow visualization techniques. Noise reduction data were obtained by optimizing basic jet nozzle wing/flap structural geometries for the lowest noise. Among the associated parameters which define USB-PHLS configurations, (1) the location relative to wing/flap and the shape of the exhaust jet nozzle and (2) flow attachment devices are important parameters. Flow characteristics dependence on these parameters and PHLS noise were also obtained. From far field noise spectra overall sound pressure level dependence on jet velocity and coherence across near field surface pressure, it was concluded tht the flap trailing edge noise was the most predominant noise source. Several acoustically treated flaps and serrated trailing edge design techniques were applied to attenuate edge noise. Author

N82-22955*# DyTec Engineering, Inc., Long Beach, Calif.
RECOMMENDATIONS FOR FIELD MEASUREMENTS OF AIRCRAFT NOISE Final Report
Alan H. Marsh Washington NASA Apr. 1982 94 p refs
(NASA-CR-3540; NAS 1.26:3540) Avail: NTIS HC A05/MF A01 CSCL 20A

Specific recommendations for environmental test criteria, data acquisition procedures, and instrument performance requirements for measurement of noise levels produced by aircraft in flight are provided. Recommendations are also given for measurement of associated airplane and engine parameters and atmospheric conditions. Recommendations are based on capabilities which were available commercially in 1981; they are applicable to field tests of aircraft flying subsonically past microphones located near the surface of the ground either directly under or to the side of a flight path. Aircraft types covered by the recommendations include fixed-wing airplanes powered by turbojet or turbofan engines or by propellers. The recommended field-measurement procedures are consistent with assumed requirements for data processing and analysis. R.J.F.

N82-22962# New South Wales Univ., Sydney (Australia). School of Mechanical Engineering.
ACOUSTIC EMISSION FROM FREE JETS
S.-L. Hall *In* Ecole Centrale de Lyon Euromech 142: Acoustics of Turbulent Flows 1981 4 p

Avail: NTIS HC A08/MF A01

Nozzle centered radiation, wider spaced waves, and low angle waves are seen in correctly expanded supersonic jets. In working conditions, shock jet interaction, resulting from incorrect expansion, generates additional high frequency noise. Underexpanded jets emit more noise than overexpanded jets, due to operating at higher Mach numbers and oscillations of the shock cells. Shadowgraphs and Schlieren photographs show that helium jets have larger angles and greater extent of noise radiation than air jets. Mathematical models for correctly expanded supersonic air jets exhausting into the quiescent atmosphere, given no extraneous shocks near the nozzle exit, calculate acoustic wave angles to within 3 deg of measured values. Similar accuracy is achieved for helium jets when the ratio of acoustic impedances is used to correct the air jet values for refraction and convection effects. Models give reasonably good prediction of wave angles from + or - 50% of the correct expansion. For jets without extraneous shocks, when correctly expanded, calculated angles are within 4 deg of measured values. Author (ESA)

N82-22963# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Berlin (West Germany). Abt. Turbulenzforschung.
PREDICTION OF FLYOVER JET NOISE SPECTRA FROM STATIC TESTS
Ulf Michel and Alfons Michalke (Technische Univ., Berlin) *In* Ecole Centrale de Lyon Euromech 142: Acoustics of Turbulent Flows 1981 4 p refs

Avail: NTIS HC A08/MF A01

A scaling law for predicting the overall flyover noise of a single stream shock-free circular jet from static experiments is outlined. It is valid for isothermal and hot jets. It assumes that the jet flow and turbulence field are axially stretched in flight. Effects of the boundary layer within the nozzle and along the engine nacelle are neglected. The scaling laws for the power spectral density and spectra with constant relative bandwidth can be derived. In order to compare static and inflight directivities, the far field point relative to the source position must be denoted by the emission angle and the wave normal distance. From the solution of the convective Lighthill equation in a coordinate system fixed to the jet nozzle (wind tunnel case), the power spectral density of sound pressure at a given frequency is found. Predictions for Aerotrain compare well with measured values. Author (ESA)

N82-22976# Societe Nationale Industrielle Aerospatiale, Toulouse (France).
AIRCRAFT AERODYNAMIC NOISE DURING APPROACH [BRUIT AERODYNAMIQUE DES AVIONS EN APPROCHE]
J. L. Parent *In* Ecole Centrale de Lyon Euromech 142: Acoustics of Turbulent Flows 1981 3 p In FRENCH
Avail: NTIS HC A08/MF A01

The effect of approach velocity, nose and flap inclination, and undercarriage position on aircraft noise was studied. The A 300 B and SN 601 aircraft made two approach passes over a chain of noise recorders. The sound fields and noise spectra show that increasing the speed and flap angle or lowering the undercarriage produces a general increase in noise level such that the directivity of the aerodynamic noise source is hardly changed. All noise spectra increase. Pure frequencies (400 to 500 Hz) accompany flap deployment for the SN 601.
Author (ESA)

N82-22978# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany).
EXPERIMENTS ON PROPELLER NOISE
F. R. Grosche and H. Stiewitt *In* Ecole Centrale de Lyon Euromech 142: Acoustics of Turbulent Flows 1981 4 p refs

Avail: NTIS HC A08/MF A01

Propeller sound generation was investigated. Tests were performed at flow velocities up to 58 m/sec on 90 cm dia. four bladed propellers driven by an electric motor enclosed in a streamlined nacelle. Five models with different blade geometries were tested at helical tip Mach numbers up to 0.69. Nearfield blade tip measurements were made at 0.14 dia. by an in-flow microphone. The acoustic far field was measured by four microphones outside the wind tunnel flow 2.7 m from the propeller axis. An acoustic mirror telescope with three microphones was used to investigate sound generation from the upper, central and lower parts of the propeller. The spectrum in the propeller plane is dominated by the tonal components at the blade passing frequency and its harmonics. Tonal component amplitude is greatly reduced downstream. The blades radiate high frequency noise mainly in motion direction. Author (ESA)

N82-22990# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Technische Akustik.
GROUND REFLECTION EFFECTS IN MEASURING PROPELLER AIRCRAFT FLYOVER NOISE
Werner Dobrzynski Aug. 1981 85 p refs In GERMAN; ENGLISH summary Report will also be announced as (ESA-TT-742)
(DFVLR-FB-81-28; ESA-TT-742) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 21

In measuring flyover noise for purposes of propeller aircraft noise certification, microphones are positioned 1.2 m above the ground. The influence of ground reflection on the maximum A weighted aircraft noise level was investigated. Ground reflection induces level differences of up to 3 db (A), depending on rotational speed and number of blades. Since reflection corrections can not successfully be applied to propeller noise signatures, alternative measuring arrangements, such as microphones in close proximity to the ground, were investigated. For different microphone orientations next to an acoustically hard, smooth surface, or above ground plates in case of grass covered surfaces, frequency regimes not affected by ground reflection interferences are determined. Author (ESA)

N82-23068# Committee on Science and Technology (U. S. House).

THE 1983 NASA AUTHORIZATION, VOLUME 1

Washington GPO 1982 114 p Hearing before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 97th Congr., 2nd Sess., No. 71, 17 Feb. 1982 (GPO-91-488-Vol-1) Avail: Subcommittee on Transportation, Aviation and Materials

The status of NASA systems technology programs which provide focused technology applications principally to civil aviation is addressed in light of the cost effectiveness of NASA's partnership with the aircraft industry and the economic impact of the reduction of NASA's roll in promoting advanced aeronautical technology. Progress made in research and technology programs encompassing aerodynamics, propulsion, materials and structures as well as controls and guidance, human factors, and low speed and high speed aircraft technology is reported. The six elements of the Aircraft Energy Efficiency program are highlighted. These are: engine component improvement, energy efficient engine, advanced turboprop, energy efficient transport, composite primary aircraft structures, and laminar flow control. The budget request for these programs is presented. N.W.

N82-23137# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Zentralbereich Entwicklung.

RESEARCH AND DEVELOPMENT AT MBB. TECHNICAL AND SCIENTIFIC PUBLICATIONS, 1981 [FORSCHUNG UND ETWICKLUNG. TECHNISCH-WISSENSCHAFTLICHE VEROEFFENTLICHUNGEN 1981]

1981 193 p refs Partly in ENGLISH and GERMAN
Avail: NTIS HC A09/MF A01

Research and development work carried out during 1981 at Messetschmitt-Bolkow-Blohm GmbH, Ottobrunn, FRG is presented. Aerodynamics, materials science, infrared imagery, aircraft and spacecraft design, and production engineering are discussed. Calculation methods, mathematical and scale models, and computer aided design are treated. Solar energy and high speed trains were investigated.

N82-23140# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Military Aircraft Div.

EXPERIENCE WITH HIGH PERFORMANCE V/STOL FIGHTER PROJECTS AT MBB

Felix Aulehla and Gerhard K. Kissel *In its* Res. and Develop. at MBB. Tech. and Sci. Publ., 1981 1981 16 p refs Presented at AIAA/NASA Ames V/STOL Conf., Palo Alto, Calif. 7-9 Dec. 1981
(MBB-FE-124/S/PUB/50) Avail: NTIS HC A09/MF A01

Experience gained with V/STOL aircraft having the capability to reach Mach 2 and to take off at after-burning temperatures is described. The German project VJ 101 C and the U.S./FRG project AVS as well as the joint U.S./FRG V/STOL Technology Program serve as examples. Guidance and control systems are depicted, including hover and transition control. Jet interference aspects, e.g., hot gas ingestion during take off with reheated jets are described. Author (ESA)

N82-23141# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Aeroelastic Branch.

APPLICATION OF A STRUCTURAL OPTIMIZATION PROCEDURE FOR ADVANCED WINGS

Heinrich Goedel and Guenter Schneider *In its* Res. and Develop. at MBB. Tech. and Sci. Publ., 1981 1981 15 p refs Presented at 51st AGARD Meeting on Struct. and Mater. Panel, Aix-en-Provence, France, 14-19 Sep. 1981

(MBB-FE-171/S/PUB/49: AGARD-691) Avail: NTIS HC A09/MF A01

A finite element method optimization program was applied to: the sizing of a simplified metal wing for strength and flutter constraints; aeroelastic efficiency calculations for fin and rudder; and the structural layout of a carbon fiber composite delta wing. A flutter speed is calculated for the initial fully stressed design being 700 kt. After 5 iterations the desired flutter speed of 900 kt is reached with an increase < 3% total weight. Good correlation with more sophisticated analyses, e.g., NASTRAN is achieved. The aeroelastic deformation of a fin and rudder are calculated statisfactorily without iteration using the aerodynamic influence matrix produced by a separate program module. A 5% weight saving is achieved for the delta wing. Aileron aeroelastic efficiency is above specification for a supersonic roll. Author (ESA)

N82-23150# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

FLUID DYNAMICS OF JETS WITH APPLICATIONS TO V/STOL

Jan. 1982 433 p refs Proceedings of Symp. held at Lisbon, 2-5 Nov. 1981
(AGARD-CP-308; ISBN-92-835-0308-2) Avail: NTIS HC A19/MF A01

The fluid dynamics of vertical and short take-off and landing aircraft which employ thrust vectoring or lift augmentation were discussed. Jet interactions with neighboring surfaces, jet structure and development, wind tunnel simulation, injection and thrust augmentation, and theoretical models were considered.

N82-23151# Surrey Univ., Guildford (England). Dept. of Mechanical Engineering.

SOME ASPECTS OF JET DYNAMICS AND THEIR IMPLICATIONS FOR VTOL RESEARCH

L. J. S. Bradbury *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 26 p refs

Avail: NTIS HC A19/MF A01

Some of the problems associated with jet interference on VTOL aircraft are discussed. The jet interference that arises in hovering both in and out of ground effect is considered first and the factors that influence the entrainment that is responsible for the interference are discussed. In particular, it is shown that the flow in the initial region of a jet is strongly affected by circumferential variations in the jet nozzle flow angle and that this might account for some of the anomolous results for the decay of jets issuing from VTOL models. The possible use of Reichardt's method for studying the behavior of nonuniform jets is also discussed. The problem of jet interference in transition is next examined and the basis on which model tests are currently carried out is briefly reviewed. The dynamics of jet interference in transition are then considered in more detail and it is suggested that unlike interference in hovering, transition interference might well be accounted for on the basis of a potential flow model of the jet in a cross flow. Some experimental evidence in support of this notion is examined and a few examples of comparisons between predicted and experimental pressure distributions around a single jet issuing from a flat plate are given. Author

N82-23158# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Aircraft Div.

AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE INTERACTION BETWEEN THE ENGINE JET AND THE SURROUNDING FLOW FIELD WITH REGARD TO THE PRESSURE DRAG ON AFTERBODIES

A. Zacharias *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 22 p refs

Avail: NTIS HC A19/MF A01

In order to clarify the interaction between rotationally symmetric engine jets and afterbody configurations, the dependence of the jet characteristics (i.e., the plume effect and the entrainment) and the afterbody pressure drag on the jet parameters, the free stream Mach number, and the afterbody geometry was analyzed. Extensive tests were carried out in the high subsonic Mach number range on three different afterbodies at Reynolds numbers from 500,000 to 1,300,000. The nozzle pressure ratio and the temperature ratio of the model jets were varied in the range (1.0) 1.2 to 2.4 and 1.0 to 2.86 respectively. Measurements were then carried out to determine the static pressure and temperature distribution as well as the boundary layer profiles over the surface of the models. At the same time, the pressure and temperature profiles in the jet were determined in several planes behind the jet exhaust plane. Empirical equations are presented which show the dependence of the plume effect, the entrainment, and the afterbody pressure drag on the jet parameters, the free stream Mach number, and the afterbody geometry. With the aid of a finite element method and theoretical potential flow model for jet simulation, a numerical procedure was developed which allows the pressure drag on rotationally symmetric afterbodies to be calculated with due allowance for the effects of the engine jets. Comparison of the theoretical and experimental results shows satisfactory agreement. J.D.

N82-23163# Technische Hochschule, Aachen (West Germany). Inst. fuer Luft- und Raumfahrt.

FLOWFIELD AND NOISE SOURCES OF JET IMPINGEMENT OF FLAPS AND GROUND SURFACE

Guenther Neuwerth *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 7 p refs

Avail: NTIS HC A19/MF A01

On the basis of experimental results it is shown that, in an undisturbed free jet of high subsonic speed as well as in a jet deflected by externally blown flaps (EBF), there are ordered turbulence structures. First, a feedback mechanism which develops at small distances between nozzle and stagnation point on the flaps and which amplifies the turbulence structures is explained. It is subsequently shown that the interaction of the jets and EBF generates a strong noise. Even without feedback both the undisturbed free jet and the jet deflected by EBF have the maximum levels in the noise spectrum at the Strouhal numbers of the natural ordered turbulence structures. Author

N82-23165*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

JET V/STOL WIND-TUNNEL SIMULATION AND GROUND-PLANE EFFECTS

Richard J. Margason *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 21 p refs

Avail: NTIS HC A19/MF A01 CSCL 01A

The pretest preparation necessary to define the objectives of an appropriate investigation into the jet V/STOL wind tunnel simulation and ground plane effects were examined. Low speed wind tunnel testing of V/STOL aircraft concepts to determine the aerodynamic propulsion interaction effects during the transition between hover and wingborne flight is a necessary step in the development cycle of this type of aircraft. Powered models are normally used to determine the aerodynamic performance characteristics. Several factors which influence the selection of the model concept and the engine simulator are discussed. Some of the test techniques important for this class of aircraft model are examined. Wind tunnel wall effects important to this aircraft testing with special emphasis on groundplane effects are reviewed. E.A.K.

N82-23166*# McDonnell-Douglas Corp., St. Louis, Mo. Aerodynamics Dept.

THE MODELING AND PREDICTION OF MULTIPLE JET VTOL AIRCRAFT FLOW FIELDS IN GROUND EFFECT

Donald R. Kotansky *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 20 p refs

(Contracts NAS2-9646; NAS2-10184; N62269-76-C-0086; N00014-79-C-0130)
Avail: NTIS HC A19/MF A01 CSCL 01A

An engineering methodology based on an empirical data base and analytical fluid dynamic models was developed for the prediction of propulsive lift system induced aerodynamic effects for multiple lift jet VTOL aircraft operating in the hover mode in and out of ground effect. The effects of aircraft geometry, aircraft orientation (pitch, roll) as well as height above ground are considered. Lift jet vector and splay directions fit the airframe, lift jet exit flow conditions, and both axisymmetric and rectangular nozzle exit geometry are also accommodated. The induced suckdown flows are computed from the potential flowfield induced by the turbulent entrainment of both the free jets and wall jets in ground effect and from the free jets alone out of ground effect. The methodology emphasized geometric considerations, computation of stagnation lines and fountain upwash inclination, fountain upwash formation and development, and fountain impingement on the airframe. E.A.K.

N82-23167# Grumman Aerospace Corp., Bethpage, N.Y.

EVALUATION OF THE EFFECTS OF MODEL SCALE AND TEST TECHNIQUE ON JET-INDUCED EFFECTS

Stanley G. Kalemaris *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 11 p

Avail: NTIS HC A19/MF A01

The effects of model scale and test technique on the jet induced of a twin turbofan V/STOL aircraft were evaluated. The smallest mode was 2.1% as large as the full scale model. It is found that the two most important items to be modeled are fuselage shape and the coannular nature of a typical turbofan exhaust. Lift enhancing strakes are effective in enhancing the ground cushion and eliminating a possible source of scale effect. E.A.K.

N82-23168# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).

JET EFFECTS ON FORCES AND MOMENTS OF A VSTOL FIGHTER TYPE AIRCRAFT

B. Haftmann *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 13 p refs

Avail: NTIS HC A19/MF A01

Results of jet effects on forces and moments of the VAK-191 B were compiled. The jet induced effects were investigated during the Vertical/Short Take-Off and Landing (VSTOL) mode in and out of ground effect, in yawed flight, during hover and transition right up to aerodynamic flight. The flight test results were compared with wind tunnel measurements performed during the VAK-191 B development phase and used for preparation of simulation and automatic flight control system development. Trends and deviations between aircraft and model test results are verified. The adequacy of wind tunnel data preparation are questioned. The practicability of wind tunnel data for the assessment of VSTOL aircraft design and determination of flight characteristics and performances are discussed. Recommendations for the measurements of jet induced forces and moments on VSTOL aircraft are outlined. E.A.K.

N82-23169# Aeronautical Research Associates of Princeton, Inc., N. J.

THRUST AUGMENTING EJECTORS: A REVIEW OF THE APPLICATION OF JET MECHANICS TO V/STOL AIRCRAFT PROPULSION

Brian Quinn *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 14 p refs

Avail: NTIS HC A19/MF A01

The fundamental role played by the fluid dynamics of jets within thrust augmenting ejectors that are designed as propulsive units for V/STOL aircraft were reviewed. Energy transfer efficiency and its impact on the production of thrust is discussed. It is explained why propellor like devices more effectively convert available energy to thrust and that overall ejector performance is very sensitive to losses sustained by individual components. The most important loss mechanism is incomplete mixing between the ejector's primary and entrained streams. An experimental data base that provides insight into interactions between turbulent mixing and other factors and improving mixing and ejector performance are reviewed. Free mixing and mixing in a confined environment are contrasted and it is concluded that the development of theoretical methods that successfully predict the performance of V/STOL ejectors must await the results of new experiments that measure turbulence intensities and Reynolds stresses in confined regions. E.A.K.

N82-23170# Centre d'Etudes et de Recherches, Toulouse (France). Dept. of Aerothermodynamique.

THEORETICAL OPTIMISATION AND EXPERIMENTAL VERIFICATION OF AN INJECTOR

A. Mignosi *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 12 p refs In FRENCH; ENGLISH summary

Avail: NTIS HC A19/MF A01

A modelization of induction systems, which could be used for thrust augmentation or more generally constitute a fluid drive system, is proposed for the steady regime case. A simple scheme in which a rapid mixing of the flows is assumed, allows to solve the basic equations and express the main parameters influence. Its verification is effected, using a set of experimental data obtained during the study of an induction driven wind-tunnel.

Various parameters (are ratio between injected and driven flows, Mach number, pressure and temperature ratios) are studied. The injector configuration also appears to be very important, in particular as to pressure fluctuations produced at injection and the corresponding aerodynamic noise in the wind tunnel. Author

N82-23171# West Virginia Univ., Morgantown. Coll. of Engineering.
UNSTEADY EJECTORS
Herman Viets *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 12 p refs

(Grant AF-AFOSR-0025-81)
Avail: NTIS HC A19/MF A01

Ejectors are examined by introducing a time dependency into the flow to increase the mixing rate and hence improve the performance of very short devices. Past studies of unsteady flows related to ejectors are reviewed and a device is proposed which has the potential to increase the mixing by means of both an unsteady flow and also acoustic interaction between the frequencies generated by the jet and the ejector shroud. Standing acoustic waves are identified in the ejector and, it is found that the short unsteady ejector performance is superior to that of a slot jet geometry. E.A.K.

N82-23172# Universite Scientifique et Medicale de Grenoble (France). Inst. de Mechanique.
IMPROVEMENT OF EJECTOR THRUST AUGMENTATION BY PULSATING OR FLAPPING JETS
G. Binder and H. Didelle *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 11 p refs Sponsored in part by Minstere de la Defense

Avail: NTIS HC A19/MF A01

The influence of pulsating or flapping motions forced on the primary jet on the performance of thrust augmenting ejectors was investigated. The effect of the frequency and the amplitude of the forced perturbations was determined for various mixing duct lengths and diffusor geometries. In constant area ejectors the improvement in thrust augmentation ratio over the performance obtained with a steady jet in the same geometry increases with decreasing duct length. Thrust augmentation further improved by the gain in diffusor pressure recovery produced by the unsteady jets. Maximum augmentations of 1.9 and 1.65 were obtained with pulsating and flapping jets respectively as compared to 1.35 and 1.5 in the steady case. These improvements in ejector performance are mainly due to the faster mixing produced by these jets. E.A.K.

N82-23173# Societe Bertin et Cie, Plaisir (France).
EXPERIMENTAL STUDY OF A JET DEFLECTOR [ETUDE EXPERIMENTALE D'UN DEVIATEUR DE JET]
M. Lepretre and C. Portier *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 20 p refs In FRENCH; ENGLISH summary Sponsored in part by Delegation Generale pour l'Armement
Avail: NTIS HC A19/MF A01

A provisional model of an aerodynamic device for orienting the thrust vector of a jet engine was set up by exploiting the reattachment properties of a sonic or slightly supersonic jet on a flat or curved deflector conveniently positioned downwards from the nozzle outlet. A parametric study shows that it would be possible to obtain important reverse rates without a drastic loss of the resultant thrust. Such a device can be of benefit in improving controllability during combat or in designing a STOL. The arrangement defined is characterized by great simplicity, the jet reattachment is spontaneous over all the explored area, and no extra systems are required for blowing or suction.
Transl. by A.R.H.

N82-23174# Alfa Romeo S.p.A., Naples (Italy).
TURBOPROP AND TURBOJET EJECTOR OPTIMISATION

V. P. Riviello, A. Murolo, and G. Torella (Italian Air Force Academy) *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 13 p refs
Avail: NTIS HC A19/MF A01

The off design performance of turboprop and turbojet engine with ejector exhaust ducts was investigated during the AR 318 turboprop engine development and certification program. The optimization of the matching between angle and exhaust duct system is developed. A theoretical approach is used by a synthesis program the appropriate numerical simulation of the ejector, both in the case of subsonic condition at the engine exhaust station and in a sonic station, with supersonic development of the flow through the ejector. To study the supersonic flow through the ejector a set of available experimental results is examinated to evaluate the reliability of theoretical methods for the secondary flow and for conditions. Hot condition experimental tests were performed and was compared with theoretical calculations. The next step concerns the installation of a suitable ejector system on the AR 180.10 turbojet engine, which is a derived version of the AR 318 turboprop. E.A.K.

N82-23179*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
V/STOL AIRCRAFT AND FLUID DYNAMIC
Leonard Roberts (Stanford Univ.) and Seth B. Anderson *In* AGARD Fluid Dyn. of Jets with Appl. to V/STOL Jan. 1982 5 p refs
Avail: NTIS HC A19/MF A01 CSCL 01A

The impact of military applications on rotorcraft and V/STOL aircraft design with respect to fixed wing aircraft is discussed. The influence of the mission needs on the configurational design of V/STOL aircraft, the implications regarding some problems in fluid dynamics relating to propulsive flows, and their interaction with the aircraft and the ground plane, are summarized. E.A.K.

N82-23183# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).
INTEGRATED NAVIGATION-TF/TA-SYSTEM BASED ON STORED TERRAIN DATA PROCESSING
Horst-Dieter Lerche *In* AGARD Guidance and Control Technol. for Highly Integrated Systems Feb. 1982 13 p

Avail: NTIS HC A09/MF A01

A method to improve the reliability and optimization of terrain following flight is discussed. The terrain parameter comparison (TERPAC) system is described in which the main source of information is a terrain data base aboard the aircraft. The comparison is done in the position-fix-mode by matching the measured terrain signatures against terrain reference signatures stored in the mass memory. A hardware and software design of the combined navigation and terrain following/avoidance flight control system was developed and adapted to a modern avionic system architecture. M.G.

N82-23184# Societe d'Applications Generales d'Electricite et de Mecanique, Paris (France).
OPTIMAL INERTIAL NAVIGATION USING TERRAIN CORRELATION: AN ATTRACTIVE SOLUTION TO THE GROUND ATTACK AIRCRAFT NAVIGATION PROBLEM

L. Camberlein, M. deCremiers, and D. Chermette *In* AGARD Guidance and Control Technol. for Highly Integrated Systems Feb. 1982 15 p In FRENCH; ENGLISH summary

Avail: NTIS HC A09/MF A01

The use of terrain correlation for all-weather penetration and ground attack aircraft is discussed. Positioning by terrain correlation is briefly reviewed. For the ground attack aircraft application special algorithms allow large heading freedom over the updating area. The parameter sensitivity of the updating accuracy is analysed. This includes the terrain characteristics, the cartography accuracy, and the altitude measurement accuracy. The main operational features for ground attack aircraft are summarized: tri-dimensional updating; high accuracy facilitated by low altitude flight; self-contained, secure, jam-resistant, automated operation; a low level of heading constraint to and over the updating area; savings in weight, volume, electrical power and cost using sensors already needed on the aircraft. The principle of inertial system optimal updating is also briefly discussed. Temporal carryover from position and velocity updates can be crucial for accurate horizontal terrain following and weapon delivery initialization and in-flight alignment of tactical missiles. The possibility of integrating correlation and optimal filtering in the inertial unit is shown. A typical all weather ground attack mission scenario is described. This includes the extensive mission preparation, the nominal flight plan and possible alternatives, update area selection using ground based equipment and map data bases, and the data assembly and cassette loading. A possible operational systems architecture is described with the necessary equipment. M.G.

N82-23185# McDonnell Aircraft Co., St. Louis, Mo.
INTEGRATED FLIGHT AND FIRE CONTROL DEMONSTRATION ON AN F-15B AIRCRAFT: SYSTEM DEVELOPMENT AND GROUND TEST RESULTS
R. J. Landy, C. A. Scolatti, and J. E. Hunter (AFWAL) *In* AGARD Guidance and Control Technol. for Highly Integrated Systems Feb. 1982 17 p refs

Avail: NTIS HC A09/MF A01

An integrated flight and fire control (IFFC) system is described which utilizes an automatic coupler and modified flight control system to steer out tracking errors calculated by a director fire control system using information from an ATLIS 2 electro-optical tracker. The F-15B aircraft is the test bed aircraft. Simulation and analysis results indicate that the IFFC system has excellent air-to-air gunnery accuracy with decreased pilot workload. These results also indicate that attacker survivability in air-to-ground gunnery and bombing encounters can be increased by using maneuvering approaches without compromising air-to-ground weapon delivery accuracy. Extensive ground testing of IFFC hardware and software is described. Details of the flight test program plan are presented. M.G.

N82-23186# Singer Co., Wayne, N. J.
THE INTEGRATION OF MULTIPLE AVIONIC SENSORS AND TECHNOLOGIES FOR FUTURE MILITARY HELICOPTERS

Albert J. Shapiro *In* AGARD Guidance and Control Technol. for Highly Integrated Systems Feb. 1982 21 p refs

Avail: NTIS HC A09/MF A01

Multi-sensor navigation systems already available and in use in helicopters are discussed followed by a review of the system trade-offs and considerations leading to new systems that use more advanced digital electronic techniques to achieve the goals of reduced pilot workload, improved performance at minimum size, weight, and cost. The beneficial impact of ongoing technological advances in improving the operating capabilities of future avionics systems is indicated. R.J.F.

N82-23187# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Plans and Management Information Dept.
PRODUCTION VERIFICATION TESTING (PVT) OF GUIDANCE AND CONTROL SYSTEMS FOR HIGH RELIABILITY

Paul J. Logus *In* AGARD Guidance and Control Technol. for Highly Integrated Systems Feb. 1982 11 p refs

Avail: NTIS HC A09/MF A01

The testing of equipment for highly integrated guidance and control systems is addressed. A departure to the usual acceptance testing is discussed by examining in some detail a technique called production verification testing (PVT). Some of the recent literature and experience is reviewed. Computer simulation are used to examine various facets of PVT. Particular emphasis is directed toward the implementation of 100% testing of all systems prior to delivery through the use of N sequential failure-free cycles. Finally, conclusions drawn from computer simulations are presented. The number of N sequential failure free cycles that may be necessary is suggested, providing insight into interpreting the results. Simulation results suggest a means for determining not only expected operational reliability but also process control problems during manufacturing. R.J.F.

N82-23189# Systems Control, Inc., Palo Alto, Calif.
ANALYSIS OF COMPUTING SYSTEM CONFIGURATIONS FOR HIGHLY INTEGRATED GUIDANCE AND CONTROL SYSTEMS
J. Edwin Jones, Jay S. Karmarkar, and Randall E. Fleming *In* AGARD Guidance and Control Technol. for Highly Integrated Systems Feb. 1982 9 p refs

Avail: NTIS HC A09/MF A01

The importance of early and sustained validation of architectures for highly integrated systems is discussed. Two early validation tools are presented. A description of the two tools, (1) generalized reliability and maintainability program (GRAMP), and (2) functional emulation, is presented, along with a discussion of their utility in the development of highly integrated guidance and control systems. B.W.

N82-23192*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A FLIGHT INVESTIGATION OF BLADE-SECTION AERODYNAMICS FOR A HELICOPTER MAIN ROTOR HAVING RC-SC2 AIRFOIL SECTIONS
Charles E. K. Morris, Jr. Mar. 1982 163 p refs
(NASA-TM-83298; NAS 1.15:83298) Avail: NTIS HC A08/MF A01 CSCL 10A

Pressure data at 90 percent blade radius for a helicopter main rotor with RC-SC2 blade sections was obtained. Concurrent measurements were made of vehicle flight state, performance and some rotor loads. The test envelope included hover, level flight from about 65 to 144 knots, climb and descent, and collective fixed maneuvers. Airfoil pressure distributions obtained in flight agree with those theoretical calculations for two dimensional, steady flow. S.L.

N82-23193*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
APPLICATION OF A TRANSONIC POTENTIAL FLOW CODE TO THE STATIC AEROELASTIC ANALYSIS OF THREE-DIMENSIONAL WINGS
Woodrow Whitlow, Jr. and Robert M. Bennett Apr. 1982 12 p refs Presented at the AIAA/ASME/ASCE/AHS 23rd Struct., Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982
(NASA-TM-83296; NAS 1.15:83296; AIAA-PAPER-82-0689)
Avail: NTIS HC A02/MF A01 CSCL 01A

Since the aerodynamic theory is nonlinear, the method requires the coupling of two iterative processes - an aerodynamic analysis and a structural analysis. A full potential analysis code, FLO22, is combined with a linear structural analysis to yield aerodynamic load distributions on and deflections of elastic wings. This method was used to analyze an aeroelastically-scaled wind tunnel model of a proposed executive-jet transport wing and an aeroelastic research wing. The results are compared with the corresponding rigid-wing analyses, and some effects of elasticity on the aerodynamic loading are noted. T.M.

N82-23194*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ACCURATE METHOD FOR EVALUATING THE KERNEL OF THE INTEGRAL EQUATION RELATING LIFT TO DOWNWASH IN UNSTEADY POTENTIAL FLOW
Robert N. Desmarais Apr. 1982 15 p refs Presented at the AIAA/ASME/ASCE/AHS 23rd Struct., Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982 10-12 May 1982
(NASA-TM-83281; NAS 1.15:83281; AIAA-PAPER-82-687)
Avail: NTIS HC A02/MF A01 CSCL 01A

The method is capable of generating approximations of arbitrary accuracy. It is based on approximating the algebraic part of the nonelementary integrals in the kernel by exponential functions and then integrating termwise. The exponent spacing in the approximation is a geometric sequence. The coefficients and exponent multiplier of the exponential approximation are computed by least squares so the method is completely automated. Exponential approximates generated in this manner are two orders of magnitude more accurate than the exponential approximation that is currently most often used for this purpose. The method can be used to generate approximations to attain any desired trade-off between accuracy and computing cost. T.M.

N82-23195*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STATIC AND UNSTEADY PRESSURE MEASUREMENTS ON A 50 DEGREE CLIPPED DELTA WING AT M = 0.9
R. W. Hess, E. C. Wynne, and F. W. Cazier Apr. 1982 10 p refs
(NASA-TM-83297; NAS 1.15:83297) Avail: NTIS HC A02/MF A01 CSCL 01A

Pressures were measured with Freon as the test medium. Data taken at M = 0.9 is presented for static and oscillatory deflections of the trailing edge control surface and for the wing in pitch. Comparisons of the static measured data are made with results computed using the Bailey-Ballhaus small disturbance code. T.M.

N82-23196*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TIME-MARCHING TRANSONIC FLUTTER SOLUTIONS INCLUDING ANGLE-OF-ATTACK EFFECTS
John W. Edwards, Robert M. Bennett, Woodrow Whitlow, Jr., and David A. Seidel Apr. 1982 16 p refs Presented at the

AIAA/ASME/ASCE/AHS Struct., Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982
(NASA-TM-83295; NAS 1.15:83295; AIAA-PAPER-82-0685)
Avail: NTIS HC A02/MF A01 CSCL 01A

Transonic aeroelastic solutions based upon the transonic small perturbation potential equation were studied. Time-marching trancient solutions of plunging and pitching airfoils were analyzed using a complex exponential modal identification technique, and seven alternative integration techniques for the structural equations were evaluated. The HYTRAN2 code was used to determine transonic flutter boundaries versus Mach number and angle-of-attack for NACA 64A010 and MBB A-3 airfoils. In the code, a monotone differencing method, which eliminates leading edge expansion shocks, is used to solve the potential equation. When the effect of static pitching moment upon the angle-of-attack is included, the MBB A-3 airfoil can have multiple flutter speeds at a given Mach number. T.M.

N82-23197# Aeronautical Research Labs., Melbourne (Australia).
A NUMERICAL INVESTIGATION OF TWO-DIMENSIONAL, SUBSONIC, LINEAR, WIND TUNNEL INTERFERENCE THEORY
N. Pollock Jun. 1981 40 p refs
(ARL/AERO-NOTE-403; AR-002-294) Avail: NTIS HC A03/MF A01

An investigation of two-dimensional, subsonic, linear wind tunnel interference using the computer program TSFOIL as a numerical tunnel was carried out for solid, open, porous and slotted walls. The use of a computer code rather than physical experiment has the advantage that test parameters such as wall characteristics and model chord can be varied widely at low cost. The aim was to determine the relative merits of the various walls and to establish the limits of applicability of linear interference theory. The most favorable wall type was found to be an ideal slotted wall with the slot parameter appropriate for zero solid blockage (F = 1.1844). For this wall type linear interference theory accurately predicted lift and pitching moment corrections for tunnel height to chord ratios greater than 2 and supersonic region height to tunnel height ratios less than 0.2. Author

N82-23198# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Aeroelastik.
UNSTEADY PRESSURE MEASUREMENTS AT STALL AND BUFFETING
Peter Bublitz Apr. 1979 52 p refs In GERMAN; ENGLISH summary Translation was announced as N81-21041
(DFVLR-Mitt-79-09) Avail: NTIS HC A04/MF A01

The fluid dynamic phenomena of stall and buffeting, as well as the marked effects on elastic structures are described. By applying the generalized form of the equations of motion and the Fourier transforms, the governing equation of the dynamic response problem is concisely derived. Quantities needed to treat the problem under consideration are determined. Then the test installation and the relevant test method are depicted to some extent, in which the direct pressure measuring method and the statistical evaluation method are the main topics. A trapezoidal stalled wing with and without strake are tested. The efficiency of the test procedure is shown and some insight into the dynamic behavior of the stall is provided. S.L.

N82-23199# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
APPROXIMATE METHOD FOR PREDICTING SUPERSONIC NORMAL FORCE COEFFICIENT VERY-LOW-ASPECT-RATIO LIFTING SURFACES
E. F. Lucero 14 May 1981 32 p refs Sponsored in part by NAVSEA 62R
(AD-A111770) Avail: NTIS HC A03/MF A01 CSCL 20/4

A simple, empirical method has been developed for predicting at supersonic speeds the normal force coefficient, C(N), (including carryover) of very-low-aspect ratio lifting surfaces mounted on bodies of revolution. Predicted values of C(N) using this method are shown to be in good agreement with test data obtained on both thick and thin surfaces, at Mach numbers from about 2.5 to 7.7 and angles of attack to 24 degrees. Author (GRA)

N82-23200# Akademische Fliegergruppe Braunschweig (West Germany).
WIND TUNNEL INVESTIGATIONS OF SAILPLANE FUSELAGES WITH DIFFERENT LACINGS AND WING SETTINGS [WINDKANALUNTERSUCHUNGEN AN SEGELFLUGZEUGRUEMPFEN MIT VERSCHIEDENER EINSCHNUERUNG UND FLUEGELANORDNUNG]
Rolf Radespiel 1981 14 p In GERMAN
Avail: NTIS HC A02/MF A01

The parameter fuselage lacing, sailplane wing setting and fuselage nose radius of nine glider configurations were investigated in a wind tunnel. Laminar peeling off blisters were found on strongly laced fuselages. These in the transition between fuselage and wing are essential for the harmful aerodynamic resistance. Resistance reduction was measured for increasing lacing and wing setting in the rear. These results are only valid for undisturbed flow on the fuselage front part, a condition which is not yet fulfilled for original sailplanes. Author (ESA)

N82-23207*# Boeing Commercial Airplane Co., Seattle, Wash.
COMMERCIAL JET TRANSPORT CRASHWORTHINESS
E. Widmayer and Otto B. Brende Apr. 1982 255 p refs
(Contract NAS1-16076)
(NASA-CR-165849; NAS 1.26:165849; DOT-FAA-CT-82-86)
Avail: NTIS HC A12/MF A01 CSCL 01C

The results of a study to identify areas of research and approaches that may result in improved occupant survivability and crashworthiness of transport aircraft are given. The study defines areas of structural crashworthiness for transport aircraft which might form the basis for a research program. A 10-year research and development program to improve the structural impact resistance of general aviation and commercial jet transport aircraft is planned. As part of this program parallel studies were conducted to review the accident experience of commercial transport aircraft, assess the accident performance of structural components and the status of impact resistance technology, and recommend areas of research and development for that 10-year plan. The results of that study are also given. R.J.F.

N82-23208*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HELICOPTER HANDLING QUALITIES
Apr. 1982 243 p refs Proceedings of the special meeting held at Moffett Field, Calif., 14-15 Apr. 1982; sponsored by the American Helicopter Society
(NASA-CP-2219; A-8891; NAS 1.55:2219) Avail: NTIS HC A11/MF A01 CSCL 01C

Helicopters are used by the military and civilian communities for a variety of tasks and must be capable of operating in poor weather conditions and at night. Accompanying extended helicopter operations is a significant increase in pilot workload and a need for better handling qualities. An overview of the status and problems in the development and specification of helicopter handling-qualities criteria is presented. Topics for future research efforts by government and industry are highlighted.

N82-23209*# Naval Air Development Center, Warminster, Pa.
VTOL AND VSTOL HANDLING QUALITIES SPECIFICATIONS, AN OVERVIEW OF THE CURRENT STATUS
Kevin W. Goldstein *In* NASA, Ames Research Center Helicopter Handling Qualities Apr. 1982 p 1-7 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

The highlights of a comparative analysis between the current helicopter and VSTOL specifications and four representative rotary wing aircraft are presented. Longitudinal, lateral, and directional control power and dynamic stability characteristics were analyzed for hovering conditions. Forward flight static and dynamic stability were analyzed for the longitudinal and lateral-directional axes. Results of the analyses in terms of the applicability/utility of the MIL-H-8501A criteria are presented for each of the above areas. The review of the MIL-H-8301A criteria against those in MIL-F-83300 and AGARD 577 indicate many areas in which MIL-H-8501A does not give adequate design guidance. T.M.

N82-23210*# Aerospatiale Helicopter Corp., Grand Prairie, Tex.
CIVIL (FRENCH/US) CERTIFICATION OF THE COAST GUARD'S HH-65A DAUPHIN
J. C. Hart, J. M. Besse (Societe Nationale Industrielle Aerospatiale, Marignane, France), and K. W. McElreath (Rockwell Collins Government Avionics Div., Cedar Rapids, Iowa) *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p

9-13
Avail: NTIS HC A11/MF A01 CSCL 01C

Certification programs with particular emphasis on handling qualities requirements are described. A dynamic simulator was designed and constructed to support and verify the dynamic aspects of the avionics system, particularly the Automatic Flight Control System (AFCS). The role of the Dynamic Simulator is discussed. T.M.

N82-23211*# Boeing Vertol Co., Philadelphia, Pa.
BOEING 234 FLIGHT CONTROL DEVELOPMENT
James J. Morris *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 15-22

Avail: NTIS HC A11/MF A01 CSCL 01C

The Boeing 234 is the commercially certified derivative of the CH-47 Chinook. The automatic flight control system and flight director with coupler were designed to reduce pilot work-load for missions of approximately six hour duration during VFR, IFR, day and night conditions. The AFCS system for the 234 is essentially the same system as developed for the CH-47D, which has airspeed hold, attitude hold, and maneuver enhancement in all three axes. The system also has the capability to couple to the Sperry Helcis flight director system which provides for enroute navigation and landing approaches. Certification testing was completed, by both the FAA and CAA, to FAR Part 29 for Transport Category Rotorcraft and BCAR Section G: Rotorcraft. The aircraft was certified for civil operation in June 1981. Author

N82-23212*# Grumman Aerospace Corp., Bethpage, N.Y.
INFLUENCE OF MANEUVERABILITY ON HELICOPTER COMBAT EFFECTIVENESS
Michael Falco and Roger Smith (Army Aviation Research and Development Command, St. Louis, Mo.) *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 23-33 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

A computational procedure employing a stochastic learning method in conjunction with dynamic simulation of helicopter flight and weapon system operation was used to derive helicopter maneuvering strategies. The derived strategies maximize either survival or kill probability and are in the form of a feedback control based upon threat visual or warning system cues. Maneuverability parameters implicit in the strategy development include maximum longitudinal acceleration and deceleration, maximum sustained and transient load factor turn rate at forward speed, and maximum pedal turn rate and lateral acceleration at hover. Results are presented in terms of probability of skill for all combat initial conditions for two threat categories. T.M.

N82-23213*# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugmechanik.
FLIGHT TESTS FOR THE ASSESSMENT OF TASK PERFORMANCE AND CONTROL ACTIVITY
Heinz-Juergen Pausder and Dieter Hummes *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 35-46 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

The tests were performed with the helicopters BO 105 and UH-1D. Closely connected with tactical demands the six test pilots' task was to minimize the time and the altitude over the obstacles. The data reduction yields statistical evaluation parameters describing the control activity of the pilots and the achieved task performance. The results are shown in form of evaluation diagrams. Additionally dolphin tests with varied control strategy were performed to get more insight into the influence of control techniques. From these test results recommendations can be derived to emphasize the direct force control and to reduce the collective to pitch crosscoupling for the dolphin. T.M.

N82-23214*# Army Research and Technology Labs., Moffett Field, Calif.
A HELICOPTER HANDLING-QUALITIES STUDY OF THE EFFECTS OF ENGINE RESPONSE CHARACTERISTICS, HEIGHT-CONTROL DYNAMICS, AND EXCESS POWER ON NAP-OF-THE-EARTH OPERATIONS
Lloyd D. Corliss *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 47-57 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

The helicopter configuration with an rpm-governed gas-turbine engine was examined. A wide range of engine response time, vehicle damping and sensitivity, and excess power levels was studied. The data are compared with the existing handling-qualities specifications, MIL-F-83300 and AGARD 577, and in general show a need for higher minimums when performing such NOE maneuvers as a dolphin and bob-up task. T.M.

N82-23215*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
UNIFIED RESULTS OF SEVERAL ANALYTICAL AND EXPERIMENTAL STUDIES OF HELICOPTER HANDLING QUALITIES IN VISUAL TERRAIN FLIGHT
Robert T. N. Chen *In its* Helicopter Handling Qualities Apr. 1982 p 59-74 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

The studies were undertaken to investigate the effects of rotor design parameters, interaxis coupling, and various levels of stability and control augmentation on the flying qualities of helicopters performing low-level, terrain-flying tasks in visual meteorological conditions. Some unified results are presented, and the validity and limitations of the flying-qualities data obtained are interpreted. Selected results, related to various design parameters, provide guidelines for the preliminary design of rotor systems and aircraft augmentation systems. T.M.

N82-23216*# Boeing Vertol Co., Philadelphia, Pa.
AN ASSESSMENT OF VARIOUS SIDE-STICK CONTROLLER/STABILITY AND CONTROL AUGMENTATION SYSTEMS FOR NIGHT NAP-OF-EARTH FLIGHT USING PILOTED SIMULATION
Kenneth H. Landis and Edwin W. Aiken (Army Research and Technology Labs., Moffett Field, Calif.) *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 75-96 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

Several night nap-of-the-earth mission tasks were evaluated using a helmet-mounted display which provided a limited field-of-view image with superimposed flight control symbology. A wide range of stability and control augmentation designs was investigated. Variations in controller force-deflection characteristics and the number of axes controlled through an integrated side-stick controller were studied. In general, a small displacement controller is preferred over a stiffstick controller particularly for maneuvering flight. Higher levels of stability augmentation were required for IMC tasks to provide handling qualities comparable to those achieved for the same tasks conducted under simulated visual flight conditions. T.M.

N82-23217*# Martin Marietta Corp., Orlando, Fla.
DEFINITION OF DISPLAY/CONTROL REQUIREMENTS FOR ASSAULT TRANSPORT NIGHT/ADVERSE WEATHER CAPABILITY
R. Joseph Milelli, Gary W. Mowery, and Carmen Pontelandolfo (Naval Air Development Center, Warminster, Pa.) *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 97-107 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

A Helicopter Night Vision System was developed to improve low-altitude night and/or adverse weather assult transport capabilities. Man-in-the-loop simulation experiments were performed to define the minimum display and control requirements for the assult transport mission and investigate forward looking infrared sensor requirements, along with alternative displays such as panel mounted displays (PMD) helmet mounted displays (HMD), and integrated control display units. Also explored were navigation requirements, pilot/copilot interaction, and overall cockpit arrangement. Pilot use of an HMD and copilot use of a PMD appear as both the preferred and most effective night navigation combination. M.D.K.

N82-23218*# National Research Council of Canada, Ottawa (Ontario). Airborne Simulator Facility.
SOME PILOTING EXPERIENCES WITH MULTIFUNCTION ISOMETRIC SIDE-ARM CONTROLLERS IN A HELICOPTER
J. Murray Morgan *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 109-119 ref

Avail: NTIS HC A11/MF A01 CSCL 01C

The installation of two side-arm mounted, isometric controllers in the NAE Airborne Simulator, a modified, variable stability Bell 205 A is described, as is the development of various control systems for use with them. The results of two experiments are presented indicating both the feasibility and acceptability of such systems for a wide variety of tasks in a conventional single rotor helicopter, with a minimum of stability augmentation. Areas of future research are indicated. Author

N82-23219*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RESULTS OF NASA/FAA GROUND AND FLIGHT SIMULATION EXPERIMENTS CONCERNING HELICOPTER IFR AIRWORTHINESS CRITERIA
J. Victor Lebacqz, Robert T. N. Chen, Ronald M. Gerdes, Jeanine M. Weber, and Raymond D. Forrest (FAA, Moffett Field, Calif.) *In its* Helicopter Handling Qualities 1 Apr. 1982 p 121-138 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

A sequence of ground and flight simulation experiments was conducted to investigate helicopter instrument-flight-rules airworthiness criteria. The first six of these experiments and major results are summarized. Five of the experiments were conducted on large-amplitude motion base simulators. The NASA-Army V/STOLAND UH-1H variable-stability helicopter was used in the flight experiment. Artificial stability and control augmentation, longitudinal and lateral control, and in pitch and roll attitude augmentation were investigated. M.D.K.

N82-23220*# Rockwell International Corp., Cedar Rapids, Iowa. Government Avionics Div.
STATE-OF-THE-ART COCKPIT DESIGN FOR THE HH-65A HELICOPTERS
Daniel E. Castleberry and Marsha Y. McElreath *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 139-143 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

In the design of a HH-65A helicopter cockpit, advanced integrated electronics systems technology was employed to achieve several important goals for this multimission aircraft. They were: (1) integrated systems operation with consistent and simplified cockpit procedures; (2) mission-task-related cockpit displays and controls, and (3) reduced pilot instrument scan effort with excellent outside visibility. The integrated avionics system was implemented to depend heavily upon distributed but complementary processing, multiplex digital bus technology, and multifunction CRT controls and displays. This avionics system was completely flight tested and will soon enter operational service with the Coast Guard. M.D.K.

N82-23221*# Ohio State Univ., Columbus.
PERFORMANCE EVALUATION OF A KINESTHETIC-TACTUAL DISPLAY
Richard J. Jagacinski, John M. Flach, Richard D. Gilson, and Richard S. Dunn (Army Research and Technology Lab., Moffett Field, Calif.) *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 145-150 refs

(Grant NsG-2179)
Avail: NTIS HC A11/MF A01 CSCL 01C

Simulator studies demonstrated the feasibility of using kinesthetic-tactual (KT) displays for providing collective and cyclic command information, and suggested that KT displays may increase pilot workload capability. A dual-axis laboratory tracking task suggested that beyond reduction in visual scanning, there may be additional sensory or cognitive benefits to the use of multiple sensory modalities. Single-axis laboratory tracking tasks revealed performance with a quickened KT display to be equivalent to performance with a quickened visual display for a low frequency sum-of-sinewaves input. In contrast, an unquickened KT display was inferior to an unquickened visual display. Full scale simulator studies and/or inflight testing are recommended to determine the generality of these results. Author

N82-23222*# Army Avionics Research and Development Activity, Fort Monmouth, N. J. Avionics Lab.
SYNTHESIS OF AN INTEGRATED COCKPIT MANAGEMENT SYSTEM
Joseph A. Dasaro and Charles T. Elliott *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 151-162 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

The process used in the synthesis of an integrated cockpit management system was discussed. Areas covered included flight displays, subsystem management, checklists, and procedures (both normal and emergency). The process of evolving from the unintegrated conventional system to the integrated system is examined and a brief description of the results presented. M.D.K.

N82-23223*# United Technologies Corp., East Hartford, Conn. Aircraft Div.
THE ROLE OF VOICE TECHNOLOGY IN ADVANCED HELICOPTER COCKPITS
Howard P. Harper *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 163-170 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

The status of voice output and voice recognition technology in relation to helicopter cockpit applications is described. The maturing of this technology provides many opportunities for new approaches to crew workload reduction. The helicopter operating environment, potential application areas, and the impact on advanced cockpit design are discussed. Author

N82-23224*# Pacer Systems, Inc., Arlington, Va.
COCKPIT INTEGRATION FROM A PILOT'S POINT OF VIEW
David L. Green *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 171-181

Avail: NTIS HC A11/MF A01 CSCL 01C

Extensive experience in both operational and engineering test flight was used to suggest straightforward changes to helicopter cockpit and control system design that would improve pilot performance in marginal and instrument flight conditions. Needed control system improvements considered include: (1) separation of yaw from cyclic force trim; (2) pedal force proportional to displacement rate; and (3) integration of engine controls in collective stick. Display improvements needed include: (1) natural cuing of yaw rate in attitude indicator; (2) collective position indication and radar altimeter placed within primary scan; and (3) omnidirectional display of full range airspeed data. M.D.K.

N82-23225*# Costruzioni Aeronautiche Giovanni Agusta S.p.A., Samarate (Italy). Helicopter Systems Engineering Div.
INTEGRATED COCKPIT FOR A-129
Filippo Reina, James J. Gracia (Harris Government Information Systems Div.), and Bryce W. Koth (Harris Government Information Systems Div.) *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 183-192

Avail: NTIS HC A11/MF A01

Weight, size, and mission requirements for the A-129 mandated an integrated system approach for the crew/cockpit interface design. Instead of the usual multitude of cockpit controls, indicators, gauges, and lights, the primary crew interface is a single multifunction keyboard and one or more multifunction CRT display units. This cockpit design approach imposed unusual constraints upon the system architecture to overcome the inherent information access limitations of a data input/output window that was restricted by the available space. The conceptual approach and resulting design of the A-129 cockpit with the intent to enhance the development of cockpit standardization are described. Author

N82-23226*# Systems Technology, Inc., Hawthorne, Calif.
NEW DEVELOPMENT IN FLYING QUALITIES WITH APPLICATION TO ROTARY WING AIRCRAFT
Roger H. Hoh *In* NASA. Ames Research Center Helicopter Handling Qualities 9 Apr. 1982 p 193-198 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

Some recent considerations and developments in handling quality criteria are reviewed with emphasis on using fixed wing experience gained in developing MIL-F-8785C and the more recent MIL Standard and Handbook. Particular emphasis is placed on the tasks and environmental conditions used to develop the criterion boundaries, SAS failures, and potential fixed wing criteria that are applicable to rotary wing aircraft. Author

N82-23227*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HELICOPTER SIMULATION TECHNOLOGY: AN AMES RESEARCH CENTER PERSPECTIVE

Richard S. Bray *In its* Helicopter Handling Qualities Apr. 1982 p 199-208 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

The total experience for evidence regarding the levels of motion and visual cueing fidelity required for handling-qualities research in ground-based simulators is reviewed. Positive contributions of cockpit motion were identified, but much remains to be learned regarding the sensitivities of individual control modes to cueing attenuation. A firmer understanding of the pilot's utilization of visual and motion cues is the key to more efficient use of simulation in helicopter control-systems research. Author

N82-23228*# Stanford Univ., Calif. Joint Inst. of Aeronautics and Acoustics.

PAST APPLICATIONS AND FUTURE POTENTIAL OF VARIABLE STABILITY RESEARCH HELICOPTERS

William S. Hindson *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 209-219 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

The historical development of variable-stability research helicopters and some of their previous applications are presented as a guide for assessing their future potential. The features of three general-purpose rotary-wing flight research aircraft that provide complementary capabilities are described briefly, and a number of future applications are proposed. Author

N82-23229*# Systems Technology, Inc., Mountain View, Calif.

A PILOT IN THE LOOP ANALYSIS OF HELICOPTER ACCELERATION/DECELERATION MANEUVERS

Robert K. Heffley *In* NASA. Ames Research Center Helicopter Handling Qualities Apr. 1982 p 221-232 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

Helicopter flight acceleration/deceleration maneuvers are quantified and put to use in the fields of handling qualities, flight training and evaluation of simulator fidelity. The three specific cases include the normal speed change maneuver, the nap-of-the-Earth dash/quickstop, and the decelerating approach to hover. All of these maneuvers share common generic features in terms of pilot adaptation and mathematical description; yet each differs in terms of the essential feedback loop structure, implications for handling qualities requirements, and simulator fidelity criteria. Author

N82-23230*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

APPLICATIONS OF SYSTEM IDENTIFICATION METHODS TO THE PREDICTION OF HELICOPTER STABILITY, CONTROL AND HANDLING CHARACTERISTICS

G. D. Padfield (RAE, Bedford, England) and R. K. DuVal *In its* Helicopter Handling Qualities Apr. 1982 p 233-247 refs

Avail: NTIS HC A11/MF A01 CSCL 01C

A set of results on rotorcraft system identification is described. Flight measurements collected on an experimental Puma helicopter are reviewed and some notable characteristics highlighted. Following a brief review of previous work in rotorcraft system identification, the results of state estimation and model structure estimation processes applied to the Puma data are presented. The results, which were obtained using NASA developed software, are compared with theoretical predictions of roll, yaw and pitching moment derivatives for a 6 degree of freedom model structure. Anomalies are reported. The theoretical methods used are described. A framework for reduced order modelling is outlined. Author

N82-23231* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

SUN SENSING GUIDANCE SYSTEM FOR HIGH ALTITUDE AIRCRAFT Patent

Robert D. Reed, Principal Investigator Issued 27 Apr. 1982 7 p Filed 12 Mar. 1980 Supersedes N80-20248 (18 - 11, p 1375)
(NASA-Case-FRC-11052-1; US-Patent-4,326,685;
US-Patent-Appl-SN-129783; US-Patent-Class-244-175;
US-Patent-Class-244-168; US-Patent-Class-244-190;
US-Patent-Class-318-580) Avail: US Patent and Trademark Office CSCL 17G

A sun sensing guidance system for high altitude aircraft is described. The system is characterized by a disk shaped body mounted for rotation aboard the aircraft in exposed relation to solar radiation. The system also has a plurality of mutually isolated chambers; each chamber being characterized by an opening having a photosensor disposed therein and arranged in facing relation with the opening for receiving incident solar radiation and responsively providing a voltage output. Photosensors are connected in paired relation through a bridge circuit for providing heading error signals in response to detected imbalances in intensities of solar radiation.

Official Gazette of the U.S. Patent and Trademark Office

N82-23233*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ANALYSIS AND MONTE CARLO SIMULATION OF NEAR-TERMINAL AIRCRAFT FLIGHT PATHS

James R. Schiess and Christine G. Matthews (Computer Sciences Corp.) Apr. 1982 39 p refs
(NASA-TP-1997; L-15062; NAS 1.60:1997) Avail: NTIS HC A03/MF A01 CSCL 17G

The flight paths of arriving and departing aircraft at an airport are stochastically represented. Radar data of the aircraft movements are used to decompose the flight paths into linear and curvilinear segments. Variables which describe the segments are derived, and the best fitting probability distributions of the variables, based on a sample of flight paths, are found. Conversely, given information on the probability distribution of the variables, generation of a random sample of flight paths in a Monte Carlo simulation is discussed. Actual flight paths at Dulles International Airport are analyzed and simulated. S.L.

N82-23234*# Lockheed-Georgia Co., Marietta.

DETERMINATION OF WIND TUNNEL CONSTRAINT EFFECTS BY A UNIFIED PRESSURE SIGNATURE METHOD. PART 1: APPLICATIONS TO WINGED CONFIGURATIONS Final Report, Oct. 1980 - Nov. 1981

J. E. Hackett, S. Sampath, and C. G. Phillips Jun. 1981 185 p refs 2 Vol.
(Contract NAS2-9883)
(NASA-CR-166186; NAS 1.26:166186; LG81ER0166-Pt-1)
Avail: NTIS HC A09/MF A01 CSCL 01C

A new, fast, non-iterative version of the 'Wall Pressure Signature Method' is described and used to determine blockage and angle-of-attack wind tunnel corrections for highly-powered jet-flap models. The correction method is complemented by the application of tangential blowing at the tunnel floor to suppress flow breakdown there, using feedback from measured floor pressures. This tangential blowing technique was substantiated by subsequent flow investigations using an LV. The basic tests on an unswept, knee-blown, jet flapped wing were supplemented to include the effects of slat-removal, sweep and the addition of unflapped tips. C sub mu values were varied from 0 to 10 free-air C sub l's in excess of 18 were measured in some cases. Application of the new methods yielded corrected data which agreed with corresponding large tunnel 'free air' resuls to within the limits of experimental accuracy in almost all cases. A program listing is provided, with sample cases. Author

N82-23235*# Lockheed-Georgia Co., Marietta.

DETERMINATION OF WIND TUNNEL CONSTRAINT EFFECTS BY A UNIFIED PRESSURE SIGNATURE METHOD. PART 2: APPLICATION TO JET-IN-CROSSFLOW Final Report, Oct. 1980 - Nov. 1981

J. E. Hackett, S. Sampath, and C. G. Phillips Jun. 1981 186 p refs 2 Vol.
(Contract NAS2-9883)
(NASA-CR-166187; NAS 1.26:166187; LG81ER0167-Pt-2)
Avail: NTIS HC A09/MF A01 CSCL 01C

The development of an improved jet-in-crossflow model for estimating wind tunnel blockage and angle-of-attack interference is described. Experiments showed that the simpler existing models fall seriously short of representing far-field flows properly. A new, vortex-source-doublet (VSD) model was therefore developed which employs curved trajectories and experimentally-based singularity strengths. The new model is consistent with existing and new experimental data and it predicts tunnel wall (i.e. far-field) pressures properly. It is implemented as a preprocessor to the wall-pressure-signature-based tunnel interference predictor. The supporting experiments and theoretical studies revealed some new results. Comparative flow field measurements with 1-inch 'free-air' and 3-inch impinging jets showed that vortex penetration into the flow, in diameters, was almost unaltered until 'hard' impingement occurred. In modeling impinging cases, a 'plume redirection' term was introduced which is apparently absent in previous models. The effects of this term were found to be very significant. Author

N82-23236*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

COMPARISON OF ANALYTICAL PREDICTIONS OF LONGITUDINAL SHORT PERIOD PILOT-INDUCED OSCILLATIONS WITH RESULTS FROM A SIMULATION STUDY OF THE SPACE SHUTTLE ORBITER

Donald R. Riley and G. Kimball Miller, Jr. Apr. 1982 43 p refs
(NASA-TM-83267; L-14847; NAS 1.15:83267) Avail: NTIS HC A03/MF A01 CSCL 01C

An analytical analysis of conditions producing pilot induced oscillations (PIO's) was made for the space shuttle orbiter in a landing approach configuration for the task of milling the elevation angle of the line of sight to a target vehicle. The analysis yielded a value of PIO frequency and a value for the amount of total system time delay (pilot + control system) that can be tolerated before instability results. Calculations were performed showing the effect of varying the range to the target and of varying the handling qualities of the orbiter vehicle. Analytical predictions were compared with simulation results obtained using a visual motion simulator. Author

N82-23237*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

VALIDATION OF ZERO-ORDER FEEDBACK STRATEGIES FOR MEDIUM RANGE AIR-TO-AIR INTERCEPTION IN A HORIZONTAL PLANE

Josef Shinar Apr. 1982 48 p refs
(NASA-TM-84237; NAS 1.15:84237; A-8895) Avail: NTIS HC A03/MF A01 CSCL 01C

A zero order feedback solution of a variable speed interception game between two aircraft in the horizontal plane, obtained by using the method of forced singular perturbation (FSP), is compared with the exact open loop solution. The comparison indicates that for initial distances of separation larger than eight turning radii of the evader, the accuracy of the feedback approximation is better than one percent. The result validates the zero order FSP approximation for medium range air combat analysis. S.L.

N82-23238*# North Carolina State Univ., Raleigh. Dept. of Mechanical and Aerospace Engineering.

AUTOMATED DESIGN OF MINIMUM DRAG LIGHT AIRCRAFT FUSELAGES AND NACELLES Final Report

Frederick O. Smetana, Star R. Fox, and Baruch E. Karlin 14 May 1982 25 p refs
(Grant NsG-1584)
(NASA-CR-168913; NAS 1.26:168913) Avail: NTIS HC A02/MF A01 CSCL 01C

The constrained minimization algorithm of Vanderplaats is applied to the problem of designing minimum drag faired bodies such as fuselages and nacelles. Body drag is computed by a variation of the Hess-Smith code. This variation includes a boundary layer computation. The encased payload provides arbitrary geometric constraints, specified a priori by the designer, below which the fairing cannot shrink. The optimization may include engine cooling air flows entering and exhausting through specific port locations on the body. M.D.K.

N82-23239*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

TRANSONIC FLUTTER STUDY OF A WIND-TUNNEL MODEL OF A SUPERCRITICAL WING WITH/WITHOUT WINGLET

Charles L. Ruhlin, Frank J. Rauch, Jr., and Catherine Waters Mar. 1982 11 p refs Presented at the 23rd AIAA/ASME/ASCE/AHS Struct., Structural Dyn. and Mater. Conf., New Orlean, 10-12 May 1982 Prepared in cooperation with Grumman Aerospace Corp., Bethpage, N.Y.
(NASA-TM-83279; NAS 1.15:83279) Avail: NTIS HC A02/MF A01 CSCL 01C

The model was a 1/6.5-size, semipan version of a wing proposed for an executive-jet-transport airplane. The model was tested with a normal wingtip, a wingtip with winglet, and a normal wingtip ballasted to simulate the winglet mass properties. Flutter and aerodynamic data were acquired at Mach numbers (M) from 0.6 to 0.95. The measured transonic flutter speed boundary for each wingtip configuration had roughly the same shape with a minimum flutter speed near M=0.82. The winglet addition and wingtip mass ballast decreased the wing flutter speed by about 7 and 5 percent, respectively; thus, the winglet effect on flutter was more a mass effect than an aerodynamic effect. T.M.

N82-23240*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EVALUATION OF FOUR SUBCRITICAL RESPONSE METHODS FOR ON-LINE PREDICTION FLUTTER ONSET IN WIND-TUNNEL TESTS

Charles L. Ruhlin, Judith J. Watson, Rodney H. Ricketts, and Robert V. Doggett, Jr. Mar. 1982 10 p refs Presented at the AIAA/ASME/ASCE/AHS 23rd Struct., Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982
(NASA-TM-83278; NAS 1.15:83278; AIAA-PAPER-82-0644CP) Avail: NTIS HC A02/MF A01 CSCL 01C

The methods were evaluated for use in tests where the flutter model is excited solely by airstream turbulence. The methods were: randomdec, power-spectral-density, peak-hold, and cross-spectrum. The test procedure was to maintain a constant Mach number (M) and increase the dynamic pressure (q) in incremental steps. The test Mach numbers were 0.65, 0.75, 0.82, 0.90, and 1.15. The four methods provided damping trends by which the flutter mode could be tracked and extrapolated to a flutter-onset q. A hard flutter point was obtained at M = 0.82. The peak-hold and cross-spectrum methods gave reliable results and could be most readily used for on-line testing. At M = 0.82, a p-k analysis predicted the same flutter mode as the experiment but a 6-percent lower flutter q. At the subcritical dynamic pressures, calculated damping values were appreciably lower than measured data. T.M.

N82-23241*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOP. VOLUME 5: PROPULSION SESSION

1980 211 p Workshop held at Palo Alto, Calif., 3-5 Dec. 1980
(NASA-TM-84207; NAS 1.15:84207) Avail: NTIS HC A10/MF A01 CSCL 01C

The expressed needs and priorities of the civil helicopter users, the existing research efforts, and technology requirements as perceived by leading airframe and engine manufacturers were addressed, compared, and evaluated. Specifically, the observations and conclusions of these areas as they relate to the helicopter propulsion system are reported. Author

N82-23242*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOP. VOLUME 6: VEHICLE CONFIGURATION SESSION

1980 256 p Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84180; NAS 1.15:84180) Avail: NTIS HC A12/MF A01 CSCL 01C

Five high speed rotorcraft configurations are considered: the high speed helicopter, compound helicopter, ABC, tilt rotor and the X wing. The technology requirements and the recommended actions are discussed. S.L.

N82-23243*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOP. VOLUME 7: TILT ROTOR SESSION

1980 37 p Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84705; NAS 1.15:84705) Avail: NTIS HC A03/MF A01 CSCL 01C

The technical characteristics of the XV-15 aircraft were discussed. Program objectives, concept evaluation, tilt rotor experiments and civil market applications are presented. The XV-15 status and test schedule are also included. S.L.

N82-23244*# National Aeronautics and Space Administration.

Langley Research Center, Hampton, Va.
PLANAR EQUATIONS OF ROLLOUT MOTION FOR AN AIRCRAFT WITH FREE OR STEERABLE LANDING GEARS
Robert K. Sleeper and Eunice G. Smith May 1982 54 p refs
(NASA-TP-1984; L-11689; NAS 1.60:1984) Avail: NTIS HC A04/MF A01 CSCL 01C

Equations were derived for an aircraft in a three-point attitude. Transient tire forces were simulated by delaying the application of forces derived from steady-state considerations. Predicted rollout trajectories were similar to those measured in tests of a small-scale landing-gear model equipped with pneumatic tires (where a laterally sloping runway was used to simulate a crosswind), both with and without nose-wheel steering. T.M.

N82-23245*# Kansas Univ. Center for Research, Inc., Lawrence.
DEVELOPMENT OF A SIMPLE, SELF-CONTAINED FLIGHT TEST DATA ACQUISITION SYSTEM **Progress Report**
Robert Clarke, Douglas Shane, Jan Roskam, and Dale I. Rummer Apr. 1982 250 p refs
(Grant NsG-4019)
(NASA-CR-168912; NAS 1.26:168912; KU-FRL-407-7) Avail: NTIS HC A11/MF A01 CSCL 14B

The flight test system described combines state-of-the-art microprocessor technology and high accuracy instrumentation with parameter identification technology which minimize data and flight time requirements. The system was designed to avoid permanent modifications of the test airplane and allow quick installation. It is capable of longitudinal and lateral-directional stability and control derivative estimation. Details of this system, calibration and flight test procedures, and the results of the Cessna 172 flight test program are presented. The system proved easy to install, simple to operate, and capable of accurate estimation of stability and control parameters in the Cessna 172 flight tests. Author

N82-23246*# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
COMPUTER MODELING OF FAN-EXIT-SPLITTER SPACING EFFECTS ON F100 RESPONSE TO DISTORTION **Final Report**
M. Shaw and R. W. Murdoch Mar. 1982 115 p refs
(Contract NAS3-22739)
(NASA-CR-167879; NAS 1.26:167879; FR-15596) Avail: NTIS HC A06/MF A01 CSCL 21E

The distortion response of the F100(3) engine was affected by the fan exit splitter configuration. The sensitivity for a proximate splitter fan is calculated to be slightly greater than a remote splitter configuration with identical airfoils. Predicted response was based upon a multiple segment parallel compressor Model modified to include a bypass ratio representation that effects the performance characteristics of the last rotor and intermediate case struts. The predicted distortion response required an accurate definition of row pre- and post-stall undistorted operation. Author

N82-23247*# Notre Dame Univ., Ind. Dept. of Electrical Engineering.
ALTERNATIVES FOR JET ENGINE CONTROL **Technical Progress Report, 1 Oct. 1980 - 30 Sep. 1981**
Michael K. Sain 1981 140 p refs
(Grant NsG-3048)
(NASA-CR-168894; NAS 1.26:168894; TPR-12) Avail: NTIS HC A07/MF A01 CSCL 21E

Research centered on basic topics in the modeling and feedback control of nonlinear dynamical systems is reported. Of special interest were the following topics: (1) the role of series descriptions, especially insofar as they relate to questions of scheduling, in the control of gas turbine engines; (2) the use of algebraic tensor theory as a technique for parameterizing such descriptions; (3) the relationship between tensor methodology and other parts of the nonlinear literature; (4) the improvement of interactive methods for parameter selection within a tensor viewpoint; and (5) study of feedback gain representation as a counterpart to these modeling and parameterization ideas. Author

N82-23248*# Pratt and Whitney Aircraft Group, East Hartford, Conn.
ANALYSIS OF HIGH LOAD DAMPERS **Final Report**
S. T. Bhat, D. F. Buono, and D. H. Hibner 21 Aug. 1981 79 p refs
(Contract NAS3-22518)
(NASA-CR-165503; NAS 1.26:165503; PWA-5779-10) Avail: NTIS HC A05/MF A01 CSCL 21E

High load damping requirements for modern jet engines are discussed. The design of damping systems which could satisfy these requirements is also discussed. In order to evaluate high load damping requirements, engines in three major classes were studied: large transport engines, small general aviation engines, and military engines. Four damper concepts applicable to these engines were evaluated: multi-ring, cartridge, curved beam, and viscous/friction. The most promising damper concept was selected for each engine and performance was assessed relative to conventional dampers and in light of projected damping requirements for advanced jet engines. B.W.

N82-23249*# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
ADVANCED TURBINE STUDY **Final Report, Aug. 1980 - Dec. 1981**
12 Apr. 1982 94 p
(Contract NAS8-33821)
(NASA-CR-162003; NAS 1.26:162003; FR-15978) Avail: NTIS HC A05/MF A01 CSCL 21E

Experiments to determine the available increase in turbine horsepower achieved by increasing turbine inlet temperature over a range of 1800 to 2600 R, while applying current gas turbine airfoil cling technology are discussed. Four cases of rocket turbine operating conditions were investigated. Two of the cases used O2/H2 propellant, one with a fuel flowrate of 160 pps, the other 80 pps. Two cases used O2/CH4 propellant, each having different fuel flowrates, pressure ratios, and inlet pressures. Film cooling was found to be the required scheme for these rocket turbine applications because of the high heat flux environments. Conventional convective or impingement cooling, used in jet engines, is inadequate in a rocket turbine environment because of the resulting high temperature gradients in the airfoil wall, causing high strains and low cyclic life. The hydrogen-rich turbine environment experienced a loss, or no gain, in delivered horsepower as turbine inlet temperature was increased at constant airfoil life. The effects of film cooling with regard to reduced flow available for turbine work, dilution of mainstream gas temperature and cooling reentry losses, offset the relatively low specific work capability of hydrogen when increasing turbine inlet temperature over the 1800 to 2600 R range. However, the methane-rich environment experienced an increase in delivered horsepower as turbine inlet temperature was increased at constant airfoil life. The results of a materials survey and heat transfer and durability analysis are discussed. M.G.

N82-23250# Shaker Research Corp., Ballston Lake, N. Y.
BASIC TECHNOLOGY OF SQUEEZE-FILM DAMPERS FOR ROTOR DYNAMICS CONTROL **Final Report, Jul. 1978 - Jul. 1981**
C. H. T. Pan Nov. 1981 47 p refs
(Contract DAAG29-78-C-0027)
(AD-A110842; SRC-81-TR-74; ARO-15657.4-E) Avail: NTIS HC A03/MF A01 CSCL 21/5

Research was performed to develop a rigorous treatment for the film rupture process in the squeeze-film damper. The short bearing analysis was generalized to accommodate a consistent treatment of the rupture domain for a squeeze-film damper, which is undergoing a circular orbit motion either in a submerged condition or with one end subjected to a pressurized feed condition. GRA

N82-23252# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Kurzuebersicht fuer Information und Dokumentation.
ACTTA: INVESTIGATION OF NEW PILOTING AND FLIGHT CONTROL TECHNOLOGIES. VOLUME 1: REVIEW; ACTIVE WING **Milestone Report on Phase 1, 1979 - 1980** **[ACTTA: UNTERSUCHUNG NEUARTIGER STEUERUNGS- UND FLUGFUEHRUNGSTECHNOLOGIEN. MEILENSTEINBERICHT ZUR PHASE 1: 1979/1980. BAND 1: UEBERSICHT; AKTIVER FLUEGEL]**
Weiss Kolander and U. A. Fischer 23 Mar. 1981 192 p refs In GERMAN 2 Vol.
(Contract BMFT-LFK-7900-9)
(MBB-UH-06-81-Vol-1) Avail: NTIS HC A09/MF A01

Flight control technologies were investigated as to their realizability and economy. The conceptual phase of project Active Wing is presented. Investigation methodology, calculation methods, tests, and results, concerning system interpretation, system dynamics and achievable cost reduction, are described. The problems with an integrated digital flight control system are treated. Gust load alleviation can be realized with available components. Operating cost reductions from 1% to 1.5% can be obtained. The choice of control surfaces represents a risk, since their unsteady highly subsonic aerodynamics during fast control is not sufficiently known. Author (ESA)

N82-23253# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Kurzueberischt fuer Information und Dokumentation.

ACTTA: INVESTIGATION OF NEW PILOTING AND FLIGHT CONTROL TECHNOLOGIES. VOLUME 2: AIRCRAFT WITH REDUCED LATERAL STABILITY Milestone Report on Phase 1, 1979 - 1980 [ACTTA: UNTERSUCHUNG NEUARTIGER STEUERUNGS- UND FLUGFUEHRUNGSTECHNOLOGIEN. MEILENSTEINBERICHT ZUR PHASE 1: 1979/1980. BAND 2: FLUGZEUG REDUZIERTER LAENGSSTABILITAET]

Weise Kolander and U. A. Fischer 23 Mar. 1981 194 p refs In GERMAN 2 Vol.
(Contract BMFT-LFK-7960-9)
(MBB-UH-05-81-Vol-2) Avail: NTIS HC A09/MF A01

The stretched version of the A-300 aircraft was used to assess the feasibility and economy of various digital flight technologies for aircraft with reduced lateral stability. Investigation methodology, calculation methods, tests, and results, concerning system interpretation, system dynamics and achievable cost reduction, are described. Operating cost reduction of 1% to 3% is expected with reduced stability, using a trim tank as the first step in a stepped design where sufficient emergency flight safety is maintained in case the stabilizing system fails. Author (ESA)

N82-23254* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

METRIC HALF-SPAN MODEL SUPPORT SYSTEM Patent

Charlie M. Jackson, Jr., Samuel M. Dollyhigh, and David S. Shaw, inventors (to NASA) Issued 4 May 1982 5 p Filed Supersedes N80-24334 (18 - 15, p 1943)
(NASA-Case-LAR-12441-1; US-Patent-4,327,581; US-Patent-Appl-SN-145210; US-Patent-Class-73-147) Avail: US Patent and Trademark Office CSCL 14B

A model support system used to support a model in a wind tunnel test section is described. The model comprises a metric, or measured, half-span supported by a nonmetric, or nonmeasured half-span which is connected to a sting support. Moments and forces acting on the metric half-span are measured without interference from the support system during a wind tunnel test. Official Gazette of the U.S. Patent and Trademark Office

N82-23255# British Aerospace Aircraft Group, Preston (England). Engine Simulation Section.

DEVELOPMENT OF A CONVOLUTED INTAKE SEAL FOR MODEL R66

A. P. Winstanley Mar. 1981 33 p refs
(BAE-ARG-163) Copyright. Avail: NTIS HC A03/MF A01

A low constraint convoluted seal is described which connects the live intake to the earthed ejector duct in a 1/7.5 scale low speed model with full engine simulation. A 6 component model with two earthed ejectors is required. Several seals were tested, achieving a progressively lower constraint by modifying either the geometry, material or manufacturing process. Subjecting the final seal to a representative pressure difference and end offset causes a lateral load of 6N, but incorporating the modifications recommended for future seals reduces this. Because the seals are on a moment arm from the balance when they are installed in the model, calibrations may have to account for pressure and end misalignment. A facility for measuring pressure differences at the seal is incorporated in the design. Author (ESA)

N82-23263# National Aerospace Lab., Amsterdam (Netherlands). Spaceflight Div.

MULTILAYER INSULATION BLANKETS FOR SPACECRAFT APPLICATIONS. THERMAL MODEL ACCOUNTING FOR OUTGASSING AND DIFFERENT WAYS OF GAS MIGRATION

A. A. M. Delil and J. F. Heemskerk 2 Sep. 1981 10 p refs Presented at 7th Intern. Heat Transfer Conf., Munich, 6-10 Sep. 1982
(NLR-MP-81051-U) Avail: NTIS HC A02/MF A01

A model of hybrid pumping (broadside and edge) in spacecraft insulation blankets was developed for an evacuated circular multilayer insulation blanket placed between a hot and a cold boundary. The blanket consists of parallel identical perforated shields with left and right side emissivity. Shield thickness is so small that shield temperature is assumed to be even. The gas is assumed to flow from the hot towards the cold boundary, as in the case of insulation of a hot black box from cold space environment. The model also applies for cryogenic vessel insulation (the cryogen at the cold side, the low pressure environment at the hot boundary) by interchanging suffixes in the governing equations. Results from guarded hot plate calorimeter tests confirm model predictions. Author (ESA)

N82-23281# Utah Univ., Salt Lake City.

THE EFFECT OF AN ACIDIC CATALYST ON SIMULTANEOUS HYDRODENITROGENATION AND HYDRODESULFURIZATION OF MODEL COMPOUNDS Ph.D. Thesis

Holly Jean Moore 1981 171 p
Avail: Univ. Microfilms Order No. 8125903

The hydrodesulfurization of thiophene and the hydrodenitrogenation of pyridine over acidic catalysts was studied. Four catalysts were considered: CoMo-SiO2/Al2O3, CoMo-Al2O3, NiW-SiO2/Al2O3, and NiW-Al2O3. These catalysts were chosen so that the effect of the metallic complex and the effect of the acidic support could be isolated. Reaction conditions of 200 to 400 C and 40 to 200 psia were used. A two site reaction mechanism (sites 1 and 2) based on the Langmuir adsorption isotherm was used to model the reaction of thiophene. A single site (site 1) analysis described the reaction of pyridine. Values of the reaction rate constants (k), and the adsorption equilibrium constants (K) were calculated from the data collected for pure thiophene, pure pyridine, and for a 50/50 solution of each. The results showed that both thiophene and pyridine adsorb significantly on the type 1 sites, but not on the type 2 sites. No consistent metal effect (NiW or CoMo) was observed. However, alumina was the more effective catalyst substrate for the reaction of both thiophene and pyridine for 50/50 feeds. Alumina was also more effective for pure thiophene reaction, but silica alumina was more effective for pyridine reaction from a pure feed. Dissert. Abstr.

N82-23409# Research Inst. of National Defence, Linkoeping (Sweden).

TRANSIENT MEASUREMENTS UNDER ELECTRIC PULSE EXCITATION IN 37 VIGGEN AIRCRAFT [TRANSIENTMAETNINGAR VID STROEMPULSEXCITERING AV FPL-37 VIGGEN]

Sven Garmland Oct. 1981 54 p In SWEDISH
(FOA-C-30243-A3) Avail: NTIS HC A04/MF A01

Determinations of the magnetic field at different locations in aircraft and of the induced electromotive force in two typical communication cables of a transmission system, during full scale electric pulse tests, are reported. These measurements were carried out in relation with lightning tests, for trying out a computerized measurement system, including transient digitizers, microwave link and magnetic field cells. The pulse generator was equipped with capacitors charged up to 75 kV, developing a sine wave 30 kHz pulse current with a 100 kA max amplitude. Results enabled a computer program to be modified so as to account for actual conditions. Author (ESA)

N82-23471*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

BLOCKAGE AND FLOW STUDIES OF A GENERALIZED TEST APPARATUS INCLUDING VARIOUS WING CONFIGURATIONS IN THE LANGLEY 7-INCH MACH 7 PILOT TUNNEL

Cindy W. Albertson Mar. 1982 50 p
(NASA-TM-83301; NAS 1.15:83301) Avail: NTIS HC A03/MF A01 CSCL 20D

A 1/12th scale model of the Curved Surface Test Apparatus (CSTA), which will be used to study aerothermal loads and evaluate Thermal Protection Systems (TPS) on a fuselage-type configuration in the Langley 8-Foot High Temperature Structures Tunnel (8 ft HTST), was tested in the Langley 7-Inch Mach 7 Pilot Tunnel. The purpose of the tests was to study the overall flow characteristics and define an envelope for testing the CSTA in the 8 ft HTST. Wings were tested on the scaled CSTA model to select a wing configuration with the most favorable characteristics for conducting TPS evaluations for curved and intersecting surfaces. The results indicate that the CSTA and selected wing configuration can be tested at angles of attack up to 15.5 and 10.5 degrees, respectively. The base pressure for both models was at the expected low level for most test conditions. Results generally indicate that the CSTA and wing configuration will provide a useful test bed for aerothermal pads and thermal structural concept evaluation over a broad range of flow conditions in the 8 ft HTST. Author

N82-23494*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HISTORICAL PERSPECTIVES ON THERMOSTRUCTURAL RESEARCH AT THE NACA LANGLEY AERONAUTICAL LABORATORY FROM 1948 TO 1958

Richard R. Heldenfels *In its* Computational Aspects of Heat Transfer in Struct. 1982 p 363-392 refs

Avail: NTIS HC A24/MF A01 CSCL 20D

Some of the early research on structural problems produced by aerodynamic heating, conducted at the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics from 1948 to 1958 is described. That was the last decade of the NACA; in 1958 NACA became the nucleus of NASA. The NACA initially contracted for research but was aware that a well-equipped and suitably staffed laboratory was required to fulfill its obligations. Langley was established in 1920; the other listed were added during the NACA expansion in the World War II years. Some specific research activities are described, starting with calculation of the temperature of the structure. B.W.

N82-23542# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

COMPARISON OF RELIABILITY, SENSITIVITY AND ACCURACY OF SOME NDI-TECHNIQUES

E. A. B. deGraaf and P. deRijk Oct. 1980 32 p refs In DUTCH; ENGLISH summary Presented at Dutch Soc. for Non-Destructive Testing Lecture Series, 4 Nov. 1980

(NLR-MP-80039-U) Avail: NTIS HC A03/MF A01

Reliability, sensitivity and accuracy of some nondestructive inspection (NDI) methods were investigated and compared. Reliability, sensitivity and accuracy of nondestructive inspection are defined. The restrictions on reusing NDI reliability specimens are described. Inspection results obtained with fluorescent and red penetrants are compared. Reliability, sensitivity and accuracy of a number of the most popular NDI methods, as applied to aluminum specimens and rejected steel aircraft landing gear components are treated. Three investigations are briefly depicted. Spreading in NDI results is substantial. Corrosion deteriorates reliability, sensitivity and accuracy. Red penetrant is much worse than fluorescent penetrant. Fluorescent penetrant inspection results strongly depend on the specimen configuration and vary from very good to moderate. Eddy current method gives good results. Magnetic inspection is advisable wherever it can be applied. Author (ESA)

N82-23549*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A TWO-DEGREE-OF-FREEDOM FLUTTER MOUNT SYSTEM WITH LOW DAMPING FOR TESTING RIGID WINGS AT DIFFERENT ANGLES OF ATTACK

Moses G. Farmer Apr. 1982 20 p refs Presented at Va. Academy of Sci. Meeting, Blacksburg, Va., 20-23 Apr. 1982

(NASA-TM-83302; NAS 1.15:83302) Avail: NTIS HC A02/MF A01 CSCL 14B

A wind tunnel model mount system for conducting flutter research using a rigid wing was developed. The wing is attached to a splitter plate so that the two move as one rigid body. The splitter plate is supported away from the tunnel wall by a system of rods with fixed fixed end conditions. The rods flex in such a way that only pitch and plunge oscillations are permitted. At the tunnel wall the rods are attached to a remotely controlled turntable so that angle of attack can be varied. Wind tunnel data obtained by using the mount system are presented for a supercritical and a conventional airfoil. Both classical flutter and stall flutter data are presented. S.L.

N82-23560# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugmechanik.

A THEORETICAL STUDY OF THE IMPACT OF AIRCRAFT WAKE VORTICES ON ROOFS IN THE FINAL APPROACH AREA OF DUSSELDORF AIRPORT

Otto Weber and Rolf Ulken Dec. 1981 63 p refs In GERMAN; ENGLISH summary

(DFVLR-Mitt-82-01) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 21,50

Damage to buildings caused by the impact of trailing wake vortices shed from widebodied aircraft in the final approach area of Dusseldorf Airport was studied. Forty-two occurrences of roof damage were analyzed, using a simplified model for the strength, transport, and decay of wake vortices. The model is interpreted with reference to the results of a vortex alleviation program carried out in the U.S. Wake vortex characteristics, maximum tangential velocity and vortex decay are discussed. Measurement of vortex far field reduction is considered. Other investigations of roof damage in the approach areas of Hamburg, Berlin (Tempelhof), and London (Heathrow) airports are summarized. The value of potential aircraft modifications and precautions on the ground are assessed, suggesting supplementary measurements on board aircraft and in buildings. Author (ESA)

N82-23561# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

SOME CASE STUDIES AND THE SIGNIFICANCE OF FATIGUE THRESHOLDS

R. J. H. Wanhill Apr. 1981 15 p refs Presented at Intern. Symp. on Fatigue Thresholds, Stockholm, Jun. 1981

(NLR-MP-81015-U) Avail: NTIS HC A02/MF A01

Examples of service failures, involving low-cycle and/or high-cycle fatigue, are described and discussed with respect to the significance of thresholds for high-cycle fatigue crack propagation. The examples are: aircraft undercarriage cylinders made of high strength 4340 steel; aircraft gas turbine compressor drive shafts made of A286 steel; and aircraft gas turbine blades made of Rene 80 nickel-base superalloy. The examples show that the importance of Delta K sub th is unlikely to be important for a particular service fatigue problem. Delta K sub th as a design criterion is restricted to safe crack growth components and structures whose anticipated service loads consist mainly or entirely of large numbers of low amplitude cycles and which are difficult or impossible to inspect in service. Author (ESA)

N82-24060*# Boeing Vertol Co., Philadelphia, Pa.

AN INVESTIGATION OF ROTOR HARMONIC NOISE BY THE USE OF SMALL SCALE WIND TUNNEL MODELS Final Report

Harry Sternfeld, Jr. and Edward G. Schaffer Apr. 1982 100 p refs

(Contract NAS2-10767)

(NASA-CR-166337; NAS 1.26:166337) Avail: NTIS HC A05/MF A01 CSCL 20A

Noise measurements of small scale helicopter rotor models were compared with noise measurements of full scale helicopters to determine what information about the full scale helicopters could be derived from noise measurements of small scale helicopter models. Comparisons were made of the discrete frequency (rotational) noise for 4 pairs of tests. Areas covered were tip speed effects, isolated rotor, tandem rotor, and main rotor/tail rotor interaction. Results show good comparison of noise trends with configuration and test condition changes, and good comparison of absolute noise measurements with the corrections used except for the isolated rotor case. Noise measurements of the isolated rotor show a great deal of scatter reflecting the fact that the rotor in hover is basically unstable. Author

N82-24137*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

RESEARCH AND TECHNOLOGY ANNUAL REPORT FY-1981

Nov. 1981 100 p

(NASA-TM-84199; NAS 1.15:84199) Avail: NTIS HC A05/MF A01 CSCL 05A

Space transportation systems are summarized: space shuttle enhancement, a space operations center, the space platform, and geostationary activites are discussed. Aeronautics and space technology are summarized: experiments, energy systems, propulsion technology, synthetic aperture radar, large space systems, and shuttle-launched vehicles are discussed. Space sciences are summarized: lunar, planetary, and life sciences are discussed. Space and terrestrial applications are summarized. The AgRISTARS program, forest and wildland resource, and Texas LANDSAT applications are discussed. N.W.

[illegible]

SOME CASE STUDIES AND THE SIGNIFICANCE OF FATIGUE THRESHOLDS

[illegible]

AN INVESTIGATION OF ROTOR HARMONIC NOISE BY THE USE OF SMALL SCALE WIND TUNNEL MODELS

[illegible]

HISTORICAL PERSPECTIVES ON THERMOSTRUCTURAL RESEARCH AT THE NACA LANGLEY AERONAUTICAL LABORATORY FROM 1948 TO 1958

[illegible]

COMPARISON OF RELIABILITY, SENSITIVITY, AND ACCURACY OF SOME NDI TECHNIQUES

[illegible]

A TWO DEGREE OF FREEDOM FLUTTER MOUNT SYSTEM WITH LOW DAMPING FOR TESTING ROTATING WINGS AT DIFFERENT ANGLES OF ATTACK

[illegible]

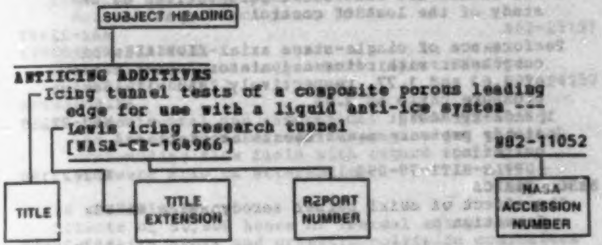
A THEORETICAL STUDY OF THE EFFECT OF AIRCRAFT WAKE VORTICES ON ROOFS IN THE FINAL APPROACH AREA OF DUSSELDORF AIRPORT

[illegible]

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 151)* **AUGUST 1982**

Typical Subject Index Listing


SUBJECT HEADING
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966]
N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-10 AIRCRAFT
Production weldbonding on the A-10 aircraft A82-28995

A-300 AIRCRAFT
ACTTA: Investigation of new piloting and flight control technologies. Volume 1: Review; active wing [MBB-UH-05-81-VOL-1] N82-23252
ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability [MBB-UH-05-81-VOL-2] N82-23253

ACCELERATION (PHYSICS)
Analysis of changes in the gas-dynamic parameters of a gas-turbine helicopter engine during acceleration A82-29872
A pilot in the loop analysis of helicopter acceleration/deceleration maneuvers N82-23229

ACCIDENT INVESTIGATION
Transport aircraft accident dynamics [NASA-CR-165850] N82-22227
Special investigation report: Evacuation of United Airlines DC-8-61, Sky Harbor International Airport, Phoenix, Arizona, December 29, 1980 [PB82-115619] N82-22236

ACOUSTIC EMISSION
Acoustic emission from free jets --- supersonic jets N82-22962

ACOUSTIC EXCITATION
Acoustic noise test as part of the dynamic qualification program in aerospace N82-22162
STOL aircraft structural vibration prediction from acoustic excitation N82-22169

ACTIVE CONTROL
Active control of aeroelastic divergence [AIAA 82-0684] A82-30151
An electronic control for an electrohydraulic active control landing gear for the F-4 aircraft [NASA-CR-3552] N82-22252
Control law design to meet constraints using SYNPAC-synthesis package for active controls [NASA-TM-83264] N82-22280
ACTTA: Investigation of new piloting and flight control technologies. Volume 1: Review; active wing [MBB-UH-05-81-VOL-1] N82-23252
ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability [MBB-UH-05-81-VOL-2] N82-23253

ADHESION TESTS
Structural integrity of an adhesively bonded aircraft fuselage A82-28996

ADHESIVE BONDING
Applications of structural adhesives in production A82-28808
Production weldbonding on the A-10 aircraft A82-28995
Fatigue behavior of adhesively bonded joints A82-29032
Bonded aluminum honeycomb - Aircraft flight surface primary structure application [AIAA 82-0676] A82-30145

ADHESIVES
Addition polyimide adhesives containing various end groups A82-29098

AERIAL RECONNAISSANCE
The utilization of aircraft in fighting forest fires - French experience A82-29581

AERODYNAMIC BRAKES
Analysis and flight evaluation of a small, fixed-wing aircraft equipped with hinged plate spoilers [NASA-CR-166247] N82-22243

AERODYNAMIC CHARACTERISTICS
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments A82-29018
Development of a homebuilt powered sailplane A82-29416
Computational aerodynamics - Its coming of age and its future A82-29773
A wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing [AIAA 82-0642] A82-30139
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method [AIAA PAPER 82-0727] A82-30193
Predictions of aerodynamic characteristics of highly maneuverable configurations N82-22199
Evaluation of direct force mode fighters by combat simulation N82-22204
Aerodynamic performance of slender wings with separated flows [NASA-CR-168760] N82-22206
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment [NAL-TR-686T] N82-22212
Application of Kalman filtering to the kinematic reconstruction of free flight of catapulted aircraft models in the laboratory [INFL-80-28] N82-22259
A flight investigation of blade-section aerodynamics for a helicopter main rotor having RC-SC2 airfoil sections [NASA-TM-83298] N82-23192

AERODYNAMIC COEFFICIENTS
Prediction of aerodynamically induced vibrations in turbomachinery blading A82-28986

Real time digital filtering test in the S1 continuous wind tunnel at Modane
N82-22152
Effect of nacelles on aerodynamic characteristics of an executive-jet model with simulated, partial-chord, laminar-flow-control wing glove
[NASA-TM-83271] N82-22217
Approximate method for predicting supersonic normal force coefficient very-low-aspect-ratio lifting surfaces
[AD-A111770] N82-23199

AERODYNAMIC CONFIGURATIONS
Aerodynamics at the 1981 Le Bourget show
A82-29789
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29831
Predictions of aerodynamic characteristics of highly maneuverable configurations
N82-22199
Tail configurations for highly maneuverable combat aircraft
N82-22201
Analysis of rotary balance data for the F-15 airplane including the effect of conformal fuel tanks
[NASA-CR-3479] N82-22213
An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
N82-23158
Experimental study of a jet deflector
N82-23173

AERODYNAMIC DRAG
Studies on wind tunnel straighteners
[NASA-TM-76689] N82-22284
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238

AERODYNAMIC FORCES
Flutter analysis using nonlinear aerodynamic forces
[AIAA 82-0728] A82-30176

AERODYNAMIC HEATING
Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958
N82-23494

AERODYNAMIC INTERFERENCE
A numerical investigation of two-dimensional, subsonic, linear, wind tunnel interference theory
[ARL/AERO-NOTE-403] N82-23197

AERODYNAMIC LOADS
The stressed state of a parachute canopy during opening
A82-29820
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[AIAA 82-0689] A82-30156
Application of optimal control techniques to aircraft flutter suppression and load alleviation
[AIAA 82-0724] A82-30173
Development of a correlated finite element dynamic model of a complete aero engine
[PNR-90081] N82-22272

AERODYNAMIC NOISE
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-168764] N82-22947
Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
[NAL-TR-685T] N82-22953
Aircraft aerodynamic noise during approach
N82-22976

AERODYNAMIC STABILITY
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
Jet V/STOL wind-tunnel simulation and groundplane effects
N82-23165
The modeling and prediction of multiple jet VTOL aircraft flow fields in ground effect
N82-23166

Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[NASA-TM-83296] N82-23193
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet --- conducted in Langley Transonic Dynamics Tunnel
[NASA-TM-83279] N82-23239

AERODYNAMIC STALLING
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments
A82-29018
State of the art and recent perspectives on the study of the loss of control and spin
N82-22197
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.77, respectively, and with design pressure ratio of 2.05
[NASA-TP-2001] N82-22269
Unsteady pressure measurements at stall and buffeting
[DFVLR-MITT-79-09] N82-23190

AERODYNAMICS
The effect of swirl burner aerodynamics on NOx formation
A82-28658
Measurement of aerodynamic work during fan flutter
A82-28987
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet
[NASA-CR-165617] N82-22211
The 1983 NASA Authorization, Volume 1
[GPO-91-488-VOL-1] N82-23068
An accurate method for evaluating the kernel of the integral equation relating lift to downwash in unsteady potential flow
[NASA-TM-83281] N82-23194

AEROELASTICITY
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0678] A82-30146
Active control of aeroelastic divergence
[AIAA 82-0684] A82-30151
Transonic time-response analysis of three D.O.F. conventional and supercritical airfoils
[AIAA 82-0688] A82-30155
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[AIAA 82-0689] A82-30156
Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157
Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates
[AIAA 82-0722] A82-30172
Flutter analysis using nonlinear aerodynamic forces
[AIAA 82-0728] A82-30176
Feedback control of a cantilever wing in steady airflow
[AIAA 82-0729] A82-30177
Aeroelastic tailoring for control and performance: Are requirements compatible?
N82-22200
Aeroelastic properties of wings in transonic flow
[NLR-MP-81005-U] N82-22224
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[NASA-TM-83296] N82-23193
Time-marching transonic flutter solutions including angle-of-attack effects
[NASA-TM-83295] N82-23196
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet --- conducted in Langley Transonic Dynamics Tunnel
[NASA-TM-83279] N82-23239

AERONAUTICAL ENGINEERING
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981
[NLR-MP-81006-U] N82-22153
The 1983 NASA Authorization, Volume 1
[GPO-91-488-VOL-1] N82-23068

Research and Technology annual report FY-1981
[NASA-TM-84199] N82-24137
AEROSPACE ENGINEERING
The Royal Aircraft Establishment: 100 years of research
[RAE-TM-FS-432] N82-22144
Research and Technology annual report FY-1981
[NASA-TM-84199] N82-24137
AEROSPACE INDUSTRY
Critical metals conservation, recycling and substitution
[AGARD-R-693] N82-22340
Research and development at MBB. Technical and scientific publications, 1981
N82-23137
AEROSPACE SCIENCES
Research and Technology annual report FY-1981
[NASA-TM-84199] N82-24137
AFTERBODIES
An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
N82-23150
AGING (MATERIALS)
Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites
[AIAA 82-0657] A82-30087
AGRICULTURAL AIRCRAFT
The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel
A82-29580
AIR CARGO
Handling air freight in the 1980s - Meeting the challenge
A82-29800
AIR DEFENSE
Multi-mission V/STOL with vectored thrust engines --- bombing, air superiority
[PNR-90086] N82-22270
AIR DUCTS
The excitation of compressor/duct systems
A82-28993
AIR FLOW
Pressure measurements on twin vertical tails in buffeting flow
[AIAA 82-0641] A82-30138
Feedback control of a cantilever wing in steady airflow
[AIAA 82-0729] A82-30177
Studies on wind tunnel straighteners
[NASA-TM-76689] N82-22284
AIR INTAKES
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet
[NASA-CR-165617] N82-22211
AIR NAVIGATION
Integrated navigation-TF/TA-system based on stored terrain data processing
N82-23183
The integration of multiple avionic sensors and technologies for future military helicopters
N82-23186
AIR POLLUTION
Calculation of the contributions of air traffic and road traffic to air pollution in the region of Schiphol airport in 1974
[NLR-TR-77100-U] N82-22800
AIR TO AIR MISSILES
Optimal control and estimation for strapdown seeker guidance of tactical missiles
A82-31121
AIR TO SURFACE MISSILES
Naval versions of the Dauphin and the AS 15 TT weapon system --- helicopters
[SNIAS-821-210-104] N82-22255
A light helicopter for night firing
[SNIAS-821-210-105] N82-22256
AIR TRAFFIC
Developmental possibilities and restrictions in air transport
[DFVLR-MITT-81-9] N82-22229
Developmental possibilities in civil aviation in the Federal Republic of Germany
N82-22230
AIR TRAFFIC CONTROL
The investigation of aircraft accidents and incidents - Some recent national and international developments
A82-29275
Air Traffic Flow Management and Air Traffic Flow Control
A82-29923
Improvements to secondary radar for air traffic control
A82-30311
Measures to increase airfield capacity by changing aircraft runway occupancy characteristics
[NASA-CR-168841] N82-22240
Analysis and Monte Carlo simulation of near-terminal aircraft flight paths
[NASA-TP-1997] N82-23233
Extravehicular Activity/Air Traffic Control (EVA/ATC) test report --- communication links to the astronaut
[NASA-CR-167600] N82-23301
AIR TRANSPORTATION
The micro revolution comes to civil air transport
A82-29259
Developmental possibilities and restrictions in air transport
[DFVLR-MITT-81-9] N82-22229
AIRBORNE EQUIPMENT
Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports
A82-29576
Fighting forest fires with the aid of aircraft in the United States of America
A82-29577
Fighting forest fires - A task for the Swiss air force
A82-29578
The current state of technology concerning the fighting of forest fires from the air in Austria
A82-29579
The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel
A82-29580
The utilization of aircraft in fighting forest fires - French experience
A82-29581
The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system
A82-29582
The employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires
A82-29583
The employment of helicopters in Austria in connection with large-scale fires in buildings
A82-29585
Performance characteristics and employment profiles of the new helicopter BK117
A82-29586
RADIAN simulator for aircraft instruments
[FOA-C-40136-A3] N82-22286
The 1981 direct strike lightning data --- utilizing the F-106 aircraft
[NASA-TM-83273] N82-22808
AIRBORNE SURVEILLANCE RADAR
Secondary radar for airborne collision avoidance
A82-30313
AIRBORNE/SPACEBORNE COMPUTERS
The micro revolution comes to civil air transport
A82-29259
Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168912] N82-23245
AIRCRAFT ACCIDENT INVESTIGATION
The investigation of aircraft accidents and incidents - Some recent national and international developments
A82-29275
AIRCRAFT ACCIDENTS
Analysis of aircraft dynamic behavior in a crash environment
[AIAA 82-0694] A82-30161

Transport aircraft accident dynamics
[NASA-CR-165850] N82-22227
Review of rotorcraft accidents 1977-1979
[PB82-115601] N82-22237
Technical approaches for measurement of human errors
[NASA-CR-166314] N82-22249
A theory of human error
[NASA-CR-166313] N82-22250
Commercial jet transport crashworthiness
[NASA-CR-165849] N82-23207

AIRCRAFT ANTENNAS
Distributed airborne array concepts
A82-31669
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers
[NASA-CR-168770] N82-22398

AIRCRAFT COMPARTMENTS
Aircraft cabin air ozone contamination and compliance with regulations
A82-31057
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition
[NASA-CR-165869] N82-22952

AIRCRAFT CONFIGURATIONS
F-15 fighter abilities evaluated
A82-29592
Aerodynamics at the 1981 Le Bourget show
A82-29789
An automated technique for improving modal test/analysis correlation
[AIAA 82-0640] A82-30137
Control law design to meet constraints using SYNPAC-synthesis package for active controls
[NASA-TM-83264] N82-22280
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 6: Vehicle Configuration Session
[NASA-TM-84180] N82-23242

AIRCRAFT CONSTRUCTION MATERIALS
Processing and uses of carbon fibre reinforced plastics --- Book
A82-28643
Elevator unit for the Alpha-Jet, made from carbon-fibre reinforced plastic
A82-28649
Tool use in cutting operations involving integral structural components in aircraft construction
A82-28873
Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981
A82-28994
A review of U.S. Air Force research related to airframe and engine materials
A82-29268
Flight qualification of composite structures at AMD-BA
[AIAA 82-0755] A82-30116
A giant step toward composite helicopters
A82-30294
New materials fly better and cheaper
A82-31426
Revolution in airplane construction? Grob G110: The first modern fiber glass composition airplane shortly before its maiden flight
[NASA-TM-76705] N82-22246
Tailor-made structures; today, and tomorrow: New materials, an exploratory investigation into their potential use --- in aircraft
[BAE-SDN-85/A/104/005] N82-22253
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft
[NASA-CR-165841] N82-22316
Critical metals conservation, recycling and substitution
[AGARD-R-693] N82-22348
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate --- for aircraft construction
[NLR-MP-80047-U] N82-22360

Some case studies and the significance of fatigue thresholds --- aircraft components
[NLR-MP-81015-U] N82-23561

AIRCRAFT CONTROL
Estimation of the performance of nonstationary discontinuous control systems for flight vehicles
A82-29832
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30181
Improvements to secondary radar for air traffic control
A82-30311
Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test
N82-22191
Multivariable closed loop control analysis and synthesis for complex flight systems
N82-22193
Integration of avionics and advanced control technology
N82-22194
Enhanced piloting control through cockpit facilities and A.C.T.
N82-22195
State of the art and recent perspectives on the study of the loss of control and spin
N82-22197
Aeroelastic tailoring for control and performance: Are requirements compatible?
N82-22200
Tail configurations for highly maneuverable combat aircraft
N82-22201
Analysis of rotary balance data for the F-15 airplane including the effect of conformal fuel tanks
[NASA-CR-3479] N82-22213
Effects of cable geometry and aircraft attitude on the accuracy of a magnetic leader cable system for aircraft guidance during rollout and turnoff
[NASA-TP-1978] N82-22239
An electronic control for an electrohydraulic active control landing gear for the F-4 aircraft
[NASA-CR-3552] N82-22252
Control law design to meet constraints using SYNPAC-synthesis package for active controls
[NASA-TM-83264] N82-22280
An analysis of a nonlinear instability in the implementation of a VTOL control system
[NASA-TM-84220] N82-22281
Production Verification Testing (PVT) of guidance and control systems for high reliability
N82-23187
State-of-the-art cockpit design for the HH-65A helicopters
N82-23220
Performance evaluation of a kinesthetic-tactual display
N82-23221
Synthesis of an integrated cockpit management system
N82-23222
Cockpit integration from a pilot's point of view
N82-23224
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 7: Tilt Rotor Session
[NASA-TM-84705] N82-23243
ACTTA: Investigation of new piloting and flight control technologies. Volume 1: Review; active wing
[MBB-UH-05-81-VOL-1] N82-23252
ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability
[MBB-UH-05-81-VOL-2] N82-23253

AIRCRAFT DESIGN
Development of a homebuilt powered sailplane
A82-29416
NASA research related to sailplane airfoils
A82-29417
The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel
A82-29580

The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system
A82-29582
The employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires
A82-29583
Adaptation and equipment of aircraft for the fighting of forest fires
A82-29584
Computational aerodynamics - Its coming of age and its future
A82-29773
Aerodynamics at the 1981 Le Bourget show
A82-29789
Comparison of light aircraft with strutted and cantilever wings
A82-29828
Design principles of a computer-aided design system
A82-29829
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29831
Flight simulators
A82-29924
Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft
[AIAA 82-0705] A82-30096
737 graphite-epoxy horizontal stabilizer certification
[AIAA 82-0745] A82-30109
Flight qualification of composite structures at AMD-BA
[AIAA 82-0755] A82-30116
Bonded aluminum honeycomb - Aircraft flight surface primary structure application
[AIAA 82-0676] A82-30145
Analysis of aircraft dynamic behavior in a crash environment
[AIAA 82-0694] A82-30161
New materials fly better and cheaper
A82-31026
Combat Aircraft Manoeuvrability
[AGARD-CP-319] N82-22187
The military flying qualities specification, a help or a hindrance to good fighter design --- flight control systems
N82-22190
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
N82-22196
State of the art and recent perspectives on the study of the loss of control and spin
N82-22197
Predictions of aerodynamic characteristics of highly maneuverable configurations
N82-22199
Aeroelastic tailoring for control and performance: Are requirements compatible?
N82-22200
The assessment of aircraft combat effectiveness using a new computational method
N82-22203
A system safety model for developmental aircraft programs
[NASA-CR-3534] N82-22228
Conceptual design study of a visual system for a rotorcraft simulator and some advances in platform motion utilization
[NASA-CR-166322] N82-22244
A linear decomposition method for large optimization problems. Blueprint for development
[NASA-TM-83248] N82-22245
Revolution in airplane construction? Grob G110: The first modern fiber glass composition airplane shortly before its maiden flight
[NASA-TM-76705] N82-22246
The 1983 NASA Authorization, Volume 1
[GPO-91-488-VOL-1] N82-23068
Research and development at MBB. Technical and scientific publications, 1981
N82-23137
Application of a structural optimization procedure for advanced wings
[MBB-FE-171/S/PUB/49] N82-23141
V/STOL aircraft and fluid dynamic
N82-23179
State-of-the-art cockpit design for the HH-65A helicopters
N82-23220
Synthesis of an integrated cockpit management system
N82-23322
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 7: Tilt Rotor Session
[NASA-TM-84705] N82-23243

AIRCRAFT ENGINES
The gas turbine engine
A82-28587
Composite materials --- with emphasis for aircraft gas turbine parts
A82-28590
A review of U.S. Air Force research related to airframe and engine materials
A82-29268
Development of a homebuilt powered sailplane
A82-29816
Determination of an optimal control program for an aircraft power plant during climb
A82-29845
New processes and methods of technical diagnostics and prognostics in the case of the engine MK-8-4. II
A82-29925
Gas turbine engines used in aviation: Design and construction of components /5th revised and enlarged edition/ --- Russian book
A82-30697
Chem-Braze abradable seal practical
A82-31048
Maintenance in Service of High Temperature Parts
[AGARD-CP-317] N82-22172
Engine depot maintenance repair technology
N82-22174
Maintenance problems in gas turbine components at the Royal Naval Aircraft Yard, Fleetlands --- helicopter and marine gas turbines
N82-22175
Maintenance experience with civil aero engines
N82-22176
Engine component retirement for cause
N82-22177
The influence of protective treatment on the mechanical properties of superalloy parts
N82-22180
The role of modern control theory in the design of controls for aircraft turbine engines
[NASA-TM-82815] N82-22262
Advanced general aviation comparative engine/airframe integration study
[NASA-CR-165564] N82-22263
Advanced Low-Emissions Catalytic-Combustor Program, phase 1 --- aircraft gas turbine engines
[NASA-CR-159656] N82-22265
Advanced general aviation engine/airframe integration study
[NASA-CR-165565] N82-22268
RB211 powerplant deterioration: Review of current situation and lessons learned
[PNR-90073] N82-22270
Development of a correlated finite element dynamic model of a complete aero engine
[PNR-90081] N82-22272
Encounters with surge: Some experiences of development of axial compressors for aero gas turbines
[PNR-90071] N82-22274
Reliable power --- RB211 aircraft engines
[PNR-90078] N82-22275
Collaborative development of aero-engines
[PNR-90083] N82-22277
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358

AIRCRAFT EQUIPMENT
Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices --- aircraft electric equipment
A82-28875

Adaptation and equipment of aircraft for the fighting of forest fires A82-29584
F-15 fighter abilities evaluated A82-29592
Dynamic Environmental Qualification Techniques --- conference [AGARD-CP-318] N82-22154
Qualification of equipment for gunfire induced vibration N82-22158
Dynamic qualification testing of F-16 equipment N82-22159
Equipment vibration qualification for Harrier and Hawk aircraft N82-22161
Gunfire blast pressure predictions N82-22170
Development of a taped random vibration technique for acceptance testing N82-22171
Production Verification Testing (PVT) of guidance and control systems for high reliability N82-23187

AIRCRAFT GUIDANCE
Effects of cable geometry and aircraft attitude on the accuracy of a magnetic leader cable system for aircraft guidance during rollout and turnoff [NASA-TP-1978] N82-22239
Integrated navigation-TF/TA-system based on stored terrain data processing N82-23183
Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem N82-23184
The integration of multiple avionic sensors and technologies for future military helicopters N82-23186
Production Verification Testing (PVT) of guidance and control systems for high reliability N82-23187
Sun sensing guidance system for high altitude aircraft [NASA-CASE-FRC-11052-1] N82-23231

AIRCRAFT HAZARDS
Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I A82-29871

AIRCRAFT INSTRUMENTS
Checking and calibrating variometers in place in the sailplane instrument panel A82-29415
F-15 fighter abilities evaluated A82-29592
RADIAK simulator for aircraft instruments [FOA-C-40136-A3] N82-22286

AIRCRAFT LANDING
A portable, low-cost flight-data measurement and recording system [NASA-TM-84229] N82-22478
Analysis and Monte Carlo simulation of near-terminal aircraft flight paths [NASA-TP-1997] N82-23233
Planar equations of rollout motion for an aircraft with free or steerable landing gears [NASA-TP-1984] N82-23244

AIRCRAFT MAINTENANCE
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport [AIAA 82-0760] A82-30119
Military maintenance policies and procedures for high-temperature parts. Will they be adequate? N82-22173
Engine depot maintenance repair technology N82-22174
Maintenance experience with civil aero engines N82-22176
Concept studies of an advanced composite helicopter fin [SNIAS-821-210-106] N82-22257

AIRCRAFT MANEUVERS
The stability of maneuverable flight vehicles A82-29827
Combat Aircraft Manoeuvrability [AGARD-CP-319] N82-22187
A review of recent AGARD Symposia on the Angle of Maneuverability of Combat Aircraft N82-22188
Review of practical experience on combat aircraft maneuverability N82-22189
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps N82-22192
Integration of avionics and advanced control technology N82-22194
Enhanced piloting control through cockpit facilities and A.C.T. N82-22195
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology N82-22196
State of the art and recent perspectives on the study of the loss of control and spin N82-22197
Application of the theory of bifurcations to the study of the loss of control in combat aircraft N82-22198
Predictions of aerodynamic characteristics of highly maneuverable configurations N82-22199
Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot N82-22202
The assessment of aircraft combat effectiveness using a new computational method N82-22203
Evaluation of direct force mode fighters by combat simulation N82-22204
Flight tests for the assessment of task performance and control activity N82-23213
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations N82-23214
Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight N82-23215
Validation of zero-order feedback strategies for medium range air-to-air interception in a horizontal plane [NASA-TM-84237] N82-23237

AIRCRAFT MODELS
Design of dynamically-scaled, asymmetrical wind tunnel models [NIAST-78/18] N82-22205
Alternatives for jet engine control [NASA-CR-168094] N82-23247

AIRCRAFT NOISE
Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison A82-29165
Fuel efficient and Mach 0.8, too A82-29774
STOL aircraft structural vibration prediction from acoustic excitation N82-22169
Recommendations for field measurements of aircraft noise [NASA-CR-3540] N82-22955
Aircraft aerodynamic noise during approach N82-22976
Ground reflection effects in measuring propeller aircraft flyover noise [DFVLR-FB-81-28] N82-22990
An investigation of rotor harmonic noise by the use of small scale wind tunnel models [NASA-CR-166337] N82-24050

AIRCRAFT PARTS
Aviation gear drives and reducers: Handbook --- in Russian A82-30675

AIRCRAFT PERFORMANCE
NASA research related to sailplane airfoils A82-29417

The current state of technology concerning the fighting of forest fires from the air in Austria A82-29579

The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system A82-29582

F-15 fighter abilities evaluated A82-29592

Fuel efficient and Mach 0.8, too A82-29778

Optimization of measurements in the state estimation of systems using the least squares method A82-29826

Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications A82-29837

The maximum flying range problem for an aircraft A82-31602

Combat Aircraft Manoeuvrability [AGARD-CP-319] N82-22187

The military flying qualities specification, a help or a hindrance to good fighter design --- flight control systems N82-22190

Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test N82-22191

Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps N82-22192

Multivariable closed loop control analysis and synthesis for complex flight systems N82-22193

Aeroelastic tailoring for control and performance: Are requirements compatible? N82-22200

Experience with high performance V/STOL fighter projects at MBB [MBB-FE-124/S/PUB/50] N82-23140

A flight investigation of blade-section aerodynamics for a helicopter main rotor having RC-SC2 airfoil sections [NASA-TM-83298] N82-23192

NASA/MAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 7: Tilt Rotor Session [NASA-TM-84705] N82-23243

AIRCRAFT PRODUCTION

Tool use in cutting operations involving integral structural components in aircraft construction A82-28873

A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means [AIAA 82-0661] A82-30091

A giant step toward composite helicopters A82-30294

AIRCRAFT RELIABILITY

Durability and damage tolerance control plans for USAF aircraft [AIAA 82-0679] A82-30147

Civil (French/US) certification of the Coast Guard's HH-65A Dauphin N82-23210

Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria N82-23219

AIRCRAFT SAFETY

Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I A82-29871

Secondary radar for airborne collision avoidance A82-30313

Transport aircraft accident dynamics [NASA-CR-165850] N82-22227

A system safety model for developmental aircraft programs [NASA-CR-3534] N82-22228

Special investigation report: Evacuation of United Airlines DC-8-61, Sky Harbor International Airport, Phoenix, Arizona, December 29, 1980 [PB82-115619] N82-22236

Review of rotorcraft accidents 1977-1979 [PB82-115601] N82-22237

NASA/MAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 6: Vehicle Configuration Session [NASA-TM-84180] N82-23242

AIRCRAFT SPECIFICATIONS

The military flying qualities specification, a help or a hindrance to good fighter design --- flight control systems N82-22190

Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test N82-22191

Socata: TB 20 Trinidad given German debut [NASA-TM-76706] N82-22247

Helicopter Handling Qualities [NASA-CP-2219] N82-23200

VTOL and VSTOL handling qualities specifications, an overview of the current status N82-23209

AIRCRAFT SPIN

Analysis of rotary balance data for the F-15 airplane including the effect of conformal fuel tanks [NASA-CR-3479] N82-22213

AIRCRAFT STABILITY

Analysis of a multihinged empennage with allowance for shear strain A82-29834

Application of optimal control techniques to aircraft flutter suppression and load alleviation [AIAA 82-0724] A82-30173

AIRCRAFT STRUCTURES

Occurrence of fretting fatigue failures in practice A82-28543

Finite element thermal analysis of convectively-cooled aircraft structures A82-28565

Tool use in cutting operations involving integral structural components in aircraft construction A82-28873

Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981 A82-28994

Production weldbonding on the A-10 aircraft A82-28995

Structural integrity of an adhesively bonded aircraft fuselage A82-28996

SPF of high strength aluminum structures --- superplastic forming for complex aircraft structures A82-28997

Development of low-cost titanium structures using blended elemental powder metallurgy A82-28998

Fatigue behavior of adhesively bonded joints A82-29032

Development of a homebuilt powered sailplane A82-29416

Analysis of a multihinged empennage with allowance for shear strain A82-29834

Zone loading of flight-vehicle structures A82-29838

Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1 - Structures and materials. Part 2 - Structural dynamics and design engineering A82-30076

Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method [AIAA 82-0742] A82-30107

737 graphite-epoxy horizontal stabilizer certification [AIAA 82-0745] A82-30109

Flight qualification of composite structures at AMD-BA [AIAA 82-0755] A82-30116

Acoustic noise test as part of the dynamic qualification program in aerospace N82-22162

Aeroelastic tailoring for control and performance: Are requirements compatible? N82-22200
Revolution in airplane construction? Grob G110: The first modern fiber glass composition airplane shortly before its maiden flight [NASA-TM-76705] N82-22246
Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958 N82-23494

AIRCRAFT SURVIVABILITY
Analysis of aircraft dynamic behavior in a crash environment [AIAA 82-0694] A82-30161
The assessment of aircraft combat effectiveness using a new computational method N82-22203
Commercial jet transport crashworthiness [NASA-CR-165849] N82-23207

AIRCRAFT TIRES
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane --- dynamic response of aircraft tires [AIAA 82-0753] A82-30114

AIRCRAFT WAKES
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport [DFVLR-MITT-82-01] N82-23560

AIRFIELD SURFACE MOVEMENTS
Measures to increase airfield capacity by changing aircraft runway occupancy characteristics [NASA-CR-168841] N82-22240

AIRFOIL FENCES
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment [NAL-TR-686T] N82-22212

AIRFOIL PROFILES
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments A82-29018
Transonic time-response analysis of three D.O.F. conventional and supercritical airfoils [AIAA 82-0688] A82-30155

AIRFOILS
Prediction of aerodynamically induced vibrations in turbomachinery blading A82-28986
NASA research related to sailplane airfoils A82-29417
Time-marching transonic flutter solutions including angle-of-attack effects [NASA-TM-83295] N82-23196

AIRFRAME MATERIALS
High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide [AIAA 82-0711] A82-30125
A giant step toward composite helicopters A82-30294
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981 [NLR-MP-81006-U] N82-22153

AIRFRAMES
A review of U.S. Air Force research related to airframe and engine materials A82-29268
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems [AIAA 82-0731] A82-30179

AIRPORT PLANNING
Traffic infrastructure: Can planning still be carried through N82-22232

AIRPORTS
Instruments and installations for meteorological measurements at airports --- Russian book A82-28826
Traffic infrastructure: Can planning still be carried through N82-22232
Measures to increase airfield capacity by changing aircraft runway occupancy characteristics [NASA-CR-168841] N82-22240
Airfield visual aids research at the Royal Aircraft Establishment [RAE-TM-FS-431] N82-22242
Calculation of the contributions of air traffic and road traffic to air pollution in the region of Schiphol airport in 1974 [NLR-TR-77100-U] N82-22808
Analysis and Monte Carlo simulation of near-terminal aircraft flight paths [NASA-TP-1997] N82-23233

ALL-WEATHER AIR NAVIGATION
Controls and displays for all-weather operation of helicopters [MBB-UD-319-81-0] N82-22260

ALLOYS
New materials fly better and cheaper A82-31426

ALUMINUM ALLOYS
Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981 A82-28994
SPF of high strength aluminum structures --- superplastic forming for complex aircraft structures A82-28997
Bonded aluminum honeycomb - Aircraft flight surface primary structure application [AIAA 82-0676] A82-30145
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981 [NLR-MP-81006-U] N82-22153
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate --- for aircraft construction [NLR-MP-80047-U] N82-22360

ALUMINUM COATINGS
An evaluation study of aluminide and chromoaluminide coatings on IN-100 A82-29597

ANGLE OF ATTACK
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing [AIAA 82-0647] A82-30143
State of the art and recent perspectives on the study of the loss of control and spin N82-22197
A tactual display aid for primary flight training [NASA-CR-166242] N82-22238
Time-marching transonic flutter solutions including angle-of-attack effects [NASA-TM-83295] N82-23196
A two-degree-of-freedom flutter mount system with low damping for testing rigid wings at different angles of attack [NASA-TM-83302] N82-23549

ANISOTROPIC MEDIA
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems [AIAA 82-0731] A82-30179

ANOMALIES
Elastic suspension of a wind tunnel test section N82-23363

ANTENNA ARRAYS
Distributed airborne array concepts A82-31669

ANTENNA RADIATION PATTERNS
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers [NASA-CR-168770] N82-22398

ANTITANK MISSILES
Approach in dynamic qualification of light helicopter stores and equipments N82-22166

APPROACH
Aircraft aerodynamic noise during approach N82-22976
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport [DFVLR-MITT-82-01] N82-23560

ARCHITECTURE (COMPUTERS)
Analysis of computing system configurations for highly integrated guidance and control systems N82-23189

ASYMPTOTIC METHODS
The stability of manoeuverable flight vehicles A82-29827

ASYNCHRONOUS MOTORS
Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices --- aircraft electric equipment A82-28875

ATTACK AIRCRAFT
Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test N82-22191
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps N82-22192
Multivariable closed loop control analysis and synthesis for complex flight systems N82-22193
Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem N82-23184

ATTITUDE CONTROL
Boeing 234 flight control development N82-23211

ATTITUDE STABILITY
Development of a simple, self-contained flight test data acquisition system [NASA-CR-168912] N82-23245

AUTOMATIC CONTROL
Design principles of a computer-aided design system A82-29829
Estimation of the performance of nonstationary discontinuous control systems for flight vehicles A82-29832

AUTOMATIC FLIGHT CONTROL
Advanced technology DFCS control panel for the L-1011-500 [AIAA PAPER 81-2240] A82-29000
Enhanced piloting control through cockpit facilities and A.C.T. N82-22195
Integrated navigation-TF/TA-system based on stored terrain data processing N82-23183
Boeing 234 flight control development N82-23211
Some piloting experiences with multifunction isometric side-arm controllers in a helicopter N82-23218

AUTOMOBILE ENGINES
Future auto engines - Competition heats up A82-29793

AVERAGE
Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques [NASA-CR-165867] N82-22949

AVIONICS
The structural dynamic interface required for developing helicopter target acquisition systems N82-22165
Integration of avionics and advanced control technology N82-22194
The integration of multiple avionic sensors and technologies for future military helicopters N82-23186
Analysis of competing system configurations for highly integrated guidance and control systems N82-23189
Helicopter Handling Qualities [NASA-CP-2219] N82-23208
Civil (French/US) certification of the Coast Guard's HH-65A Dauphin N82-23210
Integrated cockpit for A-129 N82-23225

AXIAL FLOW
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.77, respectively, and with design pressure ratio of 2.05 [NASA-TP-2001] N82-22269

AZIMUTH
A complete method for computation of blade mode characteristics and responses in forward flight [SNIAS-821-210-101] N82-22254

B

BACKWARD WAVES
Measurement of aerodynamic work during fan flutter A82-28987

BENDING THEORY
The stability of monocoque panels under bending A82-29836

BIRD-AIRCRAFT COLLISIONS
Bird impact analysis package for turbine engine fan blades [AIAA 82-0696] A82-30162

BLADE TIPS
Helicopter rotor performance improvement by utilization of swept-back parabolic blade tip --- wind tunnel tests N82-22151

BLAST LOADS
Gunfire blast pressure predictions N82-22170

BLOCKING
Blockage and flow studies of a generalized test apparatus including various wing configurations in the Langley 7-inch Mach 7 Pilot Tunnel [NASA-TM-83301] N82-23471

BLOWING
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet [NASA-CR-165617] N82-22211

BO-105 HELICOPTER
Flight tests for the assessment of task performance and control activity N82-23213

BODY-WING CONFIGURATIONS
Flutter of forward swept wings, analyses and tests [AIAA 82-0646] A82-30142
Rigid body-structural mode coupling on a forward swept wing aircraft [AIAA 82-0683] A82-30150
Approximate method for predicting supersonic normal force coefficient very-low-aspect-ratio lifting surfaces [AD-A111770] N82-23199

BOEING AIRCRAFT
Handling air freight in the 1980s - Meeting the challenge A82-29800
Boeing 234 flight control development N82-23211

BOEING 737 AIRCRAFT
737 graphite-epoxy horizontal stabilizer certification [AIAA 82-0745] A82-30109

BOMBER AIRCRAFT
Multi-mission V/STOL with vectored thrust engines --- bombing, air superiority [PNR-90086] N82-22270

BONDING
Composite bonds improve thermal integrity A82-30004

BOUNDARY LAYER CONTROL
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction [NASA-CR-168844] N82-22209
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet [NASA-CR-165617] N82-22211

BRAZING
Chem-Braze abradable seal practical A82-31048

BUFFETING
Pressure measurements on twin vertical tails in buffeting flow [AIAA 82-0641] A82-30138
Unsteady pressure measurements at stall and buffeting [DFVLR-MITT-79-09] N82-23198

BUILDINGS
The employment of helicopters in Austria in connection with large-scale fires in buildings A82-29585

BURNERS
The effect of swirl burner aerodynamics on NOx formation A82-28658

C

C-5 AIRCRAFT
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
[AIAA 82-0760] A82-30119
CABIN ATMOSPHERES
Aircraft cabin air ozone contamination and compliance with regulations
A82-31057
CALIBRATING
Checking and calibrating variometers in place in the sailplane instrument panel
A82-29415
CAMBERED WINGS
Aerodynamic performance of slender wings with separated flows
[NASA-CR-168768] N82-22206
CANOPIES
The stressed state of a parachute canopy during opening
A82-29820
Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft
[AIAA 82-0705] A82-30096
CANTILEVER MEMBERS
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
CANTILEVER PLATES
Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates
[AIAA 82-0722] A82-30172
CARBON
Investigation of soot and carbon formation in small gas turbine combustors
[NASA-CR-167853] N82-22267
CARBON DIOXIDE LASERS
Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
A82-29880
CARBON FIBER REINFORCED PLASTICS
Composite materials --- with emphasis for aircraft gas turbine parts
A82-28590
Processing and uses of carbon fibre reinforced plastics --- Book
A82-28643
Elevator unit for the Alpha-Jet, made from carbon-fibre reinforced plastic
A82-28649
High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide
[AIAA 82-0711] A82-30125
Service life investigation of a sailplane wing of CFRP construction
N82-22324
CASCADE CONTROL
Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices --- aircraft electric equipment
A82-28875
CASCADE FLOW
Prediction of aerodynamically induced vibrations in turbomachinery blading
A82-28986
CATALYTIC ACTIVITY
Advanced Low-Emissions Catalytic-Combustor Program, phase 1 --- aircraft gas turbine engines
[NASA-CR-159656] N82-22265
CATASTROPHE THEORY
Application of the theory of bifurcations to the study of the loss of control in combat aircraft
N82-22198
CATHODE RAY TUBES
Integrated cockpit for A-129
N82-23225
CAVITIES
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes
A82-28932
CEMENTS
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392
CENTER OF MASS
The maximum flying range problem for an aircraft
A82-31602
CERAMIC COATINGS
The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
[PNR-90076] N82-22271
CERAMICS
New materials fly better and cheaper
A82-31426
CERTIFICATION
737 graphite-epoxy horizontal stabilizer certification
[AIAA 82-0745] A82-30109
Civil (French/US) certification of the Coast Guard's HH-65A Dauphin
N82-23210
CESSNA 172 AIRCRAFT
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168912] N82-23245
CHROMIUM COMPOUNDS
An evaluation study of aluminide and chromoaluminide coatings on IN-100
A82-29597
CIVIL AVIATION
The micro revolution comes to civil air transport
A82-29259
Developmental possibilities in civil aviation in the Federal Republic of Germany
N82-22230
Socata: TB 20 Trinidad given German debut
[NASA-TM-76706] N82-22247
The 1983 NASA Authorization, Volume 1
[GPO-91-488-VOL-1] N82-23060
Civil (French/US) certification of the Coast Guard's HH-65A Dauphin
N82-23210
CLIMBING FLIGHT
Determination of an optimal control program for an aircraft power plant during climb
A82-29845
COANDA EFFECT
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment
[NAL-TR-686T] N82-22212
COCKPITS
Flight simulators
A82-29924
Enhanced piloting control through cockpit facilities and A.C.T.
N82-22195
Helicopter Handling Qualities
[NASA-CP-2219] N82-23208
State-of-the-art cockpit design for the HH-65A helicopters
N82-23220
Synthesis of an integrated cockpit management system
N82-23222
The role of voice technology in advanced helicopter cockpits
N82-23223
Cockpit integration from a pilot's point of view
N82-23224
Integrated cockpit for A-129
N82-23225
Helicopter simulation technology: An Ames Research Center perspective
N82-23227
COLLAPSE
Damage tolerant design using collapse techniques
[AIAA 82-0716] A82-30168
On the dynamic collapse of a column impacting a rigid surface
[AIAA 82-0735] A82-30182
COLLISION AVOIDANCE
Improvements to secondary radar for air traffic control
A82-30311
Secondary radar for airborne collision avoidance
A82-30313
COLOR CODING
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data --- for turbofan mixer nozzle mixing process analysis
A82-29008

COLUMNS (SUPPORTS)
On the dynamic collapse of a column impacting a rigid surface
[AIAA 82-0735] A82-30182
COMBAT
Combat training imagery
A82-31179
Combat Aircraft Manoeuvrability
[AGARD-CP-319] N82-22187
Review of practical experience on combat aircraft maneuverability
N82-22189
The assessment of aircraft combat effectiveness using a new computational method
N82-22203
Evaluation of direct force mode fighters by combat simulation
N82-22204
The study of combat aircraft maneuverability by air to air combat simulation
N82-22205
Influence of maneuverability on helicopter combat effectiveness
N82-23212
Validation of zero-order feedback strategies for medium range air-to-air interception in a horizontal plane
[NASA-TM-84237] N82-23237
COMBUSTION CHAMBERS
Advanced Low-Emissions Catalytic-Combustor Program, phase 1 --- aircraft gas turbine engines
[NASA-CR-159656] N82-22265
Investigation of soot and carbon formation in small gas turbine combustors
[NASA-CR-167853] N82-22267
COMBUSTION PHYSICS
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692
COMBUSTION PRODUCTS
NOx formation in flat, laminar, opposed jet methane diffusion flames
A82-28660
Investigation of soot and carbon formation in small gas turbine combustors
[NASA-CR-167853] N82-22267
COMBUSTION STABILITY
The relaxation oscillation in ramjet combustion
A82-28738
COMMAND AND CONTROL
Sea-based remotely piloted vehicles. I - Issues and concepts
A82-29714
COMMERCIAL AIRCRAFT
Test methodology for evaluation of fireworthy aircraft seat cushions
A82-29596
Calculation of the contributions of air traffic and road traffic to air pollution in the region of Schiphol airport in 1574
[NLR-TR-77100-U] N82-22808
COMMUNICATION EQUIPMENT
Sea-based remotely piloted vehicles. I - Issues and concepts
A82-29714
Special investigation report: Evacuation of United Airlines DC-8-61, Sky Harbor International Airport, Phoenix, Arizona, December 29, 1980
[PB82-115619] N82-22236
COMPOSITE MATERIALS
Processing and uses of carbon fibre reinforced plastics --- Book
A82-28643
Utility of a probability-density-function curve and F-maps in composite-material inspection
A82-28934
Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1 - Structures and materials. Part 2 - Structural dynamics and design engineering
A82-30076
Flight qualification of composite structures at AMD-BA
[AIAA 82-0755] A82-30116
Environmental and high strain rate effects on composites for engine applications
[AIAA 82-0758] A82-30118
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0679] A82-30146
New materials fly better and cheaper
A82-31426
COMPOSITE STRUCTURES
Composite bonds improve thermal integrity
A82-30004
A giant step toward composite helicopters
A82-30294
La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981 --- aerospace R and D methodology and instrumentation
[ESA-TT-725] N82-22145
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft
[NASA-CR-165841] N82-22316
COMPRESSOR EFFICIENCY
Encounters with surge: Some experiences of development of axial compressors for aero gas turbines
[PNR-90071] N82-22274
COMPRESSOR ROTORS
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.77, respectively, and with design pressure ratio of 2.05
[NASA-TP-2001] N82-22269
COMPUTATIONAL FLUID DYNAMICS
The relaxation oscillation in ramjet combustion
A82-28738
A Schwarz-Christoffel method for generating internal flow grids
A82-29005
Computational aerodynamics - Its coming of age and its future
A82-29773
COMPUTER AIDED DESIGN
Computational aerodynamics - Its coming of age and its future
A82-29773
Design principles of a computer-aided design system
A82-29829
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144
A giant step toward composite helicopters
A82-30294
COMPUTER GRAPHICS
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data --- for turbofan mixer nozzle mixing process analysis
A82-29008
Combat training imagery
A82-31179
COMPUTER PROGRAMMING
Transient measurements under electric pulse excitation in 37 Viggen aircraft
[FOA-C-30243-A3] N82-23409
COMPUTER PROGRAMS
The micro revolution comes to civil air transport
A82-29259
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
[AIAA 82-0760] A82-30119
Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157
Bird impact analysis package for turbine engine fan blades
[AIAA 82-0696] A82-30162
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques
[NASA-CR-165867] N82-22949
Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189
A numerical investigation of two-dimensional, subsonic, linear, wind tunnel interference theory
[ARL/AERO-NOTE-403] N82-23197

COMPUTER SYSTEMS DESIGN
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144
COMPUTERIZED SIMULATION
A Schwarz-Christoffel method for generating internal flow grids
A82-29005
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments
A82-29018
Low cost aircrew training devices
A82-29258
Computational aerodynamics - Its coming of age and its future
A82-29773
Flight simulators
A82-29924
Combat training imagery
A82-31179
Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot
N82-22202
The study of combat aircraft maneuverability by air to air combat simulation
N82-22205
CONCRETES
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392
CONFERENCES
Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981
A82-28994
Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings
A82-29414
Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports
A82-29576
Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1 - Structures and materials. Part 2 - Structural dynamics and design engineering
A82-30076
Dynamic Environmental Qualification Techniques --- conference
[AGARD-CP-318] N82-22154
Maintenance in Service of High Temperature Parts
[AGARD-CP-317] N82-22172
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150
Helicopter Handling Qualities
[NASA-CP-2219] N82-23208
CONGRESSIONAL REPORTS
The 1983 NASA Authorization, Volume 1
[GPO-91-488-VOL-1] N82-23068
CONICAL SHELLS
Thermal stability analysis for conical shells with variable parameters
A82-29844
CONTAMINANTS
Aircraft cabin air ozone contamination and compliance with regulations
A82-31057
CONTRACT MANAGEMENT
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147
CONTROL BOARDS
Advanced technology DPCS control panel for the L-1011-500
[AIAA PAPER 81-2240] A82-29000
Controls and displays for all-weather operation of helicopters
[MBB-UD-319-81-O] N82-22260
CONTROL CONFIGURED VEHICLES
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29831
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150
Application of optimal control techniques to aircraft flutter suppression and load alleviation
[AIAA 82-0724] A82-30173
Control law design to meet constraints using SYNPAC-synthesis package for active controls
[NASA-TM-83264] N82-22280
CONTROL SURFACES
Analysis of a multihinged empennage with allowance for shear strain
A82-29834
CONTROL THEORY
The role of modern control theory in the design of controls for aircraft turbine engines
[NASA-TM-82815] N82-22262
CONTROLLABILITY
A review of recent AGARD Symposia on the Angle of Maneuverability of Combat Aircraft
N82-22188
Helicopter Handling Qualities
[NASA-CP-2219] N82-23208
VTOL and VSTOL handling qualities specifications, an overview of the current status
N82-23209
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations
N82-23214
Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight
N82-23215
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216
CONTROLLERS
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216
Some piloting experiences with multifunction isometric side-arm controllers in a helicopter
N82-23218
CONVECTIVE HEAT TRANSFER
Finite element thermal analysis of convectively-cooled aircraft structures
A82-28565
Advanced turbine study --- airfoil coling in rocket turbines
[NASA-CR-162003] N82-23249
COOLING
Finite element thermal analysis of convectively-cooled aircraft structures
A82-28565
COOLING SYSTEMS
Advanced turbine study --- airfoil coling in rocket turbines
[NASA-CR-162003] N82-23249
CORRELATION COEFFICIENTS
An automated technique for improving modal test/analysis correlation
[AIAA 82-0640] A82-30137
COST EFFECTIVENESS
Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications
A82-29837
COST REDUCTION
Development of low-cost titanium structures using blended elemental powder metallurgy
A82-28998
ACTTA: Investigation of new piloting and flight control technologies. Volume 1: Review; active wing
[MBB-UH-05-81-VOL-1] N82-23252
ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability
[MBB-UH-05-81-VOL-2] N82-23253
CRACK INITIATION
Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method
[AIAA 82-0742] A82-30107

CRACK PROPAGATION
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes
A82-28932
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981
[NLR-MP-81006-U] N82-22153
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate --- for aircraft construction
[NLR-MP-80047-U] N82-22360

CRASHES
Transport aircraft accident dynamics
[NASA-CR-165850] N82-22227
Commercial jet transport crashworthiness
[NASA-CR-165849] N82-23207

CRASHWORTHINESS
Analysis of aircraft dynamic behavior in a crash environment
[AIAA 82-0654] A82-30161
Commercial jet transport crashworthiness
[NASA-CR-165849] N82-23207

CRITICAL LOADING
The stability of monocoque panels under bending
A82-29836

CROSS FLOW
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150
Some aspects of jet dynamics and their implications for VTOL research
N82-23151
An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
N82-23158
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235

CRUISING FLIGHT
Checking and calibrating variometers in place in the sailplane instrument panel
A82-29415

CRYOGENIC WIND TUNNELS
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
N82-22196

CUES
Helicopter simulation technology: An Ames Research Center perspective
N82-23227

CUMULATIVE DAMAGE
On the characterization of damages in graphite-epoxy composites
[AIAA 82-0757] A82-30117

CURING
Tailor-made structures; today, and tomorrow: New materials, an exploratory investigation into their potential use --- in aircraft
[BAE-SDW-85/A/104/005] N82-22253

CURVED PANELS
The stability of monocoque panels under bending
A82-29836

CUSHIONS
Test methodology for evaluation of fireworthy aircraft seat cushions
A82-29596

CYLINDRICAL BODIES
Shape optimization of fiber reinforced composites
[AIAA 82-0719] A82-30169
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition
[NASA-CR-165869] N82-22952

D

DAMAGE
Damage tolerant design using collapse techniques
[AIAA 82-0718] A82-30168

DAMAGE ASSESSMENT
Utility of a probability-density-function curve and F-maps in composite-material inspection
A82-28934
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
[AIAA 82-0760] A82-30119
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport
[DFVLR-MITT-82-01] N82-23560

DATA ACQUISITION
Review of rotorcraft accidents 1977-1979
[PB82-115601] N82-22237
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168912] N82-23245

DATA PROCESSING
Application of Kalman filtering to the kinematic reconstruction of free flight of catapulted aircraft models in the laboratory
[IMFL-80-28] N82-22259

DATA REDUCTION
Application of Kalman filtering to the kinematic reconstruction of free flight of catapulted aircraft models in the laboratory
[IMFL-80-28] N82-22259

DATA STORAGE
Integrated navigation-TF/TA-system based on stored terrain data processing
N82-23103

DATA TRANSMISSION
The micro revolution comes to civil air transport
A82-29259
Design principles of a computer-aided design system
A82-29829

DC 8 AIRCRAFT
Special investigation report: Evacuation of United Airlines DC-8-61, Sky Harbor International Airport, Phoenix, Arizona, December 29, 1980
[PB82-115619] N82-22236

DECOMPOSITION
A linear decomposition method for large optimization problems. Blueprint for development
[NASA-TM-83248] N82-22245

DEFECTS
Defects and their effect on the behavior of gas turbine discs
N82-22178

DEFLECTORS
Experimental study of a jet deflector
N82-23173

DEGREES OF FREEDOM
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142
Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test
N82-22191
Elastic suspension of a wind tunnel test section
N82-23363
A two-degree-of-freedom flutter mount system with low damping for testing rigid wings at different angles of attack
[NASA-TM-83302] N82-23549

DELTA WINGS
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153
Application of a structural optimization procedure for advanced wings
[MBB-FE-171/S/PUB/49] N82-23181
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9 --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83297] N82-23195

DESIGN ANALYSIS
NASA research related to sailplane airfoils
A82-29417
Design principles of a computer-aided design system
A82-29829
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0678] A82-30146
Damage tolerant design using collapse techniques
[AIAA 82-0718] A82-30168
A linear decomposition method for large optimization problems. Blueprint for development
[NASA-TM-83248] N82-22245
Advanced Low-Emissions Catalytic-Combustor Program, phase 1 --- aircraft gas turbine engines
[NASA-CR-159656] N82-22265
Synthesis of an integrated cockpit management system
N82-23222

DIELECTRICS
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers
[NASA-CR-168770] N82-22398

DIESEL ENGINES
Advanced general aviation comparative engine/airframe integration study
[NASA-CR-165564] N82-22263

DIFFUSION FLAMES
NOx formation in flat, laminar, opposed jet methane diffusion flames
A82-28660

DIGITAL FILTERS
La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981 --- aerospace R and D methodology and instrumentation
[ESA-TT-725] N82-22145
Real time digital filtering test in the S1 continuous wind tunnel at Modane
N82-22152

DIGITAL SIMULATION
The assessment of aircraft combat effectiveness using a new computational method
N82-22203
Evaluation of direct force mode fighters by combat simulation
N82-22204

DIGITAL SYSTEMS
Advanced technology DFCS control panel for the L-1011-500
[AIAA PAPER 81-2240] A82-29000

DIGITAL TECHNIQUES
Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189

DIMENSIONLESS NUMBERS
Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications
A82-29837

DIRECTIONAL CONTROL
Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219

DIRECTIONAL SOLIDIFICATION (CRYSTALS)
Directional solidification: Project B2 --- of gas turbine rotor blade alloys
[PNR-90088] N82-22279

DISPLAY DEVICES
Controls and displays for all-weather operation of helicopters
[MBB-UD-319-81-O] N82-22260
State-of-the-art cockpit design for the HH-65A helicopters
N82-23220
Performance evaluation of a kinesthetic-tactual display
N82-23221
Cockpit integration from a pilot's point of view
N82-23224
Integrated cockpit for A-129
N82-23225

DISTORTION
Computer modeling of fan-exit-splitter spacing effects on F100 response to distortion
[NASA-CR-167879] N82-23246

DOWNWASH
An accurate method for evaluating the kernel of the integral equation relating lift to downwash in unsteady potential flow
[NASA-TM-83281] N82-23194

DRAG MEASUREMENT
Wind tunnel investigations of sailplane fuselages with different lacings and wing settings --- aerodynamic drag measurement
N82-23200

DRAG REDUCTION
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209
Drag reduction using pneumatic turbulators --- laminar airfoils
[DFVLR-FB-81-33] N82-22223
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238

DUCTS
Turboprop and turbojet ejector optimisation
N82-23174

DURABILITY
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147

DYNAMIC CHARACTERISTICS
Tail rotor studies for satisfactory performance: Strength and dynamic behavior
[SNIAS-821-210-108] N82-22258

DYNAMIC CONTROL
Estimation of the performance of nonstationary discontinuous control systems for flight vehicles
A82-29832

DYNAMIC LOADS
Aircraft fuel tank slosh and vibration test
N82-22164

DYNAMIC MODELS
Analysis of aircraft dynamic behavior in a crash environment
[AIAA 82-0694] A82-30161
The maximum flying range problem for an aircraft
A82-31602

DYNAMIC PRESSURE
Gunfire blast pressure predictions
N82-22170
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9 --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83297] N82-23195

DYNAMIC RESPONSE
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane --- dynamic response of aircraft tires
[AIAA 82-0753] A82-30114
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Dynamic Environmental Qualification Techniques --- conference
[AGARD-CP-318] N82-22154
Development and use of dynamic qualification standards for Air Force stores
N82-22155
Qualification of equipment for gunfire induced vibration
N82-22158
Development of vibration qualification test spectra for the F-15 aircraft
N82-22160
Application of modal synthesis techniques for the dynamic qualification of wings with stores
N82-22168
A complete method for computation of blade mode characteristics and responses in forward flight
[SNIAS-821-210-101] N82-22254
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations
N82-23214

DYNAMIC STABILITY
Design of dynamically-scaled, asymmetrical wind tunnel models
[NIAST-78/18] N82-22285

DYNAMIC STRUCTURAL ANALYSIS
Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1 - Structures and materials. Part 2 - Structural dynamics and design engineering A82-30076
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane --- dynamic response of aircraft tires [AIAA 82-0753] A82-30114
Rigid body-structural mode coupling on a forward swept wing aircraft [AIAA 82-0683] A82-30150
Active control of aeroelastic divergence [AIAA 82-0684] A82-30151
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings [AIAA 82-0689] A82-30156
Analysis of aircraft dynamic behavior in a crash environment [AIAA 82-0694] A82-30161
Flutter analysis using nonlinear aerodynamic forces [AIAA 82-0728] A82-30176
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems [AIAA 82-0731] A82-30179
On the dynamic collapse of a column impacting a rigid surface [AIAA 82-0735] A82-30182
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings [NASA-TM-83296] N82-23193
Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958 N82-23494

DYNAMIC TESTS
Dynamic qualification testing of F-16 equipment N82-22159
The dynamic qualification of equipment and external stores for use with rotary winged aircraft N82-22167

E

EARLY WARNING SYSTEMS
Sea-based remotely piloted vehicles. I - Issues and concepts A82-29714

ECONOMIC FACTORS
Adaptation and equipment of aircraft for the fighting of forest fires A82-29584
Air Traffic Flow Management and Air Traffic Flow Control A82-29923

EFFECTIVE PERCEIVED NOISE LEVELS
Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison A82-29465

EFFECTIVENESS
The assessment of aircraft combat effectiveness using a new computational method N82-22203
Influence of maneuverability on helicopter combat effectiveness N82-23212

EJECTORS
Fluid dynamics of jets with applications to V/STOL [AGARD-CP-308] N82-23150
Thrust augmenting ejectors: A review of the application of jet mechanics to V/STOL aircraft propulsion N82-23169
Theoretical optimisation and experimental verification of an injector N82-23170
Unsteady ejectors N82-23171
Improvement of ejector thrust augmentation by pulsating or flapping jets N82-23172
Turboprop and turbojet ejector optimisation N82-23174

ELASTIC BENDING
The stability of monocoque panels under bending A82-29836

ELASTIC MEDIA
Elastic suspension of a wind tunnel test section N82-23363

ELASTIC PROPERTIES
Unsteady pressure measurements at stall and buffeting [DFVLR-MITT-79-09] N82-23198

ELECTRIC PULSES
Transient measurements under electric pulse excitation in 37 Viggen aircraft [FOA-C-30243-E3] N82-23409

ELECTRONIC RECORDING SYSTEMS
Development of a taped random vibration technique for acceptance testing N82-22171

ELECTRONIC WARFARE
Sea-based remotely piloted vehicles. I - Issues and concepts A82-29714

ELEVATORS (CONTROL SURFACES)
Elevator unit for the Alpha-Jet, made from carbon-fibre reinforced plastic A82-28649

ENERGY CONVERSION EFFICIENCY
Energy efficient engine exhaust mixer model technology [NASA-CR-165459] N82-22264

ENERGY POLICY
Fuel efficiency engines for large transport aircraft [PNR-90082] N82-22276

ENGINE AIRFRAME INTEGRATION
Advanced general aviation engine/airframe integration study [NASA-CR-165565] N82-22268

ENGINE CONTROL
Determination of an optimal control program for an aircraft power plant during climb A82-29845
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations N82-23214

ENGINE DESIGN
The gas turbine engine A82-28587
Sheet materials - Fabrication and joining --- for gas turbine engine components A82-28598
Future auto engines - Competition heats up A82-29793
Gas turbine engines used in aviation: Design and construction of components /5th revised and enlarged edition/ --- Russian book A82-30697
The role of modern control theory in the design of controls for aircraft turbine engines [NASA-TM-82815] N82-22262
Energy efficient engine exhaust mixer model technology [NASA-CR-165459] N82-22264
RB211 powerplant deterioration: Review of current situation and lessons learned [PNR-90073] N82-22270
Development of a correlated finite element dynamic model of a complete aero engine [PNR-90081] N82-22272
Parametric study of the influence of the engine upon the operating cost of a civil helicopter [SNIAS-827-210-102] N82-22273
Reliable power --- RB211 aircraft engines [PNR-90078] N82-22275
Fuel efficiency engines for large transport aircraft [PNR-90082] N82-22276
Alternatives for jet engine control [NASA-CR-168898] N82-23247
Advanced turbine study --- airfoil coling in rocket turbines [NASA-CR-162003] N82-23249

ENGINE FAILURE
Computer modeling of fan-exit-splitter spacing effects on F100 response to distortion [NASA-CR-167879] N82-23286

ENGINE INLETS
Effect of nacelles on aerodynamic characteristics of an executive-jet model with simulated, partial-chord, laminar-flow-control wing glove
[NASA-TM-83271] N82-22217
Development of a convoluted intake seal for model E66 --- v/stol wind tunnel
[BAE-ARG-163] N82-23255

ENGINE PARTS
The gas turbine engine
A82-28587
Gas turbine engines used in aviation: Design and construction of components /5th revised and enlarged edition/ --- Russian book
A82-30697
Chem-Braze abradable seal practical
A82-31048
Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines
A82-31643
Maintenance in Service of High Temperature Parts
[AGARD-CP-317] N82-22172
Military maintenance policies and procedures for high-temperature parts. Will they be adequate?
N82-22173
Engine depot maintenance repair technology
N82-22174
Maintenance problems in gas turbine components at the Royal Naval Aircraft Yard, Fleetlands --- helicopter and marine gas turbines
N82-22175
Maintenance experience with civil aero engines
N82-22176
Engine component retirement for cause
N82-22177
Defects and their effect on the behavior of gas turbine discs
N82-22178
Repair and regeneration of turbine blades, vanes and discs
N82-22185
The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
[PNR-90076] N82-22271
Advanced turbine study --- airfoil coling in rocket turbines
[NASA-CR-162003] N82-23249

ENGINE TESTS
New processes and methods of technical diagnostics and prognostics in the case of the engine NK-8-4. II
A82-29925

EPOXY MATRIX COMPOSITES
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036

EQUATIONS OF MOTION
Computational aerodynamics - Its coming of age and its future
A82-29773
Planar equations of rollout motion for an aircraft with free or steerable landing gears
[NASA-TP-1984] N82-23244

ERROR ANALYSIS
The reliability of height and identity data --- secondary surveillance radar error analysis
A82-30312
Technical approaches for measurement of human errors
[NASA-CR-166314] N82-22249

ESCAPE SYSTEMS
Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft
[AIAA 82-0705] A82-30096

EVACUATING (TRANSPORTATION)
Special investigation report: Evacuation of United Airlines DC-8-61, Sky Harbor International Airport, Phoenix, Arizona, December 29, 1980
[PB82-115619] N82-22236

EVALUATION
Experience with high performance V/STOL fighter projects at MBB
[MBB-FE-124/S/PUB/50] N82-23140

EXHAUST EMISSION
The effect of swirl burner aerodynamics on NOx formation
A82-28658

EXHAUST GASES
Calculation of the contributions of air traffic and road traffic to air pollution in the region of Schiphol airport in 1974
[NLR-TR-77100-U] N82-22808

EXHAUST NOZZLES
Energy efficient engine exhaust mixer model technology
[NASA-CR-165459] N82-22264

EXHAUST SYSTEMS
Energy efficient engine exhaust mixer model technology
[NASA-CR-165459] N82-22264
Turboprop and turbojet ejector optimisation
N82-23174
Computer modeling of fan-exit-splitter spacing effects on F100 response to distortion
[NASA-CR-167879] N82-23246

EXHAUST VELOCITY
Evaluation of the effects of model scale and test technique on jet-induced effects
N82-23167

EXTERNAL STORE SEPARATION
Design of dynamically-scaled, asymmetrical wind tunnel models
[NIAST-78/18] N82-22285

EXTERNAL STORES
Dynamic Environmental Qualification Techniques --- conference
[AGARD-CP-318] N82-22154
Development and use of dynamic qualification standards for Air Force stores
N82-22155
Qualification of equipment for gunfire induced vibration
N82-22158
Aircraft fuel tank slosh and vibration test
N82-22164
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166
The dynamic qualification of equipment and external stores for use with rotary winged aircraft
N82-22167
Application of modal synthesis techniques for the dynamic qualification of wings with stores
N82-22168

EXTRAVEHICULAR ACTIVITY
Extravehicular Activity/Air Traffic Control (EVA/ATC) test report --- communication links to the astronaut
[NASA-CR-167600] N82-23381

F

F-4 AIRCRAFT
An electronic control for an electrohydraulic active control landing gear for the F-4 aircraft
[NASA-CR-3552] N82-22252

F-15 AIRCRAFT
F-15 fighter abilities evaluated
A82-29592
Pressure measurements on twin vertical tails in buffeting flow
[AIAA 82-0641] A82-30138
Development of vibration qualification test spectra for the F-15 aircraft
N82-22160
Analysis of rotary balance data for the F-15 airplane including the effect of conformal fuel tanks
[NASA-CR-3479] N82-22213
Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results
N82-23185

F-16 AIRCRAFT
Dynamic qualification testing of F-16 equipment
N82-22159
Integration of avionics and advanced control technology
N82-22194

F-106 AIRCRAFT
The 1981 direct strike lightning data --- utilizing the F-106 aircraft [NASA-TM-83273] N82-22848
FABRICATION
Development of a homebuilt powered sailplane A82-29416
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements [NASA-CR-165809] N82-22315
FAIL-SAFE SYSTEMS
Damage tolerant design using collapse techniques [AIAA 82-0718] A82-30160
FAILURE ANALYSIS
Production Verification Testing (PVT) of guidance and control systems for high reliability N82-23107
FAILURE MODES
Defects and their effect on the behavior of gas turbine discs N82-22178
FAIRINGS
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft [NASA-CR-165841] N82-22316
FAN BLADES
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures [AIAA 82-0708] A82-30099
Bird impact analysis package for turbine engine fan blades [AIAA 82-0696] A82-30162
FASTENERS
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes A82-28932
FATIGUE (MATERIALS)
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981 [NLR-MP-81006-U] N82-22153
FATIGUE LIFE
On the characterization of damages in graphite-epoxy composites [AIAA 82-0757] A82-30117
Engine component retirement for cause N82-22177
Defects and their effect on the behavior of gas turbine discs N82-22178
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate --- for aircraft construction [NLR-MP-80047-U] N82-22360
FATIGUE TESTS
Production weldbonding on the A-10 aircraft A82-28995
Fatigue behavior of adhesively bonded joints A82-29032
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means [AIAA 82-0661] A82-30091
FAULT TOLERANCE
Analysis of computing system configurations for highly integrated guidance and control systems N82-23109
FEEDBACK CONTROL
Active control of aeroelastic divergence [AIAA 82-0684] A82-30151
Feedback control of a cantilever wing in steady airflow [AIAA 82-0729] A82-30177
Multivariable closed loop control analysis and synthesis for complex flight systems N82-22193
FIBER COMPOSITES
Processing and uses of carbon fibre reinforced plastics --- Book A82-28643
Tailor-made structures; today, and tomorrow: New materials, an exploratory investigation into their potential use --- in aircraft [BAE-SDM-85/A/104/005] N82-22253
FIBER ORIENTATION
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites [AIAA 82-0712] A82-30102
Shape optimization of fiber reinforced composites [AIAA 82-0719] A82-30169
FIBER REINFORCED COMPOSITES
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites [AIAA 82-0712] A82-30102
Shape optimization of fiber reinforced composites [AIAA 82-0719] A82-30169
FIGHTER AIRCRAFT
Flight qualification of composite structures at AMD-BA [AIAA 82-0755] A82-30116
Aircraft fuel tank slosh and vibration test N82-22164
Combat Aircraft Manoeuvrability [AGARD-CP-319] N82-22187
A review of recent AGARD Symposia on the Angle of Maneuverability of Combat Aircraft N82-22188
Review of practical experience on combat aircraft maneuverability N82-22189
The military flying qualities specification, a help or a hindrance to good fighter design --- flight control systems N82-22190
Enhanced piloting control through cockpit facilities and A.C.T. N82-22195
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology N82-22196
State of the art and recent perspectives on the study of the loss of control and spin N82-22197
Application of the theory of bifurcations to the study of the loss of control in combat aircraft N82-22198
Tail configurations for highly maneuverable combat aircraft N82-22201
Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot N82-22202
The assessment of aircraft combat effectiveness using a new computational method N82-22203
Evaluation of direct force mode fighters by combat simulation N82-22204
The study of combat aircraft maneuverability by air to air combat simulation N82-22205
Wind-tunnel investigation of the powered low-speed longitudinal aerodynamics of the Vectored-Engine-Over (VEO) wing fighter configuration [NASA-TM-83263] N82-22207
Multi-mission V/STOL with vectored thrust engines --- bombing, air superiority [PNR-90086] N82-22270
Experience with high performance V/STOL fighter projects at MBB [MBB-FE-124/S/PUB/50] N82-23140
Validation of zero-order feedback strategies for medium range air-to-air interception in a horizontal plane [NASA-TM-84237] N82-23237
FILLETS
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft [NASA-CR-165841] N82-22316
FILM COOLING
Advanced turbine study --- airfoil coling in rocket turbines [NASA-CR-162003] N82-23249
FINITE ELEMENT METHOD
Finite element thermal analysis of convectively-cooled aircraft structures A82-28565

Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft [AIAA 82-0705] A82-30096
Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method [AIAA 82-0742] A82-30107
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane --- dynamic response of aircraft tires [AIAA 82-0753] A82-30114

FINS
Concept studies of an advanced composite helicopter fin [SNIAS-821-210-106] N82-22257

FIRE CONTROL
Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results N82-23105

FIRE EXTINGUISHERS
Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports A82-29576
Fighting forest fires with the aid of aircraft in the United States of America A82-29577
Fighting forest fires - A task for the Swiss air force A82-29578
The current state of technology concerning the fighting of forest fires from the air in Austria A82-29579
The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel A82-29580
The utilization of aircraft in fighting forest fires - French experience A82-29581
The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system A82-29582
The employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires A82-29583
Adaptation and equipment of aircraft for the fighting of forest fires A82-29584

FIRE FIGHTING
Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports A82-29576
Fighting forest fires with the aid of aircraft in the United States of America A82-29577
Fighting forest fires - A task for the Swiss air force A82-29578
The current state of technology concerning the fighting of forest fires from the air in Austria A82-29579
The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel A82-29580
The utilization of aircraft in fighting forest fires - French experience A82-29581
The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system A82-29582
The employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires A82-29583
Adaptation and equipment of aircraft for the fighting of forest fires A82-29584
The employment of helicopters in Austria in connection with large-scale fires in buildings A82-29585
Performance characteristics and employment profiles of the new helicopter BK117 A82-29586

FIREPROOFING
Test methodology for evaluation of fireworthy aircraft seat cushions A82-29596

FIXED WINGS
Analysis and flight evaluation of a small, fixed-wing aircraft equipped with hinged plate spoilers [NASA-CR-166287] N82-22203
V/STOL aircraft and fluid dynamic N82-23179
New development in flying qualities with application to rotary wing aircraft N82-23226

FLAME PROPAGATION
The relaxation oscillation in ramjet combustion A82-28738

FLAPPING
Improvement of ejector thrust augmentation by pulsating or flapping jets N82-23172

FLAPPING HINGES
Turbulence-excited flapping motion of a rotor blade in hovering flight A82-29082

FLEXIBLE WINGS
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings [AIAA 82-0689] A82-30156

FLIGHT ALTITUDE
Checking and calibrating variometers in place in the sailplane instrument panel A82-29815

FLIGHT CHARACTERISTICS
Performance characteristics and employment profiles of the new helicopter BK117 A82-29586
Helicopter rotor performance improvement by utilization of swept-back parabolic blade tip --- wind tunnel tests N82-22151
Combat Aircraft Manoeuvrability [AGARD-CP-319] N82-22187
The military flying qualities specification, a help or a hindrance to good fighter design --- flight control systems N82-22190
Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test N82-22191
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps N82-22192
Multivariable closed loop control analysis and synthesis for complex flight systems N82-22193
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology N82-22196
Socata: TB 20 Trinidad given German debut [NASA-TM-76706] N82-22247
Applications of system identification methods to the prediction of helicopter stability, control and handling characteristics N82-23230

FLIGHT CONTROL
Combat Aircraft Manoeuvrability [AGARD-CP-319] N82-22187
The military flying qualities specification, a help or a hindrance to good fighter design --- flight control systems N82-22190
Multivariable closed loop control analysis and synthesis for complex flight systems N82-22193
Integration of avionics and advanced control technology N82-22194

The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
N82-22196

Application of the theory of bifurcations to the study of the loss of control in combat aircraft
N82-22198

Strapdown inertial navigation systems: An algorithm for attitude and navigation computations
[ARL/SYS-REPT-23] N82-22241

Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem
N82-23184

Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results
N82-23185

The integration of multiple avionic sensors and technologies for future military helicopters
N82-23186

Production Verification Testing (PVT) of guidance and control systems for high reliability
N82-23187

Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189

Flight tests for the assessment of task performance and control activity
N82-23213

An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216

Some piloting experiences with multifunction isometric side-arm controllers in a helicopter
N82-23218

Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219

State-of-the-art cockpit design for the HH-65A helicopters
N82-23220

The role of voice technology in advanced helicopter cockpits
N82-23223

Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236

ACTTA: Investigation of new piloting and flight control technologies. Volume 1: Review; active wing
[MBB-UH-05-81-VOL-1] N82-23252

ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability
[MBB-UH-05-81-VOL-2] N82-23253

FLIGHT CREWS

Low cost aircrew training devices
A82-29258

FLIGHT MECHANICS

A review of recent AGARD Symposia on the Angle of Maneuverability of Combat Aircraft
N82-22188

FLIGHT OPTIMIZATION

Comparison of light aircraft with strutted and cantilever wings
A82-29828

Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications
A82-29837

The maximum flying range problem for an aircraft
A82-31602

FLIGHT PATHS

Analysis and Monte Carlo simulation of near-terminal aircraft flight paths
[NASA-TP-1997] N82-23233

FLIGHT RECORDERS

A portable, low-cost flight-data measurement and recording system
[NASA-TM-84229] N82-22478

FLIGHT SAFETY

The investigation of aircraft accidents and incidents - Some recent national and international developments
A82-29275

Air Traffic Flow Management and Air Traffic Flow Control
A82-29923

FLIGHT SIMULATION

Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981
[NLR-MP-81006-U] N82-22153

Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot
N82-22202

Functional requirements for the man-vehicle systems research facility --- identifying and correcting human errors during flight simulation
[NASA-CR-166315] N82-22240

Application of Kalman filtering to the kinematic reconstruction of free flight of catapulted aircraft models in the laboratory
[IBFL-80-28] N82-22259

Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219

Helicopter simulation technology: An Ames Research Center perspective
N82-23227

A pilot in the loop analysis of helicopter acceleration/deceleration maneuvers
N82-23229

Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236

FLIGHT SIMULATORS

Low cost aircrew training devices
A82-29258

Flight simulators
A82-29924

Conceptual design study of a visual system for a rotorcraft simulator and some advances in platform motion utilization
[NASA-CR-166322] N82-22244

FLIGHT STABILITY TESTS

The stability of maneuverable flight vehicles
A82-29827

FLIGHT TESTS

F-15 fighter abilities evaluated
A82-29592

Fuel efficient and Mach 0.8, too
A82-29774

Flight qualification of composite structures at AMD-BA
[AIAA 82-0755] A82-30116

The helicopter Navstar GPS test program
A82-31290

Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test
N82-22191

Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps
N82-22192

Civil (French/US) certification of the Coast Guard's HH-65A Dauphin
N82-23210

Flight tests for the assessment of task performance and control activity
N82-23213

FLIGHT TRAINING

Low cost aircrew training devices
A82-29258

A tactual display aid for primary flight training
[NASA-CR-166242] N82-22238

A pilot in the loop analysis of helicopter acceleration/deceleration maneuvers
N82-23229

FLIGHT VEHICLES

The stability of maneuverable flight vehicles
A82-29827

FLIR DETECTORS
Definition of display/control requirements for assault transport night/adverse weather capability
N82-23217

FLOW CHARACTERISTICS
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-168764] N82-22947
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
[NASA-CR-166186] N82-23234
Blockage and flow studies of a generalized test apparatus including various wing configurations in the Langley 7-inch Mach 7 Pilot Tunnel
[NASA-TM-83301] N82-23471

FLOW DISTRIBUTION
The modeling and prediction of multiple jet VTOL aircraft flow fields in ground effect
N82-23166
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238

FLOW EQUATIONS
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150
An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
N82-23158

FLOW GEOMETRY
A Schwarz-Christoffel method for generating internal flow grids
A82-29005
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150
Flowfield and noise sources of jet impingement of flaps and ground surface
N82-23163
The modeling and prediction of multiple jet VTOL aircraft flow fields in ground effect
N82-23166
Jet effects on forces and moments of a VSTOL fighter type aircraft
N82-23168

FLOW MEASUREMENT
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
[NASA-CR-166186] N82-23234
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235

FLOW STABILITY
The excitation of compressor/duct systems
A82-28993

FLUID DYNAMICS
Thrust augmenting ejectors: A review of the application of jet mechanics to V/STOL aircraft propulsion
N82-23169
V/STOL aircraft and fluid dynamic
N82-23179
Unsteady pressure measurements at stall and buffeting
[DFVLR-MITT-79-09] N82-23198

FLUID INJECTION
Theoretical optimisation and experimental verification of an injector
N82-23170

FLUTTER
Measurement of aerodynamic work during fan flutter
A82-28987
Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates
[AIAA 82-0722] A82-30172
Application of optimal control techniques to aircraft flutter suppression and load alleviation
[AIAA 82-0724] A82-30173
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83278] N82-23240

FLUTTER ANALYSIS
A wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing
[AIAA 82-0642] A82-30139
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[AIAA 82-0647] A82-30143
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0678] A82-30146
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Flutter analysis using nonlinear aerodynamic forces
[AIAA 82-0728] A82-30176
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
A two-degree-of-freedom flutter mount system with low damping for testing rigid wings at different angles of attack
[NASA-TM-83302] N82-23549

FLY BY WIRE CONTROL
Some piloting experiences with multifunction isometric side-arm controllers in a helicopter
N82-23218

FLYWHEELS
Prototype flywheel spin testing program
[UCRL-15381] N82-22499

FORCED VIBRATION
Prediction of aerodynamically induced vibrations in turbomachinery blading
A82-28986

FOREST FIRES
Fighting fire and other disasters from the air; International Scientific-Technical Symposium, Hanover, West Germany, June 11, 12, 1980, Reports
A82-29576
Fighting forest fires with the aid of aircraft in the United States of America
A82-29577
Fighting forest fires - A task for the Swiss air force
A82-29578
The current state of technology concerning the fighting of forest fires from the air in Austria
A82-29579
The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel
A82-29580
The utilization of aircraft in fighting forest fires - French experience
A82-29581
The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system
A82-29582
The employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires
A82-29583
Adaptation and equipment of aircraft for the fighting of forest fires
A82-29584

FORMING TECHNIQUES
Sheet materials - Fabrication and joining --- for gas turbine engine components
A82-28594
SPF of high strength aluminum structures --- superplastic forming for complex aircraft structures
A82-28997

FRACTURE MECHANICS
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes
A82-28932
Engine component retirement for cause
N82-22177

FRACTURE STRENGTH
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate --- for aircraft construction
[NLR-MP-80047-U] N82-22360

FRACTURES (MATERIALS)
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
[AIAA 82-0760] A82-30119

FREE FLIGHT TEST APPARATUS
Design of dynamically-scaled, asymmetrical wind tunnel models
[NIAST-78/18] N82-22285

FREE JETS
Acoustic emission from free jets --- supersonic jets
N82-22962
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150
Flowfield and noise sources of jet impingement of flaps and ground surface
N82-23163

FREQUENCY STABILITY
Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices --- aircraft electric equipment
A82-28875

FRETTING
Occurrence of fretting fatigue failures in practice
A82-28543

FUEL COMBUSTION
The effect of swirl burner aerodynamics on NOx formation
A82-28658
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692
Advanced Low-Emissions Catalytic-Combustor Program, phase 1 --- aircraft gas turbine engines
[NASA-CR-159656] N82-22265

FUEL CONSUMPTION
Fuel efficient and Mach 0.8, too
A82-29774
Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications
A82-29837
Determination of an optimal control program for an aircraft power plant during climb
A82-29845
Advanced general aviation comparative engine/airframe integration study
[NASA-CR-165564] N82-22263
Energy efficient engine exhaust mixer model technology
[NASA-CR-165459] N82-22264
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
[SNIAS-827-210-102] N82-22273
Encounters with surge: Some experiences of development of axial compressors for aero gas turbines
[PNR-90071] N82-22274
Fuel efficiency engines for large transport aircraft
[PNR-90082] N82-22276

FUEL TANKS
Aircraft fuel tank slosh and vibration test
N82-22164
Analysis of rotary balance data for the F-15 airplane including the effect of conformal fuel tanks
[NASA-CR-3479] N82-22213

FULL SCALE TESTS
Transient measurements under electric pulse excitation in 37 Viggen aircraft
[FOA-C-30243-A3] N82-23409

FUNCTIONS (MATHEMATICS)
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29831

FUSELAGES
Structural integrity of an adhesively bonded aircraft fuselage
A82-28996
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition
[NASA-CR-165869] N82-22952
Wind tunnel investigations of sailplane fuselages with different lacings and wing settings --- aerodynamic drag measurement
N82-23200
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238

G

GAS DYNAMICS
Analysis of changes in the gas-dynamic parameters of a gas-turbine helicopter engine during acceleration
A82-29872

GAS STREAMS
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692

GAS TURBINE ENGINES
The gas turbine engine
A82-28587
Composite materials --- with emphasis for aircraft gas turbine parts
A82-28590
Sheet materials - Fabrication and joining --- for gas turbine engine components
A82-28594
Analysis of changes in the gas-dynamic parameters of a gas-turbine helicopter engine during acceleration
A82-29872
Gas turbine engines used in aviation: Design and construction of components /5th revised and enlarged edition/ --- Russian book
A82-30697
Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines
A82-31643
Maintenance in Service of High Temperature Parts
[AGARD-CP-317] N82-22172
Military maintenance policies and procedures for high-temperature parts. Will they be adequate?
N82-22173
Engine depot maintenance repair technology
N82-22174
Maintenance problems in gas turbine components at the Royal Naval Aircraft Yard, Fleetlands --- helicopter and marine gas turbines
N82-22175
Maintenance experience with civil aero engines
N82-22176
Engine component retirement for cause
N82-22177
Defects and their effect on the behavior of gas turbine discs
N82-22178
The influence of protective treatment on the mechanical properties of superalloy parts
N82-22180
Repair and regeneration of turbine blades, vanes and discs
N82-22185
Investigation of soot and carbon formation in small gas turbine combustors
[NASA-CR-167853] N82-22267

RB211 powerplant deterioration: Review of current situation and lessons learned
[PNR-90073] N82-22270
The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
[PNR-90076] N82-22271
Reliable power --- RB211 aircraft engines
[PNR-90078] N82-22275
Directional solidification: Project #2 --- of gas turbine rotor blade alloys
[PNR-90080] N82-22279
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations
N82-23214
Analysis of high load dampers
[NASA-CR-165503] N82-23240

GAS TURBINES
Basic technology of squeeze-film dampers for rotor dynamics control
[AD-A110842] N82-23250

GASDYNAMIC LASERS
Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
A82-29880

GASEOUS FUELS
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692

GEARS
Aviation gear drives and reducers: Handbook --- in Russian
A82-30675

GENERAL AVIATION AIRCRAFT
Maintenance experience with civil aero engines
N82-22176
Effect of nacelles on aerodynamic characteristics of an executive-jet model with simulated, partial-chord, laminar-flow-control wing glove
[NASA-TM-83271] N82-22217
Analysis and flight evaluation of a small, fixed-wing aircraft equipped with hinged plate spoilers
[NASA-CR-166247] N82-22243
Revolution in airplane construction? Grob G110: The first modern fiber glass composition airplane shortly before its maiden flight
[NASA-TM-76705] N82-22246

GEOMETRICAL THEORY OF DIFFRACTION
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers
[NASA-CR-168770] N82-22398

GERMANY
Developmental possibilities in civil aviation in the Federal Republic of Germany
N82-22230
Traffic infrastructure: Can planning still be carried through
N82-22232

GIMBALS
Composite bonds improve thermal integrity
A82-30004

GLASS FIBER REINFORCED PLASTICS
Composite materials --- with emphasis for aircraft gas turbine parts
A82-28590
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099
Revolution in airplane construction? Grob G110: The first modern fiber glass composition airplane shortly before its maiden flight
[NASA-TM-76705] N82-22246

GLIDERS
Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings
A82-29414
Checking and calibrating variometers in place in the sailplane instrument panel
A82-29415
Development of a homebuilt powered sailplane
A82-29416
NASA research related to sailplane airfoils
A82-29417
Service life investigation of a sailplane wing of CFRP construction
N82-22324
Wind tunnel investigations of sailplane fuselages with different lacings and wing settings --- aerodynamic drag measurement
N82-23200

GLOBAL POSITIONING SYSTEM
The helicopter Navstar GPS test program
A82-31290

GOVERNMENT PROCUREMENT
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147

GRAPHITE-EPOXY COMPOSITES
Composite bonds improve thermal integrity
A82-30004
Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites
[AIAA 82-0657] A82-30087
737 graphite-epoxy horizontal stabilizer certification
[AIAA 82-0745] A82-30109
On the characterization of damages in graphite-epoxy composites
[AIAA 82-0757] A82-30117
Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates
[AIAA 82-0722] A82-30172
A giant step toward composite helicopters
A82-30294
Concept studies of an advanced composite helicopter fin
[SNIAS-821-210-106] N82-22257
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-165826] N82-22314

GRAPHITE-POLYIMIDE COMPOSITES
Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites
[AIAA 82-0657] A82-30087
High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide
[AIAA 82-0711] A82-30125
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315

GRIDS
A Schwarz-Christoffel method for generating internal flow grids
A82-29005

GROUND BASED CONTROL
Helicopter simulation technology: An Ames Research Center perspective
N82-23227

GROUND EFFECT
Ground reflection effects in measuring propeller aircraft flyover noise
[DFVLR-FB-81-28] N82-22990

GROUND EFFECT (AERODYNAMICS)
Performance testing of a main rotor system for a utility helicopter at 1/4 scale
[NASA-TM-83274] N82-22251
The modeling and prediction of multiple jet VTOL aircraft flow fields in ground effect
N82-23166
Evaluation of the effects of model scale and test technique on jet-induced effects
N82-23167
Jet effects on forces and moments of a VSTOL fighter type aircraft
N82-23168
V/STOL aircraft and fluid dynamic
N82-23179

GROUND SPEED
Magnetic anomalies as a reference for ground-speed and map-matching navigation
A82-30314

GROUND TESTS
Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results
N82-23185

GUIDANCE SENSORS
The integration of multiple avionic sensors and technologies for future military helicopters
N82-23186

Sun sensing guidance system for high altitude aircraft
[NASA-CASE-FRC-11052-1] N82-23231

GUNFIRE
Qualification of equipment for gunfire induced vibration
N82-22158

GUNS (ORDNANCE)
Gunfire blast pressure predictions
N82-22170

GUST ALLEVIATORS
Control law design to meet constraints using SYNPAC-synthesis package for active controls
[NASA-TM-83264] N82-22280

GUST LOADS
Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I
A82-29871
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981
[NLR-MP-81006-U] N82-22153
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 7: Tilt Rotor Session
[NASA-TM-84705] N82-23243

H

HANG GLIDERS
Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings
A82-29414

HARMONIC OSCILLATION
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments
A82-29018

HARMONICS
An investigation of rotor harmonic noise by the use of small scale wind tunnel models
[NASA-CR-166337] N82-24050

HARRIER AIRCRAFT
Equipment vibration qualification for Harrier and Hawk aircraft
N82-22161

HEAD-UP DISPLAYS
Definition of display/control requirements for assault transport night/adverse weather capability
N82-23217

HEAT RESISTANT ALLOYS
The gas turbine engine
A82-28587
Sheet materials - Fabrication and joining --- for gas turbine engine components
A82-28594
An evaluation study of aluminide and chromoaluminide coatings on IN-100
A82-29597
Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines
A82-31643
The influence of protective treatment on the mechanical properties of superalloy parts
N82-22180
Directional solidification: Project E2 --- of gas turbine rotor blade alloys
[PNR-90088] N82-22279
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358

HEAT TRANSFER
Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958
N82-23494

HELICOPTER CONTROL
The helicopter Navstar GPS test program
A82-31290
Helicopter Handling Qualities
[NASA-CP-2219] N82-23208
VTOL and VSTOL handling qualities specifications, an overview of the current status
N82-23209
Boeing 234 flight control development
N82-23211
Flight tests for the assessment of task performance and control activity
N82-23213
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations
N82-23214
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216
Helicopter simulation technology: An Ames Research Center perspective
N82-23227
Applications of system identification methods to the prediction of helicopter stability, control and handling characteristics
N82-23230

HELICOPTER DESIGN
Performance characteristics and employment profiles of the new helicopter BK117
A82-29586
A giant step toward composite helicopters
A82-30294
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166
The dynamic qualification of equipment and external stores for use with rotary winged aircraft
N82-22167
Naval versions of the Dauphin and the AS 15 TT weapon system --- helicopters
[SNIAS-821-210-104] N82-22255
A light helicopter for night firing
[SNIAS-821-210-105] N82-22256
Concept studies of an advanced composite helicopter fin
[SNIAS-821-210-106] N82-22257
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
[SNIAS-827-210-102] N82-22273
Cockpit integration from a pilot's point of view
N82-23224
Integrated cockpit for A-129
N82-23225
Past applications and future potential of variable stability research helicopters
N82-23228
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 5: Propulsion Session
[NASA-TM-84207] N82-23241
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 6: Vehicle Configuration Session
[NASA-TM-84180] N82-23242

HELICOPTER ENGINES
Analysis of changes in the gas-dynamic parameters of a gas-turbine helicopter engine during acceleration
A82-29872
New processes and methods of technical diagnostics and prognostics in the case of the engine NK-8-4. II
A82-29925
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
[SNIAS-827-210-102] N82-22273
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations
N82-23214
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 5: Propulsion Session
[NASA-TM-84207] N82-23241

HELICOPTER PERFORMANCE
Fighting forest fires - A task for the Swiss air force
A82-29578
Performance characteristics and employment profiles of the new helicopter BK117
A82-29586
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166
Concept studies of an advanced composite helicopter fin
[SNIAS-821-210-106] N82-22257

Influence of maneuverability on helicopter combat effectiveness N82-23212

Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight N82-23215

New development in flying qualities with application to rotary wing aircraft N82-23226

A pilot in the loop analysis of helicopter acceleration/deceleration maneuvers N82-23229

HELICOPTER TAIL ROTORS

A complete method for computation of blade mode characteristics and responses in forward flight [SNIAS-821-210-101] N82-22254

Concept studies of an advanced composite helicopter fin [SNIAS-821-210-106] N82-22257

Tail rotor studies for satisfactory performance: Strength and dynamic behavior [SNIAS-821-210-108] N82-22258

HELICOPTERS

Turbulence-excited flapping motion of a rotor blade in hovering flight A82-29042

The employment of helicopters in Austria in connection with large-scale fires in buildings A82-29585

Dynamic Environmental Qualification Techniques --- conference [AGARD-CP-318] N82-22154

Maintenance problems in gas turbine components at the Royal Naval Aircraft Yard, Fleetlands --- helicopter and marine gas turbines N82-22175

Conceptual design study of a visual system for a rotorcraft simulator and some advances in platform motion utilization [NASA-CR-166322] N82-22244

RADIAK simulator for aircraft instruments [FOA-C-40136-A3] N82-22286

HELIPORTS

Airfield visual aids research at the Royal Aircraft Establishment [RAE-TM-FS-431] N82-22242

HELMET MOUNTED DISPLAYS

Definition of display/control requirements for assault transport night/adverse weather capability N82-23217

HIGH ALTITUDE

Sun sensing guidance system for high altitude aircraft [NASA-CASE-FRC-11052-1] N82-23231

HIGH SPEED

NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 6: Vehicle Configuration Session [NASA-TM-84180] N82-23242

HIGH STRENGTH ALLOYS

SPF of high strength aluminum structures --- superplastic forming for complex aircraft structures A82-28997

HIGH STRENGTH STEELS

Comparison of reliability, sensitivity and accuracy of some NDI-Techniques [NLR-MP-80039-U] N82-23542

HIGH TEMPERATURE TESTS

High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide [AIAA 82-0711] A82-30125

HIGHWAYS

Pavement management and rehabilitation of portland cement concrete pavements [PB82-131384] N82-22392

HINGES

Analysis of a multihinged empennage with allowance for shear strain A82-29834

HISTORIES

The Royal Aircraft Establishment: 100 years of research [RAE-TM-FS-432] N82-22144

Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958 N82-23494

HONEYCOMB STRUCTURES

Bonded aluminum honeycomb - Aircraft flight surface primary structure application [AIAA 82-0676] A82-30145

Concept studies of an advanced composite helicopter fin [SNIAS-821-210-106] N82-22257

HORIZONTAL FLIGHT

A complete method for computation of blade mode characteristics and responses in forward flight [SNIAS-821-210-101] N82-22254

Validation of zero-order feedback strategies for medium range air-to-air interception in a horizontal plane [NASA-TM-84237] N82-23237

HORIZONTAL TAIL SURFACES

737 graphite-epoxy horizontal stabilizer certification [AIAA 82-0745] A82-30109

HORN ANTENNAS

Research and development at MBB. Technical and scientific publications, 1981 N82-23137

HOT PRESSING

Repair and regeneration of turbine blades, vanes and discs N82-22105

HOT SURFACES

Powder metallurgical innovations for improved hot section alloys in aero-engine applications [PNR-90072] N82-22358

HOVERING

Performance testing of a main rotor system for a utility helicopter at 1/4 scale [NASA-TM-83274] N82-22251

Some aspects of jet dynamics and their implications for VTOL research N82-23151

Jet effects on forces and moments of a VSTOL fighter type aircraft N82-23168

HOVERING STABILITY

Turbulence-excited flapping motion of a rotor blade in hovering flight A82-29042

An analysis of a nonlinear instability in the implementation of a VTOL control system [NASA-TM-84220] N82-22281

HUMAN BEHAVIOR

A theory of human error [NASA-CR-166313] N82-22250

HUMAN FACTORS ENGINEERING

Technical approaches for measurement of human errors [NASA-CR-166314] N82-22249

A theory of human error [NASA-CR-166313] N82-22250

Controls and displays for all-weather operation of helicopters [MBB-UD-319-81-0] N82-22260

HUMAN PERFORMANCE

Functional requirements for the man-vehicle systems research facility --- identifying and correcting human errors during flight simulation [NASA-CR-166315] N82-22248

HUMAN TOLERANCES

Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison A82-29165

HYDRAULIC CONTROL

An electronic control for an electrohydraulic active control landing gear for the F-4 aircraft [NASA-CR-3552] N82-22252

HYDROCARBON COMBUSTION

NOx formation in flat, laminar, opposed jet methane diffusion flames A82-28660

I

IMAGE PROCESSING

Combat training imagery A82-31179

IMPACT DAMAGE

Bird impact analysis package for turbine engine fan blades [AIAA 82-0696] A82-30162

IMPACT LOADS
  On the dynamic collapse of a column impacting a rigid surface
  [AIAA 82-0735] A82-30182
IMPACT RESISTANCE
  Commercial jet transport crashworthiness
  [NASA-CR-165849] N82-23207
INERTIAL NAVIGATION
  Strapdown inertial navigation systems: An algorithm for attitude and navigation computations
  [ARL/SYS-REPT-23] N82-22241
  Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem
  N82-23184
INFRARED PHOTOGRAPHY
  Fighting forest fires with the aid of aircraft in the United States of America
  A82-29577
INFRARED RADIATION
  A light helicopter for night firing
  [SNIAS-821-210-105] N82-22256
INJECTORS
  Theoretical optimisation and experimental verification of an injector
  N82-23170
INLET FLOW
  The excitation of compressor/duct systems
  A82-28993
INLET NOZZLES
  Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet
  [NASA-CR-165617] N82-22211
INLET PRESSURE
  Computer modeling of fan-exit-splitter spacing effects on F100 response to distortion
  [NASA-CR-167879] N82-23246
INLET TEMPERATURE
  Computer modeling of fan-exit-splitter spacing effects on F100 response to distortion
  [NASA-CR-167879] N82-23246
INSPECTION
  Utility of a probability-density-function curve and F-maps in composite-material inspection
  A82-28934
  A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
  [AIAA 82-0760] A82-30119
  Comparison of reliability, sensitivity and accuracy of some NDI-Techniques
  [NLR-MP-80039-U] N82-23542
INSTRUMENT ERRORS
  The reliability of height and identity data --- secondary surveillance radar error analysis
  A82-30312
  Magnetic anomalies as a reference for ground-speed and map-matching navigation
  A82-30314
INTERNATIONAL COOPERATION
  The investigation of aircraft accidents and incidents - Some recent national and international developments
  A82-29275
  Collaborative development of aero-engines
  [PNR-90083] N82-22277
INTERNATIONAL LAW
  The investigation of aircraft accidents and incidents - Some recent national and international developments
  A82-29275
INVERTED CONVERTERS (DC TO AC)
  Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices --- aircraft electric equipment
  A82-28075

J

JET AIRCRAFT
  Commercial jet transport crashworthiness
  [NASA-CR-165849] N82-23207
JET AIRCRAFT NOISE
  Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques
  [NASA-CR-165867] N82-22949
  Acoustic emission from free jets --- supersonic jets
  N82-22962
  Prediction of flyover jet noise spectra from static tests
  N82-22963
JET ENGINE FUELS
  The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
  A82-28692
JET ENGINES
  Encounters with surge: Some experiences of development of axial compressors for aero gas turbines
  [PNR-90071] N82-22274
  Alternatives for jet engine control
  [NASA-CR-168894] N82-23247
JET EXHAUST
  An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
  N82-23158
JET FLAPS
  Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
  [NAL-TR-685T] N82-22953
JET FLOW
  The role of coherent structures in the generation of noise for subsonic jets
  [NASA-CR-168764] N82-22947
  Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
  [NAL-TR-685T] N82-22953
  Fluid dynamics of jets with applications to V/STOL
  [AGARD-CP-308] N82-23150
  Some aspects of jet dynamics and their implications for VTOL research
  N82-23151
  An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
  N82-23158
  Flowfield and noise sources of jet impingement of flaps and ground surface
  N82-23163
  Jet effects on forces and moments of a VSTOL fighter type aircraft
  N82-23168
  Theoretical optimisation and experimental verification of an injector
  N82-23170
  Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
  [NASA-CR-166187] N82-23235
JET IMPINGEMENT
  Fluid dynamics of jets with applications to V/STOL
  [AGARD-CP-308] N82-23150
  Flowfield and noise sources of jet impingement of flaps and ground surface
  N82-23163
JET LIFT
  Evaluation of the effects of model scale and test technique on jet-induced effects
  N82-23167
JET MIXING FLOW
  Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
  A82-29880
  Fluid dynamics of jets with applications to V/STOL
  [AGARD-CP-308] N82-23150
  Some aspects of jet dynamics and their implications for VTOL research
  N82-23151
  Unsteady ejectors
  N82-23171
JET PROPULSION
  Thrust augmenting ejectors: A review of the application of jet mechanics to V/STOL aircraft propulsion
  N82-23169
JET THRUST
  Reliable power --- RB211 aircraft engines
  [PNR-90078] N82-22275
  Experimental study of a jet deflector
  N82-23173

JOINTS (JUNCTIONS)
Fatigue behavior of adhesively bonded joints
A82-29032

K

KALMAN FILTERS
Optimal control and estimation for strapdown seeker guidance of tactical missiles
A82-31121
Application of Kalman filtering to the kinematic reconstruction of free flight of catapulted aircraft models in the laboratory
[IMFL-80-28] N82-22259
KERNEL FUNCTIONS
An accurate method for evaluating the kernel of the integral equation relating lift to downwash in unsteady potential flow
[NASA-TM-83281] N82-23194
KEVLAR (TRADEMARK)
Concept studies of an advanced composite helicopter fin
[SNIAS-821-210-106] N82-22257
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft
[NASA-CR-165841] N82-22316

L

L-1011 AIRCRAFT
Advanced technology DFCS control panel for the L-1011-500
[AIAA PAPER 81-2240] A82-29000
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft
[NASA-CR-165841] N82-22316
LAMINAR FLOW
NOx formation in flat, laminar, opposed jet methane diffusion flames
A82-28660
LAMINAR FLOW AIRFOILS
Drag reduction using pneumatic turbulators --- laminar airfoils
[DFVLR-FB-81-33] N82-22223
LANDING AIDS
Airfield visual aids research at the Royal Aircraft Establishment
[RAE-TM-FS-431] N82-22242
LANDING GEAR
An electronic control for an electrohydraulic active control landing gear for the F-4 aircraft
[NASA-CR-3552] N82-22252
Planar equations of rollout motion for an aircraft with free or steerable landing gears
[NASA-TP-1584] N82-23244
Comparison of reliability, sensitivity and accuracy of some NDI-Techniques
[NLR-MP-80039-U] N82-23542
LANDING INSTRUMENTS
Airfield visual aids research at the Royal Aircraft Establishment
[RAE-TM-FS-431] N82-22242
LANDING LOADS
An electronic control for an electrohydraulic active control landing gear for the F-4 aircraft
[NASA-CR-3552] N82-22252
LAP JOINTS
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means
[AIAA 82-0661] A82-30091
LASER GYROSCOPES
Laser gyros - The guiding light
A82-29792
LATERAL STABILITY
ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability
[MBB-UH-05-81-VOL-2] N82-23253
LAUNCH VEHICLES
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144
LEADING EDGES
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659
LEAST SQUARES METHOD
Optimization of measurements in the state estimation of systems using the least squares method
A82-29826
LEGAL LIABILITY
The investigation of aircraft accidents and incidents - Some recent national and international developments
A82-29275
LIFT
An accurate method for evaluating the kernel of the integral equation relating lift to downwash in unsteady potential flow
[NASA-TM-83281] N82-23194
LIFT AUGMENTATION
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment
[NAL-TR-686T] N82-22212
LIFT DEVICES
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment
[NAL-TR-686T] N82-22212
Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
[NAL-TR-685T] N82-22953
LIFT FANS
Evaluation of the effects of model scale and test technique on jet-induced effects
N82-23167
LIFTING ROTORS
Aerospatiale survey of wind tunnel testing of small and large scale rotors
[SNIAS-821-210-107] N82-22225
LIGHT AIRCRAFT
Comparison of light aircraft with strutted and cantilever wings
A82-29828
Socata: TB 20 Trinidad given German debut
[NASA-TM-76706] N82-22247
LIGHT BEAMS
Laser gyros - The guiding light
A82-29792
LIGHTNING
The 1981 direct strike lightning data --- utilizing the F-106 aircraft
[NASA-TM-83273] N82-22848
LINE OF SIGHT
Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236
LINEAR SYSTEMS
Estimation of the performance of nonstationary discontinuous control systems for flight vehicles
A82-29832
LIQUID SLOSHING
Aircraft fuel tank slosh and vibration test
N82-22164
LOAD DISTRIBUTION (FORCES)
Zone loading of flight-vehicle structures
A82-29838
LOADING RATE
Zone loading of flight-vehicle structures
A82-29838
LONGITUDINAL STABILITY
Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236
LOSSY MEDIA
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers
[NASA-CR-168770] N82-22398
LOW ASPECT RATIO WINGS
Aerodynamic performance of slender wings with separated flows
[NASA-CR-168768] N82-22206
Approximate method for predicting supersonic normal force coefficient very-low-aspect-ratio lifting surfaces
[AD-A111770] N82-23199

LOW COST
Low cost aircrew training devices
A82-29258

LOW PASS FILTERS
Real time digital filtering test in the S1 continuous wind tunnel at Modane
N82-22152

LOW SPEED WIND TUNNELS
Jet V/STOL wind-tunnel simulation and groundplane effects
N82-23165

LOW THRUST
Comment on 'Optimal control via mathematical programming'
A82-31125

LUBRICATING OILS
Basic technology of squeeze-film dampers for rotor dynamics control
[AD-A110842] N82-23250

LUGS
Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method
[AIAA 82-0742] A82-30107

M

MACHINE TOOLS
Tool use in cutting operations involving integral structural components in aircraft construction
A82-28873

MAGNETIC ANOMALIES
Magnetic anomalies as a reference for ground-speed and map-matching navigation
A82-30314

MAGNETIC CONTROL
Effects of cable geometry and aircraft attitude on the accuracy of a magnetic leader cable system for aircraft guidance during rollout and turnoff
[NASA-TP-1978] N82-22239

MAGNETIC FIELDS
Transient measurements under electric pulse excitation in 37 Viggen aircraft
[FOA-C-30243-A3] N82-23409

MAINTENANCE
Maintenance in Service of High Temperature Parts
[AGARD-CP-317] N82-22172
Maintenance problems in gas turbine components at the Royal Naval Aircraft Yard, Fleetlands --- helicopter and marine gas turbines
N82-22175
Repair and regeneration of turbine blades, vanes and discs
N82-22185
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

MAN MACHINE SYSTEMS
Flight simulators
A82-29924
Functional requirements for the man-vehicle systems research facility --- identifying and correcting human errors during flight simulation
[NASA-CR-166315] N82-22248
Technical approaches for measurement of human errors
[NASA-CR-166314] N82-22249

MANAGEMENT METHODS
A system safety model for developmental aircraft programs
[NASA-CR-3534] N82-22228

MANAGEMENT SYSTEMS
Air Traffic Flow Management and Air Traffic Flow Control
A82-29923

MANEUVERABILITY
Combat Aircraft Manoeuvrability
[AGARD-CP-319] N82-22187
A review of recent AGARD Symposia on the Angle of Maneuverability of Combat Aircraft
N82-22188
Review of practical experience on combat aircraft manoeuverability
N82-22189
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps
N82-22192
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
N82-22196
State of the art and recent perspectives on the study of the loss of control and spin
N82-22197
Aeroelastic tailoring for control and performance: Are requirements compatible?
N82-22200
Tail configurations for highly maneuverable combat aircraft
N82-22201
The study of combat aircraft maneuverability by air to air combat simulation
N82-22205
Helicopter Handling Qualities
[NASA-CP-2219] N82-23208
Influence of maneuverability on helicopter combat effectiveness
N82-23212

MANUFACTURING
Applications of structural adhesives in production
A82-28808
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315

MAP MATCHING GUIDANCE
Magnetic anomalies as a reference for ground-speed and map-matching navigation
A82-30314

MARINE PROPULSION
Maintenance problems in gas turbine components at the Royal Naval Aircraft Yard, Fleetlands --- helicopter and marine gas turbines
N82-22175

MASS DISTRIBUTION
An automated technique for improving modal test/analysis correlation
[AIAA 82-0640] A82-30137

MATERIALS RECOVERY
Critical metals conservation, recycling and substitution
[AGARD-R-693] N82-22348

MATERIALS SCIENCE
New materials fly better and cheaper
A82-31426

MATERIALS TESTS
Test methodology for evaluation of fireworthy aircraft seat cushions
A82-29596

MATHEMATICAL MODELS
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29831
Theoretical optimisation and experimental verification of an injector
N82-23170
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport
[DFVLR-MITT-82-01] N82-23560

MATHEMATICAL PROGRAMMING
Comment on 'Optimal control via mathematical programming'
A82-31125

MATRIX METHODS
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems
[AIAA 82-0731] A82-30179

MEASURE AND INTEGRATION
Optimization of measurements in the state estimation of systems using the least squares method
A82-29826

MEASURING INSTRUMENTS
A portable, low-cost flight-data measurement and recording system
[NASA-TM-84229] N82-22478

MECHANICAL DRIVES
Aviation gear drives and reducers: Handbook --- in Russian
A82-30675
Advanced general aviation comparative engine/airframe integration study
[NASA-CR-165564] N82-22263

MECHANICAL PROPERTIES
Composite materials --- with emphasis for aircraft gas turbine parts
A82-28590
Processing and uses of carbon fibre reinforced plastics --- Book
A82-28643
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036
A review of U.S. Air Force research related to airframe and engine materials
A82-29268
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099
Environmental and high strain rate effects on composites for engine applications
[AIAA 82-0758] A82-30118
Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines
A82-31643
The influence of protective treatment on the mechanical properties of superalloy parts
N82-22180

METAL CUTTING
Tool use in cutting operations involving integral structural components in aircraft construction
A82-28873

METAL FATIGUE
Occurrence of fretting fatigue failures in practice
A82-28543
Some case studies and the significance of fatigue thresholds --- aircraft components
[NLR-MP-81015-U] N82-23561

METAL JOINTS
Sheet materials - Fabrication and joining --- for gas turbine engine components
A82-28594

METAL PLATES
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers
[NASA-CR-168770] N82-22398

METAL SHEETS
Sheet materials - Fabrication and joining --- for gas turbine engine components
A82-28594

METAL WORKING
SPF of high strength aluminum structures --- superplastic forming for complex aircraft structures
A82-28997

METAL-METAL BONDING
Structural integrity of an adhesively bonded aircraft fuselage
A82-28996

METALS
Critical metals conservation, recycling and substitution
[AGARD-R-693] N82-22348

METEOROLOGICAL INSTRUMENTS
Instruments and installations for meteorological measurements at airports --- Russian book
A82-28826

METHANE
NOx formation in flat, laminar, opposed jet methane diffusion flames
A82-28660

MICROPROCESSORS
The micro revolution comes to civil air transport
A82-29259

MILITARY AIRCRAFT
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
[AIAA 82-0760] A82-30119
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147

MILITARY HELICOPTERS
The structural dynamic interface required for developing helicopter target acquisition systems
N82-22165
Naval versions of the Dauphin and the AS 15 TT weapon system --- helicopters
[SNIAS-821-210-104] N82-22255
Controls and displays for all-weather operation of helicopters
[MBB-UD-319-81-O] N82-22260
The integration of multiple avionic sensors and technologies for future military helicopters
N82-23186
VTOL and VSTOL handling qualities specifications, an overview of the current status
N82-23209
Civil (French/US) certification of the Coast Guard's HH-65A Dauphin
N82-23210
Influence of maneuverability on helicopter combat effectiveness
N82-23212
Definition of display/control requirements for assault transport night/adverse weather capability
N82-23217
Some piloting experiences with multifunction isometric side-arm controllers in a helicopter
N82-23218
Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219
State-of-the-art cockpit design for the HH-65A helicopters
N82-23220
Performance evaluation of a kinesthetic-tactual display
N82-23221
Synthesis of an integrated cockpit management system
N82-23222
The role of voice technology in advanced helicopter cockpits
N82-23223
Cockpit integration from a pilot's point of view
N82-23224

MILITARY TECHNOLOGY
V/STOL aircraft and fluid dynamic
N82-23179

MISSILE BODIES
Research and development at MBB. Technical and scientific publications, 1981
N82-23137

MISSILE CONTROL
Optimal control and estimation for strapdown seeker guidance of tactical missiles
A82-31121

MISSILE DESIGN
Approximate method for predicting supersonic normal force coefficient very-low-aspect-ratio lifting surfaces
[AD-A111770] N82-23199

MISSILE SYSTEMS
Naval versions of the Dauphin and the AS 15 TT weapon system --- helicopters
[SNIAS-821-210-104] N82-22255

MIXING LENGTH FLOW THEORY
Thrust augmenting ejectors: A review of the application of jet mechanics to V/STOL aircraft propulsion
N82-23169
Unsteady ejectors
N82-23171
Improvement of ejector thrust augmentation by pulsating or flapping jets
N82-23172

MODAL RESPONSE
A complete method for computation of blade mode characteristics and responses in forward flight
[SNIAS-821-210-101] N82-22254

MOISTURE CONTENT
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036

MOLECULAR RELAXATION
Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
A82-29880

MOTOR VEHICLES
Calculation of the contributions of air traffic and road traffic to air pollution in the region of Schiphol airport in 1974
[NLR-TR-77100-U] N82-22808

MRCA AIRCRAFT
Qualification of equipment for gunfire induced vibration
N82-22158

N

NACELLES
Effect of nacelles on aerodynamic characteristics of an executive-jet model with simulated, partial-chord, laminar-flow-control wing glove
[NASA-TM-83271] N82-22217
RB211 powerplant deterioration: Review of current situation and lessons learned
[PNR-90073] N82-22270
Development of a correlated finite element dynamic model of a complete aero engine
[PNR-90081] N82-22272
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238
Development of a convoluted intake seal for model R66 --- v/stol wind tunnel
[BAE-ARG-163] N82-23255

NAP-OF-THE-EARTH NAVIGATION
Helicopter Handling Qualities
[NASA-CP-2219] N82-23208
Flight tests for the assessment of task performance and control activity
N82-23213
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations
N82-23214
Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight
N82-23215
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216

NASA PROGRAMS
The 1983 NASA Authorization, Volume 1
[GPO-91-488-VOL-1] N82-23060

NAVIGATION
Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189

NAVIGATION INSTRUMENTS
Magnetic anomalies as a reference for ground-speed and map-matching navigation
A82-30314

NAVSTAR SATELLITES
The helicopter Navstar GPS test program
A82-31290

NAVY
Sea-based remotely piloted vehicles. I - Issues and concepts
A82-29718

NICKEL ALLOYS
The gas turbine engine
A82-28587
An evaluation study of aluminide and chromoaluminide coatings on IN-100
A82-29597
Directional solidification: Project B2 --- of gas turbine rotor blade alloys
[PNR-90088] N82-22279

NIGHT FLIGHTS (AIRCRAFT)
A light helicopter for night firing
[SNIAS-821-210-105] N82-22256
Helicopter Handling Qualities
[NASA-CP-2219] N82-23208
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216

NIGHT VISION
Definition of display/control requirements for assault transport night/adverse weather capability
N82-23217

NITROGEN OXIDES
The effect of swirl burner aerodynamics on NOx formation
A82-28658
NOx formation in flat, laminar, opposed jet methane diffusion flames
A82-28660

NOISE MEASUREMENT
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-168764] N82-22947
Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques
[NASA-CR-165867] N82-22949
Recommendations for field measurements of aircraft noise
[NASA-CR-3540] N82-22955
An investigation of rotor harmonic noise by the use of small scale wind tunnel models
[NASA-CR-166337] N82-24050

NOISE PREDICTION (AIRCRAFT)
STOL aircraft structural vibration prediction from acoustic excitation
N82-22169
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition
[NASA-CR-165869] N82-22952
Prediction of flyover jet noise spectra from static tests
N82-22963

NOISE PROPAGATION
Experiments on propeller noise
N82-22978

NOISE SPECTRA
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-168764] N82-22947
Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques
[NASA-CR-165867] N82-22949
Prediction of flyover jet noise spectra from static tests
N82-22963

NOISE TOLERANCE
Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison
A82-29165

NONDESTRUCTIVE TESTS
Utility of a probability-density-function curve and F-maps in composite-material inspection
A82-28934
On the characterization of damages in graphite-epoxy composites
[AIAA 82-0757] A82-30117
Comparison of reliability, sensitivity and accuracy of some NDI-Techniques
[NLR-MP-80039-U] N82-23542

NONLINEAR SYSTEMS
Flutter analysis using nonlinear aerodynamic forces
[AIAA 82-0728] A82-30176
Application of the theory of bifurcations to the study of the loss of control in combat aircraft
N82-22198
An analysis of a nonlinear instability in the implementation of a VTOL control system
[NASA-TM-84220] N82-22281

NOZZLE FLOW
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data --- for turbofan mixer nozzle mixing process analysis
A82-29008
Some aspects of jet dynamics and their implications for VTOL research
N82-23151

NOZZLE GEOMETRY
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet
[NASA-CR-165617] N82-22211
Experimental study of a jet deflector
N82-23173

NOZZLE THRUST COEFFICIENTS
Wind-tunnel investigation of the powered low-speed longitudinal aerodynamics of the Vectored-Engine-Over (VEO) wing fighter configuration
[NASA-TM-83263] N82-22207

NUMERICAL CONTROL
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments
A82-29018

Test demonstration of digital control of wing/store flutter [AIAA 82-0645] A82-30141

NUMERICAL FLOW VISUALIZATION
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data --- for turbofan mixer nozzle mixing process analysis A82-29008

NUMERICAL INTEGRATION
A Schwarz-Christoffel method for generating internal flow grids A82-29005

O

OBSTACLE AVOIDANCE
Integrated navigation-TF/TA-system based on stored terrain data processing N82-23183

ON-LINE SYSTEMS
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests --- conducted in the Langley Transonic Dynamics Tunnel [NASA-TM-83278] N82-23240

OPERATORS (PERSONNEL)
A theory of human error [NASA-CR-166313] N82-22250

OPTICAL GYROSCOPES
Laser gyros - The guiding light A82-29792

OPTIMAL CONTROL
Determination of an optimal control program for an aircraft power plant during climb A82-29845
Application of optimal control techniques to aircraft flutter suppression and load alleviation [AIAA 82-0724] A82-30173
Optimal control and estimation for strapdown seeker guidance of tactical missiles A82-31121
Multivariable closed loop control analysis and synthesis for complex flight systems N82-22193

OPTIMIZATION
Optimization of measurements in the state estimation of systems using the least squares method A82-29826
Design principles of a computer-aided design system A82-29829
Shape optimization of fiber reinforced composites [AIAA 82-0719] A82-30169
A linear decomposition method for large optimization problems. Blueprint for development [NASA-TM-83248] N82-22245

OSCILLATING FLOW
The relaxation oscillation in ramjet combustion A82-28738

OSCILLATIONS
Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter [NASA-TM-83267] N82-23236

OZONOMETRY
Aircraft cabin air ozone contamination and compliance with regulations A82-31057

P

PANEL METHOD (FLUID DYNAMICS)
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method [AIAA PAPER 82-0727] A82-30193

PANELS
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft [NASA-CR-165841] N82-22316

PARABOLIC BODIES
Helicopter rotor performance improvement by utilization of swept-back parabolic blade tip --- wind tunnel tests N82-22151

PARACHUTE DESCENT
The stressed state of a parachute canopy during opening A82-29820

PARAMETER IDENTIFICATION
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition [NASA-CR-165869] N82-22952
Analysis and Monte Carlo simulation of near-terminal aircraft flight paths [NASA-TP-1997] N82-23233

PAVEMENTS
Pavement management and rehabilitation of portland cement concrete pavements [PB82-131384] N82-22392

PERFORMANCE PREDICTION
Prediction of aerodynamically induced vibrations in turbomachinery blading A82-28986
Estimation of the performance of nonstationary discontinuous control systems for flight vehicles A82-29832

PERFORMANCE TESTS
Tail rotor studies for satisfactory performance: Strength and dynamic behavior [SNIAS-821-210-108] N82-22258
Production Verification Testing (PVT) of guidance and control systems for high reliability N82-23187

PILOT ERROR
Functional requirements for the man-vehicle systems research facility --- identifying and correcting human errors during flight simulation [NASA-CR-166315] N82-22248
A theory of human error [NASA-CR-166313] N82-22250

PILOT PERFORMANCE
Enhanced piloting control through cockpit facilities and A.C.T. N82-22195
Technical approaches for measurement of human errors [NASA-CR-166314] N82-22249
Flight tests for the assessment of task performance and control activity N82-23213

PILOT TRAINING
Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot N82-22202

PISTON ENGINES
Advanced general aviation comparative engine/airframe integration study [NASA-CR-165564] N82-22263

PITCHING MOMENTS
A two-degree-of-freedom flutter mount system with low damping for testing rigid wings at different angles of attack [NASA-TM-83302] N82-23549

PLASTIC AIRCRAFT STRUCTURES
Addition polyimide adhesives containing various end groups A82-29098
On the characterization of damages in graphite-epoxy composites [AIAA 82-0757] A82-30117
A giant step toward composite helicopters A82-30294

PNEUMATIC EQUIPMENT
Drag reduction using pneumatic turbulators --- laminar airfoils [DFVLR-FB-81-33] N82-22223

POLICIES
Developmental possibilities and restrictions in air transport [DFVLR-MITT-81-9] N82-22229

POLLUTION MONITORING
Aircraft cabin air ozone contamination and compliance with regulations A82-31057

POLYIMIDE RESINS
Addition polyimide adhesives containing various end groups A82-29098

POLYMER MATRIX COMPOSITES
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites
[AIAA 82-0712] A82-30102
POSITION ERRORS
The reliability of height and identity data --- secondary surveillance radar error analysis
A82-30312
POTENTIAL FLOW
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[AIAA 82-0689] A82-30156
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[NASA-TM-83296] N82-23193
An accurate method for evaluating the kernel of the integral equation relating lift to downwash in unsteady potential flow
[NASA-TM-83281] N82-23194
POWDER METALLURGY
Development of low-cost titanium structures using blended elemental powder metallurgy
A82-28998
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358
POWER EFFICIENCY
Analysis of changes in the gas-dynamic parameters of a gas-turbine helicopter engine during acceleration
A82-29872
POWERED MODELS
Development of a convoluted intake seal for model B66 --- v/stol wind tunnel
[BAE-ARG-163] N82-23255
PREDICTION ANALYSIS TECHNIQUES
New processes and methods of technical diagnostics and prognostics in the case of the engine NK-8-4. II
A82-29925
Gunfire blast pressure predictions
N82-22170
Predictions of aerodynamic characteristics of highly maneuverable configurations
N82-22199
PREDICTIONS
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83278] N82-23240
PREPREGS
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099
PRESSURE DISTRIBUTION
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
A flight investigation of blade-section aerodynamics for a helicopter main rotor having RC-SC2 airfoil sections
[NASA-TM-83298] N82-23192
PRESSURE DRAG
An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
N82-23158
PRESSURE GRADIENTS
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9 --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83297] N82-23195
PRESSURE MEASUREMENT
Pressure measurements on twin vertical tails in buffeting flow
[AIAA 82-0641] A82-30138
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153
PRESSURE PULSES
The excitation of compressor/duct systems
A82-28993
PRESSURE RATIO
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.77, respectively, and with design pressure ratio of 2.05
[NASA-TP-2001] N82-22269
PROBABILITY DENSITY FUNCTIONS
Utility of a probability-density-function curve and F-maps in composite-material inspection
A82-28934
PROBLEM SOLVING
A complete method for computation of blade mode characteristics and responses in forward flight
[SNIAS-821-210-101] N82-22254
PRODUCT DEVELOPMENT
Collaborative development of aero-engines
[PNR-90083] N82-22277
PRODUCTION ENGINEERING
Applications of structural adhesives in production
A82-28808
Directional solidification: Project B2 --- of gas turbine rotor blade alloys
[PNR-90008] N82-22279
PROGNOSIS
Developmental possibilities and restrictions in air transport
[DFVLR-MITT-81-9] N82-22229
Developmental possibilities in civil aviation in the Federal Republic of Germany
N82-22230
PROJECT MANAGEMENT
A system safety model for developmental aircraft programs
[NASA-CR-3534] N82-22220
PROPELLANT EXPLOSIONS
Gunfire blast pressure predictions
N82-22170
PROPELLER BLADES
A flight investigation of blade-section aerodynamics for a helicopter main rotor having RC-SC2 airfoil sections
[NASA-TM-83298] N82-23192
PROPELLER DRIVE
Ground reflection effects in measuring propeller aircraft flyover noise
[DFVLR-FB-81-28] N82-22990
PROPELLER FANS
Fuel efficient and Mach 0.8, too
A82-29774
New processes and methods of technical diagnostics and prognostics in the case of the engine NK-8-4. II
A82-29925
PROPELLERS
Experiments on propeller noise
N82-22976
PROPRIOCEPTION
A tactual display aid for primary flight training
[NASA-CR-166242] N82-22228
PROPULSION
Jet V/STOL wind-tunnel simulation and groundplane effects
N82-23165
PROPULSION SYSTEM CONFIGURATIONS
The role of modern control theory in the design of controls for aircraft turbine engines
[NASA-TM-82815] N82-22262
PROPULSION SYSTEM PERFORMANCE
NASA/FAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 5: Propulsion Session
[NASA-TM-84207] N82-23241
PROTECTIVE COATINGS
An evaluation study of aluminide and chromoaluminide coatings on IN-100
A82-29597
The influence of protective treatment on the mechanical properties of superalloy parts
N82-22180

Q

QUALIFICATIONS
Development and use of dynamic qualification standards for Air Force stores
N82-22155

QUALITY CONTROL
Development of a taped random vibration technique for acceptance testing
N82-22171

R

RADAR ANTENNAS
Distributed airborne array concepts
A82-31669

RADAR BEACONS
Secondary radar for airborne collision avoidance
A82-30313

RADAR DETECTION
Distributed airborne array concepts
A82-31669

RADIATION DETECTORS
RADIAK simulator for aircraft instruments
[FOA-C-40136-A3] N82-22286

RADIO NAVIGATION
The helicopter Navstar GPS test program
A82-31290

RAIL TRANSPORTATION
Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison
A82-29165

RAMJET ENGINES
The relaxation oscillation in ramjet combustion
A82-28738

REAL TIME OPERATION
Real time digital filtering test in the S1 continuous wind tunnel at Modane
N82-22152

REATTACHED FLOW
Experimental study of a jet deflector
N82-23173

RECORDING INSTRUMENTS
A portable, low-cost flight-data measurement and recording system
[NASA-TM-84229] N82-22478

RECTANGULAR WINGS
Analysis of shells of straight-wing type
A82-29841

RECYCLING
Critical metals conservation, recycling and substitution
[AGARD-R-693] N82-22348

REFLECTED WAVES
Ground reflection effects in measuring propeller aircraft flyover noise
[DFVLR-FB-81-28] N82-22990

REFRACTORY MATERIALS
Maintenance in Service of High Temperature Parts
[AGARD-CP-317] N82-22172
Military maintenance policies and procedures for high-temperature parts. Will they be adequate?
N82-22173

REGENERATION (ENGINEERING)
Repair and regeneration of turbine blades, vanes and discs
N82-22165

REGULATIONS
Traffic intrastructure: Can planning still be carried through
N82-22232

RELIABILITY ANALYSIS
The reliability of height and identity data --- secondary surveillance radar error analysis
A82-30312
Production Verification Testing (PVT) of guidance and control systems for high reliability
N82-23187

REMOTE SENSORS
Improvements to secondary radar for air traffic control
A82-30311
Magnetic anomalies as a reference for ground-speed and map-matching navigation
A82-30314

REMOTELY PILOTED VEHICLES
Sea-based remotely piloted vehicles. I - Issues and concepts
A82-29714

RESCUE OPERATIONS
The employment of helicopters in Austria in connection with large-scale fires in buildings
A82-29585
Performance characteristics and employment profiles of the new helicopter BK117
A82-29506
Naval versions of the Dauphin and the AS 15 TT weapon system --- helicopters
[SNIAS-821-210-104] N82-22255

RESEARCH AND DEVELOPMENT
A review of U.S. Air Force research related to airframe and engine materials
A82-29268
The Royal Aircraft Establishment: 100 years of research
[RAE-TM-FS-432] N82-22144
Research and development at MBB. Technical and scientific publications, 1981
N82-23137

RESEARCH FACILITIES
Functional requirements for the man-vehicle systems research facility --- identifying and correcting human errors during flight simulation
[NASA-CR-166315] N82-22248

RESIDUAL STRESS
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes
A82-28932

RESIN BONDING
Addition polyimide adhesives containing various end groups
A82-29098

RESIN MATRIX COMPOSITES
Tailor-made structures; today, and tomorrow: New materials, an exploratory investigation into their potential use --- in aircraft
[BAE-SDR-85/A/104/005] N82-22253

RETIREMENT FOR CAUSE
Engine component retirement for cause
N82-22177

REVERBERATION
Acoustic noise test as part of the dynamic qualification program in aerospace
N82-22162

RIGID STRUCTURES
An automated technique for improving modal test/analysis correlation
[AIAA 82-0640] A82-30137
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150
On the dynamic collapse of a column impacting a rigid surface
[AIAA 82-0735] A82-30182

RIGID WINGS
A two-degree-of-freedom flutter mount system with low damping for testing rigid wings at different angles of attack
[NASA-TM-83302] N82-23549

RODS
Shape optimization of fiber reinforced composites
[AIAA 82-0719] A82-30169

ROLL
Planar equations of rollout motion for an aircraft with free or steerable landing gears
[NASA-TP-1984] N82-23244

ROOFS
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport
[DFVLR-MITT-82-01] N82-23560

ROTARY STABILITY
Stability and self-oscillations of coaxial rotors
A82-31603

ROTARY WING AIRCRAFT
Review of rotorcraft accidents 1977-1979
[PB82-115601] N82-22237
New development in flying qualities with application to rotary wing aircraft
N82-23226
Past applications and future potential of variable stability research helicopters
N82-23228
Applications of system identification methods to the prediction of helicopter stability, control and handling characteristics
N82-23230
NASA/NAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 6: Vehicle Configuration Session
[NASA-TM-84180] N82-23242

ROTARY WINGS
Turbulence-excited flapping motion of a rotor blade in hovering flight
A82-29042
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems
[AIAA 82-0731] A82-30179
La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981 --- aerospace R and D methodology and instrumentation
[ESA-TT-725] N82-22145
Helicopter rotor performance improvement by utilization of swept-back parabolic blade tip --- wind tunnel tests
N82-22151
Performance testing of a main rotor system for a utility helicopter at 1/4 scale
[NASA-TM-83274] N82-22251
A flight investigation of blade-section aerodynamics for a helicopter main rotor having RC-SC2 airfoil sections
[NASA-TM-83298] N82-23192
Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight
N82-23215
NASA/FAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 6: Vehicle Configuration Session
[NASA-TM-84180] N82-23242
An investigation of rotor harmonic noise by the use of small scale wind tunnel models
[NASA-CR-166337] N82-24050

ROTATING DISKS
Defects and their effect on the behavior of gas turbine discs
N82-22178

ROTOR AERODYNAMICS
Analysis of rotary balance data for the F-15 airplane including the effect of conformal fuel tanks
[NASA-CR-3479] N82-22213
Performance testing of a main rotor system for a utility helicopter at 1/4 scale
[NASA-TM-83274] N82-22251
Prototype flywheel spin testing program
[UCRL-15381] N82-22499

ROTOR BLADES (TURBOMACHINERY)
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.77, respectively, and with design pressure ratio of 2.05
[NASA-TP-2001] N82-22269

ROTORS
Measurement of aerodynamic work during fan flutter
A82-28987
Stability and self-oscillations of coaxial rotors
A82-31603
Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines
A82-31643
Basic technology of squeeze-film dampers for rotor dynamics control
[AD-A110842] N82-23250

RUNWAYS
Measures to increase airfield capacity by changing aircraft runway occupancy characteristics
[NASA-CR-168841] N82-22240
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

S

SAAB 37 AIRCRAFT
Transient measurements under electric pulse excitation in 37 Viggen aircraft
[FOA-C-30243-A3] N82-23409

SAFETY DEVICES
Sudden changes in wind velocity - their effect on aircraft and means of reducing hazard. I
A82-29871

SAILWINGS
Service life investigation of a sailplane wing of CFRP construction
N82-22324

SATELLITE NAVIGATION SYSTEMS
The helicopter Navstar GPS test program
A82-31290

SCALE MODELS
Aerospatiale survey of wind tunnel testing of small and large scale rotors
[SNIAS-821-210-107] N82-22225
Design of dynamically-scaled, asymmetrical wind tunnel models
[NIAST-78/18] N82-22285

SCALING LAWS
Prediction of flyover jet noise spectra from static tests
N82-22963

SCHWARZ-CHRISTOFFEL TRANSFORMATION
A Schwarz-Christoffel method for generating internal flow grids
A82-29005

SEALS (STOPPERS)
Chem-Braze abradable seal practical
A82-31040
Development of a convoluted intake seal for model R66 --- v/stol wind tunnel
[BAE-ARG-163] N82-23255

SEATS
Test methodology for evaluation of fireworthy aircraft seat cushions
A82-29596

SECONDARY RADAR
Improvements to secondary radar for air traffic control
A82-30311
The reliability of height and identity data --- secondary surveillance radar error analysis
A82-30312
Secondary radar for airborne collision avoidance
A82-30313

SELF OSCILLATION
Stability and self-oscillations of coaxial rotors
A82-31603

SERVICE LIFE
The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
[PNR-90076] N82-22271
Service life investigation of a sailplane wing of CFRP construction
N82-22324

SERVOCONTROL
An electronic control for an electrohydraulic active control landing gear for the F-8 aircraft
[NASA-CR-3552] N82-22252
An analysis of a nonlinear instability in the implementation of a VTOL control system
[NASA-TM-84220] N82-22281

SHAPE CONTROL
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29431

SHEAR STRAIN
Analysis of a multihinged empennage with allowance for shear strain
A82-29834

SHELL STABILITY
Thermal stability analysis for conical shells with variable parameters
A82-29844

SHELLS (STRUCTURAL FORMS)
Analysis of shells of straight-wing type
A82-29841

SHOCK WAVE PROPAGATION
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659

SHOCK WAVES
The relaxation oscillation in ramjet combustion
A82-28730
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209

SHORT TAKEOFF AIRCRAFT
STOL aircraft structural vibration prediction from acoustic excitation
N82-22169

Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
[NAL-TR-685T] N82-22953

SIGNAL PROCESSING
Distributed airborne array concepts A82-31669
La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981 --- aerospace R and D methodology and instrumentation
[ESA-TT-725] N82-22145

SIGNAL TO NOISE RATIOS
Distributed airborne array concepts A82-31669

SKIN (STRUCTURAL MEMBER)
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0678] A82-30146

SOARING
Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings A82-29414

SOLAR SENSORS
Sun sensing guidance system for high altitude aircraft
[NASA-CASE-FRC-11052-1] N82-23231

SOOT
Investigation of soot and carbon formation in small gas turbine combustors
[NASA-CR-167853] N82-22267

SOUND GENERATORS
Experiments on propeller noise N82-22978

SOUND TRANSMISSION
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition
[NASA-CR-165869] N82-22952

SOUND WAVES
Unsteady ejectors N82-23171

SPACE COMMUNICATION
Extravehicular Activity/Air Traffic Control (EVA/ATC) test report --- communication links to the astronaut
[NASA-CR-167600] N82-23381

SPACE SHUTTLE ORBITERS
Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236

SPACE SHUTTLE PAYLOADS
Research and development at MBB. Technical and scientific publications, 1981 N82-23137

SPACE SHUTTLES
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315

SPACE TRANSPORTATION SYSTEM
Research and Technology annual report FY-1981
[NASA-TM-84199] N82-24137

SPACECRAFT CONSTRUCTION MATERIALS
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315

SPACECRAFT CONTROL
Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236

SPACECRAFT DESIGN
Research and development at MBB. Technical and scientific publications, 1981 N82-23137

SPACECRAFT STRUCTURES
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315

SPECTRAL BANDS
Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques
[NASA-CR-165867] N82-22949

SPIN TESTS
Prototype flywheel spin testing program
[UCRL-15381] N82-22499

SPLIT FLAPS
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps N82-22192

SPOILERS
Analysis and flight evaluation of a small, fixed-wing aircraft equipped with hinged plate spoilers
[NASA-CR-166247] N82-22243
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-165826] N82-22314

SPOT WELDS
Production weldbonding on the A-10 aircraft A82-28995
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means
[AIAA 82-0661] A82-30091

SQUEEZE FILMS
Basic technology of squeeze-film dampers for rotor dynamics control
[AD-A110842] N82-23250

STABILITY AUGMENTATION
Control law design to meet constraints using SYNPAC-synthesis package for active controls
[NASA-TM-83264] N82-22280
Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight N82-23215
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation N82-23216

STABILIZERS (FLUID DYNAMICS)
Pressure measurements on twin vertical tails in buffeting flow
[AIAA 82-0641] A82-30138
Bonded aluminum honeycomb - Aircraft flight surface primary structure application
[AIAA 82-0676] A82-30145

STABLE OSCILLATIONS
Stability and self-oscillations of coaxial rotors A82-31603

STAGNATION PRESSURE
The excitation of compressor/duct systems A82-28993

STANDARDIZATION
Development and use of dynamic qualification standards for Air Force stores N82-22155

STATE VECTORS
Optimization of measurements in the state estimation of systems using the least squares method A82-29826

STATIC PRESSURE
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9 --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83297] N82-23195

STATIC TESTS
Prediction of flyover jet noise spectra from static tests N82-22963

STATISTICAL ANALYSIS
Review of rotorcraft accidents 1977-1979
[PB82-115601] N82-22237
Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques
[NASA-CR-165867] N82-22949

STEADY FLOW
Feedback control of a cantilever wing in steady airflow
[AIAA 82-0729] A82-30177

STIFFNESS
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites
[AIAA 82-0712] A82-30102
Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates
[AIAA 82-0722] A82-30172
STRAIN RATE
Environmental and high strain rate effects on composites for engine applications
[AIAA 82-0758] A82-30118
STRAKES
Unsteady pressure measurements at stall and buffeting
[DFVLR-MITT-79-09] N82-23198
STRAPDOWN INERTIAL GUIDANCE
Optimal control and estimation for strapdown seeker guidance of tactical missiles
A82-31121
Strapdown inertial navigation systems: An algorithm for attitude and navigation computations
[ARL/SYS-REPT-23] N82-22241
STRESS ANALYSIS
The stressed state of a parachute canopy during opening
A82-29820
Analysis of shells of straight-wing type
A82-29841
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means
[AIAA 82-0661] A82-30091
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane --- dynamic response of aircraft tires
[AIAA 82-0753] A82-30114
STRESS CONCENTRATION
Occurrence of fretting fatigue failures in practice
A82-28543
STRESS CORROSION CRACKING
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate --- for aircraft construction
[NLR-MP-80047-U] N82-22360
STRESS INTENSITY FACTORS
Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method
[AIAA 82-0742] A82-30107
Environmental and high strain rate effects on composites for engine applications
[AIAA 82-0758] A82-30118
STRESS-STRAIN RELATIONSHIPS
Thermal stability analysis for conical shells with variable parameters
A82-29844
STRUCTURAL ANALYSIS
A review of U.S. Air Force research related to airframe and engine materials
A82-29268
737 graphite-epoxy horizontal stabilizer certification
[AIAA 82-0745] A82-30109
Environmental and high strain rate effects on composites for engine applications
[AIAA 82-0758] A82-30118
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144
Bird impact analysis package for turbine engine fan blades
[AIAA 82-0696] A82-30162
A linear decomposition method for large optimization problems. Blueprint for development
[NASA-TM-83248] N82-22245
STRUCTURAL DESIGN
Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 1 - Structures and materials. Part 2 - Structural dynamics and design engineering
A82-30076
Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft
[AIAA 82-0705] A82-30096
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144
Damage tolerant design using collapse techniques
[AIAA 82-0718] A82-30168
A linear decomposition method for large optimization problems. Blueprint for development
[NASA-TM-83248] N82-22245
Application of a structural optimization procedure for advanced wings
[MBB-FE-171/S/PUB/49] N82-23141
STRUCTURAL DESIGN CRITERIA
Tool use in cutting operations involving integral structural components in aircraft construction
A82-28873
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147
Application of a structural optimization procedure for advanced wings
[MBB-FE-171/S/PUB/49] N82-23141
Some case studies and the significance of fatigue thresholds --- aircraft components
[NLR-MP-81015-U] N82-23561
STRUCTURAL ENGINEERING
Occurrence of fretting fatigue failures in practice
A82-28543
STRUCTURAL FAILURE
Occurrence of fretting fatigue failures in practice
A82-28543
Damage tolerant design using collapse techniques
[AIAA 82-0718] A82-30168
On the dynamic collapse of a column impacting a rigid surface
[AIAA 82-0735] A82-30182
STRUCTURAL RELIABILITY
Structural integrity of an adhesively bonded aircraft fuselage
A82-28996
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft
[NASA-CR-165841] N82-22316
STRUCTURAL STABILITY
Analysis of a multihinged empennage with allowance for shear strain
A82-29834
The stability of monocoque panels under bending
A82-29836
Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines
A82-31643
STRUCTURAL VIBRATION
An automated technique for improving modal test/analysis correlation
[AIAA 82-0640] A82-30137
Pressure measurements on twin vertical tails in buffeting flow
[AIAA 82-0641] A82-30130
Transonic time-response analysis of three D.O.F. conventional and supercritical airfoils
[AIAA 82-0688] A82-3[illegible]155
Development of vibration qualification test spectra for the F-15 aircraft
N82-22160
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166
The dynamic qualification of equipment and external stores for use with rotary winged aircraft
N82-22167
STOL aircraft structural vibration prediction from acoustic excitation
N82-22169
STRUCTURAL WEIGHT
Comparison of light aircraft with strutted and cantilever wings
A82-29828
SUBSONIC FLOW
Subsonic aerodynamic and flutter characteristics of several wings calculated by the [illegible]USSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-168764] N82-22947

SUBSONIC FLUTTER
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
SUBSONIC SPEED
Fuel efficient and Mach 0.8, too
A82-29774
SUBSONIC WIND TUNNELS
A numerical investigation of two-dimensional, subsonic, linear, wind tunnel interference theory
[ARL/AERO-NOTE-403] N82-23197
SUCTION
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659
SUPERCRITICAL WINGS
A wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing
[AIAA 82-0642] A82-30139
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[AIAA 82-0647] A82-30143
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209
Aeroelastic properties of wings in transonic flow
[NLR-MP-81005-U] N82-22224
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet --- conducted in Langley Transonic Dynamics Tunnel
[NASA-TM-83279] N82-23239
SUPERPLASTICITY
SPF of high strength aluminum structures --- superplastic forming for complex aircraft structures
A82-28997
SUPERSONIC FLOW
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659
Turboprop and turbojet ejector optimisation
N82-23174
SUPERSONIC JET FLOW
Acoustic emission from free jets --- supersonic jets
N82-22962
Experimental study of a jet deflector
N82-23173
SUPERSONIC NOZZLES
Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
A82-29880
SUPERSONIC SPEEDS
Approximate method for predicting supersonic normal force coefficient very-low-aspect-ratio lifting surfaces
[AD-A111770] N82-23199
SUPPORT SYSTEMS
Metric half-span model support system
[NASA-CASE-LAR-12441-1] N82-23254
SURFACE DEFECTS
Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method
[AIAA 82-0742] A82-30107
SURFACE FINISHING
Structural integrity of an adhesively bonded aircraft fuselage
A82-28996
SURGES
Encounters with surge: Some experiences of development of axial compressors for aero gas turbines
[PNR-90071] N82-22274
SURVEILLANCE RADAR
Improvements to secondary radar for air traffic control
A82-30311
The reliability of height and identity data --- secondary surveillance radar error analysis
A82-30312
SURVIVAL
Commercial jet transport crashworthiness
[NASA-CR-165849] N82-23207
SUSPENDING (HANGING)
Elastic suspension of a wind tunnel test section
N82-23363
SWEPT FORWARD WINGS
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150
Active control of aeroelastic divergence
[AIAA 82-0684] A82-30151
SWEPTBACK WINGS
Helicopter rotor performance improvement by utilization of swept-back parabolic blade tip --- wind tunnel tests
N82-22151
Aerodynamic performance of slender wings with separated flows
[NASA-CR-168768] N82-22206
Aeroelastic properties of wings in transonic flow
[NLR-MP-81005-U] N82-22224
SWIRLING
The effect of swirl burner aerodynamics on NOx formation
A82-28650
SYSTEM EFFECTIVENESS
Estimation of the performance of nonstationary discontinuous control systems for flight vehicles
A82-29832
SYSTEMS ENGINEERING
Applications of system identification methods to the prediction of helicopter stability, control and handling characteristics
N82-23230
SYSTEMS INTEGRATION
The integration of multiple avionic sensors and technologies for future military helicopters
N82-23186

T

T-38 AIRCRAFT
Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft
[AIAA 82-0705] A82-30096
TACTICS
Review of practical experience on combat aircraft maneuverability
N82-22189
TACTILE DISCRIMINATION
A tactual display aid for primary flight training
[NASA-CR-166242] N82-22238
TAIL ASSEMBLIES
Tail configurations for highly maneuverable combat aircraft
N82-22201
Concept studies of an advanced composite helicopter fin
[SNIAS-821-210-106] N82-22257
TAILLESS AIRCRAFT
Tail configurations for highly maneuverable combat aircraft
N82-22201
TAKEOFF
Analysis and Monte Carlo simulation of near-terminal aircraft flight paths
[NASA-TP-1997] N82-23233
TANKS (COMBAT VEHICLES)
A light helicopter for night firing
[SNIAS-821-210-105] N82-22256
TAPE RECORDERS
A portable, low-cost flight-data measurement and recording system
[NASA-TM-84229] N82-22478
TARGET ACQUISITION
The structural dynamic interface required for developing helicopter target acquisition systems
N82-22165
TARGET RECOGNITION
A light helicopter for night firing
[SNIAS-821-210-105] N82-22256
TAXIING
Effects of cable geometry and aircraft attitude on the accuracy of a magnetic leader cable system for aircraft guidance during rollout and turnoff
[NASA-TP-1978] N82-22239

TECHNOLOGICAL FORECASTING
Developmental possibilities in civil aviation in the Federal Republic of Germany
N82-22230
TECHNOLOGY ASSESSMENT
Fuel efficient and Mach 0.8, too
A82-29774
Effects of cable geometry and aircraft attitude on the accuracy of a magnetic leader cable system for aircraft guidance during rollout and turnoff
[NASA-TP-1978] N82-22239
Conceptual design study of a visual system for a rotorcraft simulator and some advances in platform motion utilization
[NASA-CR-166322] N82-22244
TEMPERATURE DISTRIBUTION
Thermal stability analysis for conical shells with variable parameters
A82-29844
TENSILE STRENGTH
Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites
[AIAA 82-0657] A82-30087
High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide
[AIAA 82-0711] A82-30125
TENSILE TESTS
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036
TENSOR ANALYSIS
Alternatives for jet engine control
[NASA-CR-168894] N82-23247
TERMINAL FACILITIES
Instruments and installations for meteorological measurements at airports --- Russian book
A82-28826
TERRAIN ANALYSIS
Integrated navigation-TF/TA-system based on stored terrain data processing
N82-23183
TERRAIN FOLLOWING AIRCRAFT
Integrated navigation-TF/TA-system based on stored terrain data processing
N82-23183
Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem
N82-23184
TEST CHAMBERS
Acoustic noise test as part of the dynamic qualification program in aerospace
N82-22162
TEST EQUIPMENT
Blockage and flow studies of a generalized test apparatus including various wing configurations in the Langley 7-inch Mach 7 Pilot Tunnel
[NASA-TM-83301] N82-23471
THERMAL CONTROL COATINGS
The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
[PNR-90076] N82-22271
THERMAL DEGRADATION
Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites
[AIAA 82-0657] A82-30087
On the characterization of damages in graphite-epoxy composites
[AIAA 82-0757] A82-30117
THERMAL EMISSION
A light helicopter for night firing
[SNIAS-821-210-105] N82-22256
THERMAL RESISTANCE
Test methodology for evaluation of fireworthy aircraft seat cushions
A82-29596
THERMAL STABILITY
Thermal stability analysis for conical shells with variable parameters
A82-29844
Composite bonds improve thermal integrity
A82-30004
THERMOMECHANICAL TREATMENT
SPF of high strength aluminum structures --- superplastic forming for complex aircraft structures
A82-28997
THICKNESS RATIO
Analysis of shells of straight-wing type
A82-29841
THIN WALLED SHELLS
Thermal stability analysis for conical shells with variable parameters
A82-29844
THIN WALLS
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane --- dynamic response of aircraft tires
[AIAA 82-0753] A82-30114
THREE DIMENSIONAL FLOW
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data --- for turbofan mixer nozzle mixing process analysis
A82-29008
Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157
THRUST AUGMENTATION
Thrust augmenting ejectors: A review of the application of jet mechanics to V/STOL aircraft propulsion
N82-23169
Improvement of ejector thrust augmentation by pulsating or flapping jets
N82-23172
THRUST VECTOR CONTROL
Wind-tunnel investigation of the powered low-speed longitudinal aerodynamics of the Vectored-Engine-Over (VEO) wing fighter configuration
[NASA-TM-83263] N82-22207
THUNDERSTORMS
The 1981 direct strike lightning data --- utilizing the F-106 aircraft
[NASA-TM-83273] N82-22048
TILT ROTOR RESEARCH AIRCRAFT PROGRAM
NASA/FAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 7: Tilt Rotor Session
[NASA-TM-84705] N82-23243
TILTING ROTORS
Aerospatiale survey of wind tunnel testing of small and large scale rotors
[SNIAS-821-210-107] N82-22225
TIME MARCHING
Time-marching transonic flutter solutions including angle-of-attack effects
[NASA-TM-83295] N82-23196
TIME OPTIMAL CONTROL
Comment on 'Optimal control via mathematical programming'
A82-31125
TIME RESPONSE
Transonic time-response analysis of three D.O.F. conventional and supercritical airfoils
[AIAA 82-0688] A82-30155
TITANIUM ALLOYS
Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981
A82-28994
Development of low-cost titanium structures using blended elemental powder metallurgy
A82-28998
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981
[NLR-MP-81006-U] N82-22153
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22356
TOOLING
Tailor-made structures; today, and tomorrow: New materials, an exploratory investigation into their potential use --- in aircraft
[BAE-SDW-85/A/104/005] N82-22253
TORSIONAL STRESS
Shape optimization of fiber reinforced composites
[AIAA 82-0719] A82-30169
TORUSES
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane --- dynamic response of aircraft tires
[AIAA 82-0753] A82-30114

TRAFFIC
Comparing the relationships between noise level
and annoyance in different surveys - A railway
noise vs. aircraft and road traffic comparison
A82-29165
TRAILING-EDGE FLAPS
Aerodynamic noise generated by jet-wing/flap
interactions of the external USB configuration
of STOL aircraft. Part 1: Eight percent scale
cold-flow model analysis
[NAL-TR-685T] N82-22953
TRAINING SIMULATORS
Combat training imagery
A82-31179
TRAJECTORY OPTIMIZATION
Determination of an optimal control program for an
aircraft power plant during climb
A82-29845
Comment on 'Optimal control via mathematical
programming'
A82-31125
TRANSFER ORBITS
Comment on 'Optimal control via mathematical
programming'
A82-31125
TRANSMISSIONS (MACHINE ELEMENTS)
Aviation gear drives and reducers: Handbook --- in
Russian
A82-30675
TRANSMITTER RECEIVERS
Extravehicular Activity/Air Traffic Control
(EVA/ATC) test report --- communication links to
the astronaut
[NASA-CR-167600] N82-23381
TRANSONIC FLOW
Application of a transonic potential flow code to
the static aeroelastic analysis of
three-dimensional wings
[AIAA 82-0689] A82-30156
Investigation of passive shock wave-boundary layer
control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209
Aeroelastic properties of wings in transonic flow
[NLR-MP-81005-U] N82-22224
Application of a transonic potential flow code to
the static aeroelastic analysis of
three-dimensional wings
[NASA-TM-83296] N82-23193
TRANSONIC FLUTTER
A wind-tunnel study of the aerodynamic
characteristics of a slotted versus smooth-skin
supercritical wing
[AIAA 82-0642] A82-30139
Evaluation of four subcritical response methods
for on-line prediction of flutter onset in
wind-tunnel tests
[AIAA 82-0644] A82-30140
Measured and calculated effects of angle of attack
on the transonic flutter of a supercritical wing
[AIAA 82-0647] A82-30143
Transonic time-response analysis of three D.O.F.
conventional and supercritical airfoils
[AIAA 82-0688] A82-30155
Comparison between computations and experimental
data in unsteady three-dimensional transonic
aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157
Transonic flutter study of a wind-tunnel model of
a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Flutter analysis using nonlinear aerodynamic forces
[AIAA 82-0728] A82-30176
Aeroelastic properties of wings in transonic flow
[NLR-MP-81005-U] N82-22224
Time-marching transonic flutter solutions
including angle-of-attack effects
[NASA-TM-83295] N82-23196
Transonic flutter study of a wind-tunnel model of
a supercritical wing with/without winglet ---
conducted in Langley Transonic Dynamics Tunnel
[NASA-TM-83279] N82-23239
TRANSONIC WIND TUNNELS
Evaluation of four subcritical response methods
for on-line prediction of flutter onset in
wind-tunnel tests
[AIAA 82-0644] A82-30140
Static and unsteady pressure measurements on a 50
degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153

The development of cryogenic wind tunnels and
their application to maneuvering aircraft
technology
N82-22196
TRANSPORT AIRCRAFT
Application of a dimensionless criterion of
transport efficiency in evaluating aircraft
modifications
A82-29837
Transport aircraft accident dynamics
[NASA-CR-165850] N82-22227
Fuel efficiency engines for large transport aircraft
[PNR-90082] N82-22276
The 737 graphite composite flight spoiler flight
service evaluation
[NASA-CR-165826] N82-22314
Commercial jet transport crashworthiness
[NASA-CR-165649] N82-23207
Definition of display/control requirements for
assault transport night/adverse weather capability
N82-23217
TRAPEZOIDAL WINGS
Unsteady pressure measurements at stall and
buffeting
[DFVLR-MITT-79-09] N82-23198
TURBINE BLADES
Engine depot maintenance repair technology
N82-22174
Repair and regeneration of turbine blades, vanes
and discs
N82-22185
TURBINE ENGINES
Bird impact analysis package for turbine engine
fan blades
[AIAA 82-0696] A82-30162
The role of modern control theory in the design of
controls for aircraft turbine engines
[NASA-TM-82815] N82-22262
Advanced general aviation engine/airframe
integration study
[NASA-CR-165565] N82-22268
Advanced turbine study --- airfoil coling in
rocket turbines
[NASA-CR-162003] N82-23249
TURBOCOMPRESSORS
The excitation of compressor/duct systems
A82-28993
Encounters with surge: Some experiences of
development of axial compressors for aero gas
turbines
[PNR-90071] N82-22274
Computer modeling of fan-exit-splitter spacing
effects on F100 response to distortion
[NASA-CR-167879] N82-23246
TURBOFAN ENGINES
Measurement of aerodynamic work during fan flutter
A82-28987
Energy efficient engine exhaust mixer model
technology
[NASA-CR-165459] N82-22264
Computer modeling of fan-exit-splitter spacing
effects on F100 response to distortion
[NASA-CR-167879] N82-23246
Alternatives for jet engine control
[NASA-CR-168894] N82-23247
TURBOFANS
Evaluation of the effects of model scale and test
technique on jet-induced effects
N82-23167
TURBOJET ENGINES
Environmental and high strain rate effects on
composites for engine applications
[AIAA 82-0758] A82-30118
Turboprop and turbojet ejector optimisation
N82-23174
Basic technology of squeeze-film dampers for rotor
dynamics control
[AD-A110842] N82-23250
TURBOMACHINE BLADES
Prediction of aerodynamically induced vibrations
in turbomachinery blading
A82-28986
Directional solidification: Project E2 --- of gas
turbine rotor blade alloys
[PNR-90088] N82-22279
TURBOPROP ENGINES
Advanced general aviation comparative
engine/airframe integration study
[NASA-CR-165564] N82-22263

Turboprop and turbojet ejector optimisation
N82-23174

TURBOROCKET ENGINES
Advanced turbine study --- airfoil coling in rocket turbines
[NASA-CR-162003] N82-23249

TURBULENCE EFFECTS
Turbulence-excited flapping motion of a rotor blade in hovering flight
A82-29042

TURBULENT BOUNDARY LAYER
La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981 --- aerospace R and D methodology and instrumentation
[ESA-TT-725] N82-22145
Drag reduction using pneumatic turbulators --- laminar airfoils
[DFVLR-FB-81-33] N82-22223

TURBULENT FLOW
Flowfield and noise sources of jet impingement of flaps and ground surface
N82-23163

TURBULENT JETS
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150

TURBULENT MIXING
Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
A82-29880

TURNING FLIGHT
Validation of zero-order feedback strategies for medium range air-to-air interception in a horizontal plane
[NASA-TM-84237] N82-23237

U

UH-1 HELICOPTER
Performance testing of a main rotor system for a utility helicopter at 1/4 scale
[NASA-TM-83274] N82-22251
Flight tests for the assessment of task performance and control activity
N82-23213

ULTRASONIC WELDING
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means
[AIAA 82-0661] A82-30091

UNSTEADY FLOW
The excitation of compressor/duct systems
A82-28993
Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157
Unsteady ejectors
N82-23171
Improvement of ejector thrust augmentation by pulsating or flapping jets
N82-23172
An accurate method for evaluating the kernel of the integral equation relating lift to downwash in unsteady potential flow
[NASA-TM-83281] N82-23194

UNSTEADY STATE
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153

UNSWEPT WINGS
Aeroelastic properties of wings in transonic flow
[NLR-MP-81005-U] N82-22234

UPPER SURFACE BLOWING
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment
[NAL-TR-686T] N82-22212
Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
[NAL-TR-685T] N82-22953

V

V/STOL AIRCRAFT
Multi-mission V/STOL with vectored thrust engines --- bombing, air superiority
[PNR-90086] N82-22278
Experience with high performance V/STOL fighter projects at MBB
[MBB-FE-124/S/PUB/50] N82-23140
Jet effects on forces and moments of a VSTOL fighter type aircraft
N82-23168
Thrust augmenting ejectors: A review of the application of jet mechanics to V/STOL aircraft propulsion
N82-23169
V/STOL aircraft and fluid dynamic
N82-23179
VTOL and VSTOL handling qualities specifications, an overview of the current status
N82-23209

VARIABLE PITCH PROPELLERS
Past applications and future potential of variable stability research helicopters
N82-23228

VARIATIONAL PRINCIPLES
Analysis of shells of straight-wing type
A82-29841

VARIOMETERS
Checking and calibrating variometers in place in the sailplane instrument panel
A82-29815

VERTICAL TAKEOFF AIRCRAFT
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet
[NASA-CR-165617] N82-22211
An analysis of a nonlinear instability in the implementation of a VTOL control system
[NASA-TM-84220] N82-22281
Jet V/STOL wind-tunnel simulation and groundplane effects
N82-23165
The modeling and prediction of multiple jet VTOL aircraft flow fields in ground effect
N82-23166
Evaluation of the effects of model scale and test technique on jet-induced effects
N82-23167

VIBRATION DAMPING
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites
[AIAA 82-0712] A82-30102
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30181
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150
Active control of aeroelastic divergence
[AIAA 82-0684] A82-30151
Feedback control of a cantilever wing in steady airflow
[AIAA 82-0729] A82-30177
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
Analysis of high load dampers
[NASA-CR-165503] N82-23248
Basic technology of squeeze-film dampers for rotor dynamics control
[AD-A110842] N82-23250

VIBRATION ISOLATORS
Analysis of high load dampers
[NASA-CR-165503] N82-23240

VIBRATION MEASUREMENT
The structural dynamic interface required for developing helicopter target acquisition systems
N82-22165
STOL aircraft structural vibration prediction from acoustic excitation
N82-22169

VIBRATION MODE
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Active control of aeroelastic divergence
[AIAA 82-0684] A82-30151

VIBRATION TESTS
An automated technique for improving modal test/analysis correlation
[AIAA 82-0640] A82-30137
Dynamic Environmental Qualification Techniques --- conference
[AGARD-CP-318] N82-22154

Development and use of dynamic qualification standards for Air Force stores
N82-22155
Qualification of equipment for gunfire induced vibration
N82-22158
Dynamic qualification testing of F-16 equipment
N82-22159
Development of vibration qualification test spectra for the F-15 aircraft
N82-22160
Equipment vibration qualification for Harrier and Hawk aircraft
N82-22161
Aircraft fuel tank slosh and vibration test
N82-22164
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166
Application of modal synthesis techniques for the dynamic qualification of wings with stores
N82-22168
Development of a taped random vibration technique for acceptance testing
N82-22171

VIBRATORY LOADS
The structural dynamic interface required for developing helicopter target acquisition systems
N82-22165
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166
The dynamic qualification of equipment and external stores for use with rotary winged aircraft
N82-22167

VISCOELASTIC DAMPING
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites
[AIAA 82-0712] A82-30102

VISUAL AIDS
Flight simulators
A82-29924

VISUAL CONTROL
Conceptual design study of a visual system for a rotorcraft simulator and some advances in platform motion utilization
[NASA-CR-166322] N82-22244
Performance evaluation of a kinesthetic-tactual display
N82-23221

VISUAL FLIGHT
Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight
N82-23215

VOICE CONTROL
The role of voice technology in advanced helicopter cockpits
N82-23223

VOLTAGE REGULATORS
Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices --- aircraft electric equipment
A82-28875

VORTEX BREAKDOWN
La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981 --- aerospace R and D methodology and instrumentation
[ESA-TT-725] N82-22145

VORTICES
A flight investigation of blade-section aerodynamics for a helicopter main rotor having RC-SC2 airfoil sections
[NASA-TM-83298] N82-23192

W

WALL FLOW
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150

WALL JETS
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150

WALL PRESSURE
Jet V/STOL wind-tunnel simulation and groundplane effects
N82-23165
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
[NASA-CR-166186] N82-23234
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235

WANKEL ENGINES
Advanced general aviation engine/airframe integration study
[NASA-CR-165565] N82-22268

WAR GAMES
Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot
N82-22202

WARNING SYSTEMS
The assessment of aircraft combat effectiveness using a new computational method
N82-22203

WATER TEMPERATURE
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036

WAVEFORMS
The 1981 direct strike lightning data --- utilizing the F-106 aircraft
[NASA-TM-83273] N82-22848

WEAPON SYSTEMS
Military maintenance policies and procedures for high-temperature parts. Will they be adequate?
N82-22173

WEAPONS DELIVERY
Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results
N82-23185

WEATHER STATIONS
Instruments and installations for meteorological measurements at airports --- Russian book
A82-28826

WEIGHT ANALYSIS
Zone loading of flight-vehicle structures
A82-29838

WELDED STRUCTURES
Production weldbonding on the A-10 aircraft
A82-28995

WIND EFFECTS
Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I
A82-29871

WIND TUNNEL APPARATUS
Studies on wind tunnel straighteners
[NASA-TM-76689] N82-22284
Metric half-span model support system
[NASA-CASE-LAR-12441-1] N82-23254
Elastic suspension of a wind tunnel test section
N82-23363

WIND TUNNEL DRIVES
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099
Theoretical optimization and experimental verification of an injector
N82-23170

WIND TUNNEL MODELS
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Design of dynamically-scaled, asymmetrical wind tunnel models
[NIAST-78/18] N82-22285
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
[NASA-CR-166186] N82-23234
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235
Metric half-span model support system
[NASA-CASE-LAR-12441-1] N82-23254
Development of a convoluted intake seal for model R66 --- v/stol wind tunnel
[BAE-ARG-163] N82-23255

WIND TUNNEL TESTS
NASA research related to sailplane airfoils
A82-29417

Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099
A wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing
[AIAA 82-0642] A82-30139
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142
Aerospatiale survey of wind tunnel testing of small and large scale rotors
[SNIAS-821-210-107] N82-22225
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
Experiments on propeller noise
N82-22978
Fluid dynamics of jets with applications to V/STOL
[AGARD-CP-308] N82-23150
Jet V/STOL wind-tunnel simulation and groundplane effects
N82-23165
Wind tunnel investigations of sailplane fuselages with different lacings and wing settings --- aerodynamic drag measurement
N82-23200
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83276] N82-23240
Metric half-span model support system
[NASA-CASE-LAR-12441-1] N82-23254

WIND TUNNEL WALLS
A numerical investigation of two-dimensional, subsonic, linear, wind tunnel interference theory
[ARL/AERO-NOTE-403] N82-23197
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
[NASA-CR-166186] N82-23234
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235

WIND VELOCITY
Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I
A82-29871

WING CAMBER
Aeroelastic tailoring for control and performance: Are requirements compatible?
N82-22200

WING FLAPS
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps
N82-22192

WING LOADING
Application of a structural optimization procedure for advanced wings
[MBB-FE-171/S/PUB/49] N82-23141

WING OSCILLATIONS
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153
Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Feedback control of a cantilever wing in steady airflow
[AIAA 82-0729] A82-30177
Application of modal synthesis techniques for the dynamic qualification of wings with stores
N82-22168
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9 --- conducted in the Langley Transonic Dynamics Tunnel
[NASA-TM-83297] N82-23195

WING PROFILES
Comparison of light aircraft with strutted and cantilever wings
A82-29828
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
Wind tunnel investigations of sailplane fuselages with different lacings and wing settings --- aerodynamic drag measurement
N82-23200

WING SLOTS
A wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing
[AIAA 82-0642] A82-30139

WING TIP VORTICES
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport
[DFVLR-MITT-82-01] N82-23560

WING-FUSELAGE STORES
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141

WINGLETS
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet --- conducted in Langley Transonic Dynamics Tunnel
[NASA-TM-83279] N82-23239

WINGS
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0678] A82-30146
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[NASA-TM-83296] N82-23193

X

XV-15 AIRCRAFT
NASA/FAA Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 7: Tilt Rotor Session
[NASA-TM-84705] N82-23243

Y

YAW
An analysis of a nonlinear instability in the implementation of a VTOL control system
[NASA-TM-84220] N82-22201

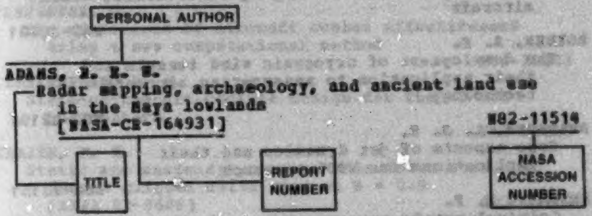
YAWING MOMENTS
Jet effects on forces and moments of a VSTOL fighter type aircraft
N82-23166

YIELD POINT
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes
A82-28932

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 151)* AUGUST 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ADAMS, W. M., JR.
Control law design to meet constraints using SYNPAC-synthesis package for active controls
[NASA-TM-83264] N82-22280

AFINOGENOV, L. P.
Instruments and installations for meteorological measurements at airports
A82-28826

AGENT, K. R.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

AHARRAH, R. C.
The military flying qualities specification, a help or a hindrance to good fighter design
N82-22190

AIKEN, E. W.
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216

AKKATOV, N. KH.
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29631

AKHREMENKO, V. L.
Effect of operating life on the mechanical properties of the materials and load-bearing capacity of the rotor elements of gas-turbine engines
A82-31643

ALBERTSON, C. W.
Blockage and flow studies of a generalized test apparatus including various wing configurations in the Langley 7-inch Mach 7 Pilot Tunnel
[NASA-TM-83301] N82-23471

ALLEN, R. W.
Functional requirements for the man-vehicle systems research facility
[NASA-CR-166315] N82-22248
A theory of human error
[NASA-CR-166313] N82-22250

AMBARTSUMOV, L. G.
Optimization of measurements in the state estimation of systems using the least squares method
A82-29826

AMBERBOY, R. J.
A system safety model for developmental aircraft programs
[NASA-CR-3534] N82-22228

AMINOV, A. B.
The stability of maneuverable flight vehicles
A82-29827

ANDERSON, B. H.
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
A82-29008

ANDERSON, C. A.
Integration of avionics and advanced control technology
N82-22194

ANDERSON, S. B.
V/STOL aircraft and fluid dynamic
N82-23179

ANGERMAIR, T.
The current state of technology concerning the fighting of forest fires from the air in Austria
A82-29579
The employment of helicopters in Austria in connection with large-scale fires in buildings
A82-29585

ANNIS, C. G., JR.
Engine component retirement for cause
N82-22177

APPEL, J.
Real time digital filtering test in the S1 continuous wind tunnel at Modane
N82-22152

ARNDT, W. E.
Fuel efficient and Mach 0.8, too
A82-29778

ASHKENAS, I. L.
Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test
N82-22191

ATLURI, S. N.
Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method
[AIAA 82-0742] A82-30107

AULEHLA, F.
Experience with high performance V/STOL fighter projects at MBB
[MBB-FE-124/S/PUB/50] N82-23140

AVIOLI, M. J.
Utility of a probability-density-function curve and F-maps in composite-material inspection
A82-28934

AZANIN, V. S.
Zone loading of flight-vehicle structures
A82-29838

B

BADIAGIN, A. A.
Comparison of light aircraft with strutted and cantilever wings
A82-29628

BAHI, L.
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168044] N82-22209

BAIRD, E.
Development of a taped random vibration technique for acceptance testing
N82-22171

BALL, R. H.
Checking and calibrating variometers in place in the sailplane instrument panel
A82-29415

BARNES, A. G.
The study of combat aircraft maneuverability by air to air combat simulation
N82-22205

BARNHART, B.
Analysis of rotary balance data for the F-15 airplane including the effect of conformal fuel tanks
[NASA-CR-3479] N82-22213

BATINA, J. T.
Transonic time-response analysis of three D.O.F. conventional and supercritical airfoils
[AIAA 82-0688] A82-30155

BAUMGARTEN, J. R.
Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane
[AIAA 82-0753] A82-30114

BAYERDOERFER, G.
Acoustic noise test as part of the dynamic qualification program in aerospace
N82-22162

BEATTY, T. D.
Predictions of aerodynamic characteristics of highly maneuverable configurations
N82-22199

BELLAMY, R. A.
Development of a correlated finite element dynamic model of a complete aero engine
[PNR-90081] N82-22272

BENNETT, J. C.
Development of a correlated finite element dynamic model of a complete aero engine
[PNR-90081] N82-22272

BENNETT, R. M.
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[AIAA 82-0689] A82-30156
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[NASA-TM-83296] N82-23193
Time-marching transonic flutter solutions including angle-of-attack effects
[NASA-TM-83295] N82-23196

BERRY, J. D.
Performance testing of a main rotor system for a utility helicopter at 1/4 scale
[NASA-TM-83274] N82-22251

BESSE, J. M.
Civil (French/US) certification of the Coast Guard's HH-65A Dauphin
N82-23210

BEYERS, M. E.
Design of dynamically-scaled, asymmetrical wind tunnel models
[NIAST-78/18] N82-22285

BEZIAC, G.
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
[SNIAS-827-210-102] N82-22273

BHAT, S. T.
Analysis of high load dampers
[NASA-CR-165503] N82-23248

BINDER, G.
Improvement of ejector thrust augmentation by pulsating or flapping jets
N82-23172

BIRD, W. J.
Tailor-made structures; today, and tomorrow: New materials, an exploratory investigation into their potential use
[BAE-SDW-85/A/104/005] N82-22253

BLACHERE, G.
Tail rotor studies for satisfactory performance: Strength and dynamic behavior
[SNIAS-821-210-108] N82-22258

BOLZINGER, H.
The utilization of aircraft in fighting forest fires - French experience
A82-29581

BOOKER, D.
Aeroelastic tailoring for control and performance: Are requirements compatible?
N82-22200

BORZOV, V. I.
The maximum flying range problem for an aircraft
A82-31602

BOUSQUET, R. D.
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144

BOWES, R. C.
Improvements to secondary radar for air traffic control
A82-30311

BOWMAN, W. S.
Tail configurations for highly maneuverable combat aircraft
N82-22201

BOYDEN, R. P.
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
N82-22196

BRADBURY, L. J. S.
Some aspects of jet dynamics and their implications for VTOL research
N82-23151

BRADLEY, E. F.
Critical metals conservation, recycling and substitution
[AGARD-R-693] N82-22348

BRAUN, D.
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166

BRAY, R. S.
Helicopter simulation technology: An Ames Research Center perspective
N82-23227

BREITBACH, E.
Application of modal synthesis techniques for the dynamic qualification of wings with stores
N82-22168

BRENDE, O. B.
Commercial jet transport crashworthiness
[NASA-CR-165849] N82-23207

BRIGNAC, W. J.
Dynamic qualification testing of F-16 equipment
N82-22159

BROOKS, W. B.
Predictions of aerodynamic characteristics of highly maneuverable configurations
N82-22199

BROSNAN, M. J.
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150

BROWER, W. B., JR.
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209

BUBLITZ, P.
Unsteady pressure measurements at stall and buffeting
[DFVLR-MITT-79-09] N82-23198

BULATOV, S. N.
Analysis of shells of straight-wing type
A82-29841

BUNDICK, W. T.
Effects of cable geometry and aircraft attitude on the accuracy of a magnetic leader cable system for aircraft guidance during rollout and turnoff
[NASA-TP-1978] N82-22239

BUONO, D. F.
Analysis of high load dampers
[NASA-CR-165503] N82-23248

BURKHARD, A. H.
Development and use of dynamic qualification standards for Air Force stores
N82-22155

BURNSIDE, W. D.
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers
[NASA-CR-168770] N82-22398

C

CABRIT, P.
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
[SNIAS-827-210-102] N82-22273

CAMBERLEIN, L.
Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem
N82-23184

CAMPBELL, R. L.
Effect of nacelles on aerodynamic characteristics of an executive-jet model with simulated, partial-chord, laminar-flow-control wing glove
[NASA-TM-83271] N82-22217

CANDAU, J. F.
A light helicopter for night firing
[SNIAS-821-210-105] N82-22256

CARPENTER, G.
The assessment of aircraft combat effectiveness using a new computational method
N82-22203

CASTLEBERRY, D. E.
State-of-the-art cockpit design for the HH-65A helicopters
N82-23220

CAZIER, F. W.
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[NASA-TM-83297] N82-23195

CHAMIS, C. C.
Environmental and high strain rate effects on composites for engine applications
[AIAA 82-0758] A82-30118

CHARLES, W. J.
Applications of structural adhesives in production
A82-28808

CHATTAPADHYAY, A.
Shape optimization of fiber reinforced composites
[AIAA 82-0719] A82-30169

CHATURVEDI, S. K.
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites
[AIAA 82-0712] A82-30102

CHAUMETTE, D.
Flight qualification of composite structures at AMD-BA
[AIAA 82-0755] A82-30116

CHEN, R. T. N.
Unified results of several analytical and experimental studies of helicopter handling qualities in visual terrain flight
N82-23215
Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219

CHERMETTE, D.
Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem
N82-23184

CHIPMAN, R. R.
Active control of aeroelastic divergence
[AIAA 82-0684] A82-30151

CHRISTIANSEN, U.
Traffic infrastructure: Can planning still be carried through
N82-22232

CLARKE, R.
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168912] N82-23245

CLAYPOLE, T. C.
The effect of swirl burner aerodynamics on NOx formation
A82-28658

CLEMENT, W. F.
Functional requirements for the man-vehicle systems research facility
[NASA-CR-166315] N82-22248
Technical approaches for measurement of human errors
[NASA-CR-166314] N82-22249
A theory of human error
[NASA-CR-166313] N82-22250

CLINTON, R. G., JR.
On the characterization of damages in graphite-epoxy composites
[AIAA 82-0757] A82-30117

COCKRELL, C. E.
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099

COGGESHALL, R. L.
The 737 graphite composite flight spoiler flight service evaluation
[NASA-CR-165826] N82-22314

COLLINS, A. G.
RB211 powerplant deterioration: Review of current situation and lessons learned
[PNR-90073] N82-22270

COMINSKY, A.
Transport aircraft accident dynamics
[NASA-CR-165850] N82-22227

CONEN, H.
Elevator unit for the Alpha-Jet, made from carbon-fibre reinforced plastic
A82-28649

CORLISS, L. D.
A helicopter handling-qualities study of the effects of engine response characteristics, height-control dynamics, and excess power on nap-of-the-Earth operations
N82-23214

CORRIGAN, J.
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems
[AIAA 82-0731] A82-30179

COTON, P.
Application of Kalman filtering to the kinematic reconstruction of free flight of catapulted aircraft models in the laboratory
[ISL-80-28] N82-22259

COUTSOURADIS, D.
Directional solidification: Project B2
[PNR-90088] N82-22279

CREWS, S. T.
The structural dynamic interface required for developing helicopter target acquisition systems
N82-22165

CUNNINGHAM, H. J.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193

CURTAYNE, P. C.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

D

DANDRA, V.
Tail rotor studies for satisfactory performance: Strength and dynamic behavior
[SNIAS-821-210-108] N82-22258

DAS, D. K.
The excitation of compressor/duct systems
A82-28393

DASARO, J. A.
Synthesis of an integrated cockpit management system
N82-23222

DAVIES, H. P.
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358

DAVIS, R. A.
The employment of two-engine and four-engine aircraft for dropping the latest chemical fire extinguishing agents in connection with the fighting of forest fires
A82-29583

DAVIS, R. T.
A Schwarz-Christoffel method for generating internal flow grids
A82-29005

DAVYDOV, IU. V.
Design principles of a computer-aided design system
A82-29829

DEBRA, D. B.
Elastic suspension of a wind tunnel test section
N82-23363

DECRESSIERS, N.
Optimal inertial navigation using terrain correlation: An attractive solution to the ground attack aircraft navigation problem
N82-23184

DEDIEU, J. P.
Parametric study of the influence of the engine upon the operating cost of a civil helicopter
[SNIAS-827-210-102] N82-22273

DEGRAAF, R. A. B.
Comparison of reliability, sensitivity and accuracy of some NDI-Techniques
[NLR-MP-80039-U] N82-23542

DEJONGE, J. B.
Review of aeronautical fatigue investigations in the Netherlands, March 1979 - February 1981
[NLR-MP-81006-U] N82-22153

DERIJK, P.
Comparison of reliability, sensitivity and accuracy of some NDI-Techniques
[NLR-MP-80039-U] N82-23542

DESMARAIS, R. N.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
An accurate method for evaluating the kernel of the integral equation relating lift to downwash in unsteady potential flow
[NASA-TM-83281] N82-23194

DESMONCEAUX, A.
Concept studies of an advanced composite helicopter fin
[SNIAS-821-210-106] N82-22257

DEVITT, J.
Development of a taped random vibration technique for acceptance testing
N82-22171

DIDELLE, H.
Improvement of ejector thrust augmentation by pulsating or flapping jets
N82-23172

DIGIOVANNI, P. R.
High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide
[AIAA 82-0711] A82-30125

DOBRZYNSKI, W.
Ground reflection effects in measuring propeller aircraft flyover noise
[DFVLR-FB-81-28] N82-22990

DOGGETT, R. V., JR.
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests
[NASA-TM-83278] N82-23240

DOLLYHIGH, S. M.
Metric half-span model support system
[NASA-CASE-LAR-12441-1] N82-23254

DORPINGHAUS, R.
Revolution in airplane construction? Grob G110: The first modern fiber glass composition airplane shortly before its maiden flight
[NASA-TM-76705] N82-22246

DOTSON, B. F.
STOL aircraft structural vibration prediction from acoustic excitation
N82-22169

DOUGLAS, C. D.
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036

DOWELL, E. H.
Flutter analysis using nonlinear aerodynamic forces
[AIAA 82-0728] A82-30176

DRIVER, D.
The gas turbine engine
A82-28587

DROBENKO, B.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193

DUBREUIL, J. P.
Naval versions of the Dauphin and the AS 15 TT weapon system
[SNIAS-821-210-104] N82-22255

DUC, J. M.
A review of recent AGARD Symposia on the Angle of Maneuverability of Combat Aircraft
N82-22188

DUGUNDJI, J.
Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates
[AIAA 82-0722] A82-30172

DUNN, R. S.
Performance evaluation of a kinesthetic-tactual display
N82-23221

DURET, C.
The influence of protective treatment on the mechanical properties of superalloy parts
N82-22180

DUVAL, R. K.
Applications of system identification methods to the prediction of helicopter stability, control and handling characteristics
N82-23230

DYNES, P. J.
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315

E

ECKSTROM, C. V.
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0678] A82-30146

EDWARDS, J. W.
Time-marching transonic flutter solutions including angle-of-attack effects
[NASA-TM-83295] N82-23196

ELLIOTT, C. T.
Synthesis of an integrated cockpit management system
N82-23222

ELLIS, D. R.
Analysis and flight evaluation of a small, fixed-wing aircraft equipped with hinged plate spoilers
[NASA-CR-166247] N82-22243
Advanced general aviation comparative engine/airframe integration study
[NASA-CR-165564] N82-22263

ELOFF, P. C.
Development of low-cost titanium structures using blended elemental powder metallurgy
A82-28998

ELSTON, S. Y.
Development of a correlated finite element dynamic model of a complete aero engine
[PNR-90081] N82-22272

F

FALCO, M.
The assessment of aircraft combat effectiveness using a new computational method
N82-22203
Influence of maneuverability on helicopter combat effectiveness
N82-23212

FARMER, M. G.
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[AIAA 82-0647] A82-30143
A two-degree-of-freedom flutter mount system with low damping for testing rigid wings at different angles of attack
[NASA-TM-83302] N82-23549

FELLERS, W. E.
Tail configurations for highly maneuverable combat aircraft
N82-22201

FIELDS, J. M.
Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison
A82-29165

FINKLE, D. V.
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
[AIAA 82-0760] A82-30119

FISCHER, U. A.
ACTTA: Investigation of new piloting and flight control technologies. Volume 1: Review; active wing
[MBB-UH-05-81-VOL-1] N82-23252
ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability
[MBB-UH-05-81-VOL-2] N82-23253

FLACH, J. M.
Performance evaluation of a kinesthetic-tactual display
N82-23221

FLEETER, S.
Prediction of aerodynamically induced vibrations in turbomachinery blading
A82-28986

FLEMING, R. E.
Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189

FORREST, R. D.
Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219

FORSYTH, P. J. E.
Occurrence of fretting fatigue failures in practice
A82-28543

FOSTER, T. B.
Advanced technology DFCS control panel for the L-1011-500
[AIAA PAPRE 81-2240] A82-29000

FOX, S. R.
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238

FOY, D. E.
Adaptation and equipment of aircraft for the fighting of forest fires
A82-29584

FRANCIS, M. S.
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments
A82-29018

FROST, R. K.
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315

FUJIEDA, H.
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment
[NAL-TR-686T] N82-22212

FUJIMOTO, T.
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659

FUJIMOTO, W. T.
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes
A82-28932

FULLAM, P. W. J.
Enhanced piloting control through cockpit facilities and A.C.T.
N82-22195

FULLER, C. R.
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144

G

GAIUBOV, G. M.
The stressed state of a parachute canopy during opening
A82-29820

GARBLAND, S.
Transient measurements under electric pulse excitation in 37 Viggen aircraft
[FOA-C-30243-A3] N82-23409

GENT, H.
The reliability of height and identity data
A82-30312

GERDES, R. M.
Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219

GIAMATI, C. C.
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
A82-29008

GIBSON, R. F.
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites
[AIAA 82-0712] A82-30102

GILSON, R. D.
A tactual display aid for primary flight training
[NASA-CR-166242] N82-22230
Performance evaluation of a kinesthetic-tactual display
N82-23221

GOEDEL, H.
Application of a structural optimization procedure for advanced wings
[MBB-FE-171/S/PUB/49] N82-23141

GOLDSTEIN, K. W.
VTOL and VSTOL handling qualities specifications, an overview of the current status
N82-23209

GOODMAN, J. W.
Advanced aluminum and titanium structures; Proceedings of the Winter Annual Meeting, Washington, DC, November 15-20, 1981
A82-28994

GOORJIAN, P. M.
Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157

GOSLING, G. D.
Measures to increase airfield capacity by changing aircraft runway occupancy characteristics
[NASA-CR-168841] N82-22240

GRAALMANN, H.
Tool use in cutting operations involving integral structural components in aircraft construction
A82-28873

GRACIA, J. J.
Integrated cockpit for A-129
N82-23225

GREEN, D. L.
Cockpit integration from a pilot's point of view
N82-23224

GRIDLEY, D.
Program for narrow-band analysis of aircraft flyover noise using ensemble averaging techniques
[NASA-CR-165867] N82-22949

GROSCHE, F. R.
Experiments on propeller noise
N82-22976

GROSSER, W. F.
A wind-tunnel study of the aerodynamic characteristics of a slotted versus smooth-skin supercritical wing
[AIAA 82-0642] A82-30139

GROSSMAN, D. T.
An automated technique for improving modal test/analysis correlation
[AIAA 82-0640] A82-30137

GUICHETEAU, P.
Application of the theory of bifurcations to the study of the loss of control in combat aircraft
N82-22198

GURUSWAMY, P.
Comparison between computations and experimental data in unsteady three-dimensional transonic aerodynamics, including aeroelastic applications
[AIAA 82-0690] A82-30157

GUTHRIE, C. H.
Evaluation of direct force mode fighters by combat simulation
N82-22204

H

HAAS, R.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

HACKER, B.
  Elastic suspension of a wind tunnel test section
  N82-23363
HACKETT, J. E.
  Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
  [NASA-CR-166186] N82-23234
  Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
  [NASA-CR-166187] N82-23235
HAFTKA, R. T.
  Damage tolerant design using collapse techniques
  [AIAA 82-0718] A82-30168
HAFTMANN, B.
  Jet effects on forces and moments of a VSTOL fighter type aircraft
  N82-23168
HAHN, W. A.
  NOx formation in flat, laminar, opposed jet methane diffusion flames
  A82-28660
HALL, D. W.
  The gas turbine engine
  A82-28587
HALL, S. L.
  Acoustic emission from free jets
  N82-22962
HAMILTON, C. H.
  SPF of high strength aluminum structures
  A82-28997
HANAGUD, S. V.
  On the characterization of damages in graphite-epoxy composites
  [AIAA 82-0757] A82-30117
  Shape optimization of fiber reinforced composites
  [AIAA 82-0719] A82-30169
HANNAH, C. G.
  Composite materials
  A82-28590
HARPER, H. P.
  The role of voice technolcgy in advanced helicopter cockpits
  N82-23223
HARRIS, J. A., JR.
  Engine component retirement for cause
  N82-22177
HARRISON, H.
  Powder metallurgical innovations for improved hot section alloys in aero-engine applications
  [PNR-90072] N82-22358
HART, J. C.
  Civil (French/US) certification of the Coast Guard's HH-65A Dauphin
  N82-23210
HARTHOPP, S. J.
  The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
  [PNR-90076] N82-22271
HARVEY, C. A.
  Test demonstration of digital control of wing/store flutter
  [AIAA 82-0645] A82-30141
HASKINS, J. F.
  Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites
  [AIAA 82-0657] A82-30087
HAUSER, J. M.
  The influence of protective treatment on the mechanical properties of superalloy parts
  N82-22180
HECHT, J.
  Laser gyros - The guiding light
  A82-29792
HEDGECOCK, R. B. G.
  Military maintenance policies and procedures for high-temperature parts. Will they be adequate?
  N82-22173
HEFFLEY, R. K.
  Functional requirements for the man-vehicle systems research facility
  [NASA-CR-166315] N82-22248
  Technical approaches for measurement of human errors
  [NASA-CR-166314] N82-22249
  A pilot in the loop analysis of helicopter acceleration/deceleration maneuvers
  N82-23229
HELDENFELS, R. R.
  Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958
  N82-23494
HELLIWELL, B. J.
  Powder metallurgical innovations for improved hot section alloys in aero-engine applications
  [PNR-90072] N82-22358
HENDERSON, C.
  Sea-based remotely piloted vehicles. I - Issues and concepts
  A82-29714
HENNI, A. H.
  Review of practical experience on combat aircraft maneuverability
  N82-22189
HERTZ, T. J.
  Flutter of forward swept wings, analyses and tests
  [AIAA 82-0646] A32-30142
HESS, R. W.
  Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
  [AIAA 82-0686] A82-30153
  Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
  [NASA-TM-83297] N82-23195
HIBNER, D. H.
  Analysis of high load dampers
  [NASA-CR-165503] N82-23248
HICKS, B.
  Sheet materials - Fabrication and joining
  A82-28594
HIGNARD, Y.
  Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot
  N82-22202
HILL, D. E.
  Experimental stress analysis of a thin-walled pressurized torus loaded by contact with a plane
  [AIAA 82-0753] A82-30114
HINDSON, W. S.
  Past applications and future potential of variable stability research helicopters
  N82-23226
HIRSCH, I.
  The utilization of agricultural aircraft in economical operations for fighting forest fires in Israel
  A82-29580
HIRSCHBEIN, M. S.
  Bird impact analysis package for turbine engine fan blades
  [AIAA 82-0696] A82-30162
HOH, R. H.
  Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test
  N82-22191
  New development in flying qualities with application to rotary wing aircraft
  N82-23226
HOLLOWELL, S. J.
  Aeroelastic flutter and divergence of stiffness coupled, graphite/epoxy, cantilevered plates
  [AIAA 82-0722] A82-30172
HONG, C. Y. R.
  Turbulence-excited flapping motion of a rotor blade in hovering flight
  A82-29042
HORSTMANN, K. H.
  Drag reduction using pneumatic turbulators
  [DFVLR-FB-81-33] N82-22223
HOUSNER, J. M.
  On the dynamic collapse of a column impacting a rigid surface
  [AIAA 82-0735] A82-30182
HOYNIAK, D.
  Prediction of aerodynamically induced vibrations in turbomachinery blading
  A82-28986
HUANG, N.
  The relaxation oscillation in ramjet combustion
  A82-28738

HUDSON, W. R.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392
HUFF, H.
Repair and regeneration of turbine blades, vanes and discs
N82-22185
HUGGINS, G. L.
Advanced general aviation comparative engine/airframe integration study
[NASA-CR-165564] N82-22263
HULTEN, G.
RADIAK simulator for aircraft instruments
[FOA-C-40136-A3] N82-22286
HUMMES, D.
Flight tests for the assessment of task performance and control activity
N82-23213
HUNTER, J. E.
Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results
N82-23185
HWANG, C.
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141
Application of optimal control techniques to aircraft flutter suppression and load alleviation
[AIAA 82-0724] A82-30173

I

IGONINA, T. R.
The maximum flying range problem for an aircraft
A82-31602
IUGOV, O. K.
Determination of an optimal control program for an aircraft power plant during climb
A82-29845

J

JACARUSO, G.
A giant step toward composite helicopters
A82-30294
JACKSON, C. M., JR.
Metric half-span model support system
[NASA-CASE-LAR-12441-1] N82-23254
JACOB, D.
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps
N82-22192
JAGACINSKI, R. J.
Performance evaluation of a kinesthetic-tactual display
N82-23221
JAWORSKI, E.
Analysis of changes in the gas-dynamic parameters of a gas-turbine helicopter engine during acceleration
A82-29872
JEAL, R. H.
Defects and their effect on the behavior of gas turbine discs
N82-22178
JHONG, Y. H.
Utility of a probability-density-function curve and F-maps in composite-material inspection
A82-28934
JEWELL, W. F.
Functional requirements for the man-vehicle systems research facility
[NASA-CR-166315] N82-22248
Technical approaches for measurement of human errors
[NASA-CR-166314] N82-22249
JEX, H. R.
Functional requirements for the man-vehicle systems research facility
[NASA-CR-166315] N82-22248
JOHNSON, F. H.
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141
JOHNSON, J. T.
Composite bonds improve thermal integrity
A82-30004
JOHNSON, J. W.
Composite materials
A82-28590
JOHNSON, R. W.
737 graphite-epoxy horizontal stabilizer certification
[AIAA 82-0745] A82-30109
JONES, A. L.
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet
[NASA-CR-165617] N82-22211
JONES, J. E.
Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189
JONES, J. S.
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315
JONES, W. R., JR.
Fatigue behavior of adhesively bonded joints
A82-29032
JOSHI, D. S.
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141
JUNG, S.
New processes and methods of technical diagnostics and prognostics in the case of the engine NK-8-4. II
A82-29925

K

KAITATZIDIS, H.
Elevator unit for the Alpha-Jet, made from carbon-fibre reinforced plastic
A82-28649
KALEMARIS, S. G.
Evaluation of the effects of model scale and test technique on jet-induced effects
N82-23167
KANAFANI, A.
Measures to increase airfield capacity by changing aircraft runway occupancy characteristics
[NASA-CR-168841] N82-22240
KARAN, M. A.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392
KARIN, G. A.
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692
KARLIN, B. E.
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238
KARLOVITZ, L.
Shape optimization of fiber reinforced composites
[AIAA 82-0719] A82-30169
KARMARKAR, J. S.
Analysis of computing system configurations for highly integrated guidance and control systems
N82-23189
KEEGAN, E. W.
Fighting forest fires with the aid of aircraft in the United States of America
A82-29577
KEEN, J. M. S.
Reliable power
[PNR-90078] N82-22275
KEESE, J. E.
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments
A82-29018
KENSCHE, C.
Service life investigation of a sailplane wing of CFRP construction
N82-22324
KERR, J. R.
Effects of 50,000 hours of thermal aging on graphite/epoxy and graphite/polyimide composites
[AIAA 82-0657] A82-30087
KESLER, D. F.
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141

KIKUCHI, T.
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
KISSEL, G. K.
Experience with high performance V/STOL fighter projects at MBB
[MBB-FE-124/S/PUB/50] N82-23140
KLEIDER, A.
Composite bonds improve thermal integrity
A82-30004
KLICH, P. J.
Mechanical properties of a fiberglass prepreg system at cryogenic and other temperatures
[AIAA 82-0708] A82-30099
KNIGHT, M. A. G.
Low cost aircrew training devices
A82-29256
KNIGHT, N. F., JR.
On the dynamic collapse of a column impacting a rigid surface
[AIAA 82-0735] A82-30182
KOLANDER, W.
ACTTA: Investigation of new piloting and flight control technologies. Volume 1: Review; active wing
[MBB-UH-05-81-VOL-1] N82-23252
ACTTA: Investigation of new piloting and flight control technologies. Volume 2: Aircraft with reduced lateral stability
[MBB-UH-05-81-VOL-2] N82-23253
KOLEK, R. L.
Composite bonds improve thermal integrity
A82-30004
KOTANSKY, D. R.
The modeling and prediction of multiple jet VTOL aircraft flow fields in ground effect
N82-23166
KOTELNIKOV, V. R.
Thermal stability analysis for conical shells with variable parameters
A82-29844
KOTH, D. W.
Integrated cockpit for A-129
N82-23225
KOURTIDES, D. A.
Test methodology for evaluation of fireworthy aircraft seat cushions
A82-29596
KOZLOWSKI, H.
Energy efficient engine exhaust mixer model technology
[NASA-CR-165459] N82-22264
KRASNOSHAPKA, N. M.
Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices
A82-28875
KUBO, S.
Crossflow shock on the suction side of a flat delta wing with supersonic leading edges
A82-29659
KUETTNER, R.
Air Traffic Flow Management and Air Traffic Flow Control
A82-29923
KUKLEV, E. A.
Estimation of the performance of nonstationary discontinuous control systems for flight vehicles
A82-29832
KURKOV, A. P.
Measurement of aerodynamic work during fan flutter
A82-28987
KUROCHKA, P. N.
Analysis of shells of straight-wing type
A82-29841

L

LAFON, P.
Helicopter rotor performance improvement by utilization of swept-back parabolic blade tip
N82-22151
LAMBERIGTS, M.
Directional solidification: Project B2
[PNR-90088] N82-22279
LANDIS, K. H.
An assessment of various side-stick controller/stability and control augmentation systems for night nap-of-Earth flight using piloted simulation
N82-23216
LANDY, M. A.
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147
LANDY, R. J.
Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results
N82-23185
LARKIN, M.
Energy efficient engine exhaust mixer model technology
[NASA-CR-165459] N82-22264
LAVROV, A. V.
Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
A82-29880
LEACH, J. F.
Aircraft cabin air ozone contamination and compliance with regulations
A82-31057
LEBACQZ, J. V.
Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219
LECOMTE-MERTENS, C.
Directional solidification: Project B2
[PNR-90088] N82-22279
LEE, H. K.
Experiment on active flutter suppression of a cantilever wing
[NAL-TR-690] N82-22282
LEE, S. G.
Production weldbonding on the A-10 aircraft
A82-28995
LEFRANCQ, J. P.
A complete method for computation of blade mode characteristics and responses in forward flight
[SNIAS-821-210-101] N82-22254
LEHTINEN, B.
The role of modern control theory in the design of controls for aircraft turbine engines
[NASA-TM-82815] N82-22262
LEPRETRE, M.
Experimental study of a jet deflector
N82-23173
LERCHE, H. D.
Integrated navigation-TF/TA-system based on stored terrain data processing
N82-23183
LEVY, M.
Chem-Braze abradable seal practical
A82-31048
LEWIS, G. M.
Collaborative development of aero-engines
[PNR-90083] N82-22277
LEWIS, W. J.
Multi-mission V/STOL with vectored thrust engines
[PNR-90086] N82-22278
LIN, Y. K.
Turbulence-excited flapping motion of a rotor blade in hovering flight
A82-29042
LINCOLN, J.
Soaring Society of America, National Convention, Phoenix, AZ, January 14-18, 1981, Proceedings
A82-29414
LOGAN, T. R.
Bonded aluminum honeycomb - Aircraft flight surface primary structure application
[AIAA 82-0676] A82-30145
LOGUS, P. J.
Production Verification Testing (PVT) of guidance and control systems for high reliability
N82-23187
LOZHKIN, O. B.
The stability of monocoque panels under bending
A82-29836

LUCERO, E. P.
Approximate method for predicting supersonic normal force coefficient very-low-aspect-ratio lifting surfaces
[AD-A111770] N82-23199

M

MAITA, M.
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment
[NAL-TR-686T] N82-22212
Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
[NAL-TR-685T] N82-22953

MALZBENDER, B.
Socata: TB 20 Trinidad given German debut
[NASA-TM-76706] N82-22247

MARGASON, R. J.
Jet V/STOL wind-tunnel simulation and groundplane effects
N82-23165

MARSDEN, K. D.
The use of 'water bombers' and chemical agents against forest fires, taking into account the employment of a first-attack system
A82-29582

MARSH, A. H.
Recommendations for field measurements of aircraft noise
[NASA-CR-3540] N82-22955

MARSH, D. A.
The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
[PNR-90076] N82-22271

MASURE, B.
A complete method for computation of blade mode characteristics and responses in forward flight
[SNIAS-821-210-101] N82-22254

MATTHEWS, C. G.
Analysis and Monte Carlo simulation of near-terminal aircraft flight paths
[NASA-TP-1997] N82-23233

MAURER, O. F.
Development and use of dynamic qualification standards for Air Force stores
N82-22155

MCCARTY, J. E.
737 graphite-epoxy horizontal stabilizer certification
[AIAA 82-0745] A82-30109

MCCARTY, N. E.
Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft
[AIAA 82-0705] A82-30096

MCCLENDON, J. R.
Optimal control and estimation for strapdown seeker guidance of tactical missiles
A82-31121

MCELREATH, K. W.
Civil (French/US) certification of the Coast Guard's HH-65A Dauphin
N82-23210

MCELREATH, H. Y.
State-of-the-art cockpit design for the HH-65A helicopters
N82-23220

MCKENZIE, A. B.
Encounters with surge: Some experiences of development of axial compressors for aero gas turbines
[PNR-90071] N82-22274

MCQUILKIN, F. T.
SPF of high strength aluminum structures
A82-28997

MCRUER, D. T.
Functional requirements for the man-vehicle systems research facility
[NASA-CR-166315] N82-22248
Technical approaches for measurement of human errors
[NASA-CR-166314] N82-22249
A theory of human error
[NASA-CR-166313] N82-22250

MEETHAM, G. W.
The gas turbine engine
A82-28587
The contribution of thermal barrier coatings to improvements in the life and performance of gas turbine components
[PNR-90076] N82-22271

MEIROVITCH, L.
Feedback control of a cantilever wing in steady airflow
[AIAA 82-0729] A82-30177

MERRILL, W.
The role of modern control theory in the design of controls for aircraft turbine engines
[NASA-TM-82815] N82-22262

METWALLY, M.
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692

MICHALKE, A.
Prediction of flyover jet noise spectra from static tests
N82-22963

MICHEL, U.
Prediction of flyover jet noise spectra from static tests
N82-22963

MIGNOSI, A.
Theoretical optimisation and experimental verification of an injector
N82-23170

MILELLI, R. J.
Definition of display/control requirements for assault transport night/adverse weather capability
N82-23217

MILLER, G. D.
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150

MILLER, G. K., JR.
Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236

MILLER, R. B.
Strapdown inertial navigation systems: An algorithm for attitude and navigation computations
[ARL/SYS-REPT-23] N82-22241

MILLER, R. J.
A portable, low-cost flight-data measurement and recording system
[NASA-TM-84229] N82-32478

MIRANDA, L. R.
Computational aerodynamics - Its coming of age and its future
A82-29773

MOHAN, K.
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692

MOORE, R. D.
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.77, respectively, and with design pressure ratio of 2.05
[NASA-TP-2001] N82-22269

MOORSE, S. A.
Gunfire blast pressure predictions
N82-22170

MORAWSKI, J. M.
Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I
A82-29871

MORGAN, J. M.
Some piloting experiences with multifunction isometric side-arm controllers in a helicopter
N82-23218

MORRIS, C. E. K., JR.
A flight investigation of blade-section aerodynamics for a helicopter main rotor having NC-SC2 airfoil sections
[NASA-TM-83298] N82-23192

MORRIS, J. J.
Boeing 234 flight control development
N82-23211

MORRISON, G. L.
The role of coherent structures in the generation of noise for subsonic jets
[NASA-CR-168764] N82-22947
MOWERY, G. W.
Definition of display/control requirements for assault transport night/adverse weather capability
N82-23217
MUNT, R. M.
Gunfire blast pressure predictions
N82-22170
MURDOCH, R. W.
Computer modeling of fan-exit-splitter spacing effects on F100 response to distortion
[NASA-CR-167879] N82-23246
MUROLO, A.
Turboprop and turbojet ejector optimisation
N82-23174
MYERS, T. T.
Development of a tentative flying qualities criterion for aircraft with independent control of six degrees of freedom: Analysis and flight test
N82-22191

N

NAGAEV, V. A.
The stability of monocoque panels under bending
A82-29836
NAGAMATSU, H. T.
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209
NEUWERTH, G.
Flowfield and noise sources of jet impingement of flaps and ground surface
N82-23163
NEVIUS, H. E.
Dynamic qualification testing of F-16 equipment
N82-22159
NISHIOKA, T.
Integrity analyses of surface-flawed aircraft attachment lugs - A new, inexpensive, 3-D alternating method
[AIAA 82-0742] A82-30107
NORDSTRAND, K.
RADIAK simulator for aircraft instruments
[FOA-C-40136-A3] N82-22286
NUESSER, H. G.
Developmental possibilities in civil aviation in the Federal Republic of Germany
N82-22230

O

OLCOTT, J. W.
Analysis and flight evaluation of a small, fixed-wing aircraft equipped with hinged plate spoilers
[NASA-CR-166247] N82-22243
OSIPOV, V. A.
Design principles of a computer-aided design system
A82-29829
Investigation of the aerodynamic-contour method with control functions in the form of smooth constant-sign contours
A82-29831

P

PADFIELD, G. D.
Applications of system identification methods to the prediction of helicopter stability, control and handling characteristics
N82-23230
PALMER, S. J.
Applications of structural adhesives in production
A82-28808
PAN, C. H. T.
Basic technology of squeeze-film dampers for rotor dynamics control
[AD-A110842] N82-23250
PARANT, J. L.
Aircraft aerodynamic noise during approach
N82-22976
PARFITT, D. J.
Fuel efficiency engines for large transport aircraft
[PNR-90082] N82-22276
PARKER, J. A.
Test methodology for evaluation of fireworthy aircraft seat cushions
A82-29596
PATERSON, D.
High temperature, short term tensile strength of C6000/PMR-15 graphite polyimide
[AIAA 82-0711] A82-30125
PATSENKER, B. L.
Zone loading of flight-vehicle structures
A82-29838
PATTIE, R. R.
Effects of moisture on the mechanical properties of glass/epoxy composites
A82-29036
PAULSON, J. W.
Wind-tunnel investigation of the powered low-speed longitudinal aerodynamics of the Vectored-Engine-Over (VEO) wing fighter configuration
[NASA-TM-83263] N82-22207
PAUSDER, H. J.
Flight tests for the assessment of task performance and control activity
N82-23213
PAVLOV, V. A.
Analysis of a multihinged empennage with allowance for shear strain
A82-29834
PEACOCK, A.
Qualification of equipment for gunfire induced vibration
N82-22158
PEACOCK, R. E.
The excitation of compressor/duct systems
A82-28993
PEARSON, J.
STOL aircraft structural vibration prediction from acoustic excitation
N82-22169
PEDIGO, R. D.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392
PEDOTTI, J.
Evaluation of aircraft in simulated combat: Computer against computer or computer against human pilot
N82-22202
PEOPLES, P. L.
Handling air freight in the 1980s - Meeting the challenge
A82-29800
PERRY, A. J.
Gunfire blast pressure predictions
N82-22170
PHILIPPE, J. J.
Helicopter rotor performance improvement by utilization of swept-back parabolic blade tip
N82-22151
PHILLIPS, C. G.
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
[NASA-CR-166186] N82-23234
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235
PI, W. S.
Test demonstration of digital control of wing/store flutter
[AIAA 82-0645] A82-30141
Application of optimal control techniques to aircraft flutter suppression and load alleviation
[AIAA 82-0724] A82-30173
PICHOIR, R.
The influence of protective treatment on the mechanical properties of superalloy parts
N82-22180
PITTS, F. L.
The 1981 direct strike lightning data
[NASA-TM-83273] N82-22848
PLUMB, F. J.
Maintenance problems in gas turbine components at the Royal Naval Aircraft Yard, Fleetlands
N82-22175

POKALLUS, R.
Development of a taped random vibration technique for acceptance testing
N82-22171

POLHAMUS, E. C.
The development of cryogenic wind tunnels and their application to maneuvering aircraft technology
N82-22196

POLLOCK, N.
A numerical investigation of two-dimensional, subsonic, linear, wind tunnel interference theory
[ARL/AERO-NOTE-403] N82-23197

PONTELANDOLFO, C.
Definition of display/control requirements for assault transport night/adverse weather capability
N82-23217

POPE, L. D.
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition
[NASA-CR-165869] N82-22952

POPOLO, J.
Development of a taped random vibration technique for acceptance testing
N82-22171

PORTIER, C.
Experimental study of a jet deflector
N82-23173

PORTNOI, V. A.
Analysis of a multihinged empennage with allowance for shear strain
A82-29834

POSPELOV, V. A.
Numerical study of vibrational relaxation in the turbulent mixing of jets in a supersonic nozzle
A82-29880

POTTER, D. L.
Structural integrity of an adhesively bonded aircraft fuselage
A82-28996

POZNIAK, E. L.
Stability and self-oscillations of coaxial rotors
A82-31603

PUTT, C. W.
Application of computer generated color graphic techniques to the processing and display of three dimensional fluid dynamic data
A82-29008

Q

QUAST, A.
Drag reduction using pneumatic turbulators
[DFVLR-FB-81-33] N82-22223

QUINN, B.
Thrust augmenting ejectors: A review of the application of jet mechanics to V/STOL aircraft propulsion
N82-23169

R

RABENHORST, D. W.
Prototype flywheel spin testing program
[UCRL-15381] N82-22499

RADESPIEL, R.
Wind tunnel investigations of sailplane fuselages with different lacings and wing settings
N82-23200

RAIN, C.
Future auto engines - Competition heats up
A82-29793

RATCLIFFE, S.
Secondary radar for airborne collision avoidance
A82-30313

RAUCH, F. J., JR.
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[NASA-TM-83279] N82-23239

REDDY, C. S.
Aerodynamic performance of slender wings with separated flows
[NASA-CR-168768] N82-22206

REED, R. D.
Sun sensing guidance system for high altitude aircraft
[NASA-CASE-FRC-11052-1] N82-23231

REID, L.
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.77, respectively, and with design pressure ratio of 2.05
[NASA-TP-2001] N82-22269

REINA, F.
Integrated cockpit for A-129
N82-23225

RENSHAW, T.
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means
[AIAA 82-0661] A82-30091

RETELLE, J. P.
A computer-controlled oscillation mechanism for unsteady aerodynamics experiments
A82-29018

RICKETTS, R. H.
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests
[NASA-TM-83278] N82-23240

RILEY, D. R.
Comparison of analytical predictions of longitudinal short period pilot-induced oscillations with results from a simulation study of the space shuttle orbiter
[NASA-TM-83267] N82-23236

RIVIELLO, V. P.
Turboprop and turbojet ejector optimisation
N82-23174

RIZENBERGS, R. L.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

ROBERTS, F. L.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

ROBERTS, L.
V/STOL aircraft and fluid dynamic
N82-23179

ROBINSON, G. H.
Aircraft cabin air ozone contamination and compliance with regulations
A82-31057

ROCK, S.
Elastic suspension of a wind tunnel test section
N82-23363

ROCKADAY, S. L. M.
Measures to increase airfield capacity by changing aircraft runway occupancy characteristics
[NASA-CR-168841] N82-22240

ROJAS-TERAN, R. G.
GTD analysis of airborne antennas radiating in the presence of lossy dielectric layers
[NASA-CR-168770] N82-22390

ROMANKO, J.
Fatigue behavior of adhesively bonded joints
A82-29032

ROMANOV, E. V.
Instruments and installations for meteorological measurements at airports
A82-28826

ROPELEWSKI, R. R.
F-15 fighter abilities evaluated
A82-29592

ROSE, J. L.
Utility of a probability-density-function curve and F-maps in composite-material inspection
A82-28934

ROSENSTEIN, A. H.
A review of U.S. Air Force research related to airframe and engine materials
A82-29260

ROSENTHAL, L.
Aerodynamics at the 1981 Le Bourget show
A82-29709

ROSFJORD, T. J.
Investigation of soot and carbon formation in small gas turbine combustors
[NASA-CR-167853] N82-22267

ROSKAM, J.
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168912] N82-23245

ROSS, I.
An electronic control for an electrohydraulic active control landing gear for the F-4 aircraft
[NASA-CR-3552] N82-22252

ROSS, J.
Investigation of passive shock wave-boundary layer control for transonic airfoil drag reduction
[NASA-CR-168844] N82-22209

RUHLIN, C. L.
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[NASA-TM-83279] N82-23239
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests
[NASA-TM-83278] N82-23240

RUMMER, D. I.
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168912] N82-23245

RUPP, E. L.
Production weldbonding on the A-10 aircraft
A82-28995

RYLAND, H.
The micro revolution comes to civil air transport
A82-29259

S

SACKEL, E.
Analysis and flight evaluation of a small, fixed-wing aircraft equipped with hinged plate spoilers
[NASA-CR-166247] N82-22243

SADLER, S. G.
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems
[AIAA 82-0731] A82-30179

SAFF, C. R.
A multidimensional-crack-growth prediction methodology for flaws originating at fastener holes
A82-28932

SAIN, M. K.
Alternatives for jet engine control
[NASA-CR-168894] N82-23247

SAINT CLAIR, A. K.
Addition polyimide adhesives containing various end groups
A82-29098

SAINT CLAIR, T. L.
Addition polyimide adhesives containing various end groups
A82-29098

SALZBORN, R.
Fighting forest fires - A task for the Swiss air force
A82-29578

SAMPATH, S.
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 1: Applications to winged configurations
[NASA-CR-166186] N82-23234
Determination of wind tunnel constraint effects by a unified pressure signature method. Part 2: Application to jet-in-crossflow
[NASA-CR-166187] N82-23235

SANDALLS, F. J.
Aircraft cabin air ozone contamination and compliance with regulations
A82-31057

SARRANTONIO, A.
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means
[AIAA 82-0661] A82-30091

SCHAFFER, E. G.
An investigation of rotor harmonic noise by the use of small scale wind tunnel models
[NASA-CR-166337] N82-24050

SCHIESS, J. R.
Analysis and Monte Carlo simulation of near-terminal aircraft flight paths
[NASA-TP-1997] N82-23233

SCHMIDT-BISCHOFFSHAUSEN, HR.
Performance characteristics and employment profiles of the new helicopter BK117
A82-29586

SCHMIDT, D. K.
Multivariable closed loop control analysis and synthesis for complex flight systems
N82-22193

SCHNEIDER, G.
Application of a structural optimization procedure for advanced wings
[MBB-FE-171/S/PUB/49] N82-23141

SCHRA, L.
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate
[NLR-MP-80047-U] N82-22360

SCHULMAN, T. M.
Functional requirements for the man-vehicle systems research facility
[NASA-CR-166315] N82-22248

SCHULTZ-GRUNOW, F.
Studies on wind tunnel straighteners
[NASA-TM-76689] N82-22284

SCHULZ, W. J.
Engine depot maintenance repair technology
N82-22174

SCHWARTZ, M. H.
A giant step toward composite helicopters
A82-30294

SCOLATTI, C. A.
Integrated flight and fire control demonstration on an F-15B aircraft: System development and ground test results
N82-23185

SCULLION, T.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

SEIDEL, D. A.
Time-marching transonic flutter solutions including angle-of-attack effects
[NASA-TM-83295] N82-23196

SEVESTRE, C.
La Recherche Aerospatiale, bi-monthly Bulletin number 1981-5, September - October 1981
[ESA-TT-725] N82-22145

SHALASHILIN, V. I.
The stability of monocoque panels under bending
A82-29836

SHAMES, A.
Production weldbonding on the A-10 aircraft
A82-28995

SHANE, D.
Development of a simple, self-contained flight test data acquisition system
[NASA-CR-168912] N82-23245

SHAPIRO, A. J.
The integration of multiple avionic sensors and technologies for future military helicopters
N82-23186

SHAW, L. S.
Metric half-span model support system
[NASA-CASE-LAR-12441-1] N82-23254

SHAW, M.
Computer modeling of fan-exit-splitter spacing effects on F100 response to distortion
[NASA-CR-167879] N82-23246

SHEPTUNOV, V. N.
Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications
A82-29837

SHINAR, J.
Validation of zero-order feedback strategies for medium range air-to-air interception in a horizontal plane
[NASA-TM-84237] N82-23237
SHINDO, S.
Aerodynamic characteristics of the external USB powered lift system using side fences for enhancement of Coanda flow attachment
[NAL-TR-686T] N82-22212
Aerodynamic noise generated by jet-wing/flap interactions of the external USB configuration of STOL aircraft. Part 1: Eight percent scale cold-flow model analysis
[NAL-TR-685T] N82-22953
SHIRK, M. H.
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142
SILVA, W. A.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
SILVANI, J. P.
Aerospatiale survey of wind tunnel testing of small and large scale rotors
[SNIAS-821-210-107] N82-22225
SILVERBERG, L.
Feedback control of a cantilever wing in steady airflow
[AIAA 82-0729] A82-30177
SIMPKIN, P.
Multi-mission V/STOL with vectored thrust engines
[PNR-90086] N82-22278
SIMS, D. L.
Engine component retirement for cause
N82-22177
SINACORI, J. B.
Conceptual design study of a visual system for a rotorcraft simulator and some advances in platform motion utilization
[NASA-CR-166322] N82-22244
SIVAKUMAR, R.
An evaluation study of aluminide and chromoaluminide coatings on IN-100
A82-29597
SKUBACHEVSKII, G. S.
Gas turbine engines used in aviation: Design and construction of components /5th revised and enlarged edition/
A82-30697
SLEEPER, R. K.
Planar equations of rollout motion for an aircraft with free or steerable landing gears
[NASA-TP-1984] N82-23244
SMETANA, F. O.
Automated design of minimum drag light aircraft fuselages and nacelles
[NASA-CR-168913] N82-23238
SMITH, A. J.
The Royal Aircraft Establishment: 100 years of research
[RAE-TM-FS-432] N82-22148
Airfield visual aids research at the Royal Aircraft Establishment
[RAE-TM-FS-431] N82-22242
SMITH, E. G.
Planar equations of rollout motion for an aircraft with free or steerable landing gears
[NASA-TP-1984] N82-23244
SMITH, G. T.
Environmental and high strain rate effects on composites for engine applications
[AIAA 82-0758] A82-30118
SMITH, R.
Influence of maneuverability on helicopter combat effectiveness
N82-23212
SMITH, R. A.
Finite element analysis of through the canopy emergency crew escape from the T-38 aircraft
[AIAA 82-0705] A82-30096
SMITHERS, O. L.
Durability and damage tolerance control plans for USAF aircraft
[AIAA 82-0679] A82-30147
SMOLICZ, T.
Sudden changes in wind velocity - Their effect on aircraft and means of reducing hazard. I
A82-29871
SNIDE, J. A.
Engine depot maintenance repair technology
N82-22174
SOBIESZCZANSKI-SOBIESKI, J.
A linear decomposition method for large optimization problems. Blueprint for development
[NASA-TM-83248] N82-22245
SOMERS, D. M.
NASA research related to sailplane airfoils
A82-29417
SOUDAK, U.
Bonded aluminum honeycomb - Aircraft flight surface primary structure application
[AIAA 82-0676] A82-30145
SPAIN, C. V.
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[AIAA 82-0678] A82-30146
SRIDHAR, K. P.
A Schwarz-Christoffel method for generating internal flow grids
A82-29005
STAPLEFORD, R. L.
Functional requirements for the man-vehicle systems research facility
[NASA-CR-166315] N82-22248
STEINBERG, B. D.
Distributed airborne array concepts
A82-31669
STERNFELD, H., JR.
An investigation of rotor harmonic noise by the use of small scale wind tunnel models
[NASA-CR-166337] N82-24050
STIEWITT, H.
Experiments on propeller noise
N82-22978
STOKELD, R. L.
A system safety model for developmental aircraft programs
[NASA-CR-3534] N82-22228
STONE, R. H.
Flight service evaluation of Kevlar-49 epoxy composite panels in wide-bodied commercial transport aircraft
[NASA-CR-165841] N82-22316
STOPPEL, J.
Approach in dynamic qualification of light helicopter stores and equipments
N82-22166
STROJNIK, A.
Development of a homebuilt powered sailplane
A82-29416
STROOBACH, J. P.
Maintenance experience with civil aero engines
N82-22176
STUMPFL, S. C.
Wind-tunnel investigation of the powered low-speed longitudinal aerodynamics of the Vectored-Engine-Over (VEO) wing fighter configuration
[NASA-TM-83263] N82-22207
STURGESS, G. J.
Advanced Low-Emissions Catalytic-Combustor Program, phase 1
[NASA-CR-159656] N82-22265
SUN, C. T.
Damping and stiffness of aligned discontinuous fiber reinforced polymer composites
[AIAA 82-0712] A82-30102
SWENTLAND, V.
Handling air freight in the 1980s - Meeting the challenge
A82-29800
SYBERG, J.
Aerodynamic analysis of VTOL inlets and definition of a short, blowing-lip inlet
[NASA-CR-165617] N82-22211
SYRED, N.
The effect of swirl burner aerodynamics on NOx formation
A82-28658

T

TEREKHOV, I. P.
Cascade converter of dc voltage to ac voltage of higher frequency with voltage and frequency stabilization devices
A82-28875

THART, W. G. J.
Engineering property comparisons of 7050-T73651, 7010-T7651 and 7010-T73651 aluminum alloy plate
[NLR-MP-80047-U] N82-22360

THOMAS, M. E.
The 1981 direct strike lightning data
[NASA-TM-83273] N82-22846

THORBY, D. C.
Equipment vibration qualification for Harrier and Hawk aircraft
N82-22161

THORNTON, E. A.
Finite element thermal analysis of convectively-cooled aircraft structures
A82-28565

TIFFANY, S. H.
Control law design to meet constraints using SYNPAC-synthesis package for active controls
[NASA-TM-83264] N82-22280

TIGGELAAR, J. J.
Calculation of the contributions of air traffic and road traffic to air pollution in the region of Schiphol airport in 1974
[NLR-TR-77100-U] N82-22808

TILL, R. D.
The helicopter Navstar GPS test program
A82-31290

TOMANO, D. J.
Extravehicular Activity/Air Traffic Control (EVA/ATC) test report
[NASA-CR-167600] N82-23381

TORELLA, G.
Turboprop and turbojet ejector optimisation
N82-23174

TORRES, M.
Concept studies of an advanced composite helicopter fin
[SNIAS-821-210-106] N82-22257

TRIPLETT, W. E.
Pressure measurements on twin vertical tails in buffeting flow
[AIAA 82-0641] A82-30138

TRISTRANT, D. R.
State of the art and recent perspectives on the study of the loss of control and spin
N82-22197

TURNER, N. G.
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358

TURNER, W. M.
Composite materials
A82-28590

TYREN, C.
Magnetic anomalies as a reference for ground-speed and map-matching navigation
A82-30314

U

UBANK, R.
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358

UDEA, T.
Flutter analysis using nonlinear aerodynamic forces
[AIAA 82-0728] A82-30176

ULKEN, H.
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport
[DFVLR-MITT-82-01] N82-23560

ULVSAND, T.
BADIAK simulator for aircraft instruments
[FOA-C-40136-A3] N82-22286

V

VAN WIJK, A.
The investigation of aircraft accidents and incidents - Some recent national and international developments
A82-29275

VANMANSART, M. G.
State of the art and recent perspectives on the study of the loss of control and spin
N82-22197

VANWANDERHAM, M. C.
Engine component retirement for cause
N82-22177

VENN, G. J.
The dynamic qualification of equipment and external stores for use with rotary winged aircraft
N82-22167

VERGEZ, P. L.
Optimal control and estimation for strapdown seeker guidance of tactical missiles
A82-31121

VERGNE, H.
A review of recent AGARD Symposia on the Angle of Maneuverability of Combat Aircraft
N82-22188

VIETS, H.
Unsteady ejectors
N82-23171

VONRETH, R. D.
Controls and displays for all-weather operation of helicopters
[MBB-UD-319-81-O] N82-22260

VUILLET, A.
Aerospatiale survey of wind tunnel testing of small and large scale rotors
[SNIAS-821-210-107] N82-22225

VULGAKOV, E. B.
Aviation gear drives and reducers: Handbook
A82-30675

W

WADDOUPS, M. E.
Integration of avionics and advanced control technology
N82-22194

WALDMAN, J.
SPF of high strength aluminum structures
A82-28997

WALKER, D. J.
Enhanced piloting control through cockpit facilities and A.C.T.
N82-22195

WALKER, J. G.
Comparing the relationships between noise level and annoyance in different surveys - A railway noise vs. aircraft and road traffic comparison
A82-29165

WANHILL, R. J. H.
Some case studies and the significance of fatigue thresholds
[NLR-MP-81015-U] N82-23561

WATERS, C.
Active control of aeroelastic divergence
[AIAA 82-0684] A82-30151
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[AIAA 82-0721] A82-30171
Transonic flutter study of a wind-tunnel model of a supercritical wing with/without winglet
[NASA-TM-83279] N82-23239

WATSON, J. J.
Evaluation of four subcritical response methods for on-line prediction of flutter onset in wind-tunnel tests
[AIAA 82-0644] A82-30140
Evaluation of four subcritical response methods for on-line prediction flutter onset in wind-tunnel tests
[NASA-TM-83278] N82-23240

WAYMON, G. R.
Development of vibration qualification test spectra for the F-15 aircraft
N82-22160

WEBER, J. M.
An analysis of a nonlinear instability in the implementation of a VTOL control system
[NASA-TM-84220] N82-22281
Results of NASA/FAA ground and flight simulation experiments concerning helicopter IFR airworthiness criteria
N82-23219
WEBER, O.
A theoretical study of the impact of aircraft wake vortices on roofs in the final approach area of Dusseldorf airport
[DFVLR-MITT-82-01] N82-23560
WEISSHAAR, T. A.
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142
WELTE, D.
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps
N82-22192
WENDT, J. O. L.
NOx formation in flat, laminar, opposed jet methane diffusion flames
A82-28660
WESTPHAL, G.
Flight simulators
A82-29924
WHITLOW, W., JR.
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[AIAA 82-0689] A82-30156
Application of a transonic potential flow code to the static aeroelastic analysis of three-dimensional wings
[NASA-TM-83296] N82-23193
Time-marching transonic flutter solutions including angle-of-attack effects
[NASA-TM-83295] N82-23196
WHITTEN, P. D.
Wind-tunnel investigation of the powered low-speed longitudinal aerodynamics of the Vectored-Engine-Over (VEO) wing fighter configuration
[NASA-TM-83263] N82-22207
WIDMAYER, E.
Commercial jet transport crashworthiness
[NASA-CR-165849] N82-23207
WIEGHARDT, K.
Studies on wind tunnel straighteners
[NASA-TM-76689] N82-22284
WIERZBA, I.
The combustion of a fuel jet in a stream of lean gaseous fuel-air mixtures
A82-28692
WIETING, A. R.
Finite element thermal analysis of convectively-cooled aircraft structures
A82-28565
WILBY, E. G.
Analytical prediction of the interior noise for cylindrical models of aircraft fuselages for prescribed exterior noise fields. Phase 2: Models for sidewall trim, stiffened structures and cabin acoustics with floor partition
[NASA-CR-165869] N82-22952
WILDGOOSE, P.
Powder metallurgical innovations for improved hot section alloys in aero-engine applications
[PNR-90072] N82-22358
WILKINSON, W. O.
Prototype flywheel spin testing program
[UCRL-15381] N82-22499
WILSON, D. R.
737 graphite-epoxy horizontal stabilizer certification
[AIAA 82-0745] A82-30109
WILSON, J. S.
A computerized system for the application of fracture tracking data to aircraft management for the C-5A military airlift transport
[AIAA 82-0760] A82-30119
WINSTANLEY, A. E.
Development of a convoluted intake seal for model M66
[BAE-ARG-163] N82-23255
WITTLIN, G.
Analysis of aircraft dynamic behavior in a crash environment
[AIAA 82-0694] A82-30161
WONG, D. G.
Integrated structural analysis and design support for advanced launch vehicles
[AIAA 82-0675] A82-30144
WONGWIWAT, K.
A comparison of properties of single overlap tension joints prepared by ultrasonic welding and other means
[AIAA 82-0661] A82-30091
WONNENBERG, H.
Experimental flight test programs for improving combat aircraft maneuverability by maneuver flaps and pylon split flaps
N82-22192
WOOD, L. J.
Comment on 'Optimal control via mathematical programming'
A82-31125
WOODCOCK, R. J.
The military flying qualities specification, a help or a hindrance to good fighter design
N82-22190
WOOLER, P. T.
Tail configurations for highly maneuverable combat aircraft
N82-22201
WORTMANN, J.
Repair and regeneration of turbine blades, vanes and discs
N82-22185
WYKES, D. H.
Development and demonstration of manufacturing processes for fabricating graphite/LARC 160 polyimide structural elements
[NASA-CR-165809] N82-22315
WYKES, J. H.
Rigid body-structural mode coupling on a forward swept wing aircraft
[AIAA 82-0683] A82-30150
WYNNE, E. C.
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[AIAA 82-0647] A82-30143
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[AIAA 82-0686] A82-30153
Static and unsteady pressure measurements on a 50 degree clipped delta wing at M = 0.9
[NASA-TM-83297] N82-23195

Y

YADIN, E.
Distributed airborne array concepts
A82-31669
YANG, T. Y.
Transonic time-response analysis of three D.O.F. conventional and supercritical airfoils
[AIAA 82-0688] A82-30155
YATES, E. C., JR.
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[AIAA 82-0647] A82-30143
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[AIAA PAPER 82-0727] A82-30193
YEN, J. G.
Component coupling with time-invariant mass matrix for nonisotropic rotating and nonrotating systems
[AIAA 82-0731] A82-30178

Z

ZACHARIAS, A.
An experimental and theoretical investigation of the interaction between the engine jet and the surrounding flow field with regard to the pressure drag on afterbodies
N82-23150
ZAZHIGIN, A. A.
Design principles of a computer-aided design system
A82-29829

ZEGEER, C. V.
Pavement management and rehabilitation of portland cement concrete pavements
[PB82-131384] N82-22392

ZEILER, T. A.
Flutter of forward swept wings, analyses and tests
[AIAA 82-0646] A82-30142

ZELLER, J.
The role of modern control theory in the design of controls for aircraft turbine engines
[NASA-TM-82815] N82-22262

ZIMMERMANN, H.
Aircraft fuel tank slosh and vibration test
N82-22164

ZISLIN, A. N.
Active control of aeroelastic divergence
[AIAA 82-0684] A82-30151

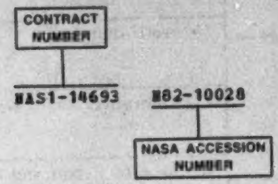
ZMROCZEK, L. A.
Advanced general aviation engine/airframe integration study
[NASA-CR-165565] N82-22268

ZWAAN, R. J.
Aeroelastic properties of wings in transonic flow
[NLR-MP-81005-U] N82-22224

CONTRACT NUMBER INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 151)* AUGUST 1982

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF-AFOSR-78-3688
A82-31669
AF-AFOSR-81-0057
A82-30107
AF-AFOSR-81-0123
A82-30176
AF-AFOSR-0025-81
N82-23171
AF-AFOSR-0042-72
N82-22193
BMFT-LFK-7960-9
N82-23252
N82-23253
DA PROJ. 1L1-61102-AH-45
N82-22251
DAAG29-78-C-0027
N82-23250
DAAG29-78-G-0039
A82-29042
EPA-R-803715 A82-28660
EPA-68-02-2631
A82-28660
F33615-76-C-5220
A82-29032
F33615-77-C-5155
A82-30172
F33615-78-C-3616
N82-22191
F33615-78-C-5121
A82-28995
F33615-80-C-3217
A82-30141
A82-30173
NAG1-112 N82-22947
NAG1-168 A82-30168
NAG2-19 N82-22240
NAG4-1 N82-22193
NASW-3541 N82-22284
NASW-3542 N82-22246
N82-22247
NAS1-11621 N82-22316
NAS1-11668 N82-22314
NAS1-12308 A82-30087
NAS1-15371 N82-22315
NAS1-15782 N82-22952
NAS1-16000 N82-22949
NAS1-16076 N82-23207
NAS1-16111 N82-22227
NAS1-16205 N82-22213
NAS1-16420 N82-22252
NAS2-5589 N82-22243
NAS2-8954 N82-22238
NAS2-9646 N82-23166
NAS2-9883 N82-23234
N82-23235
NAS2-10184 N82-23166
NAS2-10278 N82-22244
NAS2-10361 N82-22228
NAS2-10400 N82-22248
N82-22249
N82-22250
NAS2-10767 N82-24050
NAS3-20646 N82-22264
NAS3-20821 N82-22265
NAS3-22220 N82-22268
NAS3-22221 N82-22263
NAS3-22369 N82-22211
NAS3-22518 N82-23248
NAS3-22524 N82-22267
NAS3-22739 N82-23246
NAS7-100 A82-31125
NAS8-33821 N82-23249
NAS9-15800 N82-23381
NSG-1498 N82-22398
NSG-1561 N82-22206
NSG-1584 N82-23238
NSG-1605 A82-30114
NSG-1624 N82-22209
NSG-2179 N82-23221
NSG-3048 N82-23247
NSG-4019 N82-23245
N00014-79-C-0130
N82-23166
N62269-76-C-0086
N82-23166
SRC-B/RG/3777/3
A82-29165
W-7405-ENG-48
N82-22499
505-03-22 N82-22265
505-31-43-03 N82-22217
505-31-83-02 N82-23233
505-32-2A N82-22269
505-32-03-01 N82-22955
505-33-52-01 N82-23239
505-33-53-07 N82-23193
N82-23194
N82-23196
505-33-63-02 N82-22245
505-34-33-05 N82-22280
505-35-31 N82-22478
505-42-23-01 N82-22251
505-42-71 N82-22281
N82-23234
N82-23235
505-43-13-01 N82-22213
505-43-23-04 N82-22207
505-43-33-0[illegible] N82-23240
505-44-13-02 N82-22848
505-44-33-01 N82-23244
506-53-63-05 N82-23471
532-03-11 N82-22228
534-04-13-54 N82-22239

1. Report No. NASA SP-7037 (151)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Aeronautical Engineering A Continuing Bibliography (Supplement 151)		5. Report Date August 1982 6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, DC 20546		10. Work Unit No. 11. Contract or Grant No.
12. Sponsoring Agency Name and Address		13. Type of Report and Period Covered 14. Sponsoring Agency Code
15. Supplementary Notes		
16. Abstract This bibliography lists 362 reports, articles and other documents introduced into the NASA Scientific and Technical Information System in July 1982.		
17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified - Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 118 22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NASA SP-7037(152)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 152)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in August 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141 093 from the National Technical Information Service (NTIS) Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 338 reports, journal articles, and other documents originally announced in August 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche(1) of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction)

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-- 1/	-- 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

N01	30.00	45.00

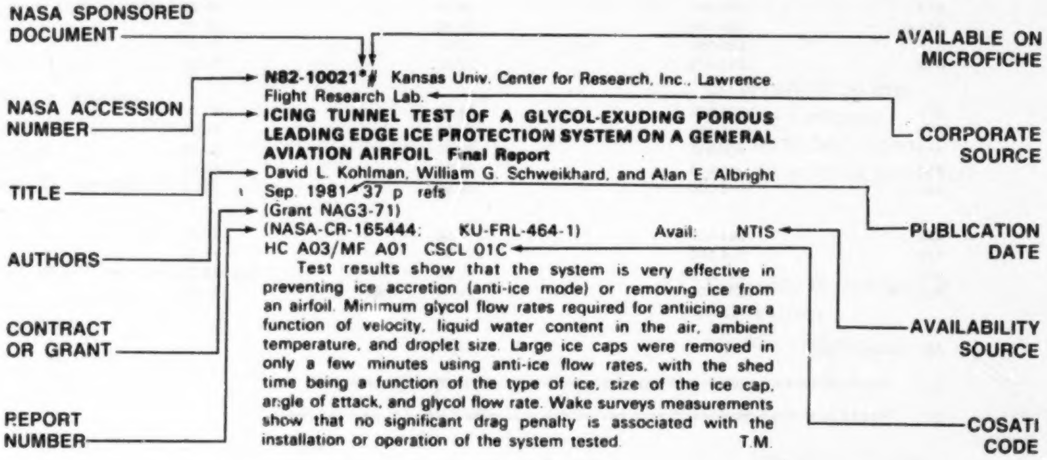
TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) 373
STAR ENTRIES (N82-10000) 393

Subject Index A-1
Personal Author Index B-1
Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*

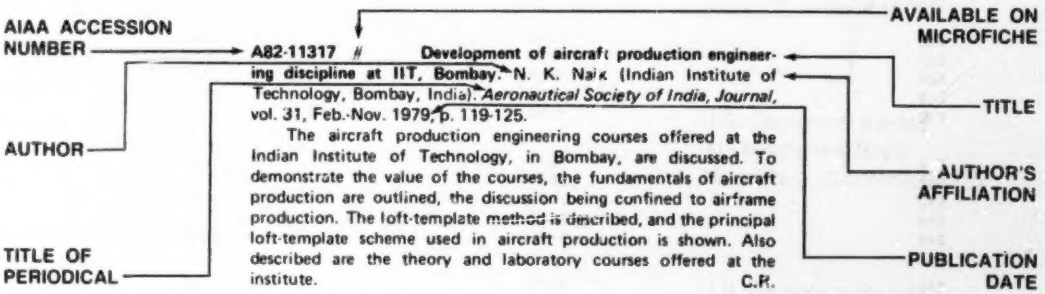


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
CORPORATE SOURCE
TITLE
PUBLICATION DATE
AUTHORS
AVAILABILITY SOURCE
CONTRACT OR GRANT
REPORT NUMBER
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AVAILABLE ON MICROFICHE
TITLE
AUTHOR
AUTHOR'S AFFILIATION
PUBLICATION DATE
TITLE OF PERIODICAL

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 152)

SEPTEMBER 1982

IAA ENTRIES

A82-31824 # **Identification of the form of motion of an aircraft (Identyfikacja postaci ruchu samolotu).** A. Banasik. *Instytut Lotnictwa, Prace,* no. 86, 1981, p. 13-25. In Polish.

Methods for identifying the form of the motion of an arbitrary vibrating system described by a set of ordinary linear equations with constant coefficients are surveyed. The fundamental parameters of the set of equations (the state matrix, the state vector, and the dynamic stability criterion) are determined on the basis of calculated eigenvalues. The eigenvectors corresponding to particular eigenvalues are determined, which characterizes the state vector for a given eigenvalue. Particular emphasis is placed on an identification method which consists in obtaining an analytic solution of the system of differential equations of motion. Numerical examples are presented concerning the lateral dynamic stability of an aircraft treated as a rigid body. B.J.

A82-31853 * # **Approximate method of predicting heating on the windward side of Space Shuttle Orbiter and comparisons with flight data.** H. H. Hamilton, II (NASA, Langley Research Center, Space Systems Div., Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0823.* 15 p. 30 refs.

An approximate method is developed for predicting laminar and turbulent heating rates on the windward side of the Space Shuttle Orbiter for both the wind-tunnel and flight environments. The method is based on a 'local infinite swept cylinder' analysis and includes both equilibrium-air chemistry and variable boundary-layer-edge entropy. The method is validated by comparing with data from wind-tunnel experiments and from the first and second Space Shuttle flights both along the windward-symmetry plane and in a lateral direction off the symmetry plane. Agreement with the flight data is good from approximately 67 km (peak heating) downward. (Author)

A82-31871 # **Thermodynamic performance of an airplane wing leading edge anti-icing system.** R. Ross (Ross Aviation Associates, Sedgwick, KS). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0851.* 5 p.

Flight data gathered from dry air tests are used to develop a procedure that will predict the spanwise and chordwise surface temperature distribution for any aircraft for either dry air or icing conditions. It is shown that wing leading edge surface temperatures can be estimated within plus or minus 5% for dry air and plus or minus 10 percent for natural icing for a wide range of aircraft conditions. The method is somewhat conservative for dry air conditions and quite conservative for icing conditions. (Author)

A82-31883 * # **Radiation enhancement by nonequilibrium during flight through the Titan atmosphere.** C. Park (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0878.* 16 p. 40 refs.

The chemical reactions occurring in the adiabatic inviscid shock layer over a two-dimensional wedge flying through Titan's atmosphere are calculated. Radiative transfer through the shock layer is calculated, accounting for the deviation of electronic state populations from the equilibrium distributions, to determine the heat flux reaching the edge of the boundary layer of the proposed Titan Aerocapture vehicle. The heat fluxes are found to be larger by a ratio of up to 100,000 than those calculated under the assumption of equilibrium flow. For a typical flight, the radiative heat load reaching the edge of the boundary layer is 3.4 x 10 to the 5th J/sq cm, which is 5.7 times the equilibrium value. (Author)

A82-31891 * # **An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors.** A. F. Emery, J. Wolak, S. Etemad, and S. R. Choi (Washington, University, Seattle, WA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0890.* 8 p. 8 refs. NASA-sponsored research.

Results are presented for the rubbing of rotating (100 m/s) titanium blade specimens, with different plasma-sprayed tip coating, against an abradable porous seal material at two different incursion rates. In general, there was a good correspondence between the average transverse force of rubbing and the seal specimen surface temperature. Instantaneous seal surface temperature measurement showed a significant temperature jump before and after each rubbing with a high rate of cooling during each revolution and a high overall temperature level. Numerical predictions of both blade and seal temperature agreed well for the bare blade tip experiments but were consistently high for the coated blades. This suggests that the thermal properties of the coatings may significantly affect the temperatures and hence the wear characteristics of the system. (Author)

A82-31898 * # **Design, fabrication and test of liquid metal heat-pipe sandwich panels.** A. Basiulis (Hughes Aircraft Co., Torrance, CA) and C. J. Camarda (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0903.* 8 p. 9 refs.

Integral heat-pipe sandwich panels, which synergistically combine the thermal efficiency of heat pipes and the structural efficiency of honeycomb sandwich panel construction, were fabricated and tested. The designs utilize two different wickable honeycomb cores, facesheets with screen mesh sintered to the internal surfaces, and potassium or sodium as the working fluid. Panels were tested by radiant heating, and the results indicate successful heat pipe operation at temperatures of approximately 922 K (1200 F). These panels, in addition to solving potential thermal stress problems in an Airframe-Integrated Scramjet Engine, have potential applications as cold plates for electronic component cooling, as radiators for space platforms, and as low distortion, large area structures. (Author)

A82-31922 # **A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations.** J. van der Vooren, J. T. van der Kolk, and J. W. Slooff (Nationaal Lucht- en Ruimtevaartlaboratorium, Amsterdam, Netherlands). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO,* *June 7-11, 1982, AIAA Paper 82-0935.* 14 p. 23 refs. Research supported by the Nederlands Instituut voor Vliegtuigontwikkeling en Ruimtevaart.

A computer program system used for the prediction of aircraft steady aerodynamic characteristics is presented for simulating body and fillet effects in a wing-alone code. The computational aerodynamic information system XFLO22NLR contains a geometry processor, a modified transonic flow analysis code FLO22, simulating body influence, the subsonic Panel method, the three-dimensional laminar-turbulent boundary layer code BOLA, and the post-processing system EDIPAS. The system can predict gross values of lift, pitching moment and drag of wing-body configurations, and can provide information with respect to individual drag components, pressure distributions and boundary layer quantities. Capabilities of the system are demonstrated for various transport-type wing-body configurations. D.L.G.

A82-31923 # **The equivalent simple body /ESB/ method for transonic wing analysis.** P. J. O. Neil and A. Verhoff (McDonnell Aircraft Co., St. Louis, MO). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0936.* 12 p. 10 refs. Research supported by the McDonnell Douglas Independent Research and Development Program.

A procedure is presented for generating an Equivalent Simple Body (ESB) which simulates the wing/fuselage interaction of a complex fighter-type fuselage. The method is used in conjunction with state-of-the-art transonic, potential flow codes, which are limited in their ability to generate computational grids about complex fuselage geometries. The ESB representation is determined at a subcritical Mach number using the precise geometric modelling capabilities of a panel method. Mach number independence of the interaction is established for small angles of attack, thus allowing for accurate computation of wing pressures with the transonic codes. Results are shown for F-15, F/A-18, and AV-8B geometries. (Author)

A82-31932 # **A high-frequency transonic small disturbance code for unsteady flows in a cascade.** G. D. Kerlick and D. Nixon (Nielsen Engineering and Research, Inc., Mountain View, CA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0955.* 8 p. 10 refs. Contract No. N00019-81-0169.

A high-frequency version of the Ballhaus-Goorjian (1977) code LTRAN2 has been adapted to represent unsteady aerodynamic phenomena in transonic cascade flow. The modifications to the algorithm for high frequencies differ from those of Rizzetta and Chin (1979) in two ways: first, a second-order difference for the velocity potential term instead of a first order one is used, and second, a wake condition derived for the transonic small disturbance equation is applied. Then, in order to represent the cascade geometry, periodic boundary conditions and periodic tridiagonal solvers must be introduced. Examples of both oscillatory flows and indicial responses are presented. Application of the indicial method to unsteady cascades is discussed. Future work on the code will extend the applicability of the code to staggered, highly cambered cascades. (Author)

A82-31933 * # **Finite volume calculation of three-dimensional potential flow around a propeller.** W.-H. Jou (Flow Industries, Inc., Kent, WA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0957.* 7 p. 10 refs. Contract No. NAS3-22148.

The finite volume scheme of Jameson (1977) is used to calculate potential flow around a propeller rotating at high speed. An H-type mesh is generated and used successfully in the calculations. A test calculation with a thick blade cross section shows that the present code is capable of computing the propeller flow at the advance Mach number 0.8. The possible physical mechanisms which may play an important role in the propeller aerodynamics are discussed. V.L.

A82-31934 # **Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow.** S. N. Chaudhuri, C. Balasubramanyan (Tennessee, University, Tullahoma, TN), and P. Sundaram. *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0958.* 7 p. 12 refs. Contract No. F08635-80-C-0088.

An integral equation method developed by Oswatitsch et al (1950, 1955) is extended to calculate the flow-field perturbation velocity components for various wing-body-pylon-external store configurations in the lateral and transverse directions. The computed flow field velocities are found to be in reasonably good agreement with pressure probe and laser Doppler velocimetry data at different Mach numbers and angles of attack for regions where strong viscous effects are absent. The method can be further extended to more complicated geometries such as multiple stores and engine intakes at both subsonic and supersonic free-stream Mach numbers. V.L.

A82-31935 * # **Evaluation of two analytical methods for the prediction of inlet flow fields in the vicinity of generalized forebodies.** S. F. Yaros (NASA, Langley Research Center, Transonic Aerodynamics Div., Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0959.* 11 p. 16 refs.

An investigation of the capability of two computer programs to simulate transonic and supersonic flows about representative fighter aircraft forebodies has been carried out for purpose of predicting flow fields in the vicinity of typical inlet locations. Each computer program is described as to its features and usage, and results are compared with comprehensive wind tunnel data. Although both computer codes were inviscid, results show that the gross aerodynamic effects of the forebody, with and without a wing, can be simulated fairly well. Further work is needed to include the effects of viscosity including vortex shedding. (Author)

A82-31944 # **Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing.** R. N. Gupta, N. K. Varghese (M.A. College of Engineering, Kerala, India), C. M. Rodkiewicz (Alberta, University, Edmonton, Canada), and A. C. Jain (Indian Institute of Technology, Kanpur, India). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0979.* 30 p. 32 refs.

The steady hypersonic interaction problem with air, argon, and helium injection is analyzed. A complete solution has been obtained for the basically nonsimilar problem of a slender wedge wing at an angle of attack. In the analysis presented here, a series solution has been developed to specify the initial condition close to the leading edge and the numerical integration is carried out downstream of this line for all the regions from strong to weak interactions including the transition. The numerical solutions have been obtained by the 'difference-differential' technique as well as by a finite-difference method. The comparative advantages and disadvantages of the two methods are discussed. The obtained results include the lift and drag coefficients, the lift to drag ratio, the position of the aerodynamic center, and the heat transfer rate per unit width of the wedge wing. A lighter gas like helium may be less appealing as a coolant due to the large induced pressures. (Author)

A82-31954 * # **Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations.** D. R. Bristow, J. D. Hawk (McDonnell Aircraft Co., St. Louis, MO), and J. L. Thomas (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0993.* 12 p. 12 refs.

For any baseline aircraft configuration, a matrix of partial derivatives of surface velocity potential with respect to geometry coordinates is calculated. Linear extrapolation is then used to analyze the subcritical potential flow corresponding to a series of arbitrary small geometry perturbations. Each perturbation analysis is more than an order of magnitude more efficient than a conventional panel method solution because no influence coefficients are calculated and no large system of linear algebraic equations is solved. Wing and wing-fuselage examples are presented to demonstrate that the predicted pressure distributions are nearly exact for large changes to wing camber, thickness, and leading edge radius. (Author)

A82-31957 # **Calculations of viscous transonic flow over aerofoils.** Z. B. Chen and P. Bradshaw (Imperial College of Science and Technology, London, England). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0997.* 7 p. 9 refs.

A simple and economic iterative scheme is presented for calculating compressible viscous boundary layers and wakes over aerofoils, and for matching the shear layer calculations to the calculations of the transonic potential external flows. The iterative scheme is an extension and improvement of the scheme developed by Mahgoub and Bradshaw for calculating incompressible flow. A new iterative method in the shear layer calculations has been designed and applied in the near wake region. The computing time is only a little greater than in conventional displacement-surface calculations that ignore normal pressure gradients and consequently incur errors in the near wake. Some comparisons are made with full Navier-Stokes solutions and experimental data. (Author)

A82-31958 # **A numerical study of the turbulent flow past an isolated airfoil with trailing edge separation.** C. M. Rhie (Ford Motor Co., Detroit Diesel Allison Div., Indianapolis, IN) and W. L. Chow (Illinois, University, Urbana, IL). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0998.* 12 p. 20 refs. Grant No. DAAG29-79-C-184.

A finite volume numerical method is presented for the solution of the two-dimensional, incompressible, steady Navier-Stokes equations in general curvilinear coordinates. This method is applied to the turbulent flows over isolated airfoils with and without trailing edge separation. The standard K-epsilon model is utilized to describe Reynolds stresses. Body-fitted coordinates are generated for the computation. The solution method is an extension of the procedure developed by Gosman and Pun (1973). The performance of the K-epsilon model is assessed by comparing the predictions with the available experimental data. (Author)

A82-31960 * # **Numerical investigation of supersonic base flow with parallel injection.** G. A. Sullins (Johns Hopkins University, Applied Physics Laboratory, Laurel, MD), J. D. Anderson, Jr. (Maryland, University, College Park, MD), and J. P. Drummond (NASA, Langley Research Center, Computational Methods Branch, Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-1001.* 10 p. 11 refs. Research supported by the University of Maryland; Grant No. NCC1-41.

The present investigation represents the first detailed numerical calculations of base flow with gas injection using a geometry and primary flow condition germane to a scramjet combustor. The investigation is concerned with the numerical solution of the complete two-dimensional Navier-Stokes equations for the flowfield in the vicinity of the base with parallel gas injection, taking into account the fluid dynamic aspects of this flowfield. The flow is dominated by separation, and by mixed regions of locally subsonic and supersonic flow. A comparison is conducted of flows with and without injection, and the effect of base injection on the wave patterns and shear layers of such flows is clearly established. G.R.

A82-31965 * # **Three dimensional turbulent boundary layer development on a fan rotor blade.** B. Lakshminarayana, C. Hah, and T. R. Govindan (Pennsylvania State University, University Park, PA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-1007.* 10 p. 12 refs. Grant No. NsG-3266.

This paper is concerned with an experimental study undertaken to measure the boundary layer growth on a fan rotor blade. The measurements were carried out using a miniature 'X' configuration hot wire probe at various chordwise and radial locations on both surfaces of the blade. The streamwise and radial velocity profiles as well as the corresponding intensity components are interpreted and correlated. The validity of conventional velocity profiles such as the 'law of the wall' for the streamwise profile and the hodograph plot for the cross flow profile are examined. The measured values of boundary-layer gross properties are compared with the predictions based on a momentum-integral technique. (Author)

A82-31972 # **Design of finite element grids for the computation of the three-dimensional transonic flow around a wing.** A. Ecer, E. Citipitioglu, and B. A. Bhutta (Purdue University, Indianapolis, IN). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-1019.* 11 p. 14 refs. Grant No. AF-AFOSR-80-0258.

The solution of the three-dimensional, transonic potential flow equations using the finite element method is presented for the case of flow around a wing. Numerical results obtained for different computational grids are compared for studying the efficiency and accuracy of the solution as related to the choice of the computational grid. A finite element mesh generation scheme is presented which was developed for designing proper computational grids for the solution of transonic flows around three-dimensional bodies with complex geometries. The utilization of higher-order elements and their implementation in this new mesh generation technique is discussed. Also, the application of a new iterative, element based finite element solver for transonic flows is introduced. (Author)

A82-31974 * # **Prediction of separated asymmetric trailing-edge flows at transonic Mach numbers.** C. C. Horstman (NASA, Ames Research Center, Experimental Fluid Dynamics Branch, Moffett Field, CA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-1021.* 13 p. 17 refs.

Numerical simulations of the time-dependent, Reynolds averaged, Navier-Stokes equations, employing various eddy viscosity turbulence models, are presented and compared with measurements from an investigation of a transonic trailing-edge flow at a high Reynolds number. Comparisons are made for mean surface quantities as well as mean and fluctuating flow-field quantities. Solutions employing two-equation turbulence models correctly predict all the major features of the flow field. Viscous-inviscid interaction effects were found to be extremely important for predicting this flow field and equally important to the turbulence modeling employed. (Author)

A82-31978 # **A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number.** M. Ribaut (Brown Boveri et Cie. AG, Baden, Switzerland). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-1030.* 9 p. 12 refs.

A mixed boundary condition problem for the time-averaged separated flow of a compressible and viscous fluid at high Reynolds number is formulated and solved by means of vortex and source integral equations. Application of the method to the flows past a flat plate and a blunt-trailing-edge section has shown that the extension and underpressure of the calculated wakes directly depend on the amount of vorticity diffusion and dissipation occurring in the flow. Computed velocity distributions and wake underpressures are compared with the experiment. (Author)

A82-31979 # **Very large aircraft - A common response to a rapidly changing global environment.** C. Dornier, Jr. (Dornier GmbH, Friedrichshafen, West Germany). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0799.* 6 p.

A82-31980 # **The potential of large aircraft.** G. D. Brewer (Lockheed-California Co., Burbank, CA). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0804.* 6 p.

The present investigation is concerned with two designs of unconventional aircraft, both very much larger than existing equipment. One of the two designs, implemented by the Surface Effect Aircraft (SEA), takes advantage of the increase in lift/drag (L/D) which results from flying very close to the surface. In connection with their size, the vehicles were designed to operate as flying boats. It was recognized that their principal operational mode would be in transocean service, providing '125 knot sea lift'. At a takeoff gross weight of 1.8 million pounds one of the considered SEA is capable of carrying 810,000 pounds of payload a distance of 3450 nautical miles. Attention is also given to a study regarding the largest aircraft anyone might conceivably build, taking into account the conceptual design of a nuclear-powered aircraft which weighed nearly 12 million pounds. A military situation was conceived in which such aircraft might be used. G.R.

A82-31981 # **Aircraft carrier - Surface effect ship.** D. P. Germeraad (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0808.* 12 p. 5 refs.

Conventional ships encounter at high speeds a wave-making drag phenomenon which increases roughly as the cube of the velocity. The Surface Effect Ship (SES) concept alleviates this deficiency by permitting the ship to ride on a cushion of air. This cushion is created by large vertical-axis fans, which are contained between twin catamaran hulls and pliant seals fore and aft. These seals are essentially transparent to wave passage. Speeds on the order of 100 knots can thus be realized. A summary is provided of developments related to two aircraft carrier SES design contracts. Attention is given to basic SES design criteria, the definition and feasibility study of a minimum size SES aircraft carrier (SES-CV), aspects of SES-CV conceptual design, and CTOL aircraft carrier options. G.R.

A82-31982 # **Considerations for international joint venture development of very large aircraft.** W. A. Garrett (Lockheed-Georgia Co., Marietta, GA) and H. Liese (Dornier GmbH, Friedrichshafen, West Germany). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0809.* 10 p. 5 refs.

Attention is given to a joint international civilian-military venture for the development of a common aircraft that will satisfy the growing mutual defense objectives and commercial interests of both the U.S. and the respective European NATO countries. The high costs involved in the development and manufacture of an advanced-technology, fuel efficient, transport aircraft for the considered applications make it imperative to find an approach in which these costs are distributed among a number of partners. A description is presented of an investigation conducted by an American and a European aerospace company, relative to the prospects for a joint U.S./European NATO cooperative aircraft venture. The decision of the two companies to conduct this investigation is based on a long-standing interest in Very Large Aircraft concepts. G.R.

A82-31983 * # **Multibody transport concept.** J. W. Moore (Lockheed-Georgia Co., Marietta, GA) and D. V. Maddalon (NASA, Langley Research Center, Laminar Flow Control Projects Office, Hampton, VA). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0810.* 13 p. 8 refs.

Two baseline aircraft are configured in this study. The multibody aircraft has two fuselage bodies located at approximately 28% wing semispan. The single-body aircraft is configured in such a way as to provide a reference base with which the multibody aircraft can be compared. The aircraft are sized to provide the lowest direct operating cost configuration when transporting 771,620 lbs. over a distance of 3,500 nautical miles at a cruise speed of Mach 0.80. The aircraft are assumed to operate in the years 1990-1995, thus allowing for the incorporation of those technologies expected to be mature and available for production usage in 1985. In comparison with the single-body aircraft, the two-body aircraft shows reductions of 8.9% in wing weight, 7.7% in structural weight, 13.5% in block fuel weight, and 11.3% in direct operating cost. C.R.

A82-31984 * # **Solar-powered airplane design for long-endurance, high-altitude flight.** J. W. Youngblood and T. A. Talay (NASA, Langley Research Center, Space Systems Div., Hampton, VA). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0811.* 10 p. 24 refs.

This paper describes the performance analysis and design of a solar-powered airplane for long-endurance, unmanned, high-altitude cruise flight utilizing electric propulsion and solar energy collection/storage devices. For a fixed calendar date and geocentric latitude, the daily energy balance, airplane sizing, and airplane aerodynamics relations combine to determine airplane size and geometry to meet mission requirements. Vehicle component weight loadings, aerodynamic parameters, and current and projected values of power train component characteristics form the basis of the solution. For a specified mission, a candidate airplane design is presented to demonstrate the feasibility of solar-powered long endurance flight. Parametric data are presented to illustrate the airplane's mission flexibility. (Author)

A82-31985 # **System study of application of composite materials for future transport aircraft.** R. H. Lange and J. W. Moore (Lockheed-Georgia Co., Marietta, GA). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0812.* 7 p. 13 refs.

The application of advanced technologies shows the potential for significant improvement in the fuel efficiency of future transport aircraft envisioned for operations in the mid to late 1990s. This paper reviews recent preliminary design system studies of advanced civil/military transport aircraft featuring cost/benefit analysis of advanced technology. Emphasis is directed toward the use of graphite/epoxy composite materials in the primary and secondary structures of transport aircraft. The aircraft design parameters include cruise Mach number of 0.80, design payload of 330,000 pounds, and 3,500 nautical miles range. (Author)

A82-31986 # **Very large aircraft with alternate fuels - LH2 most promising.** J. C. Muehlbauer (Lockheed-Georgia Co., Marietta, GA). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0813.* 10 p. 7 refs.

Optimum designs of cargo aircraft using alternate fuels and carrying large payloads roundtrip over transoceanic distances without refueling are developed and compared. Synthetic jet propulsion (JP) fuel, liquid hydrogen (LH2) fuel, and nuclear power are considered. In relation to the JP aircraft, the LH2 aircraft is found to have lower ramp weights (by 25%) and lower trip costs (15%). The ramp weights and trip costs of the nuclear aircraft are, respectively, approximately 5 and 20% higher than those for the JP aircraft. With JP aircraft trip costs the most sensitive to fuel price, it is believed that rising prices in the future will make LH2 and nuclear power increasingly attractive. C.R.

A82-31987 # **The potential for long-range high-payload aircraft with alternate fuels.** W. M. Hawkins (Lockheed Corp., Burbank, CA). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0814.* 7 p. 5 refs.

It is assumed that these aircraft will not be produced until the year 2005 and that they will use liquid hydrogen, which can be produced using coal, natural gas, or any other source of energy and water. With regard to propulsion, the present size of modern high-by-pass engines will be employed; between 6 and 12 such units will be used on each aircraft. Control systems in use today to relieve structural loads will figure in the design, as will controls to avoid flutter, which at present are under development. Also considered possible is the use of precision rendezvous. It is pointed out that the cooling capacity of the liquid hydrogen fuel may be able to maintain laminar flow over a substantial portion of the aircraft by surface cooling. C.R.

A82-31988 # **Beyond 2000 - The airlift challenge ahead.** W. T. Stallings (USAF, Military Airlift Command, Scott AFB, IL). *American Institute of Aeronautics and Astronautics, International Very Large Vehicles Conference, 2nd, Washington, DC, May 17, 18, 1982, Paper 82-0815.* 6 p. 16 refs.

This paper discusses the present course and current concerns of the U.S. aviation industry. The paper suggests that the future strength of the industry could be enhanced through civil-military commonality and international cooperative agreements. A strong national air transportation policy is also advocated as a means to revitalize the industry. (Author)

A82-31991 **A system design for a multispectral sensor using two-dimensional solid-state imaging arrays.** R. M. Hodgson (Canterbury, University, Christchurch, New Zealand), F. M. Cady (Montana State University, Bozeman, MT), and D. Pairman (Department of Scientific and Industrial Research, Physics and Engineering Laboratories, Lower Hutt, New Zealand). *IEEE Transactions on Geoscience and Remote Sensing,* vol. GE-20, Apr. 1982, p. 177-179. 7 refs. Research supported by the University of Canterbury and University Grants Committee.

A system developed for remote sensing from light aircraft in the 400-1100 nm wavelength range possesses an architecture which permits the simultaneous capture of up to four images from solid-state, two-dimensional image sensors. In operation, the array sensor captures a series of relatively rapid, approximately 10 msec exposures at intervals as long as 10 sec. This mode of operation has the advantage of nearly the same degree of distortion due to aircraft roll in all image elements. The software generation of sensor drive signals is incorporated in the system. O.C.

A82-31999 **Army's 1st IPI program begun - Blisk impeller followup.** A. E. Goldberger (McDonnell-Douglas Corp., St. Louis, MO). *ManTech Journal,* vol. 6, no. 4, 1981, p. 6-14. Army-supported research.

A description is given of the performance-enhancement and manufacturing cost-reduction advantages of the blisk, or integral blade-disk, method of axial and centrifugal compressor rotor construction exemplified by the T700 helicopter engine. The five axial stages and single centrifugal stage of the T700 compressor rotor achieves a 15:1 compression ratio, by comparison to the 8:1 ratio of the T58 engine compressor. The blisk manufacturing approach is embodied in a single, integrated manufacturing center which employs numerical control equipment for all fabrication steps. These steps include the machining of forgings, to within 0.125 in of their rectilinear configuration, ultrasonic and magnaflux inspection, and finish turning on a numerically-controlled slant bed turret lathe. Attention is given the novel technique of abrasive flow machining for final airfoil finishing. O.C.

A82-32055 **Recent developments in aviation cases.** D. L. Campbell and D. K. Cherry. *Journal of Air Law and Commerce,* vol. 47, Fall 1981, p. 1-52. 342 refs.

Aviation court case decisions in 1980 are reviewed. The trend was strongly in favor of defendants, especially manufacturers and component manufacturers, with several successful motions for summary judgment. Defendants were also very often successful in enforcing contractural waivers between parties of relatively equal status. Numerous cases involved implied causes of action arising out of aviation statutes, and the trend toward enforcement of the Warsaw Convention's technical requirements continued. There were further cases alleging U.S. negligence in the publication of aeronautical charts. The courts continued to enforce coverage limitations and exclusions in aviation insurance policies. Numerous interesting decisions in the area of conflict of laws were handed down, most of them dealing with areas of great activity such as the offshore North Sea exploration and drilling operations. C.D.

A82-32056 **Predicting the application of vicarious liability to fixed base operators - Still guesswork after all these years.** L. S. Kaplan. *Journal of Air Law and Commerce,* vol. 47, Fall 1981, p. 53-89. 168 refs.

A82-32059 **Aviation accident investigation - Functional and legal perspectives.** C. O. Miller (System Safety, Inc., McLean, VA). *Journal of Air Law and Commerce,* vol. 46, Winter 1981, p. 237-293. 187 refs.

The legislative history of aviation accident investigation, current rules and procedures in investigation, probable cause in investigation and the law, and problems in investigation in relation to law and society are discussed. The Federal Aviation Act of 1958, Department of Transportation Act of 1966, Independent Safety Board Act of 1974, Federal Tort Claims Act, Freedom of Information Act, Federal Advisory Committee Act, Privacy Act, Government in the Sunshine Act, and Airline Deregulation Act are discussed in terms of their effect on accident investigation. The various rules promulgated in the area are detailed. The distinction between factual and legal cause is discussed in terms of its influence on accident investigation, particularly the problem of multiple causation. Finally, problems of openness of investigation are assessed. C.D.

A82-32062 **Factors influencing settlement of personal injury and death claims in aircraft accident litigation.** R. R. Craft, Jr. (Haight, Gardner, Poor and Havens, New York, NY). *Journal of Air Law and Commerce,* vol. 46, Summer 1981, p. 895-940. 84 refs.

The Tenerife accident (March 1977) is used as a reference point in a discussion of settlement of aircraft accident litigation. The topics discussed include gathering information and contacting clients; initial role of plaintiffs' attorneys; setting up funds and making offers; multidistrict litigation and narrowing of issues; forum non conveniens; punitive damages; prejudgement interest; the roles of the judge and the attorneys for both sides; settlement negotiations; and attorneys' fees. C.D.

A82-32063 **Aviation negotiations and the U.S. model agreement.** R. W. Bogosian (U.S. Department of State, Office of Aviation, Washington, DC). *Journal of Air Law and Commerce,* Summer 1981, p. 1007-1037. 52 refs.

As historical background, the development from the liberal post-World War II Bermuda I bilateral aviation agreement to the restrictive Bermuda II agreement of 1977 is traced. The U.S. model agreement (the text of which is included) is then discussed. The 'doing business' provisions provide both parties with fair and equal opportunity to compete, and require that unfair competitive practices and discriminations be removed. One article requires complete operational freedom, subject to customs or other technical constraints. The pricing article calls for mutual disapproval pricing based upon market considerations and limits intervention to prevention of predatory or discriminatory pricing, protection of consumers from excessively high prices and of airlines from excessively low ones. The opposition of foreign aviation leaders is discussed and present achievements and future prospects are assessed. C.D.

A82-32135 **A unified and generalized definition of static longitudinal stability in aircraft (Zur Vereinheitlichung und Verallgemeinerung des Begriffs der statischen Stabilität von Fluggeräten).** R. Staufenbiel (Aachen, Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). *Zeitschrift für Flugwissenschaften und Weltraumforschung,* vol. 6, Mar.-Apr. 1982, p. 74-80. 10 refs. In German.

The static stability of vibrational modes is mathematically analyzed. Equations are derived for static stability conditions that ignore Mach number and altitude, and then equations that include them are derived. A general procedure for obtaining the conditions necessary for longitudinal stability is demonstrated. C.D.

A82-32136 **Parameter identification for structures with neighboring natural frequencies especially for the case of flight resonance tests (Parameteridentifikation bei Strukturen mit benachbarten Eigenfrequenzen, speziell bei Flugschwingungsversuchen).** H. Wittmeyer. *Zeitschrift für Flugwissenschaften und Weltraumforschung,* vol. 6, Mar.-Apr. 1982, p. 80-90. 8 refs. In German.

A procedure to be used for linear vibrating systems that are viscously or structurally damped, especially where the eigenfrequencies are neighbors, is developed. The procedure is applied to a sample vibrational system with viscous damping whose symmetries have no unusual characteristics, such as a vibration test in a wind tunnel. Structural amplitudes are evaluated at several points and for several exciting frequencies. These amplitudes are the structural solutions for harmonic excitation by a set of forces whose amplitude is independent of exciting frequency. The eigenfrequencies located in a given small interval and their proper damping values and eigenvibrational modes are determined. Finally, potential generalizations from the procedure are applied to several variant cases. C.D.

A82-32137 Transformation relations for singularity avoidance in three-dimensional trajectory optimization (Transformationsbeziehungen bei der Optimierung dreidimensionaler Flugbahnen zur Umgehung von Singularitäten). G.-C. Shau (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Dynamik der Flugsysteme, Obepfaffenhofen, West Germany). *Zeitschrift für Flugwissenschaften und Weltraumforschung*, vol. 6, Mar.-Apr. 1982, p. 90-98. 6 refs. In German.

Problems in calculating the line of flight of an aircraft can be solved by referring the flight motion to a geodetic set of axes, translating the speed and power to that set. The equations of motion can then be written according to Newton's laws, and the right sides of these equations and their adjoint differential equations are regularly differentiable. Based on the Hamilton-Jacob theory, a procedure for translating adjoint variables to geodetic coordinates with the help of given variables in aerodynamical coordinates, and vice-versa, is developed. This will make it possible to switch the system of equations to each iteration state without losing the intermediate results. A concrete example of flight condition at 90 degrees is analyzed. C.D.

A82-32159 Hydrogen economy assessment for long-term energy systems in Japan. T. Ohtsuka (Tohoku University, Sendai, Japan), M. Akiyama, T. Saito, Y. Ishizaki, A. Suzuki (Tokyo, University, Tokyo, Japan), N. Negishi, J. Moriya, K. Hoashi, and T. Hoshino (Industrial Research Institute, Tokyo, Japan). *International Journal of Hydrogen Energy*, vol. 7, no. 6, 1982, p. 455-462.

An assessment is made of hydrogen technology development; in particular, economy as an energy carrier, applicability for end-uses and the potential of the market in the future. Specifically, rough static cost comparisons are made on several modes of electricity transmission and hydrogen transport, and on several ways of off-peak electricity saving; including energy storage in the form of hydrogen. Then, the quantity of oil that could be saved from some representative end-use sectors if hydrogen fuel were to be introduced is discussed. Finally, a potential market is assessed, by projecting overall future energy supply/demand dynamics in Japan. (Author)

A82-32202 Shock associated noise of supersonic jets from convergent-divergent nozzles. C. K. W. Tam (Lockheed-Georgia Co., Marietta, GA; Florida State University, Tallahassee, FL) and H. K. Tanna (Lockheed-Georgia Co., Marietta, GA). *Journal of Sound and Vibration*, vol. 81, Apr. 8, 1982, p. 337-358. 26 refs. Research supported by the Lockheed Internal Research and Development Funds.

Experimental and theoretical results are presented on the characteristics of shock-associated noise from imperfectly expanded supersonic jets from convergent-divergent nozzles over an extensive range of underexpanded and overexpanded operating conditions. The source of this noise is believed to be the weak but coherent interaction between the downstream-propagating large-scale turbulent flow structures in the mixing layer of the jet and the nearly periodic shock cell system. Reasoning based on this mechanism leads to the scaling formula that the intensity of shock-associated noise varies as (Mj-squared minus Md-squared)-squared, where Mj and Md are the fully expanded jet operating Mach number and the nozzle design Mach number, respectively. A peak frequency formula is also derived from the same model. The noise intensity, directivity, and spectra of supersonic jets from a convergent-divergent nozzle of design Mach number 1.67 were measured in an anechoic chamber over the Mach number range of 1.1 to 2.0. Theoretical results agree very favorably with measurements. B.J.

A82-32223 Analysis of small-aspect-ratio lifting surfaces in ground effect. J. N. Newman (MIT, Cambridge, MA). *Journal of Fluid Mechanics*, vol. 117, Apr. 1982, p. 305-314. 5 refs. Research supported by the Australian Research Grants Committee, U.S. Navy, and NSF.

A lifting surface of small aspect ratio is analysed for motion with constant forward velocity, parallel and in close proximity to a rigid plane surface of infinite extent. The gap flow beneath the lifting surface is represented by a simple nonlinear solution in the cross-flow plane, and appropriate conditions are imposed at leading and trailing edges. The transition between these two conditions depends on the kinematics of the gap flow as well as the planform geometry. For steady-state motion of a delta wing with sufficiently large angle of attack, the transition point is upstream of the tail. For oscillatory heaving motion of a delta wing the transition point is cyclic if the heave velocity is sufficiently large. Illustrative computations of the lift force are presented. (Author)

A82-32330 * Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser. L. Back and R. Cuffel (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *International Journal of Heat and Mass Transfer*, vol. 25, June 1982, p. 871-887. 7 refs. Contracts No. N00019-76-MP-67811; No. NAS7-100.

An experimental study of wall static pressure distributions and mean velocity profiles along a duct and diffuser downstream of wall-jet injection was conducted over a range of diffuser total angles from 15 to 40 deg at injection to core flow mass flux ratios from 0 to 6. Pressure recovery in the diffuser increased with injection ratio and decreased with diffuser total angle. Peak velocities in the wall-jet decayed along the flow and the inner shear layer and outer mixing region grew in thickness along the flow. The inner layer was near similarity condition, but non-similar variations were found in the outer layer. Estimated wall shear stresses depended upon injection mass fluxes, downstream distance and diffuser total angle. Greater decay of peak velocity and larger friction coefficients were found in the diffuser than indicated by correlations from data for a wall-jet without a pressure gradient. At the largest diffuser total angle and the highest injection ratio flow reversal occurred in the core region. (Author)

A82-32624 British aerospace begins update effort. *Aviation Week and Space Technology*, vol. 116, May 17, 1982, p. 78, 83, 85, 86, 89.

Among the advanced production technologies selected for installation by British Aerospace Corporation's Aircraft Group are: semi-automated carbon fiber production, super plastic forming/diffusion bonding (SPF-DB) of bond titanium and aluminum alloys, and introduction of direct numerical control of manufacturing processes and a CAD/CAM program. Development programs for these technologies are discussed, including a water jet carbon fiber cutting machine, a carbon fiber second fuselage that is easier to assemble, a new forming press for SPF-DB components, a pilot program for SPF-DB production which includes a 500-ton forming press, and numerically controlled robots and machine tools. C.D.

A82-32725 Nondestructive detection of exfoliation corrosion around fastener holes in aluminum wing skins. D. J. Hagemaier (Douglas Aircraft Co., Long Beach, CA). *Materials Evaluation*, vol. 40, May 1982, p. 682-685.

Instructions are given for nondestructive inspections performed on the upper and lower wing skin surfaces for the presence of corrosion around fastener holes. Three methods of inspection are involved: contact ultrasonic testing, contact eddy current testing, and automated ultrasonic C-scan testing. Descriptions are given of these methods. With the contact ultrasonic test, corrosion is detected by the loss of a back surface signal. With the contact eddy current test, the phase-sensitive, eddy current instrument is calibrated to yield a maximum response difference between a corroded and uncorroded area. With the ultrasonic C-scan recording test, a flaw gate is set to record a loss of 50% signal amplitude of the back-surface signal. Here, uncorroded areas of the part are recorded, whereas corroded areas do not record. C.R.

A82-32801 † Mathematical modeling of unsteady separated flow past solid airfoil cascades (Matematicheskoe modelirovanie nestatsionarnogo otryvnogo obtekaniia reshetok telesnykh profilei). V. N. Kotovskii, M. I. Nisht, and R. M. Fedorov. *Akademiia Nauk SSSR, Doklady*, vol. 263, no. 6, 1982, p. 1326-1330. 7 refs. In Russian.

Unsteady separated flow past solid airfoil cascades is investigated using a complex approach which combines an ideal medium scheme for a finite-thickness body in the case of the main part of the flow with boundary-layer theory in the case of the region directly adjacent to the body surface. With this approach, phenomena as complex as hysteresis in separated flow past solid bodies can be successfully simulated using a computer. It is found that as the dimensionless frequency increases, the hysteresis of the separation point decreases and the hysteresis of the normal profile force coefficient, Cn, increases. It is also shown that hysteresis, in the separation point position and in Cn increases and the hysteresis loop shifts toward the leading edge with decreasing cascade density and increasing mean angle of attack. V.L.

A82-32847 * # **Wind-tunnel wall interference corrections for three-dimensional flows.** M. H. Rizk and M. G. Smithmeyer (Flow Research Co., Kent, WA). *Journal of Aircraft,* vol. 19, June 1982, p. 465-472. 11 refs.

A procedure for the evaluation of wall interference corrections for three-dimensional aircraft configurations is presented. The Mach number and angle-of-attack corrections are obtained by numerically solving the Laplace equation in a parallelepiped with boundary conditions supplied mainly from experimental pressure measurements. A portion of these measurements and other wind-tunnel data required by the procedure may be replaced by theoretical estimates if not available from experiments. The accuracy of the correction results will then depend on the accuracy of these estimates. The correction procedure is applied to an isolated wing and to a wing-tail configuration in a solid-wall wind tunnel. It is found that neglecting twist and camber corrections for the wing effectively increases the tail angle-of-attack correction. Two different Mach number corrections can be calculated for the wing and tail. However, since only one Mach number correction is allowed for both the wing and the tail, and since the wing surface area is larger than the tail surface area, the final correction tends to be closer to the required wing correction. This is a source of error for the tail results. (Author)

A82-32848 # **Finite-element modeling of a fighter aircraft canopy acrylic panel.** J. J. Labra (Southwest Research Institute, San Antonio, TX). *Journal of Aircraft,* vol. 19, June 1982, p. 480-484.

A detailed three-dimensional stress analysis of a canopy aircraft acrylic panel was conducted to investigate the probable cause of a recent in-flight acrylic panel failure. The analysis was made using a general-purpose finite-element computer program. Based in part on this analysis, probable design problems associated with the canopy were identified. The study clearly demonstrates that computer-based technology can be successfully used in determining probable causes of failure in geometrically complex structures. (Author)

A82-32849 # **Structural modification to achieve antiresonance in helicopters.** B. P. Wang, L. Kitis, W. D. Pilkey, and A. Palazzolo (Virginia, University, Charlottesville, VA). *Journal of Aircraft,* vol. 19, June 1982, p. 499-504. 12 refs. Army-supported research.

A design method is developed to create an antiresonance (by modifying structural properties) of a vibrating system under sinusoidal loading. A local modification method in which appendant systems are added to the original structure is used to analyze such systems. Since the original system and added systems are treated entirely separately, this method allows for efficient repetitive searching until the appendant system produces a meaningful reduction in vibration. Finally, the direct design of appendant structures to create antiresonance is presented. These methods are illustrated by numerical results obtained for a 44-degree-of-freedom elastic line helicopter model. (Author)

A82-32850 # **Incompressible symmetric flow characteristics of sharp-edged rectangular wings.** E. S. Larson (Flygtekniska Forsoksanstalten, Stockholm, Sweden). *Journal of Aircraft,* vol. 19, June 1982, p. 508-510. 8 refs. Research supported by the Forsvarets Materielverk.

In a previous study (Larson, 1981), the symmetric aerodynamic characteristics of sharp-edged rectangular wings were obtained by a set of semiempirical analytical formulas that represent Lamar's (1974) extension of the Multhopp solution. A difference between theory and experiment has been noticed, however, in regard to the lift and pitching moment coefficients for all the investigated aspect ratios except A = 1. The present study examines whether this discrepancy is a result of the formulation of the angle of attack squared in combination with the side-edge suction force coefficient. Improved correlation with experiments in incompressible flow up to moderately high angles of attack is obtained by using an alpha to the 5/3 dependence of the side-edge singularity of sharp-edged rectangular wings. C.D.

A82-32920 * # **Cloud top remote sensing by airborne lidar.** J. D. Spinhirne, M. Z. Hansen, and L. O. Caudill (NASA, Goddard Space Flight Center, Greenbelt, MD). *Applied Optics,* vol. 21, May 1, 1982, p. 1564-1571. 10 refs. NASA-supported research.

Observations of cloud top height, backscattering, and signal depolarization have been obtained by a lidar system operating onboard a high-altitude research aircraft. The transmitter for the cloud lidar system is a doubled Nd:YAG laser operating at 5 Hz. The system functions as a fully automated sensor under microprocessor control and operates from a nominal 19-km altitude. Measurements have been acquired over a wide variety of cloud cover in conjunction with passive visible and infrared measurements. Initial observation results are reported. (Author)

A82-32979 **A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background.** D. T. Gjessing, J. Hjelmstad, and T. Lund (Norges Teknisk-Naturvitenskapelige Forskningsrad, Kjeller, Norway). *IEEE Transactions on Antennas and Propagation,* vol. AP-30, May 1982, p. 351-365. 16 refs.

An experimental model of a simple multifrequency continuous wave (CW) radar system has been developed. Preliminary experiments have been performed in order to illustrate the potential of this radar concept in regard to detection, course ranging, and also identification of low flying aircraft against a sea-clutter background. The radar can be organized so as to measure ocean wave height, wave direction, and wave velocity simultaneously for 15 different ocean wavelengths ranging from 150 m to approximately 6 m. An example of such a directional wave intensity spectrum is given. To illustrate the ranging and the identification potential of the technique in regard to airplanes, two different airplane categories, namely a propeller aircraft (Cessna 172) and a grid jet aircraft (F-16), were flown through the radar beam. The signatures of these two airplanes are shown in two signature domains: spatial distribution of scattering centers and motion pattern. The experimental results confirm theories presented in earlier contributions. It remains to introduce two more domains, namely the space/time coherence properties of the target and its polarization characteristics. (Author)

A82-32992 **Radiating elements for hemispherically scanned arrays.** A. T. Villeneuve (Hughes Aircraft Co., Los Angeles, CA), M. C. Behnke, and W. H. Kummer. *IEEE Transactions on Antennas and Propagation,* vol. AP-30, May 1982, p. 457-462. Contract No. F19268-72-C-0145.

Several types of radiating elements, including single slots covered by dielectric sheets, parasitic dipoles, and surface wave structures, have been investigated with reference to their wide angle scanning capabilities for application in hemispherically scanned arrays. It is shown that by using a combination of a surface wave structure and a parasitic radiator, it is possible to enhance E-plane radiation at the horizon and to broaden the H-plane pattern of a slot radiator in conducting planes and cylinders. The surface wave structure was also used with an eight-element array of slots oriented perpendicular to the array axis. This arrangement enhanced the radiation for a beam at the horizon (endfire) by several dB over that obtained from an array without the surface wave structure. V.L.

A82-33025 # **The aerospace learning process.** W. M. Hawkins (Lockheed Corp., Burbank, CA). *American Institute of Aeronautics and Astronautics, International Annual Meeting and Technical Display, Baltimore, MD, May 25-27, 1982, Paper 82-1291.* 6 p.

A number of projects significant in the history of aerospace are reviewed and lessons to be learned are stated. The role of private industry and government in the design and production of the Hudson, the P-38, the F-80, the C-130, the Discoverer, the Polaris, and the Reentry Test Vehicle are discussed. It is contended that high quality can be achieved with significant savings of time and money and that bureaucracy has been a much greater problem in recent projects than it was in the older ones. Major problems include the cult of systems management, excessive paperwork and meetings, the hardware competition process, and bureaucratic infighting. It is argued that there should be a return to the quick prototype and a single systems manager should preside over projects. Competition for project contracts should be curtailed. C.D.

A82-33049 * **Flight evaluation of Loran-C for general aviation area navigation.** W. M. Hollister, K. Natarajan, and J. A. Littlefield (MIT, Cambridge, MA). *Navigation,* vol. 28, Winter 1981-1982, p. 342-352. 12 refs. Grant No. NGL-22-009-640.

This paper reports on a flight evaluation of Loran-C which was part of a long range study of area navigation systems for general aviation. Tests involved two different Loran-C receivers, 6 different aircraft, and a variety of antennas. Uncorrected position fixes were typically accurate to one quarter mile. With measured corrections, repeatability was good to within 200 ft. Signal reliability was 99.7%. The receiver was not sensitive to atmospheric noise. The time difference grid demonstrated a long term stability of 0.3 microsecond. Vertical whip and ADF E-field antennas were found suitable for airborne use. Loran-C was found satisfactory for instrument approaches to runways at general aviation airports where published latitude-longitude coordinates were available. Accuracy was further improved by using locally measured Loran-C time difference coordinates. (Author)

A82-33050 **Applications of a multiplexed GPS user set.** C. R. Johnson, P. W. Ward, M. D. Turner, and S. D. Roemerman (Texas Instruments, Inc., Lewisville, TX). *Navigation,* vol. 28, Winter 1981-1982, p. 353-369. 7 refs.

A multiplexing GPS receiver has been developed that has many of the advantages of a continuous receiver at the low cost of a sequencing receiver. The multiplexing concept is explained. The receiver architecture is described. Advantages of multiplexing over the conventional receiver are highlighted. Applications of the multiplexing receiver to meet requirements now being met with single-channel, two-channel, and five-channel sets are discussed. Data comparing the performance of this multiplexing to conventional approaches are presented. A multiplexing GPS receiver solves difficult problems. Several of these applications are presented, including angle determination, single-channel differential GPS, area navigation and precision approach, and geodetic surveying. All applications examined have yielded a unique advantage with the multiplexed GPS receiver over a conventional GPS receiver. (Author)

A82-33095 **No-tail-rotor helicopter tests continue.** R. R. Ropelewski. *Aviation Week and Space Technology,* vol. 116, May 24, 1982, p. 57, 60, 61.

The experimental OH-6 helicopter uses a low-pressure air circulation yaw control system, in place of a conventional tail rotor, which consists of a small-diameter fan at the forward end of the tail boom, a slot on the lower right side of the boom, and selectively-controlled exhaust vanes at the extreme rear of the boom which provide direct thrust when additional yaw control is needed. A reduction in noise and vibration levels typical of conventional tail rotors has been demonstrated by the novel directional control system, and it is found that the helicopter's vertical tail becomes effective more quickly in forward flight. Confined-area operation hazards associated with conventional tail rotors have been obviated. Full directional control authority is maintained by the no-tail rotor system at speeds below 30 knots. O.C.

A82-33119 # **Fundamental torsional frequency of a class of solid wings.** E. H. Mansfield (Royal Aircraft Establishment, Farnborough, Hants., England). *AIAA Journal,* vol. 20, June 1982, p. 845-848.

This paper determines the fundamental torsional frequency of certain wings whose polar moment of inertia is proportional to the torsional rigidity at any section, as in a solid wing with a fixed t/c ratio. An inverse method of analysis is used in which the spanwise variation of rigidity and polar moment of inertia is related to an assumed spanwise variation of rotation in the fundamental torsional mode. The usefulness of this apparently hit-or-miss technique stems from the ease with which families of solutions may be generated. The results, which are augmented by a direct solution for wings with a constant taper, are expressed graphically in a form which relates the fundamental torsional frequency to the derived spanwise variation of the chord. (Author)

A82-33120 * # **Closed-form solutions of supersonic wing-body interference.** N. R. Vira and D.-N. Fan (Howard University, Washington, DC). *AIAA Journal,* vol. 20, June 1982, p. 855-857. Contract No. NAS5-24242.

Closed-form formulas are presented for the interference factors of a body in the presence of a wing at supersonic speeds, when a finite afterbody is introduced. In addition, formulas are obtained for those cases in which the base of the body is forward of the trailing edge of the exposed root chord. These formulas are shown to be valid, subject to the restrictions inherent in the formulation given by Pitts, Nielsen and Kaattari (1959). O.C.

A82-33125 **Aircraft evaluation in air network planning.** A. Kanafani and A. Ghobrial (California, University, Berkeley, CA). *ASCE, Transportation Engineering Journal,* vol. 108, May 1982, p. 282-300. 9 refs.

The relationship between aircraft technology and the structure of air service networks in short haul systems is investigated. The analysis is based on an optimal frequency assignment model that is integrated with a route choice model. Together these models allow the optimization of aircraft utilization and define an optimal network structure for a given demand pattern and aircraft technology. Large aircraft have a compelling advantage due to the scale economies they enjoy. Small aircraft, on the other hand, can offer level-of-service advantages and an opportunity for reducing the dependence on congested major transfer hubs in the network. A desirable technology development trend would be aimed at eliminating the diseconomies of distance suffered by small aircraft due to their limited payload-range characteristics. (Author)

A82-33143 # **Ideal ramjet - Optimum M sub infinity for fuel limit and material limit.** J. A. Roux (Mississippi, University, University, MS). *Journal of Spacecraft and Rockets,* vol. 19, May-June 1982, p. 286, 287.

The derivation of some simple algebraic expressions for the value of the freestream Mach number at which the specific impulse obtains a maximum for both the fuel-limited and material-limited cases is presented. Equations are given by which values of the freestream Mach number can be quickly determined. The dependence of this number on the increase in stagnation temperature due to combustion, on the maximum temperature, and on T sub infinity is given in explicit form. C.R.

A82-33250 **Principles of efficient energy use at Interflug (Grundsätze der rationellen Energieanwendung bei der Interflug).** K. Henkes (Ministerium für Verkehrswesen; Gesellschaft für Internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 17, no. 5-6, 1981, p. 214-220. In German.

Attention is given to the problems of efficient energy use in civil aviation, taking into account conditions in the German Democratic Republic and its Interflug airline. It is pointed out that 98% of the energy requirements of Interflug are met with the aid of energy carriers produced from petroleum. These energy carriers are almost exclusively aircraft fuels, and 50% of the fuel is obtained in refueling operations conducted in foreign countries. Interflug has, therefore, been concerned with the implementation of approaches for reducing the performance-related fuel consumption for its aircraft. A reduction in performance-related fuel consumption of 10-16% for each aircraft type could be achieved. This reduction is partly the result of organizational steps leading to a more efficient utilization of the aircraft, and partly the result of a number of suitable technical-technological procedures. Plans are discussed for a further reduction of the requirements for fuel and electric power by a variety of different approaches. G.R.

A82-33274 **A documented example of strong wind-shear.** D. A. Membery (IAL, Bahrain). *Weather,* vol. 37, Jan. 1982, p. 19-22. 5 refs.

It is noted that wind variations likely to be encountered by an aircraft on takeoff or landing are usually estimated from a nearby anemometer some 33 ft above the runway. This wind, however, may not be representative of conditions at higher levels. An urgent need is therefore seen to detect and measure rapid changes in both the horizontal and vertical components up to 1000 ft. A device that can detect rapid velocity changes in clear air by remote sensing techniques is needed. Attention is given to the advances that have been made using a pulsed CO2 laser Doppler system. When an aircraft encounters a sudden decrease in headwind, the indicated airspeed drops by an equal amount. The subsequent lift is somewhat lower than the original value. To immediately correct the situation, power is applied so that the aircraft can regain lost airspeed and climb back to the glide path. The aircraft may at this juncture be in a critical position, where an increase in thrust produces only a slight increase in lift, accompanied by a tremendous increase in drag. C.R.

A82-33309 **Forward-swept-wing technology.** G. Warwick. *Flight International,* vol. 121, May 22, 1982, p. 1317-1319.

The demonstration X-29A forward-swept-wing airplane designed by Grumman is described, and other aspects of forward-swept-wing technology are discussed. The X-29A is powered by a single 16,000 lb thrust General Electric F404 turbofan engine, and combines forward sweep with close-coupled canard, digital fly-by-wire with relaxed static stability, aeroelastic tailoring with composite primary structure, and a thin supercritical airfoil with discrete variable camber. The wing has carbonfiber-epoxy skins and front spar, and a full-depth aluminum honeycomb substructure. Composite construction controls the nose-up twisting which forces the wing to diverge, and divergence speed is increased until it lies outside the X-29A's flight envelope. The wing can sustain higher pressures before shock-induced buffet appears, increasing the usable lift in transonic maneuvers. Canard, variable-camber flaperons and strake flaps are used to trim the aircraft. C.D.

A82-33317 * # **The cryogenic wind tunnel for high Reynolds number testing.** R. A. Kilgore (NASA, Langley Research Center, Hampton, VA). *International Cryogenic Engineering Conference, 9th, Kobe, Japan, May 11-14, 1982, Paper.* 7 p. 9 refs.

An improved way to increase the Reynolds numbers capability of wind tunnels has been developed at the Langley Research Center. Cooling the test gas to cryogenic temperatures by spraying liquid nitrogen into the tunnel circuit increases Reynolds number with no increase in dynamic pressure and a reduction in drive power. In addition, the ability to vary the temperature of the test gas independently of pressure and Mach number allows for the first time the independent determination of Reynolds number, Mach number, and aeroelastic effects. A new fan-driven transonic cryogenic tunnel being built at the Langley Research Center will provide an order of magnitude increase in Reynolds number capability over existing transonic tunnels in the United States when it is completed later this year. (Author)

A82-33318 * # **Generation of three-dimensional boundary-fitted curvilinear coordinate systems for wing/wing-tip geometries using the elliptic solver method.** F. C. Thames (NASA, Langley Research Center, Hampton, VA). *Symposium on the Numerical Generation of Curvilinear Coordinate Systems and the Use in the Numerical Solution of Partial Differential Equations, Nashville, TN, Apr. 13-16, 1982, Paper.* 23 p. 12 refs.

A three-dimensional elliptic solver technique is utilized to generate surface-fitted coordinates about wing/wing-tip configurations. The method is applicable to wings of arbitrary section profile and camber, leading-edge sweep, taper ratio, and spanwise thickness variation. The basic theory of three-dimensional elliptic mappings is developed along with a method to compute interior coordinate control functions. Examples of grids generated about several wing/wing-tip geometries are given. A 49 x 33 x 17 grid requires about 3 minutes of CPU time on a CYBER 203 computer. (Author)

A82-33325 * # **Aerodynamic interactions with turbulent jet exhaust plumes.** R. G. Wilmoth (NASA, Langley Research Center, Hampton, VA). *Joint Army-Navy-NASA-Air Force Interagency Propulsion Committee, Plume Technology Meeting, 13th, Houston, TX, Apr. 27-29, 1982, Paper.* 17 p. 14 refs.

The importance of aerodynamic interactions associated with external flow-field effects on turbulent jet exhaust plume structure is discussed. A viscous/inviscid prediction technique is presented which combines the overlaid mixing and inviscid plume components of the JANNAF Standardized Plume Flow-Field (SPF) model with inviscid external flow and boundary-layer analyses for treating nozzle afterbodies at subsonic/transonic speeds. Validation of the technique via comparisons between predictions and experiment for cold-air jet plumes is presented. Predicted spatial temperature distributions for hot, nonafterburning plumes are presented and compared to results obtained from more simplified prediction techniques in order to assess the importance of the aerodynamic interactions associated with external boundary layers and pressure gradients. It is demonstrated that these interactions play a significant role in determining the near-field turbulent mixing and inviscid plume shock structure. The implication of these results to plume radiation predictions is discussed. (Author)

A82-33326 * # **Status of the national transonic facility.** L. W. McKinney and B. B. Gloss (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerodynamic Testing Conference, 12th, Williamsburg, VA, Mar. 22-24, 1982, Paper 82-0604.* 11 p. 16 refs.

The National Transonic Facility at NASA Langley Research Center, scheduled for completion in July, 1982, is described with emphasis on model and instrumentation activities, calibration plans and some initial research plans. Performance capabilities include a Mach number range of 0.2-1.2, a pressure range of 1-9 atmospheres, and a temperature range of 77-350 K, which will produce a maximum Reynolds number of 120 million at a Mach number of 1.0, based on a 0.25 m chord. A comprehensive tunnel calibration program is planned, which will cover basic tunnel calibration, data qualities, and data comparisons with other facilites and flights. D.L.G.

A82-33327 * # **The NASA Langley laminar flow control airfoil experiment.** W. D. Harvey and J. D. Pride (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Aerodynamic Testing Conference, 12th, Williamsburg, VA, Mar. 22-24, 1982, Paper 82-0567.* 26 p. 45 refs.

A large chord swept supercritical LFC airfoil has been constructed for NASA-Langley's research program to determine the compatibility of supercritical airfoils with suction laminarization and to establish a technology base for future transport designs. Features include a high design Mach number and shock-free flow, as well as the minimization of the laminarization suction through a choice of airfoil geometry and pressure distribution. Two suction surface concepts and a variety of hybrid suction concepts involving combinations of natural and forced laminar flow are to be investigated. The test facility has been modified to insure achievement of required flow quality and transonic interference-free flow over the yawed LFC airfoil. D.L.G.

A82-33348 **Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems (Senkrechtstarttechnik - Flugmechanik, Aerodynamik, Antriebssysteme).** X. Hafer (Darmstadt, Technische Hochschule, Darmstadt, West Germany) and G. Sachs (München, Hochschule der Bundeswehr, Munich, West Germany). Berlin, Springer-Verlag, 1982. 419 p. 255 refs. In German. $34.50.

An efficient solution of the problem of vertical takeoff for an aircraft is provided by the helicopter. However, with respect to cruising flight operations, the helicopter cannot compete economically with aircraft utilizing conventional takeoff. A special type of aircraft, often called 'powered lift aircraft', is needed to combine the facility of vertical takeoff with the economic cruising flight capabilities found in conventional aircraft. This book is exclusively concerned with the design problems regarding such powered lift aircraft. The book has the objective to present a survey of the development of vertical takeoff technology. It provides also a description of the various possible approaches for a technical solution of the involved problems, taking into account the basic relations of aerodynamics and flight mechanics which have to be considered for the design of systems that provide a vertical-takeoff capability. G.R.

A82-33387 † **Aerodynamics. Part 2 - Methods of aerodynamic design /3rd revised and enlarged edition/ (Aerodinamika. Part 2 - Metody aerodinamicheskogo rascheta /3rd revised and enlarged edition/).** N. F. Krasnov. Moscow, Izdatel'stvo Vysshaia Shkola, 1980. 416 p. 53 refs. In Russian.

Methods for determining the aerodynamic characteristics of aircraft and aircraft components are discussed. Analysis is carried out for supersonic flow around pointed and blunt conical surfaces and thin-walled bodies of revolution at small angles of attack (linearized problems). Methods for calculating friction and heat transfer are examined. Attention is also given to the determination of aerodynamic parameters of aircraft for the combinations fuselage-wing and fuselage-wing-empennage (control surfaces) with allowance for interference effects. Finally, the aerodynamics of rarified gases is discussed. V.L.

A82-33514 # **Downwash behind a wing with spanwise blowing.** P. R. Kumar and E. G. Tulapurkara (Indian Institute of Technology, Madras, India). *Aeronautical Society of India, Journal*, vol. 32, Feb.-Nov. 1980, p. 105-108. 7 refs.

A theoretical estimate of downwash using Campbell's (1975) data on lift distributions on trapezoidal wings is presented. An indirect method is used to obtain circulation distributions, which are worked out for different values of the blowing coefficient using the vortex lattice method of Hedman (1966). Downwash behind the wing increases rapidly with increase in the blowing coefficient, and a value for the blowing coefficient is found for which the tail contribution to stability will be zero. Thus, the wing contribution to stability increases with blowing and the net decrease in stability is lower. D.L.G.

A82-33515 # **Finite element analysis of some aerospace shell structures.** S. Viswanath, S. S. Murthy, and C. G. Shah (National Aeronautical Laboratory, Bangalore, India). *Aeronautical Society of India, Journal*, vol. 32, Feb.-Nov. 1980, p. 109-115. 9 refs.

A computer program LINSHL is developed for the linear static analysis of stiffened shell structures. The program incorporates a high precision triangular cylindrical shell element, a high precision triangular shallow shell element, a curved beam element and a straight beam element. Numerical results are presented for the stress analysis of practical structures such as a ring-stiffened cylinder and a canopy hood of a typical aircraft, and are found to be in reasonable agreement with alternate solution methods. D.L.G.

A82-33520 # **Design, fabrication and testing of an electrical analogue for heat transfer to coated turbine blade.** P. R. Joshi and W. V. Nabar (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal*, vol. 32, Feb.-Nov. 1980, p. 133-136.

The analog method is described for the study of heat transfer to a coated solid turbine blade. The method is based on the fact that the governing equations for heat conduction in an isotropic, homogeneous nonheat- generating body under steady state conditions are the same as those governing the steady state distribution of electrical potential. The analog can be used to obtain the temperature distribution over the cross section of different blades coated or otherwise for various operating conditions. A schematic diagram of the electrical analog for heat transfer to a coated turbine blade is presented, and the design and fabrication of the analog is discussed. D.L.G.

A82-33523 # **Primary sewage treatment plant as a source of bird hazards at airport.** S. C. Pillai, M. K. C. Sridhar, and G. K. Viswanath (CIERS Research and Consultancy Private, Ltd., Bangalore, India). *Aeronautical Society of India, Journal*, vol. 32, Feb.-Nov. 1980, p. 149-153. 8 refs.

A82-33542 **From the A 300 to the A 310 (De l'A 300 à l'A 310).** R. Deque and D. Puyplat (Société Nationale Industrielle Aérospatiale, Division Avions, Paris, France). *L'Aéronautique et l'Astronautique*, no. 93, 1982, p. 3-18. In French.

The subcontractor assignments and the evolutionary changes which produced the A 310 from the A 300 Airbus are described. Each subcontractor delivered parts in a maximal state of integration to the final assembly plant, which is intended to produce 8-10 aircraft/mo. The results of numerical modeling of the aerodynamic performance of the A 300 in subsonic/supersonic shock configurations led to a thickening of the wing near the root, in addition to a 16 percent reduction in total wing area, a 14 percent increase in wing length to reduce drag, and a higher cruising altitude. Composite materials were employed for the spoilers, airbrakes, the rudder, motor nacelles, etc., along with new, lightweight aluminum-zinc alloys for the longerons. Controls have been computerized and CRTs are in place in the cockpit instrument panel. Details of the instrumentation displays are provided. M.S.K.

A82-33543 **The beginning of the ATR 42 program and its importance (Le lancement du programme ATR 42 et ses conséquences).** A. Etesse (Société Nationale Industrielle Aérospatiale, Division Avions, Paris, France). *L'Aéronautique et l'Astronautique*, no. 93, 1982, p. 19-22. In French.

Marketing and flight economy goals have led to the development of the ATR 42-100 and 42-200 dual turboprop aircraft for carrying 42 or 49 passengers 1300 or 1450 km, respectively. An increase in comuter air traffic of 20-30 percent every year in France and 12 percent in the U.S. are cited as the driving force for the development of the new aircraft. The physical capabilities of the ATR are 15 tons weight, a flying range of 1350 km with 42 passengers, a cruise speed of 513 km/hr, an altitude of 13,400 ft on one motor, and a runway requirement of 900 m. The aircraft is a joint effort of the French and Italian governments, following an accord signed in 1980 to establish a common carrier. A P.W. 100/2 will initially power the plane until 1985, when a motor which allows the passenger number to increase to 50-60 will be introduced. M.S.K.

A82-33544 **Aircraft lightning protection (Protection des aéronefs contre la foudre).** J. Taillet (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *L'Aéronautique et l'Astronautique*, no. 93, 1982, p. 37-52. 40 refs. In French.

Currently known effects of lightning on aircraft and interior components are reviewed, along with measures which must be taken in order to make the broad use of composites acceptable in future aircraft. The types of accident lightning strikes have inflicted on USAF aircraft in the period 1970-1980 are examined, noting that catastrophic failures occurred due to damage to the control and navigation systems, electronics, and explosions of fuel or armaments. The introduction of increasing amounts of composite materials in the aircraft structures, parts which may cause resistance to the lightning path, and the use of electronic controls which can be degraded by electromagnetic pulses pose difficulties when the introduction of cost-saving measures is also life-endangering. The points of lightning attachment are examined, along with the effects on the aircraft components. It is recommended that composite parts be covered with a thin metallic film which conducts the current freely away from the composite, and that microelectronic circuitry be hardened against EMP. M.S.K.

A82-33547 **Simulation reaches towards reality.** D. Boyle. *Interavia*, vol. 37, May 1982, p. 451-453.

It is noted that the greatest progress is being made in the area of visual simulation, offering the possibility of considerable savings to airlines. The microcircuit has made it possible to develop computer-generated imagery (CGI) systems. A single simulator can provide a tremendous variety of airfield representations. Once the software has been developed for a given location, it can be furnished to many simulators by simply copying a tape or disk recording. A description is given of daylight CGI. C.R.

A82-33571 * **Accurate numerical solution of compressible, linear stability equations.** M. R. Malik (High Technology Corp., Hampton, VA), S. Chuang (George Washington University, Hampton, VA), and M. Y. Hussaini (Institute for Computer Applications in Science and Engineering, Hampton, VA). *Zeitschrift für angewandte Mathematik und Physik*, vol. 33, Mar. 1982, p. 189-201. 12 refs. Contracts No. NAS1-16572; No. NAS1-14472; No. NAS1-15810; Grant No. NCC1-14.

The present investigation is concerned with a fourth order accurate finite difference method and its application to the study of the temporal and spatial stability of the three-dimensional compressible boundary layer flow on a swept wing. This method belongs to the class of compact two-point difference schemes discussed by White (1974) and Keller (1974). The method was apparently first used for solving the two-dimensional boundary layer equations. Attention is given to the governing equations, the solution technique, and the search for eigenvalues. A general purpose subroutine is employed for solving a block tridiagonal system of equations. The computer time can be reduced significantly by exploiting the special structure of two matrices. G.R.

A82-33605 * **Diffraction by a finite strip.** M. H. Williams (Purdue University, West Lafayette, IN). *Quarterly Journal of Mechanics and Applied Mathematics*, vol. 35, Feb. 1982, p. 103-124. 7 refs. Grant No. NsG-3292

A new approach is presented to diffraction problems involving plane strip barriers or slit apertures. These are problems that display the effects of multiple interacting edges. The approach taken here provides exact, compact solutions. The theory is introduced through a series of examples that are, in fact, the 'standard' problems of the subject, diffraction of a plane oblique wave by a slit, for example. In each case, the solutions are found to depend explicitly on a single 'special' function and its Fourier transform. These fundamental functions are described, with the emphasis placed on practical computational methods. The example problems are all couched in the language of acoustics. C.R.

A82-33625 **Understanding aircraft structures.** J. Cutler. London, Granada Publishing, Ltd., 1981. 176 p. 11 refs. $22.75.

After a brief account of the development history of aircraft structures from wire-braced systems to present semi-monocoque designs, attention is given to the terminology connected with flight, such as the pitch, yaw and roll axes, control, high lift devices, and aircraft shape and dimensions. An account is then given of the nature and calculation of the loads to which aircraft are subjected by maneuvering and payload, and of the most common structural means that have been devised for the bearing of such loads. The design of wing boxes, fuselage tubes, and secondary structures is shown to be a decision process which entails the choosing of sheet, plate, forged or extruded forms of aluminum and titanium alloys, or reinforced plastics. Consideration must then be given to the processes by which the materials chosen will be assembled, along with the means of preventing corrosion of the resulting structure. Additional factors include the detailed design of structural components and fasteners, from the viewpoints of both weight-saving and cost-reduction criteria. Stress calculation methods and flightworthiness requirements are also covered. O.C.

A82-33626 # **Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories.** J. Coste and J. Leynaert (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), Jan.-Feb. 1982, p. 1-9.

Similitude conditions are considered for free-fall and captive trajectory store separation studies in wind tunnels, for the general case of in-flight separation with load factor. Three scaling laws, designated light, intermediate and heavy in keeping with test Mach number, were used in the store separation tests. Attention is given to the computer-controlled, six-degree-of-freedom rig which moves the store model incrementally in the aerodynamic field of the parent aircraft, taking into account the aerodynamic forces acting on the store at each point of its trajectory. Special arrangements are used to compensate for the fact that the method is only approximate, in that it does not take into account the relative speeds of store and aircraft. O.C.

A82-33627 # **Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr.** P. Rebuffet and A. Guédel (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), Jan.-Feb. 1982, p. 11-22. 8 refs.

A scale model study is conducted to determine the effects of varying the configuration of the crossing of an anechoic wind tunnel test chamber by a free jet, where the length of the jet and the dimensions of the diffuser inlet are varied. Attention is given to cavity resonances due to aeroacoustic coupling which were observed in some model configurations, as well as background noise measurements and the aerodynamic characteristics of both the jet and the reverse flow within the cavity. A collector compatible with 2-3 m diameter test sections is defined with a view to application to a new wind tunnel test facility. O.C.

A82-33628 # **Potentiality assessment of a parallel structure for the solution of partial differential equations.** J. P. Boisseau, M. Enselme, D. Guiraud, and P. Leca (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), Jan.-Feb. 1982, p. 31-41. 9 refs.

An assessment is presented of the efficiency of a parallel-structure minicomputer system consisting of an AP 120 B array processor linked to a 32-bit SEL 32/77 host computer, using software representative of the intended applications: (1) the pseudo-unsteady method, for two- and three-dimensional flow computation; and (2) the pseudo-spectral time method, for the numerical simulation of turbulence. The analysis of test results distinguishes between processing time using the array processor, and transfer time between the memory and the computer unit. A possible compatibility between the hardware and the software algorithm used is investigated in the overlapping of the two characteristic times distinguished. O.C.

A82-33629 # **Skin friction lines.** R. Legendre (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), Jan.-Feb. 1982, p. 43, 44.

The conditions of rapid variation for properties of a viscous fluid flowing around a body are discussed, in order to determine whether the hypothesis of continuity is always justified either alone or in combination with Lighthill's (1963) additional hypothesis. The method employed uses singular points and lines which either pass through, originate or terminate at them. O.C.

A82-33630 # **A new method for constructing two-dimensional orthogonal and non-orthogonal meshes.** H. Viviand (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *La Recherche Aérospatiale* (English Edition), Jan.-Feb. 1982, p. 45-49.

A novel and simple method is described for the construction of arbitrary domain orthogonal or nonorthogonal two-dimensional meshes, in which the integration of an ordinary differential equation directly yields mesh point Cartesian coordinates. Nozzle and airfoil profile flow examples are considered. O.C.

A82-33646 **Aviation electronics /4th edition/.** K. W. Bose. Indianapolis, IN, Howard W. Sams and Co., Inc., 1981. 396 p. $17.

Standard communication, navigation, and air traffic control systems are considered along with the aviation radio spectrum, and aircraft communication systems, taking into account rules for flight operations, the structure of the airways, terminal facilities, en-route facilities, aspects of collision avoidance, radio waves and their effect at aviation frequencies, very-low frequencies, the low and medium aviation frequencies, the HF aviation bands, the VHF aviation bands, the UHF bands, aircraft antenna requirements, cockpit audio requirements, microphones and headsets, and transceivers. Other topics discussed are related to the VHF omnirange, navigation systems, instrument landing systems, automatic direction finders, distance-measuring equipment, radar beacon transponders, and weather radar. Attention is also given to gyroscopes and servo systems, flight directors and flight simulators, autopilots, design and reliability of solid-state avionic systems, shop facilities and regulations, and aircraft installations. G.R.

A82-33648 **Essentials of aviation management /2nd edition/.** J. D. Richardson (Appalachian State University, Boone, NC). Dubuque, IA, Kendall-/Hunt Publishing Co., 1981. 689 p. 211 refs. $10.95.

This book is intended to focus on the management of aviation businesses and to provide assistance to managers as they strive to overcome the problems of a rapidly changing and complex business environment. The contents of this book represent a mixture of generally accepted business procedures, practical 'how-to-do-it' material, applied research findings, sophisticated 'tools' and techniques as well as accepted history. A brief review is provided of aviation history and its impact upon the modern manager. Attention is given to management functions, profit orientation, business organization, regulatory impact, manpower management, physical facilities, operational activities, flight operations, aviation maintenance, marketing, problem administration, information systems, aspects of decision making, and the future for aviation business. G.R.

A82-33650 **Gas turbine aero-thermodynamics with special reference to aircraft propulsion.** F. Whittle. Oxford, Pergamon Press, 1981. 273 p. $17.50.

The fundamental principles and developments in aerothermodynamic theory and applications in aircraft propulsion gas turbine systems are detailed. Specific attention is given to the concepts of entropy and the isentropic expansion of a perfect gas. An analysis of the flux density and radial equilibrium in whirling isentropic compressible flows are presented, along with techniques for modeling shock waves in air, isentropic flow through nozzles, and the thermal cycles of perfect gases. Approximate methods for calculating gas turbine cycles are explored, as are the mass flow rate in gas turbines, the part load performance of gas generators, and combustion. Consideration is also given to turbojets, calculations of maximum efficiency, thrust boosting, turbofans, the effect of height and speed on performance, and to a numerical model of a super-thrust engine. M.S.K.

A82-33657 * **Airborne lidar measurements of the Soufriere eruption of 17 April 1979.** W. H. Fuller, Jr., S. Sokol (NASA, Langley Research Center, Hampton, VA), and W. H. Hunt (Wyle Laboratories, Hampton, VA). *Science*, vol. 216, June 4, 1982, p. 1113-1115. 6 refs.

At the time of the Soufriere, St. Vincent, volcanic eruption of April 17, 1979, a NASA P-3 aircraft with an uplooking lidar (light detection and ranging) system onboard was airborne 130 kilometers east of the island. Lidar measurements of the fresh volcanic ash were made approximately 2 hours after the eruption, 120 kilometers to the northeast and east. On the evening of April 18, the airborne lidar, on a southerly flight track, detected significant amounts of stratospheric material in layers at 16, 17, 18, and 19.5 kilometers. These data, and measurements to the north on April 19, indicate that the volcanic plume penetrated the stratosphere to an altitude of about 20 kilometers and moved south during the first 48 hours after the eruption. (Author)

A82-33671 **Aerodynamics: The science of air in motion /2nd edition/.** J. E. Allen (British Aerospace Public, Ltd., Co., Kingston-upon-Thames, Surrey, England). New York, McGraw-Hill Book Co.; London, Granada Publishing, Ltd., 1982. 212 p. 48 refs. $25.

An anthology of aerodynamic concepts, theory, models of natural phenomena, and applications is presented. The development of aerodynamics visualizations and theory is traced from Newton's work on air resistance in 1726 to space flight and MHD modelling. The behavior of air in motion is examined, with consideration to various aspects of boundary layers, circulation, vortex flow, vorticity, and eddies. Main concepts employed in aerodynamic theory and experiments are listed, including physical constants and aerodynamic quantities such as the Reynolds number, Prandtl number, etc. Attention is given to natural phenomena such as wind flows, tornados, convective motion, and other meteorological occurrences, and the effects of terrain on the movements of the atmosphere. Theyextension of aerodynamic principles to the design of wind turbines and to aeronautics is explored and carried on to describe celestial objects and their behavior. M.S.K.

A82-33701 **Biennial Wind Energy Conference and Workshop, 5th, Washington, DC, October 5-7, 1981, Proceedings.** *ASME, Transactions, Journal of Solar Energy Engineering*, vol. 104, May 1982. 74 p. (For individual items see A82-33702 to A82-33712)

The results of studies funded by the Federal government to advance the state of the art of wind energy conversion systems (WECS) construction, operation, applications, and financial viability are presented. The economics of WECS were considered in terms of applicable tax laws, computer simulations of net value of WECS to utilities, and the installation of Mod-2 2.5 MW and WTS-4 4MW wind turbines near Medicine Bow, WY to test the operation of two different large WECS on the same utility grid. Potential problems of increasing penetration of WECS-produced electricity on a utility grid were explored and remedies suggested. The structural dynamics of wind turbines were analyzed, along with means to predict potential noise pollution from large WECS, and to make blade fatigue life assessments. Finally, Darrieus rotor aerodynamics were investigated, as were dynamic stall in small WECS and lightning protection for wind turbines and components. M.S.K.

A82-33707 # **Effects of dynamic stall on SWECS.** R. B. Noll (Aerospace Systems, Inc., Burlington, MA) and N. D. Ham (MIT, Cambridge, MA). *(Biennial Wind Energy Conference and Workshop, 5th, Washington, DC, Oct. 5-7, 1981.) ASME, Transactions, Journal of Solar Energy Engineering,* vol. 104, May 1982, p. 96-101. 12 refs.

A study of dynamic stall is presented in order to define its influence on the airfoil force and moment coefficients so that these effects can be included in the calculation of small wind energy conversion system (SWECS) loads and responses. A review of past work indicates that semiempirical methods are best suited to SWECS requirements. A definition of a dynamic stall theory is made for use in SWECS design, and the theory is implemented in SWECS loads and dynamic response analyses. Sample calculations are made for a representative vertical-axis machine. It is shown that loads and moments on the blades may be underestimated if dynamic stall is not considered. (Author)

A82-33708 # **Darrieus rotor aerodynamics.** P. C. Klimas (Sandia National Laboratory, Albuquerque, NM). *(Biennial Wind Energy Conference and Workshop, 5th, Washington, DC, Oct. 5-7, 1981.) ASME, Transactions, Journal of Solar Energy Engineering,* vol. 104, May 1982, p. 102-105. 19 refs. Contract No. DE-AC04-76DP-00789.

A summary of the progress of modeling the aerodynamic effects on the blades of a Darrieus wind turbine is presented. Interference is discussed in terms of blade/blade wake interaction and improvements in single and multiple stream tube models, of vortex simulations of blades and their wakes, and a hybrid momentum/vortex code to combine fast computation time with interference-describing capabilities. An empirical model has been developed for treating the properties of dynamic stall such as airfoil geometry, Reynolds number, reduced frequency, angle-of-attack, and Mach number. Pitching circulation has been subjected to simulation as potential flow about a two-dimensional flat plate, along with applications of the concepts of virtual camber and virtual incidence, with a cambered airfoil operating in a rectilinear flowfield. Finally, a need to develop a loading model suitable for nonsymmetrical blade sections is indicated, as well as blade behavior in a dynamic, curvilinear regime. M.S.K.

A82-33750 **The TM 333, a trump card for Turbomeca (Le TM 333, atout majeur de Turbomeca).** J. Morisset. *Air et Cosmos,* vol. 20, May 8, 1982, p. 13, 15-17. In French.

The new dual turbine, digital control TM 333 helicopter motor is described as having benefitted from a ten year program in basic aerodynamics, metallurgy, and electronics research. High compression, high expansions in reverse flow digitally controlled engines are coupled with improvements in the gear reductions and joints. The helicopter achieves program goals set in July 1979 of low operating cost, efficient fuel consumption over a broad power range, modular maintenance, fewer parts and lower purchase price, and low specific weight. The power plant furnishes a take-off impulse of 625 kW with a continuous output of 560 kW, with a fuel consumption of 318-330 gr/kWh. Specific performance features are listed and comparisons are made with turbines of other manufacturers. M.S.K.

A82-33853 # **The superalloys - Materials for gas turbine hot section components.** J. P. Immarigeon (National Aeronautical Establishment, Ottawa, Canada). *(Canadian Aeronautics and Space Institute, Annual General Meeting, 28th, Montreal, Canada, May 11, 1981.) Canadian Aeronautics and Space Journal,* vol. 27, Dec. 1981, p. 336-354. 80 refs.

Developments in materials technology for high temperature materials used in gas turbines are reviewed with emphasis on powder processing. Conditions under which turbine blades, vanes and disks operate are described, and material requirements for the three components are discussed. Advanced forming methods such as hot isostatic compaction of prealloyed powders and isothermal forging, and the rejuvenation of mechanical properties and subsequent recycling of used gas turbine components by hot isostatic pressing are considered. D.L.G.

A82-33854 # **Operational testing of the LN-33 inertial navigation system.** M. C. Mendritsky (Canadian Forces, Air Navigation School, Winnipeg, Canada). *(Canadian Symposium on Navigation, 4th, Halifax, Canada, Nov. 17, 1981.) Canadian Aeronautics and Space Journal,* vol. 27, Dec. 1981, p. 355-362.

An evaluation was performed to determine the baseline performance of the LN-33 Inertial Navigation System (INS). Tests designed include determination of geographic position accuracy in the pure inertial mode, determination of alignment quality, and the determination of a recommended time interval between system calibrations. Results of the navigation system testing on the Aurora, concentrating on the Doppler and Omega integrated operation of the INS, indicate that navigation will be more accurate in these modes of operation due to bounding effects and the fact that the INS itself performs better in this aircraft. D.L.G.

A82-33855 # **Mechanical and metallurgical considerations in extending the life of turbine blades.** J. Liburdi and J. Wilson. *(Canadian Aeronautics and Space Institute, Annual General Meeting, 28th, Montreal, Canada, May 11, 1981.) Canadian Aeronautics and Space Journal,* vol. 27, Dec. 1981, p. 363-374. Research supported by the National Research Council.

The paper outlines a systematic approach to blade life extension. Methods of predicting blade life and establishing life trends are discussed, and methods of repairing typical airfoil damage on turbine blades are outlined with general guidelines on repair limits and the influence of dissimilar filler metals on stress patterns. As blades reach their critical life they may be rejuvenated using hot isostatic pressing and appropriate heat treatments. A mechanical analysis demonstrates that limited repairs are possible on physically damaged components, and at present, repairs using a weaker filler material are limited to the lower-stressed region of the blade, such as near the tip and on top of the shroud. D.L.G.

A82-33891 # **CDS grows new muscles.** D. P. Raymer (Rockwell International Corp., Advanced Systems Design Dept., Los Angeles, CA). *Astronautics and Aeronautics,* vol. 20, June 1982, p. 22-31. 5 refs.

Recent improvements in the Configuration Development System (CDS) are discussed. Various design tasks that CDS can carry out are described, including fuselage development, wing and tail surfaces, initial structural design, fuel tanks and landing gear. New CDS abilities are also described, including the creation of command files, the modeling of existing designs for analysis or visualization, and doing on-line conceptual analysis of problems such as aerodynamic center and lift and moment derivatives, and friction drag. CDS can do tasks for which it was not specifically designed, and can perform any task that can be done on a drafting board. For the occasional user, CDS gives a productivity ratio of about four to one, while experienced users can expect an average improvement approaching ten to one. C.D.

A82-33892 # **High technology raises fighter force readiness.** R. C. Little, W. P. Murden, and R. K. Schaefer (McDonnell Douglas Corp., St. Louis, MO). *Astronautics and Aeronautics,* vol. 20, June 1982, p. 38-45, 61.

Evolutionary trends in U.S. tactical aircraft are discussed, emphasizing the role of high technology. The progressive increase in service life is accompanied by improved reliability. While digital technology in the aircraft has become more complex, there has been simplification in a number of areas, including electrical and plumbing connectors, hydraulic filters and lubrication points. Maintainability improvements include built-in test equipment and the Avionics Intermediate Shop, which uses automated test equipment to isolate a fault to an individual plug-in module. Though tactical aircraft potentially can fly two sorties per day, they are actually flying less than one. The problem derives from insufficient support services, and needed improvements are discussed in detail. C.D.

A82-33893 # **The National Airspace System plan.** J. L. Helms and S. B. Poritzky (FAA, Washington, DC). *Astronautics and Aeronautics,* vol. 20, June 1982, p. 50-61.

Major decisions, programs, and modernization plans of the National Airspace System are discussed. Greater cockpit control, automated weather observation systems, computerized ATC, and independent airborne Traffic Alert and Collision Avoidance Systems (TCAS) are anticipated. Near-term improvements include conflict-resolution advisories, en route metering, and improved terminal automation systems. The integration of traffic flow management and the use of TCAS are discussed in detail. Improved weather data will be obtained through the use of Doppler-radar technology, improved data bases, ground-based automated weather systems, and a central weather processor. The planned national airspace data interchange network will upgrade communications, and the Federal Radionavigation Plan will streamline navigation services. A modernized voice switching and control system, self-contained navigation systems, a microwave landing system, greater airport capacity, and facility consolidation are contemplated, and the plan as a whole is expected to be cost-effective. C.D.

A82-33904 **Runway end intersection design.** R. W. Hutchins (FAA, Albuquerque, NM). *Airport Forum,* Apr. 1982, p. 53-55.

One of a number of airport design problems involves the design of runway intersections. Frequently the involved runways intersect near their physical ends, and additional design parameters have to be taken into account. While runway length requirements, construction cost, and land availability will probably be the dominant design considerations, significant improvements in safety, cost, and convenience can be achieved by the selection of a particular intersection configuration. The four basic types of multiple runway layouts are classified as parallel, crossing, 'open V', and 'closed V'. Attention is given to aspects of aviation safety, ground traffic circulation, construction cost, capacity, the use of full runway length, and Navaid visual aid interference. A runway end intersection analysis is conducted, and the importance of taxiway access is discussed. G.R.

A82-33908 **The next generation trainer.** *Military Electronics/Countermeasures*, vol. 8, May 1982, p. 36, 40-42, 66.

In connection with a number of drawbacks regarding the T-37 twinjet trainers currently being used and the age of these aircraft, the U.S. Air Force is considering the introduction of a fleet of modernized aircraft for use in training undergraduate pilots at Randolph Air Force Base, TX. The T-37 have been manufactured between 1955 and 1977. They lack pressurization for high-altitude training, modern ejection seats, and fuel-efficient engines. The four Next Generation Trainer (NGT) prototypes the Air Force is considering incorporate these and other updated features. The first delivery of 54 trainers is expected to be set for September 30, 1987, when the service life of the original T-37s expires. A description is presented of the major specifications and stage of development of each of the four NGT, giving attention also to the manufacturers' reasons as to why their individual NGTs should be purchased by the Air Force. G.R.

A82-33913 # **The ubiquitous helicopter.** A. Gessow (Maryland, University, College Park, MD). *AIAA Student Journal*, vol. 19, Winter 1981-1982, p. 3-7, 46.

The theory, aerodynamics, and operation of helicopters are outlined and the extension of current technology to future versions of the helicopter for various applications is anticipated. Differences between helicopter and fixed-wing aircraft flight and control are discussed, noting the greater difficulty in maintaining stability low speeds in gusty conditions with helicopters. Blade and hub advances are reducing the complexity of the blade articulation to the drive train and rotor weight and strength are being tightly controlled by the use of composite materials. The wide rotor diameter distributes loads over a large area, allows heavy cargo to be carried, and provides a gliding force during power-out descents. Various commercial and military applications are enumerated. M.S.K.

A82-33914 # **XV-15 - Foretelling things to come.** L. H. Erb (Bell Helicopter Textron, Fort Worth, TX). *AIAA Student Journal*, vol. 19, Winter 1981-1982, p. 22-25.

The development of workable configurations of tilt-rotor aircraft culminating in the XV-15 is traced. The aircraft take off with the rotors on either wing situated like those of a helicopter then tilt the blades forward to proceed with high-speed flight, which has to date been 300 km maximum. The XV-15 proved that natural frequencies and aeroelasticity of the rotors and airframe could be combined in a stable system, and also reconfirmed the possibility of control in both helicopter and airplane modes, problems originally solved with the XV-3. Early applications for the craft are foreseen for offshore oil rigs and on destroyers and frigates of the Navy. M.S.K.

A82-33915 # **X-wing and the Navy V/STOL initiative.** R. M. Williems (U.S. Defense Advanced Research Projects Agency, Arlington, VA). *AIAA Student Journal*, vol. 19, Winter 1981-1982, p. 26-34. 8 refs.

The development of concepts for Navy use of sea control ships (SCS) which could take advantage of V/STOL aircraft capabilities in intensive combat situations is outlined. The X-wing aircraft is offered as a solution to basing antisubmarine warfare and sensor carrier aircraft on ships which are not intended as aircraft carriers, such as frigates and destroyers. Use of the VTOL aircraft would permit force projection beyond the radar horizon in the form of cruise and air-to-air missiles borne by the X-wing. Combining advances in circulation control/tandem wing aerodynamics, high stiffness composite materials, and shaft-moment-feedback/fly-by-wire controls, a craft with low disk loading became possible. The X-wing is powered by a turbofan, and pneumatic control allows elimination of blade cycle pitch, rotor blade articulation, flaps, slots, and ailerons. M.S.K.

A82-33916 # **Will ABC technology produce the next-generation helicopter.** A. W. Linden (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *AIAA Student Journal*, vol. 19, Winter 1981-1982, p. 35-37.

Design concepts developed in order to overcome the retreating-blade stall limitations on level air speed flight for helicopters are reviewed. Compound vehicles were tested to utilize the rotating blades' lift capabilities in hover and the fixed wings' high-speed flight capacity. Inherent instability and low power efficiencies ruled against the design, and dual, counter-rotating propellers were tried in an attempt to discard any need for lift on the retreating blade. The resulting XH-59A test aircraft has risen to over 25,000 ft, made 60 deg turns at 225 kn, and has exceeded 260 kn air speed. The blades are mounted without hinges or flexible elements, thus improving reliability, maintainability, and aircraft handling and controllability. M.S.K.

A82-33920 # **The U.S. airline industry - En route to deregulation.** E. Starkman (Dowling College, Oakdale, NY). *AIAA Student Journal*, vol. 20, Spring 1982, p. 30-36. 5 refs.

The Airline Deregulation Act of 1978 and its consequences for the airline industry in the United States are discussed. The act is argued to have been a product both of public sentiment for reduced government regulation of private enterprise and the particular maturity of the airline industry, and it is noted that the actual deregulation act was preceded by a period of de facto selective deregulation beginning in 1977. Provisions of the act included the establishment of a fully competitive airline industry and the gradual dismantling, by January 1, 1985, of the Civil Aeronautics Board. Airlines have responded to the act by strengthening high-cost, long-haul routes at the expense of shorter routes while seeking to maintain feeder routes, in the case of the larger airlines, and explosive growth and the formation of entirely new carriers in the case of local service carriers. A.L.W.

A82-33989 **Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980.** Symposium sponsored by the American Society for Testing and Materials. Edited by J. R. Newby (Armco, Inc., Middletown, OH) and B. A. Niemeier (Reynolds Metals Co., Richmond, VA). Philadelphia, PA, American Society for Testing and Materials (ASTM Special Technical Publication, No. 753), 1982. 332 p. $39.50.

Reports included in this volume provide a broad review of worldwide developments in forming metallic materials along with specifics for manufacturing and potential formability technologies. Papers are presented on the effect of aging on bulk formability of aluminum alloys, hot forming of aluminum-magnesium alloy sheet, application of formability assessment to autobody outer panels, and the influence of tooling temperature on the formability of stainless steel sheets. Other papers include material flow and defect formation in forging an airfoil shape from metal-matrix composites, the use of torsion testing to assess material formability, and computer-aided modeling of selected sheet metal forming processes. V.L.

A82-33994 **Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy.** M. L. Robinson (Inco Research and Development Center, Inc., Suffern, NY) and I. Astley (Wiggin Alloys, Ltd., Hereford, England). In: Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980. Philadelphia, PA, American Society for Testing and Materials, 1982, p. 147-158.

The formability of INCOLOY alloy MA 956 (Fe - 19.5 wt% Cr - 4.5 wt% Al), designed for uses such as combustor components in gas turbine engines, has been evaluated using tension testing, cup testing, and strain analysis via the grid technique. An attempt has been made to interrelate the measured formability indexes utilizing relationships developed for conventional sheet alloys. It is concluded that although the alloy studied does not have the high degree of formability typical of conventional alloys, it does exhibit a usable degree of formability and can be formed into simple shapes. V.L.

A82-33995 **Material flow and defect formation in forging an airfoil shape from metal-matrix composites.** T. Erturk (Middle East Technical University, Ankara, Turkey) and H. A. Kuhn (Pittsburgh, University, Pittsburgh, PA). In: Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980. Philadelphia, PA, American Society for Testing and Materials, 1982, p. 176-188.

Major defects that occur in the forging of a 2024 aluminum alloy matrix reinforced with 25 vol% 0.23-mm-diameter cold drawn bcc stainless steel wires are identified using compression tests on rectangular specimens. These defects include fiber shear failure and accompanying deviation from plane-strain; fiber/matrix interface decohesion and accompanying void formation; the occurrence of cracks at the convex surfaces of rectangular preforms in forgings involving bending; and nonuniformity in fiber distribution. Forming limit criteria for the prediction and the prevention of these defects are established, presenting the allowable stress states during forging and providing guidelines for the forging of airfoil shapes from rectangular preforms. V.L.

A82-33997 **Low-speed aerodynamic characteristics of wings with sweep discontinuities.** S. M. Ramachandra (Hindustan Aeronautics, Ltd., Design Bureau, Bangalore, India; Alfateh University, Tripoli, Libya) and S. Prakash (Hindustan Aeronautics, Ltd., Bangalore; Indian Space Research Organization, Vikram Sarabhai Space Centre, Trivandrum, India). *Indian Academy of Sciences, Proceedings, Section C: Engineering Sciences*, vol. 4, Dec. 1981, p. 437-447. 15 refs.

It is shown that, using the concept of a discrete vortex filament shedding, Weissinger's method can be modified to determine the span-wise loading for wings with a sweep discontinuity. The sweep discontinuity is modeled by the introduction of a discontinuity in the equivalent vortex pattern chosen to replace the wing. The total lift, induced drag, pitching moment coefficients and span-wise location of the center of pressure have been found for a few wing geometries using De Young and Harper's procedure. An increase in the outboard sweep shifts the maximum load position outboard besides decreasing the overall lift and induced drag coefficients. High suction peaks appear at the pivot. (Author)

A82-34007 * # **A review of Reynolds number studies conducted in the Langley 0.3-m Transonic Cryogenic Tunnel.** E. J. Ray (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0941.* 15 p. 26 refs.

Initial proof-of-concept results obtained in a pilot transonic tunnel, led to a U.S. decision to apply the cryogenic tunnel concept to the National Transonic Facility (NTF). The pilot tunnel was reclassified as a 'permanent' facility and renamed the 0.3-m Transonic Cryogenic Tunnel (TCT). The 0.3-m TCT, with its ability to operate at temperatures ranging from about 78 K to 340 K, combined with a 6 atmospheres pressure capability, provides extremely high test Reynolds numbers at relatively low model loading. In addition, the ability to vary pressure and temperature independently of Mach number provides a unique capability to conduct studies at a constant dynamic pressure or at a constant Reynolds number with just one model. Attention is given to the simulation of flight conditions, the cryogenic-pressure tunnel concept, the characteristics of the 0.3-m TCT, Reynolds number studies in the three-dimensional test section including a Space Shuttle study, and Reynolds number studies in the two-dimensional test section. G.R.

A82-34008 * # **Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing.** E. L. Anglin and T. A. Byrdsong (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0960.* 14 p. 11 refs.

Wind-tunnel tests were made to investigate the control effectiveness of wing trailing-edge flap-type aerodynamic controls for a supercritical wing. The tests determined the effects of spanwise flap control location, two different wing transition grit location patterns, magnitude of angular control deflection, control hinge moments and control hinge gap seals. Results show that the inboard flap position deflections caused interference rearward at the vertical tail, and that all flap positions for deflections in one direction only caused interference at the horizontal tail at a higher than design Mach number. Changes in wing transition grit pattern caused significant changes to static longitudinal characteristics and longitudinal control effectiveness. D.L.G.

A82-34101 * **International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981.** Symposium sponsored by the U.S. Department of Commerce, NASA, and U.S. Air Force. Edited by J. Grey (American Institute of Aeronautics and Astronautics, New York, NY) and L. A. Hamdan. New York, American Institute of Aeronautics and Astronautics (AIAA Aerospace Assessment Series. Volume 6), 1982. 318 p. Members, $25.; nonmembers, $30.

The status of aerospace industrial development in various countries is summarized, and specific areas of current and future progress are discussed. The first Shuttle astronauts recount details of the flight and performance of the initial Columbia mission and an attempt to assess the importance of the Shuttle as a milestone in transportation systems is presented. ESA space activities are reviewed, including the impact of space programs on European industries and employment. Attention is also given to Japanese and Chinese space programs. The evolution of communications satellites is traced and projections are made for near-term satellite requirements to be incorporated in the construction of Intelsat VI. Finally, advances in production of military jets and helicopters are considered, along with candidate alternate fuel systems to replace petroleum products. M.S.K.

A82-34108 # **Military aircraft and international policy.** B. Revellin-Falcoz (Avions Marcel Dassault-Breguet Aviation, Vaucresson, Hauts-de-Seine, France). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 107-112.

The benefits to an aerospace company manufacturing aircraft which can be adapted to a variety of specific military uses are discussed. The practice is asserted to create production flexibility and increase sales by allowing a basic design to be reconfigured for different buyers and to the same buyer over a number of years. One drawback is that spare parts production must continue over the years for versions which are no longer produced, although some savings are realized in a commonality among different generations of the same aircraft. Sales are noted to be most favorably concluded through the use of a prime contractor who controls all details of a deal, while still answering to the demands and suggestions of all partners and parties involved. Finally, it is mentioned that weapons exports make up for one-quarter of the national cashflow which leaves France for purchases of oil. M.S.K.

A82-34109 # **Commercial transport developments for the 1980's.** J. E. Steiner (Boeing Co., Seattle, WA). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 115-139.

A review is presented of the technology currently incorporated into modern air transportation vehicles and trends for the future are discussed. Reducing fuel consumption has led to the adoption of the high-bypass ratio turbofan, which has also provided significant noise reduction. Wings are being designed with less sweep in order to be more fuel efficient, and combined with new airfoil configurations and fuel-efficient cruise speeds. The commonality of solutions to efficiency problems has led to increasing homogeneity in the design, structure, and components of aircraft built by different manufacturers. Equipment which is not cost-effective tends to be grounded as soon as possible, with new aircraft operating at 40-60% economic improvement over previous generations. A shift to smaller, commuter aircraft is foreseen, along with composite primary structures, full-scale active controls, and a reduction in wing and tail sizes. M.S.K.

A82-34110 # **Military aircraft - The way ahead.** D. Smallwood (British Aerospace Public, Ltd., Co., Weybridge, Surrey, England). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. (A82-34101 16-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 141-147.

Performance and mission requirements for present and future combat aircraft are explored, with a focus on NATO forces in central Europe. Survivability of the aircraft is stressed, particularly in scenarios where airfields have little chance of remaining intact, which is seen as a driving force for near-term operational capability for V/STOL aircraft. Additional necessities for all-weather and climatic conditions operations are listed in addition to nighttime performance ability in all combat modes. Improvements are likely to be forthcoming in the area of composite structures, higher performance engines, and continued automation of avionics and weapons systems, as well higher-resolution radars and task integration in the digitized cockpit avionics displays. M.S.K.

A82-34111 # **The military helicopter market today and tomorrow.** D. O. Smith (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 149-153.

Demands and the status of the present world helicopter market are discussed with an emphasis on military applications. Approximately 29,300 units are expected to be sold in the period 1981-1990, with a total price tag of $29.2 billion, not counting spare parts. Currently, the Sikorsky Black Hawk is being employed by the U.S. Army for carrying combat troops and equipment, while the UH-60A is used as a cargo transport with a capacity of 4 tons. Attack, surveillance, and mine laying are other functions assigned to military helicopters. Development of new helicopters in the U.S. is noted to take seven years, and an estimated 3% of all U.S. helicopters are now over 15 yr. old. M.S.K.

A82-34112 # **Development of an aircraft engine.** J. Calmon (SNECMA, Paris, France). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 155-163.

The evolution of designs in jet engines, requirements which lead to the incorporation of modifications and improvements, and the cooperation between companies to produce the engines are considered in terms of the development of a currently available GE engines. The TF 39 was certified in 1968 for the C5A, experienced a modification in the low-pressure section for use in the DC 10-10, and underwent further changes to be employed in the DC 10-30, A300, and 747, becoming the CF6-50 along the way. The CF6-80 is the next step and will feature a shorter combustion chamber and no turbine midframe. Increasing the fan diameter augments the thrust, and it is noted that 60,000 test hours have accrued on the engine up to 1981. Development, production, and product support for the CFM56 engine is shared 50-50 between GE and SNECMA, and features new materials and electronic fuel control to obtain increased fuel efficiencies. M.S.K.

A82-34113 # **Solutions to the aviation fuel problem.** W. M. Hawkins (Lockheed Aircraft Corp., Burbank, CA). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 165-180.

Projections of the duration of availability of petroleum-derived jet fuels are reviewed and candidates for alternative fuels are discussed. World production of crude oil is expected to begin to irreversibly decline in the 1990s, and the design of new aircraft which could use alternative fuels is noted to depend strongly on the new fuels which have yet to be chosen. Any new fuel supply will be required to have a low producibility cost, be continuously replenishable, be available for multiple uses, be easy to handle and transport, safe to use, cause no major changes in equipment, and be minimally polluting. An additional consideration is that the fuel could be derived where used to avoid the political problems inherent in current fuel supplies. Liquid hydrogen is found to be the best solution because of light weight, water as the source, available everywhere, and costs less than shale or coal-derived fuels. M.S.K.

A82-34114 # Aeronautical research and development. P. Poisson-Quinton (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 181-205. 7 refs.

Aerospace research and development is examined in terms of its role in progress, the necessity for industry, government, and user cooperation, the functions of ONERA, and research results which are beginning to pay off. Research is being channeled by advances in electronics and computer abilities, and balances are needed between basic and applied research funding. Government programs are noted to specifically center around risky and/or long term research, while industry concentrates its efforts on near-term evolutionary studies. ONERA research departments are reviewed, along with outlines of wing fabrication development techniques, the transonic propeller, and a carbon fiber wing. The development of active control systems has resulted in increased fuel efficiencies. The interactions between AGARD, ONERA, NASA, and GARTEUR are outlined. M.S.K.

A82-34120 # Technical trends in the civil aircraft and helicopter industry. R. Chevalier (Société Nationale Industrielle Aérospatiale, Paris, France). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 263-273.

Technical prospects for improvements in aerodynamics, weight savings, propulsion, and navigational systems in the civil air transportation industry in the next two decades are projected. Aerodynamics will encounter more wing-span for efficiency, decreased wing sweep for better low-speed control, and thicker airfoils for improved fuel efficiency. Composites and structures modeled by computer are foreseen as contributing to 15-26 percent in weight savings by the year 2000. The families of future engines include the introduction of high temperature and compression ratio turbofans and turboprops, in addition to propfans, which feature high efficiency at speeds of Mach 0.7 and above. Microminiaturization of electronics is expected to produce another order of weight reduction equal to that already achieved, in addition to improved safety, handling qualities, and control. Greater use of civil helicopters and supersonic transport is predicted. M.S.K.

A82-34121 # Military aircraft. H. F. Rogers (General Dynamics Corp., St. Louis, MO). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 275-290.

Even though the emergence of sustained supersonic cruise and maneuvering as a useful tactical tool is foreseen, no significant expansion of the current operational envelopes of fighters is now in prospect. Maximum speeds at altitude will be in the Mach 2.0-2.2 region, and maximum speeds at sea level will not significantly deviate from the current value of Mach 1.2. Two important uncertainties in the air-to-air arena are (1) positive, all-weather, beyond-visual-range identification and (2) warning and control in a high-density environment. In designing aircraft, the need for realistic requirements, balancing unit (aircraft) effectiveness against total force effectiveness, is stressed. Also considered important is the use of hybrid technology, that is, the careful integration across classic technological disciplines to achieve enhanced operational capability with a more efficient solution. A third requirement is a modular design approach. C.R.

A82-34123 # Business jets to agricultural aircraft - An overview of general aviation. J. H. Winant (National Business Aircraft Association, Washington, DC). In: International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981. New York, American Institute of Aeronautics and Astronautics, 1982, p. 295-300.

Attention is given to the inroads that have been made in the American market by foreign firms. In the turboprop field, which is seen as the area of strongest potential growth in the years immediately ahead, the United States continues to dominate. Attention is also given to the technological importance of business aircraft. The traditional technological spinoff roles appear to be reversing themselves; business aircraft, for so many years inheritors of design concepts born in the military and air transport aircraft industries, are now moving into the position of being the source for significant innovation. Three important technological challenges seen in business aviation are the problem of noise, the need to make aircraft lighter and more slippery, and the development of alternative fuels. C.R.

A82-34125 Fatigue life prediction of helicopter pitch link using Kaman life calculation methods. C. P. Hardersen (Kaman Aerospace Corp., Bloomfield, CT). *American Helicopter Society, Specialists Meeting on Helicopter Fatigue Methodology, St. Louis, MO, Mar. 1980, Paper.* 12 p.

This paper uses information supplied by the Army to arrive at a final calculated life for a pitch link component. Discussions are presented on the handling of strength data, load data, and frequency data in the context of a fatigue life computer program. Load and strength are presented as statistics which are randomly combined using Monte Carlo techniques. Improvements in technique could include the consideration of statistical variation on mission, statistical consideration of multi-mode failures, and improved cycle-by-cycle evaluation techniques. (Author)

A82-34127 † Periodic boundary value problem for the equations of the harmonic oscillation of a rotor blade about the axis of a flapping hinge (Periodicheskaia kraevaia zadacha dlia uravnenia garmonicheskikh kolebanii lopasti nesushchego vinta otnositel'no osi gorizontal'nogo sharnira). V. S. Vozhdaev. *TsAGI, Uchenye Zapiski,* vol. 12, no. 4, 1981, p. 9-18. 5 refs. In Russian.

The numerical calculation of the aerodynamics of a hinged rotor in an oblique flow in terms of blade theory is examined. It is shown that the transformation of the system of coupling equations and equations of the flywheel motion of the blade in blade theory into a system of coupling equations leads to an equation for harmonic oscillations with periodic boundary conditions. A solution to the problem is found in integral form, allowing the solution of the corresponding difference equation expressed in terms of Chebyshev polynomials and related mixed polynomials. The differential equation of flywheel motion is then transformed into the form of an integral Fredholm equation of the second kind. A.L.W.

A82-34128 † Finite element calculation of the aerodynamic forces on a vibrating wing in supersonic flow (Raschet metodom konechnykh elementov aerodinamicheskikh sil na kolebliushchemsia kryle v sverkhzvukovom potoke). V. G. Bun'kov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 4, 1981, p. 19-26. In Russian.

A finite element method is used to calculate the aerodynamic forces on a thin wing with supersonic trailing edges. Velocity potential and deformations are determined for a wing partitioned into both trapezoidal and triangular finite elements by the use of a matrix of aerodynamic influence coefficients expressing the effects of pressure differences on each node. Results of calculations are presented which demonstrate the effects of the Mach and Strouhal numbers on flutter characteristics. A.L.W.

A82-34132 † Similarity parameters for the geometric structure of a supersonic jet propagating in a channel and in a submerged space (Parametry podobiia geometricheskoi struktury sverkhzvukovoi strui, rasprostraniaiushcheisia v kanale i zatoplennom prostranstve). E. A. Leites. *TsAGI, Uchenyé Zapiski,* vol. 12, no. 4, 1981, p. 54-63. 14 refs. In Russian.

An approximate method is used to determine the linear length scales of a jet propagating in a cylindrical channel or a submerged space. The method is based on a linearization of the differential equations of motion for an inviscid compressible, nonheat-conducting perfect fluid a sufficient distance from the nozzle exit to obtain a relation between the longitudinal and transverse length scales. The analytical relations obtained are shown to be in agreement with experimental data and the results of numerical studies for a wide range of flow parameters for axisymmetric and plane jets. A.L.W.

A82-34135 † Temperature fields in three-layer panels with a honeycomb filler during unsteady heating (Temperaturnye polia v trekhsloinykh paneliakh s sotovym zapolnitelem pri nestatsionarnom nagreve). S. N. Ivanov and M. A. Morozov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 4, 1981, p. 97-104. 5 refs. In Russian.

The unsteady temperature fields in a three-layer panel with a honeycomb filler are calculated by an approximate method. Equations for heat balance in elements of the filler and sheathings with temperature-dependent thermophysical properties were solved under conditions of unsteady nonuniform heating, with the effective thermal conductivity of the filler in a direction parallel to the sheathing determined taking into account both conductive and radiative heat transfer along the honeycombs. Calculated temperature distributions are compared with those measured for the upper and lower sheathings of a three-layer panel with and without edge ribs heated along a narrow band of the center section to temperatures of up to 800 C to demonstrate the validity of the approach. A.L.W.

A82-34136 † Detached flow past V-shaped low-aspect-ratio wings (Otryvnoe obtekanie V-obraznykh kryl'ev malogo udlineniia). S. K. Betiaev, M. I. Grigor'ev, and G. G. Sudakov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 4, 1981, p. 105-109. 8 refs. In Russian.

The aerodynamic characteristics of a V-shaped wing are investigated theoretically and experimentally as a function of wing dihedral angle. Experiments were performed with a wing model with a sweep of 80 deg and dihedral angles from 0 to 40 deg attached to a conical body at angles of attack from -5 to 16 deg and free-stream Mach numbers of 0.6 and 1.1. Theoretical calculations were carried out for an isolated V-shaped delta wing of negligible thickness in terms of slender body theory, which allowed the three-dimensional problem of detached flow to be reduced to the unsteady two-dimensional problem of detached flow around a widening V-shaped plate. Lift coefficients derived from the calculations and from pressure measurements show a maximum at negative dihedral angles, indicating that the parachute effect is a consequence of nonlinear effects arising from flow separation from the lateral edges of the wing. A.L.W.

A82-34144 † **Development of a control law for the alleviation of maneuver loads on an elastic aircraft (Postroenie zakona upravleniia dlia snizheniia manevrennykh nagruzok na uprugom samolete).** F. Z. Ishmuratov and V. N. Popovskii. *TsAGI, Uchenye Zapiski,* vol. 12, no. 4, 1981, p. 156-161. 5 refs. In Russian.

A mathematical model for the longitudinal maneuver of an elastic aircraft is used to develop an active control system for the reduction of maneuver loads. This rather general model makes it possible to investigate the interaction of the active control system with the motion of the aircraft (as a rigid body) and with elastic deformations of the structure under large disturbances. As an example, this approach is used to investigate the longitudinal maneuver of a heavy passenger aircraft with swept wings of large aspect ratio. B.J.

A82-34145 † **Structural optimization of a swept wing on the basis of the aileron efficiency condition (Optimizatsiia konstruktsii strelovidnogo kryla iz usloviia effektivnosti eleronov).** V. I. Biriuk, A. V. Sharaniuk, and Iu. F. Iaremchuk. *TsAGI, Uchenye Zapiski,* vol. 12, no. 4, 1981, p. 162-166. 5 refs. In Russian.

The paper considers the maximization of the aileron efficiency of a swept wing of large aspect ratio and specified weight by means of the optimization of the distribution of stiffness characteristics. The wing is modeled as a beam, and constraints imposed on the stiffness characteristics are taken into account. It is shown that an increase of approximately 20% can be obtained in the aileron efficiency by optimization of the stiffness distribution (the initial weight being preserved). B.J.

A82-34149 † **An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms (Eksperimental'noe issledovanie pri chisle M sub infinity 5 aerodinamicheskogo nagrevaniia verkhnei poverkhnosti ploskikh kryl'ev razlichnoi formy v plane).** N. A. Kovaleva and A. Ia. Iushin. *TsAGI, Uchenye Zapiski,* vol. 12, no. 5, 1981, p. 23-32. 14 refs. In Russian.

Heat transfer at the upper surface of the wing has been investigated for plane wings of seven different planforms at a free-stream Mach number of 5, with angles of attack varying from 0 to 15 degrees. A Reynolds number of (1.7-2.5) x 10 to the 6th has been computed from incoming free-stream flow parameters and the model length. Heat transfer at the upper wing surface is found to be strongly dependent on the shape of the wing leading edge. V.L.

A82-34154 † **Determination of the glide path of an aircraft with power off (Opredelenie oblasti dostizhimosti letatel'nogo apparata bez tiagi).** G. V. Parysheva, S. A. Smirnov, and V. A. Iaroshevskii. *TsAGI, Uchenye Zapiski,* vol. 12, no. 5, 1981, p. 72-83. In Russian.

The glide path of an aircraft controlled by varying the angle of roll is analyzed in terms of a quasi-stationary gliding hypothesis. The Pontryagin maximum principle is used to determine the angle-of-roll control structure at trajectories corresponding to the glide path boundaries, and a classification of such trajectories is proposed. Glide paths are plotted for an aircraft as a function of its maneuvering capabilities, i.e., the available distance and the available angle of turn. V.L.

A82-34157 † **Hysteresis of the normal force of a wing of complex planform under unsteady motion (Gisterezis normal'noi sily kryla slozhnoi formy v plane pri neustanovivshemsia dvizhenii).** A. N. Zhuk, A. I. Kur'ianov, and G. I. Stoliarov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 5, 1981, p. 113-118. In Russian.

The effect of unsteady motion on the normal force of an aircraft having a wing of complex planform has been investigated at subsonic velocities. It is found that noticeable transformation of aerodynamic characteristics occurs, in relation to angles of attack, at separation regimes in the case of unsteady motion. It is also found that the hysteresis loop in the normal force vs angle of attack relationship widens with the angular frequency of oscillations. This effect is attributed to transformations in the unstable vortex structure of flows at large angles of attack and to the irreversibility of viscous separated flows. V.L.

A82-34161 † **An algorithm for calculating the compliance matrices of aircraft structures by the substructure method as applied to aeroelasticity problems (Algoritm rascheta matrits podatlivosti konstruktsii letatel'nykh apparatov metodom podkonstruktsii primenitel'no k zadacham aerouprugosti).** D. D. Evseev and A. A. Rybakov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 5, 1981, p. 139-142. In Russian.

An algorithm based on a polynomial method is proposed for determining the compliance matrices of aircraft structures. An aircraft is represented as a set of flexible substructures (wing, fuselage, controls, and suspensions) with independent sets of coordinate functions used for specifying substructure deformations. Coupling between the substructures is realized by means of discrete springs simulating actual connections between structural elements. V.L.

A82-34162 † **Method for the measurement of elastic deformations of aircraft models in a wind tunnel (Sposob izmereniia uprugikh deformatsii modeli samoleta v aerodinamicheskoi trube).** M. V. Ushakov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 5, 1981, p. 143-147. 8 refs. In Russian.

The measurement of the surface deformations of an aircraft model in a wind tunnel flow by a remote optical method is presented. A series of mirrors was attached flush with the wing and elevon surfaces of the model at 59 separate points, and illuminated with laser light which was subsequently reflected onto a screen. Chordwise and spanwise deformations were calculated from the differences of the positions of reflected spots for the situations of deflected and nondeflected control surfaces at an angle of attack of zero and Mach number of 2. Experimental measurements of the angle of deformation are observed to be in good agreement with those calculated from piston theory, supporting the applicability of the optical method in similar experiments. A.L.W.

A82-34163 † **Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings (Vliianie nestatsionarnosti na nagruzhenie pilonov i dvigatelei samoleta s krylom bol'shogo udlineniia).** G. I. Turchannikov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 5, 1981, p. 148-152. In Russian.

Consideration is given to the problem of the dynamic loading of the pylons and engines of an aircraft with high-aspect-ratio wings flying in the turbulent atmosphere. In contrast to previous analyses based on a quasi-steady approach to the determination of the aerodynamic forces acting on an elastically deforming aircraft flying in the downwash field of a harmonic gust, the present analysis takes into account the unsteady variations in aerodynamic forces. Results of calculations of dynamic loading are presented for a heavy transport aircraft with two engines under each wing flying at an altitude of 6 km at Mach 0.77 with normal loading. It is noted that the present method results in the reduction of calculated pylon loadings to a level acceptable for maintaining static stability. A.L.W.

A82-34166 † **Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects (Transzvukovoe obtekanie tel tipa krylo-fiuzeliazh s uchetom vliianiia granits potoka).** I. V. Tret'iakova and A. S. Fonarev. *TsAGI, Uchenye Zapiski,* vol. 12, no. 6, 1981, p. 9-15. 8 refs. In Russian.

Transonic flow past bodies of the type wing-fuselage is analyzed in the case of unbounded flow and in the case of gas flow inside a cylindrical wind tunnel with permeable boundaries. A numerical analysis is used to determine the effect of the walls of the wind tunnel test section on flow past the model. It is shown that the effect of the walls on flow past the model can be significantly reduced by adjusting pressure in the wind tunnel external chamber. V.L.

A82-34172 † **Solution of creep problems by a finite element method (Reshenie zadach polzuchesti metodom konechnykh elementov).** G. N. Zamula and V. A. Pavlov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 6, 1981, p. 87-97. 5 refs. In Russian.

A method and a computation algorithm based on the use of finite elements are used to analyze the stress-strain state of thin-walled aircraft structures. The method and the algorithm, implemented in a computer program, are tested on several problems including a problem concerning thermal relaxation in a stiffened plate which has exact (viscoelasticity case) and numerical (nonlinear creep) solutions. In both cases, the results obtained are in good agreement with those reported by other workers. V.L.

A82-34177 † **A method of accounting for the effect of aircraft deformations on its loading (Metod ucheta vliianiia deformatsii samoleta na ego nagruzhenie).** V. Ia. Mitrushchenkov. *TsAGI, Uchenye Zapiski,* vol. 12, no. 6, 1981, p. 124-130. 5 refs. In Russian.

A method is proposed for solving static aeroelasticity problems whereby structure deformation is expanded in terms of deformation forms obtained by the method of successive approximations. The convergence of the method is analyzed with reference to a problem concerning the loading and stress-strain state of an aircraft structure with allowance for the effect of deformations on aerodynamic force distribution. Numerical results are presented. V.L.

A82-34359 * **Linear decentralized systems with special structure.** C. F. Martin (Case Western Reserve University, Cleveland, OH). *International Journal of Control,* vol. 35, Feb. 1982, p. 291-308. 5 refs. Grants No. NsG-2384; No. NAG2-82; Contracts No. N00014-80-C-0199; No. DE-AC01-80RA-5256.

Certain fundamental structures associated with linear systems having internal symmetries are outlined. It is shown that the theory of finite-dimensional algebras and their representations are closely related to such systems. It is also demonstrated that certain problems in the decentralized control of symmetric systems are equivalent to long-standing problems of linear systems theory. Even though the structure imposed arose in considering the problems of twin-lift helicopters, any large system composed of several identical intercoupled control systems can be modeled by a linear system that satisfies the constraints imposed. Internal symmetry can be exploited to yield new system-theoretic invariants and a better understanding of the way in which the underlying structure affects overall system performance. C.R.

A82-34373 # **Electro-hydraulic nose wheel steering of the Dornier 228.** *Dornier-Post* (English Edition), no. 2, 1982, p. 60, 61.

The construction, control, and electronics for the electrohydraulic nose wheel steering of the Dornier 228 aircraft are described. The pilot steers with pressure on the pedal, which changes the rudder position at the same time. The alteration of pedal position initiates voltage signals from a command potentiometer, signals which move into a servo-channel and a monitor channel. Actual nose wheel deflections are recorded by a feedback sensor for comparison between input and output signals. Steering is limited to 18 deg/sec with maximum deflection set at 45 deg either way during taxiing, 8 deg during take-off, and 0 deg during take-off and landing. An error threshold is included in the control logic, resulting in steering actuator deactivation if the difference between command and feedback signals exceeds the specified level. M.S.K.

A82-34374 # **OLGA - A gust alleviation for general aviation aircraft.** H. B]hret. *Dornier-Post* (English Edition), no. 2, 1982, p. 62-64.

Open-loop gust alleviation (OLGA) is described as a method of avoiding the 0.3 Hz gust induced vibrations which are associated with the maximum occurrences of airsickness, particularly in low-flying, short haul aircraft. Closed-loop systems measure the magnitude of response to gusts and change control surface configurations to compensate. This is noted to cause sluggish response to pilot commands by altering the flight characteristics. In the new technology wing program, symmetrical aileron deflection and horizontal stabilizer changes are actuated from signals generated by a digital control unit which senses the gust angle of attack, then commands compensatory action. The pilot has complete override control. Block diagrams are provided of the control circuitry, and it is shown that OLGA can produce approximately 75% gust alleviation in the ranges 0.3-0.9 Hz. M.S.K.

A82-34397 **On the torsional modes of a uniformly tapered solid wing.** E. H. Mansfield (Royal Aircraft Establishment, Farnborough, Hants., England). *Aeronautical Quarterly,* vol. 33, May 1982, p. 154-173.

An exact analysis is first given, within the spirit of elementary theory, of the torsional modes of a uniformly tapered solid wing whose section shape - as distinct from size - is constant. Numerical results are presented for the first five torsional modes for various values of tip chord/root chord. It is shown that the frequencies are fairly insensitive to the magnitude of the taper, and a corollary to this, which is also investigated, is that an analysis based on a partially stepped representation of the taper yields close estimates of the frequencies but can yield massive differences in the higher mode shapes. An analysis is also made of warping restraint and distributed inertia effects. (Author)

A82-34398 **Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number.** C. J. Baker and L. C. Squire (Cambridge University, Cambridge, England). *Aeronautical Quarterly,* vol. 33, May 1982, p. 174-198. 15 refs. Research supported by Rolls-Royce, Ltd.

Measurements of boundary-layer development on a small two-dimensional airfoil at turbomachinery scale Reynolds numbers with turbomachinery-type pressure distributions, supercritical flow and a weak shock front are presented in addition to measurements on the tunnel side wall opposite the airfoil surface. Three boundary-layer calculation methods are considered, and none are regarded as adequate for predicting all regions of boundary-layer development on both the airfoil surface and tunnel. The lag-entrainment method of Green et al. (1973) however, is satisfactory for most purposes on the airfoil. Experimental results are compared with those results from several calculation methods. D.L.G.

A82-34464 † **Automation of the synthesis of control in a stationary linear system (Avtomatizatsiia sinteza upravleniia v statsionarnoi lineinoi sisteme).** V. L. Zagaichuk. *Priborostroenie,* vol. 25, Apr. 1982, p. 21-24. 5 refs. In Russian.

A method for determining the feedback law for the accuracy optimization of a stationary linear system is presented. A block-diagram for the digital-computer calculation of the parameters of the corresponding optimal controller is presented, and application to a particular case of aircraft flight control is considered as an example. B.J.

A82-34486 **Unistructure - A new concept for light weight integrally stiffened skin structure.** D. J. Grimm (Chem-Tronics, Inc., El Cajon, CA). *Aircraft Engineering,* vol. 54, Apr. 1982, p. 2-8.

Unistructure is a new concept for lightweight integral rib-reinforced skin structures that is readily adaptable to many configurations. The rib cross sections are a form of I beam. The rib reinforcing patterns considered here are isogrid and waffle, (i.e. triangular and rectangular constructions) but any desirable form can be produced. This paper provides an over-view of the methods of fabrication and the structural performance features of Unistructure. Comparisons are made with honeycomb, skin/stringer, and integral-machined structures. These comparisons indicate that the combined ease-of-fabrication and performance advantages of Unistructure warrant its consideration in many applications. (Author)

A82-34491 # **Trends in structural analysis at ONERA (Tendances actuelles en calcul des structures à l'ONERA).** R. Valid (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Journées sur les Tendances Actuelles en Calcul de Structures, 2nd, Sophia-Antipolis, Alpes-Maritimes, France, Feb. 1-3, 1982.) ONERA, TP* no. 1982-2, 1982. 46 p. 100 refs. In French.

Research directions for modeling phenomena of structural interactions, fluid-structure interactions, the behavior of composite structures, and in aerospace structures are discussed. Increasingly precise predictions are necessary for successful numerical simulation of stress cracking, impact damage, wing-flow interactions, elastoacoustic resonance, aeroelastic optimization, hydroelasticity, the elimination of the pogo effect, elasto-capillarity in orbiting spacecraft, trajectory deformation, the homogeneity of stiffened structures, etc. Analytical tools in the process of development comprise applications of variational principles and their coupling in static and dynamic situations, finite element modeling of multilayered composites under displacement, and isoparametric finite elements for composites with layers under rotation. Variational formulations and symmetric operators are employed in hydroelastic, elastoacoustic, and elasto-capillarity, particularly in coupling modes. M.S.K.

A82-34493 # **Flow visualization techniques for the study of high incidence aerodynamics.** H. Werlé (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(NATO, AGARD, Lecture Series on Study of High Incidence Aerodynamics, 121st, Rhode-Saint-Genèse, Belgium, Mar. 15-19, 1982, Hampton, VA, Mar. 10, 11, 1982, Gottingen, West Germany, Mar. 22-25, 1982.) ONERA, TP* no. 1982-5, 1982. 28 p. 77 refs.

Descriptions are given of the use of solid, liquid or gas tracers in water and wind tunnels for the visualization of aerodynamic flows, with emphasis on the methods employed by the experimental facilities of ONERA. The range of visualization techniques covered reveal flow patterns with all their parietal singularities, as well as the evolution of such patterns as a function of such aerodynamic parameters as incidence, yaw angle and Reynolds number. Visualization methods also reveal the separation phenomena which characterize high incidence angle aerodynamics, and they precisely define vortical, transitional and unsteady flow regimes. The aerodynamic surfaces tested by visualization methods include airfoil profiles, sweptback wings, slender bodies, inlets, and entire aircraft configurations. Attention is given the layout of ONERA and other water tunnel facilities. O.C.

A82-34495 # **Instrumentation for testing aircraft antistatic protection.** J. Taillet, J. L. Boulay, and M. Chatanier (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(International Aerospace Conference on Lightning and Static Electricity, Oxford University, Oxford, England, Mar. 23-25, 1982.) ONERA, TP* no. 1982-7, 1982. 11 p. 11 refs. Research supported by the Direction des Recherches, Etudes et Techniques.

Methods and standards relating to aircraft protection against precipitation statics are discussed, and two instruments, the INJECO and CORAS, are presented. Engineering tests are performed with the instruments to facilitate the solution of problems encountered by manufacturers and airlines with precipitation statics. An advantage of INJECO is the assessment of noise produced by local discharges following charge accumulation on insulating surfaces. Synchronous detection with the CORAS device permits the measurement of relatively small voltage drops along the resistive layer in the presence of the large capacitive voltage drop across the insulating coating. When CORAS is used on DC modes, its operation is conventional and is useful in resistive coating processing to compare DC and AC surface resistance measurements. D.L.G.

A82-34497 # **Comparison of aerodynamic characteristics of aircraft models with forward and aft swept wings at Mach number 0.5.** O. du Boucheron and Y. Brocard (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(University of Bristol and Royal Aeronautical Society, International Forward Swept Wing Aircraft Conference, University of Bristol, Bristol, England, Mar. 24-26, 1982.) ONERA, TP* no. 1982-9, 1982. 12 p. 14 refs.

A schematic model with a 21-cm span was tested in the transonic S3Ch wind tunnel at M equals 0.5 to obtain aerodynamic data on various configurations with forward and aft swept wings with or without canards. Flow characteristics were described using flow visualizations in a water tunnel and in a wind tunnel. Results of calculations using a panel method show that the use of canards improves the forward swept wing flow field, even at low angles of attack. The longitudinal and lateral characteristics were compared, and various effects were investigated, including presence, location and sweep angle of canards, height of the wind relative to the fuselage and presence and sweep angle of the vertical tail. A general weakness in the forward swept configurations was found compared to aft swept ones. D.L.G.

A82-34498 # **Automatic checking of measuring units in the Modane wind tunnels.** X. Bouis, G. Gavet, and R. Combaz (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Supersonic Tunnel Association, Meeting, Seattle, WA, Mar. 29, 30, 1982.) ONERA, TP* no. 1982-10, 1982. 10 p.

Hardware and software means are implemented to improve measurement accuracy, to accelerate test runs and to detect errors or failures in measuring units in Modane wind tunnels. These improvements allow the correct settings of the gains and cut-off frequencies of amplifiers and filters to be checked at regular intervals, in addition to the calibration of analog-to-digital converters. Signals are applied to the measuring unit, which, after amplification, should give voltages of -9, -6, -3, 0, 3, 6, 9, and 0 V to the converter terminals. The result is correct if the deviation does not exceed plus or minus 2 mV, except around zero, where it is required to respect the limits of plus or minus 1 mV. The overall precision of the measuring unit exceeds the range of plus or minus 0.00021. D.L.G.

A82-34499 # **Aircraft potential variations in flight.** J. L. Boulay and P. Laroche (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(International Aerospace Conference on Lightning and Static Electricity, Oxford University, Oxford, England, Mar. 23-25, 1982.) ONERA, TP* no. 1982-11, 1982. 20 p. 21 refs. Research supported by the Direction des Recherches, Etudes et Techniques.

Some airborne experiments have been achieved in order to study the electrostatic behavior of an aircraft in flight. Variations of triboelectric current and potential of the aircraft were recorded in different atmospheric configurations. Some passive dischargers arrangements on the aircraft structure have been also characterized. (Author)

A82-34538 **The initial lift and drag of an impulsively started airfoil of finite thickness.** C.-Y. Chow and M.-K. Huang (Colorado, University, Boulder, CO). *Journal of Fluid Mechanics*, vol. 118, May 1982, p. 393-409. 10 refs. Grant No. AF-AFOSR-81-0037.

An apparent masses formulation for an airfoil-shed vortex sheet combination is employed to model the initial lift and drag of an airfoil started impulsively from rest. The method is first applied to a flat plate to prove the accuracy and then extended to airfoils of finite thickness. Specific attention is given to the Joukowski airfoil, for which the flat plate is shown to be a special case. Further analysis is presented for a Karman-Trefftz airfoil. In the case of the Joukowski airfoil, increasing camber or angle-of-attack was demonstrated to increase the initial lift and drag, while increasing thickness caused a decrease. For the Karman-Trefftz airfoil, any finite trailing-edge angle was found to decrease both lift and drag to zero at the starting instant. It is concluded that thicker airfoils or airfoils with large trailing edge angles tend to resist increases in lift. M.S.K.

A82-34607 * **Outline of a multiple-access communication network based on adaptive arrays.** S. Zohar (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA). *IEEE Transactions on Communications*, vol. COM-30, May 1982, pt. 2, p. 1242-1248. 7 refs. Contract No. NAS7-100.

Attention is given to a narrow-band communication system consisting of a central station trying to receive signals simultaneously from K spatially distinct mobile users sharing the same frequencies. One example of such a system is a group of aircraft and ships transmitting messages to a communication satellite. A reasonable approach to such a multiple access system may be based on equipping the central station with an n-element antenna array where n is equal to or greater than K. The array employs K sets of n weights to segregate the signals received from the K users. The weights are determined by direct computation based on position information transmitted by the users. A description is presented of an improved technique which makes it possible to reduce significantly the number of required computer operations in comparison to currently known techniques. G.R.

A82-34639 # **Calculation of the lift distribution and aerodynamic derivatives of quasi-static elastic aircraft.** Q. Liu, C. Wu, and Z. Jian (Northwestern Polytechnical University, Xi'an, People's Republic of China). *Acta Aeronautica et Astronautica Sinica*, vol. 3, Mar. 1981, p. 1-11. 10 refs. In Chinese, with abstract in English.

Quasi-static approximations of the aerodynamic characteristics of an elastic aircraft are undertaken by means of a numerical method, which may be used to evaluate the lift distribution and 11 main longitudinal aerodynamic derivatives of the elastic aircraft at subsonic speeds. Green's function methods are used for the aerodynamic calculations, and structural deformation is evaluated by the free structure influence coefficient method. Numerical examples are given, and dynamical problems of elastic aircraft are discussed. It is established that the derivatives employed may be directly adopted for elastic aircraft stability and control analyses. O.C.

A82-34644 # **Experimental study on discharge and loss coefficients of combustor swirlers.** C. Zhang (Wuxi Aircraft Engine Research Institute, Wuxi, People's Republic of China) and Y. Wang (Shenyang Liming Machinery Co., Shenyang, People's Republic of China). *Acta Aeronautica et Astronautica Sinica*, vol. 3, Mar. 1981, p. 50-57. In Chinese, with abstract in English.

Blade-type swirlers used to control primary flametube airflow in aircraft engine combustors incur losses which depend on blade stagger angle, pitch/chord ratio and blade passage area. A set of discharge characteristics and relations between loss coefficients and the parameters mentioned are given, along with the correlation of loss to discharge coefficients. It is found that the discharge coefficient varies from 0.6 to 0.9 for swirlers with different stagger angles. It is found that blade loss is smaller than secondary expansion loss for a given combustor swirler, and that the twisted blade swirler design is superior to the straight-bladed one from an aerodynamic viewpoint, offsetting its higher production costs. O.C.

A82-34645 # **Aerodynamic coefficient identification of time-varying aircraft system and its application.** T. Wang (China Precision Machinery Corp., Beijing Research Institute, Beijing, People's Republic of China). *Acta Aeronautica et Astronautica Sinica*, vol. 3, Mar. 1981, p. 67-76. In Chinese, with abstract in English.

It is shown, on the basis of flight test measurements and analyses of trends in the coefficients of aircraft time-varying differential equations, that it is possible to transform the individual time-varying coefficient into a known function multiplied by an unknown constant. By extending the Newton-Raphson method to the time-varying coefficient differential equations, such undefined coefficients may be evaluated through iteration calculation. This scheme is evaluated in light of data taken during unsteady flight, and the reliability of aerodynamic coefficients obtained through this identification method is discussed. Good agreement is found between calculations and test data. O.C.

A82-34671 **Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II.** A. Ludloff, N. Füchter, F. Hagedorn, M. Minker, and H. Rohling (Telefunken AG, Ulm, West Germany). *Ortung und Navigation*, no. 1, 1982, p. 5-54. 21 refs. Research supported by the Bundesministerium für Verkehr.

Subclutter visibility (SCV), design principles, calculation of filter transfer function, and SNR and signal-to-interference ratio (SIR) improvements are discussed. The definition of SCV, the mean detection probability as a function of SCV, SCV as a function of an average SIR improvement, approximate calculation of SCV, and processor SNR loss budget are analyzed. The design principles discussed include dynamic range versus equipment noise, pulsed oscillator versus power amplifier, transversal filter bank versus MTI-FFT processing, advantages obtained by using frequency diversity, necessity of circular polarization, and radar site selection. Filter bank with MTI and DFT, filter weights derived from a modified MLR test, weighting sequences for windows, and calculation of SNR and SIR improvements are analyzed. A practical example is given. C.D.

A82-34672 **Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar (Kurzzeitverhalten eines Doppler-Navigationssystems und Vergleich mit Positionsbestimmungen durch ein Vermessungsradar).** K. Ramsayer and G. Klaedtke (Stuttgart, Universität, Stuttgart, West Germany). *Ortung und Navigation*, no. 1, 1982, p. 125-138. In German.

A concept of integrated navigation via adjustment by the method of least squares was tested in a military aircraft. The navigation equipment of the aircraft included the Bendix DRA-12B double radar and the Sperry gyroscopic platform SYP 820 furnished with a computer integrated with TACAN and DME. The flight test results are reported. In order to test various off-line evaluation methods in addition to on-line evaluation during flight, the Doppler pulses, drift, heading, and other interesting parameters were registered. The results showed that the Doppler navigation system measurements were very 'noisy'. To determine the short-term behavior of the system, recordings were investigated for an approximately rectilinear flight of 300 seconds length. The aircraft distance, azimuth, and angle of elevation were continuously recorded by scanning radar, enabling a comparison to be made with the Doppler system. C.D.

A82-34700 **Air cooling of gas turbine blades.** O. N. Favorskii and S. Z. Kopelev. *(Teploenergetika*, vol. 28, Aug. 1981, p. 7-11.) *Thermal Engineering*, vol. 28, Aug. 1981, p. 435-438. 13 refs. Translation.

During the last 20 years, the gas temperature at the inlet of aircraft gas turbines has been raised by 450 K to a temperature of 1650 K. The achievement of the current high operational temperatures, which have led to a considerable enhancement in engine efficiency, has been largely made possible by the development of suitable approaches for cooling the gas turbine blades. The various factors involved in designing an effective cooling procedure are considered, taking into account the necessity that the involved flow processes must not result in a lowering of engine efficiency, and, in connection with large temperature gradients or the introduction of stress-raising design features, must not unduly reduce the operational life of the engine. Attention is given to the internal convective and the convection-film air cooling of blades, the promotion of flow turbulence by means of internal baffles, the hydraulic resistance of internal cooling channels, and merits and drawbacks of perforations. G.R.

A82-34737 **An optical data link for airborne scanning system.** M. J. Green (Wisconsin, University, Madison, WI). In: American Society of Photogrammetry, Annual Meeting, 47th, Washington, DC, February 22-27, 1981, ASP Technical Papers. (A82-34701 16-43) Falls Church, VA, American Society of Photogrammetry, 1981, p. 476-482.

In connection with a study of oceanic thermal fronts, the Navy is interested in a thermal scanning system which could be used with their P-3 patrol aircraft. A suitable scanning system would be the RS-18A scanning thermal IR radiometer. However, an obstacle regarding the envisaged use of the instrument is related to the necessity to employ the aircraft without an introduction of any modifications. The obstacle has been overcome by making use of an optical data link which replaces the hardwire connections between the scanner and the power supply. The optical link is housed in a ten inch diameter tube which is clamped in position directly behind the scanner head. G.R.

A82-34748 # **Mach reflection of a shock wave from an inclined wall.** T. Ikui, K. Matsuo, N. Kondoh (Kyushu University, Fukuoka, Japan), and T. Aoki. *Kyushu University, Faculty of Engineering, Memoirs*, vol. 41, Dec. 1981, p. 361-380. 24 refs.

The Mach reflection phenomena of shock waves that encounter a wall inclined to the shock are investigated over a wide range of incident Mach number and wedge angle using air, carbon-dioxide and chlorofluoro-carbon (Freon-12) as a working gas. A new type of reflection which cannot be classified as regular reflection, single-Mach, complex-Mach or double-Mach reflections is observed in Freon 12 and is called pseudo-regular reflection. An equation expressing the distance between a slip stream and a Mach shock wave along the wedge surface is proposed, and the phenomenon of the rolling-up of the slip stream is explained. An equation predicting the location of the kink point in the case of double-Mach reflection is presented, which agrees with experimental evidence better than Law's (1970) method. Transitions from single-Mach to complex-Mach reflections and complex-Mach to double-Mach reflections are explained, and a criterion of the rolling-up of the slip stream is presented. D.L.G.

A82-34772 **Measuring LF and MF antenna radiation patterns by means of a helicopter.** D. J. Bem (Wroclaw, Politechnika, Wroclaw, Poland) and E. Zernicki (Institute of Telecommunications, Wroclaw, Poland). In: Electromagnetic compatibility 1980; Proceedings of the Fifth International Wroclaw Symposium and Exhibition, Wroclaw, Poland, September 17-19, 1980. Part 2. Wroclaw, Wydawnictwo Politechniki Wroclawskiej, 1980, p. 761-769.

The paper deals with a method of measuring power gain and radiation pattern of LF and MF antennae, applying the standard field produced by a loop antenna installed on a helicopter. A method of radionavigation necessary for this purpose has been presented. Results of measurements of several antennae have also been given. (Author)

A82-34814 † **A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers (Issledovanie vibratsionnoi nagruzhennosti rabochikh lopatok turbiny aviatsionnogo GTD s dempferami sukhogo treniia).** V. M. Kapralov and R. V. Skvortsov. *Problemy Prochnosti*, May 1982, p. 83-85. In Russian.

The use of box-type dry-friction dampers in aircraft gas-turbine engines is discussed, and a method is proposed for the determination of the required damper mass. In accordance with the proposed method, the damper mass is first determined by using an approximate formula. Further studies involving amplitude and spectral analysis make it possible to evaluate the damper efficiency and finally select the damper mass. V.L.

A82-34851 # **Contact problems involving the flow past an inflated aerofoil.** J.-M. Vanden-Broeck (Stanford University, Stanford, CA). *ASME, Transactions, Journal of Applied Mechanics*, vol. 49, June 1982, p. 263-265. 10 refs. USAF-Navy-Army-NSF-supported research.

Steady potential flow around a two-dimensional inflated airfoil is considered. The aerofoil consists of a flexible and inextensible membrane which is anchored at both leading and trailing edges. The flow and the aerofoil shape are determined as functions of the angle of attack, the cavitation number, and the Weber number. When the cavitation number decreases to a critical value, opposite sides of the membrane become tangent to each other at the trailing edge. For values less than critical, the aerofoil is partially collapsed near the trailing edge. The length of the region of collapse increases as the cavitation number decreases and for a cavitation number equal to minus infinity, the aerofoil is completely collapsed. The shape of the aerofoil and the value of the critical cavitation number are determined analytically by a perturbation solution for small Weber numbers. Graphs of the results are presented. (Author)

A82-34861 # **Unconventional internal cracks. II - Method of generating simple cracks.** C. H. Wu (Illinois, University, Chicago, IL). *ASME, Transactions, Journal of Applied Mechanics*, vol. 49, June 1982, p. 383-388. 10 refs.

The meaning of the word crack is extended to include holes with cusps of vanishing cusp angle. A crack is said to be simple if the associated elasticity problem has a closed-form solution. Many classes of simple cracks are constructed and solved in this two-part paper. In particular, a method of constructing very sharp cusps is described. These cusps possess not only a zero slope (zero cusp angle) but a vanishing curvature as well. In fact, a crack may be constructed in such a way that the first N derivatives are all zero. (Author)

A82-34879 **A review and assessment of fatigue crack growth rate relationships for metallic airframe materials.** J. B. Chang, M. Szamossi, and E. Klein (Rockwell International Corp., North American Aircraft Div., Los Angeles, CA). In: Fracture and failure: Analyses, mechanisms and applications; Proceedings of the Symposium, Los Angeles, CA, March 17-20, 1980. Metals Park, OH, American Society for Metals, 1981, p. 35-54. 13 refs. Contract No. F33615-77-C-3121.

An R&D program recently undertaken by Rockwell for the U.S. Air Force is aimed at upgrading the fatigue crack growth prediction technology required for implementation of the damage tolerance control procedures throughout the life cycle of any weapon system. To accomplish this objective, it was considered necessary to review and evaluate the state-of-the-art fatigue crack growth rate equations commonly used for performing damage-tolerance analysis on airframe structures. Three such rate equations (the Boeing, Grumman, and Rockwell equations) were assessed using baseline crack growth test data. It is shown that, by properly choosing the rate constants, all three equations can be used to characterize the fatigue crack growth rate relationships for airframe materials. B.J.

A82-34882 **Failure analysis of silica phenolic nozzle liners.** M. Katcher (Marquardt Co., Van Nuys, CA). In: Fracture and failure: Analyses, mechanisms and applications; Proceedings of the Symposium, Los Angeles, CA, March 17-20, 1980. Metals Park, OH, American Society for Metals, 1981, p. 165-183.

The Marquardt Company's failure investigation of cracking in two silica phenolic nozzle liners during proof testing is described. The proof testing consisted of pressuring the nozzles to 14.1 MPa for 5 to 20 sec. It is found that the longitudinal cracking of the convergent exhaust nozzle insulators was due to the use of bad fiber/fabric material by a supplier. This material was used in the manufacture of silica phenolic tape that was later used by Marquardt's exhaust nozzle liner supplier. The bad fiber/fabric could not be distinguished by then current quality control procedures which assessed tape strength properties in the warp as opposed to the bias direction. It was also found that the introduction of the bad fiber/fabric material was the only distinctive difference between the nozzle insulators that failed and other nozzles that had successfully passed. B.J.

A82-34953 # **Large scale aeroengine compressor test facility.** *Ishikawajima-Harima Engineering Review*, vol. 22, Mar. 1982, p. 133-136. In Japanese, with abstract in English.

Installation of a test facility for large compressors has recently been completed at IHI Mizuho Plant to serve in the development of aircraft engine components. The facility comprises a driving unit (IHI-developed IM 2000 gas turbine), intake and exhaust systems for the test compressor, and a data acquisition system. It is capable of testing compressors up to 18,000 SPS (13.2 MW) with maximum speed of 13,000 rpm. The whole system has been compactly designed to be installed in a small space as compared with similar facilities constructed in the past. The data acquisition system makes full use of the latest developments in minicomputers and pressure/temperature measuring devices to provide on-line computing of the measured data for instant display of the compressor overall performance as well as detailed aerodynamic properties of the internal flow field. The system has already been utilized for the front fan model testing of the RJ 500 engine which is an Anglo-Japanese collaborative engine for the next generation civil transport and proven to be a very effective tool for the achievement of high level performance requirements. (Author)

STAR ENTRIES

N82-24163# Naval Postgraduate School, Monterey, Calif.
CANNIBALIZATION OF THE F-14 AND S-3A AIRCRAFT: A VIABLE LOGISTIC M.S. Thesis
Kevin M. Myette Mar. 1981 112 p refs
(AD-A111207) Avail: NTIS HC A06/MF A01 CSCL 05/1

This thesis presents the results of an analysis of cannibalization and its effects on the F-14A and S-3A aircraft. The analysis includes cannibalization measurement methodologies, reasons why squadrons cannibalize, a comparison of fleet cannibalization activity and alternatives to cannibalization. Cannibalization is shown not to be a maintenance practice to be avoided at all cost, but rather a viable cost effective alternative to logistic failures. Additionally, material issue response delays rather than material shortages were found to lead to increased cannibalization. Author (GRA)

N82-24164# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Direction Etudes.
THE AIRBUS FAMILY OF AIRCRAFT AT THE DAWN OF THE 1980'S [LA FAMILLE 'AIRBUS' A L'AUBE DES ANNEES 1980]
G. Broihanne 7 Jan. 1982 9 p In FRENCH Submitted for publication
(SNIAS-821-111-101) Avail: NTIS HC A02/MF A01

The development and marketing of the European Airbus are reviewed. General characteristics of the A-300 B7, already in service, are presented, including flight performance and operational costs. Industrial spin-offs from the project and the impetus to European competitiveness in the field of civil aviation are mentioned. Among ongoing developments and future projects the A-310 aircraft and A-300-600 aircraft are cited. Author (ESA)

N82-24165*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL AND ANALYTICAL RESULTS OF TANGENTIAL BLOWING APPLIED TO A SUBSONIC V/STOL INLET
Richard R. Burley and Danny P. Hwang 1982 18 p refs Proposed for presentation at the 18th Joint Propulsion Conf., Cleveland, 21-23 Jun. 1982; sponsored by AIAA, SAE and ASME
(NASA-TM-82847; E-1217; NAS 1.15:82847) Avail: NTIS HC A02/MF A01 CSCL 01A

Engine inlets for subsonic V/STOL aircraft must operate over a wide range of conditions without internal flow separation. Experimental and analytical investigations were conducted to evaluate the effectiveness of tangential blowing to maintain attached flow to high angles of attack. The inlet had a relatively thin lip with a blowing slot located either on the lip or in the diffuser. The height and width of these slots was varied. Experimentally determined flow separation boundaries showed that lip blowing achieved higher angle of attack capability than diffuser blowing. This capability was achieved with the largest slot circumferential extent and either of the two slot heights. Predicted (analytical) separation boundaries showed good agreement except at the highest angles of attack. S.L.

N82-24166*# Ohio State Univ., Columbus. Dept. of Aeronautical and Astronautical Engineering.
RIME ICE ACCRETION AND ITS EFFECT ON AIRFOIL PERFORMANCE Ph.D. Thesis. Final Report
Michael B. Bragg Mar. 1982 182 p refs
(Grant NAG3-28)
(NASA-CR-165599; NAS 1.26:165599) Avail: NTIS HC A09/MF A01 CSCL 01A

A methodology was developed to predict the growth of rime ice, and the resulting aerodynamic penalty on unprotected, subcritical, airfoil surfaces. The system of equations governing the trajectory of a water droplet in the airfoil flowfield is developed and a numerical solution is obtained to predict the mass flux of super cooled water droplets freezing on impact. A rime ice shape is predicted. The effect of time on the ice growth is modeled by a time-stepping procedure where the flowfield and droplet mass flux are updated periodically through the ice accretion process. Two similarity parameters, the trajectory similarity parameter and accumulation parameter, are found to govern the accretion of rime ice. In addition, an analytical solution is presented for Langmuir's classical modified inertia parameter. The aerodynamic evaluation of the effect of the ice accretion on airfoil performance is determined using an existing airfoil analysis code with empirical corrections. The change in maximum lift coefficient is found from an analysis of the new iced airfoil shape. The drag correction needed due to the severe surface roughness is formulated from existing iced airfoil and rough airfoil data. A small scale wind tunnel test was conducted to determine the change in airfoil performance due to a simulated rime ice shape. Author

N82-24167*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THREE-DIMENSIONAL SEPARATION AND REATTACHMENT
David J. Peake and Murray Tobak Mar. 1982 17 p refs
(NASA-TM-84221; A-8845; NAS 1.15:84221) Avail: NTIS HC A02/MF A01 CSCL 01A

The separation of three dimensional turbulent boundary layers from the lee of flight vehicles at high angles of attack is investigated. The separation results in dominant, large scale, coiled vortex motions that pass along the body in the general direction of the free stream. In all cases of three dimensional flow separation and reattachment, the assumption of continuous vector fields of skin friction lines and external flow streamlines, coupled with simple laws of topology, provides a flow grammar whose elemental constituents are the singular points: the nodes, spiral nodes (foci), and saddles. The phenomenon of three dimensional separation may be construed as either a local or a global event, depending on whether the skin friction line that becomes a line of separation originates at a node or a saddle point. B.W.

N82-24168*# Bihrle Applied Research, Inc., Jericho, N. Y.
F-15 ROTARY BALANCE DATA FOR AN ANGLE-OF-ATTACK RANGE OF 8 DEG TO 90 DEG Final Report
Billy Barnhart Washington NASA May 1982 376 p refs 2 Vol.
(Contract NAS1-16205)
(NASA-CR-3478; NAS 1.26:3478) Avail: NTIS HC A17/MF A01 CSCL 01A

Aerodynamic characteristics obtained in a rotational flow environment, utilizing a rotary balance are presented in plotted form for a 1/12 scale F-15 airplane model. The configurations tested included the buildup of airplane components and the basic airplane with various control deflections. Data are presented for all configurations without analysis for an angle of attack range of 8 to 90 deg. and clockwise and counterclockwise rotations covering an omega b/2V range from 0 to 0.4. Selected configurations are presented over an extended omega b/2V range from 0 to 0.9. S.L.

N82-24169*# Bihrle Applied Research, Inc., Jericho, N. Y.
ROTARY BALANCE DATA FOR AN F-15 MODEL WITH CONFORMAL FUEL TANKS FOR AN ANGLE-OF-ATTACK RANGE OF 8 DEG TO 90 DEG Final Report
Billy Barnhart Washington NASA May 1982 377 p refs 2 Vol.
(Contract NAS1-16205)
(NASA-CR-3516; NAS 1.26:3516) Avail: NTIS HC A17/MF A01 CSCL 01A

Aerodynamic characteristics obtained in a rotational flow environment, utilizing a rotary balance, are presented in plotted form for a 1/12 scale conformal fuel tank equipped F-15 airplane model. The configurations tested included in the buildup of airplane components and the basic airplane with various control deflections. Data are presented for all configurations without analysis for an angle of attack range of 8 to 90 deg. and clockwise and counterclockwise rotations covering an omega b/2V range from 0 to 0.4. Selected configurations are presented over an extended omega b/2V range from 0 to 0.9. S.L.

N82-24176*# National Aeronautics and Space Administration, Washington, D. C.

CURRENT DEVELOPMENTS LIGHTER THAN AIR SYSTEMS

Norman J. Mayer 1981 15 p refs Presented at the United Nations Ind. Develop. Organ. Conf., Vienna, 19-22 Oct. 1981
(NASA-TM-84744; NAS 1.15:84744) Avail: NTIS HC A02/MF A01 CSCL 01A

Lighter than air aircraft (LTA) developments and research in the United States and other countries are reviewed. The emphasis in the U.S. is on VTOL airships capable of heavy lift, and on long endurance types for coastal maritime patrol. Design concepts include hybrids which combine heavier than air and LTA components and characteristics. Research programs are concentrated on aerodynamics, flight dynamics, and control of hybrid types. Author

N82-24181# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

EFFECT OF MODIFICATION OF THE TRAILING EDGE OF A SEPARATING WALL ON THE DOWNSTREAM MIXING OF PARALLEL FLOWING STREAMS M.S. Thesis

Daniel J. Gurecki Dec. 1981 76 p refs
(AD-A111124; AFIT/GAE/AA/81D-12) Avail: NTIS HC A05/MF A01 CSCL 20/4

The objective of this thesis is to study ways to enhance the mixing of two parallel streams of air by modifying the trailing edge of a separating wall. An apparatus was designed which achieved two-dimensional, good quality flow near the center of the test section passage, with freestream turbulence intensity of 2.2 percent. Measurements of the wake were made varying the velocity of one stream down to 37.5 percent of the other stream velocity, both in and upstream of the asymptotic region of the wake. A single element hot wire was used to measure velocity and RMS readings. The flat plate trailing edge was then slotted with five, eight millimeter slots and re-tested. The higher turbulence and wider wake of the flat plate indicate that the slotted plate wake does not achieve as good mixing as the flat plate wake. No velocity ratio of the two streams was found to maximize the wake growth for either configuration. Wake growth doubled when the slower velocity was 0.40 of the faster velocity. Author (GRA)

N82-24182# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AN EXPERIMENTAL INVESTIGATION OF THE FLOW FIELD OF AN EJECTOR WING DESIGN EMPLOYING A PHOTON CORRELATION LASER VELOCIMETER M.S. Thesis

Damon G. Stephens Dec. 1981 122 p refs
(AD-A111134; AFIT/GAE/AA/81D-30) Avail: NTIS HC A06/MF A01 CSCL 20/2

The flow field about a dual element airfoil model employing an ejector for aerodynamic blowing is investigated. Flow visualization is obtained by smoke tunnel testing. Mean velocities and turbulence intensities are determined at various flow field locations. All data is obtained through the use of a Laser Doppler Velocimeter (LDV) using a photon correlation processing scheme. Flow field properties are computed from the LDV generated autocorrelation function. The free stream velocity and Reynolds number based on model chord length are 8 m/sec and 325,000 respectively. Two ejector velocity ratios are investigated: (U) ejector/(U) free stream = 0. and 2. Flow visiualization photography is conducted at seven angles of attack: -5 deg, 0 deg, 5 deg, 10 deg, 15 deg, 20 deg, and 25 deg and LDV data is acquired at 0 deg and 15 deg angles of attack. The results are presented in the form of flow visualization photographs and profiles of mean velocities and turbulence intensities. Conclusions are drawn concerning the aerodynamic benefit of the ejector wing design for possible V/STOL applications. GRA

N82-24183# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Direction Etudes.

ACCOUNTING FOR THICKNESS EFFECTS IN THE CALCULATION OF SUBCRITICAL UNSTEADY AERODYNAMIC FORCES: APPLICATION TO WING-FUSELAGE INTERACTIONS [PRISE EN COMPTE DES EFFETS D'EPAISSEUR DANS LE CALCUL DES FORCES AERODYNAMIQUES INSTATIONNAIRES SURCRITIQUES. APPLICATIONS AUX INTERACTIONS FUSELAGE/SURFACES PORTANTES]

R. Barreau, M. Verdier, and J. P. Robert 7 Jan. 1982 47 p refs In FRENCH Presented at AAAF Colloq., Poitiers, France, 18-20 Nov. 1981
(SNIAS-821-111-106) Avail: NTIS HC A03/MF A01

A calculation method that yields an aerodynamic influence coefficient matrix for infinitely thin wings in a subsonic harmonic flow was modified in order to take into account the presence of a fuselage. A solution was obtained by the doublet lattice method and the method of singularites. Results relate to the development of generalized active control which requires a meticulous and precise knowledge of local unsteady aerodynamic forces. The computer program seems to give coherent results, the presence of a fuselage notably affecting the first chords of the wing. However, the method has not been sufficiently validated by calculations of aeroelastic significance. Author (ESA)

N82-24186*# Lockheed-California Co., Burbank.

TRANSPORT AIRCRAFT CRASH DYNAMICS Final Report, Jan. 1980 - Mar. 1982

Gil Wittlin, Max Gamon, and Dan Shycoff Atlantic City, N.J. FAA Mar. 1982 471 p refs
(Contract NAS1-16083)
(NASA-CR-165851; NAS 1.26:165851; FAA-CT-82-69) Avail: NTIS HC A20/MF A01 CSCL 01C

Transport airplane accident data is presented. Formulation of candidate crash scenarios, the identification of the involvement of structural systems and subsystems in transport airplane accidents, a review of existing design criteria and philosophy, and conclusions and recommendations for R&D are included. The accident is organized in relation to pertinent accident types including undershoot, overrun, ground collision, obstacle impact, stall, wheels up or retracted landing, swerve and gear collapse. Ground to ground and air to ground crash scenarios are presented. Current state of the art procedures are used in the analysis of a current airplane configuration for selected accident conditions. Available structure and occupant modeling techniques are assessed with regard to transport airplane crash dynamics modeling requirements. Design criteria and full scale crash tests are evaluated with regard to transport airplane applicability. A integrated crash dynamics analysis and test program for transport airplanes is presented along with conclusions and recommendations based on the results of the overall study. An accident data base computer program is described. S.L.

N82-24188# Auburn Univ., Ala. Dept. of Electrical Engineering.

MARINE AIR TRAFFIC CONTROL AND LANDING SYSTEM (MATCALS INVESTIGATION), VOLUME 1

E. R. Graf, C. L. Phillips, and S. A. Starks Sep. 1981 396 p refs Prepared for Georgia Inst. of Technology, Atlanta 2 Vol.
(Contracts N00039-80-C-0032; N66314-73-C-0565; N66314-74-C-1362; N66314-74-C-1634; N00228-75-C-2080; N00228-76-C-2069; N00228-78-C-2233)
(AD-A110862; GIT/EES-1-A-2550-Vol-1) Avail: NTIS HC A17/MF A01 CSCL 17/7

This report contains the results of the continuation of Marine Air Traffic Control and Landing System (MATCALS) investigations. The report is organized into three main sections, namely Part Two, Part Three, and Part Four. Part Two presents a method of estimating the centroid location of a target utilizing a scan return amplitude versus angle information. Part Three contains the results of an investigation into replacing the alpha-beta filter in the MATCAL digital controller with an observer, in order to reduce the effects of radar noise. Part Four presents the results of an investigation into replacing the same alpha-beta filter with a tri-state adaptive filter, in order to reduce the effects of radar noise. GRA

N82-24189# Auburn Univ., Ala. Dept. of Electrical Engineering.

MARINE AIR TRAFFIC CONTROL AND LANDING SYSTEM (MATCALS INVESTIGATION), VOLUME 2

E. R. Graf, C. L. Phillips, and S. A. Starks Sep. 1981 155 p refs Prepared for Georgia Inst. of Technology, Atlanta 2 Vol.
(AD-A110863; GIT/EES-1-A-2550-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 17/7

Three observers, designed for a reduced order system that represents the lateral system of F4J aircraft in an automatic landing configuration, are discussed. The observers are to be used in the aircrafts' lateral control system to estimate its lateral position and lateral velocity. Results obtained from simulation studies indicate that an observer may be used to improve the system's response. M.D.K.

N82-24192# Fondazione Ugo Bordoni, Rome (Italy).
ROUND TABLE DISCUSSION ON THE TRANSFER OF RESULTS FROM THE PROJECT 'AIDS TO NAVIGATION AND CONTROL OF AIR TRAFFIC' Final Report [TAVOLA ROTONDA SUL TRASFERIMENTO DEI RISULTATI DEL PROGETTO FINALIZZATO 'AIUTI ALLA NAVIGAZIONE E CONTROLLO DEL TRAFFICO AEREO']
Francesco Valdoni 1981 20 p In ITALIAN Presented at Rome, 27 Mar. 1981; sponsored by CNR
(FUB-20-ATC-1981) Avail: NTIS HC A02/MF A01

The transfer of results from a project was discussed. Their contributions are summarized. The main subjects include assistance to national planning of navigation aids and traffic control, consultancy to state agencies, propositions to present to the International Civil Aviation Organization, marketing of Italian products derived from project research, and research planning after the project. Author (ESA)

N82-24193*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TIRE TREAD TEMPERATURES DURING ANTISKID BRAKING AND CORNERING ON A DRY RUNWAY
John A. Tanner, Robert C. Dreher, Sandy M. Stubbs, and Eunice G. Smith May 1982 57 p refs
(NASA-TP-2009; L-15110; NAS 1.60:2009) Avail: NTIS HC 04/MF A01 CSCL 01C

Aircraft tire tread temperatures under transient conditions associated with antiskid braking and cornering operations were studied. Peak tread temperatures were shown to be much lower when the braking effort did not reach the incipient skid point than when the tire was forced into incipient skids. Braking operation at high yaw angles increased average tread temperatures. Tire energy dissipation associated with braking and cornering was far greater than that associated with wheel spin-up at touchdown. The maximum friction level developed by a worn tire is shown to be more sensitive to variations in tread temperature and ground speed than that developed by a new tire. Locked-wheel skids and braking and cornering operations at high yaw angle produced molten rubber deposits on the runway surface and tread temperatures high enough to cause the rubber to undergo changes in chemial composition. R.J.F.

N82-24194*# Textron Bell Helicopter, Fort Worth, Tex.
V/STOL TILT ROTOR RESEARCH AIRCRAFT. VOLUME 1: GENERAL INFORMATION, REVISION C
Mike Kimbell and Aaron Whitener 8 Aug. 1980 357 p refs 4 Vol.
(Contract NAS2-7800)
(NASA-CR-166347; NAS 1.26:166347; REPT-301-099-022C) Avail: NTIS HC A16/MF A01 CSCL 01C

The configuration, operation and maintenance requirements for the contractor-furnished portion of the XV-15 research instrumentation and data acquisition system are defined. Descriptions of systems operation, maintenance and checkout procedures, and cable designations are given. R.J.F.

N82-24195*# Textron Bell Helicopter, Fort Worth, Tex.
V/STOL TILT ROTOR RESEARCH AIRCRAFT. VOLUME 2: SHIP 1 INSTRUMENTATION
11 Aug. 1978 456 p refs Sponsored by NASA 4 Vol.
(NASA-CR-166348; NAS 1.26:166348) Avail: NTIS HC A20/MF A01 CSCL 01C

Information covering sensor cables, sensor installation, and sensor calibration for the XV-15 aircraft number 1 is included. For each junction box (J-box) designation there is a schematic of the J-box disconnect harness instrumentation worksheets which show sensor location, and calibration data sheets for each sensor associated with that J-box. An index of measurement item codes to J-box locations is given in a table. Cross references are given. R.J.F.

N82-24196*# Textron Bell Helicopter, Fort Worth, Tex.
V/STOL TILT ROTOR RESEARCH AIRCRAFT. VOLUME 3: SHIP 2 INSTRUMENTATION
11 Aug. 1978 579 p refs Sponsored by NASA 4 Vol.
(NASA-CR-166349; NAS 1.26:166349) Avail: NTIS HC A25/MF A01 CSCL 01C

Information covering sensor cables, sensor installation, and sensor calibration for the XV-15 aircraft number 2 is included. For each junction box (J-box) designation there is a schematic of the J-box disconnect harness, instrumentation worksheets which show sensor location, and calibration data sheets for each sensor associated with that J-box. An index of measurement data codes to J-box locations is given in a table. Cross references are given. R.J.F.

N82-24197*# Textron Bell Helicopter, Fort Worth, Tex.
V/STOL TILT ROTOR RESEARCH AIRCRAFT. VOLUME 4: CFE TECHNICAL DATA
1 Oct. 1980 319 p refs Sponsored by NASA
(NASA-CR-166350; NAS 1.26:166350) Avail: NTIS HC A14/MF A01 CSCL 01C

Manufacturer drawings and specifications for contractor furnished transducers and related equipment for the XV-15 aircraft research instrumentation and data acquisition system are given. R.J.F.

N82-24198# Texas A&M Univ., College Station. Dept. of Mechanical Engineering.
DEVELOPMENT OF EXPERIMENTALLY COMPATIBLE SUBSYSTEM METHODS FOR THE ANALYSIS OF AIRCRAFT STRUCTURES Final Report, 1 Apr. - 30 Sep. 1981
Sherif T. Noah Nov. 1981 50 p refs
(Grant AF-AFOSR-0141-81)
(AD-A111242; AFOSR-82-0050TR) Avail: NTIS HC A03/MF A01 CSCL 01/3

This study is directed toward the development of experimentally compatible synthesis techniques for the determination of the dynamic characteristics of structures from the characteristics of their components. Based on an assessment of existing methods, selected free-interface component mode methods are utilized for the development. A simple technique is developed by which the residual effects, of truncated substructures' modes, required in forming the synthesis can be directly determined from test data. The data is to be obtained by shaking each of the substructures at a single point. Depending on the type of substructures involved, the inclusion of these residual effects is shown to be very significant in drastically improving the predicted modal shapes and damping of their assembly. A method is also presented for extending the selected synthesis formulations to enable their application to non-proportionally damped substructures. The study summarized in this report clearly demonstrates the feasibility of developing general, experimentally compatible synthesis techniques. Recommendations are included for the generalization and further development of the techniques developed in this study. Author (GRA)

N82-24199# Kaman Aerospace Corp., Windsor, Conn.
EXPERIMENTAL VERIFICATION OF FORCE DETERMINATION AND GROUND FLYING ON A FULL-SCALE HELICOPTER Final Report, May 1977 - Dec. 1980
R. Jones, W. G. Fannelly, E. J. Nagy, and J. A. Fabunmi May 1981 164 p refs
(Contract DAAJ02-77-C-0027; DA Proj. 1L2-62209-AH-76)
(USAAVRADCOM-TR-81-D-11; R-1625) Avail: NTIS HC A08/MF A01

Force determination is a method of obtaining dynamic loads acting on a vehicle in flight. These loads were determined from measured fuselage responces obtained in flight and calibration matrices obtained in a shake test. These forces obtained were verified by ground flying in a hanger and duplicated the responses obtained in flight. Author

N82-24201*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A PIECEWISE LINEAR STATE VARIABLE TECHNIQUE FOR REAL TIME PROPULSION SYSTEM SIMULATION
James R. Mihaloew and Stephen P. Roth (Pratt and Whitney Aircraft Group, West Palm Beach, Fla.) 1982 16 p refs Presented at the 13th Ann. Pittsburgh Conf. on Modelling and Simulation, Pittsburgh, 22-23 Apr. 1982; sponsored by IEEE, ISA, SCS and SMCS
(NASA-TM-82851; E-1210; NAS 1.15:82851) Avail: NTIS HC A02/MF A01 CSCL 21E

The emphasis on increased aircraft and propulsion control system integration and piloted simulation has created a need for higher fidelity real time dynamic propulsion models. A real time propulsion system modeling technique which satisfies this need and which provides the capabilities needed to evaluate propulsion system performance and aircraft system interaction on manned flight simulators was developed and demonstrated using flight simulator facilities at NASA Ames. A piecewise linear state variable technique is used. This technique provides the system accuracy, stability and transient response required for integrated aircraft and propulsion control system studies. The real time dynamic model includes the detail and flexibility required for the evaluation of critical control parameters and propulsion component limits over a limited flight envelope. The model contains approximately 7.0 K bytes of in-line computational code and 14.7 K of block data. It has an 8.9 ms cycle time on a Xerox Sigma 9 computer. A Pegasus-Harrier propulsion system was used as a baseline for developing the mathematical modeling and simulation technique. A hydromechanical and water injection control system was also simulated. The model was programmed for interfacing with a Harrier aircraft simulation at NASA Ames. Descriptions of the real time methodology and model capabilities are presented. Author

N82-24202*# Garrett Turbine Engine Co., Phoenix, Ariz.
STUDY OF ADVANCED PROPULSION SYSTEMS FOR SMALL TRANSPORT AIRCRAFT TECHNOLOGY (STAT) PROGRAM Final Report
C. F. Baerst, R. W. Heldenbrand, and J. H. Rowse Mar. 1981 119 p refs
(Contract NAS3-21997)
(NASA-CR-165610; NAS 1.26:165610; Garrett-21-3911) Avail: NTIS HC A06/MF A01 CSCL 21E

Definitions of takeoff gross weight, performance, and direct operating cost for both a 30 and 50 passenger airplane were established. The results indicate that a potential direct operating cost benefit, resulting from advanced technologies, of approximately 20 percent would be achieved for the 1990 engines. Of the numerous design features that were evaluated, only maintenance-related items contributed to a significant decrease in direct operating cost. Recommendations are made to continue research and technology programs for advanced component and engine develoment. T.M.

N82-24203*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FUTURE PROPULSION OPPORTUNITIES FOR COMMUTER AIRPLANES
William C. Strack Washington 1982 24 p refs Presented at the Commuter Airlines Meeting, Savannah, 24-26 May 1982; sponsored by the Society of Automotive Engineers
(NASA-TM-82880; E-1256; NAS 1.15:82880) Avail: NTIS HC A02/MF A01 CSCL 21E

Commuter airplane propulsion opportunities are summarized. Consideration is given to advanced technology conventional turboprop engines, advanced propellers, and several unconventional alternatives: regenerative turboprops, rotaries, and diesels. Advanced versions of conventional turboprops (including propellers) offer 15-20 percent savings in fuel and 10-15 percent in DOC compared to the new crop of 1500-2000 SHP engines currently in development. Unconventional engines could boost the fuel savings to 30-40 percent. The conclusion is that several important opportunities exist and, therefore, powerplant technology need not plateau. Author

N82-24204# Solar Turbines International, San Diego, Calif.
EVALUATION OF CAST TITANIUM ALLOY COMPRESSOR COMPONENTS, VOLUME 1 Final Report, May 1976 - Aug. 1978
Alvin N. Hammer St. Louis, Mo. Army Aviation Research and Development Command Nov. 1981 84 p 2 Vol.
(Contract DAAG46-76-C-0042)
(AD-A111431; RDR-1827-18-Vol-1;
USAAVRADCOM-TR-80-F-10-VOL-1;
AMMRC-TR-81-56-VOL-1) Avail: NTIS HC A05/MF A01 CSCL 21/5

The objective of this program was to characterize the properties of cast titanium alloy compressor impellers to provide a background for design, processing, and qualification for service in the Solar T62T-40 Titan auxiliary power unit and similar small radial gas turbine engines. Four titanium alloy investment casting foundries participated in the production of straight vane test wheels; a low-cost representation of the compressor impellers. As-cast and hot isostatic pressed (HIPed) Ti-6Al-4V was seen to have less than half the high cycle fatigue strength (20 to 30 ksi versus 60 ksi) of equivalent sections from forged and machined impellers. A modified solution heat treatment and aging cycle was developed which restored the fatigue strength to approximately 50 ksi, and which provided adequate tensile strength and ductility. High cycle fatigue strength of weld repaired vanes was significantly lower than that of unwelded, however. Cast and machined wheels offer substantial cost savings over wheels conventionally machined from forgings. These savings may be as much as 50%, or about $900 per wheel.
Author (GRA)

N82-24205* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HYDRAULIC ACTUATOR MECHANISM TO CONTROL AIRCRAFT SPOILER MOVEMENTS THROUGH DUAL INPUT COMMANDS Patent
Stephen C. Irick, inventor (to NASA) Issued 9 Jun. 1981 5 p Filed 17 Aug. 1979 Supersedes N80-11065 (18 - 02, p 0148)
(NASA-Case-LAR-12412-1; US-Patent-4,272,046;
US-Patent-Appl-SN-067595; US-Patent-Class-244-226;
US-Patent-Class-244-78; US-Patent-Class-244,213;
US-Patent-Class-74-480R; US-Patent-Class-74-479) Avail: US Patent and Trademark Office CSCL 01C

An aircraft flight spoiler control mechanism is described. The invention enables the conventional, primary spoiler control system to retain its operational characteristics while accommodating a secondary input controlled by a conventional computer system to supplement the settings made by the primary input. This is achieved by interposing springs between the primary input and the spoiler control unit. The springs are selected to have a stiffness intermediate to the greater force applied by the primary control linkage and the lesser resistance offered by the spoiler control unit. Thus, operation of the primary input causes the control unit to yield before the springs, yet, operation of the secondary input, acting directly on the control unit, causes the springs to yield and absorb adjustments before they are transmitted into the primary control system.

Official Gazette of the U.S. Patent and Trademark Office

N82-24206*# Minnesota Univ., Minneapolis. Inst. of Technology.
EIGENSPACE TECHNIQUES FOR ACTIVE FLUTTER SUPPRESSION Semiannual Progress Report, 1 Oct. 1981 31 Mar. 1982
W. L. Garrard 31 Mar. 1982 116 p refs
(Grant NAG1-217)
(NASA-CR-168931; NAS 1.26:168931) Avail: NTIS HC A06/MF A0 CSCL 01C

Mathematical models to be used in the control system design were developed. A computer program, which takes aerodynamic and structural data for the ARW-2 aircraft and converts these data into state space models suitable for use in modern control synthesis procedures, was developed. Reduced order models of inboard and outboard control surface actuator dynamics and a second order vertical wind gust model were developed. An analysis of the rigid body motion of the ARW-2 was conducted. The deletion of the aerodynamic lag states in the rigid body modes resulted in more accurate values for the eigenvalues associated with the plunge and pitch modes than were obtainable if the lag states were retained. Author

N82-24208*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PREDICTION OF AIRCRAFT HANDLING QUALITIES USING ANALYTICAL MODELS OF THE HUMAN PILOT
Ronald A. Hess Apr. 1982 11 p refs
(NASA-TM-84233; A-8884; NAS 1.15:84233) Avail: NTIS HC A02/MF A01 CSCL 01C

The optimal control model (OCM) of the human pilot is applied to the study of aircraft handling qualities. Attention is focused primarily on longitudinal tasks. The modeling technique differs from previous applications of the OCM in that considerable effort is expended in simplifying the pilot/vehicle analysis. After briefly reviewing the OCM, a technique for modeling the pilot controlling higher order systems is introduced. Following this, a simple criterion for determining the susceptibility of an aircraft to pilot induced oscillations is formulated. Finally, a model based metric for pilot rating prediction is discussed. The resulting modeling procedure provides a relatively simple, yet unified approach to the study of a variety of handling qualities problems. R.J.F.

N82-24209*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

APPLICATION OF MODAL CONTROL TO WING-FLUTTER SUPPRESSION
Aaron J. Ostroff and Samuel Pines (Analytical Mechanics Associates, Inc., Jericho, N.Y.) May 1982 73 p refs
(NASA-TP-1983; L-14976; NAS 1.60:1983) Avail: NTIS HC A04/MF A01 CSCL 01C

A discrete modal control design approach that is applied to a single control surface, unswept aircraft wing subject to bending torsion flutter is described. The modal approach is a mathematical method to decouple the equations of motion into isolated differential equations. In this paper, a pole-placement approach is then applied to determine stability gains in the discrete plane using only the two complex-conjugate flutter-mode equations. A fixed gain Kalman filter is used to estimate the model amplitudes using three measurements. Results are presented for a full-state estimator (36 states) and two reduced state estimators using two different closed-loop pole locations. The control law is designed for a dynamic pressure that is 50 percent greater than the uncontrolled-flutter dynamic pressure. With constant control-law gains, the closed-loop system remains stable over the dynamic-pressure range from flutter onset to approximately an 80-percent increase in pressure. M.D.K.

N82-24210# Royal Aircraft Establishment, Farnborough (England).
THE DETERMINATION OF CRITICAL FLUTTER CONDITIONS OF NONLINEAR SYSTEMS
D. L. Woodcock Mar. 1981 26 p refs
(RAE-TM-Struct-986; BR80499) Avail: NTIS HC A03/MF A01

Direct determination of limit cycles of the periodic motion of aeroelastic systems in transonic flow is discussed. A method of imposed disturbances, based on energy balance methods, is proposed. The Lagrange equation of motion is approximated by a nonlinear matrix differential equation into which a nondimensional time, omega t, is introduced. Omega is the frequency of the periodic motion. The frequency parameter based on omega, the airspeed, V, and a reference length is upsilon. The relationship between the amplitude of steady state oscillations and V, and whether these oscillations are stable, are determined. Any one of the unknowns, e.g., upsilon, can be used to find the others. Author (ESA)

N82-24211# European Space Agency, Paris (France).
A METHOD FOR DETERMINING THE AEROELASTIC BEHAVIOR OF AIRCRAFT WITH ACTIVE CONTROL SYSTEMS Ph.D. Thesis - Tech. Univ. Carolo-Wilhelmina, West Germany
Raymond Freymann Feb. 1982 129 p refs Transl. into ENGLISH from "Ueber das aeroelastische Verhalten von Flugzeugen mit aktiven Servo-Kontrollsystemen", Rept. DFVLR-FB-81-05 DFVLR, Goettingen, West Germany, Feb. 1981 Original report in GERMAN previously announced as N82-10047
(ESA-TT-719; DFVLR-FB-81-05) Avail: NTIS HC A07/MF A01; original report in GERMAN available at DFVLR Cologne DM 26.30

An analytical method for performing dynamic calculations on servocontrolled aircraft, based on an extended formulation of the generalized aeroelastic equations, is presented. The additional parameters introduces in the extended equations of motion are determined experimentally in a ground vibration test performed on a real aircraft structure as well as with help from an experimental-analytical method for determining the transfer functions of the hydraulic actuators. The elaborated method is shown to be satisfactory by comparison of measured and calculated data resulting from investigations performed on a model wing structure with a rudder driven by a hydraulic actuator. Author (ESA)

N82-24212* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ENVIRONMENTAL FOG/RAIN VISUAL DISPLAY SYSTEM FOR AIRCRAFT SIMULATORS Patent
Wendell D. Chase, inventor (to NASA) Issued 2 Feb. 1982 28 p Filed 29 Jun. 1979 Supersedes N79-33220 (17 - 24, p 3180)
(NASA-Case-ARC-11158-1; US-Patent-4,313,726; US-Patent-Appl-SN-053566; US-Patent-Class-434-42; US-Patent-Class-434-43) Avail: US Patent and Trademark Office CSCL 14B

An environmental fog/rain visual display system for aircraft simulators is described. The electronic elements of the system include a real time digital computer, a caligraphic color display which simulates landing lights of selective intensity, and a color television camera for producing a moving color display of the airport runway as depicted on a model terrain board. The mechanical simulation elements of the system include an environmental chamber which can produce natural fog, nonhomogeneous fog, rain and fog combined, or rain only. A pilot looking through the aircraft wind screen will look through the fog and/or rain generated in the environmental chamber onto a viewing screen with the simulated color image of the airport runway thereon, and observe a very real simulation of actual conditions of a runway as it would appear through actual fog and/or rain.
Official Gazette of the U.S. Patent and Trademark Office

N82-24213*# National Aeronautics and Space Administration, Washington, D. C.
WIND TUNNELS OF THE INSTITUTE OF MECHANICS OF MOSCOW STATE UNIVERSITY
S. M. Gorlin, ed. and G. E. Khudyakov, ed. Apr. 1982 150 p refs Transl. into ENGLISH of 'Aerodinamicheskiye Truby Instituta Mekhaniki" Moscow, 1971 p 1-100 Transl. by Franklin Book Programs, Inc., Cairo, Egypt. Original doc. prep. by Inst. of Mechanics, Moscow State Univ.
(Contract NSF-C-724)
(NASA-TM-76909; NAS 1.15:76909; TT-78-58009) Avail: NTIS HC A07/MF A01 CSCL 14B

The construction and characteristics of subsonic wind tunnels are described. Methods are presented, on which are based the experimental works conducted on these installations. The data logs of the treatment of the results of experiments are also given. Author

N82-24214*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ADAPTIVE-WALL WIND-TUNNEL RESEARCH AT NASA-AMES RESEARCH CENTER
Edward T. Schairer and Joel P. Mendoza May 1982 16 p refs
(NASA-TM-84236; A-8893; NAS 1.15:84236) Avail: NTIS HC A02/MF A01 CSCL 14B

Adaptive wall wind tunnel research is summarized. Small scale two and three dimensional wind tunnel experiments and numerical experiments with a three dimensional adaptive wall simulator are included. A NACA 0012 airfoil was tested in a 25 by 13 cm slotted wall test section. Airflow through the test section walls was controlled by adjusting the pressures in segmented plenums. Interference free conditions were successfully attained in subsonic and transonic flows. For the three dimensional experiment, the 25 by 13 cm wind tunnel was modified to permit cross stream wall adjustments. The test model was a semispan wing mounted to one sidewall. Wall interference was substantially reduced at several angles of attack at Mach 0.60. A wing on wall configuration was also modeled in the numerical experiments. These flow simulations showed that free air conditions can be approximated by adjusting boundary conditions at only the floor and ceiling of the test section. No sidewall control was necessary. Typical results from these experiments are discussed. Author

N82-24301*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STANDARD TESTS FOR TOUGHENED RESIN COMPOSITES
May 1982 29 p refs
(NASA-RP-1092; L-15317; NAS 1.61:1092) Avail: NTIS HC A03/MF A01 CSCL 11D

Several toughened resin systems are evaluated to achieve commonality for certain kinds of tests used to characterize toughened resin composites. Specifications for five tests were standardized; these test standards are described. S.L.

N82-24326*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A STATUS REVIEW OF NASA'S COSAM (CONSERVATION OF STRATEGIC AEROSPACE MATERIALS) PROGRAM Executive Status Report
Joseph R. Stephens Washington May 1982 46 p refs
(NASA-TM-82852; E-1222; NAS 1.15:82852) Avail: NTIS HC A03/MF A01 CSCL 11F

The use and supply of strategic elements in nickel base superalloys for gas turbine engines are reviewed. Substitution of strategic elements, advanced processing concepts, and the identification of alternate materials are considered. Cobalt, tantalum, columbium, and chromium, the supplies of which are 91-100% imported, are the materials of major concern. J.D.

N82-24355# Southwest Research Inst., San Antonio, Tex. Energy Systems Research Div.

IMPACT STUDY OF SYNTHETIC AND ALTERNATIVE FUEL USAGE IN ARMY AIRCRAFT PROPULSION SYSTEMS Final Report, Oct. 1980 - Jun. 1981

C. A. Moses and M. I. Valtierra Jul. 1981 166 p refs Sponsored in part by the Army Mobility Research and Development Command

(Contract N00140-80-C-2269)

(AD-A111046; SwRI-MED134) Avail: NTIS HC A08/MF A01 CSCL 21/4

The U.S. Army is concerned about the quality of future aircraft fuels and their compatibility with current engines and aircraft fuel systems. This impact study of synthetic and alternate fuel usage on Army aircraft propulsion and fuel systems addresses four technical areas: (1) The fuel scenario for Army aviation gas turbine fuels; (2) The effects of initial properties or the performance and durability of engine and fuel system components; (3) The identification of engines and fuel system components used in Army aircraft and their interface with the fuel; and (4) A review of qualification and certification procedures. Author (GRA)

N82-24474*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

ADAPTER FOR MOUNTING MICROPHONE FLUSH WITH THE EXTERNAL SURFACE OF THE SKIN OF A PRESSURIZED AIRCRAFT Patent Application

Robert B. Cohn, inventor (to NASA) Filed 14 Dec. 1981 14 p

(NASA-Case-FRC-11072-1; US-Patent-Appl-SN-330613) Avail: NTIS HC A02/MF A01 CSCL 14B

A mounting device for securing a microphone pick-up head flush with respect to the external surfaces of the skin of an aircraft for detecting shock waves is described. The mount includes a sleeve mounted internally of the aircraft for capturing and supporting an electronics package having the microphone pick-up head attached such that the head is flush with the external surface of the aircraft skin and a pressure seal is established between the internal and external surfaces of the aircraft skin. NASA

N82-24497*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DEVELOPMENT OF HIGH-SPEED ROLLING-ELEMENT BEARINGS. A HISTORICAL AND TECHNICAL PERSPECTIVE

Erwin V. Zaretsky 1982 28 p refs Presented at the SKF Seventy-Fifth Anniv. Celebration Meeting, Nieuwegin, Netherlands, 9 Jun. 1982; sponsored by SKF Research and Development Center

(NASA-TM-82884; E-1198; NAS 1.15:82884) Avail: NTIS HC A03/MF A01 CSCL 13I

Research on large-bore ball and roller bearings for aircraft engines is described. Tapered roller bearings and small-bore bearings are discussed. Temperature capabilities of rolling element bearings for aircraft engines have moved from 450 to 589 K (350 to 600 F) with increased reliability. High bearing speeds to 3 million DN can be achieved with a reliability exceeding that which was common in commercial aircraft. Capabilities of available bearing steels and lubricants were defined and established. Computer programs for the analysis and design of rolling element bearings were developed and experimentally verified. The reported work is a summary of NASA contributions to high performance engine and transmission bearing capabilities. R.J.F.

N82-24500# National Aerospace Lab., Amsterdam (Netherlands). Bauweisen und Werkstoffe Haupabt.

COMPARISON BETWEEN PROBABILITY OF DETECTION, SENSITIVITY, AND ACCURACY OF FIVE NONDESTRUCTIVE INSPECTION METHODS

E. A. B. deGraaf and P. deRijk 25 Jun. 1981 13 p refs In DUTCH; ENGLISH summary Presented at Europaeische Tagung fuer zerstoerungsfreie Pruefung, Vienna, 14-16 Sep. 1981

(NLR-MP-81038-U) Avail: NTIS HC A02/MF A01

Approximately 200 high strength steel (AISI4340) aircraft undercarriage retraction cylinders, only part of which contained fatigue tracks, were subjected to five different nondestructive tests by six inspectors. Penetrants, ultrasonic flaw detection, eddy currents, and magnetic measurements were used. Results of all these methods and inspectors were compared. Considerable scattering in the results was observed. The ultrasonic method reliability is low. The results of fluorescent color penetration and eddy currents are moderate. Due to its high reliability, magnetic inspection is preferred. Author (ESA)

N82-24501*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NONLINEAR STRUCTURAL AND LIFE ANALYSES OF A COMBUSTOR LINER

V. Moreno (Pratt and Whitney Aircraft Group, East Hartford, Conn.), G. J. Meyers (Pratt and Whitney Aircraft Group, East Hartford, Conn.), A. Kaufman, and G. R. Halford 1982 23 p refs Proposed for presentation at the Symp. on Advances and Trends in Struct. and Solid Mech., 4-7 Oct. 1982, Washington, D.C.; sponsored by NASA and Georgetown Univ.

(NASA-TM-82846; E-1216; NAS 1.15:82846) Avail: NTIS HC A02/MF A01 CSCL 20K

Three dimensional, nonlinear finite element structural analyses were performed for a simulated combustor liner specimen to assess the capability of nonlinear analyses using classical inelastic material models to represent the thermoplastic creep response of the one half scale component. Results indicate continued cyclic hardening and ratcheting while experimental data suggested a stable stress strain response after only a few loading cycles. The computed stress strain history at the critical location was put into two life prediction methods, strainrange partitioning and a Pratt and Whitney combustor life prediction method to evaluate their ability to predict cyclic crack initiation. It is found that the life prediction analyses over predicted the observed cyclic crack initiation life. E.A.K.

N82-24502*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EVALUATION OF INELASTIC CONSTITUTIVE MODELS FOR NONLINEAR STRUCTURAL ANALYSIS

Albert Kaufman 1982 22 p refs Presented at the Symp. on Nonlinear Constitutive Relations for High Temp. Appl., Akron, Ohio, 19-20 May 1982; sponsored by NASA and Akron Univ.

(NASA-TM-82845; E-1215; NAS 1.15:82845) Avail: NTIS HC A02/MF A01 CSCL 20K

The influence of inelastic material models on computed stress-strain states, and therefore predicted lives, was studied for thermomechanically loaded structures. Nonlinear structural analyses were performed on a fatigue specimen which had been subjected to thermal cycling in fluidized beds and on a mechanically load cycled benchmark notch specimen. Four incremental plasticity creep models (isotropic, kinematic, combined isotropic kinematic, combined plus transient creep) were exercised using the MARC program. Of the plasticity models, kinematic hardening gave results most consistent with experimental observations. Life predictions using the computed strain histories at the critical location with a strainrange partitioning approach considerably overpredicted the crack initiation life of the thermal fatigue specimen. S.L.

N82-24512# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Stuttgart (West Germany).

REPORT FROM THE WORKING PARTY ON NEW FIBER MATERIALS [AUS DER ARBEIT DES ARBEITSKREISES NEUARTIGE FASERWERKSTOFFE (ANF)]

C. Kensche 1981 12 p In GERMAN Presented at 5th Symp. fuer Segelflugzeugentwicklung, Brunswick, 16-17 Nov. 1981

Avail: NTIS HC A02/MF A01

The aims, activities and achievements of a working party on new fiber composites are discussed. Participants from industry and research institutions collaborated on the drafting of norms and specification sheets for these materials.. Further research items include experimentation test stands and standardization of test procedures. Results on maximum yield stresses under tension, compression or shear are given for various specimens as well as in relation to fuselages or hulls. Author (ESA)

N82-24514# Instituut TNO voor Werktuigkundige Constructies, Delft (Netherlands).

THE VIBRATORY BEHAVIOR OF A ROTATING PROPELLER

SHAFT. PART 4: VIBRATION TESTS OF A ROTATING PROPELLER SHAFT IN A RUBBER STERN TUBE BEARING
A. J. Francken and G. C. vanVelzen Dec. 1980 80 p refs
(Contract A76/KM/134)
(IWECO-5072208-81-Pt-2; TDCK-75125-Pt-2) Avail: NTIS HC A05/MF A01

Lateral shaft vibration was tested by measuring shaft and bearing response to horizontal and vertical excitation. Results show no change in shaft position between the nonrotating and the rotating shaft at speeds up to 120 RPM. Resonance frequencies and driving point mobility deviate < 3% from reported values. Damping at 120 RPM amounts to 5% of critical damping at both resonances. Author (ESA)

N82-24620# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY. IKPIKPUK RIVER QUADRANGLE, ALASKA, VOLUME 2 Final Report
Feb. 1981 108 p
(Contract DE-AC13-76GJ-01664)
(DE82-000314; GJBX-304-81-Vol-2) Avail: NTIS HC A06/MF A01

The flight path map, multiparameter profiles, histograms, and anomaly maps for uranium, thorium, potassium, uranium/potassium, uranium/thorium, d thorium/potassium are presented. Data was gathered during airborne gamma ray spectrometer and magnetometer survey flights over Alaska. DOE

N82-24629# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY. JAMESTOWN QUADRANGLE, NORTH DAKOTA, VOLUME 1 Final Report
Mar. 1981 85 p refs 2 Vol.
(Contract DE-AC13-76GJ-01664)
(DE82-004150; GJBX-353-81-Vol-1) Avail: NTIS HC A05/MF A01

During the months of June through October, 1980 an airborne high sensitivity gamma-ray spectrometer and magnetometer survey over eleven 20 x 10 quadrangles located in the states of Minnesota and Wisconsin and seven 20 x 10 quadrangles in North and South Dakota was conducted. The results obtained over the Jamestown map area of North Dakota are discussed. The final data are presented in four different forms: on magnetic tape; on microfiche; in graphic form as profiles and histograms; and in map form as anomaly maps, flight path maps, and computer printer maps. DOE

N82-24630# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY. JAMESTOWN QUADRANGLE, NORTH DAKOTA, VOLUME 2 Final Report
Mar. 1981 100 p 2 Vol.
(Contract DE-AC13-76GJ-01664)
(DE82-004169; GJBX-353-81-Vol-2) Avail: NTIS HC A05/MF A01

The flight path map, radiometric multiple-parameter stacked profiles, magnetic and ancillary parameter stacked profiles, histograms, anomaly maps for uranium, thorium, potassium, uranium/thorium, thorium/potassium, and uranium/potassium are given. Data was obtained during an airborne gamma-ray spectrometer and magnetometer survey of North Dakota. DOE

N82-24632# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY. UMIAT QUADRANGLE, ALASKA, VOLUME 2 Final Report
Feb. 1981 106 p refs 2 Vol.
(Contract DE-AC13-76GJ-03664)
(DE82-000312; GJBX-305-81-Vol-2) Avail: NTIS HC A06/MF A01

The flight path map, multiparameter profiles, histograms, and anomaly maps are presented for uranium, thorium, potassium, uranium/potassium, uranium/thorium, and thorium/potassium. This data was obtained using an airborne gamma spectrometer and magnetometer. DOE

N82-24649*# Parsons (Ralph M.) Co., Pasadena, Calif.
FUEL QUALITY PROCESSING STUDY, VOLUME 1 Final Report
J. B. OHara, A. Bela, N. E. Jentz, H. T. Syverson, H. W. Klumpe, R. E. Kessler, H. T. Kotzot, and B. L. Loran Apr. 1981 203 p refs 2 Vol.
(Contracts DEN3-183; DE-AI01-77ET-13111)
(NASA-CR-165327-Vol-1; DOE/NASA/0183-1; NAS 1.26:165327-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 21D

A fuel quality processing study to provide a data base for an intelligent tradeoff between advanced turbine technology and liquid fuel quality, and also, to guide the development of specifications of future synthetic fuels anticipated for use in the time period 1985 to 2000 is given. Four technical performance tests are discussed: on-site pretreating, existing refineries to upgrade fuels, new refineries to upgrade fuels, and data evaluation. The base case refinery is a modern Midwest refinery processing 200,000 BPD of a 60/40 domestic/import petroleum crude mix. The synthetic crudes used for upgrading to marketable products and turbine fuel are shale oil and coal liquids. Of these syncrudes, 50,000 BPD are processed in the existing petroleum refinery, requiring additional process units and reducing petroleum feed, and in a new refinery designed for processing each syncrude to produce gasoline, distillate fuels, resid fuels, and turbine fuel, JPGs and coke. An extensive collection of synfuel properties and upgrading data was prepared for the application of a linear program model to investigate the most economical production slate meeting petroleum product specifications and turbine fuels of various quality grades. Technical and economic projections were developed for 36 scenarios, based on 4 different crude feeds to either modified existing or new refineries operated in 2 different modes to produce 7 differing grades of turbine fuels. A required product selling price of turbine fuel for each processing route was calculated. Procedures and projected economics were developed for on-site treatment of turbine fuel to meet limitations of impurities and emission of pollutants. R.J.F.

N82-24650*# Parsons (Ralph M.) Co., Pasadena, Calif.
FUEL QUALITY/PROCESSING STUDY. VOLUME 2: APPENDIX. TASK 1 LITERATURE SURVEY Final Report
J. B. OHara, A. Bela, N. E. Jentz, H. W. Klumpe, H. E. Kessler, H. T. Kotzot, and B. L. Loran Apr. 1981 274 p refs 2 Vol.
(Contract DEN3-183; DE-AI01-77ET-13111)
(NASA-CR-165327-Vol-2; DOE/NASA/0183-1; NAS 1.26:165327-Vol-2) Avail: NTIS HC A12/MF A01 CSCL 21D

The results of a literature survey of fuel processing and fuel quality are given. Liquid synfuels produced from coal and oil shale are discussed. Gas turbine fuel property specifications are discussed. On-site fuel pretreatment and emissions from stationary gas turbines are discussed. Numerous data tables and abstracts are given. R.J.F.

N82-24739# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Acoustics Dept.
AIRBUS INDUSTRY AND NOISE IN THE COMMUNITY
J. Chaussonnet 7 Jan. 1982 37 p Presented at Symp. on Aircraft Noise Johannesburg, 21 Oct. 1981; sponsored by South African Acoustic Inst.
(SNIAS-821-111-111) Avail: NTIS HC A03/MF A01

The contribution to the total perceived noise outside an aircraft during takeoff and landing, attributed to engines and the aerodynamics of the aircraft, is considered. Engine noise reduction by design, location of the engine, and by acoustic analysis of the nacelle is discussed. Aerodynamic noise reduction is treated in terms of aircraft design, operational procedures, and aircraft weight. The noise measurement facility used for checking operational procedures and measuring noise levels, is described. Results show that the acoustic noise of commercial aircraft can be significantly reduced. Author (ESA)

N82-24842# Societe Nationale Industrielle Aerospatiale, Toulouse (France). Service Controle Automatique du Vol.
FLIGHT MANAGEMENT COMPUTER
J. Grossin 7 Jan. 1982 26 p In FRENCH Presented at Soc. des Electriciens et des Radioelectriciens (SEE), Nice, 26 Nov. 1981 Submitted for Publication
(SNIAS-821-111-110) Avail: NTIS HC A03/MF A01

Ways in which automatic flight control can reduce fuel consumption were investigated. Three domains were identified:

(1) thrust optimization, (2) optimization of in-flight aerodynamic configuration, and (3) flight plan optimization. The use of flight management computers to achieve these goals is discussed and recently developed equipment is depicted. System design and functions are explained. The choice of performance optimization criteria (cost index) is considered. How a flight management computer deals with horizontal navigation is treated as an example. Author (ESA)

N82-24845*# Research Triangle Inst., Research Triangle Park, N. C. Systems and Measurements Div.

PRODUCTION OF RELIABLE FLIGHT CRUCIAL SOFTWARE: VALIDATION METHODS RESEARCH FOR FAULT TOLERANT AVIONICS AND CONTROL SYSTEMS SUB-WORKING GROUP MEETING

J. R. Dunham, ed. and J. C. Knight, ed. (Virginia Univ.) May 1982 27 p refs Meeting held at Research Triangle Park, N.C., 2-4 Nov. 1981
(NASA-CP-2222; L-15291; NAS 1.55:2222) Avail: NTIS HC A03/MF A01 CSCL 09B

The state of the art in the production of crucial software for flight control applications was addressed. The association between reliability metrics and software is considered. Thirteen software development projects are discussed. A short term need for research in the areas of tool development and software fault tolerance was indicated. For the long term, research in format verification or proof methods was recommended. Formal specification and software reliability modeling, were recommended as topics for both short and long term research. N.W.

N82-24846*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

COMBINING ANALYSIS WITH OPTIMIZATION AT LANGLEY RESEARCH CENTER. AN EVOLUTIONARY PROCESS

James L. Rogers, Jr. Apr. 1982 11 p refs Proposed for presentation at the 2nd Intern. Computer Eng. Conf. and Show, San Diego, Calif., 15-19 Aug. 1982
(NASA-TM-84472; NAS 1.15:84472) Avail: NTIS HC A02/MF A01 CSCL 09B

The evolutionary process of combining analysis and optimization codes was traced with a view toward providing insight into the long term goal of developing the methodology for an integrated, multidisciplinary software system for the concurrent analysis and optimization of aerospace structures. It was traced along the lines of strength sizing, concurrent strength and flutter sizing, and general optimization to define a near-term goal for combining analysis and optimization codes. Development of a modular software system combining general-purpose, state-of-the-art, production-level analysis computer programs for structures, aerodynamics, and aeroelasticity with a state-of-the-art optimization program is required. Incorporation of a modular and flexible structural optimization software system into a state-of-the-art finite element analysis computer program will facilitate this effort. This effort results in the software system used that is controlled with a special-purpose language, communicates with a data management system, and is easily modified for adding new programs and capabilities. A 337 degree-of-freedom finite element model is used in verifying the accuracy of this system. M.D.K.

N82-24942*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

AEROACOUSTIC PERFORMANCE OF AN EXTERNALLY BLOWN FLAP CONFIGURATION WITH SEVERAL FLAP NOISE SUPPRESSION DEVICES

Daniel J. McKinzie, Jr. May 1982 30 p refs
(NASA-TP-1995; E-573; NAS 1.60:1995) Avail: NTIS HC A03/MF A01 CSCL 20A

Small scale model acoustic experiments were conducted to measure the noise produced in the flyover and sideline planes by an engine under the wing externally blown flap configuration in its approach attitude. Broadband low frequency noise reductions as large as 9 dB were produced by reducing the separation distance between the nozzle exhaust plane and the flaps. Experiments were also conducted to determine the noise suppression effectiveness in comparison with a reference configuration of three passive types of devices that were located on the jet impingement surfaces of the reference configuration. These devices produced noise reductions that varied up to 10 dB at reduced separation distances. In addition, a qualitative estimate of the noise suppression characteristics of the separate devices was made. Finally static aerodynamic performance data were obtained to evaluate the penalties incurred by these suppression devices. The test results suggest that further parametric studies are required in order to understand more fully the noise mechanisms that are affected by the suppression devices used. M.G.

N82-24946# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

GENERATION OF NOISE BY TURBULENCE

Robert Legendre 1981 35 p refs In FRENCH; ENGLISH summary Report will also be announced as translation (ESA-TT-763)
(ONERA-P-1981-3; ISSN-0078-379X) Avail: NTIS HC A03/MF A01

The notion of noise source is elaborated, distinguishing between turbulent agitation, which is a cause, and acoustic agitation which is a minor effect or subproduct whose essential particularity is its propagation at the speed of sound. This allows for a precise definition of noise, derived from acoustic potential and apart from pseudo-noise linked to turbulence. The equation, valid for this potential, is established by an almost complete elimination of state variables and is linearized. This enables a study of convection and refraction effects and shows that generated noise is in proportion to the density relative variation rate. A model of anisotropic turbulence inside a shear flow is proposed. Its use shows that the noise generated inside a vortex tube is proportional to the square of the circulation. Application of the findings to interpretation of noise measurements in wind tunnels, e.g. aircraft noise predictions, is discussed. An extension of the method in order to include noise near obstacles is outlined. Author (ESA)

N82-25017*# National Aeronautics and Space Administration, Washington, D. C. Education Services Branch.

AEROSPACE ENGINEERS: WE'RE TOMORROW-MINDED PEOPLE

Mary H. Lewis 1981 39 p refs Original contains color illustrations
(NASA-EP-188; NAS 1.19:188) Avail: NTIS HC A03/MF A01 CSCL 05A

Brief job-related autobiographical sketches of engineers working on NASA aerospace projects are presented. Career and educational guidance is offered to students thinking about entering the aerospace field. R.J.F.

N82-25040*# Arizona Univ., Tucson. Optical Sciences Center.

TESTING OF THE KUIPER AIRBORNE OBSERVATORY 91-CM TELESCOPE Final Report

Robert E. Parks Jul. 1979 49 p refs
(Contract NAS2-10085)
(NASA-CR-166341; NAS 1.26:166341) Avail: NTIS HC A03/MF A01 CSCL 03A

The 91 cm telescope of the Kuiper Airborne Observatory was tested for optical figure errors in the surface of the mirrors and misalignment of the optical components. When the present set of optical components are installed in the telescope in proper alignment, the telescope produces an image with 80% of the energy in a circle of 1.50 arc seconds in diameter; that is, a 0.11 mm spot diameter in the focal plane. The primary mirror, an f/2 parabola, was tested against a flat and has a quality that puts 80% of the energy in a 0.51 arc second diameter spot. Two principal sources account for the residual error: the tertiary folding flat and the chopping secondary. It appears that the method of mounting the folding flat causes some distortion and that the secondary mirror has some residual spherical aberration in its figure. S.L.

N82-25170*# Grumman Aerospace Corp., Bethpage, N.Y.

STUDY OF VTOL IN GROUND-EFFECT FLOW FIELD INCLUDING TEMPERATURE EFFECT Final Report

W. G. Hill, R. C. Jenkins, S. G. Kalemaris, and M. J. Siclari Apr. 1982 179 p refs
(Contract NAS2-10645)
(NASA-CR-166258; NAS 1.26:166258) Avail: NTIS HC A09/MF A01 CSCL 01A

Detailed pressure, temperature, and velocity data were obtained for twin-fan configurations in-ground-effect and flow models to aid in predicting pressures and upwash forces on aircraft surfaces were developed. For the basic experiments, 49.5 mm-diameter jets were used, oriented normal to a simulated round plane, with pressurized, heated air providing a jet. The experimental data consisted of: (1) the effect of jet height and temperature on the ground, model, and upwash pressures, and temperatures, (2) the effect of simulated aircraft surfaces on the isolated flow field, (3) the jet-induced forces on a three-dimensional body with various strakes, (4) the effects of non-uniform coannular jets. For the uniform circular jets, temperature was varied from room temperature (24 C) to 232 C. Jet total pressure was varied between 9,300 Pascals and 31,500 Pascals. For the coannular jets, intended to represent turbofan engines, fan temperature was maintained at room temperature while core temperature was varied from room temperature to 437 C. Results are presented. B.W.

N82-25171# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.

PROCEEDINGS OF THE 11TH SYMPOSIUM ON AIRCRAFT INTEGRATED DATA SYSTEMS

Nov. 1981 454 p refs Symp. held at Cologne, 22-24 Sep. 1981

(DFVLR-Mitt-82-02) Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

The acquisition and processing of in-flight data are discussed. Flight recorder design and usefulness; cost benefits of improved data systems; trends in data system engineering are considered. Aircraft accident investigation and maintenance as well as engine monitoring are covered. For individual titles, see N82-25172 through N82-25189.

N82-25172# Sperry Univac, St. Paul, Minn.

SOLID-STATE FLIGHT INCIDENT RECORDER

D. Amundson *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 17-31 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

A deployable flight incident recorder based on MNOS technology, suitable for fighter aircraft, is described. Capable of recording 30 min of digital and 15 min of audio information, the equipment weighs 3.5 lbs and dissipates 3.5 W. Flight and crash tests show that it is more reliable than tape recorders, and improves access times a million-fold. If audio is not required, engine monitoring, aircraft fatigue recording and program storage for onboard computers are possible. Author (ESA)

N82-25173# Hamilton Standard, Windsor Locks, Conn.

SOLID STATE CRASH SURVIVABLE FLIGHT DATA RECORDERS FOR MISHAP INVESTIGATION

H. R. Ask *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 33-68 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

The state of the art in solid state memories, microprocessors and crash survival is reviewed. Flight recorders for small and large civil transport aircraft are described. Heat flow problems with crash survivable designs are solved, using an intumescent outer layer for the enclosure. This provides heat absorbtion during a phase change, followed by creation of a passive insulation layer formed by the charred residue. An aluminum alloy housing under the intumescent layer is the primary rigid structure for penetration, shock and static crush resistance. The small aircraft system has a 131 kbit memory, providing 30 min of prior flight data with > 100% reserve, using data compression. It protects airborne and on ground signal goodness data and is nondeployable. The large aircraft system stores the 21 min of raw input data and the last 15 hr of data in memory with data compression possible. It protects in memory two flight cycles of any duration, with total elapsed time > 25 hr possible. Author (ESA)

N82-25174# Sundstrand Data Control, Inc., Redmond, Wash.

NEW TECHNIQUES IN DATA RETRIEVAL AND DISPLAY

G. S. L. Benn *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 69-91 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

The contribution of multicolor graphics to the display and interpretation of aircraft data from digital flight data recorders is described. Video graphic techniques for improving the speed of data interpretation and methods that allow rapid quick look selected data are compared with previous methods. For a noncrash incident, a two page printout of relevant parameters, photographs via the screen print of the last hour of flight together with zoomed detail of the incident, and a permanent record of flight data are available in < one hour. Quick look capability is ensured by electronic scrolling of graphed data coupled with direct conversion of digital data to engineering units. Author (ESA)

N82-25175# Eurocontrol Agency, Brussels (Belgium).

ON-LINE EXPERIMENTS IN ACQUIRING AND EXPLOITING AIDS DATA FOR ATC PURPOSES

M. E. Cox *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 93-114 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

Problems in acquiring real time data from aircraft integrated data systems are discussed. The experimental evaluation of AIDS data applications and investigation of a functional system are described. Flight tests indicate that the acquisition of aircraft data via a selectively addressed secondary surveillance radar mode S transponder is straightforward if an ARINC 429 Mk 33 digital information transfer system interface is available. Author (ESA)

N82-25176# Vereinigung Cockpit, Frankfurt am Main (West Germany).

A PILOT'S VIEW ON POSSIBLE USES OF AIDS

Christian Denke *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 125-130

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

Problems with the U.S. beacon collision avoidance system and the Eurocontrol - DFVLR airborne link terminal are highlighted. The U.S. system cannot handle a large number of aircraft, and resolves encounters through distance and flight level, with no reference to relative position. Avoidance maneuvers are only possible in the vertical plane. The avoidance maneuver logic has not been proven capable of accounting for individual aircraft performance. The European system substitutes visual messages for voice communication, increasing the already considerable visual workload. Its insistence on rigidly adhering to flight plans (as an aid to strategic ATC) increases fuel costs. Author (ESA)

N82-25177# Sundstrand Data Control, Inc., Redmond, Wash.

A NEW ALL-PURPOSE DIGITAL FLIGHT DATA RECORDER

P. H. Eason *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 131-158 ref

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

A recorder which can be installed interchangably in ARINC 542 or ARINC 573/717 equipped aircraft features a coplanar, peripheral belt driven magnetic tape transport containing 450 ft of 1/4 in tape. Two interleaved 4-channel read/write heads and two erase heads are incorporated. A 7.5 deg external drive step motor operating in a slew mode drives the tape at 6 ips. The electronics cards are standard plug in boards containing: read/write, transport, data acquisition data acquisition expansion, and aircraft wiring interfaces; as well as the recording system and data acquisition controllers. The built in test capability exceeds 95% fault detection. Author (ESA)

N82-25178# Air Navigation Services, Inc., Westerngrund (West Germany). Advisory Group.

AERONAUTICAL INFORMATION DATA SUBSYSTEMS

Frank W. Fischer *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 159-184 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

The case for reorganizing aeronautical information processing is argued. Air traffic controllers need access to correct, current, definitive data on activity in their area. Since they have to make real time decisions, systems must provide information in a rapidly assimilable and retransmissible form. A centralized data source is required to preprocess data. Author (ESA)

N82-25179# Dayton Univ., Ohio. Research Inst.

THE EFFECT OF VERY HEAVY RAIN UPON AIRCRAFT AND ITS ROLE IN WIND SHEAR ATTRIBUTED ACCIDENTS

P. A. Haines and J. K. Luers *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 185-215 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

Theoretical and experimental analyses of the effects of very heavy rain on aircraft performance are summarized. Analysis reveals momentum loss, increased drag, and reduced lift resulting from cratering of the rainwater film on airfoils by raindrops. Momentum penalties were derived from a combined drop trajectory/potential flow analysis. The derived penalties were introduced into a digital flight simulation program and the effect of very heavy rain was compared to that of wind shear by performing landings in combinations of wind, rain, no wind, and no rain. Results show that the derived wind shears of accident reconstructions are too large because a significant part of the loss in indicated airspeed is caused by rain. Author (ESA)

N82-25180# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Forschungszentrum.

THE DFVLR DIGITAL FLIGHT DATA READOUT AND PROCESSING STATION AND ITS UTILITY

H. Hardegen *In its* Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 217-245

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

Efforts to meet aviation authority requirements, scientific interest, and commercial requests at a flight data readout and processing station are described, with emphasis on bit rates, data fault correction, and reduction of data loss during transcription and reformatting. Regenerated data are recorded on computer tape and an eight-channel plot which provides a quick look the preceding flight history during regeneration is produced. All the computer programs are modular. After the program is started, the initital and final blocks are requested as the parameters to be calculated. Conversion from digital to engineering units is checked manually. Data losses are easily localized by counting the frames per minute and checking the synchronization words. Author (ESA)

N82-25181# Lufthansa German Airlines, Hamburg (West Germany).

SIDESLIP INDICATION SYSTEM AS A FUEL SAVING AID IN JET TRANSPORT AIRCRAFT OPERATION

Dieter Horst *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 247-275

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

The relationship between sideslip angle heading constant, and roll angle is outlined and a sideslip sensor is described. A conical pressure sensing probe extends through the fuselage perpendicular to the local air flow. Unequal pressure arising from sideslip causes two paddle blades to rotate the probe until pressure on each paddle is equal, i.e., until the probe is realigned with the airstream. During rotation, output elements attached to the probe are also rotated, providing electrical signals proportional to sideslip angle to an indicator. Tests on an A-300 Airbus show that avoiding sideslip cuts fuel consumption by 0.2%. Author (ESA)

N82-25182# Societe de Fabrication d'Instruments de Mesure SFIM, Massy (France).

AN INTERMEDIATE SOLUTION BETWEEN BASIC AND EXPANDED AIRCRAFT INTEGRATED DATA SYSTEMS (AIDS) c35

Claude Robert *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 277-300 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

A single digital flight data acquisition and management unit, divided for reliability into two parts, is proposed as an alternative to ARINC 717. One part deals with mandatory parameters which are sampled, coded, and transmitted in a PCM stream to the digital flight data recorder. The second part processes the parameters and is user programmable. Analysis consists of exceedance processing (e.g., engine, nacelle) gas pass analysis, AIDS monitoring and aircraft system warning from the flight warning computer. Airline response indicates that this system meets their requirements. Author (ESA)

N82-25183# Lockheed Aircraft Service, Inc., Ontario, Calif.

FLIGHT DATA RECOVERY UNDER ADVERSE CONDITIONS

E. J. Rosenbauer *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 301-322 ref

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

Methods for overcoming data loss, including bit dump, bit shift, forward and reverse readout, time displacement compensation (TDC), wideband TDC, and supersynchronization are discussed. Supersynchronization systems recognize acquisition of any one sync word as an in-sync condition and process accordingly. They open a window prior to the end of the subframe which enables the circuit to look for the next sync work up to 8 bits early. A feedback loop enables one shot timing methods to track the average bit rate automatically. A time duration equal to 70.7% of the average bit period is recommended. A digital bit averaging technique, in which the bit decision time is determined by the average of the two previous bits, gives excellent results. With forward and reverse processing, data are processed in the usual way through the engineering conversion process. Valid data, prior to the out of sync area, look normal. The computer then goes to the end of the subframe and processes data from this point backwards toward the sync loss area. Author (ESA)

N82-25184# United Technologies Corp., Windsor Locks, Conn.

GAS PATH ANALYSIS OF COMMERCIAL AIRCRAFT ENGINES

Louis A. Urban *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 323-357

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

A mathematical means of determining overall engine performance, individual module performance and sensor performance from any specified set of engine parameters is introduced. If Ze = HeXe, where Ze is a set of engine measurement deltas, X2 is a set of engine module deviations and He is a set of partial derivatives, interrelating the two sets, it follows that Xe can be solved for by taking the product of Ze times the inverse of He (the diagnostic matrix). A maximum likelihood estimation technique ensures that measurements are noise free. Operating mode can include in-flight or ground-based analysis. Airline experience shows that gas path analysis is cost effective and technically sound. Author (ESA)

N82-25185# Technische Universitaet, Brunswick (West Germany). Lehrstuhl fuer Flugmechanik.

GROUND SPEED MEASUREMENT FROM DME/VHF OMNIRANGE NAVIGATION (VOR) DATA

P. Voersmann *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 359-380 refs

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

Off-line computer results of DME/VOR ground speed are compared with data from an airborne inertial navigation system platform. Signal properties of DME/VOR data are discussed, and requirements for filtering the data are stated. Best agreement between the two systems (within 2 knots) is achieved when the aircraft is flying on a constant radial, i.e., when the radial ground speed is negligibly small. Oscillation of the radial ground speed component around low frequencies is attributed to hardware limitations. Author (ESA)

N82-25186# British Aluminum Co., Ltd., London (England).

GATHERING AND ANALYSING DATA ON THE BRITISH AIRWAYS BOEING 757 AIRCRAFT

Peter Waller *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p 381-393

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

The maintenance and operational benefits of a data system connected to 24 serial digital data paths between avionics units are described. The set up includes a quick access recorder with on onboard playback capability, using a printer-plotter on the flight deck. A single unit collects, processes and distributes parameters. Separate processors handle the mandatory and integrated data system operations. Any parameter can be displayed, call up being through a simple mnemonic. Routine evaluation programs monitor flight operations, propulsion units, autoland performance and integrity, fuel performance, and the autoflight system. Engineers can request a printout of the times at which defined points of the flight occured, and use these to define the time at which reported incidents happened. The relevant parameters for this, and adjacent times, are quickly available. Author (ESA)

N82-25188# Leigh Instruments Ltd., Carleton Place (Ontario).

VALUE OF SURVIVABILITY AND RECOVERABILITY OF

FLIGHT DATA RECORDERS

James W. Wells and W. Donald Wells *In* DFVLR Proc. of the 11th Symp on Aircraft Integrated Data Systems Nov. 1981 p 419-440 refs
Avail: NTIS HC A20/MF ; DFVLR, Cologne DM 122,90

Alternative design approaches to provide survival recorded flight information offer different degrees of effectiveness. The method of protecting recorded information selected in a given application should be that which provides the most economically effective capability. The value of accident information is derived from its usefulness in accident prevention. Capability and design trades for survivability versus contributions to usefulness of information is considered in terms of economic measurement. A method is outlined for assessing recorder survivability and recoverability direct benefits, (reduced cost of investigating accident or criminal intent) and bottom line benefits (reduction of aircraft grounding expenses or reduction of fault correction cost by more reliable data inputs). A.R.H.

N82-25189# British Aluminum Co., Ltd., London (England).

ANALYSIS OF TRANSIENT DATA FROM AIRCRAFT GAS TURBINE ENGINES USING AIDS

E. R. White *In* DFVLR Proc. of the 11th Symp. on Aircraft Integrated Data Systems Nov. 1981 p441-453

Avail: NTIS HC A20/MF A01; DFVLR, Cologne DM 122,90

Takeoff margin trending is used to illustrate engine monitoring, using in-flight data. For each takeoff, engine pressure ratio (EPR) data are collected at 80 knots, and the peak turbine temperature prior to liftoff is modified by an amount equal to any subsequent throttle movement. Total air temperature at 100 knots is converted to a static air temperature by subtracting an amount equivalent to the ram rise. Peak turbine temperature is corrected to ISA conditions, then for EPR, to a full rated takeoff level. This gives the turbine temperature that the engine would have produced at a full rated thrust under ISA conditions. The corrected temperature is subtracted from the red line limit, giving a margin which is plotted as a historical trend. These margins agree almost exactly with ground run data. Author (ESA)

N82-25192# Stellenbosch Univ. (South Africa). Dept. of Engineering.

PREDICTION OF WING SIDE-EDGE SUCTION FORCES AND MAXIMUM INVISCID LIFT Ph.D. Thesis

C. Redelinghuys Sep. 1981 244 p refs
Avail: NTIS HC A11/MF A01

The possibility of predicting the characteristics of low aspect-ratio wings theoretically is investigated. A literature survey on theoretical techniques for edge separated flows, vortex breakdown and maximum theoretical wing lift is presented. It is shown that prediction of the maximum theoretical lift by means of the suction analogy leads to results which differ from those obtained by means of previous techniques. Comparisons with experiment shows that low aspect ratio rectangular wings do achieve lift coefficients close to the theoretical maximum value. A new method, based on Lan's quasi-vortex-lattice method and the suction analogy, is developed for the prediction of the aerodynamics of unconventional planforms. Author

N82-25193*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AN ANALYTICAL PROCEDURE FOR COMPUTING SMOOTH TRANSITIONS BETWEEN TWO SPECIFIED CROSS SECTIONS WITH APPLICATIONS TO BLENDED WING BODY CONFIGURATION

Raymond L. Barger May 1982 20 p refs
(NASA-TP-2012; L-15063; NAS 1.60:2012) Avail: NTIS HC A02/MF A01 CSCL 01A

An analytical procedure is described for designing smooth transition surfaces for blended wing-body configurations. Starting from two specified cross section shapes, the procedure generates a gradual transition from one cross section shape to the other as an analytic blend of the two shapes. The method utilizes a conformal mapping, with subsequent translation and scaling, to transform the specified and shapes to curves that can be combined more smoothly. A sample calculation is applied to a blended wing-body missile type configuration with a top mounted inlet. S.L.

N82-25194*# Boeing Commercial Airplane Co., Seattle, Wash.

A HARMONIC ANALYSIS METHOD FOR UNSTEADY TRANSONIC FLOW AND ITS APPLICATION TO THE FLUTTER OF AIRFOILS Final Report

F. Edward Ehlers and Warren H. Weatherill Washington NASA May 1982 151 p refs
(Contract NAS1-15957)
(NASA-CR-3537; NAS 1.26:3537; D6-48821) Avail: NTIS HC A08/MF A01 CSCL 01A

A finite difference method for solving the unsteady transonic flow about harmonically oscillating wings is investigated. The procedure is based on separating the velocity potential into steady and unsteady parts and linearizing the resulting unsteady differential equation for small disturbances. The differential equation for the unsteady velocity potential is linear with spatially varying coefficients and with the time variable eliminated by assuming harmonic motion. A study is presented of the shock motion associated with an oscillating airfoil and its representation by the harmonic procedure. The effects of the shock motion and the resulting pressure pulse are shown to be included in the harmonic pressure distributions and the corresponding generalized forces. Analytical and experimental pressure distributions for the NACA 64A010 airfoil are compared for Mach numbers of 0.75, 0.80 and 0.842. A typical section, two-degree-of-freedom flutter analysis of a NACA 64A010 airfoil is performed. The results show a sharp transonic bucket in one case and abrupt changes in instability modes. Author

N82-25196*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

WIND-TUNNEL/FLIGHT CORRELATION, 1981

L. Wayne McKinney, ed. and Donald D. Baals, ed. Jun. 1982 224 p refs Workshop held at Hampton, Va., 19-20 Nov. 1981
(NASA-CP-2225; L-15368; NAS 1.55:2225) Avail: NTIS HC A10/MF A01 CSCL 14B

Wind-tunnel/flight correlation activities are reviewed to assure maximum effectiveness of the early experimental programs of the National Transonic Facility (NTF). Topics included a status report of the NTF, the role of tunnel-to-tunnel correlation, a review of past flight correlation research and the resulting data base, the correlation potential of future flight vehicles, and an assessment of the role of computational fluid dynamics.

N82-25197*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

STATUS OF THE NATIONAL TRANSONIC FACILITY

Robert L. Swain *In its* Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 1-21

Avail: NTIS HC A10/MF A01 CSCL 14B

Construction status of major tunnel systems/subsystems of the National Transonic Facility, an advanced high Reynolds number capability wind tunnel utilizing cryogenic nitrogen as the fluid medium is presented. N.W.

N82-25198*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

REVIEW OF THE 1980 WIND-TUNNEL/FLIGHT CORRELATION PANEL

Theodore G. Ayers *In* NASA. Langley Research Center Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 23-32 refs

Avail: NTIS HC A10/MF A01 CSCL 01A

Wind tunnel/flight correlation history from the P-51 to the F-8 supercritical wing is reviewed, showing that researchers continue to be faced with nearly identical discrepancies in predicted versus measured drag. The capabilities of the National Transonic Facility to allow assessment of the effects which have heretofore plagued researchers and aircraft designers are anticipated. N.W.

N82-25199*# Lockheed-Georgia Co., Marietta.

WIND-TUNNEL/FLIGHT-DRAG CORRELATION

John H. Peterson *In* NASA. Langley Research Center Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 33-46 refs
Avail: NTIS HC A10/MF A01 CSCL 01A

Predicted and flight-test drag on the C-5A and the C-141 are correlated. Equivalent rigid flight-test profile drag and a rigid estimate based on wind tunnel data are also correlated. Correlations for the National Transonic Facility are included. N.W.

N82-25200*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TUNNEL-TO-TUNNEL CORRELATION
Frank W. Steinle, Jr. *In* NASA. Langley Research Center Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 47-63 refs

Avail: NTIS HC A10/MF A01 CSCL 01A

Flow quality is discussed. Incremental comparisons of: (1) the angle of attack, (2) the axial force coefficient, and (3) the base cavity axial force coefficient against the normal force coefficient are presented. Relative blockage determination, relative buoyancy corrections, and boundary layer transition length are discussed. Blockage buoyancy caused by tunnel model wall dynamic interaction is discussed in terms of adaptive walls. The effect of 'transonic turbulence factor' is considered. N.W.

N82-25201*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL/FLIGHT CORRELATION PROGRAM ON XB-70-1
John B. Peterson, Jr. *In its* Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 65-91 refs

Avail: NTIS HC A10/MF A01 CSCL 01A

The XB-70-1 was selected for a wind-tunnel/flight correlation program as representative of a large, flexible supersonic airplane similar to a supersonic transport. Tests were made to determine the effects of control deflections, wing tip deflection, and variations in inlet mass flow (additive drag). N.W.

N82-25202*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROBLEMS IN CORRELATION CAUSED BY PROPULSION SYSTEMS
Ronald H. Smith *In its* Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 93-108 ref

Avail: NTIS HC A10/MF A01 CSCL 01A

Correlation efforts and selected results for transonic drag are reviewed. A process to reduce the typical error sources to decrease the errors inherent in the transonic aircraft development process is summarized. Author

N82-25203*# McDonnell Aircraft Co., St. Louis, Mo.
F-15 WIND-TUNNEL/FLIGHT CORRELATIONS
Larry G. Niedling *In* NASA. Langley Research Center Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 109-115 refs
Avail: NTIS HC A10/MF A01 CSCL 01A

F-15 correlation data for longitudinal control and inlet-ramp effectiveness, and horizontal-tail setting for trim are presented. The Reynolds number effect on airfoil laminar bubble burst is included. N.W.

N82-25206*# Boeing Commercial Airplane Co., Seattle, Wash.
OPPORTUNITIES FOR WIND-TUNNEL/FLIGHT CORRELATION WITH NEW BOEING AIRPLANES
Adelbert L. Nagel *In* NASA. Langley Research Center Wind-Tunnel-Flight Correlation, 1981 Jun. 1982 p 141-157

Avail: NTIS HC A10/MF A01 CSCL 01A

The use of correlated data in airplane development is discussed. Areas of interest include initial airworthiness of an aircraft, low-speed configuration optimization, and high-speed configuration optimization. Data from wind tunnel tests are shown to be significant when applied to guarantee compliance, which includes fuel consumption, airspeeds, and takeoff and landing performance. The use of correlation in achieving FAA certification is also discussed. T.M.

N82-25207*# General Dynamics/Fort Worth, Tex.
F-16E PROGRAM OVERVIEW AND WIND TUNNEL/FLIGHT CORRELATION
A. P. Madsen *In* NASA. Langley Research Center Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 159-172 ref

Avail: NTIS HC A10/MF A01 CSCL 01A

Correlation is defined in three different ways: comparisons of wind tunnel and/or theory with flight results; detailed studies of total vehicle drag from wind tunnel and flight tests; and attempts to understand the fundamental mechanisms of fluid flows associated with aircraft components in specific areas of the flight environment. The F-16E configuration is an outgrowth of studies conducted to produce a refined fighter wing design. Several iterations required to arrive at the combination of wing planform, camber, and twist which gives near optimum lift, drag, and high-angle-of-attack stability. Theoretical analyses were backed up by extensive experimental data to validate the design and are presented. T.M.

N82-25209*# Grumman Aerospace Corp., Bethpage, N.Y.
X-29A FORWARD-SWEPT-WING DEMONSTRATOR AIRPLANE
Douglas R. Frei *In* NASA. Langley Research Center Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 177-189

Avail: NTIS HC A10/MF A01 CSCL 01A

The X-29A is a technology demonstrator. The FSW is just one of the technologies. Others include the following: discrete variable camber, relaxed static stability, triplex digital fly-by-wire (FBW) control system, variable-incidence/close-coupled canard, aeroelastically tailored composite wing, and thin supercritical airfoil. The growth potential for additional technologies is shown. T.M.

N82-25211*# Massachusetts Inst. of Tech., Cambridge.
APPLICATION OF COMPUTATIONAL FLUID DYNAMICS (CFD) IN TRANSONIC WIND-TUNNEL/FLIGHT-TEST CORRELATION
Earl M. Murman *In* NASA. Langley Research Center Wind-Tunnel/Flight Correlation, 1981 Jun. 1982 p 199-215 refs

Avail: NTIS HC A10/MF A01 CSCL 01A

The capability for calculating transonic flows for realistic configurations and conditions is discussed. Various phenomena which were modeled are shown to have the same order of magnitude on the influence of predicted results. It is concluded that CFD can make the following contributions to the task of correlating wind tunnel and flight test data: some effects of geometry differences and aeroelastic distortion can be predicted; tunnel wall effects can be assessed and corrected for; and the effects of model support systems and free stream nonuniformities can be modeled. T.M.

N82-25214*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELASTIC DEFORMATION EFFECTS ON AERODYNAMIC CHARACTERISTICS FOR A HIGH-ASPECT-RATIO SUPERCRITICAL-WING MODEL
Judith J. Watson May 1982 28 p refs
(NASA-TM-83286; L-15098; NAS 1.15:83286) Avail: NTIS HC A03/MF A01 CSCL 01A

The results of an investigation of the deformations of a high-aspect-ratio, force/pressure, supercritical-wing model during wind tunnel tests and the effects these deformations have on the wing aerodynamics are presented. A finite element model of the wing was developed, and then, for conditions corresponding to wind tunnel test points, experimental aerodynamic loads and theoretical aerodynamic loads were applied to the finite element model. Comparisons were made between the results of these load conditions for changes in structural deflections and for changes in aerodynamic characteristics. The results show that the deformations are quite small and that the pressure data are not significantly affected by model deformation. B.W.

N82-25215*# Northrop Corp., Hawthorne, Calif. Aircraft Div.
WATER TUNNEL FLOW VISUALIZATION AND WIND TUNNEL DATA ANALYSIS OF THE F/A-18
Gary E. Erickson May 1982 268 p refs Original contains color illustrations 2 Vol.
(Contract NAS1-16617)
(NASA-CR-165859; NAS 1.26:165859) Avail: NTIS HC A12/MF A01 CSCL 01A

Six degree of freedom studies were utilized to extract a band of yawing and rolling moment coefficients from the F/A-18 aircraft flight records. These were compared with 0.06 scale model data obtained in a 16T wind tunnel facility. The results, indicate the flight test yawing moment data exhibit an improvement over the wind tunnel data to near neutral stability and a significant reduction in lateral stability (again to anear neutral level). These data are consistent with the flight test results since the motion was characterized by a relatively slo departure. Flight tests repeated the slow yaw departure at M 0.3. Only 0.16 scale model wind tunnel data showed levels of lateral stability similar to the flight test results. Accordingly, geometric modifications were investigated on the 0.16 scale model in the 30x60 foot wind tunnel to improve high angle of attack lateral stability. S.L.

N82-25216*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUBSONIC AERODYNAMIC AND FLUTTER CHARACTERISTICS OF SEVERAL WINGS CALCULATED BY THE SOUSSA P1.1 PANEL METHOD
E. Carson Yates, Jr., Herbert J. Cunningham, Robert N. Desmarais, Walter A. Silva, and Bohdan Drobenko May 1982 21 p refs
Presented at the AIAA/ASME/ASCE/AHS 23rd Structures, Structural Dynamics and Materials Conf., New Orleans, 10-12 May 1982
(NASA-TM-84485; NAS 1.15:84485) Avail: NTIS HC A02/MF A01 CSCL 01A

The SOUSSA (steady, oscillatory, and unsteady subsonic and supersonic aerodynamics) program is the computational implementation of a general potential flow analysis (by the Green's function method) that can generate pressure distributions on complete aircraft having arbitrary shapes, motions and deformations. Some applications of the initial release version of this program to several wings in steady and oscillatory motion, including flutter are presented. The results are validated by comparisons with other calculations and experiments. Experiences in using the program as well as some recent improvements are described. S.L.

N82-25217*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL DETERMINATION OF FLOW-INTERFERENCE EFFECTS OF WING-MOUNTED, TWO-DIMENSIONAL, FULL-CAPTURE PROPULSION NACELLES IN CLOSE PROXIMITY TO A VEHICLE BODY AT A MACH NUMBER OF 6
Walter A. Vahl May 1982 36 p refs
(NASA-TM-83287; L-15209; NAS 1.15:83287) Avail: NTIS HC A03/MF A01 CSCL 01A

Experimental tests have been conducted to determine possible aerodynamic interference effects due to the lateral positioning of two dimensional propulsion nacelles mounted on a wing surface in close proximity to a vehicle body. The tests were conducted at a Mach number of 6 and a Reynolds number 7 million per foot. The angle of attack range for force tests was -9 deg to 9 deg. The model configurations consisted of combinations of rectangular and trapezoidal cross section bodies with a wing swept 65 and a rectangular planform wing. A pair of two dimensional, flow through propulsion nacelles simulated full capture inlet operation. S.L.

N82-25218*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THRUST-INDUCED EFFECTS ON LOW-SPEED AERODYNAMICS OF FIGHTER AIRCRAFT
Daniel W. Banks, P. Frank Quinto, and John W. Paulson, Jr. May 1982 25 p refs
(NASA-TM-83277; NAS 1.15:83277) Avail: NTIS HC A02/MF A01 CSCL 01A

Results of NASA Langley has conducted wind-tunnel investigations of several fighter configurations conducted to determine the effects of both thrust vectoring and spanwise blowing are reviewed. A recent joint NASA/Grumman Aerospace Corporation/U.S. Air Force Wright Aeronautical Laboratory wind-tunnel investigation was conducted to examine the effects of spanwise blowing on the trailing-edge flap system. This application contrasts with the more familiar method of spanwise blowing near the wing leading edge. Another joint program among NASA/McDonnell Aircraft Company/U.S. Air Force Wright Aeronautical Laboratory investigated the effects of reverse thrust on the low-speed aerodynamics of an F-15 configuration. The F-15 model was fitted with a rotating van thrust reverser concept which could simulate both in-flight reversing for approach and landing or full reversing for ground roll reduction. The significant results of these two joint programs are reported. A.R.H.

N82-25219*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRODUCTION VERSION OF THE EXTENDED NASA-LANGLEY VORTEX LATTICE FORTRAN COMPUTER PROGRAM. VOLUME 1: USER'S GUIDE
John E. Lamar and Henry E. Herbert Apr. 1982 176 p refs
(NASA-TM-83303; NAS 1.15:83303) Avail: NTIS HC A08/MF A01 CSCL 01A

The latest production version, MARK IV, of the NASA-Langley vortex lattice computer program is summarized. All viable subcritical aerodynamic features of previous versions were retained. This version extends the previously documented program capabilities to four planforms, 400 panels, and enables the user to obtain vortex-flow aerodynamics on cambered planforms, flowfield properties off the configuration in attached flow, a planform longitudinal load distributions. Author

N82-25220# Wisconsin Univ. - Madison. Mathematics Research Center.
NONLINEAR TWO-DIMENSIONAL SAIL THEORY
Jean-Marc Vanden-Broeck Oct. 1981 20 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A110450; MRC-TSR-2293) Avail: NTIS HC A02/MF A01 CSCL 01/3

Steady two-dimensional flow past a sail is considered. The sail is assumed to be supported by two masts. The flow and the shape of the sail are determined as functions of the direction alpha of the flow at infinity and the Weber number lambda. The full nonlinear problem is formulated as an integro-differential equation for the shape of the sail. This equation is discretized and solved numerically by Newton's method. Sail profiles, the slack in the sail, and the lift coefficient are presented for various values of alpha and lambda. GRA

N82-25221# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
ON THE AERODYNAMICS OF WINDBLAST Final Technical Report
Daniel J. Schneck 13 Nov. 1981 51 p refs
(Grant AF-AFOSR-3706-78)
(AD-A110495; VPI-E-81-31; AFOSR-82-0031TR) Avail: NTIS HC A04/MF A01 CSCL 20/4

In two previous reports (Schneck, 1976, 1979) a mathematical theory was developed in order to calculate the aerodynamic loading to which a pilot is exposed during high speed ejections. Neglecting the effects of flow separation, preliminary results suggested that the pilot's musculo-skeletal resistance is not likely to withstand the tendency for dislodgement from a restraining surface if he is ejecting at Mach numbers exceeding 0.72. Recently (Schneck, 1979) the mathematical theory of windblast was modified to include some effects of flow separation. In the report that follows, these effects are examined in greater detail, particularly as they affect the time-course of limb dislodging forces after the onset of windblast. GRA

N82-25223# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EXPERIMENTAL ANALYSIS OF THE EFFECTS OF SWEEP AND ASPECT RATIO ON INCOMPRESSIBLE FLOW ABOUT FORWARD SWEPT WINGS M.S. Thesis
Paul W. Savage Dec. 1981 142 p refs
(AD-A111128; AFIT/GAE/AA/81D-26) Avail: NTIS HC A07/MF A01 CSCL 01/3

Low speed wind tunnel tests were conducted on nine wing planforms to determine the effect of sweep and aspect ratio on forward swept wings in incompressible flow. Sweep angles tested were -15, -30 and -45 degrees. Aspect ratios ranged from 2.05 to 4.79. A NACA 0006 airfoil section perpendicular to the leading edge was used for all models. Results showed increasing negative sweep decreased lift curve slope and shifted the aerodynamic center rearward. Increasing aspect ratio increased lift curve slope, decreased drag coefficient and shifted the aerodynamic center rearward. The wind tunnel aerodynamic data were compared to the Air Force Flight Dynamics Laboratory's Large Aircraft Performance Prediction Program to determine the program's ability to predict forward swept wing aerodynamic coefficients. At incompressible Mach numbers, the program was found to be accurate in predicting lift curve slope in the linear range using a positive sweep input. Drag Polar slope and moment coefficient were accurately predicted for lift coefficients below 0.4 using a negative sweep angle input. Neither positive nor negative angle input predicted maximum lift coefficient accurately. Author (GRA)

N82-25226# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

INVESTIGATION OF UPWIND SCHEMES FOR FINITE ELEMENT ANALYSIS OF TRANSONIC FLOW OVER THIN AIRFOILS M.S. Thesis
Dennis L. Hunt Dec. 1981 93 p refs
(AD-A111168; AFIT/GAE/AA/81D-15) Avail: NTIS HC A05/MF A01 CSCL 20/4

Two finite element upwind techniques were investigated to see if convergent solutions could be obtained from the transonic potential equation for steady flow over thin airfoils. The first technique involves the use of parabolic upwind functions, that when added to the shape functions weight the upstream node in the supersonic region more than the downwind nodes. The second technique integrates the finite element equations over the area that influences the solution (i.e., the area inside a mach cone). Author (GRA)

N82-25226# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
STARTING TRANSIENTS IN SUPERSONIC NOZZLES AND NOZZLE-DIFFUSER ASSEMBLIES M.S. Thesis
Thomas Gregory Gates Dec. 1981 47 p refs
(AD-A111143; AFIT/GA/AA/81D-6) Avail: NTIS HC A03/MF A01 CSCL 20/4

In this investigation, the flow processes involved in shock induced starting of nozzles and diffusers similar to those used in gasdynamic lasers were studied. Two geometrically similar nozzles were used. The throat opening in the large single nozzle was 0.276 inches. The other was an array of nine nozzle passages in which the throat opening was 0.069 inches. Downstream of the nine nozzles were nine diffusers whose minimum opening was 0.286 inches. These 2-dimensional nozzles and diffusers were 0.75 inches thick. A fully started condition of uniform supersonic flow was achieved throughout the entire test area for both test sections. The processes leading to this condition were highly dynamic and complicated. It was found that successful starting depended not only on the initial diaphragm pressure ratio, but also the downstream test cell configuration. Starting the large single nozzle was enhanced by an increase of flow channel just downstream from the nozzle. This decreased the strength of the incident shock wave and there by increased the pressure ratio applied across the nozzle. As a result, the gasdynamic starting shock could pass on out of the nozzle at lower shock tube diaphragm pressure ratios than would have been the case if the area had remained constant in the flow channel behind the nozzle. GRA

N82-25230# Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
THE FFA WING BODY 81 COMPUTER PROGRAM. A PANEL METHOD FOR DETERMINATION OF AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND SUPERSONIC SPEEDS
Sven G. Hedman and Lars G. Tysell 1982 36 p refs
(Contract FMV-F-INK-82223-78-170-21-001)
(FFA-TN-AU-1601) Avail: NTIS HC A03/MF A01

A panel program is extended in order to account for unsymmetric configurations and flow fields symmetric, antisymmetric or unsymmetric to the vertical plane. Input instructions are given. The program calculates pressure distribution for completely specified geometries, wing camber for given load distributions, and wing camber for minimum drag with given values of lift and pitching moment. The body length is divided into intervals each with a distribution of sources or doublets of either constant or linearly varying intensity. The boundary condition is fulfilled on the body surface midway between the ends of an interval. Compressible velocities are obtained by the Goethert rule and alternatively for the wing by a semiempirical compressibility correction method, based on the nonlinear compressibility effects in the flow about two-dimensional and sheared wings. Comparison of results with known data shows that the program works best for subsonic load calculations, involving elastic airplanes. Author (ESA)

N82-25231# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
MODIFIED VERSION OF LTRAN2: A CALCULATION METHOD FOR INVISCID TRANSONIC FLOW ABOUT THIN AIRFOILS IN MODERATELY SLOW UNSTEADY MOTION
J. vanderVooren and G. H. Huizing 26 Jun. 1980 54 p refs
(Contract NIVR-1814)
(NLR-TR-80059-U) Avail: NTIS HC A04/MF A01

A method for strictly slow unsteady motions is modified by including extra unsteady terms in the boundary conditions. The unsteady transonic small perturbation equation and the airfoil, wake and far field boundary conditions are derived heuristically. A radiation condition on the far field boundary which accommodates outgoing disturbances only is presented. Analysis shows that the infinite physical domain surrounding the airfoil can not be mapped onto a finite computational domain. Numerical experiments on an airfoil oscillating in pitch at reduced frequencies 0.05 and 0.1 for a freestream Mach number = 0.85, and zero angle of attack show that radiation condition can reduce the computational domain and the number of grid points. Author (ESA)

N82-25232# National Aerospace Lab., Amsterdam (Netherlands). Informations Div.
COMPARISON OF BOUNDARY LAYER CALCULATIONS FOR THE ROOT SECTION OF A WING. THE SEPTEMBER 1979 AMSTERDAM WORKSHOP TEST CASE
J. P. F. Lindhout, B. vandenBerg, and A. Elsenaar 6 Mar. 1981 71 p refs
(NLR-MP-80028-U) Avail: NTIS HC A04/MF A01

Integral and field method calculations of three-dimensional turbulent boundary layer development, including separation, on the root section of a swept wing are compared. Although the predicted position of the separation region varies, all methods give a good global impression of the state of the nonseparated part of the three-dimensional boundary layer. In the weakly three-dimensional region of the flow, agreement between the results is very good. In the strongly three-dimensional region, variation is considerable. Field methods vary more than integral methods. The integral methods are on average ten times faster than the field methods. Author (ESA)

N82-25233# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler.
THE PROBLEM OF CALCULATION OF THE FLOW AROUND HELICOPTER ROTOR BLADE TIPS
H. Stahl 19 Aug. 1981 22 p refs Presented at 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981; sponsored by DGLR
(MBB-UD-330-81-O) Avail: NTIS HC A02/MF A01

Computational problems that arise with the theoretical analysis of the flow around rotary wing blade tips are evoked. The modification of existing computer programs in order to handle three-dimensional, unsteady, rotational flow that, on the advancing blade in fast forward flight, can also be transonic is discussed. Potential flow theory is presented. A program for steady three-dimensional flow past a fixed wing was adapted for a rotating blade, taking into account the irrotational condition of the applied theory. Calculations show that this approach leads to an acceptable description of the actual flow. Author (ESA)

N82-25234# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler und Verkehr.
PROGRAM PRESENTATION OF THE WORKING GROUP SEPARATED FLOW: PROBLEMS WITH ROTARY WINGS [PROGRAM-PRAESENTATION DER ARBEITSGEMEINSCHAFT STROEMUNGEN MIT ABLOESUNGEN (STAB): THEMENKREIS DREHFLUEGEL]
G. Polz 19 Mar. 1981 19 p In GERMAN
(MBB-UD-336-81-O) Avail: NTIS HC A02/MF A01

With reference to propellers and rotors, relevent separation phenomena and their resulting effects are described. These include stress induced separation at the blade tip associated with high Mach numbers, separation due to exceeding maximum lift for low Mach numbers, and vortex induced separation. Cause/effect relationships with advancing blade tip vortices are emphasized. All of these separation phenomena have a negative influence on performance and economy in flight management. As for helicopter rotors, the identified extremely high dynamic flight loads can cause acute structural loading and vibration. Minimization of flow separation and its effects is possible by improving blade profiles, optimizing blade shapes (planform/warpage), and by developing blade tips. Author (ESA)

N82-25235*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EVALUATION OF A VOICE RECOGNITION SYSTEM FOR

THE MOTAS PSEUDO PILOT STATION FUNCTION
Jacob A. Houck Apr. 1982 57 p refs
(NASA-TM-84487; NAS 1.15:84487) Avail: NTIS HC A04/MF A01 CSCL 17G

The Langley Research Center has undertaken a technology development activity to provide a capability, the mission oriented terminal area simulation (MOTAS), wherein terminal area and aircraft systems studies can be performed. An experiment was conducted to evaluate state-of-the-art voice recognition technology and specifically, the Threshold 600 voice recognition system to serve as an aircraft control input device for the MOTAS pseudo pilot station function. The results of the experiment using ten subjects showed a recognition error of 3.67 percent for a 48-word vocabulary tested against a programmed vocabulary of 103 words. After the ten subjects retrained the Threshold 600 system for the words which were misrecognized or rejected, the recognition error decreased to 1.96 percent. The rejection rates for both cases were less than 0.70 percent. Based on the results of the experiment, voice recognition technology and specifically the Threshold 600 voice recognition system were chosen to fulfill this MOTAS function. Author

N82-25238*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
AN AIRCRAFT SENSOR FAULT TOLERANT SYSTEM Interim Report
Alper K. Caglayan and Roy E. Lancraft Apr. 1982 113 p refs
(Contract NAS1-16579)
(NASA-CR-165876; NAS 1.26:165876; BBN-4858) Avail: NTIS HC A06/MF A01 CSCL 17G

The design of a sensor fault tolerant system which uses analytical redundancy for the Terminal Configured Vehicle (TCV) research aircraft in a Microwave Landing System (MLS) environment was studied. The fault tolerant system provides reliable estimates for aircraft position, velocity, and attitude in the presence of possible failures in navigation aid instruments and onboard sensors. The estimates, provided by the fault tolerant system, are used by the automated guidance and control system to land the aircraft along a prescribed path. Sensor failures are identified by utilizing the analytic relationship between the various sensor outputs arising from the aircraft equations of motion. E.A.K.

N82-25239*# Hampton Inst., Va.
[COST AND FUEL CONSUMPTION PER NAUTICAL MILE FOR TWO ENGINE JET TRANSPORTS USING OPTIM AND TRAGEN] Final Report
John F. Wiggs 30 Apr. 1982 280 p
(Grant NAG1-69)
(NASA-CR-168973; NAS 1.26:168973) Avail: NTIS HC A13/MF A01 CSCL 01C

The cost and fuel consumption per nautical mile for two engine jet transports are computed using OPTIM and TRAGEN. The savings in fuel and direct operating costs per nautical mile for each of the different types of optimal trajectories over a standard profile are shown. S.L.

N82-25240*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LEADING EDGE FLAP SYSTEM FOR AIRCRAFT CONTROL AUGMENTATION Patent Application
Dhanvada M. Rao, inventor (to NASA) (Old Dominion Univ.) Filed 10 Sep. 1981 15 p Sponsored by NASA
(NASA-Case-LAR-12787-1; US-Patent-Appl-SN-301078) Avail: NTIS HC A02/MF A01 CSCL 01C

Traditional roll control systems such as ailerons, elevons or spoilers are least effective at high angles of attack due to boundary layer separation over the wing. Independently deployed leading edge flaps on the upper surfaces of vortex stabilized wings are used to shift the center of lift outboard. A rolling moment is created that is used to control roll in flight at high angles of attack. The effectiveness of the rolling moment increases linearly with angle of attack. No adverse yaw effects are induced. In an alternate mode of operation, both leading edge flaps are deployed together at cruise speeds to create a very effective airbrake without appreciable modification in pitching moment. Little trim change is required. NASA

N82-25241*# National Aeronautics and Space Administration, Washington, D. C.
AERODYNAMICS/ACEE: AIRCRAFT ENERGY EFFICIENCY
1981 8 p refs
(NASA-Facts-94/8-81) Avail: NTIS HC A02/MF A01 CSCL 01C

An overview is presented of a 10 year program managed by NASA which seeks to make possible the most efficient use of energy for aircraft propulsion and lift as well as provide a technology that can be used by U.S. manufacturers of air transports and engines. Supercritical wings, winglets, vortex drag reduction, high lift, active control, laminar flow control, and aerodynamics by computer are among the topics discussed. Wind tunnel models in flight verification of advanced technology, and the design, construction and testing of various aircraft structures are also described. A.R.H.

N82-25242*# National Aeronautics and Space Administration, Washington, D. C.
MATERIALS AND STRUCTURES/ACEE
1981 8 p
(NASA-Facts-117/8-81) Avail: NTIS HC A02/MF A01 CSCL 01C

Light weight composites made from graphite fibers, glass, or man made materials held in an epoxy matrix, and their application to airframe design are reviewed. The Aircraft Energy Efficiency program is discussed. Characteristics of composites, acceptable risks, building parts and confidence, and aeroelastic tailoring are considered. N.W.

N82-25243# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
STATISTICAL REVIEW OF COUNTING ACCELEROMETER DATA FOR NAVY AND MARINE FLEET AIRCRAFT FROM 1 JANUARY 1962 TO 30 JUNE 1981 Semiannual Summary Report
Warren J. Williams 1 Nov. 1981 149 p
(AD-A110660; NADC-13920-2) Avail: NTIS HC A07/MF A01 CSCL 01/1

This is a semi-annual progress report, and it presents a specialized summary of the data in the counting accelerometer program. Statistics describing Navy and Marine aircraft cumulative g-count exceedances are calculated and tabulated. These tabulations are separated by calendar time and into four major categories of fleet experience: Navy Training, Navy Combat, Marine Training, and Marine Combat. These data show that the load rate distributions (counts at 1000 hours) for most models and most g-levels have a non-normal distribution. Within a model (A-7E, F-4N, etc.) differences in the average load rates exist when data are separated by calendar time or mission category. Author (GRA)

N82-25244# San Antonio Air Logistics Center, Kelly AFB., Tex.
OV-10A NOSE GEAR FORK DAMAGE ANALYSIS Final Report, Aug. 1980 - Sep. 1981
Kenneth F. Barnes and James L. Haines Jan. 1982 49 p refs
(AD-A111492; SA-ALC/MM-7588) Avail: NTIS HC A03/MF A01 CSCL 03/1

A limited Damage Tolerance Analysis (DTA) of the OV-10A nose gear fork was performed to determine the fracture characteristics at a location on the underside of the fork in a machined fillet radius just aft of the jack point. The analysis included determination of a landing load history, finite element stress analysis, stress spectrum development, stress intensity solution, crack growth analysis, and residual strength calculations. Author (GRA)

N82-25245# Boeing Military Airplane Development, Seattle, Wash. Advanced Airplane Branch.
FIREPROOF BRAKE HYDRAULIC SYSTEM Final Report, Jun. 1980 - Jun. 1981
S. M. Warren and J. R. Kilner Wright-Patterson AFB, Ohio AFWAL Sep. 1981 391 p refs
(Contract F33615-80-C-2026; AF Proj. 3145)
(AD-A111319; AFWAL-TR-81-2080) Avail: NTIS HC A17/MF A01 CSCL 01/2

The feasibility of a fireproof two-fluid brake hydraulic system which utilizes nonflammable chlorotrifluoroethylene (CTFE) fluid in a dead ended brake hydraulic system mechanically isolated from the primary MIL-H-5606 hydraulic system was studied. Experimental brake system hardware was designed, built and laboratory tested. Results indicate that the fireproof two-fluid brake hydraulic system concept is feasible, and the basic operation, control characteristics and stability of the brake system are not affected by the two-fluid configuration. The increased density of the CTFE fluid does not cause the hydraulic system to respond slower resulting in longer aircraft stopping distances. However, analysis indicates that the performance lost by changing to the CTFE fluid can be regained by increasing brake hydraulic line sizes and returning the antiskid control box. Author (GRA)

N82-25248# Arinc Research Corp., Annapolis, Md.
IMPROVEMENT PROGRAM FOR THE C-141 NAVIGATION SELECTOR PANEL Final Engineering Report
Henry L. Riser, Jr. Jan. 1982 20 p
(Grant F09603-80-G-3338-0012)
(AD-A111469; Rept-2315-11-1-2635) Avail: NTIS HC A02/MF A01 CSCL 01/4

This report presents the results of an engineering study to improve the reliability and maintainability of the Navigation Selector Panel, Part Number 75-89181, NSN 6605-01-038-6849JH, used in all models of the C-141 aircraft. The work described in this document was performed for the U. S. Air Force and specifically for the Reliability Engineering Branch, Item Management Division, MMIRCA-4, of Robins Air Force Base, Georgia, 31098. Maintenance date covering one year were obtained and analyzed. The items most often replaced were the lighted push-button switches in the assembly caused by poor switch design. Changes were recommended. Author (GRA)

N82-25249# Arinc Research Corp., Annapolis, Md.
ELECTRONIC WARFARE AVIONICS INTEGRATION SUPPORT FACILITY SUPPORT PROCESSOR Final Report
C. J. Manspeaker, F. M. Stamps, and C. W. Strack Nov. 1981 217 p refs
(Grant F09603-80-G-3338-0011)
(AD-A111641; Rept-2311-11-1-2568) Avail: NTIS HC A10/MF A01 CSCL 09/3

ARINC Research was tasked to perform a long-range study of the functional and system requirements of the Electronic Warfare Avionics Integration Support Facility (EWAISF) support processor. This document describes the results of the four phases of that effort: the definition of functional requirements for data processing equipment (ADPE) and Software, identification of alternative architectures to fulfill these requirements, and a cost benefit analysis of the alternatives. Also recommendations for implementing a preferred architecture and describes a means for updating the study are given. Author (GRA)

N82-25250*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STGSTK: A COMPUTER CODE FOR PREDICTING MULTISTAGE AXIAL FLOW COMPRESSOR PERFORMANCE BY A MEANLINE STAGE STACKING METHOD
Ronald J. Steinke May 1982 65 p refs
(NASA-TP-2020; E-551; NAS 1.60:2020) Avail: NTIS HC A04/MF A01 CSCL 21E

A FORTRAN computer code is presented for off-design performance prediction of axial-flow compressors. Stage and compressor performance is obtained by a stage-stacking method that uses representative velocity diagrams at rotor inlet and outlet meanline radii. The code has options for: (1) direct user input or calculation of nondimensional stage characteristics; (2) adjustment of stage characteristics for off-design speed and blade setting angle; (3) adjustment of rotor deviation angle for off-design conditions; and (4) SI or U.S. customary units. Correlations from experimental data are used to model real flow conditions. Calculations are compared with experimental data. Author

N82-25251*# National Aeronautics and Space Administration. Washington, D. C.
PROPULSION/ACEE
1981 12 p
(NASA-Facts-93/8-81) Avail: NTIS HC A02/MF A01 CSCL 21E

The research objectives of the NASA aircraft energy efficiency program are summarized. Engine component improvements for turbofan engines, diagnostics, the development of advanced turboprop engines, and propeller noise analysis are discussed. M.G.

N82-25252*# Pennsylvania State Univ., University Park. Lab. of Turbomachinery.
THREE DIMENSIONAL MEAN VELOCITY AND TURBULENCE CHARACTERISTICS IN THE ANNULUS WALL REGION OF AN AXIAL FLOW COMPRESSOR ROTOR PASSAGE
R. Davino and B. Lakshminarayana May 1982 262 p refs
(Grant NsG-3212)
(NASA-CR-169003; NAS 1.26:169003; PSU/TURBO-82-2) Avail: NTIS HC A12/MF A01 CSCL 21E

The experiment was performed using the rotating hot-wire technique within the rotor blade passage and the stationary hot-wire technique for the exitflow of the rotor blade passage. The measurements reveal the effect of rotation and subsequent flow interactions upon the rotor blade flowfield and wake development in the annulus-wall region. The flow near the rotor blade tips is found to be highly complex due to the interaction of the annulus-wall boundary layer, the blade boundary layers, the tip leakage flow, and the secondary flow. Within the blade passage, this interaction results in an appreciable radial inward flow as well as a defect in the mainstream velocity near the mid-passage. Turbulence levels within this region are very high. This indicates a considerable extent of flow mixing due to the viscous flow interactions. The size and strength of this loss core is found to grow with axial distance from the blade trailing edge. The nature of the rotor blade exit-flow was dominated by the wake development. T.M.

N82-25253*# Pennsylvania State Univ., University Park. Lab. of Turbomachinery.
INVESTIGATION OF THE TIP CLEARANCE FLOW INSIDE AND AT THE EXIT OF A COMPRESSOR ROTOR PASSAGE
A. Pandya and B. Lakshminarayana May 1982 147 p refs
(Grant NsG-3212)
(NASA-CR-169004; NAS 1.26:169004; PSU/TURBO-82-3) Avail: NTIS HC A07/MF A01 CSCL 21E

The nature of the tip clearance flow in a moderately loaded compressor rotor is studied. The measurements were taken inside the clearance between the annulus-wall casing and the rotor blade tip. These measurements were obtained using a stationary two-sensor hot-wire probe in combination with an ensemble averaging technique. The flowfield was surveyed at various radial locations and at ten axial locations, four of which were inside the blade passage in the clearance region and the remaining six outside the passage. Variations of the mean flow properties in the tangential and the radial directions at various axial locations were derived from the data. Variation of the leakage velocity at different axial stations and the annulus-wall boundary layer profiles from passage-averaged mean velocities were also estimated. B.W.

N82-25254*# General Electric Co., Evendale, Ohio. Materials and Processes Technology Labs.
COST/BENEFIT STUDIES OF ADVANCED MATERIALS TECHNOLOGIES FOR FUTURE AIRCRAFT TURBINE ENGINES: MATERIALS FOR ADVANCED TURBINE ENGINES
M. Stearns and L. Wilbers May 1982 49 p
(Contract NAS3-20074)
(NASA-CR-167849; NAS 1.26:167849) Avail: NTIS HC A03/MF A01 CSCL 21E

Cost benefit studies were conducted on six advanced materials and processes technologies applicable to commercial engines planned for production in the 1985 to 1990 time frame. These technologies consisted of thermal barrier coatings for combustor and high pressure turbine airfoils, directionally solidified eutectic high pressure turbine blades, (both cast and fabricated), and mixers, tail cones, and piping made of titanium-aluminum alloys. A fabricated titanium fan blisk, an advanced turbine disk alloy with improved low cycle fatigue life, and a long-life high pressure turbine blade abrasive tip and ceramic shroud system were also analyzed. Technologies showing considerable promise as to benefits, low development costs, and high probability of success were thermal barrier coating, directionally solidified eutectic turbine blades, and abrasive-tip blades/ceramic-shroud turbine systems. R.J.F.

N82-25255*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXHAUST EMISSIONS SURVEY OF A TURBOFAN ENGINE FOR FLAME HOLDER SWIRL TYPE AUGMENTORS AT SIMULATED ALTITUDE FLIGHT CONDITIONS
John E. Moss, Jr. Oct. 1981 47 p refs

(NASA-TM-82787; E-955; NAS 1.15:82787) Avail: NTIS HC A03/MF A01 CSCL 21E

Emissions of carbon dioxide, total oxides of nitrogen, unburned hydrocarbons, and carbon monoxide from an F100 afterburning two spool turbofan engine at simulated flight conditions are reported. Tests were run at Mach 0.8 at altitudes of 10.97 and 13.71 km (36,000 and 45,000 ft), and at Mach 1.2 at 13.71 km (45,000 ft). Emission measurements were made from intermediate power (nonafterburning) through maximum afterburning, using a single point gas sample probe traversed across the horizontal diameter of the exhaust nozzle. The data show that emissions vary with flight speed, altitude, power level, and radial position across the nozzle. Carbon monoxide emissions were low for intermediate and partial afterburning power. Unburned hydrocarbons were near zero for most of the simulated flight conditions. At maximum afterburning, there were regions of NOx deficiency in regions of high CO. The results suggest that the low NOx levels observed in the tests are a result of interaction with high CO in the thermal converter. CO2 emissions were proportional to local fuel air ratio for all test conditions. T.M.

N82-25256*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

DEVELOPMENT OF AN ANALYTICAL TECHNIQUE FOR THE OPTIMIZATION OF JET ENGINE AND DUCT ACOUSTIC LINERS Final Technical Report, 1 Mar. 1981 - 28 Feb. 1982

Ben T. Zinn and William L. Meyer 28 Feb. 1982 159 p refs
(Grant NAG1-133)
(NASA-CR-169002; NAS 1.26:169002) Avail: NTIS HC A08/MF A01 CSCL 21E

A new method was developed for the calculation of optimum constant admittance solutions for the minimization of the sound radiated from an arbitrary axisymmetric body. This method utilizes both the integral equation technique used in the calculation of the optimum non-constant admittance liners and the independent solution generated as a by product of these calculations. The results generated by both these methods are presented for three duct geometries: (1) a straight duct; (2) the QCSEE inlet; and (3) the QCSEE inlet less its centerbody. Author

N82-25257*# United Technologies Corp., East Hartford, Conn. Commercial Products Div.

FRACTURE MECHANICS CRITERIA FOR TURBINE ENGINE HOT SECTION COMPONENTS Final Report

G. J. Meyers May 1982 123 p refs
(Contract NAS3-22550)
(NASA-CR-167896; NAS 1.26:167896; PWA-5772-23) Avail: NTIS HC A06/MF A01 CSCL 21E

The application of several fracture mechanics data correlation parameters to predicting the crack propagation life of turbine engine hot section components was evaluated. An engine survey was conducted to determine the locations where conventional fracture mechanics approaches may not be adequate to characterize cracking behavior. Both linear and nonlinear fracture mechanics analyses of a cracked annular combustor liner configuration were performed. Isothermal and variable temperature crack propagation tests were performed on Hastelloy X combustor liner material. The crack growth data was reduced using the stress intensity factor, the strain intensity factor, the J integral, crack opening displacement, and Tomkins' model. The parameter which showed the most effectiveness in correlation high temperature and variable temperature Hastelloy X crack growth data was crack opening displacement. S.L.

N82-25259# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Ramjet Technology Branch.

COAXIAL DUMP RAMJET COMBUSTOR COMBUSTION INSTABILITIES. PART 1: PARAMETRIC TEST DATA Interim Report, Feb. 1979 - Mar. 1980

D. L. Davis Jul. 1981 333 p refs 2 Vol.
(AF Proj. 2308)
(AD-A111355; AFWAL-TR-81-2047-Pt-1) Avail: NTIS HC A15/MF A01 CSCL 21/5

This report contains Combustion Instability Data for Coaxial Dump Ramjet Combustors. The data includes pressure vs. time, RMS pressure spectrums, peak and broadband RMS pressures, and related steady state performance data. Analysis and interpretation of the data are reserved for future reports. Also included is a description of RMS pressure and its relation to wave shape. Author (GRA)

N82-25260# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.

NEW DEVELOPMENTS IN THE FIELD OF RAMJET MISSILE PROPULSION [NEUE ENTWICKLUNGEN AUF DEM GEBIET DER FLUGKOERPER-STAUANTRIEBE]

H.-L. Weinreich 12 Nov. 1981 65 p refs In GERMAN
(MBB-UR-516-81-O) Avail: NTIS HC A04/MF A01

Various supersonic ramjets are discussed which were proposed for the propulsion systems of tactical missiles with higher average velocities. Design and general operating characteristics of ramjet engines are reviewed. The interaction between intake system and ramjet combustion chamber performance is treated with reference to throttling schemes. Ramjet engines, using liquid or solid propellant, as well as solid fuel ramrockets are studied. Experimentally proven performance of ramjet designs is cited and technological trends are identified. Development results concern fuel, inlet systems, variable thrust chokes; and ramjet combustion chamber/integral booster configurations. Author (ESA)

N82-25261*# National Aeronautics and Space Administration, Washington, D. C.

GUIDANCE AND CONTROL/ACEE

1981 8 p
(NASA-Facts-95/8-81) Avail: NTIS HC A02/MF A01 CSCL 01C

Active controls improve airplane performance by stabilizing its flight, reducing departures from stable flight, and alleviating loads imposed by external forces such as gusts, turbulence, or maneuvers. Some uses for active control systems, the design of redundant and reliable stability augmentation systems, digital fly-by-wire, and NASA assessments of the technology of sensors and actuators are discussed. A series of trade-off studies to better define optimum flight control systems, and research by drone and full-scale models are described. A.R.H.

N82-25262*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

BARRIERS AND DISPERSAL SURFACES IN MINIMUM-TIME INTERCEPTION

N. Rajan and M. D. Ardema May 1982 34 p refs
(NASA-TM-84241; A-8912; NAS 1.15:84241) Avail: NTIS HC A03/MF A01 CSCL 01C

Minimum time interception of a target moving in a horizontal plane is analyzed as a one-player differential game. Dispersal points and points on the barrier are located for a class of pursuit evasion and interception problems. These points are determined by constructing cross sections of the isochrones and hence obtaining the barrier, dispersal, and control level surfaces. The game solution maps the controls as a function of the state within the capture region. J.D.

N82-25263# Washington Univ., St. Louis, Mo. Dept. of Mechanical Engineering.

OPTIMIZATION OF AUTO-PILOT EQUATIONS FOR RAPID ESTIMATION OF HELICOPTER CONTROL SETTINGS Interim Technical Report, Jul. 1980 - Nov. 1981

Han-Sheng Chen and David A. Peters Nov. 1981 29 p refs
(Contract DAAG29-80-C-0092)
(AD-A110739; ARO-17067.1-E; ITR-1) Avail: NTIS HC A03/MF A01 CSCL 01/1

An automatic feedback system, based on continuous monitoring of control loads, is used to find the control settings that are required to obtain a given flight condition of a helicopter rotor. A program is developed that searches automatically for the optimum gains and time constants of the system. Satisfactory results are achieved for given conditions as an example. Author (GRA)

N82-25264# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

USE OF THE PSEUDO-INVERSE FOR DESIGN OF A RECONFIGURABLE FLIGHT CONTROL SYSTEM M.S. Thesis

Syed Javed Raza Dec. 1981 156 p refs
(AD-A111172; AFIT/GAE/AA/81D-23) Avail: NTIS HC A08/MF A01 CSCL 01/3

Reconfiguration of the flight control system is achieved using generic inputs and transformation matrices for single primary control surface failure. Pseudo-inverse is used to evaluate appropriate transformation matrices. Design is tested against non-linear six degree-of-freedom model of the A-7D by simulating failure flights. System was found to provide desirable flying qualities upon reconfiguration. Author (GRA)

N82-25265# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

ROLL RESPONSE CRITERIA FOR TRANSPORT AIRCRAFT WITH ADVANCED FLIGHT CONTROL SYSTEMS IN THE LANDING APPROACH AND TOUCHDOWN

M. F. C. vanGool 26 Oct. 1980 134 p refs
(Contracts NIVR-1745; RB-RLD/78017; RB-RLD/78017/1; RB-RLD/79036)
(NLR-TR-80103-U) Avail: NTIS HC A07/MF A01

Approach and landing of an aircraft equipped with a roll-rate-command/bank-angle-hold flight control system were investigated, using a moving base simulator. Pilot comments and ratings following systematic variation of roll mode time constant, maximum available roll rate, and pure time delay were noted. Results indicate that roll response criteria are too lenient. The more precise control of bank angle, available with the flight control system, leads to a higher internal standard of the pilot for his judgement of roll response quality. These control systems must comply with more strict requirements than conventional systems to obtain the same degree of pilot approval. Based on the experiments, limits/boundaries in existing criteria are redefined and criteria are proposed. Author (ESA)

N82-25266*# Boeing Military Airplane Development, Wichita, Kans.

CONCEPTUAL DESIGN STUDY FOR AN ADVANCED CAB AND VISUAL SYSTEM, VOLUME 1 Final Report

R. J. Rue, M. L. Cyrus, T. A. Garnett, J. W. Nachbor, J. A. Seery, and R. L. Starr Jul. 1980 116 p refs Sponsored in part by the Dept. of the Army 2 Vol.
(Contract NAS2-10464)
(NASA-CR-166235; NAS 1.26:166235) Avail: NTIS HC A06/MF A01 CSCL 14B

A conceptual design study was conducted to define requirements for an advanced cab and visual system. The rotorcraft system integration simulator is for engineering studies in the area of mission associated vehicle handling qualities. Principally a technology survey and assessment of existing and proposed simulator visual display systems, image generation systems, modular cab designs, and simulator control station designs were performed and are discussed. State of the art survey data were used to synthesize a set of preliminary visual display system concepts of which five candidate display configurations were selected for further evaluation. Basic display concepts incorporated in these configurations included: real image projection, using either periscopes, fiber optic bundles, or scanned laser optics; and virtual imaging with helmet mounted displays. These display concepts were integrated in the study with a simulator cab concept employing a modular base for aircraft controls, crew seating, and instrumentation (or other) displays. A simple concept to induce vibration in the various modules was developed and is described. Results of evaluations and trade offs related to the candidate system concepts are given, along with a suggested weighting scheme for numerically comparing visual system performance characteristics. S.L.

N82-25267*# Boeing Military Airplane Development, Wichita, Kans.

CONCEPTUAL DESIGN STUDY FOR AN ADVANCED CAB AND VISUAL SYSTEM, VOLUME 2 Final Report

R. J. Rue, M. L. Cyrus, T. A. Garnett, J. W. Nachbor, J. A. Seery, and R. L. Starr Jul. 1980 171 p refs Sponsored in part by the Dept. of the Army 2 Vol.
(Contract NAS2-10464)
(NASA-CR-166236; NAS 1.26:166236) Avail: NTIS HC A08/MF A01 CSCL 14B

The performance, design, construction and testing requirements are defined for developing an advanced cab and visual system. The rotorcraft system integration simulator is composed of the advanced cab and visual system and the rotorcraft system motion generator, and is part of an existing simulation facility. User's applications for the simulator include rotorcraft design development, product improvement, threat assessment, and accident investigation. S.L.

N82-25270# Air Force Human Resources Lab., Brooks AFB, Tex. Operations Training Div.

SIMULATOR FOR AIR-TO-AIR COMBAT VERSUS REAL WORLD: VISUAL CUE ANALYSIS FOR SIMULATED AIR-TO-AIR COMBAT TRAINING Final Report

Robert E. Coward and Alexander M. Rupp Jan. 1982 26 p refs
(AF Proj. 1123)
(AD-A110570; AFHRL-TR-81-26) Avail: NTIS HC A03/MF A01 CSCL 05/9

Flying an aircraft requires a continuous interpretation of the visual environment in which the pilot uses visual information from outside the cockpit and from the flight instruments inside the cockpit to develop and maintain an awareness of the status of the aircraft and its location in space. Flying a high-speed/high-performance aircraft in an air-to-air combat environment vastly increases the complexity of the pilot's task. The pilot must also keep track of and evaluate the performance of any opposing aircraft. To maintain a dynamic awareness of the situation and ultimately to be successful in the airborne arena, the pilot depends heavily on interpretation of out-of-the-cockpit visual cues. Usually training of the necessary visual skills for air-to-air combat takes place entirely in the aircraft - a high stress environment where the student pilot quickly can become overwhelmed with visual information. In addition, the training is severely limited by both rules of engagement and aircraft safety limitations that prevent the student pilot from experiencing and practicing maximum performance tactics. GRA

N82-25271# Committee on Science and Technology (U. S. House).

THE FIRST A IN NASA

Washington GPO 1982 194 p Hearings before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 61, 8 Dec. 1981
(GPO-89-476) Avail: Subcommittee on Transportation, Aviation and Materials

The contributions of NACA/NASA to both civil and military aviation are reviewed and the current relations of NASA with the aircraft industry and academia are examined in the light of proposed cuts in the aeronautics technology research portion of the agency's budget. The impact of the closing of the Lewis Research Center on the development of military aircraft is considered. A.R.H.

N82-25334# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler.

CALCULATION OF THE CROSS SECTION PROPERTIES AND THE SHEAR STRESSES OF COMPOSITE ROTOR BLADES

Rudolf Woerndle 8 Sep. 1981 32 p refs Presented at 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981; sponsored by DGLR
(MBB-UD-334-81-O) Avail: NTIS HC A03/MF A01

Shear stress distribution and shear stiffness of transversely loaded cylindrical beams of any cross sectional shape are determined, using the finite element method. Warp, resulting from transverse load, is calculated with special two dimensional elements. If the warping of any cross section is known, shear stress distribution, shear stiffness, and shear center can be found. These values are obtained for any cross section through two dimensional analysis and, therefore, the whole structure must be considered. Stress distribution calculation results for complicated cross secions, i.e., for material that is homogeneous or inhomogeneous, isotropic or orthotropic, are shown. Because only small amounts of computational effort are necessary, the method is appropriate to the early design state. However, the validity of the theory is limited to small conus angles. Author (ESA)

N82-25383# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

MECHANICAL PROPERTIES OF HOT ISOSTATIC PRESSED P/M-TITANIUM FOR HELICOPTER COMPONENTS

Wolfgang Keinath and Marko Tapavicza 1981 31 p refs Presented at 7th European Rotorcraft and Powered Lift Aircraft Forum, Garmisch-Partenkirchen, West Germany, 8-11 Sep. 1981; sponsored by DGLR
(MBB-UD-324-81-O) Avail: NTIS HC A03/MF A01

The production of titanium alloy (Ti6Al4V) aircraft components was investigated. Powder metallurgy (P/M) manufacturing processes that involve hot isostatic pressing (HIP) and investment casting were characterized. The microstructure of P/M HIP Ti6Al4V bar and plate specimens is depicted. Mechanical properties were determined by static tensile and fatigue testing and a modified Goodman diagram was derived. Mechanical properties are the same as those of the corresponding wrought alloy. Static and dynamic values for a P/M HIP Ti6Al4V blade fitting were also found from results of helicopter rotor hub component tests. Analysis shows that the blade fitting fulfills strength requirements. Reduction in machining as well as raw material weight savings when manufacturing P/M HIP components are pointed out. Author (ESA)

N82-25399# General Technology Applications, Inc., Arlington, Va.
INVESTIGATION OF THE APPLICATION OF A CRYOGENIC BLENDING PROCESS TO PRODUCE ANTIMISTING DIESEL FUELS Final Report
Albert F. Hadermann, Paul Waters, Jerry C. Trippe, and William Weitzen 15 Jan. 1982 65 p refs
(Contract DAAK70-81-C-0134)
(AD-A110917; GTA-A-001) Avail: NTIS HC A04/MF A01 CSCL 21/4

Fire-resistant fuels have been investigated by the United States Army as a means of reducing the risk of fire in land combat vehicles and certain aircraft. One approach has been the use of high-molecular-weight polymer additives for suppression of mist formations. The polymers which are effective in mist suppression are very difficult to dissolve in fuel. A newly discovered process for dissolving high-molecular-weight polymers is investigated to determine its applicability to the preparation of mist suppression fuels. The conclusions area that certain high-molecular-weight polymers which show strong mist suppression behavior can be dissolved rapidly in diesel fuel and that the new dissolving process appears to be adaptable to field use. Author (GRA)

N82-25402# Naval Research Lab., Washington, D. C.
EVALUATION OF THREE PERCENT AQUEOUS FILM FORMING FOAM (AFFF) CONCENTRATES AS FIRE FIGHTING AGENTS Final Report, Sep. 1976 - Nov. 1980
Edwin J. Jablonski Tyndall AFB, Fla. Air Force Engineering and Services Center. Apr. 1981 45 p refs
(AF Proj. 2505)
(AD-A110821; AFESC/ESL-TR-81-18) Avail: NTIS HC A03/MF A01 CSCL 13/12

A large-scale fire test program involving 20,000-square foot JP-4 fuel fires was conducted to evaluate the fire suppression effectiveness and compatibility of 3 percent Aqueous Film Forming Foam (AFFF) agents in Air Force fire fighting vehicles. Three commercially available 3 percent AFFF concentrates were tested in accordance with military specification MIL-F-24385B. Test results are summarized in Appendix A. As a result of these tests, an updated Revision C to this MIL SPEC has been accomplished with new requirements for both 3 percent and 6 percent AFFF extinguishing agents. Author (GRA)

N82-25404# Lockheed Missiles and Space Co., Palo Alto, Calif.
PANEL OPTIMIZATION WITH INTEGRATED SOFTWARE (POIS). VOLUME 1: PANDA: INTERACTIVE PROGRAM FOR PRELIMINARY MINIMUM WEIGHT DESIGN Final Report, Jun. 1976 - Oct. 1980
David Bushnell Wright-Patterson AFB, Ohio AFWAL Jul. 1981 262 p refs
(Contract F33615-76-C-3105; AF Proj. 2307)
(AD-A110963; AFWAL-TR-81-3073-Vol-1) Avail: NTIS HC A12/MF A01 CSCL 01/3

An analysis and an interactive computer program are described through which minimum weight designs of composite, stiffened, cylindrical panels can be obtained subject to general and local buckling constraints and stress and strain constraints. The panels are subjected to arbitrary combinations of in-plane axial, circumferential, and shear resultants. Nonlinear material effects are included if the material is isotropic or has stiffness in only one direction (as does a discrete or a smeared stiffener). Several types of general and local buckling modes are included as constraints in the optimization process, including general instability, panel instability with either stringers or rings smeared out, local skin buckling, local crippling of stiffener segments, and general, panel, and local skin buckling including the effects of stiffener rolling. Certain stiffener rolling modes in which the panel skin does not deform but the cross section of the stiffener does deform are also accounted for. The interactive PANDA system consists of three independently executed modules that share the same data base. In the first module an initial design concept with rough (not necessarily feasible or accurate) dimensions are provided by the user in a conversational mode. In the second module the user decides which of the design parameters of the concept are to be treated by PANDA as decision variables in the optimization phase. In the third module the optimization calculations are carried out. Many examples are provided in which optimum designs obtained by PANDA are compared to those in the literature. Author (GRA)

N82-25424# Rome Air Development Center, Griffiss AFB, N.Y. Strategic Surveillance Branch.
RADAR FREQUENCY RADIATION Progress Report, Feb. 1979 - Sep. 1981
Edward Malowicki Nov. 1981 183 p ref
(AF Proj. 2059)
(AD-A111852; RADC-TR-81-347) Avail: NTIS HC A09/MF A01 CSCL 17/9

A method is presented for the determination of radar frequency radiation power densities that the PAVE PAWS radar system could produce in its air and ground environment. The effort was prompted by the concern of the people in the vicinity of OTIS AFB MA and BEALE AFB CA about the possible radar frequency radiation hazard of the PAVE PAWS radar. The method is based on the following main assumptions that: (a) the total field can be computed as the vector summation of the individual fields due to each antenna element; (b) the individual field can be calculated using distances for which the field point is in the far field of the antenna element. An RFR computer program was coded for the RADC HE 6180 digital computer and exercised to calculate the radiation levels in the air and ground space for the present baseline and the possible Six DB and 10 DB growth systems of the PAVE PAWS radar system at OTIS AFB MA. The average radiation levels due to the surveillance fence were computed for three regions: in the air space in front of the radar, at the radar hazard fence at OTIS AFB MA and at representative ground points in the OTIS AFB vicinity. It was concluded that the radar frequency radiation of PAVE PAWS does not present a hazard to personnel provided there is no entry to the air hazard zone or to the area within the hazard fence. The method developed offers a cost effective way to determine radiation levels from a phased array radar especially in the near field and transition regions. GRA

N82-25436# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A CASE STUDY OF RELIABILITY AND MAINTAINABILITY OF THE F-16 APG-66 FIRE CONTROL RADAR M.S. Thesis
Daniel DeMarchi Sep. 1981 115 p refs
(AD-A111387; AFIT-LSSR-99-81) Avail: NTIS HC A06/MF A01 CSCL 17/9

During the development and test phase of weapon system acquisition, program management and design emphasis must be directed to producing a system that achieves reliability and maintainability in the field. Investigated were these development and test efforts and test efforts and the demonstrated operational performance of a major weapon subsystem in the form of a case study analysis of the F-16 fire control radar. Comparisons of predicted, test-demonstrated and operational APG-66 reliability and maintainability parameters constitute the significant portion of the analyses. In addition, the reliability and maintainability programs and selected performance indicators of the APG-66 and APG-120 are compared in order to examine the results of differing test-program acquisition policies. This thesis effort determined that the APG-66 has not yet attained a constant failure rate indicative of an equipment's useful life. The research also determined that increased efforts in the test function of an acquisition produces significant benefits in operational results. A summary analysis of the entire program found the predictions based upon the critical design review and intermediate level maintainability demonstration to be somewhat optimistic. GRA

N82-25488# Perkin-Elmer Corp., Pomona, Calif. Aerospace Div.
TECHNIQUES SUITABLE FOR A PORTABLE WEAR METAL ANALYZER Final Report, Oct. 1980 - Apr. 1981
William H. Niu, Eric B. Andersen, and Gordon J. Ferguson Wright-Patterson AFB, Ohio AFWAL Sep. 1981 89 p refs
(Contract F33615-80-C-2037; AF Proj. 3048)
(AD-A111352; AFWAL-TR-81-2076) Avail: NTIS HC A05/MF A01 CSCL 20/8

A literature study for the techniques suitable for a portable wear metal analyzer has been conducted. The intent was to locate a technique which could lead to the development of a deployable field instrument to analyze metals in used aircraft engine oil for preventive maintenance purposes. Ten techniques, including six optical spectroscopic methods, two X-ray techniques, radioactive tagging, and colorimetry, were evaluated. Emphasis was placed on the fundamental limitations of each technique for this particular application. As a result, three optical techniques looked promising and their practicality was further investigated. The final assessment of these three techniques was based on the feasibility of making the instrument portable, low cost, able to analyze elements of interest, particle size independent, and with moderate power consumption. The three techniques, in order of suitability are: furnace atomic absorption spectroscopy, rotating disc electrode atomic emission spectroscopy, and dc plasma atomic emission spectroscopy. Author (GRA)

N82-25506# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
HARDWARE AND SOFTWARE INTEGRATION FOR CONCURRENT DATA ACQUISITION AND REDUCTION OF PHOTON CORRELATED LASER DOPPLER VELOCIMETRY M.S. Thesis
David L. Neyland Dec. 1981 139 p refs
(AD-A111146; AFIT/GA/AA/81D-10) Avail: NTIS HC A07/MF A01 CSCL 14/2

A general Automatic Data Acquisition System dedicated to a broad range of experiments is used to operate the Digital Correlation signal processing equipment of a Laser Doppler Velocimeter, transfer data from the correlator into the Automatic Data Acquisition System computer and perform computations with the information. The Laser Doppler Velocimeter is used to acquire vast quantities of velocity and turbulence intensity information describing turbulent fluid flow about two dimensional airfoils. Integration of the velocimeter with the computer increases the capability of the system to perform large scale fluid dynamic studies. GRA

N82-25516*# Illinois Univ., Chicago. Dept. of Materials Engineering.
MATHEMATICAL MODELS FOR THE SYNTHESIS AND OPTIMIZATION OF SPIRAL BEVEL GEAR TOOTH SURFACES Final Report
F. L. Litvin, Pernez Rahman, and Robert N. Goldrich Jun. 1982 122 p refs
(Grant NAG3-48)
(NASA-CR-3553; NAS 1.26:3553) Avail: NTIS HC A06/MF A01 CSCL 13I

The geometry of spiral bevel gears and to their rational design are studied. The nonconjugate tooth surfaces of spiral bevel gears are, in theory, replaced (or approximated) by conjugated tooth surfaces. These surfaces can be generated by two conical surfaces, and by a conical surface and a revolution. Although these conjugated tooth surfaces are simpler than the actual ones, the determination of their principal curvatures and directions is still a complicated problem. Therefore, a new approach, to the solution of these is proposed. Direct relationships between the principal curvatures and directions of the tool surface and those of the generated gear surface are obtained. With the aid of these analytical tools, the Hertzian contact problem for conjugate tooth surfaces can be solved. These results are useful in determining compressive load capacity and surface fatigue life of spiral bevel gears. A general theory of kinematical errors exerted by manufacturing and assembly errors is developed. This theory is used to determine the analytical relationship between gear misalignments and kinematical errors. This is important to the study of noise and vibration in geared systems. S.L.

N82-25520*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LUBRICANT EFFECTS ON EFFICIENCY OF A HELICOPTER TRANSMISSION
Andrew M. Mitchell and John J. Coy 1982 16 p refs Presented at the AGARD Symp. on Probl. in Bearings and Lubrication, Ottawa, Canada, 31 May - 4 Jun. 1982
(NASA-TM-82857; E-1226; NAS 1.15:82857; AVRADCOM-TR-82-C-9) Avail: NTIS HC A02/MF A01 CSCL 01C

Eleven different lubricants were used in efficiency tests conducted on the OH-58A helicopter main transmission using the NASA Lewis Research Center's 500 hp torque regenerative helicopter transmission test stand. Tests were run at oil-in temperatures of 355 K and 372 K. The efficiency was calculated from a heat balance on the water running through an oil to water heat exchanger which the transmission was heavily insulated. Results show an efficientcy range from 98.3% to 98.8% which is a 50% variation relative to the losses associated with the maximum efficiency measured. For a given lubricant, the efficiency increased as temperature increased and viscosity decreased. There were two exceptions which could not be explained. Between lubricants, efficiency was not correlated with viscosity. There were relatively large variations in efficiency with the different lubricants whose viscosity generally fell in the 5 to 7 centistoke range. The lubricants had no significant effect on the vibration signature of the transmission. A.R.H.

N82-25521# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
CHEM-BRAZE ABRADABLE SEAL ATTACHMENT TO AIRCRAFT GAS TURBINE COMPRESSOR COMPONENTS Final Report, 1 Nov. 1979 - 31 Sep. 1980
Stephen T. Narsavage, Saed Safai, and Harold W. Pettit, Jr. St Louis Army Aviation Research and Development Command Jan. 1982 71 p
(Contract DAAG46-79-C-0102)
(AD-A111692; PWA-FR-13975; USAAVRADCOM-TR-82-F-2; AMMRC-TR-82-6) Avail: NTIS HC A04/MF A01 CSCL 11/2

Manufacturing methods were established for bonding an abradable seal surface onto the stationary compressor element of small gas turbine engines utilizing an easily replaceable Chem-Braze bond system. Bonded specimens were prepared and evaluated in vibration and rub incursion tests. Tooling was fabricated for bonding a seal to Army supplied engine hardware, and NDI methods were established for inspecting bond integrity. Chemical stripping techniques for removing Chem-Braze attached seals were optimized to permit efficient refurbishment of severely worn seals. An economic analysis indicated significant cost savings for attaching abradable seals to compressor blade tip shrouds using the improved Chem-Braze system compared to attachment with gold-nickel braze. The Chem-Braze system has been used successfully to bond abradable seals to titanium, cobalt, nickel and iron base alloys; however, attempts to use Chem-Braze to bond seals to selected aluminum and magnesium alloys were not successful. Author (GRA)

N82-25545# Lockheed Missiles and Space Co., Palo Alto, Calif. Applied Mechanics Lab.
SUPPLEMENTARY STUDIES ON THE SENSITIVITY OF OPTIMIZED STRUCTURES Final Report, 14 Nov. 1979 - 29 Sep. 1980
Paul S. Jensen and W. A. Loden Wright-Patterson AFB, Ohio AFWAL Mar. 1981 81 p refs
(Contract F336150-76-C-3105; AF Proj. 2307)
(AD-A110994; AFWAL-TR-81-3013) Avail: NTIS HC A05/MF A01 CSCL 13/13

Reports of three related studies germane to structural optimization are provided. The first describes virtual memory simulator suitable for management of large quantities of numerical data such as required for sparse matrix manipulation. The second report describes two sparse matrix processors suitable for the large equation systems arising in structural analysis and provides comparative results. The last report describes a study of two optimization algorithms in the context of structural optimization. A number of test results for parameter studies and a general comparison of the two algorithms are given. GRA

N82-25613# Measurement Concept Corp., Rome, N. Y.
SOURCE ASSESSMENT SYSTEM Final Technical Report
Roy H. Senn, M. Lynn Taylor, Richard Burns, and Michael Smith Griffiss AFB, N.Y. RADC Nov. 1981 153 p refs
(Contract F30602-80-C-0040; AF Proj. 4303)
(AD-A111223; RADC-TR-81-303) Avail: NTIS HC A08/MF A01 CSCL 08/2

This report contains an analysis of the Source Assessment Procedures at both Defense Mapping Agency (DMA) production facilities (Aerospace Center DMAAC in St. Louis MO and Hydrographic Topographic Center DMAHTC in Washington DC). Following the analysis, the report documents a design trade off of various approaches to a Source Assessment System. Finally, a Design Plan for the selected approach analog-digital video system, is presented. Author (GRA)

N82-25623# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY. BARROW QUADRANAGLE, ALASKA, VOLUME 2 Final Report
Mar. 1981 63 p refs 2 Vol.
(Contract DE-AC13-76GJ-01664)
(DE82-000342; GJBX-285-81-Vol-2) Avail: NTIS HC A04/MF A01

Volume II contains the flight path map, multiparamanter profiles, histograms, and anomaly maps for potassium, uranium, thorium, uranium/potassium, uranium/thorium, and thorium/potassium. GRA

N82-25635*# Detroit Diesel Allison, Indianapolis, Ind.
LOW NOx HEAVY FUEL COMBUSTOR CONCEPT PROGRAM Final Report
A. S. Novick and D. L. Troth Oct. 1981 206 p refs
(Contracts DEN3-146; DE-AI01-77ET-13111)
(NASA-CR-165367; NAS 1.26:165367; DDA-EDR-10594; DOE/NASA/0148-1) Avail: NTIS HC A10/MF A01 CSCL 10B

The development of the technology required to operate an industrial gas turbine combustion system on minimally processed, heavy petroleum or residual fuels having high levels of fuel-bound nitrogen (FBN) while producing acceptable levels of exhaust emissions is discussed. Three combustor concepts were designed and fabricated. Three fuels were supplied for the combustor test demonstrations: a typical middle distillate fuel, a heavy residual fuel, and a synthetic coal-derived fuel. The primary concept was an air staged, variable-geometry combustor designed to produce low emissions from fuels having high levels of FBN. This combustor used a long residence time, fuel-rich primary combustion zone followed by a quick-quench air mixer to rapidly dilute the fuel rich products for the fuel-lean final burnout of the fuel. This combustor, called the rich quench lean (RQL) combustor, was extensively tested using each fuel over the entire power range of the model 570 K engine. Also, a series of parameteric tests was conducted to determine the combustor's sensitivity to rich-zone equivalence ratio, lean-zone equivalence ratio, rich-zone residence time, and overall system pressure drop. Minimum nitrogen oxide emissions were measured at 50 to 55 ppmv at maximum continuous power for all three fuels. Smoke was less than a 10 SAE smoke number. M.G.

N82-25661*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
IN SITU OZONE DATA FOR COMPARISON WITH LASER ABSORPTION REMOTE SENSOR: 1980 PEPE/NEROS PROGRAM
David S. McDougal, Robert B. Lee, III, and Richard J. Bendura May 1982 42 p refs
(NASA-TM-84471; NAS 1.15:84471) Avail: NTIS HC A03/MF A01 CSCL 13B

Several sets of in situ ozone (O3) measurements were made by a NASA aircraft in support of the laser absorption spectrometer (LAS) remote sensor. These measurements were designed to provide comparative O3 data for the LAS sensor. The LAS, which was flown on a second aircraft, remotely measured the vertical burden of O3 from the aircraft to the surface. In situ results of the air quality (O3 and B sub scat) and meteorological (temperature and dewpoint) parameters for three correlative missions are presented. The aircraft flight plans, in situ concentration profiles and vertical burdens, and measurement errors are summarized. B.W.

N82-25811*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ASSESSMENT OF THE REAL-TIME APPLICATION CAPABILITIES OF THE SIFT COMPUTER SYSTEM
Ricky W. Butler Apr. 1982 17 p refs
(NASA-TM-84482; NAS 1.15:84482) Avail: NTIS HC A02/MF A01 CSCL 09B

The real-time capabilities of the SIFT computer system, a highly reliable multicomputer architecture developed to support the flight controls of a relaxed static stability aircraft, are discussed. The SIFT computer system was designed to meet extremely high reliability requirements and to facilitate a formal proof of its correctness. Although SIFT represents a significant achievement in fault-tolerant system research it presents an unusual and restrictive interface to its users. The characteristics of the user interface and its impact on application system design are assessed. Author

N82-25827# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structures Test Branch.
STRUCTURES TESTING ANALYSIS REAL-TIME NETWORK (STARNET) Final Technical Report, Feb. 1976 - Feb. 1981
Robert L. Denison Oct. 1981 93 p
(AF Proj. 1347; AF Proj. 2401)
(AD-A111636; AFWAL-TR-81-3112) Avail: NTIS HC A05/MF A01 CSCL 14/2

The computer network employed for data acquisition and processing in the Structures Test Facility of the Air Force Wright Aeronautical Laboratories, Building 65, Area B, Wright-Patterson AFB, is extensively described. The report includes a system overview and discussions of subsystem characteristics and interconnections, system software, applications software, system operation, and a review of a large-scale network mode application. This computer network, called STARNET, is an on-line, real-time system. Author (GRA)

N82-26006# Hughes Research Labs., Malibu, Calif.
SILICON LIQUID CRYSTAL LIGHT VALVE FOR FLIGHT SIMULATION APPLICATIONS Final Report
U. Efron, J. Grinberg, P. G. Reif, and P. Braatz Brooks AFB, Tex. AFHRL Nov. 1981 118 p refs
(Contract F33615-79-C-0024; AF Proj. 2363)
(AD-A110928; AFHRL-TR-81-35) Avail: NTIS HC A06/MF A01 CSCL 20/2

The basic objective of this program has been to develop a silicon photoconductor liquid crystal light valve (Si LCLV) for application in wide-field-of-view simulators. The Si LCLV is expected to offer several advantages over the cadmium sulfide (CdS) photoconductor LCLV, including higher sensitivity, a significantly better switching ratio, higher resolution, and (most importantly) a fast response time to allow higher 60-Hz operation. The main thrust of this program was to upgrade the device in the following areas: (1) Scale up to a 2-inch aperture device (from a 1 cm x 1 cm active area), (2) Implement the silicon/silicon dioxide (Si/SiO2) dielectric mirror and improve the light blocking layer, (3) Upgrade device resolution by optimizing the focusing grid, (4) Increase the contrast ratio by improving silicon processing, (5) Implement the dc-biased guard ring to prevent edge breakdown, (6) Optimize liquid crystal operation to reduce the reponse time. Significant improvements were achieved in all areas. GRA

N82-26162# Indian Inst. of Tech., Bombay. Dept. of Aeronautical Engineering.
INVESTIGATION ON ROTATING AILERONS
S. Mozumdar and T. S. Patel *In* Indian Inst. of Science The J. of the Aeron. Soc. of India, Vol. 32, No. 1-4, Feb.-Nov. 1980 Nov. 1980 p 1-5 refs

Avail: NTIS HC A08/MF A01

The effectiveness of rotating ailerons in a subsonic flow was theoretically studied with a view to evaluate their capability in comparison to the conventional ones. The present analysis is based on the vortex lattice approach of Byelotsarkovskii for different wing planforms of small and large aspect ratios. The effect of such ailerons on the coefficients of lift and rolling moment was worked out for their positions corresponding to the most suitable positions of rotating flaps. Author

N82-26184# CIERS Research and Consultancy Private Ltd., Bangalore (India).
PRIMARY SEWAGE TREATMENT PLANT AS A SOURCE OF BIRD HAZARDS AT AIRPORT
S. C. Pillai, M. K. C. Sridhar, and G. Kasi Viswanath *In* Indian Inst. of Science The J. of the Aeron. Soc. of India, Vol. 32, No. 1-4, Feb.-Nov. 1980 Nov. 1980 p 149-153 refs

Avail: NTIS HC A08/MF A01

Quantitative observations were made on the visits of different kinds of birds, notably eagles or kites and crows, and on their movements around the different parts of the primary sewage treatment plant located in the neighborhood of the airport at Bangalore. The following information is reported: (1) early records on collisions between birds and aircrafts, (2) bird strike as a world wide problem; (3) the reasons for the attraction of birds to airports; (4) early attempts to solve the problem of bird hazards;

and (5) the conditions in India. Suggestions are made to prevent bird visits to the airport area. E.A.K.

N82-26185# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

LA RECHERCHE AEROSPATIALE, BI-MONTHLY BULLETIN, NUMBER 1981-6, NOVEMBER-DECEMBER 1981

Claude Sevestre, ed. Paris ESA Mar. 1982 72 p refs Transl. by ONERA into ENGLISH from 'La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1981-6, Nov.-Dec. 1981' Sponsored by ESA

(ESA-TT-741) Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 55

The interaction of an oblique jet with a subsonic flow was studied. Aerodynamic flow measurement, using fluorescence and laser Doppler velocimetry are discussed. Fatigue crack propagation, and subsonic flutter of compressor blades were examined. Approximate compressibility relations and Euler equations of motion are treated. An implicit pseudo unsteady calculation method for transonic flow is presented.

N82-26189# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

AEROELASTICY OF COMPRESSOR BLADES: SUBSONIC STALL FLUTTER

H. Loiseau and E. Szechenyi *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-6, Nov.-Dec. 1981 (ESA-TT-741) Mar. 1982 p 47-59 refs Transl. by ONERA into ENGLISH from 'La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1981-6, Nov.-Dec. 1981'

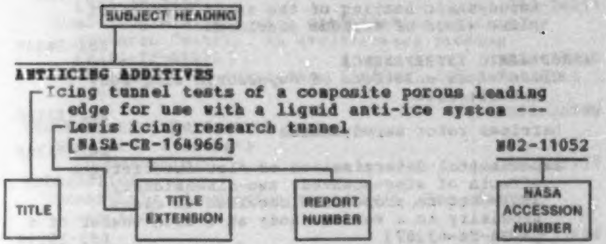
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 55

The aeroelasticity of turbomachine blades, of cascade wind tunnel and performance tests, were analyzed. Wind tunnel tests involved excitation by hydraulic actuators and pressure transducer measurements. It is found that unsteady pressures causing stall flutter are located on the upper surface, principally in the operating domains where flow is completely separated, while instability is principally a function of the angle of attack. The phase lag of unsteady pressures increases with vibration frequency. When it is sufficiently large, the flutter disappears, even under suitable separation conditions. Unsteady lift and moment, induced by a vibratory pitching movement around any axis are obtained by linear superposition of forces due to heaving and a pitching movement around a given reference axis. The wind tunnel simulated closely compressor flows with good periodicities in five interblade channels. Author (ESA)

SUBJECT INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 152)* **SEPTEMBER 1982**

Typical Subject Index Listing



ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-300 AIRCRAFT
- Sideslip indication system as a fuel saving aid in jet transport aircraft operation --- a-300 and a-310 aircraft N82-25181

ABRASION
- Chem-Braze abradable seal attachment to aircraft gas turbine compressor components [AD-A111692] N82-25521

ABSORPTION SPECTRA
- In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program [NASA-TM-84471] N82-25661

ACCELERATION (PHYSICS)
- Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 30 June 1981 [AD-A110660] N82-25243

ACOUSTIC DUCTS
- Development of an analytical technique for the optimization of jet engine and duct acoustic liners [NASA-CR-169002] N82-25256

ACTIVE CONTROL
- Development of a control law for the alleviation of maneuver loads on an elastic aircraft A82-34144
- A method for determining the aeroelastic behavior of aircraft with active control systems [ESA-TT-719] N82-24211
- Guidance and control/ACEE [NASA-FACTS-95/8-81] N82-25261

ACTUATORS
- Hydraulic actuator mechanism to control aircraft spoiler movements through dual input commands [NASA-CASE-LAR-12412-1] N82-24205
- Eigenspace techniques for active flutter suppression [NASA-CR-168931] N82-24206

ADAPTIVE CONTROL
- A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background A82-32979
- Outline of a multiple-access communication network based on adaptive arrays A82-34607

AERIAL RECONNAISSANCE
- Cloud top remote sensing by airborne lidar A82-32920
- Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2 [DE82-000314] N82-24620
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1 [DE82-004150] N82-24629
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2 [DE82-004169] N82-24630
- Airborne gamma-ray spectrometer and magnetometer survey. Barrow quadrangle, Alaska, volume 2 [DE82-000342] N82-25623

AEROACOUSTICS
- Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr A82-33627
- Aeroacoustic performance of an externally blown flap configuration with several flap noise suppression devices [NASA-TP-1995] N82-24942

AERODYNAMIC CHARACTERISTICS
- The equivalent simple body /ESB/ method for transonic wing analysis [AIAA PAPER 82-0936] A82-31923
- Finite volume calculation of three-dimensional potential flow around a propeller [AIAA PAPER 82-0957] A82-31933
- Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow [AIAA PAPER 82-0958] A82-31934
- Incompressible symmetric flow characteristics of sharp-edged rectangular wings A82-32850
- Aerodynamics. Part 2 - Methods of aerodynamic design /3rd revised and enlarged edition/ --- Russian book A82-33387
- The ubiquitous helicopter A82-33913
- Low-speed aerodynamic characteristics of wings with sweep discontinuities A82-33997
- Periodic boundary value problem for the equations of the harmonic oscillation of a rotor blade about the axis of a flapping hinge A82-34127
- Detached flow past V-shaped low-aspect-ratio wings A82-34136
- Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects A82-34166
- Comparison of aerodynamic characteristics of aircraft models with forward and aft swept wings at Mach number 0.5 [ONERA, TP NO. 1982-9] A82-34497
- Rime ice accretion and its effect on airfoil performance [NASA-CR-165599] N82-24166
- F-15 rotary balance data for an angle-of-attack range of 8 deg to 90 deg [NASA-CR-3478] N82-24168
- Rotary balance data for an F-15 model with conformal fuel tanks for an angle-of-attack range of 8 deg to 90 deg [NASA-CR-3516] N82-24169
- X-29A forward-swept-wing demonstrator airplane N82-25209
- Elastic deformation effects on aerodynamic characteristics for a high-aspect-ratio supercritical-wing model [NASA-TM-83206] N82-25214

- Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method [NASA-TM-84485] N82-25216
- Thrust-induced effects on low-speed aerodynamics of fighter aircraft --- Langley 4- by 7-meter tunnel [NASA-TM-83277] N82-25218
- Production version of the extended NASA-Langley Vortex Lattice FORTRAN computer program. Volume 1: User's guide [NASA-TM-83303] N82-25219
- Nonlinear two-dimensional sail theory [AD-A110450] N82-25220
- Experimental analysis of the effects of sweep and aspect ratio on incompressible flow about forward swept wings [AD-A111128] N82-25223
- The FFA wing body 81 computer program. A panel method for determination of aerodynamic characteristics at subsonic and supersonic speeds [FFA-TN-AU-1601] N82-25230
- Aerodynamics/ACEE: Aircraft energy efficiency [NASA-FACTS-94/8-81] N82-25241

AERODYNAMIC COEFFICIENTS
- Aerodynamic coefficient identification of time-varying aircraft system and its application A82-34645
- The effect of very heavy rain upon aircraft and its role in wind shear attributed accidents N82-25179
- Experimental analysis of the effects of sweep and aspect ratio on incompressible flow about forward swept wings [AD-A111128] N82-25223
- Leading edge flap system for aircraft control augmentation [NASA-CASE-LAR-12787-1] N82-25240

AERODYNAMIC CONFIGURATIONS
- Rime ice accretion and its effect on airfoil performance [NASA-CR-165599] N82-24166
- F-15 rotary balance data for an angle-of-attack range of 8 deg to 90 deg [NASA-CR-3478] N82-24168
- Rotary balance data for an F-15 model with conformal fuel tanks for an angle-of-attack range of 8 deg to 90 deg [NASA-CR-3516] N82-24169
- Wind tunnels of the institute of mechanics of Moscow State University [NASA-TM-76909] N82-24213
- Flight management computer [SNIAS-821-111-110] N82-24842
- An analytical procedure for computing smooth transitions between two specified cross sections with applications to blended wing body configuration [NASA-TP-2012] N82-25193
- F-16E program overview and wind tunnel/flight correlation N82-25207
- Water tunnel flow visualization and wind tunnel data analysis of the F/A-18 --- leading edge extension vortex effects [NASA-CR-165859] N82-25215
- Materials and structures/ACEE [NASA-FACTS-117/8-81] N82-25242

AERODYNAMIC DRAG
- The initial lift and drag of an impulsively started airfoil of finite thickness A82-34538
- Review of the 1980 Wind-Tunnel/Flight Correlation Panel N82-25198
- Experimental analysis of the effects of sweep and aspect ratio on incompressible flow about forward swept wings [AD-A111128] N82-25223

AERODYNAMIC FORCES
- Forward-swept-wing technology A82-33309
- Finite element calculation of the aerodynamic forces on a vibrating wing in supersonic flow A82-34128
- Hysteresis of the normal force of a wing of complex planform under unsteady motion A82-34157
- Accounting for thickness effects in the calculation of subcritical unsteady aerodynamic forces: Application to wing-fuselage interactions [SNIAS-821-111-106] N82-24183
- Experimental verification of force determination and ground flying on a full-scale helicopter [USAAVRADCOM-TR-81-D-11] N82-24199

AERODYNAMIC HEATING
- Approximate method of predicting heating on the windward side of Space Shuttle Orbiter and comparisons with flight data [AIAA PAPER 82-0823] A82-31853
- An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms A82-34149

AERODYNAMIC INTERFERENCE
- Closed-form solutions of supersonic wing-body interference A82-33120
- Darrieus rotor aerodynamics A82-33708
- Experimental determination of flow-interference effects of wing-mounted, two-dimensional, full-capture propulsion nacelles in close proximity to a vehicle body at a Mach number of 6 [NASA-TM-83287] N82-25217

AERODYNAMIC LOADS
- On the aerodynamics of windblast [AD-A110495] N82-25221
- Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 30 June 1981 [AD-A110660] N82-25243

AERODYNAMIC NOISE
- Aeroacoustic performance of an externally blown flap configuration with several flap noise suppression devices [NASA-TP-1995] N82-24942

AERODYNAMIC STABILITY
- Downwash behind a wing with spanwise blowing A82-33514
- Will ABC technology produce the next-generation helicopter A82-33916
- Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings A82-34163
- Guidance and control/ACEE [NASA-FACTS-95/8-81] N82-25261

AERODYNAMIC STALLING
- Effects of dynamic stall on SWECS --- Small Wind Energy Conversion System A82-33707
- Will ABC technology produce the next-generation helicopter A82-33916
- Aeroelasticy of compressor blades: Subsonic stall flutter N82-26189

AERODYNAMICS
- Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems --- German book A82-33348
- Aerodynamics. Part 2 - Methods of aerodynamic design /3rd revised and enlarged edition/ --- Russian book A82-33307
- Aerodynamics: The science of air in motion /2nd edition/ --- Book A82-33671
- Flow visualization techniques for the study of high incidence aerodynamics [ONERA, TP NO. 1982-5] A82-34493
- Combining analysis with optimization at Langley Research Center. An evolutionary process [NASA-TM-84472] N82-24846

AEROELASTICITY
- Identification of the form of motion of an aircraft A82-31824
- Finite element calculation of the aerodynamic forces on a vibrating wing in supersonic flow A82-34128
- Development of a control law for the alleviation of maneuver loads on an elastic aircraft A82-34144

An algorithm for calculating the compliance matrices of aircraft structures by the substructure method as applied to aeroelasticity problems
A82-34161
A method of accounting for the effect of aircraft deformations on its loading
A82-34177
The determination of critical flutter conditions of nonlinear systems
[RAE-TM-STRUCT-986] N82-24210
A method for determining the aeroelastic behavior of aircraft with active control systems
[ESA-TT-719] N82-24211
Combining analysis with optimization at Langley Research Center. An evolutionary process
[NASA-TM-84472] N82-24846
Aeroelasticy of compressor blades: Subsonic stall flutter
N82-26189

AERONAUTICAL ENGINEERING
The first A in NASA
[GPO-89-476] N82-25271

AERONAUTICS
Essentials of aviation management /2nd edition/ --- Book
A82-33648

AEROSPACE ENGINEERING
Aerospace engineers: We're tomorrow-minded people
[NASA-EP-188] N82-25017
La Recherche Aerospatiale, Bi-monthly bulletin, number 1981-6, November-December 1981 --- aerodynamic research
[ESA-TT-741] N82-26185

AEROSPACE INDUSTRY
British aerospace begins update effort
A82-32624
The aerospace learning process --- review of some past projects
[AIAA PAPER 82-1291] A82-33025
International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981
A82-34101
Aeronautical research and development
A82-34114
Technical trends in the civil aircraft and helicopter industry
A82-34120

AEROSPACEPLANES
Structures testing analysis real-time network (STARNET)
[AD-A111636] N82-25827

AEROTHERMODYNAMICS
Radiation enhancement by nonequilibrium during flight through the Titan atmosphere
[AIAA PAPER 82-0878] A82-31883
Gas turbine aero-thermodynamics with special reference to aircraft propulsion --- Book
A82-33650
An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms
A82-34149

AFTERBODIES
Aerodynamic interactions with turbulent jet exhaust plumes
A82-33325

AH-1G HELICOPTER
Experimental verification of force determination and ground flying on a full-scale helicopter
[USAAVRADCOM-TR-81-D-11] N82-24199

AILERONS
Structural optimization of a swept wing on the basis of the aileron efficiency condition
A82-34145
Investigation on rotating ailerons
N82-26162

AIR COOLING
Air cooling of gas turbine blades
A82-34700

AIR FLOW
Aerodynamics: The science of air in motion /2nd edition/ --- Book
A82-33671
Experimental study on discharge and loss coefficients of combustor swirlers
A82-34644
Adaptive-wall wind-tunnel research at NASA-Ames Research Center
[NASA-TM-84236] N82-24214

AIR LAUNCHING
Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories
A82-33626

AIR LAW
Predicting the application of vicarious liability to fixed base operators - Still guesswork after all these years
A82-32056
Aviation accident investigation - Functional and legal perspectives
A82-32059
Factors influencing settlement of personal injury and death claims in aircraft accident litigation
A82-32062
Aviation negotiations and the U.S. model agreement
A82-32063

AIR NAVIGATION
Aviation electronics /4th edition/ --- Book
A82-33646
Operational testing of the LN-33 inertial navigation system
A82-33854
Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar
A82-34672

AIR QUALITY
In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program
[NASA-TM-84471] N82-25661

AIR TRAFFIC CONTROL
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 1
[AD-A110862] N82-24188
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 2
[AD-A110863] N82-24189
Round table discussion on the transfer of results from the project "Aids to navigation and control of air traffic"
[FUB-20-ATC-1981] N82-24192
On-line experiments in acquiring and exploiting AIDS data for ATC purposes
N82-25175
A pilot's view on possible uses of AIDS --- airborne collision avoidance systems
N82-25176
Aeronautical information data subsystems --- air navigation
N82-25178
Evaluation of a voice recognition system for the NOTAS pseudo pilot station function
[NASA-TM-84487] N82-25235

AIR TRANSPORTATION
Aviation negotiations and the U.S. model agreement
A82-32063
Aircraft evaluation in air network planning
A82-33125
The U.S. airline industry - En route to deregulation
A82-33920
Commercial transport developments for the 1980's
A82-34109
Solutions to the aviation fuel problem
A82-34113
Business jets to agricultural aircraft - An overview of general aviation
A82-34123

AIRBORNE EQUIPMENT
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays
A82-31991
An optical data link for airborne scanning system
A82-34737
Testing of the Kuiper Airborne Observatory 91-CM telescope
[NASA-CR-166341] N82-25040
Airborne gamma-ray spectrometer and magnetometer survey. Barrow quadrangle, Alaska, volume 2
[DE82-000342] N82-25623

AIRBORNE SURVEILLANCE RADAR
Cloud top remote sensing by airborne lidar
A82-32920
A pilot's view on possible uses of AIDS --- airborne collision avoidance systems
N82-25176

AIRBORNE/SPACEBORNE COMPUTERS
On-line experiments in acquiring and exploiting AIDS data for ATC purposes
N82-25175
An intermediate solution between basic and expanded aircraft integrated data systems (AIDS)
N82-25182
An assessment of the real-time application capabilities of the SIFT computer system
[NASA-TM-84482] N82-25811
AIRCRAFT ACCIDENT INVESTIGATION
Aviation accident investigation - Functional and legal perspectives
A82-32059
Solid state crash survivable flight data recorders for mishap investigation
N82-25173
AIRCRAFT ACCIDENTS
Predicting the application of vicarious liability to fixed base operators - Still guesswork after all these years
A82-32056
Factors influencing settlement of personal injury and death claims in aircraft accident litigation
A82-32062
Transport aircraft crash dynamics
[NASA-CR-165851] N82-24186
The effect of very heavy rain upon aircraft and its role in wind shear attributed accidents
N82-25179
AIRCRAFT ANTENNAS
Radiating elements for hemispherically scanned arrays --- onboard aircraft for data links to satellites
A82-32992
Measuring LF and MF antenna radiation patterns by means of a helicopter
A82-34772
AIRCRAFT BRAKES
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193
AIRCRAFT CARRIERS
Aircraft carrier - Surface effect ship
[AIAA PAPER 82-0808] A82-31981
AIRCRAFT COMMUNICATION
Radiating elements for hemispherically scanned arrays --- onboard aircraft for data links to satellites
A82-32992
Aviation electronics /4th edition/ --- Book
A82-33646
AIRCRAFT CONFIGURATIONS
Multibody transport concept
[AIAA PAPER 82-0810] A82-31983
Wind-tunnel wall interference corrections for three-dimensional flows
A82-32847
Generation of three-dimensional boundary-fitted curvilinear coordinate systems for wing/wing-tip geometries using the elliptic solver method
A82-33318
Status of the national transonic facility
[AIAA PAPER 82-0604] A82-33326
Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems --- German book
A82-33348
Aerodynamics. Part 2 - Methods of aerodynamic design /3rd revised and enlarged edition/ --- Russian book
A82-33387
CDS grows new muscles
A82-33891
Unistructure - A new concept for light weight integrally stiffened skin structure
A82-34486
Flow visualization techniques for the study of high incidence aerodynamics
[ONERA, TP NO. 1982-5] A82-34493
Comparison of aerodynamic characteristics of aircraft models with forward and aft swept wings at Mach number 0.5
[ONERA, TP NO. 1982-9] A82-34497
F-16E program overview and wind tunnel/flight correlation
N82-25207
X-29A forward-swept-wing demonstrator airplane
N82-25209

AIRCRAFT CONSTRUCTION MATERIALS
System study of application of composite materials for future transport aircraft
[AIAA PAPER 82-0812] A82-31985
The superalloys - Materials for gas turbine hot section components
A82-33853
A review and assessment of fatigue crack growth rate relationships for metallic airframe materials
A82-34879
Standard tests for toughened resin composites --- for aircraft structures
[NASA-RP-1092] N82-24301
Cost/benefit studies of advanced materials technologies for future aircraft turbine engines: Materials for advanced turbine engines
[NASA-CR-167849] N82-25254
AIRCRAFT CONTROL
Transformation relations for singularity avoidance in three-dimensional trajectory optimization
A82-32137
Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing
[AIAA PAPER 82-0960] A82-34008
Development of a control law for the alleviation of maneuver loads on an elastic aircraft
A82-34144
Determination of the glide path of an aircraft with power off
A82-34154
Electro-hydraulic nose wheel steering of the Dornier 228
A82-34373
OLGA - A gust alleviation for general aviation aircraft
A82-34374
Automation of the synthesis of control in a stationary linear system --- for aircraft flight control
A82-34464
F-15 rotary balance data for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3478] N82-24168
Rotary balance data for an F-15 model with conformal fuel tanks for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3516] N82-24169
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208
Leading edge flap system for aircraft control augmentation
[NASA-CASE-LAR-12787-1] N82-25240
Guidance and control/ACEE
[NASA-FACTS-95/8-81] N82-25261
Barriers and dispersal surfaces in minimum-time interception
[NASA-TM-84241] N82-25262
Roll response criteria for transport aircraft with advanced flight control systems in the landing approach and touchdown
[NLR-TR-80103-U] N82-25265
Conceptual design study for an advanced cab and visual system, volume 1
[NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2
[NASA-CR-166236] N82-25267
AIRCRAFT DESIGN
The potential of large aircraft
[AIAA PAPER 82-0804] A82-31980
Multibody transport concept
[AIAA PAPER 82-0810] A82-31983
Solar-powered airplane design for long-endurance, high-altitude flight
[AIAA PAPER 82-0811] A82-31984
Very large aircraft with alternate fuels - LH2 most promising
[AIAA PAPER 82-0813] A82-31986
The potential for long-range high-payload aircraft with alternate fuels
[AIAA PAPER 82-0814] A82-31987
Finite-element modeling of a fighter aircraft canopy acrylic panel
A82-32848
Forward-swept-wing technology
A82-33309

Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems --- German book A82-33348
Aerodynamics. Part 2 - Methods of aerodynamic design /3rd revised and enlarged edition/ --- Russian book A82-33387
Understanding aircraft structures --- Book A82-33625
CDS grows new muscles A82-33891
XV-15 - Foretelling things to come A82-33914
X-wing and the Navy V/STOL initiative A82-33915
Military aircraft and international policy A82-34108
Commercial transport developments for the 1980's A82-34109
Military aircraft - The way ahead A82-34110
Solutions to the aviation fuel problem A82-34113
Aeronautical research and development A82-34114
Technical trends in the civil aircraft and helicopter industry A82-34120
Military aircraft A82-34121
Business jets to agricultural aircraft - An overview of general aviation A82-34123
Structural optimization of a swept wing on the basis of the aileron efficiency condition A82-34145
Electro-hydraulic nose wheel steering of the Dornier 228 A82-34373
Application of modal control to wing-flutter suppression [NASA-TP-1983] N82-24209
Airbus industry and noise in the community [SNIAS-821-111-111] N82-24739
F-16E program overview and wind tunnel/flight correlation N82-25207
Panel Optimization with Integrated Software (POIS). Volume 1: PANDA: Interactive program for preliminary minimum weight design [AD-A110963] N82-25404
Investigation on rotating ailerons N82-26162

AIRCRAFT DETECTION
A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background A82-32979

AIRCRAFT ENGINES
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors [AIAA PAPER 82-0890] A82-31891
Gas turbine aero-thermodynamics with special reference to aircraft propulsion --- Book A82-33650
The superalloys - Materials for gas turbine hot section components A82-33853
Development of an aircraft engine A82-34112
Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings A82-34163
Experimental study on discharge and loss coefficients of combustor swirlers A82-34644
Air cooling of gas turbine blades A82-34700
A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers A82-34814
Large scale aeroengine compressor test facility A82-34953
Evaluation of inelastic constitutive models for nonlinear structural analysis --- for aircraft turbine engines [NASA-TM-82845] N82-24502
Gas path analysis of commercial aircraft engines N82-25184
Analysis of transient data from aircraft gas turbine engines using AIDS N82-25189
Propulsion/ACEE [NASA-FACTS-93/8-81] N82-25251
Cost/benefit studies of advanced materials technologies for future aircraft turbine engines: Materials for advanced turbine engines [NASA-CR-167849] N82-25254

AIRCRAFT EQUIPMENT
Aviation electronics /4th edition/ --- Book A82-33646
High technology raises fighter force readiness A82-33892
Aircraft potential variations in flight [ONERA, TP NO. 1982-11] A82-34499
A new all-purpose digital flight data recorder N82-25177

AIRCRAFT FUELS
The potential of large aircraft [AIAA PAPER 82-0804] A82-31980
Very large aircraft with alternate fuels - LH2 most promising [AIAA PAPER 82-0813] A82-31986
The potential for long-range high-payload aircraft with alternate fuels [AIAA PAPER 82-0814] A82-31987
Solutions to the aviation fuel problem A82-34113
Impact study of synthetic and alternative fuel usage in Army aircraft propulsion systems [AD-A111046] N82-24365
Low NOx heavy fuel combustor concept program [NASA-CR-165367] N82-25635

AIRCRAFT GUIDANCE
Guidance and control/ACEE [NASA-FACTS-95/8-81] N82-25261

AIRCRAFT HAZARDS
Aircraft lightning protection A82-33544
Rime ice accretion and its effect on airfoil performance [NASA-CR-165599] N82-24166
Primary sewage treatment plant as a source of bird hazards at airport N82-26184

AIRCRAFT HYDRAULIC SYSTEMS
Hydraulic actuator mechanism to control aircraft spoiler movements through dual input commands [NASA-CASE-LAR-12412-1] N82-24205

AIRCRAFT INDUSTRY
Considerations for international joint venture development of very large aircraft [AIAA PAPER 82-0809] A82-31982
Beyond 2000 - The airlift challenge ahead [AIAA PAPER 82-0815] A82-31988
The beginning of the ATR 42 program and its importance A82-33543
Military aircraft and international policy A82-34108
The Airbus family of aircraft at the dawn of the 1980's [SNIAS-821-111-101] N82-24164

AIRCRAFT INSTRUMENTS
V/STOL tilt rotor research aircraft. Volume 1: General information, revision C [NASA-CR-166347] N82-24194
V/STOL tilt rotor research aircraft. Volume 2: Ship 1 instrumentation [NASA-CR-166348] N82-24195
V/STOL tilt rotor research aircraft. Volume 3: Ship 2 instrumentation [NASA-CR-166349] N82-24196
V/STOL tilt rotor research aircraft. Volume 4: CFE technical data [NASA-CR-166350] N82-24197
Improvement program for the C-141 Navigation Selector Panel [AD-A111469] N82-25248

AIRCRAFT LANDING
A documented example of strong wind-shear A82-33274

Environmental fog/rain visual display system for
aircraft simulators
[NASA-CASE-ARC-11158-1] N82-24212
Airbus industry and noise in the community
[SNIAS-821-111-111] N82-24739
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244
Roll response criteria for transport aircraft with
advanced flight control systems in the landing
approach and touchdown
[NLR-TR-80103-U] N82-25265

AIRCRAFT MANEUVERS
Development of a control law for the alleviation
of maneuver loads on an elastic aircraft
A82-34144
Simulator for air-to-air combat versus real world:
Visual cue analysis for simulated air-to-air
combat training
[AD-A110570] N82-25270

AIRCRAFT MODELS
Method for the measurement of elastic deformations
of aircraft models in a wind tunnel
A82-34162

AIRCRAFT NOISE
No-tail-rotor helicopter tests continue
A82-33095

AIRCRAFT PARTS
Aerodynamics. Part 2 - Methods of aerodynamic
design /3rd revised and enlarged edition/ ---
Russian book
A82-33387
Fatigue life prediction of helicopter pitch link
using Kaman life calculation methods
A82-34125
Electro-hydraulic nose wheel steering of the
Dornier 228
A82-34373

AIRCRAFT PERFORMANCE
Aircraft evaluation in air network planning
A82-33125
XV-15 - Foretelling things to come
A82-33914
Military aircraft - The way ahead
A82-34110
The effect of very heavy rain upon aircraft and
its role in wind shear attributed accidents
N82-25179

AIRCRAFT PRODUCTION
British aerospace begins update effort
A82-32624
From the A 300 to the A 310
A82-33542

AIRCRAFT RELIABILITY
Opportunities for wind-tunnel/flight correlation
with new Boeing airplanes
N82-25206

AIRCRAFT SAFETY
Runway end intersection design
A82-33904
Instrumentation for testing aircraft antistatic
protection
[ONERA, TP NO. 1982-7] A82-34495

AIRCRAFT STABILITY
Identification of the form of motion of an aircraft
A82-31824
A unified and generalized definition of static
longitudinal stability in aircraft
A82-32135
Calculation of the lift distribution and
aerodynamic derivatives of quasi-static elastic
aircraft
A82-34639

AIRCRAFT STRUCTURES
Finite element analysis of some aerospace shell
structures
A82-33515
Understanding aircraft structures --- Book
A82-33625
An algorithm for calculating the compliance
matrices of aircraft structures by the
substructure method as applied to aeroelasticity
problems
A82-34161
Solution of creep problems by a finite element
method
A82-34172
A method of accounting for the effect of aircraft
deformations on its loading
A82-34177
Unistructure - A new concept for light weight
integrally stiffened skin structure
A82-34486
Calculation of the lift distribution and
aerodynamic derivatives of quasi-static elastic
aircraft
A82-34639
Aerodynamic coefficient identification of
time-varying aircraft system and its application
A82-34645
A review and assessment of fatigue crack growth
rate relationships for metallic airframe materials
A82-34879
A method for determining the aeroelastic behavior
of aircraft with active control systems
[ESA-TT-719] N82-24211
Standard tests for toughened resin composites ---
for aircraft structures
[NASA-RP-1092] N82-24301
Aerodynamics/ACEE: Aircraft energy efficiency
[NASA-FACTS-94/8-81] N82-25241
Mechanical properties of hot isostatic pressed
P/M-titanium for helicopter components
[MBB-UD-324-81-0] N82-25383
Panel Optimization with Integrated Software
(POIS). Volume 1: PANDA: Interactive program
for preliminary minimum weight design
[AD-A110963] N82-25404

AIRCRAFT TIRES
Tire tread temperatures during antiskid braking
and cornering on a dry runway
[NASA-TP-2009] N82-24193

AIRFIELD SURFACE MOVEMENTS
Runway end intersection design
A82-33904

AIRFOIL PROFILES
Material flow and defect formation in forging an
airfoil shape from metal-matrix composites
A82-33995
Structural optimization of a swept wing on the
basis of the aileron efficiency condition
A82-34145
The initial lift and drag of an impulsively
started airfoil of finite thickness
A82-34538

AIRFOILS
Calculations of viscous transonic flow over
aerofoils
[AIAA PAPER 82-0997] A82-31957
A numerical study of the turbulent flow past an
isolated airfoil with trailing edge separation
[AIAA PAPER 82-0998] A82-31958
Mathematical modeling of unsteady separated flow
past solid airfoil cascades
A82-32801
Effects of dynamic stall on SWECS --- Small Wind
Energy Conversion System
A82-33707
Turbulent boundary-layer development on a
two-dimensional aerofoil with supercritical flow
at low Reynolds number
A82-34390
Contact problems involving the flow past an
inflated aerofoil
A82-34851
Rime ice accretion and its effect on airfoil
performance
[NASA-CR-165599] N82-24166
An experimental investigation of the flow field of
an ejector wing design employing a photon
correlation laser velocimeter
[AD-A111134] N82-24182
Adaptive-wall wind-tunnel research at NASA-Ames
Research Center
[NASA-TM-84236] N82-24214
A harmonic analysis method for unsteady transonic
flow and its application to the flutter of
airfoils
[NASA-CR-3537] N82-25194

AIRFRAME MATERIALS
A review and assessment of fatigue crack growth
rate relationships for metallic airframe materials
A82-34879
Materials and structures/ACEE
[NASA-FACTS-117/8-81] N82-25242

AIRFRAMES
Development of experimentally compatible subsystem
methods for the analysis of aircraft structures
[AD-A111242] N82-24198

Structures testing analysis real-time network
(STARNET)
[AD-A111636] N82-25827
AIRLINE OPERATIONS
Aircraft evaluation in air network planning
A82-33125
Principles of efficient energy use at Interflug
A82-33250
Simulation reaches towards reality
A82-33547
Essentials of aviation management /2nd edition/
--- Book
A82-33648
The U.S. airline industry - En route to deregulation
A82-33920
AIRPLANE PRODUCTION COSTS
Very large aircraft - A common response to a
rapidly changing global environment
[AIAA PAPER 82-0799] A82-31979
AIRPORT PLANNING
Primary sewage treatment plant as a source of bird
hazards at airport
A82-33523
Runway end intersection design
A82-33904
AIRPORTS
A documented example of strong wind-shear
A82-33274
Primary sewage treatment plant as a source of bird
hazards at airport
N82-26184
AIRSPACE
The National Airspace System plan
A82-33893
ALASKA
Airborne gamma-ray spectrometer and magnetometer
survey. Ikpikpuk River quadrangle, Alaska,
volume 2
[DE82-000314] N82-24620
Airborne gamma-ray spectrometer and magnetometer
survey. Umiat quadrangle, Alaska, volume 2
[DE82-000312] N82-24632
ALGORITHMS
An aircraft sensor fault tolerant system
[NASA-CR-165876] N82-25236
ALIGNMENT
Testing of the Kuiper Airborne Observatory 91-CM
telescope
[NASA-CR-166341] N82-25040
ALUMINUM
Nondestructive detection of exfoliation corrosion
around fastener holes in aluminum wing skins
A82-32725
ALUMINUM ALLOYS
Formability of INCOLOY alloy MA 956 - An oxide
dispersion strengthened sheet alloy
A82-33994
ANALOG SIMULATION
Design, fabrication and testing of an electrical
analogue for heat transfer to coated turbine blade
A82-33520
ANGLE OF ATTACK
Wind-tunnel wall interference corrections for
three-dimensional flows
A82-32847
Experimental and analytical results of tangential
blowing applied to a subsonic V/STOL inlet
[NASA-TM-82847] N82-24165
F-15 rotary balance data for an angle-of-attack
range of 0 deg to 90 deg
[NASA-CR-3478] N82-24168
Rotary balance data for an F-15 model with
conformal fuel tanks for an angle-of-attack
range of 0 deg to 90 deg
[NASA-CR-3516] N82-24169
Tunnel-to-tunnel correlation
N92-25200
Water tunnel flow visualization and wind tunnel
data analysis of the F/A-18 --- leading edge
extension vortex effects
[NASA-CR-165859] N82-25215
ANNULAR NOZZLES
Three dimensional mean velocity and turbulence
characteristics in the annulus wall region of an
axial flow compressor rotor passage
[NASA-CR-169003] N82-25252
ANTENNA ARRAYS
Outline of a multiple-access communication network
based on adaptive arrays
A82-34607
ANTENNA RADIATION PATTERNS
Measuring LF and HF antenna radiation patterns by
means of a helicopter
A82-34772
Radar frequency radiation
[AD-A111852] N82-25424
ANTIMISTING FUELS
Investigation of the application of a cryogenic
blending process to produce antimisting diesel
fuels
[AD-A110917] N82-25399
APERTURES
Diffraction by a finite strip
A82-33605
APPROACH
Roll response criteria for transport aircraft with
advanced flight control systems in the landing
approach and touchdown
[NLR-TR-80103-U] N82-25265
AQUEOUS SOLUTIONS
Evaluation of three percent Aqueous Film Forming
Foam (AFFF) concentrates as fire fighting agents
--- JP-4 jet fuel fires
[AD-A110821] N82-25402
ARCHITECTURE (COMPUTERS)
Electronic Warfare Avionics Integration Support
Facility support processor
[AD-A111641] N82-25249
An assessment of the real-time application
capabilities of the SIFT computer system
[NASA-TM-84482] N82-25811
AREA NAVIGATION
Flight evaluation of Loran-C for general aviation
area navigation
A82-33049
Applications of a multiplexed GPS user set
A82-33050
ATMOSPHERIC CHEMISTRY
Radiation enhancement by nonequilibrium during
flight through the Titan atmosphere
[AIAA PAPER 82-0878] A82-31883
ATMOSPHERIC COMPOSITION
In situ ozone data for comparison with laser
absorption remote sensor: 1980 PEPE/NEROS program
[NASA-TM-84471] N82-25661
ATMOSPHERIC ELECTRICITY
Instrumentation for testing aircraft antistatic
protection
[ONERA, TP NO. 1982-7] A82-34495
ATMOSPHERIC SOUNDING
Cloud top remote sensing by airborne lidar
A82-32920
ATTITUDE CONTROL
Marine Air Traffic Control and Landing System
(MATCALS Investigation), volume 2
[AD-A110863] N82-24189
Use of the Pseudo-inverse for design of a
reconfigurable flight control system
[AD-A111172] N82-25264
ATTITUDE INDICATORS
Sideslip indication system as a fuel saving aid in
jet transport aircraft operation --- a-300 and
a-310 aircraft
N82-25181
AUTOMATIC CONTROL
British aerospace begins update effort
A82-32624
Hydraulic actuator mechanism to control aircraft
spoiler movements through dual input commands
[NASA-CASE-LAR-12412-1] N82-24205
AUTOMATIC FLIGHT CONTROL
Automation of the synthesis of control in a
stationary linear system --- for aircraft flight
control
A82-34464
Flight management computer
[SNIAS-821-111-110] N82-24842
Production of Reliable Flight Crucial Software:
Validation Methods Research for Fault Tolerant
Avionics and Control Systems Sub-Working Group
Meeting
[NASA-CP-2222] N82-24845

AUTOMATIC PILOTS
Optimization of auto-pilot equations for rapid estimation of helicopter control settings
[AD-A110739] N82-25263
AVIONICS
Aviation electronics /4th edition/ --- Book A82-33646
Operational testing of the LN-33 inertial navigation system A82-33854
Production of Reliable Flight Crucial Software: Validation Methods Research for Fault Tolerant Avionics and Control Systems Sub-Working Group Meeting
[NASA-CP-2222] N82-24845
Electronic Warfare Avionics Integration Support Facility support processor
[AD-A111641] N82-25249
AXIAL FLOW
Tunnel-to-tunnel correlation N82-25200
STGSTK: A computer code for predicting multistage axial flow compressor performance by a meanline stage stacking method
[NASA-TP-2020] N82-25250
Investigation of the tip clearance flow inside and at the exit of a compressor rotor passage
[NASA-CR-169004] N82-25253

B

B-70 AIRCRAFT
Wind-tunnel/flight correlation program on XB-70-1 N82-25201
BALL BEARINGS
Development of high-speed rolling-element bearings. A historical and technical perspective
[NASA-TM-82884] N82-24497
BASE FLOW
Numerical investigation of supersonic base flow with parallel injection --- in scramjet combustors
[AIAA PAPER 82-1001] A82-31960
BEAMS (SUPPORTS)
Linear decentralized systems with special structure --- for twin lift helicopters A82-34359
BEARINGS
The vibratory behavior of a rotating propeller shaft. Part 4: Vibration tests of a rotating propeller shaft in a rubber stern tube bearing --- ship propellers
[INECO-5072208-81-PT-2] N82-24514
BIOGRAPHY
Aerospace engineers: We're tomorrow-minded people
[NASA-EP-188] N82-25017
BIRD-AIRCRAFT COLLISIONS
Primary sewage treatment plant as a source of bird hazards at airport A82-33523
BIRDS
Primary sewage treatment plant as a source of bird hazards at airport N82-26184
BLADE TIPS
The problem of calculation of the flow around helicopter rotor blade tips --- and adapting computer programs
[MBB-UD-330-81-O] N82-25233
Program presentation of the working group separated flow: Problems with rotary wings
[MBB-UD-336-81-O] N82-25234
BLOWING
Experimental and analytical results of tangential blowing applied to a subsonic V/STOL inlet
[NASA-TM-82847] N82-24165
BODY-WING CONFIGURATIONS
A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations
[AIAA PAPER 82-0935] A82-31922
The equivalent simple body /ESB/ method for transonic wing analysis
[AIAA PAPER 82-0936] A82-31923
Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow
[AIAA PAPER 82-0958] A82-31934
Closed-form solutions of supersonic wing-body interference A82-33120
Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects A82-34166
Accounting for thickness effects in the calculation of subcritical unsteady aerodynamic forces: Application to wing-fuselage interactions
[SNIAS-821-111-106] N82-24183
An analytical procedure for computing smooth transitions between two specified cross sections with applications to blended wing body configuration
[NASA-TP-2012] N82-25193
Application of Computational Fluid Dynamics (CFD) in transonic wind-tunnel/flight-test correlation N82-25211
Experimental determination of flow-interference effects of wing-mounted, two-dimensional, full-capture propulsion nacelles in close proximity to a vehicle body at a Mach number of 6
[NASA-TM-83287] N82-25217
The FFA wing body 81 computer program. A panel method for determination of aerodynamic characteristics at subsonic and supersonic speeds
[FFA-TN-AU-1601] N82-25230
BOEING AIRCRAFT
Opportunities for wind-tunnel/flight correlation with new Boeing airplanes N82-25206
BOEING 757 AIRCRAFT
Gathering and analysing data on the British Airways Boeing 757 aircraft N82-25186
BONDING
Chem-Braze abradable seal attachment to aircraft gas turbine compressor components
[AD-A111692] N82-25521
BOUNDARY LAYER CONTROL
The NASA Langley laminar flow control airfoil experiment
[AIAA PAPER 82-0567] A82-33327
Experimental and analytical results of tangential blowing applied to a subsonic V/STOL inlet
[NASA-TM-82847] N82-24165
BOUNDARY LAYER SEPARATION
Three-dimensional separation and reattachment
[NASA-TM-84221] N82-24167
Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case
[NLR-MP-80028-U] N82-25232
BOUNDARY LAYER STABILITY
Accurate numerical solution of compressible, linear stability equations A82-33571
BOUNDARY VALUE PROBLEMS
Analysis of small-aspect-ratio lifting surfaces in ground effect A82-32223
Nonlinear two-dimensional sail theory
[AD-A110450] N82-25220
BRAKING
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193

C

C-141 AIRCRAFT
Improvement program for the C-141 Navigation Selector Panel
[AD-A111469] N82-25248
CANOPIES
Finite-element modeling of a fighter aircraft canopy acrylic panel A82-32848
CARGO AIRCRAFT
The potential of large aircraft
[AIAA PAPER 82-0808] A82-31980
Very large aircraft with alternate fuels - LH2 most promising
[AIAA PAPER 82-0813] A82-31986
The potential for long-range high-payload aircraft with alternate fuels
[AIAA PAPER 82-0814] A82-31987
CARTESIAN COORDINATES
A new method for constructing two-dimensional orthogonal and non-orthogonal meshes A82-33630

CASCADE FLOW
A high-frequency transonic small disturbance code for unsteady flows in a cascade
[AIAA PAPER 82-0955] A82-31932
Mathematical modeling of unsteady separated flow past solid airfoil cascades
A82-32001
CERAMICS
Chem-Braze abradable seal attachment to aircraft gas turbine compressor components
[AD-A111692] N82-25521
CHANNEL FLOW
Similarity parameters for the geometric structure of a supersonic jet propagating in a channel and in a submerged space
A82-34132
CHEMICAL CLEANING
Chem-Braze abradable seal attachment to aircraft gas turbine compressor components
[AD-A111692] N82-25521
CHROMIUM
A status review of NASA's COSAM (Conservation Of Strategic Aerospace Materials) program
[NASA-TM-82852] N82-24326
CHROMIUM ALLOYS
Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy
A82-33994
CIRCUIT BOARDS
Improvement program for the C-141 Navigation Selector Panel
[AD-A111469] N82-25248
CIVIL AVIATION
Beyond 2000 - The airlift challenge ahead
[AIAA PAPER 82-0815] A82-31988
Recent developments in aviation cases
A82-32055
Aviation accident investigation - Functional and legal perspectives
A82-32059
Factors influencing settlement of personal injury and death claims in aircraft accident litigation
A82-32062
Principles of efficient energy use at Interflug
A82-33250
Essentials of aviation management /2nd edition/ --- Book
A82-33648
Solutions to the aviation fuel problem
A82-34113
Technical trends in the civil aircraft and helicopter industry
A82-34120
Aeronautical information data subsystems --- air navigation
N82-25178
CLEARANCES
Investigation of the tip clearance flow inside and at the exit of a compressor rotor passage
[NASA-CR-169004] N82-25253
CLOUD COVER
Cloud top remote sensing by airborne lidar
A82-32920
CLUTTER
A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background
A82-32979
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34631
COAL DERIVED LIQUIDS
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635
COBALT
A status review of NASA's COSAM (Conservation Of Strategic Aerospace Materials) program
[NASA-TM-82852] N82-24326
COLLISION AVOIDANCE
Primary sewage treatment plant as a source of bird hazards at airport
A82-33523
Proceedings of the 11th symposium on aircraft integrated data systems --- conferences
[DFVLR-MITT-82-02] N82-25171
A pilot's view on possible uses of AIDS --- airborne collision avoidance systems
N82-25176
COLOR CODING
New techniques in data retrieval and display --- color graphics
N82-25174
COMBAT
Military aircraft
A82-34121
Simulator for air-to-air combat versus real world: Visual cue analysis for simulated air-to-air combat training
[AD-A110570] N82-25270
COMBUSTION CHAMBERS
Experimental study on discharge and loss coefficients of combustor swirlers
A82-34144
Nonlinear structural and life analyses of a combustor liner
[NASA-TM-82846] N82-24501
Fracture mechanics criteria for turbine engine hot section components
[NASA-CR-167896] N82-25257
Coaxial dump Ramjet combustor combustion instabilities. Part 1: Parametric test data
[AD-A111355] N82-25259
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635
COMBUSTION PRODUCTS
Exhaust emissions survey of a turbofan engine for flame holder swirl type augmentors at simulated altitude flight conditions
[NASA-TM-82787] N82-25255
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635
COMBUSTION STABILITY
Coaxial dump Ramjet combustor combustion instabilities. Part 1: Parametric test data
[AD-A111355] N82-25259
COMMERCIAL AIRCRAFT
Commercial transport developments for the 1980's
A82-34109
Future propulsion opportunities for commuter airplanes
[NASA-TM-82880] N82-24203
COMMUNICATION NETWORKS
Outline of a multiple-access communication network based on adaptive arrays
A82-34607
COMMUNICATION SATELLITES
Outline of a multiple-access communication network based on adaptive arrays
A82-34607
COMPOSITE STRUCTURES
Calculation of the cross section properties and the shear stresses of composite rotor blades
[MBB-UD-334-81-O] N82-25334
COMPRESSIBLE BOUNDARY LAYER
Calculations of viscous transonic flow over aerofoils
[AIAA PAPER 82-0997] A82-31957
Accurate numerical solution of compressible, linear stability equations
A82-33571
COMPRESSIBLE FLOW
A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number
[AIAA PAPER 82-1030] A82-31978
COMPRESSION TESTS
Material flow and defect formation in forging an airfoil shape from metal-matrix composites
A82-33995
COMPRESSOR BLADES
Aeroelasticy of compressor blades: Subsonic stall flutter
N82-26189
COMPRESSOR EFFICIENCY
STGSTK: A computer code for predicting multistage axial flow compressor performance by a meanline stage stacking method
[NASA-TP-2020] N82-25250
COMPRESSOR ROTORS
Investigation of the tip clearance flow inside and at the exit of a compressor rotor passage
[NASA-CR-169004] N82-25253
COMPRESSORS
Large scale aeroengine compressor test facility
A82-34953

Evaluation of cast titanium alloy compressor
components, volume 1
[AD-A111431] N82-24204
Investigation of the tip clearance flow inside and
at the exit of a compressor rotor passage
[NASA-CR-169004] N82-25253
COMPUTATIONAL FLUID DYNAMICS
A system for the numerical simulation of sub- and
transonic viscous attached flows around
wing-body configurations
[AIAA PAPER 82-0935] A82-31922
The equivalent simple body /ESB/ method for
transonic wing analysis
[AIAA PAPER 82-0936] A82-31923
A high-frequency transonic small disturbance code
for unsteady flows in a cascade
[AIAA PAPER 82-0955] A82-31932
Finite volume calculation of three-dimensional
potential flow around a propeller
[AIAA PAPER 82-0957] A82-31933
Calculation of the flow-field velocities of a
wing-body-stores combination in transonic flow
[AIAA PAPER 82-0958] A82-31934
Hypersonic interactions with surface mass
transfer. I - Steady flow over a slender wedge
wing
[AIAA PAPER 82-0979] A82-31944
Subsonic 3-D surface panel method for rapid
analysis of multiple geometry perturbations
[AIAA PAPER 82-0993] A82-31954
Calculations of viscous transonic flow over
aerofoils
[AIAA PAPER 82-0997] A82-31957
A numerical study of the turbulent flow past an
isolated airfoil with trailing edge separation
[AIAA PAPER 82-0998] A82-31958
Numerical investigation of supersonic base flow
with parallel injection --- in scramjet combustors
[AIAA PAPER 82-1001] A82-31960
Design of finite element grids for the computation
of the three-dimensional transonic flow around a
wing
[AIAA PAPER 82-1019] A82-31972
Prediction of separated asymmetric trailing-edge
flows at transonic Mach numbers
[AIAA PAPER 82-1021] A82-31974
A vortex sheet method for calculating separated
two-dimensional flows at high Reynolds number
[AIAA PAPER 82-1030] A82-31978
Wind-tunnel wall interference corrections for
three-dimensional flows
A82-32847
Closed-form solutions of supersonic wing-body
interference
A82-33120
Generation of three-dimensional boundary-fitted
curvilinear coordinate systems for wing/wing-tip
geometries using the elliptic solver method
A82-33318
Aerodynamic interactions with turbulent jet
exhaust plumes
A82-33325
Accurate numerical solution of compressible,
linear stability equations
A82-33571
Potentiality assessment of a parallel structure
for the solution of partial differential equations
A82-33628
A new method for constructing two-dimensional
orthogonal and non-orthogonal meshes
A82-33630
The initial lift and drag of an impulsively
started airfoil of finite thickness
A82-34538
Rime ice accretion and its effect on airfoil
performance
[NASA-CR-165599] N82-24166
Three-dimensional separation and reattachment
[NASA-TM-84221] N82-24167
Application of Computational Fluid Dynamics (CFD)
in transonic wind-tunnel/flight-test correlation
N82-25211
Comparison of boundary layer calculations for the
root section of a wing. The September 1979
Amsterdam Workshop test case
[NLR-MP-80028-U] N82-25232
COMPUTER AIDED DESIGN
CDS grows new muscles
A82-33891

COMPUTER GRAPHICS
Simulation reaches towards reality
A82-33547
New techniques in data retrieval and display ---
color graphics
N82-25174
COMPUTER NETWORKS
Structures testing analysis real-time network
(STARNET)
[AD-A111636] N82-25827
COMPUTER PROGRAMMING
Combining analysis with optimization at Langley
Research Center. An evolutionary process
[NASA-TM-84472] N82-24846
COMPUTER PROGRAMS
Fatigue life prediction of helicopter pitch link
using Kaman life calculation methods
A82-34125
Production version of the extended NASA-Langley
Vortex Lattice FORTRAN computer program. Volume
1: User's guide
[NASA-TM-83303] N82-25219
STGSTK: A computer code for predicting multistage
axial flow compressor performance by a meanline
stage stacking method
[NASA-TP-2020] N82-25250
Panel Optimization with Integrated Software
(POIS). Volume 1: PANDA: Interactive program
for preliminary minimum weight design
[AD-A110963] N82-25404
COMPUTER SYSTEMS DESIGN
An analytical procedure for computing smooth
transitions between two specified cross sections
with applications to blended wing body
configuration
[NASA-TP-2012] N82-25193
COMPUTER SYSTEMS PERFORMANCE
Production of Reliable Flight Crucial Software:
Validation Methods Research for Fault Tolerant
Avionics and Control Systems Sub-Working Group
Meeting
[NASA-CP-2222] N82-24045
COMPUTER TECHNIQUES
Outline of a multiple-access communication network
based on adaptive arrays
A82-34607
Combining analysis with optimization at Langley
Research Center. An evolutionary process
[NASA-TM-84472] N82-24846
Flight data recovery under adverse conditions
N82-25183
COMPUTERIZED SIMULATION
Evaluation of two analytical methods for the
prediction of inlet flow fields in the vicinity
of generalized forebodies
[AIAA PAPER 82-0959] A82-31935
Finite-element modeling of a fighter aircraft
canopy acrylic panel
A82-32848
Simulation reaches towards reality
A82-33547
Accounting for thickness effects in the
calculation of subcritical unsteady aerodynamic
forces: Application to wing-fuselage interactions
[SNIAS-821-111-106] N82-24183
Production version of the extended NASA-Langley
Vortex Lattice FORTRAN computer program. Volume
1: User's guide
[NASA-TM-83303] N82-25219
Supplementary studies on the sensitivity of
optimized structures
[AD-A110994] N82-25545
CONFERENCES
Biennial Wind Energy Conference and Workshop, 5th,
Washington, DC, October 5-7, 1981, Proceedings
A82-33701
Formability of metallic materials - 2000 A.D.;
Proceedings of the Symposium, Chicago, IL, June
24, 25, 1980
A82-33989
International aerospace review; Proceedings of the
First International Aerospace Symposium, Le
Bourget, Seine-Saint-Denis, France, June 2, 3,
1981
A82-34101
Current developments lighter than air systems ---
heavy lift airships
[NASA-TM-84744] N82-24176

Future propulsion opportunities for commuter
airplanes
[NASA-TM-82880] N82-24203
Production of Reliable Flight Crucial Software:
Validation Methods Research for Fault Tolerant
Avionics and Control Systems Sub-Working Group
Meeting
[NASA-CP-2222] N82-24845
Proceedings of the 11th symposium on aircraft
integrated data systems --- conferences
[DFVLR-MITT-82-02] N82-25171
Wind-Tunnel/Flight Correlation, 1981
[NASA-CP-2225] N82-25196
Comparison of boundary layer calculations for the
root section of a wing. The September 1979
Amsterdam Workshop test case
[NLR-MP-80028-U] N82-25232

CONFIGURATION INTERACTION
Accounting for thickness effects in the
calculation of subcritical unsteady aerodynamic
forces: Application to wing-fuselage interactions
[SNIAS-821-111-106] N82-24183

CONGRESSIONAL REPORTS
The first A in NASA
[GPO-89-476] N82-25271

CONSTITUTIVE EQUATIONS
Nonlinear structural and life analyses of a
combustor liner
[NASA-TM-82846] N82-24501

CONTINUITY (MATHEMATICS)
Skin friction lines
A82-33629

CONTROL SIMULATION
Eigenspace techniques for active flutter suppression
[NASA-CR-168931] N82-24206

CONTROL SURFACES
Method for the measurement of elastic deformations
of aircraft models in a wind tunnel
A82-34162
Eigenspace techniques for active flutter suppression
[NASA-CR-168931] N82-24206
Use of the Pseudo-inverse for design of a
reconfigurable flight control system
[AD-A111172] N82-25264

CONTROL THEORY
Development of a control law for the alleviation
of maneuver loads on an elastic aircraft
A82-34144
Application of modal control to wing-flutter
suppression
[NASA-TP-1983] N82-24209

CONTROLLABILITY
Prediction of aircraft handling qualities using
analytical models of the human pilot
[NASA-TM-84233] N82-24208

CONVERGENT-DIVERGENT NOZZLES
Shock associated noise of supersonic jets from
convergent-divergent nozzles
A82-32202

COORDINATE TRANSFORMATIONS
Transformation relations for singularity avoidance
in three-dimensional trajectory optimization
A82-32137
Generation of three-dimensional boundary-fitted
curvilinear coordinate systems for wing/wing-tip
geometries using the elliptic solver method
A82-33318

CORRELATION
Opportunities for wind-tunnel/flight correlation
with new Boeing airplanes
N82-25206
Application of Computational Fluid Dynamics (CFD)
in transonic wind-tunnel/flight-test correlation
N82-25211
Hardware and software integration for concurrent
data acquisition and reduction of photon
correlated laser Doppler velocimetry
[AD-A111146] N82-25506

COST ANALYSIS
Solutions to the aviation fuel problem
A82-34113
Cost/benefit studies of advanced materials
technologies for future aircraft turbine
engines: Materials for advanced turbine engines
[NASA-CR-167849] N82-25250

COST EFFECTIVENESS
Value of survivability and recoverability of
flight data recorders --- benefit cost methodology
N82-25188

COST REDUCTION
Multibody transport concept
[AIAA PAPER 82-0810] A82-31983
Army's 1st IPI program begun - Blisk impeller
followup --- integral blade-disk
A82-31999

COUNTER ROTATION
Will ABC technology produce the next-generation
helicopter
A82-33916

CRACK PROPAGATION
Material flow and defect formation in forging an
airfoil shape from metal-matrix composites
A82-33995
A review and assessment of fatigue crack growth
rate relationships for metallic airframe materials
A82-34879
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244
Fracture mechanics criteria for turbine engine hot
section components
[NASA-CR-167896] N82-25257

CRACKS
Unconventional internal cracks. II - Method of
generating simple cracks
A82-34861

CRASH LANDING
Transport aircraft crash dynamics
[NASA-CR-165851] N82-24186

CRASHWORTHINESS
Solid-state flight incident recorder
N82-25172
Solid state crash survivable flight data recorders
for mishap investigation
N82-25173
Value of survivability and recoverability of
flight data recorders --- benefit cost methodology
N82-25188

CREEP ANALYSIS
Solution of creep problems by a finite element
method
A82-34172

CREEP RUPTURE STRENGTH
Mechanical and metallurgical considerations in
extending the life of turbine blades
A82-33855

CRYOGENIC COOLING
The cryogenic wind tunnel for high Reynolds number
testing
A82-33317

CRYOGENIC WIND TUNNELS
The cryogenic wind tunnel for high Reynolds number
testing
A82-33317
Status of the national transonic facility
[AIAA PAPER 82-0604] A82-33326
A review of Reynolds number studies conducted in
the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0941] A82-34007
Status of the National Transonic Facility
N82-25197

CRYOGENICS
Investigation of the application of a cryogenic
blending process to produce antimisting diesel
fuels
[AD-A110917] N82-25399

CUSPS (MATHEMATICS)
Unconventional internal cracks. II - Method of
generating simple cracks
A82-34861

D

DAMAGE
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244

DAMPING TESTS
Development of experimentally compatible subsystem
methods for the analysis of aircraft structures
[AD-A111242] N82-24190
The vibratory behavior of a rotating propellor
shaft. Part 4: Vibration tests of a rotating
propeller shaft in a rubber stern tube bearing
--- ship propellers
[ISRCO-5072208-81-PT-2] N82-24514

DATA ACQUISITION
V/STOL tilt rotor research aircraft. Volume 1:
General information, revision C
[NASA-CR-166347] N82-24194

V/STOL tilt rotor research aircraft. Volume 2: Ship 1 instrumentation [NASA-CR-166348] N82-24195
V/STOL tilt rotor research aircraft. Volume 3: Ship 2 instrumentation [NASA-CR-166349] N82-24196
V/STOL tilt rotor research aircraft. Volume 4: CFE technical data [NASA-CR-166350] N82-24197
On-line experiments in acquiring and exploiting AIDS data for ATC purposes N82-25175
Hardware and software integration for concurrent data acquisition and reduction of photon correlated laser Doppler velocimetry [AD-A111146] N82-25506
Source assessment system [AD-A111223] N82-25613

DATA BASE MANAGEMENT SYSTEMS
Electronic Warfare Avionics Integration Support Facility support processor [AD-A111641] N82-25249
Source assessment system [AD-A111223] N82-25613

DATA CONVERSION ROUTINES
Eigenspace techniques for active flutter suppression [NASA-CR-168931] N82-24206

DATA CORRELATION
Wind-Tunnel/Flight Correlation, 1981 [NASA-CP-2225] N82-25196
Wind-tunnel/flight-drag correlation N82-25199
Wind-tunnel/flight correlation program on XB-70-1 N82-25201
Problems in correlation caused by propulsion systems N82-25202
F-15 wind-tunnel/flight correlations N82-25203
F-16E program overview and wind tunnel/flight correlation N82-25207

DATA LINKS
Radiating elements for hemispherically scanned arrays --- onboard aircraft for data links to satellites A82-32992
An optical data link for airborne scanning system A82-34737
A pilot's view on possible uses of AIDS --- airborne collision avoidance systems N82-25176

DATA PROCESSING
Aeronautical information data subsystems --- air navigation N82-25178
The DFVLR Digital Flight Data Readout and Processing Station and its Utility N82-25180
Gas path analysis of commercial aircraft engines N82-25184
Analysis of transient data from aircraft gas turbine engines using AIDS N82-25189
Supplementary studies on the sensitivity of optimized structures [AD-A110994] N82-25545
Structures testing analysis real-time network (STARNET) [AD-A111636] N82-25827

DATA RETRIEVAL
New techniques in data retrieval and display --- color graphics N82-25174
Flight data recovery under adverse conditions N82-25183
Value of survivability and recoverability of flight data recorders --- benefit cost methodology N82-25188

DATA SYSTEMS
Proceedings of the 11th symposium on aircraft integrated data systems --- conferences [DFVLR-MITT-82-02] N82-25171
The DFVLR Digital Flight Data Readout and Processing Station and its Utility N82-25180
An intermediate solution between basic and expanded aircraft integrated data systems (AIDS) N82-25182
Gathering and analysing data on the British Airways Boeing 757 aircraft N82-25186

DEFORMATION
Contact problems involving the flow past an inflated aerofoil A82-34851

DEGREES OF FREEDOM
Structural modification to achieve antiresonance in helicopters A82-32849

DEICERS
Thermodynamic performance of an airplane wing loading edge anti-icing system [AIAA PAPER 82-0851] A82-31871

DESIGN ANALYSIS
Structural modification to achieve antiresonance in helicopters A82-32849

DIELECTRICS
Silicon liquid crystal light valve for flight simulation applications [AD-A110928] N82-26005

DIESEL FUELS
Investigation of the application of a cryogenic blending process to produce antimisting diesel fuels [AD-A110917] N82-25399

DIFFRACTION PATTERNS
Diffraction by a finite strip A82-33605

DIFFUSERS
Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser A82-32330

DIGITAL COMPUTERS
Environmental fog/rain visual display system for aircraft simulators [NASA-CASE-ARC-11158-1] N82-24212

DIGITAL DATA
Flight data recovery under adverse conditions N82-25183

DIGITAL SYSTEMS
Proceedings of the 11th symposium on aircraft integrated data systems --- conferences [DFVLR-MITT-82-02] N82-25171
New techniques in data retrieval and display --- color graphics N82-25174
A new all-purpose digital flight data recorder N82-25177
An intermediate solution between basic and expanded aircraft integrated data systems (AIDS) N82-25182
Hardware and software integration for concurrent data acquisition and reduction of photon correlated laser Doppler velocimetry [AD-A111146] N82-25506

DISCHARGE COEFFICIENT
Experimental study on discharge and loss coefficients of combustor swirlers A82-34644

DISPLAY DEVICES
Environmental fog/rain visual display system for aircraft simulators [NASA-CASE-ARC-11158-1] N82-24212
New techniques in data retrieval and display --- color graphics N82-25174
The DFVLR Digital Flight Data Readout and Processing Station and its Utility N82-25180
Gathering and analysing data on the British Airways Boeing 757 aircraft N82-25186
Conceptual design study for an advanced cab and visual system, volume 1 [NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2 [NASA-CR-166236] N82-25267
Source assessment system [AD-A111223] N82-25613

DISTANCE MEASURING EQUIPMENT
Ground speed measurement from DME/VHF omnirange navigation (VOR) data N82-25185

DOPPLER NAVIGATION
Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar
A82-34672
DOWNWASH
Downwash behind a wing with spanwise blowing
A82-33514
DRAG REDUCTION
Aerodynamics/ACEE: Aircraft energy efficiency
[NASA-FACTS-94/8-81] N82-25241
DRAWINGS
V/STOL tilt rotor research aircraft. Volume 4: CFE technical data
[NASA-CR-166350] N82-24197
DYNAMIC RESPONSE
Effects of dynamic stall on SWECS --- Small Wind Energy Conversion System
A82-33707
A method for determining the aeroelastic behavior of aircraft with active control systems
[ESA-TT-719] N82-24211
Roll response criteria for transport aircraft with advanced flight control systems in the landing approach and touchdown
[NLR-TR-80103-U] N82-25265
DYNAMIC STRUCTURAL ANALYSIS
Trends in structural analysis at ONERA
[ONERA, TP NO. 1982-2] A82-34491
Development of experimentally compatible subsystem methods for the analysis of aircraft structures
[AD-A111242] N82-24198

E

ECONOMIC FACTORS
Value of survivability and recoverability of flight data recorders --- benefit cost methodology
N82-25186
EDGE LOADING
Prediction of wing side-edge suction forces and maximum inviscid lift
N82-25192
EDUCATION
Aerospace engineers: We're tomorrow-minded people
[NASA-EP-188] N82-25017
EIGENVALUES
Eigenspace techniques for active flutter suppression
[NASA-CR-168931] N82-24206
EJECTION INJURIES
On the aerodynamics of windblast
[AD-A110495] N82-25221
EJECTORS
An experimental investigation of the flow field of an ejector wing design employing a photon correlation laser velocimeter
[AD-A111134] N82-24182
ELASTIC BODIES
An algorithm for calculating the compliance matrices of aircraft structures by the substructure method as applied to aeroelasticity problems
A82-34161
Calculation of the lift distribution and aerodynamic derivatives of quasi-static elastic aircraft
A82-34639
ELASTIC DEFORMATION
Method for the measurement of elastic deformations of aircraft models in a wind tunnel
A82-34162
Elastic deformation effects on aerodynamic characteristics for a high-aspect-ratio supercritical-wing model
[NASA-TM-83286] N82-25214
ELECTRIC CONTROL
Electro-hydraulic nose wheel steering of the Dornier 228
A82-34373
ELECTRIC CURRENT
Aircraft potential variations in flight
[ONERA, TP NO. 1982-11] A82-34499
ELECTRIC EQUIPMENT
Aviation electronics /4th edition/ --- Book
A82-33645
ELECTRIC FIELDS
Aircraft potential variations in flight
[ONERA, TP NO. 1982-11] A82-34499
ELECTRIC POTENTIAL
Aircraft potential variations in flight
[ONERA, TP NO. 1982-11] A82-34499
ELECTRIC SWITCHES
Improvement program for the C-141 Navigation Selector Panel
[AD-A111469] N82-25248
ELECTROMAGNETIC INTERFERENCE
Aircraft potential variations in flight
[ONERA, TP NO. 1982-11] A82-34499
ELECTROMAGNETIC SHIELDING
Aircraft lightning protection
A82-33544
ELECTROMAGNETIC SURFACE WAVES
Radiating elements for hemispherically scanned arrays --- onboard aircraft for data links to satellites
A82-32992
ELECTRONIC EQUIPMENT
Aviation electronics /4th edition/ --- Book
A82-33646
ELECTRONIC WARFARE
Electronic Warfare Avionics Integration Support Facility support processor
[AD-A111641] N82-25249
ELECTROSTATIC CHARGE
Aircraft potential variations in flight
[ONERA, TP NO. 1982-11] A82-34499
ELEVATORS (CONTROL SURFACES)
Investigation on rotating ailerons
N82-26162
ELLIPTIC DIFFERENTIAL EQUATIONS
Generation of three-dimensional boundary-fitted curvilinear coordinate systems for wing/wing-tip geometries using the elliptic solver method
A82-33318
EMPLOYMENT
Aerospace engineers: We're tomorrow-minded people
[NASA-EP-188] N82-25017
ENERGY CONSERVATION
Principles of efficient energy use at Interflug
A82-33250
Sideslip indication system as a fuel saving aid in jet transport aircraft operation --- a-300 and a-310 aircraft
N82-25181
Aerodynamics/ACEE: Aircraft energy efficiency
[NASA-FACTS-94/8-81] N82-25241
Guidance and control/ACEE
[NASA-FACTS-95/8-81] N82-25261
ENERGY CONVERSION
Biennial Wind Energy Conference and Workshop, 5th, Washington, DC, October 5-7, 1981, Proceedings
A82-33701
Effects of dynamic stall on SWECS --- Small Wind Energy Conversion System
A82-33707
ENERGY METHODS
The determination of critical flutter conditions of nonlinear systems
[RAE-TM-STRUCT-986] N82-24210
ENERGY TECHNOLOGY
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159
ENGINE AIRFRAME INTEGRATION
Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings
A82-34163
ENGINE DESIGN
Gas turbine aero-thermodynamics with special reference to aircraft propulsion --- Book
A82-33660
The TM 333, a trump card for Turbomeca
A82-33750
Development of an aircraft engine
A82-34112
Air cooling of gas turbine blades
A82-34700
Study of advanced propulsion systems for Small Transport Aircraft Technology (STAT) program
[NASA-CR-165610] N82-24202
Propulsion/ACEE
[NASA-FACTS-93/8-81] N82-25251
Coaxial dump Ramjet combustor combustion instabilities. Part 1: Parametric test data
[AD-A111355] N82-25259
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635

ENGINE MONITORING INSTRUMENTS
Gas path analysis of commercial aircraft engines N82-25184
ENGINE NOISE
Shock associated noise of supersonic jets from convergent-divergent nozzles A82-32202
ENGINE PARTS
The superalloys - Materials for gas turbine hot section components A82-33853
Large scale aeroengine compressor test facility A82-34953
Cost/benefit studies of advancnd materials technologies for future aircraft turbine engines: Materials for advanced turbine engines [NASA-CR-167849] N82-25254
ENGINE TESTS
Large scale aeroengine compressor test facility A82-34953
Coaxial dump Ramjet combustor combustion instabilities. Part 1: Parametric test data [AD-A111355] N82-25259
ENVIRONMENT EFFECTS
Radar frequency radiation [AD-A111852] N82-25424
EPOXY MATRIX COMPOSITES
Materials and structures/ACEE [NASA-FACTS-117/8-81] N82-25242
EQUATIONS OF MOTION
Transformation relations for singularity avoidance in three-dimensional trajectory optimization A82-32137
An aircraft sensor fault tolerant system [NASA-CR-165876] N82-25236
EQUIPMENT SPECIFICATIONS
V/STOL tilt rotor research aircraft. Volume 4: CFE technical data [NASA-CR-166350] N82-24197
A new all-purpose digital flight data recorder N82-25177
ERROR CORRECTING DEVICES
Flight data recovery under adverse conditions N82-25183
EUROPEAN AIRBUS
From the A 300 to the A 310 A82-33542
The Airbus family of aircraft at the dawn of the 1980's [SNIAS-821-111-101] N82-24154
EXHAUST EMISSION
Exhaust emissions survey of a turbofan engine for flame holder swirl type augmentors at simulated altitude flight conditions [NASA-TM-82787] N82-25255
EXHAUST GASES
Exhaust emissions survey of a turbofan engine for flame holder swirl type augmentors at simulated altitude flight conditions [NASA-TM-82787] N82-25255
Low NOx heavy fuel combustor concept program [NASA-CR-165367] N82-25635
EXPERIMENTAL DESIGN
La Recherche Aerospatiale, Bi-monthly bulletin, number 1981-6, November-December 1981 --- aerodynamic research [ESA-TT-741] N82-26185
EXTERNAL STORE SEPARATION
Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories A82-33626
EXTERNAL STORES
Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow [AIAA PAPER 82-0958] A82-31934
EXTERNALLY BLOWN FLAPS
Aeroacoustic performance of an externally blown flap configuration with several flap noise suppression devices [NASA-TP-1995] N82-24942
EXTREMUM VALUES
Ideal ramjet - Optimum M sub infinity for fuel limit and material limit A82-33143

F

F-14 AIRCRAFT
Cannibalization of the F-14 and S-3A aircraft: A viable logistic [AD-A111207] N82-24163
F-15 AIRCRAFT
F-15 rotary balance data for an angle-of-attack range of 8 deg to 90 deg [NASA-CR-3478] N82-24168
Rotary balance data for an F-15 model with conformal fuel tanks for an angle-of-attack range of 8 deg to 90 deg [NASA-CR-3516] N82-24169
F-15 wind-tunnel/flight correlations N82-25203
F-16 AIRCRAFT
F-16E program overview and wind tunnel/flight correlation N82-25207
A case study of reliability and maintainability of the F-16 APG-66 fire control radar [AD-A111387] N82-25435
F-18 AIRCRAFT
Water tunnel flow visualization and wind tunnel data analysis of the F/A-18 --- leading edge extension vortex effects [NASA-CR-165859] N82-25215
FABRICATION
Army's 1st IPI program begun - Blisk impeller followup --- integral blade-disk A82-31999
Wind tunnels of the institute of mechanics of Moscow State University [NASA-TM-76909] N82-24213
FAILURE ANALYSIS
Failure analysis of silica phenolic nozzle liners A82-34882
FAN BLADES
Three dimensional turbulent boundary layer development on a fan rotor blade [AIAA PAPER 82-1007] A82-31965
FATIGUE LIFE
Mechanical and metallurgical considerations in extending the life of turbine blades A82-33855
Fatigue life prediction of helicopter pitch link using Kaman life calculation methods A82-34125
A review and assessment of fatigue crack growth rate relationships for metallic airframe materials A82-34879
FAULT TOLERANCE
Production of Reliable Flight Crucial Software: Validation Methods Research for Fault Tolerant Avionics and Control Systems Sub-Working Group Meeting [NASA-CP-2222] N82-24845
An aircraft sensor fault tolerant system [NASA-CR-165876] N82-25236
FEEDBACK CONTROL
OLGA - A gust alleviation for general aviation aircraft A82-34374
Automation of the synthesis of control in a stationary linear system --- for aircraft flight control A82-34464
Optimization of auto-pilot equations for rapid estimation of helicopter control settings [AD-A110739] N82-25263
FIBER REINFORCED COMPOSITES
Failure analysis of silica phenolic nozzle liners A82-34882
FIBER STRENGTH
Report from the Working Party on New Fiber Materials --- standardization and strength N82-24512
FIBERS
Report from the Working Party on New Fiber Materials --- standardization and strength N82-24512
FIGHTER AIRCRAFT
The equivalent simple body /ESB/ method for transonic wing analysis [AIAA PAPER 82-0936] A82-31923

Finite-element modeling of a fighter aircraft canopy acrylic panel A82-32848
High technology raises fighter force readiness A82-33892
Military aircraft - The way ahead A82-34110
Thrust-induced effects on low-speed aerodynamics of fighter aircraft --- Langley 4- by 7-meter tunnel [NASA-TM-83277] N82-25218
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 30 June 1981 [AD-A110660] N82-25243
Simulator for air-to-air combat versus real world: Visual cue analysis for simulated air-to-air combat training [AD-A110570] N82-25270

FILLERS
Temperature fields in three-layer panels with a honeycomb filler during unsteady heating A82-34135

FINITE DIFFERENCE THEORY
A harmonic analysis method for unsteady transonic flow and its application to the flutter of airfoils [NASA-CR-3537] N82-25194

FINITE ELEMENT METHOD
Design of finite element grids for the computation of the three-dimensional transonic flow around a wing [AIAA PAPER 82-1019] A82-31972
Finite-element modeling of a fighter aircraft canopy acrylic panel A82-32848
Finite element analysis of some aerospace shell structures A82-33515
Finite element calculation of the aerodynamic forces on a vibrating wing in supersonic flow A82-34128
Solution of creep problems by a finite element method A82-34172
Nonlinear structural and life analyses of a combustor liner [NASA-TM-82846] N82-24501

FINITE VOLUME METHOD
Finite volume calculation of three-dimensional potential flow around a propeller [AIAA PAPER 82-0957] A82-31933
A numerical study of the turbulent flow past an isolated airfoil with trailing edge separation [AIAA PAPER 82-0998] A82-31958

FIRE CONTROL
A case study of reliability and maintainability of the F-16 APG-66 fire control radar [AD-A111387] N82-25435

FIRE EXTINGUISHERS
Evaluation of three percent Aqueous Film Forming Foam (AFFF) concentrates as fire fighting agents --- JP-4 jet fuel fires [AD-A110821] N82-25402

FIREPROOFING
Fireproof brake hydraulic system [AD-A111319] N82-25245

FLAME RETARDANTS
Investigation of the application of a cryogenic blending process to produce antimisting diesel fuels [AD-A110917] N82-25399

FLAPPING HINGES
Periodic boundary value problem for the equations of the harmonic oscillation of a rotor blade about the axis of a flapping hinge A82-34127

FLAT PLATES
Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams [AD-A111124] N82-24181

FLIGHT CHARACTERISTICS
Forward-swept-wing technology A82-33309
OLGA - A gust alleviation for general aviation aircraft A82-34374

FLIGHT CONTROL
Barriers and dispersal surfaces in minimum-time interception [NASA-TM-84241] N82-25262
Optimization of auto-pilot equations for rapid estimation of helicopter control settings [AD-A110739] N82-25263
Use of the Pseudo-inverse for design of a reconfigurable flight control system [AD-A111172] N82-25264
An assessment of the real-time application capabilities of the SIFT computer system [NASA-TM-84482] N82-25811

FLIGHT HAZARDS
A documented example of strong wind-shear A82-33274
Primary sewage treatment plant as a source of bird hazards at airport A82-33523

FLIGHT INSTRUMENTS
Improvement program for the C-141 Navigation Selector Panel [AD-A111469] N82-25248

FLIGHT MECHANICS
Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems --- German book A82-33348

FLIGHT OPTIMIZATION
Determination of the glide path of an aircraft with power off A82-34154
Flight management computer [SNIAS-821-111-110] N82-24842
Cost and fuel consumption per nautical mile for two engine jet transports using OPTIM and TRAGEN [NASA-CR-168973] N82-25239

FLIGHT PATHS
Transformation relations for singularity avoidance in three-dimensional trajectory optimization A82-32137
Flight evaluation of Loran-C for general aviation area navigation A82-33049

FLIGHT PLANS
Flight management computer [SNIAS-821-111-110] N82-24842

FLIGHT RECORDERS
Proceedings of the 11th symposium on aircraft integrated data systems --- conferences [DFVLR-MITT-82-02] N82-25171
Solid-state flight incident recorder N82-25172
Solid state crash survivable flight data recorders for mishap investigation N82-25173
New techniques in data retrieval and display --- color graphics N82-25174
A new all-purpose digital flight data recorder N82-25177
The DFVLR Digital Flight Data Readout and Processing Station and its Utility N82-25180
An intermediate solution between basic and expanded aircraft integrated data systems (AIDS) N82-25182
Flight data recovery under adverse conditions N82-25183
Value of survivability and recoverability of flight data recorders --- benefit cost methodology N82-25188

FLIGHT SIMULATION
Simulation reaches towards reality A82-33547

FLIGHT SIMULATORS
Environmental fog/rain visual display system for aircraft simulators [NASA-CASE-ARC-11158-1] N82-24212
Silicon liquid crystal light valve for flight simulation applications [AD-A110928] N82-26005

FLIGHT TESTS
Flight evaluation of Loran-C for general aviation area navigation A82-33049
No-tail-rotor helicopter tests continue A82-33095

XV-15 - Foretelling things to come
A82-33914
Aerodynamic coefficient identification of
time-varying aircraft system and its application
A82-34645
Short-term behavior of a Doppler navigation system
and comparison with position indication by means
of scanning radar
A82-34672
Wind-Tunnel/Flight Correlation, 1981
[NASA-CP-2225] N82-25196
Wind-tunnel/flight-drag correlation
N82-25199
Wind-tunnel/flight correlation program on XB-70-1
N82-25201
Problems in correlation caused by propulsion systems
N82-25202
Opportunities for wind-tunnel/flight correlation
with new Boeing airplanes
N82-25206
F-16E program overview and wind tunnel/flight
correlation
N82-25207
Application of Computational Fluid Dynamics (CFD)
in transonic wind-tunnel/flight-test correlation
N82-25211

FLIGHT TIME
Solar-powered airplane design for long-endurance,
high-altitude flight
[AIAA PAPER 82-0611] A82-31984
Statistical review of counting accelerometer data
for Navy and Marine fleet aircraft from 1
January 1962 to 30 June 1981
[AD-A110660] N82-25243

FLOW CHARACTERISTICS
Incompressible symmetric flow characteristics of
sharp-edged rectangular wings
A82-32850
Effects of dynamic stall on SWECS --- Small Wind
Energy Conversion System
A82-33707

FLOW COEFFICIENTS
Experimental study on discharge and loss
coefficients of combustor swirlers
A82-34644

FLOW DISTRIBUTION
Evaluation of two analytical methods for the
prediction of inlet flow fields in the vicinity
of generalized forebodies
[AIAA PAPER 82-0959] A82-31935
Aerodynamic interactions with turbulent jet
exhaust plumes
A82-33325
Flow visualization techniques for the study of
high incidence aerodynamics
[ONERA, TP NO. 1982-5] A82-34493
An experimental investigation of the flow field of
an ejector wing design employing a photon
correlation laser velocimeter
[AD-A111134] N82-24182
Study of VTOL in ground-effect flow field
including temperature effect
[NASA-CR-166258] N82-25170
Investigation of the tip clearance flow inside and
at the exit of a compressor rotor passage
[NASA-CR-169004] N82-25253

FLOW GEOMETRY
Subsonic 3-D surface panel method for rapid
analysis of multiple geometry perturbations
[AIAA PAPER 82-0993] A82-31954
Similarity parameters for the geometric structure
of a supersonic jet propagating in a channel and
in a submerged space
A82-34132

FLOW MEASUREMENT
Three dimensional turbulent boundary layer
development on a fan rotor blade
[AIAA PAPER 82-1007] A82-31965

FLOW THEORY
The problem of calculation of the flow around
helicopter rotor blade tips --- and adapting
computer programs
[MBB-UD-330-81-O] N82-25233

FLOW VELOCITY
Calculation of the flow-field velocities of a
wing-body-stores combination in transonic flow
[AIAA PAPER 82-0958] A82-31934
Three dimensional mean velocity and turbulence
characteristics in the annulus wall region of an
axial flow compressor rotor passage
[NASA-CR-169003] N82-25252

FLOW VISUALIZATION
Flow visualization techniques for the study of
high incidence aerodynamics
[ONERA, TP NO. 1982-5] A82-34493

FLUID FILMS
Evaluation of three percent Aqueous Film Forming
Foam (AFFF) concentrates as fire fighting agents
--- JP-4 jet fuel fires
[AD-A110821] N82-25402

FLUID INJECTION
Experimental investigation of turbulent wall-jets
in the presence of adverse pressure gradients in
a rectangular diffuser
A82-32330

FLUTTER ANALYSIS
Parameter identification for structures with
neighboring natural frequencies especially for
the case of flight resonance tests
A82-32136
Eigenspace techniques for active flutter suppression
[NASA-CR-168931] N82-24206
Application of modal control to wing-flutter
suppression
[NASA-TP-1983] N82-24209
The determination of critical flutter conditions
of nonlinear systems
[RAE-TM-STRUCT-986] N82-24210
A harmonic analysis method for unsteady transonic
flow and its application to the flutter of
airfoils
[NASA-CR-3537] N82-25194
Subsonic aerodynamic and flutter characteristics
of several wings calculated by the SOUSSA P1.1
panel method
[NASA-TM-84485] N82-25216

FOAMS
Evaluation of three percent Aqueous Film Forming
Foam (AFFF) concentrates as fire fighting agents
--- JP-4 jet fuel fires
[AD-A110821] N82-25402

FOG
Environmental fog/rain visual display system for
aircraft simulators
[NASA-CASE-ARC-11158-1] N82-24212

FORCE DISTRIBUTION
Experimental verification of force determination
and ground flying on a full-scale helicopter
[USAAVRADCOM-TR-81-D-11] N82-24199
Statistical review of counting accelerometer data
for Navy and Marine fleet aircraft from 1
January 1962 to 30 June 1981
[AD-A110660] N82-25243

FOREBODIES
Evaluation of two analytical methods for the
prediction of inlet flow fields in the vicinity
of generalized forebodies
[AIAA PAPER 82-0959] A82-31935

FORGING
Material flow and defect formation in forging an
airfoil shape from metal-matrix composites
A82-33995

FORKS
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244

FORMING TECHNIQUES
Formability of metallic materials - 2000 A.D.;
Proceedings of the Symposium, Chicago, IL, June
24, 25, 1980
A82-33989

FORTRAN
STGSTK: A computer code for predicting multistage
axial flow compressor performance by a meanline
stage stacking method
[NASA-TP-2020] N82-25250

FRACTURE MECHANICS
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244
Fracture mechanics criteria for turbine engine hot
section components
[NASA-CR-167896] N82-25257

FREE FLOW
An experimental study at free-stream Mach 5 of the
aerodynamic heating of the upper surface of
plane wings of various planforms
A82-34149

FREE JETS
Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr
A82-33627
FRICTION
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193
Lubricant effects on efficiency of a helicopter transmission
[NASA-TM-82857] N82-25520
FUEL COMBUSTION
Ideal ramjet - Optimum M sub infinity for fuel limit and material limit
A82-33143
FUEL CONSUMPTION
System study of application of composite materials for future transport aircraft
[AIAA PAPER 82-0812] A82-31985
Principles of efficient energy use at Interflug
A82-33250
Commercial transport developments for the 1990's
A82-34109
Impact study of synthetic and alternative fuel usage in Army aircraft propulsion systems
[AD-A111046] N82-24355
Flight management computer
[SNIAS-821-111-110] N82-24842
Cost and fuel consumption per nautical mile for two engine jet transports using OPTIM and TRAGEN
[NASA-CR-168973] N82-25239
Materials and structures/ACEE
[NASA-FACTS-117/8-81] N82-25242
Propulsion/ACEE
[NASA-FACTS-93/8-81] N82-25251
FUEL PRODUCTION
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
FUEL TANKS
F-15 rotary balance data for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3478] N82-24168
Rotary balance data for an F-15 model with conformal fuel tanks for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3516] N82-24169
FUSELAGES
Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects
A82-34166
Experimental verification of force determination and ground flying on a full-scale helicopter
[USAAVRADCOM-TR-81-D-11] N82-24199
Adapter for mounting microphone flush with the external surface of the skin of a pressurized aircraft
[NASA-CASE-FRC-11072-1] N82-24474

G

GAMMA RAY SPECTROMETERS
Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2
[DE82-000314] N82-24620
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1
[DE82-004150] N82-24629
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2
[DE82-004169] N82-24630
Airborne gamma-ray spectrometer and magnetometer survey. Barrow quadrangle, Alaska, volume 2
[DE82-000342] N82-25623
GARBAGE
Primary sewage treatment plant as a source of bird hazards at airport
A82-33523
GAS FLOW
Gas path analysis of commercial aircraft engines
N82-25184
GAS INJECTION
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944
Numerical investigation of supersonic base flow with parallel injection --- in scramjet combustors
[AIAA PAPER 82-1001] A82-31960
GAS LASERS
Starting transients in supersonic nozzles and nozzle-diffuser assemblies
[AD-A111143] N82-25226
GAS MIXTURES
Mach reflection of a shock wave from an inclined wall
A82-34740
GAS TURBINE ENGINES
Gas turbine aero-thermodynamics with special reference to aircraft propulsion --- Book
A82-33650
The TM 333, a trump card for Turbomeca
A82-33750
The superalloys - Materials for gas turbine hot section components
A82-33853
A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers
A82-34814
Impact study of synthetic and alternative fuel usage in Army aircraft propulsion systems
[AD-A111046] N82-24355
Evaluation of inelastic constitutive models for nonlinear structural analysis --- for aircraft turbine engines
[NASA-TM-82845] N82-24502
Analysis of transient data from aircraft gas turbine engines using AIDS
N82-25189
Cost/benefit studies of advanced materials technologies for future aircraft turbine engines: Materials for advanced turbine engines
[NASA-CR-167849] N82-25254
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635
GAS TURBINES
Air cooling of gas turbine blades
A82-34700
Evaluation of cast titanium alloy compressor components, volume 1
[AD-A111431] N82-24204
GEAR TEETH
Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces --- for helicopter transmissions
[NASA-CR-3553] N82-25516
GEARS
Lubricant effects on efficiency of a helicopter transmission
[NASA-TM-82857] N82-25520
GENERAL AVIATION AIRCRAFT
Predicting the application of vicarious liability to fixed base operators - Still guesswork after all these years
A82-32056
Flight evaluation of Loran-C for general aviation area navigation
A82-33049
Technical trends in the civil aircraft and helicopter industry
A82-34120
Business jets to agricultural aircraft - An overview of general aviation
A82-34123
OLGA - A gust alleviation for general aviation aircraft
A82-34374
Solid state crash survivable flight data recorders for mishap investigation
N82-25173
GEODETIC COORDINATES
Transformation relations for singularity avoidance in three-dimensional trajectory optimization
A82-32137
GEODETIC SURVEYS
Applications of a multiplexed GPS user set
A82-33050

GEOLOGICAL SURVEYS
- Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2 [DE82-000314] N82-24620
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1 [DE82-004150] N82-24629
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2 [DE82-004169] N82-24630
- Airborne gamma-ray spectrometer and magnetometer survey. Barrow quadranagle, Alaska, volume 2 [DE82-000342] N82-25623

GLIDE PATHS
- Determination of the glide path of an aircraft with power off A82-34154

GLOBAL POSITIONING SYSTEM
- Applications of a multiplexed GPS user set A82-33050

GOVERNMENT/INDUSTRY RELATIONS
- Considerations for international joint venture development of very large aircraft [AIAA PAPER 82-0809] A82-31982
- The aerospace learning process --- review of some past projects [AIAA PAPER 82-1291] A82-33025
- The U.S. airline industry - En route to deregulation A82-33920
- The first A in NASA [GPO-89-476] N82-25271

GRAPHITE-EPOXY COMPOSITES
- System study of application of composite materials for future transport aircraft [AIAA PAPER 82-0812] A82-31985
- Standard tests for toughened resin composites --- for aircraft structures [NASA-RP-1092] N82-24301

GRAPHS (CHARTS)
- Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2 [DE82-000314] N82-24620
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1 [DE82-004150] N82-24629
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2 [DE82-004169] N82-24630

GROUND EFFECT (AERODYNAMICS)
- The potential of large aircraft [AIAA PAPER 82-0804] A82-31980
- Analysis of small-aspect-ratio lifting surfaces in ground effect A82-32223
- Study of VTOL in ground-effect flow field including temperature effect [NASA-CR-166258] N82-25170

GROUND SPEED
- Ground speed measurement from DME/VHF omnirange navigation (VOR) data N82-25185

GRUMMAN AIRCRAFT
- X-29A forward-swept-wing demonstrator airplane N82-25209

GUST ALLEVIATORS
- OLGA - A gust alleviation for general aviation aircraft A82-34374

H

HARMONIC ANALYSIS
- A harmonic analysis method for unsteady transonic flow and its application to the flutter of airfoils [NASA-CR-3537] N82-25194

HARMONIC OSCILLATION
- Periodic boundary value problem for the equations of the harmonic oscillation of a rotor blade about the axis of a flapping hinge A82-34127

HEAT PIPES
- Design, fabrication and test of liquid metal heat-pipe sandwich panels [AIAA PAPER 82-0903] A82-31898

HEAT RESISTANT ALLOYS
- The superalloys - Materials for gas turbine hot section components A82-33853
- A status review of NASA's COSAM (Conservation Of Strategic Aerospace Materials) program [NASA-TM-82852] N82-24326

HEAT TRANSFER
- Design, fabrication and testing of an electrical analogue for heat transfer to coated turbine blade A82-33520
- An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms A82-34149

HEAVY LIFT AIRSHIPS
- Current developments lighter than air systems --- heavy lift airships [NASA-TM-84744] N82-24176

HEAVY LIFT HELICOPTERS
- Linear decentralized systems with special structure --- for twin lift helicopters A82-34359

HELICOPTER CONTROL
- No-tail-rotor helicopter tests continue A82-33095
- The ubiquitous helicopter A82-33913
- Linear decentralized systems with special structure --- for twin lift helicopters A82-34359
- Optimization of auto-pilot equations for rapid estimation of helicopter control settings [AD-A110739] N82-25263

HELICOPTER DESIGN
- Structural modification to achieve antiresonance in helicopters A82-32849
- The ubiquitous helicopter A82-33913
- Will ABC technology produce the next-generation helicopter A82-33916
- Mechanical properties of hot isostatic pressed P/M-titanium for helicopter components [MBB-UD-324-81-0] N82-25383

HELICOPTER ENGINES
- The TM 333, a trump card for Turbomeca A82-33750
- Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces --- for helicopter transmissions [NASA-CR-3553] N82-25516

HELICOPTER PERFORMANCE
- No-tail-rotor helicopter tests continue A82-33095

HELICOPTERS
- Technical trends in the civil aircraft and helicopter industry A82-34120
- Fatigue life prediction of helicopter pitch link using Kaman life calculation methods A82-34125
- Measuring LF and MF antenna radiation patterns by means of a helicopter A82-34772
- Lubricant effects on efficiency of a helicopter transmission [NASA-TM-82857] N82-25520

HIGH ALTITUDE
- Solar-powered airplane design for long-endurance, high-altitude flight [AIAA PAPER 82-0811] A82-31984

HIGH ALTITUDE ENVIRONMENTS
- The next generation trainer A82-33908

HIGH ASPECT RATIO
- Elastic deformation effects on aerodynamic characteristics for a high-aspect-ratio supercritical-wing model [NASA-TM-83286] N82-25214

HIGH STRENGTH STEELS
  Comparison between probability of detection, sensitivity, and accuracy of five nondestructive inspection methods --- high strength steel aircraft undercarriage retraction cylinders
  [NLR-MP-81038-U] N82-24500
HISTORIES
  The aerospace learning process --- review of some past projects
  [AIAA PAPER 82-1291] A82-33025
HONEYCOMB STRUCTURES
  Design, fabrication and test of liquid metal heat-pipe sandwich panels
  [AIAA PAPER 82-0903] A82-31898
  Temperature fields in three-layer panels with a honeycomb filler during unsteady heating
  A82-34135
HOT PRESSING
  Mechanical properties of hot isostatic pressed P/M-titanium for helicopter components
  [MBB-UD-324-81-O] N82-25383
HYDRAULIC CONTROL
  Electro-hydraulic nose wheel steering of the Dornier 228
  A82-34373
  Fireproof brake hydraulic system
  [AD-A111319] N82-25245
HYDRAULIC EQUIPMENT
  Fireproof brake hydraulic system
  [AD-A111319] N82-25245
HYDRAULIC TEST TUNNELS
  Flow visualization techniques for the study of high incidence aerodynamics
  [ONERA, TP NO. 1982-5] A82-34493
HYDROGEN FUELS
  The potential for long-range high-payload aircraft with alternate fuels
  [AIAA PAPER 82-0814] A82-31987
HYDROGEN-BASED ENERGY
  Hydrogen economy assessment for long-term energy systems in Japan
  A82-32159
HYPERSONIC FLOW
  Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
  [AIAA PAPER 82-0579] A82-31944
HYSTERESIS
  Hysteresis of the normal force of a wing of complex planform under unsteady motion
  A82-34157

I

ICE FORMATION
  Thermodynamic performance of an airplane wing leading edge anti-icing system
  [AIAA PAPER 82-0651] A82-31871
  Rime ice accretion and its effect on airfoil performance
  [NASA-CR-165599] N82-24166
IMAGE ENHANCEMENT
  Testing of the Kuiper Airborne Observatory 91-CM telescope
  [NASA-CR-166341] N82-25040
IMPACT RESISTANCE
  Solid-state flight incident recorder
  N82-25172
IMPELLERS
  Army's 1st IPI program begun - Blisk impeller followup --- integral blade-disk
  A82-31999
IN-FLIGHT MONITORING
  Proceedings of the 11th symposium on aircraft integrated data systems --- conferences
  [DFVLR-MITT-82-02] N82-25171
  An intermediate solution between basic and expanded aircraft integrated data systems (AIDS)
  N82-25182
  Analysis of transient data from aircraft gas turbine engines using AIDS
  N82-25189
INCOMPRESSIBLE FLOW
  Incompressible symmetric flow characteristics of sharp-edged rectangular wings
  A82-32850
INDUSTRIAL PLANTS
  Primary sewage treatment plant as a source of bird hazards at airport
  N82-26184
INELASTIC STRESS
  Evaluation of inelastic constitutive models for nonlinear structural analysis --- for aircraft turbine engines
  [NASA-TM-82845] N82-24502
INERTIAL NAVIGATION
  Operational testing of the LN-33 inertial navigation system
  A82-33854
INERTIAL PLATFORMS
  Ground speed measurement from DME/VHF omnirange navigation (VOR) data
  N82-25185
INFLATABLE STRUCTURES
  Contact problems involving the flow past an inflated aerofoil
  A82-34851
INFORMATION SYSTEMS
  Aeronautical information data subsystems --- air navigation
  N82-25178
INJURIES
  Factors influencing settlement of personal injury and death claims in aircraft accident litigation
  A82-32062
INLET AIRFRAME CONFIGURATIONS
  F-15 wind-tunnel/flight correlations
  N82-25203
INLET FLOW
  Evaluation of two analytical methods for the prediction of inlet flow fields in the vicinity of generalized forebodies
  [AIAA PAPER 82-0959] A82-31935
  Experimental and analytical results of tangential blowing applied to a subsonic V/STOL inlet
  [NASA-TM-82847] N82-24165
  Investigation of the tip clearance flow inside and at the exit of a compressor rotor passage
  [NASA-CR-169004] N82-25253
INLET TEMPERATURE
  Air cooling of gas turbine blades
  A82-34700
INTERCEPTION
  Barriers and dispersal surfaces in minimum-time interception
  [NASA-TM-84241] N82-25262
INTERGRANULAR CORROSION
  Nondestructive detection of exfoliation corrosion around fastener holes in aluminum wing skins
  A82-32725
INTERNATIONAL COOPERATION
  Considerations for international joint venture development of very large aircraft
  [AIAA PAPER 82-0809] A82-31902
INTERNATIONAL LAW
  Aviation negotiations and the U.S. model agreement
  A82-32063
INTERNATIONAL TRADE
  Military aircraft and international policy
  A82-34108
INTERPLANETARY FLIGHT
  Radiation enhancement by nonequilibrium during flight through the Titan atmosphere
  [AIAA PAPER 82-0878] A82-31883
INTERSECTIONS
  Runway end intersection design
  A82-33904
INVISCID FLOW
  Prediction of wing side-edge suction forces and maximum inviscid lift
  N82-25192
  Modified version of LTRAN2: A calculation method for inviscid transonic flow about thin airfoils in moderately slow unsteady motion
  [NLR-TR-80059-U] N82-25231
IRON ALLOYS
  Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy
  A82-33994

J

JET AIRCRAFT
  The next generation trainer
  A82-33908

Cost and fuel consumption per nautical mile for two engine jet transports using OPTIM and TRAGEN [NASA-CR-168973] N82-25239

JET AIRCRAFT NOISE

Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr A82-33627

Airbus industry and noise in the community [SNIAS-821-111-111] N82-24739

Aeroacoustic performance of an externally blown flap configuration with several flap noise suppression devices [NASA-TP-1995] N82-24942

JET ENGINE FUELS

Impact study of synthetic and alternative fuel usage in Army aircraft propulsion systems [AD-A111086] N82-24355

JET ENGINES

Development of an aircraft engine A82-34112

Development of an analytical technique for the optimization of jet engine and duct acoustic liners [NASA-CR-169002] N82-25256

JET EXHAUST

Aerodynamic interactions with turbulent jet exhaust plumes A82-33325

JP-4 JET FUEL

Evaluation of three percent Aqueous Film Forming Foam (AFFF) concentrates as fire fighting agents --- JP-4 jet fuel fires [AD-A110821] N82-25402

K

KEVLAR (TRADEMARK)

Materials and structures/ACEE [NASL-FACTS-117/8-81] N82-25242

L

LAMINAR FLOW

Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams [AD-A111124] N82-24181

LAMINAR FLOW AIRFOILS

The NASA Langley laminar flow control airfoil experiment [AIAA PAPER 82-0567] A82-33327

LAMINAR HEAT TRANSFER

Approximate method of predicting heating on the windward side of Space Shuttle Orbiter and comparisons with flight data [AIAA PAPER 82-0823] A82-31853

LAMINATES

Standard tests for toughened resin composites --- for aircraft structures [NASA-RP-1092] N82-24301

LANDING AIDS

Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 1 [AD-A110862] N82-24188

Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 2 [AD-A110863] N82-24189

LANDING GEAR

OV-10A nose gear fork damage analysis [AD-A111492] N82-25244

Fireproof brake hydraulic system [AD-A111319] N82-25245

LASER DOPPLER VELOCIMETERS

An experimental investigation of the flow field of an ejector wing design employing a photon correlation laser velocimeter [AD-A111134] N82-24182

Hardware and software integration for concurrent data acquisition and reduction of photon correlated laser Doppler velocimetry [AD-A111146] N82-25506

LASER SPECTROMETERS

In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program [NASA-TM-84471] N82-25661

LATERAL CONTROL

Leading edge flap system for aircraft control augmentation [NASA-CASE-LAR-12787-1] N82-25240

LAW (JURISPRUDENCE)

Recent developments in aviation cases A82-32055

LEADING EDGE FLAPS

Leading edge flap system for aircraft control augmentation [NASA-CASE-LAR-12787-1] N82-25240

LEADING EDGES

Thermodynamic performance of an airplane wing leading edge anti-icing system [AIAA PAPER 82-0851] A82-31871

Water tunnel flow visualization and wind tunnel data analysis of the F/A-18 --- leading edge extension vortex effects [NASA-CR-165859] N82-25215

LEAST SQUARES METHOD

Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar A82-34672

LEGAL LIABILITY

Recent developments in aviation cases A82-32055

Predicting the application of vicarious liability to fixed base operators - Still guesswork after all these years A82-32056

Aviation accident investigation - Functional and legal perspectives A82-32059

Factors influencing settlement of personal injury and death claims in aircraft accident litigation A82-32062

LIFT

The initial lift and drag of an impulsively started airfoil of finite thickness A82-34538

Prediction of wing side-edge suction forces and maximum inviscid lift N82-25192

LIFTING BODIES

Analysis of small-aspect-ratio lifting surfaces in ground effect A82-32223

LIGHT MODULATION

Silicon liquid crystal light valve for flight simulation applications [AD-A110928] N82-26005

LIGHTNING SUPPRESSION

Aircraft lightning protection A82-33544

LIMBS (ANATOMY)

On the aerodynamics of windblast [AD-A110495] N82-25221

LINEAR SYSTEMS

Linear decentralized systems with special structure --- for twin lift helicopters A82-34359

Automation of the synthesis of control in a stationary linear system --- for aircraft flight control A82-34464

LININGS

Nonlinear structural and life analyses of a combustor liner [NASA-TM-82846] N82-24501

Development of an analytical technique for the optimization of jet engine and duct acoustic liners [NASA-CR-169002] N82-25256

LIQUID CRYSTALS

Silicon liquid crystal light valve for flight simulation applications [AD-A110928] N82-26005

LIQUID HYDROGEN

Very large aircraft with alternate fuels - LH2 most promising [AIAA PAPER 82-0813] A82-31986

LOAD DISTRIBUTION (FORCES)

A method of accounting for the effect of aircraft deformations on its loading A82-34177

Program presentation of the working group separated flow: Problems with rotary wings [MBB-UD-336-81-O] N82-25234

LOGISTICS MANAGEMENT
Cannibalization of the F-14 and S-3A aircraft: A viable logistic
[AD-A111207] N82-24163

LONGITUDINAL CONTROL
Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing
[AIAA PAPER 82-0960] A82-34008
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208
F-15 wind-tunnel/flight correlations
N82-25203

LONGITUDINAL STABILITY
A unified and generalized definition of static longitudinal stability in aircraft
A82-32135
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208

LORAN C
Flight evaluation of Loran-C for general aviation area navigation
A82-33049

LOW ASPECT RATIO WINGS
Analysis of small-aspect-ratio lifting surfaces in ground effect
A82-32223
Detached flow past V-shaped low-aspect-ratio wings
A82-34136
Prediction of wing side-edge suction forces and maximum inviscid lift
N82-25192

LOW DENSITY MATERIALS
Evaluation of three percent Aqueous Film Forming Foam (AFFF) concentrates as fire fighting agents --- JP-4 jet fuel fires
[AD-A110821] N82-25402

LOW SPEED
Low-speed aerodynamic characteristics of wings with sweep discontinuities
A82-33997
Thrust-induced effects on low-speed aerodynamics of fighter aircraft --- Langley 4- by 7-meter tunnel
[NASA-TM-83277] N82-25218

LUBRICANTS
Lubricant effects on efficiency of a helicopter transmission
[NASA-TM-82657] N82-25520

M

MACH NUMBER
Experimental determination of flow-interference effects of wing-mounted, two-dimensional, full-capture propulsion nacelles in close proximity to a vehicle body at a Mach number of 6
[NASA-TM-83267] N82-25217
On the aerodynamics of windblast
[AD-A110495] N82-25221

MACH REFLECTION
Mach reflection of a shock wave from an inclined wall
A82-34748

MAGNETIC SURVEYS
Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2
[DE82-000314] N82-24620
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1
[DE82-004150] N82-24629
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2
[DE82-004169] N82-24630

MAGNETOMETERS
Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2
[DE82-000314] N82-24620
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1
[DE82-004150] N82-24629
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2
[DE82-004169] N82-24630
Airborne gamma-ray spectrometer and magnetometer survey. Barrow quadrangle, Alaska, volume 2
[DE82-000342] N82-25623

MAINTAINABILITY
A case study of reliability and maintainability of the F-16 APG-66 fire control radar
[AD-A111387] N82-25435

MAINTENANCE
Cannibalization of the F-14 and S-3A aircraft: A viable logistic
[AD-A111207] N82-24163

MAN MACHINE SYSTEMS
Aeronautical information data subsystems --- air navigation
N82-25178

MANAGEMENT METHODS
Essentials of aviation management /2nd edition/ --- Book
A82-33648

MANUAL CONTROL
Hydraulic actuator mechanism to control aircraft spoiler movements through dual input commands
[NASA-CASE-LAR-12412-1] N82-24205

MAPPING
Source assessment system
[AD-A111223] N82-25613

MARKET RESEARCH
The military helicopter market today and tomorrow
A82-34111
Business jets to agricultural aircraft - An overview of general aviation
A82-34123

MASS TRANSFER
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944

MATERIALS HANDLING
British aerospace begins update effort
A82-32624

MATHEMATICAL MODELS
Mathematical modeling of unsteady separated flow past solid airfoil cascades
A82-32801
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208

MATRICES (MATHEMATICS)
Gas path analysis of commercial aircraft engines
N82-25184
Supplementary studies on the sensitivity of optimized structures
[AD-A110994] N82-25545

MATRIX METHODS
An algorithm for calculating the compliance matrices of aircraft structures by the substructure method as applied to aeroelasticity problems
A82-34161
Linear decentralized systems with special structure --- for twin lift helicopters
A82-34359

MEASURING INSTRUMENTS
Instrumentation for testing aircraft antistatic protection
[ONERA, TP NO. 1982-7] A82-34495

MECHANICAL PROPERTIES
Mechanical properties of hot isostatic pressed P/M-titanium for helicopter components
[MBB-UD-324-81-O] N82-25383

MESH
A new method for constructing two-dimensional orthogonal and non-orthogonal meshes
A82-33630

METAL FATIGUE
A review and assessment of fatigue crack growth rate relationships for metallic airframe materials
A82-34879
Evaluation of cast titanium alloy compressor components, volume 1
[AD-A111431] N82-24204

Comparison between probability of detection, sensitivity, and accuracy of five nondestructive inspection methods --- high strength steel aircraft undercarriage retraction cylinders [NLR-MP-81033-U] N82-24500
Evaluation of inelastic constitutive models for nonlinear structural analysis --- for aircraft turbine engines [NASA-TM-82845] N82-24502

METAL MATRIX COMPOSITES
Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980 A82-33989
Material flow and defect formation in forging an airfoil shape from metal-matrix composites A82-33995

METAL SHEETS
Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980 A82-33989
Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy A82-33994

METAL WORKING
Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980 A82-33989
Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy A82-33994

METAL-NITRIDE-OXIDE-SILICON
Solid-state flight incident recorder N82-25172
Solid state crash survivable flight data recorders for mishap investigation N82-25173

METHODOLOGY
Combining analysis with optimization at Langley Research Center. An evolutionary process [NASA-TM-84472] N82-24846

METROLOGY
Automatic checking of measuring units in the Modane wind tunnels [ONERA, TP NO. 1982-10] A82-34498

MICROELECTRONICS
Simulation reaches towards reality A82-33547

MICROPHONES
Adapter for mounting microphone flush with the external surface of the skin of a pressurized aircraft [NASA-CASE-FRC-11072-1] N82-24474

MICROSTRUCTURE
Mechanical and metallurgical considerations in extending the life of turbine blades A82-33855

MICROWAVE LANDING SYSTEMS
An aircraft sensor fault tolerant system [NASA-CR-165876] N82-25236

MILITARY AIRCRAFT
Very large aircraft - A common response to a rapidly changing global environment [AIAA PAPER 82-0799] A82-31979
The potential of large aircraft [AIAA PAPER 82-0804] A82-31980
Military aircraft and international policy A82-34108
Military aircraft - The way ahead A82-34110
Military aircraft A82-34121
Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar A82-34672

MILITARY HELICOPTERS
Army's 1st IPI program begun - Blisk impeller followup --- integral blade-disk A82-31999
The military helicopter market today and tomorrow A82-34111

MILITARY TECHNOLOGY
High technology raises fighter force readiness A82-33892
Military aircraft - The way ahead A82-34110
Military aircraft A82-34121

MINERAL EXPLORATION
Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2 [DE82-000314] N82-24620
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1 [DE82-004150] N82-24629
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2 [DE82-004169] N82-24630
Airborne gamma-ray spectrometer and magnetometer survey. Umiat quadrangle, Alaska, volume 2 [DE82-000312] N82-24632
Airborne gamma-ray spectrometer and magnetometer survey. Barrow quadranagle, Alaska, volume 2 [DE82-000342] N82-25623

MINICOMPUTERS
Potentiality assessment of a parallel structure for the solution of partial differential equations A82-33628

MIRRORS
Testing of the Kuiper Airborne Observatory 91-CM telescope [NASA-CR-166341] N82-25040

MISSILE CONFIGURATIONS
An analytical procedure for computing smooth transitions between two specified cross sections with applications to blended wing body configuration [NASA-TP-2012] N82-25193

MISSILE DESIGN
An analytical procedure for computing smooth transitions between two specified cross sections with applications to blended wing body configuration [NASA-TP-2012] N82-25193

MISSION PLANNING
The National Airspace System plan A82-33893

MOUNTING
Adapter for mounting microphone flush with the external surface of the skin of a pressurized aircraft [NASA-CASE-FRC-11072-1] N82-24474

MOVING TARGET INDICATORS
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II A82-34671

MULTIPLE ACCESS
Outline of a multiple-access communication network based on adaptive arrays A82-34607

MULTIPLEXING
Applications of a multiplexed GPS user set A82-33050

MULTIPROCESSING (COMPUTERS)
Electronic Warfare Avionics Integration Support Facility support processor [AD-A111641] N82-25249

MULTISPECTRAL BAND SCANNERS
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays A82-31991

N

NACELLES
Experimental determination of flow-interference effects of wing-mounted, two-dimensional, full-capture propulsion nacelles in close proximity to a vehicle body at a Mach number of 6 [NASA-TM-83287] N82-25217

NASA PROGRAMS
Aerospace engineers: We're tomorrow-minded people [NASA-EP-188] N82-25017
Propulsion/ACEE [NASA-FACTS-93/8-81] N82-25251
The first A in NASA [GPO-89-476] N82-25271

NATIONAL AIRSPACE UTILIZATION SYSTEM
The National Airspace System plan A82-33893

NAVIGATION
Improvement program for the C-141 Navigation Selector Panel
[AD-A111469] N82-25248
NAVIGATION AIDS
Round table discussion on the transfer of results from the project "Aids to navigation and control of air traffic"
[PUB-20-ATC-1981] N82-24192
NAVIGATION INSTRUMENTS
Applications of a multiplexed GPS user set
A82-33050
NAVY
X-wing and the Navy V/STOL initiative
A82-33915
NICKEL ALLOYS
A status review of NASA's COSAM (Conservation Of Strategic Aerospace Materials) program
[NASA-TM-82852] N82-24326
NIOBIUM
A status review of NASA's COSAM (Conservation Of Strategic Aerospace Materials) program
[NASA-TM-82852] N82-24326
NOISE (SOUND)
Generation of noise by turbulence
[ONERA-P-1981-3] N82-24946
NOISE GENERATORS
Generation of noise by turbulence
[ONERA-P-1981-3] N82-24946
NOISE REDUCTION
Airbus industry and noise in the community
[SNIAS-821-111-111] N82-24739
Aeroacoustic performance of an externally blown flap configuration with several flap noise suppression devices
[NASA-TP-1995] N82-24942
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-169002] N82-25256
NONDESTRUCTIVE TESTS
Nondestructive detection of exfoliation corrosion around fastener holes in aluminum wing skins
A82-32725
Comparison between probability of detection, sensitivity, and accuracy of five nondestructive inspection methods --- high strength steel aircraft undercarriage retraction cylinders
[NLR-MP-81038-U] N82-24500
NONEQUILIBRIUM RADIATION
Radiation enhancement by nonequilibrium during flight through the Titan atmosphere
[AIAA PAPER 82-0878] A82-31683
NONLINEAR SYSTEMS
The determination of critical flutter conditions of nonlinear systems
[RAE-TM-STRUCT-986] N82-24210
Nonlinear structural and life analyses of a combustor liner
[NASA-TM-82846] N82-24501
NORTH DAKOTA
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1
[DE82-004150] N82-24629
Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2
[DE82-004169] N82-24630
NOSE WHEELS
Electro-hydraulic nose wheel steering of the Dornier 228
A82-34373
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244
NOZZLE FLOW
Aerodynamic interactions with turbulent jet exhaust plumes
A82-33325
NOZZLE INSERTS
Failure analysis of silica phenolic nozzle liners
A82-34882
NUCLEAR PROPELLED AIRCRAFT
Very large aircraft with alternate fuels - LH2 most promising
[AIAA PAPER 82-0813] A82-31986
NUMERICAL ANALYSIS
A unified and generalized definition of static longitudinal stability in aircraft
A82-32135
Trends in structural analysis at ONERA
[ONERA, TP NO. 1982-2] A82-34491
NUMERICAL CONTROL
Automatic checking of measuring units in the Modane wind tunnels
[ONERA, TP NO. 1982-10] A82-34498
NUMERICAL FLOW VISUALIZATION
A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations
[AIAA PAPER 82-0935] A82-31922
Mathematical modeling of unsteady separated flow past solid airfoil cascades
A82-32801

O

ON-LINE SYSTEMS
On-line experiments in acquiring and exploiting AIDS data for ATC purposes
N82-25175
Structures testing analysis real-time network (STARNET)
[AD-A111636] N82-25827
ONBOARD DATA PROCESSING
Gathering and analysing data on the British Airways Boeing 757 aircraft
N82-25186
ONBOARD EQUIPMENT
An aircraft sensor fault tolerant system
[NASA-CR-165876] N82-25236
OPERATING SYSTEMS (COMPUTERS)
An assessment of the real-time application capabilities of the SIFT computer system
[NASA-TM-84482] N82-25811
OPERATORS (PERSONNEL)
Predicting the application of vicarious liability to fixed base operators - Still guesswork after all these years
A82-32056
OPTICAL MEASUREMENT
Method for the measurement of elastic deformations of aircraft models in a wind tunnel
A82-34162
OPTICAL PROPERTIES
Techniques suitable for a portable wear metal analyzer
[AD-A111352] N82-25488
OPTICAL RADAR
Cloud top remote sensing by airborne lidar
A82-32920
Airborne lidar measurements of the Soufriere eruption of 17 April 1979
A82-33657
OPTICAL SCANNERS
An optical data link for airborne scanning system
A82-34737
OPTIMAL CONTROL
Automation of the synthesis of control in a stationary linear system --- for aircraft flight control
A82-34464
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208
Optimization of auto-pilot equations for rapid estimation of helicopter control settings
[AD-A110739] N82-25263
OPTIMIZATION
Combining analysis with optimization at Langley Research Center. An evolutionary process
[NASA-TM-84472] N82-24846
Opportunities for wind-tunnel/flight correlation with new Boeing airplanes
N82-25206
Panel Optimization with Integrated Software (POIS). Volume 1: PANDA: Interactive program for preliminary minimum weight design
[AD-A110963] N82-25404
Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces --- for helicopter transmissions
[NASA-CR-3553] N82-25516

Supplementary studies on the sensitivity of optimized structures
[AD-A110994] N82-25545

OV-10 AIRCRAFT
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244

OZONE
In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program
[NASA-TM-84471] N82-25661

P

PANEL METHOD (FLUID DYNAMICS)
Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations
[AIAA PAPER 82-0993] A82-31954
The FFA wing body 81 computer program. A panel method for determination of aerodynamic characteristics at subsonic and supersonic speeds
[FFA-TN-AU-1601] N82-25230

PANELS
Design, fabrication and test of liquid metal heat-pipe sandwich panels
[AIAA PAPER 82-0903] A82-31898
Temperature fields in three-layer panels with a honeycomb filler during unsteady heating
A82-34135
Panel Optimization with Integrated Software (POIS). Volume 1: PANDA: Interactive program for preliminary minimum weight design
[AD-A110963] N82-25404

PARALLEL FLOW
Numerical investigation of supersonic base flow with parallel injection --- in scramjet combustors
[AIAA PAPER 82-1001] A82-31960
Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams
[AD-A111124] N82-24181

PARALLEL PROCESSING (COMPUTERS)
Potentiality assessment of a parallel structure for the solution of partial differential equations
A82-33628

PARAMETER IDENTIFICATION
Parameter identification for structures with neighboring natural frequencies especially for the case of flight resonance tests
A82-32136
Aerodynamic coefficient identification of time-varying aircraft system and its application
A82-34645

PARAWINGS
Nonlinear two-dimensional sail theory
[AD-A110450] N82-25220

PARTIAL DIFFERENTIAL EQUATIONS
Potentiality assessment of a parallel structure for the solution of partial differential equations
A82-33628

PASSENGER AIRCRAFT
The beginning of the ATR 42 program and its importance
A82-33543

PAYLOADS
A method of accounting for the effect of aircraft deformations on its loading
A82-34177

PERFORMANCE PREDICTION
Approximate method of predicting heating on the windward side of Space Shuttle Orbiter and comparisons with flight data
[AIAA PAPER 82-0823] A82-31853
Solar-powered airplane design for long-endurance, high-altitude flight
[AIAA PAPER 82-0811] A82-31984
Fatigue life prediction of helicopter pitch link using Kaman life calculation methods
A82-34125

PERFORMANCE TESTS
Operational testing of the LN-33 inertial navigation system
A82-33854
Instrumentation for testing aircraft antistatic protection
[ONERA, TP NO. 1982-7] A82-34495

PERSONNEL
Aerospace engineers: We're tomorrow-minded people
[NASA-EP-188] N82-25017

PHASED ARRAYS
Radar frequency radiation
[AD-A111852] N82-25424

PHENOLIC RESINS
Failure analysis of silica phenolic nozzle liners
A82-34882

PHOTOCONDUCTORS
Silicon liquid crystal light valve for flight simulation applications
[AD-A110928] N82-26005

PHOTONS
An experimental investigation of the flow field of an ejector wing design employing a photon correlation laser velocimeter
[AD-A111134] N82-24182

PILOT PERFORMANCE
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208

PILOT TRAINING
The next generation trainer
A82-33908
Simulator for air-to-air combat versus real world: Visual cue analysis for simulated air-to-air combat training
[AD-A110570] N82-25270

PITCHING MOMENTS
Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing
[AIAA PAPER 82-0960] A82-34008

PLANFORMS
Production version of the extended NASA-Langley Vortex Lattice FORTRAN computer program. Volume 1: User's guide
[NASA-TM-83303] N82-25219

PLASTIC AIRCRAFT STRUCTURES
Materials and structures/ACEE
[NASA-FACTS-117/8-81] N82-25242

PLASTIC FLOW
Material flow and defect formation in forging an airfoil shape from metal-matrix composites
A82-33995

PLUMES
Aerodynamic interactions with turbulent jet exhaust plumes
A82-33325
Airborne lidar measurements of the Soufriere eruption of 17 April 1979
A82-33657
In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program
[NASA-TM-84471] N82-25661

POLYMER CHEMISTRY
Investigation of the application of a cryogenic blending process to produce antimisting diesel fuels
[AD-A110917] N82-25399

PORTABLE EQUIPMENT
Techniques suitable for a portable wear metal analyzer
[AD-A111352] N82-25488

POSITION (LOCATION)
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 1
[AD-A110862] N82-24188
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 2
[AD-A110863] N82-24189

POTASSIUM
Airborne gamma-ray spectrometer and magnetometer survey. Umiat quadrangle, Alaska, volume 2
[DE82-000312] N82-24632

POTENTIAL FLOW
Finite volume calculation of three-dimensional potential flow around a propeller
[AIAA PAPER 82-0957] A82-31933
Contact problems involving the flow past an inflated aerofoil
A82-34851
Investigation of upwind schemes for finite element analysis of transonic flow over thin airfoils
[AD-A111168] N82-25225
The problem of calculation of the flow around helicopter rotor blade tips --- and adapting computer programs
[MBB-UD-330-81-O] N82-25233

POTENTIAL THEORY
Generation of noise by turbulence
[ONERA-P-1981-3] N82-24946
POWDER METALLURGY
The superalloys - Materials for gas turbine hot section components
A82-33853
Mechanical properties of hot isostatic pressed P/M-titanium for helicopter components
[MBB-UD-324-81-O] N82-25383
POWER GAIN
Measuring LF and HF antenna radiation patterns by means of a helicopter
A82-34772
PRECIPITATION HARDENING
Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy
A82-33994
PREDICTION ANALYSIS TECHNIQUES
Evaluation of two analytical methods for the prediction of inlet flow fields in the vicinity of generalized forebodies
[AIAA PAPER 82-0959] A82-31935
Prediction of separated asymmetric trailing-edge flows at transonic Mach numbers
[AIAA PAPER 82-1021] A82-31974
Review of the 1980 Wind-Tunnel/Flight Correlation Panel
N82-25198
PREDICTIONS
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208
PRESSURE DISTRIBUTION
Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser
A82-32330
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216
PRESSURE GRADIENTS
Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser
A82-32330
PRESSURE MEASUREMENT
Study of VTOL in ground-effect flow field including temperature effect
[NASA-CR-166258] N82-25170
PRESSURE SENSORS
Sideslip indication system as a fuel saving aid in jet transport aircraft operation --- a-300 and a-310 aircraft
N82-25181
PRINTED CIRCUITS
Improvement program for the C-141 Navigation Selector Panel
[AD-A111469] N82-25248
PROCESS CONTROL (INDUSTRY)
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
PRODUCT DEVELOPMENT
Very large aircraft - A common response to a rapidly changing global environment
[AIAA PAPER 82-0799] A82-31979
Development of an aircraft engine
A82-34112
The Airbus family of aircraft at the dawn of the 1980's
[SNIAS-821-111-101] N82-24164
PRODUCTION ENGINEERING
British aerospace begins update effort
A82-32624
PROGRAM VERIFICATION (COMPUTERS)
Production of Reliable Flight Crucial Software: Validation Methods Research for Fault Tolerant Avionics and Control Systems Sub-Working Group Meeting
[NASA-CP-2222] N82-24845
Combining analysis with optimization at Langley Research Center. An evolutionary process
[NASA-TM-84472] N82-24846
PROJECT MANAGEMENT
The aerospace learning process --- review of some past projects
[AIAA PAPER 82-1291] A82-33025
PROP-FAN TECHNOLOGY
Propulsion/ACEE
[NASA-FACTS-93/8-81] N82-25251
PROPELLERS
Finite volume calculation of three-dimensional potential flow around a propeller
[AIAA PAPER 82-0957] A82-31933
Future propulsion opportunities for commuter airplanes
[NASA-TM-82880] N82-24203
The vibratory behavior of a rotating propeller shaft. Part 4: Vibration tests of a rotating propeller shaft in a rubber stern tube bearing --- ship propellers
[INECO-5072208-81-PT-2] N82-24514
PROPULSION
A piecewise linear state variable technique for real time propulsion system simulation
[NASA-TM-82851] N82-24201
PROPULSION SYSTEM CONFIGURATIONS
Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems --- German book
A82-33348
Future propulsion opportunities for commuter airplanes
[NASA-TM-82880] N82-24203
Experimental determination of flow-interference effects of wing-mounted, two-dimensional, full-capture propulsion nacelles in close proximity to a vehicle body at a Mach number of 6
[NASA-TM-83287] N82-25217
New developments in the field of ramjet missile propulsion
[MBB-UR-516-81-O] N82-25260
PROPULSION SYSTEM PERFORMANCE
The TM 333, a trump card for Turbomeca
A82-33750
A piecewise linear state variable technique for real time propulsion system simulation
[NASA-TM-82851] N92-24201
Problems in correlation caused by propulsion systems
N82-25202
PROPULSIVE EFFICIENCY
System study of application of composite materials for future transport aircraft
[AIAA PAPER 82-0812] A82-31985
PULSE DOPPLER RADAR
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34671
PYLONS
Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings
A82-34163
PYROLYTIC MATERIALS
Chem-Braze abradable seal attachment to aircraft gas turbine compressor components
[AD-A111692] N82-25521

Q

QUALITY CONTROL
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
QUASI-STEADY STATES
Calculation of the lift distribution and aerodynamic derivatives of quasi-static elastic aircraft
A82-34639

R

RADAR
A case study of reliability and maintainability of the F-16 APG-66 fire control radar
[AD-A111387] N82-25435
RADAR ANTENNAS
Radar frequency radiation
[AD-A111852] N82-25424

RADAR DETECTION
A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background
A82-32979
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34671
RADAR MEASUREMENT
Airborne lidar measurements of the Soufriere eruption of 17 April 1979
A82-33657
RADAR NAVIGATION
Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar
A82-34672
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 1
[AD-A110862] N82-24188
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 2
[AD-A110863] N82-24189
RADIATION HAZARDS
Radar frequency radiation
[AD-A111852] N82-25424
RADIO ANTENNAS
Measuring LF and MF antenna radiation patterns by means of a helicopter
A82-34772
RADIO NAVIGATION
Measuring LF and MF antenna radiation patterns by means of a helicopter
A82-34772
RADIO RECEIVERS
Applications of a multiplexed GPS user set
A82-33050
RAIN
Environmental fog/rain visual display system for aircraft simulators
[NASA-CASE-ARC-11158-1] N82-24212
The effect of very heavy rain upon aircraft and its role in wind shear attributed accidents
N82-25179
RAMJET ENGINES
Numerical investigation of supersonic base flow with parallel injection --- in scramjet combustors
[AIAA PAPER 82-1001] A82-31960
Ideal ramjet - Optimum M sub infinity for fuel limit and material limit
A82-33143
Coaxial dump Ramjet combustor combustion instabilities. Part 1: Parametric test data
[AD-A111355] N82-25259
RAMJET MISSILES
New developments in the field of ramjet missile propulsion
[MBB-UR-516-81-O] N82-25260
READOUT
The DFVLR Digital Flight Data Readout and Processing Station and its Utility
N82-25180
REAL TIME OPERATION
A piecewise linear state variable technique for real time propulsion system simulation
[NASA-TM-82851] N82-24201
Structures testing analysis real-time network (STARNET)
[AD-A111636] N82-25827
RECOVERABILITY
Value of survivability and recoverability of flight data recorders --- benefit cost methodology
N82-25188
RECTANGULAR WINGS
Incompressible symmetric flow characteristics of sharp-edged rectangular wings
A82-32850
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216
REFINING
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
REGIONAL PLANNING
Round table discussion on the transfer of results from the project "Aids to navigation and control of air traffic"
[PUB-20-ATC-1981] N82-24192
REGULATIONS
The U.S. airline industry - En route to deregulation
A82-33920
REINFORCED SHELLS
Finite element analysis of some aerospace shell structures
A82-33515
REINFORCEMENT (STRUCTURES)
Unistructure - A new concept for light weight integrally stiffened skin structure
A82-34406
REINFORCING FIBERS
Material flow and defect formation in forging an airfoil shape from metal-matrix composites
A82-33995
RELIABILITY
A case study of reliability and maintainability of the F-16 APG-66 fire control radar
[AD-A111387] N82-25435
RELIABILITY ENGINEERING
Production of Reliable Flight Crucial Software: Validation Methods Research for Fault Tolerant Avionics and Control Systems Sub-Working Group Meeting
[NASA-CP-2222] N82-24845
REMOTE SENSING
Cloud top remote sensing by airborne lidar
A82-32920
REMOTE SENSORS
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays
A82-31991
In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program
[NASA-TM-84471] N82-25661
RESEARCH
La Recherche Aerospatiale, Bi-monthly bulletin, number 1981-6, November-December 1981 --- aerodynamic research
[ESA-TT-741] N82-26185
RESEARCH AND DEVELOPMENT
Status of the national transonic facility
[AIAA PAPER 82-0604] A82-33326
Aeronautical research and development
A82-34114
RESONANT FREQUENCIES
Parameter identification for structures with neighboring natural frequencies especially for the case of flight resonance tests
A82-32136
RESONANT VIBRATION
A unified and generalized definition of static longitudinal stability in aircraft
A82-32135
RESOURCES MANAGEMENT
Principles of efficient energy use at Interflug
A82-33250
Cannibalization of the F-14 and S-3A aircraft: A viable logistic
[AD-A111207] N82-24163
REYNOLDS NUMBER
A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number
[AIAA PAPER 82-1030] A82-31978
A review of Reynolds number studies conducted in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0941] A82-34007
Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number
A82-34398
RIGID STRUCTURES
Eigenspace techniques for active flutter suppression
[NASA-CR-168931] N82-24206
ROCKET ENGINE DESIGN
New developments in the field of ramjet missile propulsion
[MBB-UR-516-81-O] N82-25260
ROLL
Roll response criteria for transport aircraft with advanced flight control systems in the landing approach and touchdown
[NLR-TR-80103-U] N82-25265

ROLLER BEARINGS
Development of high-speed rolling-element bearings. A historical and technical perspective [NASA-TM-82884] N82-24497
ROLLING MOMENTS
Leading edge flap system for aircraft control augmentation [NASA-CASE-LAR-12787-1] N82-25240
ROTARY WING AIRCRAFT
Conceptual design study for an advanced cab and visual system, volume 1 [NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2 [NASA-CR-166236] N82-25267
ROTARY WINGS
Army's 1st IPI program began - Blisk impeller followup --- integral blade-disk A82-31999
The problem of calculation of the flow around helicopter rotor blade tips --- and adapting computer programs [MBB-UD-330-81-O] N82-25233
Program presentation of the working group separated flow: Problems with rotary wings [MBB-UD-336-81-O] N82-25234
Calculation of the cross section properties and the shear stresses of composite rotor blades [MBB-UD-334-81-O] N82-25334
ROTATING BODIES
Investigation on rotating ailerons N82-26162
ROTOR AERODYNAMICS
Three dimensional turbulent boundary layer development on a fan rotor blade [AIAA PAPER 82-1007] A82-31965
Darrieus rotor aerodynamics A82-33708
XV-15 - Foretelling things to come A82-33914
Will ABC technology produce the next-generation helicopter A82-33916
Periodic boundary value problem for the equations of the harmonic oscillation of a rotor blade about the axis of a flapping hinge A82-34127
Experimental verification of force determination and ground flying on a full-scale helicopter [USAAVRADCOM-TR-81-D-11] N82-24199
The problem of calculation of the flow around helicopter rotor blade tips --- and adapting computer programs [MBB-UD-330-81-O] N82-25233
ROTOR BLADES (TURBOMACHINERY)
Effects of dynamic stall on SWECS --- Small Wind Energy Conversion System A82-33707
Periodic boundary value problem for the equations of the harmonic oscillation of a rotor blade about the axis of a flapping hinge A82-34127
RUNWAYS
Runway end intersection design A82-33904

S

S-3 AIRCRAFT
Cannibalization of the F-14 and S-3A aircraft: A viable logistic [AD-A111207] N82-24163
SAILWINGS
Nonlinear two-dimensional sail theory [AD-A110450] N82-25220
SANDWICH STRUCTURES
Design, fabrication and test of liquid metal heat-pipe sandwich panels [AIAA PAPER 82-0903] A82-31898
Temperature fields in three-layer panels with a honeycomb filler during unsteady heating A82-34135
SATELLITE ATMOSPHERES
Radiation enhancement by nonequilibrium during flight through the Titan atmosphere [AIAA PAPER 82-0878] A82-31883
SATELLITE TRANSMISSION
Radiating elements for hemispherically scanned arrays --- onboard aircraft for data links to satellites A82-32992
SEALS (STOPPERS)
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors [AIAA PAPER 82-0890] A82-31891
SENSORS
An aircraft sensor fault tolerant system [NASA-CR-165876] N82-25236
SEPARATED FLOW
A numerical study of the turbulent flow past an isolated airfoil with trailing edge separation [AIAA PAPER 82-0998] A82-31958
Prediction of separated asymmetric trailing-edge flows at transonic Mach numbers [AIAA PAPER 82-1021] A82-31974
A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number [AIAA PAPER 82-1030] A82-31978
Mathematical modeling of unsteady separated flow past solid airfoil cascades A82-32801
Detached flow past V-shaped low-aspect-ratio wings A82-34136
Water tunnel flow visualization and wind tunnel data analysis of the F/A-18 --- leading edge extension vortex effects [NASA-CR-165859] N82-25215
On the aerodynamics of windblast [AD-A110495] N82-25221
Program presentation of the working group separated flow: Problems with rotary wings [MBB-UD-336-81-O] N82-25234
SERVICE LIFE
Mechanical and metallurgical considerations in extending the life of turbine blades A82-33855
Fracture mechanics criteria for turbine engine hot section components [NASA-CR-167896] N82-25257
SERVOMECHANISMS
Hydraulic actuator mechanism to control aircraft spoiler movements through dual input commands [NASA-CASE-LAR-12412-1] N82-24205
SEWAGE TREATMENT
Primary sewage treatment plant as a source of bird hazards at airport A82-33523
Primary sewage treatment plant as a source of bird hazards at airport N82-26184
SHAFTS (MACHINE ELEMENTS)
The vibratory behavior of a rotating propeller shaft. Part 4: Vibration tests of a rotating propeller shaft in a rubber stern tube bearing --- ship propellers [INECO-5072208-81-PT-2] N82-24514
SHEAR STRESS
Calculation of the cross section properties and the shear stresses of composite rotor blades [MBB-UD-334-81-O] N82-25324
SHOCK WAVE GENERATORS
Shock associated noise of supersonic jets from convergent-divergent nozzles A82-32202
SHOCK WAVE INTERACTION
Mach reflection of a shock wave from an inclined wall A82-34748
SHOCK WAVE PROFILES
Adapter for mounting microphone flush with the external surface of the skin of a pressurized aircraft [NASA-CASE-FRC-11072-1] N82-24474
SHORT HAUL AIRCRAFT
Aircraft evaluation in air network planning A82-33125
OLGA - A gust alleviation for general aviation aircraft A82-34374
SIDESLIP
Sideslip indication system as a fuel saving aid in jet transport aircraft operation --- a-300 and a-310 aircraft N82-25101

SIGNAL PROCESSING
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34671
Hardware and software integration for concurrent data acquisition and reduction of photon correlated laser Doppler velocimetry
[AD-A111146] N82-25506
SILICON
Silicon liquid crystal light valve for flight simulation applications
[AD-A110928] N82-26005
SILICON DIOXIDE
Failure analysis of silica phenolic nozzle liners
A82-34882
SIMILARITY THEOREM
Similarity parameters for the geometric structure of a supersonic jet propagating in a channel and in a submerged space
A82-34132
SIMULATION
A piecewise linear state variable technique for real time propulsion system simulation
[NASA-TM-82851] N82-24201
Evaluation of a voice recognition system for the MOTAS pseudo pilot station function
[NASA-TM-84487] N82-25235
SKIDDING
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193
SKIN (STRUCTURAL MEMBER)
Nondestructive detection of exfoliation corrosion around fastener holes in aluminum wing skins
A82-32725
Unistructure - A new concept for light weight integrally stiffened skin structure
A82-34486
SKIN FRICTION
Skin friction lines
A82-33629
SLENDER WINGS
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944
Structural optimization of a swept wing on the basis of the aileron efficiency condition
A82-34145
Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings
A82-34163
SMALL PERTURBATION FLOW
A high-frequency transonic small disturbance code for unsteady flows in a cascade
[AIAA PAPER 82-0955] A82-31932
Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations
[AIAA PAPER 82-0993] A82-31954
Modified version of ITEAN2: A calculation method for inviscid transonic flow about thin airfoils in moderately slow unsteady motion
[NLR-TR-80059-U] N82-25231
SOLAR ELECTRIC PROPULSION
Solar-powered airplane design for long-endurance, high-altitude flight
[AIAA PAPER 82-0811] A82-31984
SOLAR SAILS
Solar-powered airplane design for long-endurance, high-altitude flight
[AIAA PAPER 82-0811] A82-31984
SOLID STATE DEVICES
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays
A82-31991
SOLID-SOLID INTERFACES
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891
SPACE SHUTTLE ORBITERS
Approximate method of predicting heating on the windward side of Space Shuttle Orbiter and comparisons with flight data
[AIAA PAPER 82-0823] A82-31853
Wind-Tunnel/Flight Correlation, 1981
[NASA-CP-2225] N82-25196
SPACECRAFT CONTROL
Eigenspace techniques for active flutter suppression
[NASA-CR-168931] N82-24206
SPACECRAFT STRUCTURES
Finite element analysis of some aerospace shell structures
A82-33515
SPANWISE BLOWING
Downwash behind a wing with spanwise blowing
A82-33514
Thrust-induced effects on low-speed aerodynamics of fighter aircraft --- Langley 4- by 7-meter tunnel
[NASA-TM-83277] N82-25218
SPARE PARTS
Cannibalization of the F-14 and S-3A aircraft: A viable logistic
[AD-A111207] N82-24163
SPEECH RECOGNITION
Evaluation of a voice recognition system for the MOTAS pseudo pilot station function
[NASA-TM-84487] N82-25235
SPIRAL WRAPPING
Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces --- for helicopter transmissions
[NASA-CR-3553] N82-25516
SPOILERS
Hydraulic actuator mechanism to control aircraft spoiler movements through dual input commands
[NASA-CASE-LAR-12412-1] N82-24205
STABILITY DERIVATIVES
Calculation of the lift distribution and aerodynamic derivatives of quasi-static elastic aircraft
A82-34639
STAGNATION TEMPERATURE
Ideal ramjet - Optimum M sub infinity for fuel limit and material limit
A82-33143
STANDARDIZATION
Report from the Working Party on New Fiber Materials --- standardization and strength
N82-24512
STARTING
Starting transients in supersonic nozzles and nozzle-diffuser assemblies
[AD-A111143] N82-25226
STATIC ELECTRICITY
Instrumentation for testing aircraft antistatic protection
[ONERA, TP NO. 1982-7] A82-34495
STATIC PRESSURE
Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser
A82-32330
STATIC STABILITY
A unified and generalized definition of static longitudinal stability in aircraft
A82-32135
STATISTICAL ANALYSIS
Fatigue life prediction of helicopter pitch link using Kaman life calculation methods
A82-34125
STEADY FLOW
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944
STEERABLE ANTENNAS
Radiating elements for hemispherically scanned arrays --- onboard aircraft for data links to satellites
A82-32992
STEERING
Electro-hydraulic nose wheel steering of the Dornier 228
A82-34373
STIFFENING
Unistructure - A new concept for light weight integrally stiffened skin structure
A82-34486
STIFFNESS
Structural optimization of a swept wing on the basis of the aileron efficiency condition
A82-34145

STIFFNESS MATRIX
An algorithm for calculating the compliance matrices of aircraft structures by the substructure method as applied to aeroelasticity problems A82-34161
Calculation of the cross section properties and the shear stresses of composite rotor blades [MBB-UD-334-81-O] N82-25334
STRATOSPHERE
Airborne lidar measurements of the Soufriere eruption of 17 April 1979 A82-33657
STRESS ANALYSIS
Finite-element modeling of a fighter aircraft canopy acrylic panel A82-32848
Linear decentralized systems with special structure --- for twin lift helicopters A82-34359
STRESS CONCENTRATION
Calculation of the cross section properties and the shear stresses of composite rotor blades [MBB-UD-334-81-O] N82-25334
STRESS MEASUREMENT
Method for the measurement of elastic deformations of aircraft models in a wind tunnel A82-34162
STRESS-STRAIN RELATIONSHIPS
Solution of creep problems by a finite element method A82-34172
STRUCTURAL ANALYSIS
Structural modification to achieve antiresonance in helicopters A82-32849
Finite element analysis of some aerospace shell structures A82-33515
Unistructure - A new concept for light weight integrally stiffened skin structure A82-34486
Trends in structural analysis at ONERA [ONERA, TP NO. 1982-2] A82-34491
Evaluation of inelastic constitutive models for nonlinear structural analysis --- for aircraft turbine engines [NASA-TM-82845] N82-24502
Supplementary studies on the sensitivity of optimized structures [AD-A110994] N82-25585
STRUCTURAL DESIGN
Design, fabrication and test of liquid metal heat-pipe sandwich panels [AIAA PAPER 82-0903] A82-31898
Aircraft carrier - Surface effect ship [AIAA PAPER 82-0808] A82-31981
STRUCTURAL DESIGN CRITERIA
Transport aircraft crash dynamics [NASA-CR-165851] N82-24186
STRUCTURAL VIBRATION
Identification of the form of motion of an aircraft A82-31824
Parameter identification for structures with neighboring natural frequencies especially for the case of flight resonance tests A82-32136
Structural modification to achieve antiresonance in helicopters A82-32849
A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers A82-34814
SUBSONIC FLOW
A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations [AIAA PAPER 82-0935] A82-31922
Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations [AIAA PAPER 82-0993] A82-31954
Incompressible symmetric flow characteristics of sharp-edged rectangular wings A82-32850
Hysteresis of the normal force of a wing of complex planform under unsteady motion A82-34157
The FFA wing body 81 computer program. A panel method for determination of aerodynamic characteristics at subsonic and supersonic speeds [FFA-TN-AU-1601] N82-25230
Investigation on rotating ailerons N82-26162
SUBSONIC FLUTTER
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method [NASA-TM-84485] N82-25216
Aeroelasticy of compressor blades: Subsonic stall flutter N82-26189
SUBSONIC WIND TUNNELS
Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr A82-33627
Wind tunnels of the institute of mechanics of Moscow State University [NASA-TM-76909] N82-24213
SUCTION
Prediction of wing side-edge suction forces and maximum inviscid lift N82-25192
SUPERCRITICAL FLOW
Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number A82-34398
SUPERCRITICAL WINGS
The NASA Langley laminar flow control airfoil experiment [AIAA PAPER 82-0567] A82-33327
Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing [AIAA PAPER 82-0960] A82-34008
Elastic deformation effects on aerodynamic characteristics for a high-aspect-ratio supercritical-wing model [NASA-TM-83286] N82-25214
SUPERSONIC COMBUSTION
Numerical investigation of supersonic base flow with parallel injection --- in scramjet combustors [AIAA PAPER 82-1001] A82-31960
SUPERSONIC COMBUSTION RAMJET ENGINES
New developments in the field of ramjet missile propulsion [MBB-UR-516-81-O] N82-25260
SUPERSONIC DIFFUSERS
Starting transients in supersonic nozzles and nozzle-diffuser assemblies [AD-A111143] N82-25226
SUPERSONIC DRAG
Problems in correlation caused by propulsion systems N82-25292
SUPERSONIC FLIGHT
Military aircraft A82-34121
SUPERSONIC FLOW
Evaluation of two analytical methods for the prediction of inlet flow fields in the vicinity of generalized forebodies [AIAA PAPER 82-0959] A82-31935
Numerical investigation of supersonic base flow with parallel injection --- in scramjet combustors [AIAA PAPER 82-1001] A82-31960
Closed-form solutions of supersonic wing-body interference A82-33120
Finite element calculation of the aerodynamic forces on a vibrating wing in supersonic flow A82-34128
Starting transients in supersonic nozzles and nozzle-diffuser assemblies [AD-A111143] N82-25226
The FFA wing body 81 computer program. A panel method for determination of aerodynamic characteristics at subsonic and supersonic speeds [FFA-TN-AU-1601] N82-25230
SUPERSONIC HEAT TRANSFER
An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms A82-34149

SUPERSONIC JET FLOW
Shock associated noise of supersonic jets from convergent-divergent nozzles
A82-32202
Similarity parameters for the geometric structure of a supersonic jet propagating in a channel and in a submerged space
A82-34132

SUPERSONIC NOZZLES
Shock associated noise of supersonic jets from convergent-divergent nozzles
A82-32202
Starting transients in supersonic nozzles and nozzle-diffuser assemblies
[AD-A111143] N82-25226

SUPERSONIC WIND TUNNELS
Wind-Tunnel/Flight Correlation, 1981
[NASA-CP-2225] N82-25196
Wind-tunnel/flight correlation program on XB-70-1
N82-25201

SURFACE EFFECT SHIPS
Aircraft carrier - Surface effect ship
[AIAA PAPER 82-0808] A82-31981

SURFACE TEMPERATURE
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193

SURGES
Starting transients in supersonic nozzles and nozzle-diffuser assemblies
[AD-A111143] N82-25226

SURVEYS
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650

SURVIVAL
Value of survivability and recoverability of flight data recorders --- benefit cost methodology
N82-25188

SWEPT FORWARD WINGS
Forward-swept-wing technology
A82-33309
Comparison of aerodynamic characteristics of aircraft models with forward and aft swept wings at Mach number 0.5
[ONERA, TP NO. 1982-9] A82-34497
X-29A forward-swept-wing demonstrator airplane
N82-25209

SWEPT WINGS
Accurate numerical solution of compressible, linear stability equations
A82-33571
Low-speed aerodynamic characteristics of wings with sweep discontinuities
A82-33997
Detached flow past V-shaped low-aspect-ratio wings
A82-34136
Structural optimization of a swept wing on the basis of the aileron efficiency condition
A82-34145
Comparison of aerodynamic characteristics of aircraft models with forward and aft swept wings at Mach number 0.5
[ONERA, TP NO. 1982-9] A82-34497
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216
Experimental analysis of the effects of sweep and aspect ratio on incompressible flow about forward swept wings
[AD-A111128] N82-25223

SWEPTBACK WINGS
Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case
[NLR-MP-80028-U] N82-25232

SWIRLING
Experimental study on discharge and loss coefficients of combustor swirlers
A82-34644

SYNTHETIC FUELS
Very large aircraft with alternate fuels - LH2 most promising
[AIAA PAPER 82-0813] A82-31986
Impact study of synthetic and alternative fuel usage in Army aircraft propulsion systems
[AD-A111046] N82-24355
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635

SYSTEM IDENTIFICATION
Identification of the form of motion of an aircraft
A82-31824

SYSTEMS ENGINEERING
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays
A82-31991
Electronic Warfare Avionics Integration Support Facility support processor
[AD-A111641] N82-25249

SYSTEMS INTEGRATION
Hardware and software integration for concurrent data acquisition and reduction of photon correlated laser Doppler velocimetry
[AD-A111146] N82-25506

T

TAIL ASSEMBLIES
F-15 wind-tunnel/flight correlations
N82-25203

TAILLESS AIRCRAFT
No-tail-rotor helicopter tests continue
A82-33095

TAKEOFF
Airbus industry and noise in the community
[SNIAS-821-111-111] N82-24739
Analysis of transient data from aircraft gas turbine engines using AIDS
N82-25189

TANGENTS
Experimental and analytical results of tangential blowing applied to a subsonic V/STOL inlet
[NASA-TM-82847] N82-24165

TANTALUM
A status review of NASA's COSAM (Conservation Of Strategic Aerospace Materials) program
[NASA-TM-82852] N82-24326

TARGET RECOGNITION
A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background
A82-32979

TARGETS
Barriers and dispersal surfaces in minimum-time interception
[NASA-TM-84241] N82-25262

TECHNOLOGICAL FORECASTING
The potential for long-range high-payload aircraft with alternate fuels
[AIAA PAPER 82-0814] A82-31987
Beyond 2000 - The airlift challenge ahead
[AIAA PAPER 82-0815] A82-31988
The next generation trainer
A82-33908
Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980
A82-33989
Commercial transport developments for the 1980's
A82-34109
Solutions to the aviation fuel problem
A82-34113

TECHNOLOGY ASSESSMENT
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159
Forward-swept-wing technology
A82-33309
The ubiquitous helicopter
A82-33913
X-wing and the Navy V/STOL initiative
A82-33915
Will ABC technology produce the next-generation helicopter
A82-33916

Technical trends in the civil aircraft and helicopter industry A82-34120
Cost/benefit studies of advanced materials technologies for future aircraft turbine engines: Materials for advanced turbine engines [NASA-CR-167849] N82-25254

TECHNOLOGY UTILIZATION
British aerospace begins update effort A82-32624
Round table discussion on the transfer of results from the project "Aids to navigation and control of air traffic" [PUB-20-ATC-1981] N82-24192

TELESCOPES
Testing of the Kuiper Airborne Observatory 91-CM telescope [NASA-CR-166341] N82-25040

TEMPERATURE DEPENDENCE
Ideal ramjet - Optimum M sub infinity for fuel limit and material limit A82-33143

TEMPERATURE DISTRIBUTION
Temperature fields in three-layer panels with a honeycomb filler during unsteady heating A82-34135

TEMPERATURE EFFECTS
Study of VTOL in ground-effect flow field including temperature effect [NASA-CR-166258] N82-25170

TENSILE TESTS
Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy A82-33994

TEST FACILITIES
Status of the national transonic facility [AIAA PAPER 82-0604] A82-33326
Large scale aeroengine compressor test facility A82-34953

THERMAL INSULATION
Failure analysis of silica phenolic nozzle liners A82-34882

THERMAL MAPPING
An optical data link for airborne scanning system A82-34737

THERMODYNAMIC CYCLES
Evaluation of inelastic constitutive models for nonlinear structural analysis --- for aircraft turbine engines [NASA-TM-82845] N82-24502

THERMODYNAMIC EFFICIENCY
Design, fabrication and test of liquid metal heat-pipe sandwich panels [AIAA PAPER 82-0903] A82-31898

THERMOPLASTICITY
Nonlinear structural and life analyses of a combustor liner [NASA-TM-82846] N82-24501

THIN AIRFOILS
Modified version of LTRAN2: A calculation method for inviscid transonic flow about thin airfoils in moderately slow unsteady motion [NLR-TR-80059-U] N82-25231

THIN WINGS
Finite element calculation of the aerodynamic forces on a vibrating wing in supersonic flow A82-34128
Investigation of upwind schemes for finite element analysis of transonic flow over thin airfoils [AD-A111168] N82-25225

THORIUM
Airborne gamma-ray spectrometer and magnetometer survey. Umiat quadrangle, Alaska, volume 2 [DE82-000312] N82-24632

THREE DIMENSIONAL BOUNDARY LAYER
Three dimensional turbulent boundary layer development on a fan rotor blade [AIAA PAPER 82-1007] A82-31965
Accurate numerical solution of compressible, linear stability equations A82-33571
Three-dimensional separation and reattachment [NASA-TM-84221] N82-24167

THREE DIMENSIONAL FLOW
Finite volume calculation of three-dimensional potential flow around a propeller [AIAA PAPER 82-0957] A82-31933
Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations [AIAA PAPER 82-0993] A82-31954
Design of finite element grids for the computation of the three-dimensional transonic flow around a wing [AIAA PAPER 82-1019] A82-31972
Wind-tunnel wall interference corrections for three-dimensional flows A82-32847
Generation of three-dimensional boundary-fitted curvilinear coordinate systems for wing/wing-tip geometries using the elliptic solver method A82-33318
Skin friction lines A82-33629
Three-dimensional separation and reattachment [NASA-TM-84221] N82-24167
Application of Computational Fluid Dynamics (CFD) in transonic wind-tunnel/flight-test correlation N82-25211
Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case [NLR-MP-80028-U] N82-25232
The problem of calculation of the flow around helicopter rotor blade tips --- and adapting computer programs [MBB-UD-330-81-O] N82-25233
Three dimensional mean velocity and turbulence characteristics in the annulus wall region of an axial flow compressor rotor passage [NASA-CR-169003] N82-25252

THRUST
Thrust-induced effects on low-speed aerodynamics of fighter aircraft --- Langley 4- by 7-meter tunnel [NASA-TM-83277] N82-25218

THRUST CONTROL
No-tail-rotor helicopter tests continue A82-33095

THRUST PROGRAMMING
Flight management computer [SNIAS-821-111-110] N82-24842

TILT ROTOR AIRCRAFT
XV-15 - Foretelling things to come A82-33914

TILT ROTOR RESEARCH AIRCRAFT PROGRAM
V/STOL tilt rotor research aircraft. Volume 1: General information, revision C [NASA-CR-166347] N82-24194
V/STOL tilt rotor research aircraft. Volume 2: Ship 1 instrumentation [NASA-CR-166348] N82-24195
V/STOL tilt rotor research aircraft. Volume 3: Ship 2 instrumentation [NASA-CR-166349] N82-24196
V/STOL tilt rotor research aircraft. Volume 4: CFE technical data [NASA-CR-166350] N82-24197

TITAN
Radiation enhancement by nonequilibrium during flight through the Titan atmosphere [AIAA PAPER 82-0878] A82-31883

TITANIUM ALLOYS
Evaluation of cast titanium alloy compressor components, volume 1 [AD-A111431] N82-24204
Mechanical properties of hot isostatic pressed P/M-titanium for helicopter components [MBB-UD-324-81-O] N82-25383

TORSIONAL VIBRATION
Fundamental torsional frequency of a class of solid wings A82-33119
On the torsional modes of a uniformly tapered solid wing A82-34357

TOUGHNESS
Standard tests for toughened resin composites --- for aircraft structures [NASA-RP-1092] N82-24301

TRAILING EDGES
Prediction of separated asymmetric trailing-edge flows at transonic Mach numbers [AIAA PAPER 82-1021] A82-31974
The initial lift and drag of an impulsively started airfoil of finite thickness A82-34538

Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams
[AD-A111124] N82-24181

TRAILING-EDGE FLAPS
Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing
[AIAA PAPER 82-0960] A82-34008

TRAINING SIMULATORS
The next generation trainer
A82-33908

TRAJECTORY ANALYSIS
Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories
A82-33626

TRAJECTORY CONTROL
Determination of the glide path of an aircraft with power off
A82-34154

TRAJECTORY OPTIMIZATION
Transformation relations for singularity avoidance in three-dimensional trajectory optimization
A82-32137

TRANSIENT RESPONSE
Analysis of transient data from aircraft gas turbine engines using AIDS
N82-25189

TRANSMISSIONS (MACHINE ELEMENTS)
Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces --- for helicopter transmissions
[NASA-CR-3553] N82-25516
Lubricant effects on efficiency of a helicopter transmission
[NASA-TM-82857] N82-25520

TRANSONIC FLOW
A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations
[AIAA PAPER 82-0935] A82-31922
The equivalent simple body /ESB/ method for transonic wing analysis
[AIAA PAPER 82-0936] A82-31923
A high-frequency transonic small disturbance code for unsteady flows in a cascade
[AIAA PAPER 82-0955] A82-31932
Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow
[AIAA PAPER 82-0958] A82-31934
Evaluation of two analytical methods for the prediction of inlet flow fields in the vicinity of generalized forebodies
[AIAA PAPER 82-0959] A82-31935
Calculations of viscous transonic flow over aerofoils
[AIAA PAPER 82-0997] A82-31957
Design of finite element grids for the computation of the three-dimensional transonic flow around a wing
[AIAA PAPER 82-1019] A82-31972
Prediction of separated asymmetric trailing-edge flows at transonic Mach numbers
[AIAA PAPER 82-1021] A82-31974
Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects
A82-34166
A harmonic analysis method for unsteady transonic flow and its application to the flutter of airfoils
[NASA-CR-3537] N82-25194
Application of Computational Fluid Dynamics (CFD) in transonic wind-tunnel/flight-test correlation
N82-25211
Investigation of upwind schemes for finite element analysis of transonic flow over thin airfoils
[AD-A111168] N82-25225
Modified version of LTRAN2: A calculation method for inviscid transonic flow about thin airfoils in moderately slow unsteady motion
[NLR-TR-80059-U] N82-25231

TRANSONIC FLUTTER
The determination of critical flutter conditions of nonlinear systems
[RAE-TM-STRUCT-986] N82-24210

TRANSONIC WIND TUNNELS
The cryogenic wind tunnel for high Reynolds number testing
A82-33317
Status of the national transonic facility
[AIAA PAPER 82-0604] A82-33326
A review of Reynolds number studies conducted in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0941] A82-34007
Wind-Tunnel/Flight Correlation, 1981
[NASA-CP-2225] N82-25196
Status of the National Transonic Facility
N82-25197
Review of the 1980 Wind-Tunnel/Flight Correlation Panel
N82-25198
Wind-tunnel/flight-drag correlation
N82-25199
Tunnel-to-tunnel correlation
N82-25200
Problems in correlation caused by propulsion systems
N82-25202

TRANSPORT AIRCRAFT
Very large aircraft - A common response to a rapidly changing global environment
[AIAA PAPER 82-0799] A82-31979
The potential of large aircraft
[AIAA PAPER 82-0804] A82-31980
Multibody transport concept
[AIAA PAPER 82-0810] A82-31983
System study of application of composite materials for future transport aircraft
[AIAA PAPER 82-0812] A82-31985
Commercial transport developments for the 1980's
A82-34109
Transport aircraft crash dynamics
[NASA-CR-165851] N82-24186
Study of advanced propulsion systems for Small Transport Aircraft Technology (STAT) program
[NASA-CR-165610] N82-24202
Cost and fuel consumption per nautical mile for two engine jet transports using OPTIM and TRAGEN
[NASA-CR-168973] N82-25239
Aerodynamics/ACEE: Aircraft energy efficiency
[NASA-FACTS-94/8-81] N82-25241
Guidance and control/ACEE
[NASA-FACTS-95/8-81] N82-25261

TRANSPORTATION NETWORKS
Beyond 2000 - The airlift challenge ahead
[AIAA PAPER 82-0815] A82-31988
Aircraft evaluation in air network planning
A82-33125

TREADS
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193

TURBINE BLADES
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891
Design, fabrication and testing of an electrical analogue for heat transfer to coated turbine blade
A82-33520
Darrieus rotor aerodynamics
A82-33708
Mechanical and metallurgical considerations in extending the life of turbine blades
A82-33855
Air cooling of gas turbine blades
A82-34700
A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers
A82-34814

TURBINE ENGINES
Fracture mechanics criteria for turbine engine hot section components
[NASA-CR-167896] N82-25257

TURBOCOMPRESSORS
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891
STGSTK: A computer code for predicting multistage axial flow compressor performance by a meanline stage stacking method
[NASA-TP-2020] N82-25250
Three dimensional mean velocity and turbulence characteristics in the annulus wall region of an axial flow compressor rotor passage
[NASA-CR-169003] N82-25252

TURBOFAN ENGINES
- Propulsion/ACEE [NASA-FACTS-93/8-81] N82-25251
- Exhaust emissions survey of a turbofan engine for flame holder swirl type augmentors at simulated altitude flight conditions [NASA-TM-82787] N82-25255

TURBOJET ENGINES
- Development of high-speed rolling-element bearings. A historical and technical perspective [NASA-TM-82884] N82-24497

TURBOMACHINE BLADES
- Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number A82-34398

TURBOPROP AIRCRAFT
- The beginning of the ATR 42 program and its importance A82-33543

TURBOPROP ENGINES
- Study of advanced propulsion systems for Small Transport Aircraft Technology (STAT) program [NASA-CR-165610] N82-24202
- Future propulsion opportunities for commuter airplanes [NASA-TM-82880] N82-24203
- Propulsion/ACEE [NASA-FACTS-93/8-81] N82-25251

TURBULENCE
- Generation of noise by turbulence [ONERA-P-1981-3] N82-24946
- Three dimensional mean velocity and turbulence characteristics in the annulus wall region of an axial flow compressor rotor passage [NASA-CR-169003] N82-25252

TURBULENCE EFFECTS
- Program presentation of the working group separated flow: Problems with rotary wings [MBB-UD-336-81-O] N82-25234

TURBULENT BOUNDARY LAYER
- Three dimensional turbulent boundary layer development on a fan rotor blade [AIAA PAPER 82-1007] A82-31965
- Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number A82-34398
- Three-dimensional separation and reattachment [NASA-TM-84221] N82-24167
- Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case [NLR-MP-80028-U] N82-25232

TURBULENT FLOW
- A numerical study of the turbulent flow past an isolated airfoil with trailing edge separation [AIAA PAPER 82-0998] A82-31958
- Shock associated noise of supersonic jets from convergent-divergent nozzles A82-32202
- Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams [AD-A111124] N82-24181

TURBULENT HEAT TRANSFER
- Approximate method of predicting heating on the windward side of Space Shuttle Orbiter and comparisons with flight data [AIAA PAPER 82-0823] A82-31853

TURBULENT JETS
- Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser A82-32330
- Aerodynamic interactions with turbulent jet exhaust plumes A82-33325

TURBULENT WAKES
- Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams [AD-A111124] N82-24181

TWO DIMENSIONAL FLOW
- A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number [AIAA PAPER 82-1030] A82-31978
- Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number A82-34398
- Nonlinear two-dimensional sail theory [AD-A110450] N82-25220

U

UNDERCARRIAGES
- Comparison between probability of detection, sensitivity, and accuracy of five nondestructive inspection methods --- high strength steel aircraft undercarriage retraction cylinders [NLR-MP-81038-U] N82-24500

UNSTEADY FLOW
- A high-frequency transonic small disturbance code for unsteady flows in a cascade [AIAA PAPER 82-0955] A82-31932
- Mathematical modeling of unsteady separated flow past solid airfoil cascades A82-32801
- Hysteresis of the normal force of a wing of complex planform under unsteady motion A82-34157
- A harmonic analysis method for unsteady transonic flow and its application to the flutter of airfoils [NASA-CR-3537] N82-25194
- Modified version of LTRAN2: A calculation method for inviscid transonic flow about thin airfoils in moderately slow unsteady motion [NLR-TR-80059-U] N82-25231

UNSWEPT WINGS
- On the torsional modes of a uniformly tapered solid wing A82-34397
- Application of modal control to wing-flutter suppression [NASA-TP-1983] N82-24209

UPWASH
- Study of VTOL in ground-effect flow field including temperature effect [NASA-CR-166258] N82-25170

URANIUM
- Airborne gamma-ray spectrometer and magnetometer survey. Ikpikpuk River quadrangle, Alaska, volume 2 [DE82-000314] N82-24620
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 1 [DE82-004150] N82-24629
- Airborne gamma-ray spectrometer and magnetometer survey. Jamestown quadrangle, North Dakota, volume 2 [DE82-004169] N82-24630
- Airborne gamma-ray spectrometer and magnetometer survey. Umiat quadrangle, Alaska, volume 2 [DE82-000312] N82-24632
- Airborne gamma-ray spectrometer and magnetometer survey. Barrow quadrangle, Alaska, volume 2 [DE82-000342] N82-25623

USER MANUALS (COMPUTER PROGRAMS)
- Production version of the extended NASA-Langley Vortex Lattice FORTRAN computer program. Volume 1: User's guide [NASA-TM-83303] N82-25219

V

V/STOL AIRCRAFT
- X-wing and the Navy V/STOL initiative A82-33915
- Experimental and analytical results of tangential blowing applied to a subsonic V/STOL inlet [NASA-TM-82847] N82-24165

VARIABLE SWEEP WINGS
- Low-speed aerodynamic characteristics of wings with sweep discontinuities A82-33997

VELOCITY DISTRIBUTION
- Three dimensional turbulent boundary layer development on a fan rotor blade [AIAA PAPER 82-1007] A82-31965
- An experimental investigation of the flow field of an ejector wing design employing a photon correlation laser velocimeter [AD-A111134] N82-24182

VERTICAL TAKEOFF AIRCRAFT
  Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems --- German book
  A82-33348
  Current developments lighter than air systems --- heavy lift airships
  [NASA-TM-84744] N82-24176
  Study of VTOL in ground-effect flow field including temperature effect
  [NASA-CR-166258] N82-25170
VHF OMNIRANGE NAVIGATION
  Ground speed measurement from DME/VHF omnirange navigation (VOR) data
  N82-25185
VIBRATION DAMPING
  Parameter identification for structures with neighboring natural frequencies especially for the case of flight resonance tests
  A82-32136
VIBRATION MEASUREMENT
  The vibratory behavior of a rotating propeller shaft. Part 4: Vibration tests of a rotating propeller shaft in a rubber stern tube bearing --- ship propellers
  [IWECO-5072208-81-PT-2] N82-24514
VIBRATION MODE
  A unified and generalized definition of static longitudinal stability in aircraft
  A82-32135
  Experimental verification of force determination and ground flying on a full-scale helicopter
  [USAAVRADCOM-TR-81-D-11] N82-24199
VIBRATIONAL STRESS
  Development of experimentally compatible subsystem methods for the analysis of aircraft structures
  [AD-A111242] N82-24198
VIBRATORY LOADS
  A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers
  A82-34814
VISCOUS FLOW
  A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations
  [AIAA PAPER 82-0935] A82-31922
  Calculations of viscous transonic flow over aerofoils
  [AIAA PAPER 82-0997] A82-31957
  Skin friction lines
  A82-33629
VISCOUS FLUIDS
  A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number
  [AIAA PAPER 82-1030] A82-31978
VISUAL FLIGHT
  Conceptual design study for an advanced cab and visual system, volume 1
  [NASA-CR-166235] N82-25266
  Conceptual design study for an advanced cab and visual system, volume 2
  [NASA-CR-166236] N82-25267
  Simulator for air-to-air combat versus real world: Visual cue analysis for simulated air-to-air combat training
  [AD-A110570] N82-25270
VISUAL STIMULI
  Simulator for air-to-air combat versus real world: Visual cue analysis for simulated air-to-air combat training
  [AD-A110570] N82-25270
VOICE COMMUNICATION
  Evaluation of a voice recognition system for the ROTAS pseudo pilot station function
  [NASA-TM-84467] N82-25235
VOLCANOLOGY
  Airborne lidar measurements of the Soufriere eruption of 17 April 1979
  A82-33657
VORTEX FLAPS
  Leading edge flap system for aircraft control augmentation
  [NASA-CASE-LAR-12787-1] N82-25240
VORTEX SHEDDING
  Low-speed aerodynamic characteristics of wings with sweep discontinuities
  A82-33997
  Water tunnel flow visualization and wind tunnel data analysis of the F/A-18 --- leading edge extension vortex effects
  [NASA-CR-165859] N82-25215
VORTEX SHEETS
  A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number
  [AIAA PAPER 82-1030] A82-31978
VORTICES
  Prediction of wing side-edge suction forces and maximum inviscid lift
  N82-25192
  Production version of the extended NASA-Langley Vortex Lattice FORTRAN computer program. Volume 1: User's guide
  [NASA-TM-83303] N82-25219

W

WAKES
  Calculations of viscous transonic flow over aerofoils
  [AIAA PAPER 82-0997] A82-31957
WALL FLOW
  Mach reflection of a shock wave from an inclined wall
  A82-34748
  Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams
  [AD-A111124] N82-24181
  Three dimensional mean velocity and turbulence characteristics in the annulus wall region of an axial flow compressor rotor passage
  [NASA-CR-169003] N82-25252
WALL PRESSURE
  Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser
  A82-32330
WARPAGE
  Calculation of the cross section properties and the shear stresses of composite rotor blades
  [MBB-UD-334-81-O] N82-25334
WASTE TREATMENT
  Primary sewage treatment plant as a source of bird hazards at airport
  N82-26184
WAVE DIFFRACTION
  Diffraction by a finite strip
  A82-33605
WAVE EQUATIONS
  Diffraction by a finite strip
  A82-33605
WAVE REFLECTION
  Mach reflection of a shock wave from an inclined wall
  A82-34748
WAVEFORMS
  Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
  A82-34671
WEAPON SYSTEMS
  A case study of reliability and maintainability of the F-16 APG-66 fire control radar
  [AD-A111387] N82-25435
WEAR TESTS
  Lubricant effects on efficiency of a helicopter transmission
  [NASA-TM-82857] N82-25520
WEDGE FLOW
  Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
  [AIAA PAPER 82-0979] A82-31944
WEIGHT REDUCTION
  Panel Optimization with Integrated Software (POIS). Volume 1: PANDA: Interactive program for preliminary minimum weight design
  [AD-A110963] N82-25404
WHEEL BRAKES
  Fireproof brake hydraulic system
  [AD-A111319] N82-25245
WIND EFFECTS
  Eigenspace techniques for active flutter suppression
  [NASA-CR-168931] N82-24206

WIND SHEAR
  A documented example of strong wind-shear A82-33274
  The effect of very heavy rain upon aircraft and its role in wind shear attributed accidents N82-25179

WIND TUNNEL APPARATUS
  Wind-Tunnel/Flight Correlation, 1981 [NASA-CP-2225] N82-25196
  Status of the National Transonic Facility N82-25197

WIND TUNNEL CALIBRATION
  Automatic checking of measuring units in the Modane wind tunnels [ONERA, TP NO. 1982-10] A82-34498

WIND TUNNEL MODELS
  Status of the national transonic facility [AIAA PAPER 82-0604] A82-33326
  Method for the measurement of elastic deformations of aircraft models in a wind tunnel A82-34162

WIND TUNNEL TESTS
  Parameter identification for structures with neighboring natural frequencies especially for the case of flight resonance tests A82-32136
  Wind-tunnel wall interference corrections for three-dimensional flows A82-32847
  The cryogenic wind tunnel for high Reynolds number testing A82-33317
  Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories A82-33626
  Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr A82-33627
  A review of Reynolds number studies conducted in the Langley 0.3-m Transonic Cryogenic Tunnel [AIAA PAPER 82-0541] A82-34007
  Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing [AIAA PAPER 82-0960] A82-34008
  Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects A82-34166
  Flow visualization techniques for the study of high incidence aerodynamics [ONERA, TP NO. 1982-5] A82-34493
  Wind-Tunnel/Flight Correlation, 1981 [NASA-CP-2225] N82-25196
  Review of the 1980 Wind-Tunnel/Flight Correlation Panel N82-25198
  Wind-tunnel/flight-drag correlation N82-25199
  Wind-tunnel/flight correlation program on XB-70-1 N82-25201
  Problems in correlation caused by propulsion systems N82-25202
  F-15 wind-tunnel/flight correlations N82-25203
  Opportunities for wind-tunnel/flight correlation with new Boeing airplanes N82-25206
  F-16E program overview and wind tunnel/flight correlation N82-25207
  X-29A forward-swept-wing demonstrator airplane N82-25209
  Application of Computational Fluid Dynamics (CFD) in transonic wind-tunnel/flight-test correlation N82-25211
  Elastic deformation effects on aerodynamic characteristics for a high-aspect-ratio supercritical-wing model [NASA-TM-83286] N82-25214
  Thrust-induced effects on low-speed aerodynamics of fighter aircraft ---- Langley 4- by 7-meter tunnel [NASA-TM-83277] N82-25218
  Aeroelasticy of compressor blades: Subsonic stall flutter N82-26189

WIND TUNNEL WALLS
  Wind-tunnel wall interference corrections for three-dimensional flows A82-32847
  Adaptive-wall wind-tunnel research at NASA-Ames Research Center [NASA-TM-84236] N82-24214
  Wind-Tunnel/Flight Correlation, 1981 [NASA-CP-2225] N82-25196
  Tunnel-to-tunnel correlation N82-25200

WIND TUNNELS
  Aeronautical research and development A82-34114

WIND TURBINES
  Darrieus rotor aerodynamics A82-33708

WIND VELOCITY
  On the aerodynamics of windblast [AD-A110495] N82-25221

WINDPOWER UTILIZATION
  Biennial Wind Energy Conference and Workshop, 5th, Washington, DC, October 5-7, 1981, Proceedings A82-33701

WING FLOW METHOD TESTS
  The NASA Langley laminar flow control airfoil experiment [AIAA PAPER 82-0567] A82-33327

WING LOADING
  Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings A82-34163
  Prediction of wing side-edge suction forces and maximum inviscid lift N82-25192

WING OSCILLATIONS
  Fundamental torsional frequency of a class of solid wings A82-33119
  On the torsional modes of a uniformly tapered solid wing A82-34397
  Application of modal control to wing-flutter suppression [NASA-TP-1983] N82-24209

WING PANELS
  Nondestructive detection of exfoliation corrosion around fastener holes in aluminum wing skins A82-32725

WING PLANFORMS
  Analysis of small-aspect-ratio lifting surfaces in ground effect A82-32223
  An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms A82-34149
  Hysteresis of the normal force of a wing of complex planform under unsteady motion A82-34157

WING ROOTS
  Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case [NLR-MP-80028-U] N82-25232

WING TIP VORTICES
  Program presentation of the working group separated flow: Problems with rotary wings [MBB-UD-336-81-O] N82-25234

WING TIPS
  Generation of three-dimensional boundary-fitted curvilinear coordinate systems for wing/wing-tip geometries using the elliptic solver method A82-33318

WING-FUSELAGE STORES
  Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories A82-33626

WINGS
  The equivalent simple body /ESB/ method for transonic wing analysis [AIAA PAPER 82-0936] A82-31923
  Design of finite element grids for the computation of the three-dimensional transonic flow around a wing [AIAA PAPER 82-1019] A82-31972
  Multibody transport concept [AIAA PAPER 82-0810] A82-31983

X

X RAY SPECTROSCOPY
Techniques suitable for a portable wear metal analyzer
[AD-A111352] N82-25488

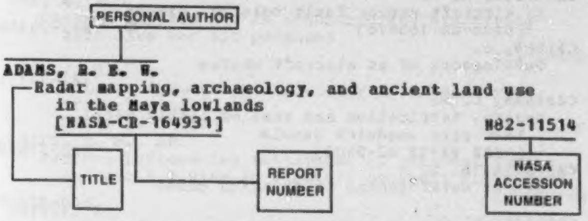
X WING ROTORS
X-wing and the Navy V/STOL initiative
A82-33915

XV-15 AIRCRAFT
XV-15 - Foretelling things to come
A82-33914
V/STOL tilt rotor research aircraft. Volume 1: General information, revision C
[NASA-CR-166347] N82-24194
V/STOL tilt rotor research aircraft. Volume 2: Ship 1 instrumentation
[NASA-CR-166348] N82-24195
V/STOL tilt rotor research aircraft. Volume 3: Ship 2 instrumentation
[NASA-CR-166349] N82-24196
V/STOL tilt rotor research aircraft. Volume 4: CFE technical data
[NASA-CR-166350] N82-24197

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 152)* SEPTEMBER 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

AKIYAMA, H.
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159

ALLEN, J. E.
Aerodynamics: The science of air in motion /2nd edition/
A82-33671

AMUNDSON, D.
Solid-state flight incident recorder
N82-25172

ANDERSEN, E. B.
Techniques suitable for a portable wear metal analyzer
[AD-A111352] N82-25488

ANDERSON, J. D., JR.
Numerical investigation of supersonic base flow with parallel injection
[AIAA PAPER 82-1001] A82-31960

ANGLIN, E. L.
Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing
[AIAA PAPER 82-0960] A82-34008

AOKI, T.
Mach reflection of a shock wave from an inclined wall
A82-34748

ARDEMA, M. D.
Barriers and dispersal surfaces in minimum-time interception
[NASA-TM-84241] N82-25262

ASK, H. R.
Solid state crash survivable flight data recorders for mishap investigation
N82-25173

ASTLEY, I.
Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy
A82-33994

AYERS, T. G.
Review of the 1980 Wind-Tunnel/Flight Correlation Panel
N82-25198

B

BAALS, D. D.
Wind-Tunnel/Flight Correlation, 1981
[NASA-CP-2225] N82-25196

BACK, L.
Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser
A82-32330

BAERST, C. F.
Study of advanced propulsion systems for Small Transport Aircraft Technology (STAT) program
[NASA-CR-165610] N82-24202

BAKER, C. J.
Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number
A82-34398

BALASUBRAMANYAN, C.
Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow
[AIAA PAPER 82-0958] A82-31934

BANASIK, A.
Identification of the form of motion of an aircraft
A82-31824

BANKS, D. W.
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[NASA-TM-83277] N82-25218

BARGER, R. L.
An analytical procedure for computing smooth transitions between two specified cross sections with applications to blended wing body configuration
[NASA-TP-2012] N82-25193

BARNES, K. F.
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244

BARNHART, B.
F-15 rotary balance data for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3478] N82-24168
Rotary balance data for an F-15 model with conformal fuel tanks for an angle-of-attack range of 8 deg to 90 deg
[NASA-CR-3516] N82-24169

BARREAU, R.
Accounting for thickness effects in the calculation of subcritical unsteady aerodynamic forces: Application to wing-fuselage interactions
[SNIAS-821-111-106] N82-24183

BASIULIS, A.
Design, fabrication and test of liquid metal heat-pipe sandwich panels
[AIAA PAPER 82-0903] A82-31898

BEHNKE, M. C.
Radiating elements for hemispherically scanned arrays
A82-32992

BELA, A.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650

BEM, D. J.
Measuring LF and MF antenna radiation patterns by means of a helicopter
A82-34772

BENDURA, R. J.
In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program
[NASA-TM-84471] N82-25661

BENN, G. S. L.
New techniques in data retrieval and display
N82-25174

BETIAEV, S. K.
Detached flow past V-shaped low-aspect-ratio wings
A82-34136

BHUTTA, B. A.
Design of finite element grids for the computation of the three-dimensional transonic flow around a wing
[AIAA PAPER 82-1019] A82-31972

BIRIUK, V. I.
Structural optimization of a swept wing on the basis of the aileron efficiency condition
A82-34145

BOEHRET, H.
OLGA - A gust alleviation for general aviation aircraft
A82-34374

BOGOSIAN, R. W.
Aviation negotiations and the U.S. model agreement
A82-32063

BOISSEAU, J. P.
Potentiality assessment of a parallel structure for the solution of partial differential equations
A82-33628

BOSE, K. W.
Aviation electronics /4th edition/
A82-33646

BOUIS, X.
Automatic checking of measuring units in the Modane wind tunnels
[ONERA, TP NO. 1982-10] A82-34498

BOULAY, J. L.
Instrumentation for testing aircraft antistatic protection
[ONERA, TP NO. 1982-7] A82-34495
Aircraft potential variations in flight
[ONERA, TP NO. 1982-11] A82-34499

BOYLE, D.
Simulation reaches towards reality
A82-33547

BRAATZ, P.
Silicon liquid crystal light valve for flight simulation applications
[AD-A110928] N82-26005

BRADSHAW, P.
Calculations of viscous transonic flow over aerofoils
[AIAA PAPER 82-0997] A82-31957

BRAGG, M. B.
Rime ice accretion and its effect on airfoil performance
[NASA-CR-165599] N82-24166

BREWER, G. D.
The potential of large aircraft
[AIAA PAPER 82-0804] A82-31980

BRINN, D. J.
Unistructure - A new concept for light weight integrally stiffened skin structure
A82-34486

BRISTOW, D. R.
Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations
[AIAA PAPER 82-0993] A82-31954

BROCARD, Y.
Comparison of aerodynamic characteristics of aircraft models with forward and aft swept wings at Mach number 0.5
[ONERA, TP NO. 1982-9] A82-34497

BROIHANNS, G.
The Airbus family of aircraft at the dawn of the 1980's
[SNIAS-821-111-101] N82-24164

BUNKOV, V. G.
Finite element calculation of the aerodynamic forces on a vibrating wing in supersonic flow
A82-34128

BURLEY, R. R.
Experimental and analytical results of tangential blowing applied to a subsonic V/STOL inlet
[NASA-TM-82847] N82-24165

BURNS, R.
Source assessment system
[AD-A111223] N82-25613

BUSHNELL, D.
Panel Optimization with Integrated Software (POIS). Volume 1: PANDA: Interactive program for preliminary minimum weight design
[AD-A110963] N82-25404

BUTLER, R. W.
An assessment of the real-time application capabilities of the SIFT computer system
[NASA-TM-84482] N82-25811

BYRDSONG, T. A.
Wing flap-type control effectiveness and effects of control hinge gap seals for a supercritical wing
[AIAA PAPER 82-0960] A82-34008

C

CADY, F. M.
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays
A82-31991

CAGLAYAN, A. K.
An aircraft sensor fault tolerant system
[NASA-CR-165876] N82-25236

CALMON, J.
Development of an aircraft engine
A82-34112

CAMARDA, C. J.
Design, fabrication and test of liquid metal heat-pipe sandwich panels
[AIAA PAPER 82-0903] A82-31898

CAMPBELL, D. L.
Recent developments in aviation cases
A82-32055

CAUDILL, L. O.
Cloud top remote sensing by airborne lidar
A82-32920

CHANG, J. B.
A review and assessment of fatigue crack growth rate relationships for metallic airframe materials
A82-34879

CHASE, W. D.
Environmental fog/rain visual display system for aircraft simulators
[NASA-CASE-ARC-11158-1] N82-24212

CHATANIER, M.
Instrumentation for testing aircraft antistatic protection
[ONERA, TP NO. 1982-7] A82-34495

CHAUDHURI, S. N.
Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow
[AIAA PAPER 82-0958] A82-31934

CHAUSSONNET, J.
Airbus industry and noise in the community
[SNIAS-821-111-111] N82-24739

CHEN, H. S.
Optimization of auto-pilot equations for rapid estimation of helicopter control settings
[AD-A110739] N82-25263

CHEN, Z. B.
Calculations of viscous transonic flow over aerofoils
[AIAA PAPER 82-0997] A82-31957

CHERRY, D. K.
Recent developments in aviation cases
A82-32055

CHEVALIER, R.
Technical trends in the civil aircraft and helicopter industry
A82-34120

CHOI, S. R.
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891

CHOW, C.-Y.
The initial lift and drag of an impulsively started airfoil of finite thickness
A82-34538

CHOW, W. L.
A numerical study of the turbulent flow past an isolated airfoil with trailing edge separation
[AIAA PAPER 82-0998] A82-31958

CHUANG, S.
Accurate numerical solution of compressible, linear stability equations
A82-33571

CITIPITIOGLU, E.
Design of finite element grids for the computation of the three-dimensional transonic flow around a wing
[AIAA PAPER 82-1019] A82-31972

COHN, R. B.
Adapter for mounting microphone flush with the external surface of the skin of a pressurized aircraft
[NASA-CASE-FRC-11072-1] N82-24474

COMBAZ, R.
Automatic checking of measuring units in the Modane wind tunnels
[ONERA, TP NO. 1982-10] A82-34498

COSTE, J.
Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories
A82-33626

COWARD, R. E.
Simulator for air-to-air combat versus real world: Visual cue analysis for simulated air-to-air combat training
[AD-A110570] N82-25270

COX, M. E.
On-line experiments in acquiring and exploiting AIDS data for ATC purposes
N82-25175

COY, J. J.
Lubricant effects on efficiency of a helicopter transmission
[NASA-TM-82857] N82-25520

CRAFT, R. E., JR.
Factors influencing settlement of personal injury and death claims in aircraft accident litigation
A82-32062

CUFFEL, R.
Experimental investigation of turbulent wall-jets in the presence of adverse pressure gradients in a rectangular diffuser
A82-32330

CUNNINGHAM, H. J.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216

CUTLER, J.
Understanding aircraft structures
A82-33625

CYRUS, M. L.
Conceptual design study for an advanced cab and visual system, volume 1
[NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2
[NASA-CR-166236] N82-25267

D

DAVINO, R.
Three dimensional mean velocity and turbulence characteristics in the annulus wall region of an axial flow compressor rotor passage
[NASA-CR-169003] N82-23252

DAVIS, D. L.
Coaxial dump Ramjet combustor combustion instabilities. Part 1: Parametric test data
[AD-A111355] N82-25259

DEGRAAF, E. A. B.
Comparison between probability of detection, sensitivity, and accuracy of five nondestructive inspection methods
[NLR-MP-81038-U] N82-24500

DEMARCHI, D.
A case study of reliability and maintainability of the F-16 APG-66 fire control radar
[AD-A111387] N82-25435

DENISON, R. L.
Structures testing analysis real-time network (STARNET)
[AD-A111636] N82-25827

DENKE, C.
A pilot's view on possible uses of AIDS
N82-25176

DEQUE, R.
From the A 300 to the A 310
A82-33542

DERIJK, P.
Comparison between probability of detection, sensitivity, and accuracy of five nondestructive inspection methods
[NLR-MP-81038-U] N82-24500

DESMARAIS, R. N.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216

DORNIER, C., JR.
Very large aircraft - A common response to a rapidly changing global environment
[AIAA PAPER 82-0799] A82-31979

DREHER, R. C.
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193

DROBENKO, B.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216

DRUMMOND, J. P.
Numerical investigation of supersonic base flow with parallel injection
[AIAA PAPER 82-1001] A82-31960

DU BOUCHERON, O.
Comparison of aerodynamic characteristics of aircraft models with forward and aft swept wings at Mach number 0.5
[ONERA, TP NO. 1982-9] A82-34497

DUNHAM, J. R.
Production of Reliable Flight Crucial Software: Validation Methods Research for Fault Tolerant Avionics and Control Systems Sub-Working Group Meeting
[NASA-CP-2222] N82-24845

E

EASON, P. H.
A new all-purpose digital flight data recorder
N82-25177

ECER, A.
Design of finite element grids for the computation of the three-dimensional transonic flow around a wing
[AIAA PAPER 82-1019] A82-31972

EFRON, U.
Silicon liquid crystal light valve for flight simulation applications
[AD-A110928] N82-26005

EHLERS, F. E.
A harmonic analysis method for unsteady transonic flow and its application to the flutter of airfoils
[NASA-CR-3537] N82-25194

ELSENAAR, A.
Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case
[NLR-MP-80028-U] N82-25232

EMERY, A. F.
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891

ENSELME, M.
Potentiality assessment of a parallel structure for the solution of partial differential equations
A82-33628

ERB, L. H.
XV-15 - Foretelling things to come
A82-33914

ERICKSON, G. E.
Water tunnel flow visualization and wind tunnel data analysis of the F/A-18
[NASA-CR-165859] N82-25215

ERTURK, T.
Material flow and defect formation in forging an airfoil shape from metal-matrix composites
A82-33995

ETEMAD, S.
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891

ETESSE, A.
The beginning of the ATR 42 program and its importance
A82-33543

EVSEEV, D. D.
An algorithm for calculating the compliance matrices of aircraft structures by the substructure method as applied to aeroelasticity problems
A82-34161

F

FABUNMI, J. A.
Experimental verification of force determination and ground flying on a full-scale helicopter
[USAAVRADCOM-TR-81-D-11] N82-24199
FAN, D.-N.
Closed-form solutions of supersonic wing-body interference
A82-33120
FANNELLY, W. G.
Experimental verification of force determination and ground flying on a full-scale helicopter
[USAAVRADCOM-TR-81-D-11] N82-24199
FAVORSKII, O. N.
Air cooling of gas turbine blades
A82-34700
FEDOROV, R. M.
Mathematical modeling of unsteady separated flow past solid airfoil cascades
A82-32801
FERGUSSON, G. J.
Techniques suitable for a portable wear metal analyzer
[AD-A111352] N82-25488
FISCHER, F. W.
Aeronautical information data subsystems
N82-25178
FONAREV, A. S.
Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects
A82-34166
FRANCKEN, A. J.
The vibratory behavior of a rotating propeller shaft. Part 4: Vibration tests of a rotating propeller shaft in a rubber stern tube bearing
[IWECO-5072208-81-PT-2] N82-24514
FREI, D. R.
X-29A forward-swept-wing demonstrator airplane
N82-25209
FREYMANN, R.
A method for determining the aeroelastic behavior of aircraft with active control systems
[ESA-TT-719] N82-24211
FUECHTER, N.
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34671
FULLER, W. H., JR.
Airborne lidar measurements of the Soufriere eruption of 17 April 1979
A82-33657

G

GAMON, M.
Transport aircraft crash dynamics
[NASA-CR-165851] N82-24186
GARNETT, T. A.
Conceptual design study for an advanced cab and visual system, volume 1
[NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2
[NASA-CR-166236] N82-25267
GARRARD, W. L.
Eigenspace techniques for active flutter suppression
[NASA-CR-168931] N82-24206
GARRETT, W. A.
Considerations for international joint venture development of very large aircraft
[AIAA PAPER 82-0809] A82-31982
GATES, T. G.
Starting transients in supersonic nozzles and nozzle-diffuser assemblies
[AD-A111143] N82-25226
GAVET, G.
Automatic checking of measuring units in the Modane wind tunnels
[ONERA, TP NO. 1982-10] A82-34498
GERMERAAD, D. P.
Aircraft carrier - Surface effect ship
[AIAA PAPER 82-0808] A82-31981
GESSOW, A.
The ubiquitous helicopter
A82-33913
GHOBRIAL, A.
Aircraft evaluation in air network planning
A82-33125
GJESSING, D. T.
A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background
A82-32979
GLOSS, B. B.
Status of the national transonic facility
[AIAA PAPER 82-0604] A82-33326
GOLDBERGER, A. E.
Army's 1st IPI program begun - Blisk impeller followup
A82-31999
GOLDRICH, R. N.
Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces
[NASA-CR-3553] N82-25516
GORLIN, S. M.
Wind tunnels of the institute of mechanics of Moscow State University
[NASA-TM-76909] N82-24213
GOVINDAN, T. R.
Three dimensional turbulent boundary layer development on a fan rotor blade
[AIAA PAPER 82-1007] A82-31965
GRAF, E. R.
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 1
[AD-A110862] N82-24188
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 2
[AD-A110863] N82-24189
GREEN, M. J.
An optical data link for airborne scanning system
A82-34737
GREY, J.
International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981
A82-34101
GRIGOREV, M. I.
Detached flow past V-shaped low-aspect-ratio wings
A82-34136
GRINBERG, J.
Silicon liquid crystal light valve for flight simulation applications
[AD-A110928] N82-26005
GROSSIN, J.
Flight management computer
[SNIAS-821-111-110] N82-24842
GUEDEL, A.
Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr
A82-33627
GUIRAUD, D.
Potentiality assessment of a parallel structure for the solution of partial differential equations
A82-33628
GUPTA, R. N.
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944
GURECKI, D. J.
Effect of modification of the trailing edge of a separating wall on the downstream mixing of parallel flowing streams
[AD-A111124] N82-24181

H

HADERMANN, A. F.
Investigation of the application of a cryogenic blending process to produce antimisting diesel fuels
[AD-A110917] N82-25399
HAFER, X.
Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems
A82-33348

HAGEDORN, F.
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34671

HAGEMAIER, D. J.
Nondestructive detection of exfoliation corrosion around fastener holes in aluminum wing skins
A82-32725

HAH, C.
Three dimensional turbulent boundary layer development on a fan rotor blade
[AIAA PAPER 82-1007] A82-31965

HAINES, J. L.
OV-10A nose gear fork damage analysis
[AD-A111492] N82-25244

HAINES, P. A.
The effect of very heavy rain upon aircraft and its role in wind shear attributed accidents
N82-25179

HALFORD, G. R.
Nonlinear structural and life analyses of a combustor liner
[NASA-TM-82846] N82-24501

HAM, N. D.
Effects of dynemic stall on SWECS
A82-33707

HAMDAN, L. A.
International aerospace review; Proceedings of the First International Aerospace Symposium, Le Bourget, Seine-Saint-Denis, France, June 2, 3, 1981
A82-34101

HAMILTON, H. H., II
Approximate method of predicting heating on the windward side of Space Shuttle Orbiter and comparisons with flight data
[AIAA PAPER 82-0823] A82-31853

HAMMER, A. N.
Evaluation of cast titanium alloy compressor components, volume 1
[AD-A111431] N82-24204

HANSEN, M. Z.
Cloud top remote sensing by airborne lidar
A82-32920

HARDEGEN, H.
The DFVLR Digital Flight Data Readout and Processing Station and its Utility
N82-25180

HARDERSEN, C. P.
Fatigue life prediction of helicopter pitch link using Kaman life calculation methods
A82-34125

HARVEY, W. D.
The NASA Langley laminar flow control airfoil experiment
[AIAA PAPER 82-0567] A82-33327

HAWK, J. D.
Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations
[AIAA PAPER 82-0993] A82-31954

HAWKINS, W. B.
The potential for long-range high-payload aircraft with alternate fuels
[AIAA PAPER 82-0814] A82-31987
The aerospace learning process
[AIAA PAPER 82-1291] A82-33025
Solutions to the aviation fuel problem
A82-34113

HEDMAN, S. G.
The FFA wing body 81 computer program. A panel method for determination of aerodynamic characteristics at subsonic and supersonic speeds
[FFA-TN-AU-1601] N82-25230

HELDENBRAND, R. W.
Study of advanced propulsion systems for Small Transport Aircraft Technology (STAT) program
[NASA-CR-165610] N82-24202

HELMS, J. L.
The National Airspace System plan
A82-33893

HENKES, K.
Principles of efficient energy use at Interflug
A82-33250

HERBERT, H. E.
Production version of the extended NASA-Langley Vortex Lattice FORTRAN computer program. Volume 1: User's guide
[NASA-TM-83303] N82-25219

HESS, R. A.
Prediction of aircraft handling qualities using analytical models of the human pilot
[NASA-TM-84233] N82-24208

HILL, W. G.
Study of VTOL in ground-effect flow field including temperature effect
[NASA-CR-166258] N82-25170

HJELMSTAD, J.
A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background
A82-32979

HOASHI, K.
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159

HODGSON, R. M.
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays
A82-31991

HOLLISTER, W. M.
Flight evaluation of Loran-C for general aviation area navigation
A82-33049

HORST, D.
Sideslip indication system as a fuel saving aid in jet transport aircraft operation
N82-25181

HORSTMAN, C. C.
Prediction of separated asymmetric trailing-edge flows at transonic Mach numbers
[AIAA PAPER 82-1021] A82-31974

HOSHINO, T.
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159

HOUCK, J. A.
Evaluation of a voice recognition system for the MOTAS pseudo pilot station function
[NASA-TM-84487] N82-25235

HUANG, M.-K.
The initial lift and drag of an impulsively started airfoil of finite thickness
A82-34538

HUIZING, G. H.
Modified version of LTRAN2: A calculation method for inviscid transonic flow about thin airfoils in moderately slow unsteady motion
[NLR-TR-80059-U] N82-25231

HUNT, D. L.
Investigation of upwind schemes for finite element analysis of transonic flow over thin airfoils
[AD-A111168] N82-25225

HUNT, W. H.
Airborne lidar measurements of the Soufriere eruption of 17 April 1979
A82-33657

HUSSAINI, M. Y.
Accurate numerical solution of compressible, linear stability equations
A82-33571

HUTCHINS, R. W.
Runway end intersection design
A82-33904

HWANG, D. P.
Experimental and analytical results of tangential blowing applied to a subsonic V/STOL inlet
[NASA-TM-82847] N82-24165

I

IAREMCHUK, IU. F.
Structural optimization of a swept wing on the basis of the aileron efficiency condition
A82-34145

IAROSHEVSKII, V. A.
Determination of the glide path of an aircraft with power off
A82-34154

IKUI, T.
Mach reflection of a shock wave from an inclined wall
A82-34748

IMMARIGEON, J. P.
The superalloys - Materials for gas turbine hot section components
A82-33853

IRICK, S. C.
Hydraulic actuator mechanism to control aircraft spoiler movements through dual input commands
[NASA-CASE-LAR-12412-1] N82-24205
ISHIZAKI, Y.
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159
ISHMURATOV, F. Z.
Development of a control law for the alleviation of maneuver loads on an elastic aircraft
A82-34144
IUSHIN, A. IA.
An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms
A82-34149
IVANOV, S. N.
Temperature fields in three-layer panels with a honeycomb filler during unsteady heating
A82-34135

J

JABLONSKI, E. J.
Evaluation of three percent Aqueous Film Forming Foam (AFFF) concentrates as fire fighting agents
[AD-A110821] N82-25402
JAIN, A. C.
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944
JENKINS, R. C.
Study of VTOL in ground-effect flow field including temperature effect
[NASA-CR-166258] N82-25170
JENSEN, P. S.
Supplementary studies on the sensitivity of optimized structures
[AD-A110994] N82-25545
JENTZ, N. E.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
JIAN, Z.
Calculation of the lift distribution and aerodynamic derivatives of quasi-static elastic aircraft
A82-34639
JOHNSON, C. R.
Applications of a multiplexed GPS user set
A82-33050
JONES, R.
Experimental verification of force determination and ground flying on a full-scale helicopter
[USAAVRADCOM-TR-81-D-11] N82-24199
JOSHI, P. R.
Design, fabrication and testing of an electrical analogue for heat transfer to coated turbine blade
A82-33520
JOU, W.-H.
Finite volume calculation of three-dimensional potential flow around a propeller
[AIAA PAPER 82-0957] A82-31933

K

KALEMARIS, S. G.
Study of VTOL in ground-effect flow field including temperature effect
[NASA-CR-166258] N82-25170
KANAFANI, A.
Aircraft evaluation in air network planning
A82-33125
KAPLAN, L. S.
Predicting the application of vicarious liability to fixed base operators - Still guesswork after all these years
A82-32056
KAPRALOV, V. M.
A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers
A82-34814
KATCHER, M.
Failure analysis of silica phenolic nozzle liners
A82-34882
KAUFMAN, A.
Nonlinear structural and life analyses of a combustor liner
[NASA-TM-82846] N82-24501
Evaluation of inelastic constitutive models for nonlinear structural analysis
[NASA-TM-82845] N82-24502
KEINATH, W.
Mechanical properties of hot isostatic pressed P/M-titanium for helicopter components
[MBB-UD-324-81-O] N82-25383
KENSCHE, C.
Report from the Working Party on New Fiber Materials
N82-24512
KERLICK, G. D.
A high-frequency transonic small disturbance code for unsteady flows in a cascade
[AIAA PAPER 82-0955] A82-31932
KESSLER, H. E.
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
KESSLER, E. E.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
KHUDYAKOV, G. E.
Wind tunnels of the institute of mechanics of Moscow State University
[NASA-TM-76909] N82-24213
KILGORE, R. A.
The cryogenic wind tunnel for high Reynolds number testing
A82-33317
KILNER, J. R.
Fireproof brake hydraulic system
[AD-A111319] N82-25245
KIMBELL, M.
V/STOL tilt rotor research aircraft. Volume 1: General information, revision C
[NASA-CR-166347] N82-24194
KITIS, L.
Structural modification to achieve antiresonance in helicopters
A82-32849
KLAEDTKE, G.
Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar
A82-34672
KLEIN, R.
A review and assessment of fatigue crack growth rate relationships for metallic airframe materials
A82-34879
KLIMAS, P. C.
Darrieus rotor aerodynamics
A82-33708
KLUMPE, H. W.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] A82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
KNIGHT, J. C.
Production of Reliable Flight Crucial Software: Validation Methods Research for Fault Tolerant Avionics and Control Systems Sub-Working Group Meeting
[NASA-CP-2222] N82-24845
KONDOH, N.
Mach reflection of a shock wave from an inclined wall
A82-34728
KOPELEV, S. Z.
Air cooling of gas turbine blades
A82-34700
KOTOVSKII, V. N.
Mathematical modeling of unsteady separated flow past solid airfoil cascades
A82-32801
KOTZOT, H. T.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650

KOVALEVA, N. A.
An experimental study at free-stream Mach 5 of the aerodynamic heating of the upper surface of plane wings of various planforms
A82-34149

KRASNOV, N. F.
Aerodynamics. Part 2 - Methods of aerodynamic design /3rd revised and enlarged edition/
A82-33387

KUHN, H. A.
Material flow and defect formation in forging an airfoil shape from metal-matrix composites
A82-33995

KUMAR, P. E.
Downwash behind a wing with spanwise blowing
A82-33514

KUMMER, W. H.
Radiating elements for hemispherically scanned arrays
A82-32992

KURIANOV, A. I.
Hysteresis of the normal force of a wing of complex planform under unsteady motion
A82-34157

L

LABRA, J. J.
Finite-element modeling of a fighter aircraft canopy acrylic panel
A82-32848

LAKSHMINARAYANA, B.
Three dimensional turbulent boundary layer development on a fan rotor blade
[AIAA PAPER 82-1007] A82-31965
Three dimensional mean velocity and turbulence characteristics in the annulus wall region of an axial flow compressor rotor passage
[NASA-CR-169003] N82-25252
Investigation of the tip clearance flow inside and at the exit of a compressor rotor passage
[NASA-CR-169004] N82-25253

LAMAR, J. E.
Production version of the extended NASA-Langley Vortex Lattice FORTRAN computer program. Volume 1: User's guide
[NASA-TM-83303] N82-25219

LANCRAFT, R. E.
An aircraft sensor fault tolerant system
[NASA-CR-165876] N82-25236

LANGE, R. H.
System study of application of composite materials for future transport aircraft
[AIAA PAPER 82-0812] A82-31985

LAROCHE, P.
Aircraft potential variations in flight
[ONERA, TP NO. 1982-11] A82-34499

LARSON, E. S.
Incompressible symmetric flow characteristics of sharp-edged rectangular wings
A82-32850

LECA, P.
Potentiality assessment of a parallel structure for the solution of partial differential equations
A82-33628

LEE, R. E., III
In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program
[NASA-TM-84471] N82-25661

LEGENDRE, R.
Skin friction lines
A82-33629
Generation of noise by turbulence
[ONERA-P-1981-3] N82-24946

LEITES, E. A.
Similarity parameters for the geometric structure of a supersonic jet propagating in a channel and in a submerged space
A82-34132

LEWIS, M. H.
Aerospace engineers: We're tomorrow-minded people
[NASA-EP-188] N82-25017

LEYNAERT, J.
Wind tunnel studies of store separation with load factor - Freedrops and captive trajectories
A82-33626

LIBURDI, J.
Mechanical and metallurgical considerations in extending the life of turbine blades
A82-33855

LIESE, H.
Considerations for international joint venture development of very large aircraft
[AIAA PAPER 82-0809] A82-31982

LINDEN, A. W.
Will ABC technology produce the next-generation helicopter
A82-33916

LINDHOUT, J. P. F.
Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case
[NLR-MP-80028-U] N82-25232

LITTLE, R. C.
High technology raises fighter force readiness
A82-33892

LITTLEFIELD, J. A.
Flight evaluation of Loran-C for general aviation area navigation
A82-33049

LITVIN, F. L.
Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces
[NASA-CR-3553] N82-25516

LIU, Q.
Calculation of the lift distribution and aerodynamic derivatives of quasi-static elastic aircraft
A82-34639

LODEN, W. A.
Supplementary studies on the sensitivity of optimized structures
[AD-A110994] N82-25545

LOISEAU, H.
Aeroelasticy of compressor blades: Subsonic stall flutter
N82-26189

LORAN, B. L.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650

LUDLOFF, A.
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34671

LUERS, J. K.
The effect of very heavy rain upon aircraft and its role in wind shear attributed accidents
N82-25179

LUND, T.
A multifrequency adaptive radar for detection and identification of objects - Results on preliminary experiments on aircraft against a sea-clutter background
A82-32979

M

MADDALON, D. V.
Multibody transport concept
[AIAA PAPER 82-0810] A82-31983

MADSEN, A. P.
F-16E program overview and wind tunnel/flight correlation
N82-25207

MALIK, M. R.
Accurate numerical solution of compressible, linear stability equations
A82-33571

MALOWICKI, E.
Radar frequency radiation
[AD-A111852] N82-25424

MANSFIELD, E. H.
Fundamental torsional frequency of a class of solid wings
A82-33119
On the torsional modes of a uniformly tapered solid wing
A82-34397

MANSPEAKER, C. J.
  Electronic Warfare Avionics Integration Support Facility support processor
  [AD-A111641] N82-25249
MARTIN, C. F.
  Linear decentralized systems with special structure A82-34359
MATSUO, K.
  Mach reflection of a shock wave from an inclined wall A82-34748
MAYER, N. J.
  Current developments lighter than air systems
  [NASA-TM-84744] N82-24176
MCDOUGAL, D. S.
  In situ ozone data for comparison with laser absorption remote sensor: 1980 PEPE/NEROS program
  [NASA-TM-84471] N82-25661
MCKINNEY, L. W.
  Status of the national transonic facility
  [AIAA PAPER 82-0604] A82-33326
  Wind-Tunnel/Flight Correlation, 1981
  [NASA-CP-2225] N82-25196
MCKINZIE, D. J., JR.
  Aeroacoustic performance of an externally blown flap configuration with several flap noise suppression devices
  [NASA-TP-1995] N82-24942
MEMBERY, D. A.
  A documented example of strong wind-shear A82-33274
MENDOZA, J. P.
  Adaptive-wall wind-tunnel research at NASA-Ames Research Center
  [NASA-TM-84236] N82-24214
MENDRISKY, R. C.
  Operational testing of the LN-33 inertial navigation system A82-33854
MEYER, W. L.
  Development of an analytical technique for the optimization of jet engine and duct acoustic liners
  [NASA-CR-169002] N82-25256
MEYERS, G. J.
  Nonlinear structural and life analyses of a combustor liner
  [NASA-TM-82846] N82-24501
  Fracture mechanics criteria for turbine engine hot section components
  [NASA-CR-167896] N82-25257
MIHALOEW, J. R.
  A piecewise linear state variable technique for real time propulsion system simulation
  [NASA-TM-82851] N82-24201
MILLER, C. O.
  Aviation accident investigation - Functional and legal perspectives A82-32059
MINKER, M.
  Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II A82-34671
MITCHELL, A. M.
  Lubricant effects on efficiency of a helicopter transmission
  [NASA-TM-82857] N82-25520
MITRUSHCHENKOV, V. IA.
  A method of accounting for the effect of aircraft deformations on its loading A82-34177
MOORE, J. W.
  Multibody transport concept
  [AIAA PAPER 82-0810] A82-31983
  System study of application of composite materials for future transport aircraft
  [AIAA PAPER 82-0812] A82-31985
MORENO, V.
  Nonlinear structural and life analyses of a combustor liner
  [NASA-TM-82846] N82-24501
MORISSET, J.
  The TM 333, a trump card for Turbomeca A82-33750
MORIYA, J.
  Hydrogen economy assessment for long-term energy systems in Japan A82-32159
MOROZOV, M. A.
  Temperature fields in three-layer panels with a honeycomb filler during unsteady heating A82-34135
MOSES, C. A.
  Impact study of synthetic and alternative fuel usage in Army aircraft propulsion systems
  [AD-A111046] N82-24355
MOSS, J. E., JR.
  Exhaust emissions survey of a turbofan engine for flame holder swirl type augmentors at simulated altitude flight conditions
  [NASA-TM-82787] N82-25255
MOZUMDAR, S.
  Investigation on rotating ailerons N82-26162
MUEHLBAUER, J. C.
  Very large aircraft with alternate fuels - LH2 most promising
  [AIAA PAPER 82-0813] A82-31986
MURDEN, W. P.
  High technology raises fighter force readiness A82-33892
MURMAN, E. M.
  Application of Computational Fluid Dynamics (CFD) in transonic wind-tunnel/flight-test correlation N82-25211
MURTHY, S. S.
  Finite element analysis of some aerospace shell structures A82-33515
MYETTE, K. M.
  Cannibalization of the F-14 and S-3A aircraft: A viable logistic
  [AD-A111207] N82-24163

N

NABAR, S. V.
  Design, fabrication and testing of an electrical analogue for heat transfer to coated turbine blade A82-33520
NACHBOR, J. W.
  Conceptual design study for an advanced cab and visual system, volume 1
  [NASA-CR-166235] N82-25266
  Conceptual design study for an advanced cab and visual system, volume 2
  [NASA-CR-166236] N82-25267
NAGEL, A. L.
  Opportunities for wind-tunnel/flight correlation with new Boeing airplanes N82-25206
NAGY, R. J.
  Experimental verification of force determination and ground flying on a full-scale helicopter
  [USAAVRADCOM-TR-81-D-11] N82-24199
NARSAVAGE, S. T.
  Chem-Braze abradable seal attachment to aircraft gas turbine compressor components
  [AD-A111692] N82-25521
NATARAJAN, K.
  Flight evaluation of Loran-C for general aviation area navigation A82-33049
NEGISHI, N.
  Hydrogen economy assessment for long-term energy systems in Japan A82-32159
NEIL, P. J. O.
  The equivalent simple body /ESB/ method for transonic wing analysis
  [AIAA PAPER 82-0936] A82-31923
NEWBY, J. R.
  Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980 A82-33989
NEWMAN, J. N.
  Analysis of small-aspect-ratio lifting surfaces in ground effect A82-32223
NEYLAND, D. L.
  Hardware and software integration for concurrent data acquisition and reduction of photon correlated laser Doppler velocimetry
  [AD-A111146] N82-25506

NIEDLING, L. G.
F-15 wind-tunnel/flight correlations
N82-25203
NIEMEIER, B. A.
Formability of metallic materials - 2000 A.D.; Proceedings of the Symposium, Chicago, IL, June 24, 25, 1980
A82-33989
NISHT, M. I.
Mathematical modeling of unsteady separated flow past solid airfoil cascades
A82-32801
NIU, W. H.
Techniques suitable for a portable wear metal analyzer
[AD-A111352] N82-25488
NIXON, D.
A high-frequency transonic small disturbance code for unsteady flows in a cascade
[AIAA PAPER 82-0955] A82-31932
NOAH, S. T.
Development of experimentally compatible subsystem methods for the analysis of aircraft structures
[AD-A111242] N82-24198
NOLL, R. B.
Effects of dynamic stall on SWECS
A82-33707
NOVICK, A. S.
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635

O

OHARA, J. B.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649
Fuel quality/processing study. Volume 2: Appendix. Task 1 literature survey
[NASA-CR-165327-VOL-2] N82-24650
OHTSUKA, T.
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159
OSTROFF, A. J.
Application of modal control to wing-flutter suppression
[NASA-TP-1983] N82-24209

P

PAIRMAN, D.
A system design for a multispectral sensor using two-dimensional solid-state imaging arrays
A82-31991
PALAZZOLO, A.
Structural modification to achieve antiresonance in helicopters
A82-32849
PANDYA, A.
Investigation of the tip clearance flow inside and at the exit of a compressor rotor passage
[NASA-CR-169004] N82-25253
PARK, C.
Radiation enhancement by nonequilibrium during flight through the Titan atmosphere
[AIAA PAPER 82-0878] A82-31883
PARKS, R. E.
Testing of the Kuiper Airborne Observatory 91-CM telescope
[NASA-CR-166341] N82-25040
PARYSHEVA, G. V.
Determination of the glide path of an aircraft with power off
A82-34154
PATEL, T. S.
Investigation on rotating ailerons
N82-26162
PAULSON, J. W., JR.
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[NASA-TM-83277] N82-25218
PAVLOV, V. A.
Solution of creep problems by a finite element method
A82-34172
PEAKE, D. J.
Three-dimensional separation and reattachment
[NASA-TM-84221] N82-24167
PETERS, D. A.
Optimization of auto-pilot equations for rapid estimation of helicopter control settings
[AD-A110739] N82-25263
PETERSON, J. B., JR.
Wind-tunnel/flight correlation program on XB-70-1
N82-25201
PETERSON, J. H.
Wind-tunnel/flight-drag correlation
N82-25199
PETTIT, H. W., JR.
Chem-Braze abradable seal attachment to aircraft gas turbine compressor components
[AD-A111692] N82-25521
PHILLIPS, C. L.
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 1
[AD-A110862] N82-24188
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 2
[AD-A110863] N82-24189
PILKEY, W. D.
Structural modification to achieve antiresonance in helicopters
A82-32849
PILLAI, S. C.
Primary sewage treatment plant as a source of bird hazards at airport
A82-33523
Primary sewage treatment plant as a source of bird hazards at airport
N82-26180
PINES, S.
Application of modal control to wing-flutter suppression
[NASA-TP-1983] N82-24209
POISSON-QUINTON, P.
Aeronautical research and development
A82-34110
POLZ, G.
Program presentation of the working group seperated flow: Problems with rotary wings
[MBB-UD-336-81-O] N82-25234
POPOVSKII, V. N.
Development of a control law for the alleviation of maneuver loads on an elastic aircraft
A82-34144
PORITZKY, S. B.
The National Airspace System plan
A82-33893
PRAKASH, S.
Low-speed aerodynamic characteristics of wings with sweep discontinuities
A82-33997
PRIDE, J. D.
The NASA Langley laminar flow control airfoil experiment
[AIAA PAPER 82-0567] A82-33327
PUYPLAT, D.
From the A 300 to the A 310
A82-33542

Q

QUINTO, P. F.
Thrust-induced effects on low-speed aerodynamics of fighter aircraft
[NASA-TM-83277] N82-25218

R

RAHMAN, P.
Mathematical models for the synthesis and optimization of spiral bevel gear tooth surfaces
[NASA-CR-3553] N82-25516
RAJAN, N.
Barriers and dispersal surfaces in minimum-time interception
[NASA-TM-84241] N82-25262
RAMACHANDRA, S. M.
Low-speed aerodynamic characteristics of wings with sweep discontinuities
A82-33997
RAMSAYER, K.
Short-term behavior of a Doppler navigation system and comparison with position indication by means of scanning radar
A82-34672

RAO, D. M.
Leading edge flap system for aircraft control augmentation
[NASA-CASE-LAR-12787-1] N82-25240
RAY, E. J.
A review of Reynolds number studies conducted in the Langley 0.3-m Transonic Cryogenic Tunnel
[AIAA PAPER 82-0941] A82-34007
RAYMER, D. P.
CDS grows new muscles
A82-33891
RAZA, S. J.
Use of the Pseudo-inverse for design of a reconfigurable flight control system
[AD-A111172] N82-25264
REBUFFET, P.
Model based study of various configurations of jet crossing a cavity - Application to the CEPRA 19 wind tunnel of CEPr
A82-33627
REDELINGHUYS, C.
Prediction of wing side-edge suction forces and maximum inviscid lift
N82-25192
REIF, P. G.
Silicon liquid crystal light valve for flight simulation applications
[AD-A110928] N82-26005
REVELLIN-FALCOZ, B.
Military aircraft and international policy
A82-34108
RHIE, C. M.
A numerical study of the turbulent flow past an isolated airfoil with trailing edge separation
[AIAA PAPER 82-0998] A82-31958
RIBAUT, M.
A vortex sheet method for calculating separated two-dimensional flows at high Reynolds number
[AIAA PAPER 82-1030] A82-31978
RICHARDSON, J. D.
Essentials of aviation management /2nd edition/
A82-33648
RISER, H. L., JR.
Improvement program for the C-141 Navigation Selector Panel
[AD-A111469] N82-25248
RIZK, M. H.
Wind-tunnel wall interference corrections for three-dimensional flows
A82-32847
ROBERT, C.
An intermediate solution between basic and expanded aircraft integrated data systems (AIDS)
N82-25182
ROBERT, J. P.
Accounting for thickness effects in the calculation of subcritical unsteady aerodynamic forces: Application to wing-fuselage interactions
[SNIAS-821-111-106] N82-24183
ROBINSON, M. L.
Formability of INCOLOY alloy MA 956 - An oxide dispersion strengthened sheet alloy
A82-33994
RODKIEWICZ, C. M.
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944
ROEMERMAN, S. D.
Applications of a multiplexed GPS user set
A82-33050
ROGERS, H. F.
Military aircraft
A82-34121
ROGERS, J. L., JR.
Combining analysis with optimization at Langley Research Center. An evolutionary process
[NASA-TM-84472] N82-24846
ROHLING, H.
Doppler processing, waveform design and performance measures for some pulsed Doppler and MTD-radars. II
A82-34671
ROPELEWSKI, R. R.
No-tail-rotor helicopter tests continue
A82-33095
ROSENBAUER, R. J.
Flight data recovery under adverse conditions
N82-25183
ROSS, R.
Thermodynamic performance of an airplane wing leading edge anti-icing system
[AIAA PAPER 82-0851] A82-31871
ROTH, S. P.
A piecewise linear state variable technique for real time propulsion system simulation
[NASA-TM-82851] N82-24201
ROUX, J. A.
Ideal ramjet - Optimum M sub infinity for fuel limit and material limit
A82-33143
ROWSE, J. H.
Study of advanced propulsion systems for Small Transport Aircraft Technology (STAT) program
[NASA-CR-165610] N82-24202
RUE, R. J.
Conceptual design study for an advanced cab and visual system, volume 1
[NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2
[NASA-CR-166236] N82-25267
RUPP, A. M.
Simulator for air-to-air combat versus real world: Visual cue analysis for simulated air-to-air combat training
[AD-A110570] N82-25270
RYBAKOV, A. A.
An algorithm for calculating the compliance matrices of aircraft structures by the substructure method as applied to aeroelasticity problems
A82-34161

S

SACHS, G.
Vertical takeoff technology - Flight mechanics, aerodynamics, and propulsion systems
A82-33348
SAFAI, S.
Chem-Braze abradable seal attachment to aircraft gas turbine compressor components
[AD-A111692] N82-25521
SAITO, T.
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159
SAVAGE, P. W.
Experimental analysis of the effects of sweep and aspect ratio on incompressible flow about forward swept wings
[AD-A111128] N82-25223
SCHAEFER, R. K.
High technology raises fighter force readiness
A82-33892
SCHAIRER, E. T.
Adaptive-wall wind-tunnel research at NASA-Ames Research Center
[NASA-TM-84236] N82-24214
SCHNECK, D. J.
On the aerodynamics of windblast
[AD-A110495] N82-25221
SEERY, J. A.
Conceptual design study for an advanced cab and visual system, volume 1
[NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2
[NASA-CR-166236] N82-25267
SENN, R. H.
Source assessment system
[AD-A111223] N82-25613
SEVESTRE, C.
La Recherche Aerospatiale, Bi-monthly bulletin, number 1981-6, November-December 1981
[ESA-TT-741] N82-26185
SHAH, C. G.
Finite element analysis of some aerospace shell structures
A82-33515
SHARANIUK, A. V.
Structural optimization of a swept wing on the basis of the aileron efficiency condition
A82-34145

SHAU, G.-C.
Transformation relations for singularity avoidance in three-dimensional trajectory optimization
A82-32137

SHYCOFF, D.
Transport aircraft crash dynamics
[NASA-CR-165851] N82-24186

SICLARI, M. J.
Study of VTOL in ground-effect flow field including temperature effect
[NASA-CR-166258] N82-25170

SILVA, W. A.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216

SKVORTSOV, E. V.
A study of the vibration loading of the turbine blades of an aircraft gas-turbine engine with dry-friction dampers
A82-34814

SLOOFF, J. W.
A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations
[AIAA PAPER 82-0935] A82-31922

SMALLWOOD, D.
Military aircraft - The way ahead
A82-34110

SMIRNOV, S. A.
Determination of the glide path of an aircraft with power off
A82-34154

SMITH, D. O.
The military helicopter market today and tomorrow
A82-34111

SMITH, E. G.
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193

SMITH, M.
Source assessment system
[AD-A111223] N82-25613

SMITH, R. H.
Problems in correlation caused by propulsion systems
N82-25202

SMITHMEYER, M. G.
Wind-tunnel wall interference corrections for three-dimensional flows
A82-32847

SOKOL, S.
Airborne lidar measurements of the Soufriere eruption of 17 April 1979
A82-33657

SPINHIRNE, J. D.
Cloud top remote sensing by airborne lidar
A82-32920

SQUIRE, L. C.
Turbulent boundary-layer development on a two-dimensional aerofoil with supercritical flow at low Reynolds number
A82-34398

SRIDHAR, M. K. C.
Primary sewage treatment plant as a source of bird hazards at airport
A82-33523
Primary sewage treatment plant as a source of bird hazards at airport
N82-26184

STAHL, H.
The problem of calculation of the flow around helicopter rotor blade tips
[MBB-UD-330-81-O] N82-25233

STALLINGS, R. T.
Beyond 2000 - The airlift challenge ahead
[AIAA PAPER 82-0815] A82-31988

STAMPS, F. M.
Electronic Warfare Avionics Integration Support Facility support processor
[AD-A111641] N82-25249

STARKMAN, E.
The U.S. airline industry - En route to deregulation
A82-33920

STARKS, S. A.
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 1
[AD-A110862] N82-24188
Marine Air Traffic Control and Landing System (MATCALS Investigation), volume 2
[AD-A110863] N82-24189

STARR, R. L.
Conceptual design study for an advanced cab and visual system, volume 1
[NASA-CR-166235] N82-25266
Conceptual design study for an advanced cab and visual system, volume 2
[NASA-CR-166236] N82-25267

STAUFENBIEL, R.
A unified and generalized definition of static longitudinal stability in aircraft
A82-32135

STEARNS, M.
Cost/benefit studies of advanced materials technologies for future aircraft turbine engines: Materials for advanced turbine engines
[NASA-CR-167849] N82-25258

STEINER, J. E.
Commercial transport developments for the 1980's
A82-34109

STEINKE, R. J.
STGSTK: A computer code for predicting multistage axial flow compressor performance by a meanline stage stacking method
[NASA-TP-2020] N82-25250

STEINLE, F. W., JR.
Tunnel-to-tunnel correlation
N82-25200

STEPHENS, D. G.
An experimental investigation of the flow field of an ejector wing design employing a photon correlation laser velocimeter
[AD-A111134] N82-24182

STEPHENS, J. R.
A status review of NASA's COSAM (Conservation Of Strategic Aerospace Materials) program
[NASA-TM-82852] N82-24326

STOLIAROV, G. I.
Hysteresis of the normal force of a wing of complex planform under unsteady motion
A82-34157

STRACK, C. W.
Electronic Warfare Avionics Integration Support Facility support processor
[AD-A111641] N82-25249

STRACK, W. C.
Future propulsion opportunities for commuter airplanes
[NASA-TM-82880] N82-24203

STUBBS, S. M.
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193

SUDAKOV, G. G.
Detached flow past V-shaped low-aspect-ratio wings
A82-34136

SULLINS, G. A.
Numerical investigation of supersonic base flow with parallel injection
[AIAA PAPER 82-1001] A82-31960

SUNDARAM, P.
Calculation of the flow-field velocities of a wing-body-stores combination in transonic flow
[AIAA PAPER 82-0958] A82-31934

SUZUKI, A.
Hydrogen economy assessment for long-term energy systems in Japan
A82-32159

SWAIN, R. L.
Status of the National Transonic Facility
N82-25197

SYVERSON, H. T.
Fuel quality processing study, volume 1
[NASA-CR-165327-VOL-1] N82-24649

SZAMOSSI, M.
A review and assessment of fatigue crack growth rate relationships for metallic airframe materials
A82-34879

SZECHENYI, E.
Aeroelasticy of compressor blades: Subsonic stall flutter
N82-26189

T

TAILLET, J.
Aircraft lightning protection
A82-33544
Instrumentation for testing aircraft antistatic protection
[ONERA, TP NO. 1982-7] A82-34495

TALAY, T. A.
Solar-powered airplane design for long-endurance, high-altitude flight
[AIAA PAPER 82-0811] A82-31984

TAN, C. K. W.
Shock associated noise of supersonic jets from convergent-divergent nozzles
A82-32202

TANNA, H. K.
Shock associated noise of supersonic jets from convergent-divergent nozzles
A82-32202

TANNER, J. A.
Tire tread temperatures during antiskid braking and cornering on a dry runway
[NASA-TP-2009] N82-24193

TAPAVICZA, M.
Mechanical properties of hot isostatic pressed P/M-titanium for helicopter components
[MBB-UD-324-81-0] N82-25383

TAYLOR, R. L.
Source assessment system
[AD-A111223] N82-25613

THAMES, F. C.
Generation of three-dimensional boundary-fitted curvilinear coordinate systems for wing/wing-tip geometries using the elliptic solver method
A82-33318

THOMAS, J. L.
Subsonic 3-D surface panel method for rapid analysis of multiple geometry perturbations
[AIAA PAPER 82-0993] A82-31954

TOBAK, M.
Three-dimensional separation and reattachment
[NASA-TM-84221] N82-24167

TRETIAKOVA, I. V.
Transonic flow past bodies of the type wing-fuselage with allowance for boundary effects
A82-34166

TRIPPE, J. C.
Investigation of the application of a cryogenic blending process to produce antimisting diesel fuels
[AD-A110917] N82-25399

TROTH, D. L.
Low NOx heavy fuel combustor concept program
[NASA-CR-165367] N82-25635

TULAPURKARA, E. G.
Downwash behind a wing with spanwise blowing
A82-33514

TURCHANNIKOV, G. I.
Instability effects on pylon and engine loading in an aircraft with high-aspect-ratio wings
A82-34163

TURNER, M. D.
Applications of a multiplexed GPS user set
A82-33050

TYSELL, L. G.
The FFA wing body 81 computer program. A panel method for determination of aerodynamic characteristics at subsonic and supersonic speeds
[FFA-TN-AU-1601] N82-25230

U

URBAN, L. A.
Gas path analysis of commercial aircraft engines
N82-25184

USHAKOV, M. V.
Method for the measurement of elastic deformations of aircraft models in a wind tunnel
A82-34162

V

VAHL, W. A.
Experimental determination of flow-interference effects of wing-mounted, two-dimensional, full-capture propulsion nacelles in close proximity to a vehicle body at a Mach number of 6
[NASA-TM-83287] N82-25217

VALDONI, F.
Round table discussion on the transfer of results from the project "Aids to navigation and control of air traffic"
[PUB-20-ATC-1981] N82-24192

VALID, R.
Trends in structural analysis at ONERA
[ONERA, TP NO. 1982-2] A82-34491

VALTIERRA, M. I.
Impact study of synthetic and alternative fuel usage in Army aircraft propulsion systems
[AD-A111046] N82-24355

VAN DER KOLK, J. T.
A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations
[AIAA PAPER 82-0935] A82-31922

VAN DER VOOREN, J.
A system for the numerical simulation of sub- and transonic viscous attached flows around wing-body configurations
[AIAA PAPER 82-0935] A82-31922

VANDEN-BROECK, J. M.
Nonlinear two-dimensional sail theory
[AD-A110450] N82-25220

VANDEN-BROECK, J.-M.
Contact problems involving the flow past an inflated aerofoil
A82-34851

VANDENBERG, D.
Comparison of boundary layer calculations for the root section of a wing. The September 1979 Amsterdam Workshop test case
[NLR-MP-80028-U] N82-25232

VANDERVOOREN, J.
Modified version of LTRAN2: A calculation method for inviscid transonic flow about thin airfoils in moderately slow unsteady motion
[NLR-TR-80059-U] N82-25231

VANGOOL, M. F. C.
Roll response criteria for transport aircraft with advanced flight control systems in the landing approach and touchdown
[NLR-TR-80103-U] N82-25265

VANVELZEN, G. C.
The vibratory behavior of a rotating propeller shaft. Part 4: Vibration tests of a rotating propeller shaft in a rubber stern tube bearing
[IWECO-5072208-81-PT-2] N82-24514

VARGHESE, N. K.
Hypersonic interactions with surface mass transfer. I - Steady flow over a slender wedge wing
[AIAA PAPER 82-0979] A82-31944

VERDIER, M.
Accounting for thickness effects in the calculation of subcritical unsteady aerodynamic forces: Application to wing-fuselage interactions
[SNIAS-821-111-106] N82-24183

VERHOFF, A.
The equivalent simple body /ESB/ method for transonic wing analysis
[AIAA PAPER 82-0936] A82-31923

VILLENEUVE, A. T.
Radiating elements for hemispherically scanned arrays
A82-32992

VIRA, N. R.
Closed-form solutions of supersonic wing-body interference
A82-33120

VISWANATH, G. K.
Primary sewage treatment plant as a source of bird hazards at airport
A82-33523
Primary sewage treatment plant as a source of bird hazards at airport
N82-26184

VISWANATH, S.
Finite element analysis of some aerospace shell structures
A82-33515

VIVIAND, H.
A new method for constructing two-dimensional orthogonal and non-orthogonal meshes
A82-33630

VOERSMANN, P.
Ground speed measurement from DME/VHF omnirange navigation (VOR) data
N82-25185

VOZHDAEV, V. S.
Periodic boundary value problem for the equations of the harmonic oscillation of a rotor blade about the axis of a flapping hinge
A82-34127

W

WALLER, P.
Gathering and analysing data on the British Airways Boeing 757 aircraft
N82-25186

WANG, B. P.
Structural modification to achieve antiresonance in helicopters
A82-32849

WANG, T.
Aerodynamic coefficient identification of time-varying aircraft system and its application
A82-34645

WANG, Y.
Experimental study on discharge and loss coefficients of combustor swirlers
A82-34644

WARD, P. W.
Applications of a multiplexed GPS user set
A82-33050

WARREN, S. M.
Fireproof brake hydraulic system
[AD-A111319] N82-25245

WARWICK, G.
Forward-swept-wing technology
A82-33309

WATERS, P.
Investigation of the application of a cryogenic blending process to produce antimisting diesel fuels
[AD-A110917] N82-25399

WATSON, J. J.
Elastic deformation effects on aerodynamic characteristics for a high-aspect-ratio supercritical-wing model
[NASA-TM-83286] N82-25214

WEATHERILL, W. H.
A harmonic analysis method for unsteady transonic flow and its application to the flutter of airfoils
[NASA-CR-3537] N82-25194

WEINREICH, H. L.
New developments in the field of ramjet missile propulsion
[MBB-UR-516-81-O] N82-25260

WEITZEN, W.
Investigation of the application of a cryogenic blending process to produce antimisting diesel fuels
[AD-A110917] N82-25399

WELLS, J. W.
Value of survivability and recoverability of flight data recorders
N82-25188

WELLS, W. D.
Value of survivability and recoverability of flight data recorders
N82-25188

WERLE, H.
Flow visualization techniques for the study of high incidence aerodynamics
[ONERA, TP NO. 1982-5] A82-34493

WHITE, R. E.
Analysis of transient data from aircraft gas turbine engines using AIDS
N82-25189

WHITENER, A.
V/STOL tilt rotor research aircraft. Volume 1: General information, revision C
[NASA-CR-166347] N82-24194

WHITTLE, F.
Gas turbine aero-thermodynamics with special reference to aircraft propulsion
A82-33650

WIGGS, J. F.
Cost and fuel consumption per nautical mile for two engine jet transports using OPTIM and TRAGEN
[NASA-CR-168973] N82-25239

WILBERS, L.
Cost/benefit studies of advanced materials technologies for future aircraft turbine engines: Materials for advanced turbine engines
[NASA-CR-167849] N82-25254

WILLIAMS, M. H.
Diffraction by a finite strip
A82-33605

WILLIAMS, R. M.
X-wing and the Navy V/STOL initiative
A82-33915

WILLIAMS, W. J.
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft from 1 January 1962 to 30 June 1981
[AD-A110660] N82-25243

WILMOTH, R. G.
Aerodynamic interactions with turbulent jet exhaust plumes
A82-33325

WILSON, J.
Mechanical and metallurgical considerations in extending the life of turbine blades
A82-33855

WINANT, J. H.
Business jets to agricultural aircraft - An overview of general aviation
A82-34123

WITTLIN, G.
Transport aircraft crash dynamics
[NASA-CR-165851] N82-24186

WITTMEYER, H.
Parameter identification for structures with neighboring natural frequencies especially for the case of flight resonance tests
A82-32136

WOERNDLE, R.
Calculation of the cross section properties and the shear stresses of composite rotor blades
[MBB-UD-334-81-O] N82-25334

WOLAK, J.
An experimental investigation of interfacial temperatures in blade-seal material rubbing of aircraft compressors
[AIAA PAPER 82-0890] A82-31891

WOODCOCK, D. L.
The determination of critical flutter conditions of nonlinear systems
[RAE-TM-STRUCT-986] N82-24210

WU, C.
Calculation of the lift distribution and aerodynamic derivatives of quasi-static elastic aircraft
A82-34639

WU, C. H.
Unconventional internal cracks. II - Method of generating simple cracks
A82-34061

Y

YAROS, S. F.
Evaluation of two analytical methods for the prediction of inlet flow fields in the vicinity of generalized forebodies
[AIAA PAPER 82-0959] A82-31935

YATES, E. C., JR.
Subsonic aerodynamic and flutter characteristics of several wings calculated by the SOUSSA P1.1 panel method
[NASA-TM-84485] N82-25216

YOUNGBLOOD, J. W.
Solar-powered airplane design for long-endurance, high-altitude flight
[AIAA PAPER 82-0811] A82-31984

Z

ZAGAICHUK, V. L.
Automation of the synthesis of control in a stationary linear system
A82-34464

ZAMULA, G. N.
Solution of creep problems by a finite element method
A82-34172

ZARETSKY, E. V.
Development of high-speed rolling-element bearings. A historical and technical perspective
[NASA-TM-82884] N82-24497

ZERNICKI, E.
Measuring LF and HF antenna radiation patterns by means of a helicopter
A82-34772

ZHANG, C.
Experimental study on discharge and loss coefficients of combustor swirlers
A82-34644

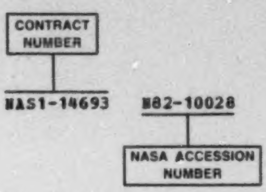
ZHUK, A. N.
Hysteresis of the normal force of a wing of complex planform under unsteady motion
A82-34157

ZINN, B. T.
Development of an analytical technique for the optimization of jet engine and duct acoustic liners
[NASA-CR-169002] N82-25256

ZOHAR, S.
Outline of a multiple-access communication network based on adaptive arrays
A82-34607

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 1123 N82-25270
AF PROJ. 1347 N82-25827
AF PROJ. 2059 N82-25424
AF PROJ. 2307 N82-25404
N82-25545
AF PROJ. 2308 N82-25259
AF PROJ. 2363 N82-26005
AF PROJ. 2401 N82-25827
AF PROJ. 2505 N82-25402
AF PROJ. 3048 N82-25488
AF PROJ. 3145 N82-25245
AF PROJ. 4303 N82-25613
AF-AFOSR-80-0258 A82-31972
AF-AFOSR-81-0037 A82-34538
AF-AFOSR-0141-81 N82-24198
AF-AFOSR-3706-78 N82-25221
A76/AH/134 N82-24514
DA PROJ. 1L2-62209-AH-76 N82-24199
DAAG29-79-C-184 A82-31958
DAAG29-80-C-0041 N82-25220
DAAG29-80-C-0092 N82-25263
DAAG46-76-C-0042 N82-24204
DAAG46-79-C-0102 N82-25521
DAAJ02-77-C-0027 N82-24199
DAAK70-81-C-0134 N82-25399
DE-AC01-80RA-5256 A82-34359
DE-AC04-76DP-00789 A82-33708
DE-AC13-76GJ-01664 N82-24620
N82-24629
N82-2463[illegible]
N82-2562[illegible]
DE-AC13-76GJ-03664 N82-24632
DE-AI01-77ET-13111 N82-24649
N82-24650
N82-25635
DEN3-148 N82-25635
DEN3-183 N82-24649
N82-24650
FMV-F-INK-82223-78-170-21-001 N82-25230
F08635-80-C-0088 A82-31934
F09603-80-G-3338-0011 N82-25249
F09603-80-G-3338-0012 N82-25248
F19268-72-C-0145 A82-32992
F30602-80-C-0040 N82-25613
F33615-76-C-3105 N82-25404
F33615-77-C-3121 A82-34879
F33615-79-C-0024 N82-26005
F33615-80-C-2026 N82-25245
F33615-80-C-2037 N82-25488
F336150-76-C-3105 N82-25545
NAG1-69 N82-25239
NAG1-133 N82-25256
NAG1-217 N82-24206
NAG2-82 A82-34359
NAG3-28 N82-24166
NAG3-48 N82-25516
NAS1-14472 A82-33571
NAS1-15810 A82-33571
NAS1-15957 N82-25194
NAS1-16083 N82-24186
NAS1-16205 N82-24168
N82-24169
NAS1-16572 A82-33571
NAS1-16579 N82-25236
NAS1-16617 N82-25215
NAS2-7800 N82-24194
NAS2-10085 N82-25040
NAS2-10464 N82-25266
N82-25267
NAS2-10645 N82-25170
NAS3-20074 N82-25254
NAS3-21997 N82-24202
NAS3-22148 A82-31933
NAS3-22550 N82-25257
NAS5-24242 A82-33120
NAS7-100 A82-32330
A82-34607
NCC1-14 A82-33571
NCC1-41 A82-31960
NGL-22-009-640 A82-33049
NIVR-1745 N82-25265
NIVR-1814 N82-25231
NSF MCS-79-27062 N82-25220
NSF-C-724 N82-24213
NSG-2384 A82-34359
NSG-3212 N82-25252
N82-25253
NSG-3266 A82-31965
NSG-3292 A82-33605
N00014-80-C-0199 A82-34359
N00019-76-MP-67811 A82-32330
N00019-81-0169 A82-31932
N00039-80-C-0032 N82-24188
N00140-80-C-2269 N82-24355
N00228-75-C-2080 N82-24188
N00228-76-C-2069 N82-24188
N00228-78-C-2233 N82-24188
N66314-73-C-0565 N82-24188
N66314-74-C-1362 N82-24188
N66314-74-C-1634 N82-24188
RB-RLD/78017 N82-25265
RB-RLD/78017/1 N82-25265
RB-RLD/79036 N82-25265
146-20-10-29 N82-25661
307-02-01 N82-25262
505-31-13-03 N82-25193
505-31-21 N82-24167
505-31-31 N82-24214
505-31-43-03 N82-25219
505-31-63-01 N82-25196
505-32-2 N82-24942
505-32-6A N82-25255
505-32-22 N82-25250
505-33-22 N82-24501
N82-24502
505-33-53-07 N82-25216
505-33-63-02 N82-24846
505-34-33 N82-24209
505-34-43-05 N82-24845
505-34-43-06 N82-25811
505-41-22 N82-24203
505-42-23-01 N82-25218
505-42-62 N82-24165
505-43-01 N82-25170
505-43-13-01 N82-24168
N82-24169
505-43-83-01 N82-25217
505-44-12 N82-24166
505-44-21 N82-24208
505-44-33-01 N82-24193
510-53-12 N82-25254
510-57-1B N82-24326
511-58-12 N82-25516
N82-25520
532-05-12 N82-24201
534-02-13-21 N82-25214
534-03-13-01 N82-24301
534-04-13-55 N82-25235

1. Report No. NASA SP-7037(152)	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle Aeronautical Engineering A Continuing Bibliography (Supplement 152)	5. Report Date September 1982 6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20545	10. Work Unit No. 11. Contract or Grant No.
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 338 reports, articles and other documents introduced into the NASA scientific and technical information system in August 1982.

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified - Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 104	22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NASA SP-7037(153)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 153)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in September 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB 141/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 535 reports, journal articles, and other documents originally announced in September 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche(1) of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-1	-2

A99 - Write for quote

1 Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2 Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.30
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.30
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	30.00	45.00

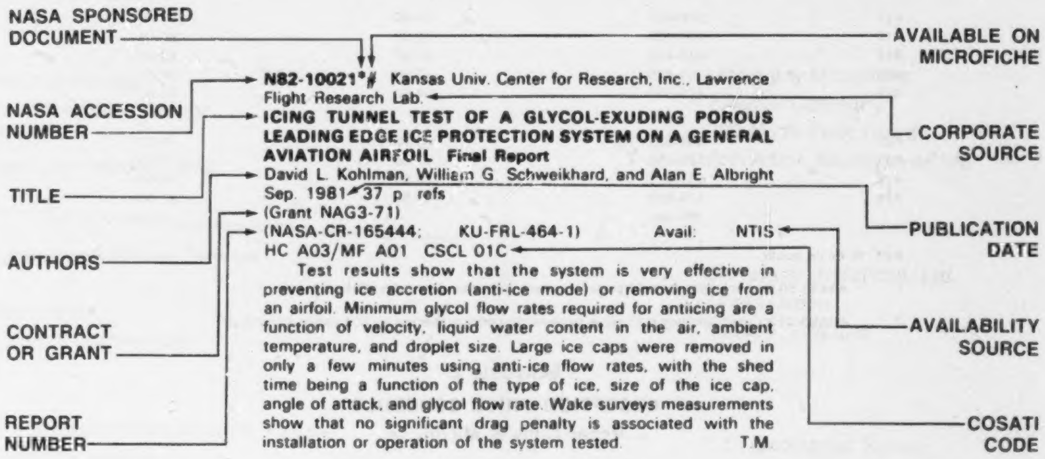
TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) **415**
STAR ENTRIES (N82-10000) **445**

Subject Index **A-1**
Personal Author Index **B-1**
Contract Number Index **C-1**

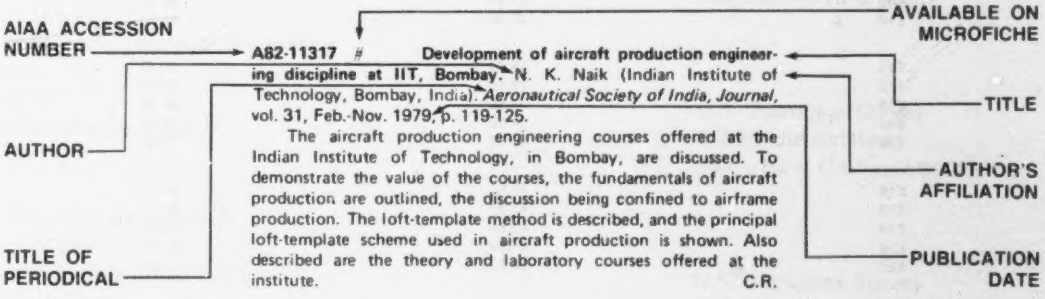
TYPICAL CITATION AND ABSTRACT FROM *STAR*


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHORS
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence Flight Research Lab.
ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report
David L. Kohlman, William G. Schweikhard, and Alan E. Albright
Sep. 1981 37 p refs
(Grant NAG3-71)
(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS
HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*


AIAA ACCESSION NUMBER
AUTHOR
TITLE OF PERIODICAL
AVAILABLE ON MICROFICHE
TITLE
AUTHOR'S AFFILIATION
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 153)

OCTOBER 1982

IAA ENTRIES

A82-34976 * # Selected results of the F-15 propulsion interactions program. L. D. Webb and J. Nugent (NASA, Ames Research Center, Edwards, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1041.* 15 p. 10 refs.

A better understanding of propulsion system/airframe flow interactions could aid in the reduction of aircraft drag. For this purpose, NASA and the United States Air Force have conducted a series of wind-tunnel and flight tests on the F-15 airplane. This paper presents a correlation of flight test data from tests conducted at the NASA Dryden Flight Research Facility of the Ames Research Center, with data obtained from wind-tunnel tests. Flights were made at stabilized Mach numbers around 0.6, 0.9, 1.2, and 1.5 with accelerations up to near Mach number 2. Wind-tunnel tests used a 7.5 percent-scale F-15 inlet/airframe model. Flight and wind-tunnel pressure coefficients showed good agreement in most cases. Correlation of interaction effects caused by changes in cowl angle, angle-of-attack, and Mach number are presented. For the afterbody region, the pressure coefficients on the nozzle surfaces were influenced by boattail angles and Mach number. Boundary-layer thickness decreased as angle of attack increased above 4 deg. (Author)

A82-34977 # Selection of a starting system for a low cost single engine fighter aircraft. W. F. Keller (Northrop Corp., Hawthorne, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1043.* 6 p.

Selection of a starting system for a low cost, single engine turbofan fighter aircraft requires identification of ground start alternatives, study of the need for airstart assist and, if the need is found, of available airstart alternatives. It also requires consideration of the special inflight starting requirements of turbofan engines, and evaluation of alternatives on the basis of appropriate design criteria. Review of turbofan engine inflight starting requirements led to the conclusion that the need for airstart assist is real but infrequent, and that multiple airstart assist is not required. Alternatives were identified using the morphological approach. Evaluation, on the basis of both quantitative (weight, volume, cost, etc.) and qualitative criteria (logistics, risk, flexibility, etc.), led to selection of an air turbine cartridge starter. The starter uses compressed air from a start cart as the ground energy source and hot gas from decomposition of hydrazine monopropellant liquid, stored in a sealed cartridge, as the inflight energy source. (Author)

A82-34978 * # Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility. J. L. Baer-Riedhart (NASA, Ames Research Center, Edwards, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1044.* 12 p. 7 refs.

A simplified gross thrust calculation method was evaluated on its ability to predict the gross thrust of a modified J85-21 engine. The method used tailpipe pressure data and ambient pressure data to predict the gross thrust. The method's algorithm is based on a one-dimensional analysis of the flow in the afterburner and nozzle. The test results showed that the method was notably accurate over the engine operating envelope using the altitude facility measured thrust for comparison. A summary of these results, the simplified gross thrust method and requirements, and the test techniques used are discussed in this paper. (Author)

A82-34979 # Ceramic component development for limited-life propulsion engines. D. W. Richerson and J. M. Wimmer (Garrett Turbine Engine Co., Phoenix, AZ). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1050.* 7 p. DARPA-supported research; Contract No. N00024-76-C-5352.

The use of ceramic materials for high-temperature components in gas turbine engines offers significant payoffs for a broad range of commercial and military applications. However, the task of integrating ceramics into advanced gas turbine engines represents a difficult challenge. In February 1976, the Ceramic Gas Turbine Engine Demonstration Program was initiated with the objective to meet this challenge. The engine selected for the demonstration was the Garrett Model T76 turboprop engine, a 715-horsepower engine whose various derivatives are used both for military and civil aircraft propulsion and as an industrial and marine engine. The turbine section was redesigned to use ceramic gas-path components. An increase of approximately 350 F in turbine inlet temperature was projected to increase engine output to 1000 horsepower and decrease specific fuel consumption by 10%. G.R.

A82-34980 # Energy efficient engine /E3/ technology status. W. B. Gardner (United Technologies Corp., Commercial Products Div., East Hartford, CT). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1052.* 10 p. 15 refs.

The Energy Efficient Engine (EEE) Technology program has the objective to establish the technology readiness of components and subsystems which could be utilized in turbofan engines in the late 1980's, early 1990's. A description is presented of the results of the supporting technology programs, the status and results of the component verification testing to date, and the possibilities for employing the developed technology in connection with the design of an energy efficient, environmentally acceptable engine for the 1990's. Attention is given to aspects of shroudless fan fabrication, the diffuser/combustor model, a combustor sector rig, an uncooled high-pressure turbine rig, supersonic high-pressure turbine cascades, a high-pressure turbine cooling model, aspects of high-pressure turbine leakage control, and subsonic cascades. G.R.

A82-34981 * # Turbine blade nonlinear structural and life analysis. R. L. McKnight, J. H. Laflen (General Electric Co., Cincinnati, OH), G. R. Halford, and A. Kaufman (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1056.* 9 p. 9 refs.

The utility of advanced structural analysis and life prediction techniques was evaluated for the life assessment of a commercial air-cooled turbine blade with a history of tip cracking. Three dimensional, nonlinear finite element structural analyses were performed for the blade tip region. The computed strain-temperature history of the critical location was imposed on a uniaxial strain controlled test specimen to evaluate the validity of the structural analysis method. Experimental results indicated higher peak stresses and greater stress relaxation than the analytical predictions. Life predictions using the Strainrange Partitioning and Frequency Modified approaches predicted 1200 to 4420 cycles and 2700 cycles to crack initiation, respectively, compared to an observed life of 3000 cycles. (Author)

A82-34982 * # Blade loss transient dynamic analysis of turbomachinery. M. J. Stallone, V. Gallardo, A. F. Storace, L. J. Bach, G. Black, and E. F. Gaffney (General Electric Co., Cincinnati, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1057.* 8 p. Contract No. NAS3-22053.

This paper reports on work completed to develop an analytical method for predicting the transient non-linear response of a complete aircraft engine system due to the loss of a fan blade, and to validate the analysis by comparing the results against actual blade loss test data. The solution, which is based on the component element method, accounts for rotor-to-casing rubs, high damping and rapid deceleration rates associated with the blade loss event. A comparison of test results and predicted response show good agreement except for an initial overshoot spike not observed in test. The method is effective for analysis of large systems. (Author)

A82-34992 * # Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor. G. Roffe, R. S. V. Raman (General Applied Science Laboratories, Inc., Westbury, NY), and C. J. Marek (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1072.* 10 p. 7 refs. NASA-supported research.

A study of the effects of secondary air addition on the stability and emissions of a gas turbine combustor has been performed. Tests were conducted with two types of flameholders and varying amounts of dilution air addition. Results indicate that NO(x) decreases with increasing dilution air injection, whereas CO is independent of the amount of dilution air and is related to the gas temperature near the walls. The axial location of the dilution air addition has no effect on the performance or stability. Results also indicate that the amount of secondary air entrained by the flameholder recirculation zone is dependent on the amount of dilution air and flameholder geometry. (Author)

A82-34993 # **Influence of airblast atomizer design features on mean drop size.** N. K. Rizk and A. H. Lefebvre (Purdue University, West Lafayette, IN). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1073.* 7 p. 15 refs.

Measurements of mean drop size, using the light-scattering technique, were carried out on eight different airblast atomizers. The liquids employed were water and kerosine. The test range included wide variations in atomizing air velocity, air pressure, and liquid and air flow rates, but the main objective was to examine the influence of scale and various design features on atomization performance. The results obtained show, for all types of airblast atomizer, that atomization quality is improved by increase in ambient air pressure, decrease in atomizer size, and by minimizing the angle of impact between the fuel jet and the high velocity air stream. (Author)

A82-34994 # **Numerical and experimental examination of a prevaporized/premixed combustor.** C. L. Proctor, II (Florida, University, Gainesville, FL) and A. M. Mellor. *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1074.* 11 p. 10 refs. USAF-sponsored research.

An experimental prevaporizing/premixing combustor configuration was examined numerically and experimentally. Non-reacting flow field calculations were made using the computer code 'CORA2'. Experimental evaluation of the combustor configuration was accomplished by extracting gas samples at discrete locations from within the combustor and analyzing them for unburned hydrocarbons (UHC), CO, CO2, and O2. These data were used to calculate local combustion efficiency and temperature. Contour plots were developed to interpret the gaseous flow field. Results indicate two distinct regions of combustion: one in the recirculation zone providing constant ignition of incoming air/fuel mixture, and another where vitiated air impinges on the burning air/fuel mixture downstream of the ignition source. (Author)

A82-34995 * # **Advancements in real-time engine simulation technology.** J. R. Szuch (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1075.* 9 p. 21 refs.
(Previously announced in STAR as N82-22915)

A82-34996 # **Transport engine control design.** J. F. Kuhlberg, J. Kniat, D. M. Newirth, J. C. Jamison, and J. R. Switalski (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1076.* 11 p. 7 refs.

A full authority digital electronic control was selected for the Pratt and Whitney Aircraft PW2037 turbofan transport engine. This control system will provide optimum engine performance and fuel economy, high operational reliability, minimum pilot workload, simplified control maintenance procedures, and maximum engine protection. A general description of the system is presented and benefits are discussed. (Author)

A82-34997 * # **Development of a helicopter rotor/propulsion system dynamics analysis.** W. Warmbrodt (NASA, Ames Research Center, Moffett Field, CA) and R. Hull (Systems Control Technology, Inc., Palo Alto, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1078.* 16 p. 12 refs.

A time-domain analysis of coupled engine/drive train/rotor dynamics of a twin-engine, single main rotor helicopter model has been performed. The analysis incorporates an existing helicopter model with nonlinear simulations of a helicopter turboshaft engine and its fuel controller. System dynamic behavior is studied using the resulting simulation which included representations for the two engines and their fuel controllers, drive system, main rotor, tail rotor, and aircraft rigid body motions. Time histories of engine and rotor RPM response to pilot control inputs are studied for a baseline rotor and propulsion system model. Sensitivity of rotor RPM droop to fuel controller gain changes and collective input feed-forward gain changes are studied. Torque-load-sharing between the two engines is investigated by making changes in the fuel controller feedback paths. A linear engine model is derived from the nonlinear engine simulation and used in the coupled system analysis. This four-state linear engine model is then reduced to a three-state model. The effect of this simplification on coupled system behavior is shown. (Author)

A82-34998 # **Analysis of two-dimensional internal flows using a primitive-variable relaxation Navier-Stokes procedure.** R. K. Scharnhorst (McDonnell Aircraft Co., St. Louis, MO). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1083.* 10 p. 18 refs. Research supported by the McDonnell Aircraft Co.

Accurate and economic internal flow analysis procedures are needed for the efficient design of suitable diffuser and nozzles in advanced fighter aircraft engines. The largely empirical conventional approach used for the design of such components is inefficient and time-consuming, and it might fail to produce optimal design solutions. The present study is concerned with the latest stages in the development of a primitive-variable, relaxation Navier-Stokes solution procedure. A two-dimensional version was developed primarily to become familiar with the involved technique. A two-dimensional analysis procedure can provide information regarding valuable performance trends of preliminary diffuser and nozzle designs. The computational time required for the implementation of the considered procedure was found to be significantly less than that of classical time dependent approaches, and no difficulties have been encountered for separated flows. G.R.

A82-34999 * # **NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status.** R. P. Lohmann (United Technologies Corp., Commercial Products Div., East Hartford, CT) and J. S. Fear (NASA, Lewis Research Center, Aerothermodynamics and Fuel Div., Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1088.* 12 p. 11 refs.

In connection with increases in the cost of fuels and the reduced availability of high quality petroleum crude, a modification of fuel specifications has been considered to allow acceptance of poorer quality fuels. To obtain the information upon which a selection of appropriate fuels for aircraft can be based, the Broad Specification Fuels Combustion Technology program was formulated by NASA. A description is presented of program-related investigations conducted by an American aerospace company. The specific objective of Phase I of this program has been to evaluate the impact of the use of broadened properties fuels on combustor design through comprehensive combustor rig testing. Attention is given to combustor concepts, experimental evaluation, results obtained with single stage combustors, the stage combustor concept, and the capability of a variable geometry combustor. G.R.

A82-35000 * # **NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status.** W. J. Dodds, E. E. Ekstedt, D. W. Bahr (General Electric Co., Aircraft Engine Business Group, Cincinnati, OH), and J. S. Fear (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1089.* 12 p. 14 refs.

A program is being conducted to develop the technology required to utilize fuels with broadened properties in aircraft gas turbine engines. The first phase of this program consisted of the experimental evaluation of three different combustor concepts to determine their potential for meeting several specific emissions and performance goals, when operated on broadened property fuels. The three concepts were a single annular combustor; a double annular combustor; and a short single annular combustor with variable geometry. All of these concepts were sized for the General Electric CF6-80 engine. A total of 24 different configurations of these concepts were evaluated in a high pressure test facility, using four test fuels having hydrogen contents between 11.8 and 14%. Fuel effects on combustor performance, durability and emissions, and combustor design features to offset these effects were demonstrated. (Author)

A82-35017 * # **In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8.** K. G. Mackall, P. L. Lasagna, K. Walsh (NASA, Ames Research Center, Edwards, CA), and J. H. Dittmar (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1120.* 9 p. 6 refs.

Acoustic data for the advanced-design SR-3 propeller at Mach numbers to 0.8 and helical tip Mach numbers to 1.14 are presented. Several advanced-design propellers, previously tested in wind tunnels at the Lewis Research Center, are being tested in flight at the Dryden Flight Research Facility. The flight-test propellers are mounted on a pylon on the top of the fuselage of a JetStar airplane. Instrumentation provides near-field acoustic data for the SR-3. Acoustic data for the SR-3 propeller at Mach numbers up to 0.8, for propeller helical tip Mach numbers up to 1.14, and comparison of wind tunnel to flight data are included. Flowfield profiles measured in the area adjacent to the propeller are also included. (Author)

A82-35018 * # **Interior noise considerations for advanced high-speed turboprop aircraft.** J. S. Mixson, F. Farassat, J. D. Leatherwood (NASA, Langley Research Center, Hampton, VA), R. Prydz, and J. D. Revell (Lockheed-California Co., Burbank, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1121.* 12 p. 25 refs.

This paper describes recent research on noise generated by high-speed propellers, on noise transmission through acoustically treated aircraft sidewalls and on subjective response to simulated turboprop noise. Propeller noise discussion focuses on theoretical prediction methods for complex blade shapes designed for low noise at Mach = 0.8 flight and on comparisons with experimental test results.

Noise transmission experiments using a 168 cm. diameter aircraft fuselage model and scaled heavy-double-wall treatments indicate that the treatments perform well and that the predictions are usually conservative. Studies of subjective comfort response in an anechoic environment are described for noise signatures having combinations of broadband and propeller-type tone components. (Author)

A82-35019 # An experimental investigation of S-duct diffusers for high-speed propfans. B. H. Little, Jr. and W. S. Trimboli (Lockheed-Georgia Co., Marietta, GA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1123.* 9 p.

Wind tunnel test results are presented for three propfan engine installation diffuser configurations of the S-duct type, of which two were single-scoop designs having diffuser inlet throat/diffuser exit area ratios of 1.0 and 1.25, and the third, wrap-around design had a 1.25 area ratio. Of the two diffusers with a 1.25 area ratio, the wrap-around design performed better than a shaft-penetrating S-duct in both pressure recovery and static pressure rise, although the thickening of the inlet boundary layer to simulate measured propfan test profiles produced a 2% loss in total pressure recovery and increased distortion parameters several-fold for this design. Duct cross-sectional area distribution discontinuities inherent in simple drive shaft geometries were found to have no effect on diffuser performance. O.C.

A82-35020 # Selecting the best reduction gear concept for prop-fan propulsion systems. J. Godston (United Technologies Corp., Commercial Products Div., East Hartford, CT) and J. Kish (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1124.* 12 p. 8 refs.

A study of reduction gearboxes for application to prop-fan propulsion systems is presented in which 10 different reduction gear configurations are considered. Attention is given to the definition of gearbox technical requirements and of the screening process used in the selection of the more promising concepts. A detailed presentation is made of two typical prop-fan propulsion systems, of which one incorporates an in-line and the other an offset reduction gearbox. The inline systems studied are the splined and integral split path, star/star, compound planetary, layshaft, and planetary/planetary. Offset systems include the spur/-star, spur/planetary, compound idler, and spur/spur. These are evaluated with respect to cruise efficiency, internal or external pitch control, reliability, maintainability, weight, cost, degree of risk, acoustics, and degrees of component contrarotation and ease of scaling. O.C.

A82-35021 # Optimization of propeller blade shape by an analytical method. L. K. Chang and J. P. Sullivan (Purdue University, West Lafayette, IN). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1125.* 6 p. 12 refs.

Based upon the vortex lattice method and nonlinear programming procedures, the problem of predicting the optimum propeller-blade shape has been formulated and solved by maximizing the propulsive efficiency under the constraint of constant power consumption. The predicted optimum propeller blades with tip devices (proplets) show an ideal efficiency improvement of 1-6%. Comparisons of the angle of twist distributions for the optimized and unoptimized propeller blades are presented. (Author)

A82-35022 # PMUX - The interface for engine data to AIDS. J. A. Bluish and W. Lorenz (Bendix Corp., Energy Controls Div., South Bend, IN). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1127.* 10 p.

The propulsion multiplexer (PMUX) unit, a new component of the Aircraft Integrated Data System (AIDS), promises to improve the accuracy and reduce the weight of condition-monitoring equipment in commercial engines. PMUX will improve accuracy by packaging advanced technology pressure sensors within the electronic unit and by using digital signal conditioning - made more practical by placing the microprocessor near the engine sensors. To reduce weight, the PMUX system will replace multiconductor cables with a serial digital data link. This paper discusses typical design requirements and describes the approach used in a PMUX unit designed for the 747 Extended Upper Deck (EUD) aircraft. (Author)

A82-35023 # Charting propulsion's future - The ATES results. A. Adams and S. Parkola (United Technologies Corp., Government Products Div., West Palm Beach, FL). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1139.* 10 p. 5 refs. Contract No. N00019-80-C-0225.

The Advanced Technology Engine Studies (ATES) program was conducted to establish a coordinated government/industry long range propulsion plan for new aircraft systems envisioned through the year 2010. This paper presents results obtained in support of this long range planning effort. These efforts identified optimum engine design requirements (e.g. size, cycle, duty cycle, and maintenance goals), high payoff advanced technologies and engine development-/qualification plans for 15 specific fighter, bomber, transport and V/STOL weapon systems under investigation. The elements of the long range plan were selected to minimize the life cycle cost of future weapon systems while at the same time providing the engine performance necessary to meet advanced weapon system combat requirements. (Author)

A82-35024 # A methodology for planning a cost effective engine development. W. S. Willis (General Electric Co., Evendale, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1140.* 7 p.

The Advanced Tactical Attack Manned System (ATAMS) was chosen as a subject for an advanced technology engine study, whose objective was the development of a life cycle cost methodology for the exploration of alternative propulsion system design and development approaches. Development schedules were evaluated with respect to their impact on product reliability, durability and life cycle cost, for the case of a mixed flow augmented turbofan with 17,150-lb thrust rating, after consideration of this engine's estimated life cycle cost breakdown, failure rate models, operating and support cost breakdown, and relative development cost dependence on quality of testing. A long range propulsion development plan is suggested in light of study results. O.C.

A82-35025 # Propulsion system requirements for advanced fighter aircraft. J. H. Kamman and D. C. Perryman (McDonnell Aircraft Co., St. Louis, MO). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1143.* 9 p.

The mission requirements stipulated for the next generation of Air Force and Navy fighter aircraft suggest the design characteristics and performance capabilities needed in a new engine. Engine cycle optimizations have been performed with reference to both system life cycle cost and takeoff gross weight, in view of primary and alternate missions. Parametric sensitivity results indicate the relative impact of both the primary engine cycle variables and the various mission segments envisaged on aircraft takeoff gross weight. The fighter aircraft considered are an Air Force air superiority configuration in the 40,000-lb weight class, with a 300-nautical mile mission radius, and a 50,000-lb weight class Navy combat air patrol mission configuration with a 200-nautical mile combat radius. Attention is given to the penalties of using derivatives of existing engines, as well as an engine development timetable spanning the period from mid-1982 to 1993. O.C.

A82-35041 * # Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors. T. J. Rosfjord (United Technologies Research Center, East Hartford, CT) and D. Briehl (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1175.* 12 p. 6 refs.

An experimental program to investigate hardware configurations which attempt to minimize carbon formation and soot production without sacrificing performance in small gas turbine combustors has been conducted at the United Technologies Research Center. Four fuel injectors, embodying either airblast atomization, pressure atomization, or fuel vaporization techniques, were combined with nozzle air swirlers and injector sheaths, and evaluated at test conditions which included and extended beyond standard small gas turbine combustor operation. Extensive testing was accomplished with configurations embodying either a spill return or a T-vaporizer injector. Minimal carbon deposits were observed on the spill return nozzle for tests using either Jet A or ERBS test fuel. A more extensive film of soft carbon was observed on the vaporizer after operation at standard engine conditions, with large carbonaceous growths forming on the device during off-design operation at low combustor inlet temperature. Test results indicated that smoke emission levels depended on the combustor fluid mechanics (especially the mixing rates near the injector), the atomization quality of the injector and the fuel hydrogen content. (Author)

A82-35044 # Small turbine engine augmentor design methodology. T. E. Kuhn, H. C. Mongia, T. W. Bruce (Garrett Turbine Engine Co., Phoenix, AZ), and E. Buchanan (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1179.* 8 p. 14 refs.

This paper describes a design technique based on the use of semianalytical methods, along with a multidimensional aerothermal analysis that has been developed for application to small thrust-class engines. Partial validation of the technique is presented, utilizing existing data on spray injection and flow characteristics around typical flameholders. This improved technique has been used to design an augmentor for a small gas turbine engine in a thrust class of less than 1000 pounds. Typical predictions of internal profiles of fuel/air ratio, temperature, velocity, and combustion efficiency are presented for the final configuration selected for the afterburner. (Author)

A82-35045 # The F404 development program - A new approach. G. C. Rapp (General Electric Co., Lynn, MA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1180.* 14 p.

The experience gained during more than 10 years of F404 engine development is summarized. To achieve maximum results, engine objectives must be clearly defined to permit major design decisions and trade-offs during the initial design layouts. The prototype philosophy is considered a low-cost, effective method of demonstrating new engine features and configurations, as well as 'proof of concept'. It is pointed out that when the prototype is used, an adequate time period should be allowed for engine redesign prior to beginning a full-scale development program. Completing aerodynamic development before or shortly after beginning full-scale development permits concentration on the controls system and on durability development without frequent changes. It is also pointed out that the definition of engine failure modes requires a mix of test schedules to probe design sensitivity to various stimuli. C.R.

A82-35046 # **Development of engine operability.** T. J. Christie (United Technologies Corp., Government Products Div., West Palm Beach, FL). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1181.* 11 p.

An important criterion in connection with the selection of an engine for advanced aircraft weapon systems is related to operability. Good operability is the ability of the engine to perform flawlessly in all aspects of the mission. The various areas of engine operability are explored, taking into account potential design solutions for advanced engine systems. Aspects of engine airstarting capability are considered, giving attention to the compressor, the utilization of digital electronic control, and the bearing support system. The engine thrust response is discussed along with the solution of engine stall problems, taking into consideration fan and compressor, the augmentor, and control components. Problems related to the occurrence of nonrecoverable stall are also explored. It is pointed out that to ensure adequate engine operability for the next generation of air superiority fighters, it is imperative to modify the engine development program. The required changes are discussed. G.R.

A82-35047 # **Control of gas turbine power transients for improved turbine airfoil durability.** R. R. Sellers (United Technologies Corp., Government Products Div., West Palm Beach, FL). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1182.* 11 p.

It is noted that today's advanced military fighter engines are demonstrating thrust-to-weight ratios of 8 to 1 and that fighter engine requirements exceeding 10 to 1 are forecast. In practice, this increase in thrust-to-weight ratio has been achieved in large part by increasing the level of the combustor exit temperature. Low cycle fatigue has thus become a lift-limiting factor in turbine airfoils because of this increased combustor exit temperature and the increased number of major throttle transients. A test facility that can provide the engine data base necessary for improving turbine airfoil low-cycle-fatigue life predictions is described. C.R.

A82-35048 # **T700 - Modern development test techniques, lessons learned and results.** R. A. Dangelmaier (General Electric Co., Aircraft Engine Business Group, Lynn, MA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1183.* 10 p.

The testing of the T700 engine is discussed. The 300-hr model qualification test required the engine to withstand low cycle fatigue cycles, thermal cycles, ingestion of various objects and substances including liquid water, ice, sand, and birds, and to meet hot and cold start criteria. The engine was measured for overtemperature, smoke emission and corrosion susceptibility. Abusive vibration testing, inlet and exhaust system evaluation, and suction fuel system examination was also done. Pre-production engine ground and flight testing was done in a number of aircraft. This was followed by a two-year maturity/life verification program in order to further assure a high level of life, durability, reliability, and maturity at the time of production introduction in 1978. Accelerated endurance and accelerated mission testing was done. Problems uncovered and corrected during the testing are discussed. C.R.

A82-35049 # **Next generation trainer /NGT/ engine requirements - An application of lessons learned.** C. J. Bauer (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1184.* 7 p.

A new, four-step approach for turbine engine development is described, as well as the new Engine Structural Integrity Program (ENSIP). Instead of the former two-step qualification process including a preliminary flight rating test and a model qualification test, the new concept emphasizes definition and verification of field maintenance procedures and parts life limits. It includes an initial flight release, full flight release, initial service release, and operational capacity release, each of which is briefly described. ENSIP encompasses five tasks: (1) design information; (2) design analysis, component and materials characterization; (3) component and core engine testing; (4) ground and flight testing; and (5) product quality control and engine life management. The integration of the former procedure with the new concept and procedure is discussed. C.D.

A82-35067 # **A concept for light-powered flight.** L. N. Myrabo (BDM Corp., McLean, VA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1214.* 20 p. 22 refs.

The concept for an advanced flight transport vehicle propelled by variable cycle laser propulsion engines is described. The vehicle is designed for efficient propulsion both within the atmosphere (by momentum exchange) and in space (as a rocket). Pulsed laser power is absorbed directly into gaseous reaction propellants by electrical gas breakdown and inverse Bremsstrahlung. Small scale experiments on each key engine component have been performed, and their performance characteristics are known. Innovation results from the synergism of the various engine parts. The resultant system can demonstrate substantial performance improvements over conventional chemical thrusters and flight vehicle configurations - in a future era of plentiful beamed space power. (Author)

A82-35076 # **Aircraft fire safety research with antimisting fuels - Status report.** E. P. Klueg, B. C. Fenton, and S. L. Imbrogno (FAA, Technical Center, Atlantic City, NJ). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1235.* 26 p. 18 refs.

Laboratory tests have been developed which characterize the antimisting, filtration, and flammability properties and the degradation level of antimisting kerosene (AMK). Interrelations among rheological, physical, and flammability properties and production and compatibility characteristics of antimisting additives are discussed. Problems caused by addition of water to AMK are studied, as are the tendency of AMK to form gel under conditions of cold temperature and shear. AMK is found to provide very significant fire protection benefits under impact survivable crash conditions. Problems of in-line blending of antimisting additive FM-9 and of airframe fuel system hardware incompatibilities are surmountable. Turbine engines can operate on FM-9 and meet performance criteria provided the fuel is highly degraded, which does not present insurmountable problems. C.D.

A82-35077 # **Will hydrogen-fueled aircraft be safe.** G. D. Brewer (Lockheed-California Co., Burbank, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1236.* 6 p. 9 refs.

Analysis has shown that liquid hydrogen will be significantly safer than liquid methane and synjet, the other alternative fuels for aircraft. With LH2 there will be less risk of a major spill occurring in event of a crash in which passengers can survive the impact. If fuel is spilled, and assuming ignition does not occur, LH2 will not spread as far before it vaporizes, becomes buoyant, and dissipates in the atmosphere. If the spilled fuel is ignited, as will occur more than 80 percent of the time with any of the fuels, the resulting hydrogen fire will be of such short duration and will be confined to such a small area that the passenger survival rate can be expected to be much higher. (Author)

A82-35078 # **Icing conditions on sea level gas turbine engine test stands.** H. J. Willcocks (United Technologies Corp., Government Products Div., West Palm Beach, FL). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1237.* 7 p. 7 refs.

Engine icing conditions are discussed and various methods of icing prevention are compared. Icing can be caused by a drop in the static temperature within the engine inlet duct or by increase of relative humidity with increasing Mach number till saturation. Two types of icing exist, engine face icing and general stand icing, which includes engine face icing. Stand inlet heaters are found to provide the best solution to engine face and general stand icing, but are not cost-effective to use for icing alone. Engine running appears useful for engine face icing but is hazardous when general stand icing is present. An ice detector rig is described which will discriminate between the two types of icing, and so permit running the engine when appropriate. C.D.

A82-35079 # **Model test and full scale checkout of dry-cooled jet runup sound suppressors.** J. L. Grunnet (FluiDyne Engineering Corp., Minneapolis, MN) and E. Ference (U.S. Navy, Naval Facilities Engineering Command, Alexandria, VA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1239.* 12 p. 7 refs.

This paper describes the design, model testing and full-scale checkout of hush house type jet aircraft runup sound suppressors. This hush house concept features: complete enclosure of the aircraft, dry cooling of the exhaust sound suppressor even during afterburning, and adaptability of one enclosure to a variety of aircraft types. The comparison of model test data and full-scale checkout data (exhaust system temperatures, air flow rates and exhaust sound suppression) is emphasized in the paper. Also the extension of the concept to unusual aircraft designs and to dry-cooled engine test cells are covered. (Author)

A82-35080 * # **Increased capabilities of the Langley Mach 7 Scramjet Test Facility.** S. R. Thomas and R. W. Guy (NASA, Langley Research Center, Hampton, VA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1240.* 13 p. 15 refs.

An experimental research program which explored the potential for expanding the operating range of NASA Langley's Mach 7 Scramjet Test Facility is described. The facility uses electric arc-heated air as the test gas and is configured for testing airframe-integrated scramjet engine models at conditions duplicating flight velocities and temperatures. Previous scramjet testing in this facility was limited to a single simulated flight condition of Mach 6.9 at 115,300 ft. altitude.

The present arc heater research demonstrated that the facility can be used for scramjet testing at simulated flight conditions from Mach 4 (at altitudes from 77,000 to 114,000 ft.) to Mach 7 (at altitudes from 108,000 to 149,000 ft.). Flow quality was established from the uniformity of measured total temperature profiles. In addition, nitrogen oxide levels in the test stream were determined for relating engine test data to expected flight performance. The test frequency and reliability of the facility were also improved by a novel redesign of the heater downstream electrode and by defining limits for stable arc operation. (Author)

A82-35089 # **Characteristics of a side dump gas generator ramjet.** P. R. Choudhury (Southern California, University, Los Angeles, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1258*. 5 p. 7 refs. Grant No. AF-AFOSR-77-3354.

This paper deals with an experimental study of a small side dump gas generator ramjet whose geometric characteristics and flow field were changed parametrically to investigate the interaction of vortices and stable burning in the combustor. Vortices were perturbed and the size of the recirculation zone reduced by external means. The results show that the vortices at the head are crucial to stable and oscillation free operation. Axial fuel injection at the head and the introduction of swirl by canting the inlets tend to weaken the system of vortices at the head and thereby degrade the burner performance. Secondary vortices downstream of the dump plane are weak and cannot function properly without the recirculation zone at the head acting as a 'pilot flame'. A well designed side dump burner can operate satisfactorily at low IR and visible signatures in the exhaust. Although the burner was not choked at the exit plane, it is felt that the mutual interaction of vortices would not change significantly for the choked case and the conclusions from this study would aid in designing a real side dump propulsion system. (Author)

A82-35091 * # **A comprehensive method for preliminary design optimization of axial gas turbine stages.** R. M. Jenkins (Tuskegee Institute, Tuskegee, AL). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1264*. 11 p. 15 refs. Grant No. NsG-3295.

A method is presented that performs a rapid, reasonably accurate preliminary pitchline optimization of axial gas turbine annular flowpath geometry, as well as an initial estimate of blade profile shapes, given only a minimum of thermodynamic cycle requirements. No geometric parameters need be specified. The following preliminary design data are determined: (1) the optimum flowpath geometry, within mechanical stress limits; (2) initial estimates of cascade blade shapes; (3) predictions of expected turbine performance. The method uses an inverse calculation technique whereby blade profiles are generated by designing channels to yield a specified velocity distribution on the two walls. Velocity distributions are then used to calculate the cascade loss parameters. Calculated blade shapes are used primarily to determine whether the assumed velocity loadings are physically realistic. Model verification is accomplished by comparison of predicted turbine geometry and performance with four existing single stage turbines. C.D.

A82-35100 # **Individual bypass throttling in fighter engines.** H. Kuenkler (Industrieanlagen-Betriebsgesellschaft mbH, Ottobrunn, West Germany). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1285*. 9 p.

It is demonstrated that individual bypass throttling (IBT) by an independent bypass nozzle/throttle device is an attractive means of influencing partload specific fuel consumption characteristics in low bypass ratio turbofan engines, such as those of fighter aircraft, without introducing turbocomponent variable-geometry features. An IBT application is considered in which total engine pressure ratio as well as bypass ratio have been selected with a view to high thrust characteristics and optimum reheat conditions, while the low-partload specific fuel consumption was decreased by means of the IBT feature. The calculated total propulsive weight for both long-loiter and interception fighter missions shows that the more complex construction of a separate bypass nozzle will be compensated by the new engine design's efficiency. An 8% takeoff weight saving was attained by the IBT engine over a conventional design for the two missions considered. O.C.

A82-35101 # **Combat survivability in the Advanced Technology Engine Study /ATES/.** L. Throndson (U.S. Naval Weapons Center, China Lake, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1287*. 9 p.

The Advanced Technology Engine Study (ATES) has shown that the advanced tactical aircraft used as study baselines will have high survivability in year-2000 combat scenarios which include advanced missile threats in high densities. Reductions in radar cross section and infrared signature greater then 50%, however, are required for significant reductions in combat attrition losses. Cost studies indicate that configurations requiring extensive modification for low observables should be avoided, in favor of 15-year peacetime life cycle cost vehicles possessing low radar and infrared detectability features from the outset of design formulation. Attention is given to engine cycle, bypass configuration and nozzle design elements of infrared signature reduction, as well as requirements for radar cross section reduction in engine inlet and nozzle design. O.C.

A82-35102 # **Turbine stage heat flux measurements.** M. G. Dunn (Calspan Advanced Technology Center, Buffalo, NY) and J. L. Holt (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1289*. 8 p. 30 refs. Contract No. F33615-81-C-2017.

This paper describes an ongoing effort at Calspan designed to obtain detailed heat transfer data for a full-stage rotating turbine. A description of the accompanying analysis effort intended to define the range of validity of the various predictive methods is also presented. The experiments are performed using a shock tunnel as a short-duration source of heated air which is used to drive a test-section device containing the high-pressure stage of the Garrett TFE 731-2 turbine. The turbine is extensively instrumented with thin-film heat-transfer gauges. Heat-flux distributions have been obtained at the turbine design flow function and 100% corrected speed for values of the ratio of the wall temperature to the total temperature in the range of 0.2 to 0.3. (Author)

A82-35233 **Ultralight airplanes.** M. A. Markowski. *Scientific American*, vol. 247, July 1982, p. 62-68.

The typical design features and performance capabilities of ultralight aircraft, which incorporate a small reciprocating engine on a hang glider airframe and may be flown without a pilot's license, are described. Designs of this class, of which more than 10,000 were sold in 1981, generally have an empty weight of 200 lbs, a wingspan of more than 30 ft, and cruising and stalling speeds of 50 and 25 mph, respectively. Glide ratios better than 9:1 and 500 ft/min rates of climb have been achieved. After a brief historical account of ultralight-like aircraft development, attention is given to the aerodynamic and propulsion-system features of a variety of popular configurations. It is noted that great care must be taken by ultralight pilots of wind conditions, because of their crafts' high sensitivity to gusts. Extant ultralight configurations are illustrated with attention to performance-maximizing features. O.C.

A82-35256 **A laboratory mock-up ultrasonic inspection system for composites.** F. H. Chang (General Dynamics Materials Research Laboratory, Fort Worth, TX), J. R. Bell, A. H. Gardner, C. P. Fisher, and R. W. Haile. *Materials Evaluation*, vol. 40, June 1982, p. 756-761. Contract No. F33615-77-C-5206.

The use of advanced composite materials in aircraft structures offers distinct advantages in terms of reduced weight, increased performance, lower cost, and higher structural reliability. The complexity of the advanced composite structures increases the degree of difficulty for nondestructive testing (NDT) and inspection. The major NDT techniques for composite structure inspection are ultrasonics and radiography. In connection with requirements for the low-cost inspection of large areas for small flaws, a need exists for an in-service inspection system for composites which will record the flaw location in a pseudo real-time C-scan while minimizing the operator effort to attain a high level of inspection reliability. In 1978 a program was initiated with the aim to develop such an in-service inspection system (ISIS) for advanced composite aircraft structure. A description is given of a laboratory mock-up model of the ISIS. G.R.

A82-35257 **Acoustic emission in jet engine fan blades.** E. v. K. Hill (Clemson University, Clemson, SC) and D. M. Egle (Oklahoma, University, Norman, OK). *(American Society for Nondestructive Testing, Fall Conference, Atlanta, GA, Oct. 1981.) Materials Evaluation*, vol. 40, June 1982, p. 770-773. 10 refs. Contract No. F34601-78-C-2828.

Titanium alloys, in connection with their low density and, in general, good mechanical properties at high temperatures, are particularly popular for applications in high performance military aircraft. However, unfortunately these materials exhibit also low fracture toughness which can often lead to sudden failure of components without warning. An enhancement of nondestructive test procedures to reduce damage related to the failure of compressors in turbofan engines proved to be only partly successful. A test program was, therefore, developed for the study of flaw growth in fan blades using acoustic emission (AE). It was found through testing that AE can detect the presence of flaws even when conventional techniques cannot. Moreover, it can sense them long before they become critical. Therefore, it is believed that with a proper development program, acoustic emission could be the best nondestructive test technique for sensing flaws in jet engine fan blades. G.R.

A82-35278 # **F-14 inlet development experience.** R. H. Tindell, C. A. Hoelzer (Grumman Aerospace Corp., Bethpage, NY), and D. Alexander (U.S. Naval Air Systems Command, Washington, DC). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-5*. 11 p. Members, $2.00; nonmembers, $4.00.

The inlet control system of the F-14 fighter, which has demonstrated in-flight compatibility with the advanced F401-PW-400 and GE-F-101X engines, as well as the TF30 engine, is based on a simple concept that minimizes maintenance and maximizes reliability. The potential benefits of inlet and engine control integration are presently under study. The primary function of the air inlet control system is to position the three variable ramps in each inlet to some preset schedule of angles, so that ramp position is exclusively a function of Mach number. To achieve low total pressure distortion for static operation, total pressure recovery was intentionally lowered to minimize differences between average and minimum pressures. Analytical estimates of aircraft forebody effects on the inlet flow field, using a three-dimensional inviscid supersonic flow field code, are found to be close to wind tunnel test results. Suggestions are made in light of study determinations for more advanced inlet designs. O.C.

A82-35279 # The performance of centrifugal compressor channel diffusers. C. Rodgers (Solar Turbines, Inc., Turbomach Div., San Diego, CA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-10.* 13 p. 14 refs. Members, $2.00; nonmembers, $4.00.

The most important performance criteria influencing maximum diffusion capability are formulated through the analysis of test results, for single-stage centrifugal compressors having backswept impellers and channel-type diffusers. The diffuser types considered are pipe, splitter, tandem, profiled L/E, channel, and slotted. It is determined that for any given stage, state surge occurred near a constant mean stream velocity diffusion ratio between the impeller tip and diffuser throat. While this diffusion ratio reached a maximum number of 1.8 for impeller tip Mach numbers lower than unity, it was not unique for all stages and was more strongly associated with throat blockage accumulation as a function of diffusion rate. Results of experiments in the vaneless space illustrate the sensitivity of the influence of flow in that region on centrifugal compressor performance. O.C.

A82-35285 # Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow. M.-H. Cao (Beijing Institute of Aeronautics and Astronautics, Beijing, People's Republic of China), H.-K. Jiang, and J.-S. Chin. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-16.* 9 p. Members, $2.00; nonmembers, $4.00.

An improved flat-fan spray model is used for the semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow. The model assumes that, due to the aerodynamic force of the high-velocity cross air flow, the injected fuel immediately forms a flat-fan liquid sheet perpendicular to the cross flow. Once the droplets have been formed, the trajectories of individual droplets determine fuel distribution downstream. Comparison with test data shows that the proposed model accurately predicts liquid fuel distribution at any point downstream of a plain orifice injector under high-velocity, low-temperature uniform cross-stream air flow over a wide range of conditions. V.L.

A82-35287 # Casing wall boundary-layer development through an isolated compressor rotor. I. H. Hunter (Shell Research, Ltd., Chester, England) and N. A. Cumpsty (Cambridge University, Cambridge, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-18.* 13 p. 20 refs. Members, $2.00; nonmembers, $4.00.

A comprehensive series of measurements were made of the development of the casing wall boundary layer across an isolated compressor rotor having variable tip clearance with a view to revealing details of the flow phenomena. Time-averaged measurements of the outer-wall boundary layer downstream of the rotor were obtained using a conventional pressure probe, while a hot-wire anemometry technique yielded the three-dimensional blade-to-blade structure of the flow. The downstream boundary layer was found to thicken as the rotor blading and blade-end clearance were increased, with fluid tending to accumulate towards the pressure side of the passage. Results of the study should find application in multistage machines where the importance of casing boundary layers is particularly great. V.L.

A82-35288 # Secondary flows and losses in axial flow turbines. D. G. Gregory-Smith (Durham, University, Durham, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-19.* 4 p. 11 refs. Members, $2.00; nonmembers, $4.00.

A simple method is proposed for estimating secondary flow angles and losses in turbines which is suitable to form a subroutine of a larger design method. The secondary flow angles are calculated using classical secondary flow theory, while losses are estimated by identifying three sources of loss, calculating them independently, and adding them together. Initial results show that the method has the potential of yielding reliable estimates, while being much faster and easier to apply than viscous three-dimensional flow calculation methods. V.L.

A82-35289 # CFD technology for propulsion installation design - Forecast for the 80's. G. C. Paynter (Boeing Military Airplane Co., Seattle, WA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-21.* 8 p. 13 refs. Members, $2.00; nonmembers, $4.00.

One of the objectives of the present investigation is to provide an outline of the primary role of Computational Fluid Dynamics (CFD) in the aerospace industry and to clarify why CFD will be of increasing interest to industry in the 1980's. A second objective is to present current trends in CFD along with an explanation of these trends. Finally, key problem areas are defined which will pace the application of CFD technology by industry. In aircraft design procedures, the potential role of CFD is to minimize parametric model scale testing and use parametric analysis as the basis for configuration selection. Use of parametric analysis rather than parametric testing for design offers the advantages of reduced development cost, time, and risk. It also removes as a design contraint the existing test data base. Aspects of flow analysis technology development are discussed, taking into account numerics and mesh generation, turbulence modeling, and modeling and validation experiments. G.R.

A82-35290 # Smoke reduction in FJR-710 turbofan engines by an airblast combustor. K. Eguchi, A. Ishii (National Aerospace Laboratory, Chofu, Tokyo, Japan), K. Suzuki (Ministry of International Trade and Industry, Mechanical Engineering Laboratory, Ibaraki, Japan), K. Kitahara (Kawasaki Heavy Industries Co., Ltd., Hyogo, Japan), and T. Tagashira (Ishikawajima-Harima Heavy Industries Co., Ltd., Jet Engine Div., Tokyo, Japan). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-24.* 11 p. 18 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Ministry of International Trade and Industry of Japan.

An airblast fuel atomizer has been developed to reduce smoke emission levels in turbofan engines of the FJR-710 series. An annular combustor with the newly designed fuel atomizer was rig-tested in the presence of inlet airflow distortions over a wide range of inlet pressures and temperatures with a view to improving the combustor performance and reducing exhaust emissions through cowl and liner modifications. Smoke emission levels were below the visible limits for both main- and main/primary-fuel operations in the engine tests; levels at full-power conditions were found to meet the 1984 EPA standard for T2-class engines. There was no problem with flame instability or combustor durability. V.L.

A82-35292 # Thermal decomposition of aviation fuel. A. E. Peat (Rolls-Royce, Ltd., Derby, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-27.* 4 p. 5 refs. Members, $2.00; nonmembers, $4.00.

Thermal stressing of aviation fuels can promote the formation of fuel insoluble compounds. Their presence within the fuel system is troublesome to aviation gas turbine manufacturers as they can adversely affect engine performance. To study this phenomenon, an experimental program based on a fuel rig capable of reproducing relevant engine conditions and featuring an instrumented replica fuel injector feed arm was devised. The initial objectives are to rate quantitatively the effects of bulk fuel and metal temperatures, fuel flow rates, and fuel types on the production of fuel insoluble matter, both deposited and suspended. This report presents the initial results which indicate a relationship between the weight of 'tube' carbon deposits and a function of 'tube' metal temperature and fuel velocity. Further, this approach could provide an interface between the engine and laboratory test results. (Author)

A82-35293 # Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions. A. K. Jasuja (Cranfield Institute of Technology, Cranfield, Beds., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-32.* 7 p. 5 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Ministry of Defence (Procurement Executive).

The effects that air and fuel properties have upon the spray mean drop size characteristics of a plain-jet airblast atomizer of the type employed in the gas turbine engine are investigated. The tests used kerosene, gas oil and a high-viscosity blend of gas oil in residual fuel oil, and covered a wide range of ambient air pressures. Laser light-scattering technique was employed for drop size measurements. It is concluded that the atomizer's measured mean drop size characteristics are only slightly different from those of the pre-filming type, especially when operating on low-viscosity kerosene under higher ambient air pressure. The beneficial effect of increased levels of ambient air pressure on mean drop size is shown to be much reduced in the case of high-viscosity fuels, thus making the attainment of good atomization performance on such fuels difficult. An expression is derived for correlating the obtained mean drop size data. C.D.

A82-35294 # Fuel microemulsions for jet engine smoke reduction. D. W. Naegeli and C. A. Moses (Southwest Research Institute, San Antonio, TX). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-33.* 10

p. 11 refs. Members, $2.00; nonmembers, $4.00. Contract No. F08635-79-C-0213.

Soot formation in gas turbine engines continues to be a threat to the operation and performance of aircraft. A recent problem is related to the control of smoke emissions from jet engine test cell facilities. A concept of water-in-fuel emulsions for the purpose of reducing smoke emissions from jet engine test cells was developed. However, some basic problems were encountered with water-in-fuel macroemulsions. Recently, methods were developed for creating 'microemulsions' of water-in-fuel and of alcohol-in-fuel. The present investigation has the objective to determine if the microemulsion concept could be used as a viable method to reduce exhaust smoke from gas turbine engines. It was found that if it is possible to formulate microemulsions involving fuel blends of both JP-4 and JP-8 with ethanol (aqueous), methanol, and water. Ethanol (anhydrous) is soluble in JP-4 and JP-8. Effects of these blends on combustion performance are related to the reduction of soot formation, exhaust smoke, and nitrogen oxide concentration. G.R.

A82-35295 # Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry. U. Haupt and M. Rautenberg (Hannover, Universität, Hanover, West Germany). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-34.* 6 p. Members, $2.00; nonmembers, $4.00. Research supported by the Deutsche Forschungsgemeinschaft and Forschungsvereinigung Verbrennungskraftmaschinen.

Blade vibration measurements are carried out on a high-pressure, high-mass-flow, centrifugal compressor to determine the excitation mechanism in various operating ranges. Semiconductor strain gauges are used in the experiments, and an eight-channel telemetry system serves to transmit the signals. Blade vibration measurements are made for different operating ranges of the compressor, such as rotating stall and surge and flutter, and for the case of nonuniform flow conditions. The results of vibration tests with the impeller at rest show the stress distribution and the strain directions during blade vibration. This information is used for the choice of the strain gauge position on the blade. The experimental results are confirmed by a finite-element calculation considering a segment of the impeller with one blade, which determines the different vibration modes. In addition, the steady strain distribution of the impeller due to centrifugal force and temperature is calculated. The investigations are completed by optical measurements to find out the vibration modes of the different blades in rotating operation. The results reveal the various vibration modes of the blade up to a rotational speed of the compressor of 13,000 rpm. C.R.

A82-35296 # Acoustic control of dilution-air mixing in a gas turbine combustor. P. J. Vermeulen, J. Odgers (Université Laval, Quebec, Canada), and V. Ramesh (Calgary, University, Calgary, Alberta, Canada). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-35.* 12 p. Members, $2.00; nonmembers, $4.00. Natural Sciences and Engineering Research Council of Canada *Grant No. A-7801.*

A successful test carried out on a small combustor of normal design employing acoustic control of the dilution-air flows is described, noting that the combustor, even though tested at 'off-load' conditions, is much more representative of an engine combustor than the one described by Vermeulen and Odgers (1979). It is demonstrated that acoustic modulation of the dilution-air flows can be used to selectively and progressively control the exit plane temperature distribution. In particular, for an already good traverse quality, it is shown to be possible to trim the temperature profile; the results here are seen as sufficiently encouraging to warrant further development of the technique. It is thought that the study will contribute to the design of combustors in which a desired exit plane temperature distribution may be achieved. The acoustic drive is found to have no effect on the combustion efficiency. C.R.

A82-35298 # Experimental investigations on the flow in the impeller of a centrifugal fan. G. Caignaert, B. Desmet, and D. Stevenaert (Ecole Nationale Supérieure d'Arts et Métiers, Lille, France). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-37.* 6 p. 9 refs. Members, $2.00; nonmembers, $4.00.

A centrifugal research fan facility designed for pressure measurements on the impeller blades is described. Results of mean and fluctuating pressures are presented, showing the flow to be three-dimensional and rather unsteady. Also included is an analysis of rotating stall at low flow rates. The variations in the pressure distributions on the blade when the flow is varied reveal the influence of the angle of attack all along the blade leading edge and the importance of a good design of the inlet part of the blade in order to obtain better characteristics. The analysis of pressure fluctuations shows the important interaction with the volute, despite a large gap between the volute tongue and impeller. C.R.

A82-35299 # Small engine inlet air particle separator technology. H. L. Morrow and D. B. Cale (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-40.* 7 p. 18 refs. Members, $2.00; nonmembers, $4.00.

In connection with Army operations involving an employment of the newly developed airmobile concept, it was found that engine erosion problems, related to an ingestion of sand and dust, limited the average operational life of helicopter gas turbine engines to about 300 hours. A number of programs were initiated with the aim to study approaches for solving the corrosion problem. The Army finally elected to solve the problem by having the engine manufacturer develop the inlet protection system as part of the engine. This approach insures adequate development testing of the protection system concurrent with normal engine development and precludes quick-fix, after-the-fact development. It also results in the inclusion of the inlet protection system and its losses in the basic engine weight, volume, and performance. G.R.

A82-35300 # Conversion of centrifugal compressor performance curves considering non-similar flow conditions. W. Fister (Bochum, Ruhr-Universität, Bochum, West Germany) and J. Kotzur (Maschinenfabrik Augsburg-Nürnberg AG, Oberhausen, West Germany). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-42.* 14 p. 22 refs. Members, $2.00; nonmembers, $4.00.

A detailed flow model of a radial compressor stage has been used to develop a new conversion method which makes it possible to consider, with few measurements, the effect of the most important parameters, such as Mach and Reynolds numbers, on energy transfer in the stage and flow losses. The new method is shown to provide a convenient, time-saving and sufficiently accurate way of converting performance characteristics within relatively wide ranges of peripheral Mach numbers and Reynolds numbers. Performance curves converted using the proposed method are presented and compared to measured values. V.L.

A82-35301 # On the influence of the number of stages on the efficiency of axial-flow turbines. G. Lozza, E. Macchi, and A. Perdichizzi (Milano, Politecnico, Milan, Italy). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-43.* 10 p. 12 refs. Members, $2.00; nonmembers, $4.00.

A computer code able to optimize significant design variables of a multi-stage axial-flow turbine is described, and the selection of optimizing design variables, constraint assumptions within which the solution is searched, and the optimization procedure used, are discussed. Losses are predicted by the Craig and Cox (1971) correlation. The design and performance prediction of a number of representative turbines is accomplished by a computer program, and similarity parameters are introduced to generalize the results obtained after a discussion of their physical significance for a multistage turbine's compressible flow. Turbine stage number influence on overall turbine efficiency is derived as a function of expansion ratio, specific speed and turbine dimensions. O.C.

A82-35302 # Secondary flow mixing losses in a centrifugal impeller. M. W. Johnson (Liverpool, University, Liverpool, England) and J. Moore (Virginia Polytechnic Institute and State University, Blacksburg, VA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-44.* 9 p. 13 refs. Members, $2.00; nonmembers, $4.00. Research supported by Rolls-Royce, Ltd.

A 'jet-wake' pattern has been observed in studies of outlet flows from centrifugal impellers. However, although impeller geometry, flow rate, and operating speed are known to influence the size and position of the wake, wake flows cannot be predicted reliably by current design methods. An improvement regarding the understanding of the wake flow would, therefore, be helpful in connection with efforts to optimize the performance of centrifugal compressors. In order to predict the development of the wake, it is necessary to investigate in detail the secondary flows which contribute to the thickening of the boundary layers on the suction surface and shroud walls. The present investigation is concerned with the determination of the flow phenomena which influence the development of the wake and its size and location in the impeller discharge flow. It is found that the secondary flows strongly influence the position of the wake in the outlet plane of a centrifugal impeller. G.R.

A82-35303 # The influence of flow rate on the wake in a centrifugal impeller. M. W. Johnson (Liverpool, University, Liverpool, England) and J. Moore (Virginia Polytechnic Institute and State University, Blacksburg, VA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-45.* 8 p. 11 refs. Members, $2.00; nonmembers, $4.00. Research supported by Rolls-Royce, Ltd.

A description is presented of the results of measurements made in a de Havilland Ghost centrifugal impeller running at low speed (500 rpm). All three mutually perpendicular components of relative velocity and the rotary stagnation pressure were measured on five cross-sectional planes between the inlet and the outlet of the impeller for three different flow rates. It was found that significant total pressure losses occur in two regions of the impeller, including the suction-side/-shroud corner region in the inducer at both the 'below design' and 'design' flow rates, and the final radial section of the impeller at all three flow rates. The losses in the inducer are the result of an adverse pressure gradient in the streamwise direction in the suction-side/shroud corner region, which causes the separation of the boundary layer. The separation point moves downstream as the flow rate is increased, until, at the 'above design' flow rate, separation losses are entirely avoided in the inducer. G.R.

A82-35304 # Secondary flow effects and mixing of the wake behind a turbine stator. A. Binder and R. Romey (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Antriebstechnik, Cologne, West Germany). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-46.* 9 p. 16 refs. Members, $2.00; nonmembers, $4.00.

The increase in secondary flow effects of highly loaded turbines with large hub/tip ratios is investigated for the case of a single-stage turbine with cold air flow, whose stator was designed for transonic flow and has a hub/tip ratio of 0.756. After taking measurements without the rotor in several sections behind the turbine stator, with attention to wake mixing and secondary vortices, the magnitude of the mixing losses is derived from the distributions of total pressure loss coefficient and flow direction. The position, intensity structure and development of secondary vortices are also obtained. Complementary five-hole probe measurements confirm the earlier, two-dimensional measurement results. O.C.

A82-35306 # The low temperature properties of aviation fuels. G. Brunton, R. R. Willock, and M. A. Voisey (Shell Research, Ltd., Thornton Research Centre, Chester, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-48.* 10 p. 15 refs. Members, $2.00; nonmembers, $4.00.

In connection with easing major constraints regarding the aviation fuel market in connection with increasing fuel demands and decreasing supplies, it is desirable to identify ways of moderating specification requirements which will enhance flexibility, but at the same time maintain product quality. One of the important specification requirements that can constrain fuel availability is the freezing point. A description is presented of research into the low-temperature properties of aviation fuels conducted by a major oil company. Attention is given to the need to define the low-temperature specification requirement, tank studies, the effect of fuel composition on low-temperature properties, current efforts, and the consequences of utilizing a flow-related low-temperature specification requirement. G.R.

A82-35307 * # Deposit formation in hydrocarbon fuels. R. Roback, E. J. Szetela, and L. J. Spadaccini (United Technologies Research Center, East Hartford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-49.* 9 p. 9 refs. Members, $2.00; nonmembers, $4.00. Contract No. NAS3-22277.

The hydrocarbon fuels RP-1, commercial-grade propane, JP-7 and chemically pure propane were subjected to tests in a high pressure fuel coking apparatus in order to evaluate their thermal decomposition limits and carbon deposition rates in heated copper tubes. A fuel thermal stability parametric evaluation was conducted at 136-340 atmospheres, bulk fuel velocities of 6-30 m/sec, and tube wall temperatures of 422-811 K, and the effect of inside wall material on deposit formation was evaluated in tests using nickel-plated tubes. Results show RP-1 deposit formation at wall temperatures between 600 and 800 K, with peak deposit formation near 700 K. Substitution of deoxygenated JP-7 for RP-1 showed no improvement, and the carbon deposition rates for propane fuels were found to be higher than those of either of the kerosene fuels. Nickel plating of the tube walls significantly reduced RP-1 carbon deposition rates. O.C.

A82-35310 # Development and application of Dabber gas tungsten arc welding for repair of aircraft engine, seal teeth. J. F. Rudy (General Electric Co., Aircraft Engine Business Group, Cincinnati, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-55.* 4 p. Members, $2.00; nonmembers, $4.00.

It has been recognized that the task of rebuilding worn seal teeth on rotating parts of gas turbine engine hardware is an important part of any program for the reduction of the operating costs of these engines. A procedure for performing the required repair operations for such a task is discussed. Attention is given to the development of a welding technique which places a minimum puddle volume and a small width build-up on top of a continuous narrow edge, to achieve a minimal heat affected zone and minimum shrinkage, in the absence of cold overlaps or other weld defects. A process which worked significantly better than other procedures investigated was to 'dab' the filler wire into the puddle or arc plasma zone. Aircraft gas turbine engine components with seal teeth repaired by the 'Dabber' welding method are now performing satisfactorily in commercial service. G.R.

A82-35311 # EAGLE - An interactive engine/airframe life cycle cost model. E. J. Reed, R. R. Horton, and J. B. Fyfe (United Technologies Corp., Government Products Div., West Palm Beach, FL). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-56.* 7 p. Members, $2.00; nonmembers, $4.00. Contracts No. N00019-80-C-0225; No. F33657-77-C-0403; No. F33657-78-C-0256.

The DOD is placing increased emphasis on procedures for predicting and tracking the cost of developing, procuring, and supporting weapon systems over their life cycles. The DOD has also begun to state weapon system requirements in terms of mission to be accomplished rather than specific hardware. The net effect of these and other similar DOD actions has been to require weapon system contractors to expand their system analysis capability to meet DOD requirements. A description has been presented of the Engine/Airframe Generalized Life Cycle Cost Evaluator (EAGLE) model, which has been developed by an American aerospace company primarily to evaluate the influence of engine design decisions on the total weapon system. To accomplish this, an adequate accounting and understanding of engine/airframe interaction, mission impact, engine performance, maintenance, and cost effects was a prerequisite. G.R.

A82-35312 * # Experimental study of external fuel vaporization. E. J. Szetela and J. A. TeVelde (United Technologies Research Center, East Hartford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-59* 8 p. 9 refs. Members, $2.00; nonmembers, $4.00. Contract No. NAS3-21971.

The fuel properties used in the design of a flash vaporization system for aircraft gas turbine engines were evaluated in experiments using a flowing system to determine critical temperature and pressure, boiling points, dew points, heat transfer coefficients, deposit formation rates, and deposit removal. Three fuels were included in the experiments: Jet-A, an experimental referee broad specification fuel, and a premium No. 2 diesel fuel. Engine conditions representing a NASA Energy Efficient Engine at sea-level take-off, cruise, and idle were simulated in the vaporization system and it was found that single phase flow was maintained in the heat exchanger and downstream of the throttle. Deposits encountered in the heat exchanger represented a thermal resistance as high as 1300 sq M K/watt and a deposit formation rate over 1000 gC/sq cm hr. C.D.

A82-35314 # Atomization quality of twin fluid atomizers for gas turbines. M. M. Elkotb, M. A. E. Mahdy (Cairo University, Cairo, Egypt), and M. E. Montaser (Egyptian Army, Egypt). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-61.* 10 p. 17 refs. Members, $2.00; nonmembers, $4.00.

The flow and atomization performance characteristics of external mixing twin fluid atomizers, which were tested over a wide range of geometries and operating conditions, are discussed. Attention is given to such factors as nozzle/needle diameter ratio, normal fuel area, cone angle, and droplet size distribution. It is found that the flow rate increases with nozzle/needle diameter ratio and fuel nozzle area, as well as with an increase of fuel pressure and decrease of air pressure. A dimensional relation is derived which accurately predicts flow number. Functions are also derived for droplet size distribution and Sauter mean diameter, which can together with that for flow number be used in the prediction of fuel concentration and heat release. O.C.

A82-35315 # The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine. G. W. Michel (Rolls-Royce, Ltd., Aero Div., Bristol, England) and F. H. Kost (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für experimentelle Strömungsmechanik, Göttingen, West Germany). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-63*10 p. 10 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Ministry of Defence (Procurement Executive).

In connection with plans for improving gas turbine efficiency by raising the operational temperature, an investigation has been conducted concerning the design of a suitable engine cooling procedure. The investigation involved a study of the aerodynamic penalties of coolant flow for various configurations of coolant flow. Tests were carried out to investigate the effect of coolant ejection through slots in the trailing edge of a turbine profile suitable for a small engine. In the considered case, the trailing edge thickness has to be large to accommodate the slot and a wall thickness which is mechanically strong enough on either side of the slot. It was found that the vortex shedding from the airfoil trailing edge has a very great effect on the airfoil efficiency at subsonic speeds, at least for airfoils with a thick trailing edge. The efficiency can be improved by the using of a trailing edge slot of certain characteristics. G.R.

A82-35316 # The use of performance-monitoring to prevent compressor and turbine blade failures. R. E. Dundas (Factory Mutual Research Corp., Norwood, MA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-66.* 14 p. Members, $2.00; nonmembers, $4.00.

It is noted that in nearly all cases the cause of complete failure in turbine blades is high-frequency fatigue. The three types of vibration that give rise to alternating loading, namely free vibration, forced vibration, and self-excited vibration (flutter), are discussed. It is recommended that manufacturers design blades in such a way that no critical resonances exist within the operating speed range. It is pointed out that no practical method exists for detecting vibration in a blade. The only way to avoid resonant vibration failures is to avoid conditions that produce abnormal circumferential flow distortion. A regular program of frequent performance analysis of compressors and gas turbines can serve to detect developing flow distortion. Uneven combustion can be detected from temperature differences between exhaust-area thermocouples. It is stressed that the occurrence of fatigue signifies a change in the system that should be corrected. C.R.

A82-35318 # Improved vane-island diffusers at high swirl. T. Jiang and T.-T. Yang (Clemson University, Clemson, SC). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-68.* 9 p. 7 refs. Members, $2.00; nonmembers, $4.00.

An experimental study is presented on the performance of vane-island diffusers at high swirl (lambda = 9). Results obtained for four sets of 14 straight vanes are compared with those obtained by Ryan and Yang (1980) for five sets of eight vanes. The 14-vane configuration results in a 40% reduction in pressure loss coefficient below that obtained with the eight-vane configurations, the lowest loss coefficients being obtained where the vane leading edge is at a radius equal to about 1.2 times the diffuser inlet radius. Results are presented in terms of (1) pressure rise versus radial location along the diffuser, (2) diffuser effectiveness versus flow coefficient, and (3) minimum pressure loss coefficient versus flow coefficient. O.C.

A82-35322 # Test facility and data handling system for the development of axial compressors. A. C. Reusch and S. Timberley (Ruston Gas Turbines, Ltd., New Products Div., Lincoln, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-73.* 9 p. Members, $2.00; nonmembers, $4.00.

The test installation and the data acquisition system used in the aerothermodynamic development of the axial compressor for a new Ruston 6-MW industrial gas turbine are described. Developments in instrumentation techniques are discussed. Processing of the data is outlined and data are presented for a typical graphical output. The merits of the flexibility achieved, both for the aerothermodynamic test facility and the data acquisition system, are discussed. The potential of the installation for the development of other axial compressors is outlined. (Author)

A82-35323 # Comprehensive analysis of an axial compressor test with adjustable guide vanes. C.-L. Chang, C.-H. Kuo, and S.-L. Sha (Marine Boiler and Turbine Research Institute, Harbin, People's Republic of China). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-74.* 7 p. 14 refs. Members, $2.00; nonmembers, $4.00.

Adjustment tests have been successfully conducted on a 12-stage single rotor axial compressor formed by adding two stages to the front of the original 10-stage subsonic compressor. Tests were carried out for five rows of adjustable guide vanes, based on the relationship of setting angle variation to speed. The test results were compared with the case when fixed geometry was used. Under the latter conditions, there existed in the medium speed zone 'dual value characteristics' for which detailed measurements were taken and possible implications discussed. It has been shown that the use of adjustable guide vanes for improving medium and low speed performance is fully justified. C.D.

A82-35327 # Optimization of compressor vane and bleed settings. J. E. Garberoglio, J. O. Song, and W. L. Boudreaux (United Technologies Corp., Government Products Div., West Palm Beach, FL). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-81.* 9 p. 16 refs. Members, $2.00; nonmembers, $4.00. Contract No. F33615-79-C-2013.

A comparative evaluation of optimization techniques applied to the optimization of vane and bleed settings in multistage axial compressors is carried out. The main considerations in the evaluation are: the number of test points required to achieve an optimum performance goal, the ability to handle performance and aeromechanical constraints, the sensitivity to measurement errors, and the effect of finite vane travel and bleed flow variations. Descriptions are given of Conmin (a FORTRAN program for constrained minimization) and Copes (a FORTRAN program for engineering synthesis). It is concluded that the Copes/Conmin approximate optimization technique is able to guide the optimization of compressor vane and bleed settings. The approximate optimization approach is shown to work well on problems involving experimental measurements and finite step sizes of the independent variables. C.R.

A82-35329 # Gas turbine airflow control for optimum heat recovery. W. I. Rowen and R. L. Van Housen (General Electric Co., Schenectady, NY). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-83.* 9 p. Members, $2.00; nonmembers, $4.00.

Attention is given to the economic gains that can be realized by using the control modes now available to optimize the cycle efficiency at part load operation. Included here are variable inlet guide vane (VIGV) control for single-shaft units, and combined VIGV and variable high pressure set (compressor) speed control for two-shaft units. In addition to the normal control optimization mode for maintaining the maximum exhaust temperature, a new control mode is discussed which permits airflow to be modulated in response to a process signal while at constant part load. This control feature is desirable for gas turbines that supply preheated combustion air to fired process heaters. C.R.

A82-35330 # Carbon formation by the pyrolysis of gas turbine fuels in preflame regions of gas turbine combustors. C. D. Hurley (National Gas Turbine Establishment, Farnborough, Hants., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-84.* 7 p. 8 refs. Members, $2.00; nonmembers, $4.00.

A series of experiments is carried out to investigate the formation of carbon from the pyrolysis of gas-turbine fuels, in both the gas and liquid phases, over the temperature range 573-1300 K. Two fuels are examined, a kerosene and a diesel, spanning the range of current and possible future aviation fuels. It is found that only gas-phase pyrolysis can account for the formation of carbon and that there is no difference in the carbon-forming tendencies of kerosene and diesel. The kinetics of the reaction is determined, making it possible to predict the amount of decomposition of the fuels at temperatures up to those typical of the preflame regions of combustors. C.R.

A82-35331 # Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors. Y. Ribaud (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France) and P. Avram (ONERA, Palaiseau, Essonne, France). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-85.* 9 p. 8 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Direction des Recherches, Etudes et Techniques.

While centrifugal compressors with pressure ratios in the 7-10 range often exhibit slow mass flow margins, such casing treatments as the use of large openings at the diffuser throat which are connected to annular plenums have been found to broaden the reduced mass flow range of the diffuser during supersonic inlet operation. While diffuser flow reduction is associated with a drop in efficiency in the region of reduced mass flow variation, the use of a backswept centrifugal rotor is shown to overcome this efficiency. Attention is given to both the experimental apparatus employed and the mechanical design details of the diffuser equipped with near-throat large apertures. O.C.

A82-35332 # Liquid particle dynamics and rate of evaporation in the rotating field of centrifugal compressors. O. Pinkus. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-86.* 10 p. 5 refs. Members, $2.00; nonmembers, $4.00. Contract No. W-7405-eng-26.

Attention is given to an approach in which for an improvement in performance isothermal conditions in centrifugal compressors are achieved in connection with the injection of a coolant from the rotating blades along the path of compression. By full or partial vaporization, the injected liquid would cool the gas, or superheated vapor, and keep it below adiabatic compression temperatures. The particular attraction of such an injection system in centrifugal compressors is that no special equipment is needed for the delivery and compression of the coolant. A study of the process of liquid injection has to take into account the flow of the liquid, aspects of particle dynamics, the rate of vaporization, and two-phase flow. In a study of the injection system, it is found that a large number of orifices with a small diameter should be used. It is desirable to use for the injection liquids of low viscosity. G.R.

A82-35333 # Two-phase transpiration cooling. M. A. El-Masri (MIT, Cambridge, MA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-89.* 10 p. 20 refs. Members, $2.00; nonmembers, $4.00.

The history of cooling technologies for gas turbines is briefly considered. It is pointed out that two-phase transpiration cooling offers significant benefits. A major incentive to study two-phase transpiration cooling is the thermodynamic benefit if fuel could be used as the transpiration coolant. The heat transfer problem in a transpired wall is composed of two matched subproblems, including the internal heat transfer between the coolant and the porous wall and the interaction of the transpired stream with the external boundary layer. An analysis of two-phase transpiration cooling is conducted, taking into account a model physical description, governing equations, regimes and modes of operation, and the two-phase range. On the basis of the analysis, two-phase transpiration is identified as a potentially-powerful cooling scheme for gas turbines. Moderate blade temperatures may be maintained in very high temperature gas streams without separating the boundary layer or incurring large aerodynamic or cooling penalties. G.R.

A82-35335 # **The effect of inlet distortion on the performance characteristics of a centrifugal compressor.** I. Ariga, S. Masuda (Keio University, Yokohama, Japan), Y. Watanabe (Japan Air Lines, Overhaul Center, Tokyo, Japan), I. Watanabe (Kanto Gakuin University, Yokohama, Japan), and N. Kasai. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-92.* 9 p. 9 refs. Members, $2.00; nonmembers, $4.00.

The effects of inlet pressure distortion on the performance characteristics and surge margin of a centrifugal compressor have been investigated experimentally using a low-speed compressor test rig with the inlet honeycomb acting as the distortion generator. Results indicate that inlet distortion has a negative effect on the efficiency and surge margin of the compressor, with radial distortion having a much stronger effect than circumferential distortion. Various distortion indices are examined in order to correlate the compressor performance to inlet distortion, and a distortion index related to the shock loss of the inducer is shown to be a suitable parameter for estimating the total pressure ratio in the case of inlet distortions. V.L.

A82-35336 # **A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation.** R. M. C. So (Arizona State University, Tempe, AZ), I. H. Edelfelt, D. M. Kercher (General Electric Co., Schenectady, NY), and E. Elovic (General Electric Co., Aircraft Engine Group, Cincinnati, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-93.* 8 p. 23 refs. Members, $2.00; nonmembers, $4.00. Contract No. DE-AC01-76-ET-10340.

Modern gas turbines operate at turbine inlet gas temperature levels which are substantially above the structural capability of the high-temperature alloys used in gas turbine components. It is, therefore, necessary to cool these components. The design of suitable cooling procedures is currently a complex, expensive process, involving the adjustment of calculated values by empirical test factors. The development of a heat transfer calculation procedure could, in this connection, lead to faster and much more economical procedures for the design of suitable cooling processes. The two-dimensional boundary-layer program STAN5 reported by Crawford and Kays (1976) is used as a basis for the development of a program which can be used with confidence by heat transfer design engineers to calculate the heat transfer on turbine airfoil surfaces. G.R.

A82-35337 # **Development of hybrid gas turbine bucket technology.** L. G. Peterson, D. E. Hrencecin, W. F. Schilling, and W. J. Ostergren (General Electric Co., Gas Turbine Div., Schenectady, NY). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-94.* 10 p. Members, $2.00; nonmembers, $4.00. Contract No. DE-AC01-80ET-17005.

A program has been initiated to evaluate the feasibility of producing a composite large-scale industrial gas turbine bucket using different nickel base superalloys in the airfoil and dovetail sections. Preliminary studies involve microstructure and high temperature tensile test evaluation of three directionally solidified alloys and two powder metal alloys. DS nickel base alloys include MAR-M200 plus Hf, René 80H and 441 (modified René 150) while the powder metals are low carbon versions of Astroloy (AP1) and PA-101. Hot isostatic pressing has been used to diffusion bond DS and powder alloys together. Powder densification and bonding take place simultaneously. Three separate solution temperatures have been used to HIP diffusion and bond each DS/powder alloy combination. Subsequent heat-treating to simulate a coating cycle and aging are being evaluated. Metallurgical evaluation as well as high temperature tensile testing have been used to assess bondline cleanliness and mechanical integrity. (Author)

A82-35338 # **Net shape components for small gas turbine engines.** W. P. Schimmel and G. J. Quill (Williams International, Walled Lake, MI). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-96.* 9 p. Members, $2.00; nonmembers, $4.00.

Advanced manufacturing methods producing net shape components for both current and next-generation high performance gas turbine engines are described. A coordinated development program is being conducted to provide near-net shape components which will minimize machining costs, save critical materials, and in some cases improve component performance. The techniques used include the isothermal forging of titanium, titanium casting, hot isostatic pressing of titanium powder, diffusion-bonded dual property techniques, and a diffuser case fabrication process. Emphasis is placed on the unique demands of small gas turbine engines. O.C.

A82-35339 # **Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors.** M. Jansen and M. Rautenberg (Hannover, Universität, Hanover, West Germany). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-102.* 9 p. 8 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Forschungsvereinigung Verbrennungskraftmaschinen; Deutsche Forschungsgemeinschaft *Contract No. SFB-61.*

A vaned diffuser has been designed for a 30 deg centrifugal compressor impeller having a highly distorted exit flow distribution, where the maximum flow angle difference across the diffuser width at the entrance is 29 deg. The vane inlet angle is matched to this flow angle distribution by imparting a three-dimensional twist to the diffuser vanes. Mappings of total pressure ratio and efficiency against mass flow for the cases of a twisted diffuser compressor and a compressor using a conventional, cambered vane and straight channel diffuser are compared. Twisted diffuser performance is discussed in light of detailed flow field measurements both before and behind the diffuser, as well as the static pressure distribution along the diffuser. O.C.

A82-35340 # **Influence of casing treatment on the operating range of axial compressors.** J. Paulon (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France) and D. Dehondt (Turboméca, S.A., Bordes, Pyrénées-Atlantiques, France). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-103.* 9 p. 9 refs. Members, $2.00; nonmembers, $4.00.

A theoretical study has been conducted in order to clarify the effect of casing treatment by cutting circular grooves on the performance of axial flow compressors. Rules for determining the groove depths have been established which account for the surge margin improvement obtained in some cases and make it possible to dismiss inefficient geometric configurations. Such parameters as groove length and position do not seem to be critical; however, optimum results are obtained when the treated length is smaller than the chord projection on the axis, and the groove is centered on that chord or slightly shifted upstream. V.L.

A82-35342 # **The effect of NaCl/g/ in high temperature oxidation.** J. G. Smeggil and N. S. Bornstein (United Technologies Research Center, East Hartford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-106.* 5 p. 6 refs. Members, $2.00; nonmembers, $4.00.

Experiments have been carried out to investigate the effect of gaseous NaCl on the oxidation of materials used in gas turbines. The materials investigated included NiAl, Mar M-509, NX-188; Ni-10Mo, Ni-25Cr, Ni-40Cr, and Ni-40Cr-5Si. It is found that very low levels of gaseous NaCl (0.1-100 ppm) approaching those expected for some marine and industrial turbine applications are sufficient to markedly increase the oxidation rate of turbine alloys and coatings, with the magnitude of the effect related to the alloy substrate chemistry. Alloys rich in molybdenum appear to be most susceptible to this form of corrosion. V.L.

A82-35344 # **Effect of the rear stage casing treatment on the overall performance of a multistage axial-flow compressor.** Y.-L. Gao (Shenyang Aeroengine Co., Shenyang, People's Republic of China) and K.-M. Li (Shenyang Aeroengine Research Institute, Shenyang, People's Republic of China). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-110.* 5 p. 10 refs. Members, $2.00; nonmembers, $4.00.

The effect on high speed stall margin and efficiency of tip treatment at the rear stages of a compressor is discussed. A nine-stage engine compressor was tested in a rig with and without casing treatment on the tip sections of the last three rotors, and another series of tests was conducted on a modified compressor with twisted rotor blades in the rear stages. The results showed that the casing treatment of rear stages in a multistage axial-flow compressor could effectively improve the surge margin of the compressor at high speeds. The casing treatment had almost no effect on the efficiency of the compressor with blades untwisted, while at the inlet stage it mainly improved the distortion tolerance and the performance of the compressor at low and medium speeds. C.D.

A82-35345 # **On the performance prediction of a centrifugal compressor scaled up.** T. Mashimo (Meiji University, Kawasaki, Japan), I. Ariga (Keio University, Yokohama, Japan), T. Sakai (Tokyo Science University, Tokyo, Japan), and I. Watanabe (Kanto Gakuin University, Yokohama, Japan). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-112.* 9 p. 18 refs. Members, $2.00; nonmembers, $4.00. Research sponsored by the Dengyosha Machine Works, Ebara Manufacturing Co., Fuji Electric Co., Hitachi, Ltd., Hitachi Shipbuilding and Engineering Co., et al.

A centrifugal compressor performance prediction method, in which each loss generated within the compressor stage is estimated by recognizing the individual relationship between it and the velocity distribution, the Reynolds number, and the Mach number, was investigated over a wide range of sizes and types. Three compressors having impellers of 154, 112, and 78 mm diameters were employed in the test, and the results were analyzed to obtain calculation formulas for the losses. By referring to unpublished test data, it was confirmed that the formulas could be applied to predict the performance levels of larger compressors with impellers up to 640 mm. From the results, it could be deduced that (1) the wall friction losses and the secondary flow losses within the compressor decreased with increase of impeller size, and (2) the leakage flow losses increased when scaling up the compressor, even when tip clearance or blade height were held constant. C.D.

A82-35346 # **Cryogenic turbine testing.** R. J. Iannuzzelli and R. E. Filippi (Air Products and Chemicals, Inc., Allentown, PA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-113.* 9 p. 8 refs. Members, $2.00; nonmembers, $4.00.

Problems encountered in data acquisition during turbine machinery testing in a cryogenic environment are discussed with reference to measurement and sensing errors, overall data uncertainty and its implications, and surface roughness effects on wheel losses. It is shown that data quality can be insured by using the power balance as an indicator of data uncertainty. Data uncertainty due to heat transfer effects can be minimized by adequately insulating the test vehicle. The measurement of temperature downstream of a turbine wheel should be made after a flow-mixing device to avoid adverse temperature distributions which could lead to sensing errors. And, finally, computerization of the data acquisition function can significantly reduce data uncertainty. V.L.

A82-35348 * # **A computational design method for transonic turbomachinery cascades.** H. Sobieczky (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für theoretische Strömunsgmechanik, Göttingen, West Germany) and D. S. Dulikravich (NASA, Lewis Research Center, Cleveland, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-117.* 10 p. 17 refs. Members, $2.00; nonmembers, $4.00.

This paper describes a systematical computational procedure to find configuration changes necessary to modify the resulting flow past turbomachinery cascades, channels and nozzles, to be shock-free at prescribed transonic operating conditions. The method is based on a finite area transonic analysis technique and the fictitious gas approach. This design scheme has two major areas of application. First, it can be used for design of supercritical cascades, with applications mainly in compressor blade design. Second, it provides subsonic inlet shapes including sonic surfaces with suitable initial data for the design of supersonic (accelerated) exits, like nozzles and turbine cascade shapes. This fast, accurate and economical method with a proven potential for applications to three-dimensional flows is illustrated by some design examples. (Author)

A82-35350 # **A critical appraisal of some current incidence loss models for the stator and rotor of a mixed flow gas turbine.** F. Fairbanks (Hatfield Polytechnic, Hatfield, Herts., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-120.* 6 p. 5 refs. Members, $2.00; nonmembers, $4.00.

Current models predicting the loss due to incidence in radial turbomachinery are briefly reviewed, and a new incidence loss model, designated the shock loss model, is proposed. As with the other models, the shock loss model assumes a change in the tangential components of the kinetic energy at entry but thereafter uses only fundamental principles, obviating the difficulty of changing the definition of the loss according to the flow conditions. Analysis is carried out for the stator blades of a radial turbine, and it is found that the shock loss model, as derived, overestimates by approximately 80% the overall loss parameter for the stator passage. It is concluded that none of the loss models reviewed, including the shock loss model, is satisfactory since they do not account for flow pattern in the rotor or stator passages. V.L.

A82-35351 # **A mixed-flow cascade passage design procedure based on a power series expansion.** R. A. Novak and G. Haymann-Haber. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-121.* 15 p. 10 refs. Members, $2.00; nonmembers, $4.00.

A blade-to-blade design technique is presented which will quickly develop the unique blade shape implied by the meridional-plane input specifications, which could then be treated as a preliminary version of a final blade shape, to be modified in accordance with the designer's perception of neglected real flow effects. The flow is assumed to be steady, two-dimensional on surfaces of revolution, nonviscous, and nonrotational. The process readily gives solutions for subsonic, supersonic, or mixed-flow conditions. The solutions are channel solutions, and realistic only in situations where a shock-free flow is possible. Particularly for supersonic compressor cascades, the results must be treated with caution. Numerous examples are given, with comparisons with experimental data and other analytic solutions. C.D.

A82-35352 # **Development and application of a performance prediction method for straight rectangular diffuser.** F. S. Bhinder and M. H. Al-Modafar (Hatfield Polytechnic, Hatfield, Herts., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-122.* 5 p. 7 refs. Members, $2.00; nonmembers, $4.00. Research supported by Rolls-Royce, Ltd.

A brief description of a step-by-step method for predicting the performance of straight rectangular diffuser is given. The theory has been used to predict the performance of rectangular diffusers for which comprehensive experimental data are available and the agreement between experimental and predicted results is very close. The method is shown to be applicable over a wide range of inlet Mach numbers, aspect ratios, and Reynolds numbers. When the diffuser divergence angle is less than 8 deg, the static pressure recovery coefficient is only slightly dependent on the aspect ratio, provided the latter is greater than one. However, for diffuser divergence angle greater than 12, the optimum entry aspect ratio is around unity. The inlet blockage has a significant influence on the pressure recovery for all geometical configurations, entry Mach numbers, and entry Reynolds numbers. C.D.

A82-35353 # **Performance analysis of the test results on a two-stage transonic fan.** C. Baoshi and Z. Tianyi (Shenyang Aeroengine Research Institute, Shenyang, People's Republic of China). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-123.* 5 p. Members, $2.00; nonmembers, $4.00.

Test results obtained from a two-stage fan are analyzed and the reasons for failure to attain the design performance target are presented. It was found that the design airflow and pressure ratio of the fan were attained, but the efficiency and stall margin were far lower than the design values. The problems found in stage one were that the design performance parameters selected on the basis of the original tests were too high, that the partspan shroud added onto the rotor degraded the performance and completely changed the spanwise flow field, and that the modifications on the flowpath and chord length of the stator caused an excessively high inlet Mach number at the stator hub, resulting in high losses and flow separation there. The high load and high incidence at the hub of the second rotor caused higher losses and reduced the stall margin of the fan, and the stages were inadequately matched. C.D.

A82-35358 # **Accuracy expectations for gas turbine and centrifugal compressor performance testing.** T. C. Heard and E. J. Hipp (General Electric Co., Schenectady, NY). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-128.* 13 p. 13 refs. Members, $2.00; nonmembers, $4.00.

A simple procedure for estimating instrument errors and for assessing their influences on the final results is outlined. The procedure uses the statistical approach of first estimating the uncertainty of each measurement or piece of data to be used, and then combining their effects in prescribed ways to estimate the uncertainties of performance functions. Probable error uncertainty is defined as a band of such width that there is a 50 percent chance of including the true value. As an example, the p/e uncertainties are estimated for testing a gas turbine driven compressor operating at 25,000 horsepower and at a relatively low pressure ratio on natural gas. Uncertainties are found for the compressor shaft power, the gas turbine shaft power, the gas turbine heat rate, and the gas turbine and compressor considered as a single package. C.D.

A82-35362 # **The potential impact of future fuels on small gas turbine engines.** J. A. Saintsbury (Pratt and Whitney Aircraft of Canada, Ltd., Longueuil, Quebec, Canada) and P. Sampath. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-133.* 8 p. 11 refs. Members, $2.00; nonmembers, $4.00.

The present investigation is based on the assumption that in the not too distant future aviation gas turbine fuels as they are known today will not be available and that it will be necessary to accept either degraded fuels or fuels derived from sources presently considered unconventional. The investigation addresses gas turbine fuels in general and their effect on combustion systems, giving particular attention to small gas turbine engine combustion systems. It is found that the impact of future fuels on aircraft gas turbine engines will vary depending on engine size and type, because of differences in fundamental design criteria, and constraints of weight, cost, and size. As a first step towards fuel conservation pending availability of viable alternate energy sources, broadened specification fuels with modest relaxations in aromatics, and freeze point will likely be in use in the near term, but fuels from alternate sources will be longer term because of the need to develop an appropriate production industry. G.R.

A82-35363 **An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves.** W. J. Calvert (National Gas Turbine Establishment, Farnborough, Hants., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-135.* 12 p. 23 refs. Members, $2.00; nonmembers, $4.00.

An inviscid-viscous interaction treatment has been developed to predict the blade-to-blade flow in axial compressors operating with supersonic inlet conditions and a normal shock wave at inlet to the blade passage. The treatment uses both direct and inverse modes of operation for the inviscid and viscous calculations, and thus it can model the separation of the suction surface boundary layer produced by the strong interaction with the shock wave. The inviscid flow is calculated by a time marching method and the viscous flow by integral methods for laminar and turbulent boundary layers. (Author)

A82-35366 # Application of high bypass turbofan computer simulation to flight and test data processing. J. F. Chapier and L. Levine (Avco Corp., Avco Lycoming Div., Stratford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-141.* 8 p. Members, $2.00; nonmembers, $4.00.

This paper describes the computer program used to compare gas turbine engine flight and static test results with a predicted standard engine computer simulation model. The program is conceived not only for a final presentation of engine performance, but also as a research tool to further analyze the validity of measurements and the assumptions used in data reduction. (Author)

A82-35371 # Effect of crossflows on the discharge coefficient of film cooling holes. N. Hay, D. Lampard, and S. Benmansour (Nottingham University, Nottingham, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-147.* 6 p. 9 refs. Members, $2.00; nonmembers, $4.00.

Film cooling is the standard method of cooling the stator and rotor blades in an aircraft gas turbine engine. Many parameters govern film cooling performance, but the most pertinent is the 'blowing parameter', a nondimensionalized parameter reflecting the mass flow emerging from the cooling hole. Knowledge of the discharge coefficient, Cd, of film cooling holes is vital in sizing film cooling holes at the design stage. The discharge coefficient depends both on the local geometry and the flow conditions upstream and downstream of the hole. The effect of coolant crossflow was examined by Rohde et al. (1969). No data are available on the combined effects of mainstream and coolant crossflows. The present investigation was undertaken to provide a more extensive data base. Further data on Cd for film cooling holes have been obtained, taking into account data on both the coolant and mainstream sides. For the simpler situation of crossflow on one side only, the data agree well with earlier published results. G.R.

A82-35373 * # The use of optimization techniques to design controlled diffusion compressor blading. N. L. Sanger (NASA, Lewis Research Center, Cleveland, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-149.* 11 p. 17 refs. Members, $2.00; nonmembers, $4.00. (Previously announced in STAR as N82-14094)

A82-35374 # A practical approach to the design of multivariable control strategies for gas turbines. A. M. Foss (National Gas Turbine Establishment, Farnborough, Hants., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-150.* 12 p. 15 refs. Members, $2.00; nonmembers, $4.00.

The requirement for gas turbine engines to operate over wider ranges has resulted in today's more sophisticated engines with multiple controls. Current control philosophy for such powerplants is to adopt separate control systems for each of the major components. However, interactions between the various control parameters involved may be large enough to degrade the transient performance of the overall system. In such cases a design strategy specifically aimed at such a system, may be better. In the considered multivariable approach, a multivariable design strategy has been applied to derive a multivariable controller. According to the definition of the term, a multivariable design strategy is a strategy which takes into account interactions in the plant to be controlled. A multivariable controller contains interaction terms in the controller. The practical application of a multivariable control scheme to an aircraft engine has been made feasible in connection with the development of the microprocessor. G.R.

A82-35380 # Scaling effects on leakage losses in labyrinth seals. S. L. K. Wittig, L. Dörr, and S. Kim (Karlsruhe, Universität, Karlsruhe, West Germany). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-157.* 5 p. 8 refs. Members, $2.00; nonmembers, $4.00.

The accurate prediction of leakage losses through labyrinth seals in gas turbine engines depends largely on exact measurements. As tolerance effects are important, scaled-up models are used for experimental analysis. Application to real size engine conditions is of predominant importance. Measurements in a newly developed test section over wide pressure ranges with geometrically similar straight-through seal models of different scale indicate that the flow coefficient is not independent of the scale chosen. In a first attempt to clarify these questions, the results obtained from various models were correlated using Fanno-line analysis with dimensionless integral friction coefficients. The results obtained reveal the necessity for simultaneous consideration of Reynolds and Mach-number effects as well as relatively small geometrical deviations. (Author)

A82-35383 # Dry friction damping mechanisms in engine blades. A. V. Srinivasan and D. G. Cutts (United Technologies Research Center, East Hartford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-162* 14 p. 11 refs. Members, $2.00; nonmembers, $4.00.

In the context of jet engines, significant vibration damping due to dry friction can occur at (1) shroud interfaces of fans and (2) the platform of turbine blades fitted with 'platform dampers'. Analytical and experimental studies in regard to this important source of nonaerodynamic damping of blade vibration are presented in this paper. Comparisons between results from analytical models and laboratory test data are made and discussed. (Author)

A82-35384 * # The influence of Coriolis forces on gyroscopic motion of spinning blades. F. Sisto, A. Chang, and M. Sutcu (Stevens Institute of Technology, Hoboken, NJ). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-163.* 6 p. 5 refs. Members, $2.00; nonmembers, $4.00. Grant No. NAG3-47.

Turbomachine blades on spinning and precessing rotors experience gyroscopically induced instabilities and forcing. With vehicle-mounted turbomachines, either constant or harmonic precession occurs, depending on vehicle or mount motion. Responses of uniform cantilever beams at arbitrary stagger, subjected to the noted rotor motion, are predicted in both self-excited and forced-excitation modes taking into account Coriolis acceleration. (Author)

A82-35385 # Integrated aircraft avionics and powerplant control and management systems. J. McNamara (Rolls-Royce, Ltd., Aero Div., Bristol, England) and A. G. Seabridge (British Aerospace Public, Ltd., Co., Warton Div., Preston, Lancs., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-165.* 12 p. 7 refs. Members, $2.00; nonmembers, $4.00.

The need for integration of the powerplant, intake, and airframe in an aircraft has long been recognized as an essential requirement for maximizing performance achievement in combat aircraft, and the emergence of highly maneuverable and highly unstable aircraft configurations has enhanced the need for this integration. In the present study of powerplant control systems, a systems approach has, therefore, been adopted to ensure that the results obtained for an integrated control system are truly applicable to the combined system. Attention is given to a powerplant control system configuration, the data highway system, the powerplant control and management system, a system for the 1990's, and the benefits provided by an ideal system. It is pointed out that the optimum solution will ultimately be dictated by the constraints and objectives of the aircraft project. G.R.

A82-35387 # Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments. B. Barry, A. E. Forest, and A. J. White (Rolls-Royce, Ltd., Derby, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-174.* 9 p. 9 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Ministry of Defence (Procurement Executive).

A method of determining local convective heat transfer coefficients around internally cooled components in a hostile flow environment is described. The method involves the measurement of the response of the wall temperature to perturbations in the coolant flow. A companion paper includes results obtained in cascades of turbine aerofoils using refined versions of the method. (Author)

A82-35388 # Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions. R. J. Beacock, F. G. Horton, T. J. Kirker, and A. J. White (Rolls-Royce, Ltd., Derby, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-175.* 7 p. 5 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Ministry of Defence (Procurement Executive).

A82-35389 * # NASA research in aircraft propulsion. M. A. Beheim (NASA, Lewis Research Center, Cleveland, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-177.* 10 p. Members, $2.00; nonmembers, $4.00. (Previously announced in STAR as N82-13146)

A82-35390 # HC and CO emission abatement via selective fuel injection. D. W. Bahr (General Electric Co., Aircraft Engine Business Group, Cincinnati, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-178.* 9 p. 5 refs. Members, $2.00; nonmembers, $4.00.

The results of investigations to develop carbon monoxide (CO) and unburned hydrocarbons (HC) abatement methods for use in aircraft turbofan engines are reviewed. Specifically, the use of selective fuel injection patterns at ground idle operating conditions in CF6 engines was assessed and evolved in combustor and engine tests. These fueling patterns were obtained by valving fuel to selected combinations of fuel nozzles at idle, rather than to the full complement of engine fuel nozzles, and were intended to provide localized fuel-air ratio enrichment within the combustor annulus. In addition to the effects of such fueling patterns on HC and CO levels, their effects on engine performance at starting, sub-idle, and idle conditions were determined. The use of repetitive clusters of fueled nozzles around the combustor annulus was determined to provide the best overall emission abatement, performance, and operational characteristics. (Author)

A82-35391 # Status report of the USAF's Engine Model Derivative Program. M. S. Coalson (USAF, Wright-Patterson AFB, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-183.* 9 p. Members, $2.00; nonmembers, $4.00.

An investment strategy, known as the Engine Model Derivative Program has resulted in the prototype development of a new fighter engine, a new turboprop engine, and promises the future development of a second fighter engine. The rationale for prototype, rather than full-scale development is presented and a brief overview of the F101 derivative fighter engine, XT56-100 and F100 advanced derivative is described. (Author)

A82-35392 # Demonstration of ceramic hot-section static components in a radial flow turbine. J. P. Arnold, W. McGovern (U.S. Army, Mobility Equipment Research and Development Command, Fort Belvoir, VA), J. C. Napier, and A. P. Batakis (Solar Turbines, Inc., San Diego, CA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-184.* 6 p. 9 refs. Members, $2.00; nonmembers, $4.00. Army sponsored research.

Ceramic hot-section turbine components allow higher temperature for up-rated power and improved fuel economy. The methodology used in arriving at a successful 200-hr engine demonstration of an all ceramic nozzle is presented along with current progress in demonstrating the remaining ceramic hot-section static components. (Author)

A82-35394 # A stage-by-stage dual-spool compression system modeling technique. M. W. Davis, Jr. (Sverdrup Technology, Inc., Arnold Air Force Station, TN). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-189.* 11 p. 16 refs. Members, $2.00; nonmembers, $4.00.

Mathematical compressor models are major tools used in resolving engine problems and evaluating the influence of compressor modifications on performance and stability. This paper discusses the development of a one-dimensional, time-dependent, dual-spool, stage-by-stage compression system mathematical model and its application to a current compression system. The dual-spool model was constructed by extending a current single-spool modeling technique to include dual-spool compression systems. To improve the numerical stability characteristics of the compressor modeling technique, the dual-spool model was formulated using MacCormack's (1969) explicit differencing scheme and a method of characteristics boundary treatment. The dual-spool model was applied to a current compression system, and several types of planar destabilizing disturbances were studied to determine their effect on compression system stability. Model predictions were validated against experimental data whenever possible. (Author)

A82-35396 # TURBOTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems. J. R. Palmer (Cranfield Institute of Technology, Cranfield, Beds., England) and C.-Z. Yan (Shenyang Aeroengine Research Institute, Shenyang, People's Republic of China). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-200.* 8 p. 6 refs. Members, $2.00; nonmembers, $4.00.

TURBOTRANS is a new computer program, written in FORTRAN IV and implemented on various computers, which satisfies the requirements of flexibility, accuracy, ease of use, and suitability. The component performance, steady-state performance simulation, and transient performance simulation are analyzed. The configuration of the gas turbine engine and control system can be described in the program by using codewords corresponding to the various components and processes of both engine and control systems. A flow diagram of TURBOTRANS and a brief description of the function of each main subroutine are given. Illustrations of the program's capabilities are presented. C.D.

A82-35398 # Aeropropulsion research for the U.S. Army. R. E. Singleton (U.S. Army, Research Office, Research Triangle Park, NC). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-203.* 11 p. 20 refs. Members, $2.00; nonmembers, $4.00.

Examples are presented of U.S. Army-supported research in aeropropulsion static and rotating component design and manufacture, with emphasis on anticipated improvements in engine reliability, life cycle costs, and fuel consumption. The investigations extend to centrifugal flow compressor rotors and variable area nozzles, counterflow film-cooled combustors, felt-ceramic liner annular combustor concept development, turbine blade thermal barrier coatings, gear tooth dynamics, turbine seals, such advanced ceramics as silicon nitride, and polyimide composite fan blades. O.C.

A82-35400 # Adaptive fuel control feasibility investigation for helicopter applications. T. Morrison, R. D. Zagranski (Chandler Evans, Inc., West Hartford, CT), and J. J. Howlett (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-205.* 11 p. Members, $2.00; nonmembers, $4.00.

A United States Army-sponsored, computer-aided study of a twin engine helicopter is being conducted to determine the feasibility of incorporating into the engine microprocessor-based control system, airframe signals and control strategies that improve helicopter capability. Investigations are considering online changes to the control characteristics which adapt to abnormal engine operation due, for example, to engine deterioration, surge or failure. The anticipation of power recovery from a split needle condition is accomplished with rotor speed feedback, which allows increased transient load factors and improved handling qualities in maneuvering flight. An improvement in torsional damping is achieved with software filters which reduce the dependence of the drive train stability on the blade lag dampers. (Author)

A82-35401 # Local heat transfer to staggered arrays of impinging circular air jets. A. I. Behbahani and R. J. Goldstein (Minnesota, University, Minneapolis, MN). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-211.* 7 p. 16 refs. Members, $2.00; nonmembers, $4.00.

Measurements are made of the local heat transfer from a flat plate to impinging arrays of staggered circular air jets. Fluid from the spent jets is constrained to flow out in one direction. Two different jet-to-jet spacings, 4 and 8 jet diameters, are employed. The parameters that are varied include jet-orifice-plate to impingement-surface spacing and jet Reynolds number. Local heat transfer coefficients vary periodically both in the flow direction and across the span with high values occurring at stagnation regions. Stagnation regions of individual jets as determined by local heat transfer coefficients move further in the downstream direction as the amount of crossflow due to upstream jet air increases. Local heat transfer coefficients are averaged numerically to obtain spanwise and streamwise-spanwise averaged heat transfer coefficients. (Author)

A82-35402 # Acquisition of F-100/3/ high pressure compressor entrance profiles. D. C. Rabe, W. W. Copenhaver, and M. S. Perry (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-215.* 5 p. 6 refs. Members, $2.00; nonmembers, $4.00.

A transportable automatic data acquisition system to obtain high pressure compressor entrance profiles in an F-100 Series 3 gas turbine engine is described. The system was developed, assembled, and tested at Wright-Patterson Air Force Base and transported to a remote location for implementation in a sea level engine test. Acquisition of data was controlled through a Hewlett Packard Model 9825T desktop calculator, preprogrammed to display airflow data in engineering units during the test. Entrance profiles of total and static pressure, temperature, and flow angle for two axial locations are presented. A wedge probe sensing element was positioned at 12 radial locations by remote traversing mechanisms to obtain these profiles. For a total pressure range of 18 to 46 psia (0.13 to 0.32 MPa), acquisition uncertainties in static and total pressure were reduced to below + or - percent of measured values by optimizing data system component uncertainties. (Author)

A82-35404 # Advanced turboprop engines for long endurance naval patrol aircraft. R. Hirschkron and R. H. Davis (General Electric Co., Aircraft Engine Business Group, Lynn, MA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-217.* 7 p. Members, $2.00; nonmembers, $4.00. Navy-sponsored research.

Long endurance naval patrol aircraft of the future will require more efficient advanced turboprop powerplants. Engines used in this kind of application will have performance requirements emphasizing prolonged endurance and very low specific fuel consumption for cruise and part-power loiter operation. Regenerative, regenerative/intercooled and advanced conventional cycle screening studies were carried out to select the cycle pressure ratio and turbine temperature for each type, considering the effects on installed performance and weight. Design and cycle choices were studied in each engine category including recuperator types, effectiveness, pressure drop, bypass bleed and variable area turbine nozzle. The engine characteristics of each type were then compared using a representative mission. The advanced conventional engine showed the largest potential, the regenerative second and the regenerative/intercooled the least promise for lower installed fuel consumption and improved mission performance. (Author)

A82-35409 * # **The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine.** R. J. Roelke (NASA, Lewis Research Center, Cleveland, OH) and J. E. Haas (U.S. Army, Propulsion Laboratory, Cleveland, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-222.* 6 p. 9 refs. Members, $2.00; nonmembers, $4.00. (Previously announced in STAR as N82-13114)

A82-35411 # **Effect of impeller extended shrouds on centrifugal compressor performance as a function of specific speed.** L. Sapiro. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-228.* 11 p. Members, $2.00; nonmembers, $4.00.

Centrifugal compressors for gas compression applications usually employ low-pressure ratio, backward-swept impellers with vaneless diffusers. To increase the compressor flow range and speed, impeller blades are occasionally trimmed, resulting in an extended shroud configuration. The effect of extended front and back impeller shrouds on the performance of centrifugal compressors with vaneless diffusers, and the variation of this effect as a function of specific speed, is thus of concern and is the subject of this paper. An investigation was carried out on two backward-swept shrouded impellers of common blade tip and inducer hub diameters, but different inducer tip diameters (corresponding to low and high specific speeds), with the front and back shrouds extending 20 percent above the blade's outside diameter. (Author)

A82-35412 # **The calculation of deviation angle in axial-flow compressor cascades.** L. C. Wang (Nanjing Aeronautics Institute, Nanjing, People's Republic of China), R. Hetherington (Cranfield Institute of Technology, Cranfield, Beds., England), and A. Goulas. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-230.* 6 p. 17 refs. Members, $2.00; nonmembers, $4.00.

The deviation angles of axial flow compressor cascades have been predicted by solving the Reynolds averaged fully turbulent Navier-Stokes equations. A finite element method has been used. To close the problem an algebraic eddy viscosity turbulent model has been chosen. The introduction of the idea of vorticity to the governing equation enables the establishment of a relation between the entropy and the vorticity fields, and the vorticity transport differential equation in the stream function-vorticity method is replaced by a differential operation. A series of calculations have been carried out to examine the influence of cascade geometry on the deviation angle. Very good agreement has been obtained for small angles of incidence with the correlations produced by NASA and using Carter's rule. Good agreement has also been shown for the variation of deviation angle with the angle of incidence with the experimental data of Felix and Emery, as well as for the distribution of the pressure coefficient along the blade axial chord. (Author)

A82-35413 # **Transient vibration of high speed lightweight rotor due to sudden imbalance.** M. Sakata (Tokyo Institute of Technology, Tokyo, Japan), H. Ohnabe (Ishikawajima-Harima Heavy Industries Co., Ltd., Tanashi, Tokyo, Japan), and T. Aiba. *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-231.* 8 p. 11 refs. Members, $2.00; nonmembers, $4.00.

A transient vibration analysis is carried out on a flexible disk-flexible shaft system or rigid disk-flexible shaft system subjected to a sudden imbalance which is assumed to represent the effect of blade loss. Galerkin's method is used to solve the basic equation governing a rotating flexible disk, and the equation of motion of the rotor system is numerically solved using the Runge-Kutta method. A model rotor with a blade loss simulator is examined, and shaft vibrations are measured. For subcritical blade loss or sudden increase of imbalance, the maximum amplitude increases with disk flexibility and the analysis with cycloidal front step-type imbalance increase predicts larger peak values in the response curves than that with unit step balance increase. D.L.G.

A82-35415 # **Experimental evaluation of squeeze film supported flexible rotors.** M. D. Rabinowitz (SCITEC Corp., Sydney, Australia) and E. J. Hahn (New South Wales, University, Kensington, Australia). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-233.* 10 p. 15 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Australian Research Grants Committee.

This paper describes the experimental investigations which were conducted to verify existing theoretical vibration amplitude predictions for centrally preloaded, squeeze film supported flexible rotors. The influence of measurement errors and operating condition uncertainties are quantified. The agreement between theory and experiment was excellent, and it is shown that any discrepancy can be explained in terms of errors in determining the mean lubricant viscosity and the orbit magnitudes. Hence, for the range of parameters investigated, the theoretical model and predictions therefrom are validated. (Author)

A82-35418 # **Next generation turboprop gearboxes.** W. L. McIntire and D. A. Wagner (General Motors Corp., Detroit Diesel Allison Div., Indianapolis, IN). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-236.* 9 p. 7 refs. Members, $2.00; nonmembers, $4.00.

A new generation of fuel-efficient turboprop propulsion systems is under consideration now that fuel is a significant portion of the direct operating cost of aircraft. Systems in the 5000- to 15,000-hp (3730- to 11,185-kW) range that use conventional propellers or the new propfan are being studied. Reduction gearing for this next generation of turboprops is of significant interest due to new requirements for cruise speed life, and reliability. Detroit Diesel Allison's past experience with the T56 family of turboprop reduction gearboxes is recounted. Probable requirements of the next generation of reduction gearboxes are discussed since new requirements for gearboxes combined with past experience should determine the profile of the next generation of gearboxes. A discussion of gearbox general arrangement and its impact on airframe installation is included, along with comments on reduction ratio, gear arrangement, accessory drives, reliability goals, and probable technology needs. (Author)

A82-35425 # **Engine experience of turbine rotor blade materials and coatings.** F. N. Davis and C. E. Grinnell (Rolls-Royce, Ltd., Coventry, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-244.* 9 p. 9 refs. Members, $2.00; nonmembers, $4.00.

Corrosion resistance of hot end components was evaluated on Rolls-Royce industrial and marine gas turbines. Early materials and coatings assessment trials were performed, and extended cyclic running of up to 2500 hours for a single test was carried out to assess component reliability and various material/coating combinations. Results of cyclic running under agressive conditions suggest the need for two layer coating systems. The change from wrought Nimonic alloys to cast superalloys for turbine rotor blades has produced a marked increase in corrosion resistance, and to date, platinum aluminide has demonstrated best overall protection characteristics and can be standardized for production engines. D.L.G.

A82-35426 # **Heat transfer measurements of a transonic nozzle guide vane.** M. R. Litchfield (National Gas Turbine Establishment, Farnborough, Hants., England) and R. J. G. Norton (Rolls-Royce, Ltd., Aero Div., Derby, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-247.* 10 p. 12 refs. Members, $2.00; nonmembers, $4.00.

The heat transfer and aerodynamic characteristics of a turbine nozzle guide vane with a supersonic exit velocity have been measured in a transient cascade facility. The vane possesses a convergent-divergent passage, and this, together with a low trailing edge wedge angle, is seen to control the supersonic flow efficiently at design conditions. Heat transfer measurements have been taken on both suction and pressure surfaces. On the suction surface, transition is marked by a rapid increase in heat transfer, whereas on the pressure surface a slow increase in heat transfer indicates the gradual onset of turbulence. The measurements also indicate possible relaminarisation of the suction surface boundary layer at the impingement of the trailing edge shock. Predictions are presented of aerodynamic flow, using an inviscid time-marching calculation, and heat transfer, using a differential method applied to the vane surface. (Author)

A82-35429 # **An advanced helicopter engine control system.** A. F. Saunders (Dowty and Smiths Industries Controls, Ltd., Cheltenham, Glos., England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-250.* 12 p. Members, $2.00; nonmembers, $4.00.

A full-authority digital engine control and intelligent cockpit command box has been designed and developed in order to: (1) demonstrate continued improvement in IC technology, with its associated increases in computing power; (2) employ control laws more relevant to electronic control, thereby obviating precise fuel metering by a hydromechanical unit; and (3) significantly improve engine and system performance monitoring methods. The control system described has undergone successful engine tests with a GEM helicopter engine, and is scheduled to be tested in prototype form aboard a Lynx military helicopter. O.C.

A82-35430 # **An approach to software for high integrity applications.** W. C. Dolman and J. P. Parkes (Lucas Aerospace, Ltd., Birmingham, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-251.* 10 p. Members, $2.00; nonmembers, $4.00.

This paper outlines one approach taken in designing a software system for the production of high quality software for use in gas turbine control applications. Central to the approach is a special control language with its inherent features of visibility, reliability and testability, leading to a software system which can be applied to applications in which the integrity of the units is of prime importance. The structure of the language is described together with the method of application in the field of aircraft gas turbine control. The provision of documentation automatically is an integral part of the system together with the testing procedures and test documentation. A description of how these features are combined into the total software system is also given. (Author)

A82-35432 # **Ceramic components for automotive and heavy duty turbine engines - CATE and AGT 100.** H. E. Helms and J. A. Byrd (General Motors Corp., Detroit Diesel Allison Div., Indianapolis, IN). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-253.* 10 p. 9 refs. Members, $2.00; nonmembers, $4.00.

Detroit Diesel Allison is actively applying advanced ceramic materials to components in gas turbine engines. Silicon carbide, silicon nitride, aluminum silicate, lithium aluminum silicate, and mullite are materials being used in various components in both the DDA GT 404-4 and AGT 100 engines. Approximately 9400 hr of ceramic component operating time in the GT 404 engine has been accumulated, and design, component processing, proof testing, and engine testing experience have begun to show the applicability of ceramic materials in production engines. Material variability, processing procedures, strength characterization, and nondestructive evaluations are emerging as critical but controllable factors. Ceramic components offer the potential of significant fuel consumption improvements in gas turbine engines for vehicles and other applications. (Author)

A82-35433 # **The influence of engine characteristics on patrol aircraft life cycle cost optimization.** A. J. Schuetz (Lockheed-California Co., Burbank, CA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-256.* 6 p. Members, $2.00; nonmembers, $4.00.

Peacetime utilization is postulated in an estimation of the engine duty cycle of a novel, land-based patrol aircraft, whose propulsion system incorporates high-speed turboprop engines and whose flight profile is that of the antisubmarine mission. It is determined that, where aircraft design has been optimized for minimum takeoff gross weight and life cycle costs, performance requirements and design constraints circumscribe the optimization process to the extent that the same point design is obtained for the takeoff weight and life cycle cost criteria. Engine cost contribution to overall life cycle costs is examined, and the sensitivity of aircraft optimization to such aircraft characteristics as specific fuel consumption, length, diameter and cost is analyzed. It is found that specific fuel consumption is the most significant engine characteristic. O.C.

A82-35436 # **Cycle considerations for tactical fighters in the early 1990's.** H. D. Snyder (United Technologies Corp., Pratt and Whitney Aircraft Group, West Palm Beach, FL). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-259.* 5 p. 6 refs. Members, $2.00; nonmembers, $4.00.

The possibility of a new tactical fighter for the 1990s is considered, and various aspects of such a fighter are discussed, including maneuverability, avionics, takeoff and landing, observables, supersonic persistence, and range. A probable peacetime training syllabus is set out. It is concluded that a jet cycle is preferable than a fan cycle in such an aircraft, and that combustor inlet temperatures will be increased for maneuverability and supersonic persistence. The overall engine pressure ratio will be moderate (18-22) and the engine pressure ratio will be high (3.5-4.5). The engine will probably have a two-dimensional reversing/vectoring nozzle and the radar cross section of the inlet will be reduced. A longer engine development cycle will be necessary to improve engine capability, while also improving operability, reliability, and maintainability. C.D.

A82-35446 # **Performance improvement features of General Electric turbofan engines.** D. J. Lennard and W. A. Fasching (General Electric Co., Cincinnati, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-270.* 7 p. 10 refs. Members, $2.00; nonmembers, $4.00.

Turbofan engine performance improvement features are presented, for engines already in operation and those currently undergoing development, with attention to fuel consumption reduction. Several of the performance improvement features incorporated have emerged from the NASA Engine Component Improvement program, and include fan, compressor, and high and low pressure turbine clearance modifications. Fan and exhaust nozzle aerodynamics improvements, reduced flowpath losses, and high efficiency turbine cooling are discussed. The evolutionary process of feature incorporation has yielded a specific fuel consumption improvement in the CF6-80C engine of 8% over the original CF6-50 design. O.C.

A82-35447 * # **Interim review of the Energy Efficient Engine /E3/ Program.** W. B. Gardner, W. Hannah, and D. E. Gray (United Technologies Corp., Commercial Products Div., East Hartford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-271.* 10 p. 12 refs. Members, $2.00; nonmembers, $4.00. NASA-sponsored research.

The NASA-sponsored Energy Efficient Engine (E3) Program, which is now in its fourth year, is assessed from the viewpoint of one of its research contractors. Attention is given to the development status of the shroudless fan, segmented combustor and exhaust mixer components which are encompassed by the program. The shroudless fan blades are two-thirds hollow for lightness, and are fabricated by means of plies and cores subjected to hot isostatic pressing diffusion bonding. The combustor's segmented liner is cast from turbine blade materials. Exhaust mixer flow visualization tests are described. Consideration is given to the effects of integrating the technology described with the low and high pressure advanced turbines whose development is also part of the E3 program. O.C.

[illegible] # **NASA ECI programs - Benefits to Pratt and Whitney Engines.** [illegible] O. Gaffin (United Technologies Corp., Pratt and Whitney Aircraft Group, East Hartford, CT). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 13-22, 1982, Paper 82-GT-272.* 8 p. 5 refs. Members, $2.00; nonmembers, $4.00. NASA-sponsored research.

Proprietary research conducted under the NASA-sponsored Engine Component Improvement program is shown to have advanced the state of such component technologies as thermal barrier coatings, ceramic seal systems, advanced turbine clearance control, and JT9D engine fan design. In addition, the tests conducted have demonstrated the advantages of updated cooling, sealing and aerodynamic designs in the high pressure turbine and compressor of the JT8D engine. These technological advances are being transferred to such novel engine configurations as the PW2037 and NASA Energy Efficient Engine. Attention is given to the results of the thermal coating refinement tests of convectively cooled vanes, and to the development of a single shroud fan design applicable to the JT9D and next-generation engines. O.C.

A82-35450 * # **Progress in the development of energy efficient engine components.** R. W. Bucy (General Electric Co., Cincinnati, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-275.* 7 p. 6 refs. Members, $2.00; nonmembers, $4.00. Contract No. NAS3-20643.

Component test results are presented for the NASA Energy Efficient Engine program, whose design goals relative to the CF6-50C reference engine include a 12% reduction in specific fuel consumption, 5% reduction in direct operating costs, and 50% reduction in specific fuel consumption deterioration rate over the course of commercial service. Emphasis is placed on the engine's high pressure compressor, which has a design pressure ratio of 23:1, and has completed a series of component tests whose resulting configuration is expected to meet all major objectives of the program. Descriptions are given of the core engine and integrated core/low spool tests, and system test benefits are discussed. Attention is given to the design features of the engine's double annular combustor, high and low pressure air turbines, and scale model exhaust mixer. O.C.

A82-35453 # **Material and process impact on aircraft engine designs of the 1990's.** R. A. Sprague (GE Material and Process Technology Laboratories, Cincinnati, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-278.* 10 p. Members, $2.00; nonmembers, $4.00.

Major material and process technology areas are discussed in terms of their impact on future engine performance. Airfoil materials development will concentrate on enhancing high temperature mechanical properties. New single-crystal or eutectic alloys, and overlay and/or thermal barrier coatings will permit increases of up to 250 F in allowable metal temperature capability. Increases in turbine inlet temperature and the desire to reduce engine weight and life cycle costs will drive disk material development toward attainment of higher tensile, creep, and fatigue strengths through development of dual-property disks, which combine new alloy compositions with novel processing techniques, and by increased application of polymeric composites. Rapid solidification plasma deposition technology promises to permit fabrication of complex, multialloy structural parts with improved mechanical properties and environmental resistance. Definition of new laboratory testing procedures and analyses will lead to better management of life cycle costs through enhanced materials utilization. C.D.

A82-35454 # **Investigation of the transonic calibration characteristics of turbine static pressure probes.** R. W. Langford, K. R. Keeley, and N. B. Wood (Central Electricity Generating Board, Central Electricity Research Laboratories, Leatherhead, Surrey, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-280.* 9 p. 12 refs. Members, $2.00; nonmembers, $4.00.

Measurement of static pressure in transonic turbines is made difficult because of the need to use probes with substantial support stems in the measurement plane, enabling them to traverse in the confined axial spaces between blade rows. Problems arise because of shock interactions with the probes and the close proximity of shock-reflecting surfaces. Tests show that the calibration can depend on the proportion of probe support immersed in the transonic flow. The wind tunnel gives only partial representation of the turbine transonic flow field, but by using turbine measured and computed static pressures the most representative calibration is selected. (Author)

A82-35455 # **Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing.** J. A. Palla[illegible] and T. W. Gray (General Electric Co., Aircraft Engine Business Group, Lynn, MA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-281.* 9 p. 5 refs. Members, $2.00; nonmembers, $4.00.

A study was carried out to investigate vibration related problems, namely cabin noise and high engine vibration levels, encountered during service introduction of an upgraded turbojet engine having a three-bearing support system with an overhung turbine. The problem was found to be due to an interaction between a rotor mode and a stator mode through bearing clearance, and it was proposed to use a plain, uncentralized, squeeze film damper to lower the turbine rotor critical speed and to eliminate the interaction between the rotor and stator modes. It is shown that with this design, the turbine critical speed is reduced to 25-30% of the rate speed, corresponding to a 50% reduction in the critical speed, and eliminates the bistable vibration. The effects of the exhaust system weight on the engine vibration and cabin noise are also discussed. V.L.

A82-35456 * # **Structural dynamics of shroudless, hollow, fan blades with composite in-lays.** R. A. Aiello, M. S. Hirschbein, and C. C. Chamis (NASA, Lewis Research Center, Cleveland, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-284.* 7 p. Members, $2.00; nonmembers, $4.00. (Previously announced in STAR as N82-22266)

A82-35457 # **The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper.** R. A. Cookson (Cranfield Institute of Technology, Cranfield, Beds., England), X. H. Feng (Chinese Aeronautical Establishment, Aero-Gas Turbine Research Institute, Beijing, People's Republic of China), and S. S. Kossa (Military Technical College, Cairo, Egypt). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-285.* 5 p. 8 refs. Members, $2.00; nonmembers, $4.00.

The effect of journal misalignment in a two-land, squeeze-film damper on the oil-film pressure distribution and the resulting oil-film forces is investigated using a finite-difference technique implemented in a FORTRAN 1V computer program. It is found that the effect of misalignment can lead to a significant increase in the transmission of unbalance force through the oil film. This effect becomes more pronounced in the case of large ratio of land-length to radial clearance, large level of unbalance, or large bearing orbit. Although at this stage there is no clear indication of the range of operating conditions wherein allowance for misalignment should be made, a threshold of 0.0005 radians has been adopted in a current theoretical study into the effectiveness of uncentralized squeeze-film dampers. V.L.

A82-35462 * # **Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking.** J. Padovan, M. Adams, P. Lam (Akron, University, Akron, OH), D. Fertis, and I. Zeid (Northeastern University, Boston, MA). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-292.* 9 p. 12 refs. Members, $2.00; nonmembers, $4.00. Grant No. NsG-3283.

Second-year efforts within a three-year study to develop and extend finite element (FE) methodology to efficiently handle the transient/steady state response of rotor-bearing-stator structure associated with gas turbine engines are outlined. The two main areas aim at (1) implanting the squeeze film damper element into a general purpose FE code for testing and evaluation; and (2) determining the numerical characteristics of the FE-generated rotor-bearing-stator simulation scheme. The governing FE field equations are set out and the solution methodology is presented. The choice of ADINA as the general-purpose FE code is explained, and the numerical operational characteristics of the direct integration approach of FE-generated rotor-bearing-stator simulations is determined, including benchmarking, comparison of explicit vs. implicit methodologies of direct integration, and demonstration problems. C.D.

A82-35463 # **Ceramic turbine housings.** A. F. McLean (Ford Motor Co., Dearborn, MI). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-293.* 10 p. 12 refs. Members, $2.00; nonmembers, $4.00. Research supported by the U.S. Department of Energy and DARPA.

A development program aimed at the application of ceramics to automotive gas turbine engine inner housings is described. After a review of the design concepts considered, and the comparison of candidate ceramic designs with conventional sheet metal or cast iron structures for internal hot gas transition ducts, consideration of the properties of reaction bonded silicon nitride, reaction bonded silicon carbide, and lithium aluminum silicate (LAS) led to the selection of LAS because of its low bulk thermal expansion characteristics. Forming processes such as slip casting and glass forming are considered, along with thermal and mechanical problems that inhere in such large ceramic components. The performance potential of ceramic turbine housings is established in light of the engine and rig tests evaluated. O.C.

A82-35465 # **A procedure for evaluating fuel composition effects on combustor life.** H. L. Foltz and M. J. Kenworthy (General Electric Co., Advanced Engineering and Technology Programs Dept., Cincinnati, OH). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-296.* 6 p. 6 refs. Members, $2.00; nonmembers, $4.00. Contract No. N00140-80-C-2269.

A generalized method is presented for estimating the effects of fuel composition on liner life. This method avoids the detailed temperature and stress distribution calculations required when using conventional cyclic material property charts. The simplified approach became possible when it was found that cyclic life ratios due to fuel change were very similar when correlated with a convenient temperature parameter that had already been used in the past to correlate fuel composition with metal temperature change. This life ratio was found to be relatively independent of: (1) the peak temperature existing with the base fuel; (2) the coolant temperature; and (3) the actual detailed stress calculation. A trend of increased life ratio effect at longer cyclic lives for crack initiation was found. This trend can be incorporated into life ratio estimates from the prepared curves by using the actual observed service life without the need for a calculated absolute life. (Author)

A82-35469 # **Heat transfer optimised turbine rotor blades - An experimental study using transient techniques.** J. H. Nicholson, A. E. Forest (Rolls-Royce, Ltd., Derby, England), M. L. G. Oldfield, and D. L. Schultz (Oxford University, Oxford, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-304.* 11 p. 10 refs. Members, $2.00; nonmembers, $4.00.

Conventionally, high pressure turbine blading is optimized for aerodynamic performance without any film cooling applied to the surfaces of the blades. It is considered that modern boundary layer prediction techniques are now sufficiently accurate to allow the heat transfer to be considered at the profile design stage. Two turbine rotor profiles were designed, each with a heat-transfer-optimised pressure surface, and a detailed experimental study using transient techniques in the Oxford cascade tunnel was made. The results show that significant reductions in pressure surface heat transfer can be achieved by boundary layer optimization without compromising the aerodynamic efficiency of the blades. A description of the profiles is given, together with transfer rate measurements, pressure distribution, and aerodynamic loss measurements (a technique developed to measure aerodynamic loss in a transient cascade is described) and flow visualisation photographs. (Author)

A82-35470 # **The effect of temperature ratios on the film cooling process.** P. J. Loftus and T. V. Jones (Oxford University, Oxford, England). *American Society of Mechanical Engineers, International Gas Turbine Conference and Exhibit, 27th, London, England, Apr. 18-22, 1982, Paper 82-GT-305.* 6 p. 11 refs. Members, $2.00; nonmembers, $4.00. Research supported by the Rolls-Royce, Ltd. and Ministry of Defence (Procurement Executive) of England.

Film cooling experiments have been conducted at conditions which realistically simulate gas turbine environment. Heat transfer has been measured using a short duration wind tunnel. Mainstream injection and wall temperatures have been varied independently in order to conduct a systematic investigation of the injection process. A model of the film cooling process based on the principle of superposition is used to interpret the experimental results. The effect of gas to wall temperature ratio on heat transfer to an uncooled plate has also been investigated. (Author)

A82-35479 # **Technology advancements for energy efficient aircraft engines.** R. W. Bucy (General Electric Co., Cincinnati, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1051.* 9 p. 9 refs.

The rapid increase in fuel costs since 1973 has been a major influence on the economics of the commercial aircraft fleet. The development of more fuel efficient aircraft engines has, therefore, become an important priority for aircraft engine manufacturers and NASA. Major goals of a program designed to achieve better fuel efficiency include, relative to the CF6-50C reference engine, 12% reduction in installed Specific Fuel Consumption (SFC), 5% reduction in Direct Operating Costs (DOC), and 50% reduction in the SFC deterioration rate in commercial service. A description is presented of the progress made, in connection with the considered program, over the past four and one-half years. Attention is given to component and engine development tests, the fan component test, high pressure compressor component tests, combustor component tests, high and low pressure turbine component tests, and overall systems integration. G.R.

A82-35555 # Commercial transports - Aerodynamic design for cruise performance efficiency. F. T. Lynch (Douglas Aircraft Co., Long Beach, CA). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 81-147. 35 refs.

After a preliminary discussion of basic differences in the transonic flow problems addressed by designers of military aircraft and commercial transports in their efforts to increase cruise performance efficiency, the cruise drag efficiency of existing commercial transport aircraft are examined to determine areas for intensive future development. It is shown that, in order to permit the development of computational design procedures for the accurate calculation of three-dimensional swept wing drag and buffet-onset characteristics, collaboration is needed between developers of transonic potential flow techniques and viscous and inviscid-viscous interaction techniques. In addition, exploitation of the high Reynolds number capability of the National Transonic Facility requires additional development of instrumentation and of testing techniques aimed at flow visualization. O.C.

A82-35556 # Practical aerodynamic problems - Military aircraft. R. G. Bradley (General Dynamics Corp., Fort Worth, TX). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 149-187. 28 refs.

The compromises required by tactical military aircraft design, because of the multiple design point requirements associated with missions which require good low-speed efficiency, and both transonic and supersonic cruise and maneuver characteristics, are discussed for the case of such existing aircraft as the F-16 and similar experimental aircraft. It is shown that the wing design of tactical aircraft is heavily influenced by supersonic requirements for minimum thickness and low camber. It is suggested that the development of methods for the analytical design of wings relying on simple leading and trailing edge flaps in transonic maneuvers be emphasized. It is noted that aeroelastic tailoring is a valuable tool in providing favorable camber and twist for thin-winged fighter configurations, and that analytical methods for the calculation of operational store loads and separation trajectories are not satisfactory in the transonic regime. O.C.

A82-35557 # Experimental testing at transonic speeds. J. A. Blackwell, Jr. (Lockheed-Georgia Co., Marietta, GA). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 189-238. 30 refs.

The process of experimental design for wind tunnel tests of aircraft configurations and components at transonic speeds are explored, along with suggestions for the solutions of problems encountered in experimental testing. Accounting for uncontrollable variables such as the wall effect, through computational allowances, model sizing, and streamlined tunnel walls is described. The tailoring of models for trials is examined for cases of basic research, concept development, code verification, configuration development, and production aircraft models. Minimization of model support systems' flow interference is discussed for wall mounts and sting mounts, as well as for power plant configurations. Finally, methods of accurately producing scaled-down Reynolds number flows which will retain their applicability to the real world are detailed. M.S.K.

A82-35560 # Transonic design using computational aerodynamics. M. E. Lores and B. L. Hinson (Lockheed-Georgia Co., Marietta, GA). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 377-402. 16 refs.

Design methods for improving aircraft performance in transonic regimes are reviewed in terms of inverse solution and numerical optimization methods. Inverse schemes involve computation of the surface velocity potential from surface pressures to obtain a Dirichlet boundary condition. A geometry is then developed by solving a potential flow equation and integration of a tangential flow equation. Weaknesses of the method are discussed, noting the inverse methods are useful for initial wing design. Numerical optimization requires choice of a starting geometry, defining the design objective, and then specifying the constraints. The design proceeds in a series of searches in which variables are perturbed to test the effects on the design objectives and constraints. An example of the numerical optimization of a C-141B to include a 0.03 increase in the Mach cruise speed is presented. M.S.K.

A82-35561 # Application of computational methods to transonic wing-design. I. C. Bhateley and R. A. Cox (General Dynamics Corp., Fort Worth, TX). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 405-430. 23 refs.

Available transonic computational methods for wing design are examined and examples are provided. The governing equations, differencing techniques, geometry modeled, the necessity for viscous corrections, and the Mach number range of presently used computer codes are detailed. The schemes considered include the Bailey-Ballhaus, Pandora-Boppe, Jameson FLO-22 Caughey, the Jameson FLO-27 Caughey, and the advanced Jameson FLO-28/30 codes. Design techniques which employ one or several codes for the simulation of aircraft components or combinations of components in a transonic flow regime are outlined. Specific examples are made of a trainer wing refinement, and an advanced fighter flap design. The codes are concluded to be deficient in treating complex configurations such as fuselages, and also to require large amounts of computational time. M.S.K.

A82-35562 # A-7 transonic wing designs. H. P. Haney (Lockheed-Georgia Co. Marietta, GA). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 431-450. 10 refs.

The problems encountered in applying available computer codes to the computational design of new wings for the A-7 aircraft are reported. The Navy and NASA performed the study in the period 1976-1980 to correlate the FLO-22 code wing analysis with wind tunnel data, to optimize transonic airfoils, numerically optimize wing design, design two different wings for different criteria, wind tunnel test the pressure models of the new wings, and compare experimental results with the model predictions. Simulation of the existing A-7 wing by means of the FLO-22 code showed agreement satisfactory enough for the study to proceed. Design constraints on the new airfoil included a 0.4 lift coefficient and 0.78 Mach number. It was found that only a few of 25 design variables could be used in each wing section, thereby requiring rerunning the code for each variable when gradients were needed. Correlations drawn from wind tunnel tests were concluded unsatisfactory for optimization purposes. M.S.K.

A82-35563 # Transonic computational experience for advanced tactical aircraft. E. Bonner and P. B. Gingrich (Rockwell International Corp., Aircraft Group, Los Angeles, CA). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 451-465. 10 refs.

Three-dimensional transonic numerical analysis performed for the HiMAT and FSW wing definition is described, along with comparisons with experimental results. HiMAT manuuver wings were analyzed with the Bailey-Ballhaus classical small disturbance theory, which was found to predict the entire upper surface flow after modifications of the Karman-Guderly transonic small disturbance equation. Multiple surface interactions are noted to be necessarily studied instead of in isolated components at subsonic and supersonic speeds. An approximate procedure was found for changing the wing twist to account for the canard downwash, and a full potential assessment is presented, along with comparisons for a near maneuver condition of Mach 0.9 at an angle of attack of 10 deg. Forward swept wing analysis is discussed, noting that test results were not well predicted by small disturbance or full potential analysis. M.S.K.

A82-35564 # Extension of FLO codes to transonic flow prediction for fighter configurations. A. Verhoff and P. J. O'Neil (McDonnell Aircraft Co., St. Louis, MO). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 467-487. 11 refs. Research supported by the McDonnell Douglas Independent Research and Development Program.

The applications of FLO and equivalent simple body (ESB) computer codes to simulating transonic behavior of various fighter aircraft are described. The ESB program is employed to model complex geometries such as the wing/fuselage combination using a panel method. The models are valid at small angles of attack and linear and Mach independent, thereby suitable for the transonic regime. When employed with the FLO codes, the ESB technique allows determination of the perturbation velocity distributions of a complex fuselage. Correlations are then available for FLO code results at subcritical Mach numbers, and the FLO program can be used for transonic regimes. The results of applications to the F-15 geometry are presented, and further use for modeling the F/A-18, the

AV-8B, and the F-4 to test the range of the combined method are indicated. M.S.K.

A82-35565 # **A series of airfoils designed by transonic drag minimization for Gates Learjet aircraft.** M. L. Hinson (Gates Learjet Corp., Wichita, KS). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 489-509. 13 refs.

Airfoils designed for reduced transonic drag using various versions of numerical optimization programs are described and compared with experimental results. Focussing on evolutionary models of the Gates Learjet, efforts to find an airfoil to replace the currently used NACA 64A109 profile are explored. Noting a preference for flight around Mach 0.81 and the long range cruise design point of Mach 0.7, efforts were made to maintain low stall speeds, eliminate aileron buzz, minimize the structural components which needed changing, and fit the new wing within existing contours. The CONMIN constrained function minimization program was employed to find a minimum value of an objective function and simultaneously satisfy a set of constraints such as drag coefficient. FLO-6 was employed for aerodynamic parameters. One- and two-point optimization results are given for airfoils chosen and wind tunnel tests. Five airfoils with reduced drag were constructed. M.S.K.

A82-35566 # **Applied computational transonics - Capabilities and limitations.** P. A. Henne, J. A. Dahlin, and C. C. Peavey (Douglas Aircraft Co., Long Beach, CA). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 511-543. 19 refs.

Computational transonic methods which feature nonconservative solution of the full-potential equation for airfoils and wings are examined from the viewpoint of utilization in a production framework. Attention is given to direct solutions in defining the aerodynamic flow about a body and to inverse solutions obtained in the design process. The direct solutions comprise the Program H and FLO-22 codes and involve finite difference schemes to describe the potential flow. The concept of surface transpiration is the basis for the two- and three-dimensional inverse methods, those of Tranen and Henne, respectively. Direct solutions entail simulation of viscous effects through boundary layer additions to the airfoil surface, in addition to approximate fuselage volume and cross flow effects in the three-dimensional case. Inverse methods require the inclusion of the capability of airfoils to produce shocks. Comparisons are made between predicted and observed airfoil performance in transonic flows. M.S.K.

A82-35567 # **Evaluation of full potential flow methods for the design and analysis of transport wings.** L. R. Miranda (Lockheed-California Co., Burbank, CA). In: Transonic aerodynamics; Transonic Perspective Symposium, Moffett Field, CA, February 18-20, 1981, Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1982, p. 545-561.

The applicability and limitations present with the use of currently available full potential flow computer codes for the analysis of transport-type wings in the transonic regime are investigated. It is noted that the design process involves definition of the target pressure distributions for analytical generation of a tentative design which is then analyzed numerically through the available codes. The FLO-22 scheme employs a nonconservative difference scheme with a computational grid generated by a series of sheared and parabolic coordinate transformations. The FLO-28 and -30 codes are based on the finite volume conservative difference scheme. Use of the three schemes for the design of a wing and subsequent verification in the NASA-Ames Transonic Tunnel is described. Inclusion of viscous effects was found to enhance the accuracy of the modeling process. M.S.K.

A82-35727 **Triggered lightning.** D. W. Clifford (McDonnell Aircraft Co., St. Louis, MO) and H. W. Kasemir (Colorado Scientific Research Corp., Berthoud, CO). *IEEE Transactions on Electromagnetic Compatibility,* vol. EMC-24, May 1982, pt. 1, p. 112-122. 41 refs.

The present investigation is concerned with the possible triggering of lightning as a result of introducing an aircraft or other aerospace vehicle into the atmospheric electrical system, taking into account the study of natural lightning processes reported by Uman and Krider (1981). The evidence and arguments for aircraft-triggered lightning are reviewed, drawing upon the ground-based triggering experience for insights into the triggering process. The triggering arguments which have been advanced are examined and compared with in-flight lightning-strike reports to deduce the flight and weather conditions most likely to produce triggered lightning. Based upon the conclusions drawn about the triggering process, the probable characteristics of aircraft-triggered lightning are discussed in light of their effects on aircraft safety. G.R.

A82-35729 **Airborne warning systems for natural and aircraft-initiated lightning.** L. W. Parker (Lee W. Parker, Inc., Concord, MA) and H. W. Kasemir (Colorado Scientific Research Corp., Berthoud, CO). *IEEE Transactions on Electromagnetic Compatibility,* vol. EMC-24, May 1982, pt. 1, p. 137-158. 83 refs. Contract No. F19628-79-C-0161.

A needs exists for reliable and inexpensive (light-weight) airborne lightning warning and avoidance systems. In one application of such a system warnings would be provided of distant storms, enabling a pilot to avoid severe weather. In another application warnings of possible imminent lightning strikes would be given to the aircraft in electrified clouds. Two general classes of lightning warning systems are considered, including systems providing distant warnings and systems giving near-zone warnings. Dectors providing near-range warnings are discussed. These are electrostatic-field detectors which can be useful for warning and avoidance of lightning strikes to the aircraft. They warn of the presence of high electric fields. A description is also given of detectors providing distant warnings. Attention is given to RF sferics bearing detection (direction-finding) by magnetic loops, HF-VHF-UHF bearing detectors, optical bearing detectors, RF-sferics range detection, and bearing errors. G.R.

A82-35730 **The direct effects of lightning on aircraft.** J. A. Plumer (Lightning Technologies, Inc., Pittsfield, MA) and J. D. Robb (Lightning and Transients Research Institute, St. Paul, MN). *IEEE Transactions on Electromagnetic Compatibility,* vol. EMC-24, May 1982, pt. 1, p. 158-172. 24 refs.

In the case of early wooden aircraft, lightning could produce catastrophic results. However, the conventional aluminum airframes of the aircraft replacing the early aircraft types have, by virtue of their excellent electrical conductivity, rarely suffered critical damage from lightning strikes. But now the situation is changing again with the advent of aircraft constructed partly (and sometimes entirely) of new, fiber-reinforced plastics with desirable lightweight and high-strength properties, but with poor electrical conductivity. The designers of nonmetallic structures must, therefore, give particular attention to the lightning environment, taking positive measures to protect against its adverse effects lest safety of flight be endangered. A review is conducted of the physical-damage effects, called direct effects, of lightning on aircraft structures and fuel systems, taking into account the implementation of basic protective methods. Attention is given to metallic structures, nonmetallic structures, and fuel systems. G.R.

A82-35731 **Electromagnetic interaction of lightning with aircraft.** R. A. Perala, T. Rudolph, and F. Eriksen (Electro-Magnetic Applications, Inc., Denver, CO). *IEEE Transactions on Electromagnetic Compatibility,* vol. EMC-24, May 1982, pt. 1, p. 173-203. 127 refs.

The electromagnetic interaction of lightning with aircraft is a complex event. Because of new aircraft technologies, it is becoming more important to be able to predict and understand lightning-induced transients on avionics systems. In this paper, a review of state-of-the-art of lightning-interaction modeling is presented. The overall interaction process is discussed, and specific modeling techniques are given for external interaction, internal interaction, and internal propagation. Some examples are given for lightning strokes attached to an aircraft. A discussion of nonlinear effects is also given, and comparison between nuclear electromagnetic pulse and lightning environments are presented. Finally, an overview of hardening techniques is given. An extensive bibliography is included. (Author)

A82-35732 **Static charging and its effects on avionic systems.** J. E. Nanevicz (SRI International Electromagnetic Sciences Laboratory, Menlo Park, CA). *IEEE Transactions on Electromagnetic Compatibility,* vol. EMC-24, May 1982, pt. 1, p. 203-209. 15 refs.

It is pointed out that the effects of electrostatic charging first became apparent when aircraft began operation under all-weather conditions. Frictional charging of the aircraft occurred when precipitation particles struck the aircraft and deposited a charge on its surface. The charging, in turn, led to electrical discharges from the aircraft, which generated noise which interfered with the communication and navigation equipment. Techniques were developed to mitigate the undesirable effects of charging and discharging processes. Investigations related to the occurrence of static electrification are discussed, and a description is provided of interference sources and their effects on systems. Attention is given to corona discharges, streamer discharges, discharges from helicopter blades, and spark discharges. G.R.

A82-35733 **Lightning simulation and testing.** D. W. Clifford, E. H. Schulte (McDonnell Aircraft Co., St. Louis, MO), and K. E. Crouch (Lightning Technologies, Inc., Pittsfield, MA). *IEEE Transactions on Electromagnetic Compatibility,* vol. EMC-24, May 1982, pt. 1, p. 209-224. 34 refs.

Laboratory simulation testing is relied upon for assessing the effects of lightning on aircraft and other aerospace systems. This paper reviews the laboratory equipment, techniques, and test waveforms used in simulating the important effects of atmospheric electricity on aerospace systems. Test criteria and techniques are well established for simulating the direct physical damage effects of lightning, but tests for determining the indirect, induced-coupling effects of lightning are still in the development stage. These last tests are necessary for evaluating the effects of the lightning environment on modern aircraft which make extensive use of computerized flight-control systems. (Author)

A82-35734 **Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria.** J. C. Corbin (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) and W. W. Cooley (Boeing Military Airplane Co., Seattle, WA). *IEEE Transactions on Electromagnetic Compatibility*, vol. EMC-24, May 1982, pt. 1, p. 225-237. 21 refs.

Possible approaches for assessing the susceptibility/vulnerability of aircraft to both the direct and indirect (induced) effects of lightning and for developing lightning-protection design criteria are examined. Particular emphasis is focused on methods that can be used to achieve a high level of confidence in aircraft safety and survival. Assessment factors and their uncertainties are qualitatively and quantitatively discussed. Lightning-protection design approaches involving both test and analysis as applied to the F-16 fighter aircraft and the NASA Space Shuttle are reviewed. A probabilistic or statistical approach is outlined (with examples) for predicting single and/or redundant equipment failure due to indirect lightning effects. (Author)

A82-35767 # **Laser application in weapon guidance and active imaging.** V. V. Rampal (Instruments Research and Development Establishment, Dehra Dun, India). *Indian Journal of Physics, Section B*, vol. 54B, no. 4-5, Aug.-Oct. 1980, p. 465-470. 10 refs.

The application of lasers in weapon guidance and active imaging is reviewed. Modern low flying aircraft used for ground attack are fitted with suitable laser instrumentation to provide range finding and target capabilities for seeking the target, and to measure its range, sending the weapon into it and thus reducing human element to the minimum. The principle of laser guidance is discussed, and the cost effectiveness of the weapon system is considered. Laser imaging using a high average power Nd YAG laser is described, and evidence for the possibility of using high repetition rate pulsed lasers for illumination and imaging of distant targets at night is presented. D.L.G.

A82-35820 # **Aerodynamic lag functions, divergence, and the British flutter method.** W. P. Rodden and E. D. Bellinger (MacNeal-Schwendler Corp., Los Angeles, CA). *Journal of Aircraft*, vol. 19, July 1982, p. 596-598. 18 refs.

Results of calculations of flutter and divergence instabilities for a two-dimensional airfoil are presented in a comparison of the transient method, which includes the transient aerodynamic representation explicitly, and the British flutter method, which only includes transient aerodynamics implicitly. The calculations involve airfoils mounted on bending and torsion springs, with the center of gravity located at 37% or 45% chord, aerodynamic center at 25% chord, and elastic axis at 40% chord. Both the transient and the British flutter method using either the exact Theodorsen function or the Jones approximation to the Theodorsen function show that flutter occurs when the torsion root becomes unstable, whereas divergence occurs when an aerodynamic lag root becomes unstable. It is concluded that the British flutter method adequately predicts all of the instabilities of aeroelastic systems without any need for approximations to aerodynamic transfer functions. S.C.S.

A82-35821 # **STOL aircraft response to turbulence generated by a tall upwind building.** L. D. Reid (Toronto, University, Toronto, Canada). *Journal of Aircraft*, vol. 19, July 1982, p. 601-603. 8 refs. Research supported by Environment Canada and Natural Sciences and Engineering Research Council of Canada.

The influence of building-induced turbulence on the landing approach of an STOL aircraft is predicted by the use of the turbulence correlation technique. Measurements of turbulence intensity and the turbulence correlation matrix were made in a planetary boundary layer wind tunnel with a simulated 152.4-m tall building and a steep (15-deg) glideslope located in the wind field. Calculations based on the measured turbulence correlation matrix for the case of a twin-engine turboprop light STOL transport executing a constant airspeed landing approach with fixed controls in the presence of a constant headwind indicate the presence of the building to result in a general increase in the dispersion of the longitudinal state vector of the aircraft, with the extent of increase becoming greater towards the bottom of the glideslope as the aircraft nears the building. It is noted, however, that the upwind building has only a minor impact on the turbulence-induced disturbance to the landing approach. S.C.S.

A82-35869 **Multiple aircraft tracking system for coordinated research missions.** P. N. Johnson and J. L. Fink (National Center for Atmospheric Research, Boulder, CO). *American Meteorological Society, Bulletin*, vol. 63, May 1982, p. 487-491.

The Multiple Aircraft Position System was developed in response to the need for aircraft position in the coordination of large field projects involving several research aircraft. Radio interferometer techniques are used to provide rapid, accurate determination of positions for up to 10 aircraft furnished with special airborne radio beacons. Three remote interferometer array sites receive the signals from the airborne beacons, each transmitting at a unique frequency. Each remote site is tuned to one beacon frequency at a time according to a programmable polling sequence; several phase difference measurements are made from the received signal. These data then are telemetered to a central control station where they are transferred to a computer that calculates the direction cosines from each remote site to the airborne beacon, and thus determines the position of the beacon. The aircraft positions then are immediately available for display. (Author)

A82-35874 † **The effect of erosion wear on the vibration characteristics of axial-turbine blades (Vliianie erozionnogo iznosa na vibratsionnye kharakteristiki lopatok osevykh turbomashin).** R. G. Perel'man, V. V. Bodryshev, V. V. Priakhin, E. B. Karpin, L. V. Matrosova, and V. N. Chebotarev (Moskovskii Aviatsionnyi Institut, Moscow; Ob'edinenie Kaluzhskii Turbinnyi Zavod, Kaluga, USSR). *Energetika*, Apr. 1982, p. 60-64. 5 refs. In Russian.

A variational method based on the theory of twisted rods with nonrectilinear axis is used to analyze the effect of erosion wear on the vibration characteristics of axial-turbine blades. It is shown that relative variations of vibration frequencies of free blades for static and dynamic modes of operation almost coincide. Theoretical results agree well with experimental data. B.J.

A82-35876 **Certification of an airborne Loran-C navigation system.** F. D. MacKenzie (U.S. Department of Transportation, Transportation Systems Center, Cambridge, MA). *Navigation*, vol. 29, Spring 1982, p. 69-79. 5 refs. Research supported by the Research and Special Programs Administration.

The requirements, FAA approval process, testing, and analysis which led to acceptance of a Loran-C navigational system certification for the state of Vermont are detailed. NASA personnel from Langley Research Center designed, fabricated, installed, and calibrated the on-board data collection instrumentation, as well as the software for analysis of the airborne and ground-based records. Flights were required during visual and instrument conditions, day and night, through all seasons, and during twilight conditions, while the Loran-C signal characteristics were measured at ground stations for EM compatibility, predictability, temporal stability, and ease of airborne acquisition. Standard deviations were either calculated or measured for the equipment, for parts of the system, and for the pilot's contribution to the errors. The Loran-C system was determined to meet or exceed all relevant criteria. M.S.K.

A82-35881 **Propellers come full circle.** R. DeMeis. *High Technology*, vol. 2, July-Aug. 1982, p. 16-18.

The use of the propfan in future aircraft is discussed. With the large external fan generating more thrust per engine revolution than a small internal fan, propfan jets could achieve fuel savings as high as 25 percent in commercial operations and 35 percent for military patrol missions, while retaining the vibration-free operation and mechanical simplicity of turbojet engine cores. The propfan would have as many as 12 stiff composite blades that would be highly swept, thinner, and shorter than conventional blades in order to reduce noise and drag. The gearbox would be reintroduced to permit operation at maximum efficiency with the best blade rotation speed for the airflow conditions. A double-wall insulated fuselage and shaped wing-nacelle interface would deal with internal aircraft noise and propfan-swept wing integration problems. The development of the propfan may depend on continued government funding to NASA's program. C.D.

A82-36047 # **Prospects for Navsat - A future worldwide civil navigation-satellite system.** C. Rosetti (ESA, Directorate of Applications Programmes, Paris, France). *ESA Bulletin*, no. 30, May 1982, p. 54-59.

Air navigational problems which inhibit flying optimal routes and which could be aided by a worldwide navigational satellite system (Navsat) are examined. Satellite systems are noted to alleviate ground- and air-based equipment constraints for the airlines, developing nations in need of mapping assistance, offshore oil drilling operations, and geodetic surveys. A Navsat system, following the design adopted by military GPS operations, involves a receiver capable of detecting time-lapsed signals from well-positioned satellites. The transmission is broadcast in terms of a lock-on signal and a signal carrying tens of bits/sec of information regarding ephemerides. Either mobile or fixed receivers can gain precise location data by tuning in to two or three satellites simultaneously. A potential system involving 24 satellites is described, which would offer 95.6% availability from anywhere on earth. M.S.K.

A82-36054 **Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds.** M. Bain and J. F. Gayet (Clermont-Ferrand II, Université, Aubière, Puy-de-Dôme, France). *Journal of Applied Meteorology*, vol. 21, May 1982, p. 631-641. 19 refs. Direction des Recherches, Etudes et Techniques *Contract No. 79-34-183.*

Some results of icing rate measurements connected with meteorological parameters during penetrations into stratiform and cumuliform clouds are described. Icing measurements were carried out in Spain during a precipitation enhancement project experiment in 1979, using an instrumented DC-7 aircraft. The meteorological parameters determined include the temperature, concentration of large ice particles, liquid water content, cloud droplet concentration, and median volume diameter. The energy balance at the riming surface of a cylinder is analyzed and the critical liquid water concentration determined in order to predict the ice growth regime (wet or dry), with an 85 percent success rate. An expression is derived for the dependence of the icing rate upon the studied parameters and comparison is made with the measured icing rate. For a range of temperatures from -21 to -8 C, the icing rate appears to be reduced by about 50 percent by the presence of large ice particles in concentrations above 5/L. C.D.

A82-36065 **Evaluation criteria for aero engine materials (Bewertungskriterien für Werkstoffe des Flugtriebwerkbaues).** P. Esslinger (Motoren- und Turbinen-Union München GmbH, Munich, West Germany). *Metall*, vol. 36, June 1982, p. 654-659. In German.

The criteria examined include lightweight construction, technological and economic properties, and reliability. Energy and raw materials consumption is a criterion steadily increasing in importance, especially when critical elements such as cobalt and chromium are involved. Substitutes for scarce materials are indicated. The quantitative prediction of materials failure is analytically discussed, and failure probability curves for a homogeneously stressed, rotating bar are given. Wöhler curves for strain tests on nickel materials are found along with maximum strain amplitudes for nickel materials of various yield points and failure values. C.D.

A82-36175 # **An alternate test procedure to qualify future fuels for Navy aircraft.** C. A. Moses, N. R. Sefer, and M. L. Valtierra (Southwest Research Institute, San Antonio, TX). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1233.* 9 p. 22 refs. Contract No. N00140-80-C-2269.

The U.S. Navy is experiencing pressures to modify the JP-5 fuel specification because of the growing shortage of high-quality crude oils from which kerosene can be simply distilled, and the increased costs of refining lesser quality crude oils to meet the current specification. A program has been initiated with the objective to study and develop a qualification procedure for future fuels. The purpose of the Alternative Test Procedure (ATP) would be to reduce the number of large-scale engine and flight tests required to develop confidence that a new fuel type will perform satisfactorily. Attention is given to future Navy aircraft fuels, the impact of future fuels on aircraft systems, aspects of hot section durability, materials compatibility, lubricity, cold day ignition, and thermal stability. It is concluded that an ATP to qualify future fuels is both necessary and feasible. G.R.

A82-36191 **Digital spectral analysis of the noise from short duration impulsively started jets.** I. S. Hodge, D. J. Smith, and N. H. Johannesen (Manchester, Victoria University, Manchester, England). *Journal of Sound and Vibration*, vol. 82, May 22, 1982, p. 171-179.

Techniques in which a shock tube is used to produce short duration jets are discussed briefly. The method adopted involves using the shock tube as a static reservoir with the jet exhausting through a nozzle originally closed by a diaphragm. Short duration noise samples of a Mach 0.9 air jet are recorded digitally and narrow band and one-third octave spectra are evaluated. Average spectra from a number of samples are presented. Comparison with both digital and analog spectra from the equivalent continuous jet demonstrates that it is possible to obtain meaningful spectra by averaging short duration samples of impulsively started jets. The technique is therefore suitable for the relatively cheap exploration of the noise field of jets of a wide variety of gases. (Author)

A82-36281 * # **A single-frequency multitransmitter telemetry technique.** V. A. Carreno (NASA, Langley Research Center, Flight Control Systems Div., Hampton, VA). *Instrument Society of America, International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Paper.* 9 p.

A telemetry technique for a special data collection system being developed for use on general aviation aircraft involved in aeronautical research programs is described. The system consists of a number of sensor-transmitter units at different locations on the aircraft, with individual signal conditioning and logic, which send sampled data signals to a single receiver in the airplane. The transmitters operate independently on the same frequency and are not synchronized to the receiver. The problem of reception of multiple samples simultaneously is treated by discarding such samples. An overlap detection technique for the frequency shift keyed modulation system is described. The amount of predicted data loss due to overlap is presented and compared with results obtained with a circuit implementation; the effects of discarded data on accuracy is discussed. (Author)

A82-36673 † **Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel (Otsenka effektivnosti gidroochistki malostabil'nogo komponenta topliva T-1).** A. A. Aliev, Kh. A. Akhmedov, L. G. Ismailova, and M. A. Mardanov (Akademiia Nauk Azerbaidzhanskoi SSR, Institut Neftekhimicheskikh Protsessov, Baku, Azerbaidzhan SSR). *Khimiia i Tekhnologiia Topliv i Masel*, no. 6, 1982, p. 27, 28. In Russian.

An experimental study has been carried out to investigate the possibility of improving the thermal stability of T-1 jet fuel by hydrorefining the component responsible for the low stability of T-1. The physicochemical properties of T-1 are presented along with the results of thermal stability tests before and after hydrorefining, showing that the thermal stability of the fuel increases by 3.8 times following hydrorefining. V.L.

A82-36937 **The computerized cockpit for the one-man crew.** M. Lambert. *Interavia*, vol. 37, June 1982, p. 608, 609.

The Demonstration Advanced Avionics System (DAAS), a NASA experiment, is an integrated computer system designed to produce information, guidance and control for the pilots of light aircraft, similar to that already in use in fighters and airliners. The DAAS system uses integrated displays from a central computer to provide data about navigation, flight status, aircraft configuration items and other similar matters to general aviation pilots. An improved version of the DAAS system offering greater reliability, smoother integration of analog sensors and with weather radar incorporated might become commercially available by the mid-1980s. A detailed block diagram of the system in included. N.B.

A82-36947 † **The powerplants of the Yak-40 and M-15 aircraft (Silovaia ustanovka samoletov Iak-40 i M-15).** V. K. Frantsev and N. A. Sherlygin. Moscow, Izdatel'stvo Transport, 1981. 232 p. 17 refs. In Russian.

The work examines the design, parameters, and operation of the powerplants of the Yak-40 and M-15 aircraft. Attention is given to the effect of changes in the modes and conditions of operation on the loading and mechanical stability of the engine parts. The physical principles underlying engine processes are described theoretically, and particular emphasis is placed on the operation of the engine, its systems and components. B.J.

A82-36950 † **Assembly of aircraft instruments (Sborka aviatsionnykh priborov).** A. V. Seleznev and V. A. Volokhov. Moscow, Izdatel'stvo Mashinostroenie, 1981. 312 p. 10 refs. In Russian.

The fundamentals of aircraft instrument manufacture are reviewed with reference to the design and performance characteristics of various instruments and basic fabrication processes. In particular, consideration is given to mechanical assembly, electrical assembly, testing, adjustment, and calibration of instruments. Instruments discussed include mechanical instruments with elastic sensing elements (e.g., pressure gages), electromechanical instruments, and gyroscopic instruments. The discussion also covers instrument reliability, process mechanization and automation, quality assurance, and, finally, worker safety and fire prevention. V.L.

A82-36969 * **Justification for, and design of, an economical programmable multiple flight simulator.** J. G. Kreifeldt (Tufts University, Medford, MA), J. Wittenber, and G. Macdonald. In: Manned systems design: Methods, equipment, and applications; Proceedings of the Conference, Freiburg im Breisgau, West Germany, September 22-25, 1980. New York, Plenum Press, 1981, p. 427-448. 9 refs. Grant No. NsG-2156.

The considered research interests in air traffic control (ATC) studies revolve about the concept of distributed ATC management based on the assumption that the pilot has a cockpit display of traffic and navigation information (CDTI) via CRT graphics. The basic premise is that a CDTI equipped pilot can, in coordination with a controller, manage a part of his local traffic situation thereby improving important aspects of ATC performance. A modularly designed programmable flight simulator system is prototyped as a means of providing an economical facility of up to eight simulators to interface with a mainframe/graphics system for ATC experimentation, particularly CDTI-distributed management in which pilot-pilot interaction can have a determining effect on system performance. Need for a multiman simulator facility is predicted on results from an earlier three simulator facility. G.R.

A82-36972 † **Aviation meteorology (Aviatsionnaia meteorologiia).** A. M. Baranov and S. V. Solonin. Leningrad, Gidrometeoizdat, 1981. 384 p. 132 refs. In Russian.

The effect of meteorological conditions on airplanes and helicopters is considered. In the light of new aviation standards, the principles governing the use of meteorological data in aviation in order to improve the performance and safety of aircraft are set forth. Also considered are questions pertaining to the use of new equipment, including computers, for the collection, processing, and display of the meteorological information intended for aviation. C.R.

A82-36999 # **Analysis of rotating structures using image derotation with multiple pulsed lasers and moiré techniques.** J. C. MacBain, W. A. Stange (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH), and K. G. Harding (Dayton, University, Dayton, OH). In: Society for Experimental Stress Analysis, Spring Meeting, Dearborn, MI, May 31-June 4, 1981, Proceedings. Brookfield Center, CT, Society for Experimental Stress Analysis, 1982, p. 227-232. 10 refs.

Experiments were carried out on a bladed disk to study dual resonant modes under rotating conditions using image derotated holography and a Q-switched double-pulsed ruby laser. It is shown that hologram interferometry using image derotation is a valuable tool in studying the structural response of rotating bladed disks. It is also shown that the versatility and usefulness of the method can be extended even further by the use of triple-pulsed laser holography and some form of moiré analysis.

V.L.

A82-37031 **The PATRIOT Radar in tactical air defense.** D. R. Carey (Raytheon Co., Bedford, MA) and W. Evans. In: EASCON '81; Electronics and Aerospace Systems Conventions, Washington, DC, November 16-19, 1981, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 64-70.

The PATRIOT Radar is a C-band, phased array, multifunction radar that under the control of the Weapon Control Computer in the Engagement Control Station performs target search and track, missile search, track, and communications during midcourse guidance, and target-via-missile (TVM) terminal guidance. This paper describes the functions the radar performs and provides brief descriptions of the subsystems. The use of a multichannel, multifunction receiver and digital signal processor is emphasized to demonstrate the control and processing for multiple radar actions required to support the tactical air defense mission. A summary of results of an extensive test program at the White Sands Missile Range is presented.

(Author)

A82-37034 **Simplified digital design tools.** S. M. Seltzer (Control Dynamics Co., Huntsville, AL). In: EASCON '81; Electronics and Aerospace Systems Conventions, Washington, DC, November 16-19, 1981, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 145-150. 8 refs.

This paper presents a design philosophy for developing a digital control (or, guidance and control) system. The philosophy takes advantage of high-fidelity, high-order digital simulation tools coupled with low order analysis techniques that permit mathematical tractability. After describing that philosophy, the major portion of the paper is devoted to a description of three analytical digital design tools and how they can be used in concert. These tools are: (1) the Systematic Analytical Method (SAM) which is a method for obtaining mathematical relationships between desired system inputs and system outputs; (2) the Cross-Multiplication Method which provides a means of obtaining the time-domain response from the system closed-loop transfer function; and (3) the Digital Parameter Space Method which permits one to examine and specify the dynamics of a system. The use of these tools together is demonstrated in a simple example. (Author)

A82-37035 **C band spectral tracking for FM/CW altimetry.** T. O. Perkins, III (Kollsman Instrument Co., Merrimack, NH). In: EASCON '81; Electronics and Aerospace Systems Conventions, Washington, DC, November 16-19, 1981, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 166, 167.

It is shown that the spectrum leading edge detection concept offers a highly accurate and reliable radar altimeter design with low transmit power and narrow receiver bandwidth. By avoiding frequency counters and short time measurements, many of the problems of more classical approaches can be eliminated. It is noted that the approach is also suitable for other applications where accurate distance measurement is required. Aside from the narrow bandwidth, the tracking discriminator response is balanced to cancel noise effects. Since propagation losses are 6 dB/octave for the entire altitude range, it is feasible to measure altitudes to 100,000 feet.

C.R.

A82-37037 **An accurate Doppler navigator with microwave simplicity.** S. Monfort and G. Schaffner (Teledyne, Inc., San Diego, CA). In: EASCON '81; Electronics and Aerospace Systems Conventions, Washington, DC, November 16-19, 1981, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 174-178.

This paper describes the extremely simple microwave circuitry of one of the most accurate Doppler navigation radars in use today. The radar consists of four microwave assemblies, a single diode solid state transmitter, a beam switch with one integrated circuit module, a fixed antenna assembly and a two-channel receiver in a single stripline board.

(Author)

A82-37039 # **FAA tests on the Navstar GPS Z-set.** R. J. Esposito and E. M. Sawtelle (FAA, Technical Center, Atlantic City, NJ). In: EASCON '81; Electronics and Aerospace Systems Conventions, Washington, DC, November 16-19, 1981, Record New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 208-216. 6 refs.

The FAA independently determined the applicability of Navstar GPS for civil aviation through the flight and laboratory test of a Z-set receiver after this unit was acceptance tested aboard a USAF System Command C-141 aircraft. The acceptance flight tests were performed over the Yuma Proving Ground instrumented range. The FAA conducted initial tests in a twin turboprop engine Grumman Gulfstream from the Technical Center. The Z-set operated in a stand-alone (non-instrumented) configuration. Testing included satellite shielding studies, non-precision approaches to different airports, and operations in high noise/RFI environments (in the vicinity of airports, urban areas, radio and TV antenna towers, etc.). This paper summarizes the acceptance and the FAA familiarization test results. The paper also contains a brief description of completed and future tests for the instrumented Z-set with automated data acquisition systems.

(Author)

A82-37040 **Navstar - Global Positioning System: A revolutionary capability.** W. C. Euler and J. W. Breedlove (Magnavox Advanced Products Co., Torrance, CA). In: EASCON '81; Electronics and Aerospace Systems Conventions, Washington, DC, November 16-19, 1981, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 217-224.

A GPS user can obtain an accurate navigation fix at any time in any weather condition and in the presence of interference. Analyses sponsored by the DOD indicate that much of the initial cost of GPS (approximately five billion dollars) can be offset by discontinuing some present-day navigational systems. On the other hand, force enhancement considerations and other cost benefits could reach 50 billion dollars. This paper examines various aspects of GPS, including: global navigation accuracy; support for CCCI, military capability, survivability, cost effectiveness in regard to Nudet detection, tactical-warfare applications, and force enhancement.

B.J.

A82-37061 # **Use of CGHRP in transport.** D. Short and J. Summerscales (Plymouth Polytechnic, Plymouth, Devon, England). In: Reinforced Plastics/Composites Institute, Annual Conference, 36th, Washington, DC, February 16-20, 1981, Preprints. New York, Society of the Plastics Industry, Inc., 1981 (Session 11-D). 4 p. 80 refs.

The appplications of carbon fiber and glass fiber hybrid reinforced plastics in transport are reviewed with emphasis on benefits achieved by the reduction of weight or the improvement in performance relative to conventional structures. The applications discussed include car bodies, automotive driveshafts, automotive engine parts, yacht hulls, hovercraft blades, airframe structures, and helicopter rotors. Current trends in the field of hybrid plastics are the use of materials with intimately mixed finely dispersed fibers and wider use of thermoplastic matrices instead of the thermosets.

V.L.

A82-37062 * # **Composite containment systems for jet engines.** G. T. Smith (NASA, Lewis Research Center, Cleveland, OH). In: Reinforced Plastics/Composites Institute, Annual Conference, 36th, Washington, DC, February 16-20, 1981, Preprints. New York, Society of the Plastics Industry, Inc., 1981 (Session 12-A). 8 p. (Previously announced in STAR as N81-17480)

A82-37065 # **A significant role for composites in energy-efficient aircraft.** G. A. Alther (Composite Aircraft Corp., Midland, TX). In: Reinforced Plastics/Composites Institute, Annual Conference, 36th, Washington, DC, February 16-20, 1981, Preprints. New York, Society of the Plastics Industry, Inc., 1981 (Session 12-D). 4 p. 7 refs.

The structural advantages and a 10-year in-service history of the Windecker Eagle all fiberglass/epoxy airframes are discussed. In these airframes, the skins are composed of one or more plies of nonwoven unidirectional fiber cloth, the wing spars and other laminates are also composed of multiple oriented plies of fiber cloth, and a ply of nonwoven 0/90 cloth is used for the outermost plies of the laminates and skins to enhance the finish. Stiffening for the skin laminates is provided by composite laminate stringers varying in thickness from 1/4 to 1 inch spaced with polyurethane foam. The fuselage is molded in one-piece halves complete with vertical tail, wing root, and stabilizer junctures, and bonded together at mating flanges along the top and bottom body lines. It is shown that apart from aerodynamics and energy efficiency, the all fiberglass/epoxy airframe provides greater strength, toughness, and redundancy compared to aluminum for equivalent structural weight.

V.L.

A82-37071 # **Fabrication and test of integrally stiffened graphite/epoxy components.** L. M. Poveromo and J. A. Suarez (Grumman Aerospace Corp., Bethpage, NY). In: Reinforced Plastics/Composites Institute, Annual Conference, 36th, Washington, DC, February 16-20, 1981, Preprints. New York, Society of the Plastics Industry, Inc., 1981 (Session 17-A). 8 p. Contract No. F33615-78-C-5234.

A program has been initiated to demonstrate and validate low-cost skin stabilization manufacturing methods for composite designs which are cost-competitive with conventional full-depth aluminum honeycomb structures. The demonstration component selected is the trailing edge of the EF-111A horizontal stabilizer, for which cost data and maintenance experience are available. A production-suitable, vacuum-bag-cure manufacturing method developed for this integrally stiffened graphite/epoxy component is described, and static test results are presented for a full-size trailing edge. The life-cycle cost benefits derived from the use of the proposed manufacturing techniques are discussed. V.L.

A82-37074 # **Application and testing of metallic coatings on graphite/epoxy composites.** C. J. Staebler, Jr., G. Lubin (Grumman Aerospace Corp., Bethpage, NY), and M. Stander (U.S. Naval Air Systems Command, Materials and Processes Branch, Washington, DC). In: Reinforced Plastics/Composites Institute, Annual Conference, 36th, Washington, DC, February 16-20, 1981, Preprints. New York, Society of the Plastics Industry, Inc., 1981 (Session 17-D). 5 p. Contracts No. N00019-77-C-0250; No. N00019-78-C-0602; No. N00019-80-C-0059.

Metallic coating systems for graphite/epoxy aircraft structures have been developed to provide protection against the strength-degrading effects of moisture penetration, electromagnetic interference (EMI), paint strippers, and lightning strikes. The effectiveness of these coatings in providing protection against impact damage and laser impingement is also being determined. Perforated and solid aluminum-foil coatings, applied by either secondary bonding or cocuring, significantly improve the moisture resistance and electromagnetic shielding of graphite/epoxy laminates. Aluminum-foil coatings also provide protection against the other threats investigated. The substrate corrosion compatibility, machinability, and repairability of selected coatings have been determined. Forming and bonding techniques to fabricate and apply metal-foil preforms to graphite/epoxy hardware are being developed. (Author)

A82-37080 # **Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints.** S. W. Schramm, I. M. Daniel, and W. G. Hamilton (IIT Research Institute, Chicago, IL). In: Reinforced Plastics/Composites Institute, Annual Conference, 36th, Washington, DC, February 16-20, 1981, Preprints. New York, Society of the Plastics Industry, Inc., 1981 (Session 23-D). 6 p. 16 refs.

A study was conducted to evaluate, improve and optimize ultrasonic techniques for the detection of disbonds in composite laminate to metal joints. Four graphite/epoxy laminates joined to metal plates were investigated using matched pairs of compression and shear wave ultrasonic transducers of three frequencies (1, 2.25, and 5 MHz). Pulse-echo and through transmission modes were used and A-scans, C-scans and frequency spectra were analyzed. It was found that the higher frequency (5 MHz) compression wave transducer operated in the through transmission mode gave the best results in most cases. Shear wave transducers were found to be cumbersome to use and unsuitable for the cases studied. (Author)

A82-37097 # **Efficient part removal processes.** G. Lubin. In: Reinforced Plastics/Composites Institute, Annual Conference, 37th, Washington, DC, January 11-15, 1982, Preprints. New York, Society of the Plastics Industry, Inc., 1982 (Session 15-E). 8 p.

A study is undertaken to determine possibilities for cost reduction in the removal of plastic airframe components from their molds. A method based on the use of a thin Tedlar or Nylon strip is described which has demonstrated significant cost reductions through tool wear and part removal time improvements in bag-molding processes. The thin plastic strips are used to delineate the outside edge contours of the bag-molded part's layup, and prevent the formation of resin edge flash and excess resin flow. Where the contour of the molded part is too complex, use may be made of two or more wedges at the edge of the part after the layup is completed. The thin strip technique has demonstrated a 73% saving in part removal labor time, or about 30 min. O.C.

A82-37123 **A method for observing the deterioration of airframe life in operational conditions (Metodika pro sledovani odcerpavani zivotnosti draku letounu v provoznich podminkach).** V. Kahanek. *Zpravodaj VZLU*, no. 6, 1981, p. 273-283. 8 refs. In Czech.

The paper considers the use of an onboard recording device (Parez) to monitor reductions in airframe fatigue life; this device continuously records load factor, aircraft weight, and speed. Attention is given to an algorithm for calculating the extremum values of the load factor, a method for determining stress at critical locations by means of a transfer function, and the analysis of the random process representing this stress by the method of complete cycles. The appropriate S-N curve, mean-load corrections, and fatigue-test results can be used in determining a two-parameter stress distribution, the accumulation of fatigue damage, and the expected life of the aircraft. B.J.

A82-37127 **A gust damper (Tlumic poryvu).** V. Pokorny. *Zpravodaj VZLU*, no. 1, 1982, p. 15-21. In Czech.

The paper examines a gust damper, i.e., an automatic device which diminishes the effect of gusts on the longitudinal motion of the aircraft by deflecting part of the flaps. The possibility of implementing this type of damper by its inclusion into the autopilot system is considered. Calculations performed for a small passenger aircraft, show that the use of this damper enhances the comfort of the crew and passengers, improves the piloting of the aircraft, and reduces stresses in the structure. B.J.

A82-37220 # **A spark ignition model for liquid fuel sprays applied to gas turbine engines.** J. E. Peters (Illinois, University, Urbana, IL) and A. M. Mellor (Purdue University, West Lafayette, IN). *Journal of Energy*, vol. 6, July-Aug. 1982, p. 272-274. 14 refs. Army-supported research.

The characteristic time model for ignition is used to describe the spark ignition of liquid fuel sprays in gas turbine combustors. The model states that for ignition to occur, the energy of a spark must heat up an initial volume such that the heat release rate within that volume is greater than the loss rate. Heat generation is limited first by a droplet evaporation time and then a kinetic time; heat loss (for gas turbine applications) is due to turbulent diffusion and, hence, is controlled by a mixing time. Data from two can-type combustors and seventeen fuels are correlated by a single ignition limit curve. The key to applying the model to engine data is the estimation of drop sizes and equivalence ratios at the spark gap. (Author)

A82-37377 **Electric field detection and ranging of aircraft.** H. Trinks and J. L. ter Haseborg (Hamburg, Hochschule der Bundeswehr, Hamburg, West Germany). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, May 1982, p. 268-274. 7 refs.

The electric field transported by charged aircraft during free flight can be observed quantitatively in distances of up to some 100 m. A system of three plane sensors arranged in the corners of a triangle on the earth's surface is described, by which the flight path of aircraft is detected in the range of 40 to 500 m with velocities of approximately 50 m/s. The theory and typical experimental results are discussed. (Author)

A82-37378 **Medium PRF performance analysis.** S. A. Hovanessian (Hughes Aircraft Co., Electro-Optical and Data Systems Group, El Segundo, CA). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, May 1982, p. 286-296. 9 refs.

A discussion of various types of x-band airborne radars is presented, together with an account of their development. It is related how, starting with simple, low pulse-repetition frequency (PRF) radars for measuring radar-target range, airborne radar development proceeded with more sophisticated high PRF Doppler radars where radar-target range and range rate were measured simultaneously. The use of Doppler (frequency) in signal processing allowed the separation of moving from nonmoving targets (ground), making possible the detection of moving targets in the presence of ground clutter. It is pointed out that more recent advances in waveform generation and selection have led to the development of medium PRF radars, whereby a greater degree of tactical flexibility in target detection is attained by combining the desirable features of both low and high PRF radars. The systematic evolution of these radars is emphasized, and the necessary theoretical background is given for their performance calculations. C.R.

A82-37380 **Instrument failure detection in partially observable systems.** J. E. Hertel (NORPAC Engineering, Inc., Seattle, WA) and R. N. Clark (Washington, University, Seattle, WA). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, May 1982, p. 310-317. 11 refs.

Instrument failure detection using the dedicated observer scheme (DOS) depends on partial state observability through each instrument which is monitored. For instrument fault detection by the DOS technique, a quantitative measure of partial state observability is established for each instrument and used to determine a necessary condition on the output structure of the system. This measure, called the internal redundancy of the instrument, indicates the complexity of the logic required for failure detection, and it also indicates where some hardware redundancy can be introduced into the system to improve the fault detection capability of the DOS. The principles developed are applied to a simulation of the pitch axis autopilot of the A7 jet aircraft. (Author)

A82-37381 **Implementing aircraft identification schemes by public key cryptosystems.** B. Arazi and N. Ekstein (Negev, University, Beersheba, Israel). *IEEE Transactions on Aerospace and Electronic Systems*, vol. 18, May 1982, p. 318-322. 11 refs.

The use of public key cryptosystems for identification purposes has already been suggested. The practical aspects of using such systems for aircraft identification are discussed. It is shown that the digital signature property is not mandatory for implementing an identification procedure. It is then shown how public key distribution systems can be used for identification purposes. The technical difficulties in implementing an identification scheme are finally discussed with possible solutions offered. (Author)

A82-37446 * **Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system.** P. M. Melliar-Smith and R. L. Schwartz (SRI International, Computer Sciences Laboratory, Menlo Park, CA). *IEEE Transactions on Computers*, vol. C-31, July 1982, p. 616-630. 11 refs. Contract No. NAS1-15428.

The paper describes the methodology being employed to demonstrate rigorously that the SIFT (software-implemented fault-tolerant) computer meets its requirements. The methodology uses a hierarchy of design specifications, expressed in the mathematical domain of multisorted first-order predicate calculus. The most abstract of these, from which almost all details of mechanization have been removed, represents the requirements on the system for reliability and intended functionality. Successive specifications in the hierarchy add design and implementation detail until the PASCAL programs implementing the SIFT executive are reached. A formal proof that a SIFT system in a 'safe' state operates correctly despite the presence of arbitrary faults has been completed all the way from the most abstract specifications to the PASCAL program. B.J.

A82-37466 # On the vortex flow over delta and double-delta wings. H. W. M. Hoeijmakers, W. Vaatstra (Nationaal Lucht- en Ruimtevaartlaboratorium, Amsterdam, Netherlands), and N. G. Verhaagen (Delft, Technische Hogeschool, Delft, Netherlands). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0949.* 13 p. 44 refs. Research supported by the Royal Netherlands Air Force.

An experimental and theoretical investigation is described of the flow above, and downstream of, a 76 deg delta wing and two double-delta wings (sweep 76 deg/60 deg and 76 deg/40 deg, respectively, with kink at 50% chord). The flow pattern is visualized by means of a laser light-sheet technique. For the case of the delta wing, experimental results are compared with numerical results of a free vortex sheet method for computing three-dimensional flow about slender wings, a free vortex sheet method for the limiting case of conical flow, and a computational procedure for computing two-dimensional time-dependent vortex wake roll-up. Based on the laser light-sheet investigation, a vortex-sheet model is proposed for the flow about double-delta wings with leading-edge vortex separation on both wing panels. (Author)

A82-37467 * # Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes. R. P. Weston and C. H. Liu (NASA, Langley Research Center, Analytical Methods Branch, Hampton, VA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-0951.* 9 p. 19 refs.

Research on efficient computational methods for general vorticity fields has been conducted in connection with a need for basic research on vortex-dominated flows. The present investigation is concerned with the evolution of vortex wakes behind aircraft wings. An efficient procedure is presented for the calculation of the boundary values used in the numerical solution of the unsteady, incompressible, two-dimensional Navier-Stokes equations for an unbounded flow field. The extent of the computational grid can be reduced compared to methods utilizing standard boundary conditions, without loss of accuracy. The efficiencies realized make it feasible to calculate the vortex wake development for realistic wing configurations, including the merging of multiple vortices, for Reynolds numbers of about 10,000 based on wing chord. G.R.

A82-37477 # A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations. E. H. Atta and J. Vadyak (Lockheed-Georgia Co., Advanced Flight Sciences Dept., Marietta, GA). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Joint Thermophysics, Fluids, Plasma and Heat Transfer Conference, 3rd, St. Louis, MO, June 7-11, 1982, AIAA Paper 82-1017.* 9 p. 9 refs.

An efficient grid interfacing zonal algorithm has been developed for computing the transonic flow field about three-dimensional multicomponent configurations. The algorithm uses the full-potential formulation and the fully-implicit approximate factorization scheme (AF2). The flow field solution is computed using a component adaptive grid approach in which separate grids are employed for the individual components in the multicomponent configuration, where each component grid is optimized for a particular geometry. The component grids are allowed to overlap, and flow field information is transmitted from one grid to another through the overlap region. An overlapped-grid scheme is implemented for a wing and a wing/pylon/nacelle configuration. Numerical results show that the present algorithm is stable, accurate, and can be used effectively to compute the flow field about complex configurations. (Author)

A82-37493 Boeing's new transports in a flight-test marathon. P. Condom. *Interavia,* vol. 37, July 1982, p. 695-697.

Flight testing is proceeding on two totally new aircraft, the Boeing 757 and 767, each with two alternative powerplants and FAA certifications for these aircraft are expected to be received in record time during the second half of 1982. New test facilities and more flight-test engineers have been required to keep the assigned deadlines. Radically updated acquisition and processing facilities for flight-test data also have been introduced utilizing an 'on-line' data-acquisition system, the principal components of which include a new data analysis and monitor system, a gross weight/center of gravity computer, a microwave aircraft positioning system, a data processing ground station, a ground data analysis station and a flight test computing system. A schematic diagram showing the positioning of the components of the data-acquisition system is included. N.B.

A82-37521 The DRAPO system - Materials means and logic functions (La CFAO en mécanique le système DRAPO - Moyens matériels et fonctions logicielles). M. Neuve Eglise (Avions Marcel-Dassault-Bréguet Aviation, Vaucresson, Hauts-de-Seine, France). *Revue Française de Mécanique,* 2nd Quarter, 1982, p. 37-43. In French.

Components and functioning of DRAPO (Definition and Realization of Aircraft by use of a Computer) system are described. The system comprises procedures, materials, and logistics, and interconnection of remote terminals with a centralized data base serving all fields of aerospace production. The system is used by aerospace CAD/CAM personnel in the fabrication of parts for industrial production. A description of the computers forming the central processing units and the remote terminals is provided, noting the links established through telephone lines. Interactive graphics consoles permit remote access to cataloged design shapes after entry of an alphanumeric code. Programming logic, internal to the main system offers design with light pens, electrostatic design, and large surface graphics. Logic functions for the entire system are noted, including methods of changing and rotating the objects in two- and three-dimensions. Finally, flow charts of the computer operations are given. M.S.K.

A82-37526 Traffic flow control in the Frankfurt/Main airport area (Verkehrsflusssteuerung im Anflugbereich Frankfurt/Main). R. Onken (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugführung, Braunschweig, West Germany). *DFVLR-Nachrichten,* June 1982, p. 23-27. In German.

Traffic records at the Frankfurt/Main airport are analyzed in order to determine traffic flow patterns in both the spatial and the temporal dimensions. The effect of various strategies of coordinating traffic flow are assessed. A new computerized traffic planning system concept is explained and evaluated. C.D.

A82-37676 # Investigation of subsonic nacelle performance improvement concept. D. Dusa, D. J. Lahti (General Electric Co., Cincinnati, OH), and D. Berry (Boeing Commercial Airplane Co., Seattle, WA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1042.* 9 p.

Investigations have been conducted with the objective to identify aircraft and nacelle performance improvement concepts aimed at improving the overall aircraft system installed performance. The present study is specifically concerned with exhaust system design technology and impacts on both internal performance and installed drag. A goal of 1% improvement in specific fuel consumption (SFC) and a reduction of 1% in aircraft drag was established. Attention is given to analytical studies, static performance tests, wind tunnel tests, nacelle calibration/thrust-drag bookkeeping, isolated nacelle testing, and installed nacelle testing. G.R.

A82-37677 * # Transonic wind tunnel test of a supersonic nozzle installation. J. A. Yetter (Boeing Military Airplane Co., Seattle, WA), G. B. Evelyn (Boeing Commercial Airplane Co., Seattle, WA), and C. Mercer (NASA, Langley Research Center, Hampton, VA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1045.* 14 p. 8 refs.

The design of the propulsion system installation affects strongly the total drag and overall performance of an aircraft, and the concept, placement, and integration details of the exhaust nozzle are major considerations in the configuration definition. As part of the NASA Supersonic Cruise Research (SCR) program, a wind tunnel test program has been conducted to investigate exhaust nozzle-airframe interactions at transonic speeds. First phase testing is to establish guidelines for follow-on testing. A summary is provided of the results of first phase testing, taking into account the test approach, the effect of nozzle closure on aircraft aerodynamic characteristics, nozzle installation effects and nacelle interference drag, and an analytical study of the effects of nozzle closure on the aircraft. G.R.

A82-37678 * # Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing. R. T. Kawai, R. F. McCarthy, M. S. Willer (Douglas Aircraft Co., Long Beach, CA), and F. J. Hrach (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1047.* 9 p. 6 refs.

The Aircraft Energy Efficiency (ACEE) Program was established by NASA to improve the fuel efficiency of commercial transport aircraft and thereby to reduce the amount of fuel consumed by the air transportation industry. One of the final items developed by the program is an improved fairing which is the aft closure for the thrust reverser actuators on the JT8D nacelles on DC-9 aircraft. The reduced-drag fairing uses, in the interest of weight savings, an advanced composite construction. The composite material contains Kevlar 49 fibers in a PMR-15 matrix. Attention is given to the aerodynamic configuration, the material system, and aspects of fabrication development. G.R.

A82-37679 # Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines. W. L. Gamble (United Technologies Corp., Government Products Div., West Palm Beach, CA) and R. Valori (U.S. Naval Air Propulsion Test Center, Trenton, NJ). *AIAA, SAE, and*

ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1054. 9 p.

Analytical studies on intershaft cylindrical roller bearings for advanced gas turbine engines configured with counter-rotating shafts showed advantages in fatigue life and internal radial clearance control when the outer ring was mounted on the low speed rotor and the inner ring on the high speed rotor. Parametric rig tests on eight bearings showed that the primary drivers on roller end wear were roller-to-guide flange end clearance, outer race preload and internal radial clearance. Test results showed concentric roller end wear patterns on all test bearings and varying levels of wear. The performance data was used to improve prediction techniques for bearing heat generation and temperatures. (Author)

A82-37682 # Evaluation of a multivariable control design on a variable cycle engine simulation. S. J. Przybylko (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH)and S. M. Rock (Systems Control Technology, Inc., Palo Alto, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1077.* 8 p. 13 refs. Contract No. F33615-77-C-2096.

It is pointed out that aircraft turbine engine propulsion control systems have been the focus of extensive development in recent years. Future engine cycles have been defined and include a significant variable geometry capability to the extent that the thermodynamic engine cycle varies over wide limits. The number of actuated variables was expanded, and resulting control strategies require extension of the current advanced multivariable control methodologies. The present investigation is concerned with the evaluation of a multivariable control designed for the JTDE GE 23 variable cycle engine. Attention is given to a description of the Joint Technology Demonstrator Engine (JTDE), the control requirements, a control structure overview, and the computer simulation and evaluation procedure. G.R.

A82-37683 * # Flight evaluation of a digital electronic engine control system in an F-15 airplane. L. P. Myers, K. G. Mackall, F. W. Burcham, Jr. (NASA, Ames Research Center, Edwards AFB, CA), and W. A. Walter (United Technologies Corp., Pratt and Whitney Aircraft Group, West Palm Beach, FL). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1080.* 14 p. 6 refs.

Benefits provided by a full-authority digital engine control are related to improvements in engine efficiency, performance, and operations. An additional benefit is the capability of detecting and accommodating failures in real time and providing engine-health diagnostics. The digital electronic engine control (DEEC), is a full-authority digital engine control developed for the F100-PW-100 turbofan engine. The DEEC has been flight tested on an F-15 aircraft. The flight tests had the objective to evaluate the DEEC hardware and software over the F-15 flight envelope. A description is presented of the results of the flight tests, which consisted of nonaugmented and augmented throttle transients, airstarts, and backup control operations. The aircraft, engine, DEEC system, and data acquisition and reduction system are discussed. G.R.

A82-37685 # Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique. J. A. Forner and J. M. Manter (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1085.* 10 p. 7 refs.

The commonly accepted method of assessing inlet engine compatibility is to evaluate the engine capability to operate stall-free with the peak instantaneous distortion levels delivered by the inlet. The development of inlet systems for aircraft and missiles requires, therefore, an assessment of peak instantaneous distortion. The present investigation is concerned with a statistical procedure for predicting instantaneous peak distortion patterns, taking into account an approach based on a method considered by Stevens et al. (1980). The investigation has the objective to expand the data base supporting the method by comparing predicted distortion values to analog screened values for three cruise missile inlets. G.R.

A82-37686 # Electronic control for small engines. W. H. Hermann, J. A. Weber, and E. E. Ervin (General Motors Corp., Detroit Diesel Allison Div., Indianapolis, IN). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1126.* 8 p.

A description is presented of an electronic system for the control of the small engines of the Model 250 series, which are used in many helicopter applications (single and twin) and in selected turboprop applications. The requirements for developing the Model 250 electronic control concept are examined. The electronic control is active throughout the engine operating regime. The principal features of the electronic control system are related to start temperature limiting, altitude-compensated surge avoidance, rotor speed governor, loss-of-load protection, backup analog governor, backup loss-of-load protection, manual backup, and diagnostics and readout. The principal components of the Model 250 electronic fuel control system are shown in a graph. A digital control unit is a new component which is currently being developed for this system. G.R.

A82-37689 # Reliability design study for a fault-tolerant electronic engine control. D. E. Warner and W. H. Hermann (General Motors Corp., Detroit Diesel Allison Div., Indianapolis, IN). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1129.* 8 p.

The Advanced Turbine Engine Study (ATES) has the objective to define the engines which are to power the advanced aircraft of the late 1980's. Digital electronic controls are required for the operation of advanced variable cycle engines for high performance aircraft. Problems of failure tolerance and reliability arising in connection with the control system were investigated in a study on Full-Authority, Fault-Tolerant Electronic Engine Controls (FAFTEEC). A description is presented of the highlights and the significant results of the study. Attention is given to the baseline system which was defined to meet mission, aircraft, and engine requirements derived from the ATES program. The module database is considered along with alternate fault-tolerant system designs, specific design tools utilized in the design of fault-tolerant systems, and aspects of system evaluation. G.R.

A82-37690 # Design concepts of an advanced propulsion monitoring system. A. R. Mulukutla and V. W. Lawson (General Electric Co., Cincinnati, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1130.* 5 p. Contract No. F33615-79-C-2092.

A number of tests of engine health monitoring systems have demonstrated the feasibility of acquiring and recording some of the engine health related data. An American aerospace company is developing an Advanced Propulsion Monitoring System (APMS) to remedy some of the shortcomings of previous systems with regard to automatic analysis and presentation of data in useful form. After the conduction of tests of the APMS in the laboratory, some of the hardware and software are being modified for a demonstration test on a different engine with a different operating cycle. A description is presented of some of the details of the demonstration configuration. Attention is given to the demonstration test objectives, a system overview, and a software overview. G.R.

A82-37691 * # Optical tip clearance sensor for aircraft engine controls. G. L. Poppel (General Electric Co., Aircraft Engine Business Group, Cincinnati, OH), D. T. F. Marple (General Electric Co., Schenectady, NY), and R. J. Baumbick (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1131.* 9 p. Contract No. NAS3-21843.

Aircraft gas turbine performance and efficiency are related to airfoil tip clearance. The possibility has been considered to obtain optimum performance and efficiency by reducing clearance to a safe minimum with the aid of a closed-loop tip clearance control system, which utilizes a tip clearance sensor. The use of optical sensing methods appears to represent a potential solution to the tip clearance measurement problem. Principles of sensor operation are discussed along with dimensional considerations and diffraction limitations. A description is presented of the study of the feasibility of a certain sensor, taking into account the test rig system, the optical components, and the mounting tube. Attention is also given to the operation of the feasibility-study sensor, performance estimations, the optical fiber bundle, light beam refraction, and aspects of aircraft engine implementation. G.R.

A82-37692 # Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement. J. G. Doonan and W. H. Davis, Jr. (Grumman Aerospace Corp., Bethpage, NY). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1132.* 16 p. 8 refs. Contracts No. F33615-79-C-3009; No. F33615-77-C-3045.

Underwing and wing trailing edge flap spanwise blowing configurations employing a secondary nozzle were tested in a wind tunnel investigation in order to assess their STOL performance enhancement effects, for the case of a 1990s-technology twin-engined fighter with close-coupled canard planform. The two spanwise blowing concepts were incorporated in a two-dimensional, thrust vectoring and convergent-divergent flow geometry primary exhaust nozzle. The advantages of spanwise blowing are identified through an analysis of wind tunnel 1/8-scale model aircraft force and surface pressure data. The underwing and trailing edge methods have demonstrated induced lift coefficients equal to 33% and 28% of the unpowered aerodynamic lift coefficient, respectively. Consideration is also given to lift augmentation by means of the primary thrust-vectoring nozzles. O.C.

A82-37693 # Thrust reverser induced flow interference on tactical aircraft stability and control. C. Chiarelli, D. Lorincz, and B. Hunt (Northrop Corp., Aircraft Div., Hawthorne, CA). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1133.* 11 p. 6 refs.

It is pointed out that the vulnerability of runways to bomb damage is a major threat to the operational effectiveness of tactical aircraft. Future designs will, therefore, very likely be required to operate from short undamaged portions o runway. The most critical problem in achieving STOL is to reduce landing distance because conventional tactical aircraft require landing lengths which are several times greater than their takeoff lengths. An approach involving the use of a thrust reverser represents a possible solution to the problem. Attention is given to a study of reverser jet/tunnel wall interference conducted in a low speed wind tunnel, results for a thrust reversing version of the F/A-18A aircraft, and wind tunnel data for reverser effects on the stability and control characteristics of an advanced fighter configuration. G.R.

A82-37694 # Advanced nozzle integration for air combat fighter application. H. W. Wallace (McDonnell Aircraft Co., St. Louis, MO) and D. L. Bowers (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1135.* 13 p.

Analytical and experimental investigations have been conducted in an Advanced Nozzle Concepts program, with a view to establishing design guidelines for future tactical fighters. The configurations studied include high and low aspect ratio two-dimensional nozzles, as well as advanced axisymmetric nozzle, installed in air-to-air and air-to-surface primary mission tactical aircraft of generically different design. Attention is given to the air-to-air vehicle, for which nozzle configurations were wind tunnel tested at speeds from Mach 0.6 to 1.5 in order to determine relative installation drag and aerodynamic interaction effects due to thrust vectoring and reversing. It is shown that thrust reversal for STOL operation and thrust vectoring for trim enhancement at high lift coefficients may be achieved with a small penalty in takeoff gross weight. O.C.

A82-37695 # Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines. J. S. Sokhey (Boeing Commercial Airplane Co., Seattle, WA). *AIAA, SAE and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1136.* 13 p. 7 refs.

An experimental investigation of two Ventilated Mixer cold/hot dual flow nozzle models is presented in which total axial thrust, mixer surface static pressures are measured, and rake surveys are taken of total pressure and temperature taken at the charging station, mixing plane, and nozzle exit plane. Greater accuracy than that normally obtainable was achieved in the definition of nozzle model surfaces through the numerically-controlled fabrication of each unit from a single stainless steel block. Ventilation slots were machined through the mixer lobe walls in order to improve mixer performance through boundary layer energization, which inhibits primary flow separation. Analysis of the test results shows the ventilation concept to yield a significant reduction in total mixer pressure loss, with additional improvements noted in mixing effectiveness and jet noise reduction. Ventilated mixer flow characteristics are compared with those of unventilated mixers, and the consequence of this nozzle design's applications to existing turbofan engines is discussed. O.C.

A82-37698 # A cost modeling approach to engine optimization. D. G. Culy and R. C. Gunness (Garrett Turbine Engine Co., Phoenix, AZ). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1185.* 8 p. Navy-USAF-sponsored research.

An outline is provided of an engine optimization study carried out as part of the Navy Advanced Technology Engine Study (ATES) Program. The objective of the study was to determine a set of engine cycle parameters, and then to establish a set of component technologies and a development strategy which would result in the lowest peacetime Life Cycle Cost (LCC) for six different aircraft fleets. For simplicity, one tactical system (using an engine in the middle of the study size range) is discussed. Preliminary sizing was based on conventional optimization criteria. The LCC model used is briefly described, and the scenario for the mission is given. The study results are shown in terms of both LCC and aircraft takeoff gross weight. G.R.

A82-37709 # Models for a turbulent premixed dump combustor. N. Darabiha, S. M. Candel (Ecole Centrale des Arts et Manufactures, Châtenay-Malabry; ONERA, Châtillion-sous-Bagneux, Hauts-de-Seine, France), and E. Esposito (Ecole Centrale des Arts et Manufactures, Châtenay-Malabry, Hauts-de-Seine, France). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1261.* 9 p. 23 refs. Research supported by the Société Nationale d'Etude et de Construction de Moteurs d'Aviation.

The modeling of the process of ignition and flame spreading in a premixed dump combustor is discussed. The treatment, which is essentially numerical, relies on a time-split finite difference method. Mass-averaged conservation equations are used in order to represent the flow dynamics. A simple chemically reacting system is assumed, and combustion is simulated using two models. The reaction rate is kinetically controlled in the first model. The second model is based on the coherent flame concept of Marble and Broadwell (1977). Time-dependent flame spreading calculations are described in some detail. C.R.

A82-37710 * # Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique. S. I. Janjua, D. K. McLaughlin (Dynamics Technology, Inc., Torrance, CA), D. G. Lilley (Oklahoma State University, Stillwater, OK), and T. Jackson. *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1262.* 13 p. 22 refs. Contract No. NAG3-74.

The six-orientation hot-wire technique is applied to nonreacting axisymmetric flowfields, obtaining measurements of time-mean and rms voltages at six different orientations, thus providing enough information to determine the time-mean velocities, turbulence intensities, and shear stresses. At each location in the flow, there are six different values of each of the above quantities that can be obtained using six sets of measurements of three adjacent orientations. Flowfield surveys of both swirling and nonswirling confined jets are used to calculate estimates of the mean velocity components and the normal and shear turbulent stresses, and comparisons with independent data are made. A sensitivity analysis of the data reduction technique demonstrates that the largest uncertainties are to be expected in the turbulent shear force estimates. C.D.

A82-37712 # Current techniques for jet engine test cell modeling. R. J. Freuler (Ohio State University, Columbus, OH) and R. A. Dickman (General Electric Co., Aircraft Engine Group, Cincinnati, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1272.* 16 p.

A model test program to demonstrate acceptable aerodynamic performance for a jet engine test cell with a 26 ft by 26 ft cross section is described. Utilizing a 1/17.6 scale plexiglass model of the full-scale jet engine test cell and a modified turbine powered simulator, a technique is developed in conjunction with an online data acquisition system (outlined in a block diagram) by which a maximum amount of test information can be acquired, processed, and presented to the jet cell model test engineer in a manner responsive enough to permit the 'immediate' analysis of a test point. A matrix of inlet/cell/exhaust geometries is model tested to demonstrate their interaction on the test cell system aerodynamics. This model test demonstrates acceptable test cell aerodynamics for a 26 ft by 26 ft cell geometry with a three to six inch water inlet pressure drop and a cell bypass ratio greater than 1. Specifically: no vortices are formed in the simulated engine bellmouth, the front cell velocity distortion is less than 0.20, the tip circumferential inlet distortion is less than 0.5% and the tip radial distortion is less than 0.25%. The axial pressure gradients as measured on cell walls and the simulated engine fan cowling are well below 0.5 inches of water, which corresponds to less than 0.1% correction to measured thrust due to base pressure differences. N.B.

A82-37716 * # Aerodynamic performance of high turning core turbine vanes in a two-dimensional cascade. J. R. Schwab (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1288.* 19 p. 6 refs.

Experimental and theoretical aerodynamic performance data are presented for four uncooled high turning core turbine vanes with exit angles of 74.9, 75.0, 77.5, and 79.6 degrees in a two-dimensional cascade. Data for a more conservative 67.0 degree vane are included for comparison. Correction of the experimental aftermix kinetic energy losses to a common 0.100 centimeter trailing edge thickness yields a linear trend of increased loss from 0.020 to 0.025 as the vane exit angle increases from 67.0 to 79.6 degrees. The theoretical losses show a similar trend. The experimental and theoretical vane surface velocity distributions generally agree within approximately five percent, although the suction surface theoretical velocities are generally higher than the experimental velocities as the vane exit angle increases. (Author)

A82-37764 # R & D on composite rotor blades at Agusta. V. Giavotto (Milano, Politecnico, Milan, Italy), V. Caramaschi, and G. C. Maffioli (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Varese, Italy). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmish-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 16 p. 5 refs.

An R&D program aimed at the development of improved methods for the construction of composite rotor blades is reviewed with reference to the development of a finite element code (Program HANBA 2) for blade section analysis and the development of reliable models for the study of composite behavior and failure criteria. Program HANBA 2 is based on finite element discretization in the section plane only, thus allowing the computation of beam solutions for any shape and material anisotropy or inhomogeneity of the section concerned. In particular, the code allows the evaluation of interlaminar and joint stresses in nonlinear material models with unbalanced anisotropy. Composite rotor blades have been designed and manufactured using the methods developed and are now undergoing static and fatigue tests. V.L.

A82-37765 * # A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression. N. D. Ham and T. R. Quackenbush (MIT, Cambridge, MA). *Deutsche Geselschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmish-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 10 p. NASA-sponsored research.

A new, advanced type of active control for helicopters and its application to a system for stall flutter suppression is described. The system, based on previously developed M.I.T. Individual-Blade-Control hardware, employs blade-mounted accelerometers to sense torsional oscillations and feeds back rate information to increase the damping of the first torsion mode. A linear model of the blade and control system dynamics is used to give qualitative and quantitative guidance in the design process as well as to aid in analysis of experimental results. System performance in wind tunnel tests is described, and evidence is given of the system's ability to provide substantial additional damping to stall-induced blade oscillations. (Author)

A82-37766 # **CFC drive shaft and GFC coupling for the tail rotor of the BO 105.** C. M. Herkert, D. Braun, and K. Pfeifer (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 27 p.

A new tail rotor drive system using a carbon fiber composite shaft and glass fiber composite couplings is being designed for the BO 105 instead of the existing metal version with a view to reducing the mass and the cost of the drive system. The discussion covers general design requirements, analytical evaluation of several design concepts including bolted and bonded versions, manufacturing techniques, tool design, test results and cost effectiveness of the proposed designs. It is shown that the composite version of the tail rotor drive system would provide a 10% reduction in the manufacturing cost, a mass reduction of 4 kg for the long shaft and 1 kg for the short shaft, and, possibly, a reduction in the number of parts. V.L.

A82-37767 # **Quantification of helicopter vibration ride qualities.** C. E. Hammond and D. D. Hollenbaugh (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmish-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 14 p. 8 refs.

Absorbed power, a measure of the rate at which the body absorbs energy when subjected to vibration (as developed by the U.S. Army TACOM), is used as a means for quantifying helicopter vibration ride quality. Vibration tests, performed on pilots of five different operational U.S. Army helicopters are converted to absorbed power using calculations derived for quantitative measures of ride quality for ground vehicles. The results are compared to previously obtained data showing acceptable subjective response for helicopter vibration levels and ISO 2631 reduced proficiency boundaries (both converted to absorbed power). Absorbed power measurements from the operational helicopters are, in general, higher than the values from these comparative boundaries and fall between the levels for acceptable ride quality of automobiles and off-road vehicles (0.2-6 W). Further research using the NASA-Langley Research Center Passenger Ride Quality Apparatus, is planned. N.B.

A82-37768 # **Practical application of a computerized flight by flight fatigue test system.** A. Jorio and G. Parenti (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Varese, Italy). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmish-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 17 p.

Requirements related to the procedure leading to the certification of a helicopter, and general developments concerning the state of the art provided the motivation for modernizing the equipment used in fatigue testing. The modernization made it possible to reduce the time required for testing, and to minimize needs for operator assistance during the test. It was also possible to improve accuracy and reliability. A flight test data survey is conducted, and flight by flight fatigue tests are discussed. A description of a computer controlled system is presented, taking into account the system definition, the software philosophy, the system architecture, and a system functional description. G.R.

A82-37769 # **Quasi-static and dynamic crushing of energy absorbing materials and structural components with the aim of improving helicopter crashworthiness.** C. Kindervater (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Stuttgart, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmish-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 26 p.

Energy absorbing tests are performed on several materials and structural components, such as aluminum honeycomb, thin-walled aluminum and steel cylinders, PUR-foam cylinders, and fiber-reinforced cylindrical tubes, with the eventual goal of improving helicopter crashworthiness. Axial crushing tests, under quasi-static and impact loading, are conducted to determine several key energy absorbing parameters for these materials and structures, including specific energy, energy dissipation density, stroke efficiency and operating stress. Fiber-reinforced tubes gave the best results, having a specific energy value of about twice the maximum observed for aluminum honeycomb and about six times the best value for foam-filled metal cylinders. Little difference is shown between the static and dynamic failure modes. Finally, a crash test structure is drop tested with some selected structural elements acting as energy absorbers and the results are compared to crash cases simulated using a computer program. The comparison tests showed that accurate estimations of the dynamic response of the total structural assembly can be obtained by using statically-determined load deflection characteristics of the absorbing elements. N.B.

A82-37770 # **Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution.** D. J. Merkley (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA), M. J. Riley, and C. Young (Royal Aircraft Establishment, Farnborough, Hants., England). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 21 p. 8 refs.

NASA, the U.S. Army, and the Royal Aircraft Establishment (RAE), UK, are collaborating in a study to develop interactive computer systems for use in analyzing helicopter rotor blade pressure distribution measurements. Flight tests on AH-1G and Wessex helicopters provided data which were then analyzed using two different computer program systems. The RAE interactive graphics programs perform curve fitting and integration routines which enable force and moment coefficient plots to be visually displayed, and for regions of interest, such as where blade section limitations are apparent, to be located for the more detailed study of chordwise pressure distribution. The U.S. team incorporated and considerably extended the RAE programs into a computer software system called DATA-MAP, which offers the convenience of fully interactive graphics to display the pressure measurements in absolute values or coefficient form against time, chord or radius, to derive forces and moments, and to optimize scaling as the analysis proceeds. Examples of the plots obtained from both systems are included. Two joint workshops have been held to exchange information and to correlate the various data bases (test and analytic). Further cooperative efforts are planned. N.B.

A82-37771 # **Ageing of composite rotor blades.** F. Och (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 16 p. 6 refs.

Long term effects of the environment on composite rotor blades used in different climatic zones are evaluated by means of coupon testing (sections cut out of blades) and tests of full-scale components. Blades with 2600, 3700 and 6100 flight hours, flown over the Gulf of Mexico and the North Sea region, show a reduction in interlaminar shear strength due to accelerated aging, but no weathering influence is found on bending strength. Artificial weathering of coupon specimens yields a significant reduction in the endurance limit of matrix controlled properties after sufficient time of exposure (500 hr). Full scale fatigue testing indicates that there is no adverse influence of service usage on composite rotor blades. In general, composite material fulfills its expected advantages, making it the best structural material for rotory wing applications. N.B.

A82-37772 # **Helicopter design synthesis.** O. R. Ramos and P. Taylor (Southampton, University, Southampton, England). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmish-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 22 p. 16 refs. Research supported by the Ministry of Defence (Procurement Executive).

A modular computer program is developed to aid the preliminary design analysis of the aerodynamic and dynamic characteristics for projected base-line helicopters of conventional configuration. The computer program, called HELISOTON, allows time-efficient assessment of the multi-variable relationships between the various input design requirements in the earliest stages of project definition. HELISOTON consists of an iteration procedure for automated prediction of a helicopter's AUW, installed power and size as a function of the aircraft role, specification and mission profile. When the basic iteration is linked to a series of outer iterative loops, the program then carries out simple optimization decisions related to the preliminary stages of design and can be used to simply select design parameters, ruling out those solutions that cannot be expected to lead to efficient or practical final base-line designs. HELISOTON can also be used for data generation in conjunction with external optimization programs covering fields wider than aerodynamics and dynamics and/or using more detailed, time-consuming computational models. Sample program results are included to illustrate the potentialities of the program and the several modes in which the program can be advantageously operated. N.B.

A82-37773 # **Factors shaping conceptual design of rotary-wing aircraft.** W. Z. Stepniewski. *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 18 p. 10 refs.

The investigation is mainly concerned with the most important design parameter value trends as exhibited by the foremost design schools represented by the Soviet Union and the Western nations. In addition to pure helicopters of various configurations, a few new rotary-wing concepts as the tilt rotor, ABC, and the X-wing are considered so that their competitive positions with respect to classical helicopters can be assessed. A number of Soviet helicopters listed in a table include, in addition to examples of traditional Soviet design philosophy, also the Mi-24 and Mi-26 as examples of the new Soviet design philosophy adopted by the Tishchenko design team. The Western rotorcraft selected for the comparative study include single-rotor and tandem helicopters ranging in maximum gross weights from about 5000 to almost 150,000 pounds. The state of the art of powerplants is examined, taking into account Western and Soviet engines. Attention is given to disk loading, power loading, tip speed, advancing blade-tip Mach number and advance ratio barrier, and weight and energy aspects. G.R.

A82-37775 # **An automatic map reader suitable for use in helicopters.** G. F. Walker (Marconi Avionics, Ltd., Rochester, Kent, England). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 11 p. 6 refs.

The automatic map reader (AMR) is a portable, hand-held navigation device designed to greatly increase navigational accuracy in tactical helicopters, particularly in the Nap-of-the-Earth flight environment. The AMR incorporates several features which make it attractive for use in helicoptors, including the use of unprepared standard maps, the unlimited orientation of the map, low weight, and low cost. The interface unit of the AMR converts data from the navigational computer into a form suitable for use by the display head, which contains two discs, drive mechanisms, display and processor electronics, and the system operational controls. Flight position is indicated by the intersection of lines engraved on two separately movable circular discs. Flight evaluation tests demonstrated the effectiveness of the AMR in terms of performance and cost at an overall weight and size suitable for helicopter use. N.B.

A82-37775 # **An automatic map reader suitable for use in helicopters.** G. F. Walker (Marconi Avionics, Ltd., Rochester, Kent, England). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 11 p. 6 refs.

The automatic map reader (AMR) is a portable, hand-held navigation device designed to greatly increase navigational accuracy in tactical helicopters, particularly in the Nap-of-the-Earth flight environment. The AMR incorporates several features which make it attractive for use in helicopters, including the use of unprepared standard maps, the unlimited orientation of the map, low weight, and low cost. The interface unit of the AMR converts data from the navigational computer into a form suitable for use by the display head, which contains two discs, drive mechanisms, display and processor electronics, and the system operational controls. Flight position is indicated by the intersection of lines engraved on two separately movable circular discs. Flight evaluation tests demonstrated the effectiveness of the AMR in terms of performance and cost at an overall weight and size suitable for helicopter use. N.B.

A82-37776 # **Optimization of blade pitch angle for higher harmonic rotor control.** H. G. Jacob (Braunschweig, Technische Universität, Brunswick, West Germany) and G. Lehmann (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmechanik, Braunschweig, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981, Paper.* 29 p. 7 refs.

An achievement of improved harmonic control in the case of helicopter rotors makes it possible to reduce oscillatory hub forces and moments, decrease blade stresses, increase performance, and avoid instabilities of blade motion. The present investigation is concerned with numerical studies which have been conducted to enhance the harmonic control of helicopter rotor blades. Three different mathematical models are employed to show the effectiveness of improved harmonic blade control and to provide an overview concerning the sensitivity of the control inputs. An optimization method is discussed, and the time dependent optimal control of the blade pitch angle is considered. Attention is given to the mathematical model of a rotor with rigid blades and flap hinges, and a mathematical model of a rotor system with elastic blades. G.R.

A82-37777 * **General purpose research rotor.** R. Jones, H. E. Howes (Kaman Aerospace Corp., Bloomfield, CT), and L. A. Haslim (NASA, Ames Research Center, Moffett Field, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-9.* 15 p.

An analytical study, under a NASA contract, is performed on an advanced flight research rotor (four-bladed, 54 ft in diameter, with bearingless rotor retention characteristics) to determine the sensitivity of total rotor characteristics such as vibratory hub loads, rotor horsepower, and blade loads, to parametric variability of the rotor configuration. The sensitivity of the rotor to various combinations of blade planform taper, percent of blade span that is tapered, tip sweep angle, built-in twist, and torsional frequency is determined for specific configurations by randomly selecting combinations of these parameters. Characteristics of other intermediate rotor configurations are determined by a regression analysis. The results show that a wide range of rotor total performance characteristics can be obtained for a rotor trimmed to the same flight conditions. The regression equations predict total performance of the rotor very well and appear to be a useful analytical tool for rotor design optimization. Figures showing the results of the various tests are given along with a table of the regression coefficients. N.B.

A82-37778 **Low vibration design of AAH for mission proficiency requirements.** B. P. Gupta and E. R. Wood (Hughes Helicopters, Inc., Culver City, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-2.* 9 p. 11 refs.

The Army Advanced Attack Helicopter (AAH) considered in the investigation has a four-bladed fully articulated rotor which turns at 289 RPM. The aircraft basic design gross weight is 14,660 lbs. The two-man crew includes a pilot and a copilot gunner. AAH design features for low vibration are considered, taking into account also a program to reduce even further the low vibration levels in the basic aircraft. A flight spectrum approach to helicopter vibration specifications is discussed, giving attention to helicopter vibrations and airspeed, Miner's rule applied to helicopter vibrations, the primary mission profile for the AAH, and a typical structural component S-N curve. The criterion of 'hours before proficiency degrades' relates the complex crew vibration environment to a single quantity which is physically significant. G.R.

A82-37779 **Army helicopter crew seat vibration - Past performance, future requirements.** S. T. Crews and W. W. Hamilton (U.S. Army, Qualifications Directorate, St. Louis, MO). *American Helicopter Society, Northeast Regional National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-3.* 8 p. 12 refs.

The Army is interested in setting vibration specifications as a means to insure that pilot, copilot, and crew are able to perform whatever tasks they have to accomplish to make their mission a success. Mission tasks vary in different flight regimes and for different missions. The level of vibration which will interfere with task performance will vary consequently with flight regime and mission, and, correspondingly, the vibration specifications should vary also. Investigations related to an establishment of suitable vibration specifications for Army helicopters are discussed, taking into account ride quality research, the intrusion index, flight test results, and Army ride quality specifications. The results of the study show that the Army has achieved marginally acceptable vibration related ride quality on its operational helicopters. G.R.

A82-37780 **The Helicopter Ride Revolution.** R. W. Balke (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-4.* 15 p. 33 refs.

It is pointed out that the Helicopter Ride Revolution began in earnest with the stringent requirements of a draft in 1971. It will conclude with the achievement by the helicopter industry of a jet-smooth ride by the end of the century. The major technological milestones which must be met to achieve this goal on schedule are developed through an evaluation of the interdependence of design and analytical techniques and the duration of a typical system-acquisition cycle. The 30 years between the first impetus in 1971 and the year 2000, when the first helicopters with a jet-smooth ride are scheduled for completion, can be characterized by three 10-year periods, including the reactive era, the technological development era, and the application or maturity era. For the achievement of a jet-smooth ride it will be necessary that the vibration levels, along all axes and across the frequency band, be equivalent to those of a typical jetliner. In addition, all other factors affecting the sensory perceptions must also be equivalent. G.R.

A82-37781 **Improved methods in ground vibration testing.** E. J. Nagy (Kaman Aerospace Corp., Bloomfield, CT). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-6.* 10 p.

Methods and procedures developed during ground vibration testing of an Army AH-1G helicopter airframe, which improve the validity of the test results and establish certain ground rules for the performance of this type of testing, are described. The optimum excitation technique is found to be the logarithmic swept sinusoidal testing after the initial locations of modal natural frequencies are found with the random excitation technique. Forcing levels need to be increased to levels unheard of in the industry (at least 300 lb) in order to reach the true linear range of the airframe. Various sources of error are identified, including the high frequency residual (local mode) effect which may or may not appear at the various driving points of the structure. The use of the autospectra, the coherence function, the transfer function, and the input and output signals displayed on a dual-channel oscilloscope are means of verification that good mobility spectra will be available for determination of the global parameters. N.B.

A82-37782 **Determination of in-flight helicopter loads and vibration.** N. Giansante, R. Jones (Kaman Aerospace Corp., Bloomfield, CT), and N. J. Calapodas (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-7.* 8 p.

It is pointed out that the helicopter industry has generally experienced difficulty in making analytical predictions of airframe vibrations. A number of approaches have been developed in an attempt to solve the problems of helicopter vibratory response prediction. The present investigation had the objective to explore merits and suitability of these approaches. One technique, called Force Determination methodology, was found to make it possible to determine successfully the magnitudes and phase angles of vibratory forces acting on AH-1G airframe. The 'Automated Dynamic Analytical Model Improvement Technique' could be implemented to improve a NASTRAN model of the AH-1G airframe. The calculated forces were applied to the improved NASTRAN Analytical model and the predicted accelerations were in agreement with accelerations measured on the AH-1G airframe in flight. G.R.

A82-37783 * # **Design and evaluation of a state-feedback vibration controller.** R. W. Du Val (NASA, Ames Research Center, Moffett Field, CA), C. Z. Gregory, Jr., and N. K. Gupta (Integrated Systems, Inc., Palo Alto, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-10.* 14 p.

The effectiveness and practicality of the state-feedback vibration controller is demonstrated by computer simulations. It is shown that: (1) the required measurements can be reduced to fuselage accelerations; (2) the system is stable over a wide range of flight conditions; (3) a discrete design for the controller provides effective digital implementation at 60-Hz sampling; (4) attenuation produced by the actuators does not create a problem, and a simple lead compensator provides vibration reduction; and (5) a design based on a hover model worked well at five knots. At 40 and 120 knots, vibrations in all but the vertical acceleration were effectively suppressed. The state-feedback vibration controller has a rapid convergence time and implementation is easier than with multicyclic control since no on-line harmonic analysis or identification algorithms are required. C.D.

A82-37784 **Rotor state estimation for rotorcraft.** J. W. Fuller. *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-11.* 10 p. 8 refs.

Studies of rotor control indicate that helicopter ride quality in gusty conditions can be significantly improved if rotor state feedback is used in an automatic flight controller. The present investigation is concerned with the design of an algorithm for estimating tip-path plane (TPP), and TPP rate for use in a feedback controller, given blade flapping measurements. The presence of the direct rotor measurements means that the estimator does not need to rely on detailed knowledge of helicopter and rotor dynamics. Therefore, a simple model of rotor dynamics is used. One problem still remains. The measurement equations, relating the measurements to the TPP states, are periodically time-varying. Current steady-state estimator synthesis techniques require time-invariant system equations. This problem is solved by analytically determining a coordinate transformation which converts the system equations to time-invariant forms. G.R.

A82-37785 * **A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation.** N. D. Ham and T. R. Quackenbush (MIT, Cambridge, MA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-12.* 10 p. NASA-sponsored research.

A new, advanced type of active control for helicopters and its application to a system for stall flutter suppression is described. The system, based on previously developed M.I.T. Individual-Blade-Control hardware, employs blade-mounted accelerometers to sense torsional oscillations and feeds back rate information to increase the damping of the first torsion mode. A linear model of the blade and control system dynamics is used to give qualitative and quantitative guidance in the design process as well as to aid in analysis of experimental results. System performance in wind tunnel tests is described and evidence is given of the system's ability to provide substantial additional damping to stall-induced blade oscillations. (Author)

A82-37786 * # **Considerations of open-loop, closed-loop, and adaptive multicyclic control systems.** I. Chopra (NASA; Stanford Joint Institute for Aeronautics and Acoustics; Stanford University, Stanford, CA) and J. L. McCloud, III (NASA, Ames Research Center, Moffett Field, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-13* 23 p. 8 refs.

Four different types of self-tuning regulators were studied for multicyclic control of helicopter vibration. A numerical simulation of the helicopter is made, using a multivariable frequency-domain model, in terms of transfer function with six input control harmonics and six output harmonics. The model characteristics vary with flight speed. An off-line identification of model characteristics is made, using the least-squared-error method and using a succession of input and output measurements. The on-line identification of model characteristics is made using the Kalman filter solution. The optimal controls are calculated from the minimization of quadratic performance function based on response and multicyclic inputs. The performance of various regulators or controllers is judged from the stability, transient response, convergence time, and amplitude of the steady state. C.D.

A82-37787 **Total main rotor isolation system.** D. R. Halwes (Bell Helicopter Textron, Fort Worth, TX). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-15.* 8 p.

An analytical study is described in which six LIVE (Liquid Inertia Vibration Eliminator) isolator elements are combined to establish the requirements, preliminary design, and verification procedures for a total main rotor isolation system at n/rev. This approach provides the high potential for total isolation in all degrees of freedom necessary for any type rotor system without excessive weight and complexity. The LIVE system has numerous advantages over mechanical inertia isolators, including reduced complexity, no bearings, a smaller envelope for installation, linear response at high g's, and much lower weight and cost. Analysis of the system after installation in a 206 LM helicopter showed better than 95% isolation for a weight penalty of less than 3/4% of design gross weight. N.B.

A82-37788 **Flight demonstration of an integrated floor/fuel isolation system.** R. Gabel, P. Teare, and R. A. Desjardins (Boeing Vertol Co., Philadelphia, PA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-16.* 11 p.

A vibration isolation system has been developed for the passenger cabin and the long range fuel tanks of the Boeing Commercial Chinook. The passenger floor is isolated from the airframe on a series of passive isolation units. The fuel tanks are also isolated so that their varying dynamic mass is effectively nulled at all fuel levels, thereby avoiding any deleterious effects on airframe natural frequency placement. Analyses, component tests, an aircraft shake test and now flight tests have verified the effectiveness of the system. Passenger cabin vibration levels are below 0.05 g at the 135 knot cruise speed and beyond. These flight vibration levels are insensitive to fuel quantity, despite variation from 14,000 lb down to reserve. (Author)

A82-37789 **Semi-active fluid inertia - A new concept in vibration isolation.** D. L. Margolis (California, University, Davis, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-17* 14 p. 10 refs.

A vibration isolation system which features semi-active control of fluid inertia for broad-band applications on helicopter rotor inputs is described. Semi-active control theory is reviewed, along with the skyhook concept in a continuously variable configuration. The fluid inertia based isolator is modeled numerically, noting that the use of a variable orifice and a control strategy presents a nonlinear control problem. The actual proposed device consists of a cylinder of fluid with a piston, connected by means of a long tube to some mass. The fluid-filled tube is an effective mass which provides isolation performance from, for example, helicopter downwash. Modulating the orifice in the tube allows the semi-active control. Applications during take-off and landing phases of flight, when variable engine speeds are encountered, are indicated. M.S.K.

A82-37790 **Assessment of the dynamic response of a structure when modified by the addition of mass, stiffness or dynamic absorbers.** S. P. King (Westland Helicopters Ltd., Yeovil, Somerset, England). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-18.* 10 p.

An algorithm suitable for estimating the modes and frequencies created by the introduction of reconfigured fuselages and mass spring systems to a new helicopter during the design and development phases is presented. The new modes are expressed as linear combinations of known modes and the degree of coupling resulting from the projected structural changes can be assessed. Application of the algorithm for the case of added stiffness is made, along with examples of added mass or an absorber. It is shown that the model is useful for examining the effects of varying the same parameter and also for determining the additive effects of a number of structural modifications. Comparison with the outcome of an eigenvalue analysis shows good agreement for a 39 degree of freedom two-dimensional lumped parameter model, with the algorithm underestimating the frequency reduction. M.S.K.

A82-37791 **Monofilar - A dual frequency rotorhead absorber.** T. Mouzakis (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-20.* 9 p.

A monofilar absorber is centrifugally tuned two degree of freedom device which reacts and reduces vibratory forces at two frequencies using a single active mass. A mathematical model of the monofilar is presented together with both linear and nonlinear equations of motion. It is shown that the desired natural frequencies (3P and 5P for a four bladed rotor) can be obtained with physically achievable mass, inertia and geometric properties and that the performance of the monofilar is equivalent to that of a standard bifilar. Therefore, the monofilar absorber design will allow reductions in weight, parts, maintenance and production costs, relative to the conventional bifilar absorber. (Author)

A82-37792 # **A finite element analysis of coupled rotor fuselage vibration.** M. J. Rutkowski (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-21.* 15 p. 6 refs.

The dynamic coupling between the rotor system and the fuselage of a simplified helicopter model in hover is investigated. The rotor-fuselage model is based on a two-degrees-of-freedom beam finite element with polynomial mass and stiffness properties. The linear matrix equations of motion for the system include centrifugal stiffness and quasi-steady aerodynamic damping matrices for the rotor elements and structural damping matrices for both rotor and fuselage elements. Both real and complex eigenanalyses are carried out to obtain mode shapes and modal frequencies as a function of rotor speed. Forced-response vibration results for the case of a radially uniform, harmonic load applied to the rotor are also described. The uncoupled rotor-fuselage frequencies in vacuo are poor approximations to the actual coupled frequencies near rotor-fuselage frequency coalescence, but including rotor aerodynamic design provides some improvement. The magnitude of the resonant response at the fuselage mode frequencies is highly dependent on their proximity to the blade mode frequencies. C.D.

A82-37793 **A unified approach to helicopter NASTRAN modeling.** J. J. Brown, R. A. Christ, K. L. Kilroy, and G. R. Parker (Hughes Helicopters, Inc., Culver City, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-22.* 8 p.

An approach unifying stress and dynamics analysis is presented. A common stress model is employed along with an automated method of assembling the mass data, and a variation of the subspace iteration technique is used to reduce the dynamic equations, resulting in timely, economical turnaround of any design changes and elimination of the problems associated with the use of two models. The dynamics group adds mass data to the stress model to form the dynamic model, while the structures department develops and maintains a common NASTRAN bulk data base accessed by both groups. The basic model supplies the stiffness data to predict internal loads for the stress analyst and to calculate modal data for the dynamicist. Structural and nonstructural mass data are processed separately before being combined and added to the stiffness model to produce the dynamic model. Application to the AHIP aircraft is demonstrated. C.D.

A82-37794 # **A nonlinear response analysis for coupled rotor-fuselage systems.** D. L. Kunz (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-23.* 22 p. 11 refs.

The governing equations for a fully coupled, rotor-fuselage vibration model are derived. There are three sets of equations involved. First are the equations of motion for a uniform, elastic blade that can undergo flap and lead-lag bending deflections. The second set of equations comprises the hub-load equations. For both the blade and hub-load equations, the aerodynamic forces are derived from quasi-steady strip theory. In modeling the fuselage, beam finite-elements and generalized isolator elements are used to generate the third set of equations, the fuselage equations of motion. The blade and fuselage responses, as well as the hub loads, are computed by an iterative, combined harmonic-balance, impedance-matching method. In addition, the uncoupled blade and fuselage modes and frequencies, which are by-products of the blade and fuselage analyses, and the coupled system natural frequencies may be obtained. (Author)

A82-37795 * **Substructure program for analysis of helicopter vibrations.** R. Sopher (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-24.* 21 p. 12 refs. Contract No. NAS1-16058.

A substructure vibration analysis which was developed as a design tool for predicting helicopter vibrations is described. The substructure assembly method and the composition of the transformation matrix are analyzed. The procedure for obtaining solutions to the equations of motion is illustrated for the steady-state forced response solution mode, and rotor hub load excitation and impedance are analyzed. Calculation of the mass, damping, and stiffness matrices, as well as the forcing function vectors of physical components resident in the base program code, are discussed in detail. Refinement of the model is achieved by exercising modules which interface with the external program to represent rotor induced variable inflow and fuselage induced variable inflow at the rotor. The calculation of various flow fields is discussed, and base program applications are detailed. C.D.

A82-37796 * **Determination of rotor wake induced empennage airloads.** S. T. Gangwani (United Technologies Research Center, East Hartford, CT). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-26.* 16 p. 10 refs. Army-supported research; Contract No. NAS1-16058.

A computer program has been developed that predicts the unsteady aerodynamic forces that impinge on the empennage surface due to its interactions with the main rotor wake. The program was utilized to determine the vibration airloads acting on the Black Hawk horizontal stabilizer and on the CH-53A stabilizer under high speed forward flight conditions. The results demonstrate that it is possible to compute the high frequency empennage vibration airloads efficiently by utilizing suitable analysis techniques; a CH-53A case required only 1.3 minutes of computer time. Numerical problems associated with the unsteady Kutta condition have been minimized. Even though the analysis is of transient nature, the results for harmonic cases show a very fast convergence to periodicity. In general, good correlation was shown between the predicted vibratory airloads and the measured stabilizer airloads for a CH-53A helicopter operating at high speed flight conditions. C.D.

A82-37797 **Use of optimization in helicopter vibration control by structural modification.** G. T. S. Done (City University, London, England). *American Helicopter Society, Northeast Region National Specialists' Meeting on Helicopter Vibration: Technology for the Jet Smooth Ride, Hartford, CT, Nov. 2-4, 1981, Preprint 81-27.* 8 p. 7 refs. Research sponsored by Westland Helicopters Ltd., and Royal Aircraft Establishment.

A method is described of computing the structural changes necessary to reduce the vibration in part of a helicopter fuselage subject to a constant frequency excitation at the rotor head. The method is applied to a simple two-dimensional 60 degree of freedom model. A number of structural parameters considered suitable candidates for change are selected, and then values of these parameters are computed using an optimization routine such that a function involving the response over part of the structure is minimised. The results provide the basis for useful discussion on various aspects of the selection and optimization exercises. (Author)

A82-37832 # **The DC-10 Chicago crash and the legality of SFAR 40.** G. Richard. In: Annals of air and space law. Volume 6. (A82-37826 18-84) Montreal, McGill University; Toronto, Carswell Co., Ltd.; Paris, Editions A. Pedone, 1981, p. 195-218. 42 refs.

Legal issues arising out of the invocation of SFAR 40 after the 1979 crash of a DC-10 passenger aircraft are discussed in terms of the effects on international agreements and on the Chicago convention. The decision, made by the head of the U.S. agency, the FAA, grounded all foreign and domestic flights of DC-10s in the U.S., thus extending sovereign jurisdiction to aircraft owned by other nations and/or foreign companies. Standards for airworthiness established by the ICAO in signing the multinational Chicago Convention agreements are reviewed, and it is noted that empty foreign DC-10 aircraft were allowed to fly over the U.S. after the decision. It is concluded that the decision to invoke the SFAR 40 provision was not legally sound because the head of the FAA had no jurisdiction over DC-10 aircraft under foreign registry. M.S.K.

A82-37854 * **Performance of PTFE-lined composite journal bearings.** H. E. Sliney (NASA, Lewis Research Center, Cleveland, OH) and F. J. Williams (Rockwell International Corp., North American Aviation Div., Los Angeles, CA). *American Society of Lubrication Engineers, Annual Meeting, 37th, Cincinnati, OH, May 10-13, 1982, Preprint 82-AM-1A-1.* 7 p. 10 refs. Contract No. NAS3-22123.
(Previously announced in STAR as N82-17263)

A82-37855 * **Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites.** R. L. Fusaro (NASA, Lewis Research Center, Cleveland, OH). *American Society of Lubrication Engineers, Annual Meeting, 37th, Cincinnati, OH, May 10-13, 1982, Preprint 82-AM-5A-2.* 11 p. 21 refs.
(Previously announced in STAR as N82-15198)

A82-37857 **Wear by generation of electrokinetic streaming currents.** T. R. Beck (Electrochemical Technology Corp., Seattle, WA). *American Society of Lubrication Engineers, Annual Meeting, 37th, Cincinnati, OH, May 10-13, 1982, Preprint 82-AM-6A-3.* 6 p. 16 refs.

Hydraulic control valves in commercial aircraft are subject to 'erosion' in service with phosphate ester fluids, due to corrosion from generation of electrokinetic streaming currents. This 'zeta corrosion' phenomenon is now well understood. The theory is extended here to calculate current densities that would be generated on the surfaces of lubricated journal bearings and roller bearings. Measurements of such current densities made with a disk electrode in a simulated journal bearing are in approximate agreement with the model. Many aspects of bearing wear reported in the literature are consistent with the zeta corrosion mechanism. (Author)

A82-37931 * # **Chordwise and compressibility corrections for arbitrary planform slender wings.** D. Levin (NASA, Ames Research Center, Moffett Field, CA) and A. Seginer (Technion - Israel Institute of Technology, Haifa, Israel). *AIAA Journal,* vol. 20, Aug. 1982, p. 1025-1030. 14 refs.

The Lomax and Sluder method for adapting slender-wing theory to delta or rectangular wings by making chordwise and compressibility corrections is extended to cover wings of any arbitrary planform in subsonic and supersonic flows. The numerical accuracy of the present work is better than that of the Lomax-Sluder results. Comparison of the results of this work with those of the vortex-lattice method and Kernel function method for a family of Gothic and arrowhead wings shows good agreement. A universal curve is proposed for the evaluation of the lift coefficient of a low aspect ratio wing of an arbitrary planform in subsonic flow. The location of the center of pressure can also be estimated. (Author)

A82-37945 # **Static and aeroelastic optimization of aircraft (Optimisation statique et aéroélastique des avions).** J. M. Thomas (Société Nationale Industrielle Aérospatiale, Toulouse, France). *Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, International Symposium on Aeroelasticity, Nuremberg, West Germany, Oct. 5-7, 1981, Paper.* 9 p. In French.

Techniques for the finite element modeling of the static and aeroelastic stresses on an aircraft are described. The methods are intended to serve to define sustainable loads in aircraft structures which are built with minimized weight. Attention is focussed on the components of the ASELF program, which comprises analyses of linear and nonlinear statics, crack propagation, thermal effects and static and dynamic aeroelastic characteristics. Partial derivatives are obtained for the displacements, elastic, principal, and equivalent stresses, the rupture criteria, panel buckling, and internal interactions between groups of elements. Constraints are placed on the optimization through formulation of the displacements, a rigidity matrix, and a determination of the external stresses. An optimization example is provided for a composite sheets bordering openings in the aircraft or in the empennage using 1952 degrees of freedom with 3684 elements. M.S.K.

A82-37946 # **Survey of active and passive means to reduce rotorcraft vibrations.** G. Reichert and H. Strehlow (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, International Symposium on Aeroelasticity, Nuremberg, West Germany, Oct. 5-7, 1981, Paper.* 50 p. 56 refs.

Methods employed and proposed for reducing rotorcraft vibrations are reviewed, with attention given to development and test programs. Active vibration isolators such as force generators, springs, and dampers are noted to possess advantages over passive systems, due to the ability to supply variable power, to react to many variables in a local force, and modifiability to meet performance specifications. Sources of rotorcraft vibrations are identified, along with options for controlling the vibrations, structural tuning, dynamic absorbers in the rotating and nonrotating system, rotor isolation, and multicyclic pitch or twist control. The underlying principle is compensation, enacted by producing harmonic forces to offset disturbances. The use of passive antiresonant force isolators as connecting members between the rotor-transmission unit and the fuselage is discussed as an effective combination of spring passive force generator. M.S.K.

A82-37947 **F-16 active flutter suppression program.** R. P. Peloubet, Jr., R. L. Haller, and R. M. Bolding (General Dynamics Corp., Fort Worth, TX). *Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, International Symposium on Aeroelasticity, Nuremberg, West Germany, Oct. 5-7, 1981, Paper.* 14 p. 12 refs. Contracts No. F33615-77-C-3081; No. F33615-80-C-3210.

The F-16 military aircraft is required to carry a very large number of external store configurations, and new store configurations are continuously being added to its inventory. Therefore, the probability increases that eventually store configurations might be added which would cause wing/store flutter that could not be easily stabilized by passive means. The F-16 flutter suppression program has the objective to develop the technology for a flutter suppression system (FSS) which could be employed in case such stabilization difficulties with the F-16 should occur. Attention is given to an overview of an F-16 FSS feasibility study, a description of an analog study of a technique for measuring the FSS open-loop frequency response functions (FRF) during wind tunnel tests, a description of wind tunnel tests of the F-16 flutter suppression model which were conducted from 27 January through 8 February 1979, and planned wind tunnel tests to be conducted during the fall of 1981. G.R.

A82-37969 **USAF ACES II progress report.** R. C. Delgado (USAF, Air Force Inspection and Safety Center, Norton AFB, CA). *SAFE Journal,* vol. 12, Summer 1982, p. 10-12.

A review of the operational experience for the Advanced Concept Ejection Seat (ACES II), in operational use in USAF aircraft since 1978, is presented. The ejection survival rate using the ACES II (83%) exceeds the rate for other USAF escape systems (74%). Moreover, none of the fatalities can be attributed to the ACES II seat. In addition, the major injury rate for the ACES II was only 4%, compared to others' 17%. A series of tables providing injury definitions as well as statistical data (ejection speed, ejection altitude, etc.) are presented. N.B.

A82-37970 **Lear Fan 2100 egress system.** D. W. Newton (Lear Fan Corp., Reno, NV). *SAFE Journal,* vol. 12, Summer 1982, p. 18-22.

This paper describes the crew emergency egress system developed and installed on the Lear Fan 2100 flight test prototype. The unique configuration of the airplane, which includes a large Y tail and aft mounted propeller, required development of a method of escape which would assure positive clearance of crewmembers from the airframe during a bailout. The total system which was developed includes an explosive door removal system, a crewmember rocket extraction system, and a seat mover system to transport the crewmember to the escape opening. The philosophy which led the company to develop this particular system, together with its advantages and limitations, is discussed. The system is unique in general aviation aircraft, and represents a considerable advancement in emergency escape capability for such aircraft. Extensive testing of the system, including explosive cutting tests of the graphite/epoxy airframe structural members, a stationary test of the extraction system, and a 350 knot jet sled test, was conducted and is described. (Author)

A82-37972 # **Strategic materials - Technological trends.** A. Hurlich. *Mechanical Engineering,* vol. 104, July 1982, p. 44-53. 5 refs.

The US is becoming increasingly dependent upon other countries for sources of strategic materials - raw materials such as cobalt, aluminum, manganese and chromium needed to supply military, industrial and civilian needs during a national emergency and found domestically in insufficient quantities. Various ways of reducing the US vulnerability in these strategic materials are reviewed, emphasizing technological methods to reduce consumption. The use of recycling, scrap recovery and conversation methods is expanding, but these efforts are insufficient. Another approach is to develop materials management programs, such as devising lists of alternative materials that may be used in case the normally used materials become unavailable, and strategic planning to limit the use of critical materials that may pose serious problems if their supply is interrupted. New materials and technologies are being developed and tested to reduce as much as possible the use of strategic materials - such as reducing the amount of chromium in certain stainless steels from 12-18% to 2-6%. The use of near net shape technology also can save large amounts of materials by eliminating trimming waste. Investigation and development of possible substitutes for strategic materials are now being conducted by government agencies and private industry. Finally, stockpiling is mentioned as a way to ensure adequate supplies when no substitutes are available. N.B.

A82-38025 **The recognition of air worthiness of aircraft - Comments to a remarkable judicial decision (Zur Anerkennung der Lufttüchtigkeit von Flugzeugen - Bemerkungen zu einem bemerkenswerten Urteil).** A. Rudolf. *Zeitschrift für Luft- und Weltraumrecht,* vol. 31, June 1982, p. 124-128. 15 refs. In German.

A judicial decision made by the U.S. Court of Appeals is discussed, taking into consideration the question whether a German judge might have arrived at the same decision as the American judge, and the legal consequences of such a decision. The considered decision is related to a complaint filed by foreign airlines with respect to an act of the Federal Aviation Agency (FAA). After an aircraft accident involving the loss of a U.S. DC-10 airliner on May 25, 1979, at Chicago, the FAA had prohibited for U.S. airspace the operation of all DC-10 aircraft, including those registered in foreign countries. The plaintiffs maintain that this act would constitute a violation of Article 33 of the Chicago Convention, which, in its turn, would violate Paragraph 1102 FAAct. The Court agreed with the plaintiffs. G.R.

A82-38077 * **Development and validation of preliminary analytical models for aircraft interior noise prediction.** L. D. Pope, D. C. Rennison (Bolt Beranek and Newman, Inc., Canoga Park, CA), C. M. Willis, and W. H. Mayes (NASA, Langley Research Center, Hampton, VA). *Journal of Sound and Vibration,* vol. 82, June 22, 1982, p. 541-575. 19 refs. Contract No. NAS1-15782.

Predictions are made of the transmission of sound into an unpressurized and unstiffened cylinder under random and harmonic excitations, in order to validate the preliminary version of an airplane interior noise prediction model which is based on an analysis of the power flow type. The predictions are compared to experimental results, and statistically significant differences between predictions and measurements are found to be primarily due to input data deficiencies. Because the model requires only the value of a simple integral for determining interior spatial coupling, and resonance frequencies to determine frequency coupling, the known dynamics of the fuselage can be utilized without difficulty. O.C.

STAR ENTRIES

N82-26199*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
JOINT UNIVERSITY PROGRAM AIR FOR TRANSPORTATION RESEARCH, 1981
Jun. 1982 235 p refs Proc. of a Conf. held at Washington, D.C., 11 Dec. 1981
(Grants NGL-22-009-640; NGR-36-009-017; NGL-31-001-252)
(NASA-CP-2224; L-15346; NAS 1.55:2224) Avail: NTIS HC A11/MF A01 CSCL 01B

Navigation, guidance, control and display concepts, and hardware, with special emphasis on applications to general aviation aircraft are discussed.

N82-26200*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
DYNAMIC SCHEDULING OF RUNWAY OPERATIONS
John Pararas *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 7-13

Avail: NTIS HC A11/MF A01 CSCL 01C

Automated ATM/C decision making is discussed. Runway scheduling and flight plan generator algorithms are considered. Terminal area geometry, ATM/C schematics, vector controller display and simulation work are reported. N.W.

N82-26201*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
PPOD PROGRAMMABLE PILOT-ORIENTED DISPLAY
Antonio L. Elias *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 15-30
Avail: NTIS HC A11/MF A01 CSCL 01D

A general-purpose low cost research microprocessor system for general aviation was developed. This system is intended to be the vehicle for individual research efforts in low cost airborne hardware and software as well as advanced microprocessor based navigation systems and techniques. Two such research projects were undertaken, yielding results in the areas of micro hardware/software design, cost and performance, and pilot/computer interface. Low-cost flight software reliability and a time-difference based Loran approach procedure that eliminates the need for propagation corrections and latitude/longitude transformations are also discussed. Author

N82-26202*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
THE P-POD PROJECT Progress Report
James A. Littlefield *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 31-37
Avail: NTIS HC A11/MF A01 CSCL 01D

The programmable pilot oriented display (P-POD), a multiprocessor based flight information processing and display unit, is discussed. Communication protocols between the three Z-80 processors inside P-POD are reviewed. The interface between the video processor, P2, and the main processor, P1, was tested. Hardware and software were revised. Data flow between P1 and P2 is illustrated. While running diagnostic routines to exercise the P1/P2 interface at maximum speed an intermittent failure was observed. A check of possible noise sources or race conditions in the hardware did not reveal the source of this failure. Possible software timing problems were also fully investigated. To eliminate the effects of this type of failure a performance monitor routine was used to detect these occasional failures and correct them. The data transmission cycle between P1/P2 is either allowed to continue normal operation or is re-initialized and restarted when an error is detected. N.W.

N82-26203*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
MICROWAVE ICE PREVENTION
R. John Hansman, Jr. and Walter Hollister *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 39-51

Avail: NTIS HC A11/MF A01 CSCL 01C

The concept of using microwave energy to provide aircraft ice protection, specifically an anti-icing system, and the feasibility of such a system are discussed. In a microwave anti-icing system impinging supercooled water droplets are heated to above freezing by the resonant absorption of microwave energy located upstream of the aircraft. This process is inherently more efficient than existing anti-icing devices due to the saving of the latent heat of fusion (a substantial 334 joules/gm (80 cal/gm)) and the fact that only the droplets are heated, thereby reducing convective losses to the air. Author

N82-26204*# Ohio Univ., Athens. Avionics Engineering Center.
INVESTIGATION OF AIR TRANSPORTATION TECHNOLOGY AT OHIO UNIVERSITY, 1981
Richard H. McFarland *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 55-72 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

The increased availability of Loran signals in the United States encouraged consideration of Loran for airborne applications. High quality signal processing to obtain effective signal-to-noise ratios which permit good reliability in position determination consistent with airborne applications is considered. Techniques for deriving air navigation quality information from Loran-C were investigated. N.W.

N82-26205*# Ohio Univ., Athens. Avionics Engineering Center.
LORAN-C PLOTTING PROGRAM FOR PLOTTING LINES OF POSITION ON STANDARD CHARTS
James P. Roman *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 93-114 ref
Avail: NTIS HC A11/MF A01 CSCL 17G

A set of programs designed to be run on the IBM System/370 computer is described. These programs are used to plot Loran-C lines of position (LOP) on any common map or standard aviation sectional chart. The Loran-C plotting program JRPLOT FORTRAN uses a standard Calcomp-compatible plotting subroutine package for the Hewlett-Packard 7202A graphic plotter. A general description of the features of the Loran-C plotting program. This program involves a simple add/substrate method to calculate the LOP. A description on how to use the program and some methods of operation are included. Author

N82-26207*# Ohio Univ., Athens. Avionics Engineering Center.
A LORAN-C PROTOTYPE NAVIGATION RECEIVER FOR GENERAL AVIATION
Robert W. Lilley and Daryl L. McCall *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 115-137 refs

Avail: NTIS HC A11/MF A01 CSCL 17G

An automatic gain control has been designed and fabricated to operate with the Loran-C prototype receiver and data collection system. Author

N82-26208*# Ohio Univ., Athens. Dept. of Electrical Engineering.
A LORAN-C PROTOTYPE NAVIGATION RECEIVER FOR GENERAL AVIATION
Robert W. Lilley and Daryl L. McCall *In* NASA. Langley Research Centeer Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 121-137 refs

Avail: NTIS HC A11/MF A01 CSCL 17G

The design, fabrication and evaluation of a prototype Loran-C receiver is described. Hardware, and microcomputer programming for addition of area navigation capability are reported. The receiver is an envelope processor, offering simplicity of RF processor circuitry. Author

N82-26209*# Ohio Univ., Athens. Avionics Engineering Center.

COMMUTATED AUTOMATIC GAIN CONTROL SYSTEM

Stephen R. Yost *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 139-155 refs
Avail: NTIS HC A11/MF A01 CSCL 17G

The commutated automatic gain control (AGC) system was designed and built for the prototype Loran-C receiver is discussed. The current version of the prototype receiver, the Mini L-80, was tested initially in 1980. The receiver uses a super jolt microcomputer to control a memory aided phase loop (MAPLL). The microcomputer also controls the input/output, latitude/longitude conversion, and the recently added AGC system. The AGC control adjusts the level of each station signal, such that the early portion of each envelope rise is about at the same amplitude in the receiver envelope detector. Author

N82-26210*# Ohio Univ., Athens. Avionics Engineering Center.

A PROTOTYPE INTERFACE UNIT FOR MICROPROCESSOR-BASED LORAN-C RECEIVER

Stanley M. Novacki, III *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 157-164 refs

Avail: NTIS HC A11/MF A01 CSCL 17G

A data/command entry ASCII keypad with a CRT display capable of alphanumeric and graphics mode operation which provides specialized data entry and graphics mode operation which receiver/processor was developed. This unit will replace conventional communication terminal to simplify receiver operations to a level typical of current avionics systems. E.A.K.

N82-26212*# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.

INVESTIGATION OF AIR TRANSPORTATION TECHNOLOGY AT PRINCETON UNIVERSITY, 1981

Robert F. Stengel *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 181-187 refs
Avail: NTIS HC A11/MF A01 CSCL 01C

A summary of the air transportation technology program is presented. The following topics were examined: (1) fuel use characteristics of general aviation aircraft; (2) dead-reckoning concept incorporating a fluidic rate sensor; (3) experimentation with an ultrasonic altimeter; (4) development of laser-based collision avoidance systems; (5) flight path reconstruction from sequential DME data; (6) application of fiber optics in flight control systems; and (7) voice recognition inputs for navigation/communication receiver tuning. E.A.K.

N82-26213*# Princeton Univ., N. J.

FLYING QUALITIES CRITERIA FOR GA SINGLE PILOT IFR OPERATIONS

Aharon Bar-Gill *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun 1982 p 189-210
Avail: NTIS HC A11/MF A01 CSCL 17G

The flying qualities criteria in general aviation (GA) to decrease accidents are discussed. The following in-flight research is discussed: (1) identification of key aerodynamic configurations; (2) implementation of an in-flight simulator; (3) mission matrix design; (4) experimental systems; (5) data reduction; (6) optimal flight path reconstruction. Some of the accomplished work is reported: an integrated flight testing and flight path reconstruction methodology was developd, high accuracy in trajectory estimation was achieved with an experimental setup, and a part of the flight test series was flown. E.A.K.

N82-26214*# Princeton Univ., N. J.

AIR DATA MEASUREMENT USING DISTRIBUTED PROCESSING AND FIBER OPTICS DATA TRANSMISSION

Kristin A. Farry *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 211-217
Avail: NTIS HC A11/MF A01 CSCL 01D

Distributed processing, fiber optics technology, and redundancy management in the aircraft environment are discussed. The project features the development of an angle-of-attack and sideslip data collection system hich features: (1) two independent microprocessor controlled data collection and calibration units; (2) transmission of data to the control system on a fiber optic data bus; and (3) software implemented error detection and recovery. E.A.K.

N82-26215*# Princeton Univ., N. J.

INPUT/OUTPUT MODELS FOR GENERAL AVIATION PISTON-PROP AIRCRAFT FUEL ECONOMY

L. M. Sweet *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 219-227

Avail: NTIS HC A11/MF A01 CSCL 01C

A fuel efficient cruise performance model for general aviation piston engine airplane was tested. The following equations were made: (1) for the standard atmosphere; (2) airframe-propeller-atmosphere cruise performance; and (3) naturally aspirated engine cruise performance. Adjustments are made to the compact cruise performance model as follows: corrected quantities, corrected performance plots, algebraic equations, maximize R with or without constraints, and appears suitable for airborne microprocessor implementation. The following hardwares are recommended: ignition timing regulator, fuel-air mass ration controller, microprocessor, sensors and displays. E.A.K.

N82-26216*# Princeton Univ., N. J.

WIDE FIELD OF VIEW LASER BEACON SYSTEM FOR THREE DIMENSIONAL AIRCRAFT RANGE MEASUREMENTS

E. Y. Wong *In* NASA. Langley Research Center Joint Univ. Program for Air Transportation Res., 1981 Jun. 1982 p 229-236

Avail: NTIS HC A11/MF A01 CSCL 20E

A system that measures accurately the distance from an aircraft to a helicoper for rotor noise flight testing was developed. The system measures the range and angles between two aircraft using laser optics. This system can be applied in collision avoidance, robotics and other measurement critical tasks. E.A.K.

N82-26217*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EFFECTS OF WING-LEADING-EDGE MODIFICATIONS ON A FULL-SCALE, LOW-WING GENERAL AVIATION AIRPLANE: WIND-TUNNEL INVESTIGATION OF HIGH-ANGLE-OF-ATTACK AERODYNAMIC CHARACTERISTICS

William A. Newsom, Jr., Dale R. Satran, and Joseph L. Johnson, Jr. Jun. 1982 107 p refs
(NASA-TP-2011; L-15101; NAS 1.60:2011) Avail: NTIS HC A06/MF A01 CSCL 01A

Wing-leading-edge modifications included leading-edge droop and slat configurations having full-span, partial-span, or segmented arrangements. Other devices included wing-chord extensions, fences, and leading-edge stall strips. Good correlation was apparent between the results of wind-tunnel data and the results of flight tests, on the basis of autorotational stability criterion, for a wide range of wing-leading-edge modifications. T.M.

N82-26218*# Spectron Development Labs., Inc., Costa Mesa, Calif.

OPERATING MANUAL HOLOGRAPHIC INTERFEROMETRY SYSTEM FOR 2 X 2 FOOT TRANSONIC WIND TUNNEL Final Report

James E. Craig Nov. 1981 58 p
(Contract NAS2-10297)
(NASA-CR-166344; NAS 1.26:166344; SDL-81-52002) Avail: NTIS HC A04/MF A01 CSCL 01B

A holographic interferometer system was installed in a 2X2 foot transonic wind tunnel. The system incorporates a modern, 10 pps, Nd:YAG pulsed laser which provides reliable operation and is easy to align. The spatial filtering requirements of the unstable resonator beam are described as well as the integration of the system into the existing Schieren system. A two plate holographic interferometer is used to reconstruct flow field data. For static wind tunnel models the single exposure holograms are recorded in the usual manner; however, for dynamic models such as oscillating airfoils, synchronous laser hologram recording is used. S.L.

N82-26219*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SUMMARY AND RECENT RESULTS FROM THE NASA ADVANCED HIGH SPEED PROPELLER RESEARCH PROGRAM
Glenn A. Mitchell and Daniel C. Mikkelson 1982 35 p refs
Presented at the 18th Joint Propulsion Conf., Cleveland, 21-23 Jun. 1982; sponsored by AIAA, SAE and ASME
(NASA-TM-82891; E-1269; NAS 1.15:82891) Avail: NTIS
HC A03/MF A01 CSCL 01B

Advanced high-speed propellers offer large performance improvements for aircraft that cruise in the Mach 0.7 to 0.8 speed regime. The current status of the NASA research program on high-speed propeller aerodynamics, acoustics, and aeroelastics is described. Recent wind tunnel results for five 8- to 10-blade advanced models are compared with analytical predictions. Test results show that blade sweep was important in achieving net efficiencies near 80 percent at Mach 0.8 and reducing near-field cruise noise by dB. Lifting line and lifting surface aerodynamic analysis codes are under development and some initial lifting line results are compared with propeller force and probe data. Some initial laser velocimeter measurements of the flow field velocities of an 8-bladed 45 deg swept propeller are shown. Experimental aeroelastic results indicate that cascade effects and blade sweep strongly affect propeller aeroelastic characteristics. Comparisons of propeller near-field noise data with linear acoustic theory indicate that the theory adequate predicts near-field noise for subsonic tip speeds but overpredicts the noise for supersonic tip speeds. Potential large gains in propeller efficiency of 7 to 11 percent at Mach 0.8 may be possible with advanced counter-rotation propellers. B.W.

N82-26220*# Goodyear Aerospace Corp., Akron, Ohio.
PRELIMINARY STUDY OF GROUND HANDLING CHARACTERISTICS OF BUOYANT QUAD ROTOR (BQR) VEHICLES Final Report
Ronald G. E. Browning Jul. 1980 275 p refs
(Contract NAS2-10448)
(NASA-CR-166130; NAS 1.26:166130) Avail: NTIS
HC A12/MF A01 CSCL 01B

A preliminary investigation of mooring concepts appropriate for heavy lift buoyant quad rotor (BQR) vehicles was performed. A review of the evolution of ground handling systems and procedures for all airship types is presented to ensure that appropriate consideration is given to past experiences. Two buoyant quad rotor designs are identified and described. An analysis of wind loads on a moored airship and the effects of these loads on vehicle design is provided. Four mooring concepts are assessed with respect to the airship design, wind loads and mooring site considerations. Basing requirements and applicability of expeditionary mooring at various operational scenarios are addressed. B.W.

N82-26221# Applied Science Associates, Inc., Valencia, Pa.
MAINTENANCE TRAINING SIMULATOR DESIGN AND ACQUISITION: ISD-DERIVED TRAINING EQUIPMENT DESIGN Interim Report
Rohn J. Hritz and George R. Purifoy, Jr. Brooks AFB, Tex. AFHRL Feb. 1982 80 p
(Contract F33615-78-C-0019; AF Proj. 2361)
(AD-A110871; AFHRL-TP-81-52) Avail: NTIS
HC A05/MF A01 CSCL 05/9

A model for documenting training equipment designs derived from an Instructional System Development (ISD) analysis is presented. The model contains blanks to be completed by the ISD analyst(s). Instructions for applying the model are provided. A method for communicating a specific training equipment design to the Simulator System Program Office (SimSPO) after the ISD analysis has established a need for a maintenance trainer is provided. The model provides the ISD analysts an opportunity to specify such design information as (1) characteristics of the target population who will use the trainer, (2) a list of the training objectives to be achieved using the trainer, (3) a list of the tasks to be practiced and/or acquired on the trainer and a list of the malfunctions to be presented by the trainer for isolation and/or correction, (4) a scenario discussing how the trainer will be used to achieve the specified training objectives, (5) a list of the physical and functional characteristics of the components to be represented on the trainer, and (6) a description of the instructional features required on the trainer to facilitate training objective achievement. When utilized, the model will standardize the communication between ISD and SimSPO personnel. Author

N82-26222# Logistics Management Inst., Washington, D. C.
THE SORTIE-GENERATION MODEL SYSTEM. VOLUME 1: EXECUTIVE SUMMARY
John B. Abell Sep. 1981 25 p 6 Vol.
(Contract MDA903-80-C-0554)
(AD-A110897; LMI-DP101-Vol-1) Avail: NTIS
HC A02/MF A01 CSCL 15/5

The Sortie-Generation Model System provides the capability for relating aircraft spares and maintenance manpower levels to the maximal sortie-generation capability of tactical air forces over time. Author (GRA)

N82-26223# Logistics Management Inst., Washington, D. C.
THE SORTIE-GENERATION MODEL SYSTEM. VOLUME 2: SORTIE-GENERATION MODEL USER'S GUIDE
John B. Abell, Robert S. Greenberg, and Michael J. Konvalinka Sep. 1981 123 p 6 Vol.
(Contract MDA903-80-C-0554)
(AD-A110898; LMI-DP101-Vol-2) Avail: NTIS
HC A07/MF A01 CSCL 15/5

This volume, the second of six volumes, provides sufficient information to allow a user to run the Sortie-Generation Model (SGM). Volume III, Sortie-Generation Model Analyst's Manual, describes the mathematical structures, derivations, assumptions, limitations, and data sources of the SGM at a very detailed level. Volume IV, Sortie-Generation Model Programmer's Manual, specifies the details of the computer programs, file structures, job control language, and operating environment of the SGM. Volume V describes the maintenance subsystem and explains the construction of the maintenance input file to the SGM. Volume VI describes the spares subsystem and shows a user how to build the spares file that is used by the SGM. GRA

N82-26224# Logistics Management Inst., Washington, D. C.
THE SORTIE-GENERATION MODEL SYSTEM. VOLUME 4: SORTIE-GENERATION MODEL PROGRAMMERS MANUAL
Michael J. Konvalinka and John B. Abell Sep. 1981 193 p refs 6 Vol.
(Contract MDA903-81-C-0166)
(AD-A110899; LMI-ML102-Vol-4) Avail: NTIS
HC A09/MF A01 CSCL 15/5

Sortie-Generation Model (SGM) Programmer's Manual, specifies the details of the computer programs, file structures, job control language, and operating environment of the SGM. GRA

N82-26225# Logistics Management Inst., Washington, D. C.
THE SORTIE-GENERATION MODEL SYSTEM. VOLUME 5: MAINTENANCE SUBSYSTEM
Robert S. Greenberg Sep. 1981 513 p 6 Vol.
(Contract MDA903-81-C-0166)
(AD-A110615; LMI-ML102-Vol-5) Avail: NTIS
HC A22/MF A01 CSCL 15/5

The Sortie-Generation Model System provides the capability for relating aircraft spares and maintenance manpower levels to the maximal Sortie-generation capability of tactical air forces over time. The maintenance subsystem estimates the maintenance manpower and performance input parameters for the queuing model that is embedded in the Sortie-Generation Model (SGM) System. This subsystem estimates the failure rate, service rate, and number of servers for each work center in a maintenance organization. Author (GRA)

N82-26226# Logistics Management Inst., Washington, D. C.
THE SORTIE-GENERATION MODEL SYSTEM. VOLUME 6: SPARES SUBSYSTEM
John B. Abell and F. Michael Slay Sep. 1981 180 p refs 6 Vol.
(Contract MDA903-81-C-0166)
(AD-A110900; LMI-ML102-Vol-6) Avail: NTIS
HC A09/MF A01 CSCL 15/5

The Sortie-Generation Model System provides the capability for relating aircraft spares and maintenance manpower levels to the maximal sortie-generation capability of tactical air forces over time. This volume describes the process of constructing a spares data base for input to the Sortie-Generation Model. Author (GRA)

N82-26234*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LASER ANEMOMETER MEASUREMENTS IN AN ANNULAR

CASCADE OF CORE TURBINE VANES AND COMPARISON WITH THEORY
Louis J Goldman and Richard G Seashultz Jun 1982 47 p refs
(NASA-TP-2018, E-876, NAS 1.60:2018) Avail: NTIS HC A03/MF A01 CSCL 01A

Laser measurements were made in an annular cascade of stator vanes operating at an exit critical velocity ratio of 0.78. Velocity and flow angles in the blade to blade plane were obtained at every 10 percent of axial chord within the passage and at 1/2 axial chord downstream of the vanes for radial positions near the hub, mean and tip. Results are presented in both plot and tabulated form and are compared with calculations from an inviscid, quasi three dimensional computer program. The experimental measurements generally agreed well with these theoretical calculations, an indication of the usefulness of this analytic approach. Author

N82-26235*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STATIC INTERNAL PERFORMANCE CHARACTERISTICS OF TWO THRUST REVERSER CONCEPTS FOR AXISYMMETRIC NOZZLES
Laurence D Leavitt and Richard J. Re Jun 1982 24 p refs
(NASA-TP-2025; NAS 1.60:2025) Avail: NTIS HC A02/MF A01 CSCL 01A

The static performance of two axisymmetric nozzle thrust reverser concepts was investigated. A rotating vane thrust reverser represented a concept in which reversing is accomplished upstream of the nozzle throat, and a three door reverser concept provided reversing downstream of the nozzle throat. Nozzle pressure ratio was varied from 2.0 to approximately 6.0. The results of this investigation indicate that both the rotating vane and three door reverser concepts were effective static thrust spoilers with the landing approach nozzle geometry and were capable of providing at least a 50 percent reversal of static thrust when fully deployed with the ground roll nozzle geometry. Author

N82-26236*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STEADY, OSCILLATORY, AND UNSTEADY SUBSONIC AND SUPERSONIC AERODYNAMICS, PRODUCTION VERSION 1.1 (SOUSSA-P1.1). VOLUME 2: USER/PROGRAMMER MANUAL. ADDENDUM 1: ANALYTICAL TREATMENT OF WAKE INFLUENCE
Herbert J Cunningham, Robert N. Vesmarais, and E. Carson Yates, Jr May 1982 3 p refs Addendum to NASA-CR-159131 See N80-29253
(Contract NAS1-14977)
(NASA-TM-84484; NAS 1.15:84484) Avail: NTIS HC A02/MF A01 CSCL 01A

The influence of the trailing wake at each wing panel center is investigated. The effect of the wake is calculated by analyzing the wake as being subdivided into trailing wake strips. With the improved program there are two optional ways of calculating the wake effect, and the choice is controlled by an added parameter KANW that is part of the input data. S.L.

N82-26238*# Analytical Methods, Inc., Redmond, Wash.
FLOWS OVER WINGS WITH LEADING-EDGE VORTEX SEPARATION
B. M. Rao and B. Maskew Apr 1982 44 p refs
(Contract NAS1-16155)
(NASA-CR-165858; NAS 1.26:16585; Rept-8105) Avail: NTIS HC A03/MF A01 CSCL 01A

The unsteady cross flow analogy reduces the steady three dimensional separation flow problem into an unsteady two dimensional flow problem in which the section shape changes with time. The two dimensional VORSEP code is extended to the case of arbitrary body growth rates in order to generate the initial vortex structures for the three dimensional free vortex sheet (FVS) code. Automatic procedures to reduce the wing geometry definition to a set of cross flow plane sections corresponding to the locations of the time step solutions and to generate the effective source distribution on each cross flow section to represent the section normal growth across the following steps are incorporated in the VORSEP code. Also, the wake shedding model is improved by adopting a redistribution scheme which improves the stability of the free sheet development with time. The improved wake shedding model combined with the redistribution scheme alleviated the numerical instabilities associated with the vortex rollup. S.L.

N82-26256# Rockwell International Corp., El Segundo, Calif. Aerodynamic Group.
SUPERSONIC CRUISE/TRANSONIC MANEUVER WING SECTION DEVELOPMENT STUDY Final Report, Aug. 1977 - Nov. 1979
Ellwood Bonner and Philip Gingrich Wright-Patterson AFB, Ohio AFWAL Jun. 1980 77 p refs
(Contract F33615-77-C-3066; AF Proj. 2404)
(AD-A110686; AFWAL-TR-80-3047) Avail: NTIS HC A05/MF A01 CSCL 01/3

Computational aerodynamic design of advanced fighter wings with well-controlled transonic maneuver flow and high supersonic cruise efficiency is described. Author (GRA)

N82-26258# Wright State Univ., Dayton, Ohio. School for Medicine.
UPDATE OF THE SUMMARY REPORT OF 1977-1978 TASK FORCE ON AIRCREW WORKLOAD Final Report, 1977 - 1979
William J. Cox, Fay Gold, and Richard L. Sulzer Washington FAA Apr. 1981 82 p refs
(AD-A112547; DOT/FAA/RD-81/34; DOT/FAA/ASF-300-81/2) Avail: NTIS HC A05/MF A01 CSCL 01/2

The 1978 summary of accident data from 1967 through 1976 has been extended through 1979. Comparing accident rates of aircraft types approved for operation by two crewmembers vs. accident rates for those approved for operation by three crewmembers, no indication of a safety problem relating to crew size was found. Over this three-year update period, accident rates per million departures were generally superior for the two-crew aircraft, the same result found for the earlier ten-year period. This nominal superiority is not considered a necessary result of flight deck configuration since there are other important differences in the operating environments of the various aircraft. A separate study has been made of the relationship between crew size and regulatory violations. This study, which is appended, produced no evidence that aircraft with crew size of two are being flown with less compliance than aircraft with a crew size of three. Author (GRA)

N82-26259# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
OPPORTUNITIES EXIST TO ACHIEVE GREATER STANDARDIZATION OF AIRCRAFT AND HELICOPTER SEATS
26 Feb. 1982 7 p
(AD-A111718; GAO/MASAD-82-22) Avail: NTIS HC A02/MF A01 CSCL 01/3

We reviewed the efforts of DOD and the services to standardize flight life-support equipment. While formal management structures and informal agreements have resulted in several standardized life-support items, we found a proliferation of tactical aircraft and helicopter seat systems, the most expensive items of life-support equipment. We believe that the past methods of acquiring seats have been costly; that standardization opportunities have not been adequately defined; and that for the most part, standardization efforts undertaken have not been adequately organized, planned, and supported either by DOD or the services. Increased management emphasis by the Under Secretary of Defense (Research and Engineering) and the services could increase standardization of aircraft seats and lower acquisition and support costs. Implementation of the Deputy Secretary of Defense's April 30, 1981, initiatives, which recognized that increased standardization of subsystems and support systems cannot only reduce life-cycle costs but also increase reliability, should result in additional economies. Author (GRA)

N82-26260*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MAGNETIC HEADING REFERENCE Patent Application
H. Douglas Garner, inventor (to NASA) Filed 9 Apr. 1982 19 p
(NASA-Case-LAR-12638-1; US-Patent-Appl-SN-367187) Avail: NTIS HC A02/MF A01 CSCL 17G

The invention relates to devices which vectorially sum the output signals from two magnetometers on an aircraft to produce a signal which is indicative of the error in the heading of the aircraft. This error in heading signal is used either by the pilot or an automatic control system to correct the heading. The device for generating a signal indicative of the difference between the actual heading and the selected heading of a vehicle is described. T.M.

N82-26261*# Systematics General Corp., Sterling, Va. Communications and Electronics Div.
FREQUENCY SHARING BETWEEN PASSIVE SENSORS AND AERONAUTICAL RADIONAVIGATION SYSTEMS EMPLOYING GROUND TRANSPONDERS IN THE BAND 4.2 - 4.4 GHz
Norman F. DeGroot Jan. 1982 21 p
(Contract JPL-955956)
(NASA-CR-169041; NAS 1.26:169041; JPL-9950-661) Avail: NTIS HC A02/MF A01 CSCL 17G

The 4.2 to 4.4 GHz band is reserved for radio altimeters aboard aircraft and for associated transponders on the ground. A radar altimeter system which utilizes associated ground transponders is described and the feasibility of co-channel operation of such a system with a typical passive sensor is analyzed. S.L.

N82-26262*# Systems Control, Inc., Palo Alto, Calif.
REAL-TIME SIMULATION OF AN AIRBORNE RADAR FOR OVERWATER APPROACHES Final Report, Nov. 1980 - Nov. 1981
J. Karmarkar and D. Clark Mar. 1982 132 p
(Contract NAS2-10479)
(NASA-CR-166293; NAS 1.26:166293) Avail: NTIS HC A07/MF A01 CSCL 17G

Software developed to provide a real time simulation of an airborne radar for overwater approaches to oil rig platforms is documented. The simulation is used to study advanced concepts for enhancement of airborne radar approaches (ARA) in order to reduce crew workload, improve approach tracking precision, and reduce weather minimums. ARA's are currently used for offshore helicopter operations to and from oil rigs. Author

N82-26263*# Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
STUDY OF THE GLOBAL POSITIONING SYSTEM FOR MARITIME CONCEPTS/APPLICATIONS: STUDY OF THE FEASIBILITY OF REPLACING MARITIME SHIPBORNE NAVIGATION SYSTEMS WITH NAVSTAR Final Technical Report, 1 Jun. 1979 - 31 Dec. 1981
C. Byron Winn and W. Huston 31 Dec. 1981 23 p refs
(Grant NsG-5352)
(NASA-CR-169031; NAS 1.26:169031) Avail: NTIS HC A02/MF A01 CSCL 17G

A geostationary reference satellite (REFSAT) that broadcasts every four seconds updated GPS satellite coordinates was developed. This procedure reduces the complexity of the GPS receiver. The economic and performance payoffs associated with replacing maritime shipborne navigation systems with NAVSTAR was quantified and the use of NAVSTAR for measurements of ocean currents in the broad ocean areas of the world was evaluated. S.L.

N82-26264# Emerson Electric Co., Calabasas, Calif.
MODIFICATION OF OE-258/URN TACTICAL AIR NAVIGATION (TACAN) ANTENNA GROUP Final Report, Oct. 1980 - Jul. 1981
James D Bain Washington FAA Jul. 1981 70 p refs
(Contract DTF01-80-C-10148)
(AD-A111680; FAA-RD-81-53) Avail: NTIS HC A04/MF A01 CSCL 09/5

The OE-258/URN TACAN Antenna Group has been modified to provide a remote monitor capability. This remote monitor meets the requirements of the IEEE-488 interface specification. A test set (controller) has been provided for use with the antenna group. Author (GRA)

N82-26265# Naval Postgraduate School, Monterey, Calif. Dept. of Physics and Chemistry.
A LABORATORY EVALUATION OF THE SUITABILITY OF A XENON FLASHTUBE SIGNAL AS AN AID-TO-NAVIGATION M.S. Thesis
Donald Francis Murphy Dec. 1981 109 p refs
(AD-A110729) Avail: NTIS HC A06/MF A01 CSCL 17/7

Single flick xenon flashtubes have periodically been used by the U.S. Coast Guard as visual signals on marine aids-to-navigation. Their deployment has met with mixed responses. The conspicuity of the signal is excellent; it stands out among other visual signals, both flashing and steady lights. However, the flick is apparently too short, approximately 100 micro sec, for the mariner to fixate on it. He, therefore, is unable to make an accurate judgement concerning the distance to the light. This thesis utilized a Howard-Dolman Box to examine the depth perception of subjects under various flashing light conditions. Author (GRA)

N82-26266# Arinc Research Corp., Annapolis, Md.
LIFE-CYCLE-COST ANALYSIS OF THE MICROWAVE LANDING SYSTEM GROUND AND AIRBORNE SYSTEMS Final Report, 31 Oct. 1980 - 1 Sep. 1981
A. Schust, P. Young, and K. Peter Washington FAA Oct. 1981 348 p
(Contract DOT-FA76WA-2547)
(AD-A110909; Rept-1326-01-16-2547; FAA-RD-81-96) Avail: NTIS HC A15/MF A01 CSCL 01/4

This report presents the results of a life-cycle-cost analysis of the Microwave Landing System ground and airborne configurations that may be implemented for the National Airspace System. The ground configurations evaluated consisted of 3 deg, 2 deg, and 1 deg beamwidth azimuth subsystems. The airborne configurations evaluated were for air carrier aircraft, high-performance general aviation aircraft, and low-performance general aviation aircraft. Author (GRA)

N82-26267# Defense Mapping Agency, Washington, D.C. Advanced Technology Div.
GLOBAL POSITIONING SYSTEM (GPS) GEODETIC RECEIVERS
Walter J. Senus 8 Feb. 1982 5 p refs
(AD-A111026) Avail: NTIS HC A02/MF A01 CSCL 17/7

The NAVSTAR Global Positioning System (GPS) when fully developed will provide world-wide, all weather, continuous, highly accurate radio navigation support to the full spectrum of military uses. In addition it has the potential to revolutionize the navigational capability of the civil sector as well. The Defense Mapping Agency, in conjunction with other government agencies in sponsoring the development of GPS user equipment which will benefit greatly the Mapping, Charting, and Geodesy (MC&G) Community. Among these developments are GPS receivers for geodetic survey applications. GPS geodetic receivers are being built around several operating modes, each of which has its advantages. The GPS program as well as the various techniques being pursued are briefly reviewed. Data collected to date is reported which indicated excellent performance both in the point positioning mode and in the distance difference mode of operation. Further the anticipated improvement in measurement accuracy will be provided with a corresponding reduction in time required to occupy a measurement site and therefore offers operational cost reductions. Author (GRA)

N82-26268# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
A COMPARISON OF POLE POSITIONS DERIVED FROM GPS SATELLITE AND NAVY NAVIGATION SATELLITE OBSERVATIONS
William H. Wooden, II 6 Jan. 1982 18 p refs Presented at the 3rd Intern. Geodetic Symp. on Satellite Doppler Positioning
(AD-A110765) Avail: NTIS HC A02/MF A01 CSCL 17/7

The observation of the motion of the Earth's spin axis with respect to the crust has been done continuously since the latter part of 1899 by the International Service. With the advent of new technologies, new determinations of polar motion have been possible. Doppler tracking of the Navy Navigation Satellites has provided estimates of the polar motion on a permanent basis since 1969. Currently, these estimates are done at the Defense Mapping Agency and are distributed to several agencies including the Bureau International de l'Heure (BIH), which has the responsibility of centralizing polar motion data. The NAVSTAR Global Positioning System (GPS) is a new navigation satellite system which will eventually replace the existing Navy Navigation Satellite System. As a byproduct of the orbit estimation process for the GPS satellites, values for the position of the pole are determined. In this paper the two different methods for computing the pole's position from satellite observations are described. The most recent results from each method are compared to each other and to the standard BIH values. Author (GRA)

N82-26269# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C. Advanced Technology Div.
AN UNBIASED ANALYSIS OF THE DOPPLER COORDINATE SYSTEMS
Muneendra Kumar Feb. 1982 25 p refs
(AD-A110510) Avail: NTIS HC A02/MF A01 CSCL 08/5

The Doppler system has undergone at least five major revisions, or improvements, in its definition since original inception. Some of the so-called 'minor' modifications of the past have not been well documented and corresponding rigorous updating of the software in many instances is also lacking. The actual impact and contribution of each such modification and the absence of proper updating towards inner consistency are not negligible in the present sub-meter era. The questions whether (1) the Broadcast Ephemeris (BE) based coordinates are either automatically calculated in the WGS 72 datum or derived with respect to the reference ellipsoid for the WGS 72 datum; (2) the BE system, except for a small bias, is close to the NSWC 9Z-2 system; (3) the BE based coordinates are in the NWL 9D system or 'strictly speaking' in the modified NWL 10D system; (4) the Doppler coordinate system as NWL 9D prior to June 1977 and is NSWC 9Z-2 now; and (5) the coordinate system NWL 9D (and/or NSWC 9Z-2) is geocentric or has a significant Z-axis bias, are still floating around. The net result is misunderstanding and misinterpretation for many users. The present paper tries to highlight some of the related problems and to answer them as well as possible. GRA

N82-26270# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
DATA PROCESSING AT THE GLOBAL POSITIONING SYSTEM MASTER CONTROL STATION
Fran Varnum and James Chaffee 4 Jan. 1982 25 p Presented at the 3rd Intern. Geodetic Symp. on Satellite Doppler Positioning
(AD-A110553) Avail: NTIS HC A02/MF A01 CSCL 17/7

At the GPS Master Control Station, range and delta range measurement from remote, unmanned monitor stations are processed to generate satellite navigation messages daily. Data are edited, smoothed, and processed in a Kalman filter to generate estimates of ephemerides and all system clock, solar pressure, polar wander, and tropospheric states. This processing and some examples of typical performance measures are described. Author (GRA)

N82-26271# Lincoln Lab., Mass. Inst. of Tech., Lexington.
A MODEL FOR SENSOR-INTERCEPTOR TRADE-OFF ANALYSIS
C. B. Chang 18 Jan. 1982 81 p refs
(Contract F19628-80-C-0002)
(AD-A112046; TR-599; ESD-TR-365) Avail: NTIS HC A05/MF A01 CSCL 17/7

In this report, we present an analytical model useful for sensor and interceptor trade-off analysis. Major factors used in this model include sensor measurement accuracy, data rate, interceptor time delay in responding to a command, and interceptor control error in executing a command. Guidance options considered include command guidance and homing guidance whereby the homing sensor accuracy may either be a constant or vary with powers of target range. Author (GRA)

N82-26272# Lincoln Lab., Mass. Inst. of Tech., Lexington.
APPLICATION OF ADAPTIVE ESTIMATION TO TARGET TRACKING
Chaw-Bing Chang and John A. Tabaczynski 13 Jan. 1982 63 p refs
(Contract F19628-80-C-0002)
(AD-A112036; TR-598; ESD-TR-81-361) Avail: NTIS HC A04/MF A01 CSCL 17/7

In this report, we present a survey of problems and solutions in the area of target tracking. The discussion includes design trade-offs, performance evaluation and current issues. Author (GRA)

N82-26273# Federal Aviation Administration, Atlantic City, N.J.
COMPARISON BETWEEN THE SURVEILLANCE PERFORMANCES OF THE AIR TRAFFIC CONTROL RADAR BEACON SYSTEM MODE OF THE MODE S AND THE AUTOMATED RADAR TERMINAL SYSTEM Interim Report, Jun. - Sep. 1980
William Swanseen Jan. 1982 24 p
(FAA Proj. 034-241-510)
(AD-A111733; FAA-CT-81-29; FAA-RD-81-32) Avail: NTIS HC A02/MF A01 CSCL 17/7

A test and evaluation was conducted at the Federal Aviation Administration Technical Center to compare the surveillance performance and the range and azimuth accuracy of the Air Traffic Control Radar Beacon System (ATCRBS) mode of the Mode S (formerly the Discrete Address Beacon System (DABS)) to that achieved with the existing Automated Radar Terminal System (ARTS) III. Targets of opportunity and ATCRBS-equipped Technical Center test aircraft were used in this evaluation. The 5-foot ATCRBS antenna at the Technical Center Mode S terminal sensor was used to collect data at both the Mode S and the ARTS III sensors. Data reduction and analysis tools developed by the Technical Center were used to determine sensor performance characteristics and to highlight areas for further analysis. It was concluded that the ATCRBS mode of the Mode S sensor provided improved blip scan ratio, Mode A code, and altitude reliability performance when compared to the ARTS III. The Mode S sensor also provided better range and azimuth accuracy than the ARTS III. Author (GRA)

N82-26274# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
THE EFFECT OF IONOSPHERIC VARIABILITY ON THE ACCURACY OF HIGH FREQUENCY POSITION LOCATION Final Report
Melvin G. Heaps Aug. 1981 46 p refs
(DA Proj. 1L1-61102-B-53A)
(AD-A107425; ERADCOM/ASL-TR-0095) Avail: NTIS HC A03/MF A01 CSCL 17/7

The attainable accuracies in high frequency (HF) radio wave position location over ranges of several hundred kilometers are beset with errors of tens of kilometers due to constraints in three major areas: ionospheric variability and irregularity; system size limitations for easily fieldable systems; and sufficient data acquisition, processing, and interpretation. Of principal concern here is the area of ionospheric variability and irregularity. The temporal and spatial coherence of ionospheric structure has been considered with respect to its effect on the accuracy of HF position location. The findings show that medium and small-scale ionospheric structures most likely to affect HF position location accuracies have a spatial coherence on the order of 50 km and a temporal coherence on the order of 5 minutes. On this basis it is recommended that a multiple ionosonde net be used instead of a single ionosonde, such that an ionospheric sounding point is no more than 50 km from a potential radio wave reflection point, and that soundings be taken on the order of every 5 minutes or less. Author (GRA)

N82-26275# Army Communications-Electronics Engineering Installation Agency, Fort Huachuca, Ariz.
STANDARD ENGINEERING INSTALLATION PACKAGE. AIR TRAFFIC RADIO CHANNEL CONTROL EQUIPMENT: CHANGE 1
30 Oct. 1981 41 p
(AD-A107150; USACEEIA-SEIP-036-1) Avail: NTIS HC A03/MF A01 CSCL 17/7

This report contains changes to the Standard Engineering Installation Package (SEIP) which provides information for the engineering and installation of ATRCC (Air Traffic Radio Channel Control) facilities worldwide. Information provided consists of site survey data, siting criteria, installation specifications and instructions, certification format. Information provided must be adapted to the specific ATRCC facility/location by the project engineer. GRA

N82-26276# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
THE WORLDWIDE NAVIGATIONAL WARNING SERVICE
J. E. Ayers and John P. Lyall 1981 14 p
(AD-A107372) Avail: NTIS HC A02/MF A01 CSCL 17/2

In the early 1970's both the International Hydrographic Organization (IHO), an intergovernmental agency dedicated to the improvement of nautical charting, and the Intergovernmental Maritime Consultative Organization (IMCO), a U.S. agency dedicated to safety of life at sea, became concerned over the lack of a coordinated worldwide radio service to keep deep sea mariners aware of hazards to navigation. Through their joint efforts the Worldwide Navigational Warning Service (WWNWS) was established, becoming fully operational on 1 April 1980. The WWNWS covers all international shipping routes through a system of 16 NAVAREA Broadcasts, all of which transmit warnings in English (the primary language of the NAVAREA II broadcast is in French) and some of which transmit warnings also in an additional language. This paper describes the development of the initial WWNWS, the mechanism for service improvement and advances which have been made to date, and improvements foreseen for the future. Specific examples from the broadcast experience of the Coordinator for NAVAREA IV and XII and the Northwest Atlantic and Northeast Pacific NAVAREAs, respectively, are given. Author (GRA)

N82-26277* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
ANNULAR WING Patent
Harold J. Walker, inventor (to NASA) Issued 29 Dec. 1981 12 p Filed 30 May 1979 Supersedes N79-24959 (17 - 16, p 2070) Continuation of abandoned US Patent Appl. SN-880725, filed 24 Feb. 1978
(NASA-Case-FRC-11007-2; US-Patent-4,307,856;
US-Patent-Appl-SN-043911; US-Patent-Class-244.12.2;
US-Patent-Class-244-23C; US-Patent-Class-244-34A;
US-Patent-Class-244-93) Avail: US Patent and Trademark Office CSCL 01C

An annular wing particularly suited for use in supporting in flight an aircraft characterized by the absence of directional stabilizing surfaces is described. The wing comprises a rigid annular body of a substantially uniformly symmetrical configuration characterized by an annular positive lifting surface and cord line coincident with the segment of a line radiating along the surface of an inverted truncated cone. A decalage is established for the leading and trailing semicircular portions of the body, relative to instantaneous line of flight, and a dihedral for the laterally opposed semicircular portions of the body, relative to the line of flight. The direction of flight and climb angle or glide slope angle are established by selectively positioning the center of gravity of the wing ahead of the aerodynamic center along the radius coincident with an axis for a selected line of flight.
Official Gazette of the U.S. Patent and Trademark Office

N82-26278*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HINGED STRAKE AIRCRAFT CONTROL SYSTEM Patent Application
Dhanvada M. Rao, inventor (to NASA) (Vigyan Research Associates, Inc.) Filed 11 Jan. 1982 13 p Sponsored by NASA
(NASA-Case-LAR-12860-1; US-Patent-Appl-SN-338387) Avail: NTIS HC A02/MF A01 CSCL 01C

Strakes hinged along the fuselage to avoid violent control degradation in the post-stall flight regime are described. Hinged strakes are deflected from the conventional position coplanar with wings to an anhedral setting to increase controllability at high angles of attack by decreasing projected plan area, and altering vortex flow characteristics. As a result, effective lift on wings can be maintained at higher angles of attack than is possible with conventional strakes. The hinged strakes are retracted flush against the fuselage in high speed cruise flight to avoid drag effects. In an alternate mode of operation, strakes can be asymmetrically deployed to create a rolling that enhances roll control, and a side force that counters aircraft nose-slice and directional divergence. NASA

N82-26279*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautis.
USE OF OPTIMIZATION TO PREDICT THE EFFECT OF SELECTED PARAMETERS ON COMMUTER AIRCRAFT PERFORMANCE Final Report
Valena L. Wells and Richard S. Shevell Jun. 1982 61 p refs
(Grant NAG1-202)
(NASA-CR-169027; NAS 1.26:169027; SUDAAR-534) Avail: NTIS HC A04/MF A01 CSCL 01C

An optimizing computer program determined the turboprop aircraft with lowest direct operating cost for various sets of cruise speed and field length constraints. External variables included wing area, wing aspect ratio and engine sea level static horsepower; tail sizes, climb speed and cruise altitude were varied within the function evaluation program. Direct operating cost was minimized for a 150 n.mi typical mission. Generally, DOC increased with increasing speed and decreasing field length but not by a large amount. Ride roughness, however, increased considerably as speed became higher and field length became shorter. T.M.

N82-26280# Hughes Helicopters, Culver City, Calif.
ADVANCED CONCEPTS FOR COMPOSITE STRUCTURE JOINTS AND ATTACHMENT FITTINGS. VOLUME 2: DESIGN GUIDE Final Report, Jul. 1977 - Feb. 1981
J. V. Alexander and R. H. Messinger Nov. 1981 274 p refs 2 Vol.
(Contract DAAJ02-77-C-0076; DA Proj. 1L2-62209-SH-76)
(AD-A111106; HH-80-402-Vol-2;
USAAVRADCOM-TR-81-D-21B) Avail: NTIS HC A12/MF A01 CSCL 01/3

The purpose of this program was to develop the technology of applying fiber-reinforced composite materials to helicopter joints and attachment fittings that permit disassembly of major components. A generic design methodology approach was used to make the data developed applicable to ongoing and future helicopter programs. A detail design, analysis, and testing program was carried out on the three joint and fitting concepts selected: wrapped tensions fittings, gear box attachment fittings, and seat attachment fittings. The scope of the study included analytical design tools, including finite element computer analysis; fabrication techniques, with special emphasis on weight and cost effectiveness considerations; structural integrity testing, including static, dynamic, failsafe/safe-life, and ballistic tolerance considerations; and nondestructive inspection (NDI) techniques. This volume contains the analytical and experimental results of the laminated angle bracket study and the Design Guide, which covers each type of joint or fitting tested. Author (GRA)

N82-26281# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
NAVY'S F/A-18 EXPECTED TO BE AN EFFECTIVE PERFORMER BUT PROBLEMS STILL FACE THE PROGRAM Report to Congress
26 Feb. 1982 39 p refs
(AD-A111877; GAO/MASAD-82-20) Avail: NTIS HC A03/MF A01 CSCL 01/3

The F/A-18 naval strike fighter is a multi-mission, carrier-suitable aircraft. This twin-engine aircraft will be used by the Navy and the Marine Corps for fighter and light attack missions such as strike escort, fleet air defense, interdiction, and close air support. The Navy is concentrating on initial training, logistics and support activities as the F/A-18 development program nears completion. All 9 pilot production aircraft have been delivered to the Navy as well as the first 4 of 25 limited production aircraft. Five aircraft were sent to the initial F/A-18 squadron which will begin training F/A-18 pilots and mechanics beginning in July 1982. The first class will be mostly Marine Corps personnel in preparation for the December 1982 initial operation capability, when the first Marine Corps F/A-18 squadron receives its full complement of aircraft. Author (GRA)

N82-26282# Boeing Vertol Co., Philadelphia, Pa.
ADVANCED INTERNAL CARGO SYSTEM CONCEPT DEMONSTRATION AND EVALUATION Final Report, Jan. 1980 - Sep. 1981
C. Ednie Jan. 1982 65 p refs
(Contract DAAK51-80-C-0006; DA Proj. 1L1-62209-AH-76)
(AD-A111990; D210-11648-1; USAAVRADCOM-TR-81-D-37)
Avail: NTIS HC A04/MF A01 CSCL 15/5

This report describes the design and development activity resulting in an 'add-on' cargo handling system for the CH-47 helicopter. Design activity was initiated as a result of cargo handling problems encountered in the European Theater. The Applied Technology Laboratory at Fort Eustis, Virginia, designed and fabricated a mock-up of an internal cargo handling system that demonstrated a practical approach for an add-on system for the CH-47. An evaluation of this mockup, together with the results of an investigative field trip to the European Theater, led to the requirements definition for the cargo handling system. The cargo handling system can be installed in a CH-47 helicopter with no modifications to the primary structure. The system can handle 463L pallets, warehouse pallets and special munitions. The system includes forward and aft barriers to minimize tiedown requirements, ramp extensions to allow easy fork-lift loading and a fuselage levelling system. Functional tests of the system resulted in minor modifications to the original hardware. The modified hardware has been successfully installed and demonstrated in a CH-47C and a CH-47D model helicopter. Author (GRA)

N82-26283# Boeing Military Airplane Development, Seattle, Wash Advanced Airplane Branch

DESIGN GUIDE FOR AIRCRAFT HYDRAULIC SYSTEMS AND COMPONENTS FOR USE WITH CHLOROTRIFLUOROETHYLENE NONFLAMMABLE HYDRAULIC FLUIDS Final Report, May 1976 - May 1980

E T Raymond Wright-Patterson AFB, Ohio AFWAL Mar 1982 71 p refs
(Contract F33615-76-C-2064; AF Proj 3145)
(AD-A112097, AFWAL-TR-80-2111) Avail: NTIS
HC A04/MF A01 CSCL 13/7

This design guide documents the major physical properties of chlorotrifluoroethylene (CTFE) polymer-based nonflammable hydraulic fluids and the special considerations which must be observed in the design of aircraft hydraulic systems and components in order to obtain performance comparable to that obtained with petroleum-based hydraulic fluid per MIL-H-5606. Author (GRA)

N82-26284# General Accounting Office, Washington, D C Mission Analysis and Systems Acquisition Div

MISSION EFFECTIVENESS OF THE AV-8B HARRIER 2 COULD BE IMPROVED IF ACTIONS ARE TAKEN NOW Report to the Congress

26 Feb 1982 28 p
(AD-A111878, GAO/MASAD-82-19) Avail NTIS
HC A03/MF A01 CSCL 01/3

The AV-8B Harrier II is a light attack aircraft with vertical and short-takeoff and landing capability being developed by the Navy to provide close air support for Marine Corps amphibian forces. The AV-8B is designed to be a substantially improved version of the AV-8A currently used by the Marine Corps. Potential maintenance personnel shortages, shipboard space constraints, limited repair capability, and inadequate ground-support equipment could adversely affect the ability of the AV-8B to perform its mission. Author (GRA)

N82-26286# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate for Development and Qualification

AIRWORTHINESS AND FLIGHT CHARACTERISTICS TEST OF AN OH-58C CONFIGURED TO A LIGHT COMBAT HELICOPTER (LCH) Final Report

Arthur R Marshall, Jr., Ralph Woratschek, and Robert N Ward Oct 1981 98 p refs
(AD-A112581, USAAEFA-81-07) Avail: NTIS
HC A05/MF A01 CSCL 01/3

The United States Army Aviation Engineering Flight Activity conducted a limited airworthiness and flight characteristics test of the OH-58C Light Combat Helicopter (LCH) from 22 July through 9 September 1981. The OH-58C LCH configuration increases the gross weight of the helicopter to 3425 pounds and includes one 7-tube 2.75-inch rocket pod and one 7.62mm minigun mounted externally. Performance and handling qualities were evaluated. A total of 20 flights were conducted for a total of 26.0 flight hours. As a result of the increased maximum gross weight of the OH-58C LCH, the hover ceiling was reduced. Level flight performance was degraded by the LCH configuration. No significant handling qualities differences were noted when comparing test results for the OH-58C LCH to the test results of the standard OH-58C. GRA

N82-26287# Army Aviation Engineering Flight Activity, Edwards AFB, Calif Directorate of Development and Qualification

LIMITED ARTIFICIAL AND NATURAL ICING TESTS PRODUCTION UH-60A HELICOPTER (RE-EVALUATION) Final Report, 22 Dec. 1980 - 24 Feb. 1981

Marvin L Hanks, Vernon L Diekmann, and John O Benson Aug 1981 102 p refs
(AD-A112582, USAAEFA-80-14) Avail NTIS
HC A06/MF A01 CSCL 01/3

A limited re-evaluation of the production UH-60A Black Hawk anti-ice and deice systems was conducted to verify correction of deficiencies and shortcomings which were revealed during 1979-1980 icing tests. Testing consisted of 22.3 productive flight hours. The previous droop stop deficiency (failure of the droop stops to return to the shutdown position with ice accumulation on the rotor head) was corrected by the installation of a different droop stop with anti-ice protection. The previous anti-flapping restrainer deficiency (failure of the anti-flapping restrainers to return to the shutdown position with ice accumulated on the rotor head) was downgraded to a shortcoming after correction of the droop stop deficiency. The three most important previously identified shortcomings (1) the large increase in power required with ice accumulation on the rotor system, (2) the large power available losses with activation of the engine and engine inlet anti-ice systems, and (3) the poor location of the deice system circuit breakers, were again documented, although some improvement in power available losses was observed due to installation of the modulating engine inlet anti-ice valves. Five other previously identified, icing related, shortcomings were still present and four were corrected. Three additional icing related shortcomings were identified during these tests: (l) ice impact damage to the upper strobe light assembly, (2) ice impact damage to the nose avionics compartment door, and (3) the poor reliability of the windshield anti-ice control units. The UH-60 Black Hawk helicopter, configured with the anti-ice, deice and heated government competitive test droop stop systems demonstrated safe operation in icing intensities through moderate. GRA

N82-26288*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FLIGHT-TEST VERIFICATION OF A PICTORIAL DISPLAY FOR GENERAL AVIATION INSTRUMENT APPROACH

James J Adams Jun 1982 29 p refs
(NASA-TM-83305; L-15111; NAS 1.15:83305) Avail: NTIS
HC A03/MF A01 CSCL 01D

Results of flight tests of the pictorial 'follow me' box display results of the simulator study. The most important item of agreement was the frequency of the vertical and lateral models of motion of the pilot-aircraft-display system, which was 0.4 rad/sec in each study. Successful short, curved, descending approaches, such as are often suggested for use with microwave landing systems, can be executed with the 'follow me' box display. Variations of the value of distance from the aircraft to the box were also examined using values of 736 m, 368 m, and 184 m. The results show that successful approaches can be made with all of these values. A sharper final turn and greater precision of position control are obtained with the shorter distance. Deletion of distance measuring equipment from the system was also studies. It was shown that successful approaches can be made with no distance measures included in the system, but the values of distance from the aircraft to the box that can be used are restricted. A.R.H.

N82-26289*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

A FLOATING-POINT/MULTIPLE-PRECISION PROCESSOR FOR AIRBORNE APPLICATIONS

Robert Yee Feb. 1982 11 p refs
(NASA-TM-84252; A-8832; NAS 1.15:84252) Avail: NTIS
HC A02/MF A01 CSCL 01D

A compact input output (I/O) numerical processor capable of performing floating-point, multiple precision and other arithmetic functions at execution times which are at least 100 times faster than comparable software emulation is described. The I/O device is a microcomputer system containing a 16 bit microprocessor, a numerical coprocessor with eight 80 bit registers running at a 5 MHz clock rate. 18K random access memory (RAM) and 16K electrically programmable read only memory (EPROM). The processor acts as an intelligent slave to the host computer and can be programmed in high order languages such as FORTRAN and PL/M-86. S.L

N82-26290# Bunker-Ramo Corp., Wright-Patterson AFB, Ohio Electronic Systems Div

TANKER AVIONICS/AIRCREW COMPLEMENT EVALUATION (TAACE). PHASE 1: SIMULATION EVALUATION. VOLUME 1: RESULTS Final Report, Jun. 1979 - Jun. 1980

Ralph P Madero, Gregory J Barbato, and Richard W Moss Wright-Patterson AFB, Ohio AFWAL Nov 1981 60 p refs 2 Vol
(Contract F33615-78-C-3614; AF Proj 2391)
(AD-A110956; AFWAL-TR-81-3127-Vol-1) Avail: NTIS
HC A04/MF A01 CSCL 01/3

This report documents a cockpit simulation study conducted to validate the pilot useability of a 3-man (pilot, copilot, boom operator), KC-135 crew system concept. Earlier analysis and mockup evaluation studies had established preliminary design criteria and control display arrangements. The effort reported herein draws upon this earlier work, and through full mission simulation, validates display formats, cockpit hardware arrangements and crew procedures. In addition a 'KC-135 Crew System Criteria' document was written deriving from mission statements and control display research, design criteria for operating the tanker with a reduced crew. GRA

N82-26291# Bunker-Ramo Corp., Wright-Patterson AFB, Ohio. Electronic Systems Div.
TANKER AVIONICS/AIRCREW COMPLEMENT EVALUATION (TAACE). PHASE 1: SIMULATION EVALUATION. VOLUME 2: CREW SYSTEM DESIGN Final Report, Jun. 1979 - Jun. 1980
Ralph P. Madero, Gregory J. Barbato, and Richard W. Moss Wright-Patterson AFB, Ohio AFWAL Nov. 1981 126 p 2 Vol.
(Contract F33615-78-C-3614; AF Proj. 2391)
(AD-A110954; AFWAL-TR-81-3127-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 01/3

This report documents the second phase of a two-phase effort called the Tanker Avionics/Aircrew Complement Evaluation (TAACE) Program. The results obtained from a full mission simulation of an updated avionics configuration for the KC-135 tanker are reported herein. These results concern the development of the crew station avionics criteria to be met for a 3-man crew complement (pilot, copilot, boom operator) completing all KC-135 mission requirements without compromise to either mission performance or aircraft operational safety. This volume is divided into three sections. Section I - Introduction; Section II providing sketches of the crew system design layout, and Section III - providing operational systems descriptions of the Navigation Management System and the Horizontal Situation Display are extensive and therefore are presented separately in Appendixes A and B. GRA

N82-26292# Martin Marietta Aerospace, Orlando, Fla.
HELICOPTER NIGHT VISION SYSTEM SIMULATION EVALUATION Final Report
Dec. 1981 138 p refs
(Contract N62269-80-C-0346)
(AD-A110505; OR-16551) Avail: NTIS HC A07/MF A01 CSCL 01/3

Simulation experiments demonstrated the ability of the pilot and copilot to fly a night mission at low altitudes, ranging from 50 to 150 feet AGL, in a CH-53D simulation with the night visionics equipment package described previously. Phases I and II HNVS simulation studies indicated that enroute flight profiles over the simulator's rolling terrain can be accomplished at airspeeds ranging from 60 to 80 knots with clearance altitudes averaging 100 feet. This study was conducted with a revised terrain model with improved altitude feedback cues that produced higher clearance altitudes and somewhat lower airspeeds than the prior simulations. The actual speeds and altitudes will be verified in the planned HNVS flight tests. The simulation confirmed the minimum system requirement of a gimballed FLIR with a navigation system and with ancillary hardware such as a symbol generator. Although this experiment required no data be generated on dead reckoning versus navigation system requirements, both pilot performance and opinion data reiterated the reduced crew station workload with Doppler command steering information. Incorporation of the navigation capability of the Control Display Unit also was instrumental in further reducing the navigation workload. GRA

N82-26293* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THRUST REVERSER FOR A LONG DUCT FAN ENGINE Patent
Everett A. Johnston (GE, Cincinnati) and Edward W. Ryan, inventors (to NASA) (GE, Cincinnati) Issued 14 Jul. 1981 9 p Filed 30 Mar. 1979
(NASA-Case-LEW-13199-1; US-Patent-4,278,220; US-Patent-Appl-SN-025301; US-Patent-Class-244-110B; US-Patent-Class-60-226A) Avail: US Patent and Trademark Office CSCL 21E

A bypass duct outer cowl includes a fixed cascade disposed between axially spaced fixed cowl portions and a translatable cowl sleeve and blocker doors movably disposed on the respective radially outer and inner sides of the cascade. Actuation and linkage structure located entirely within the outer cowl provides for selectively moving the cowl sleeve rearwardly and rotating the blocker doors to a position across the bypass duct to cause the fan airflow to pass through the cascade in a thrust reversing manner. Official Gazette of the U.S. Patent and Trademark Office

N82-26294*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REAL TIME PRESSURE SIGNAL SYSTEM FOR A ROTARY ENGINE Patent Application
William J. Rice, inventor (to NASA) Filed 19 Feb. 1982 21 p
(NASA-Case-LEW-13622-1; US-Patent-Appl-SN-350473) Avail: NTIS HC A02/MF A01 CSCL 21E

Apparatus for developing a signal which is a composite of the pressures at four different points in the chamber of a rotary type engine is disclosed. The composite signal can be read by an IMEP meter or displayed on an oscilloscope. The physical arrangement of a Wankel engine and the correlation embodying the invention is shown. The profile of the inner surface of a Wankel engine housing and the profile of a three lobed rotor together with the positions of the transducers are also shown. The timing diagrams depicting the active regions of the transducers and timing signals used in the correlator circuitry are illustrated. S.L.

N82-26295*# Pennsylvania State Univ., University Park.
INVESTIGATION OF SPRAY CHARACTERISTICS FOR FLASHING INJECTION OF FUELS CONTAINING DISSOLVED AIR AND SUPERHEATED FUELS Final Report, 1 Aug. 1980 - 31 Aug. 1981
A. S. P. Solomon, L. D. Chen, and G. M. Faeth Washington NASA Jun. 1982 90 p refs
(Grant NsG-3306)
(NASA-CR-3563; NAS 1.26:3563) Avail: NTIS HC A05/MF A01 CSCL 21E

The flow, atomization and spreading of flashing injector flowing liquids containing dissolved gases (jet/air) as well as superheated liquids (Freon II) were considered. The use of a two stage expansion process separated by an expansion chamber, ws found to be beneficial for flashing injection particularly for dissolved gas systems. Both locally homogeneous and separated flow models provided good predictions of injector flow properties. Conventional correlations for drop sizes from pressure atomized and airblast injectors were successfully modified, using the separated flow model to prescribe injector exit conditions, to correlate drop size measurements. Additional experimental results are provided for spray angle and combustion properties of sprays from flashing injectors. Author

N82-26296# Helsinki Univ. of Technology, Otaniemi (Finland). Lab. of Aerodynamics.
TRANSIENT SIMULATION OF GAS TURBINES INCLUDING THE EFFECTS OF HEAT CAPACITY OF THE SOLID PARTS Ph.D. Thesis
Jaakko Larjola 1982 144 p refs
(ISBN-951-752-496-X; Rept-82-A1) Avail: NTIS HC A07/MF A01

The simulation of low frequency transients (such as acceleration, deceleration) of different open cycle gas turbine types is studied. The effects of heat transfer between process gas and solid structure is emphasized. Correcting equations for these effects are developed and the transient properties of each component are then evolved from the static ones with these equations. The heat transfer effects alter significantly e.g. the surge margin of the compressor. Simulation model includes intercooler and recuperator. The programming language is CSMP. S.L.

N82-26297*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DEVELOPMENT POTENTIAL OF INTERMITTENT COMBUSTION (I.C.) AIRCRAFT ENGINES FOR COMMUTER TRANSPORT APPLICATIONS
Edward A. Willis 1982 31 p refs Presented at the Commuter Airlines and Operations Meeting, Savannah, 23-24 May 1982
(NASA-TM-82869; E-1221; NAS 1.15:82869) Avail: NTIS HC A03/MF A01 CSCL 21E

An update on general aviation (g/a) and commuter aircraft propulsion research effort is reviewed. The following topics are discussed: on several advanced intermittent combustion engines emphasizing lightweight diesels and rotary stratified charge engines. The current state-of-the-art is evaluated for lightweight, aircraft suitable versions of each engine. This information is used to project the engine characteristics that can be expected on near-term and long-term time horizons. The key enabling technology requirements are identified for each engine on the long-term time horizon. E.A.K.

N82-26298*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PROPULSION OPPORTUNITIES FOR FUTURE COMMUTER AIRCRAFT

William C. Strack 1982 27 p refs Presented at 18th Joint Propulsion Conf., Cleveland, 21-23 Jun. 1982; sponsored by AIAA, SAE and ASME
(NASA-TM-82915; E-1304; NAS 1.15:82915) Avail: NTIS HC A03/MF A01 CSCL 21E

Circa 1990 propulsion improvement concepts are discussed for 1000 to 5000 SHP conventional turboprop powerplants including engines, gearboxes, and propellers. Cycle selection, power plant configurations and advanced technology elements are defined and evaluated using average stage length DOC for commuter aircraft as the primary merit criterion. B.W.

N82-26299*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPARISON OF EXPERIMENTAL AND ANALYTICAL PERFORMANCE FOR CONTOURED ENDWALL STATORS

Robert J. Boyle and Jeffrey E. Haas (Army Aviation Research and Development Command, Cleveland) 1982 15 p refs Presented at Eighteenth Joint Propulsion Conf., Cleveland, 21-23 Jun. 1982; sponsored by AIAA, SAE and ASME
(NASA-TM-82877; NAS 1.15:82877; AVRADCOM-TR-82-C-12) Avail: NTIS HC A02/MF A01 CSCL 21E

Comparisons between predicted and experimental stator losses showed that the analysis was able to predict the change in stator loss when contoured endwalls with highly three dimensional passage geometry were used. The level of loss was predicted to within 75 percent of that measured. The predicted loss was due only to profile loss and boundary layer growth on the endwalls. The 25 percent difference was approximately 0.015 at design pressure ratio. The analysis was shown to predict the trend in stator flow angle, even for small stator geometries. Author

N82-26300*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA RESEARCH IN SUPERSONIC PROPULSION: A DECADE OF PROGRESS

L. H. Fishbach, L. E. Stitt, J. R. Stone, and J. B. Whitlow, Jr. 1982 40 p refs Presented at 18th Joint Propulsion Conf., Cleveland, 21-23 Jun. 1982; sponsored by AIAA, SAE and ASME
(NASA-TM-82862; NAS 1.15:82862) Avail: NTIS HC A03/MF A01 CSCL 21E

A second generation, economically viable, and environmentally acceptable supersonic aircraft is reviewed. Engine selection, testbed experiments, and noise reduction research are described. Author

N82-26301# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

EFFECT ON FUEL EFFICIENCY OF PARAMETER VARIATIONS IN THE COST FUNCTION FOR MULTIVARIABLE CONTROL OF A TURBOFAN ENGINE M.S. Thesis

Barry Lawrence Dougherty Sep. 1981 106 p refs
(AD-A110614) Avail: NTIS HC A06/MF A01 CSCL 21/5

In modern turbofan engines, variable geometry has been incorporated to improve some off-design performance. Most control designs ignore this variable geometry and use fuel metering as the primary control input. This thesis investigates the use of variable geometry to control the engine and, thereby, reduce fuel consumption due to transients. Additionally, steady-state trim conditions are altered to reduce the static fuel consumption. The non-linear transient simulation program is used to analyze the steady-state operating condition and develop small perturbation control limitations. Linear models, both large and reduced order, are used in analyzing the effect of controllers on system response. A computer program was generated to reduce a large order linear model to a usable size for control system development. This analysis shows the reduced-order regime dependent controllers to be viable and to favorably enhance the quest for reducing specific fuel consumption in existing engines. Author (GRA)

N82-26302# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.

PERFORMANCE OF MULTIPLE, ANGLED NOZZLES WITH SHORT MIXING STACK EDUCTOR SYSTEMS M.S. Thesis

Charles Carver Davis Sep. 1981 435 p refs
(AD-A110817) Avail: NTIS HC A19/MF A01 CSCL 21/5

Cold flow tests were conducted on a four-nozzle gas eductor system to evaluate the feasibility of reducing mixing stack lengths by the application of angled primary flow nozzles. Three short mixing stacks with length to diameter ratios of 1.75, 1.5, and 1.25 were tested using a set of straight nozzles and a series of angled nozzles having tilt angles of 10, 15, 20 and 22.5 degrees. The nozzles were constructed with an area of primary flow to area of mixing stack ratio of 2.5. Pumping coefficients, mixing stack pressure distributions, flow changes, exit velocity profiles, and back pressures were used to evaluate the various mixing stack length and angled nozzle combinations. GRA

N82-26303# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

COMBUSTION BEHAVIOR OF SOLID FUEL RAMJETS. VOLUME 2: EFFECTS OF FUEL PROPERTIES AND FUEL-AIR MIXING ON COMBUSTION EFFICIENCY Final Report

Aug. 1981 54 p refs
(AD-A110796; NPS67-81-011) Avail: NTIS HC A04/MF A01 CSCL 21/5

Fundamental SFRJ fuel properties were determined using a DTA and a gas chromatograph for both high and low heating rates. The performance of these fuels was then measured under various operating conditions and test geometries. Fuel properties were found to have some effect on the obtainable combustion efficiency but much larger effects could be induced by the flow conditions (inducad mixing near the fuel surface, bypass air, etc.). Author (GRA)

N82-26304# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AN EXPERIMENTAL STUDY OF RECTANGULAR AND CIRCULAR THRUST AUGMENTING EJECTORS M.S. Thesis

Gregory Unnever Dec. 1981 74 p refs
(AD-A111110; AFIT/GAE/AA/81D-31) Avail: NTIS HC A04/MF A01 CSCL 20/4

A short rectangular ejector and two circular ejectors were tested to determine the effects of primary nozzle configuration and geometry on thrust augmentation. The primary nozzle configurations consisted primarily of slot nozzles which injected fluid parallel to the diffuser walls and achieved Coanda typa flow at the throat. Results of the rectangular ejector tests indicate that thin plates installed in the mixing chamber or the diffuser, increase mixing but decrease thrust augmentation. A continuous slot nozzle, modified to create four discrete jets at the inlet, improved mixing and thrust augmentation compared to the original design. Thrust augmentation ratio increased from 1.4 to 1.58. The circular ejector primary nozzles consisted of a continuous slot 'torus' nozzle and individual slot nozzles which could be symmetrically placed around the inlet periphery. A nozzle configuration using 16 slot nozzles on the periphery of the inlet face gave the best performance. A thrust augmentation ratio of 2.0 was achieved. GRA

N82-26305# Army Materials and Mechanics Research Center, Watertown, Mass.

MECHANICAL WEAR ASSESSMENT OF HELICOPTER ENGINES BY FERROGRAPHY Final Report

Charles P. Merhib, Samuel J. Acquaviva, and Robert W. Ladner Nov. 1981 24 p ref
(AD-A110772; AMMRC-TR-81-55) Avail: NTIS HC A02/MF A01 CSCL 21/5

Two Ferrography analyzers, an analytical or laboratory Ferrograph and an On-Line (quasi-real-time) Ferrograph, were evaluated. The analytical Ferrograph was found to be an effective supplement to the spectrometric oil analysis program (SOAP) since the Ferrograph analyzes particles in the range of 1 to over 100 microns while SOAP analyzes particles below 5 microns in size. Comments are also offered on a third analyzer, the Direct Reading (DR) Ferrograph. To evaluate the analytical Ferrograph, oil samples from helicopters at Fort Devens, Massachusetts, were analyzed. One transmission was found with excessive wear particles which was later verified by SOAP. The On-Line Ferrograph was tested in 410 hours of operation using a T53-L-13B helicopter engine in a test cell at the Corpus Christi Army Depot. After determining baseline data for the engine, defective bearings were substituted to enhance particle wear penetration. The particles subsequently generated were successfully detected by both the On-Line Ferrograph and SOAP. GRA

N82-26306# General Motors Corp., Indianapolis, Ind.
AERODYNAMICALLY INDUCED VIBRATION Interim Report, 1 Jun. 1980 - 31 Jul. 1981
Robert L. Jay and James L. Bettner Sep. 1981 128 p
(Contract F49620-80-C-0078; AF Proj. 2307)
(AD-A110493; DDA-EDR-10840) Avail: NTIS HC A07/MF A01 CSCL 21/5

An experimental investigation, performed in a large scale low-speed, single-stage compressor, was conducted to provide the radial and chordwise distribution of basic unsteady pressure data on the stator. Radial and circumferential distributions of streamwise and transverse velocity fluctuations were determined at stations upstream, inside and immediately downstream of the stator. Analysis of the results indicated a correlation of the normalized transverse fluctuation velocity component with stator incidence angle. The fluctuations were very large in the endwall regions and were attributed to poor flow conditions generated in the hub and tip endwall regions of the rotor. GRA

N82-26307# Massachusetts Inst. of Tech., Cambridge. Gas Turbine Lab.
HEAT TRANSFER IN TURBINES Final Report, 1 Jan. 1976 - 31 Dec. 1980
Jean F. Louis Wright-Patterson AFB, Ohio AFWAL Oct. 1981 118 p refs
(Contract F33615-76-C-2018; AF Proj. 3056)
(AD-A111534; AFWAL-TR-81-2099) Avail: NTIS HC A06/MF A01 CSCL 21/5

This report summarizes the studies in heat transfer and film cooling effectiveness performed under Contract F33615-76-C-2018. The purpose of these experimental and theoretical studies is to develop an indepth understanding of heat transfer and film cooling in gas turbines. A common experimental procedure is described for heat transfer measurements under isothermal wall conditions using fast response heat transfer gauges in tests conducted in a shock tunnel and a blowdown facility. The tests were conducted at flow and thermodynamic conditions modeling the operating conditions of advanced gas turbines. The configuration under study were single slot, single line of holes, double row of holes on a flat and curved plates, and double lines on an airfoil located in a cascade. The experimental technique was validated by long duration high temperature tests of an air cooled flat plate. Also described is an analytical study of the thermal and fluid mechanical evolution of a cooling film injected from a single line of inclined holes. Author (GRA)

N82-26308# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
BLADE TIP GAP EFFECTS IN TURBOMACHINES: A REVIEW Final Report, 1 Oct. - 30 Sep. 1980
Roy F. Peacock Nov. 1981 103 p refs
(AD-A111892; NPS67-81-016) Avail: NTIS HC A06/MF A01 CSCL 21/5

A review is presented of experiments examining the effects of blade tip gaps encountered in turbomachines and the methods by which the synthesised data are currently used in turbomachinery design and performance analysis. Data gained since the 1930's is subdivided for convenience into diffusing, or compressor-type flows, and accelerating, or turbine-type flows. There is a further sub-division into cascade and rotating machinery data. The overall trend university is that an increasing tip gap whose effect can reach over most or all of the blade height brings reduced overall performance of a turbomachine. Turbine data are in general more regular than the body of compressor data, possibly due in part to the enhanced effect of, usually, undefined boundary layers in diffusing flow. There is some evidence among the compressor and compressor cascade data that an optimum gap exists when the opposing effects of secondary flows, and tip leakage with rotor/wall relative movement tend to balance. Comment is made upon the prediction and design models published in the literature. Author (GRA)

N82-26309# Pratt and Whitney Aircraft Group, West Palm Beach, Fla.
LIFE AND UTILIZATION CRITERIA IDENTIFICATION IN DESIGN (LUCID), VOLUME 1 Final Report, Aug. 1978 - May 1981
J. G. Osmer and C. C. Dietrick Wright-Patterson AFB, Ohio AFWAL Oct. 1981 175 p 2 Vol.
(Contract F33615-78-C-2032; AF Proj. 3066)
(AD-A111939; PWA-FR-14961-Vol-1;
AFWAL-TR-81-2101-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 21/5

A methodology for quantifying relative life/performance trades during the conceptual design phase of gas turbine engine development is presented. As part of this methodology, a computer aided design system employing regression techniques was developed and demonstrated. Major elements of this system are performing satisfactorily, however, certain component subroutines are exhibiting unacceptable error levels. Further effort is required in this innovative application of standard regression techniques. GRA

N82-26310# Pratt and Whitney Aircraft Group, West Palm Beach, Fla.
LIFE AND UTILIZATION CRITERIA IDENTIFICATION IN DESIGN (LUCID), VOLUME 2 Final Report, Aug. 1978 - Mar. 1981
J. G. Osmer and C. C. Dietrick Wright-Patterson AFB, Ohio AFWAL Oct. 1981 117 p refs 2 Vol
(Contract F33615-78-C-2032; AF Proj. 3066)
(AD-A111940; AFWAL-TR-81-2101-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 21/5

Procedures for predicting gas turbine engine usage are presented. Peacetime missions were defined for an advanced tactical strike aircraft and were employed by the usage models to generate a composite engine duty cycle. The engine duty cycle was analyzed and compared to engine usage projections for other advanced tactical aircraft. The analysis demonstrated significant variations in engine usage due to weapon delivery tactics associated with advanced air to surface missiles, as well as variations in peacetime mission frequencies and aircraft performance. GRA

N82-26311# Boeing Military Airplane Development, Seattle, Wash.
CURRENT STATUS OF INLET FLOW PREDICTION METHODS
Gerald C. Paynter 14 May 1981 36 p refs
(AD-A111784) Avail: NTIS HC A03/MF A01 CSCL 21/5

The increasing availability of large computers, advances in numerical fluid mechanics, and the rapidly escalating cost of wind tunnel testing are responsible for a trend toward the use of parametric analysis rather than parametric testing to support the design of inlet systems. With an emphasis on the transonic and supersonic speed regimes, current approaches to inlet flow analysis are discussed in the context of the inlet design process. Results from typical procedures now under development for supersonic inlet flows are presented along with a discussion of the advantages and disadvantages of each for design. The requirements for experimental validation of a procedure and analysis problem areas are reviewed. Recent developments which may lead to an improved inlet flow analysis capability are discussed. Author (GRA)

N82-26312# Monsanto Research Corp., Dayton, Ohio.
TURBINE ENGINE LUBRICANT RECLAMATION Interim Report, 1 Sep. 1979 - 1 Feb. 1981
George L. Beemsterboer and Richard J. Bruns Wright-Patterson AFB, Ohio AFWAL Dec. 1981 132 p refs refs HC A06/MF A01
(Contract F33615-79-C-2052; AF Proj. 3048)
(AD-A112098; MRC-DA-1057; AFWAL-TR-81-2053) Avail: NTIS CSCL 11/8

A distillation and adsorption treatment for reclaiming used MIL-L-7808 turbine oils was investigated. A viable additive package was tested on different MIL-L-7808 type virgin base stocks. Fifteen used oils were analyzed by acid number, high performance liquid chromatography, and gas chromatography. A distillation process utilizing caustic (sodium hydroxide) pretreatment was developed on 500-ml and 13-litre scales. Adsorption treatment of distilled oils with calcium hydroxide followed by attapulgus clay was examined. Preparations for large-scale (25 and 250 gal) reclamations are currently under way to elucidate the validity of caustic distillation and absorbent treatment parameters. Author (GRA)

N82-26313# Rensselaer Polytechnic Inst., Troy, N. Y. School of Engineering and Applied Science.

AN ANALYTICAL STUDY OF TURBULENCE RESPONSES, INCLUDING HORIZONTAL TAIL LOADS, OF A CONTROL CONFIGURED JET TRANSPORT WITH RELAXED STATIC STABILITY M.S. Thesis
Boyd Perry,III 17 Feb 1975 122 p refs
Avail NTIS HC A06/MF A01

The turbulence responses of control configured vehicles (CCV) with relaxed static stability (RSS) are discussed. Three similar vehicle configurations employing two types of static stability augmentation systems (SSAS) at two flight conditions (two Mach numbers at constant altitude are considered. The configurations include a baseline (statically stable) configuration and two representative CCV (statically unstable) configurations, featuring one with baseline geometry and one with a significantly reduced horizontal tail. Stability, flying qualities, and maneuverability requirements are imposed on the airplane-SSAS systems and denote representative requirements imposed on a CCV with RSS. Using these requirements as a common base, the rigid airframe and tail load turbulence responses are examined in terms of configuration changes for a given SSAS and in terms of SSAS changes for a given configuration. Turbulence response calculations for each SSAS indicate that even though the tail load responses for the unstable configuration with the small tail are less than those for the stable configuration, the tail loads per unit tail volume are larger B.W.

N82-26314*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT EXPERIMENTS USING THE FRONT-SIDE CONTROL TECHNIQUE DURING PILOTED APPROACH AND LANDING IN A POWERED LIFT STOL AIRCRAFT
W. S. Hindson (National Research Council of Canada), G. H. Hardy, and R. C. Innis Apr. 1982 87 p refs
(NASA-TM-81337; A-8777; NAS 1.15:81337; FRL-TR-LTR-FR-81) Avail: NTIS HC A05/MF A01 CSCL 01C

The essential features of using pitch attitude for glidepath control in conjunction with longitudinal thrust modulation for speed control are described, using a simple linearized model for a powered-lift STOL aircraft operating on the backside of the drag curve and at a fixed setting of propulsive lift. It is shown that an automatic speed-hold system incorporating heave-damping augmentation can allow use of the front-side control technique with satisfactory handling qualities, and the results of previous flight investigations are reviewed. Manual control considerations, as they might be involved following failure of the automatic system, are emphasized. The influence of alternative cockpit controller configurations and flight-director display features were assessed for their effect on the control task, which consisted of a straight-in steep approach flown at constant speed in simulated instrument conditions Author

N82-26315*# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
LATERAL CONTROL SYSTEM DESIGN FOR VTOL LANDING ON A DD963 IN HIGH SEA STATES M.S. Thesis
Marc Bodson May 1982 221 p refs
(Grant NGL-22-009-124)
(NASA-CR-169074; NAS 1.26:169074; LIDS-TH-1209) Avail: NTIS HC A10/MF A01 CSCL 01C

The problem of designing lateral control systems for the safe landing of VTOL aircraft on small ships is addressed. A ship model is derived. The issues of estimation and prediction of ship motions are discussed, using optimal linear linear estimation techniques. The roll motion is the most important of the lateral motions, and it is found that it can be predicted for up to 10 seconds in perfect conditions. The automatic landing of the VTOL aircraft is considered, and a lateral controller, defined as a ship motion tracker, is designed, using optimal control techniqes. The tradeoffs between the tracking errors and the control authority are obtained. The important couplings between the lateral motions and controls are demonstrated, and it is shown that the adverse couplings between the sway and the roll motion at the landing pad are significant constraints in the tracking of the lateral ship motions. The robustness of the control system, including the optimal estimator, is studied, using the singular values analysis. Through a robustification procedure, a robust control system is obtained, and the usefulness of the singular values to define stability margins that take into account general types of unstructured modelling errors is demonstrated. The minimal destabilizing perturbations indicated by the singular values analysis are interpreted and related to the multivariable Nyquist diagrams. Author

N82-26316# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INVESTIGATION OF AN IMPROVED STRUCTURAL MODEL FOR DAMAGED T-38 HORIZONTAL STABILIZER FLUTTER ANALYSIS USING NASTRAN M.S. Thesis
Lex Clayton Dodge Dec. 1981 62 p refs
(AD-A111095; AFIT/GAE/AA/81D/6) Avail: NTIS HC A04/MF A01 CSCL 01/1

This thesis investigates tuning a finite element model and applying the procedures to the T-38 horizontal stabilizer for use on NASTRAN. The T-38 stabilizer model is to be used in a subsequent flutter analysis. Static and dynamic analysis has shown the model to have inadequate bending and torsional stiffness. The model was tuned in the frequency domain with free-free boundary conditions. The tuned frequencies and mode shapes show good correlation to the measured values. The finite element model was shown to not contain variables that significantly influence the torsion modes frequencies more than the bending frequencies. Eigenvalue analysis of the tuned model with aircraft installed boundary conditions produced good results for all but the first torsion frequency. This frequency was tuned by increasing the model's control system stiffness. This tuned model produces good frequencies and mode shapes. Additional investigation is needed to compare the dynamic model corrections to the static model corrections found by Jack Sawdy, AF IT/GAE/AA/81D-27 Author (GRA)

N82-26317# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MINIMUM TIME TURNS CONSTRAINED TO THE VERTICAL PLANE M.S. Thesis
Christopher S. Finnerty Dec. 1981 77 p refs
(AD-A111096; AFIT/GAE/AA/81D-7) Avail: NTIS HC A05/MF A01 CSCL 01/2

The objective of this study is to find the throttle controls and trajectories which yield the minimum turning times for a high performance aircraft with thrust reversal capability. The aircraft remains in the vertical plane allowing only pull-up and split-s maneuvers. A second-order parameter optimization method coupled with the suboptimal control approach is used to solve the minimum time-to-turn problem. The results of the study found that trajectories restricted to the vertical plane gave different results, and in at least one case better results, than those not so constrained. The results also indicate that depending on the maneuver performed, thrust reversal is beneficial in reducing the minimum time-to-turn regardless of whether the aircraft's initial velocity is above or below corner speed. Finally, the results demonstrate that thrust reversal can be utilized for minimum time turns with resulting increases in specific energy GRA

N82-26318# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
USE OF ENTIRE EIGENSTRUCTURE ASSIGNMENT WITH HIGH-GAIN ERROR-ACTUATED FLIGHT CONTROL SYSTEMS M.S. Thesis
Darrell Brett Ridgely Dec. 1981 155 p refs
(AD-A111098; AFIT/GAE/AA/81D-24) Avail: NTIS HC A08/MF A01 CSCL 01/3

The theory of high-gain error-actuated feedback control, developed by Porter and Bradshaw, was applied to the design of various longitudinal decoupling flight control systems for an advanced aircraft. The controllers developed in this study utilized output feedback with proportional plus integral control to produce desirable closed-loop response with minimal interaction between outputs. This report describes how entire eigenstructure assignment can be used to determine appropriate measurement equations by assigning their corresponding transmission zeros. A singular value decomposition was used to choose the eigenvectors from their permissible subspaces. The results show that these modes appear in the output response, even for very high gain. Therefore selection of good eigenvalues/eigenvectors was shown to be crucial to the successful application of this theory. This report also examined the effect of varying the other design parameters on the closed-loop system response. GRA

N82-26319# Lear, Inc., Grand Rapids, Mich. Instrument Div.
INTEGRATED FLIGHT TRAJECTORY CONTROL Final Report, Aug. 1979 - May 1981

Gregory L. Comegys and Garrett R. Hanson Wright-Patterson AFB, Ohio AFWAL Aug. 1981 151 p refs
(Contract F33615-79-C-3624; AF Proj. 2403)
(AD-A110998; ID-01R-0481; AFWAL-TR-81-3077) Avail: NTIS HC A08/MF A01 CSCL 01/3

IPTC programs demonstrated by simulation the ability to compute four dimensional reference trajectories and provide guidance commands to the pitch and role autopilot axes for vertical and lateral aircraft control, and to the autothrottle for thrust and accurate time of arrival control. The ability of the trajectory generator to respond to pilot induced flight plan deviations and data linked mission changes was also demonstrated. Conventional cathode ray tubes (CRTs) were utilized for flight plan graphics and alphanumeric display. The IFTC Development Program was concerned with adding certain functions to increase the tactical flight management capabilities of the concept. IFTC was integrated with the Firefly II advanced air to ground weapon delivery algorithms to provide ingress and egress flight path generation and control. The LSI developed Mission Data Transfer System (MDIS) was added to the simulation to demonstrate the aid to mission planning and the rapid data initialization of the simulated airborne system. Author

N82-26320# Bunker-Ramo Corp., Westlake Village, Calif. Electronic Systems Div.

SIMULATION REPORT: ADVANCED DISPLAY FOR COMPLEX FLIGHT TRAJECTORIES Final Report, Jun. - Oct. 1980

Peter B. Lovering, Debra A. Warner, Deborah K. Park, Matthew Miller, and Stuart B. Burdess (AFWAL) Wright-Patterson AFB, Ohio AFWAL Jun. 1981 72 p refs
(Contract F33615-78-C-3614; AF Proj. 2403)
(AD-A111259; AFWAL-TR-81-3057) Avail: NTIS HC A04/MF A01 CSCL 01/2

Several cockpit display problems were revealed during flight tests of complex approach trajectories in support of the Microwave Landing System (MLS) Program. Among these problems were pilot orientation with respect to the approach profile and the runway, verifying proper performance along the prescribed path and cross-checking or monitoring profile computations. This document contains a brief background statement regarding the display and describes the simulator experiment, results and recommendations for display improvement. In all, eight rated Air Force Pilots of varying backgrounds flew approximately 264 curved, multi-segmented glideslope approaches in a variety of simulated wind conditions. Data collection included objective performance with respect to the desired flight path and pilot opinion on each of the new display features. Generally, pilots were favorably impressed with the display concept and recommended further development. GRA

N82-26321# Applied Science Associates, Inc., Valencia, Pa.

MAINTENANCE TRAINING SIMULATOR DESIGN AND ACQUISITION: HANDBOOK OF ISD PROCEDURES FOR DESIGN AND DOCUMENTATION Interim Report, Mar. 1979 - Mar. 1980

Rohn J. Hritz, Hobart J. Harris, Jennifer A. Smith, and George R. Purifoy, Jr. Brooks AFB, Tex. AFHRL Feb. 1982 215 p
(Contract F33615-78-C-0019; AF Proj. 2361)
(AD-A111430; AFHRL-TP-81-51) Avail: NTIS HC A10/MF A01 CSCL 05/9

This technical paper presents a method for deriving training requirements, selecting an approach for meeting the training objectives identified, and making training equipment fidelity and instructional feature design decisions where training hardware is needed. The procedures supplement existing materials (AFP 50-58, and the 3306th Test and Evaluation Squadron Procedural Handbook, Edwards AFB) by clarifying existing training technology and providing new procedures to assist the ISD analyst in designing and documenting training equipment. The handbook expands upon currently used procedures in three major decision areas. These are (a) determining which training requirements require hardware or training equipment of some type, (b) selecting the degree of fidelity with which to represent components and parts on the training equipment, and (c) choosing instructional features to be incorporated in the training equipment. All procedures use decision flow charts to increase objectivity. The method results in documentation that is to be used as a basis for completing the ISD-Derived Training Equipment Design. The design is then communicated to the Simulator System Program Office (SimSPO) for use in preparing procurement specifications to contractors. Author (GRA)

N82-26322# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.

PERFORMANCE OF THE AEDC MARK 1 AEROSPACE ENVIRONMENTAL CHAMBER WITHOUT OIL DIFFUSION PUMPING Final Report

W. B. Stephenson and R. E. Alt Feb. 1982 26 p refs
(AD-A111406; AEDC-TR-81-32) Avail: NTIS HC A03/MF A01 CSCL 14/2

The 40- by 80-ft MK-I Aerospace Environmental Chamber was pumped down to a pressure of 2 x 10 to the minus 6th power torr in order to verify an operational mode that could maintain test conditions without the use of oil diffusion pumping. Mechanical pumps rough pumped into the micron (1 to 10.0 x 10 to the minus 3rd power torr) range, and the cryogenic arrays reduced the pressure to 2 x 10 to the minus 6th power torr and maintained it for 24 hours. The pumpdown without the use of diffusion pumping is often dictated by test requirements for exceptional cleanliness. After pumpdown, inbleeding of CO2, H2, and N2 affected chamber pressure as a function of gas species and inflow rate. The time for the liquid nitrogen and gaseous helium-cooled cryosurfaces to cool down and warm up was determined as an aid to test planning. Because several modifications to the cryopumping geometry had been made since the chamber was initially placed into service, it was considered important to verify the MK-I performance. It is concluded that the mechanical roughing/cryogenic pumping method of operation is satisfactory for simulation of conditions where the outgassing is relatively small or consists of gases with low vapor pressure at liquid nitrogen temperature (i.e., CO2 or H2O). GRA

N82-26323# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

OPTIMAL PLACEMENT MODEL FOR THE B-52G WEAPONS SYSTEM TRAINER M.S. Thesis

Franklin E. Hoke, Jr. Sep. 1981 79 p refs
(AD-A110977; AFIT/LSSR-83-81) Avail: NTIS HC A05/MF A01 CSCL 15/5

As a result of the Force Modernization Study, the Strategic Air Command will have its first new generation simulator, the Weapons System Trainer (WST), available in the beginning of 1982. Because of the highly intensive requirements of B-52 training, it had been determined that each B-52 unit would be equipped with a total WST system. While there is agreement with the strategic implications of individual base location for the WST, the necessity of that decision should be questioned. The original research question directed at G model bases was: Can an economically optimum location scheme be determined for the minimum number of WST's necessary to meet training requirements? Consequently, the central objective of this research was the development of a mathematical model which would assure the optimum placement of the WST based on the defined resources, constraints, and economic criteria. The research and generated solutions lend credence to the model as a management tool, in that it permits an objective analysis of alternatives in terms of cost location schemes and number of simulators. It is concluded that the model should provide useful information in future simulator location studies. Author (GRA)

N82-26324# Federal Aviation Administration, Washington, D.C. Office of Aviation Policy and Plans.

FINAL REGULATORY EVALUATION: METROPOLITAN WASHINGTON AIRPORTS POLICY Final Report

Lawrence A. Pearsall and Douglas A. Samuelson Oct. 1981 187 p refs
(AD-A110583; FAA-APO-81-12) Avail: NTIS HC A09/MF A01 CSCL 01/2

This final regulatory evaluation examines the potential impacts of rules to be applied to aircraft operations at Washington National Airport. These rules are part of the overall policy toward the development of Washington National Airport and Dulles International Airport. The alternative economic impacts on airlines, passengers, communities and the FAA of imposing passenger ceilings, operations quotas, landing fees, perimeter rules, curfews, and noise restrictions under various scenarios are assessed in this evaluation, and the final rule is specifically addressed in the final Chapter. The quantifiable impacts of this rule are estimated at a $27 million net cost to society, but this net cost is believed to be outweighed by benefits which cannot be measured. Author (GRA)

N82-26325# Naval Training Equipment Center, Orlando, Fla. Visual Technology Research Simulator.

VISUAL TECHNOLOGY RESEARCH SIMULATOR, VISUAL AND MOTION SYSTEM DYNAMICS Interim Report, 1978 - 1981

G. Blair Browder and Steve K. Butrimas Apr. 1981 75 p refs
(AD-A111801, NAVTRAEQUIPC-IH-326) Avail: NTIS HC A04/MF A01 CSCL 05/9

Simulator system time lags and transport delays can be critical factors in achieving a successful modern trainer. This document presents the results of detailed measurements made on the Navy's Visual Technology Research Simulator (VTRS/CTOL). These measurements determined 'end-to-end' dynamic lags, with aircraft control stick as the input stimulus and visual/motion hardware response as the output. Major subsystems of the VTRS/CTOL include a T-2C aircraft cockpit, pneumatic G-seat, six degree of freedom motion base, wide angle dome display with a servo-controlled projection system driven with either CIG or closed circuit model board TV. Dynamic performance data shows phasing between the motion and visual systems for CIG and model board simulation. This study concludes that the VTRS/CTOL simulator throughout lags are less than 150 milliseconds which is generally accepted as satisfactory for simulation. Author (GRA)

N82-26326# Federal Aviation Administration, Washington, D.C. Office of Aviation Policy and Plans.

AIRFIELD AND AIRSPACE CAPACITY/DELAY POLICY ANALYSIS

Harvey Safeer, John Rodgers, Lawrence A. Pearsall, Stefan Hoffer, Mark Pfeifer, and David DeCarme Dec. 1981 59 p refs
(AD-A110777; FAA-APO-81-14) Avail: NTIS HC A04/MF A01 CSCL 01/5

A general discussion of the concepts of capacity and delay at airfields and in enroute airspace precedes an estimation of present and future capacity and delay. Options to increase capacity and mitigate delay are then reviewed. The discussion is pointed towards United States air carrier airports and the users of those airports. The most detailed analysis concerns the top 39 air carrier airports and is based on data collection from three major air carriers. Potential congestion problems sufficient to impair the efficiency of national transportation are found to be possible at 19 major airports by 1991. Remedies to such congestion are described for 12 airports, but presently known resources are expected to be insufficient to satisfy the potential demand at 7 airports. GRA

N82-26350*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

THE MARSHALL SPACE FLIGHT CENTER KC-135 ZERO GRAVITY TEST PROGRAM FOR FY 1981

R. E. Shurney, ed. Mar. 1982 69 p refs
(NASA-TM-82476; NAS 1.15:82476) Avail: NTIS HC A04/MF A01 CSCL 11G

Seven separate investigations during 23.5 hours of testing aboard the KC-135 zero gravity aircraft were conducted. All experiment objectives were met or exceeded. Author

N82-26384* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FUSELAGE STRUCTURE USING ADVANCED TECHNOLOGY FIBER REINFORCED COMPOSITES Patent

Robert K. Robinson (Boeing Commercial Airplane Co., Seattle) and Harry M. Tomlinson, inventors (to NASA) (Boeing Commercial Airplane Co., Seattle) Issued 12 Jan. 1982 9 p Filed 16 Feb. 1978 Supersedes N78-18045 (16 - 09, p 1111) Sponsored by NASA
(NASA-Case-LAR-11688-1; US-Patent-4,310,132; US-Patent-Appl-SN-878540; US-Patent-Class-244-119; US-Patent-Class-244-123; US-Patent-Class-244-132) Avail: US Patent and Trademark Office CSCL 11D

A fuselage structure is described in which the skin is comprised of layers of a matrix fiber reinforced composite, with the stringers reinforced with the same composite material. The high strength to weight ratio of the composite, particularly at elevated temperatures, and its high modulus of elasticity, makes it desirable for use in airplane structures.

Official Gazette of the U.S. Patent and Trademark Office

N82-26400# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels Branch.

KOVATS INDICES AS A TOOL IN CHARACTERIZING HYDROCARBON FUELS IN TEMPERATURE PROGRAMMED GLASS CAPILLARY GAS CHROMATOGRAPHY. PART 1: QUALITATIVE IDENTIFICATION Final Report, Dec. 1979 - Sep. 1980

Paul C. Hayes, Jr. and Edward W. Pitzer Nov. 1981 85 p refs
(AF Proj. 3048)
(AD-A111389; AFWAL-TR-81-2102) Avail: NTIS HC A05/MF A01 CSCL 21/4

Kovats Indices are used as a tool to identify the major components of several aircraft jet fuels of the JP-4 type. Glass capillary gas chromatography in the temperature programmed mode was the technique of choice. The first phase of the effort involved optimization of the capillary system for the maximum resolution between a selected pair of normal hydrocarbons in an acceptable analysis time. Peak resolution was investigated as a function of carrier capillary pressure, temperature programming rate, and initial column temperature. Eleven qualitatively known and quantitatively accurate calibration solutions were prepared to include over 200 different hydrocarbons. Kovats Indices were generated for these solutions in a statistically reliable fashion on two capillary columns of different polarities. Thus, each hydrocarbon standard had its own unique set of two Kovats Indices. Several petroleum, as well as shale derived, JP-4 samples were subsequently chromatographed on the same two capillary columns. Peaks were given tentative identification by matching of Kovats Indices. Author (GRA)

N82-26439*# United Technologies Corp., East Hartford, Conn. Commercial Products Div.

HOT ISOSTATICALLY PRESSED MANUFACTURE OF HIGH STRENGTH MERL 76 DISK AND SEAL SHAPES Final Report

R. D. Eng and D. J. Evans May 1982 139 p refs
(Contract NAS3-20072)
(NASA-CR-165549; NAS 1.26:165549; PWA/5574-123) Avail: NTIS HC A07/MF A01 CSCL 11F

The feasibility of using MERL 76, an advanced high strength direct hot isostatic pressed powder metallurgy superalloy, as a full scale component in a high technology, long life, commercial turbine engine were demonstrated. The component was a JT9D first stage turbine disk. The JT9D disk rim temperature capability was increased by at least 22 C and the weight of JT9D high pressure turbine rotating components was reduced by at least 35 pounds by replacement of forged Superwaspaloy components with hot isostatic pressed (HIP) MERL 76 components. The process control plan and acceptance criteria for manufacture of MERL 76 HIP consolidated components were generated. Disk components were manufactured for spin/burst rig test, experimental engine tests, and design data generation, which established lower design properties including tensile, stress-rupture, 0.2% creep and notched (Kt = 2.5) low cycle fatigue properties, Sonntag, fatigue crack propagation, and low cycle fatigue crack threshold data. Direct HIP MERL 76, when compared to conventionally forged Superwaspaloy, is demonstrated to be superior in mechanical properties, increased rim temperature capability, reduced component weight, and reduced material cost by at least 30% based on 1980 costs. J.D.

N82-26446# Dayton Univ., Ohio. Research Inst.

RESEARCH AND DEVELOPMENT ON WEAR METAL ANALYSIS Final Report, 16 Mar. 1976 - 20 Jul. 1981

Wendell E. Rhine, Costandy S. Saba, Robert E. Kauffman, John R. Brown, and Patricia S. Fair Wright-Patterson AFB, Ohio AFWAL Jan. 1982 253 p refs
(Contract F33615-76-C-5312; AF Proj. 2303)
(AD-A112100; AFWAL-TR-81-4184) Avail: NTIS HC A12/MF A01 CSCL 07/4

Since the reliability of wear metal determinations depends on the integrity of the primary standards used to calibrate the instruments, standards were synthesized and evaluated for use in the Oil Analysis Program (OAP). The standards currently used by the Air Force, in addition to Cannon, metal caprates, metal beta-diketonates, and NBS standards were evaluated for their long term stability. Two state-of-the-art plasma emission instruments were evaluated for their potential applications to the AF OAP. The goal of this effort was to improve the particle detection capability of oil analysis instruments. The sample introduction systems used by these instruments could not efficiently transport particles to the plasma sources. However, the dc plasma instrument could analyze particles better than currently used instruments. Research was also conducted to identify and characterize wear debris found in typical used turbine engine lubricating oils. Methods were developed to determine the concentration of organometallic, metallic and metal oxide species in oils for Mg, Cu and Fe. An investigation was conducted to determine and recommend optimized atomic absorption procedures for analysis of wear metals in aircraft lubricating oils. Optimization procedures and recommended AA methods are included. A method was developed to determine the 'actual' concentration of wear metals in authentic used aircraft engine oils. It is quantitative for Al, Cr, Cu, Fe, Mg, Mo, Ni, Pb, Sn and Ti metallic particles. GRA

N82-26465*# Rockwell International Corp., Downey, Calif.

DEVELOP, DEMONSTRATE, AND VERIFY LARGE AREA COMPOSITE STRUCTURAL BONDING WITH POLYIMIDE ADHESIVES Final Report

Bashir D. Bhombal, Donald H. Wykes, Keith C. Hong, and Arnold A. Stenersen May 1982 152 p refs
(Contract NAS1-15843)
(NASA-CR-165839; NAS 1.26:165839) Avail: NTIS HC A08/MF A01 CSCL 11A

The technology required to produce graphite-polyimide structural components with operational capability at 598 K (600 F) is considered. A series of polyimide adhesives was screened for mechanical and physical properties and processibility in fabricating large midplane bonded panels and honeycomb sandwich panels in an effort to fabricate a structural test component of the space shuttle aft body flap. From 41 formulations, LaRC-13, FM34B-18, and a modified LaRC-13 adhesive were selected for further evaluation. The LaRC-13 adhesive was rated as the best of the three adhesives in terms of availability, cost, processibility, properties, and ability to produce void fee large area (12' x 12') midplane bonds. Surface treatments and primers for the adhesives were evaluated and processes were developed for the fabrication of honeycomb sandwich panels of very good quality which was evidenced by rupture in the honeycomb core rather than in the facesheet bands on flatwise tensile strength testing. The fabrication of the adhesively bonded honeycomb sandwich cover panels, ribs, and leading edge covers of Celion graphite/LARC-160 polyimide laminates is described. A.R.H.

N82-26483*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EXPERIMENTS ON FUEL HEATING FOR COMMERCIAL AIRCRAFT

R. Friedman and F. J. Stockemer (Lockheed-California Co., Burbank, Calif.) 1982 15 p refs Presented at 18th Joint Propulsion Conf., Cleveland, 21-23 Jun. 1982; Sponsored by AIAA, SAE and ASME
(NASA-TM-82878; E-1254; NAS 1.15:82878) Avail: NTIS HC A02/MF A01 CSCL 21D

An experimental jet fuel with a -33 C freezing point was chilled in a wing tank simulator with superimposed fuel heating to improve low temperature flowability. Heating consisted of circulating a portion of the fuel to an external heat exchanger and returning the heated fuel to the tank. Flowability was determined by the mass percent of unpumpable fuel (holdup) left in the simulator upon withdrawal of fuel at the conclusion of testing. The study demonstrated that fuel heating is feasible and improves flowability as compared to that of baseline, unheated tests. Delayed heating with initiation when the fuel reaches a prescribed low temperature limit, showed promise of being more efficient than continuous heating. Regardless of the mode or rate of heating, complete flowability (zero holdup) could not be restored by fuel heating. The severe, extreme-day environment imposed by the test caused a very small amount of subfreezing fuel to be retained near the tank surfaces even at high rates of heating. Correlations of flowability established for unheated fuel tests also could be applied to the heated test results if based on boundary-layer temperature or a solid index (subfreezing point) characteristic of the fuel. Author

N82-26484# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Fuels Branch.

JET FUEL FROM SHALE OIL: THE 1981 TECHNOLOGY REVIEW

Herbert R. Lander, Jr. Dec. 1981 257 p refs Proceedings of Symp., Miamisburg, Ohio, 17-18 Nov. 1981
(AF Proj. 3048)
(AD-A111217; AFWAL-TR-81-2135) Avail: NTIS HC A12/MF A01 CSCL 21/4

The 'Jet Fuel From Shale Oil - 1981 Technology Review' culminated three years of Air Force Shale Oil related programs. Final economic optimized results of three processing studies evaluating the yield, cost and quality of JP-4 and JP-8 jet fuel produced from whole crude shale oil are discussed. Reported also are technologies associated with a newly developed nitrogen tolerant catalyst and conclusions of combustion studies performed on shale derived JP-4 jet fuel samples and Nuclear Magnetic Resonance (NMR) analyses of the composition of shale derived jet fuel samples. Author (GRA)

N82-26485# Center for Naval Analyses, Alexandria, Va. Naval Studies Group.

MOBILITY FUELS FOR THE NAVY

Thomas ONeill Jan. 1982 21 p refs
(Contract N00014-76-C-0001)
(AD-A112511; CNA-PP-336) Avail: NTIS HC A02/MF A01 CSCL 21/4

As fuel declines, both specifications and engine designs will have to be modified to accommodate this change. In addition, specifications have to reflect the fact that fuel chemistry itself is undergoing change, so that new problems have begun to arise. Recently, batches of DFM and JP-5 that passed inspection have been associated with fuel filter clogging and excessive smoking. The mechanisms of these effects are not clearly understood. As synfuels are introduced, the variety of chemicals in fuels will be greatly expanded, and this will cause a new range of problems. Besides modifying the specifications of current fuels to address the issues of price and availability, other ways might come from changing the types of fuel burned. The Navy could attempt to switch to fuels in civilian use. Number 2 diesel oil is similar to the ship fuel DFM, while Jet A-1 is not unlike the aircraft fuel JP-5. Another approach could involve the use of just one type of fuel for both ships and airplanes. This would reduce storage and handling costs, perhaps enough to offset the modest differential of 5 cents per gallon between JP-5 and DFM that existed in October 1981. GRA

N82-26487# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.

DEVELOPMENT OF ARMY HIGH-ENERGY FUEL DIESEL/ TURBINE-POWERED SURFACE EQUIPMENT, PHASE 2 Interim Report, Oct. 1979 - Sep. 1981

William W. Wimer and D. M. Yost Dec. 1981 134 p refs
(Contracts DAAK70-80-C-0001; DAAK70-82-C-0001; DA Proj. 1L7-62733-AH-20)
(AD-A111942; AFLRL-147) Avail: NTIS HC A07/MF A01 CSCL 21/4

The Army is interested in those fuels that have a high-energy content per unit volume and therefore result in increased payload capabilities and/or extended operational range of the vehicle. A series of screening processes are being used to identify those fuels and/or fuel components that could result in an increase of 10 percent in the range of the vehicle without an increase in the fuel tank size, i.e., fuels with a high-energy content percent volume. The chemical and physical properties of various candidate fuels and fuel components are described. The fuel components included both liquids and solids (at room temperature). The blending of the various components and the characterization of the resulting fuels are outlined. Solubility studies were done on some of the solid components to assist in obtaining the resulting fuel in the more desirable liquid state. Those solid components, such as anthracene, that were insoluble in the tests conducted but judged to have good high-energy potential, were studied as slurries. Catalyzed 'carbon black' was investigated. Settling studies with carbonaceous fuels included the effect of temperature upon the stability, the stability of FRF-carbon slurries, and the refinement of the previously reported 'Freezing Tube Technique' for measuring stability. Impact dispersion tests were conducted to study the fire-safety characteristics of energy-augmented fuels. The screening of candidate fuels with the Petter engine is described in detail. Other engine studies with the CLR engine are also included. Author (GRA)

N82-26490# Department of Energy, Washington, D. C. Office of Transportation Programs.

SYMPOSIUM ON COMMERCIAL AVIATION ENERGY CONSERVATION STRATEGIES, PAPERS AND PRESENTATIONS

Apr. 1981 354 p refs Symp. held in Washington, D.C., 2-3 Apr. 1981 Sponsored in part by FAA
(AD-A107106) Avail: NTIS HC A16/MF A01 CSCL 21/4

The Symposium provided a forum in which representatives from DOE, FAA, National Aeronautics and Space Administration (NASA) and the aviation industry exchanged information and ideas regarding current and future efforts to conserve fuel and to promote energy conservation within the commercial aviation sector. General topics discussed included Federal and industry energy conservation programs such as flight operations, air traffic control, engineering and maintenance, and corporate management strategies. The Symposium, was highlighted by a panel discussion entitled 'Energy Conservation: Where Do We Go From Here?' This report contains the papers and presentations from the Symposium. GRA

N82-26546# Lincoln Lab., Mass. Inst. of Tech., Lexington.

A COMPARATIVE STUDY OF NARROWBAND VOCODER ALGORITHMS IN AIR FORCE OPERATIONAL ENVIRONMENTS USING THE DIAGNOSTIC RHYME TEST

E. Singer 6 Jan. 1982 26 p refs
(Contract F19628-80-C-0002)
(AD-A112053; TR-590; ESD-TR-81-334) Avail: NTIS HC A03/MF A01 CSCL 17/2

This report presents a summary of work performed at Lincoln Laboratory aimed at improving the intelligibility of 2.4 kbps vocoders to be used in USAF operational environments. The distortions present in some of these environments, particularly the F-15 fighter aircraft, can place a severe burden on the speech modelling capabilities of contemporary vocoders. To study these effects and the benefits of various algorithmic improvements, the Diagnostic Rhyme Test was used as a means of providing an objective measure of relative system performance. A wide range of areas was explored through the use of real time computer simulations, including the effects of modified analysis and synthesis techniques, design parameter choices, interoperability, and environmental factors. The purpose of this report is to assemble and document the extensive body of DRT data which has been collected and thereby provide a means for the selection of design parameters likely to lead to improved vocoder performance. Author (GRA)

N82-26554# Ohio State Univ., Columbus. ElectroScience Lab.

ELEVATION PLANE ANALYSIS OF ON-AIRCRAFT ANTENNAS

Chong L. Yu and Walter Dennis Burnside Jan. 1982 93 p refs
(Contract N62269-71-C-0296)
(AD-A112373; ESL-3188-2) Avail: NTIS HC A05/MF A01 CSCL 09/5

The radiation patterns, in the elevation plane, of airborne antennas mounted on the aircraft fuselage have been analyzed by modern diffraction theory including wedge diffraction theory and creeping wave theory. It is found that the fuselage shape has a dominant effect on the elevation patterns. In order to analyze a general convex shape, a new approach, 'section matching method', has been developed in which the fuselage profile is described by a set of points. This new method is applied to some general geometrical shapes which approximate aircraft fuselage. The composite elliptical cylinder is the most general model considered. The validity of this method has been verified by modal one more rigorous GTD solutions. Author (GRA)

N82-26612# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Aerodynamics and Airframe Branch.

THE NUMERICAL SOLUTION OF THE NAVIER-STOKES EQUATIONS FOR INCOMPRESSIBLE TURBULENT FLOW OVER AIRFOILS Final Technical Report, Oct. 1979 - Feb. 1981

Harwood A. Hegna Oct. 1981 154 p refs
(AF Proj. 2307)
(AD-A111279; AFWAL-TR-81-3053) Avail: NTIS HC A08/MF A01 CSCL 20/4

Numerical solutions are obtained for two-dimensional incompressible turbulent viscous flow over airfoils of arbitrary geometry. An algebraic eddy viscosity turbulence model based on Prandtl's mixing length theory is modified for separated adverse pressure gradient flows. Finite difference methods for solving the inviscid stream function equation and the incompressible laminar Navier-Stokes equations are used. A finite difference method for solving the Reynolds averaged incompressible turbulent two-dimensional Navier-Stokes equations is employed. The inviscid stream function equation and the Navier-Stokes equations are transformed using a curvilinear transformation. A body-fitted coordinate system with a constant coordinate line defining the airfoil section surface is transformed to a rectangular coordinate system in the transformed or computational plane. An elliptic partial differential Poisson equation for each coordinate is used to generate the coordinate system in the physical plane for arbitrary airfoils. The two-dimensional time dependent Reynolds averaged incompressible Navier-Stokes equations in the primitive variables of velocity and pressure and a Poisson pressure equation are numerically solved. Turbulence is modelled with an adverse pressure gradient eddy viscosity technique. An implicit finite difference method is used to solve the set of transformed partial differential equations. The system of linearized simultaneous difference equations, at each time step, is solved using successive-over-relaxation iteration. GRA

N82-26619# Naval Surface Weapons Center, White Oak, Md.

COMPARISON OF NUMERICAL RESULTS AND MEASURED DATA FOR SMOOTH AND INDENTED NOSETIPS

Tsuying Hsieh 14 May 1981 12 p refs
(AD-A111794) Avail: NTIS HC A02/MF A01 CSCL 20/4

Numerical calculations, using an unsteady implicit numerical algorithm which solves either the inviscid or the thin-layer Navier-Stokes equations, were performed for smooth and severely indented nosetips at hypersonic speed and zero angle of attack. The computed results of inviscid and laminar flowfield are compared to wind tunnel measured data for surface pressure, shock location, heat transfer and density distribution in the shock layer. Good agreements between the calculated and measured flowfield are obtained for smooth nosetip without flow separation. Difficulties in the simulation of severely indented nosetips with large separation bubble or sharp corner are discussed. Author (GRA)

N82-26660# Defense Mapping Agency, Washington, D.C. Advanced Technology Div.

THE HYDROGRAPHIC AIRBORNE LASER SOUNDER (HALS)

Stephen M. Webb 3 Feb. 1982 12 p refs
(AD-A111027) Avail: NTIS HC A02/MF A01 CSCL 08/10

To provide an increase in hydrographic survey resources the Hydrographic Airborne Laser Sounder is being developed by the Naval Ocean Research and Development Activity (NORDA) under the sponsorship of the Defense Mapping Agency (DMA). The HALS system incorporates a pulsed, scanning blue-green laser and will be flown in a helicopter from a survey ship operated by the U.S. Naval Oceanographic Office (NAVOCEANO). Through the use of statistics in post-flight processing the HALS data will meet survey accuracy standards, more than adequate for safe navigation. NORDA will perform a technical evaluation of HALS and then turn the system over to NAVOCEANO for operation in late 1983. Author (GRA)

N82-26701*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

BIRD IMPACT ANALYSIS PACKAGE FOR TURBINE ENGINE FAN BLADES

Murray S. Hirschbein 1982 20 p refs Presented at 23rd Struct. Dyn. and Mater. Conf., New Orleans, 10-12 Previously announced in IAA as A82-30162 May 1982; Sponsored by AIAA, ASME, ASCE, and AHS
(NASA-TM-82831; NAS 1.15:82831) Avail: NTIS HC A02/MF A01 CSCL 20K

N82-26703*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

COMPARISON OF ANALYTICAL AND WIND-TUNNEL RESULTS FOR FLUTTER AND GUST RESPONSE OF A TRANSPORT WING WITH ACTIVE CONTROLS

Irving Abel, Boyd Perry, III, and Jerry R. Newsom Jun. 1982 47 p refs
(NASA-TP-2010; L-15099; NAS 1.60:2010) Avail: NTIS HC A03/MF A01 CSCL 01C

Two flutter suppression control laws wre designed and tested on a low speed aeroelastic model of a DC-10 derivative wing. Both control laws demontrated increases in flutter speed in excess of 25 percent above the passive wing flutter speed. In addition, one of the control laws was effective in reducing loads due to turbulence generated in the wind tunnel. The effect of variations in gain and phase on the closed-loop performance was measured and is compared with predictions. In general, both flutter and gust response predictions agree reasonably well with experimental data. B.W.

N82-26720# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautical Engineering.

DESIGN OF A DATA ACQUISITION AND REDUCTION SYSTEM FOR FATIGUE TESTING M.S. Thesis

Jerry Wayne Dalton Sep. 1981 64 p refs

(AD-A110612) Avail: NTIS HC A04/MF A01 CSCL 14/2

A data acquisition and reduction system has been created for aircraft materials fatigue testing. The system uses an HP-9835 Desktop Calculator, an HP-2240A Measurement and Control Processor and a Materials Testing System loading machine. Three different computer programs on the HP-9835 are used to analyze material properties, simulate inflight fatigue loading and compute fatigue damage at a stress concentration. The flight loads are selected from Mil Spec 8866 and applied in a random order. The fatigue damage at a stress concentration is calculated from the applied local stresses using Miner's Law. Author (GRA)

N82-26822# Washington Univ. Technology Associates, Inc., St. Louis, Mo.

YAWING OF WIND TURBINES WITH BLADE CYCLIC-PITCH VARIATION Final Report, 15 Sep. 1979 - 15 Dec. 1980

K. H. Hohenemser, Andrew H. P. Swift, and David A. Peters Aug. 1981 242 p refs Prepared for Midwest Research Inst., Golden, Colo.

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE81-029639; SERI/TR-8085-3-T2) Avail: NTIS HC A11/MF A01

The control system horizontal axis wind turbine is discussed. It incorporates two features: the application of blade cyclic pitch variation adopted from rotorcraft technology, and the use of yaw angle control, not only for wind direction following, but also for rotor speed or torque control. Cyclic pitch variation in a two-bladed rotor relieves the blades of all the gyroscopic and odd harmonic aerodynamic root moments. It makes rapid yaw rates of a two-bladed rotor possible without causing vibratory hub moments and without causing appreciable angular excursions of the blade tip path plane. Due to the allowable rapid yaw rates of wind turbines with blade cyclic pitch variation, the two conventional separate control systems - yaw control for wind direction following and blade feathering control for regulating rotor speed and torque - can be replaced by a system with only a single control variable, the rotor yaw angle. DOE

N82-26826# Sandia Labs., Albuquerque, N. Mex.

USER'S MANUAL FOR THE VERTICAL AXIS WING TURBINE CODE VDART2

J. H. Strickland, T. Smith, and K. Sun Sep. 1981 70 p refs

(Contract DE-AC04-76DP-00789)

(DE82-000796; SAND-81-7039) Avail: NTIS HC A04/MF A01

This user's manual provides details on the Darrieus wind turbine aerodynamic performance/loads prediction computer code, VDART2. The code is the latest generation of vortex-based models and includes the effects of dynamic stall, pitching circulation, and added mass. DOE

N82-26873# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.

THE BIOLOGICAL DEGRADATION OF SPILLED JET FUELS: A LITERATURE REVIEW Final Report, Jun. - Aug. 1981

Robert E. Carlson Oct. 1981 41 p refs

(AF Proj. 1900)

(AD-A110758; AFESC/ESL-TR-81-50) Avail: NTIS HC A03/MF A01 CSCL 06/6

Biodegradation of many of the components of Air Force fuels does occur, although most studies have been done under laboratory conditions, and the extrapolation of the findings to natural rates of biodegradation is premature. Many factors affect biodegradation rates, including the nature and concentration of the specific hydrocarbon compound, the species of bacteria present and their quantity, and environmental factors such as nutrient availability, temperature, and oxygen concentrations. Initial concerns should be first, the determination of the importance of biodegradation relative to other loss factors such as volatilization and sediment sorption, and second, the determination of the ultimate fate of recalcitrant compounds and their metabolites. Author (GRA)

N82-26897# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

INFLUENCE OF METEOROLOGICAL PROCESSES ON THE VERTICALITY OF ELECTRIC FIELDS Final Report, 1 Oct. 1978 - 30 Sep. 1981

Maynard L. Hill 15 Jan. 1982 16 p refs

(Contract N00024-78-C-5384; DA Proj. 1L1-61102-BH-57)

(AD-A111549; APL/ATO-P/MLH82-06; ARO-14830.1-GS) Avail: NTIS HC A02/MF A01 CSCL 04/1

A maneuverable atmospheric probe (MAP) was instrumented with atmospheric electric field sensors and operated at White Sands Missile Range to investigate meteorological affects on the verticality of electric fields. Verticality to within + or - 2 deg was found to be the norm for fair weather conditions that included a high degree of convective instability. Near a large mountain peak, it was observed that the field contours are favorable for deriving information that is useful for preventing collisions of aircraft with mountainous and other terrain protuberances. Author (GRA)

N82-26921*# Arizona State Univ., Tempe.

WIND TUNNEL MEASUREMENTS OF THREE-DIMENSIONAL WAKES OF BUILDINGS Final Report

Earl Logan, Jr. and Shu Ho Lin Washington NASA Jun. 1982 95 p refs

(Contract NAS8-32357)

(NASA-CR-3565; M-379; NAS 1.26:3565) Avail: NTIS HC A05/MF A01 CSCL 04B

Measurements relevant to the effect of buildings on the low level atmospheric boundary layer are presented. A wind tunnel experiment was undertaken to determine the nature of the flow downstream from a gap between two transversely aligned, equal sized models of rectangular cross section. These building models were immersed in an equilibrium turbulent boundary layer which was developed on a smooth floor in a zero longitudinal pressure gradient. Measurements with an inclined (45 degree) hot-wire were made at key positions downstream of models arranged with a large, small, and no gap between them. Hot-wire theory is presented which enables computation of the three mean velocity components, U, V and W, as well as Reynolds stresses. These measurements permit understanding of the character of the wake downstream of laterally spaced buildings. Surface streamline patterns obtained by the oil film method were used to delineate the separation region to the rear of the buildings for a variety of spacings. S.L.

N82-26939# Air Weather Service, Scott AFB, Ill. Aerospace Sciences Branch.

FORECASTING AIRCRAFT CONDENSATION TRAILS

Sep. 1981 25 p refs

(AD-A111876; AD-E850130; AWS/TR-81/001) Avail: NTIS HC A02/MF A01 CSCL 04/2

Aircraft condensation trails (contrails) are caused by aircraft aerodynamics or engine exhaust in the proper atmospheric conditions. Engine-exhaust trails are the most common and are discussed in this report. Jet aircraft contrail-formation graphs facilitate yes-or-no forecasts for any season with forecasts of pressure, temperature, and relative humidity. Contrail probability curves give condensation trail probabilities with forecast pressure and temperature. Engine power setting does not affect contrail formation, but does affect intensity. The contrail-formation graph for propeller aircraft is similar to the jet graph. GRA

N82-27009*# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

CONTROL OPTIMIZATION, STABILIZATION AND COMPUTER ALGORITHMS FOR AIRCRAFT APPLICATIONS Status Report, 15 Apr. 1981 - 15 May 1982

Michael Athans, ed. and Alan S. Willsky, ed. 15 May 1982 40 p refs

(Grant NGL-22-009-124)

(NASA-CR-169015; NAS 1.26:169015; LIDS-SR-1210; SR-28) Avail: NTIS HC A03/MF A01 CSCL 09B

The analysis and design of complex multivariable reliable control systems are considered. High performance and fault tolerant aircraft systems are the objectives. A preliminary feasibility study of the design of a lateral control system for a VTOL aircraft that is to land on a DD963 class destroyer under high sea state conditions is provided. Progress in the following areas is summarized: (1) VTCL control system design studies; (2) robust multivariable control system synthesis; (3) adaptive control systems: (4) failure detection algorithms: and (5) fault tolerant optimal control theory. Author

N82-27088*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
A RESEARCH PROGRAM TO REDUCE INTERIOR NOISE IN GENERAL AVIATION AIRPLANES. INFLUENCE OF DEPRESSURIZATION AND DAMPING MATERIAL ON THE NOISE REDUCTION CHARACTERISTICS OF FLAT AND CURVED STIFFENED PANELS Progress Report
Ramasamy Navaneethan, Barry Streeter, Steven Koontz, and Jan Roskam Oct. 1981 310 p refs
(Contract NCC1-6)
(NASA-CR-169035; NAS 1.26:169035; KU-FRL-417-17) Avail: NTIS HC A14/MF A01 CSCL 20A

Some 20 x 20 aluminum panels were studied in a frequency range from 20 Hz to 5000 Hz. The noise sources used were a swept sine wave generator and a random noise generator. The effect of noise source was found to be negligible. Increasing the pressure differential across the panel gave better noise reduction below the fundamental resonance frequency due to an increase in stiffness. The largest increase occurred in the first 1 psi pressure differential. The curved, stiffened panel exhibited similar behavior, but with a lower increase of low frequency noise reduction. Depressurization on these panels resulted in decreased noise reduction at higher frequencies. The effect of damping tapes on the overall noise reduction values of the test specimens was small away from the resonance frequency. In the mass-law region, a slight and proportional improvement in noise reduction was observed by adding damping material. Adding sound absorbtion material to a panel with damping material beneficially increased noise reduction at high frequencies. A.R.H.

N82-27089*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
ON THE DESIGN AND TEST OF A LOW NOISE PROPELLER Final Report
George P. Succi Nov. 1981 52 p refs
(Contract NAS1-16521)
(NASA-CR-165938; NAS 1.26:165938; Rept-4764) Avail: NTIS HC A04/MF A01 CSCL 20A

An extensive review of noise and performance of general aviation propellers was performed. Research was done in three areas: The acoustic and aerodynamic theory of general aviation propellers, wind tunnel tests of three one-quarter scale models of general aviation propellers, and flight test of two low noise propellers. The design and testing of the second propeller is reviewed. The general aerodynamic considerations needed to design a new propeller are described. The design point analysis of low noise propellers is reviewed. The predicted and measured noise levels are compared. Author

N82-27090*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
ACOUSTIC PROPERTIES OF TURBOFAN INLETS Final Technical Report, 1 Sep. 1974 - 31 Oct. 1981
Ben T. Zinn, Robert K. Sigman, and Scott J. Horowitz 31 Oct. 1981 6 p refs
(Grant NsG-3036)
(NASA-CR-169016; NAS 1.26:169016) Avail: NTIS HC A02/MF A01 CSCL 20A

The acoustic field within a duct containing a nonuniform steady flow was predicted. This analysis used the finite element method to calculate the velocity potential within the duct. S.L.

N82-27191*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
BIBLIOGRAPHY OF LEWIS RESEARCH CENTER TECHNICAL PUBLICATIONS ANNOUNCED IN 1981
May 1982 295 p
(NASA-TM-82838; E-1205; NAS 1.15:82838) Avail: NTIS HC A13/MF A01 CSCL 05B

Technical reporting that resulted from the scientific and engineering work performed and managed by the Lewis Research Center in 1981 are indexed and abstracted. All the publications were announced in the 1981 issues of STAR (Scientific and Technical Aerospace Reports) and/or IAA (International Aerospace Abstracts). Included are research reports, journal articles, conference presentations, patent applications, and theses. A total of 384 technical publications is listed. Author

N82-27216# Air Force Academy, Colo. Dept. of Aeronautics.
AIR FORCE ACADEMY AERONAUTICS DIGEST: SPRING/SUMMER 1981 Final Report
A. M. Higgins, ed., F. M. Jonas, ed., E. J. Jumper, ed., J. M. Kempf, ed., and B. Gregory, ed. Dec. 1981 110 p refs
(AD-A112421; USAFA-TR-81-11) Avail: NTIS HC A06/MF A01 CSCL 20/4

This Digest covers unclassified research in aeronautics performed at the United States Air Force Academy during the six months ending 15 July 1981. This report includes technical papers in the specific areas of aerodynamics, propulsion, experimental instrumentation, engineering education and aeronautical history. Topics include: The Mass Flux Surface Boundary Condition for Linarized Potential Flow; A Numerical Investigation of the Effects of Fin Planform Parameters on the Subsonic Cruise Performance of a Supersonic Arrow Wing Configuration; An Improved Method for Calculation of Static Thrust for the USAFA J-85/13 Turbojet Engine; Pressure Measurement Using a High-Speed Data Acquisition and On-Line Calibration System; Cadet Performance during Summer Academics-Repeat versus non-repeat students; Reflections of an English Literature Major on Our Technological Society; and The Evolution and Future of Aeropropulsion Systems. GRA

N82-27217# Logistics Management Inst., Washington, D. C.
DEPOT SUPPORT OF GAS TURBINE ENGINES Final Report
T. J. OMalley and David V. Glass Oct. 1981 39 p
(Contract MDA903-81-C-0166)
(AD-A107141; LMI-ML103) Avail: NTIS HC A03/MF A01 CSCL 15/5

This report assesses the DoD's capacity and capability to support the depot maintenance requirements of gas turbine engines over the next 5-10 years. Special attention is given to newer nonaeronautical applications (tanks, marine propulsion, and cruise missile). Gas turbine engines used in fixed and rotary wing aircraft will continue to dominate the engine workload; the gas turbines used in cruise missiles, tanks, and ships will comprise less than 10 percent of the total engine workload by 1990. Additional depot maintenance capacity to support gas turbine engines is not required. The depots have adequate capacity today, and since the gas turbine workload is projected to increase by only 6 percent between FY 82 and FY 87, capacity should remain adequate through the 1980s. The Military Departments have the required capabilities to support the new nonaeronautical gas turbine engines entering the DoD inventory. They have repaired similar engines, both in size and technology, for several years. Author (GRA)

N82-27218# Office of Naval Research, London (England).
A TECHNICAL ASSESSMENT OF AERONAUTICAL ENGINEERING IN ISRAEL
Joseph A. Strada 1 Jul. 1981 8 p refs
(AD-A106980; ONRL-R-5-81) Avail: NTIS HC A02/MF A01 CSCL 01/3

A variety of Israeli academic and industrial institutions are discussed with an eye toward assessing research and development activities in aeronautical engineering disciplines. Each institution is described in brief and some of its current research projects are listed. Research in aerodynamics, guidance and control, propulsion and combustion is discussed and industrial product lines are described where appropriate. Some conclusions are drawn in an effort to assess the country's overall capabilities in aeronautical engineering. Author (GRA)

N82-27219# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
OPPORTUNITIES TO REDUCE THE COST OF SOME B-52 MODIFICATIONS Report to Secretary of Defense
9 Apr. 1982 7 p
(AD-A113563; GAO/MASAD-82-30) Avail: NTIS HC A02/MF A01 CSCL 05/1

As part of our ongoing review of the overall modernization of the strategic bomber force, we have paid particular attention to the Air Force's plans for modifying the B-52 force. We found that certain costly items may not be needed in view of the missions of the various models of the B-52 force and their expected life in the force. More specifically, the offensive avionics system (OAS) modification could be scaled back on 67 B-52Gs by deleting unneeded components for a potential savings of $21.6 million; using certain components acquired for B-52Ds on other B-52 aircraft could further reduce OAS funding needs by $33.3 million; and a $35 million modification to comply with SALT II may not be needed on B-52Hs that have been modified to carry cruise missiles. GRA

N82-27220# RAND Corp., Santa Monica, Calif.
PREPLANNED PRODUCT IMPROVEMENT AND OTHER MODIFICATION STRATEGIES: LESSONS FROM PAST AIRCRAFT MODIFICATION PROGRAMS Interim Report
Frederick Biery and Mark Lorell Dec. 1981 78 p refs
(Contract F49620-82-C-0018)
(AD-A113599; RAND/N-1794-AF) Avail: NTIS HC A05/MF A01 CSCL 15/5

Pre-Planned Product Improvement (P31) is a weapon system acquisition strategy formulated in the late 1970s in a response to the high development costs of new systems, lengthening acquisition intervals, increasing age of current inventories, constrained budgets, and various technology trends. It is founded on the assumption that quality enhancement modification of existing inventory systems is a cheaper and quicker way to modernize than the development of entirely new systems. The P31 strategy is aimed at facilitating this process; its central element is the design of new systems from their origins to accommodate future quality upgrades. Discussion of the merits and disadvantages of P3I, however, remains abstract and theoretical. This Note reviews the circumstances that led to the formulation of P3I, clarifies the implications of the concept and offers an initial assessment of the policy as applied to aircraft systems based on a careful and extensive examination of past major aircraft modification efforts. The authors conclude that long-range pre-planning during the design stage is impractical. This note also provides lessons drawn from past experience on the conduct of modification programs in general. Author (GRA)

N82-27221# Clemson Univ., S.C. Dept. of Mathematical Sciences.
SPECIFICATION AND ESTIMATION OF DYNAMIC COST FUNCTIONS FOR AIRFRAME PRODUCTION AIRFRAMES
Thomas R. Gulledge, Jr. Dec. 1981 185 p refs
(Contracts N00014-75-C-0451; F33615-81-K-5116; NR Proj. 365-049)
(AD-A113147; N135) Avail: NTIS HC A09/MF A01 CSCL 14/1

The cost behavior of the airframe industry is unique. Cost minimization models are specified that have potential for modeling this unique production situation. These models are firmly grounded in economic theory, and they stress the importance of learning and production rate as determinants of program costs. As an empirical application, one of the models is applied to the F102 airframe program. Author (GRA)

N82-27225# Naval Ship Research and Development Center, Bethesda, Md.
PROCEEDINGS OF THE 12TH NAVY SYMPOSIUM ON AEROBALLISTICS, VOLUME 1
May 1981 451 p refs Symp. held at Bethesda, Md., 12-14 May 1981 2 Vol.
(AD-A111763) Avail: NTIS HC A20/MF A01 CSCL 20/4

Partial Contents: Missile Aerodynamics; Aerodynamics of Tactical Weapons to Mach No. 8 and Angle of Attack 180 Deg.; An Inviscid Computational Method for Tactical Missile Configurations; Triservice Data Base Extension of PROGRAM MISSILE; Theoretical and Experimental Supersonic Lateral-Directional Stability Characteristics; Aerodynamics of a Rolling Airframe Missile; Approximate Method for Predicting Supersonic Normal Force Coefficient of Very-low-aspect-ratio Lifting Surfaces; Supersonic Aerodynamics of a Class of Cone-Derived Waveriders; Determination of Aerodynamic Characteristics of Ballistic Projectiles at Transonic Speeds; Store Separation; Study of Flow Fields and Store Forces in Close Proximity to a Triple Ejection Rack at Transonic Speeds; Computer Program for Simulating the Six-Degree-of-Freedom Motion of Missile Debris Fragments; An Influence Function Method for Predicting Aerodynamic Characteristics during Weapon Separation; Submissile Aerodynamics during Dispensing; Gun Launch Dynamics of the Navy 5-Inch Guided Projectile; Dynamics of Subsonic Tracer Projectiles; Thrust Augmentation for Tomahawk Cruise Missile; and Drag Characteristics and Suitability of Three-Foot Long Parachute Decelerators. GRA

N82-27233*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CHARACTERISTICS OF FUTURE AIRCRAFT IMPACTING AIRCRAFT AND AIRPORT COMPATIBILITY
D. William Conner May 1982 26 p refs
(NASA-TM-84476; NAS 1.15:84476) Avail: NTIS HC A03/MF A01 CSCL 01C

Results are reported of an opinion survey of selected individuals at the decision-making level within the five major manufacturers of transport aircraft in the United States and Europe. Opinions were obtained concerning both possible and probable existence of over 50 compatibility-related characteristics of transport aircraft in use in the years 1990, 2000, and 2010. The maximum size of aircraft is expected to increase, at a roughly uniform rate, to the year 2010 by 85 percent in passengers, 55 percent in airfreighter payload, and 35 percent in gross weight weight. Companion to the expected growth in payloads and gross weight was the identification of probable increases in aircraft geometrical dimensions and component capability, and use of fully double-decked passenger compartments. Wing span will increase considerably more than normally expected to provide wings of higher aspect ratio. New aircraft features coming into probable use include large turboprops, synthetic jet-A fuel, winglets, wake-vortex-reducing devices and laminar flow control. New operational concepts considered probable include steep approaches, high-speed turnoffs, and taxiway towing for the aircraft, plus passenger bypass of the terminal building, expedited handling of belly cargo and an intermodal cargo container for the payloads. B.W.

N82-27235*# National Aeronautics and Space Administration, Washington, D. C.
AERODYNAMIC INVESTIGATIONS TO DETERMINE POSSIBLE ICE FLIGHT PATHS
W. Burgsmueller, H. Frenz, P. May, and G. Anders Mar. 1982 77 p Transl. into ENGLISH of Vereinigte Flugtechnische Werke--Fokker GMBH Rept-Ef-586, 18 Jan. 1977 84 p Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76648; NAS 1.15:76648) Avail: NTIS HC A05/MF A01 CSCL 01C

After flights with the VFW 614 under severe icing conditions, damage to the engine was found. In wind tunnel tests a determination of the origin of this ice was made; it is supposed that the damage was caused by this ice. On the modified flight test model of the VFW 614 on a 1:15 scale, measurements were conducted in the VFW-Fokker wind tunnel with exposed particles which represented the free ice. The results of this testing are presented. Author

N82-27236# Boeing Commercial Airplane Co., Seattle, Wash. Systems Technology Div.
AIRCRAFT ALERTING SYSTEMS STANDARDIZATION STUDY. VOLUME 1: CANDIDATE SYSTEM VALIDATION AND TIME-CRITICAL DISPLAY EVALUATION Final Report, Feb. - Nov. 1980
G. P. Boucek, D. A. Po-Chedley, B. L. Berson, D. C. Hanson, M. F. Leffler, and R. W. White Jan. 1981 116 p refs
(Contract DOT-FA79WA-4268)
(AD-A107225; FAA/RD-81/38/1) Avail: NTIS HC A06/MF A01 CSCL 01/2

This report is one of a series of documented studies directed to the improvement and standardization of aircraft alerting systems. The purpose of the study was to develop and validate, through simulation, functional design criteria that can be used in designing effective aircraft alerting systems. The major objectives of this phase study were to: resolve system component questions; validate the two candidate system concepts by comparison to a representative baseline system, for both the pilot and flight engineer stations; evaluate presentation media and display formats for time-critical warnings; develop guidelines for the design of alerting systems. The system component questions were resolved in a series of experiments and the results were integrated into two system concepts for validation. In the validation tests, line-qualified pilots exercised the three alerting systems in a full-mission, fixed-base simulator. In all areas of measurement pilot performance was as good or better with the two candidate system designs than with the conventional, baseline system. The results indicate that a flight engineer station should contain the visual display components offered by the candidate system concepts. Voice was the recommended medium of presentation when rapid response is required. The time-critical display tests showed that fastest pilot response performance was obtained when graphic guidance alerts were placed in the

pilot's primary field of view. The functional design criteria that were developed are contained in 'Aircraft Alerting System Design Guidelines,' Report Number DOT/FAA/RD-81/38/11.
Author (GRA)

N82-27237# Federal Aviation Administration, Atlantic City, N.J.
PROCEEDINGS OF THE 1ST ANNUAL WORKSHOP ON AVIATION RELATED ELECTRICITY HAZARDS ASSOCIATED WITH ATMOSPHERIC PHENOMENA AND AIRCRAFT GENERATED INPUTS
Joseph J. Traybar and Nickolus O. Rasch Oct. 1981 38 p
Workshop held at Atlantic City, 26-27 Feb. 1980
(FAA Proj. 182-340-100)
(AD-A107326; FAA-CT-81-205) Avail: NTIS
HC A03/MF A01 CSCL 01/3

This workshop was to bring together the various elements of the agency to engage in discussions to identify aviation related electricity hazards associated with both atmospheric phenomena and aircraft generated inputs, and determine a prioritize specific FAA problem area and/or requirements that need to be addressed. This information is vital in the development of the agency's posture and requirements in this important technology area.
Author (GRA)

N82-27238# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
CURRENT ADM RESTRAINT SYSTEM STATUS, TRADE-OFF CONSTRAINTS AND LONG RANGE OBJECTIVES FOR THE MAXIMUM PERFORMANCE EJECTION SYSTEM (MPES)
Marcus Schwartz Feb. 1982 31 p
(AD-A112645; NADC-82021-60) Avail: NTIS
HC A03/MF A01 CSCL 01/2

This report documents the restraint sub-system design options which were investigated for possible incorporation on the Navy Maximum Performance Ejection System (MPES). This study focused mainly on three ongoing development items for the advanced development model (ADM), but also considered some longer range objectives which address future requirements and anticipated technology developments which are necessary for a more comprehensive restraint package. Author (GRA)

N82-27239# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
AN OXYGEN ENRICHED AIR SYSTEM FOR THE AV-8A HARRIER Final Report
Richard L. Routzahn Oct. 1981 185 p refs
(AD-A112334; NADC-81198-60) Avail: NTIS
HC A09/MF A01 CSCL 06/11

Due to the high support costs, increase in aircraft down time and hazards associated with the utilization of liquid oxygen, development has been progressing with On-Board Oxygen Generation Systems (OBOGS) which have the capability of providing an aviator's breathing gas of sufficient quality and quantity. An Oxygen Enriched Air System (OEAS), employing the molecular sieve concept, has been subjected to environmental test and evaluation by the Naval Air Development Center. The OEAS contains a molecular sieve oxygen concentrator, breathing regulator and performance monitor. The test and evaluation program was conducted to verify that design criteria have been met and to establish system performance in the environments anticipated on the AV-8A Harrier and other tactical aircraft. The system has successfully demonstrated the ability, under certain conditions, to provide a breathing gas composed of 95 percent oxygen and 5 percent argon. It will also provide adequate amounts of breathing gas and sufficient oxygen concentrations for a one or two man open loop breathing schedule. Concentrator anomalies have occurred during the program with control electronics and lubricants within the unit. Redesign of the breathing regulator is necessary to insure compatibility with lox systems and in providing a greater gas quantity during ground idle conditions. Redesign of the performance monitor is necessary to withstand environmental conditions anticipated in service use. Prior to future aircraft incorporation, design studies must pay consideration not only to bleed air pressure availabilities, but also to temperatures which may degrade system performance.
Author (GRA)

N82-27241# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
PROPOSED RESEARCH TASKS FOR THE REDUCTION OF HUMAN ERROR IN NAVAL AVIATION MISHAPS Final Report, 1 Jul. 1980 - Sep. 1981
Donald M. Layton Oct. 1981 24 p
(AD-A112339; NPS67-81-018) Avail: NTIS
HC A02/MF A01 CSCL 01/2

Seven possible areas of research are proposed that could lead to the reduction and/or mitigation of the human error involvement in Navy aircraft mishaps. These include tasks for the Naval Aerospace Medical Research Laboratory, other Navy and contracted activities. The following research actions have been recommended: Review of existing mishap reports; Cockpit review/analysis of existing Aircraft; Review and revision of standard anthrometrical data; Critical Incident Technique; Design/T&E cooperation procedures; Basic research into error causes; and Broad research functions. GRA

N82-27242# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
DEVELOPMENT OF A BACKPACK SURVIVAL KIT FOR EJECTION SEATS
Thomas J. Zenobi and Gary F. Whitman 8 Feb. 1982 15 p
(W0584001)
(AD-A113653; NADC-82024-60) Avail: NTIS
HC A02/MF A01 CSCL 06/7

The Navy is designing a Backpack Survival Kit (BSK) for ejection seats. Expected advantages of the BSK as compared to seat lid kits are less weight and more crewmember mobility during emergency egress from aircraft cockpits. With development of more sophisticated ejection propulsion systems, volume for survival kit stowage under the seat lid may not be available; the BSK offers an alternative stowage location. Design considerations include integration into the ejection seat system, attachment to the crewmember's restraint harness, stowage of survival gear, liferaft deployment, and crewmember mobility. Author (GRA)

N82-27244# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
CABIN SAFETY IN LARGE TRANSPORT AIRCRAFT
9 Sep. 1981 57 p refs
(PB82-129297; NTSB-AAS-81-2) Avail: NTIS
HC A04/MF A01 CSCL 01B

A study by the National Transportation Safety Board showed that in 58.4 percent of the 77 survivable/partially survivable passenger carrying transport aircraft accidents/incidents occurring since 1970, there were failures of cabin furnishings. These failures killed, injured, entrapped or otherwise incapacitated aircraft occupants preventing successful emergency escape in many cases. Failures of cabin furnishings also created obstacles to egress by blocking aisles and exits. Regulations dealing with occupant protection in crashes were last updated 30 years ago. They do not adequately reflect actual crash experience nor do they provide adequate protection to occupants in survivable crashes, especially the more severe crashes, where it is most needed. Recent accident experience supports the need to upgrade the current minimum design standards. Moreover, the technology exists for upgrading existing design and testing methods for cabin furnishings to meet the upgraded regulations. GRA

N82-27245# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS, INVOLVING CORPORATE/EXECUTIVE AIRCRAFT, U.S. GENERAL AVIATION, 1979
16 Oct 1981 67 p
(PB82-138967; NTSB-AMM-81-8) Avail: NTIS
HC A04/MF A01 CSCL 01B

Reports of U.S. general aviation corporate/executive aircraft accidents are given. Included are 77 accident briefs, 14 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances and probable cause(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, injuries and causal/factors(s). GRA

N82-27246# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING MISSING AND MISSING LATER RECOVERED AIRCRAFT, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 72 p
(PB82-138959; NTSB-AMM-81-7) Avail: NTIS
HC A04/MF A01 CSCL 01B

Reports of U.S. general aviation missing and missing later recovered accidents are presented. Included are 68 accident briefs, 21 of which cover missing aircraft not recovered and 47 missing later recovered. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, pilot certificate, injuries and causal factor(s). GRA

N82-27247# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING ALCOHOL AS A CAUSE/FACTOR, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 40 p
(PB82-138942; NTSB-AMM-81-6) Avail: NTIS
HC A03/MF A01 CSCL 01B

Reports on all U.S. general aviation accidents involving alcohol inpairment as a cause/factor are given. Included are 34 accident briefs, 30 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances and probable cause(s)/factor(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, pilot certificate, injuries and causal factor(s). GRA

N82-27248# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF FATAL ACCIDENTS INVOLVING WEATHER AS A CAUSE/FACTOR, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 271 p
(PB82-138934; NTSB-AMM-81-5) Avail: NTIS
HC A12/MF A01 CSCL 01B

Report of all fatal U.S. general aviation accidents involving weather as a cause/factor for the year 1979 are presented. Included are 276 fatal accidents in the brief format. This format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated on all accidents involving weather as a cause/factor by type of accident, phase of operation, injury index, aircraft damage, pilots certificate, injuries and cause/factor(s). GRA

N82-27249# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING ROTORCRAFT, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 166 p
(PB82-138926; NTSB-AMM-81-4) Avail: NTIS
HC A08/MF A01 CSCL 01B

General aviation rotorcraft accidents are reported. Included are 289 accident briefs, 39 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, kind of flying, pilot certificates, injuries, and causes and related factors. GRA

N82-27250# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING TURBINE POWERED AIRCRAFT, US GENERAL AVIATION, 1979
16 Oct. 1981 110 p refs
(PB82-138918; NTSB-AMM-81-3) Avail: NTIS
HC A06/MF A01 CSCL 01B

General aviation turbine powered aircraft accidents are reported. Included are 171 accident briefs, 36 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances, and probable cause(s) fo each accident. Additional statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, pilot certificate, injuries and cause/factor(s). GRA

N82-27251# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING MIDAIR COLLISIONS: U.S. GENERAL AVIATION, 1979
16 Oct. 1981 54 p
(PB82-138900; NTSB-AMM-81-2) Avail: NTIS
HC A04/MF A01 CSCL 01B

General aviation accidents involving midair collisions are reported. Included are 25 accident files, 14 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by kind of flying, phase of operation, injury index, altitude of occurrence, airport proximity, aircraft damage, pilot certificate, injuries and causal factors(s). GRA

N82-27252# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
LISTING OF AIRCRAFT ACCIDENTS/INCIDENTS BY MAKE AND MODEL, U.S. CIVIL AVIATION, 1979
16 Oct. 1981 188 p
(PB82-138892; NTSB-AMM-81-1) Avail: NTIS
HC A09/MF A01 CSCL 01B

Civil aviation accidents/incidents, sorted by aircraft make and model are reported. Included are the file number, aircraft registration number, date and location of the accident, aircraft make and model and injury index for all 4,182 accidents/incidents occurring in this period. GRA

N82-27253# National Transportation Safety Board, Washington, D. C.
ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA: U.S. AIR CARRIER OPERATIONS, 1979
16 Nov. 1981 87 p
(PB82-134339; NTSB-ARC-81-1) Avail: NTIS
HC A05/MF A01 CSCL 01B

This record of aviation accidents in all operations of the U.S. air carriers for calendar year 1979 includes an analysis by class of carrier and type of service in which the 1979 performances are compared with 5 year base-period averages. A 10 year review, 1970 through 1979, of the certificated route carriers shows accident rates by aircraft make and model, types of accidents, phases of operation, causes or related factors, and a comparison of total which summarize the accidents, fatalities, and accident rates, causal tables; and briefs of accidents are included. GRA

N82-27254# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF FATAL ACCIDENTS INVOLVING FIXED-WING MULTI-ENGINE AIRCRAFT, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 148 p
(PB82-139007; NTSB-AMM-81-12) Avail: NTIS
HC A07/MF A01 CSCL 01B

The publication contains reports of fixed-wing multiengine general aviation aircraft accidents that occurred in 1979. Included are 15 turbojet, 51 turboprop and 444 reciprocating engine aircraft accidents. However, briefs of only the fatal accidents in the three categories are presented. The brief format presents the facts, conditions, circumstances and probable cause(s) for each accident. Additional statistical informatin is tabulated by injuries and cause(s) and related factor(s). GRA

N82-27255# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING COMPUTER AIR CARRIERS AND ON-DEMAND AIR TAXI OPERATIONS, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 168 p
(PB82-138991; NTSB-AMM-81-11) Avail: NTIS
HC A08/MF A01 CSCL 01B

Reports of commuter air carrier and on-demand air taxi accidents are presented. Included are 50 commuter air carrier and 173 on-demand air taxi accident briefs. The brief format presents the facts, conditions, circumstances and probable cause(s) for each accident. Additional statistical information is tabulated by type of operation, injuries, aircraft weight, and cause(s) and related factor(s). GRA

N82-27256# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING AERIAL APPLICATION OPERATIONS, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 260 p
(PB82-138983; NTSB-AMM-81-10) Avail: NTIS
HC A12/MF A01 CSCL 01B

Reports of U.S. general aviation aerial application accidents occurring in 1979 are given. Included are 395 accident briefs, 27 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additonal statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, pilot certificate, injuries, kind of operation and causes/factors. GRA

N82-27257# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING AMATEUR/HOME BUILT AIRCRAFT, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 76 p
(PB82-138975; NTSB-AMM-81-9) Avail: NTIS HC A05/MF A01 CSCL 01B

Reports of U.S. general aviation accidents involving amateur/home built aircraft are presented. Included are 130 accident briefs, 36 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances and probable cause(s)/factor(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, pilot certificate, injuries and causal/factor(s). GRA

N82-27258# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
BRIEFS OF ACCIDENTS INVOLVING GLIDERS, U.S. GENERAL AVIATION, 1979
16 Oct. 1981 44 p refs
(PB82-139015; NTSB-AMM-81-13) Avail: NTIS HC A03/MF A01 CSCL 01B

Reports of all U.S. general aviation accidents, occurring in 1979, involving gliders are presented. Included are 54 accident Briefs, 2 of which involve fatal accidents. The brief format presents the facts, conditions, circumstances and probable cause(s)/factor(s) for each accident. Additional statistical information is tabulated by type of accident, phase of operation, injury index, aircraft damage, pilot age, injuries and causal factor(s). GRA

N82-27259*# Ohio Univ., Athens. Avionics Engineering Center.
A LORAN-C PROTOTYPE NAVIGATION RECEIVER FOR GENERAL AVIATION
Robert W. Lilley and Daryl L. McCall Aug. 1981 25 p refs Presented at the 4th Digital Avionics Systems Conf., St. Louis, Nov. 1981
(NASA-CR-169118; NAS 1.26:169118; TM-80) Avail: NTIS HC A02/MF A01 CSCL 17G

Prototype equipment was developed for flight evaluation which provides enroute navigation in both latitude-longitude and rho-theta coordinates. The nonprecision approach capabilities of this equipment was evaluated. The antenna/preamplifier coupler, the RF processor, tracking loop hardware, tracking loop software, and the video output are discussed. Laboratory and flight test results are evaluated. A.R.H.

N82-27260# Auburn Univ., Ala. Dept. of Electrical Engineering.
MARINE AIR TRAFFIC CONTROL AND LANDING SYSTEM (MATCALS) INVESTIGATION
E. R. Graf, Charles L. Phillips, and Scott A. Starks Apr. 1981 184 p refs Sponsored in part by Georgia Inst. of Technology, Atlanta
(Contract N00039-80-C-0032)
(AD-A107384) Avail: NTIS HC A09/MF A01 CSCL 17/7

The report is organized into three main sections, namely Part Two, Part Three, and Part Four. Part Two contains the results of an investigation into replacing the alpha-beta filter in the MATCALS digital controller with an observer, in order to reduce the effects of radar noise. Part Three presents a centroid algorithm based up return amplitude-versus-angle signature. Part Four presents an investigation of adaptive filtering algorithms for the MATCALS system. GRA

N82-27261# Ohio Univ., Athens. Dept. of Electrical Engineering.
EFFECTS OF HIGH VOLTAGE TRANSMISSION LINES ON NON-DIRECTIONAL BEACON PERFORMANCE Final Report, Jun. 1980 - Oct. 1981
Ismail Ibrahim and Raymond Luebbers Washington FAA Oct. 1981 184 p refs
(Contract DTFA01-80-C-10072)
(AD-A112311; QUEE-FAA-1-2; FAA-RD-81-82) Avail: NTIS HC A09/MF A01 CSCL 17/7

The potential for high-voltage transmission lines to interfere with the operation of non-directional beacons through the mechanisms of coronagenerated radio noise or passive reradiation of the desired signal has been assessed by use of computer prediction models. The generated noise levels were calculated for both AC and DC lines using methods found in the appropriate literature which have previously been compared with measured data. The reradiated signal levels were computed using a moment-method wire model computer program. This approach was validated by measurements made and reported herein. For all situations considered, it was concluded that locating an NDB near a high-voltage transmission line should not impair the function of the NDB due to either corona noise or passive reradiation from the line. GRA

N82-27262# Center for Naval Analyses, Alexandria, Va. Operations Evaluation Group.
A RESULT IN THE THEORY OF SPIRAL SEARCH
Walter R. Nunn Mar. 1980 16 p refs
(Contract N00014-76-C-0001)
(AD-A112481; CNA-PP-274) Avail: NTIS HC A02/MF A01 CSCL 17/7

This note presents a result in the theory of spiral search which does not seem to be available in the literature in spite of its straightforward derivation and obvious applicability in certain types of 'real life' search problems. The result gives the probability of detection as a function of time for a class of prior distributions of search-object, i.e. target, position centered at the origin of the x,y plane. We restrict attention to a spiral-type search in which the searcher covers the AOU(area of uncertainty) in concentric rings, moving out from the center. In the common case that the prior density is circular normal, the time to detection is seen to be approximately exponentially distributed. This is a somewhat counter-intuitive result in that the detection rate is constant, since it would appear that detection rate must decrease with time as the searcher moves from high probability areas to low probability areas. GRA

N82-27263# Federal Aviation Administration, Atlantic City, N.J.
MICROWAVE LANDING SYSTEM FLARE SUBSYSTEM TEST Data Report, period ending Apr. 1979
Carl B. Jezierski Oct. 1981 43 p refs
(FAA Proj. 075-725-420)
(AD-A107327; FAA-CT-81-61) Avail: NTIS HC A03/MF A01 CSCL 17/7

Microwave Landing System (MLS) Flare subsystem performance data were collected on a specially instrumented Federal Aviation Administration (FAA) Technical Center aircraft. The airborne data were compared with a theodolite tracking system reference and error plots generated. Due to extensive lightning damage only two flight tests were performed. Flare subsystem accuracy could not be determined because of insufficient data. Author (GRA)

N82-27264# Federal Aviation Administration, Atlantic City, N.J.
HIGH-SPEED ROTARY PRINTING DEVICE FOR AIR TRAFFIC CONTROL APPLICATIONS: A PRELIMINARY EVALUATION Final Report, Aug. 1980 - Apr. 1981
Gerard Spanier Oct. 1981 16 p
(AD-A107325; FAA-CT-81-59; FAA/RD-81/73) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report describes a unique, high-speed rotary printing device evaluated by the Federal Aviation Administration (FAA) Technical Center to determine potential applicability in air traffic control (ATC) work stations. The report discusses general performance of the unit, basic ATC operational problems being addressed by the study, concepts of application, and future activities for more comprehensive evaluations in simulated and real work station environments. Author (GRA)

N82-27265# Federal Aviation Administration, Atlantic City, N.J.
SURVEILLANCE SIMULATION TESTING OF TERMINAL AND EN ROUTE MODE S SENSORS Interim Report, Apr. - Aug. 1980
Robert B. Frack Jan. 1982 66 p
(FAA Proj. 034-241-510)
(AD-A112250; DOT/FAA/CT-81/16) Avail: NTIS HC A04/MF A01 CSCL 17/7

A test and evaluation (T&E) was conducted to determine the surveillance characteristics of the Mode S (formerly the Discrete Address Beacon System (DABS) en route and terminal sensors operating with effective receive beam widths of 2.4 deg. and 3.4 deg. The tests were conducted at the FAA Technical Center for terminal and enroute Mode S configurations having maximum ranges of 60 and 200 nautical miles (nmi), respectively. Surveillance loading was simulated using an aircraft reply and interference environment simulator (ARIES) to provide Mode S, Air Traffic Control Radar Beacon System (ATCRBS), or a mixture of the two types of aircraft. Surveillance characteristics were measured by determining the percent detection, blip scan ratio, Mode 3/A and C reliability, Mode S identifier (ID) reliability, and the number of replies per report or interrogations per scan for both types of aircraft. It was concluded that increasing the effective receive beam width had negligible impact on the surveillance characteristics of either sensor operating with simulated Mode S targets. Increasing the effective receive beam width improved the percent detection and Mode C reliability for both sensors operating with simulated ATCRBS targets. GRA

N82-27266# Federal Aviation Administration, Atlantic City, N.J.
MODE S SYSTEM ACCURACY Final Report, Jun. - Oct. 1980
Clifford Chapman and Joseph J. Brady Feb. 1982 69 p refs
(FAA Proj. 034-241-510)
(AD-A112249; FAA-CT-81-67; FAA-RD-81-90) Avail: NTIS
HC A04/MF A01 CSCL 17/7

A series of flight tests were performed using three Mode S (formerly the Discrete Address Beacon System (DABS)) sensors for the purpose of determining the capability of each sensor in reporting the true position of an aircraft. For both the Mode S and the Air Traffic Control Radar Beacon System (ATCRBS) mode of operation, slant range, and azimuthal position data, as reported by each sensor, were compared to positional data collected concurrently by a precision range instrumentation system at the Federal Aviation Administration (FAA) Technical Center. GRA

N82-27267# Federal Aviation Administration, Atlantic City, N.J.
DESIGN AND IMPLEMENTATION OF EFFICIENT ALGORITHMS FOR AUTOMATIC DETERMINATION OF CORRECTED SLANT RANGE Final Report
D. W. Stout and R. G. Mulholland Feb. 1982 22 p refs
(FAA Proj. 975-200-10A)
(AD-A112246; FAA-CT-81-30) Avail: NTIS
HC A02/MF A01 CSCL 17/7

This report introduces a systematic approach to the design of algorithms for evaluating the corrected slant range in a radar surveillance system. Applications include air traffic control (ATC) operations requiring real-time continuous comptutation for a multitude of targets without overtaxing available computational resources. From the point of view of accuracy, utilization of memory, and computational speed, the design technique is capable of providing an algorithm that is superior to the corrected slant range technique presently employed in the National Airspace System (NAS). Author (GRA)

N82-27268# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
TERMINAL AIR TRAFFIC CONTROL WITH SURVEILLANCE DATA FROM THE MODE S SYSTEM: RESULTS OF SYSTEM DEMONSTRATIONS TO FIELD CONTROLLERS Final System Demonstration Report, period ending May 1981
Verne Tallio and Haim Gabriali Feb. 1982 76 p refs
(Contract DTFA01-81-C-10001)
(AD-A112632; MTR-81T7; DOT/FAA/CT-82/11) Avail: NTIS
HC A05/MF A01 CSCL 17/7

This report describes the results of a series of system demonstrations of a modified version of the ARTS III system (ADS2) which was developed to operate with target reports provided by the Mode S system. The demonstrations were conducted at the FAA Technical Center with field controllers from the Philadelphia ARTS III facility. The report contains a compilation of the controllers' opinions and comments on the operational characteristics of the new system. This demonstration cannot be considered a comprehensive test and evaluation effort; however, with regard to those system capabilities which were demonstrated, the controllers found no major technical or operational obstacles which would impact the system implementation in an operational environment. Author (GRA)

N82-27269# RAND Corp., Santa Monica, Calif.
AUTOPILOT: A DISTRIBUTED PLANNER FOR AIR FLEET CONTROL Interim Report
Perry W. Thorndyke, David McArthur, and Stephanie Cammarata Jul. 1981 34 p refs
(Contract MDA903-78-C-0029; ARPA Order 3460)
(AD-A107139; RAND/N-731-ARPA) Avail: NTIS
HC A03/MF A01 CSCL 17/7

Distributed planning requires both architectures for structuring multiple planners and techniques for planning, communication, and cooperation. We describe a family of systems for distributed control of multiple aircraft, in which each aircraft plans it own flight path and avoids collisions with other aircraft. AUTOPILOT, the kernel planner used by each aircraft, comprises several processing experts that share a common world model. These experts sense the world, plan and evaluate flight paths, communicate with other aircraft, and control plan execution. We discuss four architectures for the distribution of airspace management and planning responsibility among the several aircraft occupying the airspace at any point in time. The architecture differ in the extent of cooperation and communication among aircraft. Author (GRA)

N82-27270# RAND Corp., Santa Monica, Calif.
SCENARIOS FOR EVOLUTION OF AIR TRAFFIC CONTROL
Robert Wesson, Kenneth Solomon, Randall Steeb, Perry W. Thorndyke, and Keith Wescourt Nov. 1981 82 p refs
(Contract MDA903-81-C-0211)
(AD-A112566; RAND/R-2698-FAA) Avail: NTIS
HC A05/MF A01 CSCL 17/7

To accommodate the predicted demand for air traffic service in the year 2000, computer technology must augment human control skills. Preliminary laboratory studies have demonstrated that computer programs can track aircraft, predict their future paths, generate conflict-free clearances, and monitor them for compliance-all automatically. This technology could automate most routine ATC tasks and could change the human role in ATC to that of a system manager. How to make the transition to such a system from the present one and exactly what the future specialist's role would be are the issues addressed by this report. We present three scenarios that delineate a spectrum of transition plans: a Baseline scenario in which the human controller's role is emphasized; and AERA (Automated En Route ATC) scenario in which computers assume the primary control responsibility and perform most ATC functions autonomously; and a Shared Control scenario in which automated, individually invokable modules assist a human specialist who retains the primary responsibility for control. GRA

N82-27271# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
GYRO SYSTEMS (SELECTED PAGES)
D. S. Pelpor 19 Mar. 1982 87 p Transl. into ENGLISH of the mono. "Giroskopicheskiye Sistemy" Moscow, 1971 p 5-12, 97-105, 281-293, 431-436, 475-485
(AD-A113748; FTD-ID(RS)T-1768-81) Avail: NTIS
HC A05/MF A01 CSCL 17/7

Operating principles are discussed for: (1) differentiating and integrating gyroscopes; (2) gyrostabilizers; (3) course gyros and gyroscopic sensors of the direction of the true vertical; and (4) inertial systems. Schematics are provided of each of these means for control of aircraft, rockets, and spacecraft as well as of their onboard instruments. A diagram of the layout of gyroscopes on the platform of a three dimensional space gyrostabilizer is included. A.R.H.

N82-27272# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
GRAVITY INDUCED POSITION ERRORS IN AIRBORNE INERTIAL NAVIGATION
Klaus-Peter Schwarz Dec. 1981 60 p refs
(Contract F19628-79-C-0075; AF Proj. 7600)
(AD-A113823; Rept-326; AFGL-TR-82-0030; SR-11) Avail: NTIS HC A04/MF A01 CSCL 17/7

The report investigates the feasibility of improving airborne inertial navigation by use of gravity field approximations which are more accurate than the normal model presently applied. The effect of the anomalous gravity field on positioning is investigated by using a simplified dynamical error model and by deriving analytical expressions for the steady state error via the state space approach. In this approach, changes in the anomalous gravity field are cast into the form of first-order differential equations which are related to a position dependent covariance representation of the gravity field by way of the vehicle velocity. Different possibilities for a state space model of the anomalous field are discussed. The procedure chosen combines the consistency of the Tscherning-Rapp model with the advantages of a formulation in terms of Gauss-Markov processes by making use of the essential parameters of a covariance function proposed by Moritz. The expressions for the gravity induced position errors resulting from this approach are easy to compute for a wide variety of cases. The assumptions made to derive them are in general justifiable. Based on the available gravity field information a number of approximation models are proposed and expressed in terms of equivalent spherical harmonic expansions. Results show that the use of presently available global models would reduce the gravity induced position errors from Sigma = 150 m. Improved global models expected in the near future as for instance those from the GRAVSAT mission, would bring errors below Sigma = 50 m. GRA

N82-27273# Army Missile Command, Redstone Arsenal, Ala. Systems Simulation and Development Directorate.
QUASILINEARIZATION SOLUTION OF THE PROPORTIONAL NAVIGATION PROBLEM
Dale W. Alspaugh (Purdue Univ., West Lafayette, Ind.) and Maurice M. Hallum, III Jun. 1981 24 p refs
(DA Proj. 1L1-62302-A-214)
(AD-A113668; AD-E950227; DRSMI/RD-81-15-TR) Avail: NTIS HC A02/MF A01 CSCL 17/7

An approximate solution is presented in this report for the trajectory of a constant-speed missile following a planar intercept trajectory based on proportional navigation guidance. The technique of quasilinearization is used to generate a sequence of solutions. An explicit solution is developed using the first recursive solution. The accuracy of this solution is discussed in the context of specific sets of parameters. It is shown that this explicit solution provides excellent accuracy over a wide range of intercept trajectories. Author (GRA)

N82-27274# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.
DOPPLER TEST RESULTS OF EXPERIMENTAL GPS RECEIVER Final Report
Richard J. Anderle Jan. 1982 64 p refs
(AD-A113587; NSWC/TR-82-01) Avail: NTIS HC A04/MF A01 CSCL 08/5

Three experimental geodetic Global Positioning System Receivers were deployed in the Washington, D. C. area. Analysis of five to six hours of Doppler observations distributed among four satellites yielded relative position coordinates on a 28 km baseline which were repeatable to 30 cm in height, 70 cm in the East directions and to 10 cm in the North directions. Results obtained for a receiver equipped with an oscillator having poorer stability degraded to 50 cm to 1.5 meters. The results confirm simulations that Doppler observations made with the geodetic receiver under development will yield decimeter accuracy in relative position in one to three hours. Since the experimental receivers required about a minute to sequence between satellites, tests could not be performed to test cm precision in relative station positioning which can be obtained by comparing phase observations between satellites with receivers under development. GRA

N82-27275# Naval Coastal Systems Center, Panama City, Fla. Mine Countermeasures Development Div.
A BALANCED ACTIVE ANTENNA AND IMPULSE NOISE BLANKET SYSTEM FOR THE REYDIST T RADIO NAVIGATION RECEIVER
Bobby R. Ludlum Feb. 1982 32 p
(AD-A114074; AD-F200023; NCSC-TM-340-82) Avail: NTIS HC A03/MF A01 CSCL 17/7

Erratic operation of Raydist T radio navigation equipment aboard mine countermeasures helicopters has been traced to fuselage-tow cable interactions with the Raydist receiving antenna and to negative-corona generated impulse noise. The development of a balanced active antenna and an impulse noise blanker which have proved successful in reducing these detrimental effects are described. The final system is described in detail and the results of laboratory tests are presented. Author (GRA)

N82-27276# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
MARINE AIR TRAFFIC CONTROL AND LANDING SYSTEM (METCALS) INVESTIGATION Final Report
Robert N. Trebits, Eric S. Stoberg, Raymond B. Efurd, Benjamin Perry, and Mark A. Corbin Feb. 1982 172 p refs
(Contract N00039-80-C-0082)
(AD-A113047; GIT/EES-A-2550-FTR) Avail: NTIS HC A08/MF A01 CSCL 17/7

A television tracker system for the AN/TPN-22 radar was designed, assembled, and delivered. A cursor whose position is determined by the radar's tracking solution is superimposed on a TV camera image of the aircraft on its landing approach. Alphanumeric data also appear on the display for video tape documentation purposes. Author (GRA)

N82-27277# Mitre Corp., McLean, Va. METREK Div.
THE FLIGHT SERVICE AUTOMATION SYSTEM (FSAS) SYSTEM BENCHMARK. VOLUME 1: SUMMARY, INTRODUCTION AND CONCEPTS
R. G. Nystrom, S. Koslow, and C. R. Spooner Aug. 1981 80 p 4 Vol.
(Contract DTFA01-81-C-10001)
(PB82-143538; MTR-81W131-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 01B

A system benchmarking technology was developed to meet the requirements of an interactive, dedicated application. This methodology is applicable to procurements in which the hardware/operating system configurations are off the shelf and the applications software was not implemented in its eventual form. In this methodology, a model of the application is interfaced with the operating system and is executed, while being driven by a specified load, and performance of the proposed configuration is measured. The requirements of the FSAS application of this system benchmark methodology was documented and is published in the present form to record and the concepts and techniques of the methodology are made available. GRA

N82-27278# Mitre Corp., McLean, Va. METREK Div.
THE FLIGHT SERVICE AUTOMATION SYSTEM (FSAS) SYSTEM BENCHMARK. VOLUME 2: THE MODEL OF THE APPLICATION
C. R. Spooner Aug. 1981 344 p 4 Vol.
(Contract DTFA01-81-C-10001)
(PB82-143546; MTR-81W131-Vol-2) Avail: NTIS HC A15/MF A01 CSCL 01B

Application of a system benchmarking technology is illustrated. The model of the application is described and requirements and guidelines for mapping the model to the proposed configurations, and for selection of options in the model are provided. GRA

N82-27279# Mitre Corp., McLean, Va. METREK Div.
THE FLIGHT SERVICE AUTOMATION SYSTEM (FSAS) SYSTEM BENCHMARK. VOLUME 3: THE VENDOR INTERFACE PACKAGE
C. R. Spooner Aug. 1981 175 p 4 Vol.
(Contract DTFA01-81-C-10001)
(PB82-143553; MTR-81W131-Vol-3) Avail: NTIS HC A08/MF A01 CSCL 01B

The Vendor Interface Package (VIP) for th FSAS system is presented. It provides a standard interface for the model with the proposed system. The VIP requirements and implementation guidelines are given. GRA

N82-27280*# Operations Research, Inc., Silver Spring, Md.
BENEFIT COST ANALYSIS OF THE AIRCRAFT ENERGY EFFICIENCY PROGRAM Final Report
James Bauchspies, Frank Hopkins, and Lawrence Kaplan Nov. 1980 242 p refs Revised
(Contract NASw-2961)
(NASA-CR-169116; NAS 1.26:169116) Avail: NTIS HC A11/MF A01 CSCL 01C

Analyses were reviewed in light of rapid and dramatic changes in fuel cost and availability, as well as significant changes in the economic and political climate relating to these factors. N.W.

N82-27281# Boeing Commercial Airplane Co., Seattle, Wash. Noise Technology Dept.
AIRCRAFT NOISE REDUCTION
Richard E. Russell and J. M. Streckenbach 1981 15 p Presented at the Intern. Symp. on Transportation Noise, Pretoria, 21-23 Oct. 1981
Avail: NTIS HC A02/MF A01

A brief introduction of the Boeing commercial airliner family is followed by a discussion of the significant noise reduction accomplishments for turbine-powered aircraft from the 1950's to the 1980's, with projections of further benefits until the year 2000. Definition of the trades to be made between noise reduction and fuel economy, as well as technical problems yet unsolved, lead to a recognition that the greatest advances in aircraft noise reduction are past, and that significant research will be required in the future to lower noise floors that are presently inhibiting further progress. Emphasis is given to precautions that must be taken in the selection of meaningful fleet noise data to avoid costly and irreversible errors in airport and community planning. T.M.

N82-27282# United Technologies Corp., Stratford, Conn. Sikorsky Aircraft Div.
XH-59A ABC TECHNOLOGY DEMONSTRATOR ALTITUDE EXPANSION AND OPERATIONAL TESTS Final Report, Aug. 1980 - Jun. 1981
A. J. Ruddell Dec. 1981 79 p refs
(Contract DAAK51-80-C-0021; DA Proj. 1L1-62209-AH-76)
(AD-A111114; SER-69072; USAAVRADCOM-TR-81-D-35)
Avail: NTIS HC A05/MF A01 CSCL 01/3

This report presents the results of two flight test programs conducted with the XH-59A Advancing Blade Concept demonstra-configuration, consisted of altitude and center-of-gravity envelope expansion testing. Test results verified the concept of ope expansion testing. Test results verified the concept of developing lift primarily on the advancing rotor blades to dramatically improve lift and speed potential. The XH-59A achieved a maximum speed of 263 knots true airspeed and demonstrated a service ceiling of 25,500 feet. The entire flight envelope was demonstrated without classical retreating blade stall. Rotor loads and stresses and rotor tip clearance followed predicted trends and were controllable. Limited center-of-gravity envelope expansion was accomplished. The second program consisted of operational tests conducted primarily in the nap-of-the-earth and contour flight environments, using both the auxiliary and helicopter propulsion modes. The compact ABC design and smaller rotor diameter enhanced operation in confined areas. Operational test results showed the ABC to be a viable alternative concept for future tactical aircraft. GRA

N82-27283# Army Logistics Evaluation Agency, Cumberland, Pa.
AVIATION MATERIEL COMBAT READY IN-COUNTRY (AMCRIC)
Herman M. Orrell, III Jun. 1981 58 p refs
(AD-A107451) Avail: NTIS HC A04/MF A01 CSCL 15/5

A previous study, titled Aviation Materiel Combat Ready In-Country (AMCRIC), was provided as a basis to develop a concept to preposition Army aircraft in US Army Europe. This study recognized that aircraft are not authorized as war reserve, and that no aircraft are currently included in POMCUS in Europe. To adequately reinforce NATO, some method had to be devised to allow Army aircraft to be immediately available to a deploying combat force. The project considered: (a) Methods available to accomplish prepositioning of Army helicopters and ancillary systems; (b) South Vietnam Army aviation experience in combat; (c) State-of-the-art storage methods by US Government, foreign governments, and commercial contractors; and (d) Major command interfaces within the US Army that will be required to establish a workable concept. The project results were that US Army has the capability to store helicopters for short periods using on-hand resources; and The Vice Chief of Staff, Army, approved a prepositioning concept developed which will store helicopters in USAREUR on a test bed basis using AH-1S helicopters. GRA

N82-27284# Air Force Geophysics Lab., Hanscom AFB, Mass.
RESPONSE OF CLOUD MICROPHYSICAL INSTRUMENTS TO AIRCRAFT ICING CONDITIONS Interim Scientific Report
Morton Glass and Donald D. Grantham 6 Jul. 1981 56 p refs
(AF Proj. 6670)
(AD-A112317; AFGL-TR-81-0192; AFGL-ERP-747) Avail: NTIS HC A04/MF A01 CSCL 01/4

A series of passes on 6 December 1979 through multilayered-supercooled stratiform and stratocumulus clouds by the Air Force Geophysics Laboratory's instrumented C-130E cloud physics research aircraft is used to evaluate a Rosemount Ice Detector. The response of the detector to icing conditions is compared with measurements from a J-W liquid water content meter and the Knollenberg Axial Scattering Spectrometer Probe (ASSP). A procedure to adjust for zero drift of the J-W instrument is developed. Comparison of liquid water measurements from the J-W and from the ASSP indicate that these data are highly correlated and similar in magnitude. A procedure for extracting useful information from the Rosemount Ice detector has been developed. The icing conditions in the cloud systems studied are typical of the range of conditions in winter stratiform clouds. Liquid water (LWC) values of 0.3 g/cu m and median volume diameters of 15 micrometers were most frequently observed. The results of the analysis show that the Rosemount Ice Detector is a sensitive indicator of the fluctuations of liquid water in clouds with LWC not exceeding 0.8 g/cu m -3. Author (GRA)

N82-27285# General Accounting Office, Washington, D. C. Mission and Analysis and Systems Acquisition Div.
REDUCED PERFORMANCE AND INCREASED COST WARRANT REASSESSMENT OF THE MULTIPLE STORES EJECTOR RACK
26 Mar. 1982 6 p refs
(AD-A112776; GAO/MASAD-82-26) Avail: NTIS HC A02/MF A01 CSCL 19/2

The Air Force plans to award a contract in June 1982 for the continued development of an aircraft bomb carrier known as the Multiple Stores Ejector Rack (MSER). The rack, in development since 1976, was intended for use by certain Navy aircraft as well as several aircraft operated by the Air Force. However, we have found that: service interest in a common bomb rack has dwindled and both the Air Force and the Navy are pursuing seperate bomb rack developments; some MSER development goals may not be achieved; and other alternatives to MSER have not been fully evaluated; in addition, MSER's estimated development costs have tripled and average unit procurement costs could not be 14 times greater than the cost of the racks now in service; and the development period has more than doubled. The Air Force has basically reduced it MSER requirements to one aircraft, the F-16, and the Navy has all but pulled out of the program. Before authorizing further expenditure of funds for MSER, GAO recommends that the Air Force and Navy Secretaries be required to determine whether a common bomb rack is still needed, whether MSER will meet Air Force and Navy requirements, and whether it is cost effective. GRA

N82-27286# Systems Control, Inc., Palo Alto, Calif.
DEVELOPMENT OF LOW-ORDER MODEL OF AN X-WING AIRCRAFT BY SYSTEM IDENTIFICATION Final Report
James H. Vincent and John W. Bunnell Feb. 1982 103 p refs
(Contract N00014-79-C-0578)
(AD-A113760) Avail: NTIS HC A06/MF A01 CSCL 01/3

The original purpose of this contract was to prepare a flight test plan for the proposed X-wing demonstrator using system identification to extract useful math models from the flight test data. Since the original statement of work was submitted, however, the scope of this study changed. An X-wing program decision has been reached not to carry the Lockheed X-wing configuration to flight test. Therefore, this task was modified to provide a demonstration of the feasibility of using system identification techniques to extract low-order math models from time history data from a detailed X-wing rotor simulation (REXOR). GRA

N82-27287# Transportation Systems Center, Cambridge, Mass.
B-747 VORTEX ALLEVIATION FLIGHT TESTS: GROUND-BASED SENSOR MEASUREMENTS Final Report
D. C. Burnham Jan. 1982 188 p refs
(AD-A113621; DOT-TSC-FAA-81-19; DOT/FAA/RD-81/99)
Avail: NTIS HC A09/MF A01 CSCL 20/4

In 1979, a series of B-747 flight tests were carried out to study the wake-vortex alleviation produced by deploying spoilers in the landing configuration. The alleviation achieved was examined by encounters of probe aircraft and by velocity profile measurements made by a ground-based Laser Doppler Velocimeter. For the first time these two types of measurements were analyzed in a way which allowed direct comparison; they showed reasonable agreement. The velocimeter measurements can be used to evaluate the vortex-induced rolling moment on any following aircraft at any separation. The spoiler alleviation was found to be insufficient to assure safe landings of small aircraft at reduced separation behind the B-747. The persistence of the alleviated vortices appears to be due to the wing-tip vortices which dominate the roll-up of the spoiler-alleviated wake. The addition of rapid roll inputs to the spoiler deployment produced much more effective alleviation, but at the expense of an unacceptable ride quality in the generating aircraft. Author (GRA)

N82-27288# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.

COMPARISON OF DIFFERENT FIGHTER AIRCRAFT LOAD SPECTRA

Aake Magnusson 1982 16 p refs
(Contract F-INK-82223-77-001-21-001)
(FFA-TN-1982-02) Avail: NTIS HC A02/MF A01

Open hole specimens, made from 3 mm thick aluminum 7075-T6 [3627-48] clad sheet, were subjected to fighter aircraft load spectra. The influence on fatigue life of spectrum variations, e.g., severe negative maneuver loads, maximum load truncation and cycle omission was studied. Six load spectra, including fighter aircraft loading standard for fatigue evaluation (FALSTAFF) and a cycle truncated version of FALSTAFF, containing 9006 cycles per 200 flights, i.e., half the original number, were investigated. Severe negative maneuver loads as well as maximum load truncation reduce the fatigue life. Truncated FALSTAFF produces the same fatigue life as the original sequence. Author (ESA)

N82-27289# Advanced Engineering Lab., Salisbury (Australia).

COMPOSITE FLIGHT TEST BOOM FOR NOMAD N22B AIRCRAFT

N. C. Frost Nov. 1981 20 p refs
(AEL-0086-TM; AR-002-598) Avail: NTIS HC A02/MF A01

The design, analysis and manufacturing processes are described for an instrumentation nose boom for a flight test program on the Nomad aircraft. Author

N82-27290# Naval Ship Research and Development Center, Bethesda, Md. Central Instrumentation Dept.

CORRECTING FOR TURBULENCE EFFECTS ON AVERAGE VELOCITY MEASUREMENTS MADE USING FIVE HOLE SPHERICAL PITOT TUBE PROBES

Robert D. Pierce Feb. 1982 32 p refs
(AD-A112573; DTNSRDC/CID-82/1) Avail: NTIS HC A03/MF A01 CSCL 14/2

A procedure has been developed for correcting five hole spherical pitot tube mean velocity measurements for errors caused by velocity fluctuations associated with turbulent flow. Velocity fluctuations are independently measured with hot film or hot wire anemometers. These data are then applied to expressions derived in this report to accomplish the necessary correction. This procedure applies to the case where the pitot tube responds to average pressure differentials and is not oriented to null the cross velocity components. For the special case of isotropic flow, the results derived in this report show that corrections are not required. Author (GRA)

N82-27291# Federal Aviation Administration, Atlantic City, N.J. Technical Center.

COCKPIT DISPLAY OF TRAFFIC INFORMATION AND THE MEASUREMENT OF PILOT WORKLOAD: AN ANNOTATED BIBLIOGRAPHY Final Report, 1970 - 1982

Jacqueline T. Rehmann Feb. 1982 62 p
(AD-A113637; DOT/FAA/CT-81/49; DOT/FAA/EM-81/9)
Avail: NTIS HC A04/MF A01 CSCL 01/3

Approximately 80 references relating to pilot workload were selected and summarized as part of the Cockpit Display of Traffic Information (CDTI) studies currently being conducted by the Federal Aviation Administration Technical Center in Atlantic City, New Jersey. A comprehensive search of the scientific literature was conducted using several sources, including books, scientific journals, proceedings of technical meetings, and computerized information retrieval. Specific topics covered on this annotated bibliography, as they related to CDTI and its concomitant workload considerations, are subjective measures, spare mental capacity, primary task measures, and physiological measures. Author (GRA)

N82-27292# AOA Apparatebau Gauting G.m.b.H. (West Germany).

TORSIONAL STIFFNESS ELEMENT BASED ON COBALT-SAMARIUM MAGNETS Final Report

Rainer Osthermayer Bonn Bundesministerium fuer Forschung und Technologie Dec. 1981 70 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-81-044; ISSN-0170-1339; Rept-4.1.0032) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,70

The feasibility of a strapdown turn and bank indicator with an electromagnetic torsional stiffness element based on cobalt samarium permanent magnets was investigated. Characterization of the suitability of this magnetic material in fulfilling design requirements was stressed. Theoretical fundamentals for the tailoring of magnetic heads were reviewed. Cobalt samarium disks were magnetized axially in such a way that over a range of 18 deg a linear relationship between magnetic induction and the axial deviation angle exists. With these magnets, electromagnetic torsional stiffness elements were built in which the torsion constant is adjustable by the current. Alternative torsional stiffness elements with constant magnetization, but specific profiling of the magnets as well as magnets in connection with a specific current were also studied on a model for dynamic applications. Results validate the mechanical torsional stiffness element design and confirm the magnetic properties of cobalt samarium. Author (ESA)

N82-27293# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

IMPACT OF ADVANCED AVIONICS TECHNOLOGY AND GROUND ATTACK WEAPON SYSTEMS

Feb. 1982 147 p refs Meeting held at Agheos-Andreas, Greece, 19-23 Oct. 1981
(AGARD-CP-306; ISBN-92-835-0310-4) Avail: NTIS HC A07/MF A01

Autonomous operations conducted by day, night, and in adverse weather are associated with a high degree of automation, requiring sensors with high performance and a large data and signal processing capacity. The vulnerability of attack aircraft to the ground to air defense and the excessive workload of the pilot in the guidance of air to ground weapons point to the concept of a generation of fire and forget weapons.

N82-27294# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. Deputy for Avionics Control.

IMPACT OF ADVANCED AVIONICS AND MUNITIONS TECHNOLOGY ON GROUND ATTACK WEAPONS SYSTEMS IN NIGHT AND ADVERSE WEATHER CONDITIONS

Louis J. Urban *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 4 p (For primary document see N82-27293 18-06)
Avail: NTIS HC A07/MF A01

Worldwide environmental conditions that may be encountered by fighter pilots are reviewed as well as the capabilities of potential adversaries. Technology efforts and systems developed to improve capability to operate at night and under unfavorable weather conditions discussed include advanced medium range air-to-air missiles, the PAVE TACK system used on the F-4 and F-111 aircraft, and the low altitude navigation and targeting infrared system for night (LANTIRN) which assists the pilot of a single seat aircraft to fly under the weather in night and helps in acquiring targets and readying weapons for launch. To complement LANTIRN, high resolution synthetic aperture tactical radar and millimeter wave radars are under development to improve target recognition, resolution, and navigation. The precision location strike system, imaging infrared Maverick, combined effects bomblets, GATOR air delivered mines, and wide area antiarmor munitions are other developments summarized. A.R.H.

N82-27295# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

AIR-GROUND ATTACK: AXES OF RESEARCH FOR AIRBORNE SYSTEMS [ATTAQUE AIR-SOL: AXES DE RECHERCHE POUR LES SYSTEMES AEROPORTES]

S. Croce-Spinelli *In its* Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 14 p In FRENCH (For primary document see N82-27293 18-06)
Avail: NTIS HC A07/MF A01

The integration of weapons systems with other airborne systems and equipment is considered from the point of view of operational aspects. Various weapons and their fire control characteristics are classed and the requirements and possibilities offered for meeting them are tabulated. Target acquisition, mission constraints, and versatility of mission are examined. Strapdown inertial guidance, radio altimeters, radar maps, electro-optics, and multiple access transmission networks are discussed. Systems for very low altitude flight and threat evaluation are described. Transl. by A.R.H.

N82-27296# British Aerospace Aircraft Group, Kingston-upon-Thames (England).

SOME POTENTIAL NOVEL APPROACHES TO THE AUTOMATIC AIRBORNE DETECTION AND IDENTIFICATION OF GROUND TARGETS

J. S. Williams *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 13 p refs

Avail: NTIS HC A07/MF A01

Basic sensor processing functions are examined in an effort to establish the type of operation to be conducted optically. If optical techniques are to be used in target detection and identification, interfaces must be minimized in order to reduce the size of the device used, improve reliability and inspectability, and conserve signal power during processing. Topics covered include receiving optics, optical signal decomposition, image preprocessing, display prepreparation, acquisition computation, and range and bearing. Coherent transform optics, holographic methods, optical feedback, real-time processing, and optical bistable devices are discussed as processing elements. Although optical signal processing has considerable potential in airborne target recognition, considerable research is needed in this capability is to be realized. There is a need to support this activity with adequate modelling of the perception capability of the human visual system if information is to properly displayed and then utilized. A.R.H.

N82-27297# National Aerospace Lab., Amsterdam (Netherlands).

A PLANNING SYSTEM FOR F-16 AIR-TO-SURFACE MISSIONS

P. J. M. Urlings, W. Loeve, and J. Batenburg (Royal Netherlands Air Force, Zeist) *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 6 p refs

Avail: NTIS HC A07/MF A01

Recently introduced into the Royal Netherlands Air Force, the F-16 aircraft is to be employed in both air-to-air and air-to-surface operations. Successful air-to-surface mission accomplishment is highly dependent on the avionics system capabilities as navigation, target acquisition, fire control, and weapons delivery. To make use of the full avionic potential, the set-up of its systems requires careful planning and preflight preparation. Checklists must also be prepared for navigation and in-flight system operation. A concept for a mission planning system is presented to provide the F-16 pilot with a tool for performing adequate preparation. Specific F-16 avionic demands on mission planning are summarized and two systems related to this planning are described. The assembling of F-16 in-flight essentials into a combat mission folder is described. A.R.H.

N82-27298# Hughes Aircraft Co., El Segundo, Calif. Advanced Programs Lab.

PAVE MOVER AIDED INTEGRATED STRIKE AVIONICS SYSTEM

A. J. Mendez, T. A. DuPuis (AFWAL), and J. Boar *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 6 p refs

Avail: NTIS HC A07/MF A01

Methods were developed for specifying targeting sensor performance based on tactics and weapons characteristics alone. Targeting sensor specifications (demand curves) developed in this manner indicate that, for quick reaction, short range attack with precision-guided munitions, single sensors do not generate sufficient confidence (supply curves) to satisfy the required timeliness. This problem is alleviated by treating all sensors as an integrated set - the ISAS concept. New tactics produce sudden encounters which do not always yield a favorable attack geometry, even if the ISAS is able to distinguish the high priority targets in its field of regard. This situation is greatly improved by real-time targeting data from a stand off target acquisition/control system such as Pave Mover. Maximum benefit from the new tactics and weapon delivery concepts is accrued by pairing the complementary capabilities of ISAS and Pave Mover. This combination optimizes the strike effectiveness and survivability of ground attack aircraft which must penetrate to the battlefield and deep interdiction regions. A.R.H.

N82-27299# AEG-Telefunken, Ulm (West Germany).

ADAPTIVE MULTIFUNCTION SENSOR CONCEPT FOR AIR-GROUND MISSIONS

R. P. Mills-Goodlet, D. J. R. Stock, E. G. Woelfle, and C. Hamilton *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 13 p refs

Avail: NTIS HC A07/MF A01

The requirements imposed on a radar system it is to be installed in aircraft flying low-level interdiction missions are discussed. A typical low low-level air-ground attack scenario is described together with the various radar techniques and modes that must be employed. Particular attention is given to the nose radar, its antenna, and its integration with other aircraft sensors to form an adaptive multisensor system. The ways in which such a multisensor system can reduce pilot workload are examined. A.R.H.

N82-27300# Naval Air Systems Command, Washington, D. C.

ATTACK AND EN ROUTE AVIONICS FOR IN-WEATHER OPERATIONS

E. B. Beggs, W. F. Ball (Naval Weapons Center, China Lake, Calif.), and N. J. Schneider (Naval Weapons Center, China Lake, Calif.) *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 11 p

Avail: NTIS HC A07/MF A01

An increasingly sophisticated and lethal ground threat environment must be countered in large part by technological advances in the avionics of naval attack aircraft. Critical deficiencies exist in the areas of standoff targeting and weapon delivery, defense suppression, equipment reliability, and crew loading. To reduce pilot workload, automated procedures and decision aids must be developed. Technology must be made available for precise navigation, integration of weapon delivery and flight control systems, automatic target recognition, detection avoidance, automatic flight path routing, and secure communications. The ingress and egress phases of naval air missions are discussed as well as the attack phase and defense suppression. Author

N82-27301# Electronique Marcel Dassault, St. Cloud (France).

WEAPON SYSTEM OF A FUTURE ATTACK AIRCRAFT [SYSTEME D'ARME D'UN AVION D'ATTAQUE FUTUR]

B. E. Bortomb *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 11 p refs In FRENCH

Avail: NTIS HC A07/MF A01

A hypothetical all-weather air-to-surface weapon system is presented which is adaptable to a single seat aircraft whose weight without armor would be on the order of 4 tons. It would appear that this system requires a precise predesignation of objectives, so that it can then fulfill its mission with good chances of success by day as well as by night, through diverse fogs and relatively important precipitation, conditions which cover 89% of the cases in which it is used. Transl. by A.R.H.

N82-27302# British Aerospace Public Ltd. Co., Preston (England).

ADVANCED TECHNOLOGY AND FIGHTER COCKPIT DESIGN: WHICH DRIVES WHICH?

I. E. Schofield *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 10 p

Avail: NTIS HC A07/MF A01

Problems experienced by the ground attack fighter pilot are reviewed, and the design of an acceptable man machine interface in the cockpit in order to ensure maximum head up operation for low level flying is discussed. The present use of automation and CRT displays is reviewed. Problems in the employment of increased automation, direct voice input, and synthetic speech, and their integration into the avionics system are considered. The use of multifunction displays and controls, keyboards, and the more traditional switchery is discussed. J.D.

N82-27303# Army Armament Research and Development Command, Dover, N. J.

DIGITAL IMAGE PROCESSING FOR ACQUISITION, TRACKING, HAND OFF AND RANGING

Robert R. Marinellie and John V. Spangler *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 12 p refs

Avail: NTIS HC A07/MF A01

The design, application, and preliminary analysis of flight test results of the AUTO-Q digital image processor for the automatic recognition of targets in reconnaissance images are discussed. The problems of information extraction from and bandwidth reduction in raw sensor data and the way they lead to the evolution of a common preprocessing approach are considered. The image processing tasks involved in target acquisition, tracking, and handoff are described. The basic concepts and algorithms in AUTO-Q are presented, and the volution of three generations of digital hardware described. A description of the electrical and mechanical characteristics of the latest system is presented. J.D.

N82-27304# Marconi Avionics Ltd., Rochester (England). Airborne Display Div.
WIDE ANGLE RASTER HEAD UP DISPLAY DESIGN AND APPLICATION TO FUTURE SINGLE SEAT FIGHTERS
David W. Hussey *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 8 p refs

Avail: NTIS HC A07/MF A01

Unconventional optical design capable of the largest practical field of view, around 20 degrees by 30 degrees for the majority of existing fighter cockpits are described. Some auxiliary advantages implicit in the designs are also outlined. Head up displays of this type are currently in development for the USAF LANTIRN program to be flown in the F-16 and A-10. They are also compatible with a wide range of other fighter aircraft. J.D.

N82-27305# Army Night Vision Lab., Fort Belvoir, Va.
ADVANCED TARGET ACQUISITION AND TRACKING CONCEPTS FOR REAL TIME APPLICATIONS
John Thomas Hall *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 7 p refs

Avail: NTIS HC A07/MF A01

The basic functional requirements for the target acquisition mission based on the sensor input, preprocessing, image segmentation, feature extraction, target detection, and target classification operations are presented. The impact on designing real time tracking algorithms to follow targets through clutter is considered. An advanced tracking concept considering the coupling of the target detection/classification algorithm with the multimode track is discussed. The thrust for multisensor systems is considered from the synergistic target acquisition point of view. The implementation of smart sensor target acquisition functions is presently limited by hardware capabilities. The advancement in the very high speed dedicated integrated circuit technology will make present advanced algorithms realizable in integrated circuit hardware. The projected needs for real time target acquisition and tracking are considered for the autonomous vehicle. Several approaches are considered for realization of the truly real time target acquisition system in the next decade. J.D.

N82-27306# Rome Air Development Center, Griffiss AFB, N.Y.
TACTICAL SYSTEMS APPROACH TO INTERDICTION OF 2ND ECHELON MOVING TARGETS USING REAL TIME SENSORS
Martin J. Biancalana and Henry J. Mancini (GE, Utica, N.Y.) *In* AGARD Impact of Advan. Avionics Technol. on Ground Attack Weapon Systems Feb. 1982 9 p refs

Avail: NTIS HC A07/MF A01

An integrated system architecture for the effective interdiction of second echelon ground forces which are advancing under the cover of intense EW and air defense protection is described. The proposed architecture is based on principles derived from control theory and present practice, and includes the use of advanced air to surface and surface to surface quasi-autonomous attack elements operating in a complementary manner with stand off target acquisition and track sensors. All of the necessary elements of such an advanced architecture are in fact in various stages of development today. Author

N82-27309*# Pratt and Whitney Aircraft Group, East Hartford, Conn.
PERFORMANCE DETERIORATION DUE TO ACCEPTANCE TESTING AND FLIGHT LOADS; JT9D JET ENGINE DIAGNOSTIC PROGRAM
W. J. Olsson 22 Jan. 1982 147 p refs
(Contract NAS3-20632)
(NASA-CR-165572; NAS 1.26:165572; PWA-5512-87) Avail: NTIS HC A07/MF A01 CSCL 21E

The results of a flight loads test of the JT9D-7 engine are presented. The goals of this test program were to: measure aerodynamic and inertia loads on the engine during flight, explore the effects of airplane gross weight and typical maneuvers on these flight loads, simultaneously measure the changes in engine running clearances and performance resulting from the maneuvers, make refinements of engine performance deterioration prediction models based on analytical results of the tests, and make recommendations to improve propulsion system performance retention. The test program included a typical production airplane acceptance test plus additional flights and maneuvers to encompass the range of flight loads in revenue service. The test results indicated that aerodynamic loads, primarily at take-off, were the major cause of rub-indicated that aerodynamic loads, primarily at take-off, were the major cause of rub-induced deterioration in the cold section of the engine Differential thermal expansion between rotating and static parts plus aerodynamic loads combined to cause blade-to-seal rubs in the turbine. B.W.

N82-27310*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
CORE COMPRESSOR EXIT STAGE STUDY, VOLUME 6 Final Report, Oct. 1976 - Dec. 1981
D. C. Wisler Dec. 1981 97 p refs
(Contract NAS3-20070)
(NASA-CR-165554; NAS 1.26:165554; GE-R81AEG288) Avail: NTIS HC A05/MF A01 CSCL 21E

Rear stage blading designs that have lower losses in their endwall boundary layer regions were studied. A baseline Stage A was designed as a low-speed model of stage 7 of a 10-stage compressor. Candidate rotors and stators were designed which have the potential of reducing endwall losses relative to the baseline. Rotor B uses a type of meanline in the tip region that unloads the leading edge and loads the trailing edge relative to the baseline rotor A designs. Rotor C incorporates a more skewed (hub strong) radial distribution of total pressure and smoother distribution of static pressure on the rotor tip than those of rotor B. Candidate stator B embodies twist gradients in the endwall region. Stator C embodies airfoil sections near the endwalls that have reduced trailing edge loading relative to stator A. The baseline and candidate bladings were tested using four identical stages to produce a true multistage environment. Single-stage tests were also conducted. The test data were analyzed and performances were compared. Several of the candidate configurations showed a performance improvement relative to the baseline. A.R.H.

N82-27311*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
QCSEE UNDER-THE-WING ENGINE ACOUSTIC DATA
Harry E. Bloomer and Nick E. Samanich May 1982 28 p refs
(NASA-TM-82691; E-972; NAS 1.15:82691) Avail: NTIS HC A03/MF A01 CSCL 21E

Both an over-the-wing (OTW) and an under-the-wing (UTW) experimental engine are discussed. The UTW engine had a variable-geometry fan exhaust nozzle and a variable-pitch fan that provided quick-response reverse thrust capability. An automatic digital control enabled optimal engine operation under all steady-state conditions as well as during forward and reverse thrust transient operation. The engine was tested at the Engine Noise Test Facility alone and with wind and flap segments to simulate an installation on a short-haul transport aircraft. The engine acoustic configuration was varied to give 14 test configurations. All of the acoustic test results from the UTW program at Lewis are presented as 1/3-octave-band sound pressure level (SPL) tabulations for all of the test points and some narrow-band spectra and 1/3-octave-band data plots for selected conditions. T.M.

N82-27312# Naval Ship Research and Development Center, Bethesda, Md.
PROCEEDINGS OF THE 12TH NAVY SYMPOSIUM ON AEROBALLISTICS, VOLUME 2
14 May 1981 366 p refs Symp. held at Bethesda, Md., 12-14 May 1981 2 Vol.
(AD-A111783) Avail: NTIS HC A16/MF A01 CSCL 20/4

Contents: Current Status of Inlet Flow Prediction Methods; Rotational Flow in a Curved-Wall Diffuser Designed by Using the Inverse Method of Solution of Potential Flow Theory; Aerodynamic Characteristics of a Series of Airbreathing Missile Configurations; Parabolized Navier-Stokes Predictions for Three-Dimensional Viscous Supersonic Flows; Results of a

Government and Industry Survey of the Heating Methods Used to Determine Missile Structural Temperatures; Supersonic Combustor Insulation Ablation Analysis and Tests; Computation of Three-Dimensional Viscous Flow over Blunt Lifting Bodies at High Angle of Attack; Computation of Hypersonic Laminar Viscous Flow over a Body with Mass Transfer and/or Spin at Angle of Attack; Three-Dimensional Viscous Shock-Layer Analysis of Laminar or Turbulent Flows in Chemical Equilibrium; Further Development of the Streamline Method for Determination of Three-Dimensional Flow Separation; Comparison of Numerical Results and Measured Data for Smooth and Indented Nosetips; Structural and Electrical Performance Considerations in the Design of Multiband Radomes; and Structural Considerations for the Recovery of Air-to-Air Missiles. GRA

N82-27313# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
FOREIGN OBJECT IMPACT DESIGN CRITERIA, VOLUME 2 Interim Technical Report, 31 Dec. 1977 - 31 Dec. 1978
Albert F. Storace Wright-Patterson AFB, Ohio AFAPL Feb. 1982 73 p refs
(Contract F33615-77-C-5221; AF Proj. 3066)
(AD-A112701; R78AEG180-Vol-2; AFAPL-TR-78-81-Vol-2)
Avail: NTIS HC A04/MF A01 CSCL 21/5

The program objective is to establish specific design criteria and provide the analytical design tools to assess and improve the foreign object damage tolerance of turbine engine fan and compressor blading. This program will aid in the design of more efficient damage-tolerant blading through the replacement of trial and error FOD test and evaluation practices with systematic transient structural analysis methods, test procedures and design criteria. A design system structure was completed and initial versions of the preliminary and final design transient structural response computer programs were developed. In addition, the interface between the bird loading model and the final design response model was completed. Three first stage blades were selected for modeling and testing. Tests and analyses to be used to generate local and gross structural damage design data are in progress and planning was completed for structural element impact tests. Composite and metallic specimens for local and gross damage testing were designed and most of these specimens have been fabricated. A parametric matrix to guide the analyses and validation testing was completed and FOD design criteria goals were formulated for consideration in the program. Author (GRA)

N82-27314# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
FOREIGN OBJECT IMPACT DESIGN CRITERIA, VOLUME 3 Interim Technical Report, 31 Dec. 1978 - 31 Dec. 1979
Albert F. Storace Wright-Patterson AFB, Ohio AFAPL Feb. 1982 134 p refs
(Contract F33615-77-C-5221; AF Proj. 3006)
(AD-A112447; AFAPL-TR-78-81-Vol-3) Avail: NTIS HC A03/MF A01 CSCL 21/5

Specific design criteria were established and the analytical design tools were provided to assess and improve the foreign object damage (FOD) tolerance of turbine engine fan and compressor blading. Efficient, damage tolerant blading is designed by replacing trial and error FOD test and evaluation practices with systematic transient structural analysis methods, test procedures, and design criteria. A design structure was developed for the purposes of providing a consistent framework in which to constitute the design criteria, guiding the overall technical effort, and formulating a data foundation to define the problem environment. The transient-structural-response and interactive-loading models were developed. Local and structural impact testing, material property determination, error band analysis, and the formulation of design criteria were addressed. The properties for the metallic materials were established, and testing is underway to establish the properties for the composite materials. GRA

N82-27315# Virginia Univ., Charlottesville. Dept. of Mechanical Engineering.
THE SCHLADITZ FUEL INJECTOR: AN INITIAL PERFORMANCE EVALUATION WITHOUT BURNING Final Report, 1 Sep. 1977 - 28 Feb. 1979
G. B. Matthews, J. E. Scott, K. A. Harvey, Jr., and J. Z. Colt, Jr. Mar. 1982 96 p refs
(Contract N00014-77-C-0564)
(AD-A113612; UVA/525335/MAE78/101R) Avail: NTIS HC A05/MF A01 CSCL 21/5

The Schladitz Fuel Injector (SFI) is a network of electrically heated, extremely thin metal whiskers. Tests show that very fine fuel droplet sprays are formed leading to substantial improvements in combustion efficiency. Evaluation of this performance potential, however, requires thorough investigation of the flow rate/pressure drop/heating rate influence on spray quality and droplet distribution. Such tests were performed on two SFI geometries with steady flows of Jet A fuel. When these flows were discharged directly to the atmosphere, pressure drop reached a minimum at heating rates of 280 J/cc. At this point, spray quality improved noticeably, showing substantial fog or mist production, which became complete mist as the heating rate approached three-fourths the Jet A enthalpy of vaporization. Similar tests of SFI flows exhausting through conventional spray nozzles showed appreciable improvement in spray quality, producing 50% or more mist at heating rates about one-third less than those required in the absence of nozzles. GRA

N82-27316*# Naval Air Propulsion Test Center, Trenton, N.J. Propulsion Technology and Project Engineering Dept.
ROTOR FRAGMENT PROTECTION PROGRAM: STATISTICS ON AIRCRAFT GAS TURBINE NGINE ROTOR FAILURES THAT OCCURRED IN U.S. COMMERCIAL AVIATION DURING 1978 Final Report, 1977 - 1978
R. A. DeLucia and J. T. Salvino Sep. 1981 30 p
(NASA Order C-41581-B)
(NASA-CR-165388; NAS 1.26:165388; AD-A113767; NAPC-PE-23) Avail: NTIS HC A03/MF A01 CSCL 21/5

This report presents statistical information relating to the number of gas turbine engine rotor failures which occurred in commercial aviation service use. The predominant failure involved blade fragments, 82.4 percent of which were contained. Although fewer rotor rim, disk, and seal failures occurred, 33.3%, 100% and 50% respectively were uncontained. Sixty-five percent of the 166 rotor failures occurred during the takeoff and climb stages of flight. Author (GRA)

N82-27317# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.
DEVELOPMENT OF ACCELERATED FUEL-ENGINES QUALIFICATION PROCEDURES METHODOLOGY, VOLUME 1 Interim Report, Oct. 1980 - Sep. 1981
J. A. Russell, J. P. Cuellar, Jr., J. C. Tyler, J. Erwin, W. K. Knutson, R. A. Alvarez, R. L. Stanberg (Army Aviation Research and Development Command), F. O. Zimmer (Army Aviation Research and Development Command), R. L. Renta (Mueller Associates, Inc.), and T. J. Timbario (Mueller Associates, Inc.) Dec. 1981 216 p refs 2 Vol.
(Contracts DAAK70-81-C-0209; DAAK70-80-C-0001; DAAK70-82-C-0001; DA Proj. 1L2-63104-D-150)
(AD-A113461; AFLRL-144-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 15/5

Activities and findings are reported for a 12-month program aimed at the development of procedures for accelerating the qualification of new fuels on Army equipment, emphasizing those derived from oil shale and coal. Prinicpal activities were identification of key tactical and combat surface and air vehicles, powerplants, and fuels systems components; identification of critical properties peculiar to new fuels anticipated to have significant impact upon Army materiel; laboratory evaluations of materials compatibility and fuels characteristics (including lubricity, elastomer compatibility, thermal stability, and corrosion); full-scale fuel systems component testing, and an overall review and evaluation of existing engine/fuel system qualification procedures. Conclusions and recommendations are presented in terms of methodology and criteria which will realistically address key peculiarities of altnerative fuels and thus serve to accelerate their qualification for field Army use. Author (GRA)

N82-27318# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.
DEVELOPMENT OF ACCELERATED FUEL-ENGINES QUALIFICATION PROCEDURES METHODOLOGY. VOLUME 1: APPENDICES Interim Report, Oct. 1980 - Sep. 1981
J. A. Russell, J. P. Cuellar, Jr., J. C. Tyler, J. Erwin, R. A. Alvarez, W. K. Knutson, R. L. Stanberg (Army Aviation Research and Development Command), F. O. Zimmer (Army Aviation

Research and Development Command), R. L. Rentz (Mueller Associates, Inc.), T. J. Timbario (Mueller Associates, Inc.) et al Dec. 1981 438 p 2 Vol.
(Contracts DAAK70-81-C-0209; DAAK70-82-C-0001; DAAK70-80-C-0001)
(AD-A113532; AFLRL-144-Vol-2) Avail: NTIS HC A19/MF A01 CSCL 15/5

Aircraft engine component listings are included, along with elastomer swell and hardness data and retention properties. Several shale oil fuel test plans are presented. Pre and post test definition data, spot calibration, flow test, fuel characteristics, lubricity and interfacial tension data are also given. Component test results, disassembly and inspection, identification of critical fuel system components, and existing engine qualification procedures are also included. S.L.

N82-27319*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
QUIET SHORT-HAUL RESEARCH AIRPLANE (QSRA) MODEL SELECT PANEL FUNCTIONAL DESCRIPTION
DeLamar M. Watson May 1982 121 p refs
(NASA-TM-84243; A-8915; NAS 1.15:84243) Avail: NTIS HC A06/MF A01 CSCL 01C

The QSRA, when equipped with programmable color cathode ray tube displays, a head up display, a general purpose digital computer and a microwave landing system receiver, will provide a capability to do handling qualities studies and terminal area operating systems experiments as well as to enhance an experimenter's ability to obtain repeatable aircraft performance data. The operating systems experiments include the capability to generate minimum fuel approach and departure paths and to conduct precision approaches to a STOLport runway. The mode select panel is designed to provide both the flexibility needed for a variety of flight test experiments and the minimum workload operation required by pilots flying into congested terminal traffic areas. T.M.

N82-27320# Eagle Technology, Inc., Arlington, Va.
RELIABILITY AND MAINTAINABILITY ANALYSIS OF FLUIDIC BACK-UP FLIGHT CONTROL SYSTEM AND COMPONENTS Final Report
William H. Skewis and David R. Keyser Sep. 1981 61 p refs
(Contract N62269-81-M-3047)
(AD-A110496; NADC-80227-60) Avail: NTIS HC A04/MF A01 CSCL 01/4

Fluidic components being used in various aircraft applications are demonstrating extremely high reliability. However, the unique design of new fluidic components results in a very limited failure rate data base and prevents the determination of numerical values of fluidic system reliability at a sufficient confidence level. This report identifies the potential failure modes of typical components used in a Fluidic Backup Flight Control System and establishes their frequencies of occurrence from published test reports. Author (GRA)

N82-27321# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
DIGITAL COMMAND AUGMENTATION FOR LATERAL DIRECTIONAL AIRCRAFT DYNAMICS M.S. Thesis
David Atzhorn May 1981 203 p refs
(AD-A107264; AFIT-CI-81-55T) Avail: NTIS HC A10/MF A01 CSCL 09/2

Linear-quadratic sampled-data regulator theory is used to design several Type 0 and Type 1 control laws for lateral-directional aircraft dynamics. Control structures are defined for singular command inputs and for control rate outputs; the former allows for precise following of a command whose integral appears in the state vector, while the latter uses both a difference approximation and the Tustin transform to characterize control rate in the discrete-time domain. Type 0 controllers with control rate restraint and 'equivalent' Type 1 controllers are implemented in a microprocessor-based digital flight control system, and flight tests are conducted using Princeton University's Variable-Response Research Aircraft. The control system, entitled CAS-4, offers four combinations of control: direct (unaugmented) control, Type 0 control with both roll rate/sideslip angle and roll rate/lateral acceleration command combinations, and Type 1 control with roll rate/sideslip angle command. Ground-based hybrid simulation and flight tests results show that major closed-loop response features are unaffected by the choice of sampling rate when sampled-data regulator is used. Consequently, much lower sampling rates than would normally be expected can be used when control laws are derived in this manner (a sampling rate of 10 sps is primarily used in this investigation, though lower sampling rates are investigated as well). The results derived through this investigation and presented herein provide additional evidence that digital flight control through modern control theory will be a practical way of implementing flight control systems in future high performance aircraft. GRA

N82-27322# Systems Research Labs., Inc., Dayton, Ohio.
NOTES ON LATERAL-DIRECTIONAL PILOT INDUCED OSCILLATIONS Final Report, May 1979 - May 1981
Ralph H. Smith Wright-Patterson AFB, Ohio AFWAL Mar. 1982 84 p refs
(Contract F33615-79-C-3620; AF Proj. 2403)
(AD-A113996; AFWAL-TR-81-3090) Avail: NTIS HC A05/MF A01 CSCL 05/8

A method is developed for the assessment of lateral-directional pilot induced oscillation (PIO) tendencies. The method is applicable regardless of the flight control system mechanization. The relations between linear and non-linear system effects on the probability or nature of PIO are discussed. In its simplest form, the method proposed for PIO assessment is very similar to methods currently in use. The principal difference is that quantitative methods are provided for the identification of specific frequencies at which appropriate stability criteria must be satisfied if PIO is not to be a possibility. Based upon analyses in this report, the single axis, bank angle PIO is believed to be the most commonly encountered lateral-directional PIO. The possibility for pitch only PIO in the longitudinal mode is discussed. The methods of this report are believed to apply to the study of longitudinal PIO. Author (GRA)

N82-27323# General Electric Co., Daytona Beach, Fla. Space Div.
SYSTEM DESCRIPTION-AVIATION WIDE-ANGLE VISUAL SYSTEM (AWAVS) COMPUTER IMAGE Final Report
D. V. Morland and F. A. Michler Orlando, Fla. Naval Training Equipment Center May 1981 93 p refs
(Contracts N61339-76-C-0048; N61339-79-C-0143)
(AD-A111800; NAVTRAEQUIPC-76-C-0048-1) Avail: NTIS HC A05/MF A01 CSCL 05/9

This report provides an overall description of the Aviation Wide Angle Visual System (AWAVS) Computer Image Generator (CIG) System installed at the Naval Training Equipment Center in Orlando, Florida. The report includes descriptions of system functions and capabilities, system hardware and new technology features incorporated in the CIG System design. This revised report includes descriptions of additions to original CIG which are identified by margin bars. Also, the AWAVS name has been changed to Visual Technology Research Simulator, VTRS. Author (GRA)

N82-27324# Canyon Research Group, Inc., Westlake Village, Calif.
REPORTS BY SYSTEMS TECHNOLOGY, INC., IN SUPPORT OF CARRIER-LANDING RESEARCH IN THE VISUAL TECHNOLOGY RESEARCH SIMULATOR Interim Report, 1 May 1980 - 30 Nov. 1981
W. F. Jewell, H. R. Jex, R. E. Magdaleno, and R. F. Ringland Dec. 1981 65 p refs
(Contract N61339-78-C-0060)
(AD-A112466; TR-81-025; NAVTRAEQUIPC-78-C-0060-10) Avail: NTIS HC A04/MF A01 CSCL 01/2

The following work was undertaken: (1) Development of a quasi-random turbulence model. This model was preferred to the one provided initially with the VTRS system because it enabled better analysis of pilot responses to turbulence inputs. The STI model is expected to be appropriate for tasks other than carrier landings and for simulations of other aircraft types. (2) Modification of the T-2C simulation to more closely represent the A-7 and F-18 aircraft. (3) Application and evaluation of STI's Non-Intrusive Pilot Identification Program (NIPIP), which was developed to estimate the pilot's input-output describing function and combined pilot-vehicle performance parameters such as crossover frequency and phase margin by using a time domain model of the pilot and a least-squares identification algorithm. NIPIP functions in real-time and uses a sliding time window to maintain freshness in the data; thus time-varying characteristics in the pilot's control strategy can be measured. GRA

N82-27325# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
COLD REGIONS TESTING OF AN AIR TRANSPORTABLE SHELTER
Stephen N. Flanders Aug. 1981 28 p refs
(DA Proj. 4A7-62730-AT-42)
(AD-A107131; CRREL-81-16) Avail: NTIS HC A03/MF A01 CSCL 13/13

An air-transportable shelter designed and built at CRREL for use in cold regions underwent testing in Hanover, New Hampshire, and Ft. Greely, Alaska. The shelter demonstrated some of its capabilities for mobility by being towed for more than 60 miles behind various vehicles and by being transported on a C-130 cargo airplane, a CH-47 helicopter, and a trailer truck. The shelter proved to be very easy for a crew of two to four to set up in all weather conditions including -40 F cold. However, the gasoline-powered generator, which was a source for space heat as well as electricity, functioned very poorly. Overall, the prototype successfully demonstrated qualities of self-reliance, ease of operation and thermal efficiency. Author (GRA)

N82-27328# Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
FIELD TEST OF AN IN STACK DIFFUSION CLASSIFIER ON AN AIRCRAFT ENGINE TEST CELL Final Report, Jun. - Dec. 1980
Dale A. Lundgren and Brian J. Hausknecht Tyndall AFB, Fla. Air Force Engineering and Services Center Apr. 1981 40 p
(Grant EPA-R-805762-02-2; AF Proj. 1900)
(AD-A113811; AFESC/ESL-TR-81-21) Avail: NTIS HC A03/MF A01 CSCL 14/2

An in-stack diffusion classifier was field tested at Tyndall Air Force Base, Florida. Particle size distribution measurements were made on the exhaust stream from the engine test cell while running a J75-P17 jet engine. Samples were collected at the test cell exhaust plane using a University of Washington in stack cascade impactor followed, in series, by an in stack diffusion classifier being developed at University of Florida. In addition, total particulate samples were obtained using absolute filters to determine particulate mass concentration in the exhaust gases. Opacity readings of the plume were also taken during sampling. The procedures to collect significant data and the general problems encountered to generate a reasonable estimate of jet exhaust aerosol size distribution using a diffusion classifier are described in this report. Author (GRA)

N82-27411# Lockheed Missiles and Space Co., Palo Alto, Calif.
PANEL OPTIMIZATION WITH INTEGRATED SOFTWARE (POIS), VOLUME 2. USER INSTRUCTIONS: ECHO AND RRSYS Final Report, Jun. 1976 - Oct. 1980
P. Stern, B. O. Almroth, and P. Stehlin Wright-Patterson AFB, Ohio AFWAL Mar. 1981 135 p refs
(Contract F33615-76-C-3105; AF Proj. 2307)
(AD-A112224; AFWAL-TR-81-3073-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 01/3

Optimization of structural panels with respect to bifurcation buckling constraints tends to lead to imperfection sensitive panels. The panels may not represent least weight configurations if the influence of always present geometrical imperfections are taken into account. A software package, POIS (Panel Optimization with Integrated Software) was developed in response to this problem. Here user instructions are presented for Computer Program ECHO and RRSYS which are part of the POIS system. ECHO is a collection of computer programs for least weight design of stiffened structural panels subjected to multiple combinations of inplane loads. ECHO includes program modules for optimization of perfect panels and nonlinear static stress analysis of panels with random imperfections. The optimization problem is carried out as a constrained function minimization problem in which buckling loads, stress, and strain may be constraints. RRSYS is a program system for the nonlinear analysis of elastic structures by means of the Rayleigh-Ritz method. RRSYS is designed to analyze such diverse structural phenomena as collapse, linear and nonlinear bifurcation, vibrations and transient dynamic response. Author (GRA)

N82-27434# Exxon Research and Engineering Co., Linden, N.J. Corporate Research-Technology Feasibility Center.
RADIATION/CATALYTIC AUGMENTED COMBUSTION Final Report, 1 Jun. 1977 - 28 Feb. 1981
Moshe Lavid Jul. 1981 40 p refs
(Contract F49620-77-C-0085; AF Proj. 2308)
(AD-A112376; AFOSR-82-0132TR) Avail: NTIS HC A03/MF A01 CSCL 21/2

Two techniques for extending aircraft operational range are reported. They are radiative and catalytic augmentation techniques to enhance combustion initiation and reaction kinetics which restrict combustor operation via limits on flammability, flame propagation, ignition and stability. Both techniques demonstrated the capability to enhance combustion processes and to broaden normally encountered stability limits. The radiative technique under laboratory static conditions successfully ignited fuel air mixtures, and enhanced combustion processes, utilizing pulsed and continuous VUV light souces. Similarly, the catalytic technique provided efficient combustion under normally difficult fuel lean, low temperature, conditions. A complementary effort involves the development of analytical capability required for modeling the radiative and catalytic techniques. Radiative ignition and combustion enhancement tests were performed on gaseous mixtures under various static conditions. Successful radiative ignitions were obtained with pulsed and continuous VUV/UV light sources. GRA

N82-27436# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
MODELING SOLID-FUEL RAMJET COMBUSTION INCLUDING RADIATION HEAT TRANSFER TO THE FUEL SURFACE Interim Report
Michael E. Metochianakis (Greek Air Force), William V. Goodwin, Uri Katz, and David W. Netzer Aug. 1981 50 p refs
(AD-A107441; NPS67-81-012) Avail: NTIS HC A03/MF A01 CSCL 21/5

Radiation heat transfer from soot in the flame zone to the fuel surface of a solid fuel ramjet was incorporated into an existing two-dimensional computer code. Improved prediction of the fuel regression pattern was obtained. Near-wall temperature measurements indicated that the model predicts too much turbulent mixing near the fuel surface. Author (GRA)

N82-27506# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
CORROSION TESTS WITH MIL-H-83282 AND MIL-H-6083 AIRCRAFT HYDRAULIC FLUIDS Final Report
Alfeo A. Conte, Jr. 25 Jan. 1982 12 p
(WF6154200)
(AD-A112437; NADC-81301-60) Avail: NTIS HC A02/MF A01 CSCL 11/8

Corrosion tests were performed to determine whether MIL-H-83282 hydraulic fluid could be used in place of MIL-H-6083 preservative fluid in Intermediate Maintenance Activity (IMA) and NAVAIREWORKFAC hydraulic test stands. The results presented in this report show that MIL-H-83282 can not be considered as a suitable alternative fluid. Author (GRA)

N82-27512# Dayton Univ., Ohio. Research Inst.
EVALUATION OF PLASMA SOURCE SPECTROMETERS FOR THE AIR FORCE OIL ANALYSIS PROGRAM Interim Report, 30 Aug. 1977 - 30 Sep. 1980
Wendell E. Rhine, Costandy S. Saba, Robert E. Kauffman, John R. Brown, and Patricia S. Fair Wright-Patterson AFB, Ohio AFWAL Feb. 1982 354 p refs
(Contract F33615-76-C-5312; AF Proj. 2303)
(AD-A113809; AFWAL-TR-82-4017) Avail: NTIS HC A16/MF A01 CSCL 14/2

An investigation was conducted in order to evaluate two plasma source emission spectrometers for use in the Air Force Oil Analysis Program (OAP). The high temperatures of the plasma sources were expected to improve the Oil Analysis Program's capability to analyze wear metal particulates. The work is presented in two phases. Phase I of the work dealt with determining the capabilities of the two plasma instruments as well as the currently used OAP spectrometers. During this phase of the work the sample introduction systems were identified as the reason each instrument could not detect particles larger than 3-10 Microns. Phase 2 of the work dealt with optimizing the sample introduction systems so that particles could be more efficiently transported where they could be analyzed. The improved systems were capable of analyzing particles as large as 14-20 Microns. GRA

N82-27519*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF SOME NITROGEN COMPOUNDS THERMAL STABILITY OF JET A
Albert C. Antoine Jun. 1982 20 p refs
(NASA-TM-82908; NAS 1.15:82908) Avail: NTIS HC A02/MF A01 CSCL 21D

The effect of known concentrations of some nitrogen containing compounds on the thermal stability of a conventional fuel, namely, Jet A was investigated. The concentration range from 0.01 to 0.1 wt% nitrogen was examined. Solutions were made containing, individually, pyrrole, indole, quinoline, pyridine, and 4 ethylpyridine at 0.01, 0.03, 0.06, and 0.1 wt% nitrogen concentrations in Jet A. The measurements were all made by using a standard ASTM test for evaluating fuel thermal oxidation behavior, namely, ASTM D3241, 'thermal oxidation stability of turbine fuels (JFTOT procedure).' Measurements were made at two temperature settings, and 'breakpoint temperatures' were determined. The results show that the pyrrole and indole solutions have breakpoint temperatures substantially lower than those of the Jet A used. S.L.

N82-27523# Amoco Oil Co., Naperville, Ill. Research and Development Dept.
EVALUATION OF HYDROCRACKING CATALYSTS FOR CONVERSION OF WHOLE SHALE OIL INTO HIGH YIELDS OF JET FUELS Final Report, Dec. 1979 - Oct. 1981
A. M. Tait and A. L. Hensley Wright-Patterson AFB, Ohio AFWAL Oct. 1981 196 p refs
(Contract F33615-79-C-2095; AF Proj. 3048)
(AD-A112820; M81-65; AFWAL-TR-81-2098) Avail: NTIS HC A09/MF A01 CSCL 21/4

A catalyst development and screening program has led to a formulation capable of upgrading whole shale oil into high yields of military jet fuel in a single operation. The catalyst is multifaceted in its functionality in that it sequentially saturates, denitrogenates, and hydrocracks the feedstock in the presence of high levels of contaminants, such as organic nitrogen compounds and ammonia, while maintaining a high selectivity towards jet-fuel, boiling range material. The catalyst, developed by optimization of both chemical and physical properties, consists of 1.5% cobalt oxide, 10% chromium oxide, and 15% molybdenum oxide on a support of 50% ultrastable molecular sieve in alumina. The effectiveness of the catalyst for the direct upgrading of an Occidental whole shale oil was demonstrated in a 100-day test. The feed, containing approximately 15 weight percent material boiling within the range for JP-4 and containing 13,000 ppm nitrogen, was upgraded to a water-white product containing 1 to 3 ppm nitrogen and approximately 75% JP-4 material. The hydrogen consumption required for this level of upgrading and conversion was approximately 1800 SCFB. The catalyst developed represents an advance in shale oil upgrading technology over more conventional petroleum-based technology. Author (GRA)

N82-27524# Simmonds Precision Products, Inc., Vergennes, Vermont.
COMMERCIAL AIRCRAFT AIRFRAME FUEL SYSTEMS SURVEYS Interim Report, Oct. 1980 - Oct. 1981
P. G. Weitz Atlantic City FAA Feb. 1982 55 p refs
(Contract DTFA03-80-C-0080)
(AD-A112241; E-2304; FAA-CT-82/12) Avail: NTIS HC A04/MF A01 CSCL 20/4

A selection of commercial aircraft airframe fuel systems has been studied to determine areas where incompatibility with antimisting kerosene fuel (AMK) may exist. Incompatibility can be due to reduced fuel system component performance with AMK or shear degradation of the AMK by the fuel system components. Survey results, to date, indicate that potential component performance problems with AMK are more significant than loss of AMK flammability protection due to shear degradation. Components of interest include ejector pumps, fuel filters, and auxiliary power units. The solubility of water in AMK and its effect on fuel system performance under actual operating conditions is also of major importance. Author (GRA)

N82-27527# Naval Postgraduate School, Monterey, Calif.
AN INVESTIGATION OF ENGINE AND TEST CELL OPERATING CONDITIONS ON THE EFFECTIVENESS OF SMOKE SUPPRESSANT FUEL ADDITIVES M.S. Thesis
Donald Wendell Thornburg Dec. 1981 103 p refs
(Contract N6237681-WR-00014)
(AD-A112800) Avail: NTIS HC A06/MF A01 CSCL 13/2

Tests were conducted in a one-eighth scale turbojet test cell with a ramjet type combustor to investigate the effects of fuel additives on smoke reduction. Particle size and mass concentrations were determined at the engine and stack exhaust using three wavelength optical detector systems. Particulate samples were also collected at the engine exhaust and analyzed with a scanning electron microscope. Combustor temperature and fuel additives were found to significantly affect particulate mass concentrations emitted from the engine while particle size appeared to be unaffected. No significant changes in the particulate size or mass occurred from the engine exhaust to the stack exhaust. The optical determination of exhaust mean particulate size/mass concentration with three wavelength optical detector systems appears to be a good and reasonably accurate technique for evaluating the effects of engine and test cell operating conditions and fuel composition changes on the emitted particulates. Author (GRA)

N82-27548# National Bureau of Standards, Washington, D.C.
HURRICANE-INDUCED WIND LOADS
Martin E. Batts and Emil Simiu Aug. 1981 23 p refs
(Grant NSF CEE-80-25718)
(PB82-132267; NBS-DF-81/005A) Avail: NTIS HC A02/MF A01 CSCL 13M

A computer program was developed that uses as input the aerodynamic coefficients corresponding to eight or sixteen compass directions and produces as output wind loads on cladding or structural members corresponding to various mean recurrence intervals. GRA

N82-27558* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SPIRAL SLOTTED PHASED ANTENNA ARRAY Patent
Haynes Ellis, Jr., inventor (to NASA) (Rockwell International Corp., Downey, Calif.) Issued 9 Feb. 1982 7 p Filed 25 Jul. 1980 Supersedes N80-29543 (18 - 20, p 2685) Sponsored by NASA
(NASA-Case-MSC-18532-1; US-Patent-4,315,266; US-Patent-Appl-SN-172099; US-Patent-Class-343-895; US-Patent-Class-343-789) Avail: US Patent and Trademark Office CSCL 20N

A flush mounting, cavity-backed, dual orthogonal slot antenna for aircraft and space vehicles is described. Improved radiation pattern characteristics are obtained by making the spiral slot pattern elliptical in the aperture plane. A cavity and a flanged aperture plate are configured such that one slot pair is orthogonal with respect to another slot pair within the aperture plate. Coaxial split-tube baluns are used to drive the junctions between corresponding slot pairs. An optional cavity dielectric is provided and a drive coupling arrangement includes a four port comparator hybrid having sum and difference ports respectively, for alternate excitation to produce a single lobe or a double lobe pattern with null. Switching apparatus is provided to connect a common terminal to either of the ports.
Official Gazette of the U.S. Patent and Trademark Office

N82-27561# Auburn Univ., Ala. Engineering Experiment Station.
AUTOMATIC HANDOFF OF MULTIPLE TARGETS Final Technial Report, 10 Oct. 1980 - 14 Sep. 1981
J. S. Boland, III, H. S. Ranganath, and D. V. Satish Chandra Redstone Arsenal, Ala. Army Missile Command 14 Sep. 1981 166 p refs
(Contract DAAH01-80-C-0258)
(AD-A107490; AD-E950176; DRSMI/RG-CR-81-4) Avail: NTIS HC A08/MF A01 CSCL 17/5

In order to fully utilize the potential of the 'fire and forget' class of helicopter-borne missiles, it is necessary to solve the technical problems associated with acquiring and handing off multiple targets from a precision pointing and tracking system (PTS) to several missile seekers simultaneously or almost so in a short period of time. The multiple target problem is that of locating targets and missile seeker aim points within the PTS field of view, deciding which target is to be assigned to each missile, generating error signals to the torquers in order to slew the missile LOS such that its assigned target is in the center of its FOV, and initiating automatic seeker tracking. The task of locating a given smaller image within a larger image is known as 'image registration'. A detailed comparison of the important multiple image registration methods based on the number of arithmetic operations for software implementation and the complexity of hardware for real time implementation is presented.

New methods of accomplishing multiple image registration which are computationally more efficient than the most commonly used template matching techniques (correlation and sequential similarity detection algorithm) are described. Several methods are compared with respect to hardware requirements and speed of computation. Author (GRA)

N82-27573# Federal Aviation Administration, Atlantic City, N.J. Technical Center.

SOFTWARE FUNCTIONAL DESCRIPTION OF MASS WEATHER DISSEMINATION SYSTEM EXPLORATORY ENGINEERING MODEL Final Report

Louis Delemarre Feb. 1982 52 p
(FAA Proj. 131-401-835)
(AD-A112706; DOT/FAA/CT-81/33; FAA-RD-82-1) Avail: NTIS HC A04/MF A01 CSCL 17/2

This report describes the Mass Weather Dissemination System Exploratory Engineering Model software currently being evaluated in the Flight Service Station Engineering Laboratory. The object of this effort is to investigate, through development, test and evaluation, the application of digital technology to the dissemination of meteorological and aeronautical information. The prototype model is a fully-automated system designed to transfer a significant amount of workload from the flight service station specialist to system hardware/software in order to provide better service to the flying public. Author (GRA)

N82-27588# Ball Aerospace Systems Div., Boulder, Colo.

ADVANCED MICROSTRIP ANTENNA DEVELOPMENTS. VOLUME 2: MICROSTRIP GPS ANTENNAS FOR GENERAL AVIATION AIRCRAFT Final Report, Apr. 1979 - Jun. 1980

Gary G. Sanford and Brian D. Gross Mar. 1982 48 p
(Grant DOT-TSC-1397-1)
(AD-A113620; FAA-EM-80-12-2; TSC-FAA-80-15-Vol-2) Avail: NTIS HC A03/MF A01 CSCL 09/5

This report describes the application of microstrip antenna technology to the design of general aviation (G/A) aircraft antennas for use with the Global Positioning System (GPS). For most G/A aircraft, only single frequency operation will be required. However, air-carrier and some large corporate aircraft may make use of dual-frequency operation. For this reason, some dual-frequency designs have been investigated. The main effort was given to the design of antennas with broad beamwidths which could be switched or steered to compensate for aircraft maneuvers, with the goal of maintaining near-hemispherical carriage in flight. A hybrid microstrip crossed-slot and sleeve-dipole element used with a suitable combining network gives a suitable, controllable broad-beam pattern. This element and its performance are described. In addition, radiation patterns are presented using scale-model aircraft and simple crossed-slot antennas. Author (GRA)

N82-27609# Forschungsinstitut fuer Anthropotechnik, Bonn (West Germany).

INFLUENCE OF CONTRAST ON SPATIAL PERCEPTION IN TV DISPLAY OF MOVING IMAGES [EINFLUSS DES KONTRASTES AUF DIE RAUMWAHRNEHMUNG BEI TV -FLUGAUSSENSICHT- DARSTELLUNGEN]

H. Heising Sep. 1981 80 p refs In GERMAN; ENGLISH summary
(FB-50) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10

A low cost visual simulation system was developed which involves a hybrid computer controlled transformation of perspective on a raster scan TV display. It is applicable to a wide range of simulation tasks, including training and research, but is especially useful in facilitating detection of moving objects and reducing frame rate in RPV applications with a number of advantages, e.g., reduction of bandwidth and improved protection against jamming. Because of the perspective transformation in TV raster scan, a change of contrast can occur during the display of moving images. Therefore, it is of interest to know the effect of this contrast change on human spatial perception. The investigations undertaken led to the conclusion that the physical contrast in the ratio range of l:ll to 1:25 (by a medium illuminance of 7 cd/sqm at the white parts of the picture) does not influence human distance and height judgments. Author (ESA)

N82-27658# Boeing Military Airplane Development, Seattle, Wash. Mechanical/Electrical Systems Technology.

PROTECTION OF ADVANCED ELECTRICAL POWER SYSTEMS FROM ATMOSPHERIC ELECTROMAGNETIC HAZARDS Final Report, 15 Jun. 1979 - 15 Oct. 1981

David L. Sommer Wright-Patterson AFB, Ohio AFWAL Dec. 1981 233 p refs
(Contract F33615-79-C-2006; AF Proj. 3145)
(AD-A112612; D180-26154-2; AFWAL-TR-81-2117) Avail: NTIS HC A11/MF A01 CSCL 01/3

The effects of lightning strikes on aircraft and the resulting transients coupled onto the electrical systems were investigated. The historical background and overall scope of the study are presented. The lightning threat is defined and electrical system math models are developed. The normal design of aircraft for inherent hardness is evaluated. Wire routing, equipment location, fiber optics, threat level comparisons and the evaluation of specific electrical circuits are assessed. The effects of using add on protection to suppress induced transients on the electrical system are analyzed. Protection schemes include cable shielding, linear protection devices, nonlinear protection devices and conductive coatings applied to the aircraft skin. The design guide provides the most appropriate lightning hardening techniques is summarized. Reliability/maintainability, system safety and design to cost considerations are discussed. Protection criteria to develop a lightning tolerant electrical system are included. E.A.K.

N82-27659# Boeing Military Airplane Development, Seattle, Wash. Mechanical/Electrical Systems Technology.

PROTECTION OF ELECTRICAL SYSTEMS FROM EM HAZARDS: DESIGN GUIDE Interim Report, Jun. 1979 - Oct. 1981

David L. Sommer Wright-Patterson AFB, Ohio AFWAL Sep. 1981 211 p refs
(Contract F33615-79-C-2006)
(AD-A112707; D180-26154-3; AFWAL-TR-81-2118) Avail: NTIS HC A10/MF A01 CSCL 01/3

This report contains results of a two-phase study program investigating the effects of lightning strikes on aircraft and the resulting transients coupled on to the electrical systems. The design guide contains the historical background and the lighting threat assessment in the sections 1 and 2. Section 3 of the design guide contains the techniques for inherent hardening against the lightning strike electromagnetic energy. Section of 4 of the design guide provides two methods for evaluating electrical systems to determine the levels of transients that can be induced. The first method allows an electrical systems designer to make a preliminary assessment of the lightning strike threats. The second method allows a more detailed evaluation using a computer program called PRESTO. Section 5 identifies and examines the various military specifications covering the transients that existing electrical equipment has to withstand. Using this information, add-on protection hardware and hardening techniques were evaluated in Sections 6 and 7. Section 8 provides examples for selecting hardening techniques for advanced electrical systems. Sections 9, 10, and 11 discuss the reliability/maintainability, system safety and Design to Cost considerations in selection of the appropriate hardening techniques. Author (GRA)

N82-27663# McDonnell Aircraft Co., St. Louis, Mo. Lightning-Lab.

ASSESSMENT OF LIGHTNING SIMULATION TEST TECHNIQUES, PART 1 Final Report, Jul. 1980 - Oct. 1981

W. G. Butters, D. W. Clifford, K. P. Murphy, and K. S. Zeisel Oct. 1981 128 p refs Sponsored in part by Navy
(Contract F33615-80-C-3406; AF Proj. 2402)
(AD-A112626; AFWAL-TR-81-3075-Pt-1) Avail: NTIS HC A07/MF A01 CSCL 14/2

The program objective was to assess the current pulse and shock-excitation lightning simulation test techniques. The current pulse test technique applies a pulsed current stimulus to the test article, while the shock-excitation technique first charges the test article to a high voltage which then produces a rapid voltage/current pulse on the test article as the spark gap (between the test article and the return conductors) breaks down. Direct comparisons of the induced voltage response on interior circuits were made for the two test techniques. The interior circuits were high-impedance differential wire pairs typical of many flight-critical in advanced aircraft. The program was divided into three tasks: (1) an analytical task to model both test techniques to provide a theoretical base, (2) comparative tests using an aluminum cylinder and simple interior circuits that were readily modeled, and (3) comparative tests on the flight control circuits of a full-scale YF-16 fighter aircraft. The cylinder test configuration was modeled as two coupled transmission line circuits. The generator, cylinder, return lines, and the output configuration between the cylinder and the return line comprise the primary tranmission line that interacts with an interior circuit transmission line via aperture coupling. GRA

N82-27743*# Curtiss-Wright Corp., Wood-Ridge, N.J. Rotary Engine Facility.
ADVANCED STRATIFIED CHARGE ROTARY AIRCRAFT ENGINE DESIGN STUDY
P. Badgley, M. Berkowitz, C. Jones, D. Myers, E. Norwood, W. B. Pratt, D. R. Ellis (Cessna Aircraft Corp.), G. Huggins (Cessna Aircraft Corp.), A. Mueller (Cessna Aircraft Corp.), and J. H. Hembrey (Cessna Aircraft Corp.) 29 Jan. 1982 149 p refs
(Contract NAS3-21285)
(NASA-CR-165398; NAS 1.26:165398; CW-WR-81.021) Avail: NTIS HC A07/MF A01 CSCL 21A

A technology base of new developments which offered potential benefits to a general aviation engine was compiled and ranked. Using design approaches selected from the ranked list, conceptual design studies were performed of an advanced and a highly advanced engine sized to provide 186/250 shaft Kw/HP under cruise conditions at 7620/25,000 m/ft altitude. These are turbocharged, direct-injected stratified charge engines intended for commercial introduction in the early 1990's. The engine descriptive data includes tables, curves, and drawings depicting configuration, performance, weights and sizes, heat rejection, ignition and fuel injection system descriptions, maintenance requirements, and scaling data for varying power. An engine-airframe integration study of the resulting engines in advanced airframes was performed on a comparative basis with current production type engines. The results show airplane performance, costs, noise & installation factors. The rotary-engined airplanes display substantial improvements over the baseline, including 30 to 35% lower fuel usage. A.R.H.

N82-27784# Systems Research Labs., Inc., Dayton, Ohio. Research Applications Div.
MECHANICAL PROPERTY CHARACTERIZATION AND MODELING OF STRUCTURAL MATERIALS Final Report, Jun. 1979 - May 1981
Noel E. Ashbaugh, Henry L. Bernstein, Bhaskar Majumdar, and Jalees Ahmad Wright-Patterson AFB, Ohio AFWAL Feb. 1982 132 p refs
(Contract F33615-79-C-5025; AF Proj. 2307)
(AD-A113841; SRL-9799; AFWAL-TR-81-4187) Avail: NTIS HC A07/MF A01 CSCL 11/4

The crack growth behavior of engine disk nickel base superalloys operating in the temperature range 538-760 C was investigated. The effects of sustained load upon crack growth, crack growth in deleterious environments, and crack initiation and growth of short cracks were emphasized. Crack growth rate models were developed based upon experimental results and upon analytical characterization of fundamental processes which occur during crack growth. Mechanical property data were generated from tests including uniaxial tension, compression, bend, creep fatigue, low cycle fatigue, crack initiation, sustained load crack growth, and fatigue crack growth. The materials tested included nickel base superalloys, titanium, aluminum, and other structural materials. GRA

N82-27864# Ministry of the Environment, Ottawa (Ontario). Pollution Control Branch
TRANSPORTATION NOISE, ITS IMPACT, PLANNING AND REGULATION
J. Manuel 1981 19 p refs Presented at the Intern. Symp. on Transportation Noise, Pretoria, 21-23 Oct. 1981
(S-258) Avail: NTIS HC A02/MF A01

Examples of the effects transportation noise has on communities are provided. Recent work in noise pollution in Canada is highlighted. National policies were examined and regulations were reviewed. T.M.

N82-27865# Airbus Industrie, Blagnac (France). Acoustics Dept. of Aerospatiale.
AIRBUS INDUSTRIE AND COMMUNITY NOISE
J. Chausonnet 1981 35 p Presented at the Intern. Symp. on Transportation Noise, Pretoria, 21-23 Oct. 1981
Avail: NTIS HC A03/MF A01

The contributions of the total noise perceived outside an aircraft during takeoff and landing by the engine and the aerodynamics of the aircraft are considered. The reduction of engine noise by design, the location of the engine and acoustic treatment of the nacelles is discussed. Aerodynamic noise reduction is considered in terms of aircraft design, operational procedures, and aircraft weight. A noise measuring facility used for checking operational procedures and measuring noise levels is described. Author

N82-27869# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
CONTROL OF AIR POLLUTION FROM AVIATION: THE EMISSION STANDARD SETTING PROCESS Ph.D. Thesis
Dennis Freeman Naugle 1981 260 p refs
(AD-A107435; AFIT-CI-81-26D) Avail: NTIS HC A12/MF A01 CSCL 01/2

The potential effects of aviation on ambient air quality with special emphasis on the requirement and techniques for setting aviation control standards are discussed. A logical framework called the 'hypothesis decision model' was developed. It offers a structured way of dealing with complex issues. Application of the model focuses on aircraft sources but a generic version is also proposed. Adoption would explicitly document the manner that technical evidence is considered in a variety of decisions concerning the establishment of emission standards. Author

N82-27900# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
THE EARTH'S GRAVITY FIELD TO DEGREE AND ORDER 180 USING SEASAT ALTIMETER DATA, TERRESTRIAL GRAVITY DATA AND OTHER DATA
Richard H. Rapp Hanscom AFB, Mass. AFGL Dec. 1981 58 p refs
(Contract F19628-79-C-0027; AF Proj. 2309)
(AD-A113098; DGS-322; SCIENTIFIC-12; AFGL-TR-82-0019) Avail: NTIS HC A04/MF A01 CSCL 08/14

The spherical harmonic expansion of the Earth's gravitational field has been obtained to degree 180 by combining several sources of data. The first data set was an a priori set of potential coefficients to degree 36 based on number of recent solutions including a substantial of resonance terms. A second data set was a 1 x 1 deg anomaly field derived from the SEASAT data set, while the third data set was an updated 1 x 1 deg terrestrial field. The last two fields were combined into one set containing 56761 1 x 1 deg values. The remaining values were computed from the a priori potential coefficients. A rigorous combination solution was not carried out. Instead all anomalies were weighted in such a way that the normal equations were diagonal. The results of the adjustment were 64800 1 x 1 deg anomalies that were expanded into spherical harmonics using the optimum quadrature procedure developed by Colombo. Accuracy estimates for each coefficient were obtained considering noise propagation and sampling error caused by the finite block size in which the anomalies are given. The percentage error of the solution reaches 100% near degree 120. The coefficients and their accuracy to degree 50 are listed in an appendix. GRA

N82-27924# Federal Aviation Administration, Atlantic City, N.J.
TEST AND EVALUATION OF THE AIRPORT RADAR WIND SHEAR DETECTION SYSTEM Final Report, Mar. 1978 - May 1981
Dominick L. Offi, William Lewis, Tai Lee, and Alfred DeLaMarche Feb. 1982 39 p refs
(FAA Proj. 022-242-830)
(AD-A112663; DOT/FAA/CT-81/63; FAA-RD-81-85) Avail: NTIS HC A03/MF A01 CSCL 17/9

A wind shear detection system, developed to operate with airport surveillance radar ASH-(8), was installed and tested. Initial tests consisted of hardware and software shakedown and feasibility determinations. Second phase tests compared radar with aircraft and tower winds, evaluated the wind shear measurement capability under various weather conditions, and investigated the effectiveness of a simple two azimuth pointing strategy. Final efforts consisted of observations in all weather regimes and tests of a modified velocity azimuth display (VAD) and a glide slope scan. Results showed the system was compatible with and operate satisfactorily with the ASR-8. The processing and spectral display of clear air and precipitation returns is feasible. The accuracy of agreement, between radar measured winds and components of the aircraft measured winds in both radially oriented flights and runway offset flights using a two azimuth pointing technique, a glide slope scan, and a modified VAD was examined. GRA

N82-28007# McDonnell-Douglas Electronics Co., St. Charles, Mo.

ADVANCED TRAINING TECHNIQUES USING COMPUTER GENERATED IMAGERY Annual Technique Report, 16 May 1980 - 15 Jul. 1981

D. Hauck and D. Soblitz 15 Sep. 1981 74 p refs
(Contract F49620-79-C-0067; AF Proj. 2313)
(AD-A111979; MDC-M3026; AFOSR-82-0160TR) Avail: NTIS HC A04/MF A01 CSCL 05/9

Aircraft simulator systems have been primarily designed as substitutes for actual aircraft. The computer generated imagery of these systems provides the flexibility to enhance training in ways that cannot be done in the real world. The thrust of this research is to conceive and demonstrate training approaches to take advantage of this flexibility as a step towards reducing pilot combat attrition and increasing readiness. Two broad categories of techniques are available to us: (1) synthesizing tasks that are untrainable in aircraft during peacetime but are required during combat; and (2) application of teaching/learning methods unavailable in aircraft. Exploratory testing has begun on numerous techniques. A VITAL IV computer generated image (CGI) system has been used for testing and demonstration.
Author (GRA)

N82-28016# Honeywell Systems and Research Center, Minneapolis, Minn. Operations Training Div.

COMPUTER IMAGE GENERATION: ADVANCED VISUAL/SENSOR SIMULATION Final Report

David Serreyn and David Duncan Brooks AFB, Texas AFHRL Oct. 1981 51 p refs
(Contract F33615-80-C-0006; AF Proj. 6114)
(AD-A107098; AFHRL-TP-81-23) Avail: NTIS HC A04/MF A01 CSCL 14/5

This study investigated, developed, and evaluated various Computer Image Generation (CIG) techniques to overcome the qualitative limitations of current CIG imaginery produced by edge-based systems. The study concluded with an integration of techniques into a system concept. This report describes the techniques investigated, the system concept developed, and the general hardware implementations which are useful for cost/benefit tradeoffs. The system concept presented is based on the use of textured terrain for realistic simulation. In areas where the technique was for training effectiveness and an algorithmically unified system. The approach also involves the display of terrain as curved surfaces represented by bicubic splines. Author (GRA)

N82-28044# Transportation Systems Center, Cambridge, Mass.

AN ANALYSIS OF SELECTED ENHANCEMENTS TO THE EN ROUTE CENTRAL COMPUTING COMPLEX Final Report, May - Sep. 1981

William Broadley, Harvey Freeman, James Olesen, Ronald Rutledge, and Kenneth Thurber Washington Sep. 1981 105 p refs
(AD-A113575; DOT-TSC-FAA-81-20) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report analyzes selected hardware enhancements that could improve the performance of the 9020 computer systems, which are used to provide en route air traffic control services. These enhancements could be implemented quickly, would be relatively inexpensive, and would provide a solution to the short-term but not the long-term problems that the system faces. Three memory enhancements are discussed. First, the storage element (SE) memory boxes could be replaced. Second, the memory stacks in the SE's could be replaced. Third, the memory stacks in the input-output control elements (IOCE's) could be replaced. Three processor enhancements are discussed. First, the processors in the compute elements (CE's) could be sped up. Second, the processors in the IOCE's could be sped up. Third, the CE's could be replaced.
GRA

N82-28134*# Stanford Univ., Calif. Joint Inst. for Aeronautics and Acoustics.

THE ANNOYANCE OF IMPULSIVE HELICOPTER NOISE Final Report, Jan. - Dec. 1981

K. Karamcheti Dec. 1981 27 p refs
(Grant NAG1-17)
(NASA-CR-169123; NAS 1.26:169123) Avail: NTIS HC A03/MF A01 CSCL 20A

A total of 96 impulsive and non-impulsive sounds were rated for annoyance by 10 subjects. The signals had the same amplitude spectrum with a maximum frequency of 4.75 kHz. By changing the phase of the spectral components different levels of impulsivity were obtained. The signals had coefficients of impulsivity of 10.8, 7.9, and -0.2 respectively. Further, signals had intensity levels 89 and 95 dBA, pulse repetition rates 10 and 20 Hz, and half the signals had pink noise added at a level 12 dBA lower than the level of the sound. The significant results were: The four females and six male subjects rated the impulsive sounds respectively 3.7 dB less annoying and 2.6 dB more annoying than the non-impulsive sounds. Overall, impulsivity had no effect. The hish pulse repetition rate increased annoyance by 2.2 dB. Addition of pink noise increased annoyance of the non-impulsive sounds 1.2 dB, but decreased the annoyance of the impulsive sounds 0.5 dB.
T.M.

N82-28210# Clemson Univ., S.C. Dept. of Mathematical Sciences.

LEARNING AND COSTS IN AIRFRAME PRODUCTION, PART 1

Norman K. Womer and Thomas R. Gulledge, Jr. (Louisiana State Univ.) Oct. 1981 19 p refs Presented at the ORSA-TIMS Joint Natl. Meeting, Houston, Tex., 11-14 Oct. 1981
(Contracts N00014-75-C-0451; F33615-81-K5116; NR Proj. 365-049)
(AD-A112948; N131) Avail: NTIS HC A02/MF A01 CSCL 05/1

In recent years, there has been much interest in exploring the impact of learning and changes in production rate on program costs. Most researchers agree that learning is an important determinant of cost, but agreement on the cost impact of production rate changes has been less certain. Still, common sense and economic theory suggest that production rate should be an important determinant of cost. This importance is also suggested by the fact that cost penalties for production rate changes now occur in some department of defense contracts. This paper does not present a theoretical justification for the integration of learning curves with traditional neoclassical economic theory. The general theoretical framework for this paper is published in previous reserach. The purpose of this paper is to extend the range of applicability of the general framework by considering a previously unexplored specification. In particular, this paper explores the joint production situation, where learning and output are simultaneously produced, and a model is presented that has potential application in the airframe industry. The theoretical properties of the model are explored, and a cost minimizing solution is presented. Finally, a strategy is proposed for adapting the model to a particular airframe program.
Author (GRA)

[illegible]

N82-28065 McDonnell Douglas [illegible]

ADVANCED TRAINING TECHNIQUES USING COMPUTER GENERATED IMAGERY [illegible]

[illegible]

COMPUTER IMAGE GENERATION [illegible]

[illegible]

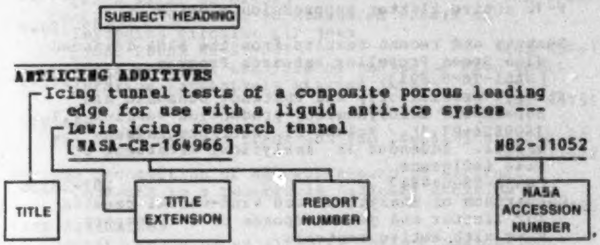
AN ANALYSIS OF SELECTED [illegible]

[illegible]

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 153)* OCTOBER 1982

Typical Subject Index Listing



ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-7 AIRCRAFT
A-7 transonic wing designs A82-35562

ABSORBERS (MATERIALS)
Quasi-static and dynamic crushing of energy absorbing materials and structural components with the aim of improving helicopter crashworthiness A82-37769

ACCIDENT PREVENTION
Flying qualities criteria for GA single pilot IFR operations N82-26213
Proposed research tasks for the reduction of human error in naval aviation mishaps [AD-A112339] N82-27241

ACEE PROGRAM
Benefit cost analysis of the aircraft energy efficiency program [NASA-CR-169116] N82-27280

ACOUSTIC EMISSION
Acoustic emission in jet engine fan blades A82-35257

ACOUSTIC EXCITATION
Development and validation of preliminary analytical models for aircraft interior noise prediction A82-38077

ACOUSTIC PROPERTIES
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8 [AIAA PAPER 82-1120] A82-35017
Acoustic properties of turbofan inlets [NASA-CR-169016] N82-27090

ACOUSTICS
Bibliography of Lewis Research Center technical publications announced in 1981 [NASA-TM-82838] N82-27191

ACTIVE CONTROL
A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression A82-37765
Design and evaluation of a state-feedback vibration controller [AHS PREPRINT 81-10] A82-37783
Semi-active fluid inertia - A new concept in vibration isolation [AHS PREPRINT 81-17] A82-37789
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls [NASA-TP-2010] N82-26703

ADAPTIVE CONTROL
Considerations of open-loop, closed-loop, and adaptive multicyclic control systems [AHS PREPRINT 81-13] A82-37786
Effect on fuel efficiency of parameter variations in the cost function for multivariable control of a turbofan engine [AD-A110614] N82-26301

ADDITIVES
An investigation of engine and test cell operating conditions on the effectiveness of smoke suppressant fuel additives [AD-A112800] N82-27527

ADHESIVE BONDING
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives --- adhesively bonding graphite-polyimide structures [NASA-CR-165839] N82-26465

AERIAL RECONNAISSANCE
Some potential novel approaches to the automatic airborne detection and identification of ground targets N82-27296

AEROACOUSTICS
On the design and test of a low noise propeller [NASA-CR-165938] N82-27089

AERODYNAMIC CHARACTERISTICS
Ultralight airplanes A82-35233
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine [ASME PAPER 82-GT-222] A82-35409
Heat transfer measurements of a transonic nozzle guide vane [ASME PAPER 82-GT-247] A82-35426
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques [ASME PAPER 82-GT-304] A82-35469
Transonic wind tunnel test of a supersonic nozzle installation [AIAA PAPER 82-1045] A82-37677
Current techniques for jet engine test cell modeling [AIAA PAPER 82-1272] A82-37712
General purpose research rotor [AHS PREPRINT 81-9] A82-37777
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics --- conducted in Langley 30- by 60-foot tunnel [NASA-TP-2011] N82-26217
Laser anemometer measurements in an annular cascade of core turbine vanes and comparison with theory [NASA-TP-2018] N82-26234
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence [NASA-TM-84484] N82-26236
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 1 [AD-A111763] N82-27225
XH-59A ABC technology demonstrator altitude expansion and operational tests [AD-A111114] N82-27282

Proceedings of the 12th Navy Symposium on Aeroballistics, volume 2
[AD-A111783] N82-27312

AERODYNAMIC COEFFICIENTS
Hurricane-induced wind loads
[PB82-132267] N82-27548

AERODYNAMIC CONFIGURATIONS
Development of low-order model of an X-wing aircraft by system identification
[AD-A113760] N82-27286

AERODYNAMIC DRAG
Commercial transports - Aerodynamic design for cruise performance efficiency
A82-35555
Supersonic cruise/transonic maneuver wing section development study
[AD-A110686] N82-26256

AERODYNAMIC HEAT TRANSFER
Heat transfer measurements of a transonic nozzle guide vane
[ASME PAPER 82-GT-247] A82-35426

AERODYNAMIC INTERFERENCE
Thrust reverser induced flow interference on tactical aircraft stability and control
[AIAA PAPER 82-1133] A82-37693

AERODYNAMIC LOADS
Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770
Determination of rotor wake induced empennage airloads
[AHS PREPRINT 81-26] A82-37796
An analytical study of turbulence responses, including horizontal tail loads, of a control configured jet transport with relaxed static stability
N82-26313
Performance deterioration due to acceptance testing and flight loads; JT9D jet engine diagnostic program
[NASA-CR-165572] N82-27309

AERODYNAMIC NOISE
On the design and test of a low noise propeller
[NASA-CR-165938] N82-27089
Airbus Industrie and community noise
N82-27865

AERODYNAMIC STABILITY
A stage-by-stage dual-speed compression system modeling technique
[ASME PAPER 82-GT-189] A82-35394
Aerodynamic lag functions, divergence, and the British flutter method
A82-35820
Annular wing
[NASA-CASE-FRC-11007-2] N82-26277

AERODYNAMIC STALLING
The performance of centrifugal compressor channel diffusers
[ASME PAPER 82-GT-10] A82-35279
Effect of the rear stage casing treatment on the overall performance of a multistage axial-flow compressor
[ASME PAPER 82-GT-110] A82-35344
A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression
A82-37765
A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation
[AHS PREPRINT 81-12] A82-37785
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics --- conducted in Langley 30- by 60-foot tunnel
[NASA-TP-2011] N82-26217

AERODYNAMICS
CFD technology for propulsion installation design - Forecast for the 80's --- computational fluid dynamics in aerospace applications
[ASME PAPER 82-GT-21] A82-35289
Practical aerodynamic problems - Military aircraft
A82-35556
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216

AEROELASTICITY
Aerodynamic lag functions, divergence, and the British flutter method
A82-35820
Substructure program for analysis of helicopter vibrations
[AHS PREPRINT 81-24] A82-37795
Static and aeroelastic optimization of aircraft
A82-37945
Survey of active and passive means to reduce rotorcraft vibrations
A82-37946
F-16 active flutter suppression program
A82-37947
Summary and recent results from the NASA advanced High Speed Propeller Research Program
[NASA-TM-82891] N82-26219
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence
[NASA-TM-84484] N82-26236
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703

AERONAUTICAL ENGINEERING
NASA research in aircraft propulsion
[ASME PAPER 82-GT-177] A82-35389
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216
A technical assessment of aeronautical engineering in Israel
[AD-A106980] N82-27218

AERONAUTICS
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165388] N82-27316

AEROSPACE ENGINEERING
Bibliography of Lewis Research Center technical publications announced in 1981
[NASA-TM-82838] N82-27191

AEROSPACE SYSTEMS
Lightning simulation and testing
A82-35733

AEROSPACEPLANES
A concept for light-powered flight
[AIAA PAPER 82-1214] A82-35067

AEROTHERMODYNAMICS
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044
Test facility and data handling system for the development of axial compressors
[ASME PAPER 82-GT-73] A82-35322

AFTERBURNING
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044

AGING (MATERIALS)
Ageing of composite rotor blades
A82-37771

AGRICULTURAL AIRCRAFT
Briefs of accidents involving aerial application operations, U.S. general aviation, 1979
[PB82-138983] N82-27256

AH-1G HELICOPTER
Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770
Improved methods in ground vibration testing
[AHS PREPRINT 81-6] A82-37781

AIR CARGO
Advanced internal cargo system concept demonstration and evaluation
[AD-A111990] N82-26282

AIR COOLING
The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine
[ASME PAPER 82-GT-63] A82-35315

AIR DEFENSE
The PATRIOT Radar in tactical air defense
A82-37031

AIR FLOW
- Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow [ASME PAPER 82-GT-16] A82-35285
- Gas turbine airflow control for optimum heat recovery [ASME PAPER 82-GT-83] A82-35329

AIR JETS
- Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions [ASME PAPER 82-GT-32] A82-35293
- Local heat transfer to staggered arrays of impinging circular air jets [ASME PAPER 82-GT-211] A82-35401
- Digital spectral analysis of the noise from short duration impulsively started jets A82-36191

AIR LAW
- The DC-10 Chicago crash and the legality of SFAR 40 A82-37832
- The recognition of air worthiness of aircraft - Comments to a remarkable judicial decision A82-38025

AIR NAVIGATION
- Certification of an airborne Loran-C navigation system A82-35876
- Prospects for Navsat - A future worldwide civil navigation-satellite system A82-36047
- FAA tests on the Navstar GPS Z-set A82-37039
- Joint University Program Air for Transportation Research, 1981 [NASA-CP-2224] N82-26199
- PPOD Programmable pilot-oriented display --- air navigation N82-26201
- The P-POD Project --- error detection codes N82-26202
- Investigation of air transportation technology at Ohio University, 1981 --- loran N82-26204
- Loran-C plotting program for plotting lines of position on standard charts N82-26206
- A Loran-C prototype navigation receiver for general aviation N82-26207
- A Loran-C prototype navigation receiver for general aviation N82-26208
- Investigation of air transportation technology at Princeton University, 1981 N82-26212
- Modification of OE-258/URN Tactical Air Navigation (TACAN) antenna group [AD-A111680] N82-26264

AIR POLLUTION
- Smoke reduction in FJR-710 turbofan engines by an airblast combustor [ASME PAPER 82-GT-24] A82-35290
- Fuel microemulsions for jet engine smoke reduction [ASME PAPER 82-GT-33] A82-35294
- Control of air pollution from aviation: The emission standard setting process [AD-A107435] N82-27869

AIR PURIFICATION
- Small engine inlet air particle separator technology [ASME PAPER 82-GT-40] A82-35299

AIR QUALITY
- An oxygen enriched air system for the AV-8A Harrier [AD-A112338] N82-27239
- Control of air pollution from aviation: The emission standard setting process [AD-A107435] N82-27869

AIR TO SURFACE MISSILES
- Impact of advanced avionics and munitions technology on ground attack weapons systems in night and adverse weather conditions N82-27294

AIR TRAFFIC
- Cockpit display of traffic information and the measurement of pilot workload: An annotated bibliography [AD-A113637] N82-27291
- Control of air pollution from aviation: The emission standard setting process [AD-A107435] N82-27869

AIR TRAFFIC CONTROL
- Justification for, and design of, an economical programmable multiple flight simulator A82-36969
- Traffic flow control in the Frankfurt/Main airport area A82-37526
- Dynamic scheduling of runway operations N82-26200
- Comparison between the surveillance performances of the Air Traffic Control Radar Beacon System mode of the Mode S and the Automated Radar Terminal System [AD-A111733] N82-26273
- Standard engineering installation package. Air traffic radio channel control equipment: Change 1 [AD-A107150] N82-26275
- Airfield and airspace capacity/delay policy analysis [AD-A110777] N82-26326
- Marine Air Traffic Control and Landing System (MATCALS) investigation [AD-A107384] N82-27260
- High-speed rotary printing device for air traffic control applications: A preliminary evaluation [AD-A107325] N82-27264
- Design and implementation of efficient algorithms for automatic determination of corrected slant range [AD-A112248] N82-27267
- Terminal air traffic control with surveillance data from the mode 5 system: Results of system demonstrations to field controllers [AD-A112632] N82-27268
- AUTOPILOT: A distributed planner for air fleet control [AD-A107139] N82-27269
- Marine Air Traffic Control and Landing System (MATCALS) investigation [AD-A113047] N82-27276
- An analysis of selected enhancements to the en route central computing complex [AD-A113575] N82-28044

AIR TRANSPORTATION
- Investigation of air transportation technology at Princeton University, 1981 N82-26212
- Final regulatory evaluation: Metropolitan Washington Airports Policy [AD-A110583] N82-26324
- Cold regions testing of an air transportable shelter [AD-A107131] N82-27325

AIRBORNE EQUIPMENT
- Airborne warning systems for natural and aircraft-initiated lightning A82-35729
- Certification of an airborne Loran-C navigation system A82-35876
- A single-frequency multitransmitter telemetry technique A82-36281
- An accurate Doppler navigator with microwave simplicity A82-37037
- Medium PRF performance analysis --- Pulse-Repetition Frequency A82-37378
- Air-ground attack: Axes of research for airborne systems N82-27295
- Protection of electrical systems from EM hazards: Design guide [AD-A112707] N82-27659

AIRBORNE RADAR APPROACH
- Real-time simulation of an airborne radar for overwater approaches [NASA-CR-166295] N82-26262

AIRBORNE/SPACEBORNE COMPUTERS
- An approach to software for high integrity applications --- in aircraft gas turbine engine control [ASME PAPER 82-GT-251] A82-35430
- PPOD Programmable pilot-oriented display --- air navigation N82-26201

A floating-point/multiple-precision processor for airborne applications
[NASA-TM-84252] N82-26289
AUTOPILOT: A distributed planner for air fleet control
[AD-A107139] N82-27269
Pave Mover aided integrated strike avionics system
N82-27298

AIRCRAFT ACCIDENT INVESTIGATION
Briefs of accidents involving gliders, U.S. general aviation, 1979
[PB82-139015] N82-27258

AIRCRAFT ACCIDENTS
The DC-10 Chicago crash and the legality of SFAR 40
A82-37832
The recognition of air worthiness of aircraft - Comments to a remarkable judicial decision
A82-38025
Update of the summary report of 1977-1978 task force on aircrew workload
[AD-A112547] N82-26258
Proposed research tasks for the reduction of human error in naval aviation mishaps
[AD-A112339] N82-27241
Cabin safety in large transport aircraft
[PB82-129297] N82-27244
Briefs of accidents, involving corporate/executive aircraft, U.S. general aviation, 1979
[PB82-138967] N82-27245
Briefs of accidents involving missing and missing later recovered aircraft, U.S. general aviation, 1979
[PB82-138959] N82-27246
Briefs of accidents involving alcohol as a cause/factor, U.S. general aviation, 1979
[PB82-138942] N82-27247
Briefs of fatal accidents involving weather as a cause/factor, U.S. general aviation, 1979
[PB82-138934] N82-27248
Briefs of accidents involving rotorcraft, U.S. general aviation, 1979
[PB82-138926] N82-27249
Briefs of accidents involving turbine powered aircraft, US general aviation, 1979
[PB82-138918] N82-27250
Briefs of accidents involving midair collisions: U.S. general aviation, 1979
[PB82-138900] N82-27251
Listing of aircraft accidents/incidents by make and model, U.S. civil aviation, 1979
[PB82-138892] N82-27252
Annual review of aircraft accident data: U.S. air carrier operations, 1979
[PB82-134339] N82-27253
Briefs of fatal accidents involving fixed-wing multi-engine aircraft, U.S. General Aviation, 1979
[PB82-139007] N82-27254
Briefs of accidents involving computer air carriers and on-demand air taxi operations, U.S. general aviation, 1979
[PB82-138991] N82-27255
Briefs of accidents involving aerial application operations, U.S. general aviation, 1979
[PB82-138983] N82-27256
Briefs of accidents involving amateur/home built aircraft, U.S. general aviation, 1979
[PB82-138975] N82-27257
Briefs of accidents involving gliders, U.S. general aviation, 1979
[PB82-139015] N82-27258

AIRCRAFT ANTENNAS
Elevation plane analysis of on-aircraft antennas
[AD-A112373] N82-26554
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558
Advanced microstrip antenna developments. Volume 2: Microstrip GPS antennas for general aviation aircraft
[AD-A113620] N82-27588

AIRCRAFT APPROACH SPACING
Traffic flow control in the Frankfurt/Main airport area
A82-37526
Dynamic scheduling of runway operations
N82-26200
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326

AIRCRAFT CARRIERS
Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator
[AD-A112466] N82-27324

AIRCRAFT COMMUNICATION
Implementing aircraft identification schemes by public key cryptosystems
A82-37381
A comparative study of narrowband vocoder algorithms in Air Force operational environments using the Diagnostic Rhyme Test
[AD-A112053] N82-26546
Attack and en route avionics for in-weather operations
N82-27300

AIRCRAFT COMPARTMENTS
Flight demonstration of an integrated floor/fuel isolation system
[AHS PREPRINT 81-16] A82-37788
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088
Cabin safety in large transport aircraft
[PB82-129297] N82-27244

AIRCRAFT CONFIGURATIONS
Propulsion system requirements for advanced fighter aircraft
[AIAA PAPER 82-1143] A82-35025
CFD technology for propulsion installation design - Forecast for the 80's --- computational fluid dynamics in aerospace applications
[ASME PAPER 82-GT-21] A82-35289
NASA research in aircraft propulsion
[ASME PAPER 82-GT-177] A82-35389
Extension of FLO codes to transonic flow prediction for fighter configurations
A82-35564
Applied computational transonics - Capabilities and limitations
A82-35566
Evaluation of full potential flow methods for the design and analysis of transport wings
A82-35567
A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations
[AIAA PAPER 82-1017] A82-37477
Advanced nozzle integration for air combat fighter application
[AIAA PAPER 82-1135] A82-37694
An analytical study of turbulence responses, including horizontal tail loads, of a control configured jet transport with relaxed static stability
N82-26313

AIRCRAFT CONSTRUCTION MATERIALS
A laboratory mock-up ultrasonic inspection system for composites
A82-35256
Material and process impact on aircraft engine designs of the 1990's
[ASME PAPER 82-GT-278] A82-35453
The direct effects of lightning on aircraft
A82-35730
Evaluation criteria for aero engine materials
A82-36065
Fabrication and test of integrally stiffened graphite/epoxy components
A82-37071
Fuselage structure using advanced technology fiber reinforced composites
[NASA-CASE-LAR-11688-1] N82-26384
Design of a data acquisition and reduction system for fatigue testing
[AD-A110612] N82-26720
Mechanical property characterization and modeling of structural materials --- for airframes and aircraft gas turbine engines
[AD-A113841] N82-27784

AIRCRAFT CONTROL
Integrated aircraft avionics and powerplant control and management systems
[ASME PAPER 82-GT-165] A82-35385

Thrust reverser induced flow interference on tactical aircraft stability and control [AIAA PAPER 82-1133] A82-37693
Magnetic heading reference [NASA-CASE-LAR-12638-1] N82-26260
Hinged strake aircraft control system [NASA-CASE-LAR-12860-1] N82-26278
Control optimization, stabilization and computer algorithms for aircraft applications [NASA-CR-169015] N82-27009

AIRCRAFT DESIGN
Model test and full scale checkout of dry-cooled jet runup sound suppressors [AIAA PAPER 82-1239] A82-35079
Ultralight airplanes A82-35233
CFD technology for propulsion installation design - Forecast for the 80's --- computational fluid dynamics in aerospace applications [ASME PAPER 82-GT-27] A82-35289
The influence of engine characteristics on patrol aircraft life cycle cost optimization [ASME PAPER 82-GT-256] A82-35433
Cycle considerations for tactical fighters in the early 1990's [ASME PAPER 82-GT-259] A82-35436
Practical aerodynamic problems - Military aircraft A82-35556
Transonic design using computational aerodynamics A82-35560
Application of computational methods to transonic wing-design A82-35561
A-7 transonic wing designs A82-35562
A significant role for composites in energy-efficient aircraft A82-37065
Investigation of subsonic nacelle performance improvement concept [AIAA PAPER 82-1042] A82-37676
Factors shaping conceptual design of rotary-wing aircraft A82-37773
Supersonic cruise/transonic maneuver wing section development study [AD-A110686] N82-26256
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design [AD-A110954] N82-26291
Preplanned product improvement and other modification strategies: Lessons from past aircraft modification programs [AD-A113599] N82-27220
Characteristics of future aircraft impacting aircraft and airport compatibility [NASA-TM-84476] N82-27233

AIRCRAFT DETECTION
Multiple aircraft tracking system for coordinated research missions A82-35869
Electric field detection and ranging of aircraft A82-37377
Implementing aircraft identification schemes by public key cryptosystems A82-37381

AIRCRAFT ENGINES
Selection of a starting system for a low cost single engine fighter aircraft [AIAA PAPER 82-1043] A82-34977
Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility [AIAA PAPER 82-1044] A82-34978
Ceramic component development for limited-life propulsion engines [AIAA PAPER 82-1050] A82-34979
Blade loss transient dynamic analysis of turbomachinery [AIAA PAPER 82-1057] A82-34982
Analysis of two-dimensional internal flows using a primitive-variable relaxation Navier-Stokes procedure [AIAA PAPER 82-1083] A82-34998
Selecting the best reduction gear concept for prop-fan propulsion systems [AIAA PAPER 82-1124] A82-35020
PMUX - The interface for engine data to AIDS --- propulsion multiplexer in Aircraft Integrated Data System [AIAA PAPER 82-1127] A82-35022
Charting propulsion's future - The ATES results --- Advanced technology Engine Studies program for aircraft engine design [AIAA PAPER 82-1139] A82-35023
A methodology for planning a cost effective engine development --- for fighter aircraft [AIAA PAPER 82-1140] A82-35024
The F404 development program - A new approach [AIAA PAPER 82-1180] A82-35045
Development of engine operability [AIAA PAPER 82-1181] A82-35046
T700 - Modern development test techniques, lessons learned and results [AIAA PAPER 82-1183] A82-35048
Next generation trainer /NGT/ engine requirements - An application of lessons learned [AIAA PAPER 82-1184] A82-35049
Characteristics of a side dump gas generator ramjet [AIAA PAPER 82-1258] A82-35089
Ultralight airplanes A82-35233
Dry friction damping mechanisms in engine blades [ASME PAPER 82-GT-162] A82-35383
The influence of Coriolis forces on gyroscopic motion of spinning blades [ASME PAPER 82-GT-163] A82-35384
HC and CO emission abatement via selective fuel injection [ASME PAPER 82-GT-178] A82-35390
A stage-by-stage dual-spool compression system modeling technique [ASME PAPER 82-GT-189] A82-35394
Aeropropulsion research for the U.S. Army [ASME PAPER 82-GT-203] A82-35398
Acquisition of F-100/3/ high pressure compressor entrance profiles [ASME PAPER 82-GT-215] A82-35402
Advanced turboprop engines for long endurance naval patrol aircraft [ASME PAPER 82-GT-217] A82-35404
An approach to software for high integrity applications --- in aircraft gas turbine engine control [ASME PAPER 82-GT-251] A82-35430
The influence of engine characteristics on patrol aircraft life cycle cost optimization [ASME PAPER 82-GT-256] A82-35433
Performance improvement features of General Electric turbofan engines [ASME PAPER 82-GT-270] A82-35446
Interim review of the Energy Efficient Engine /E3/ Program [ASME PAPER 82-GT-271] A82-35447
NASA ECI programs - Benefits to Pratt and Whitney engines [ASME PAPER 82-GT-272] A82-35448
Material and process impact on aircraft engine designs of the 1990's [ASME PAPER 82-GT-278] A82-35453
Technology advancements for energy efficient aircraft engines [AIAA PAPER 82-1051] A82-35479
Propellers come full circle --- prop-fan technology for aircraft fuel savings A82-35881
Evaluation criteria for aero engine materials A82-36065
The powerplants of the Yak-40 and M-15 aircraft --- Russian book A82-36947
Evaluation of a multivariable control design on a variable cycle engine simulation [AIAA PAPER 82-1077] A82-37682
Reliability design study for a fault-tolerant electronic engine control [AIAA PAPER 82-1129] A82-37689
Design concepts of an advanced propulsion monitoring system [AIAA PAPER 82-1130] A82-37690
Optical tip clearance sensor for aircraft engine controls [AIAA PAPER 82-1131] A82-37691
A cost modeling approach to engine optimization [AIAA PAPER 82-1185] A82-37698

Strategic materials - Technological trends
A82-37972
Development potential of Intermittent Combustion (I.C.) aircraft engines for commuter transport applications
[NASA-TM-82869] N82-26297
NASA research in supersonic propulsion: A decade of progress
[NASA-TM-82862] N82-26300
Life and Utilization Criteria Identification In Design (LUCID), volume 2
[AD-A111940] N82-26310
Research and development on wear metal analysis
[AD-A112100] N82-26446
Forecasting aircraft condensation trails
[AD-A111876] N82-26939
Aerodynamic investigations to determine possible ice flight paths
[NASA-TM-76648] N82-27235
Briefs of accidents involving turbine powered aircraft, US general aviation, 1979
[PB82-138918] N82-27250
Performance deterioration due to acceptance testing and flight loads; JT90 jet engine diagnostic program
[NASA-CR-165572] N82-27309
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743
Mechanical property characterization and modeling of structural materials --- for airframes and aircraft gas turbine engines
[AD-A113841] N82-27784
Control of air pollution from aviation: The emission standard setting process
[AD-A107435] N82-27869

AIRCRAFT EQUIPMENT
An automatic map reader suitable for use in helicopters
A82-37775
Design guide for aircraft hydraulic systems and components for use with chlorotrifluorethylene nonflammable hydraulic fluids
[AD-A112097] N82-26283
Opportunities to reduce the cost of some B-52 modifications
[AD-A113563] N82-27219
A Loran-C prototype navigation receiver for general aviation
[NASA-CR-169118] N82-27259
Impact of Advanced Avionics Technology and Ground Attack Weapon Systems
[AGARD-CP-306] N82-27293

AIRCRAFT FUEL SYSTEMS
Aircraft fire safety research with antimisting fuels - Status report
[AIAA PAPER 82-1235] A82-35076
Experimental study of external fuel vaporization
[ASME PAPER 82-GT-59] A82-35312
The direct effects of lightning on aircraft
A82-35730
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

AIRCRAFT FUELS
NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status
[AIAA PAPER 82-1088] A82-34999
Will hydrogen-fueled aircraft be safe
[AIAA PAPER 82-1236] A82-35077
Thermal decomposition of aviation fuel
[ASME PAPER 82-GT-27] A82-35292
The low temperature properties of aviation fuels
[ASME PAPER 82-GT-48] A82-35306
The potential impact of future fuels on small gas turbine engines
[ASME PAPER 82-GT-133] A82-35362
An alternate test procedure to qualify future fuels for Navy aircraft
[AIAA PAPER 82-1233] A82-36175
Jet fuel from shale oil: The 1981 technology review
[AD-A111217] N82-26484

Benefit cost analysis of the aircraft energy efficiency program
[NASA-CR-169116] N82-27280
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

AIRCRAFT GUIDANCE
C band spectral tracking for FM/CW altimetry
A82-37035
An automatic map reader suitable for use in helicopters
A82-37775

AIRCRAFT HAZARDS
Triggered lightning --- resulting from aircraft atmospheric electricity interactions
A82-35727
Airborne warning systems for natural and aircraft-initiated lightning
A82-35729
The direct effects of lightning on aircraft
A82-35730
Proceedings of the 1st Annual Workshop on Aviation Related Electricity Hazards Associated with Atmospheric Phenomena and Aircraft Generated Inputs
[AD-A107326] N82-27237
Software functional description of mass weather dissemination system exploratory engineering model
[AD-A112706] N82-27573

AIRCRAFT HYDRAULIC SYSTEMS
Corrosion tests with MIL-H-83282 and MIL-H-6083 aircraft hydraulic fluids
[AD-A112437] N82-27506

AIRCRAFT INSTRUMENTS
Assembly of aircraft instruments --- Russian book
A82-36950
Instrument failure detection in partially observable systems
A82-37380
PPOD Programmable pilot-oriented display --- air navigation
N82-26201
Cockpit display of traffic information and the measurement of pilot workload: An annotated bibliography
[AD-A113637] N82-27291

AIRCRAFT LANDING
Lateral control system design for VTOL landing on a DD963 in high sea states
[NASA-CR-169074] N82-26315
Quiet Short-Haul Research Airplane (QSRA) model select panel functional description
[NASA-TM-84243] N82-27319

AIRCRAFT MAINTENANCE
Next generation trainer /NGT/ engine requirements - An application of lessons learned
[AIAA PAPER 82-1184] A82-35049
Development and application of Dabber gas tungsten arc welding for repair of aircraft engine, seal teeth
[ASME PAPER 82-GT-55] A82-35310
The Sortie-Generation Model system. Volume 2: Sortie-Generation Model user's guide
[AD-A110898] N82-26223
The Sortie-Generation Model system. Volume 5: Maintenance subsystem
[AD-A110815] N82-26225
The Sortie-Generation Model system. Volume 6: Spares subsystem
[AD-A110900] N82-26226

AIRCRAFT MANEUVERS
Supersonic cruise/transonic maneuver wing section development study
[AD-A110686] N82-26256
Minimum time turns constrained to the vertical plane
[AD-A111096] N82-26317
Performance deterioration due to acceptance testing and flight loads; JT90 jet engine diagnostic program
[NASA-CR-165572] N82-27309

AIRCRAFT MODELS
Development of a helicopter rotor/propulsion system dynamics analysis
[AIAA PAPER 82-1078] A82-34997

Current techniques for jet engine test cell modeling
[AIAA PAPER 82-1272] A82-37712

AIRCRAFT NOISE
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077
Airbus Industrie and community noise
N82-27865
The annoyance of impulsive helicopter noise
[NASA-CR-169123] N82-28134

AIRCRAFT PARTS
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites
[ASLE PREPRINT 82-AM-5A-2] A82-37855

AIRCRAFT PERFORMANCE
Propulsion system requirements for advanced fighter aircraft
[AIAA PAPER 82-1143] A82-35025
Development of engine operability
[AIAA PAPER 82-1181] A82-35046
Ultralight airplanes
A82-35233
Cycle considerations for tactical fighters in the early 1990's
[ASME PAPER 82-GT-259] A82-35436
Investigation of subsonic nacelle performance improvement concept
[AIAA PAPER 82-1042] A82-37676
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-169027] N82-26279
Mission effectiveness of the AV-8B Harrier 2 could be improved if actions are taken now
[AD-A111878] N82-26284
Aerodynamic investigations to determine possible ice flight paths
[NASA-TM-76648] N82-27235
Composite flight test boom for Nomad N22B aircraft
[ARL-0086-TM] N82-27289
Radiation/catalytic augmented combustion
[AD-A112376] N82-27434

AIRCRAFT PILOTS
Update of the summary report of 1977-1978 task force on aircrew workload
[AD-A112547] N82-26258

AIRCRAFT PRODUCTION
The DRAPO system - Materials means and logic functions
A82-37521
Learning and costs in airframe production, part 1
[AD-A112948] N82-28210

AIRCRAFT PRODUCTION COSTS
Learning and costs in airframe production, part 1
[AD-A112948] N82-28210

AIRCRAFT RELIABILITY
A method for observing the deterioration of airframe life in operational conditions
A82-37123
The DC-10 Chicago crash and the legality of SFAR 40
A82-37832
The recognition of air worthiness of aircraft - Comments to a remarkable judicial decision
A82-38025
Airworthiness and flight characteristics test of an OH-58C configured to a Light Combat Helicopter (LCH)
[AD-A112581] N82-26286

AIRCRAFT SAFETY
Aircraft fire safety research with antimisting fuels - Status report
[AIAA PAPER 82-1235] A82-35076
Will hydrogen-fueled aircraft be safe
[AIAA PAPER 82-1236] A82-35077
Airborne warning systems for natural and aircraft-initiated lightning
A82-35729
Electromagnetic interaction of lightning with aircraft
A82-35731
Lightning simulation and testing
A82-35733
Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria
A82-35734
Opportunities exist to achieve greater standardization of aircraft and helicopter seats
[AD-A111718] N82-26259
Wind tunnel measurements of three-dimensional wakes of buildings --- for aircraft safety applications
[NASA-CR-3565] N82-26921
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236
Assessment of lightning simulation test techniques, part 1
[AD-A112626] N82-27663

AIRCRAFT SPECIFICATIONS
The low temperature properties of aviation fuels
[ASME PAPER 82-GT-48] A82-35306

AIRCRAFT STABILITY
Thrust reverser induced flow interference on tactical aircraft stability and control
[AIAA PAPER 82-1133] A82-37693
A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation
[AHS PREPRINT 81-12] A82-37785
Considerations of open-loop, closed-loop, and adaptive multicyclic control systems
[AHS PREPRINT 81-13] A82-37786

AIRCRAFT STRUCTURES
Quasi-static and dynamic crushing of energy absorbing materials and structural components with the aim of improving helicopter crashworthiness
A82-37769
Static and aeroelastic optimization of aircraft
A82-37945

AIRCRAFT SURVIVABILITY
Combat survivability in the Advanced Technology Engine Study /ATES/
[AIAA PAPER 82-1287] A82-35101

AIRCRAFT WAKES
Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes
[AIAA PAPER 82-0951] A82-37467
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence
[NASA-TM-84484] N82-26236
Wind tunnel measurements of three-dimensional wakes of buildings --- for aircraft safety applications
[NASA-CR-3565] N82-26921
B-747 vortex alleviation flight tests: Ground-based sensor measurements
[AD-A113621] N82-27287

AIRFIELD SURFACE MOVEMENTS
Briefs of accidents involving computer air carriers and on-demand air taxi operations, U.S. general aviation, 1979
[PB82-138991] N82-27255

AIRFOIL PROFILES
Optimization of propeller blade shape by an analytical method
[AIAA PAPER 82-1125] A82-35021
A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine
[ASME PAPER 82-GT-222] A82-35409
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469
A series of airfoils designed by transonic drag minimization for Gates Learjet aircraft
A82-35565
Core compressor exit stage study, volume 6
[NASA-CR-165554] N82-27310

AIRFOILS
Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388

Aerodynamic lag functions, divergence, and the British flutter method
A82-35820
The numerical solution of the Navier-Stokes equations for incompressible turbulent flow over airfoils
[AD-A111279] N82-26612

AIRFRAME MATERIALS
A significant role for composites in energy-efficient aircraft
A82-37065
Efficient part removal processes --- from molds
A82-37097
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and RRSYS
[AD-A112224] N82-27411

AIRFRAMES
A method for observing the deterioration of airframe life in operational conditions
A82-37123
Improved methods in ground vibration testing
[AHS PREPRINT 81-6] A82-37781
Determination of in-flight helicopter loads and vibration
[AHS PREPRINT 81-7] A82-37782
Specification and estimation of dynamic cost functions for airframe production airframes
[AD-A113147] N82-27221
Commercial aircraft airframe fuel systems surveys
[AD-A112241] N82-27524
Learning and costs in airframe production, part 1
[AD-A112948] N82-28210

AIRLINE OPERATIONS
The recognition of air worthiness of aircraft - Comments to a remarkable judicial decision
A82-38025

AIRPORT PLANNING
Traffic flow control in the Frankfurt/Main airport area
A82-37526
Characteristics of future aircraft impacting aircraft and airport compatibility
[NASA-TM-84476] N82-27233

AIRPORTS
Final regulatory evaluation: Metropolitan Washington Airports Policy
[AD-A110583] N82-26324
Characteristics of future aircraft impacting aircraft and airport compatibility
[NASA-TM-84476] N82-27233
Test and evaluation of the airport radar wind shear detection system
[AD-A112663] N82-27924

AIRSPEED
XH-59A ABC technology demonstrator altitude expansion and operational tests
[AD-A111114] N82-27282

ALGORITHMS
Flying qualities criteria for GA single pilot IFR operations
N82-26213
A comparative study of narrowband vocoder algorithms in Air Force operational environments using the Diagnostic Rhyme Test
[AD-A112053] N82-26546
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A107384] N82-27260
Digital command augmentation for lateral directional aircraft dynamics
[AD-A107264] N82-27321

ALL-WEATHER AIR NAVIGATION
Weapon system of a future attack aircraft
N82-27301

ALTERNATING CURRENT
Effects of high voltage transmission lines on non-directional beacon performance
[AD-A112311] N82-27261

ALTITUDE
XH-59A ABC technology demonstrator altitude expansion and operational tests
[AD-A111114] N82-27282

ALUMINUM COATINGS
Application and testing of metallic coatings on graphite/epoxy composites
A82-37074

ANALOG SIMULATION
Advancements in real-time engine simulation technology --- of digital electronic aircraft engine controls
[AIAA PAPER 82-1075] A82-34995

ANGLE OF ATTACK
Air data measurement using distributed processing and fiber optics data transmission
N82-26214
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics --- conducted in Langley 30- by 60-foot tunnel
[NASA-TP-2011] N82-26217

ANNULAR FLOW
A comprehensive method for preliminary design optimization of axial gas turbine stages
[AIAA PAPER 82-1264] A82-35091
Local heat transfer to staggered arrays of impinging circular air jets
[ASME PAPER 82-GT-211] A82-35401
Laser anemometer measurements in an annular cascade of core turbine vanes and comparison with theory
[NASA-TP-2018] N82-26234

ANTENNA ARRAYS
Modification of OE-258/URN Tactical Air Navigation (TACAN) antenna group
[AD-A111680] N82-26264
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558

ANTENNA DESIGN
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558
Advanced microstrip antenna developments. Volume 2: Microstrip GPS antennas for general aviation aircraft
[AD-A113620] N82-27588

ANTENNA RADIATION PATTERNS
Elevation plane analysis of on-aircraft antennas
[AD-A112373] N82-26554

ANTIMISTING FUELS
Aircraft fire safety research with antimisting fuels - Status report
[AIAA PAPER 82-1235] A82-35076

APPLICATIONS PROGRAMS (COMPUTERS)
The Flight Service Automation System (FSAS) system benchmark. Volume 2: The model of the application
[PB82-143546] N82-27278

APPROACH INDICATORS
PPOD Programmable pilot-oriented display --- air navigation
N82-26201
Flight-test verification of a pictorial display for general aviation instrument approach
[NASA-TM-83305] N82-26288
Simulation report: Advanced display for complex flight trajectories
[AD-A111259] N82-26320

APPROXIMATION
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273

ARC HEATING
Increased capabilities of the Langley Mach 7 Scramjet Test Facility
[AIAA PAPER 82-1240] A82-35080

AREA NAVIGATION
Navstar - Global Positioning System: A revolutionary capability
A82-37040

ARRAYS
Local heat transfer to staggered arrays of impinging circular air jets
[ASME PAPER 82-GT-211] A82-35401

ASPECT RATIO
Secondary flow effects and mixing of the wake behind a turbine stator
[ASME PAPER 82-GT-46] A82-35304
Development and application of a performance prediction method for straight rectangular diffuser
[ASME PAPER 82-GT-122] A82-35352

ASSEMBLIES
Advanced concepts for composite structure joints and attachment fittings. Volume 2: Design guide
[AD-A111106] N82-26280

ASSEMBLING
- Assembly of aircraft instruments --- Russian book A82-36950

ASSESSMENTS
- Reduced performance and increased cost warrant reassessment of the multiple stores ejector rack [AD-A112776] N82-27285

ATMOSPHERIC EFFECTS
- Aviation meteorology --- Russian book A82-36972

ATMOSPHERIC ELECTRICITY
- Triggered lightning --- resulting from aircraft atmospheric electricity interactions A82-35727
- Influence of meteorological processes on the verticality of electric fields [AD-A111549] N82-26897
- Proceedings of the 1st Annual Workshop on Aviation Related Electricity Hazards Associated with Atmospheric Phenomena and Aircraft Generated Inputs [AD-A107326] N82-27237

ATMOSPHERIC MOISTURE
- Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds A82-36054

ATOMIZERS
- Influence of airblast atomizer design features on mean drop size [AIAA PAPER 82-1073] A82-34993
- Smoke reduction in FJR-710 turbofan engines by an airblast combustor [ASME PAPER 82-GT-24] A82-35290
- Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions [ASME PAPER 82-GT-32] A82-35293
- Atomization quality of twin fluid atomizers for gas turbines [ASME PAPER 82-GT-61] A82-35314

ATOMIZING
- The Schladitz fuel injector: An initial performance evaluation without burning [AD-A113612] N82-27315

ATTACK AIRCRAFT
- Mission effectiveness of the AV-8B Harrier 2 could be improved if actions are taken now [AD-A111878] N82-26284
- Preplanned product improvement and other modification strategies: Lessons from past aircraft modification programs [AD-A113599] N82-27220
- Impact of Advanced Avionics Technology and Ground Attack Weapon Systems [AGARD-CP-306] N82-27293
- Impact of advanced avionics and munitions technology on ground attack weapons systems in night and adverse weather conditions N82-27294
- Pave Mover aided integrated strike avionics system N82-27298
- Adaptive multifunction sensor concept for air-ground missions N82-27299
- Attack and en route avionics for in-weather operations N82-27300
- Weapon system of a future attack aircraft N82-27301

ATTITUDE INDICATORS
- Simulation report: Advanced display for complex flight trajectories [AD-A111259] N82-26320
- Torsional stiffness element based on cobalt-samarium magnets --- for a turn and bank indicator [BMFT-FB-W-81-044] N82-27292

AUTOMATED EN ROUTE ATC
- Scenarios for evolution of air traffic control [AD-A112566] N82-27270

AUTOMATED RADAR TERMINAL SYSTEM
- Comparison between the surveillance performances of the Air Traffic Control Radar Beacon System mode of the Mode S and the Automated Radar Terminal System [AD-A111733] N82-26273

AUTOMATIC CONTROL
- Quasilinearization solution of the proportional navigation problem [AD-A113668] N82-27273

AUTOMATIC FLIGHT CONTROL
- Lightning simulation and testing A82-35733
- Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system A82-37446
- Rotor state estimation for rotorcraft [AHS PREPRINT 81-11] A82-37704
- Integrated flight trajectory control [AD-A110998] N82-26319

AUTOMATIC GAIN CONTROL
- Joint University Program Air for Transportation Research, 1981 [NASA-CP-2224] N82-26199
- A Loran-C prototype navigation receiver for general aviation N82-26207
- Commutated automatic gain control system N82-26209

AUTOMATIC PILOTS
- A gust damper --- for light passenger aircraft A82-37127

AUTOMATIC TEST EQUIPMENT
- A laboratory mock-up ultrasonic inspection system for composites A82-35256

AUTOMOBILE ENGINES
- Ceramic components for automotive and heavy duty turbine engines - CATE and AGT 100 [ASME PAPER 82-GT-253] A82-35432

AVIONICS
- Integrated aircraft avionics and powerplant control and management systems [ASME PAPER 82-GT-165] A82-35385
- Static charging and its effects on avionic systems A82-35732
- The computerized cockpit for the one-man crew A82-36937
- Life-cycle-cost analysis of the microwave landing system ground and airborne systems [AD-A110909] N82-26266
- Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 1: Results [AD-A110956] N82-26290
- Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design [AD-A110954] N82-26291
- Integrated flight trajectory control [AD-A110998] N82-26319
- Bibliography of Lewis Research Center technical publications announced in 1981 [NASA-TM-82838] N82-27191
- Impact of Advanced Avionics Technology and Ground Attack Weapon Systems [AGARD-CP-306] N82-27293
- Impact of advanced avionics and munitions technology on ground attack weapons systems in night and adverse weather conditions N82-27294
- Air-ground attack: Axes of research for airborne systems N82-27295
- A planning system for F-16 air-to-surface missions N82-27297
- Pave Mover aided integrated strike avionics system N82-27298
- Adaptive multifunction sensor concept for air-ground missions N82-27299
- Attack and en route avionics for in-weather operations N82-27300
- Protection of electrical systems from EM hazards: Design guide [AD-A112707] N82-27659
- Assessment of lightning simulation test techniques, part 1 [AD-A112626] N82-27663

AXIAL FLOW TURBINES
- A comprehensive method for preliminary design optimization of axial gas turbine stages [AIAA PAPER 82-1264] A82-35091

Secondary flows and losses in axial flow turbines
[ASME PAPER 82-GT-19] A82-35288
On the influence of the number of stages on the efficiency of axial-flow turbines
[ASME PAPER 82-GT-43] A82-35301
The use of optimization techniques to design controlled diffusion compressor blading
[ASME PAPER 82-GT-149] A82-35373

AXISYMMETRIC BODIES
Static internal performance characteristics of two thrust reverser concepts for axisymmetric nozzles
[NASA-TP-2025] N82-26235

AXISYMMETRIC FLOW
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710

B

B-52 AIRCRAFT
Optimal placement model for the B-52G weapons system trainer
[AD-A110977] N82-26323
Opportunities to reduce the cost of some B-52 modifications
[AD-A113563] N82-27219

BACKUPS
Reliability and maintainability analysis of fluidic back-up flight control system and components
[AD-A110496] N82-27320

BAILOUT
Lear Fan 2100 egress system
A82-37970

BALLISTICS
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 2
[AD-A111783] N82-27312

BATHYMETERS
The Hydrographic Airborne Laser Sounder (HALS)
[AD-A111027] N82-26660

BEACONS
Wide field of view laser beacon system for three dimensional aircraft range measurements
N82-26216

BEARINGS
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing
[ASME PAPER 82-GT-281] A82-35455
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462

BIBLIOGRAPHIES
Bibliography of Lewis Research Center technical publications announced in 1981
[NASA-TM-82838] N82-27191
Cockpit display of traffic information and the measurement of pilot workload: An annotated bibliography
[AD-A113637] N82-27291

BIODEGRADATION
The biological degradation of spilled jet fuels: A literature review
[AD-A110758] N82-26873

BLADE TIPS
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981
Casing wall boundary-layer development through an isolated compressor rotor
[ASME PAPER 82-GT-18] A82-35287
Effect of impeller extended shrouds on centrifugal compressor performance as a function of specific speed
[ASME PAPER 82-GT-228] A82-35411
Optical tip clearance sensor for aircraft engine controls
[AIAA PAPER 82-1131] A82-37691
Blade tip gap effects in turbomachines: A review
[AD-A111892] N82-26308
Core compressor exit stage study, volume 6
[NASA-CR-165554] N82-27310

BLOWING
Effect of crossflows on the discharge coefficient of film cooling holes
[ASME PAPER 82-GT-147] A82-35371

BODY-WING CONFIGURATIONS
A nonlinear response analysis for coupled rotor-fuselage systems
[AHS PREPRINT 81-23] A82-37794

BOEING AIRCRAFT
Aircraft noise reduction
N82-27281

BOEING 757 AIRCRAFT
Boeing's new transports in a flight-test marathon
A82-37493

BOEING 767 AIRCRAFT
Boeing's new transports in a flight-test marathon
A82-37493

BOMBING EQUIPMENT
Reduced performance and increased cost warrant reassessment of the multiple stores ejector rack
[AD-A112776] N82-27285

BONDING
Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints
A82-37080

BOOMS (EQUIPMENT)
Composite flight test boom for Nomad N22B aircraft
[ARL-0086-TM] N82-27289

BOUNDARY LAYER CONTROL
B-747 vortex alleviation flight tests: Ground-based sensor measurements
[AD-A113621] N82-27287

BOUNDARY LAYER FLOW
An experimental investigation of S-duct diffusers for high-speed propfans
[AIAA PAPER 82-1123] A82-35019
Casing wall boundary-layer development through an isolated compressor rotor
[ASME PAPER 82-GT-18] A82-35287
Secondary flows and losses in axial flow turbines
[ASME PAPER 82-GT-19] A82-35288
Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors
[ASME PAPER 82-GT-85] A82-35331
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469
Comparison of experimental and analytical performance for contoured endwall stators
[NASA-TM-82877] N82-26299

BOUNDARY VALUE PROBLEMS
Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes
[AIAA PAPER 82-0951] A82-37467

BUILDINGS
STOL aircraft response to turbulence generated by a tall upwind building
A82-35821

BYPASS RATIO
Individual bypass throttling in fighter engines
[AIAA PAPER 82-1285] A82-35100
Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines
[AIAA PAPER 82-1136] A82-37695

BYPASSES
Thrust reverser for a long duct fan engine --- for turbofan engines
[NASA-CASE-LEW-13199-1] N82-26293

C

C BAND
C band spectral tracking for FM/CW altimetry
A82-37035

C-135 AIRCRAFT
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 1: Results
[AD-A110956] N82-26290
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design
[AD-A110954] N82-26291
The Marshall Space Flight Center KC-135 zero gravity test program for FY 1981
[NASA-TM-82476] N82-26350

CALCULUS OF VARIATIONS
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874

CANADA
Transportation noise, its impact, planning and regulation N82-27864
[S-258]

CARBON
Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors A82-35041
[AIAA PAPER 82-1175]
Carbon formation by the pyrolysis of gas turbine fuels in preflame regions of gas turbine combustors A82-35330
[ASME PAPER 82-GT-84]
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface N82-27436
[AD-A107441]

CARBON FIBER REINFORCED PLASTICS
Use of CGHRP in transport --- Carbon and Glass Hybrid Reinforced Plastics A82-37061
CFC drive shaft and GFC coupling for the tail rotor of the BO 105 A82-37766

CARBON MONOXIDE
HC and CO emission abatement via selective fuel injection A82-35390
[ASME PAPER 82-GT-178]

CASCADE FLOW
A comprehensive method for preliminary design optimization of axial gas turbine stages A82-35091
[AIAA PAPER 82-1264]
A computational design method for transonic turbomachinery cascades A82-35348
[ASME PAPER 82-GT-117]
A mixed-flow cascade passage design procedure based on a power series expansion A82-35351
[ASME PAPER 82-GT-121]
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves A82-35363
[ASME PAPER 82-GT-135]
The calculation of deviation angle in axial-flow compressor cascades A82-35412
[ASME PAPER 82-GT-230]
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques A82-35469
[ASME PAPER 82-GT-304]
Aerodynamic performance of high turning core turbine vanes in a two-dimensional cascade A82-37716
[AIAA PAPER 82-1288]
Thrust reverser for a long duct fan engine --- for turbofan engines N82-26293
[NASA-CASE-LEW-13199-1]
Blade tip gap effects in turbomachines: A review N82-26308
[AD-A111892]

CASCADE WIND TUNNELS
Heat transfer measurements of a transonic nozzle guide vane A82-35426
[ASME PAPER 82-GT-247]
Aerodynamic performance of high turning core turbine vanes in a two-dimensional cascade A82-37716
[AIAA PAPER 82-1288]

CASING
Influence of casing treatment on the operating range of axial compressors A82-35340
[ASME PAPER 82-GT-103]
Effect of the rear stage casing treatment on the overall performance of a multistage axial-flow compressor A82-35344
[ASME PAPER 82-GT-110]

CATALYSTS
Evaluation of hydrocracking catalysts for conversion of whole shale oil into high yields of jet fuels N82-27523
[AD-A112820]

CATALYTIC ACTIVITY
Radiation/catalytic augmented combustion N82-27434
[AD-A112376]

CATHODE RAY TUBES
Justification for, and design of, an economical programmable multiple flight simulator A82-36969

CAUSES
Briefs of accidents, involving corporate/executive aircraft, U.S. general aviation, 1979 N82-27245
[PB82-138967]
Briefs of accidents involving missing and missing later recovered aircraft, U.S. general aviation, 1979 N82-27246
[PB82-138959]
Briefs of accidents involving alcohol as a cause/factor, U.S. general aviation, 1979 N82-27247
[PB82-138942]
Briefs of fatal accidents involving weather as a cause/factor, U.S. general aviation, 1979 N82-27248
[PB82-138934]
Briefs of accidents involving computer air carriers and on-demand air taxi operations, U.S. general aviation, 1979 N82-27255
[PB82-138991]
Briefs of accidents involving aerial application operations, U.S. general aviation, 1979 N82-27256
[PB82-138983]
Briefs of accidents involving amateur/home built aircraft, U.S. general aviation, 1979 N82-27257
[PB82-138975]

CENTRIFUGAL COMPRESSORS
The performance of centrifugal compressor channel diffusers A82-35279
[ASME PAPER 82-GT-10]
Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry A82-35295
[ASME PAPER 82-GT-34]
Conversion of centrifugal compressor performance curves considering non-similar flow conditions A82-35300
[ASME PAPER 82-GT-42]
Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors A82-35331
[ASME PAPER 82-GT-85]
Liquid particle dynamics and rate of evaporation in the rotating field of centrifugal compressors A82-35332
[ASME PAPER 82-GT-86]
The effect of inlet distortion on the performance characteristics of a centrifugal compressor A82-35335
[ASME PAPER 82-GT-92]
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors A82-35339
[ASME PAPER 82-GT-102]
On the performance prediction of a centrifugal compressor scaled up A82-35345
[ASME PAPER 82-GT-112]
Accuracy expectations for gas turbine and centrifugal compressor performance testing A82-35358
[ASME PAPER 82-GT-128]
Effect of impeller extended shrouds on centrifugal compressor performance as a function of specific speed A82-35411
[ASME PAPER 82-GT-228]

CERAMICS
Ceramic component development for limited-life propulsion engines A82-34979
[AIAA PAPER 82-1050]
Demonstration of ceramic hot-section static components in a radial flow turbine A82-35392
[ASME PAPER 82-GT-184]
Ceramic components for automotive and heavy duty turbine engines - CATE and AGT 100 A82-35432
[ASME PAPER 82-GT-253]
Ceramic turbine housings A82-35463
[ASME PAPER 82-GT-293]

CERTIFICATION
Certification of an airborne Loran-C navigation system A82-35876
Boeing's new transports in a flight-test marathon A82-37493

CH-47 HELICOPTER
Flight demonstration of an integrated floor/fuel isolation system A82-37768
[AHS PREPRINT 81-16]
Advanced internal cargo system concept demonstration and evaluation N82-26282
[AD-A111990]

CHANNEL FLOW
The performance of centrifugal compressor channel diffusers A82-35279
[ASME PAPER 82-GT-10]

CHECKOUT
Model test and full scale checkout of dry-cooled jet runup sound suppressors A82-35079
[AIAA PAPER 82-1239]

CHEMICAL COMPOSITION
NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status
[AIAA PAPER 82-1088] A82-34999
CHLORINE COMPOUNDS
Design guide for aircraft hydraulic systems and components for use with chlorotrifluorethylene nonflammable hydraulic fluids
[AD-A112097] N82-26283
CIRCUIT PROTECTION
Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria
A82-35734
CIRCUITS
A Loran-C prototype navigation receiver for general aviation
N82-26208
CIVIL AVIATION
FAA tests on the Navstar GPS Z-set
A82-37039
The DC-10 Chicago crash and the legality of SFAR 40
A82-37832
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326
Symposium on Commercial Aviation Energy Conservation Strategies, papers and presentations
[AD-A107106] N82-26490
Listing of aircraft accidents/incidents by make and model, U.S. civil aviation, 1979
[PB82-138892] N82-27252
Annual review of aircraft accident data: U.S. air carrier operations, 1979
[PB82-134339] N82-27253
CLADDING
Hurricane-induced wind loads
[PB82-132267] N82-27548
CLASSIFICATIONS
Kovats indices as a tool in characterizing hydrocarbon fuels in temperature programmed glass capillary gas chromatography. Part 1: Qualitative identification
[AD-A111389] N82-26400
CLEARANCES
Optical tip clearance sensor for aircraft engine controls
[AIAA PAPER 82-1131] A82-37691
Blade tip gap effects in turbomachines: A review
[AD-A111892] N82-26308
CLOUD GLACIATION
Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds
A82-36054
CLOUD PHYSICS
Response of cloud microphysical instruments to aircraft icing conditions
[AD-A112317] N82-27284
CLUTTER
The PATRIOT Radar in tactical air defense
A82-37031
CMOS
Commutated automatic gain control system
N82-26209
COBALT ALLOYS
Torsional stiffness element based on cobalt-samarium magnets --- for a turn and bank indicator
[BMFT-FB-W-81-044] N82-27292
COCKPITS
The computerized cockpit for the one-man crew
A82-36937
Advanced technology and fighter cockpit design: Which drives which?
N82-27302
COHERENT LIGHT
Operating manual holographic interferometry system for 2 x 2 foot transonic wind tunnel
[NASA-CR-166344] N82-26218
COLD FLOW TESTS
The low temperature properties of aviation fuels
[ASME PAPER 82-GT-48] A82-35306
Cryogenic turbine testing
[ASME PAPER 82-GT-113] A82-35346
Performance of multiple, angled nozzles with short mixing stack eductor systems
[AD-A110817] N82-26302
COLD WEATHER
Cold regions testing of an air transportable shelter
[AD-A107131] N82-27325
COLD WEATHER TESTS
Experiments on fuel heating for commercial aircraft
[NASA-TM-82878] N82-26483
COMBAT
Combat survivability in the Advanced Technology Engine Study /ATES/
[AIAA PAPER 82-1287] A82-35101
Navstar - Global Positioning System: A revolutionary capability
A82-37040
Aviation Materiel Combat Ready In-Country (AMCRIC)
[AD-A107451] N82-27283
Pave Mover aided integrated strike avionics system
N82-27298
Adaptive multifunction sensor concept for air-ground missions
N82-27299
Tactical systems approach to interdiction of 2nd echelon moving targets using real time sensors
N82-27306
COMBUSTION CHAMBERS
Energy efficient engine /E3/ technology status
[AIAA PAPER 82-1052] A82-34980
Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
[AIAA PAPER 82-1072] A82-34992
Numerical and experimental examination of a prevaporized/premixed combustor
[AIAA PAPER 82-1074] A82-34994
NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status
[AIAA PAPER 82-1088] A82-34999
Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors
[AIAA PAPER 82-1175] A82-35041
Characteristics of a side dump gas generator ramjet
[AIAA PAPER 82-1258] A82-35089
Acoustic control of dilution-air mixing in a gas turbine combustor
[ASME PAPER 82-GT-35] A82-35296
The potential impact of future fuels on small gas turbine engines
[ASME PAPER 82-GT-133] A82-35362
A procedure for evaluating fuel composition effects on combustor life
[ASME PAPER 82-GT-296] A82-35465
A spark ignition model for liquid fuel sprays applied to gas turbine engines
A82-37220
Models for a turbulent premixed dump combustor
[AIAA PAPER 82-1261] A82-37709
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 2
[AD-A111783] N82-27312
COMBUSTION CONTROL
Acoustic control of dilution-air mixing in a gas turbine combustor
[ASME PAPER 82-GT-35] A82-35296
COMBUSTION EFFICIENCY
Energy efficient engine /E3/ technology status
[AIAA PAPER 82-1052] A82-34980
Numerical and experimental examination of a prevaporized/premixed combustor
[AIAA PAPER 82-1074] A82-34994
NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status
[AIAA PAPER 82-1088] A82-34999
Effect on fuel efficiency of parameter variations in the cost function for multivariable control of a turbofan engine
[AD-A110614] N82-26301
Combustion behavior of solid fuel Ramjets. Volume 2: Effects of fuel properties and fuel-air mixing on combustion efficiency
[AD-A110796] N82-26303
The Schladitz fuel injector: An initial performance evaluation without burning
[AD-A113612] N82-27315

Radiation/catalytic augmented combustion
[AD-A112376] N82-27434
COMBUSTION PRODUCTS
Modeling solid-fuel Ramjet combustion including
radiation heat transfer to the fuel surface
[AD-A107441] N82-27436
COMBUSTION STABILITY
Acoustic control of dilution-air mixing in a gas
turbine combustor
[ASME PAPER 82-GT-35] A82-35296
COMFORT
Quantification of helicopter vibration ride
qualities A82-37767

The annoyance of impulsive helicopter noise
[NASA-CR-169123] N82-28134
COMMAND GUIDANCE
A model for sensor-interceptor trade-off analysis
[AD-A112046] N82-26271
COMMERCIAL AIRCRAFT
Technology advancements for energy efficient
aircraft engines
[AIAA PAPER 82-1051] A82-35479
COMMERCIAL ENERGY
Symposium on Commercial Aviation Energy
Conservation Strategies, papers and presentations
[AD-A107106] N82-26490
COMPATIBILITY
Characteristics of future aircraft impacting
aircraft and airport compatibility
[NASA-TM-84476] N82-27233
COMPONENT RELIABILITY
Selecting the best reduction gear concept for
prop-fan propulsion systems
[AIAA PAPER 82-1124] A82-35020
Instrument failure detection in partially
observable systems A82-37380

Reliability design study for a fault-tolerant
electronic engine control
[AIAA PAPER 82-1129] A82-37689
COMPONENTS
Efficient part removal processes --- from molds
A82-37097

COMPOSITE MATERIALS
Kevlar/PMR-15 polyimide matrix composite for a
complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678
Bibliography of Lewis Research Center technical
publications announced in 1981
[NASA-TM-82838] N82-27191
Composite flight test boom for Nomad N22B aircraft
[ARL-0086-TM] N82-27289
COMPOSITE STRUCTURES
A laboratory mock-up ultrasonic inspection system
for composites A82-35256

Structural dynamics of shroudless, hollow, fan
blades with composite in-lays
[ASME PAPER 82-GT-284] A82-35456
Composite containment systems for jet engines
A82-37062

A significant role for composites in
energy-efficient aircraft A82-37065

R & D on composite rotor blades at Agusta
A82-37764

Ageing of composite rotor blades
A82-37771

Performance of PTFE-lined composite journal bearings
[ASLE PREPRINT 82-AM-1A-1] A82-37854
COMPRESSED AIR
Influence of airblast atomizer design features on
mean drop size
[AIAA PAPER 82-1073] A82-34993
COMPRESSOR BLADES
Casing wall boundary-layer development through an
isolated compressor rotor
[ASME PAPER 82-GT-18] A82-35287
The use of performance-monitoring to prevent
compressor and turbine blade failures
[ASME PAPER 82-GT-66] A82-35316
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
Liquid particle dynamics and rate of evaporation
in the rotating field of centrifugal compressors
[ASME PAPER 82-GT-86] A82-35332

An inviscid-viscous interaction treatment to
predict the blade-to-blade performance of axial
compressors with leading edge normal shock waves
[ASME PAPER 82-GT-135] A82-35363
The use of optimization techniques to design
controlled diffusion compressor blading
[ASME PAPER 82-GT-149] A82-35373
The effect of rotor blade thickness and surface
finish on the performance of a small axial flow
turbine
[ASME PAPER 82-GT-222] A82-35409
Blade tip gap effects in turbomachines: A review
[AD-A111892] N82-26308
Core compressor exit stage study, volume 6
[NASA-CR-165554] N82-27310
Foreign object impact design criteria, volume 2
[AD-A112701] N82-27313
Foreign object impact design criteria, volume 3
[AD-A112447] N82-27314
COMPRESSOR EFFICIENCY
Test facility and data handling system for the
development of axial compressors
[ASME PAPER 82-GT-73] A82-35322
Comprehensive analysis of an axial compressor test
with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
Effect of the rear stage casing treatment on the
overall performance of a multistage axial-flow
compressor
[ASME PAPER 82-GT-110] A82-35344
Effect of impeller extended shrouds on centrifugal
compressor performance as a function of specific
speed
[ASME PAPER 82-GT-228] A82-35411
Progress in the development of energy efficient
engine components
[ASME PAPER 82-GT-275] A82-35450
COMPRESSOR ROTORS
Casing wall boundary-layer development through an
isolated compressor rotor
[ASME PAPER 82-GT-18] A82-35287
Comprehensive analysis of an axial compressor test
with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323
Performance analysis of the test results on a
two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353
COMPRESSORS
A stage-by-stage dual-spool compression system
modeling technique
[ASME PAPER 82-GT-189] A82-35394
Blade tip gap effects in turbomachines: A review
[AD-A111892] N82-26308
COMPUTATIONAL FLUID DYNAMICS
Analysis of two-dimensional internal flows using a
primitive-variable relaxation Navier-Stokes
procedure
[AIAA PAPER 82-1083] A82-34998
Semi-empirical analysis of liquid fuel
distribution downstream of a plain orifice
injector under cross-stream air flow
[ASME PAPER 82-GT-16] A82-35285
CFD technology for propulsion installation design
- Forecast for the 80's --- computational fluid
dynamics in aerospace applications
[ASME PAPER 82-GT-21] A82-35289
A computational design method for transonic
turbomachinery cascades
[ASME PAPER 82-GT-117] A82-35348
A mixed-flow cascade passage design procedure
based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351
The calculation of deviation angle in axial-flow
compressor cascades
[ASME PAPER 82-GT-230] A82-35412
Transonic design using computational aerodynamics
A82-35560

Application of computational methods to transonic
wing-design A82-35561

A-7 transonic wing designs A82-35562

Transonic computational experience for advanced
tactical aircraft A82-35563

Extension of FLO codes to transonic flow prediction for fighter configurations
A82-35564
A series of airfoils designed by transonic drag minimization for Gates Learjet aircraft
A82-35565
Applied computational transonics - Capabilities and limitations
A82-35566
Evaluation of full potential flow methods for the design and analysis of transport wings
A82-35567
On the vortex flow over delta and double-delta wings
[AIAA PAPER 82-0949] A82-37466
Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes
[AIAA PAPER 82-0951] A82-37467
A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations
[AIAA PAPER 82-1017] A82-37477
Models for a turbulent premixed dump combustor
[AIAA PAPER 82-1261] A82-37709
Determination of rotor wake induced empennage airloads
[AHS PREPRINT 81-26] A82-37796

COMPUTER AIDED DESIGN
CFD technology for propulsion installation design - Forecast for the 80's --- computational fluid dynamics in aerospace applications
[ASME PAPER 82-GT-21] A82-35289
On the influence of the number of stages on the efficiency of axial-flow turbines
[ASME PAPER 82-GT-43] A82-35301
R & D on composite rotor blades at Agusta
A82-37764
Helicopter design synthesis
A82-37772
Life and Utilization Criteria Identification In Design (LUCID), volume 1
[AD-A111939] N82-26309

COMPUTER AIDED MANUFACTURING
The DRAPO system - Materials means and logic functions
A82-37521

COMPUTER GRAPHICS
Justification for, and design of, an economical programmable multiple flight simulator
A82-36969
Flight-test verification of a pictorial display for general aviation instrument approach
[NASA-TM-83305] N82-26288
Advanced training techniques using computer generated imagery
[AD-A111979] N82-28007
Computer image generation: Advanced visual/sensor simulation
[AD-A107098] N82-28016

COMPUTER NETWORKS
AUTOPILOT: A distributed planner for air fleet control
[AD-A107139] N82-27269

COMPUTER PROGRAMMING
Commutated automatic gain control system
N82-26209
A prototype interface unit for microprocessor-based Loran-C receiver
N82-26210
The Sortie-Generation Model system. Volume 4: Sortie-Generation Model programmers manual
[AD-A110899] N82-26224

COMPUTER PROGRAMS
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
An approach to software for high integrity applications --- in aircraft gas turbine engine control
[ASME PAPER 82-GT-251] A82-35430
Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system
A82-37446
The Sortie-Generation Model system. Volume 1: Executive summary
[AD-A110897] N82-26222
Life and Utilization Criteria Identification In Design (LUCID), volume 1
[AD-A111939] N82-26309
Life and Utilization Criteria Identification In Design (LUCID), volume 2
[AD-A111940] N82-26310
Bird impact analysis package for turbine engine fan blades
[NASA-TM-82831] N82-26701
Design of a data acquisition and reduction system for fatigue testing
[AD-A110612] N82-26720
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270
Digital command augmentation for lateral directional aircraft dynamics
[AD-A107264] N82-27321
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and RESIS
[AD-A112224] N82-27411
Hurricane-induced wind loads
[PB82-132267] N82-27548
Software technology transfer and export control
[AD-A106869] N82-28017

COMPUTER SYSTEMS DESIGN
The computerized cockpit for the one-man crew
A82-36937
The DRAPO system - Materials means and logic functions
A82-37521
A prototype interface unit for microprocessor-based Loran-C receiver
N82-26210
Life and Utilization Criteria Identification In Design (LUCID), volume 2
[AD-A111940] N82-26310
Control optimization, stabilization and computer algorithms for aircraft applications
[NASA-CR-169015] N82-27009
The Flight Service Automation System (FSAS) system benchmark. Volume 1: Summary, introduction and concepts
[PB82-143538] N82-27277
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and RESIS
[AD-A112224] N82-27411

COMPUTER SYSTEMS PERFORMANCE
An analysis of selected enhancements to the en route central computing complex
[AD-A113575] N82-28044

COMPUTER TECHNIQUES
Practical application of a computerized flight by flight fatigue test system
A82-37768
AUTOPILOT: A distributed planner for air fleet control
[AD-A107139] N82-27269
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270
A planning system for F-16 air-to-surface missions
N82-27297

COMPUTERIZED SIMULATION
Application of high bypass turbofan computer simulation to flight and test data processing
[ASME PAPER 82-GT-141] A82-35366
Justification for, and design of, an economical programmable multiple flight simulator
A82-36969
A cost modeling approach to engine optimization
[AIAA PAPER 82-1185] A82-37698
Design and evaluation of a state-feedback vibration controller
[AHS PREPRINT 81-10] A82-37783
The Sortie-Generation Model system. Volume 1: Executive summary
[AD-A110897] N82-26222
The Sortie-Generation Model system. Volume 2: Sortie-Generation Model user's guide
[AD-A110898] N82-26223
The Sortie-Generation Model system. Volume 5: Maintenance subsystem
[AD-A110815] N82-26225
The Sortie-Generation Model system. Volume 6: Spares subsystem
[AD-A110900] N82-26226
Investigation of an improved structural model for damaged T-38 horizontal stabilizer flutter analysis using NASTRAN
[AD-A111095] N82-26316

Development of low-order model of an X-wing aircraft by system identification
[AD-A113760] N82-27286

System Description-Aviation Wide-Angle Visual System (AWAVS) computer image
[AD-A111800] N82-27323

Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator
[AD-A112466] N82-27324

Influence of contrast on spatial perception in TV display of moving images
[PB-50] N82-27609

Advanced training techniques using computer generated imagery
[AD-A111979] N82-28007

CONFERENCES

Jet fuel from shale oil: The 1981 technology review
[AD-A111217] N82-26484

Symposium on Commercial Aviation Energy Conservation Strategies, papers and presentations
[AD-A107106] N82-26490

Proceedings of the 12th Navy Symposium on Aeroballistics, volume 1
[AD-A111763] N82-27225

Proceedings of the 1st Annual Workshop on Aviation Related Electricity Hazards Associated with Atmospheric Phenomena and Aircraft Generated Inputs
[AD-A107326] N82-27237

Impact of Advanced Avionics Technology and Ground Attack Weapon Systems
[AGARD-CP-306] N82-27293

Proceedings of the 12th Navy Symposium on Aeroballistics, volume 2
[AD-A111783] N82-27312

CONSTRAINTS

Current ADM restraint system status, trade-off constraints and long range objectives for the Maximum Performance Ejection System (MPES)
[AD-A112645] N82-27238

CONTAINMENT

Composite containment systems for jet engines
A82-37062

CONTINUOUS WAVE RADAR

C band spectral tracking for FM/CW altimetry
A82-37035

CONTOURS

Comparison of experimental and analytical performance for contoured endwall stators
[NASA-TM-82877] N82-26299

CONTRAILS

Forecasting aircraft condensation trails
[AD-A111876] N82-26933

CONTROL

Reliability and maintainability analysis of fluidic back-up flight control system and components
[AD-A110496] N82-27320

CONTROL CONFIGURED VEHICLES

An analytical study of turbulence responses, including horizontal tail loads, of a control configured jet transport with relaxed static stability
N82-26313

CONTROL EQUIPMENT

TURBOTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396

Simplified digital design tools
A82-37034

CONTROL SIMULATION

Evaluation of a multivariable control design on a variable cycle engine simulation
[AIAA PAPER 82-1077] A82-37682

CONTROL THEORY

A practical approach to the design of multivariable control strategies for gas turbines
[ASME PAPER 82-GT-150] A82-35374

Tactical systems approach to interdiction of 2nd echelon moving targets using real time sensors
N82-27306

Digital command augmentation for lateral directional aircraft dynamics
[AD-A107264] N82-27321

CONTROLLABILITY

Notes on lateral-directional pilot induced oscillations
[AD-A113996] N82-27322

CONTROLLERS

A practical approach to the design of multivariable control strategies for gas turbines
[ASME PAPER 82-GT-150] A82-35374

CONVECTIVE HEAT TRANSFER

Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments
[ASME PAPER 82-GT-174] A82-35387

Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388

CONVERGENT-DIVERGENT NOZZLES

Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement
[AIAA PAPER 82-1132] A82-37692

COOLING SYSTEMS

Two-phase transpiration cooling
[ASME PAPER 82-GT-89] A82-35333

Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments
[ASME PAPER 82-GT-174] A82-35387

CORIOLIS EFFECT

The influence of Coriolis forces on gyroscopic motion of spinning blades
[ASME PAPER 82-GT-163] A82-35384

CORRECTION

Correcting for turbulence effects on average velocity measurements made using five hole spherical pitot tube probes
[AD-A112573] N82-27290

CORROSION PREVENTION

Corrosion tests with MIL-H-83282 and MIL-H-6083 aircraft hydraulic fluids
[AD-A112437] N82-27506

CORROSION RESISTANCE

Wear by generation of electrokinetic streaming currents
[ASLE PREPRINT 82-AM-6A-3] A82-37857

CORROSION TESTS

Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425

COST ANALYSIS

Specification and estimation of dynamic cost functions for airframe production airframes
[AD-A113147] N82-27221

Benefit cost analysis of the aircraft energy efficiency program
[NASA-CR-169116] N82-27280

COST EFFECTIVENESS

Specification and estimation of dynamic cost functions for airframe production airframes
[AD-A113147] N82-27221

COST ESTIMATES

Life-cycle-cost analysis of the microwave landing system ground and airborne systems
[AD-A110909] N82-26266

COST REDUCTION

Technology advancements for energy efficient aircraft engines
[AIAA PAPER 82-1051] A82-35479

Opportunities to reduce the cost of some B-52 modifications
[AD-A113563] N82-27219

COUNTER ROTATION

Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines
[AIAA PAPER 82-1054] A82-37679

COUPLING

A finite element analysis of coupled rotor fuselage vibration
[AHS PREPRINT 81-21] A82-37792

COWLINGS

Thrust reverser for a long duct fan engine --- for turbofan engines
[NASA-CASE-LEW-13199-1] N82-26293

CRACK INITIATION
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981

CRACK PROPAGATION
A procedure for evaluating fuel composition effects on combustor life
[ASME PAPER 82-GT-296] A82-35465
Mechanical property characterization and modeling of structural materials --- for airframes and aircraft gas turbine engines
[AD-A113841] N82-27784

CRASH INJURIES
Briefs of fatal accidents involving fixed-wing multi-engine aircraft, U.S. General Aviation, 1979
[PB82-139007] N82-27254

CRASH LANDING
Will hydrogen-fueled aircraft be safe
[AIAA PAPER 82-1236] A82-35077

CRASHWORTHINESS
Quasi-static and dynamic crushing of energy absorbing materials and structural components with the aim of improving helicopter crashworthiness
A82-37769
Cabin safety in large transport aircraft
[PB82-129297] N82-27244

CREW STATIONS
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design
[AD-A110954] N82-26291

CROSS FLOW
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[ASME PAPER 82-GT-16] A82-35285
Effect of crossflows on the discharge coefficient of film cooling holes
[ASME PAPER 82-GT-147] A82-35371
Flows over wings with leading-edge vortex separation
[NASA-CR-165858] N82-26238

CRUISE MISSILES
Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique
[AIAA PAPER 82-1085] A82-37685

CRUISING FLIGHT
Commercial transports - Aerodynamic design for cruise performance efficiency
A82-35555

CRYOGENIC EQUIPMENT
Performance of the AEDC Mark 1 Aerospace Environmental Chamber without oil diffusion pumping
[AD-A111406] N82-26322

CRYOGENICS
Cryogenic turbine testing
[ASME PAPER 82-GT-113] A82-35346

CRYOPUMPING
Performance of the AEDC Mark 1 Aerospace Environmental Chamber without oil diffusion pumping
[AD-A111406] N82-26322

CRYPTOGRAPHY
Implementing aircraft identification schemes by public key cryptosystems
A82-37381

CRYSTAL GROWTH
The Marshall Space Flight Center KC-135 zero gravity test program for FY 1981
[NASA-TM-82476] N82-26350

CURRENT DENSITY
Wear by generation of electrokinetic streaming currents
[ASLE PREPRINT 82-AM-6A-3] A82-37857

CURVED PANELS
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088

CYCLIC LOADS
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822

CYLINDRICAL ANTENNAS
Modification of OE-258/URN Tactical Air Navigation (TACAN) antenna group
[AD-A111680] N82-26264

CYLINDRICAL BODIES
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077

D

DAMPERS
A gust damper --- for light passenger aircraft
A82-37127

DAMPING
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088

DAMPING TESTS
Dry friction damping mechanisms in engine blades
[ASME PAPER 82-GT-162] A82-35383

DATA ACQUISITION
Test facility and data handling system for the development of axial compressors
[ASME PAPER 82-GT-73] A82-35322
Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402
A single-frequency multitransmitter telemetry technique
A82-36281
Design of a data acquisition and reduction system for fatigue testing
[AD-A110612] N82-26720

DATA BASES
The Sortie-Generation Model system. Volume 6: Spares subsystem
[AD-A110900] N82-26226

DATA PROCESSING
Flying qualities criteria for GA single pilot IFR operations
N82-26213
Data processing at the Global Positioning System master control station
[AD-A110553] N82-26270
An analysis of selected enhancements to the en route central computing complex
[AD-A113575] N82-28044

DATA REDUCTION
Design of a data acquisition and reduction system for fatigue testing
[AD-A110612] N82-26720

DATA SYSTEMS
PMUX - The interface for engine data to AIDS --- propulsion multiplexer in Aircraft Integrated Data System
[AIAA PAPER 82-1127] A82-35022

DATA TRANSMISSION
The P-FOD Project --- error detection codes
N82-26202
Air data measurement using distributed processing and fiber optics data transmission
N82-26214

DC 10 AIRCRAFT
The DC-10 Chicago crash and the legality of SFAR 40
A82-37932

DEATH
Briefs of fatal accidents involving fixed-wing multi-engine aircraft, U.S. General Aviation, 1979
[PB82-139007] N82-27254

DECISION MAKING
Optimal placement model for the B-52G weapons system trainer
[AD-A110977] N82-26323

DECOUPLING
Use of entire eigenstructure assignment with high-gain error-actuated flight control systems
[AD-A111098] N82-26318

DEGREES OF FREEDOM
Gyro system, (selected pages)
[AD-A113748] N82-27271

DEICERS
Joint University Program Air for Transportation Research, 1981
[NASA-CP-2224] N82-26199
Microwave ice prevention
N82-26203
Limited artificial and natural icing tests production UH-60A helicopter (re-evaluation)
[AD-A112582] N82-26287
DELTA WINGS
On the vortex flow over delta and double-delta wings
[AIAA PAPER 82-0949] A82-37466
Chordwise and compressibility corrections for arbitrary planform slender wings
A82-37931
DEPOSITS
Thermal decomposition of aviation fuel
[ASME PAPER 82-GT-27] A82-35292
Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307
DESIGN ANALYSIS
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044
A comprehensive method for preliminary design optimization of axial gas turbine stages
[AIAA PAPER 82-1264] A82-35091
On the influence of the number of stages on the efficiency of axial-flow turbines
[ASME PAPER 82-GT-43] A82-35301
Improved vane-island diffusers at high swirl
[ASME PAPER 82-GT-68] A82-35318
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors
[ASME PAPER 82-GT-102] A82-35339
A computational design method for transonic turbomachinery cascades
[ASME PAPER 82-GT-117] A82-35348
Performance analysis of the test results on a two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353
Helicopter design synthesis
A82-37772
General purpose research rotor
[AHS PREPRINT 81-9] A82-37777
Maintenance training simulator design and acquisition: ISD-derived training equipment design
[AD-A110871] N82-26221
On the design and test of a low noise propeller
[NASA-CR-165938] N82-27089
DESIGN TO COST
Combat survivability in the Advanced Technology Engine Study /ATES/
[AIAA PAPER 82-1287] A82-35101
DETECTION
The effect of ionospheric variability on the accuracy of high frequency position location
[AD-A107425] N82-26274
A result in the theory of spiral search
[AD-A112481] N82-27262
Response of cloud microphysical instruments to aircraft icing conditions
[AD-A112317] N82-27284
DIESEL FUELS
Mobility fuels for the Navy
[AD-A112511] N82-26485
Development of Army high-energy fuel diesel/turbine-powered surface equipment, phase 2
[AD-A111942] N82-26487
DIFFRACTION
Elevation plane analysis of on-aircraft antennas
[AD-A112373] N82-26554
DIFFUSERS
Analysis of two-dimensional internal flows using a primitive-variable relaxation Navier-Stokes procedure
[AIAA PAPER 82-1083] A82-34998
Improved vane-island diffusers at high swirl
[ASME PAPER 82-GT-68] A82-35318
Net shape components for small gas turbine engines
[ASME PAPER 82-GT-96] A82-35336
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors
[ASME PAPER 82-GT-102] A82-35339
Development and application of a performance prediction method for straight rectangular diffuser
[ASME PAPER 82-GT-122] A82-35352
DIGITAL COMMAND SYSTEMS
An advanced helicopter engine control system
[ASME PAPER 82-GT-250] A82-35429
DIGITAL COMPUTERS
Digital command augmentation for lateral directional aircraft dynamics
[AD-A107264] N82-27321
DIGITAL DATA
Digital spectral analysis of the noise from short duration impulsively started jets
A82-36[illegible]91
DIGITAL SIMULATION
Advancements in real-time engine simulation technology --- of digital electronic aircraft engine controls
[AIAA PAPER 82-1075] A82-34995
DIGITAL SYSTEMS
Simplified digital design tools
A82-37034
Flight evaluation of a digital electronic engine control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683
Electronic control for small engines
[AIAA PAPER 82-1125] A82-37688
Attack and en route avionics for in-weather operations
N82-27300
Digital image processing for acquisition, tracking, hand off and ranging
N82-27303
Quiet Short-Haul Research Airplane (QSRA) model select panel functional description
[NASA-TM-84243] N82-27319
DIPOLE ANTENNAS
A balanced active antenna and impulse noise blanket system for the Heydist T radio navigation receiver
[AD-A114074] N82-27275
DIRECT CURRENT
Effects of high voltage transmission lines on non-directional beacon performance
[AD-A112311] N82-27261
DISCHARGE COEFFICIENT
Effect of crossflows on the discharge coefficient of film cooling holes
[ASME PAPER 82-GT-147] A82-35371
DISCRETE ADDRESS BEACON SYSTEM
Comparison between the surveillance performances of the Air Traffic Control Radar Beacon System mode of the Mode S and the Automated Radar Terminal System
[AD-A111733] N82-26273
Surveillance simulation testing of terminal and en route mode S sensors
[AD-A112250] N82-27265
Mode S system accuracy
[AD-A112249] N82-27266
DISKS (SHAPES)
Hot isostatically pressed manufacture of high strength MERL 76 disk and seal shapes
[NASA-CR-165549] N82-26439
DISPLAY DEVICES
A prototype interface unit for microprocessor-based Loran-C receiver
N82-26210
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 1: Results
[AD-A110956] N82-26290
Visual technology research simulator, visual and motion system dynamics
[AD-A111801] N82-26325
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270
Cockpit display of traffic information and the measurement of pilot workload: An annotated bibliography
[AD-A113637] N82-27291
Advanced technology and fighter cockpit design: Which drives which?
N82-27302
Influence of contrast on spatial perception in TV display of moving images
[FB-30] N82-27609

DISSOLVED GASES
Investigation of spray characteristics for flashing injection of fuels containing dissolved air and superheated fuels [NASA-CR-3563] N82-26295
DISTRIBUTED PARAMETER SYSTEMS
Air data measurement using distributed processing and fiber optics data transmission N82-26214
DISTRICT OF COLUMBIA
Final regulatory evaluation: Metropolitan Washington Airports Policy [AD-A110583] N82-26324
DIVERGENCE
Aerodynamic lag functions, divergence, and the British flutter method A82-35820
DOCUMENTATION
Maintenance training simulator design and acquisition: ISD-derived training equipment design [AD-A110871] N82-26221
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation [AD-A111430] N82-26321
DOPPLER EFFECT
Doppler test results of experimental GPS receiver [AD-A113587] N82-27274
DOPPLER NAVIGATION
An accurate Doppler navigator with microwave simplicity A82-37037
An unbiased analysis of the Doppler coordinate systems [AD-A110510] N82-26269
DOPPLER RADAR
Test and evaluation of the airport radar wind shear detection system [AD-A112663] N82-27924
DRAG REDUCTION
Selected results of the F-15 propulsion interactions program [AIAA PAPER 82-1041] A82-34976
A series of airfoils designed by transonic drag minimization for Gates Learjet aircraft A82-35565
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing [AIAA PAPER 82-1047] A82-37678
DROP SIZE
Influence of airblast atomizer design features on mean drop size [AIAA PAPER 82-1073] A82-34993
Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions [ASME PAPER 82-GT-32] A82-35293
DROPS (LIQUIDS)
Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds A82-36054
The Marshall Space Flight Center KC-135 zero gravity test program for FY 1981 [NASA-TM-82476] N82-26350
DRY FRICTION
Dry friction damping mechanisms in engine blades [ASME PAPER 82-GT-162] A82-35383
DUCTED BODIES
Acoustic properties of turbofan inlets [NASA-CR-169016] N82-27090
DYNAMIC CHARACTERISTICS
Development of a helicopter rotor/propulsion system dynamics analysis [AIAA PAPER 82-1078] A82-34997
DYNAMIC LOADS
Quasi-static and dynamic crushing of energy absorbing materials and structural components with the aim of improving helicopter crashworthiness A82-37769
Comparison of different fighter aircraft load spectra [FFA-TN-1982-02] N82-27288
DYNAMIC MODELS
Determination of in-flight helicopter loads and vibration [AHS PREPRINT 81-7] A82-37782
DYNAMIC RESPONSE
A nonlinear response analysis for coupled rotor-fuselage systems [AHS PREPRINT 81-23] A82-37794
An analytical study of turbulence responses, including horizontal tail loads, of a control configured jet transport with relaxed static stability N82-26313
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls [NASA-TP-2010] N82-26703
DYNAMIC STRUCTURAL ANALYSIS
Blade loss transient dynamic analysis of turbomachinery [AIAA PAPER 82-1057] A82-34982
Structural dynamics of shroudless, hollow, fan blades with composite in-lays [ASME PAPER 82-GT-284] A82-35456
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking [ASME PAPER 82-GT-292] A82-35462
Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques A82-36999
Assessment of the dynamic response of a structure when modified by the addition of mass, stiffness or dynamic absorbers [AHS PREPRINT 81-18] A82-37790
A unified approach to helicopter NASTRAN modeling [AHS PREPRINT 81-22] A82-37793

E

EFFECTIVE PERCEIVED NOISE LEVELS
Airbus Industrie and community noise N82-27865
The annoyance of impulsive helicopter noise [NASA-CR-169123] N82-28134
EGRESS
Lear Fan 2100 egress system A82-37970
EIGENVALUES
Use of entire eigenstructure assignment with high-gain error-actuated flight control systems [AD-A111098] N82-26318
EIGENVECTORS
Use of entire eigenstructure assignment with high-gain error-actuated flight control systems [AD-A111098] N82-26318
EJECTION INJURIES
USAF ACES II progress report --- Advanced Concept Ejection Seat performance A82-37969
EJECTION SEATS
USAF ACES II progress report --- Advanced Concept Ejection Seat performance A82-37969
Development of a backpack survival kit for ejection seats [AD-A113653] N82-27242
EJECTORS
An experimental study of rectangular and circular thrust augmenting ejectors [AD-A111110] N82-26304
ELECTRIC CORONA
Electromagnetic interaction of lightning with aircraft A82-35731
Static charging and its effects on avionic systems A82-35732
ELECTRIC DISCHARGES
Static charging and its effects on avionic systems A82-35732
ELECTRIC FIELD STRENGTH
Triggered lightning --- resulting from aircraft atmospheric electricity interactions A82-35727
ELECTRIC FIELDS
Airborne warning systems for natural and aircraft-initiated lightning A82-35729
Electric field detection and ranging of aircraft A82-37377

Influence of meteorological processes on the
verticality of electric fields
[AD-A111549] N82-26897
ELECTRIC POWER SUPPLIES
Development of accelerated fuel-engines
qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines
qualification procedures methodology. Volume 1:
Appendices
[AD-A113532] N82-27318
ELECTRICAL ENGINEERING
Bibliography of Lewis Research Center technical
publications announced in 1981
[NASA-TM-82838] N82-27191
ELECTRICAL MEASUREMENT
Electric field detection and ranging of aircraft
A82-37377
ELECTRO-OPTICS
Advanced target acquisition and tracking concepts
for real time applications
N82-27305
ELECTROKINETICS
Wear by generation of electrokinetic streaming
currents
[ASLE PREPRINT 82-AM-6A-3] A82-37857
ELECTROMAGNETIC INTERACTIONS
Electromagnetic interaction of lightning with
aircraft
A82-35731
ELECTROMAGNETIC NOISE
Effects of high voltage transmission lines on
non-directional beacon performance
[AD-A112311] N82-27261
ELECTROMAGNETIC SHIELDING
Protection of electrical systems from EM hazards:
Design guide
[AD-A112707] N82-27559
ELECTROMAGNETISM
Torsional stiffness element based on
cobalt-samarium magnets --- for a turn and bank
indicator
[BMFT-FB-W-81-044] N82-27292
ELECTRONIC CONTROL
Transport engine control design
[AIAA PAPER 82-1076] A82-34996
An advanced helicopter engine control system
[ASME PAPER 82-GT-250] A82-35429
Flight evaluation of a digital electronic engine
control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683
Electronic control for small engines
[AIAA PAPER 82-1126] A82-37688
Reliability design study for a fault-tolerant
electronic engine control
[AIAA PAPER 82-1129] A82-37689
EMISSION SPECTRA
Evaluation of plasma source spectrometers for the
Air Force Oil Analysis Program
[AD-A113809] N82-27512
EMULSIONS
Fuel microemulsions for jet engine smoke reduction
[ASME PAPER 82-GT-33] A82-35294
ENERGY CONSERVATION
A significant role for composites in
energy-efficient aircraft
A82-37065
Symposium on Commercial Aviation Energy
Conservation Strategies, papers and presentations
[AD-A107106] N82-26490
ENERGY CONVERSION EFFICIENCY
Interim review of the Energy Efficient Engine /E3/
Program
[ASME PAPER 82-GT-271] A82-35447
ENERGY DISSIPATION
A critical appraisal of some current incidence
loss models for the stator and rotor of a mixed
flow gas turbine
[ASME PAPER 82-GT-120] A82-35350
Aerodynamic performance of high turning core
turbine vanes in a two-dimensional cascade
[AIAA PAPER 82-1288] A82-37716
ENERGY TRANSFER
Conversion of centrifugal compressor performance
curves considering non-similar flow conditions
[ASME PAPER 82-GT-42] A82-35300
ENGINE AIRFRAME INTEGRATION
Development of a helicopter rotor/propulsion
system dynamics analysis
[AIAA PAPER 82-1078] A82-34997
EAGLE - An interactive engine/airframe life cycle
cost model
[ASME PAPER 82-GT-56] A82-35311
Transonic wind tunnel test of a supersonic nozzle
installation
[AIAA PAPER 82-1045] A82-37677
ENGINE CONTROL
A practical approach to the design of
multivariable control strategies for gas turbines
[ASME PAPER 82-GT-150] A82-35374
Integrated aircraft avionics and powerplant
control and management systems
[ASME PAPER 82-GT-165] A82-35385
TURBOTRANS - A programming language for the
performance simulation of arbitrary gas turbine
engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396
An advanced helicopter engine control system
[ASME PAPER 82-GT-250] A82-35429
An approach to software for high integrity
applications --- in aircraft gas turbine engine
control
[ASME PAPER 82-GT-251] A82-35430
Evaluation of a multivariable control design on a
variable cycle engine simulation
[AIAA PAPER 82-1077] A82-37682
Flight evaluation of a digital electronic engine
control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683
Electronic control for small engines
[AIAA PAPER 82-1126] A82-37688
Reliability design study for a fault-tolerant
electronic engine control
[AIAA PAPER 82-1129] A82-37689
Optical tip clearance sensor for aircraft engine
controls
[AIAA PAPER 82-1131] A82-37691
ENGINE COOLANTS
The effect of coolant flow on the efficiency of a
transonic HP turbine profile suitable for a
small engine
[ASME PAPER 82-GT-63] A82-35315
The effect of temperature ratios on the film
cooling process
[ASME PAPER 82-GT-305] A82-35470
ENGINE DESIGN
Selection of a starting system for a low cost
single engine fighter aircraft
[AIAA PAPER 82-1043] A82-34977
Ceramic component development for limited-life
propulsion engines
[AIAA PAPER 82-1050] A82-34979
Energy efficient engine /E3/ technology status
[AIAA PAPER 82-1052] A82-34980
Transport engine control design
[AIAA PAPER 82-1076] A82-34996
Analysis of two-dimensional internal flows using a
primitive-variable relaxation Navier-Stokes
procedure
[AIAA PAPER 82-1083] A82-34998
NASA Broad Specification Fuels Combustion
Technology program - Pratt and Whitney Aircraft
Phase I results and status
[AIAA PAPER 82-1088] A82-34999
An experimental investigation of S-duct diffusers
for high-speed propfans
[AIAA PAPER 82-1123] A82-35019
Charting propulsion's future - The ATES results
--- Advanced technology Engine Studies program
for aircraft engine design
[AIAA PAPER 82-1139] A82-35023
A methodology for planning a cost effective engine
development --- for fighter aircraft
[AIAA PAPER 82-1140] A82-35024
Propulsion system requirements for advanced
fighter aircraft
[AIAA PAPER 82-1143] A82-35025
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044
The F404 development program - A new approach
[AIAA PAPER 82-1180] A82-35045
Development of engine operability
[AIAA PAPER 82-1181] A82-35046
Individual bypass throttling in fighter engines
[AIAA PAPER 82-1285] A82-35100

Combat survivability in the Advanced Technology Engine Study /ATES/
[AIAA PAPER 82-1287] A82-35101
EAGLE - An interactive engine/airframe life cycle cost model
[ASME PAPER 82-GT-56] A82-35311
The potential impact of future fuels on small gas turbine engines
[ASME PAPER 82-GT-133] A82-35362
Status report of the USAF's Engine Model Derivative Program
[ASME PAPER 82-GT-183] A82-35391
Aeropropulsion research for the U.S. Army
[ASME PAPER 82-GT-203] A82-35398
Advanced turboprop engines for long endurance naval patrol aircraft
[ASME PAPER 82-GT-217] A82-35404
Cycle considerations for tactical fighters in the early 1990's
[ASME PAPER 82-GT-259] A82-35436
Performance improvement features of General Electric turbofan engines
[ASME PAPER 82-GT-270] A82-35446
Interim review of the Energy Efficient Engine /E3/ Program
[ASME PAPER 82-GT-271] A82-35447
NASA ECI programs - Benefits to Pratt and Whitney engines
[ASME PAPER 82-GT-272] A82-35448
Material and process impact on aircraft engine designs of the 1990's
[ASME PAPER 82-GT-278] A82-35453
Ceramic turbine housings
[ASME PAPER 82-GT-293] A82-35463
Technology advancements for energy efficient aircraft engines
[AIAA PAPER 82-1051] A82-35479
Evaluation of a multivariable control design on a variable cycle engine simulation
[AIAA PAPER 82-1077] A82-37682
A cost modeling approach to engine optimization
[AIAA PAPER 82-1185] A82-37698
Propulsion opportunities for future commuter aircraft
[NASA-TM-82915] N82-26298
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

ENGINE FAILURE
Effect of the rear stage casing treatment on the overall performance of a multistage axial-flow compressor
[ASME PAPER 82-GT-110] A82-35344
Rotor fragment protection program: Statistics on aircraft gas turbine agine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165388] N82-27316

ENGINE INLETS
An experimental investigation of S-duct diffusers for high-speed propfans
[AIAA PAPER 82-1123] A82-35019
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278
Small engine inlet air particle separator technology
[ASME PAPER 82-GT-40] A82-35299
Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique
[AIAA PAPER 82-1085] A82-37685

ENGINE MONITORING INSTRUMENTS
PMUX - The interface for engine data to AIDS --- propulsion multiplexer in Aircraft Integrated Data System
[AIAA PAPER 82-1127] A82-35022
Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402
Design concepts of an advanced propulsion monitoring system
[AIAA PAPER 82-1130] A82-37690

ENGINE NOISE
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018
QCSEE under-the-wing engine acoustic data
[NASA-TM-82691] N82-27311

ENGINE PARTS
Ceramic component development for limited-life propulsion engines
[AIAA PAPER 82-1050] A82-34979
Development and application of Dabber gas tungsten arc welding for repair of aircraft engine, seal teeth
[ASME PAPER 82-GT-55] A82-35310
Net shape components for small gas turbine engines
[ASME PAPER 82-GT-96] A82-35338
The effect of NaCl/g/ in high temperature oxidation
[ASME PAPER 82-GT-106] A82-35342
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392
Next generation turboprop gearboxes
[ASME PAPER 82-GT-236] A82-35418
Ceramic components for automotive and heavy duty turbine engines - CATE and AGT 100
[ASME PAPER 82-GT-253] A82-35432
Interim review of the Energy Efficient Engine /E3/ Program
[ASME PAPER 82-GT-271] A82-35447
NASA ECI programs - Benefits to Pratt and Whitney engines
[ASME PAPER 82-GT-272] A82-35448
Progress in the development of energy efficient engine components
[ASME PAPER 82-GT-275] A82-35450
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462
Ceramic turbine housings
[ASME PAPER 82-GT-293] A82-35463
Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines
[AIAA PAPER 82-1054] A82-37679
A cost modeling approach to engine optimization
[AIAA PAPER 82-1185] A82-37698
Propulsion opportunities for future commuter aircraft
[NASA-TM-82915] N82-26298

ENGINE STARTERS
Selection of a starting system for a low cost single engine fighter aircraft
[AIAA PAPER 82-1043] A82-34977

ENGINE TESTING LABORATORIES
Increased capabilities of the Langley Mach 7 Scramjet Test Facility
[AIAA PAPER 82-1240] A82-35080

ENGINE TESTS
Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility
[AIAA PAPER 82-1044] A82-34978
Ceramic component development for limited-life propulsion engines
[AIAA PAPER 82-1050] A82-34979
T700 - Modern development test techniques, lessons learned and results
[AIAA PAPER 82-1183] A82-35048
Icing conditions on sea level gas turbine engine test stands
[AIAA PAPER 82-1237] A82-35078
Conversion of centrifugal compressor performance curves considering non-similar flow conditions
[ASME PAPER 82-GT-42] A82-35300
Application of high bypass turbofan computer simulation to flight and test data processing
[ASME PAPER 82-GT-141] A82-35366
Status report of the USAF's Engine Model Derivative Program
[ASME PAPER 82-GT-183] A82-35391
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392
Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425
Progress in the development of energy efficient engine components
[ASME PAPER 82-GT-275] A82-35450
Current techniques for jet engine test cell modeling
[AIAA PAPER 82-1272] A82-37712

Performance deterioration due to acceptance testing and flight loads; JT90 jet engine diagnostic program
[NASA-CR-165572] N82-27309
ENGINEERING DRAWINGS
Maintenance training simulator design and acquisition: ISD-derived training equipment design
[AD-A110871] N82-26221
ENVIRONMENT EFFECTS
Transportation noise, its impact, planning and regulation
[S-258] N82-27864
ENVIRONMENT SIMULATION
Electromagnetic interaction of lightning with aircraft
A82-35731
Lightning simulation and testing
A82-35733
Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria
A82-35734
EPOXY MATRIX COMPOSITES
A significant role for composites in energy-efficient aircraft
A82-37065
ERROR ANALYSIS
Accuracy expectations for gas turbine and centrifugal compressor performance testing
[ASME PAPER 82-GT-128] A82-35358
Gravity induced position errors in airborne inertial navigation
[AD-A113823] N82-27272
ERROR DETECTION CODES
The P-POD Project --- error detection codes
N82-26202
Control optimization, stabilization and computer algorithms for aircraft applications
[NASA-CR-169015] N82-27009
ESCAPE CAPSULES
Current ADM restraint system status, trade-off constraints and long range objectives for the Maximum Performance Ejection System (MPES)
[AD-A112645] N82-27238
ESCAPE SYSTEMS
Lear Fan 2100 egress system
A82-37970
ESTIMATING
Application of adaptive estimation to target tracking
[AD-A112036] N82-26272
EVALUATION
Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program
[AD-A113809] N82-27512
EVAPORATION RATE
Liquid particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[ASME PAPER 82-GT-86] A82-35332
EXHAUST EMISSION
Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
[AIAA PAPER 82-1072] A82-34992
HC and CO emission abatement via selective fuel injection
[ASME PAPER 82-GT-178] A82-35390
Forecasting aircraft condensation trails
[AD-A111876] N82-26939
Field test of an in stack diffusion classifier on an aircraft engine test cell
[AD-A113811] N82-27326
Control of air pollution from aviation: The emission standard setting process
[AD-A107435] N82-27869
EXHAUST GASES
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290
Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-83] A82-35329
Forecasting aircraft condensation trails
[AD-A111876] N82-26939
EXHAUST NOZZLES
Advanced nozzle integration for air combat fighter application
[AIAA PAPER 82-1135] A82-37694
Static internal performance characteristics of two thrust reverser concepts for axisymmetric nozzles
[NASA-TP-2025] N82-26235
Performance of multiple, angled nozzles with short mixing stack eductor systems
[AD-A110817] N82-26302
EXHAUST SYSTEMS
Model test and full scale checkout of dry-cooled jet runup sound suppressors
[AIAA PAPER 82-1239] A82-35079
EXPERIMENTATION
Briefs of accidents involving amateur/home built aircraft, U.S. general aviation, 1979
[PB82-138975] N82-27257
EXTERNAL STORES
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 1
[AD-A111763] N82-27225

F

F-14 AIRCRAFT
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278
F-15 AIRCRAFT
Selected results of the F-15 propulsion interactions program
[AIAA PAPER 82-1041] A82-34976
Flight evaluation of a digital electronic engine control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683
F-16 AIRCRAFT
F-16 active flutter suppression program
A82-37947
A planning system for F-16 air-to-surface missions
N82-27297
F-100 AIRCRAFT
Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402
FABRICATION
Assembly of aircraft instruments --- Russian book
A82-36950
FAILURE ANALYSIS
Evaluation criteria for aero engine materials
A82-36065
Instrument failure detection in partially observable systems
A82-37380
FAIRINGS
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678
FAN BLADES
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
Acoustic emission in jet engine fan blades
A82-35257
Structural dynamics of shroudless, hollow, fan blades with composite in-lays
[ASME PAPER 82-GT-284] A82-35456
Composite containment systems for jet engines
A82-37062
Bird impact analysis package for turbine engine fan blades
[NASA-TM-82831] N82-26701
FATIGUE LIFE
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981
Control of gas turbine power transients for improved turbine airfoil durability
[AIAA PAPER 82-1182] A82-35047
A method for observing the deterioration of airframe life in operational conditions
A82-37123
Comparison of different fighter aircraft load spectra
[FFA-TN-1982-02] N82-27288
FATIGUE TESTS
T700 - Modern development test techniques, lessons learned and results
[AIAA PAPER 82-1183] A82-35040

- Practical application of a computerized flight by flight fatigue test system A82-37768
- Design of a data acquisition and reduction system for fatigue testing [AD-A110612] N82-26720

FAULT TOLERANCE
- Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system A82-37446
- Reliability design study for a fault-tolerant electronic engine control [AIAA PAPER 82-1129] A82-37689
- Control optimization, stabilization and computer algorithms for aircraft applications [NASA-CR-169015] N82-27009

FEEDBACK CONTROL
- Simplified digital design tools A82-37034
- A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression A82-37765
- Design and evaluation of a state-feedback vibration controller [AHS PREPRINT 81-10] A82-37783
- Rotor state estimation for rotorcraft [AHS PREPRINT 81-11] A82-37784
- A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation [AHS PREPRINT 81-12] A82-37785
- Considerations of open-loop, closed-loop, and adaptive multicyclic control systems [AHS PREPRINT 81-13] A82-37786
- Use of entire eigenstructure assignment with high-gain error-actuated flight control systems [AD-A111098] N82-26318
- Marine Air Traffic Control and Landing System (MATCALS) investigation [AD-A107384] N82-27260

FERROGRAPHY
- Mechanical wear assessment of helicopter engines by ferrography [AD-A110772] N82-26305

FIBER OPTICS
- Air data measurement using distributed processing and fiber optics data transmission N82-26214

FIBER REINFORCED COMPOSITES
- Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites [ASLE PREPRINT 82-AM-5A-2] A82-37855
- Advanced concepts for composite structure joints and attachment fittings. Volume 2: Design guide [AD-A111106] N82-26280
- Fuselage structure using advanced technology fiber reinforced composites [NASA-CASE-LAR-11688-1] N82-26384

FIELD OF VIEW
- Wide field of view laser beacon system for three dimensional aircraft range measurements N82-26216
- Wide angle raster head up display design and application to future single seat fighters N82-27304

FIGHTER AIRCRAFT
- A methodology for planning a cost effective engine development --- for fighter aircraft [AIAA PAPER 82-1140] A82-35024
- Propulsion system requirements for advanced fighter aircraft [AIAA PAPER 82-1143] A82-35025
- The F404 development program - A new approach [AIAA PAPER 82-1180] A82-35045
- Control of gas turbine power transients for improved turbine airfoil durability [AIAA PAPER 82-1182] A82-35047
- Individual bypass throttling in fighter engines [AIAA PAPER 82-1285] A82-35100
- Status report of the USAF's Engine Model Derivative Program [ASME PAPER 82-GT-183] A82-35391
- Cycle considerations for tactical fighters in the early 1990's [ASME PAPER 82-GT-259] A82-35436
- Extension of FLO codes to transonic flow prediction for fighter configurations A82-35564
- Thrust reverser induced flow interference on tactical aircraft stability and control [AIAA PAPER 82-1133] A82-37693
- Advanced nozzle integration for air combat fighter application [AIAA PAPER 82-1135] A82-37694
- Opportunities exist to achieve greater standardization of aircraft and helicopter seats [AD-A111718] N82-26259
- Navy's F/A-18 expected to be an effective performer but problems still face the program [AD-A111877] N82-26281
- Life and Utilization Criteria Identification In Design (LUCID), volume 1 [AD-A111939] N82-26309
- Life and Utilization Criteria Identification In Design (LUCID), volume 2 [AD-A111940] N82-26310
- Aviation Materiel Combat Ready In-Country (AMCRIC) [AD-A107451] N82-27283
- Comparison of different fighter aircraft load spectra [FFA-TN-1982-02] N82-27288
- Advanced technology and fighter cockpit design: Which drives which? N82-27302

FILM COOLING
- Effect of crossflows on the discharge coefficient of film cooling holes [ASME PAPER 82-GT-147] A82-35371
- The effect of temperature ratios on the film cooling process [ASME PAPER 82-GT-305] A82-35470
- Heat transfer in turbines [AD-A111584] N82-26307

FINITE ELEMENT METHOD
- Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking [ASME PAPER 82-GT-292] A82-35462
- A finite element analysis of coupled rotor fuselage vibration [AHS PREPRINT 81-21] A82-37792
- Static and aeroelastic optimization of aircraft A82-37945

FIRE CONTROL
- Impact of Advanced Avionics Technology and Ground Attack Weapon Systems [AGARD-CP-306] N82-27293
- A planning system for F-16 air-to-surface missions N82-27297

FIRE FIGHTING
- Briefs of accidents involving aerial application operations, U.S. general aviation, 1979 [PB82-138983] N82-27256

FIRE PREVENTION
- Aircraft fire safety research with antimisting fuels - Status report [AIAA PAPER 82-1235] A82-35076

FLAME HOLDERS
- Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor [AIAA PAPER 82-1072] A82-34992

FLAME PROPAGATION
- Models for a turbulent premixed dump combustor [AIAA PAPER 82-1261] A82-37709

FLASH LAMPS
- A laboratory evaluation of the suitability of a xenon flashtube signal as an aid-to-navigation [AD-A110729] N82-26265

FLASHING (VAPORIZING)
- Experimental study of external fuel vaporization [ASME PAPER 82-GT-59] A82-35312
- Investigation of spray characteristics for flashing injection of fuels containing dissolved air and superheated fuels [NASA-CR-3563] N82-26295

FLAT PLATES
- Local heat transfer to staggered arrays of impinging circular air jets [ASME PAPER 82-GT-211] A82-35401
- A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels [NASA-CR-169035] N82-27088

FLEXIBLE BODIES
Transient vibration of high speed lightweight rotor due to sudden imbalance [ASME PAPER 82-GT-231] A82-35413
Experimental evaluation of squeeze film supported flexible rotors [ASME PAPER 82-GT-233] A82-35415

FLIGHT CHARACTERISTICS
Airworthiness and flight characteristics test of an OH-58C configured to a Light Combat Helicopter (LCH) [AD-A112581] N82-26286

FLIGHT CONDITIONS
Aviation meteorology --- Russian book A82-36972
Briefs of fatal accidents involving weather as a cause/factor, U.S. general aviation, 1979 [PB82-138934] N82-27248
Impact of advanced avionics and munitions technology on ground attack weapons systems in night and adverse weather conditions N82-27294
Attack and en route avionics for in-weather operations N82-27300
Weapon system of a future attack aircraft N82-27301

FLIGHT CONTROL
Use of entire eigenstructure assignment with high-gain error-actuated flight control systems [AD-A111098] N82-26318
Scenarios for evolution of air traffic control [AD-A112566] N82-27270
Development of low-order model of an X-wing aircraft by system identification [AD-A113760] N82-27286
Quiet Short-Haul Research Airplane (QSRA) model select panel functional description [NASA-TM-84243] N82-27319
Reliability and maintainability analysis of fluidic back-up flight control system and components [AD-A110496] N82-27320
Digital command augmentation for lateral directional aircraft dynamics [AD-A107264] N82-27321
Notes on lateral-directional pilot induced oscillations [AD-A113996] N82-27322

FLIGHT CREWS
Army helicopter crew seat vibration - Past performance, future requirements [AHS PREPRINT 81-3] A82-37779
Update of the summary report of 1977-1978 task force on aircrew workload [AD-A112547] N82-26258
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 1: Results [AD-A110956] N82-26290
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design [AD-A110954] N82-26291

FLIGHT HAZARDS
STOL aircraft response to turbulence generated by a tall upwind building A82-35821
Briefs of fatal accidents involving weather as a cause/factor, U.S. general aviation, 1979 [PB82-138934] N82-27248

FLIGHT INSTRUMENTS
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design [AD-A110954] N82-26291

FLIGHT PATHS
Electric field detection and ranging of aircraft A82-37377
Simulation report: Advanced display for complex flight trajectories [AD-A111259] N82-26320
A result in the theory of spiral search [AD-A112481] N82-27262
AUTOPILOT: A distributed planner for air fleet control [AD-A107139] N82-27269

FLIGHT PLANS
Dynamic scheduling of runway operations N82-26200
The Flight Service Automation System (FSAS) system benchmark. Volume 1: Summary, introduction and concepts [PB82-143538] N82-27277
The Flight Service Automation System (FSAS) system benchmark. Volume 2: The model of the application [PB82-143546] N82-27278
The Flight Service Automation System (FSAS) system benchmark. Volume 3: The vendor interface package [PB82-143553] N82-27279

FLIGHT SAFETY
The direct effects of lightning on aircraft A82-35730
A gust damper --- for light passenger aircraft A82-37127
Proposed research tasks for the reduction of human error in naval aviation mishaps [AD-A112339] N82-27241

FLIGHT SIMULATION
Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility [AIAA PAPER 82-1044] A82-34978
Application of high bypass turbofan computer simulation to flight and test data processing [ASME PAPER 82-GT-141] A82-35366
Integrated flight trajectory control [AD-A110998] N82-26319
Simulation report: Advanced display for complex flight trajectories [AD-A111259] N82-26320
Comparison of different fighter aircraft load spectra [FFA-TN-1982-02] N82-27288

FLIGHT SIMULATORS
Justification for, and design of, an economical programmable multiple flight simulator A82-36969
Optimal placement model for the B-52G weapons system trainer [AD-A110977] N82-26323
Visual technology research simulator, visual and motion system dynamics [AD-A111801] N82-26325
System Description-Aviation Wide-Angle Visual System (AWAVS) computer image [AD-A111800] N82-27323
Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator [AD-A112466] N82-27324
Advanced training techniques using computer generated imagery [AD-A111979] N82-28007
Computer image generation: Advanced visual/sensor simulation [AD-A107098] N82-28016

FLIGHT TESTS
Selected results of the F-15 propulsion interactions program [AIAA PAPER 82-1041] A82-34976
Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility [AIAA PAPER 82-1044] A82-34978
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8 [AIAA PAPER 82-1120] A82-35017
T700 - Modern development test techniques, lessons learned and results [AIAA PAPER 82-1183] A82-35048
Certification of an airborne Loran-C navigation system A82-35876
The PATRIOT Radar in tactical air defense A82-37031
Boeing's new transports in a flight-test marathon A82-37493
Flight evaluation of a digital electronic engine control system in an F-15 airplane [AIAA PAPER 82-1080] A82-37683
Practical application of a computerized flight by flight fatigue test system A82-37768

Flight demonstration of an integrated floor/fuel isolation system
[AHS PREPRINT 81-16] A82-37788
Flying qualities criteria for GA single pilot IFR operations
N82-26213
Flight-test verification of a pictorial display for general aviation instrument approach
[NASA-TM-83305] N82-26288
Mode S system accuracy
[AD-A112249] N82-27266
B-747 vortex alleviation flight tests: Ground-based sensor measurements
[AD-A113621] N82-27287
Digital image processing for acquisition, tracking, hand off and ranging
N82-27303

FLIR DETECTORS
Helicopter night vision system simulation evaluation
[AD-A110505] N82-26292

FLOATING POINT ARITHMETIC
A floating-point/multiple-precision processor for airborne applications
[NASA-TM-84252] N82-26289

FLOW CHARACTERISTICS
CFD technology for propulsion installation design - Forecast for the 80's --- computational fluid dynamics in aerospace applications
[ASME PAPER 82-GT-21] A82-35289
Conversion of centrifugal compressor performance curves considering non-similar flow conditions
[ASME PAPER 82-GT-42] A82-35300
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors
[ASME PAPER 82-GT-102] A82-35339
Current techniques for jet engine test cell modeling
[AIAA PAPER 82-1272] A82-37712

FLOW DISTORTION
The effect of inlet distortion on the performance characteristics of a centrifugal compressor
[ASME PAPER 82-GT-92] A82-35335
Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique
[AIAA PAPER 82-1085] A82-37685

FLOW DISTRIBUTION
Selected results of the F-15 propulsion interactions program
[AIAA PAPER 82-1041] A82-34976
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8
[AIAA PAPER 82-1120] A82-35017
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[ASME PAPER 82-GT-16] A82-35285
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors
[ASME PAPER 82-GT-102] A82-35339
Influence of casing treatment on the operating range of axial compressors
[ASME PAPER 82-GT-103] A82-35340
A mixed-flow cascade passage design procedure based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351
On the vortex flow over delta and double-delta wings
[AIAA PAPER 82-0949] A82-37466
Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes
[AIAA PAPER 82-0951] A82-37467
A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations
[AIAA PAPER 82-1017] A82-37477
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710
Aerodynamically induced vibration
[AD-A110493] N82-26306
Comparison of numerical results and measured data for smooth and indented nosetips
[AD-A111794] N82-26619
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 2
[AD-A111783] N82-27312

FLOW EQUATIONS
The numerical solution of the Navier-Stokes equations for incompressible turbulent flow over airfoils
[AD-A111279] N82-26612

FLOW GEOMETRY
A comprehensive method for preliminary design optimization of axial gas turbine stages
[AIAA PAPER 82-1264] A82-35091
The use of optimization techniques to design controlled diffusion compressor blading
[ASME PAPER 82-GT-149] A82-35373
The calculation of deviation angle in axial-flow compressor cascades
[ASME PAPER 82-GT-230] A82-35412

FLOW MEASUREMENT
Casing wall boundary-layer development through an isolated compressor rotor
[ASME PAPER 82-GT-18] A82-35287
Secondary flow mixing losses in a centrifugal impeller
[ASME PAPER 82-GT-44] A82-35302
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710
Correcting for turbulence effects on average velocity measurements made using five hole spherical pitot tube probes
[AD-A112573] N82-27290

FLOW REGULATORS
Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-83] A82-35329

FLOW STABILITY
Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors
[ASME PAPER 82-GT-85] A82-35331

FLOW THEORY
Secondary flows and losses in axial flow turbines
[ASME PAPER 82-GT-19] A82-35288
Chordwise and compressibility corrections for arbitrary planform slender wings
A82-37931

FLOW VELOCITY
The influence of flow rate on the wake in a centrifugal impeller
[ASME PAPER 82-GT-45] A82-35303
Effect of impeller extended shrouds on centrifugal compressor performance as a function of specific speed
[ASME PAPER 82-GT-228] A82-35411
Wind tunnel measurements of three-dimensional wakes of buildings --- for aircraft safety applications
[NASA-CR-3565] N82-26921
Acoustic properties of turbofan inlets
[NASA-CR-169016] N82-27090

FLUID FLOW
Experiments on fuel heating for commercial aircraft
[NASA-TM-82878] N82-26483

FLUID PRESSURE
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
Semi-active fluid inertia - A new concept in vibration isolation
[AHS PREPRINT 81-17] A82-37789

FLUIDICS
Reliability and maintainability analysis of fluidic back-up flight control system and components
[AD-A110496] N82-27320

FLUTTER
A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression
A82-37765
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703

FLUTTER ANALYSIS
Aerodynamic lag functions, divergence, and the British flutter method
A82-35820
F-16 active flutter suppression program
A82-37947

Investigation of an improved structural model for damaged T-38 horizontal stabilizer flutter analysis using NASTRAN [AD-A111095] N82-26316

FLYING EJECTION SEATS

Current ADM restraint system status, trade-off constraints and long range objectives for the Maximum Performance Ejection System (MPES) [AD-A112645] N82-27230

FORCED VIBRATION

The influence of Coriolis forces on gyroscopic motion of spinning blades [ASME PAPER 82-GT-163] A82-35384

FOREIGN BODIES

Foreign object impact design criteria, volume 2 [AD-A112701] N82-27313

Foreign object impact design criteria, volume 3 [AD-A112447] N82-27314

FORMING TECHNIQUES

Net shape components for small gas turbine engines [ASME PAPER 82-GT-96] A82-35338

FRAGMENTS

Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in U.S. commercial aviation during 1978 [NASA-CR-165368] N82-27316

FREEZING

The low temperature properties of aviation fuels [ASME PAPER 82-GT-48] A82-35306

FREQUENCY SHIFT KEYING

A single-frequency multitransmitter telemetry technique A82-36281

FROST DAMAGE

Aerodynamic investigations to determine possible ice flight paths [NASA-TM-76648] N82-27235

FUEL COMBUSTION

NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status [AIAA PAPER 82-1088] A82-34999

NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status [AIAA PAPER 82-1089] A82-35000

Carbon formation by the pyrolysis of gas turbine fuels in preflame regions of gas turbine combustors [ASME PAPER 82-GT-84] A82-35330

Combustion behavior of solid fuel Ramjets. Volume 2: Effects of fuel properties and fuel-air mixing on combustion efficiency [AD-A110796] N82-26303

Radiation/catalytic augmented combustion [AD-A112376] N82-27434

An investigation of engine and test cell operating conditions on the effectiveness of smoke suppressant fuel additives [AD-A112800] N82-27527

FUEL CONSUMPTION

Individual bypass throttling in fighter engines [AIAA PAPER 82-1285] A82-35100

Progress in the development of energy efficient engine components [ASME PAPER 82-GT-275] A82-35450

Investigation of air transportation technology at Princeton University, 1981 N82-26212

Input/output models for general aviation piston-prop aircraft fuel economy N82-26215

Effect on fuel efficiency of parameter variations in the cost function for multivariable control of a turbofan engine [AD-A110614] N82-26301

FUEL CONTROL

Adaptive fuel control feasibility investigation for helicopter applications [ASME PAPER 82-GT-205] A82-35400

Electronic control for small engines [AIAA PAPER 82-1126] A82-37688

FUEL CORROSION

Commercial aircraft airframe fuel systems surveys [AD-A112241] N82-27524

FUEL FLOW

Atomization quality of twin fluid atomizers for gas turbines [ASME PAPER 82-GT-61] A82-35314

The Schladitz fuel injector: An initial performance evaluation without burning [AD-A113612] N82-27315

FUEL INJECTION

Influence of airblast atomizer design features on mean drop size [AIAA PAPER 82-1073] A82-34993

Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors [AIAA PAPER 82-1175] A82-35041

Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow [ASME PAPER 82-GT-16] A82-35285

Thermal decomposition of aviation fuel [ASME PAPER 82-GT-27] A82-35292

Atomization quality of twin fluid atomizers for gas turbines [ASME PAPER 82-GT-61] A82-35314

HC and CO emission abatement via selective fuel injection [ASME PAPER 82-GT-178] A82-35390

Investigation of spray characteristics for flashing injection of fuels containing dissolved air and superheated fuels [NASA-CR-3563] N82-26295

The Schladitz fuel injector: An initial performance evaluation without burning [AD-A113612] N82-27315

FUEL OILS

Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions [ASME PAPER 82-GT-32] A82-35293

FUEL SPRAYS

A spark ignition model for liquid fuel sprays applied to gas turbine engines A82-37220

FUEL SYSTEMS

Flight demonstration of an integrated floor/fuel isolation system [AHS PREPRINT 81-16] A82-37788

Commercial aircraft airframe fuel systems surveys [AD-A112241] N82-27524

FUEL TESTS

Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors [AIAA PAPER 82-1175] A82-35041

Aircraft fire safety research with antimisting fuels - Status report [AIAA PAPER 82-1235] A82-35076

Thermal decomposition of aviation fuel [ASME PAPER 82-GT-27] A82-35292

The low temperature properties of aviation fuels [ASME PAPER 82-GT-48] A82-35306

Deposit formation in hydrocarbon fuels [ASME PAPER 82-GT-49] A82-35307

Experimental study of external fuel vaporization [ASME PAPER 82-GT-59] A82-35312

A procedure for evaluating fuel composition effects on combustor life [ASME PAPER 82-GT-296] A82-35465

An alternate test procedure to qualify future fuels for Navy aircraft [AIAA PAPER 82-1233] A82-36175

Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel A82-36673

FUEL-AIR RATIO

Numerical and experimental examination of a prevaporized/premixed combustor [AIAA PAPER 82-1074] A82-34994

Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions [ASME PAPER 82-GT-32] A82-35293

Combustion behavior of solid fuel Ramjets. Volume 2: Effects of fuel properties and fuel-air mixing on combustion efficiency [AD-A110796] N82-26303

FULL SCALE TESTS

Model test and full scale checkout of dry-cooled jet runup sound suppressors [AIAA PAPER 82-1239] A82-35079

FUSELAGES

A finite element analysis of coupled rotor fuselage vibration
[AHS PREPRINT 81-21] A82-37792

A nonlinear response analysis for coupled rotor-fuselage systems
[AHS PREPRINT 81-23] A82-37794

Use of optimization in helicopter vibration control by structural modification
[AHS PREPRINT 81-27] A82-37797

Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077

Fuselage structure using advanced technology fiber reinforced composites
[NASA-CASE-LAR-11688-1] N82-26384

Elevation plane analysis of on-aircraft antennas
[AD-A112373] N82-26554

G

GAS CHROMATOGRAPHY

Turbine engine lubricant reclamation
[AD-A112098] N82-26312

Kovats indices as a tool in characterizing hydrocarbon fuels in temperature programmed glass capillary gas chromatography. Part 1: Qualitative identification
[AD-A111389] N82-26400

GAS COOLING

Model test and full scale checkout of dry-cooled jet runup sound suppressors
[AIAA PAPER 82-1239] A82-35079

GAS FLOW

A critical appraisal of some current incidence loss models for the stator and rotor of a mixed flow gas turbine
[ASME PAPER 82-GT-120] A82-35350

GAS GENERATORS

Characteristics of a side dump gas generator ramjet
[AIAA PAPER 82-1258] A82-35089

GAS RECOVERY

Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-83] A82-35329

GAS TEMPERATURE

Control of gas turbine power transients for improved turbine airfoil durability
[AIAA PAPER 82-1182] A82-35047

GAS TUNGSTEN ARC WELDING

Development and application of Dabber gas tungsten arc welding for repair of aircraft engine, seal teeth
[ASME PAPER 82-GT-55] A82-35310

GAS TURBINE ENGINES

Ceramic component development for limited-life propulsion engines
[AIAA PAPER 82-1050] A82-34979

Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982

Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
[AIAA PAPER 82-1072] A82-34992

Advancements in real-time engine simulation technology --- of digital electronic aircraft engine controls
[AIAA PAPER 82-1075] A82-34995

NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status
[AIAA PAPER 82-1089] A82-35000

Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors
[AIAA PAPER 82-1175] A82-35041

The F404 development program - A new approach
[AIAA PAPER 82-1180] A82-35045

Icing conditions on sea level gas turbine engine test stands
[AIAA PAPER 82-1237] A82-35078

Thermal decomposition of aviation fuel
[ASME PAPER 82-GT-27] A82-35292

Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions
[ASME PAPER 82-GT-32] A82-35293

Fuel microemulsions for jet engine smoke reduction
[ASME PAPER 82-GT-33] A82-35294

Acoustic control of dilution-air mixing in a gas turbine combustor
[ASME PAPER 82-GT-35] A82-35296

Small engine inlet air particle separator technology
[ASME PAPER 82-GT-40] A82-35299

The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine
[ASME PAPER 82-GT-63] A82-35315

Carbon formation by the pyrolysis of gas turbine fuels in preflame regions of gas turbine combustors
[ASME PAPER 82-GT-84] A82-35330

Two-phase transpiration cooling
[ASME PAPER 82-GT-89] A82-35333

A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336

Net shape components for small gas turbine engines
[ASME PAPER 82-GT-96] A82-35338

The effect of NaCl/g/ in high temperature oxidation
[ASME PAPER 82-GT-106] A82-35342

The potential impact of future fuels on small gas turbine engines
[ASME PAPER 82-GT-133] A82-35362

The use of optimization techniques to design controlled diffusion compressor blading
[ASME PAPER 82-GT-149] A82-35373

A practical approach to the design of multivariable control strategies for gas turbines
[ASME PAPER 82-GT-150] A82-35374

Scaling effects on leakage losses in labyrinth seals
[ASME PAPER 82-GT-157] A82-35380

Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388

A stage-by-stage dual-spool compression system modeling technique
[ASME PAPER 82-GT-189] A82-35394

TURBCTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396

Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402

Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425

An approach to software for high integrity applications --- in aircraft gas turbine engine control
[ASME PAPER 82-GT-251] A82-35430

Ceramic components for automotive and heavy duty turbine engines - CATE and AGT 100
[ASME PAPER 82-GT-253] A82-35432

Progress in the development of energy efficient engine components
[ASME PAPER 82-GT-275] A82-35450

Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462

The effect of temperature ratios on the film cooling process
[ASME PAPER 82-GT-305] A82-35470

A spark ignition model for liquid fuel sprays applied to gas turbine engines
A82-37220

Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines
[AIAA PAPER 82-1054] A82-37679

Optical tip clearance sensor for aircraft engine controls
[AIAA PAPER 82-1131] A82-37691

Transient simulation of gas turbines including the effects of heat capacity of the solid parts
[ISBN-951-752-496-X] N82-26296

Life and Utilization Criteria Identification In Design (LJCID), volume 1
[AD-A111939] N82-26309

Life and Utilization Criteria Identification In Design (LUCID), volume 2
[AD-A111940] N82-26310
Depot support of gas turbine engines
[AD-A107141] N82-27217
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165368] N82-27316
Mechanical property characterization and modeling of structural materials --- for airframes and aircraft gas turbine engines
[AD-A113841] N82-27764

GAS TURBINES
A comprehensive method for preliminary design optimization of axial gas turbine stages
[AIAA PAPER 82-1264] A82-35091
Atomization quality of twin fluid atomizers for gas turbines
[ASME PAPER 82-GT-61] A82-35314
The use of performance-monitoring to prevent compressor and turbine blade failures
[ASME PAPER 82-GT-66] A82-35316
Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-83] A82-35329
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337
A critical appraisal of some current incidence loss models for the stator and rotor of a mixed flow gas turbine
[ASME PAPER 82-GT-120] A82-35350
Accuracy expectations for gas turbine and centrifugal compressor performance testing
[ASME PAPER 82-GT-128] A82-35358
Performance of multiple, angled nozzles with short mixing stack eductor systems
[AD-A110817] N82-26302
Heat transfer in turbines
[AD-A111584] N82-26367

GAS-SOLID INTERACTIONS
Transient simulation of gas turbines including the effects of heat capacity of the solid parts
[ISBN-951-752-496-X] N82-26296

GEARS
Selecting the best reduction gear concept for prop-fan propulsion systems
[AIAA PAPER 82-1124] A82-35020
Next generation turboprop gearboxes
[ASME PAPER 82-GT-236] A82-35418

GENERAL AVIATION AIRCRAFT
NASA research in aircraft propulsion
[ASME PAPER 82-GT-177] A82-35389
A single-frequency multitransmitter telemetry technique
A82-36281
Investigation of air transportation technology at Princeton University, 1981
N82-26212
Flying qualities criteria for GA single pilot IFR operations
N82-26213
Input/output models for general aviation piston-prop aircraft fuel economy
N82-26215
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics --- conducted in Langley 30- by 60-foot tunnel
[NASA-TP-2011] N82-26217
Flight-test verification of a pictorial display for general aviation instrument approach
[NASA-TM-83305] N82-26288
Propulsion opportunities for future commuter aircraft
[NASA-TM-82915] N82-26293
Briefs of accidents, involving corporate/executive aircraft, U.S. general aviation, 1979
[PB82-138967] N82-27245
Briefs of accidents involving missing and missing later recovered aircraft, U.S. general aviation, 1979
[PB82-138959] N82-27246
Briefs of accidents involving rotorcraft, U.S. general aviation, 1979
[PB82-138926] N82-27249
Briefs of accidents involving turbine powered aircraft, US general aviation, 1979
[PB82-138918] N82-27250
Briefs of accidents involving midair collisions: U.S. general aviation, 1979
[PB82-138900] N82-27251
Annual review of aircraft accident data: U.S. air carrier operations, 1979
[PB82-138339] N82-27253
Briefs of fatal accidents involving fixed-wing multi-engine aircraft, U.S. General Aviation, 1979
[PB82-139007] N82-27254
Briefs of accidents involving amateur/home built aircraft, U.S. general aviation, 1979
[PB82-138975] N82-27257
A Loran-C prototype navigation receiver for general aviation
[NASA-CR-169118] N82-27259
Advanced microstrip antenna developments. Volume 2: Microstrip GPS antennas for general aviation aircraft
[AD-A113620] N82-27508

GEODETIC COORDINATES
An unbiased analysis of the Doppler coordinate systems
[AD-A110510] N82-26269

GEODETIC SATELLITES
Doppler test results of experimental GPS receiver
[AD-A113587] N82-27274

GEOMAGNETISM
A comparison of pole positions derived from GPS satellite and Navy navigation satellite observations
[AD-A110765] N82-26268
The Earth's gravity field to degree and order 180 using SEASAT altimeter data, terrestrial gravity data and other data
[AD-A113098] N82-27900

GEOMETRICAL OPTICS
Wide angle raster head up display design and application to future single seat fighters
N82-27304

GLASS FIBER REINFORCED PLASTICS
Use of CGHRP in transport --- Carbon and Glass Hybrid Reinforced Plastics
A82-37061
A significant role for composites in energy-efficient aircraft
A82-37065
R & D on composite rotor blades at Agusta
A82-37764
CFC drive shaft and CFC coupling for the tail rotor of the BO 105
A82-37766
Ageing of composite rotor blades
A82-37771

GLIDE PATHS
Flight experiments using the front-side control technique during piloted approach and landing in a powered lift STOL aircraft
[NASA-TM-81337] N82-26314

GLIDERS
Briefs of accidents involving gliders, U.S. general aviation, 1979
[PB82-139015] N82-27258

GLOBAL POSITIONING SYSTEM
FAA tests on the Navstar GPS Z-set
A82-37039
Navstar - Global Positioning System: A revolutionary capability
A82-37040
Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR
[NASA-CR-169031] N82-26263
Global Positioning System (GPS) geodetic receivers
[AD-A111026] N82-26267
A comparison of pole positions derived from GPS satellite and Navy navigation satellite observations
[AD-A110765] N82-26268
Data processing at the Global Positioning System master control station
[AD-A110553] N82-26270
Doppler test results of experimental GPS receiver
[AD-A113587] N82-27274

Advanced microstrip antenna developments. Volume 2: Microstrip GPS antennas for general aviation aircraft
[AD-A113620] N82-27588

GOVERNMENT PROCUREMENT
Reduced performance and increased cost warrant reassessment of the multiple stores ejector rack
[AD-A112776] N82-27285

GRAPHITE-EPOXY COMPOSITES
Fabrication and test of integrally stiffened graphite/epoxy components
A82-37071
Application and testing of metallic coatings on graphite/epoxy composites
A82-37074
Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints
A82-37080

GRAPHITE-POLYIMIDE COMPOSITES
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites
[ASLE PREPRINT 82-AM-5A-2] A82-37855
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives --- adhesively bonding graphite-polyimide structures
[NASA-CR-165839] N82-26465

GRAVITATIONAL FIELDS
Gravity induced position errors in airborne inertial navigation
[AD-A113823] N82-27272
The Earth's gravity field to degree and order 180 using SEASAT altimeter data, terrestrial gravity data and other data
[AD-A113098] N82-27900

GRAVITY ANOMALIES
Gravity induced position errors in airborne inertial navigation
[AD-A113823] N82-27272
The Earth's gravity field to degree and order 180 using SEASAT altimeter data, terrestrial gravity data and other data
[AD-A113098] N82-27900

GROOVES
Influence of casing treatment on the operating range of axial compressors
[ASME PAPER 82-GT-103] A82-35340

GROUND HANDLING
Preliminary study of ground handling characteristics of Buoyant Quad Rotor (BQR) vehicles
[NASA-CR-166130] N82-26220

GROUND STATIONS
Data processing at the Global Positioning System master control station
[AD-A110553] N82-26270
Standard engineering installation package. Air traffic radio channel control equipment: Change 1
[AD-A107150] N82-26275

GROUND SUPPORT EQUIPMENT
Frequency sharing between passive sensors and aeronautical radionavigation systems employing ground transponders in the band 4.2 - 4.4 GHz
[NASA-CR-169041] N82-26261

GROUND TESTS
T700 - Modern development test techniques, lessons learned and results
[AIAA PAPER 82-1183] A82-35048
Improved methods in ground vibration testing
[AHS PREPRINT 81-6] A82-37761

GROUND WIND
B-747 vortex alleviation flight tests: Ground-based sensor measurements
[AD-A113621] N82-27287

GUIDANCE (MOTION)
Simplified digital design tools
A82-37034
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 1
[AD-A111763] N82-27225

GUIDE VANES
Comprehensive analysis of an axial compressor test with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323
Heat transfer measurements of a transonic nozzle guide vane
[ASME PAPER 82-GT-247] A82-35426

GUST ALLEVIATORS
A gust damper --- for light passenger aircraft
A82-37127

GUST LOADS
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703

GUSTS
Rotor state estimation for rotorcraft
[AHS PREPRINT 81-11] A82-37784

GYROSCOPES
Gyro systems (selected pages)
[AD-A113748] N82-27271

GYROSCOPIC STABILITY
The influence of Coriolis forces on gyroscopic motion of spinning blades
[ASME PAPER 82-GT-163] A82-35384
Gyro systems (selected pages)
[AD-A113748] N82-27271

H

HANDBOOKS
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation
[AD-A111430] N82-26321

HANG GLIDERS
Ultralight airplanes
A82-35233

HANGARS
Preliminary study of ground handling characteristics of Buoyant Quad Rotor (BQR) vehicles
[NASA-CR-166130] N82-26220

HARMONIC EXCITATION
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077

HARMONIC OSCILLATION
Optimization of blade pitch angle for higher harmonic rotor control
A82-37776

HARRIER AIRCRAFT
An oxygen enriched air system for the AV-8A Harrier
[AD-A112336] N82-27239

HEAD-UP DISPLAYS
Wide angle raster head up display design and application to future single seat fighters
N82-27304

HEAT FLUX
Turbine stage heat flux measurements
[AIAA PAPER 82-1289] A82-35102

HEAT MEASUREMENT
Turbine stage heat flux measurements
[AIAA PAPER 82-1289] A82-35102
Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments
[ASME PAPER 82-GT-174] A82-35387
Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388

HEAT OF FUSION
Microwave ice prevention
N82-26203

HEAT RESISTANT ALLOYS
A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336
Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425
Hot isostatically pressed manufacture of high strength MERL 76 disk and seal shapes
[NASA-CR-165549] N82-26439

HEAT TRANSFER
Turbine stage heat flux measurements
[AIAA PAPER 82-1289] A82-35102
Two-phase transpiration cooling
[ASME PAPER 82-GT-89] A82-35333

A two-dimensional boundary-layer program for
turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336
Heat transfer optimised turbine rotor blades - An
experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469
Transient simulation of gas turbines including the
effects of heat capacity of the solid parts
[ISBN-951-752-496-X] N82-26296
Heat transfer in turbines
[AD-A111584] N82-26307

HEAT TRANSFER COEFFICIENTS
Measurements of heat transfer coefficients on gas
turbine components. I - Description, analysis
and experimental verification of a technique for
use in hostile environments
[ASME PAPER 82-GT-174] A82-35387
Measurements of heat transfer coefficients on gas
turbine components. II - Applications of the
technique described in part I and comparisons
with results from a conventional measuring
technique and predictions
[ASME PAPER 82-GT-175] A82-35388
Local heat transfer to staggered arrays of
impinging circular air jets
[ASME PAPER 82-GT-211] A82-35401
Heat transfer measurements of a transonic nozzle
guide vane
[ASME PAPER 82-GT-247] A82-35426
The effect of temperature ratios on the film
cooling process
[ASME PAPER 82-GT-305] A82-35470

HEATING
Experiments on fuel heating for commercial aircraft
[NASA-TM-82878] N82-26483

HEAVY LIFT AIRSHIPS
Preliminary study of ground handling
characteristics of Buoyant Quad Rotor (BQR)
vehicles
[NASA-CR-166130] N82-26220

HELICOPTER CONTROL
An advanced helicopter engine control system
[ASME PAPER 82-GT-250] A82-35429
Optimization of blade pitch angle for higher
harmonic rotor control
A82-37776
A simple system for helicopter
individual-blade-control and its application to
stall-induced vibration alleviation
[AHS PREPRINT 81-12] A82-37785
Real-time simulation of an airborne radar for
overwater approaches
[NASA-CR-166293] N82-26262

HELICOPTER DESIGN
CFC drive shaft and GFC coupling for the tail
rotor of the BO 105
A82-37766
Quasi-static and dynamic crushing of energy
absorbing materials and structural components
with the aim of improving helicopter
crashworthiness
A82-37769
Helicopter design synthesis
A82-37772
Factors shaping conceptual design of rotary-wing
aircraft
A82-37773
Low vibration design of AAH for mission
proficiency requirements --- Advanced Attack
Helicopter
[AHS PREPRINT 81-2] A82-37778
The Helicopter Ride Revolution
[AHS PREPRINT 81-4] A82-37780
Considerations of open-loop, closed-loop, and
adaptive multicyclic control systems
[AHS PREPRINT 81-13] A82-37786
Assessment of the dynamic response of a structure
when modified by the addition of mass, stiffness
or dynamic absorbers
[AHS PREPRINT 81-18] A82-37790
A unified approach to helicopter NASTRAN modeling
[AHS PREPRINT 81-22] A82-37793
Substructure program for analysis of helicopter
vibrations
[AHS PREPRINT 81-24] A82-37795
Advanced concepts for composite structure joints
and attachment fittings. Volume 2: Design guide
[AD-A111106] N82-26280

HELICOPTER ENGINES
Development of a helicopter rotor/propulsion
system dynamics analysis
[AIAA PAPER 82-1078] A82-34997
Small engine inlet air particle separator technology
[ASME PAPER 82-GT-40] A82-35299
Adaptive fuel control feasibility investigation
for helicopter applications
[ASME PAPER 82-GT-205] A82-35400
An advanced helicopter engine control system
[ASME PAPER 82-GT-250] A82-35429
Electronic control for small engines
[AIAA PAPER 82-1126] A82-37680
Mechanical wear assessment of helicopter engines
by ferrography
[AD-A110772] N82-26305

HELICOPTER PERFORMANCE
Quantification of helicopter vibration ride
qualities
A82-37767
Practical application of a computerized flight by
flight fatigue test system
A82-37768
An automatic map reader suitable for use in
helicopters
A82-37775
Army helicopter crew seat vibration - Past
performance, future requirements
[AHS PREPRINT 81-3] A82-37779
Rotor state estimation for rotorcraft
[AHS PREPRINT 81-11] A82-37784
Use of optimization in helicopter vibration
control by structural modification
[AHS PREPRINT 81-27] A82-37797
Airworthiness and flight characteristics test of
an OH-58C configured to a Light Combat
Helicopter (LCH)
[AD-A112581] N82-26286

HELICOPTER PROPELLER DRIVE
Development of a helicopter rotor/propulsion
system dynamics analysis
[AIAA PAPER 82-1078] A82-34997

HELICOPTER WAKES
Determination of rotor wake induced empennage
airloads
[AHS PREPRINT 81-26] A82-37796

HELICOPTERS
Determination of in-flight helicopter loads and
vibration
[AHS PREPRINT 81-7] A82-37782
Design and evaluation of a state-feedback
vibration controller
[AHS PREPRINT 81-10] A82-37783
Survey of active and passive means to reduce
rotorcraft vibrations
A82-37946
Opportunities exist to achieve greater
standardization of aircraft and helicopter seats
[AD-A111718] N82-26259
Helicopter night vision system simulation evaluation
[AD-A110505] N82-26292
The annoyance of impulsive helicopter noise
[NASA-CR-169123] N82-26134

HELIUM-NEON LASERS
Wide field of view laser beacon system for three
dimensional aircraft range measurements
N82-26216

HIGH PRESSURE
Plain-jet airblast atomization of alternative
liquid petroleum fuels under high ambient air
pressure conditions
[ASME PAPER 82-GT-32] A82-35293
Casing treatments on a supersonic diffuser for
high pressure ratio centrifugal compressors
[ASME PAPER 82-GT-85] A82-35331

HIGH SPEED
Summary and recent results from the NASA advanced
High Speed Propeller Research Program
[NASA-TM-82891] N82-26219

HIGH TEMPERATURE TESTS
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337
The effect of NaCl/g/ in high temperature oxidation
[ASME PAPER 82-GT-106] A82-35342

HINGES
Hinged strake aircraft control system
[NASA-CASE-LAR-13060-1] N82-26278

HOLOGRAPHIC INTERFEROMETRY
- Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry [ASME PAPER 82-GT-34] A82-35295
- Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques A82-36999
- Operating manual holographic interferometry system for 2 x 2 foot transonic wind tunnel [NASA-CR-166344] N82-26218

HOMING
- A model for sensor-interceptor trade-off analysis [AD-A112046] N82-26271

HORIZONTAL TAIL SURFACES
- Fabrication and test of integrally stiffened graphite/epoxy components A82-37071

HOT CORROSION
- The effect of NaCl/g/ in high temperature oxidation [ASME PAPER 82-GT-106] A82-35342

HOT PRESSING
- Hot isostatically pressed manufacture of high strength MERL 76 disk and seal shapes [NASA-CR-165549] N82-26439

HOT-WIRE FLOWMETERS
- Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique [AIAA PAPER 82-1262] A82-37710

HOUSINGS
- Ceramic turbine housings [ASME PAPER 82-GT-293] A82-35463

HOVERING
- A finite element analysis of coupled rotor fuselage vibration [AHS PREPRINT 81-21] A82-37792

HUBS
- Monofilar - A dual frequency rotorhead absorber [AHS PREPRINT 81-20] A82-37791

HUMAN FACTORS ENGINEERING
- Justification for, and design of, an economical programmable multiple flight simulator A82-36969
- Current ADM restraint system status, trade-off constraints and long range objectives for the Maximum Performance Ejection System (MPES) [AD-A112645] N82-27238
- Proposed research tasks for the reduction of human error in naval aviation mishaps [AD-A112339] N82-27241
- Development of a backpack survival kit for ejection seats [AD-A113653] N82-27242
- Advanced technology and fighter cockpit design: Which drives which? N82-27302

HYBRID STRUCTURES
- Use of CGHRP in transport --- Carbon and Glass Hybrid Reinforced Plastics A82-37061

HYDRAULIC CONTROL
- Wear by generation of electrokinetic streaming currents [ASLE PREPRINT 82-AM-6A-3] A82-37857

HYDRAULIC EQUIPMENT
- Design guide for aircraft hydraulic systems and components for use with chlorotrifluorethylene nonflammable hydraulic fluids [AD-A112097] N82-26283

HYDRAULIC FLUIDS
- Design guide for aircraft hydraulic systems and components for use with chlorotrifluorethylene nonflammable hydraulic fluids [AD-A112097] N82-26283
- Corrosion tests with MIL-H-83282 and MIL-H-6083 aircraft hydraulic fluids [AD-A112437] N82-27506

HYDROCARBON COMBUSTION
- Numerical and experimental examination of a prevaporized/premixed combustor [AIAA PAPER 82-1074] A82-34994
- HC and CO emission abatement via selective fuel injection [ASME PAPER 82-GT-178] A82-35390

HYDROCARBON FUELS
- Deposit formation in hydrocarbon fuels [ASME PAPER 82-GT-49] A82-35307
- Carbon formation by the pyrolysis of gas turbine fuels in preflame regions of gas turbine combustors [ASME PAPER 82-GT-84] A82-35330

HYDROCRACKING
- Evaluation of hydrocracking catalysts for conversion of whole shale oil into high yields of jet fuels [AD-A112820] N82-27523

HYDROGEN FUELS
- Will hydrogen-fueled aircraft be safe [AIAA PAPER 82-1236] A82-35077

HYDROGRAPHY
- The Hydrographic Airborne Laser Sounder (HALS) [AD-A111027] N82-26660

HYPERSONIC FLOW
- Comparison of numerical results and measured data for smooth and indented nosetips [AD-A111794] N82-26619

I

IBM COMPUTERS
- An analysis of selected enhancements to the en route central computing complex [AD-A113575] N82-28044

ICE FORMATION
- Icing conditions on sea level gas turbine engine test stands [AIAA PAPER 82-1237] A82-35078
- Limited artificial and natural icing tests production UH-60A helicopter (re-evaluation) [AD-A112582] N82-26287
- Aerodynamic investigations to determine possible ice flight paths [NASA-TM-76648] N82-27235
- Response of cloud microphysical instruments to aircraft icing conditions [AD-A112317] N82-27284

ICE PREVENTION
- Icing conditions on sea level gas turbine engine test stands [AIAA PAPER 82-1237] A82-35078
- Microwave ice prevention N82-26203
- Limited artificial and natural icing tests production UH-60A helicopter (re-evaluation) [AD-A112582] N82-26287

ICE REPORTING
- Response of cloud microphysical instruments to aircraft icing conditions [AD-A112317] N82-27284

IDENTIFYING
- Implementing aircraft identification schemes by public key cryptosystems A82-37381

IGNITION
- Models for a turbulent premixed dump combustor [AIAA PAPER 82-1261] A82-37709

IMAGE CONTRAST
- Influence of contrast on spatial perception in TV display of moving images [FB-50] N82-27609

IMAGE PROCESSING
- Visual technology research simulator, visual and motion system dynamics [AD-A111801] N82-26325
- Some potential novel approaches to the automatic airborne detection and identification of ground targets N82-27296
- Digital image processing for acquisition, tracking, hand off and ranging N82-27303

IMAGING TECHNIQUES
- Laser application in weapon guidance and active imaging A82-35767
- Advanced training techniques using computer generated imagery [AD-A111979] N82-28007
- Computer image generation: Advanced visual/sensor simulation [AD-A107098] N82-28016

IMPACT DAMAGE
- Bird impact analysis package for turbine engine fan blades [NASA-TM-82831] N82-26701

Foreign object impact design criteria, volume 2
[AD-A112701] N82-27313
Foreign object impact design criteria, volume 3
[AD-A112447] N82-27314

IMPACT LOADS
Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413

IMPELLERS
Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry
[ASME PAPER 82-GT-34] A82-35295
Experimental investigations on the flow in the impeller of a centrifugal fan
[ASME PAPER 82-GT-37] A82-35298
Secondary flow mixing losses in a centrifugal impeller
[ASME PAPER 82-GT-44] A82-35302
The influence of flow rate on the wake in a centrifugal impeller
[ASME PAPER 82-GT-45] A82-35303
On the performance prediction of a centrifugal compressor scaled up
[ASME PAPER 82-GT-112] A82-35345
Effect of impeller extended shrouds on centrifugal compressor performance as a function of specific speed
[ASME PAPER 82-GT-228] A82-35411

IN-FLIGHT MONITORING
Flying qualities criteria for GA single pilot IFR operations
N82-26213

INCOMPRESSIBLE FLOW
The numerical solution of the Navier-Stokes equations for incompressible turbulent flow over airfoils
[AD-A111279] N82-26612

INDUSTRIAL ENERGY
Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-63] A82-35329

INERTIA
Semi-active fluid inertia - A new concept in vibration isolation
[AHS PREPRINT 81-17] A82-37799

INERTIAL GUIDANCE
Gyro systems (selected pages)
[AD-A113748] N82-27271

INERTIAL NAVIGATION
Gravity induced position errors in airborne inertial navigation
[AD-A113823] N82-27272

INFORMATION DISSEMINATION
Software functional description of mass weather dissemination system exploratory engineering model
[AD-A112706] N82-27573

INFRARED IMAGERY
Automatic handoff of multiple targets
[AD-A107490] N82-27561

INLET FLOW
The effect of inlet distortion on the performance characteristics of a centrifugal compressor
[ASME PAPER 82-GT-92] A82-35335
Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique
[AIAA PAPER 82-1085] A82-37605
Current status of inlet flow prediction methods
[AD-A111784] N82-26311
Acoustic properties of turbofan inlets
[NASA-CR-169016] N82-27090

INLET NOZZLES
Selected results of the F-15 propulsion interactions program
[AIAA PAPER 82-1041] A82-34976
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278
Development and application of a performance prediction method for straight rectangular diffuser
[ASME PAPER 82-GT-122] A82-35352

INLET PRESSURE
Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402

INPUT/OUTPUT ROUTINES
Input/output models for general aviation piston-prop aircraft fuel economy
N82-26215
A floating-point/multiple-precision processor for airborne applications
[NASA-TM-84252] N82-26289

INSTRUMENT LANDING SYSTEMS
Flight-test verification of a pictorial display for general aviation instrument approach
[NASA-TM-83305] N82-26288

INTAKE SYSTEMS
Current status of inlet flow prediction methods
[AD-A111784] N82-26311

INTELLIGIBILITY
A comparative study of narrowband vocoder algorithms in Air Force operational environments using the Diagnostic Rhyme Test
[AD-A112053] N82-26546

INTERCEPTION
A model for sensor-interceptor trade-off analysis
[AD-A112046] N82-26271
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273

INTERFACES
The Flight Service Automation System (FSAS) [illegible] benchmark. Volume 3: The vendor interface package
[PB82-143553] N82-27279

INTERMITTENCY
Development potential of Intermittent Combustion (I.C.) aircraft engines for commuter transport applications
[NASA-TM-82869] N82-26297

INTERNAL COMBUSTION ENGINES
Development potential of Intermittent Combustion (I.C.) aircraft engines for commuter transport applications
[NASA-TM-82869] N82-26297

INTERNATIONAL LAW
The recognition of air worthiness of aircraft - Comments to a remarkable judicial decision
A82-38025

INTERNATIONAL TRADE
Software technology transfer and export control
[AD-A106869] N82-28017

INTERPROCESSOR COMMUNICATION
Joint University Program Air for Transportation Research, 1981
[NASA-CP-2224] N82-26199
The F-FOD Project --- error detection codes
N82-26202

INTOXICATION
Briefs of accidents involving alcohol as a cause/factor, U.S. general aviation, 1979
[PB82-138942] N82-27247

INVENTORY MANAGEMENT
The Sortie-Generation Model system. Volume 6: Spares subsystem
[AD-A110900] N82-26226

INVISCID FLOW
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves
[ASME PAPER 82-GT-135] A82-35363

IONOSPHERE
The effect of ionospheric variability on the accuracy of high frequency position location
[AD-A107425] N82-26274

IONOSPHERIC DISTURBANCES
The effect of ionospheric variability on the accuracy of high frequency position location
[AD-A107425] N82-26274

IONOSPHERIC PROPAGATION
The effect of ionospheric variability on the accuracy of high frequency position location
[AD-A107425] N82-26274

ISOSTATIC PRESSURE
Hot isostatically pressed manufacture of high strength MERL 76 disk and seal shapes
[NASA-CR-165549] N82-26439

J

J-85 ENGINE
Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility
[AIAA PAPER 82-1044] A82-34978

JET AIRCRAFT
B-747 vortex alleviation flight tests: Ground-based sensor measurements
[AD-A113621] N82-27287

JET AIRCRAFT NOISE
Model test and full scale checkout of dry-cooled jet runup sound suppressors
[AIAA PAPER 82-1239] A82-35079
Digital spectral analysis of the noise from short duration impulsively started jets
A82-36191
Aircraft noise reduction
N82-27281
QCSEE under-the-wing engine acoustic data
[NASA-TM-82691] N82-27311

JET ENGINE FUELS
NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status
[AIAA PAPER 82-1089] A82-35000
Fuel microemulsions for jet engine smoke reduction
[ASME PAPER 82-GT-33] A82-35294
Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel
A82-36673
Kovats indices as a tool in characterizing hydrocarbon fuels in temperature programmed glass capillary gas chromatography. Part 1: Qualitative identification
[AD-A111389] N82-26400
Experiments on fuel heating for commercial aircraft
[NASA-TM-82878] N82-26483
Jet fuel from shale oil: The 1981 technology review
[AD-A111217] N82-26484
Mobility fuels for the Navy
[AD-A112511] N82-26485
The biological degradation of spilled jet fuels: A literature review
[AD-A110758] N82-26873
Effect of some nitrogen compounds thermal stability of jet A
[NASA-TM-82908] N82-27519
Evaluation of hydrocracking catalysts for conversion of whole shale oil into high yields of jet fuels
[AD-A112820] N82-27523

JET ENGINES
Propulsion system requirements for advanced fighter aircraft
[AIAA PAPER 82-1143] A82-35025
Control of gas turbine power transients for improved turbine airfoil durability
[AIAA PAPER 82-1182] A82-35047
Acoustic emission in jet engine fan blades
A82-35257
Dry friction damping mechanisms in engine blades
[ASME PAPER 82-GT-162] A82-35383
Status report of the USAF's Engine Model Derivative Program
[ASME PAPER 82-GT-183] A82-35391
Cycle considerations for tactical fighters in the early 1990's
[ASME PAPER 82-GT-259] A82-35436
Composite containment systems for jet engines
A82-37062
Current techniques for jet engine test cell modeling
[AIAA PAPER 82-1272] A82-37712
Field test of an in stack diffusion classifier on an aircraft engine test cell
[AD-A113811] N82-27326

JET FLOW
Secondary flow mixing losses in a centrifugal impeller
[ASME PAPER 82-GT-44] A82-35302
The influence of flow rate on the wake in a centrifugal impeller
[ASME PAPER 82-GT-45] A82-35303

JET IMPINGEMENT
Local heat transfer to staggered arrays of impinging circular air jets
[ASME PAPER 82-GT-211] A82-35401

JET PROPULSION
Development potential of Intermittent Combustion (I.C.) aircraft engines for commuter transport applications
[NASA-TM-82869] N82-26297

JOURNAL BEARINGS
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
Performance of PTFE-lined composite journal bearings
[ASLE PREPRINT 82-AM-1A-1] A82-37854
Wear by generation of electrokinetic streaming currents
[ASLE PREPRINT 82-AM-6A-3] A82-37857

JP-5 JET FUEL
An alternate test procedure to qualify future fuels for Navy aircraft
[AIAA PAPER 82-1233] A82-36175

K

KALMAN FILTERS
Rotor state estimation for rotorcraft
[AHS PREPRINT 81-11] A82-37784

KEROSENE
Aircraft fire safety research with antimisting fuels - Status report
[AIAA PAPER 82-1235] A82-35076
Commercial aircraft airframe fuel systems surveys
[AD-A112241] N82-27524

KEVLAR (TRADEMARK)
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678

KITS
Development of a backpack survival kit for ejection seats
[AD-A113653] N82-27242

L

LABYRINTH SEALS
Scaling effects on leakage losses in labyrinth seals
[ASME PAPER 82-GT-157] A82-35380

LAMINATES
Fuselage structure using advanced technology fiber reinforced composites
[NASA-CASE-LAR-11688-1] N82-26384

LANDING AIDS
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A107384] N82-27260
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A113047] N82-27276

LANDING SIMULATION
Dynamic scheduling of runway operations
N82-26200
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A107384] N82-27260
Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator
[AD-A112466] N82-27324

LASER ANEMOMETERS
Laser anemometer measurements in an annular cascade of core turbine vanes and comparison with theory
[NASA-TP-2018] N82-26234

LASER APPLICATIONS
Laser application in weapon guidance and active imaging
A82-35767
The Hydrographic Airborne Laser Sounder (HALS)
[AD-A111027] N82-26660

LASER GUIDANCE
Laser application in weapon guidance and active imaging
A82-35767

LASER PROPULSION
A concept for light-powered flight
[AIAA PAPER 82-1214] A82-35067

LASER WEAPONS
Laser application in weapon guidance and active imaging
A82-35767

LATERAL CONTROL
Lateral control system design for VTOL landing on a DD963 in high sea states [NASA-CR-169074] N82-26315
Control optimization, stabilization and computer algorithms for aircraft applications [NASA-CR-169015] N82-27009
LATERAL OSCILLATION
Notes on lateral-directional pilot induced oscillations [AD-A113996] N82-27322
LATERAL STABILITY
Annular wing [NASA-CASE-FRC-11007-2] N82-26277
LATIN SQUARE METHOD
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites [ASLE PREPRINT 82-AM-5A-2] A82-37855
LEADING EDGES
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics --- conducted in Langley 30- by 60-foot tunnel [NASA-TP-2011] N82-26217
Flows over wings with leading-edge vortex separation [NASA-CR-165858] N82-26238
LEAKAGE
Scaling effects on leakage losses in labyrinth seals [ASME PAPER 82-GT-157] A82-35380
LEAR JET AIRCRAFT
A series of airfoils designed by transonic drag minimization for Gates Learjet aircraft A82-35565
Lear Fan 2100 egress system A82-37970
LEARNING
Learning and costs in airframe production, part 1 [AD-A112940] N82-28210
LEGAL LIABILITY
The DC-10 Chicago crash and the legality of SFAR 40 A82-37832
LIFE CYCLE COSTS
Charting propulsion's future - The ATES results --- Advanced technology Engine Studies program for aircraft engine design [AIAA PAPER 82-1139] A82-35023
A methodology for planning a cost effective engine development --- for fighter aircraft [AIAA PAPER 82-1140] A82-35024
Next generation trainer /NGT/ engine requirements - An application of lessons learned [AIAA PAPER 82-1184] A82-35049
Combat survivability in the Advanced Technology Engine Study /ATES/ [AIAA PAPER 82-1287] A82-35101
EAGLE - An interactive engine/airframe life cycle cost model [ASME PAPER 82-GT-56] A82-35311
The influence of engine characteristics on patrol aircraft life cycle cost optimization [ASME PAPER 82-GT-256] A82-35433
A cost modeling approach to engine optimization [AIAA PAPER 82-1185] A82-37698
Life-cycle-cost analysis of the microwave landing system ground and airborne systems [AD-A110909] N82-26266
LIFE SUPPORT SYSTEMS
An oxygen enriched air system for the AV-8A Harrier [AD-A112334] N82-27239
LIFT
Hinged strake aircraft control system [NASA-CASE-LAR-12860-1] N82-26278
XH-59A ABC technology demonstrator altitude expansion and operational tests [AD-A111114] N82-27282
LIFT AUGMENTATION
Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement [AIAA PAPER 82-1132] A82-37692
LIFT DRAG RATIO
Annular wing [NASA-CASE-FRC-11007-2] N82-26277
LIGHT AIRCRAFT
Ultralight airplanes A82-35233
The computerized cockpit for the one-man crew A82-36937
LIGHTNING
Triggered lightning --- resulting from aircraft atmospheric electricity interactions A82-35727
Airborne warning systems for natural and aircraft-initiated lightning A82-35729
The direct effects of lightning on aircraft A82-35730
Electromagnetic interaction of lightning with aircraft A82-35731
Lightning simulation and testing A82-35733
Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria A82-35734
Proceedings of the 1st Annual Workshop on Aviation Related Electricity Hazards Associated with Atmospheric Phenomena and Aircraft Generated Inputs [AD-A107326] N82-27237
Protection of advanced electrical power systems from atmospheric electromagnetic hazards [AD-A112612] N82-27650
Assessment of lightning simulation test techniques, part 1 [AD-A112626] N82-27663
LINEAR SYSTEMS
Digital command augmentation for lateral directional aircraft dynamics [AD-A107264] N82-27321
Notes on lateral-directional pilot induced oscillations [AD-A113996] N82-27322
LIQUID ATOMIZATION
Atomization quality of twin fluid atomizers for gas turbines [ASME PAPER 82-GT-61] A82-35314
LIQUID FUELS
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow [ASME PAPER 82-GT-16] A82-35285
LIQUID HYDROGEN
Will hydrogen-fueled aircraft be safe [AIAA PAPER 82-1236] A82-35077
LIQUID INJECTION
Liquid particle dynamics and rate of evaporation in the rotating field of centrifugal compressors [ASME PAPER 82-GT-86] A82-35332
A spark ignition model for liquid fuel sprays applied to gas turbine engines A82-37220
LOADING OPERATIONS
Advanced internal cargo system concept demonstration and evaluation [AD-A111990] N82-26282
LOADS (FORCES)
A method for observing the deterioration of airframe life in operational conditions A82-37123
Preliminary study of ground handling characteristics of Buoyant Quad Rotor (BQR) vehicles [NASA-CR-166130] N82-26220
Hurricane-induced wind loads [PB82-132267] N82-27540
LOGIC DESIGN
The DRAPO system - Materials means and logic functions A82-37521
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence [NASA-TM-84484] N82-26236
LOGISTICS
Strategic materials - Technological trends A82-37972
LOGISTICS MANAGEMENT
Opportunities exist to achieve greater standardization of aircraft and helicopter seats [AD-A111718] N82-26259

Navy's F/A-18 expected to be an effective
performer but problems still face the program
[AD-A111877] N82-26281
Mission effectiveness of the AV-8B Harrier 2 could
be improved if actions are taken now
[AD-A111878] N82-26284
Aviation Materiel Combat Ready In-Country (AMCRIC)
[AD-A107451] N82-27283

LONGITUDINAL STABILITY
Annular wing
[NASA-CASE-FRC-11007-2] N82-26277

LOOP ANTENNAS
A balanced active antenna and impulse noise
blanket system for the Reydist T radio
navigation receiver
[AD-A114074] N82-27275

LORAN
FPOD Programmable pilot-oriented display --- air
navigation
N82-26201

LORAN C
Certification of an airborne Loran-C navigation
system
A82-35876
Joint University Program Air for Transportation
Research, 1981
[NASA-CP-2224] N82-26199
Investigation of air transportation technology at
Ohio University, 1981 --- loran
N82-26204
Loran-C plotting program for plotting lines of
position on standard charts
N82-26206
A Loran-C prototype navigation receiver for
general aviation
N82-26207
A Loran-C prototype navigation receiver for
general aviation
N82-26208
Commutated automatic gain control system
N82-26209
A prototype interface unit for
microprocessor-based Loran-C receiver
N82-26210
A Loran-C prototype navigation receiver for
general aviation
[NASA-CR-169118] N82-27259

LOW ALTITUDE
Pave Mover aided integrated strike avionics system
N82-27298
Adaptive multifunction sensor concept for
air-ground missions
N82-27299

LOW NOISE
On the design and test of a low noise propeller
[NASA-CR-165938] N82-27089

LOW TEMPERATURE ENVIRONMENTS
Cold regions testing of an air transportable shelter
[AD-A107131] N82-27325

LOW TEMPERATURE TESTS
The low temperature properties of aviation fuels
[ASME PAPER 82-GT-46] A82-35306

LUBRICANTS
Turbine engine lubricant reclamation
[AD-A112098] N82-26312

LUBRICATING OILS
The effect of journal misalignment on the oil-film
forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
Evaluation of plasma source spectrometers for the
Air Force Oil Analysis Program
[AD-A113809] N82-27512

LUBRICATION
An alternate test procedure to qualify future
fuels for Navy aircraft
[AIAA PAPER 82-1233] A82-36175

LUMINAIRES
Microwave Landing System flare subsystem test
[AD-A107327] N82-27263

M

MACH NUMBER
In-flight acoustic results from an advanced-design
propeller at Mach numbers to 0.8
[AIAA PAPER 82-1120] A82-35017
Increased capabilities of the Langley Mach 7
Scramjet Test Facility
[AIAA PAPER 82-1240] A82-35080

On the performance prediction of a centrifugal
compressor scaled up
[ASME PAPER 82-GT-112] A82-35345
Development and application of a performance
prediction method for straight rectangular
diffuser
[ASME PAPER 82-GT-122] A82-35352

MAGNETIC MATERIALS
Torsional stiffness element based on
cobalt-samarium magnets --- for a turn and bank
indicator
[BMFT-FB-W-81-044] N82-27292

MAGNETIC MEASUREMENT
Magnetic heading reference
[NASA-CASE-LAR-12638-1] N82-26260

MAGNETIC POLES
A comparison of pole positions derived from GPS
satellite and Navy navigation satellite
observations
[AD-A110765] N82-26268

MAINTENANCE
Maintenance training simulator design and
acquisition: Handbook of ISD procedures for
design and documentation
[AD-A111430] N82-26321
Depot support of gas turbine engines
[AD-A107141] N82-27217

MAN MACHINE SYSTEMS
Integrated flight trajectory control
[AD-A110998] N82-26319
Advanced technology and fighter cockpit design:
Which drives which?
N82-27302

MANAGEMENT METHODS
Optimal placement model for the B-52G weapons
system trainer
[AD-A110977] N82-26323

MANAGEMENT PLANNING
Depot support of gas turbine engines
[AD-A107141] N82-27217
Preplanned product improvement and other
modification strategies: Lessons from past
aircraft modification programs
[AD-A113599] N82-27220

MANUAL CONTROL
Flight experiments using the front-side control
technique during piloted approach and landing in
a powered lift STOL aircraft
[NASA-TM-81337] N82-26314

MAP MATCHING GUIDANCE
An automatic map reader suitable for use in
helicopters
A82-37775

MAPPING
Loran-C plotting program for plotting lines of
position on standard charts
N82-26206

MASS FLOW
Accuracy expectations for gas turbine and
centrifugal compressor performance testing
[ASME PAPER 82-GT-128] A82-35358

MATERIALS HANDLING
Advanced internal cargo system concept
demonstration and evaluation
[AD-A111990] N82-26282

MATERIALS SCIENCE
Evaluation criteria for aero engine materials
A82-36065

MATHEMATICAL MODELS
EAGLE - An interactive engine/airframe life cycle
cost model
[ASME PAPER 82-GT-56] A82-35311
A stage-by-stage dual-spool compression system
modeling technique
[ASME PAPER 82-GT-189] A82-35394
A spark ignition model for liquid fuel sprays
applied to gas turbine engines
A82-37220
Monofilar - A dual frequency rotorhead absorber
[AHS PREPRINT 81-20] A82-37791
A nonlinear response analysis for coupled
rotor-fuselage systems
[AHS PREPRINT 81-23] A82-37794
A model for sensor-interceptor trade-off analysis
[AD-A112046] N82-26271
Application of adaptive estimation to target
tracking
[AD-A112036] N82-26272

Investigation of an improved structural model for damaged T-38 horizontal stabilizer flutter analysis using NASTRAN [AD-A111095] N82-26316
Gravity induced position errors in airborne inertial navigation [AD-A113823] N82-27272

MATHIEU FUNCTION
The influence of Coriolis forces on gyroscopic motion of spinning blades [ASME PAPER 82-GT-163] A82-35384

MECHANICAL DRIVES
CFC drive shaft and GFC coupling for the tail rotor of the BO 105 A82-37766
High-speed rotary printing device for air traffic control applications: A preliminary evaluation [AD-A107325] N82-27264

MECHANICAL ENGINEERING
Bibliography of Lewis Research Center technical publications announced in 1981 [NASA-TM-82838] N82-27191

MECHANICAL PROPERTIES
Mechanical property characterization and modeling of structural materials --- for airframes and aircraft gas turbine engines [AD-A113841] N82-27704

METAL COATINGS
Application and testing of metallic coatings on graphite/epoxy composites A82-37074

METAL JOINTS
Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints A82-37080

METAL MATRIX COMPOSITES
Fuselage structure using advanced technology fiber reinforced composites [NASA-CASE-LAR-11688-1] N82-26384

METAL WORKING
Net shape components for small gas turbine engines [ASME PAPER 82-GT-96] A82-35338

METALS
Strategic materials - Technological trends A82-37972
Research and development on wear metal analysis [AD-A112100] N82-26446
Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program [AD-A113809] N82-27512

METEOROLOGICAL FLIGHT
Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds A82-36054

METEOROLOGICAL PARAMETERS
Triggered lightning --- resulting from aircraft atmospheric electricity interactions A82-35727
Aviation meteorology --- Russian book A82-36972
Briefs of fatal accidents involving weather as a cause/factor, U.S. general aviation, 1979 [PB82-138934] N82-27248
Response of cloud microphysical instruments to aircraft icing conditions [AD-A112317] N82-27284

METEOROLOGICAL SERVICES
Aviation meteorology --- Russian book A82-36972

MICROCOMPUTERS
A Loran-C prototype navigation receiver for general aviation N82-26208
Commutated automatic gain control system N82-26209
A floating-point/multiple-precision processor for airborne applications [NASA-TM-84252] N82-26289

MICROPARTICLES
Small engine inlet air particle separator technology [ASME PAPER 82-GT-40] A82-35299

MICROPROCESSORS
PMUX - The interface for engine data to AIDS --- propulsion multiplexer in Aircraft Integrated Data System [AIAA PAPER 82-1127] A82-35022
An approach to software for high integrity applications --- in aircraft gas turbine engine control [ASME PAPER 82-GT-251] A82-35430
Joint University Program Air for Transportation Research, 1981 [NASA-CP-2224] N82-26199
PPOD Programmable pilot-oriented display --- air navigation N82-26201

MICROSTRIP TRANSMISSION LINES
Advanced microstrip antenna developments. Volume 2: Microstrip GPS antennas for general aviation aircraft [AD-A113620] N82-27508

MICROWAVE CIRCUITS
An accurate Doppler navigator with microwave simplicity A82-37037

MICROWAVE EQUIPMENT
Microwave ice prevention N82-26203

MICROWAVE LANDING SYSTEMS
Life-cycle-cost analysis of the microwave landing system ground and airborne systems [AD-A110909] N82-26266
Flight-test verification of a pictorial display for general aviation instrument approach [NASA-TM-83305] N82-26288
Microwave Landing System flare subsystem test [AD-A107327] N82-27263

MIDAIR COLLISIONS
Briefs of accidents involving midair collisions: U.S. general aviation, 1979 [PB82-138900] N82-27251
Listing of aircraft accidents/incidents by make and model, U.S. civil aviation, 1979 [PB82-138892] N82-27252

MILITARY AIRCRAFT
Combat survivability in the Advanced Technology Engine Study /ATES/ [AIAA PAPER 82-1287] A82-35101
Aeropropulsion research for the U.S. Army [ASME PAPER 82-GT-203] A82-35398
Advanced turboprop engines for long endurance naval patrol aircraft [ASME PAPER 82-GT-217] A82-35404
Practical aerodynamic problems - Military aircraft A82-35556
An alternate test procedure to qualify future fuels for Navy aircraft [AIAA PAPER 82-1233] A82-36175
Implementing aircraft identification schemes by public key cryptosystems A82-37381
Response of cloud microphysical instruments to aircraft icing conditions [AD-A112317] N82-27284

MILITARY HELICOPTERS
Quantification of helicopter vibration ride qualities A82-37767
Low vibration design of AAH for mission proficiency requirements --- Advanced Attack Helicopter [AHS PREPRINT 81-2] A82-37778

MILITARY OPERATIONS
The Sortie-Generation Model system. Volume 1: Executive summary [AD-A110897] N82-26222
The Sortie-Generation Model system. Volume 2: Sortie-Generation Model user's guide [AD-A110898] N82-26223
The Sortie-Generation Model system. Volume 4: Sortie-Generation Model programmers manual [AD-A110899] N82-26224
The Sortie-Generation Model system. Volume 5: Maintenance subsystem [AD-A110815] N82-26225
The Sortie-Generation Model system. Volume 6: Spares subsystem [AD-A110900] N82-26226
Aviation Materiel Combat Ready In-Country (AMCRIC) [AD-A107451] N82-27203
Attack and en route avionics for in-weather operations N82-27300

MILITARY TECHNOLOGY
A methodology for planning a cost effective engine development --- for fighter aircraft
[AIAA PAPER 82-1140] A82-35024
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216

MINERALS
Strategic materials - Technological trends A82-37972

MISALIGNMENT
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457

MISSILE CONTROL
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273

MISSILE TRACKING
Application of adaptive estimation to target tracking
[AD-A112036] N82-26272
Automatic handoff of multiple targets
[AD-A107490] N82-27561

MISSILE TRAJECTORIES
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273

MISSILES
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 1
[AD-A111763] N82-27225
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 2
[AD-A111783] N82-27312

MISSION PLANNING
Mission effectiveness of the AV-8B Harrier 2 could be improved if actions are taken now
[AD-A111878] N82-26284
A planning system for F-16 air-to-surface missions N82-27297

MIXERS
Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines
[AIAA PAPER 82-1136] A82-37695

MOBILITY
Cold regions testing of an air transportable shelter
[AD-A107131] N82-27325

MOIRE INTERFEROMETRY
Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques A82-36999

MOLDS
Efficient part removal processes --- from molds A82-37097

MOORING
Preliminary study of ground handling characteristics of Buoyant Quad Rotor (BQR) vehicles
[NASA-CR-166130] N82-26220

MOTION SIMULATORS
Visual technology research simulator, visual and motion system dynamics
[AD-A111801] N82-26325

MULTIPHASE FLOW
A mixed-flow cascade passage design procedure based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351

N

NACELLES
Investigation of subsonic nacelle performance improvement concept
[AIAA PAPER 82-1042] A82-37676
Performance deterioration due to acceptance testing and flight loads; JT90 jet engine diagnostic program
[NASA-CR-165572] N82-27309

NAP-OF-THE-EARTH NAVIGATION
An automatic map reader suitable for use in helicopters A82-37775

NASA PROGRAMS
NASA ECI programs - Benefits to Pratt and Whitney engines
[ASME PAPER 82-GT-272] A82-35448
Summary and recent results from the NASA advanced High Speed Propeller Research Program
[NASA-TM-82891] N82-26219

NASTRAN
A unified approach to helicopter NASTRAN modeling
[AHS PREPRINT 81-22] A82-37753
Investigation of an improved structural model for damaged T-38 horizontal stabilizer flutter analysis using NASTRAN
[AD-A111095] N82-26316

NATIONAL AVIATION SYSTEM
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326

NAVIER-STOKES EQUATION
Analysis of two-dimensional internal flows using a primitive-variable relaxation Navier-Stokes procedure
[AIAA PAPER 82-1083] A82-34998
The numerical solution of the Navier-Stokes equations for incompressible turbulent flow over airfoils
[AD-A111279] N82-26612

NAVIGATION
Visual technology research simulator, visual and motion system dynamics
[AD-A111801] N82-26325
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273

NAVIGATION AIDS
Wide field of view laser beacon system for three dimensional aircraft range measurements N82-26216
Magnetic heading reference
[NASA-CASE-LAR-12638-1] N82-26260
Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR
[NASA-CR-169031] N82-26263
A laboratory evaluation of the suitability of a xenon flashtube signal as an aid-to-navigation
[AD-A110729] N82-26265

NAVIGATION INSTRUMENTS
PPOD Programmable pilot-oriented display --- air navigation N82-26201

NAVIGATION SATELLITES
Prospects for Navsat - A future worldwide civil navigation-satellite system A82-36047

NAVSTAR SATELLITES
FAA tests on the Navstar GPS Z-set A82-37039
Navstar - Global Positioning System: A revolutionary capability A82-37040
Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR
[NASA-CR-169031] N82-26263

NAVY
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 1
[AD-A111763] N82-27225
Proceedings of the 12th Navy Symposium on Aeroballistics, volume 2
[AD-A111783] N82-27312

NICKEL ALLOYS
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337

NIGHT FLIGHTS (AIRCRAFT)
Impact of advanced avionics and munitions technology on ground attack weapons systems in night and adverse weather conditions N82-27294

NIGHT VISION
Helicopter night vision system simulation evaluation
[AD-A110505] N82-26292

NITROGEN COMPOUNDS
Effect of some nitrogen compounds thermal stability of jet A
[NASA-TM-82908] N82-27519

NOISE (SOUND)
Wide field of view laser beacon system for three dimensional aircraft range measurements N82-26216

NOISE POLLUTION
Transportation noise, its impact, planning and regulation
[S-258] N82-27864
NOISE PREDICTION (AIRCRAFT)
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-30077
NOISE REDUCTION
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018
Model test and full scale checkout of dry-cooled jet runup sound suppressors
[AIAA PAPER 82-1239] A82-35079
NASA research in supersonic propulsion: A decade of progress
[NASA-TM-82862] N82-26300
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A107384] N82-27260
Aircraft noise reduction
N82-27281
QCSEE under-the-wing engine acoustic data
[NASA-TM-82691] N82-27311
Airbus Industrie and community noise
N82-27865
NOISE SPECTRA
Digital spectral analysis of the noise from short duration impulsively started jets
A82-36191
NONDESTRUCTIVE TESTS
Acoustic emission in jet engine fan blades
A82-35257
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives --- adhesively bonding graphite-polyimide structures
[NASA-CR-165839] N82-26465
NONLINEAR PROGRAMMING
Optimization of propeller blade shape by an analytical method
[AIAA PAPER 82-1125] A82-35021
NONLINEAR SYSTEMS
A nonlinear response analysis for coupled rotor-fuselage systems
[AHS PREPRINT 81-23] A82-37798
Notes on lateral-directional pilot induced oscillations
[AD-A113996] N82-27322
NONLINEARITY
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273
NORMAL SHOCK WAVES
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves
[ASME PAPER 82-GT-135] A82-35363
NOSE TIPS
Comparison of numerical results and measured data for smooth and indented nosetips
[AD-A111794] N82-26619
NOSES (FOREBODIES)
Composite flight test boom for Nomad N22B aircraft
[ARL-0086-TN] N82-27289
NOZZLE DESIGN
Analysis of two-dimensional internal flows using a primitive-variable relaxation Navier-Stokes procedure
[AIAA PAPER 82-1083] A82-34998
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278
Advanced nozzle integration for air combat fighter application
[AIAA PAPER 82-1135] A82-37694
NOZZLE FLOW
An experimental study of rectangular and circular thrust augmenting ejectors
[AD-A111110] N82-26304
NOZZLE GEOMETRY
Transonic wind tunnel test of a supersonic nozzle installation
[AIAA PAPER 82-1045] A82-37677
An experimental study of rectangular and circular thrust augmenting ejectors
[AD-A111110] N82-26304
NUMERICAL ANALYSIS
Comparison of numerical results and measured data for smooth and indented nosetips
[AD-A111754] N82-26619
NUMERICAL CONTROL
Integrated aircraft avionics and powerplant control and management systems
[ASME PAPER 82-GT-165] A82-35385
Adaptive fuel control feasibility investigation for helicopter applications
[ASME PAPER 82-GT-205] A82-35400
The computerized cockpit for the one-man crew
A82-36937
The DRAPO system - Materials means and logic functions
A82-37521
Traffic flow control in the Frankfurt/Main airport area
A82-37526
An automatic map reader suitable for use in helicopters
A82-37775
NUMERICAL FLOW VISUALIZATION
Current status of inlet flow prediction methods
[AD-A111784] N82-26311

O

OBSERVABILITY (SYSTEMS)
Instrument failure detection in partially observable systems
A82-37380
OFFSHORE PLATFORMS
Real-time simulation of an airborne radar for overwater approaches
[NASA-CR-166293] N82-26262
OH-58 HELICOPTER
Airworthiness and flight characteristics test of an OH-58C configured to a Light Combat Helicopter (LCH)
[AD-A112581] N82-26286
OPERATING COSTS
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-169027] N82-26279
OPERATING SYSTEMS (COMPUTERS)
The Flight Service Automation System (FSAS) system benchmark. Volume 1: Summary, introduction and concepts
[PB82-143538] N82-27277
The Flight Service Automation System (FSAS) system benchmark. Volume 2: The model of the application
[PB82-143546] N82-27278
The Flight Service Automation System (FSAS) system benchmark. Volume 3: The vendor interface package
[PB82-143553] N82-27279
OPTICAL EQUIPMENT
Wide angle raster head up display design and application to future single seat fighters
N82-27304
OPTICAL MEASURING INSTRUMENTS
Optical tip clearance sensor for aircraft engine controls
[AIAA PAPER 82-1131] A82-37691
Some potential novel approaches to the automatic airborne detection and identification of ground targets
N82-27296
OPTIMAL CONTROL
Optimization of blade pitch angle for higher harmonic rotor control
A82-37776
Considerations of open-loop, closed-loop, and adaptive multicyclic control systems
[AHS PREPRINT 81-13] A82-37786

OPTIMIZATION
Optimization of propeller blade shape by an analytical method
[AIAA PAPER 82-1125] A82-35021
The use of optimization techniques to design controlled diffusion compressor blading
[ASME PAPER 82-GT-149] A82-35373
A cost modeling approach to engine optimization
[AIAA PAPER 82-1185] A82-37698
Static and aeroelastic optimization of aircraft
A82-37945
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-169027] N82-26279
Minimum time turns constrained to the vertical plane
[AD-A111096] N82-26317
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and RESYS
[AD-A112224] N82-27411

ORBIT SPECTRUM UTILIZATION
Frequency sharing between passive sensors and aeronautical radionavigation systems employing ground transponders in the band 4.2 - 4.4 GHz
[NASA-CR-169041] N82-26261

ORIFICE FLOW
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[ASME PAPER 82-GT-16] A82-35285

OXIDATION
Effect of some nitrogen compounds thermal stability of jet A
[NASA-TM-82908] N82-27519

OXIDATION RESISTANCE
The effect of NaCl/g/ in high temperature oxidation
[ASME PAPER 82-GT-106] A82-35342

OXYGEN BREATHING
An oxygen enriched air system for the AV-8A Harrier
[AD-A112334] N82-27239

OXYGEN SUPPLY EQUIPMENT
An oxygen enriched air system for the AV-8A Harrier
[AD-A112334] N82-27239

P

PANELS
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and RESYS
[AD-A112224] N82-27411
Hurricane-induced wind loads
[PB82-132267] N82-27548

PARTICLE MOTION
Liquid particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[ASME PAPER 82-GT-86] A82-35332

PARTICLE SIZE DISTRIBUTION
Field test of an in stack diffusion classifier on an aircraft engine test cell
[AD-A113811] N82-27326

PASCAL (PROGRAMMING LANGUAGE)
Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system
A82-37446

PASSENGER AIRCRAFT
A gust damper --- for light passenger aircraft
A82-37127
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-169027] N82-26279
Briefs of accidents involving computer air carriers and on-demand air taxi operations, U.S. general aviation, 1979
[PB82-138991] N82-27255

PATRIOT MISSILE
The PATRIOT Radar in tactical air defense
A82-37031

PATTERN REGISTRATION
Automatic handoff of multiple targets
[AD-A107490] N82-27561

PERFORMANCE PREDICTION
Development of a helicopter rotor/propulsion system dynamics analysis
[AIAA PAPER 82-1078] A82-34997
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044
On the influence of the number of stages on the efficiency of axial-flow turbines
[ASME PAPER 82-GT-43] A82-35301
On the performance prediction of a centrifugal compressor scaled up
[ASME PAPER 82-GT-112] A82-35345
A critical appraisal of some current incidence loss models for the stator and rotor of a mixed flow gas turbine
[ASME PAPER 82-GT-120] A82-35350
Development and application of a performance prediction method for straight rectangular diffuser
[ASME PAPER 82-GT-122] A82-35352
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves
[ASME PAPER 82-GT-135] A82-35363
A stage-by-stage dual-spool compression system modeling technique
[ASME PAPER 82-GT-189] A82-35394
TURBOTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396
Evaluation criteria for aero engine materials
A82-36065
General purpose research rotor
[AHS PREPRINT 81-9] A82-37777
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-169027] N82-26279
User's manual for the vertical axis wing turbine code VDART2
[DE82-000796] N82-26828

PERFORMANCE TESTS
Influence of airblast atomizer design features on mean drop size
[AIAA PAPER 82-1073] A82-34993
Increased capabilities of the Langley Mach 7 Scramjet Test Facility
[AIAA PAPER 82-1240] A82-35080
The performance of centrifugal compressor channel diffusers
[ASME PAPER 82-GT-10] A82-35279
Conversion of centrifugal compressor performance curves considering non-similar flow conditions
[ASME PAPER 82-GT-42] A82-35300
Atomization quality of twin fluid atomizers for gas turbines
[ASME PAPER 82-GT-61] A82-35314
The use of performance-monitoring to prevent compressor and turbine blade failures
[ASME PAPER 82-GT-66] A82-35316
Cryogenic turbine testing
[ASME PAPER 82-GT-113] A82-35346
Performance analysis of the test results on a two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353
Accuracy expectations for gas turbine and centrifugal compressor performance testing
[ASME PAPER 82-GT-128] A82-35358
FAA tests on the Navstar GPS Z-set
A82-37039
Application and testing of metallic coatings on graphite/epoxy composites
A82-37074
Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints
A82-37080
Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines
[AIAA PAPER 82-1136] A82-37695
Cold regions testing of an air transportable shelter
[AD-A107131] N82-27325

PHASED ARRAYS
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558

PILOT ERROR
Proposed research tasks for the reduction of human error in naval aviation mishaps
[AD-A112339] N82-27241
Briefs of accidents involving alcohol as a cause/factor, U.S. general aviation, 1979
[PB82-138942] N82-27247

PILOT PERFORMANCE
Army helicopter crew seat vibration - Past performance, future requirements
[AHS PREPRINT 81-3] A82-37779
Cockpit display of traffic information and the measurement of pilot workload: An annotated bibliography
[AD-A113637] N82-27291
PILOTS
Notes on lateral-directional pilot induced oscillations
[AD-A113996] N82-27322
PISTON ENGINES
Input/output models for general aviation piston-prop aircraft fuel economy
N82-26215
PITCH (INCLINATION)
Optimization of blade pitch angle for higher harmonic rotor control
A82-37776
Flight experiments using the front-side control technique during piloted approach and landing in a powered lift STOL aircraft
[NASA-TM-81337] N82-26314
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822
PITOT TUBES
Correcting for turbulence effects on average velocity measurements made using five hole spherical pitot tube probes
[AD-A112573] N82-27290
PLASTIC AIRCRAFT STRUCTURES
Ageing of composite rotor blades
A82-37771
PLOTTERS
Loran-C plotting program for plotting lines of position on standard charts
N82-26206
PLUMES
Field test of an in stack diffusion classifier on an aircraft engine test cell
[AD-A113811] N82-27326
POLAR WANDERING (GEOLOGY)
A comparison of pole positions derived from GPS satellite and Navy navigation satellite observations
[AD-A110765] N82-26268
POLICIES
Software technology transfer and export control
[AD-A106869] N82-28017
POLLUTION CONTROL
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290
Fuel microemulsions for jet engine smoke reduction
[ASME PAPER 82-GT-33] A82-35294
POLYCARBONATES
Mechanical property characterization and modeling of structural materials --- for airframes and aircraft gas turbine engines
[AD-A113041] N82-27784
POLYIMIDE RESINS
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives --- adhesively bonding graphite-polyimide structures
[NASA-CR-165839] N82-26465
POLYTETRAFLUOROETHYLENE
Performance of PTFE-lined composite journal bearings
[ASLE PREPRINT 82-AM-1A-1] A82-37854
POSITION (LOCATION)
A comparison of pole positions derived from GPS satellite and Navy navigation satellite observations
[AD-A110765] N82-26268
The effect of ionospheric variability on the accuracy of high frequency position location
[AD-A107425] N82-26274
Mode S system accuracy
[AD-A112249] N82-27266
POSITION ERRORS
Gravity induced position errors in airborne inertial navigation
[AD-A113823] N82-27272
POSITIONING
An unbiased analysis of the Doppler coordinate systems
[AD-A110510] N82-26269
POTENTIAL FLOW
Applied computational transonics - Capabilities and limitations
A82-35566
Evaluation of full potential flow methods for the design and analysis of transport wings
A82-35567
POWDER METALLURGY
Hot isostatically pressed manufacture of high strength MERL 76 disk and seal shapes
[NASA-CR-165549] N82-26439
POWER EFFICIENCY
On the influence of the number of stages on the efficiency of axial-flow turbines
[ASME PAPER 82-GT-83] A82-35301
Performance analysis of the test results on a two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353
Accuracy expectations for gas turbine and centrifugal compressor performance testing
[ASME PAPER 82-GT-128] A82-35358
Interim review of the Energy Efficient Engine /E3/ Program
[ASME PAPER 82-GT-271] A82-35447
POWERED LIFT AIRCRAFT
Flight experiments using the front-side control technique during piloted approach and landing in a powered lift STOL aircraft
[NASA-TM-81337] N82-26314
PREAMPLIFIERS
A balanced active antenna and impulse noise blanket system for the Raydist T radio navigation receiver
[AD-A114074] N82-27275
PREDICTION ANALYSIS TECHNIQUES
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
Turbine stage heat flux measurements
[AIAA PAPER 82-1289] A82-35102
Current status of inlet flow prediction methods
[AD-A111784] N82-26311
PREMIXED FLAMES
Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
[AIAA PAPER 82-1072] A82-34992
Numerical and experimental examination of a prevaporized/premixed combustor
[AIAA PAPER 82-1074] A82-34994
Models for a turbulent premixed dump combustor
[AIAA PAPER 82-1261] A82-37709
PREPROCESSING
Digital image processing for acquisition, tracking, hand off and ranging
N82-27303
PRESSURE DISTRIBUTION
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors
[ASME PAPER 82-GT-102] A82-35339
Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770
Aerodynamically induced vibration
[AD-A110993] N82-26306
PRESSURE EFFECTS
Influence of airblast atomizer design features on mean drop size
[AIAA PAPER 82-1073] A82-34993
PRESSURE GRADIENTS
Real time pressure signal system for a rotary engine
[NASA-CASE-LEW-13622-1] N82-26294
Comparison of experimental and analytical performance for contoured endwall stators
[NASA-TM-82877] N82-26299
PRESSURE OSCILLATIONS
Experimental investigations on the flow in the impeller of a centrifugal fan
[ASME PAPER 82-GT-37] A82-35298
PRESSURE RATIO
Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors
[ASME PAPER 82-GT-85] A82-35331

Performance analysis of the test results on a two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353

PRESSURE RECOVERY
An experimental investigation of S-duct diffusers for high-speed propfans
[AIAA PAPER 82-1123] A82-35019
The performance of centrifugal compressor channel diffusers
[ASME PAPER 82-GT-10] A82-35279
Improved vane-island diffusers at high swirl
[ASME PAPER 82-GT-68] A82-35318
Development and application of a performance prediction method for straight rectangular diffuser
[ASME PAPER 82-GT-122] A82-35352

PRESSURE REDUCTION
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088

PRESSURE SENSORS
Investigation of the transonic calibration characteristics of turbine static pressure probes
[ASME PAPER 82-GT-280] A82-35454
Real time pressure signal system for a rotary engine
[NASA-CASE-LEW-13622-1] N82-26294

PRESTRESSING
Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415

PREVAPORIZATION
Numerical and experimental examination of a prevaporized/premixed combustor
[AIAA PAPER 82-1074] A82-34994

PRINTERS (DATA PROCESSING)
High-speed rotary printing device for air traffic control applications: A preliminary evaluation
[AD-A107325] N82-27264

PROBABILITY DISTRIBUTION FUNCTIONS
A result in the theory of spiral search
[AD-A112481] N82-27262

PROBLEM SOLVING
The numerical solution of the Navier-Stokes equations for incompressible turbulent flow over airfoils
[AD-A111279] N82-26612

PRODUCT DEVELOPMENT
Preplanned product improvement and other modification strategies: Lessons from past aircraft modification programs
[AD-A113599] N82-27220

PRODUCTION ENGINEERING
Specification and estimation of dynamic cost functions for airframe production airframes
[AD-A113147] N82-27221

PRODUCTION PLANNING
Mission effectiveness of the AV-8B Harrier 2 could be improved if actions are taken now
[AD-A111878] N82-26284

PROGRAM VERIFICATION (COMPUTERS)
Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system
A82-37446

PROGRAMMING LANGUAGES
TURBOTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396

PROP-FAN TECHNOLOGY
Propellers come full circle --- prop-fan technology for aircraft fuel savings
A82-35881

PROPANE
Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307

PROPELLANT DECOMPOSITION
Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307

PROPELLANT PROPERTIES
NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status
[AIAA PAPER 82-1089] A82-35000

PROPELLER BLADES
Optimization of propeller blade shape by an analytical method
[AIAA PAPER 82-1125] A82-35021

PROPELLER EFFICIENCY
Propellers come full circle --- prop-fan technology for aircraft fuel savings
A82-35881

PROPELLER FANS
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8
[AIAA PAPER 82-1120] A82-35017
An experimental investigation of S-duct diffusers for high-speed propfans
[AIAA PAPER 82-1123] A82-35019
Selecting the best reduction gear concept for prop-fan propulsion systems
[AIAA PAPER 82-1124] A82-35020

PROPELLERS
Summary and recent results from the NASA advanced High Speed Propeller Research Program
[NASA-TM-82891] N82-26219
Propulsion opportunities for future commuter aircraft
[NASA-TM-82915] N82-26298
On the design and test of a low noise propeller
[NASA-CR-165938] N82-27089

PROPULSION SYSTEM CONFIGURATIONS
NASA research in aircraft propulsion
[ASME PAPER 82-GT-177] A82-35389

PROPULSION SYSTEM PERFORMANCE
Charting propulsion's future - The ATES results --- Advanced technology Engine Studies program for aircraft engine design
[AIAA PAPER 82-1139] A82-35023
Design concepts of an advanced propulsion monitoring system
[AIAA PAPER 82-1130] A82-37690
Summary and recent results from the NASA advanced High Speed Propeller Research Program
[NASA-TM-82891] N82-26219
Propulsion opportunities for future commuter aircraft
[NASA-TM-82915] N82-26298

PROPULSIVE EFFICIENCY
Optimization of propeller blade shape by an analytical method
[AIAA PAPER 82-1125] A82-35021

PROTECTION
Protection of advanced electrical power systems from atmospheric electromagnetic hazards
[AD-A112612] N82-27658

PROTECTIVE COATINGS
Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425
Application and testing of metallic coatings on graphite/epoxy composites
A82-37074
Protection of advanced electrical power systems from atmospheric electromagnetic hazards
[AD-A112612] N82-27658

PROTOTYPES
Status report of the USAF's Engine Model Derivative Program
[ASME PAPER 82-GT-183] A82-35391
A Loran-C prototype navigation receiver for general aviation
[NASA-CR-169118] N82-27259

PSYCHOACOUSTICS
The annoyance of impulsive helicopter noise
[NASA-CR-169123] N82-28134

PULSE DOPPLER RADAR
Medium PRF performance analysis --- Pulse-Repetition Frequency
A82-37378

PULSE RATE
Medium PRF performance analysis --- Pulse-Repetition Frequency
A82-37378

PULSED LASERS
A concept for light-powered flight
[AIAA PAPER 82-1214] A82-35067
Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques
A82-36999

PULSEJET ENGINES
A concept for light-powered flight
[AIAA PAPER 82-1214] A82-35067
PYROLYSIS
Carbon formation by the pyrolysis of gas turbine fuels in preflame regions of gas turbine combustors
[ASME PAPER 82-GT-84] A82-35330

R

RADAR
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A113047] N82-27276
RADAR ANTENNAS
Adaptive multifunction sensor concept for air-ground missions
N82-27299
RADAR APPROACH CONTROL
Real-time simulation of an airborne radar for overwater approaches
[NASA-CR-166293] N82-26262
Terminal air traffic control with surveillance data from the mode 5 system: Results of system demonstrations to field controllers
[AD-A112632] N82-27268
RADAR BEACONS
Surveillance simulation testing of terminal and en route mode S sensors
[AD-A112250] N82-27265
RADAR DETECTION
Test and evaluation of the airport radar wind shear detection system
[AD-A112663] N82-27924
RADAR EQUIPMENT
An accurate Doppler navigator with microwave simplicity
A82-37037
Terminal air traffic control with surveillance data from the mode 5 system: Results of system demonstrations to field controllers
[AD-A112632] N82-27268
RADAR SCANNING
Comparison between the surveillance performances of the Air Traffic Control Radar Beacon System mode of the Mode S and the Automated Radar Terminal System
[AD-A111733] N82-26273
Design and implementation of efficient algorithms for automatic determination of corrected slant range
[AD-A112248] N82-27267
RADAR TRACKING
The PATRIOT Radar in tactical air defense
A82-37031
C band spectral tracking for FM/CW altimetry
A82-37035
RADIAL FLOW
A critical appraisal of some current incidence loss models for the stator and rotor of a mixed flow gas turbine
[ASME PAPER 82-GT-120] A82-35350
RADIATION CHEMISTRY
Radiation/catalytic augmented combustion
[AD-A112376] N82-27434
RADIATIVE HEAT TRANSFER
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface
[AD-A107441] N82-27436
RADIO ALTIMETERS
C band spectral tracking for FM/CW altimetry
A82-37035
Frequency sharing between passive sensors and aeronautical radionavigation systems employing ground transponders in the band 4.2 - 4.4 GHz
[NASA-CR-169041] N82-26261
RADIO BEACONS
Modification of OE-258/URN Tactical Air Navigation (TACAN) antenna group
[AD-A111680] N82-26264
Effects of high voltage transmission lines on non-directional beacon performance
[AD-A112311] N82-27261
RADIO COMMUNICATION
The Worldwide Navigational Warning Service
[AD-A107372] N82-26276
RADIO CONTROL
Standard engineering installation package. Air traffic radio channel control equipment: Change 1
[AD-A107150] N82-26275
RADIO EQUIPMENT
Standard engineering installation package. Air traffic radio channel control equipment: Change 1
[AD-A107150] N82-26275
RADIO FREQUENCY INTERFERENCE
Static charging and its effects on avionic systems
A82-35732
RADIO NAVIGATION
Commutated automatic gain control system
N82-26209
A prototype interface unit for microprocessor-based Loran-C receiver
N82-26210
Investigation of air transportation technology at Princeton University, 1981
N82-26212
Frequency sharing between passive sensors and aeronautical radionavigation systems employing ground transponders in the band 4.2 - 4.4 GHz
[NASA-CR-169041] N82-26261
Global Positioning System (GPS) geodetic receivers
[AD-A111026] N82-26267
A balanced active antenna and impulse noise blanket system for the Reydist T radio navigation receiver
[AD-A114074] N82-27275
RADIO RECEIVERS
FAA tests on the Navstar GPS Z-set
A82-37039
A Loran-C prototype navigation receiver for general aviation
N82-26208
Commutated automatic gain control system
N82-26209
A prototype interface unit for microprocessor-based Loran-C receiver
N82-26210
A Loran-C prototype navigation receiver for general aviation
[NASA-CR-169118] N82-27259
Doppler test results of experimental GPS receiver
[AD-A113587] N82-27274
A balanced active antenna and impulse noise blanket system for the Reydist T radio navigation receiver
[AD-A114074] N82-27275
RADIO TELEMETRY
A single-frequency multitransmitter telemetry technique
A82-36281
RAMJET ENGINES
Characteristics of a side dump gas generator ramjet
[AIAA PAPER 82-1258] A82-35089
Combustion behavior of solid fuel Ramjets. Volume 2: Effects of fuel properties and fuel-air mixing on combustion efficiency
[AD-A110796] N82-26303
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface
[AD-A107441] N82-27436
RANDOM VIBRATION
Improved methods in ground vibration testing
[AHS PREPRINT 81-6] A82-37701
RANGE (EXTREMES)
Wide field of view laser beacon system for three dimensional aircraft range measurements
N82-26216
REAL TIME OPERATION
Advancements in real-time engine simulation technology --- of digital electronic aircraft engine controls
[AIAA PAPER 82-1075] A82-34995
Real time pressure signal system for a rotary engine
[NASA-CASE-LEW-13622-1] N82-26294
Advanced target acquisition and tracking concepts for real time applications
N82-27305
Tactical systems approach to interdiction of 2nd echelon moving targets using real time sensors
N82-27306
RECLAMATION
Turbine engine lubricant reclamation
[AD-A112098] N82-26312

RECONNAISSANCE AIRCRAFT
The influence of engine characteristics on patrol aircraft life cycle cost optimization [ASME PAPER 82-GT-256] A82-35433

RECTANGLES
Wind tunnel measurements of three-dimensional wakes of buildings --- for aircraft safety applications [NASA-CR-3565] N82-26921

RECTANGULAR WINGS
Chordwise and compressibility corrections for arbitrary planform slender wings A82-37931

REDUCED GRAVITY
The Marshall Space Flight Center KC-135 zero gravity test program for FY 1981 [NASA-TM-82476] N82-26350

REDUNDANCY
Air data measurement using distributed processing and fiber optics data transmission N82-26214

REDUNDANT COMPONENTS
Reliability and maintainability analysis of fluidic back-up flight control system and components [AD-A110496] N82-27320

REENTRY TRAJECTORIES
Application of adaptive estimation to target tracking [AD-A112036] N82-26272

REFINING
Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel A82-36673

REFRIGERATING MACHINERY
Cryogenic turbine testing [ASME PAPER 82-GT-113] A82-35346

REFSAT
Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR [NASA-CR-169031] N82-26263

REGRESSION COEFFICIENTS
General purpose research rotor [AHS PREPRINT 81-9] A82-37777

REGULATIONS
Final regulatory evaluation: Metropolitan Washington Airports Policy [AD-A110583] N82-26324
Transportation noise, its impact, planning and regulation [S-258] N82-27864
Software technology transfer and export control [AD-A106869] N82-28017

REINFORCED PLASTICS
Fabrication and test of integrally stiffened graphite/epoxy components A82-37071

RELAXATION METHOD (MATHEMATICS)
Analysis of two-dimensional internal flows using a primitive-variable relaxation Navier-Stokes procedure [AIAA PAPER 82-1083] A82-34998

RELIABILITY
Reliability and maintainability analysis of fluidic back-up flight control system and components [AD-A110496] N82-27320

RELIABILITY ANALYSIS
Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system A82-37446

RELIABILITY ENGINEERING
Next generation trainer /NGT/ engine requirements - An application of lessons learned [AIAA PAPER 82-1184] A82-35049

REMOVAL
Efficient part removal processes --- from molds A82-37097

RESEARCH AND DEVELOPMENT
NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status [AIAA PAPER 82-1089] A82-35000
Development of engine operability [AIAA PAPER 82-1181] A82-35046
The potential impact of future fuels on small gas turbine engines [ASME PAPER 82-GT-133] A82-35362
Status report of the USAF's Engine Model Derivative Program [ASME PAPER 82-GT-183] A82-35391
R & D on composite rotor blades at Agusta A82-37764
The Helicopter Ride Revolution [AHS PREPRINT 81-4] A82-37780
A technical assessment of aeronautical engineering in Israel [AD-A106980] N82-27218

RESEARCH PROJECTS
Aeropropulsion research for the U.S. Army [ASME PAPER 82-GT-203] A82-35398

RESIN MATRIX COMPOSITES
Efficient part removal processes --- from molds A82-37097

RESONANT FREQUENCIES
Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques A82-36999

RESOURCES MANAGEMENT
Strategic materials - Technological trends A82-37972
The Sortie-Generation Model system. Volume 1: Executive summary [AD-A110897] N82-26222
The Sortie-Generation Model system. Volume 2: Sortie-Generation Model user's guide [AD-A110898] N82-26223
The Sortie-Generation Model system. Volume 4: Sortie-Generation Model programmers manual [AD-A110899] N82-26224
The Sortie-Generation Model system. Volume 6: Spares subsystem [AD-A110900] N82-26226

RETARDERS (DEVICES)
Thrust reverser for a long duct fan engine --- for turbofan engines [NASA-CASE-LEW-13199-1] N82-26293

RETROFITTING
Preplanned product improvement and other modification strategies: lessons from past aircraft modification programs [AD-A113599] N82-27220

REVISIONS
Opportunities to reduce the cost of some B-52 modifications [AD-A113563] N82-27219

REYNOLDS NUMBER
On the performance prediction of a centrifugal compressor scaled up [ASME PAPER 82-GT-112] A82-35345

RIDING QUALITY
Quantification of helicopter vibration ride qualities A82-37767
Army helicopter crew seat vibration - Past performance, future requirements [AHS PREPRINT 81-3] A82-37779
The Helicopter Ride Revolution [AHS PREPRINT 81-4] A82-37780

ROCKET ENGINE DESIGN
Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique [AIAA PAPER 82-1085] A82-37685

ROLLER BEARINGS
Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines [AIAA PAPER 82-1054] A82-37679

ROTARY WING AIRCRAFT
Factors shaping conceptual design of rotary-wing aircraft A82-37773
Briefs of accidents involving rotorcraft, U.S. general aviation, 1979 [PB82-138926] N82-27249

ROTARY WINGS
R & D on composite rotor blades at Agusta A82-37764

A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression
A82-37765

Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770

Ageing of composite rotor blades
A82-37771

Optimization of blade pitch angle for higher harmonic rotor control
A82-37776

Determination of in-flight helicopter loads and vibration
[AHS PREPRINT 81-7] A82-37782

Total main rotor isolation system
[AHS PREPRINT 81-15] A82-37787

Semi-active fluid inertia - A new concept in vibration isolation
[AHS PREPRINT 81-17] A82-37789

Monofilar - A dual frequency rotorhead absorber
[AHS PREPRINT 81-20] A82-37791

A finite element analysis of coupled rotor fuselage vibration
[AHS PREPRINT 81-21] A82-37792

A nonlinear response analysis for coupled rotor-fuselage systems
[AHS PREPRINT 81-23] A82-37794

Survey of active and passive means to reduce rotorcraft vibrations
A82-37946

XH-59A ABC technology demonstrator altitude expansion and operational tests
[AD-A111114] N82-27282

Development of low-order model of an X-wing aircraft by system identification
[AD-A113760] N82-27286

ROTATING DISKS

Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques
A82-36999

ROTATING SHAFTS

Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413

ROTOR AERODYNAMICS

Aerodynamic performance of high turning core turbine vanes in a two-dimensional cascade
[AIAA PAPER 82-1288] A82-37716

General purpose research rotor
[AHS PREPRINT 81-9] A82-37777

Rotor state estimation for rotorcraft
[AHS PREPRINT 81-11] A82-37783

Substructure program for analysis of helicopter vibrations
[AHS PREPRINT 81-24] A82-37795

Determination of rotor wake induced empennage airloads
[AHS PREPRINT 81-26] A82-37796

User's manual for the vertical axis wing turbine code VDART2
[DE82-000796] N82-26828

ROTOR BLADES

R & D on composite rotor blades at Agusta
A82-37764

Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770

Optimization of blade pitch angle for higher harmonic rotor control
A82-37776

A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation
[AHS PREPRINT 81-12] A82-37785

XH-59A ABC technology demonstrator altitude expansion and operational tests
[AD-A111114] N82-27282

ROTOR BLADES (TURBOMACHINERY)

Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry
[ASME PAPER 82-GT-34] A82-35295

A critical appraisal of some current incidence loss models for the stator and rotor of a mixed flow gas turbine
[ASME PAPER 82-GT-120] A82-35350

Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413

Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425

Heat transfer optimised turbine rotor blades - An experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469

Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165388] N82-27316

ROTOR SPEED

Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413

ROTORS

Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415

Wide field of view laser beacon system for three dimensional aircraft range measurements
N82-26216

Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165388] N82-27316

RP-1 ROCKET PROPELLANTS

Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307

RUNWAY LIGHTS

Microwave Landing System flare subsystem test
[AD-A107327] N82-27263

RUNWAYS

Dynamic scheduling of runway operations
N82-26200

S

SAFETY FACTORS

Cabin safety in large transport aircraft
[PB82-129297] N82-27244

SAMARIUM

Torsional stiffness element based on cobalt-samarium magnets --- for a turn and bank indicator
[BMFT-FB-W-81-044] N82-27292

SATELLITE NAVIGATION SYSTEMS

Prospects for Navsat - A future worldwide civil navigation-satellite system
A82-36047

SATELLITE NETWORKS

Prospects for Navsat - A future worldwide civil navigation-satellite system
A82-36047

Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR
[NASA-CR-169031] N82-26263

SATELLITE OBSERVATION

A comparison of pole positions derived from GPS satellite and Navy navigation satellite observations
[AD-A110765] N82-26260

SCALE EFFECT

Scaling effects on leakage losses in labyrinth seals
[ASME PAPER 82-GT-157] A82-35380

SCALE MODELS

Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines
[AIAA PAPER 82-1136] A82-37695

SCHEDULING

Dynamic scheduling of runway operations
N82-26200

Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26[illegible]26

SEALS (STOPPERS)

Development and application of Dabber gas tungsten arc welding for repair of aircraft engine, seal teeth
[ASME PAPER 82-GT-55] A82-35310

SEARCHING

A result in the theory of spiral search
[AD-A112881] N82-27262

SEATS
Army helicopter crew seat vibration - Past performance, future requirements
[AHS PREPRINT 81-3] A82-37779
Opportunities exist to achieve greater standardization of aircraft and helicopter seats
[AD-A111718] N82-26259
SECONDARY FLOW
Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
[AIAA PAPER 82-1072] A82-34992
Secondary flows and losses in axial flow turbines
[ASME PAPER 82-GT-19] A82-35288
Secondary flow mixing losses in a centrifugal impeller
[ASME PAPER 82-GT-44] A82-35302
Secondary flow effects and mixing of the wake behind a turbine stator
[ASME PAPER 82-GT-46] A82-35304
SELF LUBRICATING MATERIALS
Performance of PTFE-lined composite journal bearings
[ASLE PREPRINT 82-AM-1A-1] A82-37854
SEPARATED FLOW
Flows over wings with leading-edge vortex separation
[NASA-CR-165858] N82-26238
SEPARATORS
Small engine inlet air particle separator technology
[ASME PAPER 82-GT-40] A82-35299
SERIES EXPANSION
A mixed-flow cascade passage design procedure based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351
SERVICE LIFE
A procedure for evaluating fuel composition effects on combustor life
[ASME PAPER 82-GT-296] A82-35465
Life and Utilization Criteria Identification In Design (LUCID), volume 1
[AD-A111939] N82-26309
Life and Utilization Criteria Identification In Design (LUCID), volume 2
[AD-A111940] N82-26310
SERVOMECHANISMS
Reliability and maintainability analysis of fluidic back-up flight control system and components
[AD-A110496] N82-27320
SHAFTS (MACHINE ELEMENTS)
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines
[AIAA PAPER 82-1054] A82-37679
CFC drive shaft and GFC coupling for the tail rotor of the BO 105
A82-37766
SHALE OIL
Jet fuel from shale oil: The 1981 technology review
[AD-A111217] N82-26484
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318
Evaluation of hydrocracking catalysts for conversion of whole shale oil into high yields of jet fuels
[AD-A112820] N82-27523
SHELTERS
Cold regions testing of an air transportable shelter
[AD-A107131] N82-27325
SHIPS
Lateral control system design for VTOL landing on a DD963 in high sea states
[NASA-CR-169074] N82-26315
SHORT HAUL AIRCRAFT
Quiet Short-Haul Research Airplane (QSRA) model select panel functional description
[NASA-TM-84243] N82-27319
SHORT TAKEOFF AIRCRAFT
STOL aircraft response to turbulence generated by a tall upwind building
A82-35821
Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement
[AIAA PAPER 82-1132] A82-37692
Thrust reverser induced flow interference on tactical aircraft stability and control
[AIAA PAPER 82-1133] A82-37693
Flight experiments using the front-side control technique during piloted approach and landing in a powered lift STOL aircraft
[NASA-TM-81337] N82-26314
SHROUDS
Effect of impeller extended shrouds on centrifugal compressor performance as a function of specific speed
[ASME PAPER 82-GT-228] A82-35411
SIDESLIP
Air data measurement using distributed processing and fiber optics data transmission
N82-26218
SIGNAL ENCODING
A single-frequency multitransmitter telemetry technique
A82-36281
SIGNAL GENERATORS
Real time pressure signal system for a rotary engine
[NASA-CASE-LEW-13622-1] N82-26294
SIGNAL PROCESSING
Investigation of air transportation technology at Ohio University, 1981 --- loran
N82-26204
SIGNAL TO NOISE RATIOS
Medium PRF performance analysis --- Pulse-Repetition Frequency
A82-37378
Investigation of air transportation technology at Ohio University, 1981 --- loran
N82-26204
SIMULATORS
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation
[AD-A111430] N82-26321
SLENDER WINGS
Chordwise and compressibility corrections for arbitrary planform slender wings
A82-37931
SLIDING FRICTION
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites
[ASLE PREPRINT 82-AM-5A-2] A82-37855
SLOPES
Design and implementation of efficient algorithms for automatic determination of corrected slant range
[AD-A112248] N82-27267
SLOT ANTENNAS
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558
SMOKE
Fuel microemulsions for jet engine smoke reduction
[ASME PAPER 82-GT-33] A82-35294
SMOKE ABATEMENT
An investigation of engine and test cell operating conditions on the effectiveness of smoke suppressant fuel additives
[AD-A112800] N82-27527
SODIUM CHLORIDES
The effect of NaCl/g/ in high temperature oxidation
[ASME PAPER 82-GT-106] A82-35342
SOLID PROPELLANT COMBUSTION
Combustion behavior of solid fuel Ramjets. Volume 2: Effects of fuel properties and fuel-air mixing on combustion efficiency
[AD-A110796] N82-26303
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface
[AD-A107441] N82-27436
SOLID PROPELLANTS
Combustion behavior of solid fuel Ramjets. Volume 2: Effects of fuel properties and fuel-air mixing on combustion efficiency
[AD-A110796] N82-26303
SOOT
Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors
[AIAA PAPER 82-1175] A82-35041

SOUNDING
The Hydrographic Airborne Laser Sounder (HALS)
[AD-A111027] N82-26660

SPACE ENVIRONMENT SIMULATION
Performance of the AEDC Mark 1 Aerospace Environmental Chamber without oil diffusion pumping
[AD-A111406] N82-26322

SPACE PERCEPTION
A laboratory evaluation of the suitability of a xenon flashtube signal as an aid-to-navigation
[AD-A110729] N82-26265
Influence of contrast on spatial perception in TV display of moving images
[FB-50] N82-27609

SPACE SIMULATORS
Performance of the AEDC Mark 1 Aerospace Environmental Chamber without oil diffusion pumping
[AD-A111406] N82-26322

SPACE TOOLS
The Marshall Space Flight Center KC-135 zero gravity test program for FY 1981
[NASA-TM-82476] N82-26350

SPACECRAFT ANTENNAS
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558

SPANWISE BLOWING
Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement
[AIAA PAPER 82-1132] A82-37692

SPARE PARTS
The Sortie-Generation Model system. Volume 6: Spares subsystem
[AD-A110900] N82-26236

SPARK IGNITION
A spark ignition model for liquid fuel sprays applied to gas turbine engines
A82-37220

SPATIAL FILTERING
Some potential novel approaches to the automatic airborne detection and identification of ground targets
N82-27296

SPECTROMETERS
Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program
[AD-A113809] N82-27512

SPECTRUM ANALYSIS
Digital spectral analysis of the noise from short duration impulsively started jets
A82-36191

SPEED CONTROL
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822

SPILLING
The biological degradation of spilled jet fuels: A literature review
[AD-A110758] N82-26973

SPIRAL ANTENNAS
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558

SPOILERS
B-747 vortex alleviation flight tests: Ground-based sensor measurements
[AD-A113621] N82-27287

SPRINGS (ELASTIC)
Assessment of the dynamic response of a structure when modified by the addition of mass, stiffness or dynamic absorbers
[AHS PREPRINT 81-18] A82-37790

SQUEEZE FILMS
Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing
[ASME PAPER 82-GT-281] A82-35455
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462

STABILITY TESTS
Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel
A82-36673

STABILIZERS (FLUID DYNAMICS)
Investigation of an improved structural model for damaged T-38 horizontal stabilizer flutter analysis using NASTRAN
[AD-A111095] N82-26316

STAGGERING
Local heat transfer to staggered arrays of impinging circular air jets
[ASME PAPER 82-GT-211] A82-35401

STAGNATION PRESSURE
The influence of flow rate on the wake in a centrifugal impeller
[ASME PAPER 82-GT-45] A82-35303

STAINLESS STEELS
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites
[ASLE PREPRINT 82-AM-5A-2] A82-37855

STANDARDIZATION
Opportunities exist to achieve greater standardization of aircraft and helicopter seats
[AD-A111718] N82-26259

STATIC ELECTRICITY
Static charging and its effects on avionic systems
A82-35732

STATIC FRICTION
Static charging and its effects on avionic systems
A82-35732

STATIC LOADS
Static and aeroelastic optimization of aircraft
A82-37945

STATIC PRESSURE
Investigation of the transonic calibration characteristics of turbine static pressure probes
[ASME PAPER 82-GT-280] A82-35454

STATIC STABILITY
An analytical study of turbulence responses, including horizontal tail loads, of a control configured jet transport with relaxed static stability
N82-26313

STATISTICAL ANALYSIS
Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria
A82-35734
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165308] N82-27316

STATOR BLADES
Laser anemometer measurements in an annular cascade of core turbine vanes and comparison with theory
[NASA-TP-2018] N82-26234

STATORS
Secondary flow effects and mixing of the wake behind a turbine stator
[ASME PAPER 82-GT-46] A82-35304
Comparison of experimental and analytical performance for contoured endwall stators
[NASA-TM-82877] N82-26299

STIFFNESS
Assessment of the dynamic response of a structure when modified by the addition of mass, stiffness or dynamic absorbers
[AHS PREPRINT 81-18] A82-37790
Torsional stiffness element based on cobalt-samarium magnets --- for a turn and bank indicator
[BMFT-FB-W-81-044] N82-27292

STRAKES
Hinged strake aircraft control system
[NASA-CASE-LAR-12860-1] N82-26270

STRESS ANALYSIS
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981
Evaluation criteria for aero engine materials
A82-36065

STRESS CONCENTRATION
A procedure for evaluating fuel composition effects on combustor life
[ASME PAPER 82-GT-296] A82-35465

STRUCTURAL ANALYSIS
Bird impact analysis package for turbine engine fan blades [NASA-TM-82831] N82-26701
STRUCTURAL DESIGN
Next generation turboprop gearboxes [ASME PAPER 82-GT-236] A82-35418
STRUCTURAL DESIGN CRITERIA
Factors shaping conceptual design of rotary-wing aircraft A82-37773
A unified approach to helicopter NASTRAN modeling [AHS PREPRINT 81-22] A82-37793
Use of optimization in helicopter vibration control by structural modification [AHS PREPRINT 81-27] A82-37797
Static and aeroelastic optimization of aircraft A82-37945
Foreign object impact design criteria, volume 2 [AD-A112701] N82-27313
Foreign object impact design criteria, volume 3 [AD-A112447] N82-27314
STRUCTURAL FAILURE
Turbine blade nonlinear structural and life analysis [AIAA PAPER 82-1056] A82-34981
The use of performance-monitoring to prevent compressor and turbine blade failures [ASME PAPER 82-GT-66] A82-35316
STRUCTURAL MEMBERS
Advanced concepts for composite structure joints and attachment fittings. Volume 2: Design guide [AD-A111106] N82-26280
STRUCTURAL RELIABILITY
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives --- adhesively bonding graphite-polyimide structures [NASA-CR-165839] N82-26465
STRUCTURAL VIBRATION
The use of performance-monitoring to prevent compressor and turbine blade failures [ASME PAPER 82-GT-66] A82-35316
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing [ASME PAPER 82-GT-281] A82-35455
Low vibration design of AAH for mission proficiency requirements --- Advanced Attack Helicopter [AHS PREPRINT 81-2] A82-37778
The Helicopter Ride Revolution [AHS PREPRINT 81-4] A82-37780
Determination of in-flight helicopter loads and vibration [AHS PREPRINT 81-7] A82-37782
Design and evaluation of a state-feedback vibration controller [AHS PREPRINT 81-10] A82-37783
Considerations of open-loop, closed-loop, and adaptive multicyclic control systems [AHS PREPRINT 81-13] A82-37786
Flight demonstration of an integrated floor/fuel isolation system [AHS PREPRINT 81-16] A82-37788
A finite element analysis of coupled rotor fuselage vibration [AHS PREPRINT 81-21] A82-37792
A nonlinear response analysis for coupled rotor-fuselage systems [AHS PREPRINT 81-23] A82-37794
Substructure program for analysis of helicopter vibrations [AHS PREPRINT 81-24] A82-37795
Use of optimization in helicopter vibration control by structural modification [AHS PREPRINT 81-27] A82-37797
STRUCTURAL WEIGHT
Performance deterioration due to acceptance testing and flight loads; JT90 jet engine diagnostic program [NASA-CR-165572] N82-27309
SUBROUTINES
Loran-C plotting program for plotting lines of position on standard charts N82-26206
The Sortie-Generation Model system. Volume 5: Maintenance subsystem [AD-A110815] N82-26225
The Sortie-Generation Model system. Volume 6: Spares subsystem [AD-A110900] N82-26226
SUBSONIC AIRCRAFT
Investigation of subsonic nacelle performance improvement concept [AIAA PAPER 82-1042] A82-37676
SUBSTRUCTURES
Substructure program for analysis of helicopter vibrations [AHS PREPRINT 81-24] A82-37795
SUPERCHARGERS
Advanced stratified charge rotary aircraft engine design study [NASA-CR-165398] N82-27743
SUPERCOOLING
Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds A82-36054
SUPERHEATING
Investigation of spray characteristics for flashing injection of fuels containing dissolved air and superheated fuels [NASA-CR-3563] N82-26295
SUPERHIGH FREQUENCIES
Medium PRF performance analysis --- Pulse-Repetition Frequency A82-37378
SUPERSONIC AIRCRAFT
NASA research in supersonic propulsion: A decade of progress [NASA-TM-82862] N82-26300
SUPERSONIC COMBUSTION RAMJET ENGINES
Increased capabilities of the Langley Mach 7 Scramjet Test Facility [AIAA PAPER 82-1240] A82-35080
SUPERSONIC DIFFUSERS
Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors [ASME PAPER 82-GT-85] A82-35331
SUPERSONIC FLIGHT
Supersonic cruise/transonic maneuver wing section development study [AD-A110686] N82-26256
SUPERSONIC INLETS
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves [ASME PAPER 82-GT-135] A82-35363
SUPERSONIC NOZZLES
Transonic wind tunnel test of a supersonic nozzle installation [AIAA PAPER 82-1045] A82-37677
SUPERSONIC TURBINES
Investigation of the transonic calibration characteristics of turbine static pressure probes [ASME PAPER 82-GT-280] A82-35454
SURFACE GEOMETRY
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites [ASLE PREPRINT 82-AM-5A-2] A82-37855
SURFACE NAVIGATION
Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR [NASA-CR-169031] N82-26263
The Worldwide Navigational Warning Service [AD-A107372] N82-26276
SURFACE ROUGHNESS
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine [ASME PAPER 82-GT-222] A82-35409
SURVEILLANCE RADAR
Test and evaluation of the airport radar wind shear detection system [AD-A112663] N82-27928
SURVIVAL EQUIPMENT
Lear Fan 2100 egress system A82-37970
Development of a backpack survival kit for ejection seats [AD-A113653] N82-27242
SUSPENSION SYSTEMS (VEHICLES)
Preliminary study of ground handling characteristics of Buoyant Quad Rotor (BQR) vehicles [NASA-CR-166130] N82-26220

SWEAT COOLING
Two-phase transpiration cooling
[ASME PAPER 82-GT-89] A82-35333
SWEPT WINGS
Supersonic cruise/transonic maneuver wing section development study
[AD-A110686] N82-26256
SWIRLING
Improved vane-island diffusers at high swirl
[ASME PAPER 82-GT-68] A82-35318
SYNTHETIC FUELS
Mobility fuels for the Navy
[AD-A112511] N82-26485
Development of Army high-energy fuel diesel/turbine-powered surface equipment, phase 2
[AD-A111942] N82-26487
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318
SYSTEM EFFECTIVENESS
Efficient part removal processes --- from molds
A82-37097
SYSTEM FAILURES
Instrument failure detection in partially observable systems
A82-37380
SYSTEM IDENTIFICATION
Development of low-order model of an X-wing aircraft by system identification
[AD-A113760] N82-27286
SYSTEMS ENGINEERING
A practical approach to the design of multivariable control strategies for gas turbines
[ASME PAPER 82-GT-150] A82-35374
Assembly of aircraft instruments --- Russian book
A82-36950
Simplified digital design tools
A82-37034
Design and evaluation of a state-feedback vibration controller
[AHS PREPRINT 81-10] A82-37783
Current ADM restraint system status, trade-off constraints and long range objectives for the Maximum Performance Ejection System (MPES)
[AD-A112645] N82-27238
Development of a backpack survival kit for ejection seats
[AD-A113653] N82-27242
Terminal air traffic control with surveillance data from the mode 5 system: Results of system demonstrations to field controllers
[AD-A112632] N82-27268
SYSTEMS INTEGRATION
Integrated aircraft avionics and powerplant control and management systems
[ASME PAPER 82-GT-165] A82-35385
Air-ground attack: Axes of research for airborne systems
N82-27295
Pave Mover aided integrated strike avionics system
N82-27298
Tactical systems approach to interdiction of 2nd echelon moving targets using real time sensors
N82-27306
SYSTEMS SIMULATION
TURBOTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396

T

T-56 ENGINE
Next generation turboprop gearboxes
[ASME PAPER 82-GT-236] A82-35418
TABLES (DATA)
Update of the summary report of 1977-1978 task force on aircrew workload
[AD-A112547] N82-26258
TACTICS
Tactical systems approach to interdiction of 2nd echelon moving targets using real time sensors
N82-27306
TAIL ASSEMBLIES
Determination of rotor wake induced empennage airloads
[AHS PREPRINT 81-26] A82-37796
TAIL ROTORS
CFC drive shaft and GFC coupling for the tail rotor of the BO 105
A82-37766
TAPE RECORDERS
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A113047] N82-27276
TARGET ACQUISITION
Medium PRF performance analysis --- Pulse-Repetition Frequency
A82-37378
A model for sensor-interceptor trade-off analysis
[AD-A112046] N82-26271
Application of adaptive estimation to target tracking
[AD-A112036] N82-26272
Air-ground attack: Axes of research for airborne systems
N82-27295
Advanced target acquisition and tracking concepts for real time applications
N82-27305
TARGET RECOGNITION
Some potential novel approaches to the automatic airborne detection and identification of ground targets
N82-27296
Adaptive multifunction sensor concept for air-ground missions
N82-27299
Digital image processing for acquisition, tracking, hand off and ranging
N82-27303
Advanced target acquisition and tracking concepts for real time applications
N82-27305
Automatic handoff of multiple targets
[AD-A107490] N82-27561
TARGETS
Automatic handoff of multiple targets
[AD-A107490] N82-27561
TAXIING
Briefs of accidents involving commuter air carriers and on-demand air taxi operations, U.S. general aviation, 1979
[PB82-138991] N82-27255
TAYLOR SERIES
A mixed-flow cascade passage design procedure based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351
TECHNOLOGICAL FORECASTING
Charting propulsion's future - The ATES results --- Advanced technology Engine Studies program for aircraft engine design
[AIAA PAPER 82-1139] A82-35023
Next generation trainer /NGT/ engine requirements - An application of lessons learned
[AIAA PAPER 82-1184] A82-35049
A concept for light-powered flight
[AIAA PAPER 82-1214] A82-35067
CFD technology for propulsion installation design - Forecast for the 80's --- computational fluid dynamics in aerospace applications
[ASME PAPER 82-GT-21] A82-35289
The potential impact of future fuels on small gas turbine engines
[ASME PAPER 82-GT-133] A82-35362
Cycle considerations for tactical fighters in the early 1990's
[ASME PAPER 82-GT-259] A82-35436
Material and process impact on aircraft engine designs of the 1990's
[ASME PAPER 82-GT-278] A82-35453
Weapon system of a future attack aircraft
N82-27301
TECHNOLOGY ASSESSMENT
Energy efficient engine /E3/ technology status
[AIAA PAPER 82-1052] A82-34980
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337
Technology advancements for energy efficient aircraft engines
[AIAA PAPER 82-1051] A82-35479

TECHNOLOGY TRANSFER
Software technology transfer and export control
[AD-A106869] N82-28017
TECHNOLOGY UTILIZATION
Propellers come full circle --- prop-fan technology for aircraft fuel savings
A82-35881
Use of CGHRP in transport --- Carbon and Glass Hybrid Reinforced Plastics
A82-37061
TELEMETRY
Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry
[ASME PAPER 82-GT-34] A82-35295
TELEVISION RECEIVERS
Influence of contrast on spatial perception in TV display of moving images
[FB-50] N82-27609
TELEVISION SYSTEMS
Marine Air Traffic Control and Landing System (METCALS) investigation
[AD-A113047] N82-27276
TEMPERATURE CONTROL
Control of gas turbine power transients for improved turbine airfoil durability
[AIAA PAPER 82-1182] A82-35047
Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-83] A82-35329
TEMPERATURE EFFECTS
A procedure for evaluating fuel composition effects on combustor life
[ASME PAPER 82-GT-296] A82-35465
The effect of temperature ratios on the film cooling process
[ASME PAPER 82-GT-305] A82-35470
TENSILE TESTS
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337
TERMINAL GUIDANCE
A model for sensor-interceptor trade-off analysis
[AD-A112046] N82-26271
Terminal air traffic control with surveillance data from the mode 5 system: Results of system demonstrations to field controllers
[AD-A112632] N82-27268
TEST EQUIPMENT
Field test of an in stack diffusion classifier on an aircraft engine test cell
[AD-A113811] N82-27326
TEST FACILITIES
Test facility and data handling system for the development of axial compressors
[ASME PAPER 82-GT-73] A82-35322
Boeing's new transports in a flight-test marathon
A82-37493
Current techniques for jet engine test cell modeling
[AIAA PAPER 82-1272] A82-37712
TEST STANDS
Icing conditions on sea level gas turbine engine test stands
[AIAA PAPER 82-1237] A82-35078
THEODORSEN TRANSFORMATION
Aerodynamic lag functions, divergence, and the British flutter method
A82-35820
THERMAL CYCLING TESTS
T700 - Modern development test techniques, lessons learned and results
[AIAA PAPER 82-1183] A82-35048
THERMAL DECOMPOSITION
Thermal decomposition of aviation fuel
[ASME PAPER 82-GT-27] A82-35292
Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307
THERMAL STABILITY
An alternate test procedure to qualify future fuels for Navy aircraft
[AIAA PAPER 82-1233] A82-36175
Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel
A82-36673
Effect of some nitrogen compounds thermal stability of jet A
[NASA-TM-82908] N82-27519
THERMODYNAMIC EFFICIENCY
Conversion of centrifugal compressor performance curves considering non-similar flow conditions
[ASME PAPER 82-GT-42] A82-35300
The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine
[ASME PAPER 82-GT-63] A82-35315
THERMODYNAMIC PROPERTIES
Experimental study of external fuel vaporization
[ASME PAPER 82-GT-59] A82-35312
THICKNESS
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine
[ASME PAPER 82-GT-222] A82-35409
THIN WALLED SHELLS
Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388
THREE DIMENSIONAL FLOW
Experimental investigations on the flow in the impeller of a centrifugal fan
[ASME PAPER 82-GT-37] A82-35298
On the vortex flow over delta and double-delta wings
[AIAA PAPER 82-0949] A82-37466
A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations
[AIAA PAPER 82-1017] A82-37477
Comparison of experimental and analytical performance for contoured endwall stators
[NASA-TM-82877] N82-26299
Wind tunnel measurements of three-dimensional wakes of buildings --- for aircraft safety applications
[NASA-CR-3565] N82-26921
THROTTLING
Individual bypass throttling in fighter engines
[AIAA PAPER 82-1285] A82-35100
THRUST AUGMENTATION
An experimental study of rectangular and circular thrust augmenting ejectors
[AD-A111110] N82-26304
THRUST MEASUREMENT
Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility
[AIAA PAPER 82-1044] A82-34978
THRUST REVERSAL
Thrust reverser induced flow interference on tactical aircraft stability and control
[AIAA PAPER 82-1133] A82-37693
Static internal performance characteristics of two thrust reverser concepts for axisymmetric nozzles
[NASA-TP-2025] N82-26235
Thrust reverser for a long duct fan engine --- for turbofan engines
[NASA-CASE-LEW-13199-1] N82-26293
Minimum time turns constrained to the vertical plane
[AD-A111096] N82-26317
TIME OPTIMAL CONTROL
Minimum time turns constrained to the vertical plane
[AD-A111096] N82-26317
TITANIUM
Structural dynamics of shroudless, hollow, fan blades with composite in-lays
[ASME PAPER 82-GT-284] A82-35456
TORSION
Torsional stiffness element based on cobalt-samarium magnets --- for a turn and bank indicator
[BMFT-FB-W-81-044] N82-27292
TRACKING (POSITION)
Multiple aircraft tracking system for coordinated research missions
A82-35869
Advanced target acquisition and tracking concepts for real time applications
N82-27305
TRACKING NETWORKS
Multiple aircraft tracking system for coordinated research missions
A82-35869

TRADEOFFS
Current ADM restraint system status, trade-off constraints and long range objectives for the Maximum Performance Ejection System (MPES)
[AD-A112645] N82-27238
TRAILING EDGES
The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine
[ASME PAPER 82-GT-63] A82-35315
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence
[NASA-TM-84484] N82-26236
TRAINING AIRCRAFT
Next generation trainer /NGT/ engine requirements - An application of lessons learned
[AIAA PAPER 82-1184] A82-35049
Mission effectiveness of the AV-8B Harrier 2 could be improved if actions are taken now
[AD-A111878] N82-26284
TRAINING DEVICES
Maintenance training simulator design and acquisition: ISD-derived training equipment design
[AD-A110871] N82-26221
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation
[AD-A111430] N82-26321
TRAINING EVALUATION
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation
[AD-A111430] N82-26321
TRAJECTORIES
Minimum time turns constrained to the vertical plane
[AD-A111096] N82-26317
TRANSFER FUNCTIONS
Simplified digital design tools
A82-37034
TRANSIENT RESPONSE
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462
Aerodynamic lag functions, divergence, and the British flutter method
A82-35820
Transient simulation of gas turbines including the effects of heat capacity of the solid parts
[ISBN-951-752-496-X] N82-26296
Assessment of lightning simulation test techniques, part 1
[AD-A112626] N82-27663
TRANSMISSION LINES
Effects of high voltage transmission lines on non-directional beacon performance
[AD-A112311] N82-27261
TRANSMISSIONS (MACHINE ELEMENTS)
Selecting the best reduction gear concept for prop-fan propulsion systems
[AIAA PAPER 82-1124] A82-35020
TRANSONIC COMPRESSORS
Performance analysis of the test results on a two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353
TRANSONIC FLIGHT
Commercial transports - Aerodynamic design for cruise performance efficiency
A82-35555
Practical aerodynamic problems - Military aircraft
A82-35556
Extension of FLO codes to transonic flow prediction for fighter configurations
A82-35564
Supersonic cruise/transonic maneuver wing section development study
[AD-A110686] N82-26256
TRANSONIC FLOW
A computational design method for transonic turbomachinery cascades
[ASME PAPER 82-GT-117] A82-35340
Transonic design using computational aerodynamics
A82-35560
Application of computational methods to transonic wing-design
A82-35561
A-7 transonic wing designs
A82-35562
Transonic computational experience for advanced tactical aircraft
A82-35563
Extension of FLO codes to transonic flow prediction for fighter configurations
A82-35564
A series of airfoils designed by transonic drag minimization for Gates Learjet aircraft
A82-35565
Applied computational transonics - Capabilities and limitations
A82-35566
Evaluation of full potential flow methods for the design and analysis of transport wings
A82-35567
A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations
[AIAA PAPER 82-1017] A82-37477
TRANSONIC NOZZLES
Heat transfer measurements of a transonic nozzle guide vane
[ASME PAPER 82-GT-247] A82-35426
TRANSONIC WIND TUNNELS
Experimental testing at transonic speeds --- wind tunnels
A82-35557
Transonic wind tunnel test of a supersonic nozzle installation
[AIAA PAPER 82-1045] A82-37677
Operating manual holographic interferometry system for 2 x 2 foot transonic wind tunnel
[NASA-CR-166344] N82-26218
TRANSPONDERS
Frequency sharing between passive sensors and aeronautical radionavigation systems employing ground transponders in the band 4.2 - 4.4 GHz
[NASA-CR-169041] N82-26261
TRANSPORT AIRCRAFT
Transport engine control design
[AIAA PAPER 82-1076] A82-34996
Commercial transports - Aerodynamic design for cruise performance efficiency
A82-35555
An analytical study of turbulence responses, including horizontal tail loads, of a control configured jet transport with relaxed static stability
N82-26313
Characteristics of future aircraft impacting aircraft and airport compatibility
[NASA-TM-84476] N82-27233
Cabin safety in large transport aircraft
[PB82-129297] N82-27244
TRANSPORT VEHICLES
Use of CGHRP in transport --- Carbon and Glass Hybrid Reinforced Plastics
A82-37061
TRANSPORTATION
Transportation noise, its impact, planning and regulation
[S-258] N82-27864
TRIBOLOGY
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites
[ASLE PREPRINT 82-AM-5A-2] A82-37855
TURBINE BLADES
Energy efficient engine /E3/ technology status
[AIAA PAPER 82-1052] A82-34980
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981
Control of gas turbine power transients for improved turbine airfoil durability
[AIAA PAPER 82-1182] A82-35047
A comprehensive method for preliminary design optimization of axial gas turbine stages
[AIAA PAPER 82-1264] A82-35091

Secondary flows and losses in axial flow turbines
[ASME PAPER 82-GT-19] A82-35288
Secondary flow effects and mixing of the wake behind a turbine stator
[ASME PAPER 82-GT-46] A82-35304
The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine
[ASME PAPER 82-GT-63] A82-35315
The use of performance-monitoring to prevent compressor and turbine blade failures
[ASME PAPER 82-GT-66] A82-35316
A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336
Effect of crossflows on the discharge coefficient of film cooling holes
[ASME PAPER 82-GT-147] A82-35371
Dry friction damping mechanisms in engine blades
[ASME PAPER 82-GT-162] A82-35383
Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments
[ASME PAPER 82-GT-174] A82-35387
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine
[ASME PAPER 82-GT-222] A82-35409
Structural dynamics of shroudless, hollow, fan blades with composite in-lays
[ASME PAPER 82-GT-284] A82-35456
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874
Aerodynamic performance of high turning core turbine vanes in a two-dimensional cascade
[AIAA PAPER 82-1288] A82-37716
Laser anemometer measurements in an annular cascade of core turbine vanes and comparison with theory
[NASA-TP-2018] N82-26234
Static internal performance characteristics of two thrust reverser concepts for axisymmetric nozzles
[NASA-TP-2025] N82-26235
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822

TURBINE ENGINES
Turbine stage heat flux measurements
[AIAA PAPER 82-1289] A82-35102
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392
Ceramic turbine housings
[ASME PAPER 82-GT-293] A82-35463
Evaluation of a multivariable control design on a variable cycle engine simulation
[AIAA PAPER 82-1077] A82-37682
Blade tip gap effects in turbomachines: A review
[AD-A111892] N82-26308
Turbine engine lubricant reclamation
[AD-A112098] N82-26312
Bird impact analysis package for turbine engine fan blades
[NASA-TM-82831] N82-26701
Briefs of accidents involving turbine powered aircraft, US general aviation, 1979
[PB82-138918] N82-27250
Foreign object impact design criteria, volume 2
[AD-A112701] N82-27313
Foreign object impact design criteria, volume 3
[AD-A112447] N82-27314

TURBINE EXHAUST NOZZLES
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392

TURBINES
User's manual for the vertical axis wing turbine code VDART2
[DE82-000796] N82-26828

TURBOCOMPRESSORS
Test facility and data handling system for the development of axial compressors
[ASME PAPER 82-GT-73] A82-35322
Comprehensive analysis of an axial compressor test with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
Influence of casing treatment on the operating range of axial compressors
[ASME PAPER 82-GT-103] A82-35340
Effect of the rear stage casing treatment on the overall performance of a multistage axial-flow compressor
[ASME PAPER 82-GT-110] A82-35344
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves
[ASME PAPER 82-GT-135] A82-35363
The use of optimization techniques to design controlled diffusion compressor blading
[ASME PAPER 82-GT-149] A82-35373
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine
[ASME PAPER 82-GT-222] A82-35409
The calculation of deviation angle in axial-flow compressor cascades
[ASME PAPER 82-GT-230] A82-35412
Progress in the development of energy efficient engine components
[ASME PAPER 82-GT-275] A82-35450
Aerodynamically induced vibration
[AD-A110493] N82-26306
Core compressor exit stage study, volume 6
[NASA-CR-165554] N82-27310
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

TURBOFAN ENGINES
Selection of a starting system for a low cost single engine fighter aircraft
[AIAA PAPER 82-1043] A82-34977
Energy efficient engine /E3/ technology status
[AIAA PAPER 82-1052] A82-34980
Transport engine control design
[AIAA PAPER 82-1076] A82-34996
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044
Individual bypass throttling in fighter engines
[AIAA PAPER 82-1285] A82-35100
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290
Experimental investigations on the flow in the impeller of a centrifugal fan
[ASME PAPER 82-GT-37] A82-35298
Application of high bypass turbofan computer simulation to flight and test data processing
[ASME PAPER 82-GT-141] A82-35366
HC and CO emission abatement via selective fuel injection
[ASME PAPER 82-GT-178] A82-35390
Performance improvement features of General Electric turbofan engines
[ASME PAPER 82-GT-270] A82-35446
Flight evaluation of a digital electronic engine control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683
Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines
[AIAA PAPER 82-1136] A82-37695
Thrust reverser for a long duct fan engine --- for turbofan engines
[NASA-CASE-LEW-13199-1] N82-26293
Effect on fuel efficiency of parameter variations in the cost function for multivariable control of a turbofan engine
[AD-A110614] N82-26301
Acoustic properties of turbofan inlets
[NASA-CR-169016] N82-27090
Performance deterioration due to acceptance testing and flight loads; JT9D jet engine diagnostic program
[NASA-CR-165572] N82-27309

TURBOJET ENGINE CONTROL
Transport engine control design
[AIAA PAPER 82-1076] A82-34996

TURBOJET ENGINES
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing
[ASME PAPER 82-GT-281] A82-35455

The powerplants of the Yak-40 and M-15 aircraft
--- Russian book
A82-36947
An investigation of engine and test cell operating
conditions on the effectiveness of smoke
suppressant fuel additives
[AD-A112800] N82-27527
TURBOMACHINE BLADES
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337
The influence of Coriolis forces on gyroscopic
motion of spinning blades
[ASME PAPER 82-GT-163] A82-35384
TURBOMACHINERY
Cryogenic turbine testing
[ASME PAPER 82-GT-113] A82-35346
A computational design method for transonic
turbomachinery cascades
[ASME PAPER 82-GT-117] A82-35348
A mixed-flow cascade passage design procedure
based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351
Blade tip gap effects in turbomachines: A review
[AD-A111892] N82-26308
TURBOPROP AIRCRAFT
Interior noise considerations for advanced
high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018
Next generation turboprop gearboxes
[ASME PAPER 82-GT-236] A82-35418
Use of optimization to predict the effect of
selected parameters on commuter aircraft
performance
[NASA-CR-169027] N82-26279
TURBOPROP ENGINES
Advanced turboprop engines for long endurance
naval patrol aircraft
[ASME PAPER 82-GT-217] A82-35404
The influence of engine characteristics on patrol
aircraft life cycle cost optimization
[ASME PAPER 82-GT-256] A82-35433
Summary and recent results from the NASA advanced
High Speed Propeller Research Program
[NASA-TM-82891] N82-26219
Propulsion opportunities for future commuter
aircraft
[NASA-TM-82915] N82-26298
TURBOSHAFTS
Development of a helicopter rotor/propulsion
system dynamics analysis
[AIAA PAPER 82-1078] A82-34997
TURBULENCE
An analytical study of turbulence responses,
including horizontal tail loads, of a control
configured jet transport with relaxed static
stability
N82-26313
TURBULENCE EFFECTS
STOL aircraft response to turbulence generated by
a tall upwind building
A82-35821
Correcting for turbulence effects on average
velocity measurements made using five hole
spherical pitot tube probes
[AD-A112573] N82-27290
TURBULENT BOUNDARY LAYER
Wind tunnel measurements of three-dimensional
wakes of buildings --- for aircraft safety
applications
[NASA-CR-3565] N82-26921
TURBULENT FLOW
Models for a turbulent premixed dump combustor
[AIAA PAPER 82-1261] A82-37709
The numerical solution of the Navier-Stokes
equations for incompressible turbulent flow over
airfoils
[AD-A111279] N82-26612
TURBULENT JETS
Turbulence measurements in a confined jet using a
six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710
TURBULENT WAKES
Secondary flow effects and mixing of the wake
behind a turbine stator
[ASME PAPER 82-GT-46] A82-35304
TURNING FLIGHT
Minimum time turns constrained to the vertical plane
[AD-A111096] N82-26317
TWO DIMENSIONAL BOUNDARY LAYER
A two-dimensional boundary-layer program for
turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336
TWO DIMENSIONAL FLOW
Analysis of two-dimensional internal flows using a
primitive-variable relaxation Navier-Stokes
procedure
[AIAA PAPER 82-1083] A82-34998
Approximate boundary condition procedure for the
two-dimensional numerical solution of vortex wakes
[AIAA PAPER 82-0951] A82-37467
Aerodynamic performance of high turning core
turbine vanes in a two-dimensional cascade
[AIAA PAPER 82-1288] A82-37716
Flows over wings with leading-edge vortex separation
[NASA-CR-165858] N82-26238
TWO PHASE FLOW
Liquid particle dynamics and rate of evaporation
in the rotating field of centrifugal compressors
[ASME PAPER 82-GT-86] A82-35332
Two-phase transpiration cooling
[ASME PAPER 82-GT-89] A82-35333

U

U.S.S.R.
Factors shaping conceptual design of rotary-wing
aircraft
A82-37773
UH-60A HELICOPTER
Limited artificial and natural icing tests
production UH-60A helicopter (re-evaluation)
[AD-A112582] N82-26287
ULTRASONIC FLAW DETECTION
A laboratory mock-up ultrasonic inspection system
for composites
A82-35256
Evaluation of sensitivity of ultrasonic detection
of disbonds in graphite/epoxy to metal joints
A82-37080
ULTRASONIC TESTS
A laboratory mock-up ultrasonic inspection system
for composites
A82-35256
UNITED STATES OF AMERICA
Briefs of accidents involving gliders, U.S.
general aviation, 1979
[PB82-139015] N82-27258
UPGRADING
An analysis of selected enhancements to the en
route central computing complex
[AD-A113575] N82-28044
USER MANUALS (COMPUTER PROGRAMS)
The Sortie-Generation Model system. Volume 1:
Executive summary
[AD-A110897] N82-26222
The Sortie-Generation Model system. Volume 2:
Sortie-Generation Model user's guide
[AD-A110898] N82-26223
User's manual for the vertical axis wing turbine
code VDART2
[DE82-000796] N82-26828
Panel Optimization with Integrated Software
(POIS), Volume 2. User instructions: ECHO and
BHSYS
[AD-A112224] N82-27411
USER REQUIREMENTS
Next generation trainer /NGT/ engine requirements
- An application of lessons learned
[AIAA PAPER 82-1184] A82-35049
UTILITY AIRCRAFT
The powerplants of the Yak-40 and M-15 aircraft
--- Russian book
A82-36947

V

VACUUM CHAMBERS
Performance of the AEDC Mark 1 Aerospace
Environmental Chamber without oil diffusion
pumping
[AD-A111406] N82-26322
VACUUM PUMPS
Performance of the AEDC Mark 1 Aerospace
Environmental Chamber without oil diffusion
pumping
[AD-A111406] N82-26322

VANELESS DIFFUSERS
The performance of centrifugal compressor channel diffusers
[ASME PAPER 82-GT-10] A82-35279
VANES
Improved vane-island diffusers at high swirl
[ASME PAPER 82-GT-68] A82-35318
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
Aerodynamic performance of high turning core turbine vanes in a two-dimensional cascade
[AIAA PAPER 82-1288] A82-37716
VAPORIZERS
Experimental study of external fuel vaporization
[ASME PAPER 82-GT-59] A82-35312
VARIABLE CYCLE ENGINES
A concept for light-powered flight
[AIAA PAPER 82-1214] A82-35067
Individual bypass throttling in fighter engines
[AIAA PAPER 82-1285] A82-35100
Evaluation of a multivariable control design on a variable cycle engine simulation
[AIAA PAPER 82-1077] A82-37682
Reliability design study for a fault-tolerant electronic engine control
[AIAA PAPER 82-1129] A82-37689
VARIABLE GEOMETRY STRUCTURES
Comprehensive analysis of an axial compressor test with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323
VARIABLE PITCH PROPELLERS
Optimization of blade pitch angle for higher harmonic rotor control
A82-37776
VELOCITY DISTRIBUTION
On the performance prediction of a centrifugal compressor scaled up
[ASME PAPER 82-GT-112] A82-35345
VELOCITY MEASUREMENT
Correcting for turbulence effects on average velocity measurements made using five hole spherical pitot tube probes
[AD-A112573] N82-27290
VENTILATION
Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines
[AIAA PAPER 82-1136] A82-37695
VERTICAL ORIENTATION
Influence of meteorological processes on the verticality of electric fields
[AD-A111549] N82-26897
VERTICAL TAKEOFF AIRCRAFT
Lateral control system design for VTOL landing on a DD963 in high sea states
[NASA-CR-169074] N82-26315
Control optimization, stabilization and computer algorithms for aircraft applications
[NASA-CR-169015] N82-27009
VIBRATION
Aerodynamically induced vibration
[AD-A110493] N82-26306
VIBRATION DAMPING
Dry friction damping mechanisms in engine blades
[ASME PAPER 82-GT-162] A82-35383
Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing
[ASME PAPER 82-GT-281] A82-35455
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression
A82-37765
The Helicopter Ride Revolution
[AHS PREPRINT 81-4] A82-37780
A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation
[AHS PREPRINT 81-12] A82-37785
Substructure program for analysis of helicopter vibrations
[AHS PREPRINT 81-24] A82-37795
Use of optimization in helicopter vibration control by structural modification
[AHS PREPRINT 81-27] A82-37797
Survey of active and passive means to reduce rotorcraft vibrations
A82-37946
F-16 active flutter suppression program
A82-37947
VIBRATION EFFECTS
Army helicopter crew seat vibration - Past performance, future requirements
[AHS PREPRINT 81-3] A82-37779
VIBRATION ISOLATORS
Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing
[ASME PAPER 82-GT-281] A82-35455
Design and evaluation of a state-feedback vibration controller
[AHS PREPRINT 81-10] A82-37783
Total main rotor isolation system
[AHS PREPRINT 81-15] A82-37787
Flight demonstration of an integrated floor/fuel isolation system
[AHS PREPRINT 81-16] A82-37788
Semi-active fluid inertia - A new concept in vibration isolation
[AHS PREPRINT 81-17] A82-37789
Assessment of the dynamic response of a structure when modified by the addition of mass, stiffness or dynamic absorbers
[AHS PREPRINT 81-18] A82-37790
Monofilar - A dual frequency rotorhead absorber
[AHS PREPRINT 81-20] A82-37791
Survey of active and passive means to reduce rotorcraft vibrations
A82-37946
VIBRATION MEASUREMENT
Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry
[ASME PAPER 82-GT-34] A82-35295
Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415
VIBRATION MODE
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874
Assessment of the dynamic response of a structure when modified by the addition of mass, stiffness or dynamic absorbers
[AHS PREPRINT 81-18] A82-37790
VIBRATION TESTS
Quantification of helicopter vibration ride qualities
A82-37767
Improved methods in ground vibration testing
[AHS PREPRINT 81-6] A82-37781
VIBRATORY LOADS
Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413
Determination of in-flight helicopter loads and vibration
[AHS PREPRINT 81-7] A82-37782
VIDEO DATA
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A113047] N82-27276
VIRGINIA
Final regulatory evaluation: Metropolitan Washington Airports Policy
[AD-A110583] N82-26324
VISCOUS FLOW
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves
[ASME PAPER 82-GT-135] A82-35363
VISUAL CONTROL
Visual technology research simulator, visual and motion system dynamics
[AD-A111801] N82-26325
VISUAL FIELDS
Influence of contrast on spatial perception in TV display of moving images
[FB-50] N82-27609

VOCODERS

A comparative study of narrowband vocoder algorithms in Air Force operational environments using the Diagnostic Rhyme Test [AD-A112053] N82-26546

VORTEX ALLEVIATION

B-747 vortex alleviation flight tests: Ground-based sensor measurements [AD-A113621] N82-27287

VORTEX SHEDDING

Flows over wings with leading-edge vortex separation [NASA-CR-165858] N82-26238

VORTEX SHEETS

On the vortex flow over delta and double-delta wings [AIAA PAPER 82-0949] A82-37466

Flows over wings with leading-edge vortex separation [NASA-CR-165858] N82-26238

VORTICES

Secondary flow effects and mixing of the wake behind a turbine stator [ASME PAPER 82-GT-46] A82-35304

On the vortex flow over delta and double-delta wings [AIAA PAPER 82-0949] A82-37466

B-747 vortex alleviation flight tests: Ground-based sensor measurements [AD-A113621] N82-27287

VORTICITY EQUATIONS

Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes [AIAA PAPER 82-0951] A82-37467

VULNERABILITY

Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria A82-35734

Protection of advanced electrical power systems from atmospheric electromagnetic hazards [AD-A112612] N82-27658

W

WAKES

Secondary flow mixing losses in a centrifugal impeller [ASME PAPER 82-GT-44] A82-35302

The influence of flow rate on the wake in a centrifugal impeller [ASME PAPER 82-GT-45] A82-35303

WALL FLOW

Casing wall boundary-layer development through an isolated compressor rotor [ASME PAPER 82-GT-18] A82-35287

Influence of casing treatment on the operating range of axial compressors [ASME PAPER 82-GT-103] A82-35340

Comparison of experimental and analytical performance for contoured endwall stators [NASA-TM-82877] N82-26299

WANKEL ENGINES

Real time pressure signal system for a rotary engine [NASA-CASE-LEW-13622-1] N82-26294

Advanced stratified charge rotary aircraft engine design study [NASA-CR-165398] N82-27743

WARNING SYSTEMS

Airborne warning systems for natural and aircraft-initiated lightning A82-35729

The Worldwide Navigational Warning Service [AD-A107372] N82-26276

Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation [AD-A107225] N82-27236

WATER EROSION

The effect of erosion wear on the vibration characteristics of axial-turbine blades A82-35874

WEAPON SYSTEMS

Development of engine operability [AIAA PAPER 82-1181] A82-35046

EAGLE - An interactive engine/airframe life cycle cost model [ASME PAPER 82-GT-56] A82-35311

The PATRIOT Radar in tactical air defense A82-37031

Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation [AD-A111430] N82-26321

Optimal placement model for the B-52G weapons system trainer [AD-A110977] N82-26323

Impact of Advanced Avionics Technology and Ground Attack Weapon Systems [AGARD-CP-306] N82-27293

Impact of advanced avionics and munitions technology on ground attack weapons systems in night and adverse weather conditions N82-27294

Weapon system of a future attack aircraft N82-27301

WEAPONS DELIVERY

Laser application in weapon guidance and active imaging A82-35767

A planning system for F-16 air-to-surface missions N82-27297

WEAR

The effect of erosion wear on the vibration characteristics of axial-turbine blades A82-35874

Wear by generation of electrokinetic streaming currents [ASLE PREPRINT 82-AM-6A-3] A82-37857

Mechanical wear assessment of helicopter engines by ferrography [AD-A110772] N82-26305

Research and development on wear metal analysis [AD-A112100] N82-26446

Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program [AD-A113809] N82-27512

WEATHER

Briefs of fatal accidents involving weather as a cause/factor, U.S. general aviation, 1979 [PB82-138934] N82-27248

Software functional description of mass weather dissemination system exploratory engineering model [AD-A112706] N82-27573

WEATHER DATA RECORDERS

The Flight Service Automation System (FSAS) system benchmark. Volume 1: Summary, introduction and concepts [PB82-143538] N82-27277

The Flight Service Automation System (FSAS) system benchmark. Volume 2: The model of the application [PB82-143546] N82-27278

The Flight Service Automation System (FSAS) system benchmark. Volume 3: The vendor interface package [PB82-143553] N82-27279

WEIGHT REDUCTION

PMUX - The interface for engine data to AIDS --- propulsion multiplexer in Aircraft Integrated Data System [AIAA PAPER 82-1127] A82-35022

WEIGHTLESSNESS

The Marshall Space Flight Center KC-135 zero gravity test program for FY 1981 [NASA-TM-82476] N82-26350

WHISKERS (CRYSTALS)

The Schladitz fuel injector: An initial performance evaluation without burning [AD-A113612] N82-27315

WIND PRESSURE

Hurricane-induced wind loads [PB82-132267] N82-27548

WIND PROFILES

Wind tunnel measurements of three-dimensional wakes of buildings --- for aircraft safety applications [NASA-CR-3565] N82-26921

WIND SHEAR

STOL aircraft response to turbulence generated by a tall upwind building A82-35821

Test and evaluation of the airport radar wind shear detection system [AD-A112663] N82-27924

WIND TUNNEL CALIBRATION

Investigation of the transonic calibration characteristics of turbine static pressure probes [ASME PAPER 82-GT-280] A82-35454

WIND TUNNEL TESTS
Selected results of the F-15 propulsion interactions program
[AIAA PAPER 82-1041] A82-34976
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8
[AIAA PAPER 82-1120] A82-35017
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018
An experimental investigation of S-duct diffusers for high-speed propfans
[AIAA PAPER 82-1123] A82-35019
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278
Experimental testing at transonic speeds --- wind tunnels
A82-35557
Investigation of subsonic nacelle performance improvement concept
[AIAA PAPER 82-1042] A82-37676
Transonic wind tunnel test of a supersonic nozzle installation
[AIAA PAPER 82-1045] A82-37677
Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement
[AIAA PAPER 82-1132] A82-37692
Advanced nozzle integration for air combat fighter application
[AIAA PAPER 82-1135] A82-37694
F-16 active flutter suppression program
A82-37947
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics --- conducted in Langley 30- by 60-foot tunnel
[NASA-TP-2011] N82-26217

WIND TURBINES
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822

WINDPOWERED GENERATORS
User's manual for the vertical axis wing turbine code VDART2
[DE82-000796] N82-26828

WING LOADING
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703

WING PLANFORMS
Transonic computational experience for advanced tactical aircraft
A82-35563
Chordwise and compressibility corrections for arbitrary planform slender wings
A82-37931

WING PROFILES
Annular wing
[NASA-CASE-FRC-11007-2] N82-26277

WINGS
Application of computational methods to transonic wing-design
A82-35561
A-7 transonic wing designs
A82-35562
Evaluation of full potential flow methods for the design and analysis of transport wings
A82-35567

WORKLOADS (PSYCHOPHYSIOLOGY)
Update of the summary report of 1977-1978 task force on aircrew workload
[AD-A112547] N82-26258
Real-time simulation of an airborne radar for overwater approaches
[NASA-CR-166293] N82-26262
Cockpit display of traffic information and the measurement of pilot workload: An annotated bibliography
[AD-A113637] N82-27291

X

X WING ROTORS
Development of low-order model of an X-wing aircraft by system identification
[AD-A113760] N82-27286

Y

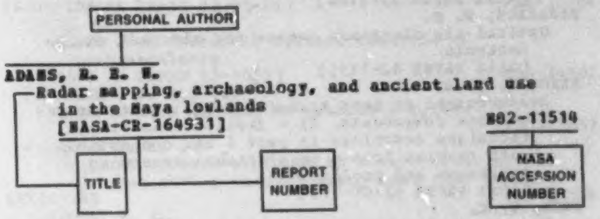
YAK 40 AIRCRAFT
The powerplants of the Yak-40 and M-15 aircraft --- Russian book
A82-36947

YAWING MOMENTS
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 153)* OCTOBER 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ABEL, I.
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703

ABELL, J. B.
The Sortie-Generation Model system. Volume 1: Executive summary
[AD-A110897] N82-26222
The Sortie-Generation Model system. Volume 2: Sortie-Generation Model user's guide
[AD-A110898] N82-26223
The Sortie-Generation Model system. Volume 4: Sortie-Generation Model programmers manual
[AD-A110899] N82-26224
The Sortie-Generation Model system. Volume 6: Spares subsystem
[AD-A110900] N82-26226

ACQUAVIVA, S. J.
Mechanical wear assessment of helicopter engines by ferrography
[AD-A110772] N82-26305

ADAMS, A.
Charting propulsion's future - The AIES results
[AIAA PAPER 82-1139] A82-35023

ADAMS, J. J.
Flight-test verification of a pictorial display for general aviation instrument approach
[NASA-TM-83305] N82-26283

ADAMS, N.
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462

AHMAD, J.
Mechanical property characterization and modeling of structural materials
[AD-A113841] N82-27784

AIDA, T.
Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413

AIELLO, R. A.
Structural dynamics of shroudless, hollow, fan blades with composite in-lays
[ASME PAPER 82-GT-284] A82-35456

AKHMEDOV, KH. A.
Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel
A82-36673

AL-MODAFAR, M. N.
Development and application of a performance prediction method for straight rectangular diffuser
[ASME PAPER 82-GT-122] A82-35352

ALEXANDER, D.
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278

ALEXANDER, J. V.
Advanced concepts for composite structure joints and attachment fittings. Volume 2: Design guide
[AD-A111106] N82-26200

ALIEV, A. A.
Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel
A82-36673

ALMROTH, B. O.
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and MMSYS
[AD-A112224] N82-27411

ALSPAUGH, D. W.
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273

ALT, R. E.
Performance of the AEDC Mark 1 Aerospace Environmental Chamber without oil diffusion pumping
[AD-A111406] N82-26322

ALTHER, G. A.
A significant role for composites in energy-efficient aircraft
A82-37065

ALVAREZ, R. A.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

ANDERLE, R. J.
Doppler test results of experimental GPS receiver
[AD-A113587] N82-27274

ANDERS, G.
Aerodynamic investigations to determine possible ice flight paths
[NASA-TM-76648] N82-27235

ANTOINE, A. C.
Effect of some nitrogen compounds thermal stability of jet A
[NASA-TM-82908] N82-27519

ARAKI, B.
Implementing aircraft identification schemes by public key cryptosystems
A82-37301

ARIGA, I.
The effect of inlet distortion on the performance characteristics of a centrifugal compressor
[ASME PAPER 82-GT-92] A82-35335
On the performance prediction of a centrifugal compressor scaled up
[ASME PAPER 82-GT-112] A82-35345

ARNOLD, J. P.
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392

ASHBAUGH, N. E.
Mechanical property characterization and modeling of structural materials
[AD-A113841] N82-27784

ATHANS, M.
Control optimization, stabilization and computer algorithms for aircraft applications
[NASA-CR-169015] N82-27009
ATTA, E. H.
A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations
[AIAA PAPER 82-1017] A82-37477
ATZHORN, D.
Digital command augmentation for lateral directional aircraft dynamics
[AD-A107264] N82-27321
AVRAM, P.
Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors
[ASME PAPER 82-GT-85] A82-35331
AYERS, J. E.
The Worldwide Navigational Warning Service
[AD-A107372] N82-26276

B

BACH, L. J.
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
BADGLEY, P.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743
BAER-RIEDHART, J. L.
Evaluation of a simplified gross thrust calculation method for a J85-21 afterburning turbojet engine in an altitude facility
[AIAA PAPER 82-1044] A82-34978
BAHR, D. W.
NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status
[AIAA PAPER 82-1089] A82-35000
HC and CO emission abatement via selective fuel injection
[ASME PAPER 82-GT-178] A82-35390
BAIN, J. D.
Modification of OE-258/URN Tactical Air Navigation (TACAN) antenna group
[AD-A111680] N82-26264
BAIN, M.
Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds
A82-36054
BALKE, R. W.
The Helicopter Ride Revolution
[AHS PREPRINT 81-4] A82-37780
BALL, W. F.
Attack and en route avionics for in-weather operations
N82-27300
BAOSHI, C.
Performance analysis of the test results on a two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353
BAR-GILL, A.
Flying qualities criteria for GA single pilot IFR operations
N82-26213
BARANOV, A. M.
Aviation meteorology
A82-36972
BARBATO, G. J.
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 1: Results
[AD-A110956] N82-26290
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design
[AD-A110954] N82-26291
BARRY, B.
Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments
[ASME PAPER 82-GT-174] A82-35387
BATAKIS, A. P.
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392
BATENBURG, J.
A planning system for F-16 air-to-surface missions
N82-27297
BATTS, M. E.
Hurricane-induced wind loads
[PB82-132267] N82-27540
BAUCHSPIES, J.
Benefit cost analysis of the aircraft energy efficiency program
[NASA-CR-169116] N82-27280
BAUER, C. J.
Next generation trainer /NGT/ engine requirements - An application of lessons learned
[AIAA PAPER 82-1184] A82-35049
BAUMBICK, R. J.
Optical tip clearance sensor for aircraft engine controls
[AIAA PAPER 82-1131] A82-37691
BEACOCK, R. J.
Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388
BECK, T. R.
Wear by generation of electrokinetic streaming currents
[ASLE PREPRINT 82-AM-6A-3] A82-37857
BEEMSTERBOER, G. L.
Turbine engine lubricant reclamation
[AD-A112098] N82-26312
BEGGS, E. B.
Attack and en route avionics for in-weather operations
N82-27300
BEHBAHANI, A. I.
Local heat transfer to staggered arrays of impinging circular air jets
[ASME PAPER 82-GT-211] A82-35401
BEHEIM, M. A.
NASA research in aircraft propulsion
[ASME PAPER 82-GT-177] A82-35389
BELL, J. R.
A laboratory mock-up ultrasonic inspection system for composites
A82-35256
BELLINGER, E. D.
Aerodynamic lag functions, divergence, and the British flutter method
A82-35820
BENMANSOUR, S.
Effect of crossflows on the discharge coefficient of film cooling holes
[ASME PAPER 82-GT-147] A82-35371
BENSON, J. O.
Limited artificial and natural icing tests production UH-60A helicopter (re-evaluation)
[AD-A112582] N82-26287
BERKOWITZ, M.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743
BERNSTEIN, M. L.
Mechanical property characterization and modeling of structural materials
[AD-A113841] N82-27784
BERRY, D.
Investigation of subsonic nacelle performance improvement concept
[AIAA PAPER 82-1042] A82-37676
BERSON, B. L.
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236
BETTNER, J. L.
Aerodynamically induced vibration
[AD-A110493] N82-26306
BHATELEY, I. C.
Application of computational methods to transonic wing-design
A82-35561
BHINDER, F. S.
Development and application of a performance prediction method for straight rectangular diffuser
[ASME PAPER 82-GT-122] A82-35352

BHOMBAL, B. D.
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives
[NASA-CR-165839] N82-26465
BIERY, F.
Preplanned product improvement and other modification strategies: Lessons from past aircraft modification programs
[AD-A113599] N82-27220
BINDER, A.
Secondary flow effects and mixing of the wake behind a turbine stator
[ASME PAPER 82-GT-46] A82-35304
BLACK, G.
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
BLACKWELL, J. A., JR.
Experimental testing at transonic speeds
A82-35557
BLANCALANA, H. J.
Tactical systems approach to interdiction of 2nd echelon moving targets using real time sensors
N82-27306
BLOOMER, H. E.
QCSEE under-the-wing engine acoustic data
[NASA-TM-82691] N82-27311
BLUISH, J. A.
PMUX - The interface for engine data to AIDS
[AIAA PAPER 82-1127] A82-35022
BOAZ, J.
Pave Mover aided integrated strike avionics system
N82-27298
BODRYSHEV, V. V.
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874
BODSON, M.
Lateral control system design for VTOL landing on a DD963 in high sea states
[NASA-CR-169074] N82-26315
BOLAND, J. S., III
Automatic handoff of multiple targets
[AD-A107490] N82-27561
BOLDING, R. M.
F-16 active flutter suppression program
A82-37947
BONNER, E.
Transonic computational experience for advanced tactical aircraft
A82-35563
Supersonic cruise/transonic maneuver wing section development study
[AD-A110686] N82-26256
BORNSTEIN, N. S.
The effect of NaCl/g/ in high temperature oxidation
[ASME PAPER 82-GT-106] A82-35342
BORTONE, B. E.
Weapon system of a future attack aircraft
N82-27301
BOUCEK, G. P.
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236
BOUDREAUX, R. L.
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
BOWERS, D. L.
Advanced nozzle integration for air combat fighter application
[AIAA PAPER 82-1135] A82-37694
BOYLE, R. J.
Comparison of experimental and analytical performance for contoured endwall stators
[NASA-TM-82877] N82-26299
BRADLEY, R. G.
Practical aerodynamic problems - Military aircraft
A82-35556
BRADY, J. J.
Mode S system accuracy
[AD-A112249] N82-27266
BRAUN, D.
CFC drive shaft and GFC coupling for the tail rotor of the BO 105
A82-37766
BREEDLOVE, J. W.
Navstar - Global Positioning System: A revolutionary capability
A82-37040
BREWER, G. D.
Will hydrogen-fueled aircraft be safe
[AIAA PAPER 82-1236] A82-35077
BRIEHL, D.
Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors
[AIAA PAPER 82-1175] A82-35041
BROADLEY, W.
An analysis of selected enhancements to the en route central computing complex
[AD-A113575] N82-28044
BROWDER, G. B.
Visual technology research simulator, visual and motion system dynamics
[AD-A111801] N82-26325
BROWN, J. J.
A unified approach to helicopter NASTRAN modeling
[AHS PREPRINT 81-22] A82-37793
BROWN, J. R.
Research and development on wear metal analysis
[AD-A112100] N82-26446
Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program
[AD-A113809] N82-27512
BROWNING, R. G. E.
Preliminary study of ground handling characteristics of Buoyant Quad Rotor (BQR) vehicles
[NASA-CR-166130] N82-26220
BRUCE, T. W.
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044
BRUNS, R. J.
Turbine engine lubricant reclamation
[AD-A112098] N82-26312
BRUNTON, G.
The low temperature properties of aviation fuels
[ASME PAPER 82-GT-48] A82-35306
BUCHANAN, R.
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044
BUCY, R. W.
Progress in the development of energy efficient engine components
[ASME PAPER 82-GT-275] A82-35450
Technology advancements for energy efficient aircraft engines
[AIAA PAPER 82-1051] A82-35479
BUNNELL, J. W.
Development of low-order model of an X-wing aircraft by system identification
[AD-A113760] N82-27286
BURCHAM, F. W., JR.
Flight evaluation of a digital electronic engine control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683
BURDESS, S. B.
Simulation report: Advanced display for complex flight trajectories
[AD-A111259] N82-26320
BURGSMUELLER, W.
Aerodynamic investigations to determine possible ice flight paths
[NASA-TM-76648] N82-27235
BURNHAM, D. C.
B-747 vortex alleviation flight tests: Ground-based sensor measurements
[AD-A113621] N82-27287
BURNSIDE, W. D.
Elevation plane analysis of on-aircraft antennas
[AD-A112373] N82-26554
BUTRIMAS, S. K.
Visual technology research simulator, visual and motion system dynamics
[AD-A111801] N82-26325
BUTTERS, B. G.
Assessment of lightning simulation test techniques, part 1
[AD-A112626] N82-27663
BYRD, J. A.
Ceramic components for automotive and heavy duty turbine engines - CATE and AGT 100
[ASME PAPER 82-GT-253] A82-35432

C

CAIGNAERT, G.
Experimental investigations on the flow in the impeller of a centrifugal fan
[ASME PAPER 82-GT-37] A82-35298
CALAPODAS, N. J.
Determination of in-flight helicopter loads and vibration
[AHS PREPRINT 81-7] A82-37782
CALE, D. B.
Small engine inlet air particle separator technology
[ASME PAPER 82-GT-40] A82-35299
CALVERT, W. J.
An inviscid-viscous interaction treatment to predict the blade-to-blade performance of axial compressors with leading edge normal shock waves
[ASME PAPER 82-GT-135] A82-35363
CANNARATA, S.
AUTOPILOT: A distributed planner for air fleet control
[AD-A107139] N82-27269
CANDEL, S. M.
Models for a turbulent premixed dump combustor
[AIAA PAPER 82-1261] A82-37709
CAO, H.-H.
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[ASME PAPER 82-GT-16] A82-35285
CARAMASCHI, V.
R & D on composite rotor blades at Agusta
A82-37764
CAREY, D. R.
The PATRIOT Radar in tactical air defense
A82-37031
CARLSON, R. E.
The biological degradation of spilled jet fuels: A literature review
[AD-A110758] N82-26873
CARRENO, V. A.
A single-frequency multitransmitter telemetry technique
A82-36281
CHAFFEE, J.
Data processing at the Global Positioning System master control station
[AD-A110553] N82-26270
CHAMIS, C. C.
Structural dynamics of shroudless, hollow, fan blades with composite in-lays
[ASME PAPER 82-GT-284] A82-35456
CHANG, A.
The influence of Coriolis forces on gyroscopic motion of spinning blades
[ASME PAPER 82-GT-163] A82-35384
CHANG, C. D.
A model for sensor-interceptor trade-off analysis
[AD-A112046] N82-26271
Application of adaptive estimation to target tracking
[AD-A112036] N82-26272
CHANG, C.-L.
Comprehensive analysis of an axial compressor test with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323
CHANG, F. H.
A laboratory mock-up ultrasonic inspection system for composites
A82-35256
CHANG, L. K.
Optimization of propeller blade shape by an analytical method
[AIAA PAPER 82-1125] A82-35021
CHAPIER, J. F.
Application of high bypass turbofan computer simulation to flight and test data processing
[ASME PAPER 82-GT-141] A82-35366
CHAPMAN, C.
Mode S system accuracy
[AD-A112249] N82-27266
CHAUSONNET, J.
Airbus Industrie and community noise
N82-27865
CHEBOTAREV, V. N.
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874
CHEN, L. D.
Investigation of spray characteristics for flashing injection of fuels containing dissolved air and superheated fuels
[NASA-CR-3563] N82-26295
CHIARELLI, C.
Thrust reverser induced flow interference on tactical aircraft stability and control
[AIAA PAPER 82-1133] A82-37693
CHIN, J.-S.
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[ASME PAPER 82-GT-16] A82-35285
CHOPRA, I.
Considerations of open-loop, closed-loop, and adaptive multicyclic control systems
[AHS PREPRINT 81-13] A82-37786
CHOUDHURY, P. R.
Characteristics of a side dump gas generator ramjet
[AIAA PAPER 82-1258] A82-35089
CHRIST, R. A.
A unified approach to helicopter NASTRAN modeling
[AHS PREPRINT 81-22] A82-37793
CHRISTIE, T. J.
Development of engine operability
[AIAA PAPER 82-1181] A82-35046
CLARK, D.
Real-time simulation of an airborne radar for overwater approaches
[NASA-CR-166293] N82-26262
CLARK, R. N.
Instrument failure detection in partially observable systems
A82-37380
CLIFFORD, D. W.
Triggered lightning
A82-35727
Lightning simulation and testing
A82-35733
Assessment of lightning simulation test techniques, part 1
[AD-A112626] N82-27663
COALSON, M. S.
Status report of the USAF's Engine Model Derivative Program
[ASME PAPER 82-GT-183] A82-35391
COLT, J. Z., JR.
The Schladitz fuel injector: An initial performance evaluation without burning
[AD-A113612] N82-27315
COMEGYS, G. L.
Integrated flight trajectory control
[AD-A110998] N82-26319
CONDOM, P.
Boeing's new transports in a flight-test marathon
A82-37493
CONNER, D. W.
Characteristics of future aircraft impacting aircraft and airport compatibility
[NASA-TM-84476] N82-27233
CONTE, A. A., JR.
Corrosion tests with MIL-H-83282 and MIL-H-6083 aircraft hydraulic fluids
[AD-A112437] N82-27506
COOKSON, R. A.
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
COOLEY, W. W.
Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria
A82-35734
COPENHAVER, W. W.
Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402
CORBIN, J. C.
Assessment of aircraft susceptibility/vulnerability to lightning and development of lightning-protection design criteria
A82-35734
CORBIN, M. A.
Marine Air Traffic Control and Landing System (METCALS) investigation
[AD-A113047] N82-27276

COX, R. A.
Application of computational methods to transonic wing-design
A82-35561

COX, W. J.
Update of the summary report of 1977-1978 task force on aircrew workload
[AD-A112547] N82-26258

CRAIG, J. E.
Operating manual holographic interferometry system for 2 x 2 foot transonic wind tunnel
[NASA-CR-166344] N82-26218

CREWS, S. T.
Army helicopter crew seat vibration - Past performance, future requirements
[AHS PREPRINT 81-3] A82-37779

CROCE-SPINELLI, S.
Air-ground attack: Axes of research for airborne systems
N82-27295

CROUCH, K. E.
Lightning simulation and testing
A82-35733

CUELLAR, J. P., JR.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

CULY, D. G.
A cost modeling approach to engine optimization
[AIAA PAPER 82-1185] A82-37698

CUMPSTY, N. A.
Casing wall boundary-layer development through an isolated compressor rotor
[ASME PAPER 82-GT-18] A82-35287

CUNNINGHAM, H. J.
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence
[NASA-TM-84484] N82-26236

CUTTS, D. G.
Dry friction damping mechanisms in engine blades
[ASME PAPER 82-GT-162] A82-35383

D

DAHLIN, J. A.
Applied computational transonics - Capabilities and limitations
A82-35566

DALTON, J. W.
Design of a data acquisition and reduction system for fatigue testing
[AD-A110612] N82-26720

DANGELMAIER, R. A.
T700 - Modern development test techniques, lessons learned and results
[AIAA PAPER 82-1183] A82-35048

DANIEL, I. M.
Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints
A82-37080

DARABIHA, N.
Models for a turbulent premixed dump combustor
[AIAA PAPER 82-1261] A82-37709

DAVIS, C. C.
Performance of multiple, angled nozzles with short mixing stack eductor systems
[AD-A110817] N82-26302

DAVIS, F. W.
Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425

DAVIS, H. W., JR.
A stage-by-stage dual-spool compression system modeling technique
[ASME PAPER 82-GT-189] A82-35394

DAVIS, R. E.
Advanced turboprop engines for long endurance naval patrol aircraft
[ASME PAPER 82-GT-217] A82-35404

DAVIS, W. H., JR.
Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement
[AIAA PAPER 82-1132] A82-37692

DECARNE, D.
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326

DEGROOT, W. P.
Frequency sharing between passive sensors and aeronautical radionavigation systems employing ground transponders in the band 4.2 - 4.4 GHz
[NASA-CR-169041] N82-26261

DEHONDT, D.
Influence of casing treatment on the operating range of axial compressors
[ASME PAPER 82-GT-103] A82-35340

DELAMARCHE, A.
Test and evaluation of the airport radar wind shear detection system
[AD-A112663] N82-27924

DELEMARRE, L.
Software functional description of mass weather dissemination system exploratory engineering model
[AD-A112706] N82-27573

DELGADO, R. C.
USAF ACES II progress report
A82-37969

DELUCIA, R. A.
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165388] N82-27316

DENNIS, R.
Propellers come full circle
A82-35881

DESJARDINS, R. A.
Flight demonstration of an integrated floor/fuel isolation system
[AHS PREPRINT 81-16] A82-37788

DESMET, B.
Experimental investigations on the flow in the impeller of a centrifugal fan
[ASME PAPER 82-GT-37] A82-35298

DICKMAN, R. A.
Current techniques for jet engine test cell modeling
[AIAA PAPER 82-1272] A82-37712

DIEKMANN, V. L.
Limited artificial and natural icing tests production UH-60A helicopter (re-evaluation)
[AD-A112582] N82-26287

DIETRICK, C. C.
Life and Utilization Criteria Identification In Design (LUCID), volume 1
[AD-A111939] N82-26309
Life and Utilization Criteria Identification In Design (LUCID), volume 2
[AD-A111940] N82-26310

DITTMAR, J. H.
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8
[AIAA PAPER 82-1120] A82-35017

DODDS, W. J.
NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status
[AIAA PAPER 82-1089] A82-35000

DODGE, L. C.
Investigation of an improved structural model for damaged T-38 horizontal stabilizer flutter analysis using NASTRAN
[AD-A111095] N82-26316

DOERR, L.
Scaling effects on leakage losses in labyrinth seals
[ASME PAPER 82-GT-157] A82-35380

DOLMAN, W. C.
An approach to software for high integrity applications
[ASME PAPER 82-GT-251] A82-35430

DONE, G. T. S.
Use of optimization in helicopter vibration control by structural modification
[AHS PREPRINT 81-27] A82-37797

DOONAN, J. G.
Advanced exhaust nozzle concepts using spanwise blowing for aerodynamic lift enhancement
[AIAA PAPER 82-1132] A82-37692

DOUGHERTY, D. L.
Effect on fuel efficiency of parameter variations in the cost function for multivariable control of a turbofan engine
[AD-A110614] N82-26301
DU VAL, R. W.
Design and evaluation of a state-feedback vibration controller
[AHS PREPRINT 81-10] A82-37783
DULIKRAVICH, D. S.
A computational design method for transonic turbomachinery cascades
[ASME PAPER 82-GT-117] A82-35348
DUNCAN, D.
Computer image generation: Advanced visual/sensor simulation
[AD-A107098] N82-28016
DUNDAS, R. E.
The use of performance-monitoring to prevent compressor and turbine blade failures
[ASME PAPER 82-GT-66] A82-35316
DUNN, M. G.
Turbine stage heat flux measurements
[AIAA PAPER 82-1289] A82-35102
DUPUIS, T. A.
Pave Mover aided integrated strike avionics system
N82-27298
DUSA, D.
Investigation of subsonic nacelle performance improvement concept
[AIAA PAPER 82-1042] A82-37676

E

EDELFELT, I. H.
A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336
EDNIE, C.
Advanced internal cargo system concept demonstration and evaluation
[AD-A111990] N82-26282
EFURD, R. D.
Marine Air Traffic Control and Landing System (METCALS) investigation
[AD-A113047] N82-27276
EGLE, D. M.
Acoustic emission in jet engine fan blades
A82-35257
EGUCHI, K.
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290
EKSTEDT, E. E.
NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status
[AIAA PAPER 82-1089] A82-35000
EKSTEIN, N.
Implementing aircraft identification schemes by public key cryptosystems
A82-37381
EL-MASRI, M. A.
Two-phase transpiration cooling
[ASME PAPER 82-GT-89] A82-35333
ELIAS, A. L.
PPOD Programmable pilot-oriented display
N82-26201
ELKOTB, M. M.
Atomization quality of twin fluid atomizers for gas turbines
[ASME PAPER 82-GT-61] A82-35314
ELLIS, D. R.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743
ELLIS, H., JR.
Spiral slotted phased antenna array
[NASA-CASE-MSC-18532-1] N82-27558
ELOVIC, E.
A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336
ENG, R. D.
Hot isostatically pressed manufacture of high strength MERL 76 disk and seal shapes
[NASA-CR-165549] N82-26439
ERIKSEN, F.
Electromagnetic interaction of lightning with aircraft
A82-35731
ERVIN, E. R.
Electronic control for small engines
[AIAA PAPER 82-1126] A82-37688
ERWIN, J.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318
ESPOSITO, E.
Models for a turbulent premixed dump combustor
[AIAA PAPER 82-1261] A82-37709
ESPOSITO, R. J.
FAA tests on the Navstar GPS Z-set
A82-37039
ESSLINGER, P.
Evaluation criteria for aero engine materials
A82-36065
EULER, W. C.
Navstar - Global Positioning System: A revolutionary capability
A82-37040
EVANS, D. J.
Hot isostatically pressed manufacture of high strength MERL 76 disk and seal shapes
[NASA-CR-165549] N82-26439
EVANS, W.
The PATRIOT Radar in tactical air defense
A82-37031
EVELYN, G. B.
Transonic wind tunnel test of a supersonic nozzle installation
[AIAA PAPER 82-1045] A82-37677

F

FAETH, G. M.
Investigation of spray characteristics for flashing injection of fuels containing dissolved air and superheated fuels
[NASA-CR-3563] N82-26295
FAIR, P. S.
Research and development on wear metal analysis
[AD-A112100] N82-26446
Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program
[AD-A113809] N82-27512
FAIRBANKS, F.
A critical appraisal of some current incidence loss models for the stator and rotor of a mixed flow gas turbine
[ASME PAPER 82-GT-120] A82-35350
FARASSAT, F.
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35010
FARRY, K. A.
Air data measurement using distributed processing and fiber optics data transmission
N82-26214
FASCHING, W. A.
Performance improvement features of General Electric turbofan engines
[ASME PAPER 82-GT-270] A82-35446
FEAR, J. S.
NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status
[AIAA PAPER 82-1088] A82-34999
NASA/General Electric broad-specification fuels combustion technology program - Phase I results and status
[AIAA PAPER 82-1089] A82-35000
FENG, Z. N.
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457
FENTON, R. C.
Aircraft fire safety research with antimisting fuels - Status report
[AIAA PAPER 82-1235] A82-35076

FERENCE, R.
Model test and full scale checkout of dry-cooled jet runup sound suppressors
[AIAA PAPER 82-1239] A82-35079
FERTIS, D.
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462
FILIPPI, R. E.
Cryogenic turbine testing
[ASME PAPER 82-GT-113] A82-35346
FINK, J. L.
Multiple aircraft tracking system for coordinated research missions
A82-35869
FINNERTY, C. S.
Minimum time turns constrained to the vertical plane
[AD-A111096] N82-26317
FISHBACH, L. H.
NASA research in supersonic propulsion: A decade of progress
[NASA-TM-82862] N82-26300
FISHER, C. P.
A laboratory mock-up ultrasonic inspection system for composites
A82-35256
FISTER, W.
Conversion of centrifugal compressor performance curves considering non-similar flow conditions
[ASME PAPER 82-GT-42] A82-35300
FLANDERS, S. N.
Cold regions testing of an air transportable shelter
[AD-A107131] N82-27325
FOLTZ, H. L.
A procedure for evaluating fuel composition effects on combustor life
[ASME PAPER 82-GT-296] A82-35465
FORREST, A. E.
Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments
[ASME PAPER 82-GT-174] A82-35387
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469
FORNER, J. A.
Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique
[AIAA PAPER 82-1085] A82-37685
FOSS, A. M.
A practical approach to the design of multivariable control strategies for gas turbines
[ASME PAPER 82-GT-150] A82-35374
FRACK, R. B.
Surveillance simulation testing of terminal and en route mode S sensors
[AD-A112250] N82-27265
FRANTSEV, V. K.
The powerplants of the Yak-40 and M-15 aircraft
A82-36947
FREEMAN, H.
An analysis of selected enhancements to the en route central computing complex
[AD-A113575] N82-28044
FRENZ, H.
Aerodynamic investigations to determine possible ice flight paths
[NASA-TM-76648] N82-27235
FREULER, R. J.
Current techniques for jet engine test cell modeling
[AIAA PAPER 82-1272] A82-37712
FRIEDMAN, R.
Experiments on fuel heating for commercial aircraft
[NASA-TM-82878] N82-26403
FROST, R. C.
Composite flight test boom for Nomad N22B aircraft
[ARL-0086-TM] N82-27289
FULLER, J. W.
Rotor state estimation for rotorcraft
[AHS PREPRINT 81-11] A82-37784
FUSARO, R. L.
Geometrical aspects of the tribological properties of graphite fiber reinforced polyimide composites
[ASLE PREPRINT 82-AM-5A-2] A82-37855
FYFE, J. R.
EAGLE - An interactive engine/airframe life cycle cost model
[ASME PAPER 82-GT-56] A82-35311

G

GABEL, R.
Flight demonstration of an integrated floor/fuel isolation system
[AHS PREPRINT 81-16] A82-37780
GABRIELI, M.
Terminal air traffic control with surveillance data from the mode S system: Results of system demonstrations to field controllers
[AD-A112632] N82-27260
GAFFIN, W. O.
NASA ECI programs - Benefits to Pratt and Whitney engines
[ASME PAPER 82-GT-272] A82-35448
GAFFNEY, E. F.
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
GALLARDO, V.
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
GAMBLE, W. L.
Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines
[AIAA PAPER 82-1054] A82-37679
GANGWANI, S. T.
Determination of rotor wake induced empennage airloads
[AHS PREPRINT 81-26] A82-37796
GAO, T.-L.
Effect of the rear stage casing treatment on the overall performance of a multistage axial-flow compressor
[ASME PAPER 82-GT-110] A82-35344
GARBEROGLIO, J. E.
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327
GARDNER, A. H.
A laboratory mock-up ultrasonic inspection system for composites
A82-35256
GARDNER, W. B.
Energy efficient engine /E3/ technology status
[AIAA PAPER 82-1052] A82-34980
Interim review of the Energy Efficient Engine /E3/ Program
[ASME PAPER 82-GT-271] A82-35447
GARNER, H. D.
Magnetic heading reference
[NASA-CASE-LAR-12638-1] N82-26260
GAYET, J. F.
Aircraft measurements of icing in supercooled and water droplet/ice crystal clouds
A82-36054
GIANSANTE, N.
Determination of in-flight helicopter loads and vibration
[AHS PREPRINT 81-7] A82-37782
GIAVOTTO, V.
R & D on composite rotor blades at Agusta
A82-37764
GINGRICH, P.
Supersonic cruise/transonic maneuver wing section development study
[AD-A110686] N82-26256
GINGRICH, P. B.
Transonic computational experience for advanced tactical aircraft
A82-35563
GLASS, D. V.
Depot support of gas turbine engines
[AD-A107141] N82-27217
GLASS, M.
Response of cloud microphysical instruments to aircraft icing conditions
[AD-A112317] N82-27284
GLICK, N. S.
Software technology transfer and export control
[AD-A106869] N82-28017

GODSTON, J.
Selecting the best reduction gear concept for prop-fan propulsion systems
[AIAA PAPER 82-1124] A82-35020
GOLD, F.
Update of the summary report of 1977-1978 task force on aircrew workload
[AD-A112547] N82-26258
GOLDMAN, L. J.
Laser anemometer measurements in an annular cascade of core turbine vanes and comparison with theory
[NASA-TP-2018] N82-26234
GOLDSTEIN, R. J.
Local heat transfer to staggered arrays of impinging circular air jets
[ASME PAPER 82-GT-211] A82-35401
GOODMAN, S. E.
Software technology transfer and export control
[AD-A106869] N82-28017
GOODWIN, W. V.
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface
[AD-A107441] N82-27436
GOULAS, A.
The calculation of deviation angle in axial-flow compressor cascades
[ASME PAPER 82-GT-230] A82-35412
GRAF, W. R.
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A107384] N82-27260
GRANTHAM, D. D.
Response of cloud microphysical instruments to aircraft icing conditions
[AD-A112317] N82-27284
GRAY, D. E.
Interim review of the Energy Efficient Engine /E3/ Program
[ASME PAPER 82-GT-271] A82-35447
GRAY, T. W.
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing
[ASME PAPER 82-GT-281] A82-35455
GREENBERG, B. S.
The Sortie-Generation Model system. Volume 2: Sortie-Generation Model user's guide
[AD-A110898] N82-26223
The Sortie-Generation Model system. Volume 5: Maintenance subsystem
[AD-A110815] N82-26225
GREGORY-SMITH, D. G.
Secondary flows and losses in axial flow turbines
[ASME PAPER 82-GT-19] A82-35288
GREGORY, B.
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216
GREGORY, C. Z., JR.
Design and evaluation of a state-feedback vibration controller
[AHS PREPRINT 81-10] A82-37783
GRINNELL, C. B.
Engine experience of turbine rotor blade materials and coatings
[ASME PAPER 82-GT-244] A82-35425
GROSS, B. D.
Advanced microstrip antenna developments. Volume 2: Microstrip GPS antennas for general aviation aircraft
[AD-A113620] N82-27588
GRUNNET, J. L.
Model test and full scale checkout of dry-cooled jet runup sound suppressors
[AIAA PAPER 82-1239] A82-35079
GULLEDGE, T. R., JR.
Specification and estimation of dynamic cost functions for airframe production airframes
[AD-A113147] N82-27221
Learning and costs in airframe production, part 1
[AD-A112948] N82-28210
GUNNESS, R. C.
A cost modeling approach to engine optimization
[AIAA PAPER 82-1185] A82-37698
GUPTA, B. P.
Low vibration design of AAH for mission proficiency requirements
[AHS PREPRINT 81-2] A82-37778
GUPTA, N. K.
Design and evaluation of a state-feedback vibration controller
[AHS PREPRINT 81-10] A82-37783
GUY, R. W.
Increased capabilities of the Langley Mach 7 Scramjet Test Facility
[AIAA PAPER 82-1240] A82-35080

H

HAAS, J. E.
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine
[ASME PAPER 82-GT-222] A82-35409
Comparison of experimental and analytical performance for contoured endwall stators
[NASA-TM-82877] N82-26299
HAHN, E. J.
Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415
HAILE, B. W.
A laboratory mock-up ultrasonic inspection system for composites
A82-35256
HALFORD, G. R.
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981
HALL, J. T.
Advanced target acquisition and tracking concepts for real time applications
N82-27305
HALLER, R. L.
F-16 active flutter suppression program
A82-37947
HALLUM, M. M., III
Quasilinearization solution of the proportional navigation problem
[AD-A113668] N82-27273
HALWES, D. R.
Total main rotor isolation system
[AHS PREPRINT 81-15] A82-37787
HAM, N. D.
A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression
A82-37765
A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation
[AHS PREPRINT 81-12] A82-37785
HAMILTON, C.
Adaptive multifunction sensor concept for air-ground missions
N82-27299
HAMILTON, W. G.
Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints
A82-37080
HAMILTON, H. W.
Army helicopter crew seat vibration - Past performance, future requirements
[AHS PREPRINT 81-3] A82-37779
HAMMOND, C. E.
Quantification of helicopter vibration ride qualities
A82-37767
HANEY, H. P.
A-7 transonic wing designs
A82-35562
HANKS, M. L.
Limited artificial and natural icing tests production UH-60A helicopter (re-evaluation)
[AD-A112582] N82-26287
HANNAN, W.
Interim review of the Energy Efficient Engine /E3/ Program
[ASME PAPER 82-GT-271] A82-35447
HANSMAN, R. J., JR.
Microwave ice prevention
N82-26203
HANSON, D. C.
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236

HANSON, G. R.
Integrated flight trajectory control
[AD-A110998] N82-26319
HARDING, K. G.
Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques
A82-36999
HARDY, G. H.
Flight experiments using the front-side control technique during piloted approach and landing in a powered lift STOL aircraft
[NASA-TM-81337] N82-26314
HARRIS, N. J.
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation
[AD-A111430] N82-26321
HARVEY, K. A., JR.
The Schladitz fuel injector: An initial performance evaluation without burning
[AD-A113612] N82-27315
HASLIM, L. A.
General purpose research rotor
[AHS PREPRINT 81-9] A82-37777
HAUCK, D.
Advanced training techniques using computer generated imagery
[AD-A111979] N82-28007
HAUPT, U.
Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry
[ASME PAPER 82-GT-34] A82-35295
HAUSKNECHT, D. J.
Field test of an in stack diffusion classifier on an aircraft engine test cell
[AD-A113811] N82-27326
HAY, N.
Effect of crossflows on the discharge coefficient of film cooling holes
[ASME PAPER 82-GT-147] A82-35371
HAYES, P. C., JR.
Kovats indices as a tool in characterizing hydrocarbon fuels in temperature programmed glass capillary gas chromatography. Part 1: Qualitative identification
[AD-A111389] N82-26400
HAYMANN-HABER, G.
A mixed-flow cascade passage design procedure based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351
HEAPS, M. G.
The effect of ionospheric variability on the accuracy of high frequency position location
[AD-A107425] N82-26274
HEARD, T. C.
Accuracy expectations for gas turbine and centrifugal compressor performance testing
[ASME PAPER 82-GT-128] A82-35358
HEGNA, H. A.
The numerical solution of the Navier-Stokes equations for incompressible turbulent flow over airfoils
[AD-A111279] N82-26612
HEISING, B.
Influence of contrast on spatial perception in TV display of moving images
[FB-50] N82-27609
HELMS, H. E.
Ceramic components for automotive and heavy duty turbine engines - CATE and AGT 100
[ASME PAPER 82-GT-253] A82-35432
HEMBREY, J. H.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743
HENNE, P. A.
Applied computational transonics - Capabilities and limitations
A82-35566
HENSLEY, A. L.
Evaluation of hydrocracking catalysts for conversion of whole shale oil into high yields of jet fuels
[AD-A112820] N82-27523
HERBERT, C. R.
CFC drive shaft and GFC coupling for the tail rotor of the BO 105
A82-37766
HERMANN, W. M.
Electronic control for small engines
[AIAA PAPER 82-1126] A82-37688
Reliability design study for a fault-tolerant electronic engine control
[AIAA PAPER 82-1129] A82-37689
HERTEL, J. E.
Instrument failure detection in partially observable systems
A82-37380
HETHERINGTON, R.
The calculation of deviation angle in axial-flow compressor cascades
[ASME PAPER 82-GT-230] A82-35412
HIGGINS, A. H.
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216
HILL, R. V. K.
Acoustic emission in jet engine fan blades
A82-35257
HILL, H. L.
Influence of meteorological processes on the verticality of electric fields
[AD-A111549] N82-26897
HINDSON, W. S.
Flight experiments using the front-side control technique during piloted approach and landing in a powered lift STOL aircraft
[NASA-TM-81337] N82-26314
HINSON, B. L.
Transonic design using computational aerodynamics
A82-35560
HINSON, M. L.
A series of airfoils designed by transonic drag minimization for Gates Learjet aircraft
A82-35565
HIPP, B. J.
Accuracy expectations for gas turbine and centrifugal compressor performance testing
[ASME PAPER 82-GT-128] A82-35358
HIRSCHBEIN, M. S.
Structural dynamics of shroudless, hollow, fan blades with composite in-lays
[ASME PAPER 82-GT-284] A82-35456
Bird impact analysis package for turbine engine fan blades
[NASA-TM-82831] N82-26701
HIRSCHKRON, R.
Advanced turboprop engines for long endurance naval patrol aircraft
[ASME PAPER 82-GT-217] A82-35404
HODGE, I. S.
Digital spectral analysis of the noise from short duration impulsively started jets
A82-36191
HOEIJMAKERS, H. W. M.
On the vortex flow over delta and double-delta wings
[AIAA PAPER 82-0949] A82-37466
HOELZER, C. A.
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278
HOFFER, S.
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326
HOHENEMSER, K. H.
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822
HOKE, F. E., JR.
Optimal placement model for the B-52G weapons system trainer
[AD-A110977] N82-26323
HOLLENBAUGH, D. D.
Quantification of helicopter vibration ride qualities
A82-37767
HOLLISTER, W.
Microwave ice prevention
N82-26203
HOLT, J. L.
Turbine stage heat flux measurements
[AIAA PAPER 82-1289] A82-35102

HONG, K. C.
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives
[NASA-CR-165839] N82-26465

HOPKINS, F.
Benefit cost analysis of the aircraft energy efficiency program
[NASA-CR-169116] N82-27280

HOROWITZ, S. J.
Acoustic properties of turbofan inlets
[NASA-CR-169016] N82-27090

HORTON, F. G.
Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388

HORTON, R. R.
EAGLE - An interactive engine/airframe life cycle cost model
[ASME PAPER 82-GT-56] A82-35311

HOVANESSIAN, S. A.
Medium PRF performance analysis
A82-37378

HOWES, H. R.
General purpose research rotor
[AHS PREPRINT 81-9] A82-37777

HOWLETT, J. J.
Adaptive fuel control feasibility investigation for helicopter applications
[ASME PAPER 82-GT-205] A82-35400

HRACH, F. J.
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678

HRENCECIN, D. E.
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337

HRITZ, R. J.
Maintenance training simulator design and acquisition: ISD-derived training equipment design
[AD-A110871] N82-26221
Maintenance training simulator design and acquisition: Handbook of ISB procedures for design and documentation
[AD-A111430] N82-26321

HSIEH, T.
Comparison of numerical results and measured data for smooth and indented nosetips
[AD-A111794] N82-26619

HUGGINS, G.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

HULL, R.
Development of a helicopter rotor/propulsion system dynamics analysis
[AIAA PAPER 82-1078] A82-34997

HUNT, B.
Thrust reverser induced flow interference on tactical aircraft stability and control
[AIAA PAPER 82-1133] A82-37693

HUNTER, I. H.
Casing wall boundary-layer development through an isolated compressor rotor
[ASME PAPER 82-GT-18] A82-35287

HURLEY, C. D.
Carbon formation by the pyrolysis of gas turbine fuels in preflame regions of gas turbine combustors
[ASME PAPER 82-GT-84] A82-35330

HURLICH, A.
Strategic materials - Technological trends
A82-37972

HUSSEY, D. W.
Wide angle raster head up display design and application to future single seat fighters
N82-27304

HUSTON, W.
Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR
[NASA-CR-169031] N82-26263

I

IANNUZZELLI, R. J.
Cryogenic turbine testing
[ASME PAPER 82-GT-113] A82-35346

IBRAHIM, I.
Effects of high voltage transmission lines on non-directional beacon performance
[AD-A112311] N82-27261

IMBROGNO, S. L.
Aircraft fire safety research with antimisting fuels - Status report
[AIAA PAPER 82-1235] A82-35076

INNIS, R. C.
Flight experiments using the front-side control technique during piloted approach and landing in a powered lift STOL aircraft
[NASA-TM-81337] N82-26314

ISHII, A.
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290

ISMAILOVA, L. G.
Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel
A82-36673

J

JACKSON, T.
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710

JACOB, H. G.
Optimization of blade pitch angle for higher harmonic rotor control
A82-37776

JAMISON, J. C.
Transport engine control design
[AIAA PAPER 82-1076] A82-34996

JANJUA, S. I.
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710

JANSEN, M.
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors
[ASME PAPER 82-GT-102] A82-35339

JASUJA, A. K.
Plain-jet airblast atomization of alternative liquid petroleum fuels under high ambient air pressure conditions
[ASME PAPER 82-GT-32] A82-35293

JAY, R. L.
Aerodynamically induced vibration
[AD-A110493] N82-26306

JENKINS, R. M.
A comprehensive method for preliminary design optimization of axial gas turbine stages
[AIAA PAPER 82-1264] A82-35091

JEWELL, W. F.
Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator
[AD-A112466] N82-27324

JEX, H. R.
Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator
[AD-A112466] N82-27324

JEZIERSKI, C. R.
Microwave Landing System flare subsystem test
[AD-A107327] N82-27263

JIANG, H.-K.
Semi-empirical analysis of liquid fuel distribution downstream of a plain orifice injector under cross-stream air flow
[ASME PAPER 82-GT-16] A82-35285

JIANG, T.
Improved vane-island diffusers at high swirl
[ASME PAPER 82-GT-68] A82-35318

JOHANNESEN, N. H.
Digital spectral analysis of the noise from short duration impulsively started jets
A82-36191

JOHNSON, J. L., JR.
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics
[NASA-TP-2011] N82-26217

JOHNSON, M. W.
Secondary flow mixing losses in a centrifugal impeller
[ASME PAPER 82-GT-44] A82-35302
The influence of flow rate on the wake in a centrifugal impeller
[ASME PAPER 82-GT-45] A82-35303

JOHNSON, P. M.
Multiple aircraft tracking system for coordinated research missions
A82-35869

JOHNSTON, E. A.
Thrust reverser for a long duct fan engine
[NASA-CASE-LEW-13199-1] N82-26293

JONAS, F. M.
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216

JONES, C.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

JONES, R.
General purpose research rotor
[AHS PREPRINT 81-9] A82-37777
Determination of in-flight helicopter loads and vibration
[AHS PREPRINT 81-7] A82-37782

JONES, T. V.
The effect of temperature ratios on the film cooling process
[ASME PAPER 82-GT-305] A82-35470

JONIO, A.
Practical application of a computerized flight by flight fatigue test system
A82-37760

JUMPER, E. J.
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216

K

KAHANEK, V.
A method for observing the deterioration of airframe life in operational conditions
A82-37123

KAMMAN, J. H.
Propulsion system requirements for advanced fighter aircraft
[AIAA PAPER 82-1143] A82-35025

KAPLAN, L.
Benefit cost analysis of the aircraft energy efficiency program
[NASA-CR-169116] N82-27280

KARAMCHETI, K.
The annoyance of impulsive helicopter noise
[NASA-CR-169123] N82-28134

KARMARKAR, J.
Real-time simulation of an airborne radar for overwater approaches
[NASA-CR-166293] N82-26262

KARPIN, E. B.
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874

KASAI, N.
The effect of inlet distortion on the performance characteristics of a centrifugal compressor
[ASME PAPER 82-GT-92] A82-35335

KASEMIR, H. W.
Triggered lightning
A82-35727
Airborne warning systems for natural and aircraft-initiated lightning
A82-35729

KATZ, U.
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface
[AD-A107441] N82-27436

KAUFFMAN, R. E.
Research and development on wear metal analysis
[AD-A112100] N82-26446
Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program
[AD-A113809] N82-27512

KAUFMAN, A.
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981

KAWAI, R. T.
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678

KEELEY, K. R.
Investigation of the transonic calibration characteristics of turbine static pressure probes
[ASME PAPER 82-GT-280] A82-35454

KELLER, W. F.
Selection of a starting system for a low cost single engine fighter aircraft
[AIAA PAPER 82-1043] A82-34977

KEMPF, J. H.
Air Force Academy aeronautics digest: Spring/summer 1981
[AD-A112421] N82-27216

KENWORTHY, M. J.
A procedure for evaluating fuel composition effects on combustor life
[ASME PAPER 82-GT-296] A82-35465

KERCHER, D. M.
A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336

KEYSER, D. R.
Reliability and maintainability analysis of fluidic back-up flight control system and components
[AD-A110496] N82-27320

KILROY, K. L.
A unified approach to helicopter NASTRAN modeling
[AHS PREPRINT 81-22] A82-37793

KIM, S.
Scaling effects on leakage losses in labyrinth seals
[ASME PAPER 82-GT-157] A82-35380

KINDERVATER, C.
Quasi-static and dynamic crushing of energy absorbing materials and structural components with the aim of improving helicopter crashworthiness
A82-37769

KING, S. P.
Assessment of the dynamic response of a structure when modified by the addition of mass, stiffness or dynamic absorbers
[AHS PREPRINT 81-18] A82-37790

KIRKER, T. J.
Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388

KISH, J.
Selecting the best reduction gear concept for prop-fan propulsion systems
[AIAA PAPER 82-1124] A82-35020

KITAHARA, K.
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290

KLUEG, E. P.
Aircraft fire safety research with antimisting fuels - Status report
[AIAA PAPER 82-1235] A82-35076

KNIAT, J.
Transport engine control design
[AIAA PAPER 82-1076] A82-34996

KNUTSON, W. K.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

KONVALINKA, R. J.
The Sortie-Generation Model system. Volume 2: Sortie-Generation Model user's guide
[AD-A110898] N82-26223
The Sortie-Generation Model system. Volume 4: Sortie-Generation Model programmers manual
[AD-A110899] N82-26224

KOONTZ, S.
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088

KOSLOW, S.
The Flight Service Automation System (FSAS) system benchmark. Volume 1: Summary, introduction and concepts
[PB82-143538] N82-27277

KOSSA, S. S.
The effect of journal misalignment on the oil-film forces generated in a squeeze-film damper
[ASME PAPER 82-GT-285] A82-35457

KOST, F. H.
The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine
[ASME PAPER 82-GT-63] A82-35315

KOTZUR, J.
Conversion of centrifugal compressor performance curves considering non-similar flow conditions
[ASME PAPER 82-GT-42] A82-35300

KREIFELDT, J. G.
Justification for, and design of, an economical programmable multiple flight simulator
A82-36969

KUENKLER, H.
Individual bypass throttling in fighter engines
[AIAA PAPER 82-1285] A82-35100

KUHLBERG, J. F.
Transport engine control design
[AIAA PAPER 82-1076] A82-34996

KUHN, T. E.
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044

KUMAR, N.
An unbiased analysis of the Doppler coordinate systems
[AD-A110510] N82-26269

KUNZ, D. L.
A nonlinear response analysis for coupled rotor-fuselage systems
[AHS PREPRINT 81-23] A82-37794

KUO, C.-H.
Comprehensive analysis of an axial compressor test with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323

L

LADNER, R. W.
Mechanical wear assessment of helicopter engines by ferrography
[AD-A110772] N82-26305

LAFLEN, J. H.
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981

LAHTI, D. J.
Investigation of subsonic nacelle performance improvement concept
[AIAA PAPER 82-1042] A82-37676

LAM, P.
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462

LAMBERT, N.
The computerized cockpit for the one-man crew
A82-36937

LAMPARD, D.
Effect of crossflows on the discharge coefficient of film cooling holes
[ASME PAPER 82-GT-147] A82-35371

LANDER, H. R., JR.
Jet fuel from shale oil: The 1981 technology review
[AD-A111217] N82-26484

LANGFORD, R. W.
Investigation of the transonic calibration characteristics of turbine static pressure probes
[ASME PAPER 82-GT-280] A82-35454

LARJOLA, J.
Transient simulation of gas turbines including the effects of heat capacity of the solid parts
[ISBN-951-752-496-X] N82-26296

LASAGNA, P. L.
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8
[AIAA PAPER 82-1120] A82-35017

LAVID, M.
Radiation/catalytic augmented combustion
[AD-A112376] N82-27434

LAWSON, V. W.
Design concepts of an advanced propulsion monitoring system
[AIAA PAPER 82-1130] A82-37690

LAYTON, D. M.
Proposed research tasks for the reduction of human error in naval aviation mishaps
[AD-A112339] N82-27241

LEATHERWOOD, J. D.
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018

LEAVITT, L. D.
Static internal performance characteristics of two thrust reverser concepts for axisymmetric nozzles
[NASA-TP-2025] N82-26235

LEE, T.
Test and evaluation of the airport radar wind shear detection system
[AD-A112663] N82-27924

LEFEBVRE, A. H.
Influence of airblast atomizer design features on mean drop size
[AIAA PAPER 82-1073] A82-34993

LEFFLER, M. F.
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236

LEHMANN, G.
Optimization of blade pitch angle for higher harmonic rotor control
A82-37776

LENNARD, D. J.
Performance improvement features of General Electric turbofan engines
[ASME PAPER 82-GT-270] A82-35446

LEVIN, D.
Chordwise and compressibility corrections for arbitrary planform slender wings
A82-37931

LEVINE, L.
Application of high bypass turbofan computer simulation to flight and test data processing
[ASME PAPER 82-GT-141] A82-35366

LEWIS, W.
Test and evaluation of the airport radar wind shear detection system
[AD-A112663] N82-27924

LI, K.-M.
Effect of the rear stage casing treatment on the overall performance of a multistage axial-flow compressor
[ASME PAPER 82-GT-110] A82-35344

LILLEY, D. G.
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710

LILLEY, R. W.
A Loran-C prototype navigation receiver for general aviation
N82-26207

A Loran-C prototype navigation receiver for general aviation
N82-26208

A Loran-C prototype navigation receiver for general aviation
[NASA-CR-169118] N82-27259

LIN, S. H.
Wind tunnel measurements of three-dimensional wakes of buildings
[NASA-CR-3565] N82-26921

LITCHFIELD, M. R.
Heat transfer measurements of a transonic nozzle guide vane
[ASME PAPER 82-GT-247] A82-35426

LITTLE, B. H., JR.
An experimental investigation of S-duct diffusers for high-speed propfans
[AIAA PAPER 82-1123] A82-35019

LITTLEFIELD, J. A.
  The P-POD Project
  N82-26202
LIU, C. H.
  Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes
  [AIAA PAPER 82-0951] A82-37467
LOEVE, N.
  A planning system for F-16 air-to-surface missions
  N82-27297
LOFTUS, P. J.
  The effect of temperature ratios on the film cooling process
  [ASME PAPER 82-GT-305] A82-35470
LOGAN, E., JR.
  Wind tunnel measurements of three-dimensional wakes of buildings
  [NASA-CR-3565] N82-26921
LOHMANN, R. P.
  NASA Broad Specification Fuels Combustion Technology program - Pratt and Whitney Aircraft Phase I results and status
  [AIAA PAPER 82-1088] A82-34999
LORELL, M.
  Preplanned product improvement and other modification strategies: Lessons from past aircraft modification programs
  [AD-A113599] N82-27220
LORENZ, W.
  PMUX - The interface for engine data to AIDS
  [AIAA PAPER 82-1127] A82-35022
LORES, M. E.
  Transonic design using computational aerodynamics
  A82-35560
LORINCZ, D.
  Thrust reverser induced flow interference on tactical aircraft stability and control
  [AIAA PAPER 82-1133] A82-37693
LOUIS, J. F.
  Heat transfer in turbines
  [AD-A111584] N82-26307
LOVERING, P. B.
  Simulation report: Advanced display for complex flight trajectories
  [AD-A111259] N82-26320
LOZZA, G.
  On the influence of the number of stages on the efficiency of axial-flow turbines
  [ASME PAPER 82-GT-43] A82-35301
LUBIN, G.
  Application and testing of metallic coatings on graphite/epoxy composites
  A82-37074
  Efficient part removal processes
  A82-37097
LUDLUM, B. R.
  A balanced active antenna and impulse noise blanket system for the Raydist T radio navigation receiver
  [AD-A114074] N82-27275
LUEBBERS, R.
  Effects of high voltage transmission lines on non-directional beacon performance
  [AD-A112311] N82-27261
LUNDGREN, D. A.
  Field test of an in stack diffusion classifier on an aircraft engine test cell
  [AD-A113811] N82-27326
LYALL, J. P.
  The Worldwide Navigational Warning Service
  [AD-A107372] N82-26276
LYNCH, F. T.
  Commercial transports - Aerodynamic design for cruise performance efficiency
  A82-35555

M

MACBAIN, J. C.
  Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques
  A82-36999
MACCHI, E.
  On the influence of the number of stages on the efficiency of axial-flow turbines
  [ASME PAPER 82-GT-43] A82-35301
MACDONALD, G.
  Justification for, and design of, an economical programmable multiple flight simulator
  A82-36969
MACKALL, K. G.
  In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8
  [AIAA PAPER 82-1120] A82-35017
  Flight evaluation of a digital electronic engine control system in an F-15 airplane
  [AIAA PAPER 82-1080] A82-37683
MACKENZIE, F. D.
  Certification of an airborne Loran-C navigation system
  A82-35876
MADERO, R. P.
  Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 1: Results
  [AD-A110956] N82-26290
  Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design
  [AD-A110954] N82-26291
MAFFIOLI, G. C.
  R & D on composite rotor blades at Agusta
  A82-37764
MAGDALENO, R. E.
  Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator
  [AD-A112466] N82-27324
MAGNUSSON, A.
  Comparison of different fighter aircraft load spectra
  [FFA-TN-1982-02] N82-27288
MAHDY, M. A. M.
  Atomization quality of twin fluid atomizers for gas turbines
  [ASME PAPER 82-GT-61] A82-35314
MAJUMDAR, B.
  Mechanical property characterization and modeling of structural materials
  [AD-A113841] N82-27784
MANCINI, H. J.
  Tactical systems approach to interdiction of 2nd echelon moving targets using real time sensors
  N82-27306
MANTER, J. E.
  Prediction of cruise missile inlet peak instantaneous distortion patterns from steady state and turbulence data using a statistical technique
  [AIAA PAPER 82-1085] A82-37685
MANUEL, J.
  Transportation noise, its impact, planning and regulation
  [S-258] N82-27864
MARDANOV, M. A.
  Evaluating the effectiveness of hydrorefining of the low-stability component of T-1 fuel
  A82-36673
MAREK, C. J.
  Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
  [AIAA PAPER 82-1072] A82-34992
MARGOLIS, D. L.
  Semi-active fluid inertia - A new concept in vibration isolation
  [AHS PREPRINT 81-17] A82-37789
MARINELLIE, R. R.
  Digital image processing for acquisition, tracking, hand off and ranging
  N82-27303
MARKOWSKI, M. A.
  Ultralight airplanes
  A82-35233
MARPLE, D. T. F.
  Optical tip clearance sensor for aircraft engine controls
  [AIAA PAPER 82-1131] A82-37691
MARSHALL, A. R., JR.
  Airworthiness and flight characteristics test of an OH-58C configured to a Light Combat Helicopter (LCH)
  [AD-A112581] N82-26266

MASHINO, T.
On the performance prediction of a centrifugal compressor scaled up
[ASME PAPER 82-GT-112] A82-35345

MASKEW, B.
Flows over wings with leading-edge vortex separation
[NASA-CR-165858] N82-26238

MASUDA, S.
The effect of inlet distortion on the performance characteristics of a centrifugal compressor
[ASME PAPER 82-GT-92] A82-35335

MATROSOVA, L. V.
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874

MATTHEWS, G. B.
The Schladitz fuel injector: An initial performance evaluation without burning
[AD-A113612] N82-27315

MAY, P.
Aerodynamic investigations to determine possible ice flight paths
[NASA-TM-76648] N82-27235

MAYES, W. H.
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077

MCARTHUR, D.
AUTOPILOT: A distributed planner for air fleet control
[AD-A107139] N82-27269

MCCALL, D. L.
A Loran-C prototype navigation receiver for general aviation
N82-26207
A Loran-C prototype navigation receiver for general aviation
N82-26208
A Loran-C prototype navigation receiver for general aviation
[NASA-CR-169118] N82-27259

MCCARTHY, R. F.
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678

MCCLOUD, J. L., III
Considerations of open-loop, closed-loop, and adaptive multicyclic control systems
[AHS PREPRINT 81-13] A82-37786

MCFARLAND, R. H.
Investigation of air transportation technology at Ohio University, 1981
N82-26204

MCGOVERN, W.
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392

MCHENRY, W. K.
Software technology transfer and export control
[AD-A106869] N82-28017

MCINTIRE, W. L.
Next generation turboprop gearboxes
[ASME PAPER 82-GT-236] A82-35418

MCKNIGHT, R. L.
Turbine blade nonlinear structural and life analysis
[AIAA PAPER 82-1056] A82-34981

MCLAUGHLIN, D. K.
Turbulence measurements in a confined jet using a six-orientation hot-wire probe technique
[AIAA PAPER 82-1262] A82-37710

MCLEAN, A. F.
Ceramic turbine housings
[ASME PAPER 82-GT-293] A82-35463

MCLEAN, J. B.
Software technology transfer and export control
[AD-A106869] N82-28017

MCNAMARA, J.
Integrated aircraft avionics and powerplant control and management systems
[ASME PAPER 82-GT-165] A82-35385

MELLIAR-SMITH, P. M.
Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system
A82-37446

MELLOR, A. M.
Numerical and experimental examination of a prevaporized/premixed combustor
[AIAA PAPER 82-1074] A82-34994
A spark ignition model for liquid fuel sprays applied to gas turbine engines
A82-37220

MENDEZ, A. J.
Pave Mover aided integrated strike avionics system
N82-27298

MERCER, C.
Transonic wind tunnel test of a supersonic nozzle installation
[AIAA PAPER 82-1045] A82-37677

MERHID, C. P.
Mechanical wear assessment of helicopter engines by ferrography
[AD-A110772] N82-26305

MERKLEY, D. J.
Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770

MESSINGER, R. H.
Advanced concepts for composite structure joints and attachment fittings. Volume 2: Design guide
[AD-A111106] N82-26280

METOCHIANAKIS, M. E.
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface
[AD-A107441] N82-27436

MICHEL, G. W.
The effect of coolant flow on the efficiency of a transonic HP turbine profile suitable for a small engine
[ASME PAPER 82-GT-63] A82-35315

MICHLER, F. A.
System Description-Aviation Wide-Angle Visual System (AWAVS) computer image
[AD-A111800] N82-27323

MIKKELSON, D. C.
Summary and recent results from the NASA advanced High Speed Propeller Research Program
[NASA-TM-82891] N82-26219

MILLER, R.
Simulation report: Advanced display for complex flight trajectories
[AD-A111259] N82-26320

MILLS-GOODLET, R. P.
Adaptive multifunction sensor concept for air-ground missions
N82-27299

MIRANDA, L. R.
Evaluation of full potential flow methods for the design and analysis of transport wings
A82-35567

MITCHELL, G. A.
Summary and recent results from the NASA advanced High Speed Propeller Research Program
[NASA-TM-82891] N82-26219

MIXSON, J. S.
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018

MONFORT, S.
An accurate Doppler navigator with microwave simplicity
A82-37037

MONGIA, H. C.
Small turbine engine augmentor design methodology
[AIAA PAPER 82-1179] A82-35044

MONTASER, M. E.
Atomization quality of twin fluid atomizers for gas turbines
[ASME PAPER 82-GT-61] A82-35314

MOORE, J.
Secondary flow mixing losses in a centrifugal impeller
[ASME PAPER 82-GT-44] A82-35302
The influence of flow rate on the wake in a centrifugal impeller
[ASME PAPER 82-GT-45] A82-35303

MORLAND, D. V.
System Description-Aviation Wide-Angle Visual System (AWAVS) computer image
[AD-A111800] N82-27323

MORRISON, T.
Adaptive fuel control feasibility investigation for helicopter applications
[ASME PAPER 82-GT-205] A82-35400

MORROW, H. L.
Small engine inlet air particle separator technology
[ASME PAPER 82-GT-40] A82-35299

MOSES, C. A.
Fuel microemulsions for jet engine smoke reduction
[ASME PAPER 82-GT-33] A82-35294
An alternate test procedure to qualify future fuels for Navy aircraft
[AIAA PAPER 82-1233] A82-36175

MOSS, R. W.
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 1: Results
[AD-A110956] N82-26290
Tanker Avionics/Aircrew Complement Evaluation (TAACE). Phase 1: Simulation evaluation. Volume 2: Crew system design
[AD-A110954] N82-26291

MOUZAKIS, T.
Monofilar - A dual frequency rotorhead absorber
[AHS PREPRINT 81-20] A82-37791

MUELLER, A.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

MULHOLLAND, R. G.
Design and implementation of efficient algorithms for automatic determination of corrected slant range
[AD-A112248] N82-27267

MULUKUTLA, A. R.
Design concepts of an advanced propulsion monitoring system
[AIAA PAPER 82-1130] A82-37690

MURPHY, D. F.
A laboratory evaluation of the suitability of a xenon flashtube signal as an aid-to-navigation
[AD-A110729] N82-26265

MURPHY, K. P.
Assessment of lightning simulation test techniques, part 1
[AD-A112626] N82-27663

MYERS, D.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

MYERS, L. P.
Flight evaluation of a digital electronic engine control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683

MYRABO, L. N.
A concept for light-powered flight
[AIAA PAPER 82-1214] A82-35067

N

NAEGELI, D. W.
Fuel microemulsions for jet engine smoke reduction
[ASME PAPER 82-GT-33] A82-35294

NAGY, B. J.
Improved methods in ground vibration testing
[AHS PREPRINT 81-6] A82-37781

NANEVICZ, J. E.
Static charging and its effects on avionic systems
A82-35732

NAPIER, J. C.
Demonstration of ceramic hot-section static components in a radial flow turbine
[ASME PAPER 82-GT-184] A82-35392

NAUGLE, D. F.
Control of air pollution from aviation: The emission standard setting process
[AD-A107435] N82-27869

NAVANEETHAN, R.
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088

NETZER, D. W.
Modeling solid-fuel Ramjet combustion including radiation heat transfer to the fuel surface
[AD-A107441] N82-27436

NEUVE EGLISE, M.
The DRAPO system - Materials means and logic functions
A82-37521

NEWIRTH, D. M.
Transport engine control design
[AIAA PAPER 82-1076] A82-34996

NEWSOM, J. R.
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703

NEWSOM, W. A., JR.
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics
[NASA-TP-2011] N82-26217

NEWTON, D. H.
Lear Fan 2100 egress system
A82-37970

NICHOLSON, J. H.
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469

NORTON, R. J. G.
Heat transfer measurements of a transonic nozzle guide vane
[ASME PAPER 82-GT-247] A82-35426

NORWOOD, R.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

NOVACKI, S. M., III
A prototype interface unit for microprocessor-based Loran-C receiver
N82-26210

NOVAK, R. A.
A mixed-flow cascade passage design procedure based on a power series expansion
[ASME PAPER 82-GT-121] A82-35351

NUGENT, J.
Selected results of the F-15 propulsion interactions program
[AIAA PAPER 82-1041] A82-34976

NUNN, R. H.
A result in the theory of spiral search
[AD-A112481] N82-27262

NYSTROM, R. G.
The Flight Service Automation System (FSAS) system benchmark. Volume 1: Summary, introduction and concepts
[PB82-143538] N82-27277

O

OCH, F.
Ageing of composite rotor blades
A82-37771

ODGERS, J.
Acoustic control of dilution-air mixing in a gas turbine combustor
[ASME PAPER 82-GT-35] A82-35296

OFFI, D. L.
Test and evaluation of the airport radar wind shear detection system
[AD-A112663] N82-27924

OHNABE, H.
Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413

OIRSEN, J.
An analysis of selected enhancements to the en route central computing complex
[AD-A113575] N82-28044

OLDFIELD, M. L. G.
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469

OLSSON, W. J.
Performance deterioration due to acceptance testing and flight loads; JT9D jet engine diagnostic program
[NASA-CR-165572] N82-27309

OMALLEY, T. J.
Depot support of gas turbine engines
[AD-A107141] N82-27217

ONEIL, F. J.
Extension of FLO codes to transonic flow prediction for fighter configurations
A82-35564

ONEILL, T.
Mobility fuels for the Navy
[AD-A112511] N82-26805

ONKEN, R.
Traffic flow control in the Frankfurt/Main airport area
A82-37526
ORRELL, E. M., III
Aviation Materiel Combat Ready In-Country (AMCRIC)
[AD-A107451] N82-27283
OSHER, J. G.
Life and Utilization Criteria Identification In Design (LUCID), volume 1
[AD-A111939] N82-26309
Life and Utilization Criteria Identification In Design (LUCID), volume 2
[AD-A111940] N82-26310
OSTERGREN, W. J.
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337
OSTERMAYER, R.
Torsional stiffness element based on cobalt-samarium magnets
[BMFT-FB-W-81-044] N82-27292

P

PADOVAN, J.
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462
PALLADINO, J. A.
Solution to a bistable vibration problem using a plain, uncentralized squeeze film damper bearing
[ASME PAPER 82-GT-281] A82-35455
PALMER, J. R.
TURBOTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396
PANARAS, J.
Dynamic scheduling of runway operations
N82-26200
PARENTI, G.
Practical application of a computerized flight by flight fatigue test system
A82-37768
PARK, D. K.
Simulation report: Advanced display for complex flight trajectories
[AD-A111259] N82-26320
PARKER, G. R.
A unified approach to helicopter NASTRAN modeling
[AHS PREPRINT 81-22] A82-37793
PARKER, L. W.
Airborne warning systems for natural and aircraft-initiated lightning
A82-35729
PARKES, J. P.
An approach to software for high integrity applications
[ASME PAPER 82-GT-251] A82-35430
PARKOLA, S.
Charting propulsion's future - The ATES results
[AIAA PAPER 82-1139] A82-35023
PAULON, J.
Influence of casing treatment on the operating range of axial compressors
[ASME PAPER 82-GT-103] A82-35340
PAYNTER, G. C.
CFD technology for propulsion installation design - Forecast for the 80's
[ASME PAPER 82-GT-21] A82-35289
Current status of inlet flow prediction methods
[AD-A111784] N82-26311
PEACOCK, R. E.
Blade tip gap effects in turbomachines: A review
[AD-A111892] N82-26308
PEARSALL, L. A.
Final regulatory evaluation: Metropolitan Washington Airports Policy
[AD-A110583] N82-26324
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326
PEAT, A. R.
Thermal decomposition of aviation fuel
[ASME PAPER 82-GT-27] A82-35292
PEAVEY, C. C.
Applied computational transonics - Capabilities and limitations
A82-35566
PELOUBET, R. P., JR.
F-16 active flutter suppression program
A82-37947
PELPOR, D. S.
Gyro systems (selected pages)
[AD-A113748] N82-27271
PERALA, R. A.
Electromagnetic interaction of lightning with aircraft
A82-35731
PERDICHIZZI, A.
On the influence of the number of stages on the efficiency of axial-flow turbines
[ASME PAPER 82-GT-43] A82-35301
PERELMAN, R. G.
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874
PERKINS, T. O., III
C band spectral tracking for FM/CW altimetry
A82-37035
PERRY, B.
Marine Air Traffic Control and Landing System (METCALS) investigation
[AD-A113047] N82-27276
PERRY, B. I.
An analytical study of turbulence responses, including horizontal tail loads, of a control configured jet transport with relaxed static stability
N82-26313
PERRY, B., III
Comparison of analytical and wind-tunnel results for flutter and gust response of a transport wing with active controls
[NASA-TP-2010] N82-26703
PERRY, M. S.
Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402
PERRYMAN, D. C.
Propulsion system requirements for advanced fighter aircraft
[AIAA PAPER 82-1143] A82-35025
PETER, K.
Life-cycle-cost analysis of the microwave landing system ground and airborne systems
[AD-A110909] N82-26266
PETERS, D. A.
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822
PETERS, J. E.
A spark ignition model for liquid fuel sprays applied to gas turbine engines
A82-37220
PETERSON, L. G.
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337
PFEIFER, K.
CFC drive shaft and GFC coupling for the tail rotor of the BO 105
A82-37766
PFEIFER, M.
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326
PHILLIPS, C. L.
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A107384] N82-27260
PIERCE, R. D.
Correcting for turbulence effects on average velocity measurements made using five hole spherical pitot tube probes
[AD-A112573] N82-27290
PINKUS, O.
Liquid particle dynamics and rate of evaporation in the rotating field of centrifugal compressors
[ASME PAPER 82-GT-86] A82-35332
PITZER, E. W.
Kovats indices as a tool in characterizing hydrocarbon fuels in temperature programmed glass capillary gas chromatography. Part 1: Qualitative identification
[AD-A111389] N82-26400

PLUMER, J. A.
The direct effects of lightning on aircraft
A82-35730

PO-CHEDLEY, D. A.
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236

POKORNY, V.
A gust damper
A82-37127

POPE, L. D.
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077

POPPEL, G. L.
Optical tip clearance sensor for aircraft engine controls
[AIAA PAPER 82-1131] A82-37691

POVEROMO, L. M.
Fabrication and test of integrally stiffened graphite/epoxy components
A82-37071

PRATT, W. B.
Advanced stratified charge rotary aircraft engine design study
[NASA-CR-165398] N82-27743

PRIAKHIN, V. V.
The effect of erosion wear on the vibration characteristics of axial-turbine blades
A82-35874

PROCTOR, C. L., II
Numerical and experimental examination of a prevaporized/premixed combustor
[AIAA PAPER 82-1074] A82-34994

PRYDZ, R.
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018

PRZYBYLKO, S. J.
Evaluation of a multivariable control design on a variable cycle engine simulation
[AIAA PAPER 82-1077] A82-37682

PURIFOY, G. R., JR.
Maintenance training simulator design and acquisition: ISD-derived training equipment design
[AD-A110871] N82-26221
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation
[AD-A111430] N82-26321

Q

QUACKENBUSH, T. R.
A simple system for helicopter Individual-Blade-Control and its application to stall flutter suppression
A82-37765
A simple system for helicopter individual-blade-control and its application to stall-induced vibration alleviation
[AHS PREPRINT 81-12] A82-37785

QUILL, G. J.
Net shape components for small gas turbine engines
[ASME PAPER 82-GT-96] A82-35338

R

RABE, D. C.
Acquisition of F-100/3/ high pressure compressor entrance profiles
[ASME PAPER 82-GT-215] A82-35402

RABINOWITZ, M. D.
Experimental evaluation of squeeze film supported flexible rotors
[ASME PAPER 82-GT-233] A82-35415

RAMAN, R. S. V.
Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
[AIAA PAPER 82-1072] A82-34992

RAMESH, V.
Acoustic control of dilution-air mixing in a gas turbine combustor
[ASME PAPER 82-GT-35] A82-35296

RAMOS, C. R.
Helicopter design synthesis
A82-37772

RAMPAL, V. V.
Laser application in weapon guidance and active imaging
A82-35767

RANGANATH, H. S.
Automatic handoff of multiple targets
[AD-A107490] N82-27561

RAO, B. M.
Flows over wings with leading-edge vortex separation
[NASA-CR-165858] N82-26230

RAO, D. M.
Hinged strake aircraft control system
[NASA-CASE-LAR-12860-1] N82-26278

RAPP, G. C.
The F404 development program - A new approach
[AIAA PAPER 82-1180] A82-35045

RAPP, R. H.
The Earth's gravity field to degree and order 180 using SEASAT altimeter data, terrestrial gravity data and other data
[AD-A113098] N82-27900

RASCH, N. O.
Proceedings of the 1st Annual Workshop on Aviation Related Electricity Hazards Associated with Atmospheric Phenomena and Aircraft Generated Inputs
[AD-A107326] N82-27237

RAUTENBERG, M.
Investigation of blade vibration of radial impellers by means of telemetry and holographic interferometry
[ASME PAPER 82-GT-34] A82-35295
Design and investigations of a three dimensionally twisted diffuser for centrifugal compressors
[ASME PAPER 82-GT-102] A82-35339

RAYMOND, E. T.
Design guide for aircraft hydraulic systems and components for use with chlorotrifluoroethylene nonflammable hydraulic fluids
[AD-A112097] N82-26283

RE, R. J.
Static internal performance characteristics of two thrust reverser concepts for axisymmetric nozzles
[NASA-TP-2025] N82-26235

REED, E. J.
EAGLE - An interactive engine/airframe life cycle cost model
[ASME PAPER 82-GT-56] A82-35311

REHMANN, J. T.
Cockpit display of traffic information and the measurement of pilot workload: An annotated bibliography
[AD-A113637] N82-27291

REICHERT, G.
Survey of active and passive means to reduce rotorcraft vibrations
A82-37946

REID, L. D.
STOL aircraft response to turbulence generated by a tall upwind building
A82-35821

RENNISON, D. C.
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077

RENTA, R. L.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317

RENTZ, R. L.
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

REUSCH, A. C.
Test facility and data handling system for the development of axial compressors
[ASME PAPER 82-GT-73] A82-35322

REVELL, J. D.
Interior noise considerations for advanced high-speed turboprop aircraft
[AIAA PAPER 82-1121] A82-35018

RHINE, W. E.
Research and development on wear metal analysis
[AD-A112100] N82-26446

Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program
[AD-A113809] N82-27512

RIBAUD, Y.
Casing treatments on a supersonic diffuser for high pressure ratio centrifugal compressors
[ASME PAPER 82-GT-85] A82-35331

RICE, W. J.
Real time pressure signal system for a rotary engine
[NASA-CASE-LEW-13622-1] N82-26294

RICHARD, G.
The DC-10 Chicago crash and the legality of SFAR 40
A82-37832

RICHERSON, D. W.
Ceramic component development for limited-life propulsion engines
[AIAA PAPER 82-1050] A82-34979

RIDGELY, D. B.
Use of entire eigenstructure assignment with high-gain error-actuated flight control systems
[AD-A111098] N82-26318

RILEY, M. J.
Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770

RINGLAND, R. F.
Reports by Systems Technology, Inc., in support of carrier-landing research in the visual technology research simulator
[AD-A112466] N82-27324

RIZK, N. K.
Influence of airblast atomizer design features on mean drop size
[AIAA PAPER 82-1073] A82-34993

ROBACK, R.
Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307

ROBB, J. D.
The direct effects of lightning on aircraft
A82-35730

ROBINSON, D. K.
Fuselage structure using advanced technology fiber reinforced composites
[NASA-CASE-LAR-11688-1] N82-26384

ROCK, S. M.
Evaluation of a multivariable control design on a variable cycle engine simulation
[AIAA PAPER 82-1077] A82-37682

RODDEN, W. P.
Aerodynamic lag functions, divergence, and the British flutter method
A82-35820

RODGERS, C.
The performance of centrifugal compressor channel diffusers
[ASME PAPER 82-GT-10] A82-35279

RODGERS, J.
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326

ROELKE, R. J.
The effect of rotor blade thickness and surface finish on the performance of a small axial flow turbine
[ASME PAPER 82-GT-222] A82-35409

ROFFE, G.
Experimental study of the effects of secondary air on the emissions and stability of a lean premixed combustor
[AIAA PAPER 82-1072] A82-34992

ROMAN, J. F.
Loran-C plotting program for plotting lines of position on standard charts
N82-26206

ROMEY, R.
Secondary flow effects and mixing of the wake behind a turbine stator
[ASME PAPER 82-GT-46] A82-35304

ROSETTI, C.
Prospects for Navsat - A future worldwide civil navigation-satellite system
A82-36047

ROSFJORD, T. J.
Evaluation of fuel injection configurations to control carbon and soot formation in small GT combustors
[AIAA PAPER 82-1175] A82-35041

ROSKAM, J.
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088

ROUTZAHN, D. L.
An oxygen enriched air system for the AV-8A Harrier
[AD-A112334] N82-27239

ROWEN, W. I.
Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-83] A82-35329

RUDDELL, A. J.
XH-59A ABC technology demonstrator altitude expansion and operational tests
[AD-A111114] N82-27282

RUDOLF, A.
The recognition of air worthiness of aircraft - Comments to a remarkable judicial decision
A82-38025

RUDOLPH, T.
Electromagnetic interaction of lightning with aircraft
A82-35731

RUDY, J. F.
Development and application of Dabber gas tungsten arc welding for repair of aircraft engine, seal teeth
[ASME PAPER 82-GT-55] A82-35310

RUSSELL, J. A.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

RUSSELL, R. E.
Aircraft noise reduction
N82-27281

RUTKOWSKI, M. J.
A finite element analysis of coupled rotor fuselage vibration
[AHS PREPRINT 81-21] A82-37792

RUTLEDGE, R.
An analysis of selected enhancements to the en route central computing complex
[AD-A113575] N82-28044

RYAN, E. W.
Thrust reverser for a long duct fan engine
[NASA-CASE-LEW-13199-1] N82-26293

S

SABA, C. S.
Research and development on wear metal analysis
[AD-A112100] N82-26446
Evaluation of plasma source spectrometers for the Air Force Oil Analysis Program
[AD-A113809] N82-27512

SAFEER, H.
Airfield and airspace capacity/delay policy analysis
[AD-A110777] N82-26326

SAINTSBURY, J. A.
The potential impact of future fuels on small gas turbine engines
[ASME PAPER 82-GT-133] A82-35362

SAKAI, T.
On the performance prediction of a centrifugal compressor scaled up
[ASME PAPER 82-GT-112] A82-35345

SAKATA, M.
Transient vibration of high speed lightweight rotor due to sudden imbalance
[ASME PAPER 82-GT-231] A82-35413

SALVINO, J. T.
Rotor fragment protection program: Statistics on aircraft gas turbine ngine rotor failures that occurred in U.S. commercial aviation during 1978
[NASA-CR-165388] N82-27316

SAMANICH, N. E.
QCSEE under-the-wing engine acoustic data
[NASA-TM-82691] N82-27311

SAMPATH, P.
The potential impact of future fuels on small gas turbine engines
[ASME PAPER 82-GT-133] A82-35362

SAMUELSON, D. A.
Final regulatory evaluation: Metropolitan Washington Airports Policy
[AD-A110583] N82-26324

SANFORD, G. G.
Advanced microstrip antenna developments. Volume 2: Microstrip GPS antennas for general aviation aircraft
[AD-A113620] N82-27568

SANGER, N. L.
The use of optimization techniques to design controlled diffusion compressor blading
[ASME PAPER 82-GT-149] A82-35373

SAPIRO, L.
Effect of impeller extended shrouds on centrifugal compressor performance as a function of specific speed
[ASME PAPER 82-GT-228] A82-35411

SATISH CHANDRA, D. V.
Automatic handoff of multiple targets
[AD-A107490] N82-27561

SATRAN, D. R.
Effects of wing-leading-edge modifications on a full-scale, low-wing general aviation airplane: Wind-tunnel investigation of high-angle-of-attack aerodynamic characteristics
[NASA-TP-2011] N82-26217

SAUNDERS, A. F.
An advanced helicopter engine control system
[ASME PAPER 82-GT-250] A82-35429

SAWTELLE, R. H.
FAA tests on the Navstar GPS Z-set
A82-37039

SCHAFFNER, G.
An accurate Doppler navigator with microwave simplicity
A82-37037

SCHARNHORST, R. K.
Analysis of two-dimensional internal flows using a primitive-variable relaxation Navier-Stokes procedure
[AIAA PAPER 82-1083] A82-34998

SCHILLING, W. F.
Development of hybrid gas turbine bucket technology
[ASME PAPER 82-GT-94] A82-35337

SCHIMMEL, W. P.
Net shape components for small gas turbine engines
[ASME PAPER 82-GT-96] A82-35338

SCHNEIDER, H. J.
Attack and en route avionics for in-weather operations
N82-27300

SCHOFIELD, I. E.
Advanced technology and fighter cockpit design: Which drives which?
N82-27302

SCHRAMM, S. W.
Evaluation of sensitivity of ultrasonic detection of disbonds in graphite/epoxy to metal joints
A82-37080

SCHUETZ, A. J.
The influence of engine characteristics on patrol aircraft life cycle cost optimization
[ASME PAPER 82-GT-256] A82-35433

SCHULTE, R. H.
Lightning simulation and testing
A82-35733

SCHULTZ, D. L.
Heat transfer optimised turbine rotor blades - An experimental study using transient techniques
[ASME PAPER 82-GT-304] A82-35469

SCHUST, A.
Life-cycle-cost analysis of the microwave landing system ground and airborne systems
[AD-A110909] N82-26266

SCHWAB, J. R.
Aerodynamic performance of high turning core turbine vanes in a two-dimensional cascade
[AIAA PAPER 82-1288] A82-37716

SCHWARTZ, H.
Current ADM restraint system status, trade-off constraints and long range objectives for the Maximum Performance Ejection System (MPES)
[AD-A112645] N82-27238

SCHWARTZ, R. L.
Formal specification and mechanical verification of SIFT - A fault-tolerant flight control system
A82-37446

SCHWARZ, K. P.
Gravity induced position errors in airborne inertial navigation
[AD-A113823] N82-27272

SCOTT, J. H.
The Schlafitz fuel injector: An initial performance evaluation without burning
[AD-A113612] N82-27315

SEABRIDGE, A. G.
Integrated aircraft avionics and powerplant control and management systems
[ASME PAPER 82-GT-165] A82-35385

SEASHOLTZ, R. G.
Laser anemometer measurements in an annular cascade of core turbine vanes and comparison with theory
[NASA-TP-2018] N82-26234

SEFER, N. R.
An alternate test procedure to qualify future fuels for Navy aircraft
[AIAA PAPER 82-1233] A82-36175

SEGINER, A.
Chordwise and compressibility corrections for arbitrary planform slender wings
A82-37931

SELEZNEV, A. V.
Assembly of aircraft instruments
A82-36950

SELLERS, R. R.
Control of gas turbine power transients for improved turbine airfoil durability
[AIAA PAPER 82-1182] A82-35047

SELTZER, S. M.
Simplified digital design tools
A82-37034

SENUS, W. J.
Global Positioning System (GPS) geodetic receivers
[AD-A111026] N82-26267

SEREVIN, D.
Computer image generation: Advanced visual/sensor simulation
[AD-A107098] N82-28016

SHA, S.-L.
Comprehensive analysis of an axial compressor test with adjustable guide vanes
[ASME PAPER 82-GT-74] A82-35323

SHEBLYGIN, N. A.
The powerplants of the Yak-40 and M-15 aircraft
A82-36947

SHEVELL, R. S.
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-169027] N82-26279

SHORT, D.
Use of CGHRP in transport
A82-37061

SHURNEY, R. E.
The Marshall Space Flight Center KC-135 zero gravity test program for FY 1981
[NASA-TM-82476] N82-26350

SIGMAN, R. K.
Acoustic properties of turbofan inlets
[NASA-CR-169016] N82-27090

SIMIU, E.
Hurricane-induced wind loads
[PB82-132267] N82-27548

SINGER, R.
A comparative study of narrowband vocoder algorithms in Air Force operational environments using the Diagnostic Rhyme Test
[AD-A112053] N82-26546

SINGLETON, R. E.
Aeropropulsion research for the U.S. Army
[ASME PAPER 82-GT-203] A82-35398

SISTO, F.
The influence of Coriolis forces on gyroscopic motion of spinning blades
[ASME PAPER 82-GT-163] A82-35384

SKEWIS, R. H.
Reliability and maintainability analysis of fluidic back-up flight control system and components
[AD-A110496] N82-27320

SLAY, F. M.
The Sortie-Generation Model system. Volume 6: Spares subsystem
[AD-A110900] N82-26226

SLINEY, H. E.
Performance of PTFE-lined composite journal bearings
[ASLE PREPRINT 82-AM-1A-1] A82-37854

SMEGGIL, J. G.
The effect of NaCl/g/ in high temperature oxidation
[ASME PAPER 82-GT-106] A82-35342

SMITH, D. J.
Digital spectral analysis of the noise from short duration impulsively started jets
A82-36191

SMITH, G. T.
Composite containment systems for jet engines
A82-37062

SMITH, J. A.
Maintenance training simulator design and acquisition: Handbook of ISD procedures for design and documentation
[AD-A111430] N82-26321

SMITH, R. H.
Notes on lateral-directional pilot induced oscillations
[AD-A113996] N82-27322

SMITH, T.
User's manual for the vertical axis wing turbine code VDART2
[DE82-000796] N82-26828

SNYDER, W. D.
Cycle considerations for tactical fighters in the early 1990's
[ASME PAPER 82-GT-259] A82-35436

SO, R. M. C.
A two-dimensional boundary-layer program for turbine airfoil heat transfer calculation
[ASME PAPER 82-GT-93] A82-35336

SOBIECZKY, H.
A computational design method for transonic turbomachinery cascades
[ASME PAPER 82-GT-117] A82-35348

SOBLITZ, D.
Advanced training techniques using computer generated imagery
[AD-A111979] N82-28007

SOKHEY, J. S.
Experimental performance evaluation of 'ventilated mixers' - A new mixer concept for high bypass turbofan engines
[AIAA PAPER 82-1136] A82-37695

SOLOMON, A. S. P.
Investigation of spray characteristics for flashing injection of fuels containing dissolved air and superheated fuels
[NASA-CR-3563] N82-26295

SOLOMON, K.
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270

SOLONIN, S. V.
Aviation meteorology
A82-36972

SOMMER, D. L.
Protection of advanced electrical power systems from atmospheric electromagnetic hazards
[AD-A112612] N82-27658
Protection of electrical systems from EM hazards: Design guide
[AD-A112707] N82-27659

SONG, J. O.
Optimization of compressor vane and bleed settings
[ASME PAPER 82-GT-81] A82-35327

SOPHER, R.
Substructure program for analysis of helicopter vibrations
[AHS PREPRINT 81-24] A82-37795

SPADACCINI, L. J.
Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307

SPANGLER, J. V.
Digital image processing for acquisition, tracking, hand off and ranging
N82-27303

SPANIER, G.
High-speed rotary printing device for air traffic control applications: A preliminary evaluation
[AD-A107325] N82-27264

SPOONER, C. R.
The Flight Service Automation System (FSAS) system benchmark. Volume 1: Summary, introduction and concepts
[PB82-143538] N82-27277
The Flight Service Automation System (FSAS) system benchmark. Volume 2: The model of the application
[PB82-143546] N82-27278
The Flight Service Automation System (FSAS) system benchmark. Volume 3: The vendor interface package
[PB82-143553] N82-27279

SPRAGUE, P. A.
Material and process impact on aircraft engine designs of the 1990's
[ASME PAPER 82-GT-278] A82-35453

SRINIVASAN, A. V.
Dry friction damping mechanisms in engine blades
[ASME PAPER 82-GT-162] A82-35383

STAEBLER, C. J., JR.
Application and testing of metallic coatings on graphite/epoxy composites
A82-37074

STALLONE, M. J.
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982

STANDER, M.
Application and testing of metallic coatings on graphite/epoxy composites
A82-37074

STANGE, W. A.
Analysis of rotating structures using image derotation with multiple pulsed lasers and moire techniques
A82-36999

STARKS, S. A.
Marine Air Traffic Control and Landing System (MATCALS) investigation
[AD-A107384] N82-27260

STEEB, R.
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270

STEHLIN, P.
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and HRSYS
[AD-A112224] N82-27411

STENBERG, R. L.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

STENERSEN, A. A.
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives
[NASA-CR-165839] N82-26465

STENGEL, R. F.
Investigation of air transportation technology at Princeton University, 1981
N82-26212

STEPHENSON, W. B.
Performance of the AEDC Mark 1 Aerospace Environmental Chamber without oil diffusion pumping
[AD-A111406] N82-26322

STEPNIEWSKI, W. Z.
Factors shaping conceptual design of rotary-wing aircraft
A82-37773

STERN, P.
Panel Optimization with Integrated Software (POIS), Volume 2. User instructions: ECHO and HRSYS
[AD-A112224] N82-27411

STEVENAERT, D.
Experimental investigations on the flow in the impeller of a centrifugal fan
[ASME PAPER 82-GT-37] A82-35298

STITT, L. E.
NASA research in supersonic propulsion: A decade of progress
[NASA-TM-82862] N82-26300

STOBERG, E. S.
Marine Air Traffic Control and Landing System (METCALS) investigation
[AD-A113047] N82-27276

STOCK, D. J. R.
Adaptive multifunction sensor concept for air-ground missions
N82-27299
STOCKEMER, F. J.
Experiments on fuel heating for commercial aircraft
[NASA-TM-82878] N82-26483
STONE, J. R.
NASA research in supersonic propulsion: A decade of progress
[NASA-TM-82862] N82-26300
STORACE, A. F.
Blade loss transient dynamic analysis of turbomachinery
[AIAA PAPER 82-1057] A82-34982
Foreign object impact design criteria, volume 2
[AD-A112701] N82-27313
Foreign object impact design criteria, volume 3
[AD-A112447] N82-27314
STOUT, D. W.
Design and implementation of efficient algorithms for automatic determination of corrected slant range
[AD-A112248] N82-27267
STRACK, W. C.
Propulsion opportunities for future commuter aircraft
[NASA-TM-82915] N82-26298
STRADA, J. A.
A technical assessment of aeronautical engineering in Israel
[AD-A106980] N82-27218
STRECKENBACH, J. M.
Aircraft noise reduction
N82-27281
STREETER, B.
A research program to reduce interior noise in general aviation airplanes. Influence of depressurization and damping material on the noise reduction characteristics of flat and curved stiffened panels
[NASA-CR-169035] N82-27088
STREHLOW, H.
Survey of active and passive means to reduce rotorcraft vibrations
A82-37946
STRICKLAND, J. H.
User's manual for the vertical axis wing turbine code VDART2
[DE82-000796] N82-26828
SUAREZ, J. A.
Fabrication and test of integrally stiffened graphite/epoxy components
A82-37071
SUCCI, G. P.
On the design and test of a low noise propeller
[NASA-CR-165938] N82-27089
SULLIVAN, J. P.
Optimization of propeller blade shape by an analytical method
[AIAA PAPER 82-1125] A82-35021
SULZER, H. L.
Update of the summary report of 1977-1978 task force on aircrew workload
[AD-A112547] N82-26258
SUMMERSCALES, J.
Use of CGHRP in transport
A82-37061
SUN, K.
User's manual for the vertical axis wing turbine code VDART2
[DE82-000796] N82-26828
SUTCU, M.
The influence of Coriolis forces on gyroscopic motion of spinning blades
[ASME PAPER 82-GT-163] A82-35384
SUZUKI, K.
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290
SWANSEEN, E.
Comparison between the surveillance performances of the Air Traffic Control Radar Beacon System mode of the Mode S and the Automated Radar Terminal System
[AD-A111733] N82-26273
SWEET, L. M.
Input/output models for general aviation piston-prop aircraft fuel economy
N82-26215
SWIFT, A. H. P.
Yawing of wind turbines with blade cyclic-pitch variation
[DE81-029639] N82-26822
SWITALSKI, J. R.
Transport engine control design
[AIAA PAPER 82-1076] A82-34996
SZETELA, E. J.
Deposit formation in hydrocarbon fuels
[ASME PAPER 82-GT-49] A82-35307
Experimental study of external fuel vaporization
[ASME PAPER 82-GT-59] A82-35312
SZUCH, J. R.
Advancements in real-time engine simulation technology
[AIAA PAPER 82-1075] A82-34995

T

TABACZYNSKI, J. A.
Application of adaptive estimation to target tracking
[AD-A112036] N82-26272
TAGASHIRA, T.
Smoke reduction in FJR-710 turbofan engines by an airblast combustor
[ASME PAPER 82-GT-24] A82-35290
TAIT, A. M.
Evaluation of hydrocracking catalysts for conversion of whole shale oil into high yields of jet fuels
[AD-A112820] N82-27523
TALLIO, V.
Terminal air traffic control with surveillance data from the mode 5 system: Results of system demonstrations to field controllers
[AD-A112632] N82-27268
TAYLOR, P.
Helicopter design synthesis
A82-37772
TEARE, P.
Flight demonstration of an integrated floor/fuel isolation system
[AHS PREPRINT 81-16] A82-37788
TER HASEBORG, J. L.
Electric field detection and ranging of aircraft
A82-37377
TEVELDE, J. A.
Experimental study of external fuel vaporization
[ASME PAPER 82-GT-59] A82-35312
THOMAS, J. M.
Static and aeroelastic optimization of aircraft
A82-37945
THOMAS, S. R.
Increased capabilities of the Langley Mach 7 Scramjet Test Facility
[AIAA PAPER 82-1240] A82-35080
THORNBURG, D. W.
An investigation of engine and test cell operating conditions on the effectiveness of smoke suppressant fuel additives
[AD-A112800] N82-27527
THORNDYKE, P. W.
AUTOPILOT: A distributed planner for air fleet control
[AD-A107139] N82-27269
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270
THRONDSON, L.
Combat survivability in the Advanced Technology Engine Study /ATES/
[AIAA PAPER 82-1207] A82-35101
THURBER, K.
An analysis of selected enhancements to the en route central computing complex
[AD-A113575] N82-28084
TIANYI, Z.
Performance analysis of the test results on a two-stage transonic fan
[ASME PAPER 82-GT-123] A82-35353
TIMBARIO, T. J.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317

Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

TINDERLEY, S.
Test facility and data handling system for the development of axial compressors
[ASME PAPER 82-GT-73] A82-35322

TINDELL, R. H.
F-14 inlet development experience
[ASME PAPER 82-GT-5] A82-35278

TOMLINSON, N. N.
Fuselage structure using advanced technology fiber reinforced composites
[NASA-CASE-LAR-11688-1] N82-26384

TRAYBAR, J. J.
Proceedings of the 1st Annual Workshop on Aviation Related Electricity Hazards Associated with Atmospheric Phenomena and Aircraft Generated Inputs
[AD-A107326] N82-27237

TREBITS, R. N.
Marine Air Traffic Control and Landing System (METCALS) investigation
[AD-A113047] N82-27276

TRIMBOLI, W. S.
An experimental investigation of S-duct diffusers for high-speed propfans
[AIAA PAPER 82-1123] A82-35019

TRINKS, H.
Electric field detection and ranging of aircraft
A82-37377

TYLER, J. C.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318

U

UNNEVER, G.
An experimental study of rectangular and circular thrust augmenting ejectors
[AD-A111110] N82-26304

URBAN, L. J.
Impact of advanced avionics and munitions technology on ground attack weapons systems in night and adverse weather conditions
N82-27294

URLINGS, P. J. M.
A planning system for F-16 air-to-surface missions
N82-27297

V

VAATSTRA, W.
On the vortex flow over delta and double-delta wings
[AIAA PAPER 82-0949] A82-37466

VADYAK, J.
A grid interfacing zonal algorithm for three-dimensional transonic flows about aircraft configurations
[AIAA PAPER 82-1017] A82-37477

VALORI, R.
Development of counter-rotating intershaft support bearing technology for aircraft gas turbine engines
[AIAA PAPER 82-1054] A82-37679

VALTIERRA, M. L.
An alternate test procedure to qualify future fuels for Navy aircraft
[AIAA PAPER 82-1233] A82-36175

VAN HOUSEN, R. L.
Gas turbine airflow control for optimum heat recovery
[ASME PAPER 82-GT-83] A82-35329

VARNUM, F.
Data processing at the Global Positioning System master control station
[AD-A110553] N82-26270

VERHAAGEN, N. G.
On the vortex flow over delta and double-delta wings
[AIAA PAPER 82-0949] A82-37466

VERHOFF, A.
Extension of FLO codes to transonic flow prediction for fighter configurations
A82-35564

VERMEULEN, P. J.
Acoustic control of dilution-air mixing in a gas turbine combustor
[ASME PAPER 82-GT-35] A82-35296

VESMARAIS, R. N.
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence
[NASA-TM-84484] N82-26236

VINCENT, J. H.
Development of low-order model of an X-wing aircraft by system identification
[AD-A113760] N82-27206

VOISEY, M. A.
The low temperature properties of aviation fuels
[ASME PAPER 82-GT-48] A82-35306

VOLOKHOV, V. A.
Assembly of aircraft instruments
A82-36950

W

WAGNER, D. A.
Next generation turboprop gearboxes
[ASME PAPER 82-GT-236] A82-35418

WALKER, G. F.
An automatic map reader suitable for use in helicopters
A82-37775

WALKER, H. J.
Annular wing
[NASA-CASE-FRC-11007-2] N82-26277

WALLACE, H. W.
Advanced nozzle integration for air combat fighter application
[AIAA PAPER 82-1135] A82-37694

WALSH, K.
In-flight acoustic results from an advanced-design propeller at Mach numbers to 0.8
[AIAA PAPER 82-1120] A82-35017

WALSTON, C. E.
Software technology transfer and export control
[AD-A106869] N82-28017

WALTER, W. A.
Flight evaluation of a digital electronic engine control system in an F-15 airplane
[AIAA PAPER 82-1080] A82-37683

WANG, L. C.
The calculation of deviation angle in axial-flow compressor cascades
[ASME PAPER 82-GT-230] A82-35412

WARD, R. E.
Airworthiness and flight characteristics test of an CH-58C configured to a Light Combat Helicopter (LCH)
[AD-A112581] N82-26206

WARMBRODT, W.
Development of a helicopter rotor/propulsion system dynamics analysis
[AIAA PAPER 82-1078] A82-34997

WARNER, D. A.
Simulation report: Advanced display for complex flight trajectories
[AD-A111259] N82-26320

WARNER, D. E.
Reliability design study for a fault-tolerant electronic engine control
[AIAA PAPER 82-1129] A82-37689

WATANABE, I.
The effect of inlet distortion on the performance characteristics of a centrifugal compressor
[ASME PAPER 82-GT-92] A82-35335
On the performance prediction of a centrifugal compressor scaled up
[ASME PAPER 82-GT-112] A82-35345

WATANABE, Y.
The effect of inlet distortion on the performance characteristics of a centrifugal compressor
[ASME PAPER 82-GT-92] A82-35335

WATSON, D. M.
Quiet Short-Haul Research Airplane (QSRA) model select panel functional description
[NASA-TM-84243] N82-27319

WEBB, L. D.
Selected results of the F-15 propulsion interactions program
[AIAA PAPER 82-1041] A82-34976
WEBB, S. H.
The Hydrographic Airborne Laser Sounder (HALS)
[AD-A111027] N82-26660
WEBER, J. A.
Electronic control for small engines
[AIAA PAPER 82-1126] A82-37688
WEISSMAN, C.
Software technology transfer and export control
[AD-A106869] N82-28017
WEITZ, P. G.
Commercial aircraft airframe fuel systems surveys
[AD-A112241] N82-27524
WELLS, V. L.
Use of optimization to predict the effect of selected parameters on commuter aircraft performance
[NASA-CR-169027] N82-26279
WESCOURT, K.
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270
WESSON, R.
Scenarios for evolution of air traffic control
[AD-A112566] N82-27270
WESTON, R. P.
Approximate boundary condition procedure for the two-dimensional numerical solution of vortex wakes
[AIAA PAPER 82-0951] A82-37467
WHITE, A. J.
Measurements of heat transfer coefficients on gas turbine components. I - Description, analysis and experimental verification of a technique for use in hostile environments
[ASME PAPER 82-GT-174] A82-35387
Measurements of heat transfer coefficients on gas turbine components. II - Applications of the technique described in part I and comparisons with results from a conventional measuring technique and predictions
[ASME PAPER 82-GT-175] A82-35388
WHITE, R. W.
Aircraft alerting systems standardization study. Volume 1: Candidate system validation and time-critical display evaluation
[AD-A107225] N82-27236
WHITLOW, J. B., JR.
NASA research in supersonic propulsion: A decade of progress
[NASA-TM-82862] N82-26300
WHITMAN, G. F.
Development of a backpack survival kit for ejection seats
[AD-A113653] N82-27242
WILLCOCKS, M. J.
Icing conditions on sea level gas turbine engine test stands
[AIAA PAPER 82-1237] A82-35070
WILLER, M. S.
Kevlar/PMR-15 polyimide matrix composite for a complex shaped DC-9 drag reduction fairing
[AIAA PAPER 82-1047] A82-37678
WILLIAMS, F. J.
Performance of PTFE-lined composite journal bearings
[ASLE PREPRINT 82-AM-1A-1] A82-37854
WILLIAMS, J. S.
Some potential novel approaches to the automatic airborne detection and identification of ground targets
N82-27296
WILLIS, C. M.
Development and validation of preliminary analytical models for aircraft interior noise prediction
A82-38077
WILLIS, R. A.
Development potential of Intermittent Combustion (I.C.) aircraft engines for commuter transport applications
[NASA-TM-82869] N82-26297
WILLIS, W. S.
A methodology for planning a cost effective engine development
[AIAA PAPER 82-1140] A82-35024
WILLOCK, R. R.
The low temperature properties of aviation fuels
[ASME PAPER 82-GT-48] A82-35306
WILLSKY, A. S.
Control optimization, stabilization and computer algorithms for aircraft applications
[NASA-CR-169015] N82-27009
WIMER, W. W.
Development of Army high-energy fuel diesel/turbine-powered surface equipment, phase 2
[AD-A111942] N82-26487
WIMMER, J. M.
Ceramic component development for limited-life propulsion engines
[AIAA PAPER 82-1050] A82-34979
WING, C. B.
Study of the global positioning system for maritime concepts/applications: Study of the feasibility of replacing maritime shipborne navigation systems with NAVSTAR
[NASA-CR-169031] N82-26263
WISLER, D. C.
Core compressor exit stage study, volume 6
[NASA-CR-165554] N82-27310
WITTENBERG, J.
Justification for, and design of, an economical programmable multiple flight simulator
A82-36969
WITTIG, S. L. K.
Scaling effects on leakage losses in labyrinth seals
[ASME PAPER 82-GT-157] A82-35380
WOHLFEIL, E. G.
Adaptive multifunction sensor concept for air-ground missions
N82-27299
WOMER, N. K.
Learning and costs in airframe production, part 1
[AD-A112948] N82-28210
WONG, K. T.
Wide field of view laser beacon system for three dimensional aircraft range measurements
N82-26216
WOOD, E. R.
Low vibration design of AAH for mission proficiency requirements
[AHS PREPRINT 81-2] A82-37778
WOOD, W. B.
Investigation of the transonic calibration characteristics of turbine static pressure probes
[ASME PAPER 82-GT-280] A82-35454
WOODEN, W. H., II
A comparison of pole positions derived from GPS satellite and Navy navigation satellite observations
[AD-A110765] N82-26268
WORATSCHEK, R.
Airworthiness and flight characteristics test of an OH-58C configured to a Light Combat Helicopter (LCH)
[AD-A112581] N82-26286
WYKES, D. H.
Develop, demonstrate, and verify large area composite structural bonding with polyimide adhesives
[NASA-CR-165839] N82-26465

Y

YAN, C.-Z.
TURBOTRANS - A programming language for the performance simulation of arbitrary gas turbine engines with arbitrary control systems
[ASME PAPER 82-GT-200] A82-35396
YANG, T.-T.
Improved vane-island diffusers at high swirl
[ASME PAPER 82-GT-68] A82-35318
YATES, E. C., JR.
Steady, Oscillatory, and Unsteady Subsonic and Supersonic Aerodynamics, production version 1.1 (SOUSSA-P1.1). Volume 2: User/programmer manual. Addendum 1: Analytical treatment of wake influence
[NASA-TM-84484] N82-26236
YEE, R.
A floating-point/multiple-precision processor for airborne applications
[NASA-TM-84252] N82-26289
YETTER, J. A.
Transonic wind tunnel test of a supersonic nozzle installation
[AIAA PAPER 82-1045] A82-37677

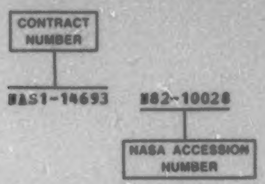
YOST, D. E.
Development of Army high-energy fuel diesel/turbine-powered surface equipment, phase 2
[AD-A111942] N82-26487
YOST, S. R.
Commutated automatic gain control system
N82-26209
YOUNG, C.
Joint Anglo-American experience of the analysis of helicopter rotor blade pressure distribution
A82-37770
YOUNG, P.
Life-cycle-cost analysis of the microwave landing system ground and airborne systems
[AD-A110909] N82-26266
YU, C. L.
Elevation plane analysis of on-aircraft antennas
[AD-A112373] N82-26554

Z

ZAGRANSKI, R. D.
Adaptive fuel control feasibility investigation for helicopter applications
[ASME PAPER 82-GT-205] A82-35400
ZEID, I.
Engine dynamic analysis with general nonlinear finite element codes. II - Bearing element implementation, overall numerical characteristics and benchmarking
[ASME PAPER 82-GT-292] A82-35462
ZEISEL, K. S.
Assessment of lightning simulation test techniques, part 1
[AD-A112626] . N82-27663
ZENOBI, T. J.
Development of a backpack survival kit for ejection seats
[AD-A113653] N82-27242
ZIMMER, P. O.
Development of accelerated fuel-engines qualification procedures methodology, volume 1
[AD-A113461] N82-27317
Development of accelerated fuel-engines qualification procedures methodology. Volume 1: Appendices
[AD-A113532] N82-27318
ZINN, B. T.
Acoustic properties of turbofan inlets
[NASA-CR-169016] N82-27090

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 1900
N82-26873
N82-27326
AF PROJ. 2303
N82-26446
N82-27512
AF PROJ. 2307
N82-26306
N82-26612
N82-27411
N82-27784
AF PROJ. 2308
N82-27434
AF PROJ. 2309
N82-27900
AF PROJ. 2313
N82-28007
AF PROJ. 2361
N82-26221
N82-26321
AF PROJ. 2391
N82-26290
N82-26291
AF PROJ. 2402
N82-27663
AF PROJ. 2403
N82-26319
N82-26320
N82-27322
AF PROJ. 2404
N82-26256
AF PROJ. 3006
N82-27314
AF PROJ. 3048
N82-26312
N82-26400
N82-26484
N82-27523
AF PROJ. 3056
N82-26307
AF PROJ. 3066
N82-26309
N82-26310
N82-27313
AF PROJ. 3145
N82-26283
N82-27658
AF PROJ. 6114
N82-28016
AF PROJ. 6670
N82-27284
AF PROJ. 7600
N82-27272
AF-AFOSR-77-3354
A82-35089
ARPA ORDER 3460
N82-27269
DA PROJ. 1L1-61102-B-53A
N82-26274
DA PROJ. 1L1-61102-BH-57
N82-26857
DA PROJ. 1L1-62209-AH-76
N82-26282
N82-27282
DA PROJ. 1L1-62302-A-214
N82-27273
DA PROJ. 1L2-62209-SH-76
N82-26280
DA PROJ. 1L2-63104-D-150
N82-27317
DA PROJ. 1L7-62733-AH-20
N82-26487
DA PROJ. 4A7-62730-AT-42
N82-27325
DAAH01-80-C-0250
N82-27561
DAAJ02-77-C-0076
N82-26280
DAAK51-80-C-0006
N82-26282
DAAK51-80-C-0021
N82-27282
DAAK70-80-C-0001
N82-26487
N82-27317
N82-27318
DAAK70-81-C-0209
N82-27317
N82-27318
DAAK70-82-C-0001
N82-26487
N82-27317
N82-27318
DE-AC01-76-ET-10340
A82-35336
DE-AC01-80ET-17005
A82-35337
DE-AC02-77CH-00178
N82-26822
DE-AC04-76DP-00789
N82-26828
DFG-SFB-61 A82-35339
DOT-FA76WA-2547
N82-26266
DOT-FA79WA-4260
N82-27236
DOT-TSC-1397-1
N82-27588
DRET-79-34-183
A82-36054
DTFA01-80-C-10072
N82-27261
DTFA01-81-C-10001
N82-27268
N82-27277
N82-27278
N82-27279
DTFA03-80-C-0080
N82-27528
DTF01-80-C-10148
N82-26264
EG-77-C-01-4042
N82-26822
EPA-R-805762-02-2
N82-27326
F-ENK-82223-77-001-21-001
N82-27288
FAA PROJ. 022-242-830
N82-27924
FAA PROJ. 034-241-510
N82-26273
N82-27265
N82-27266
FAA PROJ. 075-725-420
N82-27263
FAA PROJ. 131-401-835
N82-27573
FAA PROJ. 182-340-100
N82-27237
FAA PROJ. 975-200-10A
N82-27267
F08635-79-C-0213
A82-35294
F19628-79-C-0027
N82-27900
F19628-79-C-0075
N82-27272
F19628-79-C-0161
A82-35729
F19628-80-C-0002
N82-26271
N82-26272
N82-26546
F33615-76-C-2018
N82-26307
F33615-76-C-2064
N82-26283
F33615-76-C-3105
N82-27411
F33615-76-C-5312
N82-26446
N82-27512
F33615-77-C-2096
A82-37682
F33615-77-C-3045
A82-37692
F33615-77-C-3066
N82-26256
F33615-77-C-3081
A82-37947
F33615-77-C-5206
A82-35256
F33615-77-C-5221
N82-27313
N82-27314
F33615-78-C-0019
N82-26221
N82-26321
F33615-78-C-2032
N82-26309
N82-26310
F33615-78-C-3614
N82-26290
N82-26291
N82-26320
F33615-78-C-5234
A82-37071
F33615-79-C-2006
N82-27658
N82-27659
F33615-79-C-2013
A82-35327
F33615-79-C-2052
N82-26312
F33615-79-C-2092
A82-37690
F33615-79-C-2095
N82-27523
F33615-79-C-3009
A82-37692
F33615-79-C-3620
N82-27322
F33615-79-C-3624
N82-26319
F33615-79-C-5025
N82-27784
F33615-80-C-0006
N82-28016
F33615-80-C-3210
A82-37947
F33615-80-C-3406
N82-27663
F33615-81-C-2017
A82-35102
F33615-81-K-5116
N82-27221
F33615-81-K5116
N82-28210
F33657-77-C-0403
A82-35311
F33657-78-C-0256
A82-35311
F34601-78-C-2828
A82-35257
F49620-77-C-0085
N82-27434
F49620-79-C-0067
N82-28007
F49620-80-C-0078
N82-26306
F49620-82-C-0018
N82-27220
JPL-955956 N82-26261
MDA903-78-C-0029
N82-27269
MDA903-79-C-0018
N82-28017
MDA903-80-C-0554
N82-26222
N82-26223
MDA903-81-C-0166
N82-26224
N82-26225
N82-26226
N82-27217
MDA903-81-C-0211
N82-27270
NAG1-17 N82-28134
NAG1-202 N82-26279
NAG3-47 A82-35384
NAG3-74 A82-37710
NASA ORDER C-41581-B
N82-27316
NASW-2961 N82-27280
NASW-3541 N82-27235
NAS1-14977 N82-26236
NAS1-15428 A82-37446
NAS1-15782 A82-38077
NAS1-15843 N82-26465
NAS1-16058 A82-37795
A82-37796
NAS1-16155 N82-26238
NAS1-16521 N82-27089
NAS2-10297 N82-26218
NAS2-10448 N82-26220
NAS2-10479 N82-26262
NAS3-20070 N82-27310
NAS3-20072 N82-26439
NAS3-20632 N82-27309
NAS3-20643 A82-35450
NAS3-21285 N82-27743
NAS3-21843 A82-37691
NAS3-21971 A82-35312
NAS3-22053 A82-34982
NAS3-22123 A82-37854
NAS3-22277 A82-35307
NAS8-32357 N82-26921
NCC1-6 N82-27088
NGL-22-009-124
N82-26315
N82-27009
NGL-22-009-640
N82-26199
NGL-31-001-252
N82-26199
NGR-36-009-017
N82-26199
NR PROJ. 365-049
N82-27221
N82-28210
NSERC-A-7801 A82-35296
NSF CEE-80-25718
N82-27548
NSG-2156 A82-36969
NSG-3036 N82-27090
NSG-3283 A82-35462
NSG-3295 A82-35091
NSG-3306 N82-26295
NSG-5352 N82-26263
N62269-80-C-0346
N82-26292

N00014-75-C-0451
N82-27221
N82-28210
N00014-76-C-0001
N82-26485
N82-27262
N00014-77-C-0564
N82-27315
N00014-79-C-0578
N82-27286
N00019-77-C-0250
A82-37074
N00019-78-C-0602
A82-37074
N00019-80-C-0059
A82-37074
N00019-80-C-0225
A82-35023
A82-35311
N00024-76-C-5352
A82-34979
N00024-78-C-5384
N82-26897
N00039-80-C-0032
N82-27260
N00039-80-C-0082
N82-27276
N00140-80-C-2269
A82-35465
A82-36175
N61339-76-C-0048
N82-27323
N61339-78-C-0060
N82-27324
N61339-79-C-0143
N82-27323
N62269-71-C-0296
N82-26554
N62269-81-M-3047
N82-27320
N6237681-WR-00014
N82-27527
W-7405-ENG-26
A82-35332
NF6154200 N82-27506
N0584001 N82-27242
505-31-51 N82-26218
505-32-2A N82-27310
505-32-2B N82-26234
505-32-72 N82-27519
505-33-53-07 N82-26236
505-33-63-02 N82-26703
505-34-13-01 N82-26199
505-41-13-02 N82-26217
505-41-22 N82-26297
N82-26258
505-41-73-01 N82-26288
505-42-21-02 N82-27319
505-42-62 N82-27311
505-43-23-01 N82-26235
510-53-12 N82-26439
530-03-13-07 N82-27233
532-01-11 N82-26262
532-02-11 N82-26314
532-06-11 N82-26289
533-01-32 N82-26300
535-03-12 N82-26219

1. Report No.
NASA SP-7037(153)

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle

Aeronautical Engineering
A Continuing Bibliography (Supplement 153)

5. Report Date
October 1982

6. Performing Organization Code

7. Author(s)

8. Performing Organization Report No.

10. Work Unit No.

9. Performing Organization Name and Address

National Aeronautics and Space Administration
Washington, D.C. 20546

11. Contract or Grant No.

13. Type of Report and Period Covered

12. Sponsoring Agency Name and Address

14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 535 reports, articles and other documents introduced into the NASA Scientific and Technical Information System in September 1982.

17. Key Words (Suggested by Author(s))

Aerodynamics
Aeronautical Engineering
Aeronautics
Bibliographies

18. Distribution Statement

Unclassified - Unlimited

19. Security Classif. (of this report)
Unclassified

20. Security Classif. (of this page)
Unclassified

21. No. of Pages
156

22. Price*
$5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982

NASA SP-7037(154)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 154)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in October 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB/141/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 511 reports, journal articles, and other documents originally announced in October 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).*

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and
Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and
Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik,
Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space
Administration
Scientific and Technical Information
Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration
Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	– 1/	– 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	30.00[1]	45.00

TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) **481**

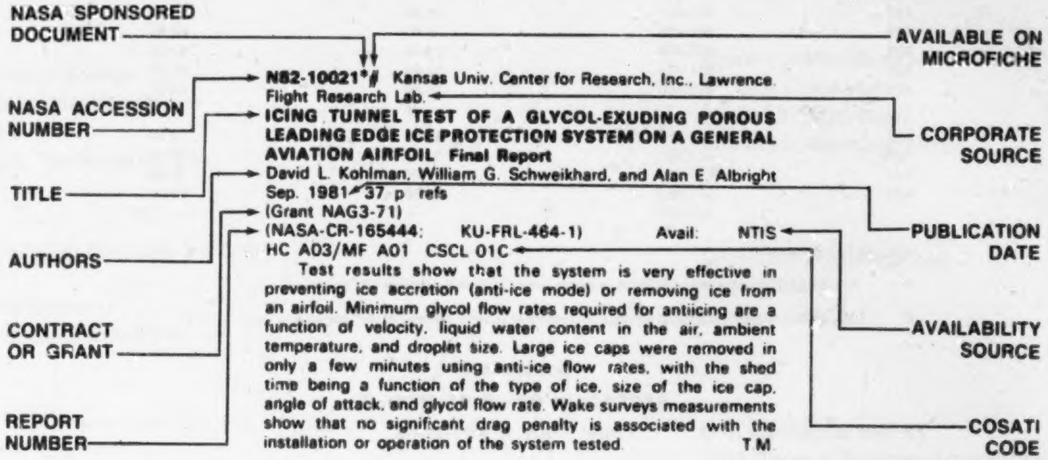
STAR ENTRIES (N82-10000) **521**

Subject Index **A-1**

Personal Author Index **B-1**

Contract Number Index **C-1**

TYPICAL CITATION AND ABSTRACT FROM *STAR*



NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
CORPORATE SOURCE
TITLE
PUBLICATION DATE
AUTHORS
AVAILABILITY SOURCE
CONTRACT OR GRANT
COSATI CODE
REPORT NUMBER

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.

ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report

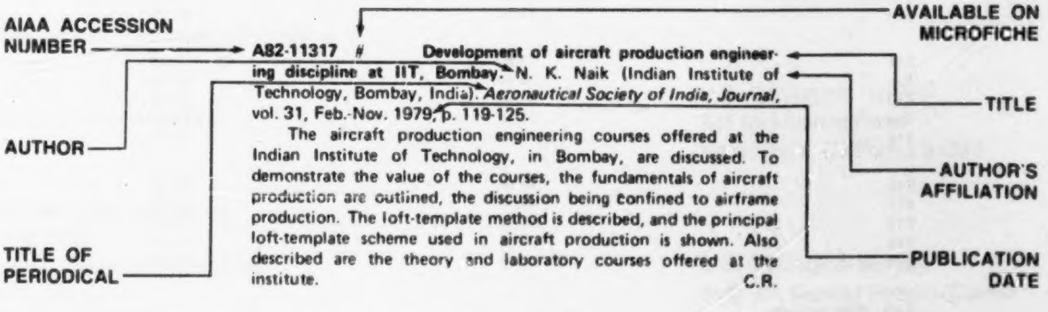
David L. Kohlman, William G. Schweikhard, and Alan E. Albright Sep. 1981 37 p refs

(Grant NAG3-71)

(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AVAILABLE ON MICROFICHE
TITLE
AUTHOR
AUTHOR'S AFFILIATION
TITLE OF PERIODICAL
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal,* vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 154)

NOVEMBER 1982

IAA ENTRIES

A82-38146 **Efficient optimum design of structures - Program DDDU.** L.-X. Qian, W. Zhong, Y. Sui, and J. Zhang (Dalian Institute of Technology, Dalian, People's Republic of China). *Computer Methods in Applied Mechanics and Engineering,* vol. 30, May 1982, p. 209-224. 12 refs.

An efficient optimization algorithm is developed for engineering structures subject to multiple constraints. This highly non-linear and implicit problem is reduced to a combination of a sequence of quasi-linear constraints and explicit problems of the statically determined structures. The method is based on the Kuhn-Tucker necessary conditions for optimality associated with a simple quadratic program designed simultaneously to determine the Lagrange multipliers and to delete non-active constraints. A number of examples including trusses and wing structures show that the method is efficient when compared with other competing techniques. (Author)

A82-38216 **Forward-swept wings add supersonic zip.** R. DeMeis. *High Technology,* vol. 2, Jan.-Feb. 1982, p. 33-40.

A forward-swept wing aircraft is being built under an Air Force contract for test flying in late 1983. This design has many advantages over conventional aft-swept wing aircraft, including a naturally smoother area distribution, which lowers wave drag and allows a wider fuselage at the center of gravity and, thus, provides greater payload and fuel capacity. However, since twisting of the wings caused by airflow produces extreme shearing forces, the forward-swept wing design has only recently become possible by means of structural tailoring of the wing using graphite-epoxy composite material which compensates for the unstable wing twisting under standard fighter-type flying conditions. In addition, the design confers such a responsive, unstable configuration that computer control is necessary to augment pilot action. Detailed explanations of the main aerodynamic features of the forward-swept wing design are given. N.B.

A82-38222 # **Composite use on helicopters.** J. Ray (United Technologies, Corp., Sikorsky Aircraft Div., Stratford, CT). *Astronautics and Aeronautics,* vol. 20, July-Aug. 1982, p. 60, 61.

Composite material used in components of the Sikorsky S-76 helicopter are reviewed. Composite fiber reinforced with Nomex and an aluminum honeycomb is employed for the horizontal stabilizer. The spar is equipped with caps made of unidirectional graphite-epoxy tape co-cured with Kevlar skin material. Two plies of woven Kevlar cover the caps in order to prevent galvanic corrosion. The inboard section of the spar possesses a precured torque tube of woven Kevlar cloth which is bonded to an aluminum core and provides the dominant load path for torsion and flexural shear. The composite materials are responsible for a 17.4% reduction in the airframe/gross weight ratio and an increase of 20% in the range due to the smooth flush contour of the stabilizer and consequent drag reduction. The fairings and doors of the S-76 are also made of laminated structures, and sandwich panels serve for the windshield support posts, internal frames, longitudinal elements and door jamb. M.S.K.

A82-38223 # **Toward all-composite helicopter fuselage.** L. Marchinski (Boeing Vertol Co., Philadelphia, PA). *Astronautics and Aeronautics,* vol. 20, July-Aug. 1982, p. 61, 62.

The construction and benefits of using all-composite material for helicopter fuselages, particularly on the Boeing Vertol 234, are outlined. The cabin floor of the 234 is made of four composite panels with fiber glass/Kevlar 49 face sheets and a Nomex honeycomb core. Molded-edge rubber seals bonded into the floor assembly during co-curing and machined 7050 aluminum fittings at each end of the lateral, Kevlar beams under the lower side of the floor panels have contributed to a vibration rate of less than 0.03 g. A 10% weight saving over that available with an all metal floor has been achieved, as well as greater impact resistance. The success with the floor indicates that replacement of all-metal fuselages with Nomex-honeycomb structures offers a potential weight savings of 33%. Further research is necessary into the effects of lightning strikes and electrical bonding. M.S.K.

A82-38224 # **Committing composites to the Boeing 767.** R. Hammer (Boeing Commercial Airplane Co., Renton, WA). *Astronautics and Aeronautics,* vol. 20, July-Aug. 1982, p. 62.

Applications of Kevlar/graphite composites in the Boeing 767 aircraft are reviewed, noting the higher weight savings which were achieved than were offered by metal or fiber glass/epoxy materials. Results from a NASA/Lockheed program testing the Kevlar composites in comparison with fiber glass parts proved the acceptability of using the Kevlar/graphite for 24 different aircraft components at a weight savings of over 2000 lb. It is concluded that the employment and techniques involving composite technologies are at the same stage as aluminum technology was in the 1930s. M.S.K.

A82-38249 **Mirage 2000 - Towards possible high series production aircraft (Mirage 2000 - Vers l'avion de série).** J. Morisset and N. Beauclair. *Air et Cosmos,* vol. 20, July 10, 1982, p. 26-42. In French.

Design and performance characteristics of the Mirage 2000 aircraft are presented, noting modifications available for different combat missions. The single-engined aircraft is equipped with multiple radar systems, can be used as an interceptor at high or low altitudes, is capable of carrying air-to-ground nuclear tipped missiles, and features two 30 mm cannons. Fly by wire control is standard, and, the aircraft is stable at high angles of attack with a top speed of Mach 2.2 while carrying a full load at 60,000 ft. The internal fuel stores are 3800 liters, and external stores can be added to extend the total range to 1500 km. By wind 1980 the Mirage 2000 had been flight tested in 1677 sorties, with tests being done on five configurations of the aircraft. Details of the design process, the use of composites in the aircraft structure, the operational features of the missile stores, the laser guidance system, and the electronics are provided. M.S.K.

A82-38281 # **Aerodynamic behavior of a slender slot in a wind tunnel wall.** D. B. Bliss (Princeton University, Princeton, NJ). *AIAA Journal,* vol. 20, Sept. 1982, p. 1244-1252. 8 refs. Grant No. AF-AFOSR-77-3337.

A theoretical model for the flow through a single slot of finite length in a wall separating a uniform freestream and a quiescent fluid at different static pressures is constructed. This problem is relevant to understanding the aerodynamic behavior of slots which are used in the test sections of some ventilated wall transonic wind tunnels. The theoretical relationship which is obtained between the pressure differential across the slot and the flow through the slot shows both the linear and quadratic regimes observed in experiments. The linear behavior arises from the acceleration of the cross flow into the slot downstream of the leading edge and from the interaction of streamwise stations along the slot, as well as from the effect of slot taper. Analytical solutions are obtained for two slot planform shapes, and some other cases are solved numerically. The quantitative agreement with experimental data is very encouraging. (Author)

A82-38283 # **Improved solutions to the Falkner-Skan boundary-layer equation.** C. A. Forbrich, Jr. (USAF, Armament Laboratory, Fort Walton Beach, FL). *AIAA Journal,* vol. 20, Sept. 1982, p. 1306, 1307. 11 refs. USAF-supported research.

The results of a state variable approach to computationally solve the Falkner-Skan equation over a wide range of boundary-layer acceleration parameters are presented. The Falkner-Skan equation is concerned with flow past an infinite wedge with a particular vertex angle, and solutions are presented which are accurate to eight places for third order differential equations. Iterative procedures for improving the order of accuracy are described, and an example is provided for the case of an initial wedge angle of 0.40 x pi. The method is considered acceptable for the analysis of slightly accelerating and decelerating flows encountered in low drag and supercritical airfoils. M.S.K.

A82-38405 **VHF radio link for ground-air-ground communications using an integrated voice-data modulation.** G. Benelli (Firenze, Università, Florence, Italy). *Electronics Letters,* vol. 18, June 24, 1982, p. 555, 556. Consiglio Nazionale delle Richerche *Contract No. 81,00,202.*

A possible realization of a data channel between aircraft and ground station is presented, which utilizes a combined amplitude-phase modulation. Amplitude modulation is used to transmit a voice signal, while phase modulation is used for data transmission. Performance of this system is evaluated through a computer simulation. (Author)

A82-38422 **The need for a dedicated public service helicopter design.** R. Morrison (Airborne Law Enforcement Association, Inc.; Huntington Beach Police Dept., Huntington Beach, CA). *Vertiflite,* vol. 28, July-Aug. 1982, p. 28-32.

A proposal is made for NASA to undertake a program to develop a technologically-advanced modular helicopter designed specifically for public service use, that is, for emergency medical services, fire fighting, wildlife management, law enforcement, etc. Public service helicopters currently in use have many unattractive features, such as high noise and cost, as a result of their original designs to satisfy military requirements, and are unable to meet the varied needs of public service operators. The proposed helicopter would have a high speed (200-300 knots), combined with effective night, all-weather operation, and could yield national benefits of over $90 billion per year, including: a greater ability to compete with foreign-made helicopters, a reduced response time in emergency situations, a greater effectiveness in law enforcement, and expanded job opportunities in the helicopter industry. N.B.

A82-38423 **JVX, what an opportunity.** C. C. Crawford, Jr. (U.S. Army, Aviation Research and Development Command, St. Louis, MO). *Vertiflite,* vol. 28, July-Aug. 1982, p. 34-39.

US military officials have proposed the creation of a Joint Services Advanced Vertical Lift Aircraft Program (JVX) to design a family of advanced technology vertical lift aircraft which could perform numerous, multi-service missions and achieve initial operating capability in the early 1990s. Six specific roles have been selected from the mission profiles to serve as a basis for molding requirements for a common multi-service air vehicle and the requirement for fulfilling world-wide self-deployment. The six roles - combat search and rescue, long range requirements, special electronics mission, signal intelligence, Marine Corps JVX, and self-deployment - are described in detail and schematics showing each of the mission profiles are included. A technical assessment group, which included representatives of the US Army Aviation Research and Development Command and NASA, reviewed possible configurations for the JVX and determined that tilt rotor configurations appear to offer the best possibility for a common multi-service design since they possess adequate hover efficiency, high-altitude and high speed capabilities as well as world-wide self-deployment. Other configurations studied, including lift/cruise fan configurations, conventional helicopters, and the auxiliary propulsion ABC/compound helicopter, all have serious drawbacks and are considered less attractive for the JVX. N.B.

A82-38439 **#** **Minimal order time sharing filters for INS in-flight alignment.** I. Y. Bar-Itzhack (Technion - Israel Institute of Technology, Haifa, Israel). *Journal of Guidance, Control, and Dynamics,* vol. 5, July-Aug. 1982, p. 396-402. 19 refs. Research supported by the Israel Aircraft Industries, Ltd., and Ministry of Defence.

Very simple reduced order filters which operate in a time sharing mode are proposed for in-flight and transfer alignment of calibrated inertial navigation systems (INS) such as those in fighter aircraft. The coarsely aligned INS is flown for a short duration in a straight and level flight during which two second-(or third-) order time sharing filters estimate the level misalignment. After removing the estimated level misalignment angles a third-(or fourth-) order filter is switched in to estimate the azimuth misalignment as the aircraft starts to maneuver in the lateral plane. A true covariance simulation is carried out, which shows that the proposed filters successfully perform the fine alignment. (Author)

A82-38441 **#** **Adaptive filtering for an aircraft flying in turbulent atmosphere.** H. Okubo (Osaka Prefecture University, Sakai, Japan). *Journal of Guidance, Control, and Dynamics,* vol. 5, July-Aug. 1982, p. 410-412. 5 refs.

On the basis of a sensitivity analysis for a simple scalar system, the deterioration of the Kalman filter performance resulting from incorrect noise covariance values is examined. It is found that the increase in the error covariance relative to the optimum value depends largely on the ratio of the process and the measurement noise covariance values. This is considered important in adaptive filtering problems when the system includes noises with extensively variable variance, such as the dynamics of aircraft flying through patches of atmospheric turbulence. C.R.

A82-38442 *** #** **Robust Kalman filter design for active flutter suppression systems.** W. L. Garrard (Minnesota, University, Minneapolis, MN), J. K. Mahesh, C. R. Stone (Honeywell Systems and Research Center, Minneapolis, MN), and H. J. Dunn (NASA, Langley Research Center, Hampton, VA). *Journal of Guidance, Control, and Dynamics,* vol. 5, July-Aug. 1982, p. 412-414. 6 refs. Contract No. NAS1-15486.

Additional insight is provided into the use of the Doyle-Stein (1979, 1981) technique in aeroelastic control problems by examining the application of the method to a flutter control problem. The system to be controlled consists of a full-size wind tunnel model of a wing, plus an aileron, an actuator, and an accelerometer used to sense the motion of the wing. A full-state feedback controller was designed using linear optimal control theory, and a Kalman filter was used in the feedback loop for state estimation. The filter design procedure is explained along with that to improve closed-loop properties of the system. The locus of the poles of the filter is examined as a scalar design parameter is varied. The Doyle-Stein design procedure is shown to substantially improve the stability properties of an active flutter controller designed using the linear quadratic Gaussian control theory. C.D.

A82-38443 *** #** **Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model.** M. D. Falarski, M. R. Dudley (NASA, Ames Research Center, Moffett Field, CA), W. Buchmann (Grumman Aerospace Corp., Bethpage, NY), and A. Pisano (U.S. Naval Air Systems Command, Washington, DC). *(American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 19th, St. Louis, MO, Jan. 12-15, 1981, Paper 81-0150.)* Journal of Aircraft, *vol. 19, Aug. 1982, p. 627-633. 6 refs.*

A subsonic tilt-nacelle V/STOL aircraft configuration is described which is powered by two turbofan engines, mounted on a single carry-through structure that is designed to maintain the thrust axis close to the center of gravity at nacelle incidences of 5-95 deg. Control during V/STOL operation, often from small ship platforms, is achieved by means of a vane assembly that is immersed in each turbofan's exhaust. Wind tunnel test data have been obtained with an 11.2-m wing span model for the vertical-to-horizontal flight transition capability of the concept. It is found that the aircraft can operate over a broad transition corridor, with sufficient maneuver capability about the trim points. The control vane exhibited linear response characteristics over a large deflection range, with little influence from power, angle of attack or ground proximity in hover. The model induced a positive ground effect in hover that increased as wheel height was approached and strake angle increased. O.C.

A82-38445 *** #** **Influence of unsteady aerodynamics on hingeless rotor ground resonance.** W. Johnson (NASA, Ames Research Center, Low Speed Aircraft Research Branch, Moffett Field, CA). *Journal of Aircraft,* vol. 19, Aug. 1982, p. 668-673. 16 refs.
(Previously announced in STAR as N81-28056)

A82-38446 **#** **U.S. Marine Corps AV-8A maintenance experience.** L. Scott and R. W. Morrissey (U.S. Naval Air Rework Facility, Cherry Point, NC). *(American Institute of Aeronautics and Astronautics and NASA Ames Research Center, V/STOL Conference, Palo Alto, CA, Dec. 7-9, 1981, Paper 81-2657.)* Journal of Aircraft, *vol. 19, Aug. 1982, p. 694-696.*

The basic structure of the AV-8A employs a 2014T6 aluminum alloy, with an epoxy primer and a polyurethane paint system, which have together been shown by U.S. Marine Corps maintenance experience to be proof against corrosion. The vectorable engine nozzles and their drive system have proven to be so strong and reliable that vectoring has been used in forward flight for air combat maneuvering. Only fatigue damage to the empennage primary structure has been experienced, and this problem is being addressed by a reduction of operational time at high power, together with a rebuilding of the ventral fin with solid rivets. O.C.

A82-38447 **#** **Estimation of the peak count of actively controlled aircraft.** N. J. Meyerhoff and J. Garlitz (U.S. Department of Transportation, Office of Air and Marine Systems, Cambridge, MA). *Journal of Aircraft,* vol. 19, Aug. 1982, p. 698-700. 5 refs.

It is suggested by an analysis of preliminary data that a regression of the peak number of actively controlled aircraft on total daily operations yields an economical estimate of the peak instantaneous air count (AIC) over various air route traffic control centers (ARTCCs). It is possible to have a single general regression model for the entire continental U.S., or separate models for each ARTCC. In addition, peak models for terminal and en route centers appear possible, and improved estimates of peak ISC may be generated by regressing on component operations, consisting of departures, arrivals and overflights, rather than total daily operations. O.C.

A82-38461 **Complete flexibility and realism in radar simulation.** C. Buttars (International Aeradio, Ltd., Southall, Middx., England). *The Controller,* vol. 21, May 1982, p. 22, 23.

A digital air traffic radar simulator, developed for International Aeradio's air traffic control training school, achieves complete flexibility and realism in all aspects of radar training. The simulator uses a model flight information region to provide radar training capable of being applied anywhere in the world. The system has the capability to operate up to seven studen controller displays, each allowing combined radar/procedural exercises to be run. Three aircraft control units are provided, each capable of controlling 16 aircraft by keyboard input. The electric data display shows full aircraft data, computer replies to keyboard injected demands, and aircraft reports either as a result of keyboard injection or automatically. The simulator is programmed with the performance envelopes of 96 aircraft types (including indicated cruising speeds, rate of climb, descent speeds between three levels, and angles of bank), and allows only realistic flight characteristics. Also programmed are international standard atmosphere, and turn and indicated air speed data, which permit the aircraft to realistically simulate actual flying conditions. N.B.

A82-38462 **Future terminal area systems.** P. A. Jorgensen (Selenia-Industrie Elettroniche Associate S.p.A., Rome, Italy). *(International Federation of Air Traffic Controllers' Associations, West European Conference, Rome, Italy, Nov. 12-14, 1981.) The Controller*, vol. 21, May 1982, p. 34, 35. 6 refs.

The development of a terminal area computer system able to interface with existing flight management systems is discussed, and this type of system is intended to provide greater fuel conservation and air space capacity, with improved safety during the descent phase of flights. The system must be able to forecast a suitable approach routing, which will allow for a continuous descent of each aircraft, while also providing optimal distribution. Utilizing such a system, a controller would concentrate on monitoring the separation between the aircraft and would only rarely need to intervene in the landing process. Studies are being conducted to determine optimum approach patterns for such a system with regard to fuel conservation, safety and airspace capacity. A graph of the actual measured fuel consumption found for three different patterns - the standard descent profile, the low drag/low power approach, and a low drag/delayed flaps approach - is presented. N.B.

A82-38463 **The detection of low level wind shear. II.** P. D. Simmons. *The Controller*, vol. 21, May 1982, p. 36-38.

The Low Level Wind Shear Alert System (LLWSAS), a real-time micro-computer-controlled, data acquisition, analysis and display system for detecting horizontal wind shear near airports, is discussed, and the system's performance since its introduction by the FAA beinning in 1977 is analyzed. The system collects wind direction and wind speed data from six anemometers located near approach and takeoff areas of the airport, computes the wind gusts, and alerts controllers to wind shears by visual and audible alarms, and the information is then relayed to pilots in the area. While proof of the effectiveness of a system of this nature is extremely difficult to establish, it is noted that there have been no wind shear accidents in the US since 1977. One incident attributed to wind shear which occurred in Atlanta in 1979, but did not result in an accident, is discussed in detail. While the LLWSAS did not dectect wind shear conditions, it is shown that the wind shear occurred outside of the range of the system, but at a distance which allowed the pilot to recover and land safely. N.B.

A82-38464 **Fuel conservation: The airline - ATC.** P. M. Grundy. *The Controller*, vol. 21, May 1982, p. 39, 40, 47.

The air traffic control system has a greater impact on fuel conservation than any other factor in aviation, the most energy intensive industry in the world. The article discusses various measures that could be adopted by airlines and air traffic controllers to increase fuel conservation. These include: reducing operating empty weights, flying at optimum altitude, direct routing, linear holding, speed control, flight planning, loading for favorable center of gravity to reduce trim drag, minimizing route mileage, and clearance priorities for more fuel demanding aircraft during landing. N.B.

A82-38474 **A simplified approach to the free wake analysis of a hovering rotor.** R. H. Miller (MIT, Cambridge, MA). *(Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept. 8-11, 1981.) Vertica*, vol. 6, no. 2, 1982, p. 89-95. 19 refs.
(Previously announced in STAR as N82-18121)

A82-38475 **Calculation of the cross section properties and the shear stresses of composite rotor blades.** R. Wörndle (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). *(Deutsche Gesellschaft für Luft- und Raumfahrt, European Rotorcraft and Powered Lift Aircraft Forum, 7th, Garmisch-Partenkirchen, West Germany, Sept 8-11, 1981.) Vertica*, vol. 6, no. 2, 1982, p. 111-129. 10 refs.
(Previously announced in STAR as N82-25334)

A82-38500 # **Wind shear - Its effect on an aircraft and ways to reduce the hazard. II (Uskok wiatru - Dzialanie na samolot, srodki zmniejszajace zagrozenie. II).** J. M. Morawski and T. Smolicz (Instytut Lotnictwa, Warsaw, Poland). *Technika Lotnicza i Astronautyczna*, vol. 37, May 1982, p. 5-8. 7 refs. In Polish.

A82-38722 † **Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles (Chislennye metody resheniia kraevykh zadach beskavitatsionnogo i kavitatsionnogo obtekaniia kryl'evykh profilei).** N. Iu. Zavadovskii, S. S. Maslennikov, and A. A. Rusetskii (Tsentral'nyii Nauchno-Issledovatel'skii Institut, Leningrad, USSR). *Gidromekhanika*, no. 45, 1982, p. 3-12. 6 refs. In Russian.

Algorithms are developed for the numerical solution of the following problems of the steady flow of an ideal incompressible fluid: noncavitating flow past an airfoil section, noncavitating flow past a wing profile, and flow past a profile with partial cavitation. An essential element of these algorithms is the computation of singular integrals and the solution of singular integral equations. B.J.

A82-38781 **Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports (Symposium über Strömungen mit Ablösung, Stuttgart, West Germany, November 23-25, 1981, Vorträge).** Symposium sponsored by the Deutsche Gesellschaft für Luft- und Raumfahrt. Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1982. 147 p. In German and English. (For individual items see A82-38782 to A82-38786)

Aspects of viscous transonic airfoil flow simulation are considered along with investigations regarding vortex formation at wings with bent leading edges, leading edge separation at delta wings with curved leading edges in supersonic flow, and measurement and visualization of skin friction on the leeside of delta wings in supersonic flow. Attention is given to measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure, the topological structure of separated flows with three-dimensional boundary conditions, the calculation of boundary layers at fuselages, and a delta wing with a high vortex stability. Other topics investigated are related to an experimental study concerning two- and three-dimensional separation, and a theoretical investigation of separated flows in cascades of fluid kinetic machines. G.R.

A82-38783 # **Investigations regarding vortex formation at wings with bent leading edges (Untersuchungen über die Wirbelbildung an Flügeln mit geknickten Vorderkanten).** U. Brennenstuhl and D. Hummel (Braunschweig, Technische Universität, Brunswick, West Germany). In: Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports. (A82-38781 19-02) Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1982. 4 p. In German.

It is pointed out that modern bomber aircraft employ presently almost exclusively wings with bent leading edges. There is currently a shortage of wind tunnel data which can provide detailed information regarding the characteristics of flows around such wings. For these reasons, an experimental program involving the study of a number of wings with the considered characteristics has been conducted in West Germany. The first results obtained in connection with this program have already been reported by Brennenstuhl and Hummel (1981). The present investigation is concerned with the remainder of the results obtained in the investigation. The effect of the angle by which the leading edge is bent on the flow characteristics is considered. Attention is given to measurements concerning the pressure distribution and the flowfield. G.R.

A82-38784 # **Leading edge separation at delta wings with curved leading edges in supersonic flow (Vorderkantenablösung an Deltaflügeln mit gekrümmten Vorderkanten im Überschall).** R. Henke (Berlin, Technische Universität, Berlin, West Germany). In: Symposium on Flows with separation, Stuttgart, West Germany, November 23-25, 1981, Reports. (A82-38781 19-02) Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1982. 14 p. 6 refs. In German.

Leeside flow types for delta wings are considered, taking into account the boundary provided by the Stanbrook-Squire region which divides the separation forms 'leading edge separation' and 'shock induced separation'. Basic information regarding the flow over wings with curved leading edges was obtained in studies conducted by Henke (1980) and by Ganzer and Henke (1981). An evaluation of oil film pictures provided an impression regarding the interference characteristics for the various wing components. A number of graphs are presented for the illustration of the obtained results. Some of the pictures were obtained by means of a vapor screen technique and a schlieren method. G.R.

A82-38785 * # **Measurement and visualization of skin friction on the leeside of delta wings in supersonic flow (Messung und Sichtbarmachung der Wandschubspannungen auf der Leeseite von Deltaflügeln im Überschall).** J. Szodruch (Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, West Germany) and D. J. Monson (NASA, Ames Research Center, Moffett Field, CA). In: Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports. (A82-38781 19-02) Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1982. 9 p. 7 refs. In German.

The reported investigation was conducted with the aid of the NASA Ames High Reynolds Number Wind Tunnel. The flow conditions considered involved free stream Mach numbers of 2 and 3, and a Reynolds number of approximately 10,000,000 p. m. The employed model was a delta wing with an angle of 70 deg. A method reported by Tanner (1977) was used for the measurement of the skin friction. This method involves the use of a laser interferometer to determine the change in the thickness of an oil film. The procedure can also be employed for a visualization of skin friction in the form of interferograms. The investigation shows that skin friction measurements can provide a significant contribution to a physical understanding of the flow processes at the delta wing. G.R.

A82-38786 # **Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure (Messungen**

von Geschwindigkeitsverteilungen im Vorderkantenwirbel eines Deltaflügels mit dem Laser-Doppler-Verfahren). K. Anders (Institut fur Thermodynamik der Luft- und Raumfahrt, Stuttgart, West Germany) and E. Wedemeyer (Institut von Karman de Dynamique des Fluides, Rhode-Saint-Genèse, Belgium). In: Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports. (A82-38781 19-02) Cologne, Deutsche Gesellschaft fur Luft- und Raumfahrt, 1982. 11 p. In German.

It is pointed out that there are significant differences between the flow around a delta wing and the flow observed in the case of a conventional wing with a large aspect ratio. Vortex formation at the leading edges of delta wings produces nonlinear additional lift. Under certain conditions, a complete change of the form of the flowfield will occur above a part of the wing, and the vortex will burst. Pronounced turbulent mixing takes place, and the supersonic speed is significantly reduced. This reduction leads to a considerable decrease of the lift. Ludwieg (1960) has discussed a theory which explains the bursting process with an occurrence of instabilities. The present investigation is concerned with a study of leading edge vortices on the basis of Ludwieg's theory. Certain deviations of experimental data from results obtained on the basis of Ludwieg's theory can, perhaps, be explained by the unsymmetrical character of the vortex near the wall. G.R.

A82-38922 Calculation of level flow using radial grating (Berechnung der ebenen Strömung durch rotierende Radialgitter). E. M. Steck (Karlsruhe, Universität, Karlsruhe, West Germany). *(Gesellschaft für angewandte Mathematik und Mechanik, Wissenschaftliche Jahrestagung, Würzburg, West Germany, Apr. 21-24, 1981.) Zeitschrift für angewandte Mathematik und Mechanik.* vol. 62, Apr. 1982, p. T 233-T 235. In German.

A theoretical study of level flow through a rotating radial grating is conducted for the special case of ideal flow as well as for laminar flow in a high-viscosity newtonian fluid. A system of equations and correlative boundary conditions are developed in order to obtain the frictional and friction-free flow in the form of the integral values of the pressure and efficiency as functions of volume, blade number, Reynolds number, blade angle variation, and radian ratio. C.D.

A82-38937 # A recursive terrain height correlation system using multiple model estimation techniques. G. L. Mealy and W. Tang (Analytic Sciences Corp., Reading, MA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 105-112. 7 refs. Grant No. DAKK80-79-C-0268. (AIAA 82-1513)

This paper describes the results of an investigation of the performance capabilities of an extended Kalman filter (EKF) based recursive terrain correlation system proposed for low-altitude helicopter navigation. The major disadvantage of this concept is its sensitivity to initial position error. One method for reducing this sensitivity involves the use of multiple model estimation techniques. In the multiple model approach, a bank of identical EKFs, each of which is initialized at a different point in the a priori uncertainty basket, is employed to ensure that one filter is initialized near the true aircraft position. In this manner, the probability of filter convergence is increased substantially, leading to improved navigation performance. (Author)

A82-38938 # PNCS - A commercial flight management computer system. M. W. Bird (Lear Siegler, Inc., Instrument Div., Grand Rapids, MI). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 113-123. 5 refs. (AIAA 82-1515)

The Performance Navigation Computer System (PNCS), a system in which performance optimization, multisensor navigation, automatic guidance, and display techniques have been integrated to provide fuel-efficient operation and a lower workload for the crew is described. The PNCS guidance and flight planning capabilities derive from the integration of the optimum speed and altitude profiles computed by the performance management function with the lateral path and speed/altitude constraints of the flight plan. The performance management functions determine the climb, cruise, and descent profile segments that minimize the total trip cost, while lateral, vertical, and speed commands are fed to the autopilot and autothrottle for automatic guidance to the optimized profile. The navigation data base of the PNCS, which contains airport, route, and navigation aid data, simplifies the selection and modification of flight plans. C.R.

A82-38939 # Air-to-air missile avoidance. G. A. Mandt and T. L. Neighbor (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 124-131. 12 refs. (AIAA 82-1516)

A methodology for developing real-time missile avoidance trajectories is presented. The steps are as follows: analyzing missile systems for vulnerabilities, determining the tactics to exploit these vulnerabilities, and testing the tactics against missile simulations to determine the location and extent of maneuver effectiveness. It is noted that these maneuvers could then be placed into an on-board computer for real-time missile avoidance. Also presented is a table look-up approach. This approach permits maneuvering at longer ranges, appears better able to handle a multiple missile scenario as compared with an optimal control algorithms, and appears more feasible to implement. C.R.

A82-38940 # Pilot models for discrete maneuvers. R. K. Heffley (Systems Technology, Inc., Mountain View, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 132-142. 17 refs. (AIAA 82-1519)

Discrete maneuvers comprise a class of piloting tasks which can include fixed-wing landing flare; gross change of heading, altitude, or airspeed; helicopter or VTOL transition to hover; and helicopter nap-of-the-earth dash and quick-stop. While these maneuvers may appear to differ fundamentally from basic tracking tasks, pilot models can be constructed using the same mathematical forms. Several examples of discrete-maneuver pilot models are presented along with accompanying flight and simulator data. The value of such models is discussed with regard to handling qualities, simulator fidelity, and pilot training. The main benefit is the ability to exploit pilot-in-the-loop analysis more effectively by formulating a complete pilot-vehicle-task context. (Author)

A82-38941 # Design and flight testing of digital direct side-force control laws. S. L. Grunwald (USAF, Washington, DC) and R. F. Stengel (Princeton University, Princeton, NJ). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 143-151. 15 refs. Contract No. N00014-78-C-0257. (AIAA 82-1521)

Three-input/three-output command augmentation control laws designed and tested in flight using Princeton University's variable-response research aircraft are discussed. It is noted that the controllers were based on algebraic model-following, a fast and efficient method of direct digital synthesis for advanced control modes. Pilot opinions of several command modes and controller-to-command pairings are presented here. Flat turns, lateral translation, and roll control are investigated. Of the command modes tested, foot pedals-to yaw rate, lateral stick-to-roll rate, and thumb lever-to-sideslip angle are found to give the best overall ratings. C.R.

A82-38942 # Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight. E. W. Aiken (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 152-164. 15 refs. (AIAA 82-1522)

Two piloted simulator experiments were conducted to assess the effects of side-stick-controller characteristics and level of stability and control augmentation on handling qualities for helicopter terrain flight. A composite of several evaluation tasks was flown with the aid of a head-up display of flight-control symbology. Variations in force-deflection characteristics and the number of axes controlled through a side-stick were investigated. Satisfactory handling qualities were achieved with a two-axis displacement controller and angular rate stabilization. Attitude stabilization was required to maintain adequate handling qualities for either a three- or four-axis rigid controller. (Author)

A82-38943 * # The effects of time delays on systems subject to manual control. R. A. Hess (NASA, Ames Research Center, Moffett Field, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 165-172. 13 refs.

Results are presented of an experimental study to determine the effects of time delays in manual control systems. A simple, fixed-base laboratory simulation facility is used for determining pilot dynamics and tracking performance in a series of single-axis, compensatory tracking tasks. In these tasks, three time-delay values and three controlled-element dynamics are used. The delays are chosen to encompass values encountered in experimental and operational aircraft. It is noted that the controlled-element dynamics replicate those found in many previous manual control studies, that is, the classical displacement, rate, and acceleration control systems. The experimental effort is complemented with an analytical pilot modeling study where the parameters of a structural model of the human pilot are adjusted so as to provide excellent matches to the experimentally determined pilot dynamics. The experimental and analytical studies both indicate that time delays cause significant changes in pilot equalization requirements. C.R.

A82-38944 * # Modal control of relaxed static stability aircraft. R. H. Rooney, J. C. Chung, and E. Y. Shapiro (Lockheed-California Co., Burbank, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 173-176. Contract No. NAS1-15326. (AIAA 82-1524)

A method is developed that assigns a selected portion of a closed loop system eigenstructure in accordance with certain desirable critera. The method is applied here to a relaxed static stability aircraft, the goal being to synthesize a control law that provides the unstable aircraft with handling qualities equal to or better than those of a comparable statically stable aircraft. It is shown that by using the target system eigenstructure, good flight characteristics are achieved by the unstable aircraft. It is also shown that improved characteristics can be obtained by assigning an orthogonal eigenvector structure. C.R.

A82-38954 # **An X-Wing aircraft control system concept.** A. J. Potthast (Lockheed-California Co., Burbank, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 257-265. 13 refs. (AIAA 82-1540)

X-Wing aircraft technology development has, as an ultimate goal, a Vertical Take-Off and Landing (VTOL) aircraft with fast tactical response, long range, and high speed that can be operated from frigates and large destroyers. The proposed aircraft combines a circulation control air rotor/wing and control system with a conventional aircraft fuselage and 'fan-in-fin' tail. Cyclic and collective modulation of rotor/wing circulation control air combined with rotor/wing hub moment feedback and conventional feedback provides continuous stability and control during rotary, conversion, and fixed wing modes of flight. The control concept is described and test results from full and 1/4-scale models are compared with predicted data. Conclusions are drawn relative to concept application to the X-wing aircraft. (Author)

A82-38959 # **A design criterion for highly augmented fly-by-wire aircraft.** C. R. Abrams (U.S. Navy, Air Development Center, Warminster, PA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 410-419. 8 refs. (AIAA 82-1570)

The present investigation is concerned with a versatile control criterion for highly augmented fly-by-wire aircraft which can provide optimized mission-oriented performance. Based on an optimization process for a second order system, a Time Response Parameter (TRP) has evolved which can be adapted to a variety of mission phases and new flight modes. The TRP approach has demonstrated definite trends with both Pilot Ratings and Pilot Induced Oscillation Ratings, and is also compatible with other transient response criteria. The TRP criterion can be readily applied to high order, nonlinear, and multivariable control systems, and is easily computerized for continuous evaluation of control system design. It is pointed out that the use of such criteria will promote the utilization of military aircraft as a weapons platform through more effective flight control design. G.R.

A82-38980 # **Generic faults and design solutions for flight-critical systems.** S. S. Osder (Sperry Flight Systems, Phoenix, AZ). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 509-518. 17 refs. (AIAA 82-1595)

The term 'generic fault' is employed to describe design defects which elude the test and analysis procedures used to validate a redundant control system design. Although the existence of such defects can be postulated in any type of system, the generic fault concept is especially significant in the flight-critical system application because it defeats the massive redundancy strategies which designers rely on to meet safety or reliability objectives. Various types of generic faults are examined, taking into account computation and scaling, timing, logical errors, hardware and firmware defects, latent failure effects, and aspects of real-time clock failure. A description is presented of solutions using decoupled, nonsynchronous architectures. It is found that dissimilar redundancy and brick-wall separation strategies are viable approaches to overcome generic-fault vulnerabilities. Their implementation requires unsynchronized channel operation. G.R.

A82-38981 * # **The use of differential pressure feedback in an automatic flight control system.** D. W. Levy, J. Roskam, and P. D. Finn (Kansas University Center for Research, Inc., Flight Research Laboratory, Lawrence, KS). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 519-524. Grant No. NAG4-5. (AIAA 82-1596)

A feasibility study has been performed to evaluate the performance of a system whereby a control surface is positioned with differential pressure as the feedback variable. Analogous to a position command system, the control surface is commanded to move until a certain differential pressure is achieved at a given point on the surface. Frequency response tests and theoretical considerations indicate that the pressure feedback transfer function is first order, with a break frequency up to 50 rad/sec. There exist applications to the outer loops of flight control systems as well. Stability augmentation, gust alleviation, and stall prevention appear to be possible by feeding back differential pressure across lifting and control surfaces. (Author)

A82-38982 # **A preliminary laboratory evaluation of a reconfigurable integrated flight control concept.** A. P. DeThomas (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH) and S. C. Goel (Systems Control Technology, Inc., West Palm Beach, FL). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 525-530. 5 refs. (AIAA 82-1597)

The present investigation is concerned with the concept of virtual redundancy as a means of maintaining the reliability of the flight control function within an integrated architecture. Virtual redundancy involves the reconfiguring of the system resources to create redundancy on demand. Virtual redundancy is invoked by the system executive by causing some known good processor to compute a solution which can break the tie between disagreeing processors. An implementation in software for the case of Virtual Flight Control redundancy is discussed. Attention is given to an examination of virtual redundancy as a means of fault isolation for cross-channel monitoring when only two signals are present, a general assessment of the feasibility of virtual redundancy and system reconfiguration to enhance coverage and recover function lost due to failures, redundancy management, and failure detection and isolation. G.R.

A82-38986 # **The ideal controlled element for real airplanes is not K/s.** C. R. Chalk (Calspan Corp., Buffalo, NY). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 556-560. (AIAA 82-1606)

The early experiments performed to generate data to support development of mathematical models of the human operator used simple controlled element transfer functions, including K, and K/s. However, when the physical system being controlled has mass and the response state being controlled is position, the K and K/s transfer function forms are physically impossible because infinite acceleration capability would be required for abrupt commands. It is found that the roll angular acceleration and the lateral linear accelerations at the pilot station are important considerations in flying qualities. The angular and linear accelerations can become objectionably high when the roll damping is very high and the height above the X stability axis is large. It is pointed out that roll ratchet is best explained by a model that assumes the pilot is closing the aileron loop on angular acceleration response cues. G.R.

A82-38988 # **An alternate method of specifying bandwidth for flying qualities.** J. Hodgkinson, J. R. Wood (McDonnell Aircraft Co., St. Louis, MO), and R. H. Hoh (Systems Technology, Inc., Hawthorne, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 571-578. 6 refs. (AIAA 82-1609)

It is pointed out that the task of predicting the flying qualities of a modern fighter aircraft has been complicated by the use of highly augmented control systems. Control systems intended to improve flying qualities have often degraded them instead. These degradations were unexpected because the criteria used to predict the aircraft's flying qualities were invalid, or were incorrectly interpreted, for augmented aircraft. Therefore, in the 'Proposed MIL Standard/Handbook - Handling Qualities of Piloted Airplanes', criteria for augmented aircraft are emphasized. The bandwidth criterion specifies the quality of aircraft attitude dynamics. A refined version of the bandwidth criterion is proposed. The new version offers two specific advantages as compared with the original version. It deals with the bandwidth sensitivity problem and, by using a Nichols chart, it encourages the designer to view the entire open- and closed-loop frequency responses simultaneously. G.R.

A82-38989 # **Investigation of low order lateral directional transfer function models for augmented aircraft.** D. E. Bischoff and R. E. Palmer (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 579-586. 11 refs. (AIAA 82-1610)

The high order transfer functions representing the lateral directional responses of augmented aircraft to pilot control inputs were matched in the frequency domain with two candidate low order equivalent forms: (1) the complete three degree of freedom representation of roll and sideslip angle responses, and (2) the single degree of freedom roll mode and Dutch roll approximations. Acceptable models were generally obtained for both forms. Simultaneous matching of sideslip and roll angle responses and/or a priori information for the roots was required to match the full three degree of freedom forms. The equivalent system models are discussed in terms of their match statistics and their modal parameters are compared against the requirements of the military flying qualities specification. (Author)

A82-38990 * # **An analysis of a nonlinear instability in the implementation of a VTOL control system during hover.** J. M. Weber (NASA, Ames Research Center, Moffett Field, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926

19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 587-596. 7 refs. (AIAA 82-1611)
(Previously announced in STAR as N82-22281)

A82-38995 # **Target acquisition system/air-to-surface weapon compatibility analysis.** A. R. Mitchell (Analytic Sciences Corp., Reading, MA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 638-642. (AIAA 82-1618)

The paper presents a simple, closed form method which has been developed for compatibility analysis of an autonomous target acquisition system with an air-to-surface weapon. The output is a probability distribution for expected target location at the moment of potential weapon release. Compatibility is measured by the probability that the target lies in the footprint of the released weapon. The method uses statistical input data on terrain masking, atmospheric obscuration, and the acquisition system timeline from first target detection through classification, designation and weapon release. Generic results are presented for a hypothetical target acquisition system. (Author)

A82-38998 # **The Shiryayev sequential probability ratio test for redundancy management.** J. L. Speyer and J. E. White (Texas, University, Austin, TX). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 658-666. 10 refs. (AIAA 82-1623)

An essential aspect in the design of fault tolerant digital flight control systems is the design of failure detection and redundancy management systems. A decision rule, the Shiryayev sequential probability ratio test (SPRT), is used to detect failures between similar instruments, as well as between dissimilar instruments through analytic redundancy. Unlike the Wald SPRT, which tests for the presence of failure or no failure in all of the data sequence, the Shiryayev SPRT detects the occurrence of a fault in the data sequence in minimum time if certain conditions are met. The performance of the Shiryayev SPRT in detecting a failure between two rate gyros as compared to standard fixed interval schemes is presented, as is the performance for a single accelerometer failure using translational kinematic equations to form a parity relation for analytic redundancy. (Author)

A82-39003 # **X-29A flight control system design experiences.** J. Chin, H. Berman, and J. Ellinwood (Grumman Aerospace Corp., Bethpage, NY). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 703-713. 11 refs. (AIAA 82-1538)

The X-29A aircraft is a technology demonstrator consisting of a structurally tailored forward swept wing, an automatic camber control concept to increase aerodynamic efficiency, a high level of aircraft relaxed static stability (RSS), and a digital fly-by-wire flight control system using control laws designed via modern optimal control techniques. A description is presented of the considerations exercised during the design and development of the flight control system (FCS), and attention is given to the uniqueness of the X-29A aircraft which led to high levels of RSS for minimum FCS requirements. The advantages of RSS are discussed along with the longitudinal control requirements, the control modes, aspects of control law development, and questions of flight control system validation. G.R.

A82-39009 * # **The effects of atmospheric turbulence on a quadrotor heavy lift airship.** M. B. Tischler and H. R. Jex (Systems Technology, Inc., Hawthorne, CA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 767-776. 15 refs. Contract No. NAS2-10330. (AIAA 82-1542)

The response of a quadrotor heavy lift airship to atmospheric turbulence is evaluated using a four-point input model. Results show interaction between gust inputs and the characteristic modes of the vehicle's response. Example loop closures demonstrate tradeoffs between response regulation and structural loads. Vehicle responses to a tuned discrete wave front compare favorably with the linear results and illustrate characteristic HLA motion. (Author)

A82-39011 # **Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability.** O. D. Starkey, J. D. Kerr, and L. D. Hall (Teledyne, Inc., Teledyne Geotech, Garland, TX). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 785-788. (AIAA 82-1585)

Among disturbing environmental mechanisms are tidal variations in gravity, natural and cultural seismic activity, and acoustic excitation of components. An analysis is presented of these disturbances. Also described is the development of a vault that isolates the sensors from external disturbances yet provides close coupling to the test pad. Initial tests carried out on a prototype vault installed in February 1982 show that a feedback-type seismometer can include a sustained oscillation within its housing. A possible analysis of this phenomenon is included. C.R.

A82-39013 # **Avoiding the pitfalls in automatic landing control system design.** A. A. Lambregts (Boeing Commercial Airplane Co., Seattle, WA). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 799-809. (AIAA 82-1599)

This paper relates recent experiences at Boeing with the development and flight testing of improved automatic landing flare control laws for the B-737 and B-747 aircraft. Some earlier designs and their limitations are reviewed. Basic requirements for flare law initiation, command synchronization, feedback signal sources and characteristics, inner loop configurations, elevator control band width and throttle control are discussed. Experiences and potential pitfalls in the development of integrated glide slope and flare control laws for improving an existing B-747-SP design and for a new B-737 SP-177 autopilot are described. Analog computer design constraints are reviewed. A 'variable tau' flare law concept, using groundspeed to reduce longitudinal dispersion and achieve a constant flare height are discussed as well as an 'explicit trajectory' flare control concept to achieve the same goals, along with flight test results. New design options using digital computers are pointed out. (Author)

A82-39016 # **Flight control synthesis using robust output observers.** E. G. Rynaski (Calspan Advanced Technology Center, Buffalo, NY). In: Guidance and Control Conference, San Diego, CA, August 9-11, 1982, Collection of Technical Papers. (A82-38926 19-18) New York, American Institute of Aeronautics and Astronautics, 1982, p. 825-831. (AIAA 82-1575)

A brief investigation is made of the application of robust output observer theory to the design of flight control systems for advanced aircraft configurations. Observer theory is seen as a natural design tool because the resulting observers are in themselves unobservable and do not increase the order of the closed-loop response, thereby more closely satisfying flying qualities requirements. Examples are adduced to show that the observer configuration is not unique in either the observer poles or the output sensors and that many different control system configurations using a variety of sensors can be designed to yield identical closed-loop dynamic behavior. In this way, it becomes possible to incorporate considerable analytic and physical redundancy into nearly any flight control system. C.R.

A82-39081 # **Handling qualities criteria for flight path control of V/STOL aircraft.** M. B. Tischler and R. H. Hoh (Systems Technology, Inc., Hawthorne, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1292.* 10 p. 14 refs. Contract No. N62269-80-C-0290.

Tentative handling qualities criteria for V/STOL path control have been developed based on a study of bandwidth requirements and lower-order equivalent system representations. This work extends the equivalent system concept from singleloop to multiloop applications. Numerical results show the significant influence of inter-axis coupling on maximum attainable piloted bandwidth. Preliminary fixed-base simulation results verify the expected trends and correlate well with the analytically derived boundaries proposed in this paper. (Author)

A82-39082 * # **Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack.** M. Lapins, R. W. Klein, R. P. Martorella, J. Cangelosi (Grumman Aerospace Corp., Bethpage, NY), and W. R. Neely, Jr. (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA. Aug. 9-11, 1982, Paper 82-1295.* 19 p. 10 refs.

A piloted simulator evaluation of the stability and control characteristics of a relaxed static stability fighter aircraft was conducted using a differential maneuvering simulator. The primary purpose of the simulation was to evaluate the effectiveness of the limiters in preventing departure from controlled flight. The simulation was conducted in two phases, the first consisting of open-loop point stability evaluations over a range of subsonic flight conditions, the second concentrating on closed-loop tracking of a preprogrammed target in low speed, high angle-of-attack air combat maneuvering. The command limiters were effective in preventing departure from controlled flight while permitting competent levels of sustained maneuvering. Parametric variations during the study included the effects of pitch control power and wing-body static margin. Stability and control issues were clearly shown to impact the configuration design. C.D.

A82-39083 # **In-Flight investigation of large airplane flying qualities for approach and landing.** N. C. Weingarten and C. R. Chalk (Calspan Advanced Technology Center, Buffalo, NY). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1296.* 13 p. 9 refs. Contract No. F33615-79-C-3618.

A study of the handling qualities of large airplanes in the approach and landing Flight Phase was performed utilizing the USAF-AFWAL/Calspan Total In-Flight Simulator. A one-million pound statically unstable airplane model was used as a baseline about which variations were made. The primary variables were relative pilot position with respect to center of rotation, command path time delays and phase shifts, augmentation schemes and levels of augmentation. The results indicate that the approach and landing task with very large airplanes is a fairly low bandwidth task. Low equivalent short-period frequencies and relatively long time delays can be tolerated. As the pilot position is moved aft towards and then behind the center of rotation, pilot ratings are degraded. (Author)

A82-39084 * # Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011. J. J. Rising (Lockheed-California Co., Burbank, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1297.* 10 p. 5 refs. Contract No. NAS1-15326.

The L-1011 has been flight tested to demonstrate the relaxed static stability concept as a means of obtaining significant drag benefits to achieve a more energy efficient transport. Satisfactory handling qualities were maintained with the design of an active control horizontal tail for stability and control augmentation to allow operation of the L-1011 at centers of gravity close to the neutral point. Prior to flight test, a motion base visual flight simulator program was performed to optimize the augmentation system. The system was successfully demonstrated in a test program totaling forty-eight actual flight hours. (Author)

A82-39085 # Supersonic missile aerodynamic and performance relationships for low observables mission profiles. R. J. Krieger (McDonnell Douglas Astronautics Co., St. Louis, MO). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA. Aug. 9-11, 1982, Paper 82-1298.* 11 p. 8 refs.

Closed-form analytical relationships are developed between supersonic missile aerodynamic characteristics such as lift, zero-lift drag and drag due-to-lift and performance parameters such as range, velocity, specific range, flight path angle and maneuver load factor. These relationships apply to low observable missile flight profiles for long range cruise and glide missions. The analytical relationships are developed for climb, cruise, glide, dive, and run-in segments. The results include equations for use in closed-form performance estimates and guiding configuration development. (Author)

A82-39090 * # Applications of parameter estimation in the study of spinning airplanes. L. W. Taylor, Jr. (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1309.* 7 p. 12 refs.

Spinning airplanes offer challenges to estimating dynamic parameters because of the nonlinear nature of the dynamics. In this paper, parameter estimation techniques are applied to spin flight test data for estimating the error in measuring post-stall angles of attack, deriving Euler angles from angular velocity data, and estimating nonlinear aerodynamic characteristics. The value of the scale factor for post-stall angles of attack agrees closely with that obtained from special wind-tunnel tests. The independently derived Euler angles are seen to be valid in spite of steep pitch angles. Estimates of flight derived nonlinear aerodynamic parameters are evaluate; in terms of the expected fit error. (Author)

A82-39091 * # Analysis of general-aviation accidents using ATC radar records. R. C. Wingrove and R. E. Bach, Jr. (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1310.* 8 p. 12 refs.

It is pointed out that general aviation aircraft usually do not carry flight recorders, and in accident investigations the only available data may come from the Air Traffic Control (ATC) records. A description is presented of a technique for deriving time-histories of aircraft motions from ATC radar records. The employed procedure involves a smoothing of the raw radar data. The smoothed results, in combination with other available information (meteorological data and aircraft aerodynamic data) are used to derive the expanded set of motion time-histories. Applications of the considered analytical methods are related to different types of aircraft, such as light piston-props, executive jets, and commuter turboprops, as well as different accident situations, such as takeoff, climb-out, icing, and deep stall. G.R.

A82-39092 * # An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions. B. N. Pamadi and L. W. Taylor, Jr. (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1311.* 14 p. 21 refs.

The problem of estimating the aerodynamic characteristics of a wing body configuration of a spinning airplane at extreme angles of attack and spin rates is approached by the application of strip theory. Semiempirical methods are used to estimate the aerodynamic force distributions over each component using static, nonrotational wind-tunnel test data. To these predictions, corrections are applied to account for the primary rotational flow effects which are significant at large spin rates. The results of this modified strip theory are shown to be in good agreement with spin tunnel rotary balance test data. (Author)

A82-39093 * # A simple, low cost application of a flight test parameter identification system. R. Clarke and J. Roskam (Kansas, University, Lawrence, KS). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1312.* 9 p. 9 refs. Grant No. NsG-4019.

The flight test system combines state-of-the-art microprocessor technology and high accuracy instrumentation with parameter identification technology which minimize data and flight time requirements. The system was designed to avoid permanent modifications of the test airplane and allow quick installation. It is capable of longitudinal and lateral-directional stability and control derivative estimation. This paper presents details of this system, calibration and flight test procedures, and the results of the Cessna 172 flight test program. The system has proven easy to install, simple to operate, and capable of accurate estimation of stability and control parameters in the Cessna 172 flight tests. (Author)

A82-39094 # Parameter estimation applied to general aviation aircraft - A case study. W. R. Wells (Wright State University, Dayton, OH) and V. Klein (George Washington University, Washington, DC; Joint Institute for Advancement of Flight Sciences, Hampton, VA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1313.* 12 p. 27 refs.

NASA is currently involved in extensive general aviation stall-spin studies. In undertaking the stall-spin research, the aircraft dynamics in pre and post stall regimes must be understood. A case study is presented of the application of parameter estimation methods to problems of general aviation aircraft. The research areas considered are related to control input selection, data compatibility, identification algorithms, unsteady aerodynamic modeling, and model structure determination. Several recent advances in the application of systems identification are summarized using the aircraft as subject. These advances are concerned with such techniques as stepwise regression algorithms, design of optimal control selection for parameter estimation, use of Kalman filtering in data compatibility checks, frequency domain identification algorithms, and high angle of attack formulation. It is shown that the discipline of systems identification can be quite effective in improving the knowledge of the flight mechanics of general aviation aircraft. G.R.

A82-39098 * # Dynamic load measurements with delta wings undergoing self-induced roll-oscillations. D. Levin and J. Katz (Technion-Israel Institute of Technology, Haifa, Israel). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1320.* 11 p. 11 refs. Grant No. NAGW-00218.

The aerodynamic forces acting on a delta wing, mounted on a free-to-roll sting-balance apparatus, were measured. Two wing planforms having leading edge sweeps of 76 and 80 deg were tested, but only the wing with the 80 deg sweep would undergo periodic self-induced roll oscillation. The time dependent forces and roll angles for this wing were then recorded for various test conditions. In these tests a considerable drop in the average normal force of the free-to-roll wing was measured, relative to the normal force obtained in the static tests. Also, the helium-bubble flow visualization technique was used to gain some insight into the periodic motion of the separated leading edge vortices. (Author)

A82-39099 * # High angle-of-attack characteristics of a forward-swept wing fighter configuration. S. B. Grafton, W. P. Gilber, M. A. Croom, and D. G. Murri (NASA, Langley Research Center, Hampton, VA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1322.* 19 p. 13 refs.

The NASA-Langley Research Center is currently investigating the high angle-of-attack characteristics of a forward-swept wing fighter technology demonstrator in a cooperative program with the Defense Advanced Research Projects Agency. The program includes static and dynamic wind-tunnel force tests, free-flight model tests, spin-tunnel tests, and piloted simulation. Particular emphasis is placed on identifying the contributions of the forward-swept wing to the configuration aerodynamics at high angles of attack. Results are presented to illustrate the wing contributions in terms of aerodynamic stability, flow visualization, and observation of free-flight characteristics. (Author)

A82-39100 # The use of small strakes to reduce interference drag of a low wing, twin engine airplane. T. E. Wallis, D. R. Ellis (Cessna Aircraft Co., Wichita, KS), and W. H. Wentz, Jr. (Wichita State University, Wichita, KS). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1323.* 13 p. 5 refs.

This paper discusses the effect of small strakes on the interference drag of a low wing, twin engine airplane. The strakes, highly swept delta wing semi-spans with a root chord 18 percent of the wing MAC, provide a strong streamwise vortex at high angles of attack. They are placed on the fuselage and nacelles at the wing leading edge. Both full scale and wind tunnel tests are discussed. The strakes, in the proper location, provide a reduction in interference drag, increases in maximum lift coefficient and lift to drag ratio at high angles of attack, a broader range of high lift coefficients, and less abrupt stall characteristics. (Author)

A82-39102 * # **Dynamic stability of flexible forward swept wing aircraft.** T. A. Weisshaar and T. A. Zeiler (Purdue University, West Lafayette, IN). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1325.* 12 p. 25 refs. Grant No. NAG1-157.

This paper describes potential vehicle instability modes for forward swept wing aircraft and other divergence prone aircraft. Examples show that either body-freedom flutter or aircraft aeroelastic divergence may occur depending upon the airplane planform geometry and mass distribution. These vehicle instabilities may occur at speeds very different than the clamped wing aeroelastic divergence speed. (Author)

A82-39103 # **Optimal three-dimensional turning performance of supersonic aircraft.** C.-F. Lin (Wisconsin, University, Madison, WI). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1326.* 10 p. 17 refs.

This paper discusses real-time, on-line three-dimensional turning maneuvers of supersonic aircraft with emphasis on the problems of minimum-time and minimum-fuel turns. The minimum-time problem is completely solved. For the minimum-fuel case, the problem of minimum-fuel turn to a line is solved while suggestions for further research on minimum-fuel turn in three dimensions are presented. Two mathematical models of the aerodynamic and engine characteristics are designed to facilitate the application of the optimal control theory to analyze a wide range of flight programs. One such model is a typical lightweight, high thrust-to-weight ratio fighter used for the computation of minimum-time problem. The other is a rocket-powered aircraft used for the computation of the minimum-fuel problem. (Author)

A82-39105 # **The correlation of flight test and analytic M-on-N air combat exchange ratios.** D. S. Hague (Aerophysics Research Corp., Bellevue, WA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1328.* 6 p. Contract No. F33615-80-C-3003.

This paper compares analytic and flight test predictions of Many-on-Many air combat performance capability. It is shown that stochastic effects dominate air combat encounter outcomes and that air combat performance estimates should be based on a large sample of encounters. Overall exchange ratios, the number of red losses per blue loss, predicted by flight test and analysis are within 5% of each other. Trends in exchange ratio with force size obtained by the two methods are also similar. Finally, it is shown that air combat performance is sensitive to both force size ratio and the total number of aircraft engaged and that differences in performance between aircraft types may diminish with increasing aircraft numbers. (Author)

A82-39106 * # **Unique flight characteristics of the AD-1 oblique-wing research airplane.** R. E. Curry and A. G. Sim (NASA, Flight Research Center, Edwards, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1329.* 8 p. 9 refs.

Flight characteristics associated with an oblique-wing airplane have been studied with limited scope and complexity using the AD-1 research vehicle. The AD-1 is a low-speed, low-cost, manned airplane with an aeroelastically tailored wing that can be pivoted 0 to 60 deg asymmetrically. Results of the flight tests include aerodynamic parameter extraction, verification of the aeroelastic wing design criteria, trim requirements, stall characteristics, and an evaluation of the handling qualities and basic control system requirements. Some of the unique characteristics of these results that pertain to the oblique-wing design are presented. (Author)

A82-39107 * # **Analysis of in-trail following dynamics of CDTI-equipped aircraft.** J. A. Sorensen and T. Goka (Analytical Mechanics Associates, Inc., Mountain View, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1330.* 10 p. 14 refs. Contract No. NAS1-16135.

In connection with the necessity to provide greater terminal area capacity, attention is given to approaches in which the required increase in capacity will be obtained by making use of more automation and by involving the pilot to a larger degree in the air traffic control (ATC) process. It was recommended that NASA should make extensive use of its research aircraft and cockpit simulators to assist the FAA in examining the capabilities and limitations of cockpit displays of traffic information (CDTI). A program was organized which utilizes FAA ATC (ground-based) simulators and NASA aircraft and associated cockpit simulators in a research project which explores applications of the CDTI system. The present investigation is concerned with several questions related to the CDTI-based terminal area traffic tactical control concepts. Attention is given to longitudinal separation criteria, a longitudinal following model, longitudinal capture, combined longitudinal/vertical control, and lateral control. G.R.

A82-39117 * # **Flight dynamics of rotorcraft in steep high-g turns.** R. T. N. Chen (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1345.* 16 p. 21 refs.

An analyticl procedure developed to permit a systematic examination of rotorcraft flight dynamics in steep high-g turns is presented. The procedure is used in a numerical investigation of a tilt-rotor aircraft and three single-rotor helicopters that have different types of main rotor systems. The results indicate (1) that strong coupling in longitudinal and lateral-directional motions exists for these rotorcraft in high-g turns; (2) that for single-rotor helicopters, the direction of turn has a significant influence on flight dynamics; and (3) that a stability and control augmentation system that is designed on the basis of standard small-disturbance equations of motion from steady straight and level flight and that otherwise performs satisfactorily in operations near 1 g, becomes significantly degraded in steep turning flight. (Author)

A82-39118 * # **A ground-simulation investigation of helicopter decelerating instrument approaches.** J. V. Lebacqz (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1346.* 11 p. 24 refs.

In connection with the expansion of civil helicopter operations in the current era, the effect of helicopter flight and control characteristics on the flying qualities for instrument flight rules (IFR) flight have become a factor of concern, and a research program has been initiated to investigate IFR certification criteria. A description is presented of an experiment which is the sixth in a series of ground- and flight-simulation investigations. This piloted-simulator experiment was conducted to examine the influence of stability-control augmentation, display information format, and approach-task effects on helicopter flying qualities for terminal-area operations incorporating a deceleration in instrument meteorological conditions. Simulated test configurations were evaluated for precision approaches with an instrument deceleration from 60 to about 15 knots in both calm air and simulated moderate turbulence and wind shear. G.R.

A82-39119 # **Maneuver stability of a vehicle with a towed body.** B. L. Nagabhushan (Goodyear Aerospace Corp., Defense Systems Div., Akron, OH) and E. M. Cliff (Virginia Polytechnic Institute and State University, Blacksburg, VA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1347.* 9 p. 8 refs. Research supported by the Virginia Polytechnic Institute and State University.

Nonlinear equations of motion are derived and subsequently linearized to describe the coupled dynamics of a vehicle with a towed body. Using these stability of an aircraft with a sling load has been determined for simple maneuvers where the vehicle is maintaining a straight and level flight path or performing a steady turn. The effect of orienting the corresponding thrust vector of the aircraft on the system stability is examined by considering the thrust (1) fixed in inertial space, (2) fixed with respect to the vehicle relative wind. Typically, towing cable length, towed body to vehicle mass ratio, and load factor in a turn have been found to affect stability of the aircraft and its sling load. These results are illustrated here with an example of a maneuvering helicopter with a sling load. (Author)

A82-39120 # **Application of multivariable model following method to flight controller.** K. Kanai (Defense Academy, Yokosuka, Japan), P. N. Nikiforuk (Saskatchewan, University, Saskatoon, Canada), S. Uchikado, and N. Hori. *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1349.* 7 p.

The present investigation is concerned with the problem of designing a model following control system for a multivariable linear plant, taking into account an application to the synthesis of a multiinput multioutput flight controller. Attention is given to a problem statement, the construction of a model following system via state feedback plus input dynamics, and the synthesis of a Control Configured Vehicle (CCV) controller. It is found that the construction of a model following system via state feedback with input dynamics compensator becomes possible even for the case of the singular control matrix. Using the proposed method, CCV modes, such as desirable precision maneuvers, independent velocity, and altitude changes, are achieved. G.R.

A82-39121 # **Design and analysis of a multivariable control system for a CCV-type fighter aircraft.** D. B. Ridgely, S. S. Banda (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH), and J. T. Silverthorn (USAF, Wright Aeronautical Laboratories and Institute of Technology, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1350.* 8 p. 10 refs.

The theory of high-gain, error-actuated feedback control was applied to the design of a longitudinal decoupling flight control system for an advanced fighter aircraft. Because of the structure of the system, measurement variables different from the outputs are necessary to apply this method. This paper describes how entire eigenstructure assignment can be used to determine appropriate measurement equations by assigning their corresponding transmission zeros. A singular value decomposition was used to choose the eigenvectors from their permissible subspaces. Proper selection of eigenvalues/eigenvectors was shown to be crucial to the successful application of this theory. (Author)

A82-39122 # An MLS with computer aided landing approach. M. N. Wagdi (Riyadh, University, Riyadh, Saudi Arabia). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1352.* 9 p. 5 refs.

A computerized landing approach path definition that utilizes the MLS radio navigational aid is presented. An algorithm is developed which identifies the minimum time path that connects the initial MLS engage point to the touch down point. Such path is generally composed of two segments. The first segment begins at the MLS engage point and ends at the beginning of the straight glide slope. The second segment starts at the beginning of the straight glide slope and ends at the touch down point. The MLS azimuth and elevation and DME signals are processed by an on board computer that displays on a CRT the aircraft position relative to the ideal position of the optimal computed landing pattern. The present technique allows the initiation of landing approaches from wide range of headings and elevations, thus resulting into more efficient terminal area traffic control. Also it is suitable for low visibility landing approaches. (Author)

A82-39123 # Perspectives of the flying qualities specification. S. G. Fuller and D. J. Moorhouse (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1354.* 9 p. 24 refs.

A combined flying qualities and flight controls conference was held to discuss proposed changes to MIL-F-8785C and MIL-F-9490D. These changes were primarily due to the new MIL-Standard and Handbook format being developed. A summary is presented of the formal and informal presentations and the discussions related to flying qualities topics. Included are organization of the requirements, equivalent systems, alternate criteria, atmospheric disturbance effects and the relationship of the flying qualities and flight control system requirements. In recent years the flying qualities specification has lost credibility. Results of this credibility loss and the solutions for the future are discussed. (Author)

A82-39124 # Guidance for the use of equivalent systems with MIL-F-8785C. T. A. Gentry (USAF, Flight Dynamic Laboratory, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1355.* 11 p. 20 refs.

It is pointed out that handling qualities requirements for military conventional aircraft are specified in MIL-F-8785C, Military Specifications - Flying Qualities of Piloted Airplanes'. This specification places requirements on the characteristics of the overall aircraft system as perceived by the pilot during piloted control. An application of the specification in the case of conventional aircraft presents no difficulties. However, there may be problems with more complex flight control systems. In order to compare future augmented aircraft systems to MIL-F-8785C the equivalent system approach has been suggested. The present investigation provides guidance in the application of the equivalent system approach to augmented aircraft longitudinal dynamics and similar application to lateral-directional dynamics where appropriate. The equivalent of an augmented system is actually produced by matching the actual high-order system with an equivalent low-order system. G.R.

A82-39125 * # A modern approach to pilot/vehicle analysis and the Neal-Smith criteria. B. J. Bacon and D. K. Schmidt (Purdue University, West Lafayette, IN). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1357.* 10 p. Grant No. NAG4-1.

The present investigation is concerned with the development of a better pilot modelling technique via optimal control theory, taking into account concepts concerning 'pilot rating' considered by Neal and Smith (1970). The investigation conducted by Neal and Smith had the objective to provide data on the effects of Flight Control System dynamics and to develop a design criterion capable of pinpointing pilot problem areas encountered in performing a given task. Neal and Smith devised a 'pilot-in-the-loop' analysis capable of showing problem areas in pitch attitude tracking. Unfortunately the employed method has some drawbacks. The current investigation attempts, therefore, to provide an alternate approach which makes use of an optimal-control pilot model. An optimal control model (OCM) had been discussed by Kleinman et al. (1970). It is shown that the alternate approach, based on the OCM, offers some distinct advantages. G.R.

A82-39128 # Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure. K. D. Tillotson (General Dynamics Corp., Pomona, CA) and A. E. Fuhs (U.S. Naval Postgraduate School, Monterey, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1361.* 10 p. 8 refs. Navy-supported research.

A static pressure probe was tested to determine the feasibility of using the probe, as an integral part of a missile nose, to sense missile altitude. Experiments were conducted at Mach 2.0 and at Mach 1.51. At Mach 2.0, the static pressure probe will perform within altitude specifications of 25,000 feet + or - 2,000 feet at angles-of-attack ranging from - 8 to + 8 degrees. At Mach 2.0, within an angle-of-attack ranging from 0 to 6 degrees, the probe will measure free stream static pressure within 4 percent; a 4 percent error in measurement is equivalent to an altitude error of 900 feet. The missile nose shock will remain downstream of the probe pressure ports for flight Mach numbers above 1.5. (Author)

A82-39129 # Use of rotary balance and forced oscillation test data in six degrees of freedom simulation. J. Kalviste (Northrop Corp., Hawthorne, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1364.* 11 p.

New analysis techniques are presented that will blend the data from the rotary balance test, forced oscillation test and computed dynamic derivatives for a nonlinear 6 DOF simulation. A component of the rotation vector about the velocity vector is used with the rotary balance test data. The other components of the rotation vector are used with the forced oscillation test data and computed derivatives. The problem of separating the pure rotational and acceleration terms of the forced oscillation test data is resolved. Recommendations are made in the data reduction procedure for forced oscillation testing to make the results more usable for aircraft motion simulation. (Author)

A82-39132 # Close-coupled canard-wing vortex interaction and Reynolds stress acquisition. W. Calarese (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1368.* 12 p. 7 refs.

The present experiment investigates the interaction of canard and wing vortices and their effect on the lifting wing's flow field turbulence and Reynolds stresses. Spanwise wing blowing was used to enhance the leading edge vortex and alter the vortex trajectory in an effort to keep it locked to the wing's leading edge for lift enhancement. The turbulence intensity and Reynolds stresses were obtained by using hot film anemometers. Air blowing enhances the circulation over the wing, preventing extensive flow separation. Reynolds stresses, mean velocity, and turbulence intensity values illustrate the vortex structure. (Author)

A82-39134 # Analysis of an airplane windshield anti-icing system. P. Ross (Ross Aviation Associates, Sedgwick, KS). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1372.* 8 p.

This report documents the analysis methods developed to predict the performance of the windshield hot air anti-icing system on a business jet airplane. Flight data gathered from dry air and natural icing tests are used to develop and verify the accuracy of a procedure that will predict the windshield surface temperature for either wet or dry air. It is shown that windshield surface temperatures can be estimated to an accuracy of + or - 5% for a wide range of aircraft conditions. It is demonstrated that the method is somewhat conservative for all conditions. (Author)

A82-39135 * # NASA Dryden's experience in parameter estimation and its uses in flight test. K. W. Iliff and R. E. Maine (NASA, Flight Research Center, Edwards, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1373.* 16 p. 17 refs.

An explanation of the parameter estimation method used at the Dryden Flight Research Facility is presented, and an overview is provided of experience related to the employment of this method, taking into account the utilization of this experience in flight tests. According to a definition of the aircraft parameter estimation problem, the system investigated is asumed to be modeled by a set of dynamic equations containing unknown parameters. To determine the values of the unknown parameters, the system is excited by a suitable input, and the input and actual system response are measured. The values of the unknown parameters are then inferred, based on the requirement that the model response to the given input match the actual system response. Examples of parameter estimation in flight test are discussed, giving attention to the F-14 fighter, the HiMAT (high maneuverable aircraft technology) vehicle, and the Space Shuttle. G.R.

A82-39141 * # Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy. C. E. Lan and C.-H. Hsu (Kansas, University, Lawrence, KS). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th,* *San Diego, CA, Aug. 9-11, 1982, Paper 82-1385.* 17 p. 30 refs. Grant No. NAG1-134.

A semi-empirical method based on the suction analogy is developed to predict longitudinal aerodynamics and lateral-directional characteristics of slender wings at high angles of attack, including effects of vortex breakdown. The latter is based on a correlation parameter derived from the predicted leading-edge suction distribution in the attached flow. Empirical formulas, derived from a least-square analysis of data, for the vortex-breakdown angle of attack at the trailing edge, the progression rate of breakdown points and the vortex lift recovery factor in the breakdown region are given. Comparison of predicted results with data in longitudinal aerodynamics and lateral-directional characteristics for wings exhibiting strong vortex flow shows that the present method is reasonably accurate. Explanation for peculiar lateral-directional characteristics is given. (Author)

A82-39142 * # **Lateral aerodynamics of delta wings with leading edge separation.** J. Katz (Technion - Israel Institute of Technology, Haifa, Israel). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1386.* 12 p. 23 refs. Grant No. NAGW-00218.

An unsteady vortex lattice method is presented for the calculation of the aerodynamic forces acting on lifting surfaces undergoing complex three dimensional motion. For the present case the nonsymmetric motion of a slender delta wing was considered and the resulting lateral characteristics were calculated. The flow separation line was specified along the wing leading edge and the emanating vortex sheet shape and rollup was then calculated. Numerical results are presented for the combined high angle of attack and side slip condition and for the wing constant roll and coning motions. (Author)

A82-39143 # **Analytic extrapolation to full scale aircraft dynamics.** L. E. Ericsson and J. P. Reding (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1387.* 13 p. 57 refs.

It is pointed out that the extrapolation from subscale wind tunnel data to full scale flight becomes an especially serious problem at subsonic speeds when stall is involved and at high subsonic and transonic speeds where shock-boundary layer interaction can dominate the aerodynamics. In the case of dynamic testing, valid subscale simulation is often impossible. A description is presented of an approach which provides a solution to this preliminary design dilemma. The approach makes it possible to obtain a prediction of the full scale aircraft dynamics on the basis of an analytical extrapolation from subscale test data. The considered procedure establishes analytic relationships between dynamic and static aerodynamic characteristics induced by viscous flow effects. The veracity of the analytic method is proved by predicting dynamic test results using corresponding static test data at the same subscale flow conditions. Finally, the procedure provides the input necessary for extrapolation to full scale. G.R.

A82-39190 **Fixed pattern noise correction for staring arrays in guidance systems.** D. T. Whinray (British Aerospace Public, Ltd., Co., Dynamics Group, Hatfield, Herts., England). In: Advanced infrared detectors and systems; Proceedings of the Symposium, London, England, October 29, 30, 1981. (A82-39176 19-35) London, Institution of Electrical Engineers, 1981, p. 97-101.

Infrared guided missiles of the next generation are expected to show significant advances in performance over those in current service. These advances are partly related to an employment of focal plane arrays. A size advantage is gained by the removal of the traditional scanning mirror and drive systems. The introduction of an electronic scanned array provides speed and reliability advantages and also the potential of increased sensitivity. On the other hand, focal plane arrays do present their own set of problems in the areas of testing and operation. The present investigation is concerned with some of the aspects of testing and systems implementation of charge-coupled device (CCD) readout IR focal plane arrays which operate in the long wavelength atmospheric IR window. A description is presented of the principles of operation, and hardware techniques, which have been successfully used to achieve fixed pattern noise compensation at the high speeds necessary for focal plane arrays working in the long infrared waveband. G.R.

A82-39191 **Algorithm development for infra-red air-to-air guidance systems.** P. D. Allen and J. Northfield (British Aerospace Public, Ltd., Co., Dynamics Group, Hatfield, Herts., England). In: Advanced infrared detectors and systems; Proceedings of the Symposium, London, England, October 29, 30, 1981. (A82-39176 19-35) London, Institution of Electrical Engineers, 1981, p. 102-111.

General algorithms for the overall guidance of air-to-air infra-red missiles through the acquisition, tracking and terminal phases are described. Special attention is given to the vital area of initial target detection. Two 3 x 3 spatial operators are described and their response against naturally occurring cluttered sky images is reported. An assessment of the performance of each of these operators as discriminators of simulated targets against cluttered backgrounds has been made and is reported. The surprising result that point enhancement operators give impressive results even against large targets is discussed and qualified. (Author)

A82-39194 **Target tracking using area correlation.** R. M. B. Jackson (EMI Electronics, Ltd., Hayes, Middx., England). *(NATO, AGARD, Conference on Image and Sensor Data Processing for Target Acquisition and Recognition, Aalborg, Denmark, Sept. 8-12, 1980.)* In: Advanced infrared detectors and systems; Proceedings of the Symposium, London, England, October 29, 30, 1981. (A82-39176 19-35) London, Institution of Electrical Engineers, 1981, p. 124-130.

With the increasing use of electrooptical imagers in weapon systems for aircraft, there is a need to provide an automatic track of targets of interest to relieve the operation - who may be the pilot - of this task. A description is presented of a tracking system, based on the area correlator technique, which can provide a stable and accurate track of targets for use in airborne systems in conjunction with Forward Looking Infrared Radar (FLIR) or TV imagers. It is of small size and can be built into standard format packages for installation in military aircraft. The tracking system can handle targets with a wide range of characteristics, and it can adapt automatically to magnification and target aspect changes. G.R.

A82-39245 **The system of 'objective control' (Das System der 'Objektiven Kontrolle').** K.-D. Grätzsch (Interflug Gesellschaft für Internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 18, no. 1, 1982, p. 1, 2. In German.

The concept of 'objective control' was originally developed as a control procedure in connection with the failure of components and systems of aviation equipment. However, it was soon recognized that this control method could also be employed for an evaluation of flight activities which is independent of subjective considerations. This advantage and the possibility to analyze flights, on a routine basis and in a manner which cannot be foreseen by the involved persons, has considerable educational significance. The system of 'objective control' in the case of a supervision of flight activities is based on the collection of information regarding the flight with the aid of onboard and ground-based equipment. This system makes it possible to initiate corrective action as soon as shortcomings with respect to the activities of the flying personnel are recognized. G.R.

A82-39246 **Rationalization of the maintenance process for helicopter Ka-26 (Rationalisierung des Instandhaltungsprozesses für Hubschrauber Ka-26).** K. Janeczek (Interflug Gesellschaft für Internationalen Flugverkehr mbH, Leipzig, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 18, no. 1, 1982, p. 3-7. In German.

Since 1970, the helicopter Ka-26 has been employed in the mountainous areas of the German Democratic Republic for agricultural applications. The maintenance program is a vital part of the utilization of the helicopter. The information obtained in connection with the use of the helicopter provided an indispensable basis for an efficient, cost-effective organization of the maintenance procedures. The enhancement of the efficiency of maintenance operations made it possible to increase the performance provided by the helicopter and to improve its reliability. Attention is given to the conventional maintenance system for helicopter Ka-26, the requirements for an optimization of maintenance procedures for the helicopter in agricultural applications, the development of an optimal maintenance system, and the introduction of suitable control procedures. G.R.

A82-39247 **Minimization of the total costs incurred in the employment of passenger jet aircraft (Minimierung der Gesamtkosten beim Einsatz von Strahlverkehrsflugzeugen).** J. Wilde (Interflug Gesellschaft für Internationalen Flugverkehr mbH, Leipzig, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 18, no. 1, 1982, p. 8-14. In German.

A description is presented of a procedure which makes it possible to minimize the total costs for the flight of a jet airliner. The procedure makes use of an optimization method which attempts to take into consideration all factors that affect the costs of a flight. The optimization problem is discussed, taking into account the various factors which affect fuel consumption and flight time, the determination of the Mach number which will provide a cost minimum, the consideration of meteorological factors and flight path characteristics, and the computation of fuel consumption. An investigation regarding the accuracy of the optimization calculation is also conducted. After the completion of a calculation including an optimization, it is possible to determine fuel consumption, flight times, and total costs for arbitrary Mach numbers by making use of the data stored in the computer as a result of the preceding calculation. Possible cost reductions for the operation of Interflug airliners are discussed, taking into account also the price for fuel at specific airports. G.R.

A82-39248 **Instrument landing systems /ILS/ at airports of the German Democratic Republic (Instrumentenlandesysteme /ILS/ auf DDR-Flughäfen).** W. Trempler (Interflug Gesellschaft für Internationalen Flugverkehr mbH, Leipzig, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 18, no. 1, 1982, p. 15-20. In German.

The introduction of a new generation of landing systems of the type ILS SP-70

(System Posadki-70), provided by the Soviet industry, began with the installation of the first system of the considered type at the airport Berlin-Schönefeld in 1978. Up to March 1981, three more ILS SP-70 were installed at airports of the German Democratic Republic. The utilization of the new SP-70 systems in Berlin and Leipzig has led to an improvement of aspects of flight safety for all arriving aircraft particularly under conditions of bad weather. The SP-70 is suited for automatic approaches according to the standards of the ICAO. Details concerning the ILS principles are discussed along with the characteristics of the ILS SP-70. The ILS SP-70 utilizes the most modern technology to satisfy Category III requirements. Attention is given to ground installations, functional descriptions of system components, and antenna diagrams. G.R.

A82-39263 † **The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades (Vliianie gibridnykh kompozitnykh materialov na dinamicheskie kharakteristiki lopastei vertoletov).** E. G. Pak, V. N. Stekol'nikov, Iu. P. Ganiushkin, R. V. Ivannikova, and V. N. Kestel'man. *Mekhanika Kompozitnykh Materialov*, May-June 1982, p. 475-479. 7 refs. In Russian.

It is shown that changes in the relationship between the rigidity and mass characteristics of helicopter rotor blades can be effected by varying the modulus of elasticity of the structural material of the spar. Hybrid composite materials make it possible to achieve this by combining in one matrix several reinforcing fillers with different physical and mechanical properties. The optimal combination is that of glass and carbon fibers. The carbon-and-glass-reinforced plastic makes it possible to increase the rigidity of the spar without changing the mass characteristics as well as to increase the fatigue strength. B.J.

A82-39275 **Application of an optical data link in the airborne scanning system.** M. J. Green (Wisconsin, University, Madison, WI). *Review of Scientific Instruments*, vol. 53, Aug. 1982, p. 1278-1280.

A scanning thermal IR radiometer has been used in the acquisition and digital processing of thermal imagery. In connection with plans for a study of oceanic thermal fronts, attention has been given to the possibility to employ the scanner in a system for mapping sea surface temperature which could be used with the Navy P-3 patrol aircraft. The main obstacle to such an employment is that, since the aircraft are to be used on an 'aircraft-of-opportunity' basis, no modifications to the aircraft would be permitted. The scanner is comprised of two principal subsystems, including the scanner head itself and a power supply/signal conditioning chassis. These two units are normally connected by a 39-conductor cable. As the requirements regarding the Navy application do not permit an employment of the normal connection, an optical data link has been fabricated which can replace the hard-wired connections between scanner head and power supply. G.R.

A82-39279 † **Primary-data devices (Pribory pervichnoi informatsii).** V. A. Bodner. Moscow, Izdatel'stvo Mashinostroenie, 1981. 344 p. 29 refs. In Russian.

The work examines the theoretical principles, design, and analysis of primary-data devices, i.e., sensors that are used to acquire information necessary for the control and monitoring of flight vehicles. Particular consideration is given to advanced measurement techniques (pulse-time and frequency output devices, correlation devices, etc.), the computer-aided design of the devices with allowance for complex optimization, the use of microprocessors, and automatic error compensation. Attention is given to sensors for measuring pressure, temperature, fuel consumption, flight speed and altitude, and acceleration. B.J.

A82-39295 † **The operation of aircraft and helicopters in difficult meteorological and environmental conditions (Ekspluatatsiia samoletov i vertoletov v uslozhnennykh prirodnykh usloviiakh).** A. M. Volodko. Moscow, Izdatel'stvo Transport, 1981. 158 p. 48 refs. In Russian.

The effects of such adverse phenomena as turbulence, ice formation and hail, wind shear, and lightning on the operation of aircraft are considered. Attention is also given to the effects of high and low air temperatures, dust in the air, and air moisture. Biological damage (from microorganisms, insects, and birds) is also considered along with conditions of helicopter flight in mountain areas and clouds. B.J.

A82-39321 **Flight management computers (Calculateurs de gestion du vol).** J. Grossin (Société Nationale Industrielle Aérospatiale, Toulouse, France). *L'Onde Electrique*, vol. 62, June-July 1982, p. 59-66. 11 refs. In French.

Flight management computers (FMC) and their role in reducing fuel consumption in commercial aircraft are examined. Research to offset rising fuel costs is concentrating on improving engine efficiency and the aerodynamic performance of the aircraft, and in flight control computers which automate control of flight and systems to the most efficient levels. Implementation of FMC with the Airbus is described, including the retrofit to provide accurate navigation and economical ascent and descent. Flight time at low speed and altitudes is minimized, and systems surveillance and fuel flow are automated. Block diagrams are presented of the systems interconnections with the FMC and the control strategy. Flight plans fed into the FMC yield an optimized flight strategy based on a plan involving lowest cost. The flight is categorized into ascent, cruise, and descent phases. Constraints which can alter the plan consist of changes in altitude to maintain proper cruise speed, the tempo of the flight in reaching fixed ground reference points, and operational limits of the aircraft. M.S.K.

A82-39322 **Electronic stabilization of an aircraft (Stabilisation d'un avion par l'électronique).** A. Chedeau (Ministère de la Défense, Service Technique des Télécommunications et des Equipements Aéronautiques, Paris, France). *L'Onde Electrique*, vol. 62, June-July 1982, p. 67-71. In French.

The applications of electronic flight control systems (EFC) to the amelioration of engine troubles and to automatic pilot systems are reviewed. Nominal instabilities are automatically corrected in-flight through commands implemented by electrohydraulic servocontrols responding to preset tolerances for the flight envelope parameters, including airspeed, altitude, pitch, route, and landing functions. EFC systems permit the use of aircraft configurations which experience instabilities which could not be handled by a human pilot, but can be electronically altered so that control of the aircraft appears similar to simple mechanical linkage. Digitized control of a modern aircraft is noted to require over 400,000 operations/sec, with control decisions being weighted toward safety through calculations of the probability of occurrence of destabilizing events and an assessment of the total effect a command decision will have on the aircraft. It is concluded that progress toward introducing new control stragegies is slow, in order to maintain the accuracy and operability of preexisting systems. M.S.K.

A82-39323 **Air-air collision avoidance systems (Systèmes d'anticollision air-air).** A. Michel (Direction Générale de l'Aviation Civile, Service Technique de la Navigation Aérienne, Paris, France). *L'Onde Electrique*, vol. 62, June-July 1982, p. 72-82. 10 refs. In French.

Methods of improving air-to-air collision avoidance through ground based actions are asserted to reside in flow control, by restricting the number of flights to levels which can be handled by available controller personnel aided by computers and radar. An on-board collision avoidance system is offered as a means to ameliorate the workload on the ground. The systems tested thus far have operated between 1520-1620 MHz and work multilaterally, obtaining identification of nearby aircraft, their relative distance, altitudes, and characterizing their approach paths. Attention is given to various systems developed as prototypes for operational systems, noting that the FAA is requiring that any system used be compatible with ATC. Characteristics of the Discrete Address Beacon System introduced in 1980 are presented, including methods for the suppression of erroneous data. Problems in perfecting the control logic for the detection systems are discussed. M.S.K.

A82-39358 # **The unsteady motion of a wing traveling at subsonic speed above a plane (Neustanovivsheesia dvizhenie kryla s dozvukovoi skorost'iu nad ploskost'iu).** E. A. Krasil'shchikova. *Revue Roumaine de Mathématiques Pures et Appliquées*, vol. 27, no. 3, 1982, p. 363-370. In Russian.

An analysis is presented of the plane-parallel flow of a compressible fluid excited by a thin wing moving at subsonic speed above a plane, the motion of the wing taken to begin from a state of rest. The aerodynamic problem is viewed as a combination of boundary value problems with a moving boundary for the two-dimensional wave equation. Each of these problems is solved by the method of integral equations in characteristic coordinates. The velocity potential is represented in recursive formulas, which make it possible to analyze the interaction of the wing and plane for arbitrary moments of time. B.J.

A82-39359 # **The rectangular wing with semiinfinite span in nonlinear theory (Der rechteckige flugel halbunendlicher spannweite in der nichtlinearen theorie).** S. Turbatu (Bucuresti, Universitatea, Bucharest, Rumania). *Revue Roumaine de Mathématiques Pures et Appliquées*, vol. 27, no. 3, 1982, p. 419-422. 10 refs. In German.

In an investigation of unsteady flow, use is made of an approach considered by Teipel (1964), Hosokawa (1964), and Ruo (1974). It is assumed that unsteady effects are superimposed on steady flow, taking into account a consideration of these effects in the first order. The concepts employed in connection with the solution of the nonlinear differential equation are similar to those used by Oswatitsch and Keune (1955) for the steady flowfield. A boundary-value problem in two parts regarding the potential of a rectangular wing with semiinfinite span in a state of harmonic oscillations is also solved, taking into consideration the case of unsteady transonic flow in a nonlinearized treatment. G.R.

A82-39374 **Optimal control application in supersonic aircraft performance.** C.-F. Lin (Michigan, University, Ann Arbor, MI). *IEE Proceedings, Part D - Control Theory and Applications*, vol. 129, pt. D, no. 4, July 1982, p. 113-117.

In the present investigation, the aerodynamic and engine characteristics of a typical lightweight high thrust/weight ratio fighter are modelled as continuous functions of a state variable, the Mach number. This approach provides the possibility for a smooth application of optimal control theory. By introducing a set of dimensionless variables, general results are obtained for an entire class of vehicles with similar physical characteristics. Numerical solutions are presented to show the characteristics of the optimal trajectory, taking into account the optimal control features for guiding the aircraft along a particular trajectory. A description is presented of the general properties of optimal trajectories. These properties are used to solve any particular optimal trajectory which depends on the terminal conditions and the physical constraints. G.R.

A82-39399 † **Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades (Primenenie metoda posledovatel'noi optimizatsii k ostroike chastot sobstvennykh kolebanii lopatok kompressora GTD).** A. B. Roitman, V. P. Afanas'ev, T. F. Mikhailova, and S. P. Omel'chenko. *Problemy Prochnosti,* July 1982, p. 86-89. 5 refs. In Russian.

The optimum tuning of the natural frequencies away from the dangerous resonance range is carried out for laterally oscillating turbine blades using the maximum blade profile thickness as the control function. The control range is limited by the tolerance on the blade geometry. A quality functional is obtained which provides a way to tune the natural frequencies with allowance for the constraints involved. V.L.

A82-39403 † **Problems in the simulation of correlation-extremal navigation systems (Problemy modelirovaniia korreliatsionno-ekstremal'nykh sistem navigatsii).** V. I. Alekseev and V. P. Tarasenko (Tomskii Institut Avtomatizirovannykh Sistem Upravleniia i Radioelektroniki, Tomsk, USSR). *Elektronnoe Modelirovanie,* vol. 4, July-Aug. 1982, p. 80-83. 9 refs. In Russian.

A general scheme for the simulation of correlation-extremal navigation systems is described, and problems of the synthesis and analysis of these systems which can be implemented through hybrid computers are examined. Applied programs developed for the simulation of correlation-extremal navigation systems are briefly characterized. B.J.

A82-39404 † **Simulation of correlation-extremal receivers of signals from sampling-phase radio-navigation systems (Modelirovanie korreliatsionno-ekstremal'nogo priemnika signalov impul'sno-fazovykh radionavigatsionnykh sistem).** I. M. Egorov and A. M. Korikov (Tomskii Gosudarstvennyi Universitet, Tomsk, USSR). *Elektronnoe Modelirovanie,* vol. 4, July-Aug. 1982, p. 84-89. 6 refs. In Russian.

The paper examines the simulation of correlation-extremal navigation systems according to radio fields created by sampling-phase radio-navigation systems. Particular attention is given to the simulation software, and the synthesis of a correlation-extremal receiver is considered for a Loran-C type system. B.J.

A82-39467 † **The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results (Ispol'zovanie AVM v resheniiakh obratnykh zadach teploprovodnosti dlia identifikatsii granichnykh uslovii na poverkhnostiakh detalei GTU po rezul'tatam ikh termometrirovaniia).** B. D. Bileka, V. N. Klimenko, and S. M. Chepaskina (Akademiia Nauk Ukrainskoi SSR, Institut Tekhnicheskoi Teplofiziki, Kiev, Ukrainian SSR). *Promyshlennaia Teplotekhnika,* vol. 4, July-Aug. 1982, p. 53-59. 5 refs. In Russian.

Methodological features and computational results are considered for two types of inverse problems of heat conduction: without heat removal in the inner zone and with heat removal. The first case is illustrated by the nonstationary problem of determining convective heat transfer from the gas to the stator above moving blades and to noncooled moving blades; while the second case is illustrated by the stationary problem of determining convective heat transfer from the gas to cooled nozzle blades. These two problems are treated by analog computation on the basis of the finite difference method; an implicit scheme using the Liebman method is applied to the nonstationary problem. Errors arising in the use of this approach to solve inverse heat-conduction problems are examined. B.J.

A82-39482 † **Turbulent boundary layer on a porous surface with injection at various angles to the wall (Turbulentnyi pogranichnyi sloi na poristykh poverkhnostiakh pri vduvakh pod raznymi uglami k stenke).** V. M. Eroshenko, A. A. Klimov, and L. S. Ianovskii. *Akademiia Nauk SSSR, Izvestiia, Mekhanika Zhidkosti i Gaza,* May-June 1982, p. 59-64. 13 refs. In Russian.

Experimental results are presented on turbulent boundary layers on porous plates in the case of uniform injection directed at various angles to the wall (15, 25, 40, 75, and 90 deg). The data disclose the influence of the intensity and angle of injection on the profiles of averaged and fluctuating velocities, characteristic thicknesses, surface friction, and turbulent shear stresses in the boundary layer. It is shown that moderate injections at angles to the flow are more effective in terms of protecting the surface than the commonly used normal-incidence injection. B.J.

A82-39539 **'Listening' systems to increase aircraft structural safety and reduce costs.** C. D. Bailey and W. M. Pless (Lockheed-Georgia Co., Marietta, GA). *Lockheed Horizons,* Summer 1982, p. 17-22.

Applications of acoustic emissions (AE) techniques to in-flight monitoring of fatigue stresses leading to parts failure is discussed. Due to inherent difficulties in designing all flows out of an aircraft, the deficiencies present in visual inspection, and the existence of many hard-to-reach critical areas, the use of AE for lifetime surveillance of potential fatigue-prone components of aircraft is offered as an effective means to prevent failure. Piezoelectric or capacitive devices are employed to detect AE originating from corrosion, stress-corrosion cracking, and crystal dislocation movements. The sensors are tuned to ranges outside of normal structural vibration and situated in areas known for potential flaws, sometimes in arrays which serve to locate a flaw through triangulation. Performance on board the KC-135 aircraft is cited as evidence for the cost-effectiveness of AE stress monitoring. M.S.K.

A82-39540 **The fourth dimension.** R. L. Heimbold and M. F. Leffler (Lockheed-California Co., Burbank, CA). *Lockheed Horizons,* Summer 1982, p. 24-30.

Problems and solutions for introduction of the Lockheed four-dimensional (4-D) flight management system (FMS) into regular airline traffic are explored. The 4-D system is operated totally by the flight management computer, which directs the plane to appropriate altitudes and speeds for minimum fuel consumption over the entire flight. The altitude is increased as fuel is consumed and the aircraft becomes lighter. Integration of the system into current air traffic involves including accurate wind data, initial estimates of arrival time and options for the flight path, a sufficient capacity for ATC control metering and spacing procedures, and accuracy of high enough order to reduce ATC workloads. Flow integration proceeds 100 mi from the airport and the necessity for a holding pattern results in a revectoring for approach once a go-around has been completed. It is noted that NWS forecasts are inadequate in terms of accuracy of available wind data. M.S.K.

A82-39718 **The technological aspects of titanium application in the TU-144 aircraft structure.** S. A. Vigdortchik and A. N. Tupolev. In: Titanium and titanium alloys: Scientific and technological aspects. Volume 3. (A82-39626 19-26) New York, Plenum Press, 1982, p. 2181-2193.

The development of techniques leading to the construction of significant portions of the TU-144 aircraft with titanium alloys is reviewed. Statistical data from experiments indicated that hydrogenation of the structural material and subsequent slow-rate failures could be controlled by vacuum low-temperature annealing, in addition to chemical milling combined with refining. The relationship of nitrogen and oxygen surface content introduced by heating, cutting, and multilayer welding to fatigue, slow-rate failure, and creep were also established statistically. Automatic inert-gas welding in sealed chambers was found to control the failure-producing elemental contents. Carbon contamination of surface layers was reduced by chemically etching and removing 0.2-0.5 mm of the surface. Finally, salt-stress corrosion was determined to be minimal in the expected operating temperatures of the titanium materials. M.S.K.

A82-39727 **Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers and Supplementary Papers.** Conference sponsored by the Royal Aeronautical Society and University of Bristol. Bristol, England, University of Bristol, 1982. Conference papers, 172 p; Supplementary papers, 57 p. (For individual items see A82-39728 to A82-39750)

Advances in system components, performance, and sensor systems of remotely piloted vehicles and unmanned vehicles are reported. The impacts and applications of RPVs on combat situations and costs are discussed, along with the various configurations of fixed wing and helicopter platforms, and Canadian, British, and U.S. efforts in RPV developmental programs. Attention is given to the various sensors which an RPV may carry, including radar, TV cameras, IR scanners, radiometers, and dead reckoning guidance systems. The design of algorithms for terrain following systems is described, as are sensor stabilization requirements and images received from remote sensors. Attention is given to the use of radio controlled aircraft in pollution studies, propulsion systems for RPVs, and image orientation for RPV ground station crew members. M.S.K.

A82-39728 # **Unmanned aircraft in future combat.** W. D. Simpson (British Aerospace Public, Ltd., Co., Dynamics Group, Stevenage, Herts., England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 2.1-2.5.

An assessment of the total effect of unmanned vehicles on armed forces is presented. The U.S. Army Aquila is noted to provide reconnaissance capability in a fixed wing aircraft form, while tethered helicopter platforms and drone dirigibles show promise of fulfilling the same needs at lower cost. Explosives delivery to targets at a distance have reached the level of cruise missiles, which are completely dependent on internal sensors and processors once launched. Similar autonomous vehicles, piston engined, can be used to jam radar, dispense chaff, and are called harassment drones. Production costs increase with the degree of sophistication of the system, including addition of IR sensors, jam-free radio, and personnel training required for control and retrieval. The autonomous systems are nominally used in large numbers and fly at high altitudes to retain line-of-sight communications. M.S.K.

A82-39729 # **Horses for courses in RPV operations.** R. G. Austin and C. J. Roberts (ML Aviation Co., Ltd., Bristol, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 3.1-3.18.

Different configurations and capacities, the increase of cost with complexity, and examples of RPVs are examined. The highest cost savings engendered by use of RPVs is noted to be the stationing of the pilot in a relatively benign environment, while additional benefits are gained from civilian applications such as crop spraying and pollution monitoring, a smaller target in combat situations, and the reduction in support crew necessary for military applications. Although the range is generally limited to a quarter mile from the controller, repeated flights may be made for photographic purposes. Operation and components of a minimal system are described, and means of extending the range, addition of a TV camera, uses of helicopter-type vehicles, and retrieval by netting are reviewed. Attention is also given to equipping RPVs for flight in severe weather, reduction of noise, shielding the RPV IR emissions, and standards for the production of RPVs. M.S.K.

A82-39730 # **Short range tactical RPH system.** M. J. Breward (Westland Helicopters, Ltd., Yeovil, Somerset, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 4.1-4.12. 5 refs.

Design features of a remotely piloted helicopter (RPH) for use in surveillance and as an observation post are discussed. The RPH is intended for use in the forward combat zone and needs high mobility, rapid deployment, flexibility of response, and rapid response. Performance requirements include all weather operation, 24-hr capability, a 10-km radius of action, a response time less than 10 min, and real time data flow. Attention is given to the sensor system with look-up ability, using low-light TV or IR scanner. The characteristics of the Wisp and Wideye RPHs are described, including payloads of 30 and 25 kg, respectively, and all up weights of 125 and 85 kg. Command links are achieved with low frequency transmissions lasting short periods, with 30-60 sec intervals of silence. Dead reckoning with meteorological input alone is recommended for overcoming the dangers of ECM. M.S.K.

A82-39731 # **Canadair rotary wing technology development.** A. S. Clark (Canadair, Ltd., Montreal, Canada). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 5.1-5.13.

Design, performance, and operational features of the Canadair CL-227 rotary wing RPV are detailed. The CL-227 is intended as a surveillance and target acquisition system transmitting in real time, operating in the short-to-medium range battlefield locations, and controlled by mobile units. A rotary winged configuration permits take-off from unprepared ground and hovering over target areas. The vehicle is modular in design, comprising power, rotor, and control units. A Wankel engine has been successfully employed during testing, and rotor blades are made of Kevlar with a foam core. The control module contains sensor and telemetry equipment for microwave relay and operation with four degrees of freedom. Attention is given to the development of a transfer function suitable for maintaining the aerodynamic stability of the vehicle. A total of 300 flights had been performed by 1980, and test procedures are described. M.S.K.

A82-39732 # **U.S. Army remotely piloted vehicle program.** J. K. Marstiller (U.S. Army, Aviation Research and Development Command, St. Louis, MO). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 6.1-6.5.

The U.S. Army full scale engineering development program for the Aquila RPV is described. Aquila is intended as an artillery aid to provide target acquisition, permit first round fire for effect, allow artillery adjustment, and provide designation for laser guided projectiles out to maximum artillery range. The entire system comprises the air vehicle, a ground control station, remote ground terminal, a hydraulic catapult launcher, a net type recovery subsystem, and support equipment. Aquila is launched 10-15 km on the friendly side of combat lines and flight is governed by preprogrammed internal commands covering waypoints, with loiter or jinking modes available by remote control, received in burst form. The vehicle carries a stabilized TV sensor with laser rangefinder/designator, and is constructed to survive in nuclear, ballistic, and chemical environments, and in worldwide climatic conditions. Operational testing is scheduled for 1982. M.S.K.

A82-39733 # **Stabileye.** R. Stephenson (British Aerospace Public, Ltd., Co., Dynamics Group, Bristol, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 7.1-7.12. 6 refs.

Performance, design, and materials characteristics of the Stabileye RPV, which is used to define applications of RPVs, are detailed. The Stabileye has progressed through three versions, each featuring a twin-boom pusher engine layout, with the most recent, the MK.3, carrying a maximum payload of 25 kg, a 50 m/sec or less top speed, and flight duration of one hour. The MK.3 was constructed to examine the effectiveness of glass reinforced plastics and honeycomb core material for the fuselage, bulkheads, nose and rear body fairings, and the top lid, which conceals the payload and recovery parachute. The wing is a NACA 4415 profile made of hot-wire cut polystyrene foam with multiple hardwood spars and wood veneer/glass reinforced plastic skins. A two-cylinder, 7-hp power plant is interfaced with a pulse code modulated system. The primary sensor is a vertical gyroscope, with flight control electronics, a yaw rate gyro, and a telemetry encoder. M.S.K.

A82-39734 # **The national dynamics 'observer' mini-RPV for tropical operation.** M. Reed (Natal, University, Durban, Republic of South Africa). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 9.1-9.9. 7 refs.

Results of testing program of a mini-RPV for civil and military applications in South Africa are reported. The airframe was fabricated using epoxy resin/fiberglass and fire-retard low density styrofoam. A two-stroke engine was chosen, developing 22.6 hp at 7200 rpm and a four-bladed propeller for reasons of maintaining engine speed. Launch is from the roof of a car and power for servo-units is derived from nickel-cadmium battery packs. Program goals for additional development of a rhombic-wing mini-RPV are outlined. M.S.K.

A82-39735 # **MACHAN - A unmanned aircraft flight research facility.** T. G. Hamill (Marconi Avionics, Ltd., Ruchester, Kent, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 10.1-10.8. Research supported by the Ministry of Defence (Procurement Executive).

The purpose of this paper is to introduce the MACHAN programme, or to give it it's full name, 'the provision of an unmanned aircraft flight research facility'. This programme is funded by MOD(PE) with a substantial PV input from Marconi Avionics. The 3 aspects of the programme covered are the aircraft itself, the supporting facilities and, here, specifically the ground station, and the programme of experimental flying and payload trials as it is currently envisaged. (Author)

A82-39736 # **Mini-RPV propulsion.** L. A. Kolbo (Kolbo Corp., Anaheim, CA). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 13.1-13.4.

Mini-RPV propulsion systems which can deliver flight durations of four hours at speeds between 100 and 200 km are reviewed. The reciprocating internal combustion engine is the favored choice because of fuel density, noise, heat signature, and fuel consumption characteristics. A two-cylinder configuration is the most satisfactory choice due to lightness, carburation, and simplicity. The engine components are preferably made of aluminum, chromium, and aluminum-magnesium alloys to preserve weight-saving design goals and heat-tolerant properties. It is recommended that mini-RPVs have a specific fuel consumption of 0.8, with an aneroid barometer-equipped carburetor in order to adjust fuel-air mixtures for height automatically. An ignition system which delivers 40,000 V open circuit is described, and features of propellers are discussed in terms of performance and material considerations. M.S.K.

A82-39737 # **The application of small propellers to RPV propulsion.** A. C. Roberts (British Aerospace Public, Ltd., Co., Dynamics Group, Bristol, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 14.1-14.10.

Progress in the development of a data base for construction of propellers for increasing the range and performance of small unmanned aircraft is assessed. Compromises are necessary in design of propellers due to different requirements during climb and dash flight modes, and options for areas to explore include diameter and number of blades. Restrictions include resulting size of the radar target produced, the effect on forward looking sensors, recovery method, and noise. Small RPV propellers operate in the middle of the critical Reynolds number flow regime, encountering both laminar and turbulent flows while turning at 6000-8000 rpm. A numerical model is developed for optimizing propeller efficiency and a computer program is outlined for predicting performance. Wind tunnel tests of 0.5 m diam fixed-pitch 2-blade propellers showed that current predictions degrade in accuracy with increases in forward speed. M.S.K.

A82-39738 # **The control and guidance unit for MACHAN.** I. F. Cooper and J. A. Birkenshaw (Marconi Avionics, Ltd., Rochester, Kent, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April

6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 16.1-16.11. Research supported by the Ministry of Defence (Procurement Executive).

Details of the MACHAN development program for evaluating the unmanned aircraft guidance achievable by a dead reckoning system aided by other systems and sensors are presented. An attitude and heading reference (AHRS) system was concluded to require a vertical reference within 0.5 deg and a heading reference of not more than 4 deg/hr, provide pitch, roll, and yaw rates for the autopilot, operate digitally, possess navigation capability and update, operate within various mission profiles, and be amenable to mass production. The AHRS system constructed featured three single axis gyros, three accelerometers, a dedicated real time microprocessor, and attitude recognition by reference to gravity and initial data. supplementary sensors, such as a single degree of freedom rate integrating gyro and accelerometer, pass data through the microprocessor where magnetic heading and Doppler velocity data are also considered. M.S.K.

A82-39739 # U.S. Army remotely piloted vehicle supporting technology program. T. D. Gossett (U.S. Army, Research and Technology Laboratory, Moffett Field, CA). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 18.1-18.10. 10 refs.

Details of the U.S. Army full scale engineering development program for the RPV Aquila are described. The system includes the air vehicle, a recovery system, an air vehicle handler, a remote ground terminal, a ground control station, a launcher subsystem, and a maintenance shelter. With attention focused on the propulsion and antijam data link developments, it is noted that the data link includes a command uplink, telemetry downlink, video downlink, and navigation of the air vehicle relative to the remote ground terminal. Components of the antijam modular integrated communication and navigation system comprise an analog null steerer, modems with chopped chirp waveforms, a direct pseudonoise spread modem, and a phased array. Ducted propellers were determined to offer higher takeoff, and quieter performance and efficiency than open propellers. Finally, operational features of the 20 hp test engines and the FLIR sensor are provided. M.S.K.

A82-39740 # A terrain following system, an algorithm and a sensor. E Skarman (Saab-Scania AB, Linkoping, Sweden) and U. Rehammar (Telefonaktiebolaget L. M. Ericsson, Molndal, Sweden). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 19.1-19.15.

The development of a control logic for terrain following RPVs using radar and laser sensors to detect possible obstacles at least 1300 m in advance is described analytically. Limitations in the theory of linear dynamic systems are discussed in terms of filtering an input command with a low pass filter to avoid exceeding the mechanical environment stress limits of all vehicle subsystems. The odeling of a dynamic system comprises two states of the kinematics, vertical speed and altitude, the two states pitch of the vehicle dynamics, the flight control system, which is an acceleration feedback system, and the low pass filter. The system is shown to have one input and seven functions with simple asymptotes and control is confined to operating at height to height from time to time. Inputs to the command filter are developed along with decision rules, and two- and three-dimensional simulation algorithms are outlined. M.S.K.

A82-39741 # Sensor stabilisation requirements of RPV's - A simulation study. K. G. Narayanan, M. Madhuranath, S. K. Bhat, and G. Elangovan (Aeronautical Development Establishment, Bangalore, India). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 21.1-21.8. 6 refs.

The application of pilot simulator video displays to the development of sensors for the stabilization of TV carrying RPVs is described. Either films with servo-induced roll, yaw, and jitter or numerically generated images can be displayed to the RPV TV sensor. Particular attention is given to scaled geometric presentations which produce out-the-window views to pilots. Requirements for the simulation include accurate representations of objects, reflectance/radiance and contrast, RPV sensor accounting for resolution, sensitivity, FOV, look angle, slewing rate, image smear/lag, platform speed, direction, altitude, attitude, and maneuvers. The data link is limited by the range of operation, bandwidth, and noise, and terrains are chosen for the approprate mission. Block diagrams are provided of the RPV sensor simulator and improvements necessary for the system to be operational. M.S.K.

A82-39742 # Radars for UMA. M. Scorer (Marconi Avionics, Ltd., Research Laboratory, Rochester, Kent, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 22.1-22.6.

The implementation of lightweight radar systems in unmanned aircraft (UMA) is discussed. Attention is given to the application of UMA to air defense as a passive receiver system, carrying radiometers as a passive detector, and microwave, millimeter wave, and laser radars for target detection and ranging. The necessity of developing laser radars which operate at eyesafe wavelengths, such as 10 micron CO2 lasers, which are currently too heavy for UMA, is noted. Data gathered by a UMA radar system is gained by means of a transmitter and a receiver, then relayed along a ground link. Millimeter wave radars permit the use of 20 cm antennas on UMAs while maintaining an image resolution of 25 m at 1.5 km, operating at 100 GHz. Flat plate printed circuit antennas several millimeters thick have been fabricated, permitting placement of the receiver on the same substrate as the antenna. Employing magnetrons for high power gain is outlined. M.S.K.

A82-39744 # Electric propulsion for a mini RPV system. G. R. Seemann and G. L. Harris (Developmental Sciences, Inc., City of Industry, CA). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Supplementary Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 12.1-12.6. Contract No. F33657-79-C-0506.

The advantages of electric propulsion, such as reliable instant-start, enhanced survivability, possible higher performance and improved storability, have merited further investigation. Advances in the development of the lithium battery have increased the payload performance to 200-300 Wh/lb with the battery being the prime factor of the propulsion system concept. A point design system of the mini-RPV is described based on predictions after a strawman mission, and studies of current and advanced concepts of an electric propulsion system are discussed in terms of the components of the system. Temperature control is studied, and performance estimates of the mini-RPV are outlined such as a speed range of 60-150 kts, a climb rate of 600 ft/min and an endurance of five hours. The system's potential use as an expendable vehicle to conduct surveillance, jamming or kamikaze missions is foreseen. R.K.R.

A82-39745 # Flight control systems for aerial targets. A. W. Bargery and K. W. Rosenberg (Marconi Avionics, Ltd., Rochester, England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Supplementary Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 17.1-17.18. Research supported by the Ministry of Defence (Procurement Executive).

Aerial targets, a class of unmanned aircraft (UMA), present constraints different from other classes of UMA. The control system design is partially determined by data link, tracking facilities, and range location. The flight control systems of two targets, the Jindivik, in operation for 25 years, and the Sea Vixen, soon to be in operation, are described. The Advanced Subsonic Aerial Target (ASAT) flight control system is under development, and its design approach, which anticipates a more expendable target vehicle, is described. The ground station for the ASAT requires a high initial investment, but the air vehicle requires a minimal cost. A comparison of each of these three systems is presented. The Jindivik has high operating skills, the Sea Vixen has medium skills, and the ASAT has low skills, while the Jindivik and the Sea Vixen require large crews and the ASAT requires a small crew. Block diagrams of each UMA are included. R.K.R.

A82-39746 The design of a viewing system for near real time stereo images from a UMA borne linescan sensor. J. A. C. Beattie (Royal Aircraft Establishment, Farnborough, Hants., England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Supplementary Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 20.1-20.3.

Laboratory trials demonstrate a display of stereoscopic images, received in data streams with a bandwidth of 512 kHz (-3 dB). The sensing and presentation of the data are described. An optical system consisting of a German television lens of 10.2 mm focal length and an F number of 1.8 is used. The image plane is divided in two by a right angle splitting prism with each half falling on a separate linear array angled 7.5 degrees from the optical axis. The two linear arrays provide data alternately, which is converted to form a pair of visible images. The demultiplexing system is explained, as well as various methods of storing the data. The effect of cardboarding is less severe with this system as it has an effective back drop. The viewing system is described with its main problem being that a 90 degree twist in the image path is necessary for correct viewing. The proposed air vehicle BAe (Filton) Stabileye MkII is discussed. In addition, it is shown that excessive movement may cause severe blurring, leading to difficulties in the fusion of the stereo pairs. Fifty lines of horizontal disparity and 12 lines of vertical disparity can be tolerated with a good stereo viewing facility. Two 4-bit images have been successfully stored and extracted using look up table methods. R.K.R.

A82-39747 # Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases. O. Hofmann and P. M. W. Navé (Messerschmitt-Bolkow-Blohm GmbH, Munich, West Germany). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Supplementary Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 20A.1-20A.3.

A82-39750 # **The design of a RPV ground station simulator.** J. Ford and P. G. Thomasson (Cranfield Institute of Technology, Cranfield, Beds., England). In: Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Supplementary Papers. (A82-39727 19-01) Bristol, England, University of Bristol, 1982, p. 26.1-26.7. Research supported by the Ministry of Defence (Procurement Executive).

A simulator complex has been designed representing the ground station environment of a remotely piloted vehicle (RPV) system, in order to evaluate the human factors of a ground control station such as the work load of the crew. The design requirements of the simulator are described, and the reasons for using a multicomputer design are explained. The primary requirement of the simulator is that it operate in real time, and a second requirement is that it be flexible in order to accommodate specification changes in the system. An example of the flexibility of the system is that the memory requirement of the system has increased from 24 K bytes to 128 K bytes with no need to modify the framework or computing capacity. The goals in creating a ground control station are that it be able to preplan missions for the RPV, to control and replan missions while the RPV is airborne, and to interpret real time imagery. Various diagrams are included. R.K.R.

A82-39836 # **Aerodynamic aspects of aircraft dynamics at high angles of attack /AGARD Lecture/.** K. J. Orlik-Ruckemann (National Aeronautical Establishment, Ottawa, Canada). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1363.* 22 p. 37 refs.

This paper presents a review of some of the fluid dynamics phenomena that are associated with the oscillatory flight at high angles of attack, with particular emphasis on asymmetric shedding of forebody vortices, asymmetric breakdown of leading edge vortices, the oscillatory motion of such vortices, and the time lag between the motion of the vortices and that of the aircraft. These phenomena cause a number of important effects on the dynamic stability parameters at high angles of attack (high alpha), such as strong nonlinearities with alpha, significant static and dynamic aerodynamic cross-coupling, large time-dependent and hysteresis effects, and a strong configuration dependence. The need to consider all the aerodynamic reactions in their vectorial form is emphasized, and the importance of the abovementioned effects on our prediction capabilities of aircraft behavior at high alpha is discussed. Development of adequate mathematical models is advocated and requirements for advanced wind tunnel techniques for performing the necessary oscillatory experiments are described. The oral presentation is illustrated by movie films showing flow visualization on oscillating models. (Author)

A82-39882 **On the state of technology and trends in composite materials in the United States.** J. R. Vinson (Delaware, University, Newark, DE). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 353-361. 16 refs.

In connection with the ongoing NASA Aircraft Energy Efficiency Composite Primary Aircraft Program a number of composite material structural components have been installed on commercial aircraft and are in service today. The composite components involved include rudder, vertical fin, ailerons, elevators, and horizontal tail. Attention is given to the use of graphite composites in commercial and military aircraft, F100 afterburner nozzle flaps made of carbon-polyimide composite, the graphite-epoxy airframe of the Learfan 2100, the use of Kevlar in helicopters, the employment of Kevlar composites in sailplanes, the fabrication of the fifty foot long booms of the Space Shuttle from graphite epoxy, and the use of Kevlar-epoxy in the design of many rocket motor cases. Unfortunately, cost and confidence are still major obstacles toward more use of composites in the auto industry. G.R.

A82-39890 **Tests of CFRP spar/rib models with corrugated web.** Y. Tada, T. Ishikawa, and E. Nakai (National Aerospace Laboratory, Chofu, Tokyo, Japan). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 461-470. 5 refs.

Static strength tests are conducted on cantilever beams with corrugated web, models of spars and ribs used in aircraft structures, which are fabricated from carbon fiber reinforced plastics. The shear strength of the corrugated web, the strain distributions, and the failure modes are evaluated for three types of models having different corrugation depths and laminate constructions. Results show that the ultimate strengths of the webs are approximately equivalent to the shear strength of flat specimens of the same laminate construction. In addition, the depth of the corrugation does not crucially change the strain distribution and the static bending strengths, but does effect the failure mode. Strengthened layers of the flange-web connections have little effect on the web strength. The critical state of the webs can be identified by observing the magnitude of the surface strains, not by the displacements. N.B.

A82-39892 **Evaluation of CFRP prototype structures for aircraft.** Y. Noritake, T. Konda, Y. Abe, F. Yamauchi, S. Toyohira, K. Mogami, H. Arai, and N. Arata (Japan Defense Agency, Technical Research and Development Institute, Tachikawa, Tokyo, Japan). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 478-486.

The results of flight test programs to test the suitability of CFRP advanced composites for aircraft structures are presented. The CFRP components tested included a rudder and rear nose landing gear door of a supersonic trainer, ground spoilers of a C-1 transport, and the outer leading edge slat rails of an antisubmarine patrol seaboat. Proof load tests were performed on the ground to affirm that the CFRP parts were as strong as conventional materials. The flight tests covered stresses from velocity, altitude, angle of attack, and load factor of the aircraft and stress on the composite components. Two and one-half years of flight data, with inspections every 200 hours and 9 months, were combined with coin tapping tests for external structural elements. No rigidity degradations were observed on the spoilers or the slat rails and all test components were evaluated as remaining in satisfactory condition. M.S.K.

A82-39893 **Developments on graphite/epoxy T-2 nose landing gear door.** K. Mogami, F. Yamauchi (Japan Defense Agency, Technical Research and Development Institute, Tachikawa, Tokyo, Japan), Y. Sakatani, and Y. Yamaguchi (Mitsubishi Heavy Industries, Ltd., Nagoya Aircraft Works, Nagoya, Japan). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 487-493.

Attention is given to the material systems and processing specially developed for the graphite/epoxy composite door, among them unidirectional tapes, fabrics, chopped fiber materials, and semi-cocuring techniques. To evaluate the durability of the graphite/epoxy skin laminates, water absorption tests and fatigue tests are performed at low, high, and room temperatures for the design required. The all-graphite/epoxy beam-fittings were fabricated using the hot-pressing technique and tested to verify the bearing and bending strength according to design requirements. The saving in weight came to 25%. C.R.

A82-39894 **Design, fabrication and qualification of the T-2 composite rudder.** F. Yamauchi, K. Mogami (Japan Defense Agency, Technical Research and Development Institute, Tachikawa, Tokyo, Japan), T. Fukui, and T. Sato (Fuji Heavy Industries, Ltd., Aircraft Engineering Div., Utsunomiya, Tochigi, Japan). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 494-503.

It is pointed out that this is the first primary control surface to be flight tested in Japan. The rudder has a span of 1.53 m, a 0.71-m chord at the midspan, and an area of 1.05 sq m. The design involves a single-spar, full depth honeycomb sandwich structure. Graphite/epoxy is used for the skins, spar, upper and lower closure ribs, and leading edge ribs. The graphite/epoxy parts make up approximately 40% of the total weight. The spar and closure ribs are precured and bonded to the sandwich assembly after the skins are cured. Nine precured leading edge ribs are attached with cherry-lock fasteners in addition to normal adhesive bonding. It is noted that a conservative design approach was used and that the primary objectives were to obtain actual production experience and in-service operational experience for a composite primary control surface. C.R.

A82-39895 **Development of the advanced composite ground spoiler for C-1 medium transport aircraft.** F. Yamauchi, K. Mogami (Japan Defense Agency, Technical Research and Development Institute, Tachikawa, Tokyo, Japan), H. Masaeda, and T. Shirata (Kawasaki Heavy Industries, Ltd., Aircraft Div., Kagamihara, Gifu, Japan). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 504-512.

The research and development program for the graphite/epoxy ground spoiler for the C-1 medium transport aircraft is discussed. The design requirement was that the spoiler provide strength and rigidity not less than the baseline spoiler in addition to interchangeability. The design analysis was done by finite element method and the detail design configurations of major structural components were evaluated by trade-off tests in the initial design phase, showing that the components met design requirements. Successful environmental characteristic tests were also conducted. The scattering characteristic of the Gr/E for static and fatigue strength were obtained and found to be significantly superior to that of aluminum alloy. Full scale verification tests were also passed. C.D.

A82-39896 **Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail.** F. Yamauchi, K. Mogami (Japan Defense Agency, Technical Research and Development Institute, Tochikawa, Tokyo, Japan), K. Suzuki, T. Kiho, and T. Ikuyama (Shin Meiwa Industry Co., Ltd., Kobe, Japan). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 513-520.

Results of a fabrication study and materials properties tests of an advanced composite horizontal tail leading edge slat rail for the Japanese PS-1 STOL antisubmarine warfare seaplane are presented. The slat rail was fabricated of carbon fiber satin cloth and a bisphenolic epoxy resin matrix, with co-curing by vacuum injection. Static tests were performed to 100 and 180% of the design load limit and satisfactory results were obtained. Coating the slat rail with silicon grease resulted in good resistance to salt spray, although stiffness was reduced 5% after 24,000 cycles. High and low temperature environmental tests produced no degradation in the material. The composite slat rails had been flown for 1000 hr in flight tests by 1978 and performed to specification. M.S.K.

A82-39897 . Development status of a composite vertical stabilizer for a jet trainer. K. Takagi and S. Idei (Fuji Heavy Industries, Ltd., Aircraft Engineering Div., Utsunomiya, Tochigi, Japan). In: Composite materials: Mechanics, mechanical properties and fabrication; Proceedings of the Japan-U.S. Conference, Tokyo, Japan, January 12-14, 1981. (A82-39851 19-39) Barking, Essex, England, Applied Science Publishers, 1982, p. 521-528.

Progress in a program to develop a composite materials vertical stabilizer for the next generation Japanese transonic military jet trainer is described. Focusing on graphite/epoxy materials, the tests to date cover small elements, components, and full scale main box trials. The stabilizer is about 2.4 m long with an area of 1.0 sq m, containing a two-spar multirib structure. All component parts are graphite/epoxy except the ribs and root fittings, which are aluminum. Tests have been run to examine the moisture temperature effects, rigidity, strain, and static loading to failure. Results have indicated no inherent difficulty in accepting a composite stabilizer on the trainer. M.S.K.

A82-39929 Fasteners for composite structures. R. T. Cole, E. J. Bateh (Lockheed-Georgia, Co., Marietta, GA), and J. Potter (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *(Symposium on Jointing in Fibre-Reinforced Plastics, London, England, July 13, 14, 1982.) Composites,* vol. 13, July 1982, p. 233-240. 16 refs.

The four basic problems with fasteners for composites - galvanic corrosion, galling, installation damage, and low pull-through strength - are identified. Seven special fastener systems for use in composites - bigfoots, semi-tubular rivets, Cherry Buck rivets, stress-wave rivet systems, groove proportioned lockbolts, composite fasteners, and self-tapping screws are described. Survey results are shown indicating that flush, low-load transfer, composite-to-composite joints are the most common in current composite structures. The rationale for selecting the flush head configuration as the modification considered is presented. Test results indicate that 100 deg tension countersink fasteners are the best for sheet thicknesses in excess of the head height. (Author)

A82-39930 On the bearing strengths of CFRP laminates. T. A. Collings (Royal Aircraft Establishment, Structures Dept., Farnborough, Hants., England). *(Symposium on Jointing in Fibre-Reinforced Plastics, London, England, July 13, 14, 1982.) Composites,* vol. 13, July 1982, p. 241-252. 12 refs.

Bearing strength measurements have been made on zero, + and - 45, zero, 90 deg and 90 + and - 45 deg carbon fiber reinforced plastic (CFRP) laminates made from three different fibre/resin systems; HTS/914, XAS/914 and HTS/HC 3501. Equations have been derived for predicting the ultimate bearing strengths of constrained pin-loaded holes using a semiempirical approach, and considering the physical conditions governing failure at the hole edge. Experimental results are presented and these show good agreement with those predicted for each of the laminate configurations and fibre/resin systems used. (Author)

A82-39996 † Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration (Chislennoe reshenie zadachi ob okolozvukovom obtekanii kryla s fiuzeliazhem). V. I. Savitskii (Tsentral'nyi Aerogidrodinamicheskii Institut, Moscow, USSR). *Gidromekhanika,* no. 46, 1982, p. 41-47. 8 refs. In Russian.

Nonviscous transonic flow past an arbitrary wing-fuselage configuration is analyzed within the framework of the small-perturbation theory. A relaxation method is used in conjunction with a finite-difference scheme. Finite-difference approximations for the relaxation equation and boundary conditions are selected by using nonstationary analogy. To illustrate the method, calculations are carried out for several different wing-fuselage configurations. V.L.

A82-40051 Noise pollution and airport regulation. J. L. Helms (FAA, Washington, DC). *Journal of Air Law and Commerce,* vol. 47, Spring 1982, p. 405-412.

Methods are proposed of reversing the trend of curfews and other limitations on airport use that have been adopted across the U.S. in the name of noise reduction or environmental protection. The economic problems caused by airport restrictions are discussed along with the drawbacks of various types of restrictions. The situation in White Plains, New York is used as an example of the progress that can be made by holding litigation against restrictions in abeyance and cooperating with the FAA to bring about quick improvements. An example of a beneficial rule is allowing the quietest planes to operate at night rather than banning night flights altogether, as was the case in White Plains. The litigation route is briefly discussed, and the remedy of seeking systematic solutions is proposed, one combining legislation with FAA review. C.D.

A82-40052 O'Hare International Airport - Impervious to proposed state efforts to limit airport noise. M. J. Pavlicek (Schaffenegger, Watson and Peterson, Ltd., Chicago, IL). *Journal of Air Law and Commerce,* vol. 47, Spring 1982, p. 413-448. 192 refs.

The complexity of formulating a legally valid, technologically feasible, and economically reasonable state regulation that effectively abates noise at O'Hare International Airport is demonstrated. The federal responsibility for airport noise, federal preemption and the role of the airport proprietor, and the Illinois Pollution Control Board's jurisdiction over the airport noise proposal before it is briefly discussed, while the proposal itself is dealt with in detail. Particular attention is given to the variance procedure which mandates that the airport proprietor consider certain noise abatement methods which are under the control of another authority. Noise abatement activities that can be directly implemented by the proprietor, those that require federal approval, and those that are controlled by local zoning authorities are discussed. C.D.

A82-40057 Touchdown technology. J. Moxon. *Flight International,* vol. 122, July 24, 1982, p. 215-217.

The introduction of widebodied jets brought on a need for modifications in tires, brakes, and wheels to accommodate for weight. Radial tires are being tested as they offer a 15-20% weight reduction. Also, tires made of Guayule, a wild desert plant found in the southern United States and Mexico, are being tested. The evolution of brakes is discussed, with the most recent development being the use of carbon disks as they absorb more kinetic energy than steel without overheating. Carbon also offers weight reduction and long life, but a more cost efficient production method is being investigated. Variations in wheel production have been minimal and the current focus is on safety improvements and the use of titanium and aluminum alloys. NASA is studying a new landing method which involves the active control of landing gear so that forces transmitted to the airframe are reduced. R.K.R.

A82-40124 Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone. R. G. Derwent (Atomic Energy Research Establishment, Harwell, Oxon, England). *Atmospheric Environment,* vol. 16, no. 8, 1982, p. 1997-2007. 38 refs. Research sponsored by the Department of Environment.

The potential effects of aircraft operations in the troposphere were investigated with a two-dimensional (latitude-altitude) transport-kinetics model. There appears to be reasonable agreement between the present and previous studies that aircraft operations may have already increased ozone concentrations in the upper troposphere by up to a few per cent or so. The corresponding increases in the total ozone column amount to a few tenths of a per cent and may well have partially offset any decrease due to the release of chlorofluorocarbons 11 and 12. (Author)

A82-40276 # Flying quality requirements for V/STOL transition. C. G. Carpenter, J. Hodgkinson (McDonnell Aircraft Co., St. Louis, MO), R. H. Hoh (Systems Technology, Inc., Hawthorne, CA), and J. W. Clark, Jr. (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1293 . *8 p. 7 refs.*

A landing approach criterion showed excellent correlation of heave damping and pitch-to-path coupling effects. Blending schemes for transition from approach dynamics to hover dynamics, and vice versa, correlated well with earlier NASA results. A time response criterion discriminated well between attitude and rate systems in low speed and hover. Pilot's command gain has a strong effect on piloting charactersitics in all phases of transition. (Author)

A82-40287 # Flying qualities requirements for roll CAS systems. D. G. Mitchell and R. H. Hoh (Systems Technology, Inc., Hawthorne, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1356.* 9 p. 8 refs. Contract No. F33615-80-C-3604.

Command augmentation systems (CAS) are becoming essential components for modern fighters. A roll rate CAS utilizes an effective feedforward so that pilot control inputs are compared directly to actual roll response. Such CASs, as they are used today, can be limited in authority with parallel direct links, or full-authority with high command gains. The latter are the more interesting from a handling qualities standpoint. Attention is given to gradient shaping, roll responses for conventional aircraft, roll CAS gradients, roll ratcheting, implications for the handling qualities standard, roll performance, linearity, the roll mode time constant, and aspects of sensitivity. G.R.

A82-40290 * # **Flight-determined correction terms for angle of attack and sideslip.** M. F. Shafer (NASA, Flight Research Center, Edwards, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1374.* 11 p.

The effects of local flow, upwash, and sidewash on angle of attack and sideslip (measured with boom-mounted vanes) were determined for subsonic, transonic, and supersonic flight using a maximum likelihood estimator. The correction terms accounting for these effects were determined using a series of maneuvers flown at a large number of flight conditions in both augmented and unaugmented control modes. The correction terms provide improved angle-of-attack and sideslip values for use in the estimation of stability and control derivatives. In addition to detailing the procedure used to determine these correction terms, this paper discusses various effects, such as those related to Mach number, on the correction terms. The use of maneuvers flown in augmented and unaugmented control modes is also discussed. (Author)

A82-40294 * # **The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/.** J. E. Lamar (NASA, Langley Research Center, Transonic Aerodynamics Div., Hampton, VA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1384.* 17 p. 41 refs.

This paper deals with selected linearized-aerodynamic and vortex-flow methods as applied to aircraft design problems at high subsonic speeds. In particular, the NASA Vortex Lattice and Modified Multhopp methods are the linearized techniques employed, and the suction analogy is used to provide estimates associated with vortex-flow aerodynamics. Many examples are given as to how researchers at Langley have used these methods to design the high subsonic, wing-mean-camber shapes for various configurations such as a supersonic transport, high-aspect-ratio transport, trapezoidal fighter wing, strake wing, tandem wing, joined wing, delta wing, and slender cranked wing. Many of these have been built, tested, and have had their data compared with theory. In addition, a technique for defining efficiently performing strake planforms for use in strake-wing combinations is discussed, and further improvements in wing design are outlined. The latter may be obtained by using higher-ordered linear panel methods as well as nonlinear-transonic methods. (Author)

A82-40346 **Boeing's new 767 eases crew workload.** R. R. Ropelewski. *Aviation Week and Space Technology,* vol. 117, Aug. 23, 1982, p. 40, 41, 43 (3 ff.).

Details of the cockpit avionics and control switches and their operations in the Boeing 767 aircraft are described. Automation of the control and monitoring of most aircraft functions has permitted elimination of the flight engineer's station, and all controls are now within reach of the pilot and copilot. Each pilot is furnished electronic attitude director and horizontal situation indicators and flight management system control display units, in addition to sharing two centrally located 6 x 7 in. electronic displays giving engine indication and crew alerts. Standard electromechanical gages remain as a redundant feature, while checklist procedures are reduced to a short time. Flight paths and travel times are currently being programmed for easy access loading into the flight computer for automated guidance, with the computer tuning to navigations aids stationed along the flight path. M.S.K.

A82-40395 # **Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements.** B. L. Uselton and D. R. Haberman (Calspan Field Services, Inc., Arnold Air Force Station, TN). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1356.* 16 p. 21 refs.

A summary of an AEDC technology program of sting effects on aerodynamic measurements is presented. Four different configurations - a 7-deg cone, 6-deg sliced-base cone, missile and an aircraft - were tested in the wind tunnel. Interference effects were obtained by measurements of damping derivatives, static data, surface pressures, and base pressures from subsonic to hypersonic Mach numbers. The critical sting limits were investigated as a function of frequency of oscillation, model boundary layer, type of measurement, angle of attack, Mach number, and configuration. Comparisons of wind tunnel and ballistic range data are presented for the missile and aircraft configurations. Critical sting length was found to be dependent on the parameter selected as the interference indicator. (Author)

A82-40417 * # **NASA research in supersonic propulsion - A decade of progress.** L. H. Fishbach, L. E. Stitt, J. R. Stone, and J. B. Whitlow, Jr. (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1048*. 23 p.
(Previously announced in STAR as N82-26300)

A82-40418 * # **Propulsion opportunities for future commuter aircraft.** W. C. Strack (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1049.* 26 p. 9 refs.
(Previously announced in STAR as N82-26296)

A82-40419 * # **Summary and recent results from the NASA advanced high-speed propeller research program.** G. A. Mitchell and D. C. Mikkelson (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1119.* 34 p. 37 refs.
(Previously announced in STAR as N82-26219)

A82-40420 * # **Performance of a 2D-CD nonaxisymmetric exhaust nozzle on a turbojet engine at altitude.** D. M. Straight and R. R. Cullom (NASA, Lewis Research Center, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1137*. 27 p. 14 refs.
(Previously announced in STAR as N82-26241)

A82-40422 * # **Comparison of experimental and analytic performance for contoured endwall stators.** R. J. Boyle (NASA, Lewis Research Center, Cleveland, OH) and J. E. Haas (U.S. Army, Propulsion Laboratory, Cleveland, OH). *AIAA, SAE, and ASME, Joint Propulsion Conference, 18th, Cleveland, OH, June 21-23, 1982, AIAA Paper 82-1286.* 14 p. 18 refs.
(Previously announced in STAR as N82-26299)

A82-40428 # **Terrain following/terrain avoidance system concept development.** G. D. Young, Jr., W. W. Harrington, R. L. Overdorf, and E. Rachovitsky (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). *American Institute of Aeronautics and Astronautics, Guidance and Control Conference, San Diego, CA, Aug. 9-11, 1982, Paper 82-1518.* 8 p. 6 refs. Grant No. F33615-80-C-3617.

The development of a real-time simulation of a terrain following/terrain avoidance (TF/TA) system algorithm for use with an operating AFTI/F-16 simulator is described. The simulator is equippped with a control feel system, a single seat cockpit, an earth/sky and a target/terrain projection system, and motion and g-force provisions. A 5000:1 scale scenario of western Europe was chosen with night, dusk, and daylight capability in addition to cloud cover and weather configurations. The TF/TA control system is considered in terms of a preplanned ground track, with the mission proceeding from waypoint to waypoint, a computed flight path, for optimized aircraft performance on trajectories within the mission path, and aircraft control to follow the actual flight path. A feasible directions algorithm for obtaining the computed flight path is presented and operations are described. Further developments to complete the pilot-in-the loop strategies are discussed. M.S.K.

A82-40429 * # **Flight experience with a backup flight-control system for the HIMAT research vehicle.** R. W. Kempel (NASA, Flight Research Center, Edwards, CA). *American Institute of Aeronautics and Astronautics, Guidance and Control Conference, San Diego, CA, Aug. 9-11, 1982, Paper 82-1541.* 20 p.

The NASA Dryden Flight Research Facility is conducting flight tests of two remotely piloted, subscale, advanced fighter configurations; the tests are part of the Highly Maneuverable Aircraft Technology (HiMAT) project. Closed-loop primary flight control is performed from a ground-based cockpit and digital computer in conjunction with an up/down telemetry link. A significant feature of these vehicles is an on-board, digitally active, backup control system designed to recover the vehicle in the event of a transfer from primary control. Automatic transfers occur upon certain critical ground or airborne system malfunctions. Control modes are provided that enable a ground or airborne controller to guide the vehicle to a safe landing. This paper describes the features, operational development, and flight evaluation of the HiMAT backup flight control system. (Author)

A82-40434 # **Analytical design and validation of digital flight control system structure.** D. B. Mulcare, W. G. Ness, and R. M. Davis (Lockheed-Georgia Co., Marietta, GA). *American Institute of Aeronautics and Astronautics, Guidance and Control Conference, San Diego, CA, Aug. 9-11, 1982, Paper 82-1626.* 11 p. 17 refs.

Flight controls applications continue to be a dominant driver of applied digital technology, especially in the areas of fault-tolerant computer subsystems and flight-critical assurance methods. The present investigation is concerned with two of the major digital flight system technology needs, taking into account system validation technology and integrated methodology. Attention is given to the integration of assurance activities or provisions into the design process. The problem at hand is to formulate, develop, and validate an analytically based methodology which can dependably yield a readily validatable and maintainable digital flight control system. Questions of basic strategy are considered along with the technical approach, the control of complexity, a design description, aspects of system validation, and questions of development methodology. G.R.

A82-40483 † Sport aircraft (Sportivnye samolety). S. A. Iakovlev. Moscow, Izdatel'stvo DOSAAF SSSR, 1981. 72 p. In Russian.

The development and character of sport aviation in the Soviet Union are discussed, with attention given to the historical background and the line of Yak light aircraft. Non-Soviet sport aircraft are also considered. Many color drawings of sport aircraft are presented. B.J.

A82-40505 American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. Washington, DC, American Helicopter Society, 1982. 537 p. (For individual items see A82-40506 to A82-40556)

Among the topics discussed are the aerodynamics, structural dynamics, propulsion, design, avionics, product assurance, structures and materials, testing, and acoustics of helicopters. The papers presented cover optimum airloads of rotors in hover and forward flight, the evaluation of vertical drag and ground effect, helicopter vibration reduction by rotor blade modal shaping, the finite element analysis of bearingless rotor blade aeroelasticity, adaptive fuel controls, digital full authority engine controls, helicopter autorotation assist concepts, and the conceptual design of an integrated cockpit. Also presented are papers on the demonstration of radar reflector detection, avionics systems for helicopter integration, the adaptation of pultrusion to the manufacture of helicopter components, composite main rotor blades, optimum structural design, the in-plane shear testing of thin panels, error minimization in ground vibration testing, and the prediction of helicopter rotor discrete frequency noise. O.C.

A82-40506 # Theory and application of optimum airloads to rotors in hover and forward flight. R. C. Moffitt and J. R. Bissell (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 1-12. (For individual items see A82-40506 to A82-40556)

A method is derived and applied that predicts optimum lift distribution for rotors in hover and forward flight. A key feature of the method is that it is formulated in terms of a matrix equation that gives a direct solution when wake geometry is fixed. An evaluation of the Theodorsen optimum static propeller theory, conducted with the analysis, indicates that the theory is not rigorous. It is shown that the torque differential term omitted in that analysis is both finite and significant. With this term included, the optimum static propeller wake displacement velocity is not constant. An optimized Black Hawk twist distribution in hover is shown to closely approximate the classic inverse radius pitch distribution predicted by strip momentum theory. The resulting downwash, however, is constant only over the inner 75% of the radius and substantial reductions occur in the tip region. Predicted improvements in Black Hawk forward flight performance with optimized azimuthally varying twist are significant but the associated variable twist is complex. (Author)

A82-40507 # A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design. J. C. Narramore and J. G. Yen (Bell Helicopter Textron, Fort Worth, TX). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 13-23. 28 refs.

A new Transonic Airfoil Design Method has recently been developed which can produce airfoils with desired aerodynamic, dynamic, and geometric characteristics. This new method is based on fundamental principles and utilizes efficient techniques to provide a practical airfoil design tool. Compressibility and shock wave terms are included in the method which evaluates families of velocity distributions and selects the best one which will satisfy the design objectives. This pressure distribution is used as input to a transonic inverse routine which calculates the coordinates of the section that will produce the desired velocity. Using this approach, sections can be produced that will provide desired levels of lift, drag, and pitching moment at the design operating conditions. This technology is applied to the design of an aeroelastically compliant rotor (ACR) by designing airfoils which produce favorable pitching moment and performance at design Mach number and Reynolds number conditions. (Author)

A82-40508 # Recent advances in rotor technology at Boeing Vertol. M. A. McVeigh and F. J. McHugh (Boeing Vertol Co., Philadelphia, PA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 24-33.

Results of a wind tunnel test on advanced rotor configurations present an assessment of the benefits of advanced airfoils, tip shape, blade chord, and blade number. A CH-47D model rotor with VR-7/8 airfoils was tested as a reference rotor. The advanced rotors, incorporating recently-developed VR-12/15 high speed airfoils, were tested to 231 knots in the wind tunnel and demonstrated an improvement of 6.0% in figure of merit and 25% in cruise lift-to-effective-drag ratio over a rotor with VR-7/8 airfoils. The advanced airfoils show significant improvements in stall inception limits, flying qualities boundaries and rotor noise. Improved blade tip shapes provide additional benefits in rotor noise and do not reduce the stall inception boundary. (Author)

A82-40509 * # Evaluation of an asymptotic method for helicopter rotor airloads. A. R. Vaidyanathan and G. A. Pierce (Georgia Institute of Technology, Atlanta, GA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 34-42. 21 refs. Contracts No. NAS1-16222; No. NAS1-16817.

(Previously announced in STAR as N82-21156)

A82-40510 * # An evaluation of vertical drag and ground effect using the RSRA rotor balance system. R. J. Flemming (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT) and R. E. Erickson (NASA, Ames Research Center, Moffett Field, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 43-54. 12 refs.

A flight test program utilizing the Rotor Systems Research Aircraft (RSRA) main rotor balance system was conducted to obtain data for the helicopter configuration. The test program is discussed along with the employed data reduction methods, and the results. NASA 740, the RSRA used for the vertical drag test, was in the standard helicopter configuration. The 31-foot radius blades have a linear twist of eight degrees and NACA 0012 airfoil sections. Aspects of instrumentation are considered, taking into account the data recording system, the static calibration facility, and aspects of data calibration and processing. Attention is given to the test procedure, data analysis methods, balance measurements, the ground effect, and vertical drag. It is found that the RSRA rotor balance system is capable of providing high quality performance data. The vertical drag of the RSRA is 4%, compared to 2.9% predicted. G.R.

A82-40511 * # Effect of tip vanes on the performance and flow field of a rotor in hover. H. R. Velkoff and T. W. Parker (Ohio State University, Columbus, OH). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 55-64. 7 refs. NASA-sponsored research.

Tests run with a single bladed model rotor with a vane located at the tip of the blade indicated significantly increased performance under certain test conditions. Data reveal that a figure of merit increase of over one third occurred in hover. Flow visualization using smoke revealed that a pair of vortices sprung from the blade tip and the vane tip. The vane tip vortex tended to roll up and over the primary vortex. The vortices in the wake became much less well defined with the tip vane configurations. (Author)

A82-40512 # An experimental investigation of a bearingless model rotor in hover. S. Dawson (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 65-79. 6 refs.

A 1.79-m diameter model rotor was used to investigate the aeroelastic stability of an isolated bearingless rotor blade in hover, and the results were compared with theory. Configurations tested included (1) an uncoupled configuration with a leading and trailing edge pitch link; (2) a cantilever pitch arm configuration with a single pitch link on the trailing edge of the blade (three pitch link radial locations were studied); (3) a cantilever pitch arm configuration with a single trailing edge pitch link (again three radial locations were studied); (4) a trailing edge pitch link location with -2.5 deg droop; and (5) a trailing edge pitch link location with 2.5 deg precone. Lead-lag damping was heavily dependent on pitch link radial location at higher pitch angles for the cantilever pitch arm configurations studied. Theoretical predictions show stability trends quite well in almost all cases but show discernible differences in damping at higher pitch angles. (Author)

A82-40513 # Whirl mode stability of the main rotor of the YAH-64 Advanced Attack Helicopter. L. J. Silverthorn (Hughes Helicopters, Inc., Culver City, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 80-89.

The selection of the main rotor configuration for the YAH-64 helicopter was based on the very favorable experience with the combat-proven rotor system of the OH-6A Light Observation Helicopter. Results of an analysis conducted to investigate the main rotor cyclic modes have shown an instability at the advancing whirl mode frequency of 15 hertz. The whirl mode instability was eliminated in connection with design changes. It is pointed out that the whirl mode instability is an aeroelastic phenomenon strongly dependent on coupling between hub motion and blade pitch change motion. Rotor support structure stiffening proved to be effective in increasing whirl model stability boundaries. G.R.

A82-40514 # Helicopter vibration reduction by rotor blade modal shaping. R. B. Taylor (United Technologies Research Center, East Hartford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 90-101.

The general vibration design criteria currently used in helicopter rotor blade design is placement of natural frequencies removed from integer frequencies of rotor rotation. In this paper, a theoretical approach is presented which demonstrates that design consideration of blade mode shapes can be as important as consideration of natural frequencies for vibration transmitted to the helicopter fuselage. A Modal Shaping Parameter is derived from the theoretical approach that is a measure of blade modal vibration susceptibility. A baseline blade design is then revised in accordance with minimizing the value of the Modal Shaping Parameter. A comparison of hub vibration predicted by a fully coupled aeroelastic analysis for the baseline and revised blade design shows a 70 percent reduction in the contribution of the flatwise modes to vertical hub vibration as well as a 20-30 percent reduction in blade fatigue loading. It is demonstrated that the large reductions in vibration resulted directly from desensitizing certain blade modes to aerodynamic loading as predicted by the modal shaping approach. (Author)

A82-40515 # **Correlation of predicted vibrations and test data for a wind tunnel helicopter model.** R. Sopher and S. B. R. Kottapalli (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 102-113. 9 refs.

The desirability to reduce helicopter vibrations has motivated the development of a substructure vibration analysis. The computer program involved is designed to serve as a predictive and design tool for designing helicopters for low vibrations. The substructure analysis, (SIMVIB - Simplified Vibration Analysis) embodies features which are necessary for vibration prediction. Little is known about the validity and sensitivity of the conducted analysis. A description is presented of the results of a limited correlation study performed at model scale to examine the method. The correlations of fuselage vibrations and blade moments are presented and discussed. Sensitivities of analytical predictions to changes in dynamic properties of the fuselage are shown. In addition, a study is conducted of the correlation of analysis and theory when higher harmonic control is applied to the rotor to minimize fuselage vibrations. G.R.

A82-40516 # **Wind tunnel modeling of rotor vibratory loads.** R. Gabel, M. Sheffler, F. Tarzanin, and D. Hodder (Boeing Vertol Co., Philadelphia, PA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 114-124.

A tandem rotor dynamic model has been designed, manufactured and tested at the Boeing Vertol 20 x 20 ft. V/STOL Wind Tunnel. The model measures vibratory hub loads with five independent measuring systems on each rotor. This four-bladed model was flown at full scale tip speeds through a wide envelope of airspeeds and thrusts, achieving a maximum speed of 200 knots. The various measurement systems are discussed, calibration activities are reviewed and test results are presented. (Author)

A82-40517 * # **Finite element analysis for bearingless rotor blade aeroelasticity.** N. T. Sivaneri and I. Chopra (NASA; Stanford Joint Institute for Aeronautics and Acoustics, Stanford, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 125-139. 18 refs. Grant No. NCC2-13.

A conventional articulated rotor blade has mechanical flap and lag hinges, a lag damper, and a pitch bearing. In connection with an interest in designs of greater mechanical simplicity and increased maintainability, hingeless and bearingless rotors have been developed. A hingeless blade lacks the hinges and is cantilevered at the hub. It does have a pitch bearing for pitch control. A bearingless design eliminates the hinges and the pitch bearing as well. In the present investigation of bearingless rotor blade characteristics, finite element analysis has been successfully applied to determine the solutions of the nonlinear trim equations and the linearized flutter equations of multiple-load-path blades. The employed formulation is based on Hamilton's principle. The spatial dependence of the equations of motion is discretized by dividing the flexbeams, the torque tube, and the outboard into a number of elements. G.R.

A82-40518 * # **Civil helicopter propulsion system reliability and engine monitoring technology assessments.** J. A. Murphy (Bell Helicopter Textron, Fort Worth, TX) and J. Zuk (NASA, Ames Research Center, Moffett Field, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 140-149. 16 refs. NASA-supported research.

A study to reduce operating costs of helicopters, particularly directed at the maintenance of the propulsion subsystem, is presented. The tasks of the study consisted of problem definition refinement, technology solutions, diagnostic system concepts, and emergency power augmentation. Quantifiable benefits (reduced fuel consumption, on-condition engine maintenance, extended drive system overhaul periods, and longer oil change intervals) would increase the initial cost by $43,000, but the benefit of $24.46 per hour would result in breakeven at 1758 hours. Other benefits not capable of being quantified but perhaps more important include improved aircraft avilability due to reduced maintenance time, potential for increased operating limits due to continuous automatic monitoring of gages, and less time and fuel required to make engine power checks. The most important improvement is the on-condition maintenance program, which will require the development of algorithms, equipment, and procedures compatible with all operating environments. R.K.R.

A82-40519 # **Adaptive fuel control feasibility investigation.** R. L. Bolton (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 150-155.

Responsive, stable power control has been an important design objective since the advent of the helicopter. Many helicopters flying today, however, suffer from less than desirable power response because of the difficulty in designing a system which is rapid in rotor speed control over the entire operating envelope. An optimization regarding the response of engine power for all flight regimes would be particularly important in the case of a combat helicopter. A description is presented of an on-going program of investigation of adaptive fuel control concepts utilizing existing full authority electronic systems capability. The concepts developed in this program are being analyzed by use of a full dynamic computer simulation of the engine/fuel control/airframe. It was found that fuel consumption can be reduced as much as 10% by variation of rotor speed for very specific cruise conditions, i.e., high speed, high altitude, and heavy load. G.R.

A82-40520 # **800 Shaft Horsepower Advanced Technology Demonstrator Engine (ATDE) status update.** D. B. Cale (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 156-162.

The objectives, engine design features, accomplishments and current status of the ATDE program are presented. More than 1000 hours of engine and gas generator testing have been accumulated, including performance, environmental and durability testing, and objectives are being demonstrated and problems discovered. More than 1500 hours of aerodynamic component testing and 4000 hours of fuel system and mechanical component testing have also been done. In particular, the durability demonstration was considered successful, but certain redesign efforts, such as inlet separator performance and producibility, compressor durability, and bearing durability, are necessary and are being considered. R.K.R.

A82-40521 * # **TF34 Convertible Engine System Technology Program.** K. L. Abdalla (NASA, Lewis Research Center, Cleveland, OH) and A. Brooks (General Electric Co., Lynn, MA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 163-165. 8 refs.

The ability of the helicopter to function efficiently at zero flight speed is counterbalanced by a limitation to rather low forward flight speeds. An ability to fly efficiently at high speed would provide very significant improvements in rotorcraft productivity and economics. The implementation of such improvements would require the development of a suitable integrated power plant for both the vertical and horizontal flight modes. The engine should be a shaft output engine in the vertical flight mode. In the horizontal mode, the propulsor can be fan or propeller. A description is presented of a program concerned with the demonstration of a convertible turbofan/turboshaft engine. The program is nominally directed toward the demonstration of a propulsion system for an X-wing aircraft. However, the principles being investigated are applicable to any convertible turbofan/turboshaft engine application. At the current early stage of the program, no barrier problems have become apparent, and interesting possibilities for high speed rotorcraft flight are envisaged. G.R.

A82-40522 # **Digital full authority controls for helicopter engines.** E. S. Eccles (Dowty and Smiths Industries Controls, Ltd., Cheltenham, Glos., England). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 170-180. 5 refs. Research supported by the Ministry of Defence /Procurement Executive/.

The paper reviews the benefits that accrue to the aircraft, the operator and the crew from using full authority digital electronic engine controls. They are discussed as performance benefits, mission effectiveness benefits, cost benefits and maintainability benefits. The paper discusses the use of redundancy and its effects on the operation of aircraft, particularly commercial operation. The paper concludes that digital controls, and particularly dual redundant controls offer some very significant cost benefits to many helicopter operators. (Author)

A82-40523 # **Tandem rotor helicopter characteristics in a continuous icing environment.** P. J. Dunford (Boeing Vertol Co., Philadelphia, PA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 181-193. 9 refs.

In connection with the growing need for Instrument Flight Rule (IFR) operations in both military and commercial applications, considerable emphasis has been placed on helicopter utilization in adverse weather conditions. As a corollary to this requirement, investigations have been conducted with the aim to permit the operation of helicopters under icing conditions. Attention is given to test results, a natural icing performance analysis, the need for a deicing system, and icing certification criteria. It is found that the impracticality and expense involved in testing helicopters to the full extent of the requirements of FAR Part 25 makes the need for LIMITED icing releases a real one. Recognition of specific helicopter attributes and shortcomings is highly desirable for this type of certification. G.R.

A82-40524 # An evaluation of helicopter autorotation assist concepts. G. T. White (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA), A. H. Logan, and J. D. Graves (Hughes Helicopters, Inc., Culver City, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 194-216. 11 refs. Grant No. DAAK51-80-C-0011.

The unique autorotation capability of the helicopter is an inherent safety feature which is heavily relied upon during power failure emergencies. However, the autorotation maneuver places great demands on pilot skill. An analytical study was conducted of autorotation improvement devices. These devices were evaluated using both weight and preliminary performance analyses. The three most promising concepts were carried through preliminary design. It was found that no significant gain in autorotation performance can be achieved by only the management of available baseline energy. Supplemental energy must be supplied. The use of a simple Autorotative Index is a good tool for the initial determination of the auxiliary power level required for good autorotative characteristics. The autorotative characteristics of a single-engine scout helicopter can be substantially improved with the combination of a MIL-STD-1290 type landing gear and either a Tip Jet, Flywheel or Auxiliary Turbine system. G.R.

A82-40525 # Predesign study for an advanced flight research rotor. R. H. Blackwell, T. G. Campbell (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT), and R. B. Taylor (United Technologies Research Center, East Hartford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 217-234. 11 refs.

A flight research rotor program aimed at demonstrating significant improvements in aerodynamic performance and reductions in vibration and noise is outlined. The benefits and practical design considerations of approximately a dozen advanced rotor concepts were considered and three concepts were chosen for inclusion in the flight research program. Detailed design of a blade permitting experimental study of tip shape, a tuned trailing edge tab system and blade mass distribution is presented. The design issues addressed in connection with the research blade are shown to have general applicability. Finally the total program required to develop these concepts including further analysis, model test, ground tests and flight test is outlined. (Author)

A82-40526 # Sikorsky ACAP preliminary design. B. F. Kay (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-4050520-01) Washington, DC, American Helicopter Society, 1982, p. 235-238A.

Sikorsky Aircraft is currently under contract to the U.S. Army to conduct an Advanced Composite Airframe Program (ACAP). The basic objectives of the ACAP are to demonstrate the weight and cost saving potential of advanced composite materials when used to the maximum extent possible in an airframe designed to meet stringent military requirements. This paper will describe Sikorsky's ACAP helicopter and the approaches used to minimize weight, reduce manufacturing costs and achieve high levels of crashworthiness, survivability, reliability, and maintainability. (Author)

A82-40527 # Conceptual design of the LHX integrated cockpit. R. R. Pruyn and R. E. Domenic (Boeing Vertol Co., Philadelphia, PA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 239-246. 9 refs.

The present investigation is concerned with the application of computer-based technology to the next generation of Army tactical aircraft. Attention is given to missions which drive cockpit design, the potential benefits of improved displays, developments in automation, questions regarding the merits of displays versus windows, mockups to develop design, aspects of display capability and flight safety, concepts in image processing, crew workload studies, assumptions for workload analysis, workload methodology, and the results of workload analysis. It is concluded that with the anticipated automation, controls, and displays, one crewman can efficiently perform all of the desired tactical scout and attack tasks. For next-generation aircraft a wide-field-of-view panel or helmet-mounted display is needed since it reduces pilot workload and improves mission performance and flight safety. G.R.

A82-40528 # The YAH-64 empennage and tail rotor - A technical history. R. W. Prouty and K. B. Amer (Hughes Helicopters, Inc., Culver City, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 247-261.

The development of a helicopter from drawing board to production line is still very much a learning process. The lessons learned in connection with the development of the Army YAH-64 Advanced Attack Helicopter should, therefore, be sufficiently valuable to future designers to warrant a detailed review. Attention is given to the changes to the empennage and tail rotor as the designers sought the best compromise between good performance and flying qualities on the one hand and low weight, low cost, and simplicity on the other. The considered helicopter has been developed primarily as a tank hunter and killer capable of flying and fighting at night or in bad weather. The primary weapons are wingmounted Hellfire guided missiles. The work discussed primarily deals with solutions to problems in the basic aircraft as they were discovered during its flight test. G.R.

A82-40529 # Future helicopter cockpit design. S. D. Roy (Westland Helicopters, Ltd., Yeovil, Somerset, England). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 262-273. 5 refs.

The influence of the use of electronic display systems on the helicopter cockpit is examined. Color CRT's are decidedly essential when proposed as complete replacements for conventional instruments, and two sizes of display are being considered (5 inches x 5 inches and 8 inches x 8 inches). Lighter displays, using flat panel technology, should be considered for the long term, but with careful consideration of pilot error due to misselection. Other technologies considered are data entry and extraction techniques, and direct voice control systems. The data technique is considered in terms of class of task, access, time constraints, and space availability, and a design approach for a voice system capable of continuous speech recognition is presented. The cockpit design implications of these modifications are considered. R.K.R.

A82-40530 # Concept demonstration of automatic subsystem parameter monitoring. M. S. Randolph (General Electric Co., Aerospace Control Systems Dept., Binghamton, NY) and R. V. Kurowsky (U.S. Army, Fort Monmouth, NY). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 274-286. Grant No. DAAK80-79-C-0270.

A feasibility demonstration model of an Electronic Master Monitor and Advisory Display System (EMMADS) has been developed as part of the Army's efforts to reduce aircrew workload, integrate cockpit instrumentation, and enhance aircraft maintenance capability. The feasibility demonstration hardware is considered along with aspects of system operation, taking into account the philosophy of operation, the types of operation, manually commanded operations, and fault commanded operations. Under a follow on development effort currently in progress, the capabilities of the current feasibility hardware will be expanded to include fault logic for all CH-47D model subsystems. G.R.

A82-40531 * # Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability. G. R. Clary (NASA, Ames Research Center, Moffett Field, CA) and P. G. Cooper (Cooper Avionics, Inc., Montara, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 287-297. 7 refs.

As a part of NASA's Rotorcraft All-Weather Operations Research Program, advanced airborne radar approach (ARA) concepts are being investigated. Since data from previous NASA/FAA flight tests showed significant ARA limitations, a research program was initiated at NASA Ames Research Center to determine the benefit that could be derived by automating certain radar functions and superimposing course display data on the radar display. To evaluate these concepts, a newly developed video tracking system which interfaces with weather radar was acquired. After the pilot designates a destination target, the system tracks the target video as it moves on the radar indicator. Using a small, efficient microprocessor, the autotracker presents valuable approach data on the radar screen and automatically adjusts the radar gain and tilt. Results of a limited flight test evaluation of the autotracker show that the course display concept, combined with automated gain and tilt functions, is effective for improving ARA's and reducing radar operator workload. (Author)

A82-40532 * # Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar. D. J. Anderson, J. S. Bull (NASA, Ames Research Center, Moffett Field, CA), and J. P. Chisholm (Nevada, University, Reno, NV). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 298-305.

A navigation system which utilizes minimum ground-based equipment is especially advantageous to helicopters, which can make off-airport landings. Research has been conducted in the use of weather and mapping radar to detect large radar reflectors overland for navigation purposes. As initial studies have not been successful, investigations were conducted regarding a new concept for the detection of ground-based radar reflectors and eliminating ground clutter, using a device called an echo processor (EP). A description is presented of the problems associated with detecting radar reflectors overland, taking into account the EP concept and the results of ground- and flight-test investigations. The echo processor concept was successfully demonstrated in detecting radar reflectors overland in a high-clutter environment. A radar reflector target size of 55 dBsm was found to be adequate for detection in an urban environment. G.R.

A82-40533 # **Micro-heads-up display.** J. R. Goodman and H. W. Upton (Bell Helicopter Textron, Fort Worth, TX). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 306-311.

A revolutionary microsized heads-up display (micro-HUD), which weighs only a few ounces and can be worn on a pair of conventional eyeglasses, is described. A microsize optical system makes the display possible. An advanced state-of-the-art visible light-emitting diode (VLED) array and a vibrating fiber ribbon generate the image. The system uses a microprocessor display generator that produces a dynamic image with 128 x 128 elements of resolution. This gives the micro-HUD the capability of presenting the same information as a standard heads-up display. Development of the custom-designed linear array of light-emitting diodes along with the specially fabricated fiber-optic scanner is also described. Results of laboratory and flight tests are discussed. Potential improvements such as higher resolution and multicolor versions of the display are described. Finally, the possible applications and future of the system is discussed. (Author)

A82-40534 # **Avionics systems for helicopter integration.** D. R. Nelson (Rockwell International Corp., Collins Government Avionics Div., Cedar Rapids, IA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 312-321.

Attention is given to a 'core system' which provides a common set of equipments that is, with appropriate software, applicable to a wide variety of helicopter missions. The basic core system is the core of the Coast Guard (USCG) HH-65A system. It has been proposed for civil and military helicopter programs with requirements ranging from covert 'behind-the-lines' operations to resupply of oil rigs. Particular elements of the core avionics systems include the Cockpit Management System (CMS), the Multi-purpose Video Display System, the Mission Computer, a dual redundant multiplex data bus control system, and a four-axis autopilot/flight director capable of hands-off flight in all regimes including transition to hover. Attention is given to system capability requirements, aspects of system functional allocation, the automatic flight control system, and the mission processor. G.R.

A82-40535 * # **NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches.** L. L. Peach, Jr., L. Tobias, and H. Q. Lee (NASA, Ames Research Center, Moffett Field, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 322-336. 6 refs.

The NASA/FAA Helicopter Air Traffic Control (ATC) simulation investigations to determine the feasibility of simultaneous, independent instrument approach procedures for helicopters at major terminal areas, using Area Navigation/Microwave Landing System (RNAV/MLS) guidance, was conducted at several levels of helicopter display sophistication, up to that of a Cockpit Display of Traffic Information (CDTI) system. Test objectives included the determination of pilot acceptability and the tracking performance of the RNAV/MLS's noninterfering rotorcraft approach path structure, along with the evaluation of the effect on controller workload of multiroute structures combining conventional and rotorcraft approaches at various arrival rates and traffic separations. The utility of electronic area maps and CDTI displays was also investigated. Participating pilots flew 127 simulated instrument approaches in an ATC simulation laboratory. O.C.

A82-40537 # **Adaptation of pultrusion to the manufacture of helicopter components.** E. E. Blake (Bell Helicopter Textron, Fort Worth, TX) and N. J. Tessier (U.S. Army, Army Materials and Mechanics Research Center, Watertown, MA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 346-351.

A fabrication technique is described in which pultruded epoxy/glass stock with a complex crossection is postformed and cured to produce a curved UH-1 helicopter door track. During pultrusion, prepreg roving is overwrapped with adhesive prepreg glass cloth for transverse strength. The 'B' stage stock is postformed and autoclave cured in a glass/epoxy tool. The resulting door track retains the cros-section of the pultrusion after developing the sweep and twist designed into the present aluminum part. Wear and load testing were performed on the composite door track along with an economic analysis comparing it with hand layup and the present aluminum track. The results demonstrate that it is feasible to produce complex helicopter components from pultrusions by means of postforming. (Author)

A82-40538 # **In-motion radiography of titanium spar tube welds.** R. J. Milne (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 352-358.

The application of titanium to a helicopter rotor blade spar was developed during the 1960's. However, the initially contemplated manfacturing method did not prove to be economical, and a new manufacturing procedure involving the use of a plasma arc welding technique was developed. The verification of weld integrity by means of a typical static X-ray test was found to be too time consuming, and the employment of in-motion radiography was considered. By using an in-motion radiographic system, it was possible to reduce significantly the time required to radiograph spar tube welds without sacrificing detail sensitivity. G.R.

A82-40539 # **Development of the Sea King composite main rotor blade.** R. Sanders (Westland Helicopters, Ltd., Yeovil, Somerset, England). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 359-370.

The Sea King composite main rotor blade has been designed to satisfy ruggedness requirements for the 1980's, and will soon be ready for flight testing. Composite materials with a replacable metal erosion shield have been chosen to improve the life of the blade, and a carbon and glass fiber mixture satisfies stiffness and weight requirements. A bolted root end design was chosen for this retrofit blade in order to ease automation, without degrading fatigue advantages of the composite construction. Technical problems and achievements encountered in the development process are discussed in terms of materials used, blade root design, manufacturing process, serviceability, and quality and safety control. A plant has been constructed to satisfy future production requirements, with an anticipated product availability date of late 1984. R.K.R.

A82-40540 # **Computer aided coordinate measuring systems.** J. W. Nastri (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 371-376.

Sikorsky's computer-aided inspection system and equipment utilized to assure that manufactured parts meet drawing tolerance specifications are discussed. An overview of the system is given, and the software is described, including the monitor console routine and commands and the language commands. The system's three coordinate measuring machines are discussed, and the part inspection methods are described in stepwise fashion. System benefits and time savings items are detailed, including quick and accurate measurement of parts difficult to inspect by conventional methods, significant reduction in inspection time, a consistent baseline that highlights variances, and the use of personnel with lower skill levels to effectively inspect critical parts. C.D.

A82-40541 # **Support of the HH-65A - The impact of advanced technology of VTOL systems upon existing product support.** R. E. Walkup (Aerospatiale Helicopter Corp., Grand Prairie, TX). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 377-382.

The Coast Guard (USCG) will begin to replace the HH-52 Helicopters with the HH-65A in 1982. The HH-65A is equipped with a state-of-the-art digital avionics system. As the HH-52 has only vacuum tube avionics equipment, the new establishment of a complete support capability for solid state digital avionics will be necessary in connection with the introduction of the HH-65A. Other technological advances utilized in the HH-65A are related to turbine engines of modular design and the employment of composite materials in the aircraft structure. The HH-52 will continue in operation until all USCG stations will have received their HH-65A's. To provide support for simultaneous operation of both helicopters without an increase in support personnel will necessitate careful planning during the transitional period. Attention is given to the HH-65A avionics system, modular engine maintenance, aspects of corrosion control and the USCG mission, and the allocation and repair of spare components. G.R.

A82-40542 # **A roadmap toward a fatigue qualification process for modern technology helicopters.** S. T.-T. Chiu and R. W. Arden (U.S. Army, Directorate for Development and Qualification, St. Louis, MO). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 383-397. 30 refs.

The helicopter fatigue qualification process is critically reviewed to establish a roadmap, providing specific directions for a more efficient and unified qualification process. Specific improvements, various alternatives, and suggested unified approaches are discussed in terms of supporing rationales in the areas of coupon

S-N data utilization, S-N curve reduction factor and curve shape, cycle counting method, structure classification, fatigue test requirement and in-service monitoring. Current status and an overview are presented of a parallel AGARD effort to compile a 'Helicopter Fatigue Design Guide'. (Author)

A82-40543 # **Optimum structural design.** R. L. Bennett (Bell Helicopter Textron, Fort Worth, TX). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 398-407. 12 refs.

Four typical helicopter engineering analyses have been combined with a nonlinear programming (NLP) algorithm to produce closed loop design-oriented analyses. The resulting models are shown to be very effective in supporting detailed design by eliminating the existing external man-in-the-loop iterative process. The nonlinear programming problem and how it relates to the engineering design process is described, along with typical NLP algorithms and how they are combined with conventional engineering analyses. C.D.

A82-40544 # **Design and fabrication of a composite rear fuselage for the UH-60 /Black Hawk/.** D. G. Orlino (U.S. Army, Applied Technology Laboratory, Fort Eustis, VA) and B. F. Kay (United Technologies Corp., Sikorsky Aircraft Div., Stratford, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 408-416.

The primary objective of the program to design a composite rear fuselage (CRF) is fabrication cost reduction, and other concerns are a 10% weight savings, improved reliability and maintainability, and increased ballistic survivability. The CRF design comprises a stiffened skin, with five major panels, bulkheads, and frames. A modular repair concept resulted in reduced life-cycle cost, introducing reliability and maintainability into the design. In order to prevent fuel fires on impact with high explosive incendiary projectiles, rigid ballistic foam was used to fill the fuel cell. Visual inspection as well as destructive tests were completed, and necessary tooling changes were implemented. Objectives being met, a full-scale static test article is being produced. R.K.R.

A82-40545 # **In-plane shear test of thin panels.** G. L. Farley and D. J. Baker (U.S. Army, Structures Laboratory, Hampton, VA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 417-425. 5 refs.

Efficient application of thin gage composite materials to helicopter fuselage structures necessitates that the materials be designed to operate at loads several times higher than initial buckling load. Methods are required to accurately measure and predict the response of thin gage composites when subjected to these loads. This paper presents the results of an analytical and experimental study of the behavior of thin gage composite panels subjected to in-plane shear loads. Finite element stress analyses were used to aid in the design of an improved shear fixture that minimizes adverse corner stresses and tearing and crimping failure modes characteristic of commonly used shear fixtures. Tests of thick buckle resistant aluminum panels and thin aluminum and composite panels were conducted to verify the fixture design. Results of finite element stress and buckling analyses and diagonal tension theory predictions are presented. Correlation of experimental data with analysis indicated that diagonal tension theory can be used to predict the load-strain response of thin composite panels. (Author)

A82-40546 # **A summary of weight savings data for composite VSTOL structure.** R. L. Foye (U.S. Army, Research and Technology Laboratory, Moffett Field, CA) and R. Arden (U.S. Army, Aviation Research and Development Command, St. Louis, MO). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 426-437. 96 refs.

This paper summarizes the weight savings that have been obtained over the last ten years through the application of advanced composite materials to each of the major structural weight groups of a VSTOL airframe. The data has been drawn from journal articles, published papers, R&D reports, and personal communications. Helicopter, VSTOL, and fixed wing applications of composites have been included. The data is not comprehensive but represents a significant sampling of all recent composite airframe designs. (Author)

A82-40547 # **Structural design of a crashworthy landing gear for the AH-64 Attack Helicopter.** J. M. McDermott (Hughes Helicopters, Inc., Culver City, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 438-450.

Requirements for the design of a landing gear for helicopters are considered. In the case of the AH-64 Attack Helicopter, an additional consideration is related to air transportability requirements of the helicopter, necessitating a kneeling requirement in the landing gear configuration in order to reduce the height of the helicopter to fit into the cabin of the cargo aircraft transporting it. This kneeling requirement was also utilized to provide a high degree of crash protection. According to specification, protection of the crew has to be provided for conditions involving a vertical impact velocity of as high as 42 ft/sec. In order to meet this requirement, it was necessary to use the landing gear to absorb as high a proportion of the vertical kinetic energy as was feasible before the fuselage contacted the ground. Attention is given to the configuration of the landing gear for the AH-64, the design criteria, details of impact energy absorption, the integration of the landing gear into the airframe, and static structural testing. G.R.

A82-40548 # **Ringfin augmentation effects.** H. E. Lemont (Bell Helicopter Textron, Fort Worth, TX). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 451-460.

The ringfin concept has been developed since 1975 as a potential remedy for a number of concerns experienced in connection with the operation of single main totor/tail rotor helicopters. This concept involves the use of a thrust ring around the tail rotor. The ring acts as fin, and generates lift force (antitorque). The present investigation is concerned with the measured augmentation effects in ground running, in hover and side flight, in forward translation, and mixing of the rotor wakes. The investigation shows that under static thrust conditions the tail rotor flow generates an induced positive force on the ring. The rotor tip vortices are dissipated with downstream flow motion, and an expanding slowed-velocity wake is created. G.R.

A82-40549 * # **Performance of the Rotor Systems Research Aircraft calibrated rotor loads measurement system.** C. W. Acree, Jr. (NASA, Ames Research Center, Moffett Field, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 461-473. 6 refs.

The compound Rotor Systems Research Aircraft (RSRA) is designed to make high accuracy, simultaneous measurements of all rotor forces and moments in flight. Physical calibration of the rotor force- and moment-measurement system when installed in the aircraft is required to account for any errors and to ensure that measurement system accuracy is traceable to the National Bureau of Standards. The first static calibration and associated analysis has been completed with good results. Hysteresis was a potential cause of static calibration errors, but was found to be negligible in flight, and analytical methods have been devised to eliminate its effects on calibration data. Flight tests confirmed that the calibrated rotor loads measurement system performs as expected in flight, and that it can dependably make direct measurements of fuselage vertical drag in hover. (Author)

A82-40550 # **Error minimization in ground vibration testing.** E. J. Nagy (Kaman Aerospace Corp., Bloomfield, CT). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 474-480. 5 refs.

The Ground Vibration Testing (GVT) of a U.S. Army AH-1G helicopter airframe has been successfully completed. New methods have been developed to identify and minimize the errors in GVT. These methods can be utilized in future programs. The new approaches make effective use of a digital signal analyzer as a 'working tool'. Examples are presented to demonstrate the use of the digital signal analyzer in connection with a number of applications. Attention is given to methods for the determination of the linear range, the location and identification of structural modes, the selection of narrow band sweeps, the selection of driving points, the local mode effect, driving point acceleration mobility checks for positive imaginary components, strain mobilities, the power method, and the number of averages. G.R.

A82-40551 # **Results of the AH-64 Structural Demonstration.** K. R. Spreuer (Hughes Helicopters, Inc., Carlsbad, CA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 481-489.

This paper presents the results of the Structural Demonstration of the AH-64 Attack Helicopter. The paper presents graphical data that shows the techniques used to attain the extreme points that define the flight envelope. The areas of the flight envelope that most challenge the various components of the helicopter are discussed. The methods used to assure flight safety during the program are also presented. Finally, the most highly loaded components are identified and the conditions and causes of the loads are presented. The Structural Demonstration was conducted successfully and all required maneuvers were performed without exceeding limit loads on any components. (Author)

A82-40552 # **Evaluation of an automatic subsystem parameter monitor.** R. V. Kurowsky and A. S. Santanelli (U.S. Army, Fort Monmouth, NJ). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 490-496.

It is pointed out that the workload of the pilot of an aircraft is not necessarily reduced by making available to the pilot a new type of avionics system architecture, if the pilot is still required to perform all the tasks he has traditionally

performed. To achieve such a reduction in workload, the pilot should be used primarily as a decision maker with the ability to reprogram and command his machine in flight. The Electronic Master Monitor and Advisory Display System (EMMADS) is an information transfer system which will relieve the pilot of certain functions he has traditionally performed, such as monitoring aircraft subsystems. A description is presented of the test procedures which will be used to evaluate the operator/control/display interface of the EMMADS Advanced Development Model.
G.R.

A82-40553 * #   The prediction of helicopter rotor discrete frequency noise. F. Farassat (NASA, Langley Research Center, Hampton, VA) and G. P. Succi (Bolt Beranek and Newman, Inc., Cambridge, MA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 497-507. 23 refs.

An accurate prediction of the noise produced by helicopters requires a good understanding of the noise generating mechanisms involved. Such an understanding can lead to controlling the noise of existing helicopters by avoiding noisy regimes of flight or by redesigning the main and tail rotors. The present investigation is concerned with approaches which are suitable for the calculation of discrete frequency noise of helicopter rotors. The governing differential equation of acoustics used in a consideration of acoustic formulations is the Ffowcs Williams-Hawkings (FW-H) equation. Attention is given to a method reported by Farassat (1981), a method developed by Succi (1979), and a procedure discussed by Woan and Gregorek (1978).
G.R.

A82-40554 #   A semiempirical high-speed rotor noise prediction technique. K. R. Shenoy (Bell Helicopter Textron, Fort Worth, TX). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 508-516. 14 refs.

A semiempirical technique to predict high-speed noise of helicopter main rotors is discussed. This technique uses an existing data base, the properties of the equations governing the flow field, and empirical relationships to account for the changes in gross weight, blade chord and the blade rotational tip Mach number. The technique is verified through an application to full-scale flyover noise data and full-scale in-flight noise data. Hover test results for a model rotor are used to predict the noise levels for forward flight and are compared with wind tunnel test data. In addition, results of flow field investigations to study the effects of blade design parameters on high-speed noise and to extend the prediction technique are presented. These results are based on the flow field calculations made by using a three-dimensional, quasi-steady, full potential transonic analysis developed by NASA.
(Author)

A82-40555 * #   Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack. J. E. Hubbard, Jr. and W. L. Harris (MIT, Cambridge, MA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 517-527. 16 refs. Research supported by the Massachusetts Institute of Technology; Grant No. NsG-1583.

The modern helicopter offers a unique operational capability to both the public and private sectors. However, the use of the helicopter may become severely limited due to the radiated noise generated by the rotor system. A description is presented of some of the experimental results obtained with a model helicopter rotor in an anechoic wind tunnel with regard to blade stall as a source mechanism of blade slap. Attention is given to dynamic rotor blade surface phenomena and the resulting far field impulsive noise from the model helicopter rotor at high angles of attack and low tip speed. The results of the investigation strongly implicates the boundary layer as playing an important role in blade slap due to blade/vortex interaction (BVI) in a highly loaded rotor. Intermittent stall cannot be ruled out as a possible source mechanism for blade slap. This implies that blade surface characteristics, airfoil shape and local Reynolds number may now be used as tools to reduce the resultant far-field sound pressure levels in helicopters.
G.R.

A82-40556 #   Helicopter model scale results of blade-vortex interaction impulsive noise as affected by blade planform. D. A. Conner and D. R. Hoad (U.S. Army, Structures Laboratory, Hampton, VA). In: American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings. (A82-40505 20-01) Washington, DC, American Helicopter Society, 1982, p. 528-537. 21 refs.

An experimental investigation of the blade-vortex interaction impulsive noise characteristics of an advanced main rotor system for the UH-1 helicopter has been conducted. Models of both the advanced main rotor system and the standard UH-1 main rotor system were tested at one-quarter scale in the Langley 4- by 7-Meter (V/STOL) Tunnel using the General Rotor Model System (GRMS). Tests were conducted over a range of descent angles which bracketed the blade-vortex interaction phenomenon at a range of simulated flight speeds. The tunnel was operated in the open-throat configuration with acoustic treatment to improve the acoustic characteristics of the test chamber. The model data indicated that the advanced rotor system has increased the flight-scaled, LA noise produced by the UH-1 at all descent angles except where the blade-vortex interaction phenomenon was most intense for the standard UH-1 main rotor system.
(Author)

A82-40561 #   Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage (Untersuchungen über das Verhalten eines Turbostrahltriebwerks bei inneren und äusseren Störungen im Hinblick auf die Schadensfrüherkennung). H. Tönskötter. Aachen, Rheinisch-Westfälische Technische Hochschule, Fakultät für Maschinenwesen, Dr.-Ing. Dissertation, 1980. 215 p. 41 refs. In German.

The results of a theoretical and experimental study on the behavior of a single-wave turbojet engine during disturbances are presented. The simulated disturbances are categorized as either external or internal. The former influence flow relationships in the engine and vary their behavior, but entail no consequences for the engine parts. Damage and structural changes in the engine components are called internal disturbances. Experimentally obtained thermodynamic parameter changes are presented as volume divisions and average values. A program to calculate the stationary and dynamic operating behavior in turbojet engines is used to determine the extent to which the experimental results coincide with a one-dimensional computational procedure, and whether monitoring of operating behavior can be useful for early detection of damage.
C.D.

A82-40562 #   Research on an adaptive Kalman filter for solving the radar tracking problem (Untersuchung adaptiver Kalman-Filter zur Lösung des Radar-Zielverfolgungsproblems). W. Schumacher. Berlin, Technische Universität, Fachberich Verfahrenstechnik, Dr.-Ing. Dissertation, 1979. 126 p. 44 refs. In German. Research supported by the Deutsche Forschungsgemeinschaft.

The use of Kalman filters in automated air traffic control for failsafe measurement of local coordinates and speeds is discussed. Continuous and time-discrete models are constructed and an optimal filter is investigated. A sensitivity analysis is presented, followed by the design and simulation of an adaptive filter. Tracking at a one-level trajectory is discussed, and the design of an adaptive procedure is analyzed for different filter levels.
C.D.

A82-40569 #   Design and construction of a flexible autonomic electronic display device (Entwurf und Aufbau eines flexiblen autonomen elektronischen Anzeigegerätes). R. Frieling. Braunschweig, Technische Universität, Fakultät für Maschinenbau und Elektrotechnik, Dr.-Ing. Dissertation, 1980. 166 p. 40 refs. In German.

A compact, autonomic display device for presenting synthetic graphic images is needed for research work in the area of flight control. The device should also be suited for the presentation of dynamic processes. A device with the desired characteristics is currently not commercially available. The present investigation is concerned with the essential design criteria for the development and the construction of a display device which satisfies the considered requirements. The envisaged device consists of a microcomputer and an image element generator which contains digital differential analyzer (DDA) circuits. A detailed mathematical description of the generation of conic sections as image elements and the linear transformation of the elements provides the basis for universal employment possibilities of the device. The performance characteristics of the display device are illustrated with the aid of two examples, including an interpolation problem, and the display of data for flight control applications.
G.R.

A82-40876   International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volumes 1 & 2. Edited by B. Laschka and R. Staufenbiel, New York, American Institute of Aeronautics and Astronautics, 1982. Vol. 1, 821 p.; vol. 2, 721 p. Members, $75.; nonmembers, $90. In English and French. (For individual items see A82-40877 to A82-41025)

Topics in aeronautical and aerodynamics research, development, implementation, and future directions are considered. The development and applications of Space Transportation Systems are described, and attention is also given to development programs for transport aircraft and military combat aircraft. Theoretical studies in flowfields, crew station design, and power plant materials and design are presented, along with investigations of aerodynamics, computational aerodynamics, control systems, and materials fatigue and tolerance. The uses of simulators for Orbiter pilot training, swept wings for efficient flight, and computer-controlled flight management systems are described, and examinations of vortex flows, structural dynamics, applications of composite structures, and canards are reported.
M.S.K.

A82-40878 #   Engineering aspects of international collaboration on Tornado. B. O. Heath (British Aerospace Public, Ltd., Co., Aircraft Group, Preston, Lancs., England). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 8-22. 11 refs.

Design features, engineering goals, and the performance envelope of the Tornado combat aircraft are described. The fighter was developed to perform air-to-ground, interdictor/strike, naval strike, reconnaissance, air superiority, interception, and training missions. The distribution of responsibilities and management authority among the organizations of the three nations which participated in the development program are outlined, along with decisions in the evolution of the design. A new engine was developed as a cost-saving measure, and the aircraft was built to ensure that no single failure would endanger flightworthiness. Easy access was also added to the Tornado systems in order to hold down repair time and costs. M.S.K.

A82-40879 # Advanced aerodynamic design for future combat aircraft. B. R. A. Burns (British Aerospace Public, Ltd., Co., Preston, Lancs., England). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 23-33.

Progress in aerodynamic design features to enhance the effectiveness and performance of combat aircraft are reviewed. Higher turning performance at subsonic and transonic speeds has been achieved through improvements in the lift/drag ratio by providing for attached flow on the upper part of the wings. The effects of wing root leading edge strakes and aeroelastic tailoring on flight performance are discussed, and methods of augmenting the turning performance by adding wing interference to the jet exhaust are considered. Pilot workload has been lowered by active flight controls, which allow full exploitation of modern aircraft flight and maneuvering envelopes, while gust alleviation has ensured stable flight during high speed, low altitude flight. Intake duct geometry has been configured to permit operation at high angles of attack and in sideslip, while an underfuselage carriage scheme has been developed which greatly reduces interference drag compared with conventional underwing carriage. M.S.K.

A82-40880 # Some aerodynamic/flightmechanic aspects for the design of future combat aircraft. P. Mangold (Dornier GmbH, Friedrichshafen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 34-43. 6 refs

At an early project state of a future combat aircraft, designed with negative static stability, it is necessary to go through an optimization process in order to minimize the complexity and cost for the control system by avoiding undesirable aerodynamic characteristics. A careful refinement of certain parts of the configuration gives the chance to stay within the limits and to meet the criteria and goals for the desired longitudinal and lateral basic behavior. General trends, evaluated from many wind tunnel tests, are presented which show the influence of changing LEX size, shape of fuselage nose, slats, vertical tails etc. Concerning maximum attainable negative static margin one limit is set by the time to double amplitude after a gust disturbance. Looking at some typical existing and projected combat aircraft the paper discusses the fact and the consequences that the same Time To Double leads to different (attainable) static margins. (Author)

A82-40881 # Gust load alleviation on Airbus A 300. O. Sensburg, J. Becker, H. Lusebrink, and F. Weiss (Messerschmitt-Bölkow-Blohm GmbH, Munich and Hamburg, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 44-58. 15 refs.

An active gust load alleviation system for an Airbus A 300 with a 10% wing span increase is described, along with passive maneuver load alleviation. The introduction of active control systems is intended to minimize the incremental structural dynamic loads caused by span expansion or increased wing loading, especially due to gusts. The gust magnitude is assayed by a vane or differential pressure sensor in the front fuselage, weighted with a time delay for the vane to wing transit. Actuator transfer functions are introduced into the existing active flight controls to compensate for unsteady aerodynamic effects. A block diagram of the closed loop gust alleviation system is provided, along with linearized equations of motion of elastic aircraft with closed or open loop systems. Finally, further studies are indicated in unsteady effects in order to implement passive maneuver load alleviation. M.S.K.

A82-40882 # Calculations of transonic steady state aeroelastic effects for a canard airplane. N. Agrell and S. G. Hedman (Flygtekniska Forsoksanstalten, Bromma, Sweden). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 59-66. 5 refs. Forsvarets Materielverk *Contracts No. AU-1540;* No. AU-1691.

A transonic small perturbation potential method for calculation of the aeroelastic effects on aircraft with a canard is presented, and comparisons are made with results of earlier calculations. The equation for the disturbance potential is defined and the velocity potential is transformed into a finite difference form. Boundary conditions are formulated for subsonic and supersonic regimes and methods of treating steady state aeroelastic effects are discussed. A numerical mesh is devised using the SAAB 37 Viggen as an example and solution procedures at sub- and supersonic speeds are presented, covering the speed range of Mach 0.9-1.1. Aeroelastic deformation is calculated by balancing aerodynamic loads against interior forces. M.S.K.

A82-40883 # Computer-aided derivation of equations of motion for rotary-wing aeroelastic problems. F. Kiessling (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Aeroelastik, Göttingen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 67-77. 13 refs.

A general computer-algebra system has been applied to derive literal equations of motion for the aeroelastic behavior of rotary-wings. Inertia, elastic, structural damping, aerodynamic, and gravitational contributions are considered. Modal degrees of freedom are provided to represent elastic rotor blades. The program input comprises mainly a kinematic description of the system. A weighting scheme is used to obtain the most important terms in a consistent manner. Multiblade coordinate transformation is applied to reduce or to eliminate periodic coefficients. As output, matrices are written in FORTRAN code, which reflect the mathematical model and can be used for further numerical calculations. As an example, the suggested procedure is applied to a model of a two-bladed wind turbine mounted on an elastic tower. (Author)

A82-40884 # HAJIF-II - A program system for the dynamic analysis of aeronautical structures. G.-G. Liu and J.-J. Li (Chinese Aeronautical Establishment, Beijing, People's Republic of China). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 78-82. 17 refs.

HAJIF-II is a program system developed for the calculation of modal parameters of aircraft structures as well as flutter and gust response analyses with active control systems taken into consideration. Ninety-nine substructures, each with 7000 degrees of freedom, can be used in the calculation of modal parameters and 50 modes for the flutter and gust response analyses. Some new techniques, such as a revised hypermatrix technique, an improved algorithm of simultaneous iteration, and new methods of modal synthesis etc., were developed to improve the efficiency of the system. Typical aircraft structures were analyzed and good results were obtained. (Author)

A82-40886 # A practical approach to the incorporation of technical advances in avionics. J. D. Bannister and D. Roughton (British Aerospace Public, Ltd., Co., Aircraft Group, Brough, North Humberside, England). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 97-107.

Features of a program to design, develop, and construct an avionic system demonstrator rig for the next generation of tactical combat aircraft while taking advantage of advances in VLSI hardware are described. The VLSI-based architecture permits shared communication and displays, in addition to sensor-dedicated microprocessors. Military standard data busses can currently handle up to 31 subsystems through a common transmission line, and further determinations are needed to identify the effects of common mode failures, limitations on the amount of traffic on a bus, the effects of transmission delays, and particular links which cannot be routed through a data bus. Details of the functional aspects of pilot, system control, mission, navaids, and aircraft groups to define problem areas, goals, and method to allow an acceptable transition to VLSI-based avionics are discussed. M.S.K.

A82-40887 # Applying advanced technology to flight station design. W. R. Paden, Jr. and G. A. Sexton (Lockheed-Georgia Co., Marietta, GA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 108-117.

Efforts by Lockheed to develop a flight simulation research facility are described, including the construction of a functional pilot's desk flight station, aircraft systems, and controls expected to be in use in the 1990s. Simulators are being constructed to accommodate high resolution CRT color graphics, flat panel displays, touch panel controls, voice command and response systems, head-up displays, and electronic flight and thrust controllers. Stages in the realization process are outlined, noting current status in the design and fabrication of the simulator hardware and software. Systems under study are an appropriate color format, display formats, and advisory, caution, and warning system and cockpit display of traffic information format. Further research on the effects of introduction of the new equipment on pilot performance and on air traffic control are indicated. M.S.K.

A82-40888 # The evolution of display formats for advanced fighters using multimode color CRT displays. N. M. Lefritz, J. H. Tuttle, Jr. (Rockwell International Corp., El Segundo, CA), and M. J. Forte (Bendix Corp., Teterboro, NJ). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 118-131. Research supported by the Rockwell Independent Research and Development Fund.

Efforts to combine electromechanical indicators, instruments, and displays onto multimode, time-shared CRT displays (MMD) in advanced cockpit configurations for military aircraft are described. A cockpit configuration is presented in which the stick controller is situated to the right of the pilot, while the center console contains three MMDs. Color formatting was guided by goals to minimize electromechanical displays, provide the pilot with information relevant solely to a given mode of operation, have all data available at the pilot's option, use color and formats already implemented by the military, replace symbolic information with pictorial information, and employ the CRT for checklists. Procedures for completing an electronic preflight checklist are detailed, in addition to take-off, climb to cruise, emergency conditions, and landing sequences. M.S.K.

A82-40889 # Application of advanced exhaust nozzles for tactical aircraft. D. L. Bowers and J. A. Laughrey (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 132-141. 39 refs.

Advanced exhaust nozzles play an important role in the system design for advanced tactical aircraft and offer attractive design options which contribute to total aircraft performance. These exhaust nozzles can improve aircraft cruise performance if integrated carefully. Thrust vectoring attainable with these exhaust nozzles adds significantly to aircraft maneuver performance. STOL performance is obtained by thrust reversing or a combination of thrust reversing and thrust vectoring. The significant aircraft performance improvements which lie in advanced exhaust nozzle technology will be determined by past, ongoing and future programs investigating the best application of advanced exhaust nozzles for tactical aircraft. (Author)

A82-40890 # Optimized 10 ton class commercial aircraft engine. R. Laurens (SNECMA, Moissy-Cramayel, Seine-et-Marne, France). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 142-145.

The development program goals and methods for the CFM56 series engines for powering aircraft of 110 to 200 passengers into the 1990s are reviewed. The CFM56, in the 20,000 lb class, began with the F101 core. Derivatives of the engine are currently used in the DC8-60, the KC-135 tanker, and the 737. Compression ratios have been raised from 25-30:1 to 35-40:1, and the core features a low clearance compressor with rotor temperature control, variable stators on the first four stages, a high speed HP turbine, active clearance cooling in the turbine, and close turning clearances. High energy X rays are being employed to improve the clearances and survey the temperature map and cooling system. A commonality of 60% has been maintained between generations of the engine. M.S.K.

A82-40891 # Recent advances in the performance of high bypass ratio fans. D. J. Nicholas and C. Freeman (Rolls-Royce, Ltd., Derby, England). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 146-158. 7 refs. Research supported by the Ministry of Defence (Procurement Executive).

Theoretical and experimental techniques employed to improve the efficiency of the high tip speed fan jet engine are reviewed, Design features of high bypass ratio fans, including arrangement of the fan diffusion factors induced by the placement of the outlet guide vanes and the splitter are discussed. Overall design parameters of the RB211-22 fan are described, including factors influencing the spanwise work distribution, the outlet guide configuration, and techniques for characterizing the airflow. It was found that an optimum tip speed existed for each level of design pressure ratio. Performance tests on scale model rigs to determine the spanwise distribution, the blade element performance, and airfoil losses, were compared with actual engine operation. It is noted that laser holography, anemometry, and two- and three-dimensional numerical models were employed to identify and define the flow in test rig conditions. M.S.K.

A82-40892 # Axisymmetric approach and landing thrust reverser impacts on usage and LCC. J. P. Blackman, P. B. Stumbo (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH), and M. F. Eigenmann (McDonnell Aircraft Co., St. Louis, MO). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A32-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 159-167. 7 refs.

The effects on the performance of the F15-C and advanced fighters by the installation of three different types of approach and landing thrust reversers (ALTR) are reported, including projected impacts on the life cycle costs (LCC). The aircraft were tested in mission configurations comprising a 350 nm subsonic cruise and 200 nm supersonic dash at high altitude, along with appropriate defensive maneuvers. The ALTR concepts examined included a rotating vane upstream of the nozzle throat, a translating shroud ALTR downstream of the throat, and a three-door ALTR downstream of the nozzle throat of the advanced air-to-surface vehicle. Effects were evaluated in terms of the resultant engine hot time, and cycles of use of the ALTRs in a variety of mission modes. The F15-C LCC was estimated to cost 3.8% more using the ALTR, while advanced vehicle LCCs increased 2.4-3.8%, with smallest increases occurring with downstream ALTR placement. M.S.K.

A82-40893 * # Observations and implications of natural laminar flow on practical airplane surfaces. B. J. Holmes (NASA, Langley Research Center, Hampton, VA) and C. J. Obara (Kentron Technical Center, Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 168-181. 48 refs.

The results of natural laminar flow (NLF) experiments conducted by NASA to determine if modern aircraft structures can benefit from NLF as do sailplanes are presented. Seven aircraft, ranging from a Cessna 210 to a Learjet 28/29, with relatively stiff skins were flown in production configurations with no modifications. Measurements were made of the boundary-layer laminar to turbulent transition locations on various aerodynamic surfaces, the effect of a total loss of laminar flow, the effect of the propeller slipstream on the wing boundary-layer transition and the boundary-layer profiles, the wing section profile drag, the effect of flight through clouds, and insect debris contamination effects. Favorable pressure gradients for NLF were concluded to be feasible up to a transition Reynolds number of 11 million. Laminar flows were observed in propeller slipstreams, and insects were found to cause transition 1/4 of the time. M.S.K.

A82-40894 # Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces. J. A. Thelander, J. B. Allen, and H. R. Weige (Douglas Aircraft Co., Long Beach, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40875 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 182-189. 8 refs.

Development of a laminar flow control system utilizing distributed suction through porous strips is reviewed. Recent improvements in electron beam perforation technology have greatly enhanced the potential for practical LFC application. The design of airfoil shapes compatible with LFC on swept wings is outlined. Boundary layer stability analysis results and determination of suction distributions are reviewed. Considerations for an operational system for protection from ice and insect contamination are noted. Results of a swept wing model test and plans for a LFC leading edge glove flight test program are reviewed. (Author)

A82-40895 # External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing. J. A. Bennett and L. B. Brandt (Lockheed-Georgia Co., Marietta, GA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 190-202. 34 refs.

A recent study contract for a subsonic laminar flow control (LFC) transport with a supercritical wing and recent Lockheed research are discussed as background information leading to the design of a JetStar part-span LFC glove to be flight-tested. The special design requirements needed to develop the glove and some of the problems encountered during the process are presented. The following topics are discussed: a method of simulating the interference effects of the body/pylons/nacelles on wing pressures when using an isolated-wing code, wind-tunnel testing of a JetStar model with a wing glove and correlation with theoretical glove pressures, and suction requirements for maintaining a laminar boundary layer. (Author)

A82-40896 * # NASA research on viscous drag reduction. R. H. Petersen and D. V. Maddalon (NASA, Langley Research Center, Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 203-213. 42 refs.

Current NASA research points toward exciting opportunities for large reductions in viscous drag. Research is underway on natural laminar flow, laminar flow control by suction, and turbulent drag reduction. Preliminary results suggest that a significant amount of natural laminar flow can be achieved on small, straight-wing airplanes. On larger, swept-wing aircraft, laminar flow control by distributed suction is expected to result in significant fuel savings. The area over which laminar flow control is applied depends on tradeoffs involving structural complexity, maintenance, and cost. Several methods of reducing turbulent skin friction by altering the turbulence structure itself have shown promise in exploratory testing. This paper reviews the status of these technologies and indicates the benefits of applying them to future aircraft. (Author)

A82-40897 # Viscous transonic airfoil flow simulation. J. Longo, W. Schmidt (Dornier GmbH, Friedrichshafen, West Germany), and A. Jameson (Dornier GmbH, Friedrichshafen, West Germany; Princeton, University, Princeton, NJ). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 214-223. 19 refs.

The present paper describes a method for the calculation of subsonic and transonic viscous flow over airfoils using the displacement surface concept. This modelling technique uses a fast multigrid solver for the full potential equation and laminar and turbulent boundary layer integral methods. In addition, special models for transition, laminar or turbulent separation bubbles and trailing edge treatment have been selected. However, the flow is limited to small parts of trailing edge-type separation. The present paper deals with some theoretical features in a short description and shows computed results compared with experimental data and other methods. (Author)

A82-40898 # Computation of supersonic flow around three-dimensional wings. B. G. Arlinger (Saab-Scania AB, Linkoping, Sweden). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 224-232. 16 refs.

As part of the development of a program for supersonic flow around realistic aircraft configurations a method is presented for the computation of strictly supersonic flow around single wings or two-wing configurations of arbitrary shape. The method is based on the steady Euler equations which are solved in a streamwise marching procedure using a shock-capturing finite volume formulation. As solution algorithm an explicit predictor-corrector scheme of MacCormack type is used. A variety of numerical applications of the method is presented including canard configuration cases, and comparisons are made with other theories and test data confirming versatility and reliability of the method. (Author)

A82-40899 # Transonic small disturbance code for body-wing configuration coupled with full potential code for wing alone. A. Luntz (Israel Aircraft Industries, Ltd., Lod, Israel). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 233-237. 7 refs.

A transonic small disturbance approximation code TSD was designed, for potential flow around a body-wing configuration. This code is based on the embedded fine grid concept elaborated by Ch. Boppe. Improvements are introduced into the boundary condition representation, including the body boundary condition, the wing boundary condition and the interface between the fine grid box and the coarse grid computation. Only cartesian coordinate grids are used. The code provides good prediction of the position of the shock on the wing surface, using a comparatively small number (about 20) of grid points along the wing section cord. The TSD code is coupled with a modified (no crossflow at the wing root plane) in FL022, is replaced with the crossflow values computed by the TSD code. This new boundary condition, at the wing root, contains all information of the body influence needed for the wing pressure computation. The coupling allows detailed analysis of the body-wing interference effects in the flow. (Author)

A82-40900 # Advanced fighter technology integration program AFTI/F-16. A. J. Bianco and F. R. Swortzel (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 238-246.

The AFTI/F-16 Advanced Development Program is developing and flight validating advanced technologies which improve fighter lethality and survivability. The capability is achieved by the integration of mission task-tailored, digital flight controls with a director-type fire control system, and advanced target sensor/-trackers. The Digital Flight Control System is the core technology. Integration of the systems forms the capability for automated maneuvering attack. Evaluation of automation, with respect to the weapon delivery task, is a key program thrust. Use is made of nonconventional aircraft control modes to achieve improved maneuverability and weapon line pointing. Careful attention is given to pilot/vehicle interface provisions. The AFTI/F-16 is now undergoing an extensive test program to provide the confidence necessary to transition the technologies for use on current and future fighter aircraft. (Author)

A82-40901 # Tail versus canard configuration - An aerodynamic comparison with regard to the suitability for future tactical combat aircraft. G. Wedekind (Dornier GmbH, Friedrichshafen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 247-254.

Extensive experimental and theoretical research work on tail and canard configurations has recently been done at Dornier, considering the requirements for a future tactical combat aircraft. Tail and canard configurations, which were designed for the same tactical requirements, are compared. This comparison leads to the conclusion that the canard configuration cannot be regarded superior to the tail configuration, neither with regard to zero-lift drag at supersonic speeds nor with regard to lift-dependent drag at subsonic and supersonic speeds. Furthermore, severe problems must be expected regarding lateral and directional stability at high angles-of-attack for a canard configuration. It turns out that those problems do not occur or are easier to handle with tail configurations. (Author)

A82-40902 # Material and process developments on the Boeing 767. J. T. Quinlivan and D. T. Lovell (Boeing Commercial Airplane Co., Seattle, WA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 255-261.

The design goal of the 767 is an economic service life of 20 years with minimum unscheduled maintenance. Materials, material processing, and assembly methods employed on the 767 play a key role in the achievement of this design goal. Materials and processes also are key in maintaining weight within design limits for fuel efficiency. The 767 uses a wealth of new and improved materials, processing methods, and assembly techniques. Some of the innovations are subtle and involve minor changes to previous technology, such as the reduction of certain fastener head diameters. Others are more dramatic, such as the use of new aluminum alloys for wing skins or advanced composites for primary flight-control surfaces. Corrosion resistance is achieved through material selection, attention to design details, and proper finishing and sealing methods. For the most part, the materials selected for the passenger cabin interior are new and are selected for their flame resistance and lack of smoke and toxicant emission during combustion. A review of major structural and nonstructural material and process developments on the 767 will be summarized in this paper. (Author)

A82-40903 # The promise of laminated metals in aircraft design. D. H. Petersen, L. E. Sloter, II, W. A. Poindexter, J. L. Maris, and G. E. Kuhn (Vought Corp., Dallas, TX). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 262-269. 8 refs.

The relative merits of monolithic metals, adhesively bonded sheet metal and a new family of metallurgically bonded laminated alloys are presented and discussed in light of the U.S. Air Force's laminated metal technology demonstration Advanced Technology Wing program. A wing section was designed and constructed whose lower skin consisted of adhesively bonded aluminum layers having no fastener penetrations. The elimination of lower wing skin fasteners precludes both corrosion intrusion sites and locations for structural cracking, and in addition reduces manufacturing and assembly costs. The wing suffered no damage during two lifetimes of spectrum fatigue testing, as well as an additional 1.8 lifetimes of damage tolerance testing which included exposure to sump water and JP-4 fuel. O.C.

A82-40904 # Design of compensated flutter suppression systems. M. Lanz and P. Mantegazza (Milano, Politecnico, Milan, Italy). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 270-279. 37 refs. Consiglio Nazionale delle Ricerche *Contract No. 81,02536,07.*

The paper presents a method to design compensated flutter suppression systems by eigenvalue assignment. The compensator is designed as a state observer by paralleling the Luenberger approach. The eigenvalues of the aeroelastic system and compensator are obtained by imposing a stationary value to a suitable norm of the gains, under the constraint of satisfying the aeroelastic eigensystem for assigned stable eigensolutions, and without any problem on the modelling of the unsteady aerodynamic forces. The compensator can be used not only to reconstruct lacking states, but also to insure insensitivity to different flight

conditions. A method is presented to mechanize, and possibly to reduce in order, the aeroelastic observer. Some simple examples illustrate the use of the method along with comments on the stabilization of an aeroelastic system by eigenvalue assignment techniques.
(Author)

A82-40905 **#** **Design and experience with a low-cost digital fly-by-wire system in the SAAB JA37 Viggen A/C.** K. Folkesson, P. O. Elgerona, and R. Haglund (Saab-Scania AB, Linkoping, Sweden). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 280-288. Research supported by the Forsvaret Materielverk.

A digital Fly-By-Wire system has been designed built and evaluated as a rig system and as a flight system installed in a JA37 Viggen test aircraft. Headlines for definition of the system have been low complexity and low production cost, met by trading off complexity against safety and reliability margins. System characteristics are minimized servo hardware, minimized channel interconnections and maximum replacement of hardware by software including servo loop closures. Functional development areas are application of optimal control technique for multimode laws and for servo loop computations. The paper will present system definition, system mechanization in test aircraft, ground test and flight test information.
(Author)

A82-40906 *** #** **Design and flight testing of a digital optimal control general aviation autopilot.** J. R. Broussard (Information and Control Systems, Inc., Hampton, VA), D. R. Downing (Kansas, University, Lawrence, KS), and W. H. Bryant (NASA, Langley Research Center, Flight Control Systems Div., Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 289-298. 12 refs. Contract No. NAS1-16303.

This paper presents the designs of Proportional-Integral-Filter (PIF) autopilots for a General Aviation (NAVION) aircraft. The PIF autopilots use modern control theory to determine heading select and altitude select and hold autopilot modes. The PIF control law uses typical General Aviation sensors for state feedback; command error integration for command tracking; digital complimentary filtering and analog prefiltering for sensor noise suppression; a control filter for computation delay accommodation; and the incremental form to eliminate trim values in implementation. Theoretical developments for the control law are described which combine the sampled-data regulator with command generator tracking for use as a digital flight control system. The digital PIF autopilots are evaluated using closed-loop eigenvalues and simulations. Successful flight test results for the PIF autopilots are presented for different turbulence conditions and quadratic weights.
(Author)

A82-40907 **#** **Preliminary design of an advanced integrated power and avionics information system.** G. L. Dunn, P. Leong (Boeing Military Airplane Co., Seattle, WA), and D. Fox (USAF, Aero Propulsion Laboratory, Wright-Patterson AFB, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 299-305. Contract No. F33615-80-C-2004.

An advanced aircraft electrical system is described which meets the requirements for a 1990 time frame two-engine tactical aircraft with multimission capability. It features modular design and use of intelligent electrical load management centers with solid state power controllers, resulting in a greatly enhanced aircraft electrical system over that currently available. The power generation and distribution, electrical power control, multiplex data bus characteristics, power system processor, electrical load management center, generator control unit, and electrical system software are discussed and diagrammed.
C.D.

A82-40908 *** #** **Inlet and airframe compatibility for a V/STOL fighter/attack aircraft with top-mounted inlets.** D. A. Durston and D. B. Smeltzer (NASA, Ames Research Center, Moffett Field, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 305/a-305/i. 9 refs.

Aerodynamic force and inlet-pressure data were obtained for 9.5% force and pressure models of a V/STOL fighter/attack aircraft configuration with top-mounted twin inlets. Data are presented from wind tunnel tests conducted at Mach numbers of 0.6, 0.9, and 1.2 at angles of attack up to 27-deg and angles of sideslip up to 12-deg. Trimmed aerodynamic characteristics and inlet performance were compared for three different leading-edge extension (LEX) configurations. The effects of wing leading- and trailing-edge flaps on the inlet were also determined. Maneuver performance was calculated from combined force and inlet-pressure data. The largest of the three LEX sizes tested gave the best airplane maneuver performance. Wing flap deflections improved inlet recovery at all Mach numbers.
(Author)

A82-40909 **#** **Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers.** H. Triebstein (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Gottingen, West Germany), R. Destuynder (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France), and H. Hansen (Messerschmitt-Bölkow-Blohm GmbH, Hamburg, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 306-315. 8 refs. Research supported by the Bundesministerium für Forschung und Technologie.

Investigations in unsteady aerodynamics were conducted in order to study the potential of active control technology for transport aircraft wings. Wind tunnel tests were carried out using a large two-dimensional model with two interchangeable, fast moving, trailing edge control surfaces of different relative chord. The subsonic and supercritical pressure distributions were studied, and the unsteady aerodynamic coefficients were analyzed. It is found that in subsonic flow trailing edge separation causes considerable reduction in steady lift, but there is far less influence on the magnitude of the unsteady lift generated by an oscillating control surface. Only the corresponding phase angle changes dramatically. In transonic flow the development of the supersonic region and the shock strength and location demonstrate a predominant influence on steady as well as unsteady pressure distributions. The properties of the supersonic regions and the shocks change considerably with all parameters investigated.
C.D.

A82-40910 **#** **Determination of the efficiency of a trailing edge flap in unsteady three-dimensional flow (Determination de l'efficacité d'un volet de bord de fuite en écoulement tridimensionnel instationnaire).** H. Consigny (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 316-328. 18 refs. In French. Research supported by the Direction des Recherches, Etudes et Techniques and Ministère de la Défense.

A study was carried out in order to improve understanding of the three-dimensional unsteady effects of an oscillating part-span trailing-edge flap. The experiments were performed on a constant chord and constant thickness supercritical wing mounted on the sidewall of a transonic wind tunnel. The model was fitted with some 236 static pressure taps and 136 small unsteady pressure transducers located on several spanwise stations. The measurements made for different geometric configurations provided extensive information on the influence of various parameters on both steady and unsteady chordwise pressure distributions and aerodynamic coefficients. The experimental results were compared with those obtained by theoretical methods based on the solution of the full potential equation in steady flow and on the classical transonic small disturbances equation in unsteady flow. Quasi-steady pressure distributions were also compared to preliminary computational results, including viscous effects.
C.D.

A82-40911 *** #** **An investigation of scale model testing of VTOL aircraft in hover.** W. G. Hill, Jr., R. C. Jenkins (Grumman Aerospace Corp., Bethpage, NY), and M. R. Dudley (NASA, Ames Research Center, Moffett Field, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 329-335. 6 refs. Contract No. NAS2-10645.

Utilizing the unique opportunity created by full scale hover testing of the twin-jet Grumman Design 698 VTOL aircraft in the NASA-Ames Hover Facility, a series of experiments was conducted to evaluate the effectivness of scale model testing in predicting full scale behavior. Interference forces were found to be sensitive to aircraft lower surface geometry, but when the geometry was modeled accurately the small scale results matched full scale forces quite well. The interference forces were found to be insensitive to core nozzle temperature and fan nozzle pressure ratio. The results clearly demonstrate that small scale models can be reliably utilized for aircraft and technology development when the appropriate sensitivities are recognized.
(Author)

A82-40912 **#** **Optimization of flight with tilt wings (Optimisation du vol à aile battante.** P. Contensou (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 336-341. In French.

Within a structure of simplifying assumptions, a complete solution is presented for the problem of optimizing a tilted flying surface by establishing the law of motion relative to a mobile wing and determining the functions of lift and propulsion for a heavy and inertial body. The solutions are compared both with bird flight and mechanical flight. C.D.

A82-40915 * # Advanced technologies applied to reduce the operating costs of small commuter transport aircraft. O. Masefield, A. Turi, and M. Reinicke (Pilatus Aircraft, Ltd., Stans, Switzerland). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 352-358. NASA-supported research.

The application of new aerodynamic, structural, and propulsion technologies to a specified baseline commuter aircraft is studied. The assessment models can be used on a desktop calculator and include a sizing program, operating cost program, and passenger ride qualities model. Evaluation is done with a step-by-step approach and is applied to range, number and type of engines, structure, wing selection, and configuration. A 40 percent direct operating cost saving is anticipated compared to current well established commuter aircraft. C.D.

A82-40917 # Design and experimental verification of the USB-flap structucture for NAL STOL aircraft. M. Sano (National Aerospace Laboratory, Tokyo, Japan), Y. Fujimori (National Space Development Agency, Tokyo, Japan), and S. Maekawa (Kawasaki, Heavy Industries, Ltd., Gifu, Japan). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 370-375. 6 refs.

In order to verify the safety of the USB flap structure of the NAL STOL experimental aircraft, tests were carried out on structural models, including a test to detect thermal buckling temperature, vibration tests, and an acoustic fatigue test at elevated and room temperature. The USB flap structure, the acoustic fatigue design, the structure and static and dynamic characteristics of the test panel are discussed, including the resonant frequency, mode shape and damping coefficient, static thermal response, and dynamic response. It was found that thermal buckling occurred on test panels, that resonant frequencies of the flat test panels fall in the range between those of clamped and those of simply supported plates, and that through the prescribed fatigue test period, all structural models proved themselves to be strong enough to resist both acoustic and thermal loading. C.D.

A82-40921 * # A summary of V/STOL inlet analysis methods. D. P. Hwang and J. M. Abbott (NASA, Lewis Research Center, Cleveland, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 402-409. 24 refs.

The methods used to analyze the aerodynamic performance of V/STOL inlets at the NASA Lewis Research Center are briefly described. Recent extensions and applications of the method are emphasized. They include the specification of the Kutta condition for a slotted inlet, the calculation of suction and tangential blowing for boundary layer control, and the analysis of auxiliary inlet geometries. A comparison is made with experiment for the slotted inlet and also for tangential blowing. Finally, an optimum inlet diffuser velocity distribution is developed. (Author)

A82-40925 * # A unique flight test facility - Description and results. R. R. Meyer, Jr. (NASA, Flight Research Center, Edwards, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 433-448. 13 refs.

The Dryden Flight Research Facility has developed a unique research facility for conducting aerodynamic and fluid mechanics experiments in flight. A low aspect ratio fin, referred to as the flight test fixture (FTF), is mounted on the underside of the fuselage of an F-104G aircraft. The F-104/FTF facility is described, and the capabilities are discussed. The capabilities include (1) a large Mach number envelope (0.4 to 2.0), including the region through Mach 1.0; (2) the potential ability to test articles larger than those that can be tested in wind tunnels; (3) the large chord Reynolds number envelope (greater than 40 million); and (4) the ability to define small increments in friction drag between two test surfaces. Data are presented from experiments that demonstrate some of the capabilities of the FTF, including the shuttle thermal protection system airload tests, instrument development, and base drag studies. Proposed skin friction experiments and instrument evaluation studies are also discussed. (Author)

A82-40928 * # Determination of airplane aerodynamic parameters from flight data at high angles of attack. V. Klein (Joint Institute for Advancement of Flight Sciences, Hampton, VA) and J. G. Batterson (NASA, Langley Research Center, Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 467-474. 8 refs.

The problem of determining airplane aerodynamic model equations and estimating the associated parameters from flight data taken at high angles of attack is addressed. Two representations of the aerodynamic function based on the polynomial and spline representations are given. Then the technique of building an adequate model using a stepwise regression is presented with examples demonstrating the construction of the model and various approaches to model verification. (Author)

A82-40930 * # Computational and experimental studies of light twin aerodynamic interference. W. G. Thomson, W. H. Wentz, Jr., and C. Ostowari (Wichita State University, Wichita, KS). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 489-495. Research supported by the Beech Aircraft Co. and NASA.

The results of an analytical and experimental study of aerodynamic interference effects for a light twin aircraft are presented. Both the influence of a body (either fuselage or nacelle) on a wing and the influence of a wing on a body are studied. The wing studied uses a new natural laminar flow airfoil with variable camber movable trailing edge. A three-dimensional panel method program utilizing surface source and surface doublet singularities was used to design wing-nacelle and wing-fuselage fairings. Experiments were conducted using a 1/6 scale reflection plane model. Forces, pressures, and surface flow visualization results are presented. Results indicate that potential flow analysis is useful to guide the design of intersection fairings, but experimental tuning is still required. While the study specifically addressed a light twin aircraft, the methods are applicable to a wide variety of aircraft. (Author)

A82-40931 * # Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes. M. D. Rhodes and B. P. Selberg (Missouri-Rolla, University, Rolla, MO). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 496-511. 32 refs. Grant No. NAG1-26.

An investigation was performed to compare closely coupled dual wing and swept forward swept rearward wing aircraft to corresponding single wing 'baseline' designs to judge the advantages offered by aircraft designed with multiple wing systems. The optimum multiple wing geometry used on the multiple wing designs was determined in an analytic study which investigated the two- and three-dimensional aerodynamic behavior of a wide range of multiple wing configurations in order to find the wing geometry that created the minimum cruise drag. This analysis used a multi-element inviscid vortex panel program coupled to a momentum integral boundary layer analysis program to account for the aerodynamic coupling between the wings and to provide the two-dimensional aerodynamic data, which was then used as input for a three-dimensional vortex lattice program, which calculated the three-dimensional aerodynamic data. The low drag of the multiple wing configurations is due to a combination of two dimensional drag reductions, tailoring the three dimensional drag for the swept forward swept rearward design, and the structural advantages of the two wings that because of the structural connections permitted higher aspect ratios. (Author)

A82-40932 * # Assessment of advanced technologies for high performance single-engine business airplanes. D. L. Kohlman (Kohlman Aviation Corp., Lawrence, KS) and B. J. Holmes (NASA, Langley Research Center, Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 512-563. 24 refs.

The prospects for significantly increasing the fuel efficiency and mission capability of single engine business aircraft through the incorporation of advanced propulsion, aerodynamics and materials technologies are explored. It is found that turbine engines cannot match the fuel economy of the heavier rotary, diesel and advanced spark reciprocating engines. The rotary engine yields the lightest and smallest aircraft for a given mission requirement, and also offers greater simplicity and a multifuel capability. Great promise is also seen in the use of composite material primary structures in conjunction with laminar flow wing surfaces, a pusher propeller and conventional wing-tail configuration. This study was conducted with the General Aviation Synthesis Program, which can furnish the most accurate mission performance calculations yet obtained. O.C.

A82-40933 * # The design integration of winglip devices for light general aviation aircraft. R. V. Gifford (NASA, Langley Research Center, Hampton, VA) and C. P. van Dam (Kansas, University, Lawrence, KS). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings.

Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 564-569. 21 refs.

An investigation was conducted to determine the load carrying capabilities and structural design requirements for wingtip devices on general aviation aircraft. Winglets were designed and analyzed as part of a research program involving a typical agricultural aircraft. This effort involved analytical load prediction for the winglets, structural design for both the winglets and aircraft installation, structural load testing and flight test verification. Conclusions from this program are believed to be applicable to the use of wingtip devices on light-weight general aviation aircraft. (Author)

A82-40934 # Operation V10F - Development of a composite material wing. G. Hellard (Société Nationale Industrielle Aérospatiale, Toulouse, France) and D. Chaumette (Avions Marcel Dassault - Breguet Aviation, Vaucresson, Hauts-de-Seine, France). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 570-578.

The design development and detailed structural and fabrication method features of the Falcon 10 business jet aircraft carbon fiber reinforced plastic composite wing are described, with emphasis on the design and testing of individual wing structure components such as stiffened ribs and integrally stiffened upper and lower surface panels. The testing of laminate composite wing structure element properties included transverse loading, thermal and mechanical fatigue, shear, combined shear and bending, fuel pressure, tension, and compression. The delamination and lightning strike behavior of the wing components were also assessed. Finally, all structural elements were assembled and tested for static loads and fatigue. The composite wing represents a 20.3 percent weight saving over the metallic wing it replaces. O.C.

A82-40935 # A one-shot autoclave manufacturing process for carbon epoxy components. M. Kaitatzidis, R. Renz (Dornier GmbH, Friedrichshafen, West Germany), and D. Wurzel (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Stuttgart, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 579-585.

For the Alpha-Jet aircraft Dornier has developed and fabricated a carbon-/epoxy horizontal stabilizer, which has already successfully completed its qualification tests. This paper presents the requirements and goals of this development and describes the structural design of the horizontal stabilizer. For its leading and trailing edges a new one-shot manufacturing technique has been developed. The toolings are described, weight and cost savings are reported. This technique is now being applied for series production of ailerons for the Do 228 Commuter Aircraft. A brief presentation of the results of the qualification tests under various environmental conditions (humidity and temperature) is given. (Author)

A82-40936 # Non-honeycomb F-16 horizontal stabilizer structural design. D. N. Butcher (General Dynamics Corp., Fort Worth, TX). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 586-592.

A description is given of the F-16 fighter's horizontal stabilizer structural design and fabrication methods. The primary components of the stabilizer are graphite/epoxy composite skins, which are mechanically fastened with countersunk rivets to a one-piece sheet aluminum corrugated substructure and a machined aluminum pivot fitting. The skins and substructure are tooled to a common inside mold-line surface to facilitate assembly. Weight, construction and maintenance costs comparisons are made with the full depth-bonded honeycomb stabilizer design which the present one will replace. Despite a weight of 165.9 lb, by comparison to 157.8, the new stabilizer represents a 50% fabrication cost reduction at the 600th stabilizer produced. Lower maintenance costs are expected, in view of the long-term service problems associated with the honeycomb fabrication alternative. O.C.

A82-40937 # Material identification for the design of composite rotary wings. V. Giavotto, C. Caprile, M. De Capitani, L. Salvioni (Milano, Politecnico, Milan, Italy), V. Caramaschi, G. C. Maffioli, and F. Mussi (Costruzioni Aeronautiche Giovanni Agusta S.p.A., Gallarate, Italy). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 593-606. 15 refs.

Among the developments that appear to be absolutely needed for the design of advanced composite rotary wings there are material models, to be supported by substantial experimentation and to be capable of an accurate modeling of the behavior of multilayer FRPs, complete of failure criteria regarding all possible failure modes. This paper reports an experimental activity carried on by Aerospace Department of Politecnico of Milano in cooperation with Costruzioni Aeronautiche G. Augusta. The most relevant part of such activity has been a fairly large campaign on tubular specimens in biaxial stress states and plane specimens in uniaxial stress states. All tests have been run statically, measuring stresses and strains up to failure. The results of such measurements have been so far worked out to verify existing material models and failure criteria. No one existing failure criteria seems to be completely adequate to the whose stress domain explored. (Author)

A82-40939 # Dynamic energy transfer between wind and aircraft. G. Schänzer (Braunschweig, Technische Universität, Brunswick, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 615-621. 6 refs.

The energy effect of vertical wind on glider aircraft is studied. The theoretical basis of maximum dynamic energy transfer is discussed, and the energy transfer problem is investigated using a glider with up and downdrafts varying in space. The response of the aircraft is calculated with a nonlinear simulation program on a digital computer. Maneuvering that produces optimal energy transfer is connected with a high kinetic energy level of the aircraft and high load factors which depend on vertical wind velocities. Energy-optimal flight maneuvers significantly increase the average groundspeed of a glider aircraft compared to the procedure described by Nickel and McCready (1949). C.D.

A82-40940 # Digital computer simulation of modern aeronautical digital communication systems. S. Chow (Nanjing Aeronautical Institute, Nanjing, People's Republic of China). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 622-629. 11 refs.

A Monte Carlo simulation method for modern aeronautical digital communication systems is described. Its relationship to various parameters is studied, including filtering, limiting, carrier frequency offset, bit time jitter, and multipath effects in A/G and A/A communications. (Author)

A82-40941 # Flight simulation studies on the feasibility of laterally segmented approaches in an MLS environment. L. J. J. Erkelens (Nationaal Lucht- en Ruimtevaartlaboratorium, Amsterdam, Netherlands). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 630-641. 5 refs.

On the moving base flight simulator of the NLR an investigation was carried out to establish a number of minimum approach parameters concerning laterally segmented approach paths, assuming that guidance was provided by an MLS facility. Seven laterally segmented approach paths with different turn angles and final intercept altitudes were flown manually with a simulated heavy transport aircraft in the final approach configuration. Results were obtained in terms of tracking accuracy, pilot effort ratings and pilot responses to a questionnaire. A subsequent simulation program was carried out recently, in which as new items were introduced: a more realistic simulation of the MLS environment (MLS coverage area and signal noise), implementation of aircraft configuration changes (flaps, landing gear). A third simulation program is prepared in which the interaction is emphasized between the air traffic controller and the flight crew. The pilot is vectored to a point within MLS coverage, from which he is expected to intercept a laterally segmented approach path using MLS-guided intercept procedures. (Author)

A82-40942 # A concept for 4D-guidance of transport aircraft in the TMA. V. Adam and W. Lechner (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Brunswick, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 642-653. 18 refs.

The four dimensional (4D) guidance of aircraft in the TMA allows for precise control of the minimum separation and thus efficient use of the available approach capacity of the airport. A concept for the 4D-guidance of transport aircraft has been developed and a corresponding control mode has been integrated in an automatic flight control system for transport aircraft. The 4D mode is based on the usual radar vector guidance technique of air traffic control and, therefore, is characterized by a succession of flight sections with constant values for indicated airspeed, heading and descent rate. The time of arrival is controlled by altering the path via a delay fan. The algorithm for the calculation of the commanded 4D flight path takes into account suitable wind models updated by actual wind data. In the paper the 4D mode is described and first flight test results are discussed. (Author)

A82-40943 # Optimal open-loop aircraft control for go-around maneuvers under wind shear influence. H. G. Jacob (Braunschweig, Technische Universität, Brunswick, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 654-664. 24 refs.

The optimization procedure is based on the representation of time dependent command inputs by analytical functions. The coefficients of these functions are iterated by a static search algorithm to values optimizing the behavior of the process. The longitudinal motion in heavy tail wind shear of the Airbus A 300 aircraft is described by a system of nonlinear equations of 4th order bounded by numerous design, safety and comfort constraints. The quality criterion is defined in a way to maximize the minimal distance between aircraft and ground as well as the area between flight path and ground. For these studies a very simple optimization program has been used which allows to consider boundaries and which comprises less than 100 FORTRAN-statements. The optimal input functions and other interesting variables are shown and discussed for the particular case that full power is available and for half power. (Author)

A82-40944 # The nonsynchronous whirls of the turbine rotor in aerojet engines. J.-L. Gu and P.-Z. Ren (Northwestern Polytechnical University, Xian, Shaanxi, People's Republic of China). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 665-673. 12 refs.

Several factors involved in the stability analyses of the supercritical overhung-rotor-bearing system of a specific type of aircraft engine are discussed. The phenomenon of 1/2 order subharmonic vibration within aerojet engines and its causes are assessed, and mathematical expressions for destabilizing forces are worked out. The latter include the unbalanced torque force due to circumferential variations of blade tip clearances, the frictional moment within splined coupling, and the aeroelasticity of labyrinth seals. Mathematical expressions for parametric excitation are found for the nonlinear stiffness of single-row deep-grooved ball bearings and for the nonlinear stiffness of the back support. Equations of motion of the high-speed overhung turbine rotor are derived. C.D.

A82-40945 # Fluctuating forces and rotor noise due to distorted inflow. G. Neuwerth, R. Staufenbiel, A. Kellner, and J. Schreier (Aachen, Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 674-688. 14 refs.

The influence of inflow distortions on the rotor blade forces and on their increased radiated noise is theoretically and experimentally investigated. Two types of distortions are considered, one involving a ducted rotor whose inflow is distorted by wakes, the other involving a helicopter tail rotor cutting the tip vortices of the main rotor. Fluctuations in the direction and magnitude of the flow relative to the blades is Fourier analyzed and the unsteady blade forces and pressures are computed on the basis of two and three-dimensional theories. The Fourier coefficients of these forces are used to compute the additional rotor noise emission due to the inflow distortions. Measurements of the unsteady blade pressures and the radiated noise power spectrum are in reasonable agreement with the theoretical results. C.D.

A82-40946 # An experimental and numerical study of 3-D rotor wakes in hovering flight. M. Nsi Mba, D. Favier, and C. Maresca (Aix-Marseille I, Université, Marseille, France). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 689-699. 12 refs. Direction des Recherches, Etudes et Techniques *Contract No. 78-456.*

Results of comparison between experimental and numerical studies on the 3-D wake of a hovering rotor are presented. The wind-tunnel investigation is conducted by means of X-hot wires and laser Doppler anemometry procedures to measure the 3-D velocity field under the rotor and to determine the tip vortex paths for several rotor configurations. Additional flow visualizations and rotor airloads coefficients are also carried out. The prediction model is based on the classical vortex theory with an empirically prescribed geometry of the wake. From the blade circulation distribution the rotor wake is represented by vortex lines which are allowed to freely adapt until a converged wake geometry is obtained. Then a new estimate of the blade circulation repartition can be deduced. The procedure is repeated, iterating until the compatibility between the adapted wake geometry and the blade circulation repartition is obtained. The validity range of the calculation model is deduced from comparison with experimental data obtained on instantaneous velocities and tip vortex paths, for different rotor parameters including solidy, number of blades, pitch angle, blade twist, and tip shape. (Author)

A82-40947 * # Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution. M. D. Betzina (NASA, Ames Research Center, Moffett Field, CA) and P. Shinoda (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 700-711. 6 refs.

A wind-tunnel investigation was conducted in which independent, steady-state aerodynamic forces and moments were measured on a 2.24-m-diam, two-bladed helicopter rotor and a body of revolution. The objective was to determine the interaction of the body on the rotor performance and the effect of the rotor on the body aerodynamics for variations in velocity, thrust, tip-path-plane angle of attack, rotor/body position, and body nose geometry. Results show that a body of revolution near the rotor can produce significant favorable or unfavorable effects on rotor performance, depending on the operating condition. Body longitudinal aerodynamic characteristics are significantly modified by the presence of an operating rotor and hub. (Author)

A82-40948 # The prediction of propeller/wing interaction effects. A. S. Aljabri (Lockheed-Georgia Co., Marietta, GA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 712-719.

An analytical technique has been developed which predicts the influence of a propeller slipstream on a nacelle/wing combination. This is achieved by coupling a slipstream code with a complex configuration potential flow analysis code. The slipstream code is based on the vortex theory of propellers and predicts the slipstream in terms of its shape induced velocities and swirl angle. To verify the slipstream code two experiments with different model propellers were carried out. The wake immediately behind these propellers was surveyed and results compared with predictions. Good correlation is obtained. The coupling of the slipstream code with the panel code allows analysis of propeller slipstream/-nacelle/wing combinations. Results comparing the wing spanwise loading with and without slipstream are presented. The computational results are found to be in good agreement with experimental data. (Author)

A82-40949 # Wind-tunnel testing of V/STOL configurations at high lift. W. R. Sears (Arizona, University, Tucson, AZ). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 720-730. 12 refs. Contract No. N00014-79-C-0010.

The results of a study of the problem of the large airstream deflections involved in wind-tunnel testing of V/STOL configurations are reported. The concept of adaptive wind-tunnel walls is utilized to eliminate, along with boundary interference, the inaccuracies of the usual tunnel calibration. Some numerical models of adaptive-wall tunnels are described and it is shown that the undisturbed stream direction and magnitude, arbitrarily chosen, are achieved by the iterative process of such a tunnel. The use of this type of tunnel in an extreme case is demonstrated by constructing and model testing an approximate panel representation of a jet-flap wing of finite span. The demonstration is completely sucessful, suggesting that the new tunnel would solve the recurring problem of V/STOL testing. C.D.

A82-40950 # Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/. B. Wagner (Dornier GmbH, Friedrichshafen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 731-740. 22 refs. Bundesministerium für Forschung und Technologie *Contract No. LVW-7901; European Transonic Wind Tunnel* Contract No. 79/01/68730/143963.

Simulation errors in cryogenic wind tunnels caused by real gas effects, changes in viscosity and heat conductivity characteristics at low temperatures, heat transfer, and local condensation are estimated theoretically. For this purpose viscous effects and heat transfer influences in transonic high Reynolds number turbulent flows are calculated by solving numerically the full Navier-Stokes equations for shock wave boundary layer interactions and by calculating boundary layers on airfoils, real gas equations of state and non-adiabatic walls being included in both procedures. Equilibrium condensation approximating the case of heterogeneous nucleation is investigated in transonic airfoil flows by means of numerical solutions of the full inviscid Euler equations. The separation behavior is shown not to be sensitive to real gas effects and small amounts of heat transfer. The condensation influence is primarily seen by a considerable drag increase. (Author)

A82-40953 # Prediction of high alpha flight characteristics utilizing rotary balance data. W. Bihrle, Jr. (Bihrle Applied Research, Inc., Jericho, NY). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 761-768.

Rotational flow aerodynamic data, as measured by a rotary balance at low Reynolds number, are used to analytically predict steady spin modes and post-stall motions. The excellent agreement obtained between predicted and full-scale flight results would indicate that use of low Reynolds number rotary balance data is sufficient for calculating steady-spin modes for military configurations and general aviation configurations not having large wing leading-edge radii. Considerations, however, in the application of these low Reynolds number data to steady-state spin analysis, as well as large angle, six degree-of-freedom high alpha studies, are discussed. Also, the procedure for developing a configuration highly resistant to spins is illustrated. (Author)

A82-40955 # **Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane.** H. C. Seetharam, N. J. Pfeiffer, M. Ohmura, and J. D. McLean (Boeing Commercial Airplane Co., Seattle, WA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 1. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 784-795. 6 refs.

This paper describes experiments conducted to measure the three-dimensional incompressible turbulent boundary layers on the horizontal and vertical tails of a 1/5 scale model of a transport airplane empennage. The boundary layer measurements were made with a V-shaped anemometer with a high precision traversing mechanism. Variations of angle of attack and Reynolds number were included in the tests. Measurements were also made with small elevator and rudder deflections. The data includes extensive pressure distributions, and detailed analyses of three-dimensional boundary layer data. Comparison of the experimental data with a three-dimensional boundary layer code taking into account viscous-inviscid interaction is shown. Details of the test theory comparison and the need for a better turbulence model are discussed. (Author)

A82-40956 # **Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles.** G. Gabrielli. In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 796-799.

A discussion is presented of the energy utilization factor, f, which relates the payload product of a vehicle, yielded by weight and route distance, to the mechanical energy used. Values of f are presented which have been derived from several hundred sea, land and air vehicles of 15 different types in view of their customary missions. It is demonstrated that turboprop aircraft, and to an even greater degree turbojet aircraft, are the only types of vehicles which offer higher transport speeds without a corresponding reduction in the energy utilization factor. O.C.

A82-40957 # **Aerodynamic concepts for fuel-efficient transport aircraft.** G. Krenz and R. Hilbig (Vereinigte Flugtechnische Werke GmbH, Bremen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 800-810. 8 refs.

The rapid inflation of jet fuel prices in the last decade contributes largely to the growing operating expenses of the airlines and to a disproportionate share of the Direct Operating Costs (D.O.C.) as well, wherein the fuel share is already dominant. This report describes the influence of the increasing fuel costs on the aircraft design and explains the manner in which the lift/drag ratio as design parameter is steadily increasing in importance compared to the weight. The evaluation of the fundamentals for a new fuel efficient aircraft is a challenge for both, designer and aeronautical research. On the other hand there still exist potentials for performance improvements in terms of L/D for most of the current aircraft in service, as they were generally designed for minimum weight performance. This paper gives examples for aircraft modifications for performance improvement and shows potentials for future designs in the field of aerodynamics. (Author)

A82-40958 # **Progress at Douglas on laminar flow control applied to commercial transport aircraft.** W. E. Pearce (Douglas Aircraft Co., Long Beach, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 811-817.

Design studies, development efforts and testing related to laminar flow control for subsonic commercial transport aircraft are described in this paper. The paper covers selection of a suitable suction surface, integration of the suction system, and results of LFC aircraft design studies. Current programs which include wind tunnel testing and flight testing are discussed as well as proposed future LFC activities. (Author)

A82-40960 # **Cracks interacting with contact forces - A finite element study on loaded holes.** H. Ansell and B. Fredriksson (Saab-Scania AB, Linkoping, Sweden). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 818-825. 17 refs. Research supported by the Forsvarets Materielverk.

A computerized method for the simultaneous solution of the contact and stress intensity factor problem has been developed. The solution is based upon the finite element method using virtual crack extension method for stress intensity factor calculations. The method is generally applicable to both two- and three-dimensional problems and both through- and part-through cracks could be studied. The method has been applied to a lug with pressfitted sleeve and shaft. Both single- and doublesided cracks are studied. Contact pressures and stress intensity factors during crack propagating are presented. The stress intensity factors are compared with experimental results. The importance of the simultaneous solution of the contact and crack problem is demonstrated. (Author)

A82-40961 # **A crack growth model under spectrum loading.** B.-X. Yang (Beijing Institute of Aeronautics and Astronautics, Beijing, People's Republic of China). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 837-843. 12 refs.

In the present study, based on the mechanisms of delayed retardation of overload retardation effect, an analytical equation for predicting the delayed retardation parameter is presented. Further, a model for predicting the retardation under tensile overloads and tensile-compressive overloads is proposed, and it can be used to predict the fatigue crack growth rate and fatigue life under complex spectrum loading. And as an example, the retardation effects of some materials under different loading conditions are predicted. The fatigue life of stiffened panel of wing and landing gear of aircraft under complex spectrum loadings are predicted. Predictions agree very well with experimental results. (Author)

A82-40962 # **Age exploration in naval aviation.** A. D. Williams (U.S. Navy, Naval Aviation Logistics Center, Patuxent River, MD). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 844-850.

In this paper, an overview of the United States Navy's newly developed aviation age exploration process is given. As age exploration is a subset of the Reliability-Centered Maintenance (RCM) program, the underlying concepts of age exploration, RCM, and their relationship to each-other, are explored. Age exploration is depicted as a multi-faceted analyzation, marrying diverse types of information with maintenance engineering logic and statistical formulation. Specific applications of the age exploration process in the Navy's aviation community are presented. It is shown how the knowledge gained from age exploration enables the designer of the RCM requirements to effect maximum uptime of the equipment at the lowest cost within the bounds of safety. (Author)

A82-40963 # **Logistics research program in the United States Air Force.** J. C. Reynolds and P. E. Davidson (USAF, Coordinating Office for Logistics Research, Wright-Patterson AFB, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 851-853.

An assessment is given of the factors which contribute to the lack of interest and investment of resources in logistics research and development, with emphasis on the need to integrate the consideration of logistics into research and development activities, and attention to the program developed toward that end by the U.S. Air Force. USAF program results demonstrate that any agency with logistics responsibilities can improve its technical capabilities and operational methods through management attention and the cooperation of the logistics and research and development communities. O.C.

A82-40964 # **Third generation turbo fans.** J. F. Coplin (Rolls-Royce, Ltd., Derby, England). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 867-878.

The modular design concept of the RB211 family of turbofan aircraft engines has allowed the progressive improvement of fuel efficiency through refinement of the design of individual components, resulting in gradual increases of optimum pressure and bypass and temperature ratios. The RB211-535E4, which is the latest engine derived from the basic RB211 design and is destined for use by the 757 airliner, incorporates inherent precision tip clearance control, thermal barrier coatings, creep-resistant titanium alloys, supercritical airfoil designs, a single nozzle exhaust, a single stage, wide chord clapperless fan, and three-dimensional core compressor and core turbine designs. Attention is given to the basic research conducted on component efficiency, which involved the use of laser holography and laser anemometry techniques for observing and measuring aerodynamic flow. O.C.

A82-40965 # Turboprop design - Now and the future. B. S. Gatzen (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 879-903. 92 refs.

After an account of the development history of turboprop rotor technology during the 1960s for V/STOL applications, the development status and design and performance characteristics of commuter aircraft turboprop and high speed propeller fan rotor technologies are considered. The commuter aircraft propeller family incorporates composite shell and aluminum spar blades with a double-acting pitch change system and a pitch-lock feature, resulting in weight reduction, greater safety, improved durability, and a near-ideal aerodynamic performance in the Mach 0.4-0.65 range that assures low cabin noise levels and meets far field noise certification requirements. The propeller fan incorporates 8-10 blades with swept blade tips for the Mach 0.65-0.8 range cruise speeds of 80-160 passenger transports and military cargo and ASW aircraft. The propeller fan will result in fuel consumption reductions of 20% and 40% for commercial and military aircraft, respectively. O.C.

A82-40966 # Inflated wings. A. Roselli. In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 904-910.

The design principles and possible uses of both statically and dynamically inflated wings are considered, on the basis of their inherently high strength/weight ratios, economy of construction, and ease of storage and deployment. It is noted that the upper surface of a large statically inflated wing acts as a greenhouse-effect solar trap which may be harnessed to provide both static buoyancy, as in a hot air balloon, and energy for propulsion. Attractive uses of these large, kite-like wings include auxiliary power for ships, seed, fertilizer and insecticide-spraying platforms for agriculture, and military parachutes. O.C.

A82-40967 # Design and tests of airfoils for sailplanes with an application to the ASW-19B. L. M. M. Boermans and H. J. W. Selen (Delft, Technische Hogeschool, Delft, Netherlands). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 911-921. 14 refs.

The paper describes the considerations, tests and results of an investigation aimed at designing some improved airfoils for sailplane applications. The following preliminary studies are discussed. Windtunnel experiments on two actual wing segments of a Standard Class sailplane ASW-19B are described. The characteristics of some modern airfoils for sailplanes are analyzed. Results of flight and windtunnel experiments with respect to leading edge contamination by insects are presented. The effectiveness of pneumatic turbulators, applied to decrease the airfoil drag by avoiding laminar separation bubbles, is demonstrated. Based on the experience gained in these studies, some airfoils were designed and, after windtunnel verification, applied to the wing of an ASW-19B. Flight performance measurements before and after the wing modification showed an improvement of 5% in glide ratio over the entire practical flight speed range. (Author)

A82-40968 # Variable geometry aerofoils as applied to the Beatty B-5 and B-6 sailplanes. R. A. Streather (Atlas Aircraft Corp., Johannesburg, Republic of South Africa). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 922-930. 11 refs.

Two variable-geometry aerofoils using flexible surfaces have been developed by Beatty for his B-5 and B-6 sailplanes. The B-5 has a basic Eppler 1001 section with a flexible upper surface which is raised to form a thick, high-camber profile for thermalling. The B-6 uses a Wortman FX 05-H-126 section with flexible upper and lower surfaces over the rear 40% of the chord. Predictions for the polars of the two sections using the Eppler and NASA viscous, two-dimensional computer programs are presented. Predictions for the overall aircraft polars are compared with flight-test measurements obtained by conventional methods and by using a prototype glide-angle indicator. (Author)

A82-40969 # Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft. M. J. Harris, J. H. Nichols, Jr., R. J. Englar, and G. G. Huson (David W. Taylor Naval Ship Research and Development Center, Bethesda, MD). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 931-939. 10 refs.

The design characteristics and performance levels attained in static, wind tunnel and test aircraft operation of the Circulation Control Wing/Upper Surface Blowing (CCW/USB) powered lift system for STOL aircraft are described. The configuration of the system places turbofan engine exhausts above the upper surface of a Coanda-effect trailing edge circulation-control wing, so that the exhaust gases scrub the wing upper surface. In addition to controlling effective wing camber with circulation control blowing, propulsion-induced lift is generated through the downward deflection of turbofan exhaust over the trailing edge of the wing to a degree which is controlled pneumatically by the momentum of the circulation-control jet sheet. It is experimentally demonstrated that the mechanically simple CCW/USB pneumatic system can generate high lift as effectively as the heavier and more complex mechanical flap systems. O.C.

A82-40970 # Ejector powered propulsion and high lift subsonic wing. R. A. Squyers, J. L. Porter (Vought Advanced Technology Center, Dallas, TX), K. S. Nagaraja (USAF, Wright Aeronautical Laboratories, Wright-Patterson AFB, OH), and G. F. Cudahy (Fairchild Republic Co., Farmingdale, NY). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 940-950. 8 refs. Contract No. F33615-79-C-3017.

A high performance ejector wing is designed by means of methodologies based on three-dimensional vortex lattice and lifting line theories and two-dimensional analog techniques, in conjunction with viscous flow predictions and empirically based ejector augmentor design and performance procedures. The initial analytical consideration of various ejector wing configurations established the superior lift and thrust performance at high angles of attack of a configuration consisting of a constant pressure mixing ejector with a wing lower surface inlet and an upper wing trailing edge exhaust flow. Test results for a swept planform, four-ejector bay wing configuration indicate maximum lift/drag ratio improvements over a conventional wing of up to 27%, and an angle of attack increase of more than 10 deg without stall. A thrust augmentation factor of 1.06 was achieved at a freestream Mach number of 0.294, in keeping with predictions. O.C.

A82-40971 # Development of an advanced no-moving-parts high-lift airfoil. R. J. Englar (David W. Taylor Naval Ship Research and Development Center, Bethesda, MD). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 951-959. 15 refs.

An advanced Circulation Control Wing (CCW) airfoil has been developed by incorporating a very small radius blown trailing edge into the aft profile of an existing supercritical airfoil. This combined no-moving-parts configuration generates the same high lift as the already flight-proven large-radius CCW airfoils (section lift coefficient near 7), yet produces negligible unblown drag penalty due to leaving the device deployed for cruise flight. The large leading edge radius of the supercritical airfoil allows high-lift operation without mechanical deflection. Experimental results presented by the paper imply the feasibility of an efficient mono-element cruise and high-lift airfoil, with transition between the two modes accomplished by merely initiating blowing from the fixed trailing edge slot. Comparisons to existing blown and unblown high lift systems are made, and possible applications are discussed. (Author)

A82-40972 # Design integration of CCW/USB for a sea-based aircraft. H. S. D. Yang (Lockheed-California Co., Burbank, CA) and J. H. Nichols, Jr. (David W. Taylor Naval Ship Research and Development Center, Bethesda, MD). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 960-968. 8 refs.

A design study is being conducted to apply the technologies of Circulation Control Wing with Upper Surface Blowing (CCW/USB) engine installation to a Navy/Lockheed sea based aircraft. Research and development in the CCW and USB concepts indicate that the application of the combined technologies may achieve a goal of operating the S-3 type aircraft from a ship deck without the catapult. The design emphasizes the integration of the propulsion system with a simple installation to obtain high lift or drag when required. Attention is also being directed to the cruise efficiency and the optimum design approach for stability and control. (Author)

A82-40973 # Aircraft design for fuel efficiency. L. O. Lehman, D. Woll, and C. Lampart (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 969-979. 6 refs

U.S. Navy Aircraft Energy Conservation Research, Development, Test and

Evaluation Program recommendations to date are presented, with emphasis on those aircraft design approaches which promise the greatest fuel savings for a given level of investment. In addition to design modifications which reduce aerodynamic drag or aircraft weight, attention is given to efficiency-enhancing propulsion system concepts, Flight Performance Advisory/Management Systems which improve mission fuel utilization, and mission planning and training techniques which improve operational effectiveness. The study results cover fighter, attack and patrol aircraft, and includes recommendations for such year 2000 air vehicles as nuclear aircraft and advanced lighter-than-air vehicles. O.C.

A82-40974 * # Performance characteristics of a buoyant quad-rotor research aircraft. B. L. Nagabhushan, P. P. Jacobs, C. E. Belknap (Goodyear Aerospace Corp., Defense Systems Div., Akron, OH), and D. A. Euler (Hughes Helicopters, Inc., Commercial Engineering Div., Culver City, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 980-989. Contract No. NAS2-10777.

Performance characteristics of a buoyant, quadrotor research aircraft, which represents a hybrid airship concept for heavy lift application, are described. Ceiling altitude and endurance for hovering at typical power levels, including partial power failure, are predicted. Climb performance at various altitude and gross weight conditions have been examined. Forward flight performance of this vehicle is illustrated in terms of typical performance parameters such as maximum speed, maximum range, and endurance, over the full range of its payload capability. Optimum payload weights have been identified which result in maximum range at sea level density altitude and constant endurance at various altitudes, both during hover and cruise flights. (Author)

A82-40975 # Application of a new hybrid material /ARALL/ in aircraft structures. J. W. Gunnink, L. B. Vogelesang, and J. Schijve (Delft, Technische Hogeschool, Delft, Netherlands). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 990-1000. 18 refs.

An aircraft structural material produced by the bonding of thin aluminum alloy sheets with an aramid fiber-reinforced adhesive, designated Aramid-Reinforced Aluminum Laminate (ARALL), is described. ARALL exhibits superior fatigue crack growth properties, and has a high tensile strength which may be maximized through the introduction of suitable residual stresses into laminates having optimized aluminum sheet thicknesses. Monolithic material test results are used as reference in comparative tensile strength and fatigue tests for notched and centrally cracked ARALL specimens, bolted and riveted joints, and lugs. Buckling test results are compared with calculations for both aluminum alloy and ARALL compression panels. Attention is given to the weight savings obtainable in pressurized cabins representative of various existing aircraft through the use of ARALL. O.C.

A82-40976 # The behavior of composite thin-walled structures in dynamic buckling under impact. J. Ari-Gur, J. Singer (Technion-Israel Institute of Technology, Haifa, Israel), and H. Röhrle (Dornier GmbH, Friedrichshafen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1001-1010. 12 refs.

The influence of material properties, and in particular those of composites, on response and behavior of columns under axial impact is studied. An extensive experimental investigation has been carried out on specimens made of graphite/epoxy, glass/epoxy and Kevlar/epoxy laminates with different layups. Dynamic buckling and failure are compared with those of metal columns and the relative advantages and disadvantages of the composite materials are discussed. In general, composite columns show improved dynamic buckling properties, and, with several exceptions, they may replace metal ones efficiently and reliably. (Author)

A82-40977 # Nondestructive testing in aircraft construction using holographic methods. K. Wanders (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Cologne, West Germany) and H. Steinbichler (Laboratory Dr. H. Steinbichler, Endorf, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1011-1017. 10 refs.

The application of high power laser-based holographic interferometry to aircraft structure nondestructive testing is described. The techniques covered include real time holography, which denotes structural deformation through the dark bands of destructive interference, the double exposure method, in which structural stresses applied between exposures are manifested as interference fringes among odd multiples of one-half wavelength, and time-average holography, which reconstructs wavefront interference between two virtual images of a vibrating structure. The concrete examples given are of a glass fiber-reinforced plastic tube, a helicopter rotor blade, the running surface of a tire, a turbine rotor, and a thermally deformed antenna, as well as exhaust nozzle jets. O.C.

A82-40978 # Design and fabrication of cocured composite hat-stiffened panels. G. D. Peddie and E. E. Spier (General Dynamics Corp., Convair Div., San Diego, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1018-1031. 7 refs.

Design/analysis study established cocured graphite-epoxy hat-stiffened panels of high compressive structural integrity for development and demonstration by mechanized methods. Both flat and curved-crown hats were involved in the design/analysis study, but only the flat-crown concept was included in the manufacturing study. It was found that manufacture of the curved-crown hat would not result in added complexity. Post-buckling structural integrity was assumed to be directly related to the summation of classical local bifurcation buckling strengths of panel elements. Parts were built in stages with the final panel being 18 feet long. Mechanization and tooling procedures were proven to be valid for the manufacturyof long panels. Test panels were not fabricated in time for correlation with analysis, but testing will be performed in the near future. (Author)

A82-40979 # Spin behaviour of the Pilatus PC-7 Turbor Trainer. P. Wittwer and O. Masefield (Pilatus Flugzeugwerke AG, Stans, Switzerland). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1032-1039.

Experience gained during the development of the PC-7 Turbo Trainer aircraft suggests that while spin tunnel tests are helpful in determining the critical points of a design's spin characteristics, an exhaustive and accurate forecast of spin behavior is not attainable. The spin tunnel test model used for the PC-7 had a generally steeper nose-down attitude, and was faster turning, than the prototype aircraft. Recovery turns were, however, accurately represented. Attention is given to the differences in spin behavior resulting from a series of modifications to the prototype aircraft in the course of its spin test program. O.C.

A82-40982 # Models for the motor state of VSCF aircraft electrical power system. X. Qiu, Y. Yan, and Y. Hu (Nanjing Aeronautical Institute, Nanjing, People's Republic of China). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1061-1071.

Mathematical models for the motor state of an AC-AC variable speed constant frequency (VSCF) power system are established in this paper. Two computing methods, of which the first is a method for finding the analytic solution of the state transition matrix with a computer and the second is a combination of the 0.618-optimization method and the Runge-Kutta method, are proposed. These methods reduce computation time. (Author)

A82-40983 # The effect of intake flow disturbences on APU compressor blade high cycle fatigue in the Airbus A300. K. W. Lotter and J. Jörg (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1072-1081. 7 refs.

Premature compressor failures of the APU in the Airbus A300, related to high cycle fatigue, led to a detailed investigation of the relevant intake/engine parameters. Relatively high total pressure distortion and excessive flow angularity have been determined to be the cause of high alternating blade loads and, in combination with the chosen material of the compressor disk and blades, surface fretting. In systematic test steps intake modifications were developed to improve the intake flow quality. It is shown that only relatively minor intake modifications were required to achieve a substantial improvement in total pressure distortion and swirl. In addition, a suitable modification at the compressor blade dove-tails was initiated to increase the blades' fatigue strength. (Author)

A82-40984 # Engine controls for the 1980s and 1990s. V. A. Fisher (Rolls-Royce, Ltd., Bristol, England). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1082-1087.

After a brief developmental history of full-authority electronic engine control systems, with attention to that employed by the Olympus 593 engines of the Concorde SST, consideration is given to the developmental prospects for such systems in the near future in view of the increasing power of microprocessors.

The fault tolerance characteristics, transducer systems, high integrity software and reliability/maintainability of the projected full authority digital electronic control (FADEC) system are described, with attention to fault identification and flight crew notification procedures. The RB211-535C turbofan engine will be equipped with such a FADEC system. O.C.

A82-40985 # Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands. N. Voogt (Fokker, Amsterdam, Netherlands) and J. W. Slooff (National Lucht- en Ruimtevaartlaboratorium, Amsterdam, Netherlands). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1088-1098. 16 refs.

An aerodynamic technology development program is described, whose main objectives are the formulation and validation of a computational procedure for the aerodynamic design of high aspect ratio wings for the transonic regime of short-/medium range commercial aircraft, as well as the establishment of a transonic technology base. An inverse procedure has been formulated for the wing design task which allows the excercise of explicit control over wing geometry while approaching the target pressure distribution as closely as possible. Experience has been gained in relating target pressure distributions to off-design conditions through two-dimensional airfoil and three-dimensional wing studies, together with wind tunnel verifications that included the assessment of high Reynolds number characteristics. A wing-body configuration computational analysis capability for drag minimization studies has also been achieved by the program. O.C.

A82-40986 # Recent airfoil developments at DFVLR. H. Körner and G. Redeker (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Entwurfs-Aerodynamik, Brunswick, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1099-1114. 37 refs.

New airfoils may bring a substantial improvement in the aerodynamic efficiency of airborne vehicles. A number of new airfoils based on transonic and laminar concept have been designed and investigated at DFVLR. With theoretical design methods and facilities for experimental verification at hand, airfoils for subsonic transports, sail-planes, propellers, helicopter rotors and combat aircraft have been developed. (Author)

A82-40987 # Wing-tip jets aerodynamic performance. J. M. Wu, A. Vakili, and Z. L. Chen (Tennessee, University, Tullahoma, TN). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1115-1121. 32 refs. Contract No. F33615-81-K-3034.

This paper presents the preliminary study of wing-tip jets blowing techniques to achieve improvements in the wings aerodynamics performance. The feasibility of utilizing wing-tip jets to reduce the currently popular winglets has been conducted. The idea is to study the potential of replacing solid winglets by more flexible wing-tip jets to suit changing flight conditions. The wing-tip jets modify the flow-field near the wing tip and could achieve better aerodynamic performance of the wing. A first order calculation has been made to check the air-jet advantage versus the disadvantage in degrading the jet-engine performance by bleed-off of compressed air. The result indicate that the power (or thrust) saved is significant enough to encourage us to explore this new concept. Munk's minimum induced drag criterion has been extended to formulate the split branched wing-tips by utilizing multi-ports jet. Moreover, it is also conceived that an added jet swirling effect may induce a circulatory motion. The induced local downwash could alter the new wing-tip flow and thus suppress the main wing-tip-roll-up vortex. For this purpose, wind-tunnel tests with a half-wing model have been conducted to verify this concept. This is done by controlling the jet blowing direction and magnitude. (Author)

A82-40988 # An experimental investigation of leading-edge spanwise blowing. W. Su, M. Liu, B. Zhou, C. Qiu, and S. Xiong (Beijing Institute of Aeronautics and Astronautics, Beijing, People's Republic of China). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1122-1132. 13 refs.

Oil flow visualizations and pressure measurements on a 30-deg swept trapezoidal wing were conducted to investigate leading edge spanwise blowing (LE SWB), which is very near the leading edge and along it. The LE SWB can provide a higher maximum lift coefficient than conventional SWB. It can generate a more stable jet leading edge vortex above the inboard wing, and the outboard wing leading edge vortex can also be enhanced. The flow patterns of the wing with LE SWB are similar to those of a strake-wing configuration. (Author)

A82-40989 # Vortex formation over double-delta wings. U. Brennenstuhl and D. Hummel (Braunschweig, Technische Univeristät, Brunswick, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1133-1146. 20 refs.

Low speed wind tunnel tests have been carried out on a series of double-delta wings. The effects of variations in leading edge kink angle and in kink position have been investigated by mens of three-component pressure distribution and flow-field measurements, as well as by flow visualization at a Reynolds number value of 1.3 million. At small angles of attack two primary vortices exist on each side of the wing, originating from the apex and from the leading-edge kink. At moderate kink angles these two vortices join each other with increasing angle of attack. The junction process is analysed in detail and is intrepreted as a 'potential flow effect'. At very large angles of attack vortex breakdown occurs within the jointed vortices, which leads to the limitation of the aerodynamic coefficients. (Author)

A82-40990 # CATIA - A computer aided design and manufacturing tridimensional system. F. Bernard (Avions Marcel Dassault-Breguet Aviation, Suresnes, Hauts-de-Seine, France). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1147-1154.

A properietary computer graphics-aided, three-dimensional interactive application (CATIA) design system is described. CATIA employs approximately 100 graphics displays, which are used by some 500 persons engaged in the definition of aircraft structures, structural strength analyses, the kinematic analysis of mobile elements, aerodynamic calculations, the choice of tooling in the machining of aircraft elements, and the programming of robotics. CATIA covers these diverse fields with a single data base. After a description of salient aspects of the system's hardware and software, graphics examples are given of the definition of curves, surfaces, complex volumes, and analytical tasks. O.C.

A82-40991 # CDS-the designer's media, the analyst's model. D. P. Raymer (Rockwell International Corp., Los Angeles, CA) and S. K. Albrecht (Rockwell International Corp., Space Transportation and Systems Group, Downey, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1155-1163. 6 refs.

A proprietary Configuration Development System (CDS) is described which incorporates both a flexible interactive graphics program for the conceptual design of aerospace vehicles and a three-dimensional geometric data base which may be used by analysis programs. Experience to date with the CDS has demonstrated substantial productivity improvements, although, as noted by Sandusky (1978), such gains are more pronounced in the conduct of iteration procedures than in the reduction of throughtime. Nevertheless, optimal results are reached at an earlier stage of the design process. Graphics examples are given from CDS work on the FDL-5 and FDL-8 lifting body manned orbital vehicles. O.C.

A82-40992 * # Aircraft geometry verification with enhanced computer-generated displays. J. V. Cozzolongo (NASA, Ames Research Center, Moffett Field, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1163/a-1163/j. 11 refs.

A method for visual verification of aerodynamic geometries using computer-generated, color-shaded images is described. The mathematical models representing aircraft geometries are created for use in theoretical aerodynamic analyses and in computer-aided manufacturing. The aerodynamic shapes are defined using parametric bi-cubic splined patches. This mathematical representation is then used as input to an algorithm that generates a color-shaded image of the geometry. A discussion of the techniques used in the mathematical representation of the geometry and in the rendering of the color-shaded display is presented. The results include examples of color-shaded displays, which are contrasted with wire-frame-type displays. The examples also show the use of mapped surface pressures in terms of color-shaded images of V/STOL fighter-/attack aircraft and advanced turboprop aircraft. (Author)

A82-40993 # Technical and economic comparison of carbon fiber tape and woven fabric applications. G. Hilaire and G. Briens (Société Nationale Industrielle Aérospatiale, Laboratoire Central, Suresnes, Hauts-de-Seine, France). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1164-1172.

A comparative study is made of the structural performance characteristics of various types of carbon fiber fabrics and unidirectional filament prepreg tapes, in view of the relative equality of the importance, in recent applications of carbon

fiber composites, of weight reduction, strength maximization, and reductions in manufacturing costs. The comparisons are between a 3000-filament (3 K) tow, T 300 carbon fiber, 5 H satin weave cloth weighing 285 g/sq m when dry, and a 3 K T 300 tape. Both are impregnated with 5208 resin and in that state represent 60 percent fiber volume composites. The performance charactersitics considered are interlaminar shear, notched and unnotched tensile strength, and compressive strength. The consequences of each alternative for manufacturing are assessed for the cases of manual and automated lay-up, machining and cut trimming.
O.C.

A82-40994 # Application of composite materials and new design concepts for future transport aircraft. R. H. Lange and J. W. Moore (Lockheed-Georgia Co., Marietta, GA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1173-1181. 30 refs.

The application of advanced technologies and the use of innovative aircraft design concepts show the potential for significant improvement in the fuel efficiency of future transport aircraft envisioned for operation in the mid to late-1990s. This paper reviews recent preliminary design system studies of transport aircraft featuring cost/benefit analyses of advanced technology and new vehicle design concepts. Emphasis is directed toward the use of graphite epoxy composite materials in the primary and secondary structures of transport aircraft. The data on aircraft design concepts include preliminary design studies of Advanced Civil/Military Aircraft (ACMA) aircraft and innovative configurations. The aircraft design parameters include cruise Mach numbers of 0.75 to 0.80, design payloads from 330,000 to 772,000 lbs, and range from 3,500 to 4,000 nautical miles.
(Author)

A82-40995 # Sliced disc design - A composite conform concept for a turbo engine axial compressor. R. Kochendörfer (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Bauweisen- und Konstruktionsforschung, Stuttgart, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1182-1191. 5 refs.

For an 800 kW turbo engine demonstrator an axial compressor concept in composite technology was developed. The aim was a reduction of mass and moment of inertia compared to a titanium design. The geometry and the blade spacing required a single-blade attachment concept. To minimize the problems in the shear loading area, the 'compressor rotor' was divided into individual segments, made of aluminum alloy. Each of the Al-segments represents the root part of a B/Al blade. In the leading and trailing edge areas these segments are shrunk together by composite hoops, which also sustain the centrifugal loads. As long as the shrinkage pressure is present, the segmented disk exhibits a similar behavior as an unsliced disk. This sliced disk concept was successfully proof-tested in cold spin tests up to the design level of 47,600 rpm, corresponding to a maximum blade tip speed of 420 m/sec.
(Author)

A82-40996 # Comparison of HP turbine 'deep blade design' effects in turbofan engine gas generators with different bearing structure configurations. D. Rist (München, Technische Universität, Munich, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1192-1202. 5 refs.

Two different types of gas generator bearing structure configurations have been investigated for a projected turbofan engine based on the deep blade design concept. Mechanical analyses are carried out for defined operation and load cases to estimate the required mass increase for the main components. It is shown that when the HP turbine rotor blade chord length is increased by 50%, the mass of the turbofan engine core increases by about 7 and 11% for the two configurations investigated.
V.L.

A82-40998 # Redundant control unit for an advanced multispool engine. G. Dahl (Bodenseewerk Gerätetechnik GmbH, Überlingen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1214-1221.

The advantages and disadvantages of the use of digital technology for the control of modern multispool engines are discussed with reference to a newly developed redundant digital engine control unit. The controller structure is discussed with emphasis on software design and software verification methods. It is shown that the many advantages resulting from the introduction of digital technology, such as increased reliability, improved maintainability, and internal controller intelligence, make up for the inevitable disadvantages associated with the sampling process and computer delay time.
V.L.

A82-40999 # Test results of chordwise and spanwise blowing for low-speed lift augmentation. G. A. Howell (General Dynamics Corp., Fort Worth, TX). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1222-1234. 11 refs.

Low-speed wind tunnel tests were conducted on a large-scale and a small-scale powered model of a STOL wing/canard concept with engines mounted over the wing. In a basic configuration, both models exhausted the entire nozzle-flow momentum over vectoring flaps. In an alternate configuration, both models exhausted a portion of the flow from spanwise nozzles in the outer nacelle wall to obtain wing-leading-edge vortex augmentation. Force and pressure data were obtained for the small-scale model powered by compressed air. Pressure and thermal data were obtained for the large-scale model powered by two turbojet engines. Chordwise blowing decreased the pressures over the entire wing upper surface and even on the canard at high angles of attack. The power-induced lift coefficients were moderate for chordwise blowing. Spanwise blowing increased the strength of the wing leading-edge vortex and reduced the pressure on the wing upper surface beneath the path of the vortex.
(Author)

A82-41000 # Aerodynamic research applications at Boeing. A. L. Nagel (Boeing Commercial Airplane Co., Seattle, WA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1235-1242. 24 refs.

This paper shows by several recent examples how aerodynamic research tools and methods have been applied to the design of subsonic commercial transport airplanes. Examples include wing modifications, nacelle integration, vortex generators, and cab design. Some recent high Reynolds number tests in the NASA 0.3-meter Transonic Cryogenic Tunnel are also described.
(Author)

A82-41001 # Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings. W. W. Braymen, W. A. Rogers (General Dynamics Corp., Fort Worth, TX), and M. H. Shirk (USAF, Flight Dynamics Laboratory, Wright-Patterson AFB, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1243-1255. 11 refs. USAF-sponsored research.

Aeroelastic tailoring of composite lifting surfaces was validated in a program that involved design, fabrication, and transonic wind tunnel testing of three static aeroelastic wings in addition to a set of steel wings. Each aeroelastic wing had unique design objectives. The test featured aeroelastic shape documentation through the use of photogrammetry along with the simultaneous acquisition of forces and pressures. Highlights of the aerodynamic test results are presented, with emphasis placed on test-to-theory comparisons. The strong points as well as areas of needed improvement in the aerodynamic design methods are discussed. The investigation demonstrates that the design of composite lifting surfaces should include consideration of aerodynamic benefits available through tailoring.
(Author)

A82-41002 * # Upper Vortex Flap - A versatile surface for highly swept wings. D. M. Rao (Vigyan Research Associates, Inc., Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1256-1266. 9 refs. NASA-supported research.

The Upper Vortex Flap (UVF) is a multipurpose surface concept to improve the subsonic aerodynamics of highly swept delta wings. Hinged along the leading edges and deployed from the wing upper surface, the UVF generates a vortex inboard on the wing in addition to the leading-edge vortex acting on the flap. The relative suction levels on the wing and on the flap surface, governed by the flap angle and angle of attack, lead to a variety of functional applications viz. lift increment, drag modulation, lift/drag improvement and roll augmentation. This paper presents wind tunnel force and pressure measurements on a 74-deg flat plate delta to define the UVF-related vortex effects and to assess its potential as a versatile control surface in different angle-of-attack regimes.
(Author)

A82-41003 * # Analytical study of vortex flaps on highly swept delta wings. N. T. Frink (NASA, Langley Research Center, Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1267-1275. 25 refs.

This paper highlights some current results from ongoing analytical studies of vortex flaps on highly swept delta wings. A brief discussion of the vortex flow analysis tools is given along with comparisons of the theories to vortex flap force and pressure data. Theoretical trends in surface pressure distribution for both angle-of-attack variation and flap deflection are correctly predicted by Free Vortex Sheet theory. Also shown are some interesting calculations for attached-flow and vortex-flow flap hinge moments that indicate flaps utilizing vortex flow may generate less hinge moment than attached flow flaps. Finally, trailing-edge flap effects on leading-edge flap thrust potential are investigated and theory-experiment comparisons made. (Author)

A82-41004 * # Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration. W. E. Schoonover, Jr. (NASA, Langley Research Center, Hampton, VA) and W. E. Ohlson (Boeing Military Airplane Co., Seattle, WA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1276-1290. 15 refs.

A subsonic wind-tunnel investigation of the application of vortex flaps to a supersonic interceptor configuration is described. Experimental results are presented which indicate the aerodynamic effects of vortex-flap deflection, trailing-edge flap deflection, vortex flap chord and span, vertical stabilizers, and a highly cambered leading edge designed for attached flow. Data presented include longitudinal forces and moments, upper-surface pressure distributions, and oil- and smoke-flow visualization photographs. It is concluded that a full-span deployable vortex flap can provide a substantial performance improvement for this and other similar configurations. (Author)

A82-41005 # Spanwise distribution of vortex drag and leading-edge suction in subsonic flow. S. N. Wagner (München, Hochschule der Bundeswehr, Neubiberg, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1291-1301. 12 refs.

The spanwise distribution of the leading-edge suction force of wings with arbitrary planforms is calculated on the basis of a linear subsonic thin-wing theory and a study by Carlson and Mack (1980) on two-dimensional airfoil sections. The approach makes it possible to account for the effects of Mach number, Reynolds number, and wing parameters, including local thickness to chord ratio, location of the maximum wing section thickness, local leading-edge radius, and leading-edge sweep. Results obtained by the proposed method are found to be in good agreement with experimental data. V.L.

A82-41006 # Fuselage effects in leading edge vortex flap aerodynamics. J. F. Marchman, III and M. L. Hollins (Virginia Polytechnic Institute and State University, Blacksburg, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1302-1309. 8 refs.

Wind tunnel tests were conducted to determine the influence of a fuselage on the aerodynamic behavior of a 60 deg delta wing with leading edge vortex flaps. The results showed that at some combinations of angle of attack and yaw, the fuselage had a stabilizing effect on the leading edge vortices and that maximum lift is increased due to fuselage lift and added vortex stability. The fuselage did not affect the ability of vortex flaps to significantly increase the L/D of the wings. (Author)

A82-41007 # New technology for the next generation of commercial transports - Real or imaginary. I. S. Macdonald. In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1310-1320.

Economical, technical, financial, and legal implications associated with the needed replacement of technically and economically obsolete fleets of old commercial aircraft are examined. The discussion includes a brief review of the factors necessitating changes in aircraft fleets; a review of what aircraft and engine manufacturers have done to respond to the needs of the airlines to upgrade their fleets; new developments which will make it possible to increase the safety, efficiency, and profitability of commercial aircraft; and possible deterrents to the successful and useful implementation of new technology. V.L.

A82-41008 * # An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts. R. M. Wood, S. M. Dollyhigh, and D. S. Miller (NASA, Langley Research Center, Hampton, VA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1320/a-1320/h. 15 refs.

Results of two studies into the supersonic aerodynamics of twin-fuselage aircraft configurations are summarized. In the first study, a set of experimental data was obtained on a simple rectangular-wing twin-fuselage wind-tunnel model; this data was then used to evaluate prediction methods, assess favorable interference effects, and identify any unexpected or unpredictable aerodynamic phenomena. Results are presented which show that significant reductions in wave drag are possible through optimum body positioning and that existing aerodynamic prediction methods are adequate for making preliminary aerodynamic estimates. Several configuration concepts were theoretically explored in the second study, and results are presented which indicate the sensitivity of the twin-fuselage concept to various methods of integrating the aircraft components. (Author)

A82-41009 # Reduced nonlinear flight dynamic model of elastic structure aircraft. J. Jankovic (Beograd, Univerzitet, Belgrade, Yugoslavia). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1321-1329. 11 refs.

A flight dynamics model defined by equations of motion for the case of an unconstrained deformable body subjected to aerodynamic forces, thrust load and aircraft weight is presented, with a deformable structure represented by the finite element method. A reducing method based on the small energy and large damping characteristics of very fast modes is introduced which involves the determination of the generalized coordinate nonlinear vector transformation which can turn the basic nonlinear model to a linear one. The method of decoupling linear systems to subsystems of slow and fast models makes it possible to extract fast structural modes and find a linear dependence between generalized, transformed coordinates. A criterion for neglecting these modes is also presented. It is, finally, necessary to find the nonlinear dependence between basic generalized coordinates which leads to the reduced nonlinear model of the system. O.C.

A82-41010 # Determination of load spectra and their application for keeping the operational life proof of sporting airplanes. H. J. Kossira (Braunschweig, Technische Universität, Brunswick, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1330-1338.

Modern load spectrum determination techniques are applied to glass fiber-reinforced plastic (GFRP) sailplanes, with attention to the estimation of aircraft structure service life. The use of such methods in the case of sailplanes is demanded by their combined gust and maneuver load environments. The preparation of data gathered during a limited time interval by means of computers, using Markov transition matrix storage and extrapolation to the total lifetime of the sailplanes, is demonstrated. O.C.

A82-41011 # The role of the scale parameter in service load assessment and simulation. J. Gadeon (Budapesti Muszaki Egyetem, Budapest, Hungary). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1339-1349. 23 refs.

The integral scale L, which is a universal parameter for stationary stochastic processes and complementary to the standard deviation, sigma, must be used in conjunction with sigma and one or two other parameters which are unique to the process being described in order to compose autocorrelation and power-spectral density functions. The conversion from measured to theoretical standard deviation and vice versa in the case of atmospheric turbulence measurement and evaluation, which is restricted to a finite frequency bandwidth, is feasible by means of the dimensionless parameter comprising L and the low frequency cutoff wavenumber. L may also be used for the direct calculation of time spectra from space spectra, and it facilitates the accurate treatment of stochastic transients. O.C.

A82-41013 # Theoretical and experimental investigation of joint-structural damping interaction for airplane construction. I. N. Krivosic (Beograd, Univerzitet, Belgrade, Yugoslavia). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1358-1367. 14 refs.

After considering previously published joint structural damping interaction studies and possible physical models for this phenomenon, experimental results for the case of typical aircraft structures are treated by employing the same geometrical model with different types of joints between the skin, stringers and transverse elements. Separate analyses are given for rivet, bolt and adhesive joints, and the corresponding mutual influence of the amplitude on structural damping is analyzed in light of the experimental results. O.C.

A82-41014 # Optimizing aerospace structures for manufacturing cost. B. R. Noton (Battelle Memorial Institute, Columbus, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings.

Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1368-1385.

The evolution of design/manufacturing interaction reveals the need for design methodologies to reduce aerospace systems cost. Cost-driver identification related to performance, design, materials, and manufacturing emphasizes the importance of the preliminary design phase. Data are required on designer-influenced cost elements, for example, with composites these are, hybrids, ply count, curing method, and quality requirements. A 'Manufacturing Cost/Design Guide' (MC/DG) for composite and metallic airframes, and also electronics, is discussed. Using examples of components and fuselage panels, the utilization of designer-oriented formats for relative and quantitative costs of manufacturing processes in trade-studies involving structural performance is shown. The MC/DC will also indicate potential cost savings of emerging technologies which accelerate technology transfer. (Author)

A82-41015 # **Composite structures repair.** H. Wicker (Grumman Aerospace Corp., Bethpage, NY). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1386-1392.

This paper concerns itself with the repair of composite materials on modern aircraft with particular emphasis on repair techniques and equipment for field use. The high strength to weight ratio of composites make them ideal to meet the demand for increasing the performance of military aircraft. However, with the increasing use of composite materials, a need has been created for unique repair methods. To meet the need to simultaneously apply pressure and a uniform temperature to the patch, a composite repair console and integral vacuum/-heater blanket was developed by Grumman. (Author)

A82-41016 # **Principles of achieving damage tolerance with flexible maintenance programs for new and aging aircraft.** J. Hall and U. G. Goranson (Boeing Commercial Airplane Co., Seattle, WA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1393-1405.

Boeing has developed new technology and procedures for determining flexible structural maintenance programs that meet damage tolerance regulations. Rating systems, based on past maintenance, are used to develop inspection programs to ensure timely detection of structural damage from environmental deterioration (EDR), accident (ADR), or fatigue (DTR). The inspection program consists of two phases. Initially, the program is based on evaluations for detecting corrosion, stress corrosion, and accidental damage using the EDR and ADR systems. As the fleet matures, inspection tasks for detecting fatigue damage, based on the DTR evaluations are incorporated into the program. (Author)

A82-41018 # **Intake swirl - A major disturbance parameter in engine/intake compatibility.** F. Aulehla (Messerschmitt-Bölkow-Blohm GmbH, Munich, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1415-1424. 10 refs.

Based on theoretical considerations and primarily on experiment it is shown that all supersonic intakes of present combat aircraft produce essentially two types of swirl components of varying magnitude i.e. bulk and twin swirl. Depending on the sensitivity of the engine towards such disturbances serious engine/intake compatibility problems may arise, as for example engine surge and fan vibration. The remedial measures to overcome this problem are described and the solution of fenced intakes selected for Tornado is discussed. It is expected that this intake modification may also be of advantage for other high performance combat aircraft having similar intake configurations. Finally the relevance of dynamic total pressure distortion as prime compatibility parameter is questioned and a proposal for an improved intake disturbance simulation in engine bench tests is made. (Author)

A82-41019 # **An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters.** M. F. Eigenmann, P. A. Devereaux (McDonnell Aircraft Co., St. Louis, MO), and C. D. Wagenknecht (General Electric Co., Cincinnati, OH). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1425-1436. 10 refs.

In the interest of accurately evaluating interactions between inlet and nozzle flowfields and between a propulsion system and aerodynamic surfaces, in advanced fighter aircraft having highly integrated and closely coupled propulsion systems, a supersonic propulsion simulator for wind tunnel models has been developed. A digital control console system was also developed in order to match model engine operational and control requirements that approximate those of a full scale engine. Attention is given to simulator engine components and wind tunnel model installation details, along with the efficient use of the simulator test technique in the various phases of a supersonic aircraft configuration's development program. The thrust/drag accounting system employing the simulator model for studies of basic aerodynamic performance and throttle-dependent effects is flowcharted, and the corrections necessary in each case are assessed. O.C.

A82-41020 # **Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip.** K. Huenecke (Vereinigte Flugtechnische Werke GmbH, Bremen, West Germany). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1437-1444.

Force measurements and flow observations were conducted on a fighter-type configuration as an aid to understanding the complex flow phenomena occuring at high angles-of-attack, with an; without sideslip. The configuration typically was provided with a cranked delta wing of aspect ratio 2.5; leading-edge sweep of 56 deg, wing-mounted vertical tails, and all-moving canard surfaces. The results indicate that certain configurational changes, such as vertical tailplane strakes, are sufficient to eliminate an otherwise unstable roll and yaw behavior occuring at around 22 deg angle-of-attack. (Author)

A82-41021 # **Wing design for supersonic cruise/transonic maneuver aircraft.** P. B. Gingrich and E. Bonner (Rockwell International Corp., El Segundo, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1445-1453. 9 refs.

An approach to multiple-design-point tactical aircraft wing development is discussed. Requirements for proposed tactical aircraft include both efficient supersonic cruise an; acceleration and enhanced transonic maneuvering performance. A computational approach was developed to address the conflicting requirements of these conditions. The approach consists of developing two point designs: a transonic maneuver configuration with weak shocks and nearly attached flow and an optimum supersonic cruise design. A compromise is then developed in an iterative cycle which seeks to approach the point design flow quality through the use of variable camber. Computational results for representative tactical aircraft are presented to illustrate the process. Test experience is discussed to indicate the performance achieved with compromise designs relative to point-design configurations. (Author)

A82-41022 # **Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods.** N. J. Pfeiffer (Boeing Commercial Airplane Co., Seattle, WA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1454-1458. 6 refs.

A computational technique has been developed which analyzes transport wings with deflected spoilers or ailerons. It uses 2-D separated flow analysis results in a 'strip theory' fashion to provide inputs for a 3-D lifting surface method. Wing body lift and pitching moments are quantitatively predicted and calculated spanloads qualitatively match experimental results. The method is accurate and economical enough to be useful in the basic design of control systems. (Author)

A82-41023 # **Optimization of canard configurations - An integrated approach and practical drag estimation method.** I. M. Kroo and T. McGeer (Stanford University, Stanford, CA). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1459-1469. 16 refs.

A fundamental analysis of subsonic canard configurations illustrates some of the problems associated with such designs and difficulties encountered in their optimization. A general solution for minimum induced drag as a function of span ratio, vertical gap, and relative surface lifts is presented. Stability and trim requirements, together with the system geometry then determine the total induced drag and practical conclusions follow when structural weight and stalling speed constrains are added. Required chord and twist distributions are determined, illustrating the problems associated with multiple design points. Unlike conventional configurations, the canards' geometric variables associated with optimal solutions to each of the above problems vary widely, showing great sensitivity to constraints and off-design operation. (Author)

A82-41024 * # **Wind-tunnel investigation of a full-scale canard-configured general aviation aircraft.** L. P. Yip and P. F. Coy (NASA, Langley Research Center, Hampton, VA). In: International Council of the Aeronautical

Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 22 (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1470-1488. 11 refs.

As part of a broad research program to provide a data base on advanced airplane configurations, a wind-tunnel investigation was conducted in the Langley 30-by 60-Foot Wind Tunnel to determine the aerodynamic characteristics of an advanced canard-configured general aviation airplane. The investigation included measurements of forces and moments of the complete configuration, isolated canard loads, and pressure distributions on the wing, winglet, and canard. Flow visualization was obtained by using surface tufts to determine regions of flow separation and by using a chemical sublimation technique to determine boundary-layer transition locations. Additionally, other tests were conducted to determine simulated rain effects on boundary layer transition. Investigation of configuration effects included variations of canard locations, canard airfoil section, winglet size, and use of a leading-edge droop on the out-board section of the wing. (Author)

A82-41025 # **Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations.** H. L. Chevalier (Texas A & M University, College Station, TX). In: International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volume 2. (A82-40876 20-01) New York, American Institute of Aeronautics and Astronautics, 1982, p. 1489-1494.

Low speed wind tunnel measurements of the variations in pitching moment coefficient with angle of attack are described for primary and secondary wing configurations, wing-canard combinations. Experimental results are shown for various vertical and horizontal distances between the surfaces, canard incidence angles and canard flap angles. These experimental results show that the stability is nonlinear with both angle of attack and incidence angle and as a consequence the pitching moment coefficient at zero lift is an important parameter affecting the stability at trim conditions. At high angles of attack, above canard stall, the change in pitching moment coefficients with canard incidence angle and flap angle is reduced and for some configurations the change is reversed. Results also show that wind tunnel tests, at the appropriate Reynolds Number, are needed to determine longitudinal stability and control characteristics of wing-canard combinations. (Author)

A82-41055 **Monopole antenna patterns on finite size composite ground planes.** C. A. Balanis (West Virginia University, Morgantown, WV) and D. DeCarlo (Naval Air Systems Command, Naval Air Test Center, Patuxent River, MD). *IEEE Transactions on Antennas and Propagation*, vol. AP-30, July 1982, p. 764-768. 9 refs.

The geometrical theory of diffraction methods is used to develop models and to predict the patterns of communications, navigation, and identification (CNI) blade antennas mounted on finite size composite ground planes. The computed patterns are found to agree extremely well with measurements. It is shown, both analytically and experimentally, that very minor differences between patterns of antennas mounted on perfectly conducting and composite ground planes appear for conductivities equal to 10,000 s/m. The anisotropy effect of the composite material on the antenna patterns is thought to be undetectable, at least within the system measuring accuracy. Therefore, perfectly conducting models can be used to analytically investigate the electromagnetic scattering properties of composite materials with conductivities equal to or greater than 10,000 s/m. C.R.

A82-41075 **Heat release rate calorimetry of engineering plastics.** A. L. Bridgman and G. L. Nelson (General Electric Co., Pittsfield, MA). *Journal of Fire and Flammability*, vol. 13, Apr. 1982, p. 114-134. 27 refs.

The Ohio State University Heat Release Rate Calorimeter (OSUHRRC) is examined as a means of defining the fire characteristics of engineering plastics under closely controlled and defined conditions of exposure to incident thermal radiation. The principles and operation of the OSUHRRC are described, and examples of tests are presented utilizing engineering thermographics. A typical test is described in detail, and the factors affecting the results, including reproducibility, external heat flux, and sample thickness, are examined. The improvement in fire retardancy resulting from the incorporation of flame retardants into test specimens is documented for polycarbonates. Comparisons of the results with large-scale foam box tests show the same relative rankings with respect to both temperature and smoke performance. C.D.

A82-41114 # **Design of a longitudinal ride-control system by Zakian's method of inequalities.** T. R. Crossley (Salford, University, Salford, England) and A. M. Dahshan (Military Technical College, Cairo, Egypt). *Journal of Aircraft*, vol. 19, Sept. 1982, p. 730-738. 36 refs.

In this paper, Zakian's method of inequalities is applied to the design of a ride-control system for a STOL aircraft. The purpose of the controller is to reduce the normal acceleration experienced by both passengers and crew. The method is based on the synthesis of a controller such that a set of performance specifications and constraints is satisfied. Controllers are designed on the basis of the characteristics of both the closed-loop step response and the closed-loop error response. It is shown that the design of a single-input, single-output controller by the method of inequalities is straightforward, and can be achieved by using a sequence of formulations until the designer is satisfied that no further improvement is necessary. (Author)

A82-41115 # **Fatigue behavior of weldbonded joints.** G. V. Scarich and G. R. Chanani (Northrop Corp., Aircraft Div., Hawthorne, CA). *Journal of Aircraft*, vol. 19, Sept. 1982, p. 773-780. 7 refs. Contract No. F33615-76-C-5412.

The effects of material and process variables on fatigue behavior were determined for a newly developed, low-cost weldbonding process for the assembly of durable aircraft structures. The weldbonding process involves spot-welding components through a previously applied adhesive, and then oven-curing the assembly to achieve a bonded structure. Both low-load and high-load transfer specimen geometries with each of two alloy combinations (7075-T6/7075-T6 and 2024-T3 alclad/7075-T6) were evaluated. Fatigue behavior of weldbonded specimens with different nugget sizes and different manufacturing defects was compared with that of riveted and adhesive-bonded specimens. In low-load transfer fatigue, weldbonding was better than riveting, but not as good as adhesive bonding, while in high-load transfer fatigue, weldbonding was equal to or better than riveting and adhesive bonding. (Author)

A82-41116 # **Minimum induced drag of canard configurations.** I. M. Kroo. *Journal of Aircraft*, vol. 19, Sept. 1982, p. 792-794. 10 refs.

Drag estimations are made for an elliptically loaded wing on an aircraft equipped with canards. An analysis of Prandtl's biplane equation, along with Monk's stagger theorem (1921), shows that a minimum induced drag occurs when the total loading is elliptical over the wing span, with lift transferred toward the outboard section of the wings. The section lift of the wing is represented as a Fourier series and a resulting lift distribution defines a minimum induced drag. Prandtl's interference factor is calculated and a nonelliptic interference factor is defined and is used to demonstrate that a substantial reduction in induced drag is possible in comparison with the elliptically loaded case. M.S.K.

A82-41117 # **Estimation of the number of in-flight aircraft on instrument flight rules.** N. Myerhoff and J. Garlitz (U.S. Department of Transportation, Office of Air and Marine Systems, Cambridge, MA). *Journal of Aircraft*, vol. 19, Sept. 1982, p. 794-796. FAA-supported research.

Mathematical models for estimating the instantaneous aircount (IAC) of aircraft on instrument flight rules flying over the U.S. at any moment are described. The data is gathered from the Official Airline Guide for scheduled great circle paths and projections are made for the location of aircraft at any time of day. The estimates are made independent of radar target reports and cover the regions monitored by each of the 20 air route traffic control centers on the continent. Noting that arrivals and departures are approximately equal from individual centers' jurisdiction at any moment, probabilities are generated for the presence of an aircraft in any given time interval, and a standard profile is employed in regions where a specific flight profile is unknown. Accuracy has been shown to be within 10% during peak hours. M.S.K.

A82-41140 **Recommended practice for a demonstration of Nondestructive Evaluation /NDE/ reliability on aircraft production parts - Introduction to the guidelines.** W. D. Rummel (Martin Marietta Aerospace, Denver, CO). *Materials Evaluation*, vol. 40, Aug. 1982, p. 922-932.

Guidelines for a demonstration of Nondestructive Evaluation (NDE) reliability on aircraft production parts have been compiled in order to promulgate recommended practices for the development of repeatable data in fracture mechanics applications. Such practices are designed to demonstrate the capabilities of various NDE methods for the detection of flaws in specific materials or parts under routine production inspection conditions. The intent of the guidelines is to define the limiting flaw size which can be detected within a given probability of detection and with a given percent of confidence in that probability. The outline presented encompasses operational requirements, the acquisition and reduction of data, and requalification procedures. O.C.

A82-41141 **Evaluation of heat damage to aluminum aircraft structures.** D. J. Hagemaier (Douglas Aircraft Co., Long Beach, CA). *Materials Evaluation*, vol. 40, Aug. 1982, p. 962-969. 15 refs.

Examinations of heated surface discoloration or distortion, eddy current conductivity comparison tests and hardness tests are used to evaluate the degree of heat damage incurred by aluminum alloy aircraft structures. Data from articles and reports on the exposure of 7075-T6 and 2024-T3/T4 aluminum alloy sheet materials to elevated temperatures for extended periods of time are considered, and portable hardness and eddy current test equipment for damage assessment are described with attention to significant variables affecting conductivity readings. The data presented suffice for the substantiation of a direct relationship between conductivity, hardness and strength which will allow the evaluation of heat or fire damage in heat-treatable aluminum alloys. O.C.

A82-41447 # Visual scene simulation concerning the landing of sporting aircraft in connection with investigations regarding the control and learning behavior of the pilot (Sichtsimulation der Landung von Sportflugzeugen im Hinblick auf Untersuchungen zum Regler- und Lernverhalten des Piloten). W. Heumann. Darmstadt, Technische Hochschule, Fachbereich Regelungs- und Datentechnik, Dr.-Ing. Dissertation, 1980. 263 p. 60 refs. In German. Research supported by the Deutsche Forschungsgemeinschaft.

The present investigation is concerned with the behavior of man as controller in a technical system. The object of the studies, which were conducted with the aid of a simulator providing a visual scene presentation, is the control of the longitudinal motion of a sporting aircraft during the last phases of a landing under visual flight conditions. Attention is given to the behavior of flying students, taking into account differences in the behavior of students and experienced pilots. Changes in the behavior of the student in connection with advances related to the learning process are examined. The landing simulation system employed provides a presentation of the visual environment of the pilot during the landing procedure, and, in addition, also a lateral view of the landing aircraft. This approach has certain advantages for the student from a didactic point of view. The analysis of the flight path with the aid of the simulator makes it possible to develop a basic model which is typical for a landing performed by an experienced pilot. G.R.

A82-41453 # Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control (Untersuchungen zur Verlagerung der Pilotentätigkeit auf eine höhere hierarchische Stufe der Flugführung). P. Sundermeyer. Braunschweig, Technische Universität, Fakultät für Maschinenbau und Elektrotechnik, Dr.-Ing. Dissertation, 1980. 120 p. 26 refs. In German.

Advantages and drawbacks of the automation of flight control systems are discussed, taking into account various hierarchical planes. The result of this system analysis is the concept of an aircraft guidance computer for the onboard four-dimensional flight path calculation and generation. The developed computer system becomes a component of an integrated flight guidance system. The computer makes it possible to conduct studies by which the activities to be performed by the pilot are raised to a higher level, involving the solution of coordination problems. The computer calculates possible alternatives regarding the flight path for the aircraft. The pilot makes the final decision on the basis of the information provided by the computer. In addition to performing a calculation of the flight path, the computer provides a representation of the flight path on a map display, time control information, and flight guidance activities (four-dimensional) with respect to different stages of automatization. G.R.

A82-41575 † High-sensitivity holographic plates PL-3M (Vysokochuvstitel'nye golograficheskie plastinki PL-3M). L. Ia. Kaplun, E. F. Klimzo, and E. N. Sergeeva (Vsesoiuznyi Gosudarstvennyi Nauchno-Issledovatel'skii i Proektnyi Institut Khimiko-Fotograficheskoi Promyshlennosti, Moscow, USSR). *Zhurnal Nauchnoi i Prikladnoi Fotografii i Kinematografii*, vol. 27, July-Aug. 1982, p. 293-295. 8 refs. In Russian.

High-sensitivity holographic plates have been obtained by using spectrally sensitized ultrafine-grained emulsion with pAg = 6.8. The plates, designated PL-3M, have a light sensitivity of 100 erg/sq cm and a diffraction efficiency of 4.3%. The high-sensitivity holographic plates are currently used in research concerned with holographic interferometry of aircraft structures, development of holographic memory devices, stress and strain analysis of structures and materials, lens testing, and optical recording of analog information. V.L.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

STAR ENTRIES

N82-28243*# Lockheed-California Co., Burbank.
ELECTRONIC/ELECTRIC TECHNOLOGY BENEFITS STUDY Report, Aug. 1980 - Jan. 1982
W. W. Howison and M. J. Cronin May 1982 226 p
(Contract NAS1-16199)
(NASA-CR-165890; NAS 1.26:165890; LR-30079) Avail: NTIS HC A11/MF A01 CSCL 01B

The benefits and payoffs of advanced electronic/electric technologies were investigated for three types of aircraft. The technologies, evaluated in each of the three airplanes, included advanced flight controls, advanced secondary power, advanced avionic complements, new cockpit displays, and advanced air traffic control techniques. For the advanced flight controls, the near term considered relaxed static stability (RSS) with mechanical backup. The far term considered an advanced fly by wire system for a longitudinally unstable airplane. In the case of the secondary power systems, trades were made in two steps: in the near term, engine bleed was eliminated; in the far term bleed air, air plus hydraulics were eliminated. Using three commercial aircraft, in the 150, 350, and 700 passenger range, the technology value and pay-offs were quantified, with emphasis on the fiscal benefits. Weight reductions deriving from fuel saving and other system improvements were identified and the weight savings were cycled for their impact on TOGW (takeoff gross weight) and upon the performance of the airframes/engines. Maintenance, reliability, and logistic support were the other criteria. Author

N82-28244# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
GENERAL AVIATION ACTIVITY AND AVIONICS SURVEY Annual Report
Judith C. Schwenk Dec. 1981 205 p refs
(AD-A112924; FAA-MS-81-5) Avail: NTIS HC A10/MF A01 CSCL 01/2

This report presents the results and a description of the 1980 General Aviation Activity and Avionics Survey. The survey was conducted during 1981 by the FAA to obtain information on the activity and avionics of the United States registered general aviation aircraft fleet, the dominant component of civil aviation in the U.S. The survey was based on statistically selected sample of about 14.0 percent of the general aviation fleet and obtained a response rate of 65 percent. Survey results are based upon responses but are expanded upward to represent the total population. Survey results revealed that during 1980 an estimated 41.0 million hours of flying time were logged by the 211,045 active general aviation aircraft in the U.S. fleet, yielding a mean annual flight time per aircraft of 190.5 hours. The active aircraft represented about 83 percent of the registered general aviation fleet. The report contains breakdowns of these and other statistics by manufacturer/model group, aircraft type, state and region of based aircraft, and primary use. Also included are fuel consumption, lifetime airframe hours, avionics, and engine hours estimates. Author (GRA)

N82-28245# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INTERNATIONAL AVIATION (SELECTED ARTICLES)
12 Apr. 1982 23 p Transl. into ENGLISH from Guoji Hangkong (Communist China), no. 224, Oct. 1981 p 2-9, 49
(AD-A114422; FTD-ID(RS)T-0027-82) Avail: NTIS HC A02/MF A01 CSCL 21/5

Chinese made goods were exhibited, including aeronautical forgings, castings, forging dies, casting molds, powder metallurgical products, and titanium alloys and products. These goods symbolize China's production capability and technical level of aeronautical forgings and castings, with excellent qualities of these products. S.L.

N82-28249*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SUMMARY OF V/STOL INLET ANALYSIS METHODS
Danny P. Hwang and John M. Abbott 1982 17 p refs To be presented at the 13th Congr. of the Intern. Council of the Aeronautical Sci. and Aircraft Systems and Technol. Conf., Seattle, 22-27 Aug. 1982; sponsored by the American Inst. of Aeronautics and Astronautics Previously announced in IAA as A82-16902
(NASA-TM-82885; E-1263; NAS 1.15:82885) Avail: NTIS HC A02/MF A01 CSCL 01A

For abstract see A82-16902

N82-28252*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AERODYNAMIC INTERACTIONS BETWEEN A 1/6 SCALE HELICOPTER ROTOR AND A BODY OF REVOLUTION
Mark D. Betzina and Patrick Shinoda Jun. 1982 15 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif.
(NASA-TM-84247; A-8940; NAS 1.15:84247) Avail: NTIS HC A02/MF A01 CSCL 01A

A wind-tunnel investigation was conducted in which independent, steady state aerodynamic forces and moments were measured on a 2.24-m-diam, two bladed helicopter rotor and a body of revolution. The objective was to determine the interaction of the body on the rotor performance and the effect of the rotor on the body aerodynamics for variations in velocity, thrust, tip-path-plane angle of attack, body angle of attack, rotor/body position, and body nose geometry. Results show that a body of revolution near the rotor can produce significant favorable or unfavorable effects on rotor performance, depending on the operating condition. Body longitudinal aerodynamic characteristics are significantly modified by the presence of an operating rotor and hub. Author

N82-28260# Systems Research Labs., Inc., Dayton, Ohio.
WIND-TUNNEL EVALUATION OF AN AEROELASTICALLY CONFORMABLE ROTOR Final Report
Lawrence R. Sutton, Richard P. White, Jr., and Robert L. Marker Mar. 1982 87 p refs
(DA Proj. 1L2-62209-AH-76)
(AD-A114384; USAAVRADCOM-TR-81-D-43) Avail: NTIS HC A05/MF A01 CSCL 01/3

This report summarizes the theoretical and experimental investigations that were conducted to evaluate the potential of aeroelastic and mass-elastic couplings in an aerolastic conformable rotor (ACR) that will improve the performance and vibratory characteristics of helicopter rotor systems without creating instabilities. ACR parameters were identified and a baseline rotor system was selected. An ACR blade concept was investigated by altering the characteristics of the baseline and using automated analysis techniques. GRA

N82-28261# Army Aviation Research and Development Command, St. Louis, Mo. Applied Technology Lab.
NATIONAL TRANSONIC FACILITY (NTF) PROTOTYPE FAN BLADE FATIGUE TEST Progress Report, Jan. - Mar. 1981
E. H. Dean, A. J. Gustafson, and D. M. Saylor Mar. 1982 18 p
(DA Proj. 1L1-62209-AH-76)
(AD-A114405; USAAVRADCOM-TR-82-D-5) Avail. NTIS HC A02/MF A01 CSCL 14/2

The Applied Technology Laboratory conducted fatigue tests on a composite fan blade designed for use in the new NTF wind tunnel being constructed at NASA-Langley. The tests were performed by the Structures Technical Area using the root end fatigue machine (REFM), which was modified for ground-air-ground testing. Simulated centrifugal and aerodynamic (bending) load tests were performed. The fan blade successfully withstood 6000 cycles at 360 rpm and 600 rpm load conditions for the cyclic rate tests. These tests simulated the starting and stopping cycles of the fan. Static load tests to 57,000 pounds design load were also successfully performed on the blade specimen. Author (GRA)

N82-28262# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
EVALUATION OF AN EXPERIMENTAL TECHNIQUE TO INVESTIGATE THE EFFECTS OF THE ENGINE POSITION ON ENGINE/PYLON/WING INTERFERENCE
J. A. J. vanEngelen, B. Munniksma, and A. Elsenaar 28 Apr. 1981 16 p refs Presented at AGARD Symp. on Aerodyn. of Power Plant Installation, Toulouse, 11-14 May 1981
(NLR-MP-81020-U) Avail: NTIS HC A02/MF A01

Free flow and blown nacelle wind tunnel testing of engine airframe integration are compared, and the magnitude of the parasitic interference of an additional strut and engine inlet fairing is examined. A semispan model, typical of a transport aircraft with a supercritical wing was tested. A 3/4 fan cowl high bypass engine was located at six positions underneath the wing. Measurements included pressure and balance force. It is shown that while accurate simulation of engine nozzle geometry is of prime importance, tests on free flow nacelles are useful for selecting engine position. Interference forces derived from pressure integration are only useful for determining trends in interference effects for flexible initial tests. Author (ESA)

N82-28263# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

A FINITE DIFFERENCE METHOD FOR THE CALCULATION OF TRANSONIC FLOW ABOUT A WING, BASED ON SMALL PERTURBATION THEORY

J. vanderVooren, G. H. Huizing, and A. vanEssen 5 Mar. 1981 103 p refs
(Contract NIVR-1739)
(NLR-TR-81031-U) Avail: NTIS HC A06/MF A01

A calculation method for the transonic flow about a semiwing based on transonic small perturbation theory, is presented. The influence of a body can be simulated by prescribing appropriate transverse velocities in a vertical plane through the wing root. The wing should be thin and have little dihedral, camber, and twist and a not too blunt leading edge. The body should be slender. The angle of incidence must be small. However, highly swept wings are allowed. A fully finite difference scheme is implemented for a correct shock capture. Line relaxation is used to solve the corresponding nonlinear equations. It is indicated that too much artificial viscosity leads to an unrepresentative calculation, and too little can lead to instabilities. Author (ESA)

N82-28264# General Accounting Office, Washington, D. C. Accounting and Financial Management Div.

COMPUTER OUTAGES AT AIR TERMINAL FACILITIES AND THEIR CORRELATION TO NEAR MISS MID-AIR COLLISIONS (AFMD-82-43)

16 Feb. 1982 17 p refs
(B-206064) HC A02/MF A01

The frequency of computer failures at terminal facilities and the extent of correlation between these failures and near mid-at collisions were investigated in a survey of nine terminal facilities. No direct correlation between the computer outages and reported mid-air collisions or the safety related incidents was found. R.J.F.

N82-28265# Aeronautical Research Labs., Melbourne (Australia).

A STUDY OF WIND SHEAR EFFECTS ON AIRCRAFT OPERATIONS AND SAFETY IN AUSTRALIA

K. W. Anderson and B. A. J. Clark Mar. 1981 84 p refs
(ARL-Sys-Rept-24; AR-002-271) Avail: NTIS HC A05/MF A01

The ergonomics aspects of aircraft operation in conditions of local variations of wind were studied. Questionnaires were analyzed for subject understanding, detection of wind difficulties, frequency of wind shear and downdraft situations, pilot techniques, and forewarning methods. Pilots often found terrain-induced downdrafts and thunderstorm wind shears troublesome. Operations in irregular terrain away from major aerodromes were frequently cited for wind shear hazards. Pilot judgements on the most susceptible aircraft types were not readily explicable in terms of size, landing speed or wing loading. Pilots and ATCs indicated that currently used cues in wind shear conditions include visual estimates of glideslope departures, precision approach radar observations and aircraft-based measurements, of wind or ground speed. Ground-based remote sensing equipment for detecting stable wind shear is considered. A synopsis of wind-involved airliner crashes and a summary of meteorological conditions for the occurrence of local wind variations are included. Author

N82-28266*# Villanova Univ., Pa.

GUST RESPONSE OF COMMERCIAL JET AIRCRAFT INCLUDING EFFECTS OF AUTOPILOT OPERATION Final Report

Joseph H. Goldberg Jun. 1982 125 p refs
(Contract NAS1-16095)
(NASA-CR-165919) Avail: NTIS HC A06/MF A01 CSCL 01C

A simplified theory of aircraft vertical acceleration gust response based on a model including pitch, vertical displacement and control motions due to autopilot operation is presented. High-order autopilot transfer functions are utilized for improved accuracy in the determination of the overall response characteristics. Four representative commercial jet aircraft were studied over a wide range of operating conditions and comparisons of individual responses are given. It is shown that autopilot operation relative to the controls fixed case causes response attenuation of from 10 percent to approximately 25 percent depending on flight condition and increases in crossing number up to 30 percent, with variations between aircraft of from 5 percent to 10 percent, in general, reflecting the differences in autopilot design. A detailed computer program description and listing of the calculation procedure suitable for the general application of the theory to any airplane autopilot combination is also included. Author

N82-28267# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Biomechanical Protection Branch.

COMPARATIVE VERTICAL IMPACT TESTING OF THE F/FB-111 CREW RESTRAINT SYSTEM AND A PROPOSED MODIFICATION

Bernard F. Hearon, James W. Brinkley, James H. Raddin, Jr., Lawrence A. McGowan, and Joseph M. Powers Mar. 1982 312 p refs
(AF Proj. 7231)
(AD-A113957; AFAMRL-TR-82-13) Avail: NTIS HC A13/MF A01 CSCL 01/3

An impact test program was conducted to evaluate the operational F/FB-111 crew seat and restraint system and a proposed modification. A primary objective of the program was to compare human response to vertical impacts in the two restraint harnessess. A total of 67 human impact tests were performed on the Vertical Deceleration Tower up to 10 G peak, 26 ft/sec. Subjects were exposed to comparable impacts at different seat elevations in both harnesses to allow parametric analysis of the test results. Measured data included seat acceleration and velocity, head and chest translational acceleration components, triaxial forces acting on the seat and footrest, forces acting at the restraint harness, attachment, and deplacements of various body segments. The resultant head and chest accelerations were significantly greater in the modified harness than in the operational harness, regardless of seat elevation. On the basis of this comparison, the proposed modification to the F/FB-111 crew seat and restraint is not recommended for implementation. Future restraint harness modification proposals should be based on careful evaluation of all unconventional design features of the operational harness and should address all mechanisms by which adverse loads may be imposed on the seat occupant. In addition, future redesign efforts of the F/FB-111 escape system should provide improved landing impact attenuation. GRA

N82-28268# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.

SMOKE ABATEMENT SYSTEM FOR CRASH RESCUE/FIRE TRAINING FACILITIES Final Report, Sep. 1979 - Sep. 1981

Anthony J. Kwan and John A. Homre Sep. 1981 33 p
(AF Proj. 2505)
(AD-A114380; AFESC/ESL-TR-81-43) Avail: NTIS HC A03/MF A01 CSCL 13/2

This report provides the design for a smoke-abated aircraft crash/rescue trainer. The design is for a 75-ft diameter fire area suitable for operation in freezing and nonfreezing climates. With this system liquid petroleum fuels can be burned with little or no smoke by injecting a fine water spray near the surface of the burning fuel. This method of smoke abatement is being applied at military fire fighting training facilities. The report includes all equipment necessary for the smoke abatement function and provides detailed step-by-step operating procedures. Author (GRA)

N82-28269*# Analytical Mechanics Associates, Inc., Hampton, Va.

TERMINAL AREA AUTOMATIC NAVIGATION, GUIDANCE, AND CONTROL RESEARCH USING THE MICROWAVE LANDING SYSTEM (MLS). PART 4: TRANSITION PATH RECONSTRUCTION ALONG A STRAIGHT LINE PATH CONTAINING A GLIDESLOPE CHANGE WAYPOINT Final Report

Samuel Pines Washington NASA Jun. 1982 40 p refs
(Contract NAS1-15116)

(NASA-CR-3574-Pt-4; NAS 1.26:3574; AMA-81-37) Avail: NTIS HC A03/MF A01 CSCL 17G

The necessary algorithms to reconstruct the glideslope change waypoint along a straight line in the event the aircraft encounters a valid MLS update and transition in the terminal approach area are presented. Results of a simulation of the Langley B737 aircraft utilizing these algorithms are presented. The method is shown to reconstruct the necessary flight path during MLS transition resulting in zero cross track error, zero track angle error, and zero altitude error, thus requiring minimal aircraft response. T.M.

N82-28270# Radio Technical Commission for Aeronautics, Washington, D. C.

MINIMUM OPERATIONAL PERFORMANCE STANDARDS FOR AUTOMATIC DIRECTION FINDING (ADF) EQUIPMENT

13 May 1982 53 p Supersedes RTCA/DO-137
(RTCA/DO-179; RTCA/DO-137) Avail: NTIS HC A04/MF A01

Minimum operational performance standards are set forth for automatic direction finding equipment. Incorporated in these standards are system characteristics that will benefit users of the system as well as designers, manufacturers, and installers. Compliance with these standards is recommended as a means of assuring that the equipment will satisfactorily perform its intended function under all conditions normally encountered. L.F.M.

N82-28274# Arinc Research Corp., Annapolis, Md.

COST ANALYSIS OF THE DISCRETE ADDRESS BEACON SYSTEM FOR THE LOW-PERFORMANCE GENERAL AVIATION AIRCRAFT COMMUNITY Final Report

S. Kowalski, K. Peter, A. Schust, D. Swann, and P. Young Sep. 1981 364 p
(Contract DOT-FA76WA-3788)
(AD-A112957; Rept-1326-01-15-2529; FAA-RD-81-61) Avail: NTIS HC A16/MF A01 CSCL 17/7

This report presents the results of cost analysis of various Discrete Address Beacon System (DABS) configurations that may be implemented for the low-performance general aviation aircraft community. The DABS designs considered in this analysis were developed by ARINC Research Corporation using state-of-the-art technology. GRA

N82-28276# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

IMPROVED 243 MHz HOMING ANTENNA SYSTEM FOR USE ON HELICOPTERS

F. Klinker 23 Apr. 1981 24 p refs Presented at Intern. IEEE/AP-s Symp., Los Angeles, 16-19 Jun. 1981
(NLR-MP-81022-U) Avail: NTIS HC A02/MF A01

The principles of azimuthal homing systems used in SAR search and rescue helicopters are outlined. In current SAR systems the homing signal is represented by the intersection of the radiation from two vertical dipoles. Intersections at 0 and 180 deg with respect to a center line are desired, but those at 120, 140, and 200 deg must be eliminated. Pattern distortion, which results in spurious intersections, is caused by mutual coupling between antennas, electromagnetic interaction coupling through the beam forming network, and attenuation and reflection of the received signal by the helicopter fuselage. The design uses reflectors on the antennas to reduce fuselage influence, and increases separation between radiation patterns to prevent intersections arising from mutual coupling. No homing ambiguities are reported in flight tests of a helicopter using the redesigned system. Author (ESA)

N82-28277# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.

SPECIAL INVESTIGATION REPORT: AIR TRAFFIC CONTROL SYSTEM

8 Dec. 1981 60 p
(PB82-136276; NTSB-SIR-81-7) Avail: NTIS HC A04/MF A01 CSCL 05A

The air traffic control system was investigated following a strike of the air traffic controllers which resulted in the walkout of about 11,400 of the 17,275 controller workforce. The investigation included an analysis of ATC data, the ability of the FAA to meet staffing requirements, the qualifications of the controller workforce, training for new controllers, the effect of stress and fatigue, facility supervision and management, the control of the capacity of the system, and computer and equipment reliability. No basic ATC procedures were changed or compromised in order to keep the ATC system in operation, and the high level of ATC safety required is possible within the present system. GRA

N82-28278*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FLIGHT EVALUATION OF LORAN-C IN THE STATE OF VERMONT Final Report, Jul. 1979 - May 1981

F. D. Mackenzie (Transportation Systems Center, Cambridge, Mass.) and C. D. Lytle Sep. 1981 162 p refs
(NASA-TM-84711; NAS 1.15:84711; PB82-138603; DOT-TSC-RSPA-81-10) Avail: NTIS HC A08/MF A01 CSCL 17G

A flight evaluation of LORAN C as a supplement to existing navigation aids for general aviation aircraft, particularly in mountainous regions of the United States and where VOR coverage is limited was conducted. Flights, initiated in the summer months, extend through four seasons and practically all weather conditions typical of northeastern U.S. operations. Assessment of all the data available indicates that LORAN C signals are suitable as a means of navigation during enroute, terminal and nonprecision approach operations and the performance exceeds the minimum accuracy criteria. GRA

N82-28279* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MEANS FOR CONTROLLING AERODYNAMICALLY INDUCED TWIST Patent

Wolf Elber, inventor (to NASA) Issued 18 May 1982 4 p Filed 28 Sep. 1979 Supersedes N80-16055 (18 - 07, p 0821)
(NASA-Case-LAR-12175-1; US-Patent-4,330,100; US-Patent-Appl-SN-079913; US-Patent-Class-244-48) Avail: US Patent and Trademark Office CSCL 01C

A control mechanism which provides active compensation for aerodynamically induced twist deformation of high aspect ratio wings consists of a torque tube, internal to each wing and rigidly attached near the tip of each wing, which is moved by an actuator located in the aircraft fuselage. As changes in the aerodynamic loads on the wings occur the torque tube is rotated to compensate for the induced wing twist.

Official Gazette of the U.S. Patent and Trademark Office

N82-28280*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DESIGN CONSIDERATIONS AND EXPERIENCES IN THE USE OF COMPOSITE MATERIAL FOR AN AEROELASTIC RESEARCH WING

Clinton V. Eckstrom and Charles V. Spain (Kentron International, Inc., Hampton, Va.) May 1982 11 p refs Presented at 23rd AIAA/ASME/ASCH/AHS Structures, Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982
(NASA-TM-83291; NAS 1.15:83291; AIAA-82-0678) Avail: NTIS HC A02/MF A01 CSCL 01C

Experiences in using composite skin material on an aeroelastic research wing used in flight flutter testing are described. Significant variations in skin shear modulus due to stress and temperature were encountered with the original fiberglass laminate skin designed to minimize wing torsional stiffness. These variations along with the sensitivity of wing torsional stiffness to the skin-to-frame attachment method complicated the structural model vibration mode predictions. A wing skin redesign with different fiber orientation and a reduction in the amount of skin-to-frame bonding resulted in more predictable model characteristics without sacrificing design objectives. Design and modeling considerations for future applications are discussed. Author

N82-28282*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

HELICOPTER VIBRATION SUPPRESSION USING SIMPLE PENDULUM ABSORBERS ON THE ROTOR BLADE Final Report

G. Alvin Pierce and M.-Nabil H. Hanouva [1982] 140 p refs
(Grant NsG-1592)
(NASA-CR-169131; NAS 1.26:169131) Avail: NTIS HC A07/MF A01 CSCL 01C

A comprehensive analytical design procedure for the installation of simple pendulums on the blades of a helicopter rotor to suppress the root reactions is presented. A frequency response analysis is conducted of typical rotor blades excited by a harmonic variation of spanwise airload distributions as well as a concentrated load at the tip. The results presented included the effect of pendulum tuning on the minimization of the hub reactions. It is found that a properly designed flapping pendulum attenuates the root out-of-plane force and moment whereas the optimum designed lead-lag pendulum attenuates the root in-plane reactions. For optimum pendulum tuning the parameters to be determined are the pendulum uncoupled natural frequency, the pendulum spanwise location and its mass. It is found that the optimum pendulum frequency is in the vicinity of the excitation frequency. For the optimum pendulum a parametric study is conducted. The parameters varied include prepitch, pretwist, precone and pendulum hinge offset. Author

N82-28283# Rockwell International Corp., Cedar Rapids, Iowa.
DELTA ELECTRICAL LOAD ANALYSIS C-141B JACC/CP AIRCRAFT
G. R. Taylor 10 Mar. 1982 9 p
(Contracts F09603-80-C-0602; F09603-81-C-1953)
(AD-A113761) Avail: NTIS HC A02/MF A01 CSCL 01/3

The installation of the provisions to accept the JACC/CP Capsule in the C-141B Aircraft causes a change to the electrical loads within the present aircraft power distribution system. The purpose of this report is to furnish a tabulation of the changes to the aircraft power system caused by this installation. GRA

N82-28284# Boeing Military Airplane Development, Seattle, Wash.
ADVANCED AIRCRAFT ELECTRICAL SYSTEM CONTROL TECHNOLOGY DEMONSTRATOR. PHASE 1: ANALYSIS AND PRELIMINARY DESIGN Interim Report, 1 Mar. - 30 Sep. 1981
T. R. Boldt, G. L. Dunn, D. E. Hankins, P. J. Lecng, and I. S. Mehdi Wright-Patterson AFB, Ohio AFWAL Jan. 1982 134 p refs
(Contract F33615-80-C-2004; AF Proj. 3145)
(AD-A113633; D180-25927-3; AFWAL-TR-81-2128) Avail: NTIS HC A07/MF A01 CSCL 10/2

This report summarizes Task 1-Requirements Analysis and Task 2-Conceptual Design and documents the results of Task 3, Phase I, of this two-phase program. Task 3 is the preliminary design of an advanced aircraft electrical system (AAES). The AAES is designed to meet the requirements of a 1990 time frame two-engine tactical aircraft with multi-mission capability. The AAES performs the functions of power generation, distribution and control of power to loads, system protection, and load management. Key characteristics of the AAES are: Integrated avionics and power data bus configuration consisting of Digital Avionics Information System (DAIS) standard elements (MIL-STD-1750 processor, MIL-STD-1553B data bus, controls and displays, and remote terminals (RT)). Intelligent Electrical Load Management Centers (ELMC) capable of controlling power to loads; Built-in-test (BIT) capability to isolate faults to the module level. BIT includes both circuit and data monitoring checks. Solid State Power Controllers (SSPC) to replace circuit breakers and power control switches. SSPCs are turned on/off via computer control. Generator control, protection and status monitoring by a Generator Control Unit (GCU) compatible with DAIS hardware and software. Multimission data information system through programmable system processors, ELMCs and standard DAIS elements. Automatic load management for increased aircraft survivability and probability of mission completion. GRA

N82-28285# National Research Council of Canada, Ottawa (Ontario). Flight Research Lab.
EVALUATIONS OF HELICOPTER INSTRUMENT-FLIGHT HANDLING QUALITIES
S. R. M. Sinclair and S. Kereliuk Jan. 1982 49 p refs In ENGLISH; FRENCH summary
(AD-A114004; NRCC-LR-608) Avail: NTIS HC A03/MF A01 CSCL 01/2

The NAE Airborne Simulator, a modified and suitably equipped Bell 205A helicopter, was used in experiments to provide background information on the handling qualities requirements for helicopter instrument flight. This investigation was in support of a regulatory review undertaken by the U.S. Federal Aviation Administration as part of an overall assessment of the helicopter certification process. The results illustrate the inter-dependence of the various stability and control characteristics which contribute to safe instrument flight handling qualities, and underline the importance of good mission simulation in conducting certification-related experiments. Author (GRA)

N82-28286# McDonnell Aircraft Co., St. Louis, Mo.
ADVANCED TRENDING ANALYSIS/EDS DATA PROGRAM Final Report, May 1979 - Sep. 1981
David C. Perryman Wright-Patterson AFB, Ohio AFWAL Jan. 1982 181 p refs
(Contract F33615-78-C-2070; AF Proj. 3066)
(AD-A113511; AFWAL-TR-81-2125) Avail: NTIS HC A09/MF A01 CSCL 09/2

Ground, flight, and maintenance data was collected during the F-15/F100 Engine Diagnostic System (EDS) Flight Evaluation and provided to the Air Force Aero-Propulsion Laboratory (AFWAL/POTC). This data was used by the Air Force, in a concurrent program, to verify a gas turbine engine fault detection/isolation and health trending algorithm employing gas path analysis. In addition, the EDS Flight Evaluation served as a demonstration vehicle for a prototype Maintenance Information Management System (MIMS). Independent assessments of the gas path analysis algorithm and of the prototype MIMS were performed and the results are presented. Several lessons learned about the automatic recording of in-flight trending data for high performance gas turbine engines in modern tactical aircraft are also presented. Author (GRA)

N82-28287# Ballistic Research Labs., Aberdeen Proving Ground, Md.
KINEMATIC INVESTIGATION HUGHES HELICOPTER 7.62mm CHAIN GUN
R. P. Kaste Feb. 1982 48 p refs
(DA Proj. 1L1-62617-AH-19)
(AD-A113114; AD-F300017; ARBRL-MR-03157) Avail: NTIS HC A03/MF A01 CSCL 19/6

A kinematic study of the Hughes Helicopter 7.62mm Chain Gun was performed to determine the power required to operate the weapon and loads on the stud roller due to the various components of the weapon. Using a 24-volt battery system the gun drew up to 60 amperes to start and operated on 22 amperes. The stud roller carries a load up to 497 Newtons. GRA

N82-28288# General Dynamics/Fort Worth, Tex.
RESEARCH MODEL WING/TAIL FABRICATION Technical Report, 17 Aug. 1981 - 18 Jan. 1982
Ronald A. Cox Mar. 1982 9 p
(Contract N00014-81-C-0680)
(AD-A114101; FZA-535) Avail: NTIS HC A02/MF A01 CSCL 14/2

The design and construction of a transonic wind-tunnel model has been completed. The 1/7.5-scale model can be equipped with an all-flying low-, mid-, or T-tail. A baseline, linear element wing and an alternate wing of identical planform, but with chordwise airfoil sections optimized for transonic cruise, have been manufactured. One row of pressures is located on each wing and on the horizontal tail. Author (GRA)

N82-28289# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate for Development and Qualification.
HISS CALIBRATION, ICE PHOBICS AND FAA R/D EVALUATIONS Final Report, Jan. - Mar. 1981
John C. Henderson, Ralph Woratschek, and Loran A. Haworth Aug. 1981 62 p refs
(AD-A114435; USAAEFA-80-13) Avail: NTIS HC A04/MF A01 CSCL 01/3

Artificial and natural icing tests of a JUH-1H helicopter were flown in the vicinity of St. Paul, Minnesota, during the three month period of January through March 1981. Productive flight time totaled 15.4 hours in the artificial icing environment behind the Helicopter Icing Spray System (HISS) and 3.2 hours in natural icing. Test conditions ranged from -5 C to -20 C and 0.25 to 1.0 gram per cubic meter liquid water content (LWC) for the artificial testing and -6 C to -9 C and 0.1 to 0.5 gram per cubic meter LWC for the natural testing. Tests in the artificial icing environment behind the HISS were flown to define the nature of the HISS cloud in terms of LWC, cloud particle size and distribution; and to quantitatively determine the effects of an ice phobic coating on the capability of the UH-1H to fly in

icing conditions. The ice phobic coating did not significantly affect the capability of the UH-1H to fly in icing conditions.
GRA

N82-28290# Army Aviation Research and Development Command, St. Louis, Mo.
HISTORICAL RESEARCH AND DEVELOPMENT INFLATION INDICES FOR ARMY FIXED AND ROTOR WINGED AIRCRAFT Annual Report
Charles W. Lines, Jr. and William J. Waymire Jan. 1982 37 p refs
(AD-A114368; USAAVRADCOM-TR-82-F-3) Avail: NTIS HC A03/MF A01 CSCL 05/1

This Technical Memorandum is a continuation of previous efforts to develop the necessary rationale and methodology needed in order to construct historical inflation indices, in the Research and Development (R&D) area, relative to Army aircraft. The R&D historical indices, and the sub-indices from which they are derived, are presented in the appendices to this report for the period FY68 through FY81. These indices are appropriate for updating statistical reports that formerly utilized the OSD forecasting indices; for initial use in bringing a cost in prior years to a present-year dollar value; and for evaluating inflation actually experienced. A computer program is utilized to make the necessary mathematical calculations. Data sources for this report were the Office of Personnel Management (OPM) and the Bureau of Labor Statistics (BLS). OPM supplied data on government salaries. BLS furnished data on industry salaries and thirteen different materials. The computer program prints the R&D historical inflation indices and subindices by fiscal year as shown in Appendices C through G of this report. GRA

N82-28291# INCOSYM, Inc., Westlake Village, Calif.
LOW COST DEVELOPMENT OF INS SENSORS FOR EXPENDABLE RPV CONTROL AND NAVIGATION Final Report, Apr. 1979 - May 1981
D. G. Kim and James G. Russell Wright-Patterson AFB, Ohio AFWAL Aug. 1981 71 p
(Contract F33615-79-C-3616)
(AD-A112691; AFWAL-TR-81-3086) Avail: NTIS HC A04/MF A01 CSCL 01/3

A two year development effort has resulted in the design, fabrication and test of a feasibility model 3-axis vibrating beam accelerometer and a brassboard cycloidal magnetic vector sensor. The cycloidal magnetic vector sensor is based on a rotating coil technique which eliminates slip rings. It performed as expected, and demonstrated an accuracy of approximately 0.25 degrees. The 3-axis vibrating beam accelerometer is based on the principle that a vibrating beam will change its frequency as a function of the applied tension. Using six beams, two per sensing axis, connected to a common mass, a 3-axis accelerometer can be designed. Such a design measures acceleration, by a change in beam vibration frequency, as a function of applied acceleration to the mass. The accelerometer, at first, demonstrated an insensitivity due to frequency lock between the beams. This effect was eliminated, but the necessary change in design caused an unstable bias and non-linearity of the scale factor. A solution to these problems was also conceived, and hardware changes made. However, to fully demonstrate the concept requires a computer and software, which is outside the scope of this program.
Author (GRA)

N82-28292# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
DESIGN STUDY FOR A LOW-DISTORTION HOLOGRAPHIC HUD Final Technical Report, Jul. 1980 - Aug. 1981
W. S. Colburn and R. C. Fairchild Wright-Patterson AFB, Ohio AFWAL Jan. 1982 104 p refs
(Contract F33615-80-C-1077)
(AD-A113982; AFWAL-TR-81-1263; ERIM-150800-28-F) Avail: NTIS HC A06/MF A01 CSCL 14/5

A low distortion holographic HUD optical system was examined. Distortion correction was based on the use of a holographic combiner made with analytically defined construction wavefronts, wavefronts for which the phase at the hologram is described by mathematical expressions. Such wavefronts are designed subsequent to the hologram design, and offer great design flexibility as their realization is based in part on the use of computer generated holograms. A method for designing the construction wavefronts of a holographic optical element based on minimizing the mean squared wavefront error while satisfying the Bragg condition is described. A holographic HUD optical system was designed for the F-16 cockpit in which distortion was corrected optically through simultaneous optimization of combiner and relay lens parameters. Both construction wavefronts of the combiner were described in terms of Legendre polynomial series. The implementation of construction beams required to form the combiner construction wavefronts is discussed. Author (GRA)

N82-28293# Federal Aviation Administration, Atlantic City, N.J.
A COMPENDIUM OF LIGHTNING EFFECTS ON FUTURE AIRCRAFT ELECTRONIC SYSTEMS Final Report
Nickolus O. Rasch Feb. 1982 257 p refs Proc. of Conf. held at Hampton, Va., 4-6 Nov. 1981
(AD-A114117; DOT-FAA-CT-82-30) Avail: NTIS HC A12/MF A01 CSCL 01/3

This publication is a composite of presentations given at the NASA-Langley Research Center/FAA Technical Center 'Lightning Effects on Future Aircraft Systems Workshop' held on November 4-6, 1981, at the NASA-Langley Research Center Facility. The presentations encompassed the full spectrum of lightning research from lightning phenomonology, lightning modeling, electromagnetic issues associated with composite materials, to the lightning/aircraft electromagnetic interaction analysis. Also included are a total of five presentations assessing the Digital System upset phenomena. Author (GRA)

N82-28294# Grumman Aerospace Corp., Bethpage, N.Y.
HYDRAULIC UNIVERSAL DISPLAY PROCESSOR SYSTEM (HUDPS) Final Report, 1 Apr. - 1 Sep. 1981
John J. Duzich and Herman L. Dreksler Warminster, Pa. Naval Air Development Center 21 Nov. 1981 66 p refs
(Contract N62269-81-C-0243)
(AD-A114428; NADC-82053-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

This six month study effort explored methods of display fault indication to ground support personnel and optimize microprocession circuitry for universal aircraft application. Task I was established the maximum number of sensors required for a complex, comprehensive diagnostic system for the F14A as 150: Inputs could be either analog or digital. For comparison purposes, an A6E system was considered. Fault display methods were investigated with emphasis on smart alphanumeric devices in Task II. Volatile and non-volatile memory components were utilized along with the Intel 8748 microprocessor and associated EPROMS. The use of National Semiconductor ADC0816 data acquisition chips consisting of a 16 input multiplexer, an 8 bit A/D converter and an 8 bit tri-state buffered output facilitates the many inputs. Power consumption for a complete system was estimated as 5 watts while airborne. On the ground, 15 watts at 5 volts is required for display requirements. Display envelope would measure 8x7x6 and would contain approximately 6 circuit boards. In Task III a universal display processor system was formulated. A Block Diagram and several flow diagrams were generated. Multiplexer schematics were established for analog and discrete inputs. An electrical component parts list was generated for a typical system. Author (GRA)

N82-28295*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
STATIC NOISE TESTS ON MODIFIED AUGMENTOR WING JET STOL RESEARCH AIRCRAFT
G. R. Cook and B. F. Lilley (deHavilland Aircraft of Canada, Ltd., Downsview, Ontario) Feb. 1981 58 p refs
(NASA-TM-81231; NAS 1.15:81231) Avail: NTIS HC A04/MF A01 CSCL 21E

Noise measurements were made to determine if recent modifications made to the bifurcated jetpipe to increase engine thrust had at the same time reduced the noise level. The noise field was measured by a 6-microphone array positioned on a 30.5m (100 ft) sideline between 90 and 150 degrees from the left engine inlet. Noise levels were recorded at three flap angles over a range of engine thrust settings from flight idle to emergency power and plotted in one-third octave band spectra. Little attenuation was observed at maximum power, but significant attenuation was achieved at approach and cruise power levels.
T.M.

N82-28296*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
B747/JT9D FLIGHT LOADS AND THEIR EFFECT ON

ENGINE RUNNING CLEARANCES AND PERFORMANCE DETERIORATION; BCAC NAIL/P AND WA JT9D ENGINE DIAGNOSTICS PROGRAMS

W. J. Olsson and R. L. Martin 19 Feb. 1982 74 p refs
Prepared in cooperation with Boeing Commercial Airplane Co., Seattle
(Contracts NAS3-20632; NAS1-15325)
(NASA-CR-165573; NAS 1.26:165573; PWA-5512-88) Avail: NTIS HC A04/MF A01 CSCL 21E

Flight loads on the 747 propulsion system and resulting JT9D blade to outer airseal running clearances during representative acceptance flight and revenue flight sequences were measured. The resulting rub induced clearance changes, and engine performance changes were then analyzed to validate and refine the JT9D-7A short term performance deterioration model.
Author

N82-28297*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.

CF6 JET ENGINE PERFORMANCE IMPROVEMENT: HIGH PRESSURE TURBINE ACTIVE CLEARANCE CONTROL

S. E. Rich and W. A. Fasching Jun. 1982 136 p refs
(Contract NAS3-20629)
(NASA-CR-165556; NAS 1.26:165556; R82AEB198) Avail: NTIS HC A07/MF A01 CSCL 21E

An active clearance control system was developed which reduces fuel consumption and performance degradation. This system utilizes compressor discharge air during takeoff and fan discharge air during cruise to impinge on the shroud structure to improve the thermal response. The system was evaluated in component and engine tests. The test results demonstrated a performance improvement of 0.7 percent in cruise SFC. S.L.

N82-28298*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

ANALYTICAL AND SIMULATOR STUDY OF ADVANCED TRANSPORT Final Report

William H. Levison and William W. Rickard (Douglas Aircraft Co., Long Beach, Calif.) Washington NASA Jun. 1982 86 p refs
(Contract NAS1-16410)
(NASA-CR-3572; NAS 1.26:3572; Rept-4778) Avail: NTIS HC A05/MF A01 CSCL 01C

An analytic methodology, based on the optimal-control pilot model, was demonstrated for assessing longitudinal-axis handling qualities of transport aircraft in final approach. Calibration of the methodology is largely in terms of closed-loop performance requirements, rather than specific vehicle response characteristics, and is based on a combination of published criteria, pilot preferences, physical limitations, and engineering judgment. Six longitudinal-axis approach configurations were studied covering a range of handling qualities problems, including the presence of flexible aircraft modes. The analytical procedure was used to obtain predictions of Cooper-Harper ratings, a solar quadratic performance index, and rms excursions of important system variables. T.M.

N82-28299*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

METHODOLOGY FOR DETERMINING ELEVON DEFLECTIONS TO TRIM AND MANEUVER THE DAST VEHICLE WITH NEGATIVE STATIC MARGIN

Boyd Perry, III May 1982 50 p refs
(NASA-TM-84499; NAS 1.15:84499) Avail: NTIS HC A03/MF A01 CSCL 01C

The relationships between elevon deflection and static margin using elements from static and dynamic stability and control and from classical control theory are emphasized. Expressions are derived and presented for calculating elevon deflections required to trim the vehicle in lg straight-and-level flight and to perform specified longitudinal and lateral maneuvers. Applications of this methodology are made at several flight conditions for the ARW-2 wing. On the basis of these applications, it appears possible to trim and maneuver the vehicle with the existing elevons at -15% static margin. Author

N82-28301# Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.

LIMITING PERFORMANCE OF NONLINEAR SYSTEMS WITH APPLICATIONS TO HELICOPTER VIBRATION CONTROL PROBLEMS Final Report

Walter D. Pilkey 1982 26 p refs
(Grant DAAG29-79-G-0015)
(AD-A113239; UVA/525098-MAE-82/10; ARO-16091.5-E) Avail: NTIS HC A03/MF A01 CSCL 20/11

This report summarizes the accomplishments of a study exploring new methods for the vibration control of helicopters. Reanalysis methodology permits a variety of vibration control problems to be solved efficiently. Both analytical and experimental studies have been conducted. Author (GRA)

N82-28302# Air Force Human Resources Lab., Brooks AFB, Tex.

MANUAL REVERSION FLIGHT CONTROL SYSTEM FOR A-10 AIRCRAFT: PILOT PERFORMANCE AND SIMULATOR CUE EFFECTS Final Report

Thomas H. Gray Mar. 1982 31 p refs
(AF Proj. 1123)
(AD-A113463; AFHRL-TR-81-53) Avail: NTIS HC A03/MF A01 CSCL 14/2

The A-10 aircraft incorporates an emergency backup control mode, the Manual Reversion Flight Control System (MRFCS). Maintaining effective control in this mode is a demanding pilot task, but it is not practiced in the flying training syllabus. Because current plans call for training this skill using simulation, information was needed on simulator cue requirements. Accordingly, the research objective was to determine the effectiveness of selected simulator visual and force cues used by experienced A-10 pilots to maintain aircraft control and to land when in the MRFCS mode. The study found that (1) a large field of view enhanced the pilot's control of the aircraft; (2) platform motion had no influence upon aircraft control; (3) aircraft control was more difficult in the MRFCS mode than in the simple single engine failure state; (4) point of failure was a significant variable reliably affecting pilot control of the aircraft; and (5) pilot performance improved as a function of practice (trials).
Author (GRA)

N82-28303# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

THE DETERMINATION OF GUST LOADS ON NONLINEAR AIRCRAFT USING A POWER SPECTRAL DENSITY APPROACH

R. Noback and C. Laauboder 17 Dec. 1980 80 p refs
(Contract NIVR-RB-1854)
(NLR-TR-80123-U) Avail: NTIS HC A05/MF A01

Since the power spectral density method cannot determine the exceedance of the output over the input in the nonlinear equations which describe an aircraft subjected to atmospheric turbulence, methods which approximate the exceedance curve were developed. One method is analogous to the classical expression for the equivalent gain. Another is analogous to the equivalent gain based on minimum error in energy. In both, the maximum value (mu zy) of the cross correlation function between output and input to the nonlinearity is used. A reasonable estimate of the exceedance curve, for systems for which mu zy is not known, can be obtained if the correlation between the input to the nonlinearity (z) and the system output (y) is high. The ratio of the standard deviations of z and y can then be used. Design loads based on mission analysis can be established once the load exceedance curve due to constant standard deviation of the input is known. A definition for the design load of nonlinear aircraft using the design envelope method is proposed.
Author (ESA)

N82-28306# Seville Research Corp., Pensacola, Fla.

OPERATIONAL TEST AND EVALUATION HANDBOOK FOR AIRCREW TRAINING DEVICES. VOLUME 3: OPERATIONAL SUITABILITY EVALUATION Final Report

William V. Hagin, Stephen R. Osborne, Roik L. Hockenberger, James P. Smith, and Thomas H. Gray (Operations Training Div., Williams AFB, Ariz.) AFHRL Brooks AFB, Tex. Feb. 1982 128 p refs
(Contract F33615-78-C-0063; AF Proj. 1123)
(AD-A112569; AFHRL-TR-81-44-Vol-3) Avail: NTIS HC A07/MF A01 CSCL 05/9

The Handbook is comprised of three volumes and is intended to provide guidelines and procedures appropriate for Air Force Operational Test and Evaluation (OT&E) personnal to use in planning, conducting and reporting the results of simulator assessment efforts. Although of value to all test personnel, it is primarily for the typical novice test manager/director - a person who has subject matter expertise (e.g., a qualified pilot or operator), but who may have little or no previous OT&E experience. The Handbook provides detailed coverage on OT&E planning and management with special emphasis on measuring device operational effectiveness and suitability. In accord with its objectives, the Handbook was prepared to serve as a supplement to Air Force Manual 55-43, 'Management of Operational Test and Evaluation,' but providing those specific additional evaluation concepts and techniques mecessary for aircrew training device test and evaluation. GRA

N82-28307# Strategic Air Command, Offutt AFB, Nebr. Aircraft Engineering Div.

ALERT AIRCRAFT ROLL OVER CHOCKS Final Engineering Report

John M. Connolly 14 Aug. 1981 53 p
(AD-A107456; SAC/LGME-ER-P-372) Avail: NTIS
HC A04/MF A01 CSCL 01/5

The feasibility of restraining a parked alert aircraft with chocks which could be safely taxied over was studied. Chocks were designed and then evaluated during SAC Giant Match II exercise. The chocks successfully restrained a parked aircraft and allowed a heavy weight aircraft to safely taxi over when the chocks were placed on a rough surface. Roll-over chock use was expanded command wide for B-52G and KC-135 alert aircraft except on icy surfaces. Three ice gripping surface designs were evaluated. All three designs performed successfully. Author

N82-28309# Naval Training Equipment Center, Orlando, Fla. Advanced Simulation Concepts Lab.

COMPUTER PROGRAM FOR ANALYSIS OF SPHERICAL SCREEN DISTORTION Technical Report, Oct. 1980 - Feb. 1981

Richard C. Hebb Mar. 1982 71 p refs
(AD-A113136; NAVTRAEQUIPC-IH-332) Avail: NTIS
HC A04/MF A01 CSCL 05/9

In visual simulation, the distortion of imagery in wide-angle display systems is a major concern. Effective flight training requires that the imagery presented to a trainee provide a proper perspective view of his simulated environment without distortion. Use of spherical screens (domes) introduces perspective and geometrical distortion into these wide-angle displays. Use of video projection systems with Computer Image Generation (CIG) offers the options of raster shaping or computer remapping for distortion correction. The method is to correct the imagery before projection in order to provide a non-distorted scene to a trainee. This report is documentation of a computer program for analysis of the required raster correction for specific projector/viewpoint positioning within a spherical screen. The programs and report were initiated to provide input to the F-18 simulator (Device 2E7) being developed by Hughes Aircraft. Author (GRA)

N82-28310# Aeronautical Research Labs., Melbourne (Australia).

PROGRAMS FOR THE TRANSONIC WIND TUNNEL DATA PROCESSING INSTALLATION. PART 8: PROGRAMS FOR PROCESSING DATA ON THE CENTRAL SITE COMPUTER

B. D. Fairlie Sep. 1980 32 p refs
(AD-A112900; ARL/AERO-TM-324-Pt-8) Avail: NTIS
HC A03/MF A01 CSCL 09/2

Three programs which run on the central site computer (PDP-10) are described. The first, PLT8 complements and extends the tunnel installation six-component force data plotting system. The second, INTEG integrates aerofoil surface pressure measurements. The third, PLTALL plots these surface pressure data. Author (GRA)

N82-28311# Aeronautical Research Labs., Melbourne (Australia).

DESIGN BASIS FOR A NEW TRANSONIC WIND TUNNEL

J. B. Willis and N. Pollock Jan. 1982 27 p refs
(AD-A112899; ARL/Aero-TM-335; AR-002-326) Avail: NTIS
HC A03/MF A01 CSCL 14/2

The existing ARL Transonic Wind Tunnel, which is the largest such tunnel in Australia, has severely limited testing capabilities due to a low test Reynolds number and an inadequate test section size. These deficiencies are becoming more acute as military aircraft performance capabilities increase. For current fighter aircraft, the ratio of tunnel test to flight Reynolds number is about 1:100 and the extrapolation of tunnel data to flight carries a high risk of serious error and for some conditions is not possible at all. The small test section size limits the scale of the models which can be tested. The difficulty of machining small models to the required accuracy produces excessive manufacturing times. Moreover, it is not possible to incorporate remotely adjusted control surfaces. These two factors severely restrict tunnel productivity. Given adequate support, it should be possible to build and commission a suitable new wind tunnel in about five years, at a cost substantially less than that of a single military fighter aircraft. GRA

N82-28364# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.

CARBON FIBER REINFORCED COMPOSITE STRUCTURES PROTECTED WITH METAL SURFACES AGAINST LIGHTNING STRIKE DAMAGE

C. M. Heckert, H. P. Wentzel (Vereinigte Flugtechnische Werke GmbH), and G. Boes (Toch. Univ., Hanover) 1982 9 p Presented at Intern. Aerospace Conf. on Lightning and Static Elec., Culham, England, 23-25 Mar. 1982
(MBB-UD-340-82-O/E) Avail: Issuing Activity

Lightning protection for carbon fiber reinforced composite (CFC) structures, typical of parts mainly located on the surface of aircraft, was investigated. Only direct structural, effects of a lightning strike on a component were considered. As protective materials, flame sprayed aluminum, aluminum mesh, aluminum foil, and aluminum/glass hybrid fabrics were tested. Three specimen geometries were studied: (1) solid CFC plates 2 and 3 mm thick; (2) sandwich plates with CFC facing of different thickness and with different core material (aluminum and Nomex) 10 mm through; and (3) electrically bonded test specimen composed of a solid CFC plate and metal substructure. The test rig for simulating lightning discharges is described. Results consist of damage diagrams, showing specimen type, applied electrical discharge, and damaged area on protective surface and composite structure. Author (ESA)

N82-28365# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.

DEVELOPMENT OF MATERIALS AND MANUFACTURING TECHNOLOGY OVER THE NEXT 20 YEARS: COMPOSITE MATERIALS [ENTWICKLUNG DER WERKSTOFF- UND FERTIGUNGSTECHNIK IN DEN NAECHSTEN 20 JAHREN - VERBUNDWERKSTOFFE]

C. M. Heckert 1982 17 p In GERMAN Presented at Wehrtech. Symp. Entwicklung der Werkstoffe- u. Fertigungstech. in den naechsten 20 Jahren, Mannheim, West Germany, 17 Dec. 1981; sponsored by Bundesakademie fuer Wehrverwaltung und Wehrtechnik, Mannheim, West Germany
(MBB-UD-341-82-O) Avail: Issuing Activity

The development of reinforced plastics and their application in various manufacturing processes are reviewed. The choice of CFRP or glass fiber reinforced plastic in military and commercial aircraft design is justified by higher specific strength and stiffness properties than alternative metals. Other applications are found in automobiles, railway cars, and helicopters. Size and mass reduction in parts as well as production cost savings are mentioned. Influence on manufacturing of component geometry (rod; plate; complex) is considered. The interrelationship of manufacturing capability with composite materials development is stressed through examples from industry. Author (ESA)

N82-28462# Suntech, Inc., Marcus Hook, Pa.

AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 1: PRELIMINARY PROCESS ANALYSES Interim Report, 2 Jan. - 1 Jul. 1979

H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Sep. 1981 48 p refs 3 Vol.
(Contract F33615-78-C-2024; AF Proj. 3048)
(AD-A112681; AFWAL-TR-81-2087-Pt-1) Avail: NTIS
HC A03/MF A01 CSCL 21/4

Preliminary process analyses of three different technically feasible processing schemes proposed by SUN TECH, INC. for converting 100,000 BPCD of raw Paraho shale oil into military turbine fuels was investigated. Each processing scheme is based on very limited, but pertinent, data generated by SUN TECH plus literature sources. The base processing scheme consists of severe hydrotreating followed by sulfuric acid extraction; the two alternate cases utilize moderate hydrotreating plus extraction for nitrogen removal and hydrocracking. Screening-type process designs and costs estimates were prepared for each case using the economic basis specified. Results indicate that shale oil fuels refineries are more capital intensive than a comparable size petroleum refinery. No attempt was made at optimization. Author (GRA)

N82-28463# Suntech, Inc., Marcus Hook, Pa.
AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 2: PROCESS VARIABLE ANALYSES AND LABORATORY SAMPLE PRODUCTION Interim Report, Jul. 1979 - 1 Nov. 1980
H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Sep. 1981 61 p refs 3 Vol.
(Contract F33615-78-C-2024; AF Proj. 2480)
(AD-A112682; AFWAL-TR-81-2087-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 21/4

Pilot plant process data have been incorporated in three design bases for manufacturing military fuels from raw Occidental shale oil. Processing schemes for 90,000 BPCD refineries to maximize either JP-4, JP-8 or to produce JP-4 plus other military fuels are presented. The processing sequence comprises moderate severity hydrotreating, fractionation, anhydrous HCl extraction and hydrocarcking. Plant capacities and product yields were not optimized. Investments for the three refinery options considered are 1.5 to 2.0 times as much as a comparable size petroleum fuels refinery. At maximum JP-4 or JP-8 production the yields are about 87 and 53 volume % of total refinery energy input, respectively. Overall, refinery thermal efficiency is > or = 75%. Inspection data are presented for five samples of specification aviation turbine fuels prepared from pilot plant operations. GRA

N82-28464# Suntech, Inc., Marcus Hook, Pa.
AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 3: PRODUCTION OF SPECIFICATION OF JP-4 FUEL FROM GEOKINETICS SHALE OIL Interim Report, 1 Jan. - 1 Apr. 1980
H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Oct. 1981 45 p refs 3 Vol.
(Contract F33615-78-C-2024; AF Proj. 2480)
(AD-A112683; AFWAL-TR-81-2087-Pt-3) Avail: NTIS HC A03/MF A01 CSCL 21/4

270 Barrels of specification JP-4 jet fuel were produced by hydrorefining 890 barrels of raw Geokinetics shale oil under severe operating conditions in a continuous process development unit. On a once thru basis the yield of JP-4 off the hydrotreater was about 35 volume % of the feed. Preliminary estimates of plant investments and economics indicate that for the combination severe hydrorefining and hydrocracking, an 85 volume % yield can be attained based on total refinery energy input. Capital investments and manufacturing costs do not appear to be excessive for a shale oil refinery. GRA

N82-28470# California Univ., Livermore. Lawrence Livermore Lab.
LABORATORY-SCALE SIMULATION OF UNDERGROUND COAL GASIFICATION: EXPERIMENT AND THEORY
J. R. Creighton and C. B. Thorsness 28 Aug. 1981 26 p refs Presented at the Western States Sect. Meeting of the Combust. Inst., Tempe, Ariz., 19-20 Oct. 1981
(Contract W-7405-eng-48)
(DE82-001063; UCRL-86473; CONF-811041-2) Avail: NTIS HC A03/MF A01

Laboratory-scale experiments simulating underground coal gasification are described. A 1 cm borehole is drilled through a block of coal which is cut to fit in a 55 gallon oil drum. Inlet gas may be air or oxygen/steam mixture at various ratios. The blocks are burned for a period of several hours at a prescribed flow schedule, with appropriate instrumentation. Gas quality is found to be relatively independent of coal type for the range of sub-bituminous coals tested. After the burn the blocks of coal are cut open to examine the cavity. A mathematical modeling effort supports these experiments. The models are restricted to pure carbon, to simplify the chemistry in the model. When plug flow is assumed in the cavity the model predicts reasonable cavity shape downstream, but an incorrect shape upstream. When aerodynamic flow, including viscosity and vortex formation, is calculated in the cavity reasonable cavity shapes are obtained. DOE

N82-28486# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany). Materials and Processes Development Dept.
ADVANCED CASTING: TODAY AND TOMORROW
Dietmar Mietrach 1982 20 p refs Presented at AGARD Meeting on Adv. Casting Technol, Brussels, 4-9 Apr. 1982
Avail: NTIS HC A02/MF A01

The state of aluminum casting technology in terms of processes, component sizes, design and material-scientific data as well as mechanical characteristics was established during visits to foundries in the USA, Canada, France, Italy, Great Britain and the Federal Republic of Germany. Components of the primary structure of Tornado and ALPHA aircraft, (pylon, intake floor) classified according to the degree of difficulty during casting, were used to compare existing designs (riveted sheet metal and machined parts) and cast versions with regard to cost reduction and technical reliability. Visual inspection, dimensional checks, chemical composition analysis, penetrant tests, X-ray tests, metallographic investigations, and tensile tests were carried out. Cost savings of 25% and weight savings of 20% can be achieved by using castings. Author (ESA)

N82-2852[illegible]# TRW Defense and Space Systems Group, Redondo Beach, Calif.
MULTIFUNCTION MULTIBAND AIRBORNE RADIO ARCHITECTURE STUDY Final Report, Apr. 1978 - Jan. 1980
L. N. Ma, S. K. Ogi, M. Y. Huang, L. L. Bodnar, and P. Martin Wright-Patterson AFB, Ohio AFWAL Jan. 1982 379 p refs
(Contract F33615-77-C-1172; AF Proj. 2003)
(AD-A114427; AFWAL-TR-81-1113) Avail: NTIS HC A17/MF A01 CSCL 17/2

The demands of modern military avionic communication, radio navigation, and cooperative identification (CNI) equipment has been greatly expanded as the result of the need for antijam (AJ), low probability of intercept (LPI), higher navigation accuracy, and increased volume of information transfer. These demands are verified in programs such as GPS, JTIDS, SEEK TALK, SINCGARS and AFSAT I and II. The cost of this additional capability has severely hampered the ability of the Government to procure new CNI systems and equipment with desired performance capabilities. The problem is further compounded by the lack of available space in the tactical aircraft, the transition of new equipment into the inventory, and the retention of many current systems. The multifunction multiband airborne radio system (MFBARS) program is formulated to explore the feasibility of producing a modern CNI system at an affordable life cycle cost (LCC) and within real estate requirements. A cost effective system approach was developed that revolved around high technology RF-LSI analog components that are in the development stage, high speed digital pre-processor elements and a programmable signal processor all under control of a host processor configuration. This design trades the ultimate gain in volume, weight and life cycle cost against a reasonable risk for the mid 1980's development. Author (GRA)

N82-28552# Boeing Aerospace Co., Seattle, Wash.
FEASIBILITY STUDY OF A 270V dc FLAT CABLE AIRCRAFT ELECTRICAL POWER DISTRIBUTED SYSTEM Final Report, Dec. 1980 - Jan. 1982
M. J. Musga and R. J. Rinehart Jan. 1982 272 p refs
(Contract N62269-81-C-0231)
(AD-A114026; D182-10816-1; NADC-82023-60) Avail: NTIS HC A12/MF A01 CSCL 10/2

This report documents the efforts of a one man-year feasibility study to evaluate the usage of flat conductors in place of conventional round wires for a 270 volt direct current aircraft power distribution system. This study consisted of designing electrically equivalent power distribution harnesses in flat conductor configurations for a currently operational military aircraft. Harness designs were established for installation in aircraft airframes which are: (1) All metal, or (2) All composite, or (3) a mixture of both. Flat cables have greater surface areas for heat transfer allowing higher current densities and therefore lighter weight conductors, than with round wires. Flat cables are less susceptible to electromagnetic effects. However, these positive factors are partially offset by installation and maintenance difficulties. This study concludes that the extent of these difficulties can be adequately limited with appropriate modification to present installation and maintenance practices. A comparative analysis of the flat and the round conductor power distribution harnesses was made for weight, cost, maintenance and reliability. The knowledge gained from the design and comparative analysis phases was used to generate design criteria for flat power cable harnesses and to identify and prioritize flat cable harness components and associated production tooling which require development. GRA

N82-28571# Aeronautical Research Inst. of Sweden, Stockholm.
MEASURING THE FLOW PROPERTIES OF SLOTTED TEST-SECTION WALLS
Sune B. Berndt May 1982 15 p refs
(FFA-135) Avail: NTIS HC A02/MF A01

By measuring pressure distributions at two levels near a slotted wall it is possible to deduce simultaneous values of normal and longitudinal velocities. Such measurements require, for their proper interpretation, a basic understanding of the flow in the neighborhood of the wall. An analysis of the problems involved is provided. Author

N82-28624# Rose Engineering and Research, Inc., Incline Village, Nev.
NEARFIELD AERODYNAMICS AND OPTICAL PROPAGATION CHARACTERISTICS OF A LARGE-SCALE TURRET MODEL Final Report
William C. Rose, James E. Craig (Spectron Development Lab., Inc.), and K. R. Raman (Raman Aeronautics, Inc.) Kirtland AFB, N. Mex. AFWL Feb. 1982 100 p refs
(Contract F29601-79-C-0011; AF Proj. 317J)
(AD-A113910; AFWL-TR-81-28) Avail: NTIS HC A05/MF A01 CSCL 20/6

Measurements of the unsteady flow field affecting optical propagation quality have been made with both aerodynamic and direct optical instrumentation. Properties affecting degradation of coherent radiation beams propagated from within the turret have been investigated. These properties include both the magnitude and scale sizes of the fluctuating index-of-refraction field present in the turbulent shear layers and separation regions of the turret flow field. Direct optical degradation information was obtained by holographic interferometry and quantified through techniques presented here. Aerodynamic measurements were made with hot-wire anemometry and multiple-port probes. Comparisons between the aerodynamically and optically deduced data are presented. These data can be used directly to estimate trends in expected loss of optical quality of a coherent beam for various flight speeds, altitudes, wavelengths and azimuthal turret angles. More data are now available for estimating the effects of unsteady aerodynamic flow fields on optical propagation quality. Data were obtained for Reynolds numbers near those occurring at full-scale flight conditions over a range of Mach number from 0.55 to 0.75. Investigation results generally agree with those obtained previously on smaller scale models and indicate that severe optical degradation can be present at aft-looking azimuth angles. Author (GRA)

N82-28643*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RELIABILITY MODEL FOR PLANETARY GEAR
Michael Savage (Akron Univ.), Charles A. Paridon (Hewlett Packard Co., Sunnyvale, California), and John J. Coy (Army Aviation Research and Development Command, Cleveland, Ohio) 1982 22 p refs Proposed for Presentation at Design Engr. Tech. Conf., Washington, D.C., 12-15 Sep. 1982; sponsored by ASME Prepared in cooperation with Army Aviation Research and Development Command
(NASA-TM-82859; NAS 1.15:82859; AVRADCOM-TR-82-C-6) Avail: NTIS HC A02/MF A01 CSCL 13I

A reliability model is presented for planetary gear trains in which the ring gear is fixed, the Sun gear is the input, and the planet arm is the output. The input and output shafts are coaxial and the input and output torques are assumed to be coaxial with these shafts. Thrust and side loading are neglected. This type of gear train is commonly used in main rotor transmissions for helicopters and in other applications which require high reductions in speed. The reliability model is based on the Weibull distribution of the individual reliabilities of the transmission components. The transmission's basic dynamic capacity is defined as the input torque which may be applied for one million input rotations of the Sun gear. Load and life are related by a power law. The load life exponent and basic dynamic capacity are developed as functions of the component capacities. Author

N82-28644*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio
ADVANCES IN HIGH-SPEED ROLLING-ELEMENT BEARINGS
Erwin V. Zaretsky 1982 29 p refs Presented at the 16th Ann. Israel Conf. on Mechan. Engr., Haifa, Israel, 12-14 Jul 1982; sponsored by Technion - Israel Inst. of Tech
(NASA-TM-82910; E-1295; NAS 1.15:82910) Avail: NTIS HC A03/MF A01 CSCL 13I

Aircraft engine and transmission rolling-element bearing state-of-the-art is summarized. Author

N82-28676# Alabama Univ., Huntsville. Dept. of Mechanical Engineering
RECENT DEVELOPMENTS IN HYGROTHERMOVISCOELASTIC ANALYSIS OF COMPOSITES
T. J. Chung *In* Shock and Vibration Information Center The Shock and Vibration Digest Vol. 14, No. 4 Apr. 1982 p 33-40 refs (For primary document see N82-28673 19-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375: $20.00/set CSCL 20/11

Constitutive theories of hygrothermomechanical behavior of viscoelastic composites are reviewed. Author

N82-28685# National Aerospace Lab., Amsterdam (Netherlands) Structures and Materials Div.
PREDICTION OF FATIGUE CRACK GROWTH RATES UNDER VARIABLE LOADING USING A SIMPLE CRACK CLOSURE MODEL
A. U. deKoning and H. H. vanderLinden Apr. 1980 45 p refs Presented at 11th ICAF Symp., Noordwijkerhout, Netherlands, 20-22 May 1981
(Contracts NIVR-1777; NIVR-1822; NIVR-1823)
(NLR-MP-81023-U) Avail: NTIS HC A03/MF A01

A model which predicts fatigue crack growth rates in aluminum alloys subjected to flight service loading is presented. The model is based on an approximate description of the crack opening behavior and was applied successfully in an analysis of effects of crack growth acceleration and retardation observed experimentally under variable amplitude loading. The model describes effects of the plane strain to plane stress transition and of relatively high overloads on crack growth rate of the crack. Author (ESA)

N82-28690*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
BASELINE MONITORING USING AIRCRAFT LASER RANGING
W. B. Krabill, F. E. Hoge, and C. F. Martin Jun. 1982 28 p refs
(NASA-TM-73298; NAS 1.15:73298) Avail: NTIS HC A03/MF A01 CSCL 08B

The use of aircraft laser ranging for the determination of baselines between ground based retroreflectors was investigated via simulations and with tests at Wallops Flight Center using the Airborne Oceanographic Lidar (AOL) on the Wallops C-54 aircraft ranging to a reflector array deployed around one of the Wallops runways. The aircraft altitude and reflector spacing were chosen on the basis of scaled down modeling of spacecraft tracking from 1000 km of reflectors separated by some 52 km, or of high altitude (10 km) aircraft tracking of reflectors separated by some 500 m. Aircraft altitudes flown for different passes across the runway reflector array varied from 800 m to 1350 m, with 32 reflectors deployed over an approximately 300 m x 500 m ground pattern. The AOL transmitted 400 pulses/sec with a scan rate of 5/sec in a near circular pattern, so that the majority of the pulses were reflected by the runway surface or its environs rather than by retroreflectors. The return pulse characteristics clearly showed the high reflectivity of portions of the runway, with several returns indistinguishable in amplitude from reflector returns. For each pass across the reflector field, typically six to ten reflector hits were identified, consistent with that predicted by simulations and the observed transmitted elliptical pulse size. Author

N82-28715*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SCANNER IMAGING SYSTEMS, AIRCRAFT
Stephen G. Ungar *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 138-152 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The causes and effects of distortion in aircraft scanner data are reviewed and an approach to reduce distortions by modelling the affect of aircraft motion on the scanner scene is discussed. With the advent of advanced satellite borne scanner systems, the geometric and radiometric correction of aircraft scanner data has become increasingly important. Corrections are needed to reliably simulate observations obtained by such systems for purposes of evaluation. It is found that if sufficient navigational information is available, aircraft scanner coordinates may be related very precisely to planimetric ground coordinates. However, the potential for a multivalue remapping transformation (i.e., scan lines crossing each other), adds an inherent uncertainty, to any radiometric resampling scheme, which is dependent on the precise geometry of the scan and ground pattern. E.A.K.

N82-28841# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Biodynamics and Bioengineering Div.
FIELD STUDIES OF THE AIR FORCE PROCEDURES (NOISECHECK) FOR MEASURING COMMUNITY NOISE EXPOSURE FROM AIRCRAFT OPERATIONS Final Report
R. A. Lee Mar. 1982 130 p
(AF Proj. 7231)
(AD-A113672; AFAMRL-TR-82-12) Avail: NTIS HC A07/MF A01 CSCL 20/1

This report describes the results of noise measurements at Laughlin AFB and Homestead AFB to field test the NOISECHECK equipment and procedures developed under contract by Bolt, Beranek and Newman, Inc. and Digital Acoustics Inc. NOISECHECK is the equipment and procedures used by the Air Force to spot check or validate the long term noise exposure predicted by NOISEMAP, the Air Force computer program for predicting community noise exposure from aircraft operations. The total noise exposure level at a specified location has an uncertainty associated with it whether the level is predicted or measured. The purpose of NOISECHECK is to determine the total noise exposure in terms of the Day-Night Level (DNL) metric for a specified ground location from direct measurements. NOISEMAP predicts DNL values for yearly-averaged 'busy days' aircraft operations. Therefore, the direct DNL measurements need to be normalized to this 'busy day' DNL. The NOISECHECK Procedures lead you through these normalizations in a straightforward step-by-step method. The results of the Laughlin and Homestead tests show that, with the proper data collection, the NOISECHECK procedures can validate the long-term noise exposure and explain any differences between the NOISEMAP predicted DNL values and the short term measurement DNL values. Author (GRA)

N82-28842# California Univ., Riverside. Statewide Air Pollution Research Center.
ATMOSPHERIC CHEMISTRY OF HYDROCARBON FUELS. VOLUME 2: OUTDOOR CHAMBER DATA TABULATIONS, PART 1 Final Report, Mar. 1980 - Sep. 1981
William P. L. Carter, Paul S. Ripley, Cecil G. Smith, and James N. Pitts, Jr. Tyndall AFB, Fla. AF Engineering and Services Center Nov. 1981 336 p 2 Vol.
(Contract F08635-80-C-0086; AF Proj. 1900)
(AD-A113665; AFESC/ESL-TR-81-53-V-2-P-1) Avail: NTIS HC A15/MF A01 CSCL 04/1

A total of 132 single- and multi-day outdoor environmental chamber experiments were conducted, involving nine different aviation and automotive fuels. These included the petroleum-derived JP-4 and JP-8 military aviation fuels, their shale-oil derived analogues, unleaded gasoline, diesel No. 2 fuel, and the experimental high-energy cruise-missile fuels JP-10, RJ-4, and RJ-5. The program was conducted to assess the potential of these fuels to adversely affect air quality. Author

N82-28881*# Tennessee Univ. Space Inst., Tullahoma.
ANALYSIS OF VIBRATION INDUCED ERROR IN TURBULENCE VELOCITY MEASUREMENTS FROM AN AIRCRAFT WING TIP BOOM Final Report
Safwan H. Akkari and Walter Frost Washington NASA Jun. 1982 77 p refs
(Contract NAS8-34627)
(NASA-CR-3571; NAS 1.26:3571) Avail: NTIS HC A05/MF A01 CSCL 04B

The effect of rolling motion of a wing on the magnitude of error induced due to the wing vibration when measuring atmospheric turbulence with a wind probe mounted on the wing tip was investigated. The wing considered had characteristics similar to that of a B-57 Cambera aircraft, and Von Karman's cross spectrum function was used to estimate the cross-correlation of atmospheric turbulence. Although the error calculated was found to be less than that calculated when only elastic bendings and vertical motions of the wing are considered, it is still relatively large in the frequency's range close to the natural frequencies of the wing. Therefore, it is concluded that accelerometers mounted on the wing tip are needed to correct for this error, or the atmospheric velocity data must be appropriately filtered. Author

N82-29022*# Research Triangle Inst., Research Triangle Park, N. C. Systems and Measurements Div.
PROBLEMS RELATED TO THE INTEGRATION OF FAULT TOLERANT AIRCRAFT ELECTRONIC SYSTEMS
J. A. Bannister, V. Adlakha, K. Triyedi, and T. A. Alspaugh, Jr. Jun. 1982 167 p refs
(Contract NAS1-16489)
(NASA-CR-165926; NAS 1.26:165926; RTI/2094/02-02F) Avail: NTIS HC A08/MF A01 CSCL 09B

Problems related to the design of the hardware for an integrated aircraft electronic system are considered. Taxonomies of concurrent systems are reviewed and a new taxonomy is proposed. An informal methodology intended to identify feasible regions of the taxonomic design space is described. Specific tools are recommended for use in the methodology. Based on the methodology, a preliminary strawman integrated fault tolerant aircraft electronic system is proposed. Next, problems related to the programming and control of inegrated aircraft electronic systems are discussed. Issues of system resource management, including the scheduling and allocation of real time periodic tasks in a multiprocessor environment, are treated in detail. The role of software design in integrated fault tolerant aircraft electronic systems is discussed. Conclusions and recommendations for further work are included. M.G.

N82-29111*# Stanford Univ., Calif. Joint Inst. for Aeronautics and Acoustics.
THE EFFECT OF BARRIERS ON WAVE PROPAGATION PHENOMENA: WITH APPLICATION FOR AIRCRAFT NOISE SHIELDING
C. V. M. Mgana and I-Dee Chang May 1982 142 p refs
(Contract NCC2-76)
(NASA-CR-169128; NAS 1.26:169128) Avail: NTIS HC A07/MF A01 CSCL 20A

The frequency spectrum was divided into high and low frequency regimes and two separate methods were developed and applied to account for physical factors associated with flight conditions. For long wave propagation, the acoustic filed due to a point source near a solid obstacle was treated in terms of an inner region which where the fluid motion is essentially incompressible, and an outer region which is a linear acoustic field generated by hydrodynamic disturbances in the inner region. This method was applied to a case of a finite slotted plate modelled to represent a wing extended flap for both stationary and moving media. Ray acoustics, the Kirchhoff integral formulation, and the stationary phase approximation were combined to study short wave length propagation in many limiting cases as well as in the case of a semi-infinite plate in a uniform flow velocity with a point source above the plate and embedded in a different flow velocity to simulate an engine exhaust jet stream surrounding the source. A.R.H.

N82-29116# Technische Physische Dienst TNO-TH, Delft (Netherlands).
USE OF THE CAVITATION TUNNEL AT THE DUTCH NAVAL EXPERIMENT STATION (NSP), WAGENINGEN FOR THE DETERMINATION OF THE ACOUSTIC SOURCE STRENGTH OF PROPELLER CAVITATION [HET GEBRUIK VAN DE CAVITATIETUNNEL VAN HET NSP TE WAGENINGEN VOOR DE BEPALING VAN DE AKOESTISCHE BRONSTERKTE VAN SCHROEFCAVITATIE]
K. Verhulst 18 Aug. 1981 44 p refs In DUTCH
(Contract A72/KM/007)
(TPD-908-720; TDCK-75536) Avail: NTIS HC A03/MF A01

Experiments were performed, using a five blade model propeller, in order to investigate the possibilities of using the large NSP ,cavitation tunnel in the acoustical study of propeller cavitation. The influence of the hydrodynamic characteristics in the tunnel on the sound transmission to the tunnel wall was investigated. The transfer functions fluctuate strongly, even at a given water velocity or static pressure, probably due to poor acoustic damping in the tunnel circuit. For a turning propeller, the acoustic response of the tunnel wall due to propeller cavitation is very stable, since the degree of turbulence in the water, and thus the absorption, are very high. Author (ESA)

N82-29118# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

SOME COMMENTS ON THE PREDICTION OF FORWARD FLIGHT EFFECTS ON JET NOISE.

Frank Obermeier Dec. 1981 37 p refs
(MPIS-20/1981; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,55

How aeroacoustic sound generation in turbulent jet flow is affected by a coflowing stream is considered. Experiment shows that simply allowing for Doppler effects, applied to the sound field of a static jet which is assumed to be known, does not yield convincing results. The effects of a coaxial stream on the aerodynamics of jet flow, i.e., the effects on its characteristic length and velocity, found experimentally, are critically reviewed through the literature. Results lead to a prediction scheme for in-flight effects on jet noise. A comparison of this method with test data exhibits good agreement. Author (ESA)

N82-29261# Federal Aviation Administration, Washington, D.C. Planning Analysis Div.

FAA AVIATION FORECASTS-FISCAL YEARS 1982-1993

Feb. 1982 72 p
(AD-A114696; FAA-APO-82-2) Avail: NTIS HC A04/MF A01 CSCL 01/2

This report contains the Fiscal Years 1982 to 1993 Federal Aviation Administration (FAA) forecasts of aviation activity at FAA facilities. These include airports with FAA control towers, air route traffic control centers, and flight service stations. Detailed forecasts were made for the four major users of the national aviation system: air carriers, air taxi/commuters, general aviation and the military. The forecasts have been prepared to meet the budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, by the aviation industry and the general public. GRA

N82-29263# Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.

ON EMBEDDED FLOW CHARACTERISTICS OF SHARP EDGED RECTANGULAR WINGS

Erik S. Larson 21 Apr. 1982 19 p refs Backup Document for AIAA Synoptic scheduled for publication in the Journal of Aircraft, Feb. or Mar. 1983
(Log-C4712) Avail: NTIS HC A02/MF A01

The semiempirical, analytic expressions for steady, symmetric flow characteristics on thin rectangular wings at transonic speed are investigated. Semiempirical expressions representing aerodynamic characteristics of sharp edged rectangular wings are reported. The basic coefficients correlated very well with panel method results for Mach number of the free stream < or = 1, the intended domain of applicability. S.L.

N82-29267*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

AERODYNAMICS OF AN AIRFOIL WITH A JET ISSUING FROM ITS SURFACE

D. A. Tavella and K. Karamcheti May 1982 93 p refs
(Contract NCC2-74)
(NASA-TM-84825; NAS 1.15:84825; SU-JIAA-TR-44) Avail: NTIS HC A05/MF A01 CSCL 01A

A simple, two dimensional, incompressible and inviscid model for the problem posed by a two dimensional wing with a jet issuing from its lower surface is considered and a parametric analysis is carried out to observe how the aerodynamic characteristics depend on the different parameters. The mathematical problem constitutes a boundary value problem where the position of part of the boundary is not known a priori. A nonlinear optimization approach was used to solve the problem, and the analysis reveals interesting characteristics that may help to better understand the physics involved in more complex situations in connection with high lift systems. Author

N82-29268*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

AIRCRAFT GEOMETRY VERIFICATION WITH ENHANCED COMPUTER GENERATED DISPLAYS

J. V. Cozzolongo Jun. 1982 13 p refs
(NASA-TM-84254; NAS 1.15:84254) Avail: NTIS HC A02/MF A01 CSCL 01A

A method for visual verification of aerodynamic geometries using computer generated, color shaded images is described. The mathematical models representing aircraft geometries are created for use in theoretical aerodynamic analyses and in computer aided manufacturing. The aerodynamic shapes are defined using parametric bi-cubic splined patches. This mathematical representation is then used as input to an algorithm that generates a color shaded image of the geometry. A discussion of the techniques used in the mathematical representation of the geometry and in the rendering of the color shaded display is presented. The results include examples of color shaded displays, which are contrasted with wire frame type displays. The examples also show the use of mapped surface pressures in terms of color shaded images of V/STOL fighter/attack aircraft and advanced turboprop aircraft. Author

N82-29271*# Boeing Vertol Co., Philadelphia, Pa.

INVESTIGATION OF A ROTOR SYSTEM INCORPORATING A CONSTANT LIFT TIP Final Contractor Report

M. A. McVeigh, H. Rosenstein, K. Bartie, and F. J. McHugh Oct. 1981 326 p refs
(Contract NAS2-10769)
(NASA-CR-166261; NAS 1.26:166261) Avail: NTIS HC A15/MF A01 CSCL 01A

A wind tunnel test of a 16.6 ft. model of a rotor having passively controlled pivotable tips is described. Performance and vibratory hub load data are presented which compare the performance of the rotor with the tips free and fixed. A brief analysis of the experimental findings is included. S.L.

N82-29274# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.

FLIGHT ATTENDANT INJURIES: 1971-1976

Donell W. Pollard, Earl D. Folk, and Richard F. Chandler Jan. 1982 60 p refs
(AD-A114909; FAA-AM-82-6) Avail: NTIS HC A04/MF A01 CSCL 01/2

Data from 206 reports of 377 flight attendant injuries occurring from 1971 through 1976 are summarized. These data were obtained from the Cabin Safety Data Bank of the Civil Aeromedical Institute, and are based on Federal Aviation Administration and National Transportation Safety Board accident/incident reports. Information relating to the severity and location of the injury is provided when available from original reports. Data relating to the flight condition and location in the aircraft where the injury occurred are provided. Summaries of each reported injury are included in the appendices. Author (GRA)

N82-29275# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.

CRASHWORTHINESS STUDIES: CABIN, SEAT, RESTRAINT, AND INJURY FINDINGS IN SELECTED GENERAL AVIATION ACCIDENTS

William R. Kirkham, S. Marlene Wicks, and Donald Lee Lowrey Mar. 1982 24 p refs
(AD-A114878; FAA-AM-82-7) Avail: NTIS HC A02/MF A01 CSCL 01/2

This report reviews 47 survivable or partly survivable accidents investigated since 1973 by personnel from the Civil Aeromedical Institute. The accidents were reviewed for a number of features of crashworthiness and, in particular, for injuries to occupants in relation to the severity of the impact and the performance of cabin and restraint systems. Opinions were rendered by trained crash injury investigators as to the role or expected role in seats and upper torso restraints in adding to or lessening the injuries. The data support the general concepts that nonoccupiable portions of the aircraft receive greater physical damage than occupiable areas. The greatest damage to the occupiable area is to the forward portion of cockpit/cabin and the occupants have a greater chance of survival if the cockpit/cabin remains reasonably intact. Occupants seated forward in the cockpit/cabin receive greater injuries than those seated more rearward. Further, the findings suggest the seat placement or seat failure to one degree or another intensified injuries (as compared to more optimum crashworthy seats) to occupants in at least

30 percent of the accidents reviewed. Upper torso restraints, in the few instances used, were beneficial, and had they been used by all occupants, would have significantly reduced the injuries. The report discusses the relation of the occupant to the seat and restraint system and the apparent benefit to be derived from a well-designed impact attenuating seat and, in particular, use of an upper torso restraint. Author (GRA)

N82-29276# Federal Aviation Administration, Atlantic City, N.J.
REDUCTION AND ANALYSIS OF MODE C ALTITUDE DATA COLLECTED AT HIGH ALTITUDES OVER THE CONTINENTAL UNITED STATES Final Report, Sep. 1977 - Apr. 1978
Robert Rigolizzo Mar. 1982 101 p refs
(AD-A114655; DOT/FAA/CT-81/53; DOT/FAA/EM-82/9) Avail: NTIS HC A06/MF A01 CSCL 01/2

This report describes the reduction and analysis of mode C altitude data collected over the en route centers of Cleveland, Ohio; Memphis, Tennessee; and Albuquerque, New Mexico. The data were gathered under the aegis of the separation standards program primarily for the study of lateral navigation performance over the continental United States at high altitudes. This study provides a procedure for estimating the vertical flight technical error as evidenced from mode C altitude data recorded at the en route centers. It does not account for basic altimeter system error or flight technical error biases and/or fluctuations that are not observable in the ground-derived mode C reported altitude. The data are fitted to six different analytical distributional forms. The effect that data quantization has on the estimation of the parameters of the distributions is examined. Then statistical tests are performed to evaluate the appropriateness of each distributional model in representing the histogram of the mode C deviations. A preliminary analysis is conducted to investigate the association between mode C altitude and aircraft environmental performance characteristics commonly utilized in evaluating separation criteria, as well as identifying aircraft attributes that are of major interest when evaluating vertical flight technical error. Author (GRA)

N82-29277# Clemson Univ., S.C. Dept. of Industrial Management.
MAXIMIZING SOUTH CAROLINA'S AVIATION RESOURCES: IDENTIFYING POTENTIALLY PROFITABLE COMMUTER AIRLINE ROUTES, VOLUME 2
Clinton H. Whitehurst, Jr., Mark A. McKnew, Michael W. Broadway, and Gayle H. Taylor Oct. 1981 168 p refs
(Grant EDA-04-06-03042-40)
(PB82-139353; EDA-81-0132) Avail: NTIS HC A08/MF A01 CSCL 01B

The commuter airline routes within South Carolina were analyzed. It is concluded there are, in fact, a number of potentially profitable commuter airline routes between communities within South Carolina and interstate routes tying some communities in the State to medium and large hub airports. There is however, still work to be done. As communities grow in size and should air service to the State by trunk carriers decline further, it would be well worth it for a community to reevaluate its potential to support commuter service in terms of the profitability criteria outlined in this study. GRA

N82-29278# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA: US GENERAL AVIATION CALENDAR YEAR 1979
5 Nov. 1981 213 p
(PB82-136250; NTSB-ARG-81-1) Avail: NTIS HC A10/MF A01 CSCL 01B

Aircraft accidents which occurred in U.S. general aviation operations during the calendar year 1979 are summarized. It includes an analysis of accident data involving an overview, types of accidents, accidental causal factors, kind of flying, and conclusions; a statistical compilation of accident information presented in the form of accident and rate tables, analytic tables, injury tables and cause/factor tables. These statistical data are divided into sections pertaining to all operations, small fixed-wing aircraft, large fixed-wing aircraft, rotorcraft, gliders, and collisions between aircraft. In 1979, there were 4,023 total general aviation accidents, 678 of which were fatal. Included in the total number of accidents are 40 collisions between aircraft. Author

N82-29279# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AIRCRAFT FIRE SAFETY
May 1982 174 p refs Presented at AGARD Lecture Series, Oslo, 7-8 Jun 1982 and London, 10-11 Jun. 1982 and Washington, 15-16 Jun. 1982
(AGARD-LS-123; ISBN-92-835-1424-6) Avail: NTIS HC A09/MF A01

Progress in aerospace science and technology, especially pertaining to aircraft safety was reported. The goals of the international organization are to: strengthen common defense posture, improve international cooperation in research and development, provide scientific and technical advance to NATO in aerospace R&D, increase scientific and technical potential and recommend effective use of R&D capabilities. The following topics are discussed: aircraft fire mishap experience/crash fire scenario quantitation; human response to fire; aviation fuels, future outlook and impact on aircraft fire threat; fuel system protection methods; fireworthiness of transport aircraft interior systems; the development and application of a full scale wide body test article to study the behavior of interior materials during a postcrash fuel fire; aircraft postcrash fire reduction/survivability enhancement from a manufacturer's viewpoint; and aircraft postcrash fire fighting/rescue For individual titles, see N82-29280 through N82-29287.

N82-29280# Federal Aviation Administration, Washington, D.C. Engineering Analysis Branch.
AIRCRAFT FIRE MISHAP EXPERIENCE/CRASH FIRE SCENARIO QUANTITATION
Thomas G. Horeff *In* ACARD Aircraft Fire Safety May 1982 6 p refs (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

Civil and military turbine aircraft accidents were reviewed. It was confirmed that the major postcrash fire hazard was caused by ignition of fuel released from wing separation failured during impact survivable accidents. General scenarios for postcrash fire hazards are described and heat flux levels and cabin airflow rates based on fuselage postcrash fire tests are suggested. Fire fatalities to fire tests are suggested. Fire fatalities to fire scenarios and fire experience data base through 1979 are related. It is concluded that the reduction of postcrash fire gives the greatest potential for improved crashworthiness and increased occupant survivability. E.A.K.

N82-29281# Army Aeromedical Research Lab., Fort Rucker, Ala.
HUMAN RESPONSE TO FIRE
Stanley C. Knapp and Francis S. Knox, III *In* AGARD Aircraft Fire Safety May 1982 19 p (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

Human survival in aircraft fire was investigated. Aircraft fires and human survival in thermophysical dimensions and aircraft fire properties, chemical and toxic nature of fibres, the concept of worst credible environment, and survival time dimension derived from ground and airborne fire suppression are discussed. The epidemiology of human fire morbidity and mortality are divided into: (1) no personal protection, no prevention of fire; (2) inadequate protection, no prevention of fire; and (3) prevention of fire and good protection. Assessment techniques to select fabric for protective clothing are examined. Physical and biomedical bases to formulated strategies for the development of aircraft fire prevention and personal protection which leads to increased human survival is constructed. E.A.K.

N82-29282# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Aero Propulsion Lab.
AVIATION FUELS-FUTURE OUTLOOK AND IMPACT ON AIRCRAFT FIRE THREAT
A. V. Churchill *In* AGARD Aircraft Fire Safety May 1982 17 p refs (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

The properties of aviation turbine fuels with respect to aircraft fire safety are described. It is indicated that projections of the availability of petroleum crudes specifications for aviation turbine fuels may have to be modified to use fuels produced from shale oil, heavy oils and coal. Projections of the chemical and physical properties of future aviation fuels produced from these alternative sources are discussed and compared with present fuels. Progress on programs to develop fire safe fuels through the use of antimisting additives is also described. E.A.K.

N82-29283# Royal Aircraft Establishment, Farnborough (England). Engineering Physics Dept.

FUEL SYSTEM PROTECTION METHODS

H. W. G. Wyeth *In* AGARD Aircraft Fire Safety May 1982 16 p refs (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

A fuel system protection equipment for military aircraft and helicopters, to reduce fires and explosions which occur under combat conditions was developed. Equipments are available for fitment to civil transport for survivability enhancement. It is recommended that aircraft fire safety and crash resistance in the initial design and appropriate safety precautions taken to minimize the risk of fire and explosion both in flight and on the ground should be considered. It is concluded that fuel containment systems and antimisting fuels can reduce dynamic fuel spillage and improve occupant survivability in postcrash fire. E.A.K.

N82-29284*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

FIREWORTHINESS OF TRANSPORT AIRCRAFT INTERIOR SYSTEMS

John A. Parker and D. A. Kourtides *In* AGARD Aircraft Fire Safety May 1982 17 p refs (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

The fire worthiness of air transport interiors was evaluated. The effect of interior systems on the survival of passengers and crew in an uncontrolled transport aircraft fire is addressed. Modification of aircraft interior subsystem components which provide improvements in aircraft fire safety are examined. Three specific subsystem components, interior panels, seats and windows, offer the most immediate and highest payoff by modifying interior materiels of existing aircrafts. It is shown that the new materials modifications reduce the fire hazards because of significant reduction in their characteristic flame spread, heat release, and smoke and toxic gas emissions. E.A.K.

N82-29285# Federal Aviation Administration, Atlantic City, N.J. Fire Safety Branch.

THE DEVELOPMENT AND APPLICATIONS OF A FULL-SCALE WIDE BODY TEST ARTICLE TO STUDY THE BEHAVIOR OF INTERIOR MATERIALS DURING A POST-CRASH FUEL FIRE

Constantine P. Sarkos, Richard G. Hill, and Wayne D. Howell *In* AGARD Aircraft Fire Safety May 1982 21 p refs (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

The full scale, wide body test article was developed to study postcrash cabin fires. Applications of the C-133 article are described as follows: (1) capabilities and instrumentation; (2) derivation of fuel fire test conditions based on physical modeling and fire tests; (3) characterization of cabin fire hazards which result from exposure of wide body interior materials to external fuel fire; and (5) evaluation of effectiveness of urethane seat cushion fire blocking layers and improved cushioning materials. It is shown that cabin hazards and parameters associated with postcrash fire can be realized by use of improved materials. E.A.K.

N82-29286# British Aerospace Aircraft Group, Bristol (England). Fire Precautions Engineering Dept.

AIRCRAFT POST CRASH FIRE REDUCTION/SURVIVABILITY ENHANCEMENT FROM A MANUFACTURER'S VIEWPOINT

T. Madgwick *In* AGARD Aircraft Fire Safety May 1982 23 p refs (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

The importance of achieving a balanced level of overall safety for flight and crash situations are outlined. Research and development in the area of external fire effects and occupant escape is evaluated. The crashworthiness requirements developed for the SST and the means of compliance are outlined. Cabin interior material combustion hazards are discussed. Visibility tests in a smoke filled cabin and the relative importance of toxicity effects in hindering escape are assessed. E.A.K.

N82-29287# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Antriebstechnik.

AIRCRAFT POST-CRASH FIRE FIGHTING/RESCUE

R. Fiala *In* AGARD Aircraft Fire Safety May 1982 27 p refs (For primary document see N82-29279 20-03)
Avail: NTIS HC A09/MF A01

The correlation between specific extinguishing time and the size of the burning fuel area was calculated. The influence of fuel properties, the boiling temperature and viscosity on extinguishing efficiency of foams is described. An extinguishing technique which considers the dependence of extinguishing efficiency on the foam properties is presented. The requirements for foam monitors are shown. The break up of foam jets, produced by foam monitors is discussed. The extinguishing efficiency with the combined application of dry powder halon and foam and the advantages of a combined use when there is only a pool fire are outlined. E.A.K.

N82-29288*# Princeton Univ., N.J. Flight Research Lab.

DEVELOPMENT OF FLYING QUALITIES CRITERIA FOR SINGLE PILOT INSTRUMENT FLIGHT OPERATIONS Interim Report, Sep. 1979 - May 1981

Aharon Bar-Gill, W. Barry Nixon, and George E. Miller Jun 1982 167 p refs
(Contract NAS1-15764)
(NASA-CR-165932; NAS 1.26:165932; MAE-1528) Avail: NTIS HC A08/MF A01 CSCL 17G

Flying qualities criteria for Single Pilot Instrument Flight Rule (SPIFR) operations were investigated. The ARA aircraft was modified and adapted for SPIFR operations. Aircraft configurations to be flight-tested were chosen and matched on the ARA in-flight simulator, implementing modern control theory algorithms. Mission planning and experimental matrix design were completed. Microprocessor software for the onboard data acquisition system was debugged and flight-tested. Flight-path reconstruction procedure and the associated FORTRAN program were developed. Algorithms associated with the statistical analysis of flight test results and the SPIFR flying qualities criteria deduction are discussed. N.W.

N82-29290# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.

EFFECTS OF APPROACH LIGHTING AND VARIATION IN VISIBLE RUNWAY LENGTH ON PERCEPTION OF APPROACH ANGLE IN SIMULATED NIGHT LANDINGS

Henry W. Mertens and Mark F. Lewis Feb. 1982 21 p refs
(AD-A114742; FAA-AM-82-6) Avail: NTIS HC A02/MF A01 CSCL 01/2

Previous experiments have demonstrated illusions due to variations in both length and width of runways in nighttime 'black hole' approaches. Even though approach lighting is not designed to provide vertical guidance, it is possible that cues from approach lights could interact with cues from runway lighting to reduce illusions due to variation in runway size. Two experiments were conducted to evaluate the effect of approach lighting on perception of approach angle in simulated night approaches. In the first experiment, 40 pilots made simulated visual approaches to a 150- by 6,000-ft runway with and without a 3,000-ft approach light system (ALSF-2). Pilots controlled a moving runway model to produce a constant 'normal' angle of approach over the distance range of 23,000 ft to 8,000 ft from threshold. In the second experiment, 24 pilots made simulated approaches to a 150- by 6,000-ft runway which was either fully visible or which had lights of the upwind half occluded. In addition, a 1,400-ft abbreviated approach light system (SSALS) was used at three intensities. Decreasing the visible length of the runway by occulting lights of the far half increased mean generated approach angles from 2.2 deg to 2.7 deg in agreement with results of a previous experiment involving similar lengths of runways. Neither the presence of equal intensity approach lights nor uncomfortable glare from approach lights 20 times brighter than runway lights had an effect of practical significance on responses. These findings reinforce previous experimental demonstrations of the importance of runway size cues related to varying runway length, and also show that potential size cues provided by approach lights do not prevent illusions due to variations in runway size. GRA

N82-29291# SRI International Corp., Menlo Park, Calif.

TERMINAL INFORMATION DISPLAY SYSTEM BENEFITS AND COSTS Final Report

Waheed Siddiqee, Janet Tomow, and Mina Chan Washington FAA Mar. 1982 79 p refs
(Contract DOT-FA-79-WA-4344)
(AD-A114937; FAA-APO-82-4) Avail: NTIS HC A05/MF A01 CSCL 17/7

Benefits and costs expected to accrue from a terminal information display system (TIDS) are analyzed. TIDS is an electronic data processing system intended to replace (1) present flight data entry and printing equipment and (2) several devices currently used to display meteorological and operational information within towers and terminal radar control facilities. A description of the terminal information display system is presented. Major sources of both quantifiable and nonquantifiable benefits are discussed. It is shown that the installation of TIDS would improve terminal controller productivity by ten to fifteen percent and would result in a substantial reduction in maintenance costs. Information in present value (1981) dollars for the equipment life cycle is presented. Over the twenty year service life of TIDS, the analysis indicates that the benefit/cost ratio is 1.74 and the net present value of savings by installing TIDS at thirty major terminal facilities is about $26 million. GRA

N82-29292# Applied Geophysics, Inc., Salt Lake City, Utah.
GEOPHYSICAL FLIGHT LINE FLYING AND FLIGHT PATH RECOVERY UTILIZING THE LITTON LTN-76 INERTIAL NAVIGATION SYSTEM
A. F. Mitkus, Dwight Cater, Patrick F. Farmer, and S. Parker Gay, Jr. Nov. 1981 177 p refs Prepared for High Life Helicopter, Inc.
(Contract DE-AC13-79GJ-01692)
(DE82-005555; GJBX-363-81) Avail: NTIS HC A09/MF A01

The Litton LTN-76 Inertial Navigation Systems (INS) with Inertial Track guidance system software is geared toward the airborne survey industry. This report is a summary of tests performed with the LTN-76 designed to fly an airborne geophysical survey as well as to recover the subsequent flight path utilizing INS derived coordinates. DOE

N82-29293# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HUMAN FACTORS IN AIR TRAFFIC CONTROL
V. David Hopkin (Royal Air Force Inst. of Aviation Medicine) Apr. 1982 187 p refs
(AGARD-AG-275; ISBN-92-835-1421-1) Avail: NTIS HC A09/MF A01

Human factors are related to air traffic control, air traffic control systems, the physical surroundings, equipment, and operation of the system, and the selection, development, training and evaluation of air traffic controllers. For individual titles, see N82-29294 through N82-29310.

N82-29294# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE AIR TRAFFIC CONTROL SYSTEM
In its Human Factors in Air Traffic Control Apr. 1982 p 3-9
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

Principles and practices of air traffic control are described. The information influencing the air traffic control system and the information available to the controller are summarized and defined. The users of air traffic control, whether commercial, military, or general aviation traffic is considered, are categorized, and their responsibilities discussed. Interactions between air traffic control and the pilot are considered. National and regional variations in the problems and practices of air traffic control are described. J.D.

N82-29295# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HUMAN FACTORS CONTRIBUTIONS TO AIR TRAFFIC CONTROL SYSTEMS
In its Human Factors in Air Traffic Control Apr. 1982 p 10-21
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

The role of the human factors specialist in air traffic control systems operations and planning is analyzed. Man-machine interactions; the contribution of human factors engineering to system design, the implementation and testing of air traffic control systems and tasks, and the evolution of air traffic control systems; and the educational role of human factors specialists as applied to air traffic control are considered. J.D.

N82-29296# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
MAN AS A SYSTEM COMPONENT
In its Human Factors in Air Traffic Control Apr. 1982 p 22-30
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

The air traffic controller is considered as a component of a man-machine system. Limitations of this approach are considered. The allocation of functions, the effects of automation and computer assistance, the man-machine interface, and human reliability are discussed. J.D.

N82-29297# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
HUMAN CAPABILITIES AND LIMITATIONS IN SYSTEMS
In its Human Factors in Air Traffic Control Apr. 1982 p 31-46
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

Human capabilities and limitations which restrict the development of air traffic control systems are discussed. Sensory factors, perception, learning, memory, capacity for attention, information processing, understanding, problem solving, decision making, and motivation are considered. Common mismatches of system requirements with human capabilities are described. J.D.

N82-29298# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
JOBS AND TASKS IN AIR TRAFFIC CONTROL
In its Human Factors in Air Traffic Control Apr. 1982 p 47-52
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

Jobs and tasks are discussed. The required content of job descriptions and their application to allocation of jobs is considered. Task analysis and task synthesis, task grouping, interactions between tasks, and workloads are described. J.D.

N82-29299# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
THE WORK ENVIRONMENT
In its Human Factors in Air Traffic Control Apr. 1982 p 53-62
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

The work environment for all traffic control tasks is considered. Principles of workspace design are discussed. The physical environment, suites and consoles, air traffic control centers and control rooms, and air traffic control towers are described. J.D.

N82-29300# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DISPLAYS
In its Human Factors in Air Traffic Control Apr. 1982 p 63-78
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

Factors affecting interactions between visual displays and their users are discussed. The physical dimensions of the display, the layout of the display and of information within the display, the information content of the display, visual codings and color codings, the legibility and readability of displays, the relation between displays, and the quality of displayed information are considered. New display technology is summarized. J.D.

N82-29301# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CONTROLS
In its Human Factors in Air Traffic Control Apr. 1982 p 79-84
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

The location, type, sensitivity, and interactions of the controls used by the human to convey information to the air traffic control system are discussed. The relationships between controls and visual displays are considered. J.D.

N82-29302# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
COMMUNICATIONS
In its Human Factors in Air Traffic Control Apr. 1982 p 85-93
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

The human factor terms of communication in air traffic control are examined. The effects of known specified variables in communications on controller performance or system efficiency were measured. The importance of speech and the use of computers in the man machine systems as a means of dialogue and information transmission is emphasized. The following topics are discussed: transmission of information between air and ground; speech as a medium of communication; qualitative attributes of speech; automated speech recognition and automated speech synthesis; coordination and liaison; language and terminology of air traffic control; air traffic phrasing and message formats; information quantification and redundancy in air traffic control messages. E.A.K.

N82-29309# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

ADDITIONAL FUNCTIONS WITHIN THE AIR TRAFFIC CONTROL SYSTEM

In its Human Factors in Air Traffic Control Apr. 1982 p 150-153
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

The application of human factors engineering to other job functions existing within the air traffic control system is discussed. Personnel involved in data gathering, maintenance of system integrity, fault finding, supervision, and traffic control assistance are considered. J.D.

N82-29310# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

FUTURE TRENDS AND PROBLEMS

In its Human Factors in Air Traffic Control Apr. 1982 p 154-155
(For primary document see N82-29293 20-04)
Avail: NTIS HC A09/MF A01

Anticipated developments and problems occurring in the application of human factors engineering to air traffic control systems, particularly in the light of technological advances in hardware and software, are summarized. J.D.

N82-29311*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

ESTABLISHMENT OF A ROTOR MODEL BASIS

R. E. McFarland Jun. 1982 93 p refs Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, Calif.
(NASA-TP-2026; A-8605; NAS 1.60:2026; AVRADCOM-TR-81-A-14) Avail: NTIS HC A05/MF A01 CSCL 01C

Radial-dimension computations in the RSRA's blade-element model are modified for both the acquisition of extensive baseline data and for real-time simulation use. The baseline data, which are for the evaluation of model changes, use very small increments and are of high quality. The modifications to the real-time simulation model are for accuracy improvement, especially when a minimal number of blade segments is required for real-time synchronization. An accurate technique for handling tip loss in discrete blade models is developed. The mathematical consistency and convergence properties of summation algorithms for blade forces and moments are examined and generalized integration coefficients are applied to equal-annuli midpoint spacing. Rotor conditions identified as 'constrained' and 'balanced' are used and the propagation of error is analyzed. Author

N82-29312*# Cincinnati Univ., Ohio. Dept. of Aerospace Engineering and Applied Mechanics.

FLAP-LAG-TORSIONAL DYNAMICS OF EXTENSIONAL AND INEXTENSIONAL ROTOR BLADES IN HOVER AND IN FORWARD FLIGHT Semiannual Progress Report, Jan. - Jun. 1982

Crespo DaSilva Jun. 1982 72 p refs
(Grant NAG2-38)
(NASA-CR-169159; NAS 1.26:169159) Avail: NTIS HC A04/MF A01 CSCL 01C

The reduction of the O(cu epsilon) integro differential equations to ordinary differential equations using a set of orthogonal functions is described. Attention was focused on the hover flight condition. The set of Galerkin integrals that appear in the reduced equations was evaluated by making use of nonrotating beam modes. Although a large amount of computer time was needed to accomplish this task, the Galerkin integrals so evaluated were stored on tape on a permanent basis. Several of the coefficients were also obtained in closed form in order to check the accuracy of the numerical computations. The equilibrium solution to the set of 3n equations obtained was determined as the solution to a minimization problem. S.L.

N82-29313*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THE FEASIBILITY OF A HIGH-ALTITUDE AIRCRAFT PLATFORM WITH CONSIDERATION OF TECHNOLOGICAL AND SOCIETAL CONSTRAINTS Thesis - Kansas Univ.

Ernald B. Graves Jun. 1982 250 p refs
(NASA-TM-84508; NAS 1.15:84508) Avail: NTIS HC A15/MF A01 CSCL 01C

The feasibility of remotely piloted aircraft performing year around missions at an altitude of 70,000 feet is determined. Blimp and airplane type vehicles employing solar-voltaic, microwave, or nuclear propulsion systems were considered. A payload weighing 100 pounds and requiring 1000 watts of continuous power was assumed for analysis purposes. Results indicate that a solar powered aircraft requires more solar cell area than is available on conventional aircraft configurations if designed for the short days and high wind speeds associated with the winter season. A conventionally shaped blimp that uses solar power appears feasible if maximum airspeed is limited to about 100 ft/s. No viable airplane configuration that uses solar power and designed to withstand the winter environment was found. Both a conventionally shaped blimp and airplane appear feasible using microwave power. Nuclear powered aircraft of these type are also feasible. Societal attitudes toward the use of solar power in high altitude aircraft appear favorable. The use of microwave power for this purpose is controversial, even though the ground station required would transmit power at levels comparable to existing satellite communications stations. S.L.

N82-29315*# Bell Helicopter Co., Fort Worth, Tex.

INVESTIGATION OF CORRELATION BETWEEN FULL-SCALE AND FIFTH-SCALE WIND TUNNEL TESTS OF A BELL HELICOPTER TEXTRON MODEL 222 Final Report

Patrick K. Squires Jun. 1982 401 p refs
(Contract NAS2-10773)
(NASA-CR-166362; NAS 1.26:166362) Avail: NTIS HC A18/MF A01 CSCL 01C

Reasons for lack of correlation between data from a fifth-scale wind tunnel test of the Bell Helicopter Textron Model 222 and a full-scale test of the model 222 prototype in the NASA Ames 40-by 80-foot tunnel were investigated. This investigation centered around a carefully designed fifth-scale wind tunnel test of an accurately contoured model of the Model 222 prototype mounted on a replica of the full-scale mounting system. The improvement in correlation for drag characteristics in pitch and yaw with the fifth-scale model mounted on the replica system is shown. Interference between the model and mounting system was identified as a significant effect and was concluded to be a primary cause of the lack of correlation in the earlier tests. Author

N82-29316*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.

THE COST OF NOISE REDUCTION FOR DEPARTURE AND ARRIVAL OPERATIONS OF COMMERCIAL TILT ROTOR AIRCRAFT

Henry B. Faulkner and William M. Swan Jun. 1976 118 p refs
(Contract NAS2-7620)
(NASA-CR-137803; NAS 1.26:137803) Avail: NTIS HC A06/MF A01 CSCL 01C

The relationship between direct operating cost (DOC) and noise annoyance due to a departure and an arrival operation was developed for commercial tilt rotor aircraft. This was accomplished by generating a series of tilt rotor aircraft designs to meet various noise goals at minimum DOC. These vehicles ranged across the spectrum of possible noise levels from completely unconstrained to the quietest vehicles that could be designed within the study ground rules. Optimization parameters were varied to find the minimum DOC. This basic variation was then extended to different aircraft sizes and technology time frames. Author

N82-29317*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AUTOMATED OPTIMUM DESIGN OF WING STRUCTURES. DETERMINISTIC AND PROBABILISTIC APPROACHES

S. S. Rao Aug. 1982 47 p refs
(NASA-TM-84475; L-15169; NAS 1.15:84475) Avail: NTIS HC A03/MF A01 CSCL 01C

The automated optimum design of airplane wing structures subjected to multiple behavior constraints is described. The structural mass of the wing is considered the objective function.

The maximum stress, wing tip deflection, root angle of attack, and flutter velocity during the pull up maneuver (static load), the natural frequencies of the wing structure, and the stresses induced in the wing structure due to landing and gust loads are suitably constrained. Both deterministic and probabilistic approaches are used for finding the stresses induced in the airplane wing structure due to landing and gust loads. A wing design is represented by a uniform beam with a cross section in the form of a hollow symmetric double wedge. The airfoil thickness and chord length are the design variables, and a graphical procedure is used to find the optimum solutions. A supersonic wing design is represented by finite elements. The thicknesses of the skin and the web and the cross sectional areas of the flanges are the design variables, and nonlinear programming techniques are used to find the optimum solution. S.L.

N82-29318# Aeronautical Research Labs., Melbourne (Australia).
A DISCUSSION OF THE FLYING QUALITY REQUIREMENTS OF A BASIC TRAINING AIRCRAFT
C. A. Martin Mar. 1982 16 p refs
(AD-A114805; ARL/AERO-TM-337) Avail: NTIS
HC A02/MF A01 CSCL 01/3

This Memo aims to identify flying qualities of importance in a basic training aircraft and also to suggest interpretations of particular military specifications. The proposition is developed that flying qualities which are considered 'good' for an operational aircraft are not necessarily desirable for a training aircraft. GRA

N82-29319*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HEADS UP DISPLAY Patent Application
H. Douglas Garner and William E. Howell, inventors (to NASA)
Filed 28 May 1982 12 p
(NASA-Case-LAR-12630-1; US-Patent-Appl-SN-383384) Avail: NTIS HC A02/MF A01 CSCL 01D

A heads up aircraft display which allows the pilot to view the display without diverting his attention from the scene ahead is disclosed. The display is designed for use on propeller driven aircraft comprised of a radially disposed row of lamps embedded in the rear surface of a propeller. Measurements of flight data are made by conventional means and converted into digital signals. These digital signals are applied to graphic generators which control lamp drivers which in turn control lamps through slip rings. The lamps are lit at the appropriate times during each revolution of the propeller to display the flight data in graphic form to the pilot. The combination of graphic generators and radially disposed lamps embedded in an aircraft propeller enables the pilot to view the display without diverting his attention from the scene ahead. NASA

N82-29321# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Technology Div.
AN EVALUATION OF THE ROSEMOUNT ICE DETECTOR FOR CLOUD WATER CONTENT MEASUREMENTS
E. N. Brown Oct. 1981 19 p refs
(Grant NSF ATM-77-23757)
(PB82-158833; NCAR/TN-183) Avail: NTIS
HC A02/MF A01 CSCL 14B

A Rosemount ice detector was installed on a Research Aviation Facility Queen Air for evaluation. It was used during a winter stratus cloud experiment at Muskegon, Michigan (1978) and also during a cumulus cloud experiment (HIPLEX) in 1980 at Big Spring, Texas. Results indicate that the detector is an extremely sensitive instrument with a reasonable dynamic range. The instrument provides a measurement of icing severity and valid computed water content values only for conditions of small water content and/or low temperature. GRA

N82-29322# Aeronautical Research Labs., Melbourne (Australia).
RESULTS OF T56 ENGINE PERFORMANCE MONITORING TRIAL IN HERCULES AIRCRAFT, FEBRUARY - JULY 1977
D. E. Glenny Apr. 1981 37 p refs
(ARL-MECH-Eng-TECH-MEMO-409; AR-002-277) Avail: NTIS
HC A03/MF A01

An engine performance monitoring trial was carried out on the Hercules aircraft. The engine monitoring procedures were developed as an aid to the flight engineer and the maintenance section, so that the performance of the Allison T56 engines were monitored more closely than was specified in operating procedures, thus enabling engine operation and maintenance action to be carried out more effectively. The trial was conducted on Hercules aircraft, and the initial analysis of results was carried out by personnel who are responsible for maintenance of these aircrafts. Operating instructions for aircrew and maintenance personnel, and the results of the trial are presented. Details of the rationale behind the monitoring procedures and overall conclusions on the trial are given. S.L.

N82-29323*# Teledyne CAE, Toledo, Ohio.
COOLED VARIABLE NOZZLE RADIAL TURBINE FOR ROTOR CRAFT APPLICATIONS
C. Rogo Mar. 1981 205 p refs
(Contract NAS3-22005; DA Proj. 1L1-62209-AH-76)
(NASA-CR-165397; NAS 1.26:165397; Rept-1759) Avail: NTIS HC A10/MF A01 CSCL 21E

An advanced, small 2.27 kg/sec (5 lbs/sec), high temperature, variable area radial turbine was studied for a rotor craft application. Variable capacity cycles including single-shaft and free-turbine engine configurations were analyzed to define an optimum engine design configuration. Parametric optimizations were made on cooled and uncooled rotor configurations. A detailed structural and heat transfer analysis was conducted to provide a 4000-hour life HP turbine with material properties of the 1989 time frame. A pivoted vane and a moveable sidewall geometry were analyzed. Cooling and variable geometry penalties were included in the cycle analysis. A variable geometry free-turbine engine configuration with a design 1477 K (2200 F) inlet temperature and a compressor pressure ratio of 16:1 was selected. An uncooled HP radial turbine rotor with a moveable sidewall nozzle showed the highest performance potential for a time weighted duty cycle. Author

N82-29324*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
QCSEE OVER-THE-WING ENGINE ACOUSTIC DATA
Harry E. Bloomer and Irvin J. Loeffler May 1982 28 p refs
(NASA-TM-82708; E-990; NAS 1.15:82708) Avail: NTIS
HC A03/MF A01 CSCL 21E

The over the wing (OTW) Quiet, Clean, Short Haul Experimental Engine (QCSEE) was tested at the NASA Lewis Engine Noise Test Facility. A boilerplate (nonflight weight), high throat Mach number, acoustically treated inlet and a D shaped OTW exhaust nozzle with variable position side doors were used in the tests along with wing and flap segments to simulate an installation on a short haul transport aircraft. All of the acoustic test data from 10 configurations are documented in tabular form. Some selected narrowband and 1/3 octave band plots of sound pressure level are presented. Author

N82-29325# Exotech Proprietary Ltd., Monterey, Calif.
MULTISTAGE AXIAL COMPRESSOR PROGRAM ON TIP CLEARANCE EFFECTS Contractor Report, May 1979 - Aug. 1981
I. Moyle Aug. 1981 49 p refs
(Contract N62271-80-M-2504)
(AD-A107445; NPS67-81-01CR) Avail: NTIS
HC A03/MF A01 CSCL 21/5

Tip clearance has long been known to be a source of losses in axial compressors with cantilevered blades. The reasons for the losses, however, are not well understood and current practice in engine design still requires extensive effort to maintain constant minimal operating clearances over a wide range of conditions. The emphasis on clearance control may be appreciated by the typical observation that a ten percent change in peak static pressure rise in a compressor stage may occur for a fifty percent change in clearance. Clearances are typically in the one to five percent of major passage dimension range, and thus a small change in passage dimensions represents a large change in clearance. It is clear that, in general, it would be desirable that blading performance be less sensitive to changes in clearance. Less sensitivity would allow a general relaxation of the mechanical tolerances on a compressor assembly and provide more consistent transient performance. The aerodynamics of achieving such a situation are a challenge as the underlying requirement is improved performance at larger clearances. Work toward understanding the basic mechanisms of tip clearance effects with an emphasis on designing for clearance has been commenced at the Naval Postgraduate School Turbopropulsion Laboratory (NPS/TPL). This report summarizes the preliminary work on the Multistage Compressor (MSC) facility at the Laboratory. GRA

N82-29326# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
WATER INGESTION INTO AXIAL FLOW COMPRESSORS. PART 3: EXPERIMENTAL RESULTS AND DISCUSSION Final Report, 15 Dec. 1977 - 30 Jun. 1981
T. Tsuchiya, S. N. B. Murthy, C. M. Ehresman, and D. Richards Wright-Patterson AFB, Ohio AFWAL Oct. 1981 288 p refs
(Contract F33615-78-C-2401; AF Proj. 3066)
(AD-A114830; AFWAL-TR-80-2090-Pt-3) Avail: NTIS HC A13/MF A01 CSCL 21/5

The subject of air-water mixture flow in axial compressors of jet engines is of practical interest in two contexts of water ingestion: during take-off from rough runways with puddles of water and during flight through rain storms. The change in the compressor performance in turn produces changes in the performance of other components and of the engine as a whole. During the current investigation, (1) an analysis of the effects of water ingestion into a compressor has been carried out leading to the development of a predictive code, the PURDU-WICSTK program and (2) a series of tests have been carried out on a small test compressor with mixtures of gases (containing methane gas to simulate steam) and with air-water droplet mixtures. The experimental results have been compared with predictions. It is concluded that the basic effects of water ingestion into compressors arise through (1) blockage, (2) distortion and (3) heat and mass transfer processes, the changes in blade aerodynamic performance being relatively small. In the case of a compressor of small mass flow and pressure ratio and high operating speed, increased quantities of water ingestion give rise to large quantities of water in the tip region. GRA

N82-29327# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
EFFECT OF WATER ON AXIAL FLOW COMPRESSORS. PART 2: COMPUTATIONAL PROGRAM Final Report, 15 Dec. 1977 - 30 Sep. 1980
T. Tsuchiya and S. N. B. Murthy Wright-Patterson AFB, Ohio AFWAL Jun. 1981 425 p refs
(Contract F33615-78-C-2401; AF Proj. 3066)
(AD-A114831; AFWAL-TR-80-2090-Pt-2) Avail: NTIS HC A18/MF A01 CSCL 21/5

An analysis of the performance of an axial flow compressor operating with mixtures of gases and air-water droplet mixtures was performed. In the case of mixtures of gases, account was taken of the changes in molecular weight and ratio of specific heats. In the case of two phase flow, the major processes of interest are: (1) droplet blade interaction; (2) droplet heating; (3) droplet centrifuging; and (4) droplet break up. The PURDU-WICSTK program developed for the prediction of compressor performance was utilized to obtain the performance of a test compressor. A three dimensional stream line computer code, the UD-0300, was also modified and exercised in the case of compressor operation with mixtures of gases. Water ingestion into the compressor of an aircraft gas turbine engine affects the performance of the engine, and a preliminary analysis of the nature of the effects was also conducted. M.G.

N82-29328# Iowa State Univ. of Science and Technology, Ames. Turbomachinery Components Research Lab.
AERODYNAMICS OF ADVANCED AXIAL-FLOW TURBOMACHINERY Annual Report, 1 Oct. 1980 - 30 Sep. 1981
George K. Serovy, Patrick Kavanagh, and Theodore H. Okiishi Dec. 1981 82 p refs
(Grant AF-AFOSR-0004-80; AF Proj. 2307)
(AD-A114911; ISU-ERI-AMES-82106; TCRL-22; AFOSR-82-0201TR) Avail: NTIS HC A05/MF A01 CSCL 21/5

A multi-task research program on the aerodynamics of advanced axial-flow turbomachinery is continuing at Iowa State University. Program components are intended to result in direct contributions to the improvement of axial-flow fan, compressor, and turbine design procedures. A detailed experimental investigation of intrapassage flow in a large-scale, curved, rectangular cross section channel representative of turbomachinery passages is in progress. Author (GRA)

N82-29329*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AGRICULTURAL AIRPLANE MISSION TIME STRUCTURE CHARACTERISTICS
Joseph W. Jewel, Jr. Jul. 1982 44 p refs
(NASA-TM-84470; L-15125; NAS 1.15:84470) Avail: NTIS HC A03/MF A01 CSCL 01C

The time structure characteristics of agricultural airplane missions were studied by using records from NASA VGH flight recorders. Flight times varied from less than 3 minutes to more than 103 minutes. There was a significant reduction in turning time between spreading runs as pilot experience in the airplane type increased. Spreading runs accounted for only 25 to 29 percent of the flight time of an agricultural airplane. Lowering the longitudinal stick force appeared to reduce both the turning time between spreading runs and pilot fatigue at the end of a working day. Author

N82-29330* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
METHOD FOR REFURBISHING AND PROCESSING PARACHUTES Patent
Russell T. Crowell, inventor (to NASA) Issued 2 Feb. 1982 7 p Filed 30 May 1980 Supersedes N81-14967 (19 - 06, p 0706) Division of US Patent Appl. SN-862878, filed 12 Dec. 1977, US Patent-4,244,810
(NASA-Case-KSC-11042-1; US-Patent-4,313,201; US-Patent-4,244,810; US-Patent-Appl-SN-154663; US-Patent-Appl-SN-862878; US-Patent-Class-53-429; US-Patent-Class-8-150) Avail: US Patent and Trademark Office CSCL 14B

A system and method for refurbishing and processing parachutes is discussed including an overhead monorail conveyor system on which the parachute is suspended for horizontal conveyance. The parachute is first suspended in partially open tented configuration wherein open inspection of the canopy is permitted to remove debris and inspect all areas. Following inspection, the parachute is transported by the monorail conveyor to a washing and drying station with the parachute canopy mounted on the conveyor ina systematic arrangement which permits water and air to pass through the ribbonlike material of the canopy. Following drying of the parachute, the parachute is conveyed into an interior space where it is finally inspected and removed from the monorail conveyor and laid upon a table for folding. Official Gazette of the U.S. Patent and Trademark Office

N82-29331*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
INFLIGHT IFR PROCEDURES SIMULATOR Patent Application
Lloyd C. Parker, inventor (to NASA) Filed 11 Jun. 1982 22 p
(NASA-Case-KSC-11218-1; US-Patent-Appl-SN-387649) Avail: NTIS HC A02/MF A01 CSCL 14B

An in-flight trainer designed to train students in a conventional aircraft is disclosed. The trainer generates simulated signals and commands to conventional instruments provided in the aircraft that correspond to the normal signals a pilot receives during instrument flight rule (IFR) flights and landing and departure procedures. Results of studies conducted using apparatus which demonstrated the concept indicate that the concept is feasible. Also, students trained using only the In-flight IFR Simulator were more proficient in skills development than those trained using table-top simulators and in aircraft in the conventional manner. J.M.S.

N82-29332# Seville Research Corp., Pensacola, Fla.
OPERATIONAL TEST AND EVALUATION HANDBOOK FOR AIRCRAFT TRAINING DEVICES. VOLUME 1: PLANNING AND MANAGEMENT Final Report
Thomas H. Gray, Stephen R. Osborne, Roik I. Hockenberger and James P. Smith Williams AFB, Ariz. Air Force Human Resources Lab Feb. 1982 72 p refs
(Contract F33615-78-C-0063; AF Proj. 1123)
(AD-A112498; AFHRL-TR-81-44-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05/9

The handbook, comprised of three volumes, is intended to provide guidelines and procedures appropriate for Air Force Operational Test and Evaluation (OT/E) personnel to use in planning, conducting, and reporting the results of simulator assessment efforts. Although of value of all test personnel, it is primarily for the typical novice test manager/director-a person who has subject matter expertise (e.g., a qualified pilot or operator), but who may have little or no previous OT/E experience. The handbook provides detailed coverage on OT/E planning and management, with special emphasis on measuring device operational effectiveness and suitability. In accord with its objectives, the handbook was prepared to serve as a supplement to Air Force Manual 55-43, 'Management of Operational Test and Evaluation', by providing those specific additional evaluation concepts and techniques necessary for aircrew training device (ATD) test and evaluation. Volume 1 is concerned, first with describing both general and specific ATD OT/E planning and management considerations and links those events which occur early in the ATD acquisition process to later ATD OT/E planning and management activities. It defines the various evaluation concepts germane to understanding ATD OT/E, and describes the two major ATD OT/E activities--Initial/Qualification OT/E and Follow-on OT/E; matters of ATD value and worth to the Air Force. The acquisition and life cycle costs associated with modern ATDs make such concerns important. GRA

N82-29333# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
THE USE OF A MULTI-DEGREE-OF-FREEDOM DUAL BALANCE SYSTEM TO MEASURE CROSS AND CROSS-COUPLING DERIVATIVES Final Report, 1 Oct. - 1 Nov. 1981
D. R. Haberman AEDC Apr. 1982 92 p refs Sponsored by Air Force
(AD-A114813; AEDC-TR-81-34) Avail: NTIS HC A05/MF A01 CSCL 12/1

The equations of motion are derived for two existing dual balance systems used at the Arnold Engineering Development Center (AEDC) to obtain measurements of aerodynamic cross and cross-coupling derivatives. The complete equations of motion presented include the effects of sting motion. Each system incorporates a dynamic cross flexure balance and a five-component static balance. The primary deflection modes of the balances were confirmed using a holographic interferometry measurement technique. Both laboratory and wind tunnel data are presented to illustrate dynamic effects. Author (GRA)

N82-29334# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Fluid Dynamics Panel.
WINDTUNNEL CAPABILITY RELATED TO TEST SECTIONS, CRYOGENICS, AND COMPUTER-WINDTUNNEL INTEGRATION
Apr. 1982 64 p refs
(AGARD-AR-174; ISBN-92-835-1420-3) Avail: NTIS HC A04/MF A01

The roles of computational fluid dynamics and wind tunnels, and their growing interdependence are considered. Transonic test sections, cryogenic testing technology, and integration of computer and wind tunnel testing are discussed. S.L.

N82-29343# Sandia Labs., Albuquerque, N. Mex. Aerodynamic Simulation Div.
USER'S MANUAL FOR THE AMEER FLIGHT PATH-TRAJECTORY SIMULATION CODE
Eugene J. Meyer Oct. 1981 187 p refs
(Contract DEOAC04-76DP-00789)
(DE82-007004; SAND-80-2056) Avail: NTIS HC A09/MF A01

A guide to the use of the AMEER (Aero-Mechanical Equations Evaluation Routines) flight path-trajectory simulation code is presented. The input data requirements, computed output data available, code control features, and code flow logic are described for a rigid-body six-degree-of-freedom or point mass simulation. DOE

N82-29347# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PRELAUNCH ESTIMATES OF NEAR EARTH SATELLITE LIFETIMES USING QUASI-DYNAMIC ATMOSPHERE MODELS - APPLICATION TO A PROPOSED BRAZILIAN SATELLITE
Nellore S. Venkataraman and Kondapalli Rama Rao Feb. 1982 22 p refs Submitted for publication
(INPE-2325-PRE/080) Avail: NTIS HC A02/MF A01

A rapid prelaunch estimate of near Earth satellite lifetimes using the small perturbation theory is calculated. A quasi-dynamic atmospheric model is used employing a different exospheric temperature every three months. The drag coefficient is calculated using kinetic theory. S.L.

N82-29393# Ellis (George S.), Chardon, Ohio.
ETHANOL PRODUCTION BY VAPOR COMPRESSION DISTILLATION Final Report
George S. Ellis 1981 9 p
(Contract DE-FG02-80R5-10240)
(DE82-004892; DOE/R5-10240/2) Avail: NTIS HC A02/MF A01

It was the goal of the project to develop and demonstrate a one (1) gallon per hour vapor compression distillation unit for fuel ethanol production that could be profitably manufactured and economically operated by individual family units. The unit constructed was originally built for strictly ambient temperature operation, but later modified to permit elevated temperature operation. It successfully separated ethanol from a dilute solution, but only at a very low production rate. The initial configuration had the compressor located outside of the distillation vessel and was losing excessive energy to the environment. Therefore, it would not be possible to operate that design at elevated temperature. Thus, the compressor was moved inside the distillation vessel. DOE

N82-29464# Brookhaven National Lab., Upton, N. Y.
WATER-COMPATIBLE POLYMER CONCRETE MATERIALS FOR USE IN RAPID REPAIR SYSTEMS FOR AIRPORT RUNWAYS Final Report, Mar. 1980 - Feb. 1981
T. Sugama and L. E. Kukacka Mar. 1981 128 p refs
(Contracts AFOSR ISSA 80-00027; DE-AC02-76CH-00016; AF Proj. 2307)
(DE82-010994; BNL-51390; AFOSR-81-0589TR) Avail: NTIS HC A07/MF A01

Water-compatible polymer concrete (PC) formulations were developed which appear to have potential for use in all-weather rapid repair procedures for bomb-damaged runways. Formulations consisting of furfuryl alcohol, water-saturated aggregate, dry silica flour, promoters, and catalysts produced composites with properties suitable for repair purposes when mixed and polymerized at temperatures from -200 to 300 C. Calcium-unsaturated polyester complexed PC also produced excellent properties. However, the early strength criteria [2000 psi (13.78 MPa) at 1 h] and other requirements such as compatibility of the formulation with water and practical working times could be attained only at temperatures > 200 C. This system can be polymerized under water. Studies of the polymerization reaction mechanisms, materials properties, costs, and potential placement methods were performed. DOE

N82-29476# UOP, Inc., Des Plaines, Ill.
UNITED STATES AIR FORCE SHALE OIL TO FUELS, PHASE 2 Interim Technical Report, 1 Apr. 1979 - 30 Sep. 1980
J. R. Wilcox, J. G. Sikonia, T. G. Board, and F. J. Riedl Wright-Patterson AFB, Ohio AFWAL Nov. 1981 295 p refs
(Contract F33615-78-C-2079)
(AD-A114531; AFWAL-TR-81-2116) Avail: NTIS HC A13/MF A01 CSCL 21/4

Phase II of this project was conducted to demonstrate innovative technology to reduce the cost of converting shale oil to high yields of aviation turbine fuels. To carry out this program, UOP selected a processing scheme involving hydrocracking as the primary conversion unit. The Phase II program included pilot plant processing, fouling studies and economic analysis. The pilot plant operations performed during Phase II involved four specific processing steps: feed preparation, low pressure hydrotreating, high pressure hydrotreating, and hydrocracking. Two shale oil feedstocks were utilized for each processing step: shale oil derived from Occidental Modified In-Situ retort and shale oil obtained from the Paraho direct-heated retort. Using data generated from the pilot plant operations and the study basis provided by the USAF, economic analyses were performed to find the cost of production of jet fuel, and total liquid product at a 15% discounted cash flow rate of return (DCFRR) on investment. GRA

N82-29510*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
SYSTEM DATA COMMUNICATION STRUCTURES FOR ACTIVE-CONTROL TRANSPORT AIRCRAFT, VOLUME 1 Final Report
A. L. Hopkins, J. H. Martin, L. D. Brock, D. G. Jansson, S. Serben, T. B. Smith, and L. D. Hanley Jun. 1981 236 p refs 2 Vol
(Contract NAS1-15359)
(NASA-CR-165773-Vol-1; NAS 1.26:165773-Vol-1; R-1469-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 17B

Candidate data communication techniques are identified, including dedicated links, local buses, broadcast buses, multiplex buses, and mesh networks. The design methodology for mesh networks is then discussed, including network topology and node architecture. Several concepts of power distribution are reviewed, including current limiting and mesh networks for power. The technology issues of packaging, transmission media, and lightning are addressed, and, finally, the analysis tools developed to aid in the communication design process are described. There are special tools to analyze the reliability and connectivity of networks and more general reliability analysis tools for all types of systems. S.L.

N82-29511*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
SYSTEM DATA COMMUNICATION STRUCTURES FOR ACTIVE-CONTROL TRANSPORT AIRCRAFT, VOLUME 2 Final Report
A. L. Hopkins, J. H. Martin, L. D. Brock, D. G. Jansson, S. Serben, T. B. Smith, and L. D. Hanley Jun. 1981 156 p refs 2 Vol.
(Contract NAS1-15359)
(NASA-CR-165773-Vol-2; NAS 1.26:165773-Vol-2; R-1469-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 17B

The application of communication structures to advanced transport aircraft are addressed. First, a set of avionic functional requirements is established, and a baseline set of avionics equipment is defined that will meet the requirements. Three alternative configurations for this equipment are then identified that represent the evolution toward more dispersed systems. Candidate communication structures are proposed for each system configuration, and these are compared using trade off analyses; these analyses emphasize reliability but also address complexity. Multiplex buses are recognized as the likely near term choice with mesh networks being desirable for advanced, highly dispersed systems. S.L.

N82-29520# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MOVING TARGET DETECTOR (MOD 2)
David Karp and John R. Anderson 3 Nov. 1981 159 p refs
(Contracts DOT-FATQ-WAI-679; F19628-80-C-0002)
(AD-A114709; ATC-95; FAA-RD-80-77) Avail: NTIS HC A08/MF A01 CSCL 17/9

Under FAA sponsorship, MIT/Lincoln Laboratory has developed a second generation, field operable Moving Target Detection System (MTD-II) which has been tested at operational FAA terminal and enroute radar sites, and serves as the basis for the ASR-9 MTD technical performance specifications. This summary report covers the period October, 1976 through September, 1979 in which design, development, field testing and system performance evaluation were carried out. Report No. FAA-RD-76-190, ATC-69, 'Description and Performance Evaluation of the Moving Target Detector' dated 8 March 1977, serves as the technical foundation of this work. MTD-processing design modifications were effected to handle conditions of excessive ground clutter and moving ground traffic. The rationale for the modified algorithms is provided, and measured performance characteristics at several FAA field sites are discussed. Author (GRA)

N82-29527# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ELECTROMAGNETIC PROPAGATION PROBLEMS IN THE TACTICAL ENVIRONMENT
Apr. 1982 155 p refs Lecture Series held in Munich, 3-4 May 1982 and Paris, 6-7 May 1982
(AGARD-LS-120; ISBN-92-835-1419-X) Avail: NTIS HC A08/MF A01

Propagation criteria affecting the performance of electronic equipment under battlefield conditions are discussed. For individual titles, see N82-29528 through N82-29537.

N82-29535# Royal Aircraft Establishment, Farnborough (England).
PROPAGATION PROBLEMS ASSOCIATED WITH AIRCRAFT COMMUNICATIONS SYSTEMS
B. Burgess *In* AGARD Electromagnetic Propagation Probl. in the Tactical Environ. Apr. 1982 10 p refs (For primary document see N82-29527 20-32)
Avail: NTIS HC A08/MF A01

Communications with mobiles is assuming increasing importance in a military context, with the advances in technology enabling not only greater amounts of information to be transferred, but also fostering a much harsher electromagnetic environment. The trend towards digital communications systems coupled with the possible demand for the wider bandwidths means that the propagation medium characteristics that influence the performance of these links are somewhat different from those that need to be addressed for narrowband analogue modulation transmissions. The various types of communications systems that are used with aeromobile platforms are reviewed and the various propagation problems that arise in achieving systems with good overall performance discussed. The links are conveniently divided into two types: beyond line of sight and line of sight systems, and span the frequency range from LF through to microwaves. Author

N82-29555# Syracuse Univ., N. Y. Dept. of Physics.
COMPUTER ENHANCED ANALYSIS OF A JET IN A CROSS-STREAM
John W. Trischka and Nancy J. Birkenheuer (Midwest Research Inst., Golden, Colo.) 22 Feb. 1982 41 p refs Backup document for AIAA synoptic scheduled for publication in the AIAA Journal, Feb. 1983
Avail: NTIS HC A03/MF A01

Previously analyzed velocity data for a jet in a wind tunnel cross stream was used in a computer analysis which, through interpolation and extrapolation, produced velocity and vorticity fields on a uniform, three dimensional grid. Microfilm output from the computer displayed isopleths on sets of planes in three orthogonal directions. Improved determinations were made of the jet center line, of the center lines of the bound vortices and of the jet boundaries. Stationary waves were discovered in the mixing region on the upstream side of the jet. An explanation for these waves is proposed. The angle between vorticity and velocity is used to compare the flow with complex lamellar and Beltrami flows. A convergence feature in the jet wake is noted. Author

N82-29556*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CORRELATION OF PRESTON-TUBE DATA WITH LAMINAR SKIN FRICTION (LOG NO. J12984)
T. D. Reed (Oklahoma State Univ., Stillwater), A. Abu-Mostafa (Oklahoma State Univ., Stillwater), and F. W. Steinle, Jr. 18 Jan. 1982 37 p refs Backup document for AIAA Synoptic scheduled for publication in AIAA Journal in Feb. 1983
(Grants NSG-2396; NAG2-76)
(NASA-TM-84827; NAS 1.15:84827; Log-J12984) Avail: NTIS HC A03/MF A01 CSCL 20D

Preston tube data within laminar boundary layers obtained on a sharp ten-degree cone in the NASA Ames eleven-foot transonic wind tunnel are correlated with the corresponding values of theoretical skin friction. Data were obtained over a Mach number range of 0.30 to 0.95 and unit Reynolds numbers of 9.84, 13.1, and 16.4 million per meter. The rms scatter of skin friction coefficient about the correlation is of the order of one percent, which is comparable to the reported accuracy for calibrations of Preston tubes in incompressible pipe flows. In contrast to previous works on Preston tube/skin friction correlations, which are based on the physical height of the probe's face, this satisfactory correlation for compressible boundary layer flows is achieved by accounting for the effects of a variable 'effective' height of the probe. The coefficients, which appear in the correlation, are dependent on the particular tunnel environment. The general procedure can be used to define correlations for other wind tunnels. Author

N82-29600# Electro Magnetic Applications, Inc., Denver, Colo.
ATMOSPHERIC ELECTRICITY HAZARDS ANALYTICAL MODEL DEVELOPMENT AND APPLICATION. VOLUME 1: LIGHTNING ENVIRONMENT MODELING Final Report, Aug. 1979 - Jun. 1982
Martin A. Uman (Lightning Location and Protection, Inc.) and E. Philip Krider (Lightning Location and Protection, Inc.) Wright-Patterson AFB, Ohio AFWAL Aug. 1981 172 p refs 3 Vol.
(Contract F33615-79-C-3412; AF Proj. 2402)
(AD-A114015; EMA-81-R-21-Vol-1; AFWAL-TR-81-3084-Vol-1) Avail: NTIS HC A08/MF A01 CSCL 04/1

The state of the art of lightning phenomenology and its electromagnetic environment is reviewed. All aspects and phases are discussed. A model is chosen for each phase which best describes what is currently known and understood. Computer models for predicting the electromagnetic environment for several of the processes are given, along with numerical predictions. A comprehensive bibliography is also provided. Author

N82-29801# Lightning and Transients Research Inst., Melbourne, Fla.
ATMOSPHERIC ELECTRICITY HAZARDS ANALYTICAL MODEL DEVELOPMENT AND APPLICATION. VOLUME 2: SIMULATION OF THE LIGHTNING/AIRCRAFT INTERACTION EVENT Final Report, Aug. 1979 - Jun. 1981
John D. Robb Wright-Patterson AFB, Ohio AFWAL Jun. 1981 59 p refs 3 Vol.
(Contract F33615-79-C-3412; AF Proj. 2402)
(AD-A114016; EMA-81-R-21-Vol-2; AFWAL-TR-81-3084-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 04/1

A review of currently used lightning test techniques for aircraft is given. The requirements for lightning simulation are given and discussed. Finally, a new approch for simulating the lightning/aircraft interaction is presented, and is based on nuclear electromagnetic pulse (NEMP) technology. GRA

N82-29802# Electro Magnetic Applications, Inc., Denver, Colo.
ATMOSPHERIC ELECTRICITY HAZARDS ANALYTICAL MODEL DEVELOPMENT AND APPLICATION. VOLUME 3: ELECTROMAGNETIC COUPLING MODELING OF THE LIGHTNING/AIRCRAFT INTERACTION EVENT Final Report, Aug. 1979 - Jun. 1981
F. J. Eriksen, T. H. Rudolph, and Rodney Perala Wright-Patterson AFB, Ohio AFWAL Jun. 1981 330 p refs 3 Vol.
(Contract F33615-79-C-3412; AF Proj. 2402)
(AD-A114017; EMA-81-R-21-Vol-3; AFWAL-TR-81-3084-Vol-3) Avail: NTIS HC A15/MF A01 CSCL 04/1

The state of the art of coupling of electromagnetic fields to aircraft is reviewed. Assessing the electromagnetic interaction of lightning with aircraft is considered. The coupling process is explained and the modeling requirements implied by the lightning environment are discussed. The description of models selected and implemented is given. Author

N82-29996# Systems Control, Inc., Palo Alto, Calif.
SYSTEM IDENTIFICATION OF NONLINEAR AERODYNAMIC MODELS
T. L. Trankle, J. H. Vincent, and S. N. Franklin *In* AGARD Advan. in the Tech. and Technol. of the Appl. of Nonlinear Filters and Kalman Filters Mar. 1982 26 p refs (For primary document see N82-29989 20-64)
Avail: NTIS HC A23/MF A01

System identification, a technology for determining a mathematical model of a dynamic system from observations of its response to inputs is discussed. Identification technology is used for the determination of nonlinear aerodynamic models for aircraft maneuvering at high angles of attack. The method outlined here (equation error, output error, and maximum likelihood algorithms) can directly nonlinear aerodynamic coefficients in table look-up or multivariable spline formats. For application to nonlinear problems, the basic algorithms are enhanced by recent techniques for evaluation of partial derivatives of the likelihood function, calculation of parameter estimation uncertainties, and by the use of multidimensional splines as a generic model structure. An example application of these methods to the identification of F-4S fighter aircraft high angle of attack aerodynamics is illustrated. B.W.

N82-30013*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
APPLICATIONS TO AERONAUTICS OF THE THEORY OF TRANSFORMATIONS OF NONLINEAR SYSTEMS
George Meyer, Renjeng Su, and L. R. Hunt May 1982 13 p refs
(Contract N00014-76-C-1136)
(NASA-TM-84249; NAS 1.15:84249; A-8943) Avail: NTIS HC A02/MF A01 CSCL 12B

The development of the transformation theory is discussed. Results and applications concerning the use of this design technique for automatic flight control of aircraft are presented. The theory examines the transformation of nonlinear systems to linear systems. The tracking of linear models by nonlinear plants is discussed. Results of manned simulation are also presented. B.W.

N82-30029# Federal Aviation Administration, Washington, D.C.
ESTIMATED AIRPLANE NOISE LEVELS IN A-WEIGHED DECIBELS
11 Feb. 1981 19 p refs
(AC-36-3B) Avail: NTIS HC A02/MF A01

Listings of estimated airplane noise levels in units of A-Weighted Sound Level in decibels (dBA) are provided. N.W.

N82-30030*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
FORWARD VELOCITY EFFECTS ON FAN NOISE AND THE SUPPRESSION CHARACTERISTICS OF ADVANCED INLETS AS MEASURED IN THE NASA-AMES 40 BY 80 FOOT WIND TUNNEL Final Report
Michael T. Moore May 1980 161 p refs
(Contract NAS2-8675)
(NASA-CR-152328; NAS 1.26:152328; R79AEG626) Avail: NTIS HC A08/MF A01 CSCL 20A

Forward velocity effects on the forward radiated fan noise and on the suppression characteristics of three advanced inlets relative to a baseline cylindrical inlet were measured in the NASA Ames Research Center 40 x 80 foot Wind Tunnel. A modified JT15D turbofan engine in a quiet nacelle was the source of fan noise; the advanced inlets were a Conventional Takeoff/Landing (CTOL) hybrid inlet, a Short Takeoff/Landing (STOL) hybrid inlet, and a treated deflector inlet. Also measured were the static to flight effects on the fan noise of canting the baseline inlet 4 deg downward to simulate typical wing mounted turbofan engines. The CTOL hybrid inlet suppressed the high tip speed fan noise as much as 18 PNdB on a 61 m (200 ft) sideline scaled to a CF6 size engine while the STOL hybrid inlet suppressed the low tip speed fan noise as much as 13 PNdB on a 61 m (200 ft) sideline scaled to a OCSEE size engine. The deflector inlet suppressed the high tip speed fan noise as much as 13 PNdB at 61 m (200 ft) overhead scaled to a CF6 size engine. No significant changes in fan noise suppression for the CTOL and STOL hybrid inlets occurred for forward velocity changes above 21 m/s (68 ft/s) or for angle of attack changes up to 15 deg. However, changes in both forward velocity and angle of attack changed the deflector inlet noise unpredictably due to the asymmetry of the inlet flow field into the fan. Author

N82-30031# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK. VOLUME 148. T-37B IN-FLIGHT CREW NOISE
Harald K. Hille Nov. 1981 15 p
(AF Proj. 7231)
(AD-A114943; AMRL-TR-75-50-Vol-148) Avail: NTIS HC A02/MF A01 CSCL 01/2

The T-37B is a USAF two-seat primary trainer aircraft. This report provides measured data defining the bioacoustic environments at flight crew/passenger locations inside this aircraft during normal flight operations. Data are reported at one location for 19 different flight conditions and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. GRA

N82-30032# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
FAR-FIELD ACOUSTIC DATA FOR THE TEXAS ASE, INC. HUSH HOUSE
Robert A. Lee Apr. 1982 287 p refs
(AF Proj. 7231)
(AD-A114564; AFAMRL-TR-81-148) Avail: NTIS HC A13/MF A01 CSCL 01/2

This report supplements AFAMRL-TR-73-110, which describes the data base (NOISEFILE) used in the computer program (NOISEMAP) to predict the community noise exposure resulting from military aircraft operations. The results of field test measurements to define the single-event noise produced on the ground by military aircraft/engines operating in the Texas ASE Inc. hush-house are presented as a function of angle (0 deg to 180 deg from the front of the hush-house) and distance (200 ft to 2500 ft) in various acoustic metrics. All the data are normalized to standard acoustic reference conditions of 59 temperature and 70% relative humidity. Refer to Volume I of the AFAMRL-TR-73-110 report for discussion of the scope, limitations, and definitions needed to understand and use the data in this report. GRA

N82-30261# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

WIND TUNNEL STUDIES OF STORE SEPARATION WITH LOAD FACTOR. FREEDROPS AND CAPTIVE TRAJECTORIES c02

J. Coste and J. Leynaert *In its* La Rech. Aerospatiale, Bi-monthly Bull. no. 1982-1, Jan.-Feb. 1982 (ESA-TT-755) May 1982 p 1-9 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1982-1, Jan.-Feb. 1982 (For primary document see N82-30260 20-99)

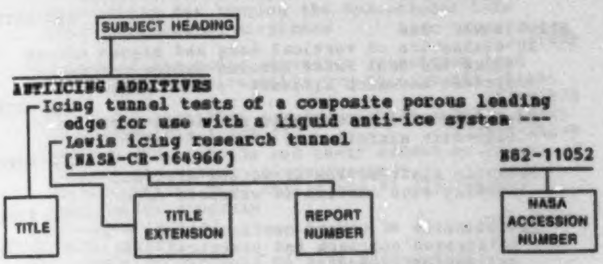
Avail: NTIS HC A02/MF A01; original report in FRENCH available at ONERA, Paris FF 55

Techniques used to study separation trajectories of stores dropped from under an aircraft are described. In dropping tests, light, heavy and intermediate scaling laws which respect the Mach number are studied. The captive trajectory tests use a six degrees of freedom system which moves the model step by step in the aerodynamic field of the aircraft. Aerodynamic forces acting on the store are measured by an internal balance. This method does not take into account the relative speed of store and aircraft. Arrangements used to compensate for this defect are shown. When the stores are inert, have perturbed trajectories, high initial separation speeds, or are incompatible with an external mount and an internal balance, the freedrop method is preferable, particularly for short trajectories. In the contrary cases, or when the store is propelled, the captive trajectory method is essential. For long trajectories, with several phases, the two methods are used in conjunction. Author (ESA)

SUBJECT INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 154)* NOVEMBER 1982

Typical Subject Index Listing



ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966] N82-11052

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

A-10 AIRCRAFT
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302

A-300 AIRCRAFT
Gust load alleviation on Airbus A 300
A82-40881
The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300
A82-40983

ABILITIES
Human capabilities and limitations in systems
N82-29297

ABLATIVE MATERIALS
Fireworthiness of transport aircraft interior systems
N82-29284

AC GENERATORS
Models for the motor state of VSCF aircraft electrical power system --- Variable Speed Constant Frequency
A82-40982

ACCELEROMETERS
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291

ACCIDENT PREVENTION
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265

ACCIDENTS
Fuel system protection methods
N82-29283

ACOUSTIC ATTENUATION
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111

ACOUSTIC EMISSION
'Listening' systems to increase aircraft structural safety and reduce costs
A82-39539

ACOUSTIC SIMULATION
QCSEE over-the-wing engine acoustic data
[NASA-TM-82708] N82-29324

ACROBATICS
Sport aircraft --- Russian book
A82-40483

ACTIVE CONTROL
Estimation of the peak count of actively controlled aircraft
A82-38447
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297

ADAPTIVE CONTROL
Adaptive fuel control feasibility investigation
A82-40519

ADAPTIVE FILTERS
Adaptive filtering for an aircraft flying in turbulent atmosphere
A82-38441
Research on an adaptive Kalman filter for solving the radar tracking problem --- German thesis
A82-40562

AERIAL RECONNAISSANCE
Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases
A82-39747
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29292

AERIAL RUDDERS
Design, fabrication and qualification of the T-2 composite rudder
A82-39894

AEROACOUSTICS
The prediction of helicopter rotor discrete frequency noise
A82-40553
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by blade planform
A82-40556
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111
Some comments on the prediction of forward flight effects on jet noise
[RPIS-20/1981] N82-29110

AERODYNAMIC BALANCE
The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives
[AD-A114813] N82-29333

AERODYNAMIC CHARACTERISTICS
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443
Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports
A82-38781
Supersonic missile aerodynamic and performance relationships for low observables mission profiles
[AIAA PAPER 82-1298] A82-39085
An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions
[AIAA PAPER 82-1311] A82-39092
High angle-of-attack characteristics of a forward-swept wing fighter configuration
[AIAA PAPER 82-1322] A82-39099
Optimal three-dimensional turning performance of supersonic aircraft
[AIAA PAPER 82-1326] A82-39103
Unique flight characteristics of the AD-1 oblique-wing research airplane
[AIAA PAPER 82-1329] A82-39106

Use of rotary balance and forced oscillation test data in six degrees of freedom simulation
[AIAA PAPER 82-1364] A82-39129
NASA Dryden's experience in parameter estimation and its uses in flight test
[AIAA PAPER 82-1373] A82-39135
Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy
[AIAA PAPER 82-1385] A82-39141
The unsteady motion of a wing traveling at subsonic speed above a plane
A82-39358
The rectangular wing with semiinfinite span in nonlinear theory
A82-39359
Optimal control application in supersonic aircraft performance
A82-39374
Aerodynamic aspects of aircraft dynamics at high angles of attack /AGARD Lecture/
[AIAA PAPER 82-1363] A82-39836
Advanced aerodynamic design for future combat aircraft
A82-40879
Some aerodynamic/flightmechanic aspects for the design of future combat aircraft
A82-40880
Recent advances in the performance of high bypass ratio fans
A82-40891
Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces
A82-40894
Viscous transonic airfoil flow simulation
A82-40897
Determination of airplane aerodynamic parameters from flight data at high angles of attack
A82-40928
Aerodynamic concepts for fuel-efficient transport aircraft
A82-40957
Variable geometry aerofoils as applied to the Beatty B-5 and B-6 sailplanes
A82-40968
Aircraft design for fuel efficiency
A82-40973
Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands
A82-40985
Recent airfoil developments at DFVLR
A82-40986
Wing-tip jets aerodynamic performance
A82-40987
An experimental investigation of leading-edge spanwise blowing
A82-40988
Vortex formation over double-delta wings
A82-40989
Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings
A82-41001
Upper Vortex Flap - A versatile surface for highly swept wings
A82-41002
An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts
A82-41008
Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip
A82-41020
Wind-tunnel investigation of a full-scale canard-configured general aviation aircraft
A82-41024
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
Aerodynamics of an airfoil with a jet issuing from its surface
[NASA-TM-84825] N82-29267
AERODYNAMIC COEFFICIENTS
Analytical study of vortex flaps on highly swept delta wings
A82-41003
Fuselage effects in leading edge vortex flap aerodynamics
A82-41006
Prelaunch estimates of near Earth satellite lifetimes using quasi-dynamic atmosphere models - application to a proposed Brazilian satellite
[INPE-2325-PRE/080] N82-29347
AERODYNAMIC CONFIGURATIONS
An experimental investigation of a bearingless model rotor in hover
A82-40512
Computer enhanced analysis of a jet in a cross-stream
N82-29555
AERODYNAMIC DRAG
An evaluation of vertical drag and ground effect using the RSRA rotor balance system --- Rotor Systems Research Aircraft
A82-40510
Development of an advanced no-moving-parts high-lift airfoil
A82-40971
Spanwise distribution of vortex drag and leading-edge suction in subsonic flow
A82-41005
Optimization of canard configurations - An integrated approach and practical drag estimation method
A82-41023
Minimum induced drag of canard configurations
A82-41116
AERODYNAMIC FORCES
An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions
[AIAA PAPER 82-1311] A82-39092
Lateral aerodynamics of delta wings with leading edge separation
[AIAA PAPER 82-1386] A82-39142
Inlet and airframe compatibility for a V/STOL fighter/attack aircraft with top-mounted inlets
A82-40908
Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution
A82-40947
Reduced nonlinear flight dynamic model of elastic structure aircraft
A82-41009
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
AERODYNAMIC INTERFERENCE
The use of small strakes to reduce interference drag of a low wing, twin engine airplane
[AIAA PAPER 82-1323] A82-39100
Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements
[AIAA PAPER 82-1366] A82-40395
External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing
A82-40895
Computational and experimental studies of light twin aerodynamic interference
A82-40930
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference --- wind tunnel tests
[NLR-MP-81020-U] N82-28262
AERODYNAMIC LOADS
Supersonic missile aerodynamic and performance relationships for low observables mission profiles
[AIAA PAPER 82-1298] A82-39085
Dynamic load measurements with delta wings undergoing self-induced roll-oscillations
[AIAA PAPER 82-1320] A82-39090
Maneuver stability of a vehicle with a towed body
[AIAA PAPER 82-1347] A82-39119
The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/
[AIAA PAPER 82-1384] A82-40299
Theory and application of optimum airloads to rotors in hover and forward flight
A82-40500
Performance of the Rotor Systems Research Aircraft calibrated rotor loads measurement system
A82-4050

Results of the AH-64 Structural Demonstration
A82-40551
Gust load alleviation on Airbus A 300
A82-40881
Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers
A82-40909
A crack growth model under spectrum loading
A82-40961
Determination of load spectra and their application for keeping the operational life proof of sporting airplanes
A82-41010
The role of the scale parameter in service load assessment and simulation --- of aircraft flight
A82-41011
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296

AERODYNAMIC NOISE
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111

AERODYNAMIC STABILITY
Flight-determined correction terms for angle of attack and sideslip
[AIAA PAPER 82-1374] A82-40290

AERODYNAMIC STALLING
Analytic extrapolation to full scale aircraft dynamics
[AIAA PAPER 82-1387] A82-39143
Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack
A82-40555
Prediction of high alpha flight characteristics utilizing rotary balance data
A82-40953

AERODYNAMICS
International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volumes 1 & 2
A82-40876
Aerodynamic research applications at Boeing
A82-41000
General aviation activity and avionics survey
[AD-A112924] N82-28244
Aerodynamics of advanced axial-flow turbomachinery
[AD-A114911] N82-29328

AEROELASTICITY
Robust Kalman filter design for active flutter suppression systems
A82-38442
Dynamic stability of flexible forward swept wing aircraft
[AIAA PAPER 82-1325] A82-39102
Summary and recent results from the NASA advanced high-speed propeller research program
[AIAA PAPER 82-1119] A82-40419
An experimental investigation of a bearingless model rotor in hover
A82-40512
Helicopter vibration reduction by rotor blade modal shaping
A82-40514
Finite element analysis for bearingless rotor blade aeroelasticity
A82-40517
Calculations of transonic steady state aeroelastic effects for a canard airplane
A82-40882
Computer-aided derivation of equations of motion for rotary-wing aeroelastic problems
A82-40883
Design of compensated flutter suppression systems
A82-40904
Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings
A82-41001
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280

AERONAUTICS
International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volumes 1 & 2
A82-40876

AEROSPACE ENGINEERING
International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volumes 1 & 2
A82-40876

AEROSPACE SYSTEMS
CDS-the designer's media, the analyst's model --- Configuration Development System for aircraft
A82-40991
Optimizing aerospace structures for manufacturing cost
A82-41014

AEROSPACEPLANES
Inflated wings
A82-40966

AGRICULTURAL AIRCRAFT
Rationalization of the maintenance process for helicopter Ka-26
A82-39246
The design integration of wingtip devices for light general aviation aircraft
A82-40933
Agricultural airplane mission time structure characteristics
[NASA-TM-84470] N82-29329

AH-1G HELICOPTER
Error minimization in ground vibration testing --- of helicopter structures
A82-40550

AH-64 HELICOPTER
Structural design of a crashworthy landing gear for the AH-64 Attack Helicopter
A82-40547
Results of the AH-64 Structural Demonstration
A82-40551

AIR DEFENSE
Logistics research program in the United States Air Force
A82-40963

AIR FLOW
Fluctuating forces and rotor noise due to distorted inflow
A82-40945
Wind-tunnel testing of V/STOL configurations at high lift
A82-40949

AIR LAW
Noise pollution and airport regulation
A82-40051
O'Hare International Airport - Impervious to proposed state efforts to limit airport noise
A82-40052

AIR NAVIGATION
Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases
A82-39747
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291

AIR POLLUTION
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268

AIR QUALITY
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842

AIR TO AIR MISSILES
Air-to-air missile avoidance
[AIAA 82-1516] A82-38939
Algorithm development for infra-red air-to-air guidance systems
A82-39191

AIR TO SURFACE MISSILES
Target acquisition system/air-to-surface weapon compatibility analysis [AIAA 82-1618] A82-38995
AIR TRAFFIC CONTROL
Complete flexibility and realism in radar simulation A82-38461
Future terminal area systems A82-38462
Fuel conservation: The airline - ATC A82-38464
Analysis of general-aviation accidents using ATC radar records [AIAA PAPER 82-1310] A82-39091
Analysis of in-trail following dynamics of CDTI-equipped aircraft --- Cockpit Displays of Traffic Information [AIAA PAPER 82-1330] A82-39107
NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches A82-40535
A concept for 4D-guidance of transport aircraft in the TMA --- Terminal Maneuvering Area A82-40942
Estimation of the number of in-flight aircraft on instrument flight rules A82-41117
Electronic/electric technology benefits study --- avionics [NASA-CR-165890] N82-28243
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43) [B-206064] N82-28264
A study of wind shear effects on aircraft operations and safety in Australia [ARL-SYS-REPT-24] N82-28265
Special investigation report: Air traffic control system [PB82-136276] N82-28277
FAA aviation forecasts-fiscal years 1982-1993 [AD-A114696] N82-29261
Terminal information display system benefits and costs [AD-A114937] N82-29291
Human factors in air traffic control [AGARD-AG-275] N82-29293
The air traffic control system N82-29294
Human factors contributions to air traffic control systems N82-29295
Man as a system component N82-29296
Human capabilities and limitations in systems N82-29297
Jobs and tasks in air traffic control N82-29298
The work environment N82-29299
Displays N82-29300
Controls N82-29301
Communications N82-29302
Additional functions within the air traffic control system N82-29309
Future trends and problems N82-29310
Moving target detector (Mod 2) [AD-A114709] N82-29520
AIR TRAFFIC CONTROLLERS (PERSONNEL)
Human factors in air traffic control [AGARD-AG-275] N82-29293
The air traffic control system N82-29294
Man as a system component N82-29296
Jobs and tasks in air traffic control N82-29298
AIRBORNE EQUIPMENT
Application of an optical data link in the airborne scanning system A82-39275
Multifunction multiband airborne radio architecture study [AD-A114427] N82-28523
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking [NASA-TM-73298] N82-28690
AIRBORNE RADAR APPROACH
Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability A82-40531
AIRBORNE/SPACEBORNE COMPUTERS
Estimation of the peak count of actively controlled aircraft A82-38447
PMCS - A commercial flight management computer system [AIAA 82-1515] A82-38938
A preliminary laboratory evaluation of a reconfigurable integrated flight control concept [AIAA 82-1597] A82-38982
An MLS with computer aided landing approach [AIAA PAPER 82-1352] A82-39122
Flight management computers A82-39321
The fourth dimension --- flight management system for airline operations A82-39540
The control and guidance unit for MACHAN A82-39738
Boeing's new 767 eases crew workload A82-40348
Aircraft design for fuel efficiency A82-40973
Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control --- German thesis A82-41453
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design [AD-A113633] N82-28284
Problems related to the integration of fault tolerant aircraft electronic systems [NASA-CR-165926] N82-29022
AIRCRAFT
Fuel system protection methods N82-29283
AIRCRAFT ACCIDENTS
Analysis of general-aviation accidents using ATC radar records [AIAA PAPER 82-1310] A82-39091
Smoke abatement system for crash rescue/fire training facilities [AD-A114380] N82-28268
Flight attendant injuries: 1971-1976 [AD-A114909] N82-29274
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents [AD-A114878] N82-29275
Annual review of aircraft accident data: US general aviation calendar year 1979 [PB82-136250] N82-29278
Aircraft post crash fire reduction/survivability enhancement from a manufacturer's viewpoint N82-29286
Aircraft post-crash fire fighting/rescue N82-29287
AIRCRAFT ANTENNAS
Monopole antenna patterns on finite size composite ground planes --- in aircraft A82-41055
Delta electrical load analysis C-141B JACC/CP aircraft [AD-A113761] N82-28283
AIRCRAFT APPROACH SPACING
Analysis of in-trail following dynamics of CDTI-equipped aircraft --- Cockpit Displays of Traffic Information [AIAA PAPER 82-1330] A82-39107
AIRCRAFT BRAKES
Alert aircraft roll over chocks [AD-A107456] N82-28307
AIRCRAFT COMMUNICATION
Digital computer simulation of modern aeronautical digital communication systems A82-40940
Propagation problems associated with aircraft communications systems N82-29535

AIRCRAFT COMPARTMENTS
  Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
    [AD-A114878] N82-29275
  Fireworthiness of transport aircraft interior systems
    N82-29284
  USAF bioenvironmental noise data handbook. Volume 148. T-37B in-flight crew noise
    [AD-A114943] N82-30031
AIRCRAFT CONFIGURATIONS
  High angle-of-attack characteristics of a forward-swept wing fighter configuration
    [AIAA PAPER 82-1322] A82-39099
  Stabileye. H. Stephenson --- RPV performance, design and materials characteristics
    A82-39733
  Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements
    [AIAA PAPER 82-1366] A82-40395
  An evaluation of vertical drag and ground effect using the RSRA rotor balance system --- Rotor Systems Research Aircraft
    A82-40510
  The YAH-64 empennage and tail rotor - A technical history
    A82-40528
  Ringfin augmentation effects
    A82-40548
  Tail versus canard configuration - An aerodynamic comparison with regard to the suitability for future tactical combat aircraft
    A82-40901
  Assessment of advanced technologies for high performance single-engine business airplanes
    A82-40932
  Wind-tunnel testing of V/STOL configurations at high lift
    A82-40949
  Design integration of CCW/USB for a sea-based aircraft
    A82-40972
  Performance characteristics of a buoyant quad-rotor research aircraft
    A82-40974
  CDS-the designer's media, the analyst's model --- Configuration Development System for aircraft
    A82-40991
  Aircraft geometry verification with enhanced computer-generated displays
    A82-40992
  An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts
    A82-41008
  Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip
    A82-41020
  Aircraft geometry verification with enhanced computer generated displays
    [NASA-TM-84254] N82-29260
  Annual review of aircraft accident data: US general aviation calendar year 1979
    [PB82-136250] N82-29278
  Development of flying qualities criteria for single pilot instrument flight operations
    [NASA-CR-165932] N82-29288
AIRCRAFT CONSTRUCTION MATERIALS
  Composite use on helicopters
    A82-38222
  Toward all-composite helicopter fuselage
    A82-38223
  Committing composites to the Boeing 767
    A82-38224
  The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
    A82-39263
  The technological aspects of titanium application in the TU-144 aircraft structure
    A82-39718
  Stabileye. H. Stephenson --- RPV performance, design and materials characteristics
    A82-39733
  The national dynamics 'observer' mini-RPV for tropical operation
    A82-39734
  On the state of technology and trends in composite materials in the United States
    A82-39882
  Tests of CFRP spar/rib models with corrugated web
    A82-39890
  Evaluation of CFRP prototype structures for aircraft
    A82-39892
  Developments on graphite/epoxy T-2 nose landing gear door
    A82-39893
  Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail
    A82-39896
  Development status of a composite vertical stabilizer for a jet trainer
    A82-39897
  In-plane shear test of thin panels
    A82-40545
  A summary of weight savings data for composite VSTOL structure
    A82-40546
  Material and process developments on the Boeing 767
    A82-40902
  The promise of laminated metals in aircraft design
    A82-40903
  Material identification for the design of composite rotary wings
    A82-40937
  Application of a new hybrid material /ARALL/ in aircraft structures
    A82-40975
  Design and fabrication of cocured composite hat-stiffened panels
    A82-40978
  Technical and economic comparison of carbon fiber tape and woven fabric applications
    A82-40993
  Application of composite materials and new design concepts for future transport aircraft
    A82-40994
  Composite structures repair
    A82-41015
  Monopole antenna patterns on finite size composite ground planes --- in aircraft
    A82-41055
AIRCRAFT CONTROL
  Adaptive filtering for an aircraft flying in turbulent atmosphere
    A82-38441
  Estimation of the peak count of actively controlled aircraft
    A82-38447
  Pilot models for discrete maneuvers
    [AIAA 82-1519] A82-38940
  Design and flight testing of digital direct side-force control laws
    [AIAA 82-1521] A82-38941
  The effects of the delays on systems subject to manual control
    A82-38943
  Modal control of relaxed static stability aircraft
    [AIAA 82-1524] A82-38944
  An X-Wing aircraft control system concept
    [AIAA 82-1540] A82-38954
  A design criterion for highly augmented fly-by-wire aircraft
    [AIAA 82-1570] A82-38969
  The use of differential pressure feedback in an automatic flight control system
    [AIAA 82-1596] A82-38981
  The ideal controlled element for real airplanes is not K/s
    [AIAA 82-1606] A82-38986
  An alternate method of specifying bandwidth for flying qualities
    [(AIAA 82-1609] A82-38988
  Investigation of low order lateral directional transfer function models for augmented aircraft
    [AIAA 82-1610] A82-38989
  An analysis of a nonlinear instability in the implementation of a VTOL control system during hover
    [AIAA 82-1611] A82-38990
  X-29A flight control system design experiences
    [AIAA 82-1538] A82-39003
  The effects of atmospheric turbulence on a quadrotor heavy lift airship
    [AIAA 82-1542] A82-39009

Flight control synthesis using robust output observers
[AIAA 82-1575] A82-39016
Handling qualities criteria for flight path control of V/STOL aircraft
[AIAA PAPER 82-1292] A82-39081
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082
In-Flight investigation of large airplane flying qualities for approach and landing
[AIAA PAPER 82-1296] A82-39083
Parameter estimation applied to general aviation aircraft - A case study
[AIAA PAPER 82-1313] A82-39094
Flight dynamics of rotorcraft in steep high-g turns
[AIAA PAPER 82-1345] A82-39117
Guidance for the use of equivalent systems with MIL-F-8785C --- for aircraft flight control systems
[AIAA PAPER 82-1355] A82-39124
A modern approach to pilot/vehicle analysis and the Neal-Smith criteria
[AIAA PAPER 82-1357] A82-39125
Electronic stabilization of an aircraft
A82-39322
Optimal control application in supersonic aircraft performance
A82-39374
Flying qualities requirements for roll CAS systems
[AIAA PAPER 82-1356] A82-40287
Terrain following/terrain avoidance system concept development
[AIAA PAPER 82-1518] A82-40428
Flight experience with a backup flight-control system for the HiMAT research vehicle
[AIAA PAPER 82-1541] A82-40429
Optimal open-loop aircraft control for go-around maneuvers under wind shear influence
A82-40943
Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations
A82-41025
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302

AIRCRAFT DESIGN

Forward-swept wings add supersonic zip
A82-38216
Mirage 2000 - Towards possible high series production aircraft
A82-38249
JVX, what an opportunity --- Joint Services Advanced Vertical Lift Aircraft Program
A82-38423
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443
The use of small strakes to reduce interference drag of a low wing, twin engine airplane
[AIAA PAPER 82-1323] A82-39100
Use of rotary balance and forced oscillation test data in six degrees of freedom simulation
[AIAA PAPER 82-1364] A82-39129
Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers and Supplementary Papers
A82-39727
Horses for courses in RPV operations --- system components design and development in terms of performance and cost
A82-39729
Canadair rotary wing technology development
A82-39731
Stabileye. B. Stephenson --- RPV performance, design and materials characteristics
A82-39733
MACHAN - A unmanned aircraft flight research facility
A82-39735
Electric propulsion for a mini RPV system
A82-39744
Development of the advanced composite ground spoiler for C-1 medium transport aircraft
A82-39895
The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/
[AIAA PAPER 82-1384] A82-40294
Analytical design and validation of digital flight control system structure
[AIAA PAPER 82-1626] A82-40434
Predesign study for an advanced flight research rotor
A82-40525
A summary of weight savings data for composite VSTOL structure
A82-40546
Engineering aspects of international collaboration on Tornado
A82-40878
Advanced aerodynamic design for future combat aircraft
A82-40879
Some aerodynamic/flightmechanic aspects for the design of future combat aircraft
A82-40880
Application of advanced exhaust nozzles for tactical aircraft
A82-40889
Observations and implications of natural laminar flow on practical airplane surfaces
A82-40893
External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing
A82-40895
Material and process developments on the Boeing 767
A82-40902
The promise of laminated metals in aircraft design
A82-40903
Design of compensated flutter suppression systems
A82-40904
Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes
A82-40931
The design integration of wingtip devices for light general aviation aircraft
A82-40933
Operation V10F - Development of a composite material wing
A82-40934
Non-honeycomb F-16 horizontal stabilizer structural design
A82-40936
Progress at Douglas on laminar flow control applied to commercial transport aircraft
A82-40958
Design and tests of airfoils for sailplanes with an application to the ASW-19B
A82-40967
Ejector powered propulsion and high lift subsonic wing
A82-40970
Design integration of CCW/USB for a sea-based aircraft
A82-40972
Aircraft design for fuel efficiency
A82-40973
Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands
A82-40985
Recent airfoil developments at DFVLR
A82-40986
CATIA - A computer aided design and manufacturing tridimensional system
A82-40990
CDS-the designer's media, the analyst's model --- Configuration Development System for aircraft
A82-40991
Aircraft geometry verification with enhanced computer-generated displays
A82-40993
Application of composite materials and new design concepts for future transport aircraft
A82-40994

Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings A82-41001
Optimizing aerospace structures for manufacturing cost A82-41014
Wing design for supersonic cruise/transonic maneuver aircraft A82-41021
Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods A82-41022
Optimization of canard configurations - An integrated approach and practical drag estimation method A82-41023
The determination of gust loads on nonlinear aircraft using a power spectral density approach [NLR-TR-80123-U] N82-28303
Aircraft geometry verification with enhanced computer generated displays [NASA-TM-84254] N82-29268
Automated optimum design of wing structures. Deterministic and probabilistic approaches [NASA-TM-84475] N82-29317

AIRCRAFT ENGINES
The national dynamics 'observer' mini-RPV for tropical operation A82-39734
NASA research in supersonic propulsion - A decade of progress [AIAA PAPER 82-1048] A82-40417
Optimized 10 ton class commercial aircraft engine A82-40890
Preliminary design of an advanced integrated power and avionics information system A82-40907
Assessment of advanced technologies for high performance single-engine business airplanes A82-40932
The nonsynchronous whirls of the turbine rotor in aerojet engines A82-40944
Third generation turbo fans A82-40964
Design integration of CCW/USB for a sea-based aircraft A82-40972
The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300 A82-40983
Engine controls for the 1980s and 1990s A82-40984
Advances in high-speed rolling-element bearings [NASA-TM-82910] N82-28644
QCSEE over-the-wing engine acoustic data [NASA-TM-82708] N82-29324
Estimated airplane noise levels in A-weighed decibels [AC-36-3B] N82-30029

AIRCRAFT EQUIPMENT
Analysis of an airplane windshield anti-icing system [AIAA PAPER 82-1372] A82-39134
Concept demonstration of automatic subsystem parameter monitoring --- military helicopter cockpit instrumentation A82-40530
Support of the HH-65A - The impact of advanced technology of VTOL systems upon existing product support A82-40541
Models for the motor state of VSCF aircraft electrical power system --- Variable Speed Constant Frequency A82-40982
A compendium of lightning effects on future aircraft electronic systems [AD-A114117] N82-28293
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system [AD-A114026] N82-28552

AIRCRAFT FUELS
Fuel conservation: The airline - ATC A82-38464
Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles A82-40956
Aerodynamic concepts for fuel-efficient transport aircraft A82-40957
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses [AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production [AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil [AD-A112683] N82-28464
Aircraft fire safety [AGARD-LS-123] N82-29279
Aircraft fire mishap experience/crash fire scenario quantitation N82-29280
Aviation fuels-future outlook and impact on aircraft fire threat N82-29282
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire N82-29285
The feasibility of a high-altitude aircraft platform with consideration of technological and societal constraints [NASA-TM-84508] N82-29313

AIRCRAFT GUIDANCE
FMCS - A commercial flight management computer system [AIAA 82-1515] A82-38936
The control and guidance unit for MACHAN A82-39738
A terrain following system, an algorithm and a sensor A82-39740
Flight simulation studies on the feasibility of laterally segmented approaches in an MLS environment A82-40941
A concept for 4D-guidance of transport aircraft in the TMA --- Terminal Maneuvering Area A82-40942
Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control --- German thesis A82-41453

AIRCRAFT HAZARDS
The operation of aircraft and helicopters in difficult meteorological and environmental conditions --- Russian book A82-39295

AIRCRAFT HYDRAULIC SYSTEMS
Hydraulic Universal Display Processor System (HUDPS) [AD-A114428] N82-28294

AIRCRAFT INSTRUMENTS
Evaluation of an automatic subsystem parameter monitor --- for aircraft A82-40552

AIRCRAFT LANDING
In-flight investigation of large airplane flying qualities for approach and landing [AIAA PAPER 82-1296] A82-39083
An MLS with computer aided landing approach [AIAA PAPER 82-1352] A82-39122
Instrument landing systems /ILS/ at airports of the German Democratic Republic A82-39248
Touchdown technology --- large aircraft landing gear stress A82-40057
Flying quality requirements for V/STOL transition [AIAA PAPER 82-1293] A82-40276

Visual scene simulation concerning the landing of
sporting aircraft in connection with
investigations regarding the control and
learning behavior of the pilot --- German thesis
A82-41447
Effects of approach lighting and variation in
visible runway length on perception of approach
angle in simulated night landings
[AD-A114742] N82-29290
AIRCRAFT MAINTENANCE
U.S. Marine Corps AV-8A maintenance experience
[AIAA PAPER 81-2657] A82-38446
Rationalization of the maintenance process for
helicopter Ka-26
A82-39246
Civil helicopter propulsion system reliability and
engine monitoring technology assessments
A82-40518
Age exploration in naval aviation --- Reliability
Centered Maintenance program
A82-40962
Composite structures repair
A82-41015
Principles of achieving damage tolerance with
flexible maintenance programs for new and aging
aircraft
A82-41016
AIRCRAFT MANEUVERS
Air-to-air missile avoidance
[AIAA 82-1516] A82-38939
Pilot models for discrete maneuvers
[AIAA 82-1519] A82-38940
Optimal three-dimensional turning performance of
supersonic aircraft
[AIAA PAPER 82-1326] A82-39103
Maneuver stability of a vehicle with a towed body
[AIAA PAPER 82-1347] A82-39119
Flight-determined correction terms for angle of
attack and sideslip
[AIAA PAPER 82-1374] A82-40290
Determination of airplane aerodynamic parameters
from flight data at high angles of attack
A82-40928
Optimal open-loop aircraft control for go-around
maneuvers under wind shear influence
A82-40943
Wing design for supersonic cruise/transonic
maneuver aircraft
A82-41021
AIRCRAFT MODELS
Aerodynamic characteristics of a large-scale, twin
tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443
An X-Wing aircraft control system concept
[AIAA 82-1540] A82-38954
Investigation of low order lateral directional
transfer function models for augmented aircraft
[AIAA 82-1610] A82-38989
An estimation of aerodynamic forces and moments on
an airplane model under steady state spin
conditions
[AIAA PAPER 82-1311] A82-39092
An investigation of scale model testing of VTOL
aircraft in hover
A82-40911
Reduced nonlinear flight dynamic model of elastic
structure aircraft
A82-41009
An improved propulsion system simulation technique
for scaled wind tunnel model testing of advanced
fighters
A82-41019
Wind-tunnel investigation of a full-scale
canard-configured general aviation aircraft
A82-41024
System identification of nonlinear aerodynamic
models
N82-29996
AIRCRAFT NOISE
Noise pollution and airport regulation
A82-40051
O'Hare International Airport - Impervious to
proposed state efforts to limit airport noise
A82-40052
Helicopter model scale results of blade-vortex
interaction impulsive noise as affected by blade
planform
A82-40556
Fluctuating forces and rotor noise due to
distorted inflow
A82-40945
Field studies of the Air Force procedures
(NOISECHECK) for measuring community noise
exposure from aircraft operations
[AD-A113672] N82-2004
Estimated airplane noise levels in A-weighed
decibels
[AC-36-3B] N82-30029
Far-field acoustic data for the Texas ASE, Inc.
hush house
[AD-A114564] N82-30032
AIRCRAFT PARTS
The technological aspects of titanium application
in the TU-144 aircraft structure
A82-39716
Horses for courses in RPV operations --- system
components design and development in terms of
performance and cost
A82-39729
AIRCRAFT PERFORMANCE
Mirage 2000 - Towards possible high series
production aircraft
A82-38249
Optimal three-dimensional turning performance of
supersonic aircraft
[AIAA PAPER 82-1326] A82-39103
Analytic extrapolation to full scale aircraft
dynamics
[AIAA PAPER 82-1387] A82-39143
Remotely piloted vehicles; International
Conference, 2nd, Bristol, England, April 6-8,
1981, Conference Papers and Supplementary Papers
A82-39727
Horses for courses in RPV operations --- system
components design and development in terms of
performance and cost
A82-39729
Canadair rotary wing technology development
A82-39731
Stabileye. R. Stephenson --- RPV performance,
design and materials characteristics
A82-39733
Aerodynamic aspects of aircraft dynamics at high
angles of attack /AGARD Lecture/
[AIAA PAPER 82-1363] A82-39836
Axisymmetric approach and landing thrust reverser
impacts on usage and LCC --- life cycle cost
A82-40892
Assessment of advanced technologies for high
performance single-engine business airplanes
A82-40932
Performance characteristics of a buoyant
quad-rotor research aircraft
A82-40974
The role of the scale parameter in service load
assessment and simulation --- of aircraft flight
A82-41011
AIRCRAFT PILOTS
The system of 'objective control'
A82-39245
Boeing's new 767 eases crew workload
A82-40340
A study of wind shear effects on aircraft
operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
AIRCRAFT PRODUCTION
Adaptation of pultrusion to the manufacture of
helicopter components
A82-40537
Design and fabrication of a composite rear
fuselage for the UH-60 /Black Hawk/
A82-40544
A one-shot autoclave manufacturing process for
carbon epoxy components
A82-40935
Fatigue behavior of weldbonded joints
A82-41115
International aviation (selected articles)
[AD-A114422] N82-28245
AIRCRAFT PRODUCTION COSTS
Optimizing aerospace structures for manufacturing
cost
A82-41014
AIRCRAFT RELIABILITY
Rationalization of the maintenance process for
helicopter Ka-26
A82-39246

Civil helicopter propulsion system reliability and engine monitoring technology assessments A82-40518

Age exploration in naval aviation --- Reliability Centered Maintenance program A82-40962

Recommended practice for a demonstration of Nondestructive Evaluation /NDE/ reliability on aircraft production parts - Introduction to the guidelines A82-41140

AIRCRAFT SAFETY

Complete flexibility and realism in radar simulation A82-38461

The detection of low level wind shear. II A82-38463

Wind shear - Its effect on an aircraft and ways to reduce the hazard. II A82-38500

'Listening' systems to increase aircraft structural safety and reduce costs A82-39539

Touchdown technology --- large aircraft landing gear stress A82-40057

An evaluation of helicopter autorotation assist concepts A82-40524

Flight attendant injuries: 1971-1976 [AD-A114905] N82-29274

Aircraft fire safety [AGARD-LS-123] N82-29279

Aircraft fire mishap experience/crash fire scenario quantitation N82-29280

Human response to fire N82-29281

Aviation fuels-future outlook and impact on aircraft fire threat N82-29282

Fireworthiness of transport aircraft interior systems N82-29284

AIRCRAFT SPECIFICATIONS

Perspectives of the flying qualities specification [AIAA PAPER 82-1354] A82-39123

Flying qualities requirements for roll CAS systems [AIAA PAPER 82-1356] A82-40287

Sport aircraft --- Russian book A82-40483

AIRCRAFT SPIN

Applications of parameter estimation in the study of spinning airplanes [AIAA PAPER 82-1309] A82-39090

AIRCRAFT STABILITY

Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight [AIAA 82-1522] A82-38942

Modal control of relaxed static stability aircraft [AIAA 82-1524] A82-38944

An X-Wing aircraft control system concept [AIAA 82-1540] A82-38954

An alternate method of specifying bandwidth for flying qualities [(AIAA 82-1609] A82-38988

X-29A flight control system design experiences [AIAA 82-1538] A82-39003

Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack [AIAA PAPER 82-1295] A82-39082

Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011 [AIAA PAPER 82-1297] A82-39084

Dynamic stability of flexible forward swept wing aircraft [AIAA PAPER 82-1325] A82-39102

A ground-simulation investigation of helicopter decelerating instrument approaches A82-39118

Maneuver stability of a vehicle with a towed body [AIAA PAPER 82-1347] A82-39119

Sensor stabilisation requirements of RPV's - A simulation study A82-39741

Aerodynamic aspects of aircraft dynamics at high angles of attack /AGARD lecture/ [AIAA PAPER 82-1363] A82-39836

AIRCRAFT STRUCTURES

Composite use on helicopters A82-38222

'Listening' systems to increase aircraft structural safety and reduce costs A82-39539

On the state of technology and trends in composite materials in the United States A82-39882

Tests of CFRP spar/rib models with corrugated web A82-39890

Evaluation of CFRP prototype structures for aircraft A82-39892

Developments on graphite/epoxy T-2 nose landing gear door A82-39893

Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail A82-39896

On the bearing strengths of CFRP laminates A82-39930

In-motion radiography of titanium spar tube welds A82-40538

Results of the AH-64 Structural Demonstration A82-40551

HAJIF-II - A program system for the dynamic analysis of aeronautical structures A82-40884

Design of compensated flutter suppression systems A82-40904

The behavior of composite thin-walled structures in dynamic buckling under impact A82-40976

Nondestructive testing in aircraft construction using holographic methods A82-40977

Determination of load spectra and their application for keeping the operational life proof of sporting airplanes A82-41010

Theoretical and experimental investigation of joint-structural damping interaction for airplane construction A82-41013

Principles of achieving damage tolerance with flexible maintenance programs for new and aging aircraft A82-41016

Fatigue behavior of weldbonded joints A82-41115

Evaluation of heat damage to aluminum aircraft structures A82-41141

Advanced casting: Today and tomorrow --- aerospace industry components casting N82-28486

Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model [AD-A113910] N82-28624

AIRCRAFT SURVIVABILITY

The correlation of flight test and analytic M-on-N air combat exchange ratios --- Many-on-Many [AIAA PAPER 82-1328] A82-39105

AIRCRAFT TIRES

Touchdown technology --- large aircraft landing gear stress A82-40057

Alert aircraft roll over chocks [AD-A107456] N82-28307

AIRFOIL PROFILES

A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design A82-40507

Viscous transonic airfoil flow simulation A82-40897

Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers A82-40909

Design and tests of airfoils for sailplanes with an application to the ASW-19B A82-40967

Variable geometry aerofoils as applied to the Beatty B-5 and B-6 sailplanes A82-40968

Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands
A82-40985
Recent airfoil developments at DFVLR
A82-40986
AIRFOILS
Observations and implications of natural laminar flow on practical airplane surfaces
A82-40893
AIRFRAME MATERIALS
Sikorsky ACAP preliminary design --- Advanced Composite Airframe Program
A82-40526
AIRFRAMES
A summary of weight savings data for composite VSTOL structure
A82-40546
Inlet and airframe compatibility for a V/STOL fighter/attack aircraft with top-mounted inlets
A82-40908
AIRLINE OPERATIONS
Complete flexibility and realism in radar simulation
A82-38461
Fuel conservation: The airline - ATC
A82-38464
Minimization of the total costs incurred in the employment of passenger jet aircraft
A82-39247
The fourth dimension --- flight management system for airline operations
A82-39540
FAA aviation forecasts-fiscal years 1982-1993
[AD-A114696] N82-29261
AIRPORT PLANNING
Noise pollution and airport regulation
A82-40051
O'Hare International Airport - Impervious to proposed state efforts to limit airport noise
A82-40052
AIRPORTS
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264
FAA aviation forecasts-fiscal years 1982-1993
[AD-A114696] N82-29261
AIRSHIPS
The feasibility of a high-altitude aircraft platform with consideration of technological and societal constraints
[NASA-TM-84508] N82-29313
ALGORITHMS
A terrain following system, an algorithm and a sensor
A82-39740
Establishment of a rotor model basis
[NASA-TP-2026] N82-29311
ALIGNMENT
Minimal order time sharing filters for INS in-flight alignment
A82-38439
ALL-WEATHER AIR NAVIGATION
Short range tactical RPV system
A82-39730
ALPHA JET AIRCRAFT
A one-shot autoclave manufacturing process for carbon epoxy components
A82-40935
ALTITUDE CONTROL
Reduction and analysis of mode C altitude data collected at high altitudes over the continental United States
[AD-A114655] N82-29276
ALUMINUM
Fatigue behavior of weldbonded joints
A82-41115
ALUMINUM ALLOYS
Material and process developments on the Boeing 767
A82-40902
Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975
Evaluation of heat damage to aluminum aircraft structures
A82-41141
Advanced casting: Today and tomorrow --- aerospace industry components casting
N82-28486
ANALOG COMPUTERS
The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results
A82-39467
ANALOG TO DIGITAL CONVERTERS
Heads up display
[NASA-CASE-LAR-12630-1] N82-29319
ANGLE OF ATTACK
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082
An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions
[AIAA PAPER 82-1311] A82-39092
Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure
[AIAA PAPER 82-1361] A82-39120
Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy
[AIAA PAPER 82-1385] A82-39141
Lateral aerodynamics of delta wings with leading edge separation
[AIAA PAPER 82-1386] A82-39142
Aerodynamic aspects of aircraft dynamics at high angles of attack /AGARD Lecture/
[AIAA PAPER 82-1363] A82-39836
Flight-determined correction terms for angle of attack and sideslip
[AIAA PAPER 82-1374] A82-40290
Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack
A82-40555
Determination of airplane aerodynamic parameters from flight data at high angles of attack
A82-40928
Prediction of high alpha flight characteristics utilizing rotary balance data
A82-40953
Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip
A82-41020
ANGLES (GEOMETRY)
Turbulent boundary layer on a porous surface with injection at various angles to the wall
A82-39482
ANGULAR ACCELERATION
The ideal controlled element for real airplanes is not K/s
[AIAA 82-1606] A82-38986
ANTENNA DESIGN
Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276
ANTENNA RADIATION PATTERNS
Monopole antenna patterns on finite size composite ground planes --- in aircraft
A82-41055
ANTIMISTING FUELS
Aviation fuels-future outlook and impact on aircraft fire threat
N82-29282
APPROACH CONTROL
In-Flight investigation of large airplane flying qualities for approach and landing
[AIAA PAPER 82-1296] A82-39083
An MLS with computer aided landing approach
[AIAA PAPER 82-1352] A82-39122
Instrument landing systems /ILS/ at airports of the German Democratic Republic
A82-39248
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269
Effects of approach lighting and variation in visible runway length on perception of approach angle in simulated night landings
[AD-A114742] N82-29290

AREA NAVIGATION
  NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches
    A82-40535
ARMED FORCES (UNITED STATES)
  U.S. Marine Corps AV-8A maintenance experience
    [AIAA PAPER 81-2657] A82-38446
ASYMPTOTIC METHODS
  Evaluation of an asymptotic method for helicopter rotor airloads
    A82-40509
ATMOSPHERIC CHEMISTRY
  Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
    [AD-A113665] N82-28842
ATMOSPHERIC COMPOSITION
  Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone
    A82-40124
ATMOSPHERIC DENSITY
  Prelaunch estimates of near Earth satellite lifetimes using quasi-dynamic atmosphere models - application to a proposed Brazilian satellite
    [INPE-2325-PRE/080] N82-29347
ATMOSPHERIC ELECTRICITY
  Atmospheric electricity hazards analytical model development and application. Volume 1: Lightning environment modeling
    [AD-A114015] N82-29800
  Atmospheric electricity hazards analytical model development and application. Volume 2: Simulation of the lightning/aircraft interaction event
    [AD-A114016] N82-29801
  Atmospheric electricity hazards analytical model development and application. Volume 3: Electromagnetic coupling modeling of the lightning/aircraft interaction event
    [AD-A114017] N82-29802
ATMOSPHERIC MODELS
  Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone
    A82-40124
ATMOSPHERIC TURBULENCE
  The effects of atmospheric turbulence on a quadrotor heavy lift airship
    [AIAA 82-1542] A82-39009
  The role of the scale parameter in service load assessment and simulation --- of aircraft flight
    A82-41011
  The determination of gust loads on nonlinear aircraft using a power spectral density approach
    [NLR-TR-80123-U] N82-28303
  Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
    [NASA-CR-3571] N82-28881
ATTACK AIRCRAFT
  Mirage 2000 - Towards possible high series production aircraft
    A82-38249
  Inlet and airframe compatibility for a V/STOL fighter/attack aircraft with top-mounted inlets
    A82-40908
  Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
    [AD-A113633] N82-28284
AUTOCLAVING
  A one-shot autoclave manufacturing process for carbon epoxy components
    A82-40935
AUTOMATIC CONTROL
  Concept demonstration of automatic subsystem parameter monitoring --- military helicopter cockpit instrumentation
    A82-40530
AUTOMATIC FLIGHT CONTROL
  FMCS - A commercial flight management computer system
    [AIAA 82-1515] A82-38938
  The use of differential pressure feedback in an automatic flight control system
    [AIAA 82-1596] A82-38981
  Avoiding the pitfalls in automatic landing control system design
    [AIAA 82-1599] A82-39013
  Primary-data devices --- Russian book
    A82-39279
  Flight management computers
    A82-39321
  Electronic stabilization of an aircraft
    A82-39322
  The fourth dimension --- flight management system for airline operations
    A82-39540
  A terrain following system, an algorithm and a sensor
    A82-39740
  Flight control systems for aerial targets
    A82-39745
  Boeing's new 767 eases crew workload
    A82-40348
  Flight experience with a backup flight-control system for the HiMAT research vehicle
    [AIAA PAPER 82-1541] A82-40429
  A concept for 4D-guidance of transport aircraft in the TMA --- Terminal Maneuvering Area
    A82-40942
  Reduced nonlinear flight dynamic model of elastic structure aircraft
    A82-41009
  Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control --- German thesis
    A82-41453
  Minimum operational performance standards for automatic direction finding (ADF) equipment
    [RTCA/DO-179] N82-28270
  Applications to aeronautics of the theory of transformations of nonlinear systems
    [NASA-TM-84249] N82-30013
AUTOMATIC LANDING CONTROL
  Avoiding the pitfalls in automatic landing control system design
    [AIAA 82-1599] A82-39013
  An MLS with computer aided landing approach
    [AIAA PAPER 82-1352] A82-39122
  Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
    [NASA-CR-3574-PT-4] N82-28269
AUTOMATIC PILOTS
  Electronic stabilization of an aircraft
    A82-39322
  The control and guidance unit for MACHAN
    A82-39738
  Design and flight testing of a digital optimal control general aviation autopilot
    A82-40906
  Gust response of commercial jet aircraft including effects of autopilot operation
    [NASA-CR-165919] N82-28266
AUTOMATIC TEST EQUIPMENT
  A simple, low cost application of a flight test parameter identification system
    [AIAA PAPER 82-1312] A82-39093
AUTOMATIC TRAFFIC ADVISORY AND RESOLUTION
  Estimation of the number of in-flight aircraft on instrument flight rules
    A82-41117
AUTOROTATION
  An evaluation of helicopter autorotation assist concepts
    A82-40524
AUXILIARY POWER SOURCES
  An evaluation of helicopter autorotation assist concepts
    A82-40524
AVIONICS
  A preliminary laboratory evaluation of a reconfigurable integrated flight control concept
    [AIAA 82-1597] A82-38982
  MACHAN - A unmanned aircraft flight research facility
    A82-39735
  Future helicopter cockpit design
    A82-40529
  Micro-heads-up display
    A82-40533
  Avionics systems for helicopter integration
    A82-40534

Support of the HH-65A - The impact of advanced technology of VTOL systems upon existing product support
A82-40541
A practical approach to the incorporation of technical advances in avionics
A82-40886
Preliminary design of an advanced integrated power and avionics information system
A82-40907
Models for the motor state of VSCF aircraft electrical power system --- Variable Speed Constant Frequency
A82-40982
Electronic/electric technology benefits study --- avionics
[NASA-CR-165890] N82-28243
General aviation activity and avionics survey
[AD-A112924] N82-28244
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
System data communication structures for active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511

AXIAL FLOW TURBINES
Aerodynamics of advanced axial-flow turbomachinery
[AD-A114911] N82-29328

B

BEACON COLLISION AVOIDANCE SYSTEM
Air-air collision avoidance systems
A82-39323

BEARINGLESS ROTORS
An experimental investigation of a bearingless model rotor in hover
A82-40512
Finite element analysis for bearingless rotor blade aeroelasticity
A82-40517

BEARINGS
Comparison of HP turbine 'deep blade design' effects in turbofan engine gas generators with different bearing structure configurations
A82-40996

BLADE SLAP NOISE
The prediction of helicopter rotor discrete frequency noise
A82-40553
A semiempirical high-speed rotor noise prediction technique
A82-40554
Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack
A82-40555
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by blade planform
A82-40556

BLADE TIPS
Effect of tip vanes on the performance and flow field of a rotor in hover
A82-40511
Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271
Multistage axial compressor program on tip clearance effects
[AD-A107445] N82-29325

BLOWING
Development of an advanced no-moving-parts high-lift airfoil
A82-40971
Wing-tip jets aerodynamic performance
A82-40987

BODIES OF REVOLUTION
Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution
A82-40947
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252

BODY-WING CONFIGURATIONS
An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions
[AIAA PAPER 82-1311] A82-39092
Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration
A82-39996
Transonic small disturbance code for body-wing configuration coupled with full potential code for wing alone
A82-40899
Computational and experimental studies of light twin aerodynamic interference
A82-40930
Test results of chordwise and spanwise blowing for low-speed lift augmentation
A82-40999
Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings
A82-41001
Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration
A82-41004
Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations
A82-41025
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model
[AD-A114101] N82-28288

BOEING AIRCRAFT
Recent advances in rotor technology at Boeing Vertol
A82-40508
Aerodynamic research applications at Boeing
A82-41000

BOEING 747 AIRCRAFT
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296

BOEING 767 AIRCRAFT
Committing composites to the Boeing 767
A82-38224
Boeing's new 767 eases crew workload
A82-40348
Material and process developments on the Boeing 767
A82-40902

BOMBER AIRCRAFT
Investigations regarding vortex formation at wings with bent leading edges
A82-38783

BOOMS (EQUIPMENT)
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881

BOUNDARY LAYER CONTROL
External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing
A82-40895
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249

BOUNDARY LAYER EQUATIONS
Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports
A82-38781

BOUNDARY LAYER FLOW
Improved solutions to the Falkner-Skan boundary-layer equation
A82-38283
Comparison of experimental and analytic performance for contoured endwall stators
[AIAA PAPER 82-1286] A82-40422
Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/
A82-40950
Aerodynamics of advanced axial-flow turbomachinery
[AD-A114911] N82-29328

BOUNDARY LAYER SEPARATION
Leading edge separation at delta wings with curved leading edges in supersonic flow
A82-38784

BOUNDARY VALUE PROBLEMS
- Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles A82-38722
- The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results A82-39467

BUCKLING
- The behavior of composite thin-walled structures in dynamic buckling under impact A82-40976

BYPASS RATIO
- Recent advances in the performance of high bypass ratio fans A82-40891

C

C-1A AIRCRAFT
- Development of the advanced composite ground spoiler for C-1 medium transport aircraft A82-39895

C-130 AIRCRAFT
- Results of T56 engine performance monitoring trial in Hercules aircraft, February - July 1977 [ARL-MECH-ENG-TECH-MEMO-409] N82-29322

C-140 AIRCRAFT
- External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing A82-40895

C-141 AIRCRAFT
- Delta electrical load analysis C-141B JACC/CP aircraft [AD-A113761] N82-28283

CANADAIR AIRCRAFT
- Canadair rotary wing technology development A82-39731

CANARD CONFIGURATIONS
- Close-coupled canard-wing vortex interaction and Reynolds stress acquisition [AIAA PAPER 82-1368] A82-39132
- Calculations of transonic steady state aeroelastic effects for a canard airplane A82-40862
- Tail versus canard configuration - An aerodynamic comparison with regard to the suitability for future tactical combat aircraft A82-40901
- Test results of chordwise and spanwise blowing for low-speed lift augmentation A82-40999
- Optimization of canard configurations - An integrated approach and practical drag estimation method A82-41023
- Wind-tunnel investigation of a full-scale canard-configured general aviation aircraft A82-41024
- Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations A82-41025
- Minimum induced drag of canard configurations A82-41116

CANOPIES
- Method for refurbishing and processing parachutes [NASA-CASE-KSC-11042-1] N82-29330

CANTILEVER BEAMS
- Tests of CFRP spar/rib models with corrugated web A82-39890

CARBON FIBER REINFORCED PLASTICS
- Tests of CFRP spar/rib models with corrugated web A82-39890
- Evaluation of CFRP prototype structures for aircraft A82-39892
- Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail A82-39896
- On the bearing strengths of CFRP laminates A82-39930
- Operation V10F - Development of a composite material wing A82-40934
- A one-shot autoclave manufacturing process for carbon epoxy components A82-40935
- Development of materials and manufacturing technology over the next 20 years: Composite materials [MBB-UD-341-82-O] N82-28365

CARBON FIBERS
- Technical and economic comparison of carbon fiber tape and woven fabric applications A82-40993
- Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage [MBB-UD-340-82-O/E] N82-28364

CASTING
- International aviation (selected articles) [AD-A114422] N82-28245
- Advanced casting: Today and tomorrow --- aerospace industry components casting N82-28486

CATHODE RAY TUBES
- The evolution of display formats for advanced fighters using multimode color CRT displays A82-40080

CAVITATION FLOW
- Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles A82-38722
- Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation [TPD-908-720] N82-29116

CENTRAL PROCESSING UNITS
- Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer [AD-A112900] N82-28310

CHARGE COUPLED DEVICES
- Fixed pattern noise correction for staring arrays in guidance systems A82-39190

CHINA (MAINLAND)
- International aviation (selected articles) [AD-A114422] N82-28245

CIRCULATION CONTROL AIRFOILS
- Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft A82-40969
- Development of an advanced no-moving-parts high-lift airfoil A82-40971
- Design integration of CCW/USB for a sea-based aircraft A82-40972

CIVIL AVIATION
- The need for a dedicated public service helicopter design A82-38422
- The national dynamics 'observer' mini-RPV for tropical operation A82-39734
- New technology for the next generation of commercial transports - Real or imaginary A82-41007
- General aviation activity and avionics survey [AD-A112924] N82-28244
- Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community [AD-A112957] N82-28274
- Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2 [PB82-139353] N82-29277

CLEARANCES
- CF6 jet engine performance improvement: High pressure turbine active clearance control [NASA-CR-165556] N82-28297
- Multistage axial compressor program on tip clearance effects [AD-A107445] N82-29325

CLOUD PHYSICS
- An evaluation of the Rosemount ice detector for cloud water content measurements [PB82-158633] N82-29321

CLUTTER
  Demonstration of radar reflector detection and
    ground clutter suppression using airborne
    weather and mapping radar
    A82-40532
COAL GASIFICATION
  Laboratory-scale simulation of underground coal
    gasification: Experiment and theory
    [DE82-001063] N82-28470
COCKPIT SIMULATORS
  Applying advanced technology to flight station
    design
    A82-40887
COCKPITS
  Analysis of in-trail following dynamics of
    CDTI-equipped aircraft --- Cockpit Displays of
    Traffic Information
    [AIAA PAPER 82-1330] A82-39107
  Boeing's new 767 eases crew workload
    A82-40348
  Conceptual design of the LHX integrated cockpit
    A82-40527
  Future helicopter cockpit design
    A82-40529
  Concept demonstration of automatic subsystem
    parameter monitoring --- military helicopter
    cockpit instrumentation
    A82-40530
  The evolution of display formats for advanced
    fighters using multimode color CRT displays
    A82-40888
  Electronic/electric technology benefits study ---
    avionics
    [NASA-CR-165890] N82-28243
COLLISION AVOIDANCE
  Air-air collision avoidance systems
    A82-39323
COLOR
  Aircraft geometry verification with enhanced
    computer generated displays
    [NASA-TM-84254] N82-29268
COLUMNS (SUPPORTS)
  The behavior of composite thin-walled structures
    in dynamic buckling under impact
    A82-40976
COMBAT
  The correlation of flight test and analytic M-on-N
    air combat exchange ratios --- Many-on-Many
    [AIAA PAPER 82-1328] A82-39105
COMBINED STRESS
  A crack growth model under spectrum loading
    A82-40961
COMBUSTION
  Laboratory-scale simulation of underground coal
    gasification: Experiment and theory
    [DE82-001063] N82-28470
COMMAND AND CONTROL
  U.S. Army remotely piloted vehicle supporting
    technology program
    A82-39739
  Flying qualities requirements for roll CAS systems
    [AIAA PAPER 82-1356] A82-40287
COMMERCIAL AIRCRAFT
  Progress at Douglas on laminar flow control
    applied to commercial transport aircraft
    A82-40958
  Aerodynamic research applications at Boeing
    A82-41000
  New technology for the next generation of
    commercial transports - Real or imaginary
    A82-41007
  Gust response of commercial jet aircraft including
    effects of autopilot operation
    [NASA-CR-165919] N82-28266
  FAA aviation forecasts-fiscal years 1982-1993
    [AD-A114696] N82-29261
COMMERCIAL ENERGY
  Maximizing South Carolina's aviation resources:
    Identifying potentially profitable commuter
    airline routes, volume 2
    [PB82-139353] N82-29277
COMMUNICATING
  Communications
    N82-29302
COMMUNICATION NETWORKS
  System data communication structures for
    active-control transport aircraft, volume 1
    [NASA-CR-165773-VOL-1] N82-29510
  System data communication structures for
    active-control transport aircraft, volume 2
    [NASA-CR-165773-VOL-2] N82-29511
  Electromagnetic Propagation Problems in the
    Tactical Environment
    [AGARD-LS-120] N82-29527
COMMUNITIES
  Field studies of the Air Force procedures
    (NOISECHECK) for measuring community noise
    exposure from aircraft operations
    [AD-A113672] N82-28841
COMPENSATORY TRACKING
  The effects of the delays on systems subject to
    manual control
    A82-38943
COMPONENT RELIABILITY
  Reliability model for planetary gear
    [NASA-TM-82859] N82-28643
COMPOSITE MATERIALS
  On the state of technology and trends in composite
    materials in the United States
    A82-39882
  Fasteners for composite structures
    A82-39929
  In-plane shear test of thin panels
    A82-40545
  Application of composite materials and new design
    concepts for future transport aircraft
    A82-40994
  Composite structures repair
    A82-41015
  Recent development in hygrothermoviscoelastic
    analysis of composites
    N82-28676
COMPOSITE STRUCTURES
  Composite use on helicopters
    A82-38222
  Toward all-composite helicopter fuselage
    A82-38223
  Committing composites to the Boeing 767
    A82-38224
  Calculation of the cross section properties and
    the shear stresses of composite rotor blades
    A82-38475
  Design, fabrication and qualification of the T-2
    composite rudder
    A82-39894
  Sikorsky ACAP preliminary design --- Advanced
    Composite Airframe Program
    A82-40526
  Development of the Sea King composite main rotor
    blade
    A82-40539
  Design and fabrication of a composite rear
    fuselage for the UH-60 /Black Hawk/
    A82-40544
  The behavior of composite thin-walled structures
    in dynamic buckling under impact
    A82-40976
  Design and fabrication of cocured composite
    hat-stiffened panels
    A82-40978
  Sliced disc design - A composite conform concept
    for a turbo engine axial compressor
    A82-40995
  Monopole antenna patterns on finite size composite
    ground planes --- in aircraft
    A82-41055
  National Transonic Facility (NTF) prototype fan
    blade fatigue test
    [AD-A114405] N82-28261
  Carbon fiber reinforced composite structures
    protected with metal surfaces against lightning
    strike damage
    [MBB-UD-340-82-O/E] N82-28364
COMPRESSING
  Ethanol production by vapor compression distillation
    [DE82-004892] N82-29393
COMPRESSION LOADS
  Cracks interacting with contact forces - A finite
    element study on loaded holes
    A82-40959
COMPRESSOR BLADES
  Application of the sequential optimization method
    to the tuning of the natural frequencies of
    gas-turbine engine compressor blades
    A82-39399

Sliced disc design - A composite conform concept for a turbo engine axial compressor A82-40995
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC MAIL/P and WA JT9D engine diagnostics programs [NASA-CR-165573] N82-28296

COMPUTATIONAL FLUID DYNAMICS
Improved solutions to the Falkner-Skan boundary-layer equation A82-38283
Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles A82-38722
Calculation of level flow using radial grating A82-38922
Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration A82-39996
Viscous transonic airfoil flow simulation A82-40897
Computation of supersonic flow around three-dimensional wings A82-40898
Transonic small disturbance code for body-wing configuration coupled with full potential code for wing alone A82-40899
A summary of V/STOL inlet analysis methods A82-40921
Computational and experimental studies of light twin aerodynamic interference A82-40930
An experimental and numerical study of 3-D rotor wakes in hovering flight A82-40946
Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/ A82-40950
Analytical study of vortex flaps on highly swept delta wings A82-41003
Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods A82-41022
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory [NLR-TR-81031-U] N82-28263
Windtunnel capability related to test sections, cryogenics, and computer-windtunnel integration [AGARD-AR-174] N82-29334

COMPUTER AIDED DESIGN
Efficient optimum design of structures - Program DDDU A82-38146
Primary-data devices --- Russian book A82-39279
The application of small propellers to RPV propulsion A82-39737
The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/ [AIAA PAPER 82-1304] A82-40294
A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design A82-40507
Optimum structural design --- for helicopters A82-40543
Engineering aspects of international collaboration on Tornado A82-40878
CATIA - A computer aided design and manufacturing tridimensional system A82-40990
CDS-the designer's media, the analyst's model --- Configuration Development System for aircraft A82-40991
Aircraft geometry verification with enhanced computer-generated displays A82-40992
Automated optimum design of wing structures. Deterministic and probabilistic approaches [NASA-TM-84475] N82-29317

COMPUTER AIDED MANUFACTURING
Computer aided coordinate measuring systems --- in engineering design of helicopter components A82-40540
CATIA - A computer aided design and manufacturing tridimensional system A82-40990
Aircraft geometry verification with enhanced computer-generated displays A82-40992

COMPUTER GRAPHICS
Design and construction of a flexible autonomic electronic display device --- for flight control A82-40569
CATIA - A computer aided design and manufacturing tridimensional system A82-40990
Aircraft geometry verification with enhanced computer-generated displays A82-40992
Aircraft geometry verification with enhanced computer generated displays [NASA-TM-84254] N82-29268

COMPUTER PROGRAMS
HAJIF-II - A program system for the dynamic analysis of aeronautical structures A82-40884
Computer program for analysis of spherical screen distortion [AD-A113136] N82-28309
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer [AD-A112900] N82-28310
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations [AD-A113672] N82-28841
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system [DE82-005555] N82-29292
Effect of water on axial flow compressors. Part 2: Computational program [AD-A114831] N82-29327
User's manual for the AMEER flight path-trajectory simulation code [DE82-007004] N82-29343

COMPUTER SYSTEMS DESIGN
Future terminal area systems A82-38462
Problems related to the integration of fault tolerant aircraft electronic systems [NASA-CR-165926] N82-29022

COMPUTER TECHNIQUES
Computer-aided derivation of equations of motion for rotary-wing aeroelastic problems A82-40883
Computer program for analysis of spherical screen distortion [AD-A113136] N82-28309

COMPUTERIZED SIMULATION
Problems in the simulation of correlation-extremal navigation systems A82-39403
Terrain following/terrain avoidance system concept development [AIAA PAPER 82-1518] A82-40428
Dynamic energy transfer between wind and aircraft A82-40939
Optimal open-loop aircraft control for go-around maneuvers under wind shear influence A82-40943
Inflight IFR procedures simulator [NASA-CASE-KSC-11218-1] N82-29331
User's manual for the AMEER flight path-trajectory simulation code [DE82-007004] N82-29343

COMPUTERS
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43) [B-206064] N82-28264
Aerodynamics of advanced axial-flow turbomachinery [AD-A114911] N82-29328

CONCRETES
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways [DE82-010994] N82-29464

CONFERENCES
Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports
A82-38781
Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers and Supplementary Papers
A82-39727
American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings
A82-40505
International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volumes 1 & 2
A82-40876

CONICAL BODIES
Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements
[AIAA PAPER 82-1366] A82-40395

CONSOLES
Controls
N82-29301

CONSTRAINTS
Human capabilities and limitations in systems
N82-29297

CONTOURS
Comparison of experimental and analytic performance for contoured endwall stators
[AIAA PAPER 82-1286] A82-40422

CONTROL BOARDS
Controls
N82-29301

CONTROL CONFIGURED VEHICLES
Design and flight testing of digital direct side-force control laws
[AIAA 82-1521] A82-38941
X-29A flight control system design experiences
[AIAA 82-1538] A82-39003
Design and analysis of a multivariable control system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121
Progress at Douglas on laminar flow control applied to commercial transport aircraft
A82-40958

CONTROL EQUIPMENT
Generic faults and design solutions for flight-critical systems
[AIAA 82-1595] A82-38980
Primary-data devices --- Russian book
A82-39279
Flight experience with a backup flight-control system for the HiMAT research vehicle
[AIAA PAPER 82-1541] A82-40429
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279

CONTROL SIMULATION
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082
Sensor stabilisation requirements of RPV's - A simulation study
A82-39741
The design of a RPV ground station simulator
A82-39750

CONTROL STABILITY
Modal control of relaxed static stability aircraft
[AIAA 82-1524] A82-38944

CONTROL STICKS
Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight
[AIAA 82-1522] A82-38942

CONTROL SURFACES
The use of differential pressure feedback in an automatic flight control system
[AIAA 82-1596] A82-38981
Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods
A82-41022

CONTROL THEORY
Application of multivariable model following method to flight controller
[AIAA PAPER 82-1349] A82-39120
A modern approach to pilot/vehicle analysis and the Neal-Smith criteria
[AIAA PAPER 82-1357] A82-39125
Applications to aeronautics of the theory of transformations of nonlinear systems
[NASA-TM-84249] N82-30013

CONTROLLABILITY
Pilot models for discrete maneuvers
[AIAA 82-1519] A82-38940
Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight
[AIAA 82-1522] A82-38942
Handling qualities criteria for flight path control of V/STOL aircraft
[AIAA PAPER 82-1292] A82-39081
In-Flight investigation of large airplane flying qualities for approach and landing
[AIAA PAPER 82-1296] A82-39083
Guidance for the use of equivalent systems with MIL-F-8785C --- for aircraft flight control systems
[AIAA PAPER 82-1355] A82-39124
Flying qualities requirements for roll CAS systems
[AIAA PAPER 82-1356] A82-40287
Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298
A discussion of the flying quality requirements of a basic training aircraft
[AD-A114805] N82-29318

CONTROLLERS
Redundant control unit for an advanced multispool engine
A82-40998

CONVECTIVE HEAT TRANSFER
The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results
A82-39467

CONVERSATION
Communications
N82-29302

CONVEYORS
Method for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] N82-29330

CORRELATION DETECTION
Target tracking using area correlation
A82-39194
Simulation of correlation-extremal receivers of signals from sampling-phase radio-navigation systems
A82-39404

CORRUGATED PLATES
Non-honeycomb F-16 horizontal stabilizer structural design
A82-40936

COST ANALYSIS
Minimization of the total costs incurred in the employment of passenger jet aircraft
A82-39247
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274

COST REDUCTION
'Listening' systems to increase aircraft structural safety and reduce costs
A82-39539
Unmanned aircraft in future combat
A82-39728
Horses for courses in RPV operations --- system components design and development in terms of performance and cost
A82-39729
Advanced technologies applied to reduce the operating costs of small commuter transport aircraft
A82-40915
Technical and economic comparison of carbon fiber tape and woven fabric applications
A82-40993

COVARIANCE
Minimal order time sharing filters for INS in-flight alignment
A82-3883

CRACK PROPAGATION
Cracks interacting with contact forces - A finite element study on loaded holes
A82-40959
A crack growth model under spectrum loading
A82-40961
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
CRASH INJURIES
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275
CRASHES
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275
Aircraft fire safety
[AGARD-LS-123] N82-29279
Aircraft fire mishap experience/crash fire scenario quantitation
N82-29280
Human response to fire
N82-29281
Fuel system protection methods
N82-29283
CRASHWORTHINESS
Structural design of a crashworthy landing gear for the AH-64 Attack Helicopter
A82-40547
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275
Aircraft post crash fire reduction/survivability enhancement from a manufacturer's viewpoint
N82-29286
CROP DUSTING
Agricultural airplane mission time structure characteristics
[NASA-TM-84470] N82-29329
CROSS COUPLING
The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives
[AD-A114813] N82-29333
CRUDE OIL
Aviation fuels-future outlook and impact on aircraft fire threat
N82-29282
CRYOGENIC WIND TUNNELS
Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/
A82-40950
Windtunnel capability related to test sections, cryogenics, and computer-windtunnel integration
[AGARD-AR-174] N82-29334
CUES
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
CURRENT DISTRIBUTION
Delta electrical load analysis C-141E JACC/CP aircraft
[AD-A113761] N82-28283
CYCLIC LOADS
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685

D

DAMAGE ASSESSMENT
Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage --- German thesis
A82-40561
Composite structures repair
A82-41015
Principles of achieving damage tolerance with flexible maintenance programs for new and aging aircraft
A82-41016
Evaluation of heat damage to aluminum aircraft structures
A82-41141
DATA ACQUISITION
The detection of low level wind shear. II
A82-38463
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286
Reduction and analysis of mode C altitude data collected at high altitudes over the continental United States
[AD-A114655] N82-29276
DATA BASE MANAGEMENT SYSTEMS
Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases
A82-39747
DATA CORRELATION
A recursive terrain height correlation system using multiple model estimation techniques
[AIAA 82-1513] A82-38937
Investigation of correlation between full-scale and fifth-scale wind tunnel tests of a Bell helicopter Textron Model 222
[NASA-CR-166362] N82-29315
Correlation of Preston-tube data with laminar skin friction (Log No. J12984)
[NASA-TM-84827] N82-29556
DATA LINKS
Application of an optical data link in the airborne scanning system
A82-39275
U.S. Army remotely piloted vehicle supporting technology program
A82-39739
DATA MANAGEMENT
PMCS - A commercial flight management computer system
[AIAA 82-1515] A82-38938
DATA PROCESSING
Primary-data devices --- Russian book
A82-39279
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310
DATA PROCESSING TERMINALS
Terminal information display system benefits and costs
[AD-A114937] N82-29291
DATA REDUCTION
Reduction and analysis of mode C altitude data collected at high altitudes over the continental United States
[AD-A114655] N82-29276
DATA TRANSMISSION
System data communication structures for active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511
Propagation problems associated with aircraft communications systems
N82-29535
DEAD RECKONING
The control and guidance unit for MACHAN
A82-39738
DEGREES OF FREEDOM
Use of rotary balance and forced oscillation test data in six degrees of freedom simulation
[AIAA PAPER 82-1364] A82-39129
The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives
[AD-A114813] N82-29333
DEICERS
An evaluation of the Rosemount ice detector for cloud water content measurements
[PB82-158833] N82-29321
DELTA WINGS
Leading edge separation at delta wings with curved leading edges in supersonic flow
A82-38784
Measurement and visualization of skin friction on the leeside of delta wings in supersonic flow
A82-38785

Measurements of velocity distributions in the
leading edge vortex of a delta wing by the
laser-Doppler procedure
A82-38786
Dynamic load measurements with delta wings
undergoing self-induced roll-oscillations
[AIAA PAPER 82-1320] A82-39098
Lateral aerodynamics of delta wings with leading
edge separation
[AIAA PAPER 82-1386] A82-39142
Vortex formation over double-delta wings
A82-40989
Upper Vortex Flap - A versatile surface for highly
swept wings
A82-41002
Analytical study of vortex flaps on highly swept
delta wings
A82-41003
Spanwise distribution of vortex drag and
leading-edge suction in subsonic flow
A82-41005
Fuselage effects in leading edge vortex flap
aerodynamics
A82-41006
DESIGN ANALYSIS
A design criterion for highly augmented
fly-by-wire aircraft
[AIAA 82-1570] A82-38969
Avoiding the pitfalls in automatic landing control
system design
[AIAA 82-1599] A82-39013
Development of the advanced composite ground
spoiler for C-1 medium transport aircraft
A82-39895
Analytical design and validation of digital flight
control system structure
[AIAA PAPER 82-1626] A82-40434
CDS-the designer's media, the analyst's model ---
Configuration Development System for aircraft
A82-40991
The determination of gust loads on nonlinear
aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
Design basis for a new transonic wind tunnel
[AD-A112899] N82-28311
Advanced casting: Today and tomorrow ---
aerospace industry components casting
N82-28486
Problems related to the integration of fault
tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
DESIGN TO COST
The promise of laminated metals in aircraft design
A82-40903
Design and experience with a low-cost digital
fly-by-wire system in the SAAB JA37 Viggen A/C
A82-40905
Optimizing aerospace structures for manufacturing
cost
A82-41014
DIFFERENTIAL PRESSURE
The use of differential pressure feedback in an
automatic flight control system
[AIAA 82-1596] A82-38981
DIGITAL COMMAND SYSTEMS
Design and flight testing of digital direct
side-force control laws
[AIAA 82-1521] A82-38941
DIGITAL DATA
Heads up display
[NASA-CASE-LAR-12630-1] N82-29319
DIGITAL FILTERS
Minimal order time sharing filters for INS
in-flight alignment
A82-38439
DIGITAL NAVIGATION
PNCS - A commercial flight management computer
system
[AIAA 82-1515] A82-38938
The Shiryayev sequential probability ratio test
for redundancy management
[AIAA 82-1623] A82-38998
Problems in the simulation of correlation-extremal
navigation systems
A82-39403
Simulation of correlation-extremal receivers of
signals from sampling-phase radio-navigation
systems
A82-39404
The control and guidance unit for MACHAN
A82-39738
DIGITAL RADAR SYSTEMS
Radars for UMA
A82-39742
DIGITAL SIMULATION
Digital computer simulation of modern aeronautical
digital communication systems
A82-40940
DIGITAL SYSTEMS
Analytical design and validation of digital flight
control system structure
[AIAA PAPER 82-1626] A82-40434
Advanced fighter technology integration program
AFTI/F-16
A82-40960
Design and experience with a low-cost digital
fly-by-wire system in the SAAB JA37 Viggen A/C
A82-40905
Design and flight testing of a digital optimal
control general aviation autopilot
A82-40906
Redundant control unit for an advanced multispool
engine
A82-40998
DIGITAL TECHNIQUES
Digital full authority controls for helicopter
engines
A82-40522
DIRECT LIFT CONTROLS
Design and analysis of a multivariable control
system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121
DISCRETE ADDRESS BEACON SYSTEM
Cost analysis of the discrete Address Beacon
System for the low-performance general aviation
aircraft community
[AD-A112957] N82-28274
DISPLAY DEVICES
The detection of low level wind shear. II
A82-38463
Analysis of in-trail following dynamics of
CDTI-equipped aircraft --- Cockpit Displays of
Traffic Information
[AIAA PAPER 82-1330] A82-39107
Conceptual design of the LHX integrated cockpit
A82-40527
Future helicopter cockpit design
A82-40529
Evaluation of an automatic subsystem parameter
monitor --- for aircraft
A82-40552
Design and construction of a flexible autonomic
electronic display device --- for flight control
A82-40569
The evolution of display formats for advanced
fighters using multimode color CRT displays
A82-40888
Visual scene simulation concerning the landing of
sporting aircraft in connection with
investigations regarding the control and
learning behavior of the pilot --- German thesis
A82-41447
Electronic/electric technology benefits study ---
avionics
[NASA-CR-165890] N82-28243
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294
Computer program for analysis of spherical screen
distortion
[AD-A113136] N82-28309
Terminal information display system benefits and
costs
[AD-A114937] N82-29291
Displays
N82-29300
DISTILLATION
Ethanol production by vapor compression distillation
[DE82-004892] N82-29393
DOMES (STRUCTURAL FORMS)
Nearfield aerodynamics and optical propagation
characteristics of a large-scale turret model
[AD-A113910] N82-2862
DOORS
Developments on graphite/epoxy T-2 nose landing
gear door
A82-3989

DRAG REDUCTION
Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011
[AIAA PAPER 82-1297] A82-39084
The use of small strakes to reduce interference drag of a low wing, twin engine airplane
[AIAA PAPER 82-1323] A82-39100
NASA research on viscous drag reduction
A82-40896
Optimization of canard configurations - An integrated approach and practical drag estimation method
A82-41023
Minimum induced drag of canard configurations
A82-41116

DROP TESTS
Structural design of a crashworthy landing gear for the AH-64 Attack Helicopter
A82-40547

DUAL WING CONFIGURATIONS
Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes
A82-40931

DYNAMIC CHARACTERISTICS
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-169159] N82-29312

DYNAMIC MODELS
Determination of airplane aerodynamic parameters from flight data at high angles of attack
A82-40928
Reduced nonlinear flight dynamic model of elastic structure aircraft
A82-41009

DYNAMIC RESPONSE
Dynamic energy transfer between wind and aircraft
A82-40939
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301

DYNAMIC STABILITY
Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability
[AIAA 82-1585] A82-39011
Dynamic stability of flexible forward swept wing aircraft
[AIAA PAPER 82-1325] A82-39102
Maneuver stability of a vehicle with a towed body
[AIAA PAPER 82-1347] A82-39119

DYNAMIC STRUCTURAL ANALYSIS
Whirl mode stability of the main rotor of the YAH-64 Advanced Attack Helicopter
A82-40513
HAJIF-II - A program system for the dynamic analysis of aeronautical structures
A82-40884
Theoretical and experimental investigation of joint-structural damping interaction for airplane construction
A82-41013

DYNAMIC TESTS
Dynamic load measurements with delta wings undergoing self-induced roll-oscillations
[AIAA PAPER 82-1320] A82-39098
Analytic extrapolation to full scale aircraft dynamics
[AIAA PAPER 82-1387] A82-39143

E

EARTH TERMINALS
U.S. Army remotely piloted vehicle supporting technology program
A82-39739

ECONOMIC ANALYSIS
Historical research and development inflation indices for Army fixed and rotor winged aircraft
[AD-A114368] N82-28290

EJECTION SEATS
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267

EJECTORS
Ejector powered propulsion and high lift subsonic wing
A82-40870

ELASTIC BODIES
Reduced nonlinear flight dynamic model of elastic structure aircraft
A82-41009

ELASTODYNAMICS
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263

ELECTRIC POWER SUPPLIES
Preliminary design of an advanced integrated power and avionics information system
A82-40907
Models for the motor state of VSCF aircraft electrical power system --- Variable Speed Constant Frequency
A82-40982
Delta electrical load analysis C-141B JACC/CP aircraft
[AD-A113761] N82-28283

ELECTRIC POWER TRANSMISSION
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552
System data communication structures for active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510

ELECTRIC PROPULSION
Electric propulsion for a mini RPV system
A82-39744

ELECTRO-OPTICAL PHOTOGRAPHY
Target tracking using area correlation
A82-39194

ELECTROMAGNETIC FIELDS
Atmospheric electricity hazards analytical model development and application. Volume 3: Electromagnetic coupling modeling of the lightning/aircraft interaction event
[AD-A114017] N82-29802

ELECTROMAGNETIC PROPERTIES
Atmospheric electricity hazards analytical model development and application. Volume 1: Lightning environment modeling
[AD-A114015] N82-29800

ELECTROMAGNETIC WAVE TRANSMISSION
Electromagnetic Propagation Problems in the Tactical Environment
[AGARD-LS-120] N82-29527
Propagation problems associated with aircraft communications systems
N82-29535

ELECTRONIC CONTROL
Electronic stabilization of an aircraft
A82-39322
Adaptive fuel control feasibility investigation
A82-40519
Digital full authority controls for helicopter engines
A82-40522
Engine controls for the 1980s and 1990s
A82-40984

ELECTRONIC EQUIPMENT
Future helicopter cockpit design
A82-40529
Design and construction of a flexible autonomic electronic display device --- for flight control
A82-40569
A compendium of lightning effects on future aircraft electronic systems
[AD-A114117] N82-28293

ELEVONS
Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
[NASA-TM-84499] N82-28299

EMBEDDING
On embedded flow characteristics of sharp edged rectangular wings
[LOC-C4712] N82-29263

EMERGENCIES
An evaluation of helicopter autorotation assist concepts
A82-40524

EMOTIONAL FACTORS
Aircraft fire safety
[AGARD-LS-123] N82-29279

ENERGY CONSERVATION
Fuel conservation: The airline - ATC A82-38464
Third generation turbo fans A82-40964
ENERGY REQUIREMENTS
Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles A82-40956
ENERGY TRANSFER
Dynamic energy transfer between wind and aircraft A82-40939
ENGINE AIRFRAME INTEGRATION
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference --- wind tunnel tests [NLR-MP-81020-U] N82-28262
ENGINE CONTROL
Optimal control application in supersonic aircraft performance A82-39374
Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades A82-39399
Digital full authority controls for helicopter engines A82-40522
Engine controls for the 1980s and 1990s A82-40984
Redundant control unit for an advanced multispool engine A82-40998
ENGINE DESIGN
Propulsion opportunities for future commuter aircraft [AIAA PAPER 82-1049] A82-40418
800 Shaft Horsepower Advanced Technology Demonstrator Engine A82-40520
TF34 Convertible Engine System Technology Program A82-40521
Optimized 10 ton class commercial aircraft engine A82-40890
Recent advances in the performance of high bypass ratio fans A82-40891
Third generation turbo fans A82-40964
Sliced disc design - A composite conform concept for a turbo engine axial compressor A82-40995
Comparison of HP turbine 'deep blade design' effects in turbofan engine gas generators with different bearing structure configurations A82-40996
QCSEE over-the-wing engine acoustic data [NASA-TM-82708] N82-29324
ENGINE FAILURE
Electronic stabilization of an aircraft A82-39322
Results of T56 engine performance monitoring trial in Hercules aircraft, February - July 1977 [ARL-MECH-ENG-TECH-MEMO-409] N82-29322
ENGINE INLETS
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA-Ames 40 by 80 foot wind tunnel [NASA-CR-152328] N82-30030
ENGINE MONITORING INSTRUMENTS
Civil helicopter propulsion system reliability and engine monitoring technology assessments A82-40518
Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage --- German thesis A82-40561
ENGINE NOISE
Static noise tests on modified augmentor wing jet STOL research aircraft [NASA-TM-81231] N82-28295
QCSEE over-the-wing engine acoustic data [NASA-TM-82708] N82-29324
Estimated airplane noise levels in A-weighed decibels [AC-36-3B] N82-30029
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA-Ames 40 by 80 foot wind tunnel [NASA-CR-152328] N82-30030
Far-field acoustic data for the Texas ASE, Inc. hush house [AD-A114564] N82-30032
ENGINE PARTS
Propulsion opportunities for future commuter aircraft [AIAA PAPER 82-1049] A82-40418
Third generation turbo fans A82-40964
ENGINE TESTS
800 Shaft Horsepower Advanced Technology Demonstrator Engine A82-40520
Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage --- German thesis A82-40561
Axisymmetric approach and landing thrust reverser impacts on usage and LCC --- life cycle cost A82-40892
The nonsynchronous whirls of the turbine rotor in aerojet engines A82-40944
Intake swirl - A major disturbance parameter in engine/intake compatibility A82-41018
Water ingestion into axial flow compressors. Part 3: Experimental results and discussion [AD-A114830] N82-29326
ENVIRONMENT SIMULATION
NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches A82-40535
Atmospheric electricity hazards analytical model development and application. Volume 2: Simulation of the lightning/aircraft interaction event [AD-A114016] N82-29801
ENVIRONMENT SIMULATORS
The design of a RPV ground station simulator A82-39750
ENVIRONMENTAL TESTS
Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability [AIAA 82-1585] A82-39011
ENVIRONMENTS
The work environment N82-29299
EPOXY MATRIX COMPOSITES
A one-shot autoclave manufacturing process for carbon epoxy components A82-40935
EQUATIONS OF MOTION
Computer-aided derivation of equations of motion for rotary-wing aeroelastic problems A82-40883
The nonsynchronous whirls of the turbine rotor in aerojet engines A82-40944
Reduced nonlinear flight dynamic model of elastic structure aircraft A82-41009
User's manual for the AMEER flight path-trajectory simulation code [DE82-007004] N82-29343
ERROR ANALYSIS
Reduction and analysis of mode C altitude data collected at high altitudes over the continental United States [AD-A114655] N82-29276
Establishment of a rotor model basis [NASA-TP-2026] N82-29311
ETHYL ALCOHOL
Ethanol production by vapor compression distillation [DE82-004892] N82-29393
EVASIVE ACTIONS
Air-to-air missile avoidance [AIAA 82-1516] A82-38939

EXHAUST EMISSION
Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone
A82-40124

EXHAUST NOZZLES
Performance of a 2D-CD nonaxisymmetric exhaust nozzle on a turbojet engine at altitude
[AIAA PAPER 82-1137] A82-40420
Application of advanced exhaust nozzles for tactical aircraft
A82-40889

EXPANDABLE STRUCTURES
Flight control systems for aerial targets
A82-39745

EXPERIMENTAL DESIGN
Applying advanced technology to flight station design
A82-40887

EXTERNAL STORE SEPARATION
Wind tunnel studies of store separation with load factor. Freedrops and captive trajectories
N82-30261

EXTRAPOLATION
Analytic extrapolation to full scale aircraft dynamics
[AIAA PAPER 82-1387] A82-39143

F

F-14 AIRCRAFT
NASA Dryden's experience in parameter estimation and its uses in flight test
[AIAA PAPER 82-1373] A82-39135

F-16 AIRCRAFT
Terrain following/terrain avoidance system concept development
[AIAA PAPER 82-1518] A82-40428
Non-honeycomb F-16 horizontal stabilizer structural design
A82-40936

F-111 AIRCRAFT
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267

FABRICATION
Design and fabrication of cocured composite hat-stiffened panels
A82-40578

FABRICS
Technical and economic comparison of carbon fiber tape and woven fabric applications
A82-40993

FAIL-SAFE SYSTEMS
Generic faults and design solutions for flight-critical systems
[AIAA 82-1595] A82-38980
A preliminary laboratory evaluation of a reconfigurable integrated flight control concept
[AIAA 82-1597] A82-38982

FAILURE ANALYSIS
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685

FAILURE MODES
Material identification for the design of composite rotary wings
A82-40937
The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300
A82-40983

FALKNER-SKAN EQUATION
Improved solutions to the Falkner-Skan boundary-layer equation
A82-38283

FAN BLADES
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261

FASTENERS
Fasteners for composite structures
A82-39929

FATIGUE (MATERIALS)
'Listening' systems to increase aircraft structural safety and reduce costs
A82-39539
The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300
A82-40983
Principles of achieving damage tolerance with flexible maintenance programs for new and aging aircraft
A82-41016

FATIGUE LIFE
A roadmap toward a fatigue qualification process for modern technology helicopters
A82-40542
Design and experimental verification of the USB-flap structucture for NAL STOL aircraft --- Upper Surface Blowing
A82-40917
A crack growth model under spectrum loading
A82-40961

FATIGUE TESTS
Fasteners for composite structures
A82-39929
A roadmap toward a fatigue qualification process for modern technology helicopters
A82-40542
Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975

FAULT TOLERANCE
Generic faults and design solutions for flight-critical systems
[AIAA 82-1595] A82-38980
The Shiryayev sequential probability ratio test for redundancy management
[AIAA 82-1623] A82-38998
Analytical design and validation of digital flight control system structure
[AIAA PAPER 82-1626] A82-40434
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022

FEASIBILITY ANALYSIS
Adaptive fuel control feasibility investigation
A82-40519

FEEDBACK CONTROL
Modal control of relaxed static stability aircraft
[AIAA 82-1524] A82-38944
The use of differential pressure feedback in an automatic flight control system
[AIAA 82-1596] A82-38981
Flight control synthesis using robust output observers
[(AIAA 82-1575] A82-39016
Application of multivariable model following method to flight controller
[AIAA PAPER 82-1349] A82-39120
Design and analysis of a multivariable control system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121
Design of a longitudinal ride-control system by Zakian's method of inequalities
A82-41114

FIBER COMPOSITES
Technical and economic comparison of carbon fiber tape and woven fabric applications
A82-40993
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28200

FIBER REINFORCED COMPOSITES
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263
A summary of weight savings data for composite VSTOL structure
A82-40546
Material and process developments on the Boeing 767
A82-40902
Material identification for the design of composite rotary wings
A82-40937
Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975
Sliced disc design - A composite conform concept for a turbo engine axial compressor
A82-40995

Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364
FIGHTER AIRCRAFT
A design criterion for highly augmented fly-by-wire aircraft
[AIAA 82-1570] A82-38969
An alternate method of specifying bandwidth for flying qualities
[(AIAA 82-1609] A82-38988
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082
High angle-of-attack characteristics of a forward-swept wing fighter configuration
[AIAA PAPER 82-1322] A82-39099
The correlation of flight test and analytic M-on-N air combat exchange ratios --- Many-on-Many
[AIAA PAPER 82-1328] A82-39105
Design and analysis of a multivariable control system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121
Unmanned aircraft in future combat
A82-39728
Short range tactical RPV system
A82-39730
Aerodynamic aspects of aircraft dynamics at high angles of attack /AGARD Lecture/
[AIAA PAPER 82-1363] A82-39836
Flying qualities requirements for roll CAS systems
[AIAA PAPER 82-1356] A82-40287
Flight experience with a backup flight-control system for the HiMAT research vehicle
[AIAA PAPER 82-1541] A82-40429
Advanced aerodynamic design for future combat aircraft
A82-40879
Some aerodynamic/flightmechanic aspects for the design of future combat aircraft
A82-40880
A practical approach to the incorporation of technical advances in avionics
A82-40885
The evolution of display formats for advanced fighters using multimode color CRT displays
A82-40888
Application of advanced exhaust nozzles for tactical aircraft
A82-40889
Advanced fighter technology integration program AFTI/F-16
A82-40900
Tail versus canard configuration - An aerodynamic comparison with regard to the suitability for future tactical combat aircraft
A82-40901
Spin behaviour of the Pilatus PC-7 Turbo Trainer
A82-40979
Analytical study of vortex flaps on highly swept delta wings
A82-41003
Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration
A82-41004
Intake swirl - A major disturbance parameter in engine/intake compatibility
A82-41018
An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters
A82-41019
Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip
A82-41020
Wing design for supersonic cruise/transonic maneuver aircraft
A82-41021
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286
A discussion of the flying quality requirements of a basic training aircraft
[AD-A114805] N82-29318
FINITE DIFFERENCE THEORY
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
FINITE ELEMENT METHOD
Development of the advanced composite ground spoiler for C-1 medium transport aircraft
A82-39895
Finite element analysis for bearingless rotor blade aeroelasticity
A82-40517
Cracks interacting with contact forces - A finite element study on loaded holes
A82-40959
FIRE CONTROL
U.S. Army remotely piloted vehicle program
A82-39732
FIRE DAMAGE
Evaluation of heat damage to aluminum aircraft structures
A82-41141
Aircraft fire safety
[AGARD-LS-123] N82-29279
Aircraft fire mishap experience/crash fire scenario quantitation
N82-29280
Aviation fuels-future outlook and impact on aircraft fire threat
N82-29282
Fireworthiness of transport aircraft interior systems
N82-29284
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire
N82-29285
Aircraft post crash fire reduction/survivability enhancement from a manufacturer's viewpoint
N82-29286
FIRE EXTINGUISHERS
Aircraft post-crash fire fighting/rescue
N82-29287
FIRE FIGHTING
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268
Aircraft fire safety
[AGARD-LS-123] N82-29279
Aircraft fire mishap experience/crash fire scenario quantitation
N82-29280
Aircraft post crash fire reduction/survivability enhancement from a manufacturer's viewpoint
N82-29286
Aircraft post-crash fire fighting/rescue
N82-29287
FIRE PREVENTION
Fuel system protection methods
N82-29283
Fireworthiness of transport aircraft interior systems
N82-29284
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire
N82-29285
FIREPROOFING
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire
N82-29285
FLAME CALORIMETERS
Heat release rate calorimetry of engineering plastics
A82-41075
FLAMMABILITY
Heat release rate calorimetry of engineering plastics
A82-41075
FLAPS (CONTROL SURFACES)
Design and experimental verification of the USB-flap structucture for NAL STOL aircraft --- Upper Surface Blowing
A82-40917
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-169159] N82-29312
FLEXIBLE WINGS
Inflated wings
A82-40966

Variable geometry aerofoils as applied to the
Beatty B-5 and B-6 sailplanes
A82-40968

FLIGHT CHARACTERISTICS
An alternate method of specifying bandwidth for
flying qualities
[(AIAA 82-1609] A82-38988
Investigation of low order lateral directional
transfer function models for augmented aircraft
[AIAA 82-1610] A82-38989
Handling qualities criteria for flight path
control of V/STOL aircraft
[AIAA PAPER 82-1292] A82-39081
In-Flight investigation of large airplane flying
qualities for approach and landing
[AIAA PAPER 82-1296] A82-39083
Unique flight characteristics of the AD-1
oblique-wing research airplane
[AIAA PAPER 82-1329] A82-39106
A ground-simulation investigation of helicopter
decelerating instrument approaches
A82-39118
Perspectives of the flying qualities specification
[AIAA PAPER 82-1354] A82-39123
Ringfin augmentation effects
A82-40548
Prediction of high alpha flight characteristics
utilizing rotary balance data
A82-40953

FLIGHT CONDITIONS
Forward-swept wings add supersonic zip
A82-38216
The operation of aircraft and helicopters in
difficult meteorological and environmental
conditions --- Russian book
A82-39295
Tandem rotor helicopter characteristics in a
continuous icing environment
A82-40523

FLIGHT CONTROL
Adaptive filtering for an aircraft flying in
turbulent atmosphere
A82-38441
Future terminal area systems
A82-38462
Design and flight testing of digital direct
side-force control laws
[AIAA 82-1521] A82-38941
Modal control of relaxed static stability aircraft
[AIAA 82-1524] A82-38944
A design criterion for highly augmented
fly-by-wire aircraft
[AIAA 82-1570] A82-38969
Generic faults and design solutions for
flight-critical systems
[AIAA 82-1595] A82-38980
A preliminary laboratory evaluation of a
reconfigurable integrated flight control concept
[AIAA 82-1597] A82-38982
An alternate method of specifying bandwidth for
flying qualities
[(AIAA 82-1609] A82-38988
The Shiryayev sequential probability ratio test
for redundancy management
[AIAA 82-1623] A82-38998
X-29A flight control system design experiences
[AIAA 82-1538] A82-39003
Flight control synthesis using robust output
observers
[(AIAA 82-1575] A82-39016
Handling qualities criteria for flight path
control of V/STOL aircraft
[AIAA PAPER 82-1292] A82-39081
Application of multivariable model following
method to flight controller
[AIAA PAPER 82-1349] A82-39120
Design and analysis of a multivariable control
system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121
Perspectives of the flying qualities specification
[AIAA PAPER 82-1354] A82-39123
Guidance for the use of equivalent systems with
MIL-F-8785C --- for aircraft flight control
systems
[AIAA PAPER 82-1355] A82-39124
NASA Dryden's experience in parameter estimation
and its uses in flight test
[AIAA PAPER 82-1373] A82-39135
The system of 'objective control'
A82-39245
Flying quality requirements for V/STOL transition
[AIAA PAPER 82-1293] A82-40276
Flight-determined correction terms for angle of
attack and sideslip
[AIAA PAPER 82-1374] A82-40290
Analytical design and validation of digital flight
control system structure
[AIAA PAPER 82-1626] A82-40434
Design and construction of a flexible autonomic
electronic display device --- for flight control
A82-40569
Advanced fighter technology integration program
AFTI/F-16
A82-40900
Optimal open-loop aircraft control for go-around
maneuvers under wind shear influence
A82-40943
Design integration of CCW/USB for a sea-based
aircraft
A82-40972
Electronic/electric technology benefits study ---
avionics
[NASA-CR-165890] N82-28243
Low cost development of INS sensors for expendable
RPV control and navigation
[AD-A112691] N82-28291
Manual reversion flight control system for A-10
aircraft: Pilot performance and simulator cue
effects
[AD-A113463] N82-28302
Geophysical flight line flying and flight path
recovery utilizing the Litton LTN-76 inertial
navigation system
[DE82-005555] N82-29292

FLIGHT CREWS
Digital full authority controls for helicopter
engines
A82-40522
Flight attendant injuries: 1971-1976
[AD-A114909] N82-29274
Operational test and evaluation handbook for
aircraft training devices. Volume 1: Planning
and management
[AD-A112498] N82-29332

FLIGHT HAZARDS
Wind shear - Its effect on an aircraft and ways to
reduce the hazard. II
A82-38500
The operation of aircraft and helicopters in
difficult meteorological and environmental
conditions --- Russian book
A82-39295
Flight attendant injuries: 1971-1976
[AD-A114909] N82-29274
Atmospheric electricity hazards analytical model
development and application. Volume 1:
Lightning environment modeling
[AD-A114015] N82-29800
Atmospheric electricity hazards analytical model
development and application. Volume 2:
Simulation of the lightning/aircraft interaction
event
[AD-A114016] N82-29801
Atmospheric electricity hazards analytical model
development and application. Volume 3:
Electromagnetic coupling modeling of the
lightning/aircraft interaction event
[AD-A114017] N82-29802

FLIGHT INSTRUMENTS
Heads up display
[NASA-CASE-LAR-12630-1] N82-29319
System data communication structures for
active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511

FLIGHT MECHANICS
Some aerodynamic/flightmechanic aspects for the
design of future combat aircraft
A82-40880

FLIGHT OPTIMIZATION
Flight management computers
A82-39321
Optimal control application in supersonic aircraft
performance
A82-39374
The fourth dimension --- flight management system
for airline operations
A82-39540

Optimization of flight with tilt wings
A82-40912
FLIGHT PATHS
Handling qualities criteria for flight path control of V/STOL aircraft
[AIAA PAPER 82-1292] A82-39081
Analysis of in-trail following dynamics of CDTI-equipped aircraft --- Cockpit Displays of Traffic Information
[AIAA PAPER 82-1330] A82-39107
An MLS with computer aided landing approach
[AIAA PAPER 82-1352] A82-39122
The fourth dimension --- flight management system for airline operations
A82-39540
A concept for 4D-guidance of transport aircraft in the TMA --- Terminal Maneuvering Area
A82-40942
Estimation of the number of in-flight aircraft on instrument flight rules
A82-41117
Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control --- German thesis
A82-41453
Reduction and analysis of mode C altitude data collected at high altitudes over the continental United States
[AD-A114655] N82-29276
Development of flying qualities criteria for single pilot instrument flight operations
[NASA-CR-165932] N82-29288
User's manual for the AdEBS flight path-trajectory simulation code
[DE82-007004] N82-29343
FLIGHT PLANS
PMCS - A commercial flight management computer system
[AIAA 82-1515] A82-38938
FLIGHT RECORDERS
Analysis of general-aviation accidents using ATC radar records
[AIAA PAPER 82-1310] A82-39091
Agricultural airplane mission time structure characteristics
[NASA-TM-84470] N82-29329
FLIGHT SAFETY
The system of 'objective control'
A82-39245
Instrument landing systems /ILS/ at airports of the German Democratic Republic
A82-39248
FLIGHT SIMULATION
Complete flexibility and realism in radar simulation
A82-38461
Pilot models for discrete maneuvers
[AIAA 82-1519] A82-38940
Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011
[AIAA PAPER 82-1297] A82-39084
A ground-simulation investigation of helicopter decelerating instrument approaches
A82-39118
Use of rotary balance and forced oscillation test data in six degrees of freedom simulation
[AIAA PAPER 82-1364] A82-39129
Flight simulation studies on the feasibility of laterally segmented approaches in an MLS environment
A82-40941
The role of the scale parameter in service load assessment and simulation --- of aircraft flight
A82-41011
Visual scene simulation concerning the landing of sporting aircraft in connection with investigations regarding the control and learning behavior of the pilot --- German thesis
A82-41447
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
FLIGHT SIMULATORS
Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight
[AIAA 82-1522] A82-38942
Terrain following/terrain avoidance system concept development
[AIAA PAPER 82-1518] A82-40428
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306
Development of flying qualities criteria for single pilot instrument flight operations
[NASA-CR-165932] N82-29288
Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
[AD-A112498] N82-29332
FLIGHT STABILITY TESTS
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082
NASA Dryden's experience in parameter estimation and its uses in flight test
[AIAA PAPER 82-1373] A82-39135
FLIGHT TEST INSTRUMENTS
A unique flight test facility - Description and results
A82-40925
FLIGHT TEST VEHICLES
A unique flight test facility - Description and results
A82-40925
FLIGHT TESTS
Design and flight testing of digital direct side-force control laws
[AIAA 82-1521] A82-38941
The ideal controlled element for real airplanes is not K/s
[AIAA 82-1606] A82-38986
Avoiding the pitfalls in automatic landing control system design
[AIAA 82-1599] A82-39013
Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011
[AIAA PAPER 82-1297] A82-39084
A simple, low cost application of a flight test parameter identification system
[AIAA PAPER 82-1312] A82-39093
The correlation of flight test and analytic M-on-N air combat exchange ratios --- Many-on-Many
[AIAA PAPER 82-1328] A82-39105
Unique flight characteristics of the AD-1 oblique-wing research airplane
[AIAA PAPER 82-1329] A82-39106
Analysis of an airplane windshield anti-icing system
[AIAA PAPER 82-1372] A82-39134
Evaluation of CFRP prototype structures for aircraft
A82-39892
An evaluation of vertical drag and ground effect using the RSRA rotor balance system --- Rotor Systems Research Aircraft
A82-40510
Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability
A82-40531
Results of the AH-64 Structural Demonstration
A82-40551
Design and flight testing of a digital optimal control general aviation autopilot
A82-40906
A concept for 4D-guidance of transport aircraft in the TMA --- Terminal Maneuvering Area
A82-40942
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286
Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
[NASA-TM-84499] N82-28299
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29292

FLIGHT TIME
  Agricultural airplane mission time structure characteristics
  [NASA-TM-84470] N82-29329
FLIGHT TRAINING
  Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
  [AD-A112569] N82-28306
  Inflight IFR procedures simulator
  [NASA-CASE-KSC-11218-1] N82-29331
  Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
  [AD-A112498] N82-29332
FLIGHT VEHICLES
  Primary-data devices --- Russian book
  A82-39279
FLOW CHARACTERISTICS
  Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports
  A82-38781
  On embedded flow characteristics of sharp edged rectangular wings
  [LOG-C4712] N82-29263
FLOW DISTORTION
  Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage --- German thesis
  A82-40561
  Fluctuating forces and rotor noise due to distorted inflow
  A82-40945
  Intake swirl - A major disturbance parameter in engine/intake compatibility
  A82-41018
FLOW DISTRIBUTION
  Close-coupled canard-wing vortex interaction and Reynolds stress acquisition
  [AIAA PAPER 82-1368] A82-39132
  Effect of tip vanes on the performance and flow field of a rotor in hover
  A82-40511
  Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution
  A82-40947
  Spanwise distribution of vortex drag and leading-edge suction in subsonic flow
  A82-41005
FLOW MEASUREMENT
  Measuring the flow properties of slotted test-section walls
  [FFA-135] N82-28571
FLOW THEORY
  Calculation of level flow using radial grating
  A82-38922
  The rectangular wing with semiinfinite span in nonlinear theory
  A82-39359
FLOW VELOCITY
  Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure
  A82-38786
FLOW VISUALIZATION
  An experimental investigation of leading-edge spanwise blowing
  A82-40988
FLUID INJECTION
  Turbulent boundary layer on a porous surface with injection at various angles to the wall
  A82-39482
FLUTTER
  Robust Kalman filter design for active flutter suppression systems
  A82-38442
  Design of compensated flutter suppression systems
  A82-40904
  Design considerations and experiences in the use of composite material for an aeroelastic research wing
  [NASA-TM-83291] N82-28280
FLUTTER ANALYSIS
  Dynamic stability of flexible forward swept wing aircraft
  [AIAA PAPER 82-1325] A82-39102
  Finite element analysis for bearingless rotor blade aeroelasticity
  A82-40517
FLY BY WIRE CONTROL
  A design criterion for highly augmented fly-by-wire aircraft
  [AIAA 82-1570] A82-38969
  Analytical design and validation of digital flight control system structure
  [AIAA PAPER 82-1626] A82-40434
  Design and experience with a low-cost digital fly-by-wire system in the SAAB JA37 Viggen A/C
  A82-40905
FOAMS
  Aircraft post-crash fire fighting/rescue
  N82-29287
FORCED VIBRATION
  Use of rotary balance and forced oscillation test data in six degrees of freedom simulation
  [AIAA PAPER 82-1364] A82-39129
  Limiting performance of nonlinear systems with applications to helicopter vibration control problems
  [AD-A113239] N82-28301
FORGING
  International aviation (selected articles)
  [AD-A114422] N82-28243
FORMING TECHNIQUES
  Adaptation of pultrusion to the manufacture of helicopter components
  A82-40537
FREE FLOW
  Aerodynamic behavior of a slender slot in a wind tunnel wall
  A82-38201
FUEL CONSUMPTION
  Fuel conservation: The airline - ATC
  A82-38464
  Minimization of the total costs incurred in the employment of passenger jet aircraft
  A82-39247
  Flight management computers
  A82-39321
  The fourth dimension --- flight management system for airline operations
  A82-39540
  Mini-RPV propulsion
  A82-39736
  Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles
  A82-40956
  Aerodynamic concepts for fuel-efficient transport aircraft
  A82-40957
  Third generation turbo fans
  A82-40964
  Aircraft design for fuel efficiency
  A82-40973
  CF6 jet engine performance improvement: High pressure turbine active clearance control
  [NASA-CR-165556] N82-28297
FUEL CONTROL
  Adaptive fuel control feasibility investigation
  A82-40519
FUEL PRODUCTION
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
  [AD-A112681] N82-28462
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
  [AD-A112682] N82-28463
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
  [AD-A112683] N82-28464
  Ethanol production by vapor compression distillation
  [DE82-004892] N82-29393
  United States Air Force shale oil to fuels, phase 2
  [AD-A114531] N82-29476

FUEL SYSTEMS
Fuel system protection methods
N82-29283
FUSELAGES
Toward all-composite helicopter fuselage
A82-38223
Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration
A82-39996
Design and fabrication of a composite rear fuselage for the UH-60 /Black Hawk/
A82-40544
Fuselage effects in leading edge vortex flap aerodynamics
A82-41006
An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts
A82-41008

G

GAS GENERATORS
Comparison of HP turbine 'deep blade design' effects in turbofan engine gas generators with different bearing structure configurations
A82-40956
GAS TURBINE ENGINES
Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades
A82-39399
The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results
A82-39467
GEARS
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
GENERAL AVIATION AIRCRAFT
Analysis of general-aviation accidents using ATC radar records
[AIAA PAPER 82-1310] A82-39091
Parameter estimation applied to general aviation aircraft - A case study
[AIAA PAPER 82-1313] A82-39094
Analysis of an airplane windshield anti-icing system
[AIAA PAPER 82-1372] A82-39134
Propulsion opportunities for future commuter aircraft
[AIAA PAPER 82-1049] A82-40418
Sport aircraft --- Russian book
A82-40483
Design and flight testing of a digital optimal control general aviation autopilot
A82-40906
Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes
A82-40931
Assessment of advanced technologies for high performance single-engine business airplanes
A82-40932
Operation V10F - Development of a composite material wing
A82-40934
Wind-tunnel investigation of a full-scale canard-configured general aviation aircraft
A82-41024
Visual scene simulation concerning the landing of sporting aircraft in connection with investigations regarding the control and learning behavior of the pilot --- German thesis
A82-41447
General aviation activity and avionics survey
[AD-A112924] N82-28244
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278
FAA aviation forecasts-fiscal years 1982-1993
[AD-A114696] N82-29261
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275
GEODYNAMICS
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690
GEOLOGICAL SURVEYS
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29292
GEOMETRIC RECTIFICATION (IMAGERY)
Scanner imaging systems, aircraft
N82-28715
GEOPHYSICS
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29292
GLASS FIBER REINFORCED PLASTICS
Adaptation of pultrusion to the manufacture of helicopter components
A82-40537
Determination of load spectra and their application for keeping the operational life proof of sporting airplanes
A82-41010
Development of materials and manufacturing technology over the next 20 years: Composite materials
[MBB-UD-341-82-O] N82-28365
GLIDE PATHS
Flight simulation studies on the feasibility of laterally segmented approaches in an MLS environment
A82-40941
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269
GLIDERS
Dynamic energy transfer between wind and aircraft
A82-40339
Design and tests of airfoils for sailplanes with an application to the ASW-19B
A82-40967
Variable geometry aerofoils as applied to the Beatty B-5 and B-6 sailplanes
A82-40968
Determination of load spectra and their application for keeping the operational life proof of sporting airplanes
A82-41010
GRAPHITE-EPOXY COMPOSITES
Developments on graphite/epoxy T-2 nose landing gear door
A82-39893
Development of the advanced composite ground spoiler for C-1 medium transport aircraft
A82-39895
Development status of a composite vertical stabilizer for a jet trainer
A82-39897
Non-honeycomb F-16 horizontal stabilizer structural design
A82-40936
Design and fabrication of cocured composite hat-stiffened panels
A82-40978
Application of composite materials and new design concepts for future transport aircraft
A82-40998
GROUND BASED CONTROL
Flight control systems for aerial targets
A82-39745
The design of a RPV ground station simulator
A82-39750
GROUND EFFECT (AERODYNAMICS)
An evaluation of vertical drag and ground effect using the RSRA rotor balance system --- Rotor Systems Research Aircraft
A82-40510
GROUND STATIONS
Flight control systems for aerial targets
A82-39745
The design of a RPV ground station simulator
A82-39750

GROUND SUPPORT SYSTEMS
U.S. Army remotely piloted vehicle supporting technology program
A82-39739
GROUND TESTS
Error minimization in ground vibration testing --- of helicopter structures
A82-40550
GROUND WAVE PROPAGATION
Electromagnetic Propagation Problems in the Tactical Environment
[AGARD-LS-120] N82-29527
GROUND-AIR-GROUND COMMUNICATION
VHF radio link for ground-air-ground communications using an integrated voice-data modulation
A82-38405
Communications
N82-29302
GUIDANCE SENSORS
Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability
[AIAA 82-1585] A82-39011
Fixed pattern noise correction for staring arrays in guidance systems
A82-39190
A terrain following system, an algorithm and a sensor
A82-39740
Sensor stabilisation requirements of RPV's - A simulation study
A82-39741
GUNS (ORDNANCE)
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28287
GUST ALLEVIATORS
Gust load alleviation on Airbus A 300
A82-40881
GUST LOADS
The effects of atmospheric turbulence on a quadrotor heavy lift airship
[AIAA 82-1542] A82-39009
Gust response of commercial jet aircraft including effects of autopilot operation
[NASA-CR-165919] N82-28266
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
Automated optimum design of wing structures. Deterministic and probabilistic approaches
[NASA-TM-84475] N82-29317

H

HANDBOOKS
Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
[AD-A112498] N82-29332
HARNESSES
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552
HAWKER SIDDELEY AIRCRAFT
U.S. Marine Corps AV-8A maintenance experience
[AIAA PAPER 81-2657] A82-38446
HEAD-UP DISPLAYS
Micro-heads-up display
A82-40533
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292
Heads up display
[NASA-CASE-LAR-12630-1] N82-29319
HEAT TRANSFER
Cooled variable nozzle radial turbine for rotor craft applications
[NASA-CR-165397] N82-29323
HEAVY LIFT AIRSHIPS
The effects of atmospheric turbulence on a quadrotor heavy lift airship
[AIAA 82-1542] A82-39009
Performance characteristics of a buoyant quad-rotor research aircraft
A82-40974
HEIGHT
A recursive terrain height correlation system using multiple model estimation techniques
[AIAA 82-1513] A82-38937
HELICOPTER CONTROL
Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight
[AIAA 82-1522] A82-38942
A ground-simulation investigation of helicopter decelerating instrument approaches
A82-39118
Adaptive fuel control feasibility investigation
A82-40519
Concept demonstration of automatic subsystem parameter monitoring --- military helicopter cockpit instrumentation
A82-40530
Avionics systems for helicopter integration
A82-40534
NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches
A82-40535
HELICOPTER DESIGN
Composite use on helicopters
A82-38222
Toward all-composite helicopter fuselage
A82-38223
The need for a dedicated public service helicopter design
A82-38422
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263
Short range tactical RPH system
A82-39730
American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings
A82-40505
A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design
A82-40507
Recent advances in rotor technology at Boeing Vertol
A82-40508
Helicopter vibration reduction by rotor blade modal shaping
A82-40514
Correlation of predicted vibrations and test data for a wind tunnel helicopter model
A82-40515
Sikorsky ACAP preliminary design --- Advanced Composite Airframe Program
A82-40526
Conceptual design of the LHX integrated cockpit
A82-40527
The YAH-64 empennage and tail rotor - A technical history
A82-40528
Future helicopter cockpit design
A82-40529
Adaptation of pultrusion to the manufacture of helicopter components
A82-40537
Development of the Sea King composite main rotor blade
A82-40539
Computer aided coordinate measuring systems --- in engineering design of helicopter components
A82-40540
A roadmap toward a fatigue qualification process for modern technology helicopters
A82-40542
Optimum structural design --- for helicopters
A82-40543
Design and fabrication of a composite rear fuselage for the UH-60 /Black Hawk/
A82-40544
Structural design of a crashworthy landing gear for the AH-64 Attack Helicopter
A82-40547
Ringfin augmentation effects
A82-40548

Results of the AH-64 Structural Demonstration A82-40551

Material identification for the design of composite rotary wings A82-40937

HELICOPTER ENGINES

Civil helicopter propulsion system reliability and engine monitoring technology assessments A82-40518

Adaptive fuel control feasibility investigation A82-40519

800 Shaft Horsepower Advanced Technology Demonstrator Engine A82-40520

TF34 Convertible Engine System Technology Program A82-40521

Digital full authority controls for helicopter engines A82-40522

Support of the HH-65A - The impact of advanced technology of VTOL systems upon existing product support A82-40541

HELICOPTER PERFORMANCE

Flight dynamics of rotorcraft in steep high-g turns [AIAA PAPER 82-1345] A82-39117

Rationalization of the maintenance process for helicopter Ka-26 A82-39246

The operation of aircraft and helicopters in difficult meteorological and environmental conditions --- Russian book A82-39295

Short range tactical RFH system A82-39730

An evaluation of vertical drag and ground effect using the RSRA rotor balance system --- Rotor Systems Research Aircraft A82-40510

Tandem rotor helicopter characteristics in a continuous icing environment A82-40523

An evaluation of helicopter autorotation assist concepts A82-40524

Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability A82-40531

Avionics systems for helicopter integration A82-40534

Support of the HH-65A - The impact of advanced technology of VTOL systems upon existing product support A82-40541

Error minimization in ground vibration testing --- of helicopter structures A82-40550

The prediction of helicopter rotor discrete frequency noise A82-40553

Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack A82-40555

Helicopter model scale results of blade-vortex interaction impulsive noise as affected by blade planform A82-40556

HELICOPTER TAIL ROTORS

The YAH-64 empennage and tail rotor - A technical history A82-40528

Ringfin augmentation effects A82-40548

HELICOPTER WAKES

A simplified approach to the free wake analysis of a hovering rotor A82-38474

An experimental and numerical study of 3-D rotor wakes in hovering flight A82-40946

HELICOPTERS

Evaluation of an asymptotic method for helicopter rotor airloads A82-40509

Micro-heads-up display A82-40533

Improved 243 MHz homing antenna system for use on helicopters [NLR-MP-81022-U] N82-28276

Evaluations of helicopter instrument-flight handling qualities [AD-A114004] N82-28285

Kinematic investigation Hughes Helicopter 7.62mm chain gun [AD-A113114] N82-28287

HISS calibration, ice phobics and FAA R/D evaluations [AD-A114435] N82-28289

Limiting performance of nonlinear systems with applications to helicopter vibration control problems [AD-A113239] N82-28301

Reliability model for planetary gear [NASA-TM-82859] N82-28643

HIERARCHIES

Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control --- German thesis A82-41453

HIGH ALTITUDE

Reduction and analysis of mode C altitude data collected at high altitudes over the continental United States [AD-A114655] N82-29276

HIGH ASPECT RATIO

Means for controlling aerodynamically induced twist [NASA-CASE-LAR-12175-1] N82-28279

HIGH GRAVITY ENVIRONMENTS

Flight dynamics of rotorcraft in steep high-g turns [AIAA PAPER 82-1345] A82-39117

HIGH SPEED

Summary and recent results from the NASA advanced high-speed propeller research program [AIAA PAPER 82-1119] A82-40419

A semiempirical high-speed rotor noise prediction technique A82-40554

HOLE DISTRIBUTION (MECHANICS)

Cracks interacting with contact forces - A finite element study on loaded holes A82-40959

HOLOGRAPHIC INTERFEROMETRY

Nondestructive testing in aircraft construction using holographic methods A82-40977

High-sensitivity holographic plates PL-3M A82-41575

HOLOGRAPHY

Design study for a low-distortion holographic HUD [AD-A113982] N82-28292

HOMING DEVICES

Improved 243 MHz homing antenna system for use on helicopters [NLR-MP-81022-U] N82-28276

HORIZONTAL FLIGHT

Some comments on the prediction of forward flight effects on jet noise [MPIS-20/1981] N82-29118

Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight [NASA-CR-169159] N82-29312

HORIZONTAL TAIL SURFACES

Tests of CFRP spar/rib models with corrugated web A82-39890

Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail A82-39896

HOVERING

A simplified approach to the free wake analysis of a hovering rotor A82-38474

Flying quality requirements for V/STOL transition [AIAA PAPER 82-1293] A82-40276

Theory and application of optimum airloads to rotors in hover and forward flight A82-40506

Effect of tip vanes on the performance and flow field of a rotor in hover A82-40511

An investigation of scale model testing of VTOL aircraft in hover A82-40911

An experimental and numerical study of 3-D rotor wakes in hovering flight A82-40946
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight [NASA-CR-169159] N82-29312

HOVERING STABILITY
An analysis of a nonlinear instability in the implementation of a VTOL control system during hover [AIAA 82-1611] A82-38990
An experimental investigation of a bearingless model rotor in hover A82-40512
Finite element analysis for bearingless rotor blade aeroelasticity A82-40517

HUBS
Investigation of a rotor system incorporating a constant lift tip [NASA-CR-166261] N82-29271

HUMAN FACTORS ENGINEERING
The effects of the delays on systems subject to manual control A82-38943
The system of 'objective control' A82-39245
Evaluation of an automatic subsystem parameter monitor --- for aircraft A82-40552
The evolution of display formats for advanced fighters using multimode color CRT displays A82-40886
Human factors in air traffic control [AGARD-AG-275] N82-29293
The air traffic control system N82-29294
Human factors contributions to air traffic control systems N82-29295
Man as a system component N82-29296
The work environment N82-29299
Displays N82-29300
Controls N82-29301
Additional functions within the air traffic control system N82-29309
Future trends and problems N82-29310

HUMAN PERFORMANCE
Human capabilities and limitations in systems N82-29297

HUMAN REACTIONS
Aircraft fire safety [AGARD-LS-123] N82-29279
Human response to fire N82-29281

HYBRID STRUCTURES
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades A82-39263

HYDRAULIC TEST TUNNELS
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation [TPD-908-720] N82-29116

HYDROCARBON FUELS
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1 [AD-A113665] N82-28842

HYGROSCOPICITY
Recent development in hygrothermoviscoelastic analysis of composites N82-28676

HYSTERESIS
Aerodynamic aspects of aircraft dynamics at high angles of attack /AGARD Lecture/ [AIAA PAPER 82-1363] A82-39836

I

ICE FORMATION
Tandem rotor helicopter characteristics in a continuous icing environment A82-40523
HISS calibration, ice phobics and FAA R/D evaluations [AD-A114435] N82-28289
An evaluation of the Rosemount ice detector for cloud water content measurements [PB82-158833] N82-29321

ICE PREVENTION
Analysis of an airplane windshield anti-icing system [AIAA PAPER 82-1372] A82-39134

IDEAL FLUIDS
Calculation of level flow using radial grating A82-38922

IMAGE PROCESSING
Scanner imaging systems, aircraft N82-28715

IMAGING TECHNIQUES
Computer program for analysis of spherical screen distortion [AD-A113136] N82-28309

IMPACT LOADS
The behavior of composite thin-walled structures in dynamic buckling under impact A82-40976

IMPACT TESTS
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification [AD-A113957] N82-28267

IN-FLIGHT MONITORING
Minimal order time sharing filters for INS in-flight alignment A82-38439
'Listening' systems to increase aircraft structural safety and reduce costs A82-39539
Concept demonstration of automatic subsystem parameter monitoring --- military helicopter cockpit instrumentation A82-40530

INCOMPRESSIBLE BOUNDARY LAYER
Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane A82-40955

INERTIAL NAVIGATION
Minimal order time sharing filters for INS in-flight alignment A82-38439
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system [DE82-005555] N82-29292

INFLATABLE STRUCTURES
Inflated wings A82-40966

INFORMATION FLOW
Communications N82-29302

INFORMATION SYSTEMS
Preliminary design of an advanced integrated power and avionics information system A82-40907

INFRARED DETECTORS
Fixed pattern noise correction for staring arrays in guidance systems A82-39190

INFRARED RADIOMETERS
Application of an optical data link in the airborne scanning system A82-39275

INFRARED TRACKING
Algorithm development for infra-red air-to-air guidance systems A82-39191

INGESTION (ENGINES)
Water ingestion into axial flow compressors. Part 3: Experimental results and discussion [AD-A114830] N82-29326
Effect of water on axial flow compressors. Part 2: Computational program [AD-A114831] N82-29327

INJURIES
Flight attendant injuries: 1971-1976 [AD-A114909] N82-29274
Annual review of aircraft accident data: US general aviation calendar year 1979 [PB82-136250] N82-29278
INLET FLOW
A summary of V/STOL inlet analysis methods A82-40921
A summary of V/STOL inlet analysis methods [NASA-TM-82885] N82-28249
INLET PRESSURE
Inlet and airframe compatibility for a V/STOL fighter/attack aircraft with top-mounted inlets A82-40908
INSPECTION
Computer aided coordinate measuring systems --- in engineering design of helicopter components A82-40540
Principles of achieving damage tolerance with flexible maintenance programs for new and aging aircraft A82-41016
Method for refurbishing and processing parachutes [NASA-CASE-KSC-11042-1] N82-29330
INSTRUMENT APPROACH
NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches A82-40535
Flight simulation studies on the feasibility of laterally segmented approaches in an MLS environment A82-40941
INSTRUMENT FLIGHT RULES
A ground-simulation investigation of helicopter decelerating instrument approaches A82-39118
Tandem rotor helicopter characteristics in a continuous icing environment A82-40523
Estimation of the number of in-flight aircraft on instrument flight rules A82-41117
Evaluations of helicopter instrument-flight handling qualities [AD-A114004] N82-28285
Development of flying qualities criteria for single pilot instrument flight operations [NASA-CR-165932] N82-29288
Inflight IFR procedures simulator [NASA-CASE-KSC-11218-1] N82-29331
INSTRUMENT LANDING SYSTEMS
Instrument landing systems /ILS/ at airports of the German Democratic Republic A82-39248
INTAKE SYSTEMS
The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300 A82-40983
INTERFERENCE DRAG
The use of small strakes to reduce interference drag of a low wing, twin engine airplane [AIAA PAPER 82-1323] A82-39100
INTERNAL COMBUSTION ENGINES
Mini-RPV propulsion A82-39736
INTERNATIONAL COOPERATION
Engineering aspects of international collaboration on Tornado A82-40878
INVISCID FLOW
Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration A82-39996
IONOSPHERIC F-SCATTER PROPAGATION
Electromagnetic Propagation Problems in the Tactical Environment [AGARD-LS-120] N82-29527

J

JET AIRCRAFT
U.S. Marine Corps AV-8A maintenance experience [AIAA PAPER 81-2657] A82-38446
Minimization of the total costs incurred in the employment of passenger jet aircraft A82-39247
Development status of a composite vertical stabilizer for a jet trainer A82-39897
Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone A82-40124
Operation V10F - Development of a composite material wing A82-40934
Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods A82-41022
Gust response of commercial jet aircraft including effects of autopilot operation [NASA-CR-165919] N82-28266
Computer enhanced analysis of a jet in a cross-stream N82-29555
JET AIRCRAFT NOISE
Static noise tests on modified augmentor wing jet STOL research aircraft [NASA-TM-81231] N82-28295
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding [NASA-CR-169128] N82-29111
Some comments on the prediction of forward flight effects on jet noise [MPIS-20/1981] N82-29118
JET ENGINE FUELS
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses [AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production [AD-A112682] N82-28463
United States Air Force shale oil to fuels, phase 2 [AD-A114531] N82-29476
JET ENGINES
Redundant control unit for an advanced multispool engine A82-40998
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs [NASA-CR-165573] N82-28296
CF6 jet engine performance improvement: High pressure turbine active clearance control [NASA-CR-165556] N82-28297
Water ingestion into axial flow compressors. Part 3: Experimental results and discussion [AD-A114830] N82-29326
Effect of water on axial flow compressors. Part 2: Computational program [AD-A114831] N82-29327
JET FLOW
Wing-tip jets aerodynamic performance A82-40987
Aerodynamics of an airfoil with a jet issuing from its surface [NASA-TM-84825] N82-29267
JOINTS (JUNCTIONS)
Fasteners for composite structures A82-39929
Theoretical and experimental investigation of joint-structural damping interaction for airplane construction A82-41013
JP-4 JET FUEL
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil [AD-A112683] N82-28464

K

KALMAN FILTERS
Adaptive filtering for an aircraft flying in turbulent atmosphere A82-38441

Robust Kalman filter design for active flutter suppression systems
A82-38442

Research on an adaptive Kalman filter for solving the radar tracking problem --- German thesis
A82-40562

KINEMATICS
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28287

KUTTA-JOUKOWSKI CONDITION
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249

L

L-1011 AIRCRAFT
Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011
[AIAA PAPER 82-1297] A82-39084

LAMINAR BOUNDARY LAYER
Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces
A82-40894

External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing
A82-40895

LAMINAR FLOW
Calculation of level flow using radial grating
A82-38922

Observations and implications of natural laminar flow on practical airplane surfaces
A82-40893

LAMINAR FLOW AIRFOILS
Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces
A82-40894

External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing
A82-40895

Progress at Douglas on laminar flow control applied to commercial transport aircraft
A82-40958

LAMINATES
On the bearing strengths of CFRP laminates
A82-39930

The promise of laminated metals in aircraft design
A82-40903

Material identification for the design of composite rotary wings
A82-40937

Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975

Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280

LANDING
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-29316

LANDING GEAR
Developments on graphite/epoxy T-2 nose landing gear door
A82-39893

Touchdown technology --- large aircraft landing gear stress
A82-40057

Structural design of a crashworthy landing gear for the AH-64 Attack Helicopter
A82-40547

LANDING LOADS
Automated optimum design of wing structures. Deterministic and probabilistic approaches
[NASA-TM-84475] N82-29317

LANDING SIMULATION
Visual scene simulation concerning the landing of sporting aircraft in connection with investigations regarding the control and learning behavior of the pilot --- German thesis
A82-41447

LASER DOPPLER VELOCIMETERS
Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure
A82-38786

LASER GUIDANCE
U.S. Army remotely piloted vehicle program
A82-39732

LASER RANGE FINDERS
Radars for USA
A82-39742

Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690

LASERS
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624

LATERAL CONTROL
The ideal controlled element for real airplanes is not K/s
[AIAA 82-1606] A82-38986
Investigation of low order lateral directional transfer function models for augmented aircraft
[AIAA 82-1610] A82-38989
Flying qualities requirements for roll CAS systems
[AIAA PAPER 82-1356] A82-40287

LAUNCHERS
U.S. Army remotely piloted vehicle supporting technology program
A82-39739

LEADING EDGE FLAPS
Fuselage effects in leading edge vortex flap aerodynamics
A82-41006

LEADING EDGE SLATS
Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail
A82-39896

LEADING EDGES
Investigations regarding vortex formation at wings with bent leading edges
A82-38783

Leading edge separation at delta wings with curved leading edges in supersonic flow
A82-38784

Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure
A82-38786

Lateral aerodynamics of delta wings with leading edge separation
[AIAA PAPER 82-1386] A82-39142
Inflated wings
A82-40966

An experimental investigation of leading-edge spanwise blowing
A82-40988

Spanwise distribution of vortex drag and leading-edge suction in subsonic flow
A82-41005

LIFE CYCLE COSTS
Axisymmetric approach and landing thrust reverser impacts on usage and LCC --- life cycle cost
A82-40892

Logistics research program in the United States Air Force
A82-40963

LIFT
Wind-tunnel testing of V/STOL configurations at high lift
A82-40949

Minimum induced drag of canard configurations
A82-41116

LIFT AUGMENTATION
Ejector powered propulsion and high lift subsonic wing
A82-40970

Development of an advanced no-moving-parts high-lift airfoil
A82-40971

Test results of chordwise and spanwise blowing for low-speed lift augmentation
A82-40999

LIFT DRAG RATIO
Aerodynamic concepts for fuel-efficient transport aircraft
A82-40957

LIGHT AIRCRAFT
  Sport aircraft --- Russian book
    A82-40483
  Computational and experimental studies of light twin aerodynamic interference
    A82-40930
  Assessment of advanced technologies for high performance single-engine business airplanes
    A82-40932
  The design integration of wingtip devices for light general aviation aircraft
    A82-40933
LIGHT EMITTING DIODES
  Heads up display
    [NASA-CASE-LAR-12630-1] N82-29319
LIGHT TRANSMISSION
  Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
    [AD-A113910] N82-28624
LIGHTING EQUIPMENT
  Effects of approach lighting and variation in visible runway length on perception of approach angle in simulated night landings
    [AD-A114742] N82-29290
LIGHTNING
  A compendium of lightning effects on future aircraft electronic systems
    [AD-A114117] N82-28293
  Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
    [MBB-UD-340-82-O/E] N82-28364
  Atmospheric electricity hazards analytical model development and application. Volume 1: Lightning environment modeling
    [AD-A114015] N82-29800
  Atmospheric electricity hazards analytical model development and application. Volume 2: Simulation of the lightning/aircraft interaction event
    [AD-A114016] N82-29801
  Atmospheric electricity hazards analytical model development and application. Volume 3: Electromagnetic coupling modeling of the lightning/aircraft interaction event
    [AD-A114017] N82-29802
LINEAR ARRAYS
  The design of a viewing system for near real time stereo images from a UMA borne linescan sensor --- Unmanned Aircraft
    A82-39746
LINEAR SYSTEMS
  Application of multivariable model following method to flight controller
    [AIAA PAPER 82-1349] A82-39120
  Applications to aeronautics of the theory of transformations of nonlinear systems
    [NASA-TM-84249] N82-30013
LINEARIZATION
  The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/
    [AIAA PAPER 82-1384] A82-40294
LOAD TESTS
  On the bearing strengths of CFRP laminates
    A82-39930
  In-plane shear test of thin panels
    A82-40545
LOADS (FORCES)
  Wind tunnel studies of store separation with load factor. Freedrops and captive trajectories
    N82-30261
LOGISTICS MANAGEMENT
  Logistics research program in the United States Air Force
    A82-40963
LONGITUDINAL CONTROL
  Design and analysis of a multivariable control system for a CCV-type fighter aircraft
    [AIAA PAPER 82-1350] A82-39121
  Design of a longitudinal ride-control system by Zakian's method of inequalities
    A82-41114
  Analytical and simulator study of advanced transport
    [NASA-CR-3572] N82-28298
LONGITUDINAL STABILITY
  Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations
    A82-41025
LORAN C
  Flight evaluation of LORAN-C in the State of Vermont
    [NASA-TM-84711] N82-28278
LOW LEVEL TURBULENCE
  The detection of low level wind shear. II
    A82-38463
LOW SPEED STABILITY
  Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip
    A82-41020

M

MACH NUMBER
  Flight-determined correction terms for angle of attack and sideslip
    [AIAA PAPER 82-1374] A82-40290
MAGNETIC COMPASSES
  Low cost development of INS sensors for expendable RPV control and navigation
    [AD-A112691] N82-28291
MAGNETIC SURVEYS
  Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
    [DE82-005555] N82-29292
MAINTENANCE
  Method for refurbishing and processing parachutes
    [NASA-CASE-KSC-11042-1] N82-29330
MAN MACHINE SYSTEMS
  A modern approach to pilot/vehicle analysis and the Neal-Smith criteria
    [AIAA PAPER 82-1357] A82-39125
  Evaluation of an automatic subsystem parameter monitor --- for aircraft
    A82-40552
  Applying advanced technology to flight station design
    A82-40887
  Human factors in air traffic control
    [AGARD-AG-275] N82-29293
  Human factors contributions to air traffic control systems
    N82-29295
  Man as a system component
    N82-29296
  Human capabilities and limitations in systems
    N82-29297
  Communications
    N82-29302
MANAGEMENT SYSTEMS
  Future terminal area systems
    A82-38462
MANUAL CONTROL
  The effects of the delays on systems subject to manual control
    A82-38943
  Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
    [AD-A113463] N82-28302
MANUFACTURING
  Development of materials and manufacturing technology over the next 20 years: Composite materials
    [MBB-UD-341-82-O] N82-28385
MATERIALS
  The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire
    N82-29285
MATERIALS TESTS
  Heat release rate calorimetry of engineering plastics
    A82-41075
MATHEMATICAL MODELS
  Aerodynamic behavior of a slender slot in a wind tunnel wall
    A82-38281
  Pilot models for discrete maneuvers
    [AIAA 82-1519] A82-38940
  Design of a longitudinal ride-control system by Zakian's method of inequalities
    A82-41114
  Estimation of the number of in-flight aircraft on instrument flight rules
    A82-41117

Reliability model for planetary gear
[NASA-TM-82859] N82-28643
Establishment of a rotor model basis
[NASA-TP-2026] N82-29311

MAXIMUM LIKELIHOOD ESTIMATES
System identification of nonlinear aerodynamic models
N82-29996

MEASURING INSTRUMENTS
Primary-data devices --- Russian book
A82-39279

MECHANICAL PROPERTIES
Technical and economic comparison of carbon fiber tape and woven fabric applications
A82-40993

METAL BONDING
The promise of laminated metals in aircraft design
A82-40903

METAL FATIGUE
Fatigue behavior of weldbonded joints
A82-41115

METAL MATRIX COMPOSITES
Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975

METAL SHEETS
The promise of laminated metals in aircraft design
A82-40903

METAL SURFACES
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364

METEOROLOGICAL RADAR
Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar
A82-40532

MICROBALANCES
An evaluation of the Rosemount ice detector for cloud water content measurements
[PB82-158833] N82-29321

MICROCOMPUTERS
The detection of low level wind shear. II
A82-38463

MICROPROCESSORS
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294

MICROWAVE LANDING SYSTEMS
An MLS with computer aided landing approach
[AIAA PAPER 82-1352] A82-39122
NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches
A82-40535
Flight simulation studies on the feasibility of laterally segmented approaches in an MLS environment
A82-40941
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269

MICROWAVE TRANSMISSION
The feasibility of a high-altitude aircraft platform with consideration of technological and societal constraints
[NASA-TM-84508] N82-29313

MIDAIR COLLISIONS
Air-air collision avoidance systems
A82-39323
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264

MILITARY AIRCRAFT
JVX, what an opportunity --- Joint Services Advanced Vertical Lift Aircraft Program
A82-38423
Guidance for the use of equivalent systems with MIL-F-8785C --- for aircraft flight control systems
[AIAA PAPER 82-1355] A82-39124
U.S. Army remotely piloted vehicle program
A82-39732
Age exploration in naval aviation --- Reliability Centered Maintenance program
A82-40962
Historical research and development inflation indices for Army fixed and rotor winged aircraft
[AD-A114368] N82-28290

MILITARY AVIATION
The national dynamics 'observer' mini-RPV for tropical operation
A82-39734
Age exploration in naval aviation --- Reliability Centered Maintenance program
A82-40962
Logistics research program in the United States Air Force
A82-40963

MILITARY HELICOPTERS
Flight dynamics of rotorcraft in steep high-g turns
[AIAA PAPER 82-1345] A82-39117
Recent advances in rotor technology at Boeing Vertol
A82-40508
Whirl mode stability of the main rotor of the YAH-64 Advanced Attack Helicopter
A82-40513
An evaluation of helicopter autorotation assist concepts
A82-40524
Conceptual design of the LHX integrated cockpit
A82-40527
The YAH-64 empennage and tail rotor - A technical history
A82-40528
Concept demonstration of automatic subsystem parameter monitoring --- military helicopter cockpit instrumentation
A82-40530

MINIMUM DRAG
Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes
A82-40931
Minimum induced drag of canard configurations
A82-41116

MIRAGE AIRCRAFT
Mirage 2000 - Towards possible high series production aircraft
A82-38249

MISSILE CONFIGURATIONS
Supersonic missile aerodynamic and performance relationships for low observables mission profiles
[AIAA PAPER 82-1298] A82-39085
Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements
[AIAA PAPER 82-1366] A82-40395

MISSILE CONTROL
Air-to-air missile avoidance
[AIAA 82-1516] A82-38939
Fixed pattern noise correction for staring arrays in guidance systems
A82-39190
Algorithm development for infra-red air-to-air guidance systems
A82-39191

MOISTURE CONTENT
An evaluation of the Rosemount ice detector for cloud water content measurements
[PB82-158833] N82-29321

MONITORS
Evaluation of an automatic subsystem parameter monitor --- for aircraft
A82-40552

MONOPLANES
Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes
A82-40931

MONOPOLE ANTENNAS
Monopole antenna patterns on finite size composite ground planes --- in aircraft
A82-41055

MONTE CARLO METHOD
Digital computer simulation of modern aeronautical digital communication systems
A82-40940

MORTALITY
Human response to fire
N82-29281

MOUNTAINS
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278

MOVING TARGET INDICATORS
- Moving target detector (Mod 2) [AD-A114709] N82-29520

MRCA AIRCRAFT
- Engineering aspects of international collaboration on Tornado A82-40878

MULTIPROCESSING (COMPUTERS)
- The design of a RPV ground station simulator A82-39750

N

NACELLES
- Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model [AIAA PAPER 81-0150] A82-38443

NASA PROGRAMS
- Summary and recent results from the NASA advanced high-speed propeller research program [AIAA PAPER 82-1119] A82-40419
- Predesign study for an advanced flight research rotor A82-40525
- Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability A82-40531
- NASA research on viscous drag reduction A82-40896

NATIONAL AIRSPACE UTILIZATION SYSTEM
- Estimation of the peak count of actively controlled aircraft A82-38447

NAVIGATION AIDS
- Problems in the simulation of correlation-extremal navigation systems A82-39403
- Simulation of correlation-extremal receivers of signals from sampling-phase radio-navigation systems A82-39404
- General aviation activity and avionics survey [AD-A112924] N82-28244
- Flight evaluation of LORAN-C in the State of Vermont [NASA-TM-84711] N82-28278

NETWORK ANALYSIS
- System data communication structures for active-control transport aircraft, volume 1 [NASA-CR-165773-VOL-1] N82-29510

NETWORK SYNTHESIS
- Flight control synthesis using robust output observers [(AIAA 82-1575] A82-39016

NOISE INTENSITY
- Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations [AD-A113672] N82-28841

NOISE MEASUREMENT
- Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations [AD-A113672] N82-28841
- Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation [TPD-908-720] N82-29116
- Estimated airplane noise levels in A-weighed decibels [AC-36-3B] N82-30029
- Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA-Ames 40 by 80 foot wind tunnel [NASA-CR-152328] N82-30030
- USAF bioenvironmental noise data handbook. Volume 148. T-37B in-flight crew noise [AD-A114943] N82-30031
- Far-field acoustic data for the Texas ASE, Inc. hush house [AD-A114564] N82-30032

NOISE POLLUTION
- Noise pollution and airport regulation A82-40051
- O'Hare International Airport - Impervious to proposed state efforts to limit airport noise A82-40052

NOISE PREDICTION (AIRCRAFT)
- The prediction of helicopter rotor discrete frequency noise A82-40553
- A semiempirical high-speed rotor noise prediction technique A82-40554
- Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack A82-40555
- Some comments on the prediction of forward flight effects on jet noise [MPIS-20/1981] N82-29118

NOISE REDUCTION
- Fixed pattern noise correction for staring arrays in guidance systems A82-39190
- NASA research in supersonic propulsion - A decade of progress [AIAA PAPER 82-1048] A82-40417
- Predesign study for an advanced flight research rotor A82-40525
- Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar A82-40532
- Static noise tests on modified augmentor wing jet STOL research aircraft [NASA-TM-81231] N82-28295
- The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding [NASA-CR-169128] N82-29111
- The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft [NASA-CR-137803] N82-29316

NOMOGRAPHS
- Computer enhanced analysis of a jet in a cross-stream N82-29555

NONDESTRUCTIVE TESTS
- Nondestructive testing in aircraft construction using holographic methods A82-40977
- Recommended practice for a demonstration of Nondestructive Evaluation /NDE/ reliability on aircraft production parts - Introduction to the guidelines A82-41140

NONLINEAR EQUATIONS
- The rectangular wing with semiinfinite span in nonlinear theory A82-39359

NONLINEAR SYSTEMS
- An analysis of a nonlinear instability in the implementation of a VTOL control system during hover [AIAA 82-1611] A82-38990
- The determination of gust loads on nonlinear aircraft using a power spectral density approach [NLR-TR-80123-U] N82-28303
- System identification of nonlinear aerodynamic models N82-29996
- Applications to aeronautics of the theory of transformations of nonlinear systems [NASA-TM-84249] N82-30013

NOSE TIPS
- Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure [AIAA PAPER 82-1361] A82-39128

NOZZLE FLOW
- An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters A82-41019

NOZZLE GEOMETRY
- A summary of V/STOL inlet analysis methods [NASA-TM-82885] N82-28289

NUCLEAR PROPULSION
- The feasibility of a high-altitude aircraft platform with consideration of technological and societal constraints [NASA-TM-84508] N82-29313

NUMERICAL ANALYSIS
Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles
A82-38722
NUMERICAL CONTROL
Design and flight testing of digital direct side-force control laws
[AIAA 82-1521] A82-38941
Digital full authority controls for helicopter engines
A82-40522
Design and flight testing of a digital optimal control general aviation autopilot
A82-40906
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284

O

OBLIQUE WINGS
Unique flight characteristics of the AD-1 oblique-wing research airplane
[AIAA PAPER 82-1329] A82-39106
OBSERVABILITY (SYSTEMS)
Flight control synthesis using robust output observers
[(AIAA 82-1575] A82-39016
ONBOARD DATA PROCESSING
A preliminary laboratory evaluation of a reconfigurable integrated flight control concept
[AIAA 82-1597] A82-38982
Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control --- German thesis
A82-41453
ONBOARD EQUIPMENT
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552
OPERATING COSTS
Minimization of the total costs incurred in the employment of passenger jet aircraft
A82-39247
Advanced technologies applied to reduce the operating costs of small commuter transport aircraft
A82-40915
OPTICAL EQUIPMENT
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292
OPTICAL RADAR
Radars for UMA
A82-39742
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690
OPTICAL SCANNERS
Application of an optical data link in the airborne scanning system
A82-39275
Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases
A82-39747
OPTIMAL CONTROL
Robust Kalman filter design for active flutter suppression systems
A82-38442
Parameter estimation applied to general aviation aircraft - A case study
[AIAA PAPER 82-1313] A82-39094
Optimal three-dimensional turning performance of supersonic aircraft
[AIAA PAPER 82-1326] A82-39103
A modern approach to pilot/vehicle analysis and the Neal-Smith criteria
[AIAA PAPER 82-1357] A82-39125
Optimal control application in supersonic aircraft performance
A82-39374
Design and flight testing of a digital optimal control general aviation autopilot
A82-40906
Optimal open-loop aircraft control for go-around maneuvers under wind shear influence
A82-40943
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298
OPTIMIZATION
Efficient optimum design of structures - Program DDDU
A82-38146
Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades
A82-39399
Optimum structural design --- for helicopters
A82-40543
Optimizing aerospace structures for manufacturing cost
A82-41014
Optimization of canard configurations - An integrated approach and practical drag estimation method
A82-41023
ORBIT DECAY
Prelaunch estimates of near Earth satellite lifetimes using quasi-dynamic atmosphere models - application to a proposed Brazilian satellite
[INPE-2325-PRE/080] N82-29347
OSCILLATION DAMPERS
Theoretical and experimental investigation of joint-structural damping interaction for airplane construction
A82-41013
OZONE
Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone
A82-40124

P

PANEL METHOD (FLUID DYNAMICS)
Lateral aerodynamics of delta wings with leading edge separation
[AIAA PAPER 82-1386] A82-39142
PANELS
Design and fabrication of cocured composite hat-stiffened panels
A82-40978
PARACHUTE FABRICS
Method for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] N82-29330
PARACHUTES
Method for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] N82-29330
PARALLEL FLOW
The unsteady motion of a wing traveling at subsonic speed above a plane
A82-39358
PARAMETER IDENTIFICATION
A recursive terrain height correlation system using multiple model estimation techniques
[AIAA 82-1513] A82-38937
Applications of parameter estimation in the study of spinning airplanes
[AIAA PAPER 82-1309] A82-39090
A simple, low cost application of a flight test parameter identification system
[AIAA PAPER 82-1312] A82-39093
Parameter estimation applied to general aviation aircraft - A case study
[AIAA PAPER 82-1313] A82-39094
NASA Dryden's experience in parameter estimation and its uses in flight test
[AIAA PAPER 82-1373] A82-39135
Determination of airplane aerodynamic parameters from flight data at high angles of attack
A82-40928
System identification of nonlinear aerodynamic models
N82-29996
PASSENGER AIRCRAFT
Minimization of the total costs incurred in the employment of passenger jet aircraft
A82-39247
Optimized 10 ton class commercial aircraft engine
A82-40890
Advanced technologies applied to reduce the operating costs of small commuter transport aircraft
A82-40915

PATTERN REGISTRATION
  Scanner imaging systems, aircraft
    N82-28715
PENDULUMS
  Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
    [NASA-CR-169131] N82-28282
PERFORMANCE PREDICTION
  An alternate method of specifying bandwidth for flying qualities
    [AIAA 82-1609] A82-38988
  Supersonic missile aerodynamic and performance relationships for low observables mission profiles
    [AIAA PAPER 82-1298] A82-39085
  The correlation of flight test and analytic M-on-N air combat exchange ratios --- Many-on-Many
    [AIAA PAPER 82-1328] A82-39105
  Analysis of an airplane windshield anti-icing system
    [AIAA PAPER 82-1372] A82-39134
  Analytic extrapolation to full scale aircraft dynamics
    [AIAA PAPER 82-1387] A82-39143
  An experimental investigation of a bearingless model rotor in hover
    A82-40512
  Correlation of predicted vibrations and test data for a wind tunnel helicopter model
    A82-40515
  Digital computer simulation of modern aeronautical digital communication systems
    A82-40940
  The prediction of propeller/wing interaction effects
    A82-40948
  Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft
    A82-40969
PERFORMANCE TESTS
  Performance of the Rotor Systems Research Aircraft calibrated rotor loads measurement system
    A82-40549
PERSONNEL
  Additional functions within the air traffic control system
    N82-29309
PHOTOCHEMICAL REACTIONS
  Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone
    A82-40124
PHOTOGRAPHIC PLATES
  High-sensitivity holographic plates EL-3M
    A82-41575
PILOT PERFORMANCE
  Pilot models for discrete maneuvers
    [AIAA 82-1519] A82-38940
  The effects of the delays on systems subject to manual control
    A82-38943
  The ideal controlled element for real airplanes is not K/s
    [AIAA 82-1606] A82-38986
  A modern approach to pilot/vehicle analysis and the Neal-Smith criteria
    [AIAA PAPER 82-1357] A82-39125
  The system of 'objective control'
    A82-39245
  Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
    [AD-A113463] N82-28302
PILOT TRAINING
  Visual scene simulation concerning the landing of sporting aircraft in connection with investigations regarding the control and learning behavior of the pilot --- German thesis
    A82-41447
PILOTLESS AIRCRAFT
  MACHAN - A unmanned aircraft flight research facility
    A82-39735
PITCHING MOMENTS
  Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011
    [AIAA PAPER 82-1297] A82-39084
  Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations
    A82-41025
PITOT TUBES
  Correlation of Preston-tube data with laminar skin friction (Log No. J12984)
    [NASA-TM-84827] N82-29556
PLANE STRAIN
  In-plane shear test of thin panels
    A82-40545
PLANNING
  Human factors contributions to air traffic control systems
    N82-29295
PLASMA ARC WELDING
  In-motion radiography of titanium spar tube welds
    A82-40538
PLASTIC AIRCRAFT STRUCTURES
  Development of the advanced composite ground spoiler for C-1 medium transport aircraft
    A82-39895
  Development status of a composite vertical stabilizer for a jet trainer
    A82-39897
  Operation V10F - Development of a composite material wing
    A82-40934
  Development of materials and manufacturing technology over the next 20 years: Composite materials
    [MBB-UD-341-82-O] N82-28365
PLASTICS
  Heat release rate calorimetry of engineering plastics
    A82-41075
PLOTTERS
  Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
    [AD-A112900] N82-28310
POLYMERIZATION
  Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
    [DE82-010994] N82-29464
POROUS BOUNDARY LAYER CONTROL
  Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces
    A82-40894
POROUS PLATES
  Turbulent boundary layer on a porous surface with injection at various angles to the wall
    A82-39482
POTENTIAL FLOW
  Evaluation of an asymptotic method for helicopter rotor airloads
    A82-40509
  Transonic small disturbance code for body-wing configuration coupled with full potential code for wing alone
    A82-40899
  The prediction of propeller/wing interaction effects
    A82-40948
POWDER METALLURGY
  International aviation (selected articles)
    [AD-A114422] N82-28245
POWERED LIFT AIRCRAFT
  Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft
    A82-40969
  Ejector powered propulsion and high lift subsonic wing
    A82-40970
  QCSEE over-the-wing engine acoustic data
    [NASA-TM-82708] N82-29324
PREDICTION ANALYSIS TECHNIQUES
  Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
    [NLR-MP-81023-U] N82-28685
  Effect of water on axial flow compressors. Part 2: Computational program
    [AD-A114831] N82-29327
PREDICTIONS
  Future trends and problems
    N82-29310
PRESSURE DISTRIBUTION
  Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane
    A82-40955

PRESSURE GRADIENTS
Comparison of experimental and analytic performance for contoured endwall stators [AIAA PAPER 82-1286] A82-40422
PRESSURE MEASUREMENT
Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure [AIAA PAPER 82-1361] A82-39128
An experimental investigation of leading-edge spanwise blowing A82-40988
PRESSURE SENSORS
Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure [AIAA PAPER 82-1361] A82-39128
PREVENTION
Human response to fire N82-29281
PROBABILITY THEORY
The Shiryayev sequential probability ratio test for redundancy management [AIAA 82-1623] A82-38998
PRODUCTION COSTS
Unmanned aircraft in future combat A82-39728
PROJECT MANAGEMENT
Engineering aspects of international collaboration on Tornado A82-40878
PROPELLER BLADES
The application of small propellers to RPV propulsion A82-39737
PROPELLER FANS
Turboprop design - Now and the future A82-40965
PROPELLER SLIPSTREAMS
The prediction of propeller/wing interaction effects A82-40948
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation [TPD-908-720] N82-29116
PROPELLERS
Propulsion opportunities for future commuter aircraft [AIAA PAPER 82-1049] A82-40418
Summary and recent results from the NASA advanced high-speed propeller research program [AIAA PAPER 82-1119] A82-40419
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation [TPD-908-720] N82-29116
Heads up display [NASA-CASE-LAR-12630-1] N82-29319
PROPULSION SYSTEM CONFIGURATIONS
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference --- wind tunnel tests [NLR-MP-81020-U] N82-28262
PROPULSION SYSTEM PERFORMANCE
Supersonic missile aerodynamic and performance relationships for low observables mission profiles [AIAA PAPER 82-1298] A82-39085
Mini-RPV propulsion A82-39736
The application of small propellers to RPV propulsion A82-39737
Electric propulsion for a mini RPV system A82-39744
Propulsion opportunities for future commuter aircraft [AIAA PAPER 82-1049] A82-40418
Summary and recent results from the NASA advanced high-speed propeller research program [AIAA PAPER 82-1119] A82-40419
Civil helicopter propulsion system reliability and engine monitoring technology assessments A82-40518
Aerodynamic concepts for fuel-efficient transport aircraft A82-40957
An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters A82-41019
PROPULSIVE EFFICIENCY
The application of small propellers to RPV propulsion A82-39737
Aircraft design for fuel efficiency A82-40973
PROTECTION
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage [MBB-UD-340-82-O/E] N82-28364
PROTECTIVE CLOTHING
Human response to fire N82-29281
PROTOTYPES
Evaluation of CFRP prototype structures for aircraft A82-39892
Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail A82-39896
PULSE COMMUNICATION
Digital computer simulation of modern aeronautical digital communication systems A82-40940
PULTRUSION
Adaptation of pultrusion to the manufacture of helicopter components A82-40537
PUSHBROOM SENSOR MODES
Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases A82-39747

Q

QUADRATIC PROGRAMMING
Efficient optimum design of structures - Program DDDU A82-38146
QUALITY CONTROL
Recommended practice for a demonstration of Nondestructive Evaluation /NDE/ reliability on aircraft production parts - Introduction to the guidelines A82-41140

R

RADAR DETECTION
Complete flexibility and realism in radar simulation A82-38461
Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar A82-40532
RADAR EQUIPMENT
Radars for UMA A82-39742
RADAR MAPS
Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar A82-40532
RADAR MEASUREMENT
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking [NASA-TM-73298] N82-28690
RADAR REFLECTORS
Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar A82-40532
RADAR RESOLUTION
Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability A82-40531
RADAR TARGETS
Moving target detector (Mod 2) [AD-A114709] N82-29520

RADAR TRACKING

Analysis of general-aviation accidents using ATC radar records [AIAA PAPER 82-1310] A82-39091

Target tracking using area correlation A82-39194

Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability A82-40531

Research on an adaptive Kalman filter for solving the radar tracking problem --- German thesis A82-40562

RADIAL FLOW

Calculation of level flow using radial grating A82-30922

Cooled variable nozzle radial turbine for rotor craft applications [NASA-CR-165397] N82-29323

RADIO ATTENUATION

Electromagnetic Propagation Problems in the Tactical Environment [AGARD-LS-120] N82-29527

RADIO BEACONS

Minimum operational performance standards for automatic direction finding (ADF) equipment [RTCA/DO-179] N82-28270

RADIO COMMUNICATION

Propagation problems associated with aircraft communications systems N82-29535

RADIO DIRECTION FINDERS

Minimum operational performance standards for automatic direction finding (ADF) equipment [RTCA/DO-179] N82-28270

RADIO EQUIPMENT

Multifunction multiband airborne radio architecture study [AD-A114427] N82-28523

RADIO NAVIGATION

Problems in the simulation of correlation-extremal navigation systems A82-39403

Simulation of correlation-extremal receivers of signals from sampling-phase radio-navigation systems A82-39404

Minimum operational performance standards for automatic direction finding (ADF) equipment [RTCA/DO-179] N82-28270

Multifunction multiband airborne radio architecture study [AD-A114427] N82-28523

RADIO RELAY SYSTEMS

VHF radio link for ground-air-ground communications using an integrated voice-data modulation A82-38405

Electromagnetic Propagation Problems in the Tactical Environment [AGARD-LS-120] N82-29527

RADIOGRAPHY

In-motion radiography of titanium spar tube welds A82-40538

RADIOMETRIC CORRECTION

Scanner imaging systems, aircraft N82-28715

RANGEFINDING

Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking [NASA-TM-73298] N82-28690

REAL GASES

Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/ A82-40950

REAL TIME OPERATION

Air-to-air missile avoidance [AIAA 82-1516] A82-38939

Terrain following/terrain avoidance system concept development [AIAA PAPER 82-1518] A82-40428

RECTANGULAR WINGS

The rectangular wing with semiinfinite span in nonlinear theory A82-39359

On embedded flow characteristics of sharp edged rectangular wings [LOG-C4712] N82-29263

RECURSIVE FUNCTIONS

A recursive terrain height correlation system using multiple model estimation techniques [AIAA 82-1513] A82-38937

REDUNDANT COMPONENTS

Generic faults and design solutions for flight-critical systems [AIAA 82-1595] A82-38980

The Shiryayev sequential probability ratio test for redundancy management [AIAA 82-1623] A82-38998

Redundant control unit for an advanced multispool engine A82-40998

REGULATIONS

Noise pollution and airport regulation A82-40051

O'Hare International Airport - Impervious to proposed state efforts to limit airport noise A82-40052

RELIABILITY ENGINEERING

Generic faults and design solutions for flight-critical systems [AIAA 82-1595] A82-38980

A preliminary laboratory evaluation of a reconfigurable integrated flight control concept [AIAA 82-1597] A82-38982

Age exploration in naval aviation --- Reliability Centered Maintenance program A82-40962

REMOTE CONTROL

Low cost development of INS sensors for expendable RPV control and navigation [AD-A112691] N82-28291

REMOTE SENSORS

Application of an optical data link in the airborne scanning system A82-39275

The design of a viewing system for near real time stereo images from a UMA borne linescan sensor --- Unmanned Aircraft A82-39746

REMOTELY PILOTED VEHICLES

Remotely piloted vehicles; International Conference, 2nd, Bristol, England, April 6-8, 1981, Conference Papers and Supplementary Papers A82-39727

Unmanned aircraft in future combat A82-39728

Horses for courses in RPV operations --- system components design and development in terms of performance and cost A82-39729

Short range tactical RPH system A82-39730

Canadair rotary wing technology development A82-39731

U.S. Army remotely piloted vehicle program A82-39732

Stabileye. R. Stephenson --- RPV performance, design and materials characteristics A82-39733

The national dynamics 'observer' mini-RPV for tropical operation A82-39734

Mini-RPV propulsion A82-39736

The application of small propellers to RPV propulsion A82-39737

The control and guidance unit for MACHAN A82-39738

U.S. Army remotely piloted vehicle supporting technology program A82-39739

A terrain following system, an algorithm and a sensor A82-39740

Sensor stabilisation requirements of RPV's - A simulation study A82-39741

Radars for UMA A82-39742

Electric propulsion for a mini RPV system A82-39744

Flight control systems for aerial targets A82-39745

The design of a viewing system for near real time stereo images from a USA borne linescan sensor --- Unmanned Aircraft A82-39746

Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases A82-39747

The design of a RPV ground station simulator A82-39750

Flight experience with a backup flight-control system for the HiMAT research vehicle [AIAA PAPER 82-1541] A82-40429

Low cost development of INS sensors for expendable RPV control and navigation [AD-A112691] N82-28291

The feasibility of a high-altitude aircraft platform with consideration of technological and societal constraints [NASA-TM-84508] N82-29313

REPLACING

New technology for the next generation of commercial transports - Real or imaginary A82-41007

RESCUE OPERATIONS

Aircraft fire safety [AGARD-LS-123] N82-29279

Aircraft fire mishap experience/crash fire scenario quantitation N82-29280

Human response to fire N82-29281

Aircraft post-crash fire fighting/rescue N82-29287

RESEARCH AIRCRAFT

Unique flight characteristics of the AD-1 oblique-wing research airplane [AIAA PAPER 82-1329] A82-39106

MACHAN - A unmanned aircraft flight research facility A82-39735

Performance characteristics of a buoyant quad-rotor research aircraft A82-40974

RESEARCH AND DEVELOPMENT

U.S. Army remotely piloted vehicle program A82-39732

Logistics research program in the United States Air Force A82-40963

Recent airfoil developments at DFVLR A82-40986

Aerodynamic research applications at Boeing A82-41000

Historical research and development inflation indices for Army fixed and rotor winged aircraft [AD-A114368] N82-28290

RESEARCH FACILITIES

MACHAN - A unmanned aircraft flight research facility A82-39735

Applying advanced technology to flight station design A82-40887

RESEARCH PROJECTS

Predesign study for an advanced flight research rotor A82-40525

NASA research on viscous drag reduction A82-40896

Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands A82-40985

RESIN MATRIX COMPOSITES

Design considerations and experiences in the use of composite material for an aeroelastic research wing [NASA-TM-83291] N82-28280

RESONANT FREQUENCIES

Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades A82-39399

RESONANT VIBRATION

Influence of unsteady aerodynamics on hingeless rotor ground resonance A82-38445

REVISIONS

Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community [AD-A112957] N82-28274

REYNOLDS STRESS

Close-coupled canard-wing vortex interaction and Reynolds stress acquisition [AIAA PAPER 82-1368] A82-39132

RIBBONS

Technical and economic comparison of carbon fiber tape and woven fabric applications A82-40993

RIDING QUALITY

Design of a longitudinal ride-control system by Zakian's method of inequalities A82-41114

RIGID ROTORS

Influence of unsteady aerodynamics on hingeless rotor ground resonance A82-38445

The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades A82-39263

RING STRUCTURES

Ringfin augmentation effects A82-40546

ROBUSTNESS (MATHEMATICS)

Robust Kalman filter design for active flutter suppression systems A82-38442

Flight control synthesis using robust output observers [(AIAA 82-1575] A82-39016

ROLLER BEARINGS

Advances in high-speed rolling-element bearings [NASA-TM-82910] N82-28644

ROTARY STABILITY

Use of rotary balance and forced oscillation test data in six degrees of freedom simulation [AIAA PAPER 82-1364] A82-39129

Whirl mode stability of the main rotor of the YAH-64 Advanced Attack Helicopter A82-40513

ROTARY WING AIRCRAFT

Performance characteristics of a buoyant quad-rotor research aircraft A82-40974

ROTARY WINGS

A simplified approach to the free wake analysis of a hovering rotor A82-38474

Calculation of the cross section properties and the shear stresses of composite rotor blades A82-38475

Canadair rotary wing technology development A82-39731

American Helicopter Society, Annual Forum, 38th, Anaheim, CA, May 4-7, 1982, Proceedings A82-40505

Theory and application of optimum airloads to rotors in hover and forward flight A82-40506

A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design A82-40507

Recent advances in rotor technology at Boeing Vertol A82-40508

Evaluation of an asymptotic method for helicopter rotor airloads A82-40509

Effect of tip vanes on the performance and flow field of a rotor in hover A82-40511

Whirl mode stability of the main rotor of the YAH-64 Advanced Attack Helicopter A82-40513

Wind tunnel modeling of rotor vibratory loads A82-40516

In-motion radiography of titanium spar tube welds A82-40538

Development of the Sea King composite main rotor blade A82-40539

The prediction of helicopter rotor discrete frequency noise A82-40553

A semiempirical high-speed rotor noise prediction technique
A82-40554

Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack
A82-40555

Computer-aided derivation of equations of motion for rotary-wing aeroelastic problems
A82-40863

Material identification for the design of composite rotary wings
A82-40937

Fluctuating forces and rotor noise due to distorted inflow
A82-40945

Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution
A82-40947

Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252

Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260

Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282

Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271

Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-169159] N82-29312

ROTOR AERODYNAMICS

Influence of unsteady aerodynamics on hingeless rotor ground resonance
A82-38445

A simplified approach to the free wake analysis of a hovering rotor
A82-38474

Calculation of level flow using radial grating
A82-38922

Flight dynamics of rotorcraft in steep high-g turns
[AIAA PAPER 82-1345] A82-39117

Theory and application of optimum airloads to rotors in hover and forward flight
A82-40506

Wind tunnel modeling of rotor vibratory loads
A82-40516

Predesign study for an advanced flight research rotor
A82-40525

A semiempirical high-speed rotor noise prediction technique
A82-40554

Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack
A82-40555

An experimental and numerical study of 3-D rotor wakes in hovering flight
A82-40946

Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution
A82-40947

Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271

Establishment of a rotor model basis
[NASA-TP-2026] N82-29311

ROTOR BLADES

The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263

Effect of tip vanes on the performance and flow field of a rotor in hover
A82-40511

Helicopter vibration reduction by rotor blade modal shaping
A82-40514

Finite element analysis for bearingless rotor blade aeroelasticity
A82-40517

Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282

ROTOR BLADES (TURBOMACHINERY)

A simplified approach to the free wake analysis of a hovering rotor
A82-38474

Fluctuating forces and rotor noise due to distorted inflow
A82-40945

Establishment of a rotor model basis
[NASA-TP-2026] N82-29311

ROTOR LIFT

Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271

ROTOR SYSTEMS RESEARCH AIRCRAFT

Performance of the Rotor Systems Research Aircraft calibrated rotor loads measurement system
A82-40549

ROTORCRAFT AIRCRAFT

Cooled variable nozzle radial turbine for rotor craft applications
[NASA-CR-165397] N82-29323

ROTORS

The nonsynchronous whirls of the turbine rotor in aerojet engines
A82-40944

ROUTES

Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2
[PB82-139353] N82-29277

RUNWAYS

Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[DE82-010994] N82-29464

S

S-N DIAGRAMS

A roadmap toward a fatigue qualification process for modern technology helicopters
A82-40542

SAAB AIRCRAFT

Design and experience with a low-cost digital fly-by-wire system in the SAAB JA37 Viggen A/C
A82-40905

SAFETY DEVICES

Aircraft post-crash fire fighting/rescue
N82-29287

SAFETY MANAGEMENT

Aircraft fire safety
[AGARD-LS-123] N82-29279

Human response to fire
N82-29281

Aviation fuels-future outlook and impact on aircraft fire threat
N82-29282

Fuel system protection methods
N82-29283

Aircraft post crash fire reduction/survivability enhancement from a manufacturer's viewpoint
N82-29286

SATELLITE LIFETIME

Prelaunch estimates of near Earth satellite lifetimes using quasi-dynamic atmosphere models - application to a proposed Brazilian satellite
[INPE-2325-PRE/080] N82-29347

SATELLITE OBSERVATION

Scanner imaging systems, aircraft
N82-28715

SCALE MODELS

An experimental investigation of a bearingless model rotor in hover
A82-40512

An investigation of scale model testing of VTOL aircraft in hover
A82-40911

An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters
A82-41019

Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model
[AD-A114101] N82-28288

Investigation of correlation between full-scale and fifth-scale wind tunnel tests of a Bell helicopter Textron Model 222
[NASA-CR-166362] N82-29315

SEAT BELTS
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275
SEATS
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275
SELF INDUCED VIBRATION
Dynamic load measurements with delta wings undergoing self-induced roll-oscillations
[AIAA PAPER 82-1320] A82-39098
SENSORS
Primary-data devices --- Russian book
A82-39279
SEPARATED FLOW
Symposium on Flows with Separation, Stuttgart, West Germany, November 23-25, 1981, Reports
A82-38781
Lateral aerodynamics of delta wings with leading edge separation
[AIAA PAPER 82-1386] A82-39142
Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods
A82-41022
SEQUENTIAL ANALYSIS
The Shiryayev sequential probability ratio test for redundancy management
[AIAA 82-1623] A82-38998
SERVICE LIFE
Determination of load spectra and their application for keeping the operational life proof of sporting airplanes
A82-41010
The role of the scale parameter in service load assessment and simulation --- of aircraft flight
A82-41011
SERVOCONTROL
An analysis of a nonlinear instability in the implementation of a VTOL control system during hover
[AIAA 82-1611] A82-38990
SH-3 HELICOPTER
Development of the Sea King composite main rotor blade
A82-40539
SHALE OIL
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
United States Air Force shale oil to fuels, phase 2
[AD-A114531] N82-29476
SHARP LEADING EDGES
On embedded flow characteristics of sharp edged rectangular wings
[LOG-C4712] N82-29263
SHEAR STRENGTH
Tests of CFRP spar/rib models with corrugated web
A82-39890
SHEAR STRESS
Calculation of the cross section properties and the shear stresses of composite rotor blades
A82-38475
In-plane shear test of thin panels
A82-40545
SHOCK FRONTS
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292
SHORT HAUL AIRCRAFT
Short range tactical RPV system
A82-39730
SHORT TAKEOFF AIRCRAFT
Application of advanced exhaust nozzles for tactical aircraft
A82-40889
Design and experimental verification of the USB-flap structucture for NAL STOL aircraft --- Upper Surface Blowing
A82-40917
Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft
A82-40969
Test results of chordwise and spanwise blowing for low-speed lift augmentation
A82-40999
Design of a longitudinal ride-control system by Zakian's method of inequalities
A82-41114
SIDESLIP
Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy
[AIAA PAPER 82-1385] A82-39141
Lateral aerodynamics of delta wings with leading edge separation
[AIAA PAPER 82-1386] A82-39142
Flight-determined correction terms for angle of attack and sideslip
[AIAA PAPER 82-1374] A82-40290
Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip
A82-41020
SIGNAL ANALYZERS
Error minimization in ground vibration testing --- of helicopter structures
A82-40550
SIGNAL GENERATORS
Inflight IFR procedures simulator
[NASA-CASE-KSC-11218-1] N82-29331
SIGNAL PROCESSING
A recursive terrain height correlation system using multiple model estimation techniques
[AIAA 82-1513] A82-38937
Parameter estimation applied to general aviation aircraft - A case study
[AIAA PAPER 82-1313] A82-39094
Moving target detector (Mod 2)
[AD-A114709] N82-29520
SIGNAL RECEPTION
Simulation of correlation-extremal receivers of signals from sampling-phase radio-navigation systems
A82-39404
SIKORSKY AIRCRAFT
Sikorsky ACAP preliminary design --- Advanced Composite Airframe Program
A82-40526
SIMULATION
Laboratory-scale simulation of underground coal gasification: Experiment and theory
[DE82-001063] N82-28470
SKIN (STRUCTURAL MEMBER)
Non-honeycomb F-16 horizontal stabilizer structural design
A82-40936
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
SKIN FRICTION
Measurement and visualization of skin friction on the leeside of delta wings in supersonic flow
A82-38785
Correlation of Preston-tube data with laminar skin friction (Log No. J12984)
[NASA-TM-84827] N82-29556
SLENDER WINGS
Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy
[AIAA PAPER 82-1385] A82-39141
SLOTTED WIND TUNNELS
Aerodynamic behavior of a slender slot in a wind tunnel wall
A82-38201
Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571

SMALL PERTURBATION FLOW
  Transonic small disturbance code for body-wing configuration coupled with full potential code for wing alone
    A82-40899
  A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
    [NLR-TR-81031-U] N82-28263
SMOKE ABATEMENT
  Smoke abatement system for crash rescue/fire training facilities
    [AD-A114380] N82-28268
SOLAR POWERED AIRCRAFT
  The feasibility of a high-altitude aircraft platform with consideration of technological and societal constraints
    [NASA-TM-84508] N82-29313
SOUND FIELDS
  Fluctuating forces and rotor noise due to distorted inflow
    A82-40945
SOUTH CAROLINA
  Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2
    [PB82-139353] N82-29277
SPACE SHUTTLE ORBITERS
  NASA Dryden's experience in parameter estimation and its uses in flight test
    [AIAA PAPER 82-1373] A82-39135
SPACECRAFT DESIGN
  CDS-the designer's media, the analyst's model --- Configuration Development System for aircraft
    A82-40991
SPANWISE BLOWING
  Close-coupled canard-wing vortex interaction and Reynolds stress acquisition
    [AIAA PAPER 82-1368] A82-39132
  An experimental investigation of leading-edge spanwise blowing
    A82-40988
  Test results of chordwise and spanwise blowing for low-speed lift augmentation
    A82-40999
SPECIFICATIONS
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
    [AD-A112681] N82-28462
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
    [AD-A112683] N82-28464
SPECTRAL SENSITIVITY
  High-sensitivity holographic plates PL-3M
    A82-41575
SPEED INDICATORS
  Correlation of Preston-tube data with laminar skin friction (Log No. J12984)
    [NASA-TM-84827] N82-29556
SPIN DYNAMICS
  Applications of parameter estimation in the study of spinning airplanes
    [AIAA PAPER 82-1309] A82-39090
  Prediction of high alpha flight characteristics utilizing rotary balance data
    A82-40953
SPIN TESTS
  Prediction of high alpha flight characteristics utilizing rotary balance data
    A82-40953
  Spin behaviour of the Pilatus PC-7 Turbo Trainer
    A82-40979
SPOILERS
  Development of the advanced composite ground spoiler for C-1 medium transport aircraft
    A82-39895
SPOT WELDS
  Fatigue behavior of weldbonded joints
    A82-41115
STABILITY AUGMENTATION
  Guidance for the use of equivalent systems with MIL-F-8785C --- for aircraft flight control systems
    [AIAA PAPER 82-1355] A82-39124
STABILITY DERIVATIVES
  Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
    [NASA-TM-84247] N82-28252
STABILIZED PLATFORMS
  Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability
    [AIAA 82-1565] A82-39011
STABILIZERS (FLUID DYNAMICS)
  Development status of a composite vertical stabilizer for a jet trainer
    A82-39897
  A one-shot autoclave manufacturing process for carbon epoxy components
    A82-40935
  Non-honeycomb F-16 horizontal stabilizer structural design
    A82-40936
STANDARDS
  Perspectives of the flying qualities specification
    [AIAA PAPER 82-1354] A82-39123
  Minimum operational performance standards for automatic direction finding (ADF) equipment
    [RTCA/DO-179] N82-28270
STATIC AERODYNAMIC CHARACTERISTICS
  Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
    [NASA-TM-84499] N82-28299
STATIC PRESSURE
  Aerodynamic behavior of a slender slot in a wind tunnel wall
    A82-38281
  Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure
    [AIAA PAPER 82-1361] A82-39128
  Multistage axial compressor program on tip clearance effects
    [AD-A107445] N82-29325
STATIC STABILITY
  Modal control of relaxed static stability aircraft
    [AIAA 82-1524] A82-38984
STATISTICAL ANALYSIS
  Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
    [AD-A113672] N82-28841
STATORS
  Comparison of experimental and analytic performance for contoured endwall stators
    [AIAA PAPER 82-1286] A82-40422
STEREOPHOTOGRAPHY
  The design of a viewing system for near real time stereo images from a UMA borne linescan sensor --- Unmanned Aircraft
    A82-39746
STIFFNESS MATRIX
  Calculation of the cross section properties and the shear stresses of composite rotor blades
    A82-38475
STOCHASTIC PROCESSES
  The correlation of flight test and analytic M-on-N air combat exchange ratios --- Many-on-Many
    [AIAA PAPER 82-1328] A82-39105
  The role of the scale parameter in service load assessment and simulation --- of aircraft flight
    A82-41011
STRAKES
  The use of small strakes to reduce interference drag of a low wing, twin engine airplane
    [AIAA PAPER 82-1323] A82-39100
STRESS (PHYSIOLOGY)
  Special investigation report: Air traffic control system
    [PB82-136276] N82-28277
STRESS ANALYSIS
  Determination of load spectra and their application for keeping the operational life proof of sporting airplanes
    A82-41010
STRESS CONCENTRATION
  Calculation of the cross section properties and the shear stresses of composite rotor blades
    A82-38475
STRESS INTENSITY FACTORS
  Cracks interacting with contact forces - A finite element study on loaded holes
    A82-40959

STRESS MEASUREMENT
  Performance of the Rotor Systems Research Aircraft calibrated rotor loads measurement system A82-40549
STRUCTURAL ANALYSIS
  Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage --- German thesis A82-40561
  Cooled variable nozzle radial turbine for rotor craft applications [NASA-CR-165397] N82-29323
STRUCTURAL DESIGN
  Efficient optimum design of structures - Program DDDU A82-30146
  Optimum structural design --- for helicopters A82-40543
STRUCTURAL DESIGN CRITERIA
  Helicopter vibration reduction by rotor blade modal shaping A82-40514
  Results of the AH-64 Structural Demonstration A82-40551
STRUCTURAL FAILURE
  On the bearing strengths of CFRP laminates A82-39930
STRUCTURAL VIBRATION
  Correlation of predicted vibrations and test data for a wind tunnel helicopter model A82-40515
  The nonsynchronous whirls of the turbine rotor in aerojet engines A82-40944
  Limiting performance of nonlinear systems with applications to helicopter vibration control problems [AD-A113239] N82-28301
SUBSONIC FLOW
  The unsteady motion of a wing traveling at subsonic speed above a plane A82-39358
  Ejector powered propulsion and high lift subsonic wing A82-40970
  Spanwise distribution of vortex drag and leading-edge suction in subsonic flow A82-41005
SUBSONIC FLUTTER
  Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers A82-40909
SUBSONIC SPEED
  The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/ [AIAA PAPER 82-1384] A82-40294
SUCTION
  Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy [AIAA PAPER 82-1385] A82-39141
  Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces A82-40894
  Spanwise distribution of vortex drag and leading-edge suction in subsonic flow A82-41005
SUPERCRITICAL WINGS
  Improved solutions to the Falkner-Skan boundary-layer equation A82-38283
  Development of an advanced no-moving-parts high-lift airfoil A82-40971
  Design considerations and experiences in the use of composite material for an aeroelastic research wing [NASA-TM-83291] N82-28280
SUPERSONIC AIRCRAFT
  Forward-swept wings add supersonic zip A82-38216
  Optimal three-dimensional turning performance of supersonic aircraft [AIAA PAPER 82-1326] A82-39103
  Optimal control application in supersonic aircraft performance A82-39374
  NASA research in supersonic propulsion - A decade of progress [AIAA PAPER 82-1048] A82-40417
  Calculations of transonic steady state aeroelastic effects for a canard airplane A82-40882
  An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts A82-41000
SUPERSONIC AIRFOILS
  Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model [AD-A114101] N82-28280
SUPERSONIC CRUISE AIRCRAFT RESEARCH
  Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack [AIAA PAPER 82-1295] A82-39082
  Upper Vortex Flap - A versatile surface for highly swept wings A82-41002
  Analytical study of vortex flaps on highly swept delta wings A82-41003
  Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration A82-41004
SUPERSONIC FLIGHT
  Wing design for supersonic cruise/transonic maneuver aircraft A82-41021
SUPERSONIC FLOW
  Leading edge separation at delta wings with curved leading edges in supersonic flow A82-38704
  Measurement and visualization of skin friction on the leeside of delta wings in supersonic flow A82-38705
  Computation of supersonic flow around three-dimensional wings A82-40898
SUPERSONIC INLETS
  Intake swirl - A major disturbance parameter in engine/intake compatibility A82-41010
SUPERSONIC LOW ALTITUDE MISSILE
  Supersonic missile aerodynamic and performance relationships for low observables mission profiles [AIAA PAPER 82-1298] A82-39085
SUPERSONIC TRANSPORTS
  Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands A82-40985
SUPPORT INTERFERENCE
  Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements [AIAA PAPER 82-1366] A82-40395
SURFACE VEHICLES
  Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles A82-40956
SURVIVAL
  Aircraft fire safety [AGARD-LS-123] N82-29279
  Aircraft fire mishap experience/crash fire scenario quantitation N82-29280
  Human response to fire N82-29281
  Fuel system protection methods N82-29283
  Aircraft post crash fire reduction/survivability enhancement from a manufacturer's viewpoint N82-29286
SWEPT FORWARD WINGS
  Forward-swept wings add supersonic zip A82-38216
  X-29A flight control system design experiences [AIAA 82-1538] A82-39003
  High angle-of-attack characteristics of a forward-swept wing fighter configuration [AIAA PAPER 82-1322] A82-39099

Dynamic stability of flexible forward swept wing
aircraft
[AIAA PAPER 82-1325] A82-39102
Dual wing, swept forward swept rearward wing, and
single wing design optimization for high
performance business airplanes
A82-40931

SWEPT WINGS
Aerodynamic development of laminar flow control on
swept wings using distributed suction through
porous surfaces
A82-40894
Upper Vortex Flap - A versatile surface for highly
swept wings
A82-41002
Analytical study of vortex flaps on highly swept
delta wings
A82-41003
Wind-tunnel investigation of vortex flaps on a
highly swept interceptor configuration
A82-41004
A finite difference method for the calculation of
transonic flow about a wing, based on small
perturbation theory
[NLR-TR-81031-U] N82-28263

SWEPTBACK WINGS
Dual wing, swept forward swept rearward wing, and
single wing design optimization for high
performance business airplanes
A82-40931

SWIRLING
Intake swirl - A major disturbance parameter in
engine/intake compatibility
A82-41018

SYSTEM EFFECTIVENESS
Horses for courses in RPV operations --- system
components design and development in terms of
performance and cost
A82-39729

SYSTEM FAILURES
Computer outages at air terminal facilities and
their correlation to near miss mid-air
collisions (AFMD-82-43)
[B-206064] N82-28264

SYSTEM IDENTIFICATION
Parameter estimation applied to general aviation
aircraft - A case study
[AIAA PAPER 82-1313] A82-39094

SYSTEMS ANALYSIS
System identification of nonlinear aerodynamic
models
N82-29996

SYSTEMS COMPATIBILITY
Target acquisition system/air-to-surface weapon
compatibility analysis
[AIAA 82-1618] A82-38995
Inlet and airframe compatibility for a V/STOL
fighter/attack aircraft with top-mounted inlets
A82-40908

SYSTEMS ENGINEERING
A design criterion for highly augmented
fly-by-wire aircraft
[AIAA 82-1570] A82-38969
The use of differential pressure feedback in an
automatic flight control system
[AIAA 82-1596] A82-38981
Avoiding the pitfalls in automatic landing control
system design
[AIAA 82-1599] A82-39013
Application of multivariable model following
method to flight controller
[AIAA PAPER 82-1349] A82-39120
A practical approach to the incorporation of
technical advances in avionics
A82-40886
Design and experience with a low-cost digital
fly-by-wire system in the SAAB JA37 Viggen A/C
A82-40905
Design of a longitudinal ride-control system by
Zakian's method of inequalities
A82-41114
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294

SYSTEMS INTEGRATION
VHF radio link for ground-air-ground
communications using an integrated voice-data
modulation
A82-38405
A preliminary laboratory evaluation of a
reconfigurable integrated flight control concept
[AIAA 82-1597] A82-38982
Conceptual design of the LHX integrated cockpit
A82-40527
Avionics systems for helicopter integration
A82-40534
Advanced fighter technology integration program
AFTI/F-16
A82-40900
Preliminary design of an advanced integrated power
and avionics information system
A82-40907
Multifunction multiband airborne radio
architecture study
[AD-A114427] N82-28523
Problems related to the integration of fault
tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
Windtunnel capability related to test sections,
cryogenics, and computer-windtunnel integration
[AGARD-AR-174] N82-29334

SYSTEMS MANAGEMENT
Special investigation report: Air traffic control
system
[PB82-136276] N82-28277

SYSTEMS SIMULATION
Problems in the simulation of correlation-extremal
navigation systems
A82-39403
Sensor stabilisation requirements of RPV's - A
simulation study
A82-39741

T

T-2 AIRCRAFT
Developments on graphite/epoxy T-2 nose landing
gear door
A82-39893
Design, fabrication and qualification of the T-2
composite rudder
A82-39894

T-37 AIRCRAFT
USAF bioenvironmental noise data handbook. Volume
148. T-37B in-flight crew noise
[AD-A114943] N82-30031

T-56 ENGINE
Results of T56 engine performance monitoring trial
in Hercules aircraft, February - July 1977
[ARL-MECH-ENG-TECH-MEMO-409] N82-29322

TABLES (DATA)
Flight attendant injuries: 1971-1976
[AD-A114909] N82-29274

TAIL ASSEMBLIES
Tail versus canard configuration - An aerodynamic
comparison with regard to the suitability for
future tactical combat aircraft
A82-40901
Experimental and theoretical studies of
three-dimensional turbulent boundary layers on
an empennage of a typical transport airplane
A82-40955
Research model wing/tail fabrication --- transonic
wind tunnel 1/7.5-scale model
[AD-A114101] N82-28280

TAKEOFF
Alert aircraft roll over chocks
[AD-A107456] N82-28307
The cost of noise reduction for departure and
arrival operations of commercial tilt rotor
aircraft
[NASA-CR-137803] N82-29316

TANDEM ROTOR HELICOPTERS
Tandem rotor helicopter characteristics in a
continuous icing environment
A82-40523

TARGET ACQUISITION
Target acquisition system/air-to-surface weapon
compatibility analysis
[AIAA 82-1618] A82-38995
Algorithm development for infra-red air-to-air
guidance systems
A82-39191
Target tracking using area correlation
A82-39194
U.S. Army remotely piloted vehicle program
A82-39732

TARGET RECOGNITION
  Target acquisition system/air-to-surface weapon compatibility analysis [AIAA 82-1618] A82-38995
  Moving target detector (Mod 2) [AD-A114709] N82-29520
TASKS
  Jobs and tasks in air traffic control N82-29296
TAXIING
  Alert aircraft roll over chocks [AD-A107456] N82-28307
TECHNOLOGICAL FORECASTING
  Future terminal area systems A82-38462
  Future helicopter cockpit design A82-40529
  Engine controls for the 1980s and 1990s A82-40964
  Advanced casting: Today and tomorrow --- aerospace industry components casting N82-28486
TECHNOLOGY ASSESSMENT
  Canadair rotary wing technology development A82-39731
  On the state of technology and trends in composite materials in the United States A82-39882
  Touchdown technology --- large aircraft landing gear stress A82-40057
  Civil helicopter propulsion system reliability and engine monitoring technology assessments A82-40518
  Support of the HH-65A - The impact of advanced technology of VTOL systems upon existing product support A82-40541
  Recent advances in the performance of high bypass ratio fans A82-40891
  Advanced technologies applied to reduce the operating costs of small commuter transport aircraft A82-40915
  Assessment of advanced technologies for high performance single-engine business airplanes A82-40932
  Turboprop design - Now and the future A82-40965
  New technology for the next generation of commercial transports - Real or imaginary A82-41007
  Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community [AD-A112957] N82-28274
TECHNOLOGY TRANSFER
  Optimizing aerospace structures for manufacturing cost A82-41014
TECHNOLOGY UTILIZATION
  The need for a dedicated public service helicopter design A82-38422
  The technological aspects of titanium application in the TU-144 aircraft structure A82-39718
  On the state of technology and trends in composite materials in the United States A82-39882
  800 Shaft Horsepower Advanced Technology Demonstrator Engine A82-40520
  Advanced technologies applied to reduce the operating costs of small commuter transport aircraft A82-40915
  Nondestructive testing in aircraft construction using holographic methods A82-40977
TELECOMMUNICATION
  Communications N82-29302
TELEVISION CAMERAS
  The design of a viewing system for near real time stereo images from a UAV borne linescan sensor --- Unmanned Aircraft A82-39746
TELEVISION SYSTEMS
  Sensor stabilisation requirements of RPV's - A simulation study A82-39741
TEMPERATURE EFFECTS
  Evaluation of heat damage to aluminum aircraft structures A82-41141
TEMPERATURE MEASUREMENT
  The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results A82-39467
TERMINAL FACILITIES
  Future terminal area systems A82-38462
TERMINAL GUIDANCE
  Algorithm development for infra-red air-to-air guidance systems A82-39191
  Terminal information display system benefits and costs [AD-A114937] N82-29291
TERRAIN ANALYSIS
  A recursive terrain height correlation system using multiple model estimation techniques [AIAA 82-1513] A82-38937
TERRAIN FOLLOWING AIRCRAFT
  Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight [AIAA 82-1522] A82-38982
  A terrain following system, an algorithm and a sensor A82-39740
  Terrain following/terrain avoidance system concept development [AIAA PAPER 82-1518] A82-40428
TEST STANDS
  Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability [AIAA 82-1585] A82-39011
TF-34 ENGINE
  TF34 Convertible Engine System Technology Program A82-40521
THEMATIC MAPPING
  Scanner imaging systems, aircraft N82-28715
THERMAL EXPANSION
  Evaluation of an asymptotic method for helicopter rotor airloads A82-40509
THERMOPLASTIC RESINS
  Heat release rate calorimetry of engineering plastics A82-41075
THERMOVISCOELASTICITY
  Recent development in hygrothermoviscoelastic analysis of composites N82-28676
THIN PLATES
  In-plane shear test of thin panels A82-40545
THIN WALLS
  The behavior of composite thin-walled structures in dynamic buckling under impact A82-40976
THIN WINGS
  The unsteady motion of a wing traveling at subsonic speed above a plane A82-39350
  On embedded flow characteristics of sharp edged rectangular wings [LOG-C4712] N82-29263
THREE DIMENSIONAL BOUNDARY LAYER
  Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane A82-40955
THREE DIMENSIONAL FLOW
  Comparison of experimental and analytic performance for contoured endwall stators [AIAA PAPER 82-1286] A82-40422
  Computation of supersonic flow around three-dimensional wings A82-40898

Determination of the efficiency of a trailing edge flap in unsteady three-dimensional flow
A82-40910
THRUST AUGMENTATION
Ringfin augmentation effects
A82-40548
THRUST REVERSAL
Axisymmetric approach and landing thrust reverser impacts on usage and LCC --- life cycle cost
A82-40892
THRUST VECTOR CONTROL
Performance of a 2D-CD nonaxisymmetric exhaust nozzle on a turbojet engine at altitude
[AIAA PAPER 82-1137] A82-40420
THUNDERSTORMS
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
TILT ROTOR AIRCRAFT
JVX, what an opportunity --- Joint Services Advanced Vertical Lift Aircraft Program
A82-38423
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443
Flight dynamics of rotorcraft in steep high-g turns
[AIAA PAPER 82-1345] A82-39117
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-29316
TILT WING AIRCRAFT
Optimization of flight with tilt wings
A82-40912
TIME LAG
The effects of the delays on systems subject to manual control
A82-38943
TIME SHARING
Minimal order time sharing filters for INS in-flight alignment
A82-38439
TIP SPEED
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA-Ames 40 by 80 foot wind tunnel
[NASA-CR-152328] N82-30030
TITANIUM ALLOYS
The technological aspects of titanium application in the TU-144 aircraft structure
A82-39718
In-motion radiography of titanium spar tube welds
A82-40538
International aviation (selected articles)
[AD-A114422] N82-28245
TOLERANCES (MECHANICS)
Computer aided coordinate measuring systems --- in engineering design of helicopter components
A82-40540
Multistage axial compressor program on tip clearance effects
[AD-A107445] N82-29325
TORSION
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-169159] N82-29312
TOWED BODIES
Maneuver stability of a vehicle with a towed body
[AIAA PAPER 82-1347] A82-39119
TRACKING PROBLEM
Target tracking using area correlation
A82-39194
Research on an adaptive Kalman filter for solving the radar tracking problem --- German thesis
A82-40562
TRAILING EDGES
Inflated wings
A82-40966
Development of an advanced no-moving-parts high-lift airfoil
A82-40971
TRAILING-EDGE FLAPS
Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers
A82-40909
Determination of the efficiency of a trailing edge flap in unsteady three-dimensional flow
A82-40910
TRAINING AIRCRAFT
Development status of a composite vertical stabilizer for a jet trainer
A82-39897
Spin behaviour of the Pilatus PC-7 Turbor Trainer
A82-40979
A discussion of the flying quality requirements of a basic training aircraft
[AD-A114805] N82-29310
TRAINING ANALYSIS
Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
[AD-A112498] N82-29332
TRAINING DEVICES
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268
TRAINING EVALUATION
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306
Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
[AD-A112498] N82-29332
TRAINING SIMULATORS
Complete flexibility and realism in radar simulation
A82-38461
TRAJECTORIES
Wind tunnel studies of store separation with load factor. Freedrops and captive trajectories
N82-30261
TRAJECTORY ANALYSIS
User's manual for the AMEER flight path-trajectory simulation code
[DE82-007004] N82-29343
TRANSFER FUNCTIONS
The ideal controlled element for real airplanes is not K/s
[AIAA 82-1606] A82-38986
Investigation of low order lateral directional transfer function models for augmented aircraft
[AIAA 82-1610] A82-38989
The effects of atmospheric turbulence on a quadrotor heavy lift airship
[AIAA 82-1542] A82-39009
TRANSFORMATIONS (MATHEMATICS)
Applications to aeronautics of the theory of transformations of nonlinear systems
[NASA-TM-84249] N82-30013
TRANSMISSION
Advances in high-speed rolling-element bearings
[NASA-TM-82910] N82-28644
TRANSMISSION LINES
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552
TRANSMISSIONS (MACHINE ELEMENTS)
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
TRANSONIC FLIGHT
Wing design for supersonic cruise/transonic maneuver aircraft
A82-41021
TRANSONIC FLOW
Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration
A82-39996
A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design
A82-40507
Calculations of transonic steady state aeroelastic effects for a canard airplane
A82-40882
Viscous transonic airfoil flow simulation
A82-40897
Transonic small disturbance code for body-wing configuration coupled with full potential code for wing alone
A82-40899
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263

TRANSONIC WIND TUNNELS
  Aerodynamic behavior of a slender slot in a wind tunnel wall A82-38261
  Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/ A82-40950
  National Transonic Facility (NTF) prototype fan blade fatigue test [AD-A114405] N82-28261
  Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer [AD-A112900] N82-28310
  Design basis for a new transonic wind tunnel [AD-A112899] N82-28311
  Windtunnel capability related to test sections, cryogenics, and computer-windtunnel integration [AGARD-AR-174] N82-29334
  Correlation of Preston-tube data with laminar skin friction (Log No. J12984) [NASA-TM-84827] N82-29556
TRANSPORT AIRCRAFT
  Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers A82-40909
  A concept for 4D-guidance of transport aircraft in the TMA --- Terminal Maneuvering Area A82-40942
  Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane A82-40955
  Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles A82-40956
  Aerodynamic concepts for fuel-efficient transport aircraft A82-40957
  Progress at Douglas on laminar flow control applied to commercial transport aircraft A82-40958
  A crack growth model under spectrum loading A82-40961
  Application of composite materials and new design concepts for future transport aircraft A82-40994
  Aerodynamic research applications at Boeing A82-41000
  Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods A82-41022
  Analytical and simulator study of advanced transport [NASA-CR-3572] N82-28298
  Fireworthiness of transport aircraft interior systems N82-29284
  System data communication structures for active-control transport aircraft, volume 1 [NASA-CR-165773-VOL-1] N82-29510
  System data communication structures for active-control transport aircraft, volume 2 [NASA-CR-165773-VOL-2] N82-29511
TRANSPORTATION
  Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2 [PB82-139353] N82-29277
TRANSPORTATION ENERGY
  Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles A82-40956
TRAPEZOIDAL WINGS
  An experimental investigation of leading-edge spanwise blowing A82-40988
TROPOSPHERE
  Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone A82-40124
TRUSSES
  Efficient optimum design of structures - Program DDDU A82-38146
TU-144 AIRCRAFT
  The technological aspects of titanium application in the TU-144 aircraft structure A82-39718
TURBINE BLADES
  Comparison of HP turbine 'deep blade design' effects in turbofan engine gas generators with different bearing structure configurations A82-40996
TURBINE ENGINES
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses [AD-A112681] N82-28462
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production [AD-A112682] N82-28463
  An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil [AD-A112683] N82-28464
  Aviation fuels-future outlook and impact on aircraft fire threat N82-29282
TURBINE WHEELS
  Sliced disc design - A composite conform concept for a turbo engine axial compressor A82-40995
TURBINES
  CF6 jet engine performance improvement: High pressure turbine active clearance control [NASA-CR-165556] N82-28297
  Cooled variable nozzle radial turbine for rotor craft applications [NASA-CR-165397] N82-29323
TURBOCOMPRESSORS
  The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300 A82-40983
  Sliced disc design - A composite conform concept for a turbo engine axial compressor A82-40995
  Multistage axial compressor program on tip clearance effects [AD-A107445] N82-29325
  Water ingestion into axial flow compressors. Part 3: Experimental results and discussion [AD-A114830] N82-29326
  Effect of water on axial flow compressors. Part 2: Computational program [AD-A114831] N82-29327
  Aerodynamics of advanced axial-flow turbomachinery [AD-A114911] N82-29328
TURBOFAN ENGINES
  Optimized 10 ton class commercial aircraft engine A82-40890
  Recent advances in the performance of high bypass ratio fans A82-40891
  Third generation turbo fans A82-40964
  Comparison of HP turbine 'deep blade design' effects in turbofan engine gas generators with different bearing structure configurations A82-40996
  Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA-Ames 40 by 80 foot wind tunnel [NASA-CR-152328] N82-30030
TURBOJET ENGINE CONTROL
  Performance of a 2D-CD nonaxisymmetric exhaust nozzle on a turbojet engine at altitude [AIAA PAPER 82-1137] A82-40420
TURBOJET ENGINES
  Performance of a 2D-CD nonaxisymmetric exhaust nozzle on a turbojet engine at altitude [AIAA PAPER 82-1137] A82-40420

Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage --- German thesis A82-40561
The nonsynchronous whirls of the turbine rotor in aerojet engines A82-40944

TURBOMACHINE BLADES
The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results A82-39467

TURBOPROP AIRCRAFT
Turboprop design - Now and the future A82-40965

TURBOPROP ENGINES
Propulsion opportunities for future commuter aircraft [AIAA PAPER 82-1049] A82-40418
Summary and recent results from the NASA advanced high-speed propeller research program [AIAA PAPER 82-1119] A82-40419
Turboprop design - Now and the future A82-40565

TURBULENCE
Flight attendant injuries: 1971-1976 [AD-A114909] N82-29274

TURBULENCE EFFECTS
Adaptive filtering for an aircraft flying in turbulent atmosphere A82-38441
The effects of atmospheric turbulence on a quadrotor heavy lift airship [AIAA 82-1542] A82-39009

TURBULENT BOUNDARY LAYER
Turbulent boundary layer on a porous surface with injection at various angles to the wall A82-39482
Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane A82-40955

TURBULENT FLOW
Close-coupled canard-wing vortex interaction and Reynolds stress acquisition [AIAA PAPER 82-1368] A82-39132
Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/ A82-40950

TURBULENT HEAT TRANSFER
Turbulent boundary layer on a porous surface with injection at various angles to the wall A82-39482

TURNING FLIGHT
Optimal three-dimensional turning performance of supersonic aircraft [AIAA PAPER 82-1326] A82-39103
Flight dynamics of rotorcraft in steep high-g turns [AIAA PAPER 82-1345] A82-39117

TWISTING
Means for controlling aerodynamically induced twist [NASA-CASE-LAR-12175-1] N82-28279

U

UH-1 HELICOPTER
Adaptation of pultrusion to the manufacture of helicopter components A82-40537

UH-60A HELICOPTER
Design and fabrication of a composite rear fuselage for the UH-60 /Black Hawk/ A82-40544

UNSTEADY FLOW
The unsteady motion of a wing traveling at subsonic speed above a plane A82-39358
The rectangular wing with semiinfinite span in nonlinear theory A82-39359
Evaluation of an asymptotic method for helicopter rotor airloads A82-40509
Determination of the efficiency of a trailing edge flap in unsteady three-dimensional flow A82-40910

UPPER SURFACE BLOWING
Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft A82-40969
Design integration of CCW/USB for a sea-based aircraft A82-40972

UPPER SURFACE BLOWN FLAPS
Design and experimental verification of the USB-flap structucture for NAL STOL aircraft --- Upper Surface Blowing A82-40917
Upper Vortex Flap - A versatile surface for highly swept wings A82-41002

URETHANES
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire N82-29285

USER MANUALS (COMPUTER PROGRAMS)
User's manual for the AMEER flight path-trajectory simulation code [DE82-007004] N82-29343

UTILITY AIRCRAFT
The need for a dedicated public service helicopter design A82-38422

V

V/STOL AIRCRAFT
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model [AIAA PAPER 81-0150] A82-38443
U.S. Marine Corps AV-8A maintenance experience [AIAA PAPER 81-2657] A82-38446
Handling qualities criteria for flight path control of V/STOL aircraft [AIAA PAPER 82-1292] A82-39081
Flying quality requirements for V/STOL transition [AIAA PAPER 82-1293] A82-40276
A summary of weight savings data for composite VSTOL structure A82-40546
Inlet and airframe compatibility for a V/STOL fighter/attack aircraft with top-mounted inlets A82-40908
A summary of V/STOL inlet analysis methods A82-40921
Wind-tunnel testing of V/STOL configurations at high lift A82-40949
Turboprop design - Now and the future A82-40965
A summary of V/STOL inlet analysis methods [NASA-TM-82885] N82-28249

VANES
Effect of tip vanes on the performance and flow field of a rotor in hover A82-40511

VARIABLE GEOMETRY STRUCTURES
Variable geometry aerofoils as applied to the Beatty B-5 and B-6 sailplanes A82-40960

VELOCITY DISTRIBUTION
An experimental and numerical study of 3-D rotor wakes in hovering flight A82-40946

VELOCITY MEASUREMENT
Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure A82-38786

VERTICAL AIR CURRENTS
Dynamic energy transfer between wind and aircraft A82-40939

VERTICAL FLIGHT
An evaluation of vertical drag and ground effect using the RSRA rotor balance system --- Rotor Systems Research Aircraft A82-40510

VERTICAL TAKEOFF AIRCRAFT
JVX, what an opportunity --- Joint Services Advanced Vertical Lift Aircraft Program A82-38423
An X-Wing aircraft control system concept [AIAA 82-1540] A82-38954

An analysis of a nonlinear instability in the implementation of a VTOL control system during hover
[AIAA 82-1611] A82-38990

Support of the HH-65A - The impact of advanced technology of VTOL systems upon existing product support
A82-40541

An investigation of scale model testing of VTOL aircraft in hover
A82-40911

VERY HIGH FREQUENCIES

VHF radio link for ground-air-ground communications using an integrated voice-data modulation
A82-38405

Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276

VIBRATION DAMPING

Robust Kalman filter design for active flutter suppression systems
A82-38442

Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades
A82-39399

Helicopter vibration reduction by rotor blade modal shaping
A82-40514

Predesign study for an advanced flight research rotor
A82-40525

Theoretical and experimental investigation of joint-structural damping interaction for airplane construction
A82-41013

Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282

VIBRATION EFFECTS

Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881

VIBRATION ISOLATORS

Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability
[AIAA 82-1585] A82-39011

Design of compensated flutter suppression systems
A82-40904

Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301

VIBRATION MEASUREMENT

Wind tunnel modeling of rotor vibratory loads
A82-40516

VIBRATION MODE

Helicopter vibration reduction by rotor blade modal shaping
A82-40514

VIBRATION TESTS

Correlation of predicted vibrations and test data for a wind tunnel helicopter model
A82-40515

Error minimization in ground vibration testing --- of helicopter structures
A82-40550

VIBRATORY LOADS

Wind tunnel modeling of rotor vibratory loads
A82-40516

Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271

VIEW EFFECTS

Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309

VISCOUS FLOW

NASA research on viscous drag reduction
A82-40856

Viscous transonic airfoil flow simulation
A82-40857

VISUAL AIDS

Displays
N82-29300

VISUAL PERCEPTION

Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292

Effects of approach lighting and variation in visible runway length on perception of approach angle in simulated night landings
[AD-A114742] N82-29290

VOICE COMMUNICATION

VHF radio link for ground-air-ground communications using an integrated voice-data modulation
A82-38405

Human factors in air traffic control
[AGARD-AG-275] N82-29293

VORTEX BREAKDOWN

Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy
[AIAA PAPER 82-1385] A82-39141

VORTEX FLAPS

Upper Vortex Flap - A versatile surface for highly swept wings
A82-41002

Analytical study of vortex flaps on highly swept delta wings
A82-41003

Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration
A82-41004

VORTICES

Investigations regarding vortex formation at wings with bent leading edges
A82-38783

Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure
A82-38786

The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/
[AIAA PAPER 82-1384] A82-40294

Prediction of high alpha flight characteristics utilizing rotary balance data
A82-40953

Vortex formation over double-delta wings
A82-40989

Spanwise distribution of vortex drag and leading-edge suction in subsonic flow
A82-41005

Fuselage effects in leading edge vortex flap aerodynamics
A82-41006

VORTICITY

Computer enhanced analysis of a jet in a cross-stream
N82-29555

W

WALL FLOW

Turbulent boundary layer on a porous surface with injection at various angles to the wall
A82-39482

Comparison of experimental and analytic performance for contoured endwall stators
[AIAA PAPER 82-1286] A82-40422

Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571

WARNING SYSTEMS

Wind shear - Its effect on an aircraft and ways to reduce the hazard. II
A82-38500

WARPAGE

Calculation of the cross section properties and the shear stresses of composite rotor blades
A82-38475

WATER

Water ingestion into axial flow compressors. Part 3: Experimental results and discussion
[AD-A114830] N82-29326

Effect of water on axial flow compressors. Part 2: Computational program
[AD-A114831] N82-29327

WAVE ATTENUATION

Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624

WAVE FRONTS
Design study for a low-distortion holographic HUD [AD-A113982] N82-28292
WAVE PROPAGATION
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding [NASA-CR-169128] N82-29111
WEAPON SYSTEMS
Target tracking using area correlation A82-39194
Logistics research program in the United States Air Force A82-40963
Kinematic investigation Hughes Helicopter 7.62mm chain gun [AD-A113114] N82-28287
WEAPONS DELIVERY
Target acquisition system/air-to-surface weapon compatibility analysis [AIAA 82-1618] A82-38995
Unmanned aircraft in future combat A82-39728
WEATHER
The operation of aircraft and helicopters in difficult meteorological and environmental conditions --- Russian book A82-39295
WEDGE FLOW
Improved solutions to the Falkner-Skan boundary-layer equation A82-38283
WEIGHT REDUCTION
Committing composites to the Boeing 767 A82-38224
The national dynamics 'observer' mini-RPV for tropical operation A82-39734
Mini-RPV propulsion A82-39736
Radars for UMA A82-39742
Electric propulsion for a mini RPV system A82-39744
A summary of weight savings data for composite VSTOL structure A82-40546
WELD TESTS
In-motion radiography of titanium spar tube welds A82-40538
WELDED JOINTS
Fatigue behavior of weldbonded joints A82-41115
WHEEL BRAKES
Touchdown technology --- large aircraft landing gear stress A82-40057
WIND MEASUREMENT
The detection of low level wind shear. II A82-38463
WIND SHEAR
The detection of low level wind shear. II A82-38463
Wind shear - Its effect on an aircraft and ways to reduce the hazard. II A82-38500
Optimal open-loop aircraft control for go-around maneuvers under wind shear influence A82-40943
A study of wind shear effects on aircraft operations and safety in Australia [ARL-SYS-REPT-24] N82-28265
WIND TUNNEL CALIBRATION
Correlation of Preston-tube data with laminar skin friction (Log No. J12984) [NASA-TM-84827] N82-29556
WIND TUNNEL MODELS
Robust Kalman filter design for active flutter suppression systems A82-38442
Correlation of predicted vibrations and test data for a wind tunnel helicopter model A82-40515
Wind tunnel modeling of rotor vibratory loads A82-40516
Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration A82-41004
Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model [AD-A114101] N82-28288
Investigation of correlation between full-scale and fifth-scale wind tunnel tests of a Bell helicopter Textron Model 222 [NASA-CR-166362] N82-29315
WIND TUNNEL STABILITY TESTS
Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations A82-41025
WIND TUNNEL TESTS
Measurement and visualization of skin friction on the leeside of delta wings in supersonic flow A82-38785
An X-Wing aircraft control system concept [AIAA 82-1540] A82-38954
An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions [AIAA PAPER 82-1311] A82-39092
Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure [AIAA PAPER 82-1361] A82-39128
Analytic extrapolation to full scale aircraft dynamics [AIAA PAPER 82-1387] A82-39143
Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements [AIAA PAPER 82-1366] A82-40395
An experimental and numerical study of 3-D rotor wakes in hovering flight A82-40946
Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution A82-40947
The prediction of propeller/wing interaction effects A82-40948
Wind-tunnel testing of V/STOL configurations at high lift A82-40949
Design and tests of airfoils for sailplanes with an application to the ASW-19B A82-40967
Spin behaviour of the Pilatus PC-7 Turbor Trainer A82-40979
Vortex formation over double-delta wings A82-40989
Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings A82-41001
Fuselage effects in leading edge vortex flap aerodynamics A82-41006
An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters A82-41019
Wind-tunnel investigation of a full-scale canard-configured general aviation aircraft A82-41024
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution [NASA-TM-84247] N82-28252
Wind-tunnel evaluation of an aeroelastically conformable rotor [AD-A114384] N82-28260
Investigation of correlation between full-scale and fifth-scale wind tunnel tests of a Bell helicopter Textron Model 222 [NASA-CR-166362] N82-29315
Windtunnel capability related to test sections, cryogenics, and computer-windtunnel integration [AGARD-AR-174] N82-29334
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA-Ames 40 by 80 foot wind tunnel [NASA-CR-152328] N82-30030
WIND TUNNEL WALLS
Aerodynamic behavior of a slender slot in a wind tunnel wall A82-38281
Wind-tunnel testing of V/STOL configurations at high lift A82-40949

- Measuring the flow properties of slotted test-section walls [FFA-135] N82-28571

WIND VELOCITY
- Computer enhanced analysis of a jet in a cross-stream N82-29555

WINDSHIELDS
- Analysis of an airplane windshield anti-icing system [AIAA PAPER 82-1372] A82-39134

WING FLOW METHOD TESTS
- The unsteady motion of a wing traveling at subsonic speed above a plane A82-39358
- Vortex formation over double-delta wings A82-40989

WING LOADING
- Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers A82-40909
- The design integration of wingtip devices for light general aviation aircraft A82-40933
- Operation V10F - Development of a composite material wing A82-40934
- A crack growth model under spectrum loading A82-40961
- Test results of chordwise and spanwise blowing for low-speed lift augmentation A82-40999
- Minimum induced drag of canard configurations A82-41116
- Automated optimum design of wing structures. Deterministic and probabilistic approaches [NASA-TM-84475] N82-29317

WING NACELLE CONFIGURATIONS
- The use of small strakes to reduce interference drag of a low wing, twin engine airplane [AIAA PAPER 82-1323] A82-39100
- The prediction of propeller/wing interaction effects A82-40948

WING OSCILLATIONS
- Dynamic load measurements with delta wings undergoing self-induced roll-oscillations [AIAA PAPER 82-1320] A82-39098
- Theoretical and experimental investigation of joint-structural damping interaction for airplane construction A82-41013

WING PANELS
- Efficient optimum design of structures - Program DDDU A82-38146
- Operation V10F - Development of a composite material wing A82-40934

WING PLANFORMS
- Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings A82-41001

WING PROFILES
- Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles A82-38722
- Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration A82-39996
- Computation of supersonic flow around three-dimensional wings A82-40898
- Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes A82-40931
- Ejector powered propulsion and high lift subsonic wing A82-40970
- Wing design for supersonic cruise/transonic maneuver aircraft A82-41021
- Automated optimum design of wing structures. Deterministic and probabilistic approaches [NASA-TM-84475] N82-29317

WING SPAN
- The rectangular wing with semiinfinite span in nonlinear theory A82-39359

WING TIP VORTICES
- Close-coupled canard-wing vortex interaction and Reynolds stress acquisition [AIAA PAPER 82-1368] A82-39132

WING TIPS
- Gust load alleviation on Airbus A 300 A82-40881
- Wing-tip jets aerodynamic performance A82-40987
- Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom [NASA-CR-3571] N82-28881

WING-FUSELAGE STORES
- Wind tunnel studies of store separation with load factor. Freedrops and captive trajectories N82-30261

WINGLETS
- The design integration of wingtip devices for light general aviation aircraft A82-40933

WINGS
- Investigations regarding vortex formation at wings with bent leading edges A82-38783
- Optimization of flight with tilt wings A82-40912
- Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands A82-40985
- Means for controlling aerodynamically induced twist [NASA-CASE-LAR-12175-1] N82-28279
- Aerodynamics of an airfoil with a jet issuing from its surface [NASA-TM-84825] N82-29267

WORK
- The work environment N82-29299

WORKLOADS (PSYCHOPHYSIOLOGY)
- Boeing's new 767 eases crew workload A82-40348
- Special investigation report: Air traffic control system [PB82-136276] N82-28277

X

X WING ROTORS
- An X-Wing aircraft control system concept [AIAA 82-1540] A82-38954

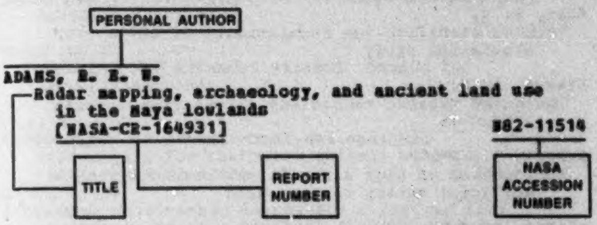
Y

YAW
- An analysis of a nonlinear instability in the implementation of a VTOL control system during hover [AIAA 82-1611] A82-38990

YIELD STRENGTH
- On the bearing strengths of CFRP laminates A82-39930

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ABBOTT, J. M.
A summary of V/STOL inlet analysis methods
A82-40921
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249

ABDALLA, K. L.
TF34 Convertible Engine System Technology Program
A82-40521

ABE, Y.
Evaluation of CFRP prototype structures for aircraft
A82-39892

ABRAMS, C. R.
A design criterion for highly augmented fly-by-wire aircraft
[AIAA 82-1570] A82-38969

ABU-MOSTAFA, A.
Correlation of Preston-tube data with laminar skin friction (Log No. J12984)
[NASA-TM-84827] N82-29556

ACREE, C. W., JR.
Performance of the Rotor Systems Research Aircraft calibrated rotor loads measurement system
A82-40549

ADAM, V.
A concept for 4D-guidance of transport aircraft in the TMA
A82-40942

ADLAKHA, V.
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022

AFANASEV, V. P.
Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades
A82-39399

AGRELL, N.
Calculations of transonic steady state aeroelastic effects for a canard airplane
A82-40882

AIKEN, E. W.
Simulator investigations of various side-stick controller/stability and control augmentation systems for helicopter terrain flight
[AIAA 82-1522] A82-38942

AKKARI, S. H.
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881

ALBRECHT, S. K.
CDS-the designer's media, the analyst's model
A82-40991

ALEKSEEV, V. I.
Problems in the simulation of correlation-extremal navigation systems
A82-39403

ALJABRI, A. S.
The prediction of propeller/wing interaction effects
A82-40943

ALLEN, J. B.
Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces
A82-40894

ALLES, P. D.
Algorithm development for infra-red air-to-air guidance systems
A82-39191

ALSPAUGH, T. A., JR.
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022

AMER, K. B.
The YAH-64 empennage and tail rotor - A technical history
A82-40528

ANDERS, K.
Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure
A82-38786

ANDERSON, D. J.
Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar
A82-40532

ANDERSON, J. R.
Moving target detector (Mod 2)
[AD-A114709] N82-29520

ANDERSON, K. W.
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265

ANSELL, H.
Cracks interacting with contact forces - A finite element study on loaded holes
A82-40959

ARAI, H.
Evaluation of CFRP prototype structures for aircraft
A82-39892

ARATA, N.
Evaluation of CFRP prototype structures for aircraft
A82-39892

ARDEN, R.
A summary of weight savings data for composite VSTOL structure
A82-40546

ARDEN, R. W.
A roadmap toward a fatigue qualification process for modern technology helicopters
A82-40542

ARI-GUR, J.
The behavior of composite thin-walled structures in dynamic buckling under impact
A82-40976

ARLINGER, B. G.
Computation of supersonic flow around three-dimensional wings
A82-40898

AULEHLA, F.
Intake swirl - A major disturbance parameter in engine/intake compatibility
A82-41018

AUSTIN, R. G.
Horses for courses in RPV operations
A82-39729

B

BACH, R. E., JR.
Analysis of general-aviation accidents using ATC radar records
[AIAA PAPER 82-1310] A82-39091

BACON, B. J.
A modern approach to pilot/vehicle analysis and the Neal-Smith criteria
[AIAA PAPER 82-1357] A82-39125

BAILEY, C. D.
'Listening' systems to increase aircraft structural safety and reduce costs
A82-39539

BAKER, D. J.
In-plane shear test of thin panels
A82-40545

BALANIS, C. A.
Monopole antenna patterns on finite size composite ground planes
A82-41055

BANDA, S. S.
Design and analysis of a multivariable control system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121

BANNISTER, J. A.
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022

BANNISTER, J. D.
A practical approach to the incorporation of technical advances in avionics
A82-40886

BAR-GILL, A.
Development of flying qualities criteria for single pilot instrument flight operations
[NASA-CR-165932] N82-29288

BAR-ITZHACK, I. Y.
Minimal order time sharing filters for INS in-flight alignment
A82-38439

BARGERY, A. W.
Flight control systems for aerial targets
A82-39745

BARTIE, K.
Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271

BATEH, E. J.
Fasteners for composite structures
A82-39929

BATTERSON, J. G.
Determination of airplane aerodynamic parameters from flight data at high angles of attack
A82-40928

BEATTIE, J. A. C.
The design of a viewing system for near real time stereo images from a JMA borne linescan sensor
A82-39746

BEAUCLAIR, N.
Mirage 2000 - Towards possible high series production aircraft
A82-38249

BECKER, J.
Gust load alleviation on Airbus A 300
A82-40881

BELKNAP, C. E.
Performance characteristics of a buoyant quad-rotor research aircraft
A82-40974

BENELLI, G.
VHF radio link for ground-air-ground communications using an integrated voice-data modulation
A82-38405

BENNETT, J. A.
External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing
A82-40895

BENNETT, R. L.
Optimum structural design
A82-40543

BERMAN, H.
X-29A flight control system design experiences
[AIAA 82-1538] A82-39003

BERNARD, F.
CATIA - A computer aided design and manufacturing tridimensional system
A82-40990

BERNDT, S. B.
Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571

BETZINA, M. D.
Aerodynamic interactions between a 1/6-scale helicopter rotor and a body of revolution
A82-40947
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252

BHAT, S. K.
Sensor stabilisation requirements of RPV's - A simulation study
A82-39741

BIANCO, A. J.
Advanced fighter technology integration program AFTI/F-16
A82-40900

BIHRLE, W., JR.
Prediction of high alpha flight characteristics utilizing rotary balance data
A82-40953

BILEKA, B. D.
The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results
A82-39467

BIRD, M. W.
PMCS - A commercial flight management computer system
[AIAA 82-1515] A82-38938

BIRKENHEUER, N. J.
Computer enhanced analysis of a jet in a cross-stream
N82-29555

BIRKENSHAW, J. A.
The control and guidance unit for MACHAN
A82-39738

BISCHOFF, D. E.
Investigation of low order lateral directional transfer function models for augmented aircraft
[AIAA 82-1610] A82-38989

BISSELL, J. R.
Theory and application of optimum airloads to rotors in hover and forward flight
A82-40506

BLACKMAN, J. P.
Axisymmetric approach and landing thrust reverser impacts on usage and LCC
A82-40892

BLACKWELL, R. H.
Predesign study for an advanced flight research rotor
A82-40525

BLAKE, E. E.
Adaptation of pultrusion to the manufacture of helicopter components
A82-40537

BLISS, D. B.
Aerodynamic behavior of a slender slot in a wind tunnel wall
A82-38281

BLOOMER, H. E.
QCSEE over-the-wing engine acoustic data
[NASA-TM-82708] N82-29324

BOARD, T. G.
United States Air Force shale oil to fuels, phase 2
[AD-A114531] N82-29476

BODNAR, L. L.
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523

BODNER, V. A.
Primary-data devices
A82-39279

BOERMANS, L. M. M.
Design and tests of airfoils for sailplanes with an application to the ASW-19B
A82-40967

BOES, G.
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364

BOLDT, T. R.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284

BOLTON, R. L.
Adaptive fuel control feasibility investigation
A82-40519

BONNER, E.
Wing design for supersonic cruise/transonic maneuver aircraft
A82-41021

BOWERS, D. L.
Application of advanced exhaust nozzles for tactical aircraft
A82-40889

BOYLE, R. J.
Comparison of experimental and analytic performance for contoured endwall stators
[AIAA PAPER 82-1286] A82-40422

BRANDT, L. B.
External aerodynamic design for a laminar flow control glove on a Lockheed JetStar wing
A82-40895

BRAYMEN, W. W.
Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings
A82-41001

BRENNENSTUHL, U.
Investigations regarding vortex formation at wings with bent leading edges
A82-38783
Vortex formation over double-delta wings
A82-40989

BREWARD, M. J.
Short range tactical RPV system
A82-39730

BRIDGMAN, A. L.
Heat release rate calorimetry of engineering plastics
A82-41075

BRIENS, G.
Technical and economic comparison of carbon fiber tape and woven fabric applications
A82-40993

BRINKLEY, J. W.
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267

BROADWAY, M. W.
Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2
[PB82-139353] N82-29277

BROCK, L. D.
System data communication structures for active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511

BROOKS, A.
TF34 Convertible Engine System Technology Program
A82-40521

BROUSSARD, J. R.
Design and flight testing of a digital optimal control general aviation autopilot
A82-40906

BROWN, E. N.
An evaluation of the Rosemount ice detector for cloud water content measurements
[PB82-158833] N82-29321

BRYANT, W. H.
Design and flight testing of a digital optimal control general aviation autopilot
A82-40906

BUCHMANN, W.
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443

BULL, J. S.
Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar
A82-40532

BURGESS, B.
Propagation problems associated with aircraft communications systems
N82-29535

BURNS, B. R. A.
Advanced aerodynamic design for future combat aircraft
A82-40879

BUTCHER, D. N.
Non-honeycomb F-16 horizontal stabilizer structural design
A82-40936

BUTTARS, C.
Complete flexibility and realism in radar simulation
A82-38461

C

CALARESE, W.
Close-coupled canard-wing vortex interaction and Reynolds stress acquisition
[AIAA PAPER 82-1368] A82-39132

CALE, D. B.
800 Shaft Horsepower Advanced Technology Demonstrator Engine
A82-40520

CAMPBELL, T. G.
Predesign study for an advanced flight research rotor
A82-40525

CANGELOSI, J.
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082

CAPRILE, C.
Material identification for the design of composite rotary wings
A82-40937

CARAMASCHI, V.
Material identification for the design of composite rotary wings
A82-40937

CARPENTER, C. G.
Flying quality requirements for V/STOL transition
[AIAA PAPER 82-1293] A82-40276

CARTER, W. P. L.
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842

CATER, D.
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29292

CHADEAU, A.
Electronic stabilization of an aircraft
A82-39322

CHALK, C. R.
The ideal controlled element for real airplanes is not K/s
[AIAA 82-1606] A82-38986
In-Flight investigation of large airplane flying qualities for approach and landing
[AIAA PAPER 82-1296] A82-39083

CHAN, M.
Terminal information display system benefits and costs
[AD-A114937] N82-29291

CHANANI, G. R.
Fatigue behavior of weldbonded joints
A82-41115

CHANDLER, R. F.
Flight attendant injuries: 1971-1976
[AD-A114909] N82-29274

CHANG, I. D.
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111

CHAUMETTE, D.
Operation V10F - Development of a composite material wing
A82-40934

CHEN, R. T. N.
Flight dynamics of rotorcraft in steep high-g turns
[AIAA PAPER 82-1345] A82-39117

CHEN, Z. L.
Wing-tip jets aerodynamic performance
A82-40587

CHERPASKINA, S. N.
The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results
A82-39467

CHEVALIER, H. L.
Wind tunnel measurements of longitudinal stability and control characteristics of primary and secondary wing configurations
A82-41025

CHIN, J.
X-29A flight control system design experiences
[AIAA 82-1538] A82-39003

CHISHOLM, J. P.
Demonstration of radar reflector detection and ground clutter suppression using airborne weather and mapping radar
A82-40532

CHIU, S. T.-T.
A roadmap toward a fatigue qualification process for modern technology helicopters
A82-40542

CHOPRA, I.
Finite element analysis for bearingless rotor blade aeroelasticity
A82-40517

CHOW, S.
Digital computer simulation of modern aeronautical digital communication systems
A82-40940

CHUNG, J. C.
Modal control of relaxed static stability aircraft
[AIAA 82-1524] A82-38944

CHUNG, T. J.
Recent development in hygrothermoviscoelastic analysis of composites
N82-28676

CHURCHILL, A. V.
Aviation fuels-future outlook and impact on aircraft fire threat
N82-29282

CLARK, A. S.
Canadair rotary wing technology development
A82-39731

CLARK, B. A. J.
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265

CLARK, J. W., JR.
Flying quality requirements for V/STOL transition
[AIAA PAPER 82-1293] A82-40276

CLARKE, R.
A simple, low cost application of a flight test parameter identification system
[AIAA PAPER 82-1312] A82-39093

CLARY, G. R.
Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability
A82-40531

CLIFF, E. M.
Maneuver stability of a vehicle with a towed body
[AIAA PAPER 82-1347] A82-39119

COLBURN, W. S.
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292

COLE, R. T.
Fasteners for composite structures
A82-39929

COLLINGS, T. A.
On the bearing strengths of CFRP laminates
A82-39930

CONNER, D. A.
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by blade planform
A82-40556

CONNOLLY, J. H.
Alert aircraft roll over chocks
[AD-A107456] N82-28307

CONSIGNY, H.
Determination of the efficiency of a trailing edge flap in unsteady three-dimensional flow
A82-40910

COOK, G. R.
Static noise tests on modified augmentor wing jet STOL research aircraft
[NASA-TM-81231] N82-28295

COOPER, I. F.
The control and guidance unit for MACHAN
A82-39738

COOPER, P. G.
Flight test evaluation of a video tracker for enhanced offshore airborne radar approach capability
A82-40531

COPLIN, J. F.
Third generation turbo fans
A82-40964

COSTE, J.
Wind tunnel studies of store separation with load factor. Freedrops and captive trajectories
N82-30261

COX, R. A.
Research model wing/tail fabrication
[AD-A114101] N82-28288

COY, J. J.
Reliability model for planetary gear
[NASA-TM-82859] N82-28603

COY, P. F.
Wind-tunnel investigation of a full-scale canard-configured general aviation aircraft
A82-41024

COZZOLONGO, J. V.
Aircraft geometry verification with enhanced computer-generated displays
A82-40992
Aircraft geometry verification with enhanced computer generated displays
[NASA-TM-84254] N82-29268

CRAIG, J. E.
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624

CRAWFORD, C. C., JR.
JVX, what an opportunity
A82-38423

CREIGHTON, J. R.
Laboratory-scale simulation of underground coal gasification: Experiment and theory
[DE82-001063] N82-28470

CRONIN, M. J.
Electronic/electric technology benefits study
[NASA-CR-165890] N82-28243

CROOM, M. A.
High angle-of-attack characteristics of a forward-swept wing fighter configuration
[AIAA PAPER 82-1322] A82-39099

CROSSLEY, T. R.
Design of a longitudinal ride-control system by Zakian's method of inequalities
A82-41114

CROWELL, D. T.
Method for refurbishing and processing parachutes
[NASA-CASE-KSC-11042-1] N82-29330

CUDAHY, G. F.
Ejector powered propulsion and high lift subsonic wing
A82-40970

CULLOM, R. R.
Performance of a 2D-CD nonaxisymmetric exhaust nozzle on a turbojet engine at altitude
[AIAA PAPER 82-1137] A82-40420

CURRY, R. E.
Unique flight characteristics of the AD-1 oblique-wing research airplane
[AIAA PAPER 82-1329] A82-39106

D

DAHL, G.
Redundant control unit for an advanced multispool engine
A82-40990

DAHSHAN, A. E.
Design of a longitudinal ride-control system by Zakian's method of inequalities
A82-41114

DASILVA, C.
Flap-lag-torsional dynamics of extensional and inextensional rotor blades in hover and in forward flight
[NASA-CR-169159] N82-29312

DAVIDSON, P. E.
Logistics research program in the United States Air Force
A82-40963

DAVIS, R. M.
Analytical design and validation of digital flight control system structure
[AIAA PAPER 82-1626] A82-40434

DAWSON, S.
An experimental investigation of a bearingless model rotor in hover
A82-40512

DE CAPITANI, M.
Material identification for the design of composite rotary wings
A82-40937

DEAN, E. H.
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261

DECARLO, D.
Monopole antenna patterns on finite size composite ground planes
A82-41055

DEKONING, A. U.
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685

DENNIS, B.
Forward-swept wings add supersonic zip
A82-38216

DERWENT, R. G.
Two-dimensional model studies of the impact of aircraft exhaust emissions on tropospheric ozone
A82-40124

DESTUYNDER, R.
Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers
A82-40909

DETHOMAS, A. P.
A preliminary laboratory evaluation of a reconfigurable integrated flight control concept
[AIAA 82-1597] A82-38982

DEVEREAUX, P. A.
An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters
A82-41019

DOLLYHIGH, S. M.
An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts
A82-41008

DOMENIC, R. E.
Conceptual design of the IHX integrated cockpit
A82-40527

DOWNING, D. R.
Design and flight testing of a digital optimal control general aviation autopilot
A82-40906

DREKSLER, H. L.
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294

DUDLEY, M. R.
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443
An investigation of scale model testing of VTOL aircraft in hover
A82-40911

DUNFORD, P. J.
Tandem rotor helicopter characteristics in a continuous icing environment
A82-40523

DUNN, G. L.
Preliminary design of an advanced integrated power and avionics information system
A82-40907
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284

DUNN, L. J.
Robust Kalman filter design for active flutter suppression systems
A82-38442

DURSTON, D. A.
Inlet and airframe compatibility for a V/STOL fighter/attack aircraft with top-mounted inlets
A82-40908

DUSICH, J. J.
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294

E

ECCLES, E. S.
Digital full authority controls for helicopter engines
A82-40522

ECKSTROM, C. V.
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280

EGOROV, I. M.
Simulation of correlation-extremal receivers of signals from sampling-phase radio-navigation systems
A82-39404

EHRESMAN, C. M.
Water ingestion into axial flow compressors. Part 3: Experimental results and discussion
[AD-A114830] N82-29326

EIGENMANN, M. F.
Axisymmetric approach and landing thrust reverser impacts on usage and LCC
A82-40892
An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters
A82-41019

ELANGOVAN, G.
Sensor stabilisation requirements of RPV's - A simulation study
A82-39741

ELBER, W.
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279

ELGCRONA, P. O.
Design and experience with a low-cost digital fly-by-wire system in the SAAB JA37 Viggen A/C
A82-40905

ELLINWOOD, J.
X-29A flight control system design experiences
[AIAA 82-1538] A82-39003

ELLIS, D. R.
The use of small strakes to reduce interference drag of a low wing, twin engine airplane
[AIAA PAPER 82-1323] A82-39100

ELLIS, G. S.
Ethanol production by vapor compression distillation
[DE82-004892] N82-29393

ELSENAAR, A.
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
[NLR-MP-81020-U] N82-28262

ENGLAR, R. J.
Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft
A82-40969
Development of an advanced no-moving-parts high-lift airfoil
A82-40971

ERICKSON, R. E.
An evaluation of vertical drag and ground effect using the RSRA rotor balance system
A82-40510

ERICSSON, L. E.
Analytic extrapolation to full scale aircraft dynamics
[AIAA PAPER 82-1387] A82-39143

ERIKSEN, F. J.
Atmospheric electricity hazards analytical model development and application. Volume 3: Electromagnetic coupling modeling of the lightning/aircraft interaction event
[AD-A114017] N82-29802

ERKELENS, L. J. J.
Flight simulation studies on the feasibility of laterally segmented approaches in an MLS environment
A82-40941

EROSHENKO, V. M.
Turbulent boundary layer on a porous surface with injection at various angles to the wall
A82-39462

EULER, D. A.
Performance characteristics of a buoyant quad-rotor research aircraft
A82-40974

F

FAIRCHILD, R. C.
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292

FAIRLIE, B. D.
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310

FALARSKI, M. D.
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443

FARASSAT, F.
The prediction of helicopter rotor discrete frequency noise
A82-40553

FARLEY, G. L.
In-plane shear test of thin panels
A82-40545

FARMER, P. F.
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29292

FASCHING, W. A.
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297

FAULKNER, H. B.
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-29316

FAVIER, D.
An experimental and numerical study of 3-D rotor wakes in hovering flight
A82-40946

FIALA, R.
Aircraft post-crash fire fighting/rescue
N82-29287

FINN, P. D.
The use of differential pressure feedback in an automatic flight control system
[AIAA 82-1596] A82-38981

FISHBACH, L. H.
NASA research in supersonic propulsion - A decade of progress
[AIAA PAPER 82-1048] A82-40417

FISHER, W. A.
Engine controls for the 1980s and 1990s
A82-40984

FLEMMING, R. J.
An evaluation of vertical drag and ground effect using the RSRA rotor balance system
A82-40510

FOLK, E. D.
Flight attendant injuries: 1971-1976
[AD-A114909] N82-29274

FOLKESSON, K.
Design and experience with a low-cost digital fly-by-wire system in the SAAB JA37 Viggen A/C
A82-40905

FORBRICH, C. A., JR.
Improved solutions to the Falkner-Skan boundary-layer equation
A82-38283

FORD, J.
The design of a RPV ground station simulator
A82-39750

FORTE, M. J.
The evolution of display formats for advanced fighters using multimode color CRT displays
A82-40888

FOX, D.
Preliminary design of an advanced integrated power and avionics information system
A82-40907

FOYE, R. L.
A summary of weight savings data for composite VSTOL structure
A82-40546

FRANKLIN, S. N.
System identification of nonlinear aerodynamic models
N82-29996

FREDRIKSSON, B.
Cracks interacting with contact forces - A finite element study on loaded holes
A82-40959

FREEMAN, C.
Recent advances in the performance of high bypass ratio fans
A82-40891

FRIELING, R.
Design and construction of a flexible autonomic electronic display device
A82-40569

FRINK, N. T.
Analytical study of vortex flaps on highly swept delta wings
A82-41003

FROST, W.
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881

FUHS, A. E.
Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure
[AIAA PAPER 82-1361] A82-39128

FUJIMORI, Y.
Design and experimental verification of the USB-flap structucture for NAL STOL aircraft
A82-40917

FUKUI, T.
Design, fabrication and qualification of the T-2 composite rudder
A82-39894

FULLER, S. G.
Perspectives of the flying qualities specification
[AIAA PAPER 82-1354] A82-39123

G

GABEL, R.
Wind tunnel modeling of rotor vibratory loads
A82-40516

GABRIELLI, G.
Requirements and trends in fuel consumption in transport mission with aircraft and surface vehicles
A82-40956

GANIUSHKIN, IU. P.
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263

GARLITZ, J.
Estimation of the peak count of actively controlled aircraft
A82-38447

Estimation of the number of in-flight aircraft on instrument flight rules
A82-41117

GARNER, H. D.
Heads up display
[NASA-CASE-LAR-12630-1] N82-29319

GARRARD, W. L.
Robust Kalman filter design for active flutter suppression systems
A82-38442

GATZEN, B. S.
Turboprop design - Now and the future
A82-40965

GAY, S. P., JR.
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29292

GEDEON, J.
The role of the scale parameter in service load assessment and simulation
A82-41011

GENTRY, T. A.
Guidance for the use of equivalent systems with MIL-F-8785C
[AIAA PAPER 82-1355] A82-39124

GIAVOTTO, V.
Material identification for the design of composite rotary wings
A82-40937

GIFFORD, R. V.
The design integration of wingtip devices for light general aviation aircraft
A82-40933

GILBER, W. P.
High angle-of-attack characteristics of a forward-swept wing fighter configuration
[AIAA PAPER 82-1322] A82-39099

GINGRICH, P. B.
Wing design for supersonic cruise/transonic maneuver aircraft
A82-41021

GLENNY, D. E.
Results of T56 engine performance monitoring trial in Hercules aircraft, February - July 1977
[ARL-MECH-ENG-TECH-MEMO-409] N82-29322

GOEL, S. C.
A preliminary laboratory evaluation of a reconfigurable integrated flight control concept
[AIAA 82-1597] A82-38982

GOKA, T.
Analysis of in-trail following dynamics of CDTI-equipped aircraft
[AIAA PAPER 82-1330] A82-39107

GOLDBERG, J. H.
Gust response of commercial jet aircraft including effects of autopilot operation
[NASA-CR-165919] N82-28266

GOODMAN, J. R.
Micro-heads-up display
A82-40533

GORANSON, U. G.
Principles of achieving damage tolerance with flexible maintenance programs for new and aging aircraft
A82-41016

GOSSETT, T. D.
U.S. Army remotely piloted vehicle supporting technology program
A82-39739

GRAETZSCH, K.-D.
The system of 'objective control'
A82-39245

GRAFTON, S. B.
High angle-of-attack characteristics of a forward-swept wing fighter configuration
[AIAA PAPER 82-1322] A82-39099

GRAVES, E. B.
The feasibility of a high-altitude aircraft platform with consideration of technological and societal constraints
[NASA-TM-84508] N82-29313

GRAVES, J. D.
An evaluation of helicopter autorotation assist concepts
A82-40524

GRAY, T. H.
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306
Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
[AD-A112498] N82-29332

GREEN, B. J.
Application of an optical data link in the airborne scanning system
A82-39275

GROSSIN, J.
Flight management computers
A82-39321

GRUNDY, P. H.
Fuel conservation: The airline - ATC
A82-38864

GRUNWALD, S. L.
Design and flight testing of digital direct side-force control laws
[AIAA 82-1521] A82-38941

GU, J.-L.
The nonsynchronous whirls of the turbine rotor in aerojet engines
A82-40944

GUNNINK, J. W.
Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975

GUSTAFSON, A. J.
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261

H

HAAS, J. E.
Comparison of experimental and analytic performance for contoured endwall stators
[AIAA PAPER 82-1286] A82-40422

HABERMAN, D. R.
Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements
[AIAA PAPER 82-1366] A82-40395
The use of a multi-degree-of-freedom dual balance system to measure cross and cross-coupling derivatives
[AD-A114813] N82-29333

HAGEMAIER, D. J.
Evaluation of heat damage to aluminum aircraft structures
A82-41141

HAGIN, W. V.
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306

HAGLUND, R.
Design and experience with a low-cost digital fly-by-wire system in the SAAB JA37 Viggen A/C
A82-40905

HAGUE, D. S.
The correlation of flight test and analytic M-on-N air combat exchange ratios
[AIAA PAPER 82-1328] A82-39105

HALL, J.
Principles of achieving damage tolerance with flexible maintenance programs for new and aging aircraft
A82-41016

HALL, L. D.
Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability
[AIAA 82-1585] A82-39011

HAMILL, T. G.
MACHAN - A unmanned aircraft flight research facility
A82-39735

HAMMER, B.
Committing composites to the Boeing 767
A82-38224

HAMRE, J. A.
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268

HANKINS, D. E.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284

HANLEY, L. D.
System data communication structures for active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511

HANOUVA, M. N. H.
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282

HANSEN, H.
Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers
A82-40909

HARRINGTON, W. W.
Terrain following/terrain avoidance system concept development
[AIAA PAPER 82-1518] A82-40428

HARRIS, G. L.
Electric propulsion for a mini RPV system
A82-39744

HARRIS, R. J.
Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft
A82-40969

HARRIS, W. L.
Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack
A82-40555

HAWORTH, L. A.
HISS calibration, ice phobics and FAA R/D evaluations
[AD-A114435] N82-28289

HEARON, B. F.
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267

HEATH, B. O.
Engineering aspects of international collaboration on Tornado
A82-40878

HEBB, R. C.
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309

HECKERT, C. H.
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-0/E] N82-28364
Development of materials and manufacturing technology over the next 20 years: Composite materials
[MBB-UD-341-82-0] N82-28365

HEDMAN, S. G.
Calculations of transonic steady state aeroelastic effects for a canard airplane
A82-40882

HEFFLEY, R. K.
Pilot models for discrete maneuvers
[AIAA 82-1519] A82-38940

HEIMBOLD, R. L.
The fourth dimension
A82-39540

HELLARD, G.
Operation V10F - Development of a composite material wing
A82-40934

HELMS, J. L.
Noise pollution and airport regulation
A82-40051

HENDERSON, J. C.
HISS calibration, ice phobics and FAA R/D evaluations
[AD-A114435] N82-28289

HENKE, R.
Leading edge separation at delta wings with curved leading edges in supersonic flow
A82-38784

HESS, R. A.
The effects of the delays on systems subject to manual control
A82-38943

HEUMANN, W.
Visual scene simulation concerning the landing of sporting aircraft in connection with investigations regarding the control and learning behavior of the pilot
A82-41447

HILAIRE, G.
Technical and economic comparison of carbon fiber tape and woven fabric applications
A82-40993

HILBIG, R.
Aerodynamic concepts for fuel-efficient transport aircraft
A82-40957

HILL, R. G.
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire
N82-29285

HILL, W. G., JR.
An investigation of scale model testing of VTOL aircraft in hover
A82-40913

HILLE, H. K.
USAF bioenvironmental noise data handbook. Volume 148. T-37B in-flight crew noise
[AD-A114943] N82-30031

HOAD, D. R.
Helicopter model scale results of blade-vortex interaction impulsive noise as affected by blade planform
A82-40556

HOCKENBERGER, R. I.
Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
[AD-A112498] N82-29332

HOCKENBERGER, R. L.
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306

HODDER, D.
Wind tunnel modeling of rotor vibratory loads
A82-40516

HODGKINSON, J.
An alternate method of specifying bandwidth for flying qualities
[(AIAA 82-1609] A82-38988
Flying quality requirements for V/STOL transition
[AIAA PAPER 82-1293] A82-40276

HOFMANN, O.
Opto-electronical push-broom scanners for navigation, reconnaissance and generation of digital data bases
A82-39747

HOGE, F. E.
Baseline monitoring using aircraft laser ranging
[NASA-TM-73298] N82-28690

HOH, R. H.
An alternate method of specifying bandwidth for flying qualities
[(AIAA 82-1609] A82-38988
Handling qualities criteria for flight path control of V/STOL aircraft
[AIAA PAPER 82-1292] A82-39081
Flying quality requirements for V/STOL transition
[AIAA PAPER 82-1293] A82-40276
Flying qualities requirements for roll CAS systems
[AIAA PAPER 82-1356] A82-40287

HOLLINS, M. L.
Fuselage effects in leading edge vortex flap aerodynamics
A82-41006

HOLMES, B. J.
Observations and implications of natural laminar flow on practical airplane surfaces
A82-40893
Assessment of advanced technologies for high performance single-engine business airplanes
A82-40932

HOPKIN, V. D.
Human factors in air traffic control
[AGARD-AG-275] N82-29293

HOPKINS, A. L.
System data communication structures for active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511

HOREFF, T. G.
Aircraft fire mishap experience/crash fire scenario quantitation
N82-29280

HORI, N.
Application of multivariable model following method to flight controller
[AIAA PAPER 82-1349] A82-39120

HOWELL, G. A.
Test results of chordwise and spanwise blowing for low-speed lift augmentation
A82-40999

HOWELL, W. D.
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire
N82-29285

HOWELL, W. E.
Heads up display
[NASA-CASE-LAR-12630-1] N82-29319

HOWISON, W. W.
Electronic/electric technology benefits study
[NASA-CR-165890] N82-28243

HSU, C.-H.
Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy
[AIAA PAPER 82-1385] A82-39141

HU, Y.
Models for the motor state of VSCF aircraft electrical power system
A82-40982

HUANG, H. Y.
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523

HUBBARD, J. E., JR.
Dynamic surface measurements on a model helicopter rotor during blade slap at high angles of attack
A82-40555

HUENECKE, K.
Low-speed characteristics of a fighter-type configuration at high angles-of-attack and sideslip
A82-41020

HUIZING, G. H.
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263

HUMMEL, D.
Investigations regarding vortex formation at wings with bent leading edges
A82-38783
Vortex formation over double-delta wings
A82-40989

HUNT, L. R.
Applications to aeronautics of the theory of transformations of nonlinear systems
[NASA-TM-84249] N82-30013

HUSON, G. G.
Development of the Circulation Control Wing-Upper Surface Blowing powered-lift system for STOL aircraft
A82-40969

HWANG, D. P.
A summary of V/STOL inlet analysis methods
A82-40921
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249

I

IAKOVLEV, S. A.
Sport aircraft
A82-40483

IANOVSKII, L. S.
Turbulent boundary layar on a porous surface with injection at various angles to the wall
A82-39482

IDEI, S.
Development status of a composite vertical stabilizer for a jet trainer
A82-39897

IKUYAMA, T.
Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail
A82-39896

ILIFF, K. W.
NASA Dryden's experience in parameter estimation and its uses in flight test
[AIAA PAPER 82-1373] A82-39135

ISHIKAWA, T.
Tests of CFRP spar/rib models with corrugated web
A82-39890

IVANNIKOVA, N. V.
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263

J

JACKSON, R. H. D.
Target tracking using area correlation
A82-39194

JACOB, H. G.
Optimal open-loop aircraft control for go-around maneuvers under wind shear influence
A82-40943

JACOBS, P. F.
Performance characteristics of a buoyant quad-rotor research aircraft
A82-40970

JAMESON, A.
Viscous transonic airfoil flow simulation
A82-40897

JANECZEK, K.
Rationalization of the maintenance process for helicopter Ka-26
A82-39246

JANKOVIC, J.
Reduced nonlinear flight dynamic model of elastic structure aircraft
A82-41009

JANSSON, D. G.
System data communication structures for active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511

JENKINS, R. C.
An investigation of scale model testing of VTOL aircraft in hover
A82-40911

JEWEL, J. W., JR.
Agricultural airplane mission time structure characteristics
[NASA-TM-84470] N82-29329

JEX, H. R.
The effects of atmospheric turbulence on a quadrotor heavy lift airship
[AIAA 82-1542] A82-39009

JOERG, J.
The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300
A82-40983

JOHNSON, W.
Influence of unsteady aerodynamics on hingeless rotor ground resonance
A82-38445

JORGENSEN, P. A.
Future terminal area systems
A82-38462

K

KAITATZIDIS, E.
A one-shot autoclave manufacturing process for carbon epoxy components
A82-40935

KALVISTE, J.
Use of rotary balance and forced oscillation test data in six degrees of freedom simulation
[AIAA PAPER 82-1364] A82-39129

KANAI, K.
Application of multivariable model following method to flight controller
[AIAA PAPER 82-1349] A82-39120

KAPLUN, L. IA.
High-sensitivity holographic plates PL-3M
A82-41573

KARAMCHETI, K.
Aerodynamics of an airfoil with a jet issuing from its surface
[NASA-TM-84825] N82-29267

KARP, D.
Moving target detector (Mod 2)
[AD-A114709] N82-29520

KASTE, R. P.
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28297

KATZ, J.
Dynamic load measurements with delta wings undergoing self-induced roll-oscillations
[AIAA PAPER 82-1320] A82-39098
Lateral aerodynamics of delta wings with leading edge separation
[AIAA PAPER 82-1386] A82-39142

KAVANAGH, P.
Aerodynamics of advanced axial-flow turbomachinery
[AD-A114911] N82-29328

KAY, B. F.
Sikorsky ACAP preliminary design
A82-40526
Design and fabrication of a composite rear fuselage for the UH-60 /Black Hawk/
A82-40544

KELLNER, A.
Fluctuating forces and rotor noise due to distorted inflow
A82-40945

KEMPEL, R. W.
Flight experience with a backup flight-control system for the HiMAT research vehicle
[AIAA PAPER 82-1541] A82-40429

KERELIUK, S.
Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285

KERR, J. D.
Analyzing stable pad disturbances and design of a sensor vault to monitor pad stability
[AIAA 82-1585] A82-39011

KESTELMAN, V. N.
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263

KIESSLING, F.
Computer-aided derivation of equations of motion for rotary-wing aeroelastic problems
A82-40883

KIHO, T.
Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail
A82-39896

KIM, D. G.
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291

KIRKHAM, W. R.
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275

KLEIN, R. W.
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082

KLEIN, V.
Parameter estimation applied to general aviation aircraft - A case study
[AIAA PAPER 82-1313] A82-39094
Determination of airplane aerodynamic parameters from flight data at high angles of attack
A82-40928

KLIMENKO, V. N.
The use of analog computers in solutions of inverse problems of heat conduction for the identification of boundary conditions on the surfaces of gas-turbine-engine parts on the basis of temperature-measurement results
A82-39467

KLIMOV, A. A.
Turbulent boundary layer on a porous surface with injection at various angles to the wall
A82-39482

KLIMZO, E. P.
High-sensitivity holographic plates FL-3M
A82-41575

KLINKER, F.
Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276

KNAPP, S. C.
Human response to fire
N82-29281

KNOX, F. S., III
Human response to fire
N82-29281

KOCHENDOERFER, R.
Sliced disc design - A composite conform concept for a turbo engine axial compressor
A82-40995

KOERNER, H.
Recent airfoil developments at DFVLR
A82-40936

KOHDA, T.
Evaluation of CFRP prototype structures for aircraft
A82-39892

KOHLMAN, D. L.
Assessment of advanced technologies for high performance single-engine business airplanes
A82-40932

KOLBO, L. A.
Mini-RPV propulsion
A82-39736

KORIKOV, A. M.
Simulation of correlation-extremal receivers of signals from sampling-phase radio-navigation systems
A82-39404

KOSSIRA, H. J.
Determination of load spectra and their application for keeping the operational life proof of sporting airplanes
A82-41010

KOTTAPALLI, S. B. R.
Correlation of predicted vibrations and test data for a wind tunnel helicopter model
A82-40515

KOURTIDES, D. A.
Fireworthiness of transport aircraft interior systems
N82-29284

KOWALSKI, S.
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274

KRABILL, W. B.
Baseline monitoring using aircraft laser ranging
[NASA-TM-73298] N82-28690

KRASILSHCHIKOVA, E. A.
The unsteady motion of a wing traveling at subsonic speed above a plane
A82-39358

KRENZ, G.
Aerodynamic concepts for fuel-efficient transport aircraft
A82-40957

KRIDER, E. P.
Atmospheric electricity hazards analytical model development and application. Volume 1: Lightning environment modeling
[AD-A114015] N82-29800

KRIEGER, R. J.
Supersonic missile aerodynamic and performance relationships for low observables mission profiles
[AIAA PAPER 82-1298] A82-39085

KRIVOSIC, I. N.
Theoretical and experimental investigation of joint-structural damping interaction for airplane construction
A82-41013

KROO, I. M.
Optimization of canard configurations - An integrated approach and practical drag estimation method
A82-41023
Minimum induced drag of canard configurations
A82-41116

KUHN, G. E.
The promise of laminated metals in aircraft design
A82-40903

KUKACKA, L. E.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[DE82-010994] N82-29464

KUROWSKY, R. V.
Concept demonstration of automatic subsystem parameter monitoring
A82-40530
Evaluation of an automatic subsystem parameter monitor
A82-40552

KWAN, A. J.
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268

L

LAAUBODER, C.
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303

LAMAR, J. E.
The use of linearized-aerodynamics and vortex-flow methods in aircraft design /invited paper/
[AIAA PAPER 82-1384] A82-40294

LAMBREGTS, A. A.
Avoiding the pitfalls in automatic landing control system design
[AIAA 82-1599] A82-39013

LAMPART, C.
Aircraft design for fuel efficiency
A82-40973

LAN, C. E.
Effects of vortex breakdown on longitudinal and lateral-directional aerodynamics of slender wings by the suction analogy
[AIAA PAPER 82-1385] A82-39141

LANGE, R. H.
Application of composite materials and new design concepts for future transport aircraft
A82-40994

LANZ, M.
Design of compensated flutter suppression systems
A82-40904

LAPINS, M.
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082

LARSON, E. S.
On embedded flow characteristics of sharp edged rectangular wings
[LOG-C4712] N82-29263

LASCHKA, B.
International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volumes 11 & 2
A82-40876

LAUGHREY, J. A.
Application of advanced exhaust nozzles for tactical aircraft
A82-40889

LAURENS, B.
Optimized 10 ton class commercial aircraft engine
A82-40890

LEBACQZ, J. V.
A ground-simulation investigation of helicopter decelerating instrument approaches
A82-39118

LECHNER, W.
A concept for 4D-guidance of transport aircraft in the TMA
A82-40942

LEE, H. Q.
NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches
A82-40535

LEE, R. A.
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841
Far-field acoustic data for the Texas ASE, Inc. hush house
[AD-A114564] N82-30032

LEFFLER, M. F.
The fourth dimension
A82-39540

LEFRITZ, N. M.
The evolution of display formats for advanced fighters using multimode color CRT displays
A82-40868

LEHMAN, L. O.
Aircraft design for fuel efficiency
A82-40973

LEMONT, H. E.
Ringfin augmentation effects
A82-40548

LEONG, F.
Preliminary design of an advanced integrated power and avionics information system
A82-40907

LEONG, F. J.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284

LEVIN, D.
Dynamic load measurements with delta wings undergoing self-induced roll-oscillations
[AIAA PAPER 82-1320] A82-39098

LEVISON, W. H.
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298

LEVY, D. W.
The use of differential pressure feedback in an automatic flight control system
[AIAA 82-1596] A82-38981

LEWIS, M. F.
Effects of approach lighting and variation in visible runway length on perception of approach angle in simulated night landings
[AD-A114742] N82-29290

LEYNAERT, J.
Wind tunnel studies of store separation with load factor. Freedrops and captive trajectories
N82-30261

LI, J.-J.
HAJIF-II - A program system for the dynamic analysis of aeronautical structures
A82-40884

LILLEY, D. F.
Static noise tests on modified augmentor wing jet STOL research aircraft
[NASA-TM-81231] N82-28295

LIN, C.-F.
Optimal three-dimensional turning performance of supersonic aircraft
[AIAA PAPER 82-1326] A82-39103
Optimal control application in supersonic aircraft performance
A82-39374

LINES, C. W., JR.
Historical research and development inflation indices for Army fixed and rotor winged aircraft
[AD-A114368] N82-28290

LIU, G.-G.
HAJIF-II - A program system for the dynamic analysis of aeronautical structures
A82-40884

LIU, M.
An experimental investigation of leading-edge spanwise blowing
A82-40988

LOEFFLER, I. J.
QCSEE over-the-wing engine acoustic data
[NASA-TM-82708] N82-29324

LOGAN, A. H.
An evaluation of helicopter autorotation assist concepts
A82-40524

LONGO, J.
Viscous transonic airfoil flow simulation
A82-40897

LOTTER, K. W.
The effect of intake flow disturbances on APU compressor blade high cycle fatigue in the Airbus A300
A82-40983

LOVELL, D. T.
Material and process developments on the Boeing 767
A82-40902

LOWREY, D. L.
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275

LUNTZ, A.
Transonic small disturbance code for body-wing configuration coupled with full potential code for wing alone
A82-40699

LUSEBRINK, H.
Gust load alleviation on Airbus A 300
A82-40881

LYTLE, C. D.
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278

M

MA, L. N.
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523

MACDONALD, I. S.
New technology for the next generation of commercial transports - Real or imaginary
A82-41007

MACKENZIE, F. D.
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278

MADDALON, D. V.
NASA research on viscous drag reduction
A82-40896

MADGWICK, T.
Aircraft post crash fire reduction/survivability enhancement from a manufacturer's viewpoint
N82-29286

MADHURANATH, N.
Sensor stabilisation requirements of RPV's - A simulation study
A82-39741

MAEKAWA, S.
Design and experimental verification of the USB-flap structucture for NAL STOL aircraft
A82-40917

MAFFIOLI, G. C.
Material identification for the design of composite rotary wings
A82-40937

MAHESH, J. K.
Robust Kalman filter design for active flutter suppression systems
A82-38442

MAINE, R. E.
NASA Dryden's experience in parameter estimation and its uses in flight test
[AIAA PAPER 82-1373] A82-39135

MANDT, G. A.
Air-to-air missile avoidance
[AIAA 82-1516] A82-38939

MANGOLD, P.
Some aerodynamic/flightmechanic aspects for the design of future combat aircraft
A82-40880

MANTEGAZZA, P.
Design of compensated flutter suppression systems
A82-40904

MARCHINSKI, L.
Toward all-composite helicopter fuselage
A82-38223

MARCHMAN, J. F., III
Fuselage effects in leading edge vortex flap aerodynamics
A82-41006

MARESCA, C.
An experimental and numerical study of 3-D rotor wakes in hovering flight
A82-40946

MARIS, J. L.
The promise of laminated metals in aircraft design
A82-40903

MARKER, R. L.
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260

MARSTILLER, J. K.
U.S. Army remotely piloted vehicle program
A82-39732

MARTIN, C. A.
A discussion of the flying quality requirements of a basic training aircraft
[AD-A114805] N82-29318

MARTIN, C. F.
Baseline monitoring using aircraft laser ranging
[NASA-TM-73298] N82-28690

MARTIN, J. N.
System data communication structures for active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511

MARTIN, P.
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523

MARTIN, R. L.
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296

MARTORELLA, R. P.
Piloted simulator evaluation of a relaxed static stability fighter at high angle-of-attack
[AIAA PAPER 82-1295] A82-39082

MASAEDA, H.
Development of the advanced composite ground spoiler for C-1 medium transport aircraft
A82-39895

MASEFIELD, O.
Advanced technologies applied to reduce the operating costs of small commuter transport aircraft
A82-40915
Spin behaviour of the Pilatus PC-7 Turbo Trainer
A82-40979

MASLENNIKOV, S. S.
Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles
A82-38722

MCDERMOTT, J. M.
Structural design of a crashworthy landing gear for the AH-64 Attack Helicopter
A82-40547

MCFARLAND, R. E.
Establishment of a rotor model basis
[NASA-TP-2026] N82-29311

MCGEER, T.
Optimization of canard configurations - An integrated approach and practical drag estimation method
A82-41023

MCGOWAN, L. A.
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267

MCHUGH, F. J.
Recent advances in rotor technology at Boeing Vertol
A82-40508
Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271

MCKNEW, M. A.
Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2
[PB82-139353] N82-29277

MCLEAN, J. D.
Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane
A82-40955

MCVEIGH, M. A.
Recent advances in rotor technology at Boeing Vertol
A82-40508
Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271

MEALY, G. L.
A recursive terrain height correlation system using multiple model estimation techniques
[AIAA 82-1513] A82-38937

MENDI, I. S.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284

MERTENS, H. W.
Effects of approach lighting and variation in visible runway length on perception of approach angle in simulated night landings
[AD-A114742] N82-29290

MEYER, E. J.
User's manual for the AMBER flight path-trajectory simulation code
[DE82-007004] N82-29343

MEYER, G.
Applications to aeronautics of the theory of transformations of nonlinear systems
[NASA-TM-84249] N82-30013
MEYER, R. R., JR.
A unique flight test facility - Description and results
A82-40925
MEYERHOFF, W. J.
Estimation of the peak count of actively controlled aircraft
A82-38447
MGANA, C. V. M.
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111
MICHEL, A.
Air-air collision avoidance systems
A82-39323
MIETRACH, D.
Advanced casting: Today and tomorrow
N82-28486
MIKHAILOVA, T. F.
Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades
A82-39399
MIKKELSON, D. C.
Summary and recent results from the NASA advanced high-speed propeller research program
[AIAA PAPER 82-1119] A82-40419
MILLER, D. S.
An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts
A82-41008
MILLER, G. E.
Development of flying qualities criteria for single pilot instrument flight operations
[NASA-CR-165932] N82-29288
MILLER, R. H.
A simplified approach to the free wake analysis of a hovering rotor
A82-38474
MILNE, R. J.
In-motion radiography of titanium spar tube welds
A82-40538
MITCHELL, A. R.
Target acquisition system/air-to-surface weapon compatibility analysis
[AIAA 82-1618] A82-38995
MITCHELL, D. G.
Flying qualities requirements for roll CAS systems
[AIAA PAPER 82-1356] A82-40287
MITCHELL, G. A.
Summary and recent results from the NASA advanced high-speed propeller research program
[AIAA PAPER 82-1119] A82-40419
MITKUS, A. F.
Geophysical flight line flying and flight path recovery utilizing the Litton LTN-76 inertial navigation system
[DE82-005555] N82-29232
MOFFITT, R. C.
Theory and application of optimum airloads to rotors in hover and forward flight
A82-40506
MOGAMI, K.
Evaluation of CFRP prototype structures for aircraft
A82-39892
Developments on graphite/epoxy T-2 nose landing gear door
A82-39893
Design, fabrication and qualification of the T-2 composite rudder
A82-39894
Development of the advanced composite ground spoiler for C-1 medium transport aircraft
A82-39895
Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail
A82-39896
MONSON, D. J.
Measurement and visualization of skin friction on the leeside of delta wings in supersonic flow
A82-38785
MOORE, J. W.
Application of composite materials and new design concepts for future transport aircraft
A82-40994
MOORE, M. T.
Forward velocity effects on fan noise and the suppression characteristics of advanced inlets as measured in the NASA-Ames 40 by 80 foot wind tunnel
[NASA-CR-152328] N82-30030
MOORHOUSE, D. J.
Perspectives of the flying qualities specification
[AIAA PAPER 82-1354] A82-39123
MORAWSKI, J. M.
Wind shear - Its effect on an aircraft and ways to reduce the hazard. II
A82-38500
MORISSET, J.
Mirage 2000 - Towards possible high series production aircraft
A82-38249
MORRISON, R.
The need for a dedicated public service helicopter design
A82-38422
MORRISSEY, E. W.
U.S. Marine Corps AV-8A maintenance experience
[AIAA PAPER 81-2657] A82-38446
MOXON, J.
Touchdown technology
A82-40057
MOYLE, I.
Multistage axial compressor program on tip clearance effects
[AD-A107445] N82-29325
MULCARE, D. D.
Analytical design and validation of digital flight control system structure
[AIAA PAPER 82-1626] A82-40434
MUNNIKSMA, B.
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
[NLR-MP-81020-U] N82-28262
MURPHY, J. A.
Civil helicopter propulsion system reliability and engine monitoring technology assessments
A82-40518
MURRI, D. G.
High angle-of-attack characteristics of a forward-swept wing fighter configuration
[AIAA PAPER 82-1322] A82-39099
MURTHY, S. N. B.
Water ingestion into axial flow compressors. Part 3: Experimental results and discussion
[AD-A114830] N82-29326
Effect of water on axial flow compressors. Part 2: Computational program
[AD-A114831] N82-29327
MUSGA, M. J.
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552
MUSSI, F.
Material identification for the design of composite rotary wings
A82-40937
MYERHOFF, W.
Estimation of the number of in-flight aircraft on instrument flight rules
A82-41117

N

NAGABHUSHAN, B. L.
Maneuver stability of a vehicle with a towed body
[AIAA PAPER 82-1347] A82-39119
Performance characteristics of a buoyant quad-rotor research aircraft
A82-40974
NAGARAJA, K. S.
Ejector powered propulsion and high lift subsonic wing
A82-40970
NAGEL, A. L.
Aerodynamic research applications at Boeing
A82-41000

NAGY, E. J.
Error minimization in ground vibration testing
A82-40550

NAKAI, E.
Tests of CFRP spar/rib models with corrugated web
A82-39890

NARAYANAN, K. G.
Sensor stabilisation requirements of RPV's - A simulation study
A82-39741

NARRAMORE, J. C.
A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design
A82-405C7

NASTRI, J. W.
Computer aided coordinate measuring systems
A82-40540

NAVE, P. M. N.
Opto-electronical push-brccm scanners for navigation, reconnaissance and generation of digital data bases
A82-39747

NEELY, W. R., JR.
Piloted simulator evaluaticn of a relaxed static stability fighter at nigh angle-cf-attack
[AIAA PAPER 82-1295] A82-39082

NEIGHBOR, T. L.
Air-to-air missile avoidance
[AIAA 82-1516] A82-38939

NELSON, D. R.
Avionics systems fcr helicopter integration
A82-40534

NELSON, G. L.
Heat release rate calorimetry of engineering plastics
A82-41075

NESS, W. G.
Analytical design and validation of digital flight control system structure
[AIAA PAPER 82-1626] A82-40434

NEUWERTH, G.
Fluctuating forces and rotor noise due to distorted inflow
A82-40945

NICHOLAS, D. J.
Recent advances in the performance of high bypass ratio fans
A82-40891

NICHOLS, J. H., JR.
Development of the Circulation Contrcl Wing-Upper Surface Blcwing powered-lift system for STOL aircraft
A82-40969
Design integration of CCW/USB for a sea-based aircraft
A82-40972

NIKIFORUK, P. N.
Application cf multivariable model following method to flight contrcller
[AIAA PAPER 82-1349] A82-39120

NIXON, W. B.
Development of flying qualities criteria for single pilct instrument flight operations
[NASA-CR-165932] N82-29288

NOBACK, R.
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28[illegible]

NORITAKE, Y.
Evaluation of CFRP prototype structures for aircraft
A82-39892

NORTHFIELD, J.
Algorithm development for infra-red air-to-air guidance systems
A82-39191

NOTON, B. R.
Optimizing aercspace structures for manufacturing cost
A82-41014

NSI MBA, M.
An experimental and numerical study of 3-D rotor wakes in hovering flight
A82-40946

O

OBARA, C. J.
Observations and implications of natural laminar flow on practical airplane surfaces
A82-40893

OBERMEIER, F.
Some comments on the prediction of forward flight effects on jet noise
[MPIS-20/1981] N82-29118

OGI, S. K.
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523

OHLSON, W. E.
Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration
A82-41004

OHMURA, H.
Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane
A82-40955

OKIISHI, T. H.
Aerodynamics of advanced axial-flow turbomachinery
[AD-A114911] N82-29328

OKUBO, H.
Adaptive filtering for an aircraft flying in turbulent atmosphere
A82-38441

OLSSON, W. J.
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296

OMELCHENKO, S. P.
Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades
A82-39399

ORLIK-RUCKEMANN, K. J.
Aerodynamic aspects of aircraft dynamics at high angles of attack /AGARD Lecture/
[AIAA PAPER 82-1363] A82-39836

ORLINO, D. G.
Design and fabrication of a composite rear fuselage for the UH-60 /Black Hawk/
A82-40544

OSBORNE, S. R.
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306
Operational test and evaluation handbook for aircraft training devices. Volume 1: Planning and management
[AD-A112498] N82-29332

OSDER, S. S.
Generic faults and design solutions for flight-critical systems
[AIAA 82-1595] A82-38980

OSTOWARI, C.
Computational and experimental studies of light twin aerodynamic interference
A82-40930

OVERDORF, R. L.
Terrain following/terrain avoidance system concept development
[AIAA PAPER 82-1518] A82-40428

P

PADEN, W. R., JR.
Applying advanced technology to flight station design
A82-40887

PAK, E. G.
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263

PALMER, R. E.
Investigation of low order lateral directional transfer function models for augmented aircraft
[AIAA 82-1610] A82-38989

PAMADI, B. N.
An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions
[AIAA PAPER 82-1311] A82-39092
PARIDON, C. A.
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
PARKER, J. A.
Fireworthiness of transport aircraft interior systems
N82-29284
PARKER, L. C.
Inflight IFR procedures simulator
[NASA-CASE-KSC-11218-1] N82-29331
PARKER, T. W.
Effect of tip vanes on the performance and flow field of a rotor in hover
A82-40511
PAVLICEK, M. J.
O'Hare International Airport - Impervious to proposed state efforts to limit airport noise
A82-40052
PEACH, L. L., JR.
NASA/FAA Helicopter ATC simulation investigation of RNAV/MLS instrument approaches
A82-40535
PEARCE, W. E.
Progress at Douglas on laminar flow control applied to commercial transport aircraft
A82-40958
PEDDIE, G. D.
Design and fabrication of cocured composite hat-stiffened panels
A82-40978
PERALA, R.
Atmospheric electricity hazards analytical model development and application. Volume 3: Electromagnetic coupling modeling of the lightning/aircraft interaction event
[AD-A114017] N82-29802
PERRY, B., III
Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
[NASA-TM-84499] N82-28299
PERRYMAN, D. C.
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286
PETER, K.
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274
PETERSEN, D. H.
The promise of laminated metals in aircraft design
A82-40903
PETERSEN, R. H.
NASA research on viscous drag reduction
A82-40896
PFEIFFER, N. J.
Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane
A82-40955
Analysis of jet transport wings with deflected control surfaces by using a combination of 2- and 3-D methods
A82-41022
PIERCE, G. A.
Evaluation of an asymptotic method for helicopter rotor airloads
A82-40509
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282
PILKEY, W. D.
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301
PINES, S.
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269
PISANO, A.
Aerodynamic characteristics of a large-scale, twin tilt-nacelle V/STOL model
[AIAA PAPER 81-0150] A82-38443
PITTS, J. N., JR.
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842
PLESS, W. M.
'Listening' systems to increase aircraft structural safety and reduce costs
A82-39539
POINDEXTER, W. A.
The promise of laminated metals in aircraft design
A82-40903
POLLARD, D. W.
Flight attendant injuries: 1971-1976
[AD-A114909] N82-29274
POLLOCK, N.
Design basis for a new transonic wind tunnel
[AD-A112899] N82-28311
PORTER, J. L.
Ejector powered propulsion and high lift subsonic wing
A82-40970
POTTER, J.
Fasteners for composite structures
A82-39929
POTTHAST, A. J.
An X-Wing aircraft control system concept
[AIAA 82-1540] A82-38954
POWERS, J. M.
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267
PROUTY, R. W.
The YAH-64 empennage and tail rotor - A technical history
A82-40528
PRUYN, R. R.
Conceptual design of the LHX integrated cockpit
A82-40527

Q

QIAN, L.-X.
Efficient optimum design of structures - Program DDDU
A82-38146
QIU, C.
An experimental investigation of leading-edge spanwise blowing
A82-40988
QIU, X.
Models for the motor state of VSCF aircraft electrical power system
A82-40982
QUINLIVAN, J. T.
Material and process developments on the Boeing 767
A82-40902

R

RACHOVITSKY, R.
Terrain following/terrain avoidance system concept development
[AIAA PAPER 82-1518] A82-40426
RADDIN, J. H., JR.
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267
RAMAN, K. R.
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
RANDOLPH, M. S.
Concept demonstration of automatic subsystem parameter monitoring
A82-40530
RAO, D. M.
Upper Vortex Flap - A versatile surface for highly swept wings
A82-41002

RAO, K. R.
Prelaunch estimates of near Earth satellite lifetimes using quasi-dynamic atmosphere models - application to a proposed Brazilian satellite
[INPE-2325-PRE/080] N82-29347
RAO, S. S.
Automated optimum design of wing structures. Deterministic and probabilistic approaches
[NASA-TM-84475] N82-29317
RASCH, N. O.
A compendium of lightning effects on future aircraft electronic systems
[AD-A114117] N82-28293
RAY, J.
Composite use on helicopters
A82-38222
RAYNER, D. P.
CDS-the designer's media, the analyst's model
A82-40991
REDEKER, G.
Recent airfoil developments at DFVLR
A82-40986
REDING, J. P.
Analytic extrapolation to full scale aircraft dynamics
[AIAA PAPER 82-1387] A82-39143
REED, M.
The national dynamics 'observer' mini-RPV for tropical operation
A82-39734
REED, T. D.
Correlation of Preston-tube data with laminar skin friction (Log No. J12984)
[NASA-TM-84827] N82-29556
REHAMMAR, U.
A terrain following system, an algorithm and a sensor
A82-39740
REIF, H. E.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
REINICKE, H.
Advanced technologies applied to reduce the operating costs of small commuter transport aircraft
A82-40915
REN, P.-Z.
The nonsynchronous whirls of the turbine rotor in aerojet engines
A82-40944
RENZ, R.
A one-shot autoclave manufacturing process for carbon epoxy components
A82-40935
REYNOLDS, J. C.
Logistics research program in the United States Air Force
A82-40963
RHODES, M. D.
Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes
A82-40931
RICH, S. E.
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297
RICHARDS, D.
Water ingestion into axial flow compressors. Part 3: Experimental results and discussion
[AD-A114830] N82-29326
RICKARD, W. W.
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298
RIDGELY, D. B.
Design and analysis of a multivariable control system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121
RIEDL, F. J.
United States Air Force shale oil to fuels, phase 2
[AD-A114531] N82-29476
RIGOLIZZO, R.
Reduction and analysis of mode C altitude data collected at high altitudes over the continental United States
[AD-A114655] N82-29276
RINEHART, R. J.
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552
RIPLEY, P. S.
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842
RISING, J. J.
Development and flight test evaluation of a pitch stability augmentation system for a relaxed stability L-1011
[AIAA PAPER 82-1297] A82-39084
RIST, D.
Comparison of HP turbine 'deep blade design' effects in turbofan engine gas generators with different bearing structure configurations
A82-40996
ROBB, J. D.
Atmospheric electricity hazards analytical model development and application. Volume 2: Simulation of the lightning/aircraft interaction event
[AD-A114016] N82-29801
ROBERTS, A. C.
The application of small propellers to RPV propulsion
A82-39737
ROBERTS, C. J.
Horses for courses in RPV operations
A82-39729
ROEHRLE, H.
The behavior of composite thin-walled structures in dynamic buckling under impact
A82-40976
ROGERS, W. A.
Wind tunnel test and aerodynamic analysis of three aeroelastically tailored wings
A82-41001
ROGO, C.
Cooled variable nozzle radial turbine for rotor craft applications
[NASA-CR-165397] N82-29323
ROITMAN, A. B.
Application of the sequential optimization method to the tuning of the natural frequencies of gas-turbine engine compressor blades
A82-39399
ROONEY, R. H.
Modal control of relaxed static stability aircraft
[AIAA 82-1524] A82-38944
ROPELEWSKI, R. R.
Boeing's new 767 eases crew workload
A82-40348
ROSE, W. C.
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
ROSELLI, A.
Inflated wings
A82-40966
ROSENBERG, K. H.
Flight control systems for aerial targets
A82-39745
ROSENSTEIN, H.
Investigation of a rotor system incorporating a constant lift tip
[NASA-CR-166261] N82-29271
ROSKAM, J.
The use of differential pressure feedback in an automatic flight control system
[AIAA 82-1596] A82-38981
A simple, low cost application of a flight test parameter identification system
[AIAA PAPER 82-1312] A82-39093

ROSS, P.
Analysis of an airplane windshield anti-icing system
[AIAA PAPER 82-1372] A82-39134
ROUGHTON, D.
A practical approach to the incorporation of technical advances in avionics
A82-40866
ROY, S. D.
Future helicopter cockpit design
A82-40529
RUDOLPH, T. H.
Atmospheric electricity hazards analytical model development and application. Volume 3: Electromagnetic coupling modeling of the lightning/aircraft interaction event
[AD-A114017] N82-29802
RUMMEL, W. D.
Recommended practice for a demonstration of Nondestructive Evaluation /NDE/ reliability on aircraft production parts - Introduction to the guidelines
A82-41140
RUSETSKII, A. A.
Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles
A82-38722
RUSSELL, J. G.
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291
RYNASKI, E. G.
Flight control synthesis using robust output observers
[(AIAA 82-1575] A82-39016

S

SAKATANI, Y.
Developments on graphite/epoxy T-2 nose landing gear door
A82-39893
SALVIONI, L.
Material identification for the design of composite rotary wings
A82-40937
SANDERS, R.
Development of the Sea King composite main rotor blade
A82-40539
SANO, M.
Design and experimental verification of the USB-flap structucture for NAL STOL aircraft
A82-40917
SANTANELLI, A. S.
Evaluation of an automatic subsystem parameter monitor
A82-40552
SARKOS, C. P.
The development and applications of a full-scale wide body test article to study the behavior of interior materials during a postcrash fuel fire
N82-29285
SATO, T.
Design, fabrication and qualification of the T-2 composite rudder
A82-39894
SAVAGE, M.
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
SAVITSKII, V. I.
Numerical solution of a problem concerning transonic flow past a wing-fuselage configuration
A82-39996
SAYLOR, D. M.
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261
SCARICH, G. V.
Fatigue behavior of weldbonded joints
A82-41115
SCHAENZER, G.
Dynamic energy transfer between wind and aircraft
A82-40939
SCHIJVE, J.
Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975
SCHMIDT, D. K.
A modern approach to pilot/vehicle analysis and the Neal-Smith criteria
[AIAA PAPER 82-1357] A82-39125
SCHMIDT, W.
Viscous transonic airfoil flow simulation
A82-40897
SCHNEIDER, A.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
SCHOONOVER, W. E., JR.
Wind-tunnel investigation of vortex flaps on a highly swept interceptor configuration
A82-41004
SCHREIBER, J.
Fluctuating forces and rotor noise due to distorted inflow
A82-40945
SCHUMACHER, W.
Research on an adaptive Kalman filter for solving the radar tracking problem
A82-40562
SCHUST, A.
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274
SCHWEDOCK, J. P.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
SCHWENK, J. C.
General aviation activity and avionics survey
[AD-A112924] N82-28244
SCORER, M.
Radars for USA
A82-39742
SCOTT, L.
U.S. Marine Corps AV-8A maintenance experience
[AIAA PAPER 81-2657] A82-38446
SEARS, W. R.
Wind-tunnel testing of V/STOL configurations at high lift
A82-40999
SEEMANN, G. R.
Electric propulsion for a mini RPV system
A82-39744
SEETHARAM, H. C.
Experimental and theoretical studies of three-dimensional turbulent boundary layers on an empennage of a typical transport airplane
A82-40955
SELBERG, B. P.
Dual wing, swept forward swept rearward wing, and single wing design optimization for high performance business airplanes
A82-40931

SELEN, H. J. W.
Design and tests of airfoils for sailplanes with
an application to the ASW-19B
A82-40967
SENSBURG, O.
Gust load alleviation on Airbus A 300
A82-40881
SEBBEN, S.
System data communication structures for
active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for
active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511
SERGEEVA, N. N.
High-sensitivity holographic plates FL-3M
A82-41575
SEROVY, G. K.
Aerodynamics of advanced axial-flow turbomachinery
[AD-A114911] N82-29328
SEXTON, G. A.
Applying advanced technology to flight station
design
A82-40887
SHAFER, M. F.
Flight-determined correction terms for angle of
attack and sideslip
[AIAA PAPER 82-1374] A82-40290
SHAPIRO, E. Y.
Modal control of relaxed static stability aircraft
[AIAA 82-1524] A82-38944
SHEFFLER, M.
Wind tunnel modeling of rotor vibratory loads
A82-40516
SHENOY, K. R.
A semiempirical high-speed rotor noise prediction
technique
A82-40554
SHINODA, P.
Aerodynamic interactions between a 1/6-scale
helicopter rotor and a body of revolution
A82-40947
Aerodynamic interactions between a 1/6 scale
helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
SHIRATA, T.
Development of the advanced composite ground
spoiler for C-1 medium transport aircraft
A82-39895
SHIRK, M. H.
Wind tunnel test and aerodynamic analysis of three
aeroelastically tailored wings
A82-41001
SIDDIQEE, W.
Terminal information display system benefits and
costs
[AD-A114937] N82-29291
SIKONIA, J. G.
United States Air Force shale oil to fuels, phase 2
[AD-A114531] N82-29476
SILVERTHORN, J. T.
Design and analysis of a multivariable control
system for a CCV-type fighter aircraft
[AIAA PAPER 82-1350] A82-39121
SILVERTHORN, L. J.
Whirl mode stability of the main rotor of the
YAH-64 Advanced Attack Helicopter
A82-40513
SIM, A. G.
Unique flight characteristics of the AD-1
oblique-wing research airplane
[AIAA PAPER 82-1329] A82-39106
SIMMONS, R. D.
The detection of low level wind shear. II
A82-38463
SIMPSON, W. D.
Unmanned aircraft in future combat
A82-39728
SINCLAIR, S. R. M.
Evaluations of helicopter instrument-flight
handling qualities
[AD-A114004] N82-28285
SINGER, J.
The behavior of composite thin-walled structures
in dynamic buckling under impact
A82-40976
SIVANERI, N. T.
Finite element analysis for bearingless rotor
blade aeroelasticity
A82-40517
SKARMAN, E.
A terrain following system, an algorithm and a
sensor
A82-39740
SLOOFF, J. W.
Advanced aerodynamic wing design for commercial
transports - Review of a technology program in
the Netherlands
A82-40985
SLOTER, L. E., II
The promise of laminated metals in aircraft design
A82-40903
SMELTZER, D. B.
Inlet and airframe compatibility for a V/STOL
fighter/attack aircraft with top-mounted inlets
A82-40908
SMITH, C. G.
Atmospheric chemistry of hydrocarbon fuels.
Volume 2: Outdoor chamber data tabulations,
Part 1
[AD-A113665] N82-28842
SMITH, J. P.
Operational test and evaluation handbook for
aircrew training devices. Volume 3:
Operational suitability evaluation
[AD-A112569] N82-28306
Operational test and evaluation handbook for
aircraft training devices. Volume 1: Planning
and management
[AD-A112498] N82-29332
SMITH, T. B.
System data communication structures for
active-control transport aircraft, volume 1
[NASA-CR-165773-VOL-1] N82-29510
System data communication structures for
active-control transport aircraft, volume 2
[NASA-CR-165773-VOL-2] N82-29511
SMOLICZ, T.
Wind shear - Its effect on an aircraft and ways to
reduce the hazard. II
A82-38500
SOPHER, R.
Correlation of predicted vibrations and test data
for a wind tunnel helicopter model
A82-40515
SORENSEN, J. A.
Analysis of in-trail following dynamics of
CDTI-equipped aircraft
[AIAA PAPER 82-1330] A82-39107
SPAIN, C. V.
Design considerations and experiences in the use
of composite material for an aeroelastic
research wing
[NASA-TM-83291] N82-28280
SPEYER, J. L.
The Shiryayev sequential probability ratio test
for redundancy management
[AIAA 82-1623] A82-38998
SPIER, E. E.
Design and fabrication of cocured composite
hat-stiffened panels
A82-40978
SPRENGER, K. R.
Results of the AH-64 Structural Demonstration
A82-40551
SQUIRES, P. K.
Investigation of correlation between full-scale
and fifth-scale wind tunnel tests of a Bell
helicopter Textron Model 222
[NASA-CR-166362] N82-29315
SQUYERS, R. A.
Ejector powered propulsion and high lift subsonic
wing
A82-40970
STARKEY, O. D.
Analyzing stable pad disturbances and design of a
sensor vault to monitor pad stability
[AIAA 82-1585] A82-39011
STAUFENBIEL, R.
Fluctuating forces and rotor noise due to
distorted inflow
A82-40945

STAUFENBIEL, R.
International Council of the Aeronautical Sciences, Congress, 13th and AIAA Aircraft Systems and Technology Conference, Seattle, WA, August 22-27, 1982, Proceedings. Volumes 1 & 2
A82-40876

STECK, K. H.
Calculation of level flow using radial grating
A82-38922

STEINBICHLER, H.
Nondestructive testing in aircraft construction using holographic methods
A82-40977

STEINLE, F. W., JR.
Correlation of Preston-tube data with laminar skin friction (Log No. J12984)
[NASA-TM-84827] N82-29556

STEKOLNIKOV, V. N.
The effect of hybrid composite materials on the dynamic characteristics of helicopter rotor blades
A82-39263

STENGEL, R. F.
Design and flight testing of digital direct side-force control laws
[AIAA 82-1521] A82-38941

STITT, L. E.
NASA research in supersonic propulsion - A decade of progress
[AIAA PAPER 82-1048] A82-40417

STONE, C. R.
Robust Kalman filter design for active flutter suppression systems
A82-38442

STONE, J. R.
NASA research in supersonic propulsion - A decade of progress
[AIAA PAPER 82-1048] A82-40417

STRACK, W. C.
Propulsion opportunities for future commuter aircraft
[AIAA PAPER 82-1049] A82-40418

STRAIGHT, D. M.
Performance of a 2D-CD nonaxisymmetric exhaust nozzle on a turbojet engine at altitude
[AIAA PAPER 82-1137] A82-40420

STREATHER, R. A.
Variable geometry aerofoils as applied to the Beatty B-5 and B-6 sailplanes
A82-40968

STUMBO, P. B.
Axisymmetric approach and landing thrust reverser impacts on usage and LCC
A82-40892

SU, R.
Applications to aeronautics of the theory of transformations of nonlinear systems
[NASA-TM-84249] N82-30013

SU, W.
An experimental investigation of leading-edge spanwise blowing
A82-40988

SUCCI, G. P.
The prediction of helicopter rotor discrete frequency noise
A82-40553

SUGAMA, T.
Water-compatible polymer concrete materials for use in rapid repair systems for airport runways
[DE82-010994] N82-29464

SUI, Y.
Efficient optimum design of structures - Program DDDU
A82-38146

SUNDERMEYER, P.
Investigations concerned with shifting pilot activities to a higher hierarchical stage of flight control
A82-41453

SUTTON, L. R.
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260

SUZUKI, K.
Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail
A82-39896

SWAN, W. S.
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-29316

SWANN, D.
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274

SWORTZEL, F. R.
Advanced fighter technology integration program AFTI/F-16
A82-40900

SZODRUCH, J.
Measurement and visualization of skin friction on the leeside of delta wings in supersonic flow
A82-38785

T

TADA, Y.
Tests of CFRP spar/rib models with corrugated web
A82-39890

TAKAGI, K.
Development status of a composite vertical stabilizer for a jet trainer
A82-39897

TANG, W.
A recursive terrain height correlation system using multiple model estimation techniques
[AIAA 82-1513] A82-38937

TARASENKO, V. P.
Problems in the simulation of correlation-extremal navigation systems
A82-39403

TARZANIN, F.
Wind tunnel modeling of rotor vibratory loads
A82-40516

TAVELLA, D. A.
Aerodynamics of an airfoil with a jet issuing from its surface
[NASA-TM-84825] N82-29267

TAYLOR, G. H.
Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2
[PB82-139353] N82-29277

TAYLOR, G. R.
Delta electrical load analysis C-141B JACC/CP aircraft
[AD-A113761] N82-28283

TAYLOR, L. W., JR.
An estimation of aerodynamic forces and moments on an airplane model under steady state spin conditions
[AIAA PAPER 82-1311] A82-39092

TAYLOR, R. B.
Helicopter vibration reduction by rotor blade modal shaping
A82-40514
Predesign study for an advanced flight research rotor
A82-40525

TESSIER, N. J.
Adaptation of pultrusion to the manufacture of helicopter components
A82-40537

THELANDER, J. A.
Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces
A82-40894

THOMASSON, P. G.
The design of a RPV ground station simulator
A82-39750

THOMSON, W. G.
Computational and experimental studies of light twin aerodynamic interference
A82-40930

THORSNESS, C. B.
Laboratory-scale simulation of underground coal gasification: Experiment and theory
[DE82-001063] N82-28470

TILLOTSON, K. D.
Analysis and wind tunnel tests of a probe used to sense altitude through measurement of static pressure
[AIAA PAPER 82-1361] A82-39128

TISCHLER, M. B.
The effects of atmospheric turbulence on a quadrotor heavy lift airship
[AIAA 82-1542] A82-39009
Handling qualities criteria for flight path control of V/STOL aircraft
[AIAA PAPER 82-1292] A82-39081
TOBIAS, L.
NASA/FAA helicopter ATC simulation investigation of RNAV/MLS instrument approaches
A82-40535
TOENSKOETTER, H.
Research on the behavior of a turbojet engine during internal and external disturbances with respect to early recognition of damage
A82-40561
TORNOW, J.
Terminal information display system benefits and costs
[AD-A114937] N82-29291
TOYOHIRA, S.
Evaluation of CFRP prototype structures for aircraft
A82-39892
TRANKLE, T. L.
System identification of nonlinear aerodynamic models
N82-29996
TREMPLER, N.
Instrument landing systems /ILS/ at airports of the German Democratic Republic
A82-39248
TRIEBSTEIN, H.
Investigation of the unsteady airloads on a transport aircraft type airfoil with two interchangeable oscillating trailing edge flaps, at transonic speed and high Reynolds numbers
A82-40909
TRISCHKA, J. W.
Computer enhanced analysis of a jet in a cross-stream
N82-29555
TRIVEDI, K.
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
TSUCHIYA, T.
Water ingestion into axial flow compressors. Part 3: Experimental results and discussion
[AD-A114830] N82-29326
Effect of water on axial flow compressors. Part 2: Computational program
[AD-A114831] N82-29327
TUPOLEV, A. N.
The technological aspects of titanium application in the TU-144 aircraft structure
A82-39718
TURBATU, S.
The rectangular wing with semiinfinite span in nonlinear theory
A82-39359
TURI, A.
Advanced technologies applied to reduce the operating costs of small commuter transport aircraft
A82-40915
TUTTLE, J. H., JR.
The evolution of display formats for advanced fighters using multimode color CRT displays
A82-40888

U

UCHIKADO, S.
Application of multivariable model following method to flight controller
[AIAA PAPER 82-1349] A82-39120
UMAN, M. A.
Atmospheric electricity hazards analytical model development and application. Volume 1: Lightning environment modeling
[AD-A114015] N82-29800
UNGAR, S. G.
Scanner imaging systems, aircraft
N82-28715
UPTON, H. W.
Micro-heads-up display
A82-40533
USELTON, B. L.
Summary of sting interference effects for cone, missile, and aircraft configurations as determined by dynamic and static measurements
[AIAA PAPER 82-1366] A82-40395

V

VAIDYANATHAN, A. R.
Evaluation of an asymptotic method for helicopter rotor airloads
A82-40509
VAKILI, A.
Wing-tip jets aerodynamic performance
A82-40987
VAN DAM, C. P.
The design integration of wingtip devices for light general aviation aircraft
A82-40933
VANDERLINDEN, H. H.
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
VANDERVOOREN, J.
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
VANENGELEN, J. A. J.
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
[NLR-MP-81020-U] N82-28262
VANESSEN, A.
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
VELKOFF, H. R.
Effect of tip vanes on the performance and flow field of a rotor in hover
A82-40511
VENKATARAMAN, N. S.
Prelaunch estimates of near Earth satellite lifetimes using quasi-dynamic atmosphere models - application to a proposed Brazilian satellite
[INPE-2325-PRE/080] N82-29347
VERHULST, K.
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation
[TPD-908-720] N82-29116
VIGDORTCHIK, S. A.
The technological aspects of titanium application in the TU-144 aircraft structure
A82-39718
VINCENT, J. H.
System identification of nonlinear aerodynamic models
N82-29996
VINSON, J. R.
On the state of technology and trends in composite materials in the United States
A82-39882
VOGELESANG, L. B.
Application of a new hybrid material /ARALL/ in aircraft structures
A82-40975
VOLODKO, A. M.
The operation of aircraft and helicopters in difficult meteorological and environmental conditions
A82-39295
VOOGT, N.
Advanced aerodynamic wing design for commercial transports - Review of a technology program in the Netherlands
A82-40985

W

W TAYLOR, L., JR.
Applications of parameter estimation in the study of spinning airplanes
[AIAA PAPER 82-1309] A82-39090

WAGDI, M. E.
An MLS with computer aided landing approach
[AIAA PAPER 82-1352] A82-39122

WAGENKNECHT, C. D.
An improved propulsion system simulation technique for scaled wind tunnel model testing of advanced fighters
A82-41019

WAGNER, B.
Estimation of simulation errors in the European Transonic Wind Tunnel /ETW/
A82-40950

WAGNER, S. N.
Spanwise distribution of vortex drag and leading-edge suction in subsonic flow
A82-41005

WALKUP, R. E.
Support of the HH-65A - The impact of advanced technology of VTCL systems upon existing product support
A82-40541

WALLIS, T. E.
The use of small strakes to reduce interference drag of a low wing, twin engine airplane
[AIAA PAPER 82-1323] A82-39100

WANDERS, K.
Nondestructive testing in aircraft construction using holographic methods
A82-40977

WAYMIRE, W. J.
Historical research and development inflation indices for Army fixed and rotor winged aircraft
[AD-A114368] N82-28290

WEBER, J. M.
An analysis of a nonlinear instability in the implementation of a VTOL control system during hover
[AIAA 82-1611] A82-38990

WEDEKIND, G.
Tail versus canard configuration - An aerodynamic comparison with regard to the suitability for future tactical combat aircraft
A82-40901

WEDEMEYER, E.
Measurements of velocity distributions in the leading edge vortex of a delta wing by the laser-Doppler procedure
A82-38786

WEINGARTEN, N. C.
In-Flight investigation of large airplane flying qualities for approach and landing
[AIAA PAPER 82-1296] A82-39083

WEISS, F.
Gust load alleviation on Airbus A 300
A82-40881

WEISSHAAR, T. A.
Dynamic stability of flexible forward swept wing aircraft
[AIAA PAPER 82-1325] A82-39102

WELGE, H. R.
Aerodynamic development of laminar flow control on swept wings using distributed suction through porous surfaces
A82-40894

WELLS, W. R.
Parameter estimation applied to general aviation aircraft - A case study
[AIAA PAPER 82-1313] A82-39094

WENTZ, W. H., JR.
The use of small strakes to reduce interference drag of a low wing, twin engine airplane
[AIAA PAPER 82-1323] A82-39100
Computational and experimental studies of light twin aerodynamic interference
A82-40930

WENTZEL, H. P.
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364

WHINRAY, D. T.
Fixed pattern noise correction for staring arrays in guidance systems
A82-39190

WHITE, G. T.
An evaluation of helicopter autorotation assist concepts
A82-40524

WHITE, J. E.
The Shiryayev sequential probability ratio test for redundancy management
[AIAA 82-1623] A82-38998

WHITE, R. P., JR.
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260

WHITEHURST, C. H., JR.
Maximizing South Carolina's aviation resources: Identifying potentially profitable commuter airline routes, volume 2
[PB82-139353] N82-29277

WHITLOW, J. B., JR.
NASA research in supersonic propulsion - A decade of progress
[AIAA PAPER 82-1048] A82-40417

WICKER, H.
Composite structures repair
A82-41015

WICKS, S. M.
Crashworthiness studies: Cabin, seat, restraint, and injury findings in selected general aviation accidents
[AD-A114878] N82-29275

WILCOX, J. R.
United States Air Force shale oil to fuels, phase 2
[AD-A114531] N82-29476

WILDE, J.
Minimization of the total costs incurred in the employment of passenger jet aircraft
A82-39247

WILLIAMS, A. D.
Age exploration in naval aviation
A82-40962

WILLIS, J. B.
Design basis for a new transonic wind tunnel
[AD-A112899] N82-28311

WINGROVE, R. C.
Analysis of general-aviation accidents using ATC radar records
[AIAA PAPER 82-1310] A82-39091

WITTMER, P.
Spin behaviour of the Pilatus PC-7 Turbor Trainer
A82-40979

WOERNDLE, R.
Calculation of the cross section properties and the shear stresses of composite rotor blades
A82-38475

WOLL, D.
Aircraft design for fuel efficiency
A82-40973

WOOD, J. R.
An alternate method of specifying bandwidth for flying qualities
[(AIAA 82-1609] A82-38988

WOOD, R. M.
An initial look at the supersonic aerodynamics of twin-fuselage aircraft concepts
A82-41008

WORATSCHEK, R.
HISS calibration, ice phobics and FAA R/D evaluations
[AD-A114435] N82-28289

WU, J. M.
Wing-tip jets aerodynamic performance
A82-40987

WURZEL, D.
A one-shot autoclave manufacturing process for carbon epoxy components
A82-40935

WYETH, H. W. G.
Fuel system protection methods
N82-29283

X

XIONG, S.
An experimental investigation of leading-edge spanwise blowing
A82-40988

Y

YAMAGUCHI, I.
Developments on graphite/epoxy T-2 nose landing gear door
A82-39893

YAMAUCHI, F.
Evaluation of CFRP prototype structures for aircraft
A82-39892
Developments on graphite/epoxy T-2 nose landing gear door
A82-39893
Design, fabrication and qualification of the T-2 composite rudder
A82-39894
Development of the advanced composite ground spoiler for C-1 medium transport aircraft
A82-39895
Fabrication of CFRP prototype structure for aircraft horizontal tail leading edge slat rail
A82-39896

YAN, Y.
Models for the motor state of VSCF aircraft electrical power system
A82-40982

YANG, B.-X.
A crack growth model under spectrum loading
A82-40961

YANG, H. S. D.
Design integration of CCW/USB for a sea-based aircraft
A82-40972

YEN, J. G.
A new Transonic Airfoil Design Method and its application to helicopter rotor airfoil design
A82-40507

YIP, L. P.
Wind-tunnel investigation of a full-scale canard-configured general aviation aircraft
A82-41024

YOUNG, G. D., JR.
Terrain following/terrain avoidance system concept development
[AIAA PAPER 82-1518] A82-40428

YOUNG, P.
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274

Z

ZARETSKY, E. V.
Advances in high-speed rolling-element bearings
[NASA-TM-82910] N82-28644

ZAVADOVSKII, N. IU.
Numerical methods for solving boundary value problems for noncavitating and cavitating flow past wing profiles
A82-38722

ZEILER, T. A.
Dynamic stability of flexible forward swept wing aircraft
[AIAA PAPER 82-1325] A82-39102

ZHANG, J.
Efficient optimum design of structures - Program DDDU
A82-38146

ZHONG, W.
Efficient optimum design of structures - Program DDDU
A82-38146

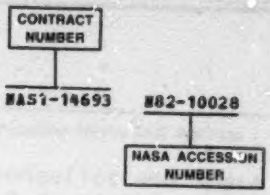
ZHOU, B.
An experimental investigation of leading-edge spanwise blowing
A82-40988

ZUK, J.
Civil helicopter propulsion system reliability and engine monitoring technology assessments
A82-40518

☆U.S. GOVERNMENT PRINTING OFFICE: 1982 639-008/21 1-3 32428

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 317J
N82-28624
AF PROJ. 1123
N82-28302
N82-28306
N82-29332
AF PROJ. 1900
N82-28842
AF PROJ. 2003
N82-28523
AF PROJ. 2307
N82-29328
N82-29464
AF PROJ. 2402
N82-29800
N82-29801
N82-29802
AF PROJ. 2480
N82-28463
N82-28464
AF PROJ. 2505
N82-28268
AF PROJ. 3048
N82-28462
AF PROJ. 3066
N82-28286
N82-29326
N82-29327
AF PROJ. 3145
N82-28284
AF PROJ. 7231
N82-28267
N82-28841
N82-30031
N82-30032
AF-AFOSR-77-3337
A82-38281
AF-AFOSR-0004-80
N82-29328
AFOSR ISSA 80-00027
N82-29464
A72/KB/007 N82-29116
BMFT-LVW-7901
A82-40950
CNR-81,00,202
A82-38405
CNR-81,02536,07
A82-40904
DA PROJ. 1L1-62209-AH-76
N82-28261
N82-29323
DA PROJ. 1L1-62617-AH-19
N82-28287
DA PROJ. 1L2-62209-AH-76
N82-28260
DAAG29-79-G-0015
N82-28301
DAAK51-80-C-0011
A82-40524
DAAK80-79-C-0270
A82-40530
DAKK80-79-C-0268
A82-38937
DE-AC02-76CH-00016
N82-29464
DE-AC13-79GJ-01692
N82-29292
DE-FG02-80R5-10240
N82-29393
DEOAC04-76DP-00789
N82-29343
DOT-FA-79-WA-4344
N82-29291
DOT-FATQ-WAI-679
N82-29520
DOT-FA76WA-3788
N82-28274
DRET-76-456 A82-40946
EDA-04-06-03042-40
N82-29277
ETW-79/01/68730/143963
A82-40950
FMV-AU-1540 A82-40882
FMV-AU-1691 A82-40882
F08635-80-C-0086
N82-28842
F09603-80-C-0602
N82-28283
F09603-81-C-1953
N82-28283
F19628-80-C-0002
N82-29520
F29601-79-C-0011
N82-28624
F33615-76-C-5412
A82-41115
F33615-77-C-1172
N82-28523
F33615-78-C-0063
N82-28306
N82-29332
F33615-78-C-2024
N82-28462
N82-28463
N82-28464
F33615-78-C-2070
N82-28286
F33615-78-C-2079
N82-29476
F33615-78-C-2401
N82-29326
N82-29327
F33615-79-C-3017
A82-40970
F33615-79-C-3412
N82-29800
N82-29801
N82-29802
F33615-79-C-3616
N82-28291
F33615-79-C-3618
A82-39083
F33615-80-C-1077
N82-28292
F33615-80-C-2004
A82-40907
N82-28284
F33615-80-C-3003
A82-39105
F33615-80-C-3604
A82-40287
F33615-80-C-3617
A82-40428
F33615-81-K-3034
A82-40987
F33657-79-C-0508
A82-39744
NAGW-00218 A82-39098
A82-39142
NAG1-26 A82-40931
NAG1-134 A82-39141
NAG1-157 A82-39102
NAG2-30 N82-29312
NAG2-76 N82-29556
NAG4-1 A82-39125
NAG4-5 A82-38981
NAS1-15116 N82-28269
NAS1-15325 N82-28296
NAS1-15326 A82-38944
A82-39084
NAS1-15359 N82-29510
N82-29511
NAS1-15486 A82-38442
NAS1-15764 N82-29288
NAS1-16095 N82-28266
NAS1-16135 A82-39107
NAS1-16199 N82-28243
NAS1-16222 A82-40509
NAS1-16303 A82-40906
NAS1-16410 N82-28298
NAS1-16489 N82-29022
NAS1-16817 A82-40509
NAS2-7620 N82-29316
NAS2-8675 N82-30030
NAS2-10330 A82-39009
NAS2-10645 A82-40911
NAS2-10769 N82-29271
NAS2-10773 N82-29315
NAS2-10777 A82-40974
NAS3-20629 N82-28297
NAS3-20632 N82-28296
NAS3-22005 N82-29323
NAS8-34627 N82-28881
NCC2-13 A82-40517
NCC2-74 N82-29267
NCC2-76 N82-29111
NIVR-RB-1854 N82-28303
NIVR-1739 N82-28263
NIVR-1777 N82-28685
NIVR-1822 N82-28685
NIVR-1823 N82-28685
NSF ATM-77-23757
N82-29321
NSG-1583 A82-40555
NSG-1592 N82-28282
NSG-2396 N82-29556
NSG-4019 A82-39093
N00014-76-C-1136
N82-30013
N00014-78-C-0257
A82-38941
N00014-79-C-0010
A82-40949
N00014-81-C-0680
N82-28288
N62269-80-C-0290
A82-39081
N62269-81-C-0231
N82-28552
N62269-81-C-0243
N82-28294
N62271-80-M-2504
N82-29325
W-7405-ENG-48
N82-28470
505-32-42 N82-28644
505-33-53-02 N82-28280
505-33-63-02 N82-29317
505-34-31 N82-30013
505-34-43-06 N82-29022
505-42-13-04 N82-28282
505-42-21 N82-28252
N82-29315
505-42-62 N82-29324
505-43-02 N82-28249
511-58-12 N82-28643
533-01-43-08 N82-29313
534-02-13-21 N82-28299
535-03-11 N82-29271
535-03-12 N82-29268
992-21-01 N82-29311

1. Report No. NASA SP-7037(154)	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Aeronautical Engineering A Continuing Bibliography (Supplement 154)		5. Report Date November 1982
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
		10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		11. Contract or Grant No.
		13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 511 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1982.

17. Key Words (Suggested by Author(s)) Aerodynamics Aeronautical Engineering Aeronautics Bibliographies	18. Distribution Statement Unclassified - Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 148	22. Price* $5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA SP-7037(155)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY
WITH INDEXES

(Supplement 155)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in November 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

Scientific and Technical Information Branch 1982
National Aeronautics and Space Administration
Washington, DC

This supplement is available as NTISUB/141/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $5.00 domestic; $10.00 foreign.

INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 272 reports, journal articles, and other documents originally announced in November 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections, *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Three indexes -- subject, personal author, and contract number -- are included.

An annual cumulative index will be published.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A82-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.00 per document. Microfiche[(1)] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand, and at the rate of $1.35 per microfiche for standing orders for all *IAA* microfiche.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N82-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction)

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	–1	–2

A99 - Write for quote

1 Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2 Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	30.00	45.00

TABLE OF CONTENTS

Page

IAA ENTRIES (A82-10000) 543

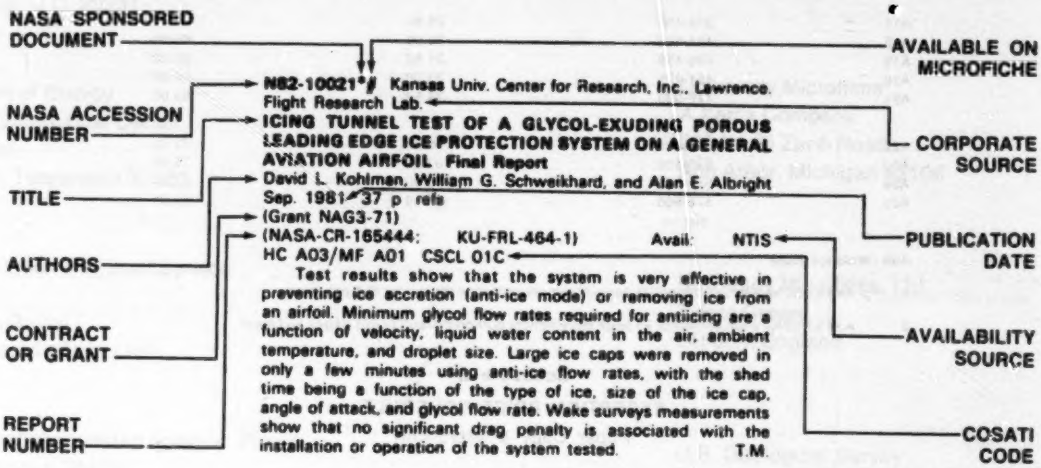
STAR ENTRIES (N82-10000) 557

Subject Index A-1

Personal Author Index B-1

Contract Number Index C-1

TYPICAL CITATION AND ABSTRACT FROM *STAR*



NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
CORPORATE SOURCE
TITLE
PUBLICATION DATE
AUTHORS
CONTRACT OR GRANT
AVAILABILITY SOURCE
REPORT NUMBER
COSATI CODE

N82-10021*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.

ICING TUNNEL TEST OF A GLYCOL-EXUDING POROUS LEADING EDGE ICE PROTECTION SYSTEM ON A GENERAL AVIATION AIRFOIL Final Report

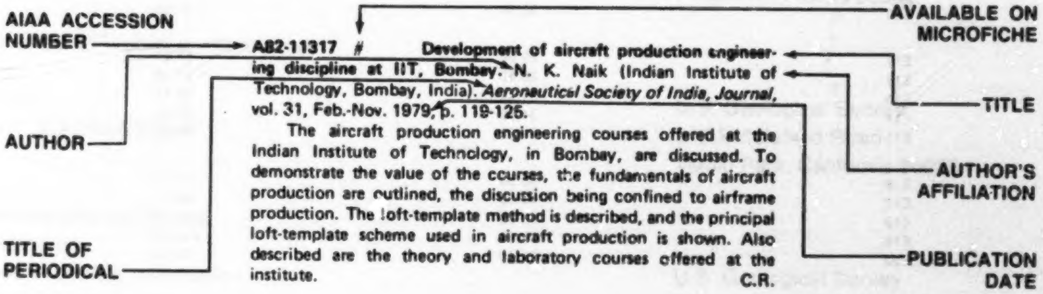
David L. Kohlman, William G. Schweikhard, and Alan E. Albright Sep. 1981 37 p refs

(Grant NAG3-71)

(NASA-CR-165444; KU-FRL-464-1) Avail: NTIS HC A03/MF A01 CSCL 01C

Test results show that the system is very effective in preventing ice accretion (anti-ice mode) or removing ice from an airfoil. Minimum glycol flow rates required for antiicing are a function of velocity, liquid water content in the air, ambient temperature, and droplet size. Large ice caps were removed in only a few minutes using anti-ice flow rates, with the shed time being a function of the type of ice, size of the ice cap, angle of attack, and glycol flow rate. Wake surveys measurements show that no significant drag penalty is associated with the installation or operation of the system tested. T.M.

TYPICAL CITATION AND ABSTRACT FROM *IAA*



AIAA ACCESSION NUMBER
AVAILABLE ON MICROFICHE
TITLE
AUTHOR
AUTHOR'S AFFILIATION
TITLE OF PERIODICAL
PUBLICATION DATE

A82-11317 # **Development of aircraft production engineering discipline at IIT, Bombay.** N. K. Naik (Indian Institute of Technology, Bombay, India). *Aeronautical Society of India, Journal*, vol. 31, Feb.-Nov. 1979, p. 119-125.

The aircraft production engineering courses offered at the Indian Institute of Technology, in Bombay, are discussed. To demonstrate the value of the courses, the fundamentals of aircraft production are outlined, the discussion being confined to airframe production. The loft-template method is described, and the principal loft-template scheme used in aircraft production is shown. Also described are the theory and laboratory courses offered at the institute. C.R.

AERONAUTICAL ENGINEERING *A Continuing Bibliography (Suppl. 155)*

DECEMBER 1982

IAA ENTRIES

A82-41685 # The analysis of the thermal-mechanical stress conditions in axisymmetric rotating hot components of /aircraft/ gas turbines (Zur Analyse des thermisch-mechanischen Spannungszustandes in rotationssymmetrischen drehenden Heisstellen von /Flug-/ Gasturbinen). D. Keppeler. München, Technische Universität, Fakultät für Maschinenwesen, Dr.-Ing. Dissertation, 1980. 183 p. 85 refs. In German.

The essential equations for computations concerning axial turbine disks are presented, taking into account steady and unsteady heat transfer, linear-elastic calculations, elastoplastic calculations, and thermal, aerodynamic, and mechanical boundary conditions. Two different numerical methods are described. One is used to obtain numerical values regarding the aerodynamic-thermal boundary conditions at the hub and on the surfaces. The second procedure considered is the method of finite elements. This method provides a good approximation regarding the solution of the considered problems even in the case of axiel turbine disks of complex shape. The suitability of the developed programs for the solution of the considered problems is demonstrated with the aid of comprehensive computational examples. The elastoplastic calculation discussed represents a first important step towards the computation of the operational life of hot gas turbine components which are subjected to great thermal-mechanical stresses. G.R.

A82-41687 # A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior (Ein flugfähig eingespannter Modellhubschrauber für Untersuchungen zum menschlichen Mehrgrössenreglerverhalten). W. H. Oesterlin. Darmstadt, Technische Hochschule, Fachbereich Regelungs- und Datentechnik, Dr.-Ing. Dissertation, 1980. 259 p. 77 refs. In German. Research supported by the Deutsche Forschungsgemeinschaften.

The control of a Remotely Piloted Vehicle (RPV) with six degrees of freedom of motion represents for the human operator a very difficult problem. The present investigation is concerned with this problem. The conducted studies involve the control of the hovering flight of a remotely piloted model helicopter. A 'model helicopter trainer' was employed in place of a model engaged in free flight. By means of a special mechanism, the helicopter is connected to a carriage which is mounted on two rails. The constructional design involved permits helicopter hovering flight operations. The conduction of investigations regarding the control behavior of man requires that the dynamic behavior of the controlled system is known. A model for the operational characteristics of the helicopter in hovering flight was, therefore, developed. The model provided the basis for the development of a dynamic multiparameter control model for two experienced pilots. G.R.

A82-41700 Characteristics of a Paris-New York flight on board the Concorde (Réalisation d'un vol Paris-New York sur Concorde). F. Vicons (Compagnie Nationale Air France, Paris, France). *Navigation* (Paris), vol. 30, July 1982, p. 310-326. In French.

A summary of crew operating procedures in-flight on board the Concorde during a trip from Paris to New York is presented. Details of checklist sequences are reviewed, including adjustment of the center of gravity through fuel pumping, noise suppression steps, climb through the transonic regime, and use of afterburners for supersonic cruise. The inertial navigation system is activated once cruise speed is reached at Mach 2 and over 50,000 ft altitude, and maintains control for the Atlantic crossing. The landing phase is guided either by a VOR/DME designated Hyannis-Long Island, or by means of a VOR situated 119 nmi along a 142 deg radial vector from New York. Using the second beacon is noted to allow approximately six more miles in a supersonic regime. M.S.K.

A82-41725 Oxidation-resistant materials for hot-gas turbines and jet engines. I (Über oxidationsbeständige Werkstoffe für Heissgasturbinen und Strahltriebwerke. I). K. Hauffe. *Metall*, vol. 36, Aug. 1982, p. 882-888. In German.

High-alloy chromium and chromium-nickel steels are very suitable for a use as construction material in gas turbines operating at high temperatures and in jet engines. Nickel-chromium alloys containing aluminum are superior to cobalt-chromium alloys with respect to corrosion resistance. It is pointed out that the presence of halides and sulfur compounds in the combustion gases makes it necessary to utilize special approaches in order to keep the corrosion of expensive alloys, even at high temperatures, within acceptable limits. These approaches involve the development of oxidation-resistant materials which can provide a protective coating for the basic alloy. Possibilities are discussed for improving the inherent corrosion resistance of pure nickel with the aid of suitable alloying ingredients. G.R.

A82-41795 Simulated ILS using a laser tracker. L. H. Morinaga (Douglas Aircraft Co., Long Beach, CA). In: International Instrumentation Symposium, 27th, Indianapolis, IN, April 27-30, 1981, Proceedings. Part 1. Research Triangle Park, NC, Instrument Society of America, 1981, p. 347-355.

The Simulated ILS (instrument Landing System) was developed to test and evaluate an aircraft's Autopilot modes, particularly autoland and ground rollout. This system utilizes a laser tracker to obtain continuous space position data of the test aircraft. A minicomputer software program determines the aircraft position relative to the test runway. Aircraft deviation from the center of a simulated ILS beam is calculated on the ground, telemetered to the test aircraft, and input to the airborne flight guidance system. Since beam simulation is accomplished in software, almost any type of desired simulation is possible. By the simulation of numerous actual airport ILS beams at a single test site, significant cost savings in flight time and fuel are realized. This system is currently in use on a major commercial aircraft flight-test program. (Author)

A82-41796 Analysis of flight data in the frequency domain. W. R. Wells (Wright State University, Dayton, OH) and S. S. Banda (Dayton, University, Dayton, OH). In: International Instrumentation Symposium, 27th, Indianapolis, IN, April 27-30, 1981, Proceedings. Part 1. Research Triangle Park, NC, Instrument Society of America, 1981, p. 357-365. 9 refs.

This paper describes the methods commonly used to process flight data in the frequency domain for application to aircraft parameter estimation. Estimates of stability and control derivatives were obtained by the use of maximum likelihood estimation methods in the frequency domain. The case used for illustration purposes is flight data from a single engine general aviation airplane. The airplane equations of motion included unsteady aerodynamics. The airplane responses were generated by using rudder and aileron deflections. Measured data is converted by a Fast Fourier Transform algorithm into the frequency domain. An interpolation technique such as 'zero packing' is demonstrated for the purpose of increasing the frequency sampling rate for the estimation algorithm. It was shown that the use of zero packing technique will improve the estimates of stability and control derivatives. (Author)

A82-41846 * Programmable controller system for wind tunnel diversion vanes. R. F. King (NASA, Ames Research Center, Moffett Field, CA). In: International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 1. Research Triangle Park, NC, Instrument Society of America, 1982, p. 457-463.

A programmable controller (PC) system automatic sequence control, which acts as a supervisory controller for the servos, selects the proper drives, and automatically sequences the vanes, was developed for use in a subsonic wind tunnel. Tunnel modifications include a new second test section (80 ft x 100 ft with a maximum air speed capability of 110 knots) and an increase in maximum velocity flow from 200 knots to 300 knots. A completely automatic sequence control is necessary in order to allow intricate motion of the 14 triangularly arranged vanes which can be as large as 70 ft high x 35 ft wide and which require precise acceleration and deceleration control. Rate servos on each drive aid in this control, and servo cost was minimized by using four silicon controlled rectifier controllers to control the 20 dc drives. The PC has a programming capacity which facilitated the implementation of extensive logic design. A series of diagrams sequencing the vanes and a block diagram of the system are included. R.K.R.

A82-41854 * A miniature electro-optical air flow sensor. D. D. Kershner (NASA, Langley Research Center, Cockpit Systems Branch, Hampton, VA). In: International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 2. Research Triangle Park, NC, Instrument Society of America, 1982, p. 645-652.

Miniature sensors are needed for rapid and uncomplicated installation on light aircraft engaged in stability research programs. One particularly difficult sensor to miniaturize to the required degree has been a flow angle and velocity sensor for measuring the local flow ahead of a wing. However, by using an electrooptical technique it was possible to overcome the encountered difficulties and to design a sensor satisfying the requirements. The developed sensor for measuring angle-of-attack, yaw, and airspeed was shown to be suitable for rapid instrumentation of research aircraft because of its small size. The size reduction was accomplished by a design feature which eliminates the need for slip rings and wiring within the movable components of the sensor. G.R.

A82-41868 * **A floating-point/multiple-precision processor for airborne applications.** R. Yee (NASA, Ames Research Center, Moffett Field, CA). In: International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 2. Research Triangle Park, NC, Instrument Society of America, 1982, p. 857-864.
(Previously announced in STAR as N82-26289)

A82-41869 **Integrated sensor system for flight test instrumentation.** L. D. Plews (USAF Flight Test Center, Edwards AFB, CA). In: International Instrumentation Symposium, 28th, Las Vegas, NV, May 3-6, 1982, Proceedings. Part 2. Research Triangle Park, NC, Instrument Society of America, 1982, p. 865-873.

The motivation for the integrated sensor system (ISS) was to take advantage of advances in strapdown inertial navigation systems and microcomputer technology to improve flight test efficiency at lower cost by providing a standard interface with the data acquisition system, aircraft sensors, and onboard flight-/navigation computers. The ISS will generate flight test data in a form which can be used to document the aerodynamic properties of the test aircraft. Flight tests applications are related to performance testing, stability and control testing, and pre and poststall flying qualities testing. Attention is given to data accuracy, sensors for performance and flying qualities testing, a system definition, the ISS computer, the ISS interface, the inertial measurement unit, the air data system, and aspects of implementation. G.R.

A82-41881 # **Requirements and possible design choices for improving the operation of aircraft in the terminal control area (Requisiti e possibili scelte di progetto per migliorare la operatività degli aeromobili in area di controllo terminale).** F. Bossa. *Ingegneria*, May-June 1982, p. 130-136. 6 refs. In Italian.

Ways to optimize operations in the terminal control area are discussed with particular reference to the Terminal Configured Vehicle Program. Attention is given to criteria for the design of aircraft that are compatible with the terminal control area. Questions of aircraft noise and airport congestion are examined. B.J.

A82-41888 **Hover jam - US Army studies EW helicopter.** D. Boyle. *Interavia*, vol. 37, Aug. 1982, p. 760-762.

An airborne radar jamming system (ARJS) has been conceived to provide tactical jamming and operational flexibility necessary to suppress enemy radars (e.g., surveillance, anti-mortar, and anti-artillery radars) to protect attack helicopters and close air support aircraft. The ARJS electronic system is similar to EA-6B and EF-111 systems, but is lighter and simpler. Three frequency bands would have to be covered by the ARJS, reducing power and cooling requirements, as opposed to eight covered by the EF-111 system; but within these three bands, more radar frequencies would have to be covered. The ALQ-99 tactical jamming system is fundamental to the ARJS, and developments include mechanically steerable antennas in the pods. Other developments are underway such as the use of phased lens arrays, and an increased need for battlefield support jamming is foreseen. R.K.R.

A82-41914 **Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion.** W. D. Feist (Motoren- und Turbinen-Union München GmbH, Munich, West Germany). *NDT International*, vol. 15, Aug. 1982, p. 197-200.

The depth of the intergranular corrosion on turbine blades is of decisive significance with regard to their suitability for continued use. An acoustic emission method is introduced that is suitable for examination of blades during regular engine overhaul and which permits a statement on the depth of the corrosion to be made. (Author)

A82-41951 **Long-range radio NAVAID signal reliability.** W. B. Ruhnow (Rockwell International Corp., Cedar Rapids, IA). *Navigation*, vol. 29, Summer 1982, p. 152-159.

The results of a continuing study of Loran-C, VLF communication and Omega long range radio navigation signal reliability are updated. MTBF and mean time to repair statistics are given for the ground stations of the three systems, and trends in failure statistics from late 1973 to 1981 are presented in yearly and half-year intervals. The trends show that while the Loran-C signal reliability has improved significantly in recent years, VLF communication stations show random fluctuations which degrade performance in certain years and Omega signal integrity has remained constant since 1973. The 1981 probability of completing a stated mission of given duration is calculated for each transmitter type in zero- or two-station redundancy situations. The redundant signal coverage calculations show that airborne equipment should be structured to take advantage of redundant signals which have good geometry. O.C.

A82-42035 **1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton.** Edited by B. Lindenbaum, D. L. Quam, W. T. Grady (Dayton, University, Dayton, OH), J. R. Hunter (Boeing Co., Seattle, WA), E. J. Leach (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT), and J. J. Lusczek, Jr. (USAF, Washington, DC). New York, American Institute of Aeronautics and Astronautics, 1982. 157 p. $25.

Following a report on conference results, and a series of reports on the deliberations of panels on aircraft design and manufacture, propulsion system performance, propulsion hardware design and manufacture, and noise and vibration, the topics presented at this conference on the development status of propeller and propeller fan aircraft propulsion systems include Navy, Air Force and Commercial user views of propeller propulsion, the application of this technology to general aviation aircraft, and NASA research on low to high speed propeller systems. Also considered are the aerodynamic and structural analyses of propeller fan systems, the mechanical drive requirements of turboshaft gas turbine engines, the prospective fuel efficiency gains of state-of-the-art propeller propulsion systems, and the aerodynamic compatibility of propellers and the wing and fuselage flows with which they interact. O.C.

A82-42055 † **Models for controlling reliability in aviation (Modeli upravleniia nadezhnost'iu aviatsionnoi tekhniki).** V. P. Molomin. Moscow, Izdatel'stvo Mashinostroenie, 1981. 200 p. 91 refs. In Russian.

Ways of formalizing and optimizing the control of reliability are considered, with an allowance made for the maintainability and useful life of parts and units that are serviced in processes that involve several stages (the extent of control differing in each stage). The mathematical models required to provide the basis for the operational control actions that are optimum in relation to reliability control are elaborated. C.R.

A82-42059 † **Repair and maintenance of buildings in civil aviation (Ekspluatatsiia i remont zdanii grazhdanskoi aviatsii).** A. M. Malyshkov and Iu. Ia. Berlin. Moscow, Izdatel'stvo Transport, 1981. 224 p. 28 refs. In Russian.

Basic information is presented in this handbook on the repair and maintenance of civil-aviation buildings, with particular reference to the situation in the Soviet Union. A classification of such buildings is presented, and their structural and equipment requirements are considered. Regulations concerning the planning, financing, and organization of repair operations are examined. B.J.

A82-42063 † **Structural strength of materials and parts of gas turbine engines (Konstruktsionnaia prochnost' materialov i detalei gazoturbinnykh dvigatelei).** I. A. Birger, B. F. Balashov, R. A. Dul'nev, T. P. Zakharova, L. A. Kozlov, A. N. Petukhov, and R. N. Sizova. Moscow, Izdatel'stvo Mashinostroenie, 1981. 224 p. 90 refs. In Russian.

Aspects of the study of the fatigue strength, thermal fatigue, and long-term strength of the materials and parts of gas turbine engines are reviewed. Particular consideration is given to fatigue-test methods, low-cycle fatigue under isothermal and nonisothermal loading, and determinate and statistical models of fracture. B.J.

A82-42066 † **A history of aerostatics and aviation in Russia - In the period up to 1914 /2nd revised and enlarged edition/ (Istoriia vozdukhoplavaniia i aviatsii v Rossii - Period do 1914 g /2nd revised and enlarged edition/).** P. D. Duz'. Moscow, Izdatel'stvo Mashinostroenie, 1981. 272 p. 52 refs. In Russian.

A history of the planning and building of piloted balloons, dirigibles, and airplanes in Russia, focusing on the period 1861-1914, is presented based on an extensive use of archival and published documentation. Following a survey of the designing and testing of piloted balloons up to 1861, the development of theoretical aerodynamics in Russia is examined, including the work of Tsiolkovskii and Zhukovskii. The pioneer efforts in the construction of airplanes in Russia are treated in detail, including the first airplanes designed and built by Sikorsky. N.B.

A82-42067 † **Aircraft radio communications equipment: Design and use (Samoletnoe radiooborudovanie sviazi: Ustroistvo i ekspluatatsiia).** A. P. Shved, Iu. V. Efremenkov, and F. F. Tiagun. Moscow, Izdatel'stvo Transport, 1981. 264 p. In Russian.

Descriptions are given of the Mikron and Landysh radio sets, the SPU-7 interphone, the SGS-25 loudspeaker system, and the Aria-MB, MS-61, and Mars-BM tape recorders. Attention is also given to the operation of the equipment and to prospects for the development of shortwave and ultrashort-wave radio sets. C.R.

A82-42176 **Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings.** Symposium sponsored by IEEE, AIAA, ASME, et al. New York, Institute of Electrical and Electronics Engineers, 1982. 548 p. Members, $30.; nonmembers, $40.

Topics considered include reliability and the rare event, life-cycle costing, screening, new developments in analysis, software reliability, equipment readiness, new developments in mathematics and modeling, R&M data systems, new developments in testability, manufacturing reliability, and reliability testing. Case histories are presented on mechanical reliability, energy, consumer and industrial projects, maintainability, transportation, and military and aerospace. Aspects of reliability in the Space Shuttle program are discussed. B.J.

A82-42178 **Repair-discard concepts in design.** J. K. Seger (Lockheed-California Co., Burbank, CA). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 21-24.

The repair-discard and expanded repair-level analysis methodology is being developed at Lockheed, and initial experience shows that this methodology is a practical means for determining LRU (line replaceable unit) and SRU (shop replaceable unit) maintenance policy. This methodology provides a structured approach for proposing design changes and for assessing the impact of economic and operational factors when the objective is to achieve mission and readiness requirements at a minimum life cycle cost. The methodology complements the logistic support analysis process of MIL-STD 1388. B.J.

A82-42181 # **R/M/LCC effects of commercial off-the-shelf equipment.** P. R. MacDiarmid, A. D. Pettinato (USAF, Rome Air Development Center, Griffiss AFB, NY), and B. G. Johnson (Rockwell International Corp., Cedar Rapids, IA). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 40-46. 8 refs.

This paper addresses the effects of using commercial off-the-shelf equipment in military environments. Comparisons are made of military vs commercial reliability approaches and an analytical approach for choosing the most appropriate acquisition strategy is presented. Life cycle cost comparisons are made of commercial off-the-shelf equipment vs similar militarized equipment in military environments. Examples are presented of assessing risks under varying applications and choosing the best acquisition strategy. (Author)

A82-42206 # **F-16 Centralized Data System /CDS/.** G. M. Arnold (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 326-328.

This paper describes a data system developed for the F-16 System Program Office (SPO). This Centralized Data System (CDS) contains F-16 maintenance, operational, and configuration data which is used for engineering and management information. Existing data sources within the Air Force are used and special queries and transmission procedures were developed. The existing data sources utilized included various base level tapes. These tapes contain operational and maintenance information and are updated on a daily basis. Mitron tape transmitters are then used to transfer the data from the base locations to the contractor's centralized computers. The contractors facility uses two Honeywell 852s and a Honeywell 620 to process and store the information. (Author)

A82-42208 **Economic analysis for data base management.** F. M. Hall (Evaluation Research Corp., Arlington, VA). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 343-352. 11 refs.

The purpose of this paper is to establish those factors which must be evaluated and properly structured to institute a cost effective field data collection system to support a system readiness improvement program. Factors outlined in this paper represent decision points to tailor a data collection system which effectively contributes to a readiness improvement program at a level which is equal to the cost of the data system. Cost-effectiveness is determined through a detailed evaluation and comparison of: (1) the cost of obtaining information; and (2) the value and benefits of information obtained. In order to relate some practical experience in the use of field data for operational readiness improvement, a brief review is provided on Department of Defense experience with large-scale field data collection systems. The proposed analysis procedure does not assume that a dedicated readiness data collection system is required for any program. The functions of data collection and analysis are evaluated for return on investment in the same manner as other systems effectiveness engineering elements within a program. If a cost-benefit analysis of a proposed data collection system indicates a low rate of return, resources should be reallocated to other functions, such as reliability design analysis, parts and material control, production readiness planning, or testing. (Author)

A82-42210 **Fault isolation BITE for increased productivity.** C. R. Stander (Boeing Commercial Airplane Co., Seattle, WA). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 365-369.

The paper discusses the potential effect of fault isolation on productivity, the development of BITE (built-in test equipment) on the 757/767 aircraft, and a new analytical method for verifying the level of system fault isolation efficiency. It is noted that the 757/767 BITE is designed for the mechanic, not the engineer. It eliminates such problems as the inability to deal with intermittent faults, and is expected to lead to improved aircraft productivity through improved schedule reliability and decreased maintenance cost. B.J.

A82-42211 # **Analysis of built-in-test accuracy.** D. Gleason (USAF, Rome Air Development Center, Griffiss AFB, NY). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 370-372.

Built-in-test (BIT) accuracy is a combined measure of fault detection capability and false alarm occurrences. This paper provides a Markovian analysis of BIT accuracy. The results of the analysis are used to develop tradeoff techniques for achieving optimal BIT accuracy levels. (Author)

A82-42216 **R & M characteristics of a Microwave Landing System.** W. R. Belcher (Amalgamated Wireless (Australasia), Ltd., North Ryde, New South Wales, Australia) and R. E. Kuehn (Kuehn and Co., North Ryde, New South Wales, Australia). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 404-407. 10 refs.

The function, performance and hardware implementation of the Time Reference Scanning Beam (TRSB) Interscan Microwave Landing System (MLS) are briefly discussed. Reliability and Maintainability (R and M) design goals for MLS are established. Selected aspects of R and M design support to monitor and optimize implementation are discussed, and the R and M status of an Interscan prototype system assessed. (Author)

A82-42217 **Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity.** H. D. Hall (Lockheed-Georgia Co., Marietta, GA). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 408-416.

A computer program has been developed which permits maintenance managers to maintain aircraft scheduled inspection programs in a dynamic and cost-effective configuration. This program, which is called CMIP (Computer Monitored Inspection Program), was specifically designed to increase the aircraft's and the maintenance manager's productivity by assisting the maintenance manager in evaluating the effectiveness of scheduled maintenance programs. The CMIP gives the maintenance manager the ability to keep inspection programs dynamic and cost-effective while simultaneously maintaining inherent design levels of safety and reliability. (Author)

A82-42229 **F/A-18 Hornet reliability challenge - Status report.** M. P. Ricketts (McDonnell Aircraft Co., St. Louis, MO). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 491-496.

A development status report is given for the F/A-18 Hornet Reliability Program, in which an attempt is made to give reliability criteria the same design emphasis as weight, performance and cost. Among the established reliability assurance techniques applied are periodic status assessments for each subsystem manager, failure mode and affects analyses, an approved parts list, selective use of Sneak Circuit Analysis, and a closed loop evaluation and reporting system which reports and tracks all equipment failures. The F/A-18's 3.7-hour mean flight time between failures (MFTBF) requirement was tested in 50 Reliability Demonstration flights, and an 8.4-hour MFTBF was demonstrated. The F/A-18 incorporates such high inherent reliability design components as solid state avionics, improved avionics cooling, a fixed-geometry engine air inlet, simpler hydraulics, and the highly simplified F404 engine. C.C.

A82-42462 † **Mathematical models of rotor strength and optimization in computer-aided design (Matematicheskie modeli prochnosti i optimizatsii rotorov pri avtomatizirovannom proektirovanii).** I. V. Dem'ianushko, V. V.

Zhestovskii, and V. Ia. Bratchik. *Problemy Prochnosti*, Aug. 1982, p. 90-93. 9 refs. In Russian.

The efficiency of various schemes and methods for analyzing plates, shells, and three-dimensional structures is examined in order to select appropriate mathematical models for incorporation into a computer-based system for designing aircraft engine rotors. It is shown that at the stage of preliminary design studies, the analysis of rotor components can be carried out in the approximation of axisymmetric plates and shells. Rotor design modules are developed which can be used within the automated design system or autonomously. V.L.

A82-42474 # The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters. A. L. Neuburger (Pratt and Whitney Aircraft of Canada, Ltd., Longueuil, Quebec, Canada). *Canadian Aeronautics and Space Journal*, vol. 28, Mar. 1982, p. 56-64.

Multi-engine passenger carrying helicopters require an engine emergency rating whose magnitude affects the economics of the vehicle. The Power Pair Locus is introduced as an optimization tool suitable for initial vehicle/engine design iterations. It represents pairs of takeoff and emergency power and it is based on a creep wear criterion for the critical turbine blade such that engine qualification requirements are satisfied. Modification of these requirements has been explored and a 10% reduction in engine size appears feasible if only 1/4% of the endurance test time is spent at the emergency rating instead of the 4% which is currently required. For cooled blades, increased cooling tends to reduce the engine's emergency to takeoff power ratio. (Author)

A82-42504 Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations. H. W. Thomas and C. C. Lefas (Manchester, Victoria University, Manchester, England). *IEE Proceedings, Part F - Communications, Radar and Signal Processing*, vol. 129, pt. F, no. 4, Aug. 1982, p. 281-288. 9 refs. Research supported by EUROCONTROL.

The possible uses of currently available aircraft-derived data in assisting in radar tracking are investigated theoretically to establish the accuracies required for such data to improve the performance at present obtained from radar position measurements. For straight-line tracking, it is found that velocity measurements can be obtained by resolving TAS and heading in two axes. Such velocity measurements, however, are biased by the wind to such an extent that they are not directly useful. Even though the straight-line filter may be augmented in order to estimate the wind speed online, and accuracies obtained are not significantly better than those obtained by filtering SSR data only. For maneuvering aircraft, the results obtained suggest that maneuver tracking is possible using either roll-angle or heading measurements. It is noted that use of 'higher-order' measurements such as velocity and acceleration provide considerable benefit during turns and that their incorporation into the tracking algorithm is straightforward. C.R.

A82-42531 # Adaptation and first cryogenic operation of T2 ONERA/-CERT wind tunnel. R. Michel and A. Mignosi (ONERA, Centre d'Etudes et de Recherches de Toulouse, Toulouse, France). *La Recherche Aérospatiale* (English Edition) no. 2, 1982, p. 75-85. 5 refs.

A description is given of the transformation of the ONERA/CERT induction-driven transonic wind tunnel into a blowdown, cryogenic wind tunnel which employs high pressure air as a driving gas and nitrogen as a coolant. An analysis of results from the first series of low temperature tests shows that the combination of induction and cryogenics yields steady and well defined low temperature flows at transonic Mach numbers, with temperatures as low as 100 K and Reynolds numbers from 3 million to over 30 million. Attention is given to the design details of the liquid nitrogen supply and injection systems, as well as the performance levels achieved. O.C.

A82-42533 # An optimum design of fuselage structure. H.-L. Ding, W.-P. Chen, X.-X. Sun, and W. Fang. *Acta Mechanica Solida Sinica*, May 1982, p. 157-164; 6 refs. In Chinese, with abstract in English.

The application of the improved fully stressed design method to fuselage structure design is presented. The conventional stress and minimum gage constraints as well as the component buckling constraints are studied. For the latter, the oscillation in stress ratio redesign can be effectively damped by means of the 'under-relaxation' factor derived in this paper. In addition to the commonly used bars, panels and beams, some dummy and scalar elements are used to avoid the 'ill-condition' or an idealized model of the complex fuselage structure. The presented computer program includes adjustments to the converged design and a final structural analysis in order to improve reliability. In a sample application of the fuselage structure, the design is basically converged after only five iterations. The converged design is satisfactory and is about eleven percent lighter than the initial one. C.D.

A82-42544 Aircraft R&D in Europe - A perspective view. J. C. Wimpenny (British Aerospace Public, Ltd., Co., Aircraft Group, Kingston-upon-Thames, Surrey, England). *(European Pioneer's Day Conference, Toulouse, France, May 6, 7, 1982.) Aeronautical Journal*, vol. 86, Aug.-Sept. 1982, p. 243-251.

Research and development in European civil air transport is considered. It is suggested that industry growth depends primarily on fare reduction, resulting in an increased actual passenger per km figure. A high rate of product improvement implies a reasonable growth rate, but a low rate may reduce the amount of competition. If an excessive rise in fuel prices occurs, R&D will still have to be high in order to reduce direct operating cost (DOC) penalties. A high or low improvement rate for DOC can influence whether future developments are primarily reorders or new types. A steady R&D is essential in order to ensure high DOC reductions, and R&D effectiveness requires precise definition and management. R&D growth must be accompanied by improved profitability of manufacturers and operators. Air traffic management (ATM) can be a major improvement as it provides a 6% potential DOC reduction, and further investigation of ATM is needed. R.K.R.

A82-42545 A supersonic V/STOL fighter design project. J. P. Fielding (Cranfield Institute of Technology, Cranfield, Beds., England). *Aeronautical Journal*, vol. 86, Aug.-Sept. 1982, p. 252-258.

Students of the College of Aeronautics of the Cranfield Institute of Technology have designed a V/STOL aircraft, using carbon fiber reinforced plastic construction wherever possible. This material offers weight savings of 15% for wing type components, 16% for fuselage, and 10% for undercarriage, and a mass breakdown of the aircraft is given. The design offers improved lift characteristics for short take-off and combat as it employs a close-coupled canard arrangement. As engine intakes are on top of the rear fuselage, radar cross-section is reduced, area distribution is increased, and inlet duct volume is reduced. Wind-tunnel test of a similar configuration show promising efficiency results for such intakes. Other design considerations presented pertain to wing, fuselage, and powerplant and vertical take-off system design. Particular attention during construction was given to achieving a reduced vulnerability by performing extensive penetration calculations. It is suggested that further development of the powerplant and remote augmented lift system, and investigation of high temperature materials and insulation be done. R.K.R.

A82-42546 The application of geometric programming to the structural design of aircraft wings. M. B. Snell and P. Bartholomew (Royal Aircraft Establishment, Dept. of Materials and Studies, Farnborough, Hants., England). *Aeronautical Journal*, vol. 86, Aug.-Sept. 1982, p. 259-268. 6 refs.

The technique of geometric programming is applied to the design of optimum aircraft wings in the multi-spar monolithic skin configuration. Both flat and corrugated web systems are considered and design examples are given based on contemporary wing data. The present report is confined to the consideration of minimum weight design of metallic structure and the constraints are those which arise naturally from consideration of allowable stress, buckling and in some instances geometric limitations on the layout. Most of the problems solved give rise to closed form solutions while more complex problems are readily solved by computer program. (Author)

A82-42547 Turbulence modelling - Report of a Working Party. A. B. Haines (Aircraft Research Association, Ltd., Bedford, England). *Aeronautical Journal*, vol. 86, Aug.-Sept. 1982, p. 269-277. 21 refs.

A review of turbulence modelling for aeronautical applications is presented, and recommendations for future progress in the field are suggested. External flow viscous turbulence models are based on boundary-layer development calculations matched with an inviscid-flow solution. Boundary layer calculations derived from the Bradshaw finite difference method require the use of a Reynolds-stress (RS) turbulence model. Internal flow models have lower Reynolds numbers than external; thus, the viscous layers are thicker. Turbulence models for various engine parts such as compressors (basic integral methods), combustion chambers (k-epsilon model), and jets and propulsion installation (k-epsilon model, but with better methods to account for the fluxes of heat and water) are presented. Short-term priority tasks include speeding up computer programs, applying methods to configurations of more complex geometry, and incorporating viscous effects into inviscid methods. R.K.R.

A82-42552 Modern compressible flow with historical perspective. J. D. Anderson, Jr., (Maryland, University, College Park, MD). New York, McGraw-Hill Book Co., 1982. 479 p. 80 refs. $33.

The fundamentals of classical compressible flow are reviewed along with modern computational fluid dynamics and high-temperature flows. Topics discussed include integral forms of the conservation equations for inviscid flows, one-dimensional flow, oblique shock and expansion waves, quasi-one-dimensional flow, differential conservation equations for inviscid flows, and unsteady wave motion. Other topics are the velocity potential equation, linearized flow, conical flow, numerical techniques for steady supersonic flow, properties of high-temperature gases, and basic examples of high-temperature flows. V.L.

A82-42565 Optimisation in multivariable design. G. F. Bryant. In: Design of modern control systems. (A82-42558 21-63) Stevenage, Herts., England and New York, Peter Peregrinus, Ltd., 1982, p. 159-176. 8 refs.

Three new basic algorithms for achieving diagonal dominance are described: (1) the choice of optimal permutation of input or output variables of the plant; (2)

the optimal choice of scaling factors; and (3) the determination of a real precompensator to optimize the dominance measure of the compensated plant. A linear jet-engine model is considered as a design example. B.J.

A82-42572 **The sporty game.** J. Newhouse. Research supported by the Marshall Fund. New York, Alfred A. Knopf, 1982. 250 p. 70 refs. $15.

An episodic history of the airliner business in the era of widebody airplanes is presented. Competition in the development and marketing of big airplanes is focused on, with each of the major companies being discussed in detail, and the development of international competition emphasized. The relationship of governments to the individual companies is explored, and aspects such as comfort, safety, and aircraft size are evaluated as factors in the competition. Future prospects of the American airplane industry are assessed. C.D.

A82-42574 **Automation of flight operational control in the German Democratic Republic (Automatisierung der Flugleitung in der DDR).** W. Raschke (Interflug Gesellschaft für Internationalen Flugverkehr mbH, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt*, vol. 18, no. 2, 1982, p. 63-80. In German.

A description is given of the procedures and the equipment of the subsystem flight operational control of the automated transportation process control system of Interflug. Attention is given to radar data processing and radar data display complexes of Berlin-Schönefeld (Gamma-1). In connection with the employment of modern technological and technical solutions, this system represents a significant step from a manual flight control system to an automated flight control system. The factors which make the automation of flight operational control procedures necessary are examined. They are found to be largely related to a very significant increase in the number of flights which have to be considered. Operational experience regarding the Gamma-1 is also discussed, and plans for additional automation projects are outlined. G.R.

A82-42670 **Design and analysis of advanced composite structures.** R. N. Hadcock (Grumman Aerospace Corp., Bethpage, NY). In: Handbook of composites. (A82-42651 21-24) New York, Van Nostrand Reinhold Co., 1982, p. 533-556. 9 refs.

The iterative final design process in the case of advanced composite structures is generally so complex that it can only be readily accomplished by utilizing a computer. However, the process can be greatly simplified for preliminary design. The present investigation is concerned with a simplified design approach which is quite adequate for preliminary design. The preliminary design of composite structures begins with tradeoffs of the impact of using different types of construction and materials on the weight and cost of either a part or on the total structure associated with an aircraft or space vehicle. Parametric trade studies are discussed, taking into account fuselage weight savings, weight savings for rudders and flaps, weight reductions over metal airframes, and advanced design composite aircraft configurations. Attention is given to multidirectional laminate structural behavior, laminate strength under uniaxial loading, and the preliminary analysis and design of composite panels. G.R.

A82-42675 **Aerospace applications of composites.** G. Lubin and S. J. Dastin (Grumman Aerospace Corp., Bethpage, NY). In: Handbook of composites. New York, Van Nostrand Reinhold Co., 1982, p. 722-743. 16 refs.

It is estimated that within 10 years composites will comprise up to 40 percent of all aircraft structures. This is due to the fact that high performance composites are the only existing materials meeting the requirements for light weight, high strength, high stiffness and good fatigue resistance characteristic of aerospace applications. For example, a graphite composite has a tensile strength of 3.6 x 10 to the sixth in. compared with 0.8 x 10 to the sixth for aluminum, and a fatigue endurance of 80 percent of its static strength, compared with 35 percent for aluminum. Additional advantages over commonly used metals include: superior surface finish, dimensional stability, material uniformity and freedom of aerodynamic design and contouring. Current applications to spacecraft include: rocket nozzles, filament wound tanks and grid-stiffened composite panels. Applications for aircraft currently include wing skins and stabilizers, with static engine components envisioned. A.B.

A82-42722 † **Optimal stream surfaces in supersonic three-dimensional flows (Ob optimal'nykh poverkhnostiakh toka v sverkhzvukovykh prostranstvennykh techeniiakh).** M. P. Levin. *Zhurnal Vychislitel'noi Matematiki i Matematicheskoi Fiziki*, vol. 22, July-Aug. 1982, p. 1003-1008. 9 refs. In Russian.

A numerical solution is obtained for the optimal contouring of the supersonic part of a three-dimensional nozzle in the case when the adjoint problem for the Lagrange multipliers has an analytical solution. Attention is given to the cases of smooth stream surfaces and to cases when the optimality conditions are formulated on the characteristic control surface. The contouring problem is reduced to the solution of a three-dimensional nonlinear system of hyperbolic equations. B.J.

A82-42750 **Europe's best seller - Second-generation Airbus emerges.** *Air International*, vol. 23, Sept. 1982, p. 111-115, 116, 118, 147, 148.

The Airbus A310 is discussed, revealing extensions and modifications of the current design. Intended as a smaller capacity short/medium range transport, it has wide-body twin aisle cabins accomodating between 220-262 passengers, depending on cabin configuration. The basic model employs two turbofan engines with 22,680kgp each, and has an operating range that varies from 1,250-2,600 naut miles. Another model having a range of 3,750 naut miles and accomodating 218 passengers is likely to be introduced. Changes made in the wing design represent an extension of ideas about supercritical airfoils and peaky sections employed in the A300 wing. The main improvement is that the shock wave has been pushed back along the chord of the wing, delaying the compressibility drag rise and increasing rear loading, giving a substantial increase in the lift carried by the wing. While the span and the sweepback remain unchanged, the aspect ratio was increased from 7.73 to 8.8. As a result of improved wing efficiency, engine efficiency and lower aircraft weight, the A310 is 21 percent more fuel efficient than its predecessor. Airbus claims that the A310 will carry more passengers and cargo at lower costs than the Boeing 767, but sales figures to date show 311 767's ordered vs 183 A310's ordered. Flight testing, begun in April 1982, is expected to lead to certification in Europe in March 1983. A.B.

A82-42791 # **Passive aircraft location.** J. L. Love (Mitre Corp., Bedford, MA). *Astronautics and Aeronautics*, vol. 20, Sept. 1982, p. 52, 53.

Results of a study of systems equations and fabrication of a test passive ground-based aircraft detection system are presented. Discrimination abilities of the system are noted to include accuracy in a noisy environment, sorting out aircraft emissions, and time-difference-of-arrival signal processing. A civilian Mark X signal transponder was employed as the test emitter, while sensors were spread on the ground with a 10-25 n mi separation. Measurements were made of pulse time of arrival, amplitude, and frequency, and fed to the sorting algorithms. Synchronization was established between the sensors using rubidium frequency standards. It was shown that the passive system could measure the signal time of arrival, frequency, and the direction of arrival, even if the aircraft were approaching in a line. M.S.K.

A82-42792 * # **Bonding procedure for Teflon seals.** S. R. Barringer, T. E. Ezell, Jr., A. B. Stacey, Jr., and D. B. Wright, Jr. (NASA, Langley Research Center, Hampton, VA). *Astronautics and Aeronautics*, vol. 20, Sept. 1982, p. 53.

Material and bonding procedures designed for use as seals at the National Transonic Facility at the NASA Langley Research Center are presented. Teflon TFE was chosen for its ability to withstand pressures of up to 130 psi and temperatures ranging from -320 to 150 F, in addition to tolerances of 0.074 in. and having a movement allowance of 0.75 in. during transient cycles. Since some of the seals are 14 in. in diameter, Teflon sheets had to be sliced and bonded together after machining to size, resulting in seals with circular, oval, straight, and rectangular cross sections. Step-by-step preparation procedures are provided, and it is noted that the scarf joints performed as predicted during tests. M.S.K.

A82-42808 # **An experimental examination of compressor blade flutter (Etude expérimentale du flottement d'aubes de compresseurs).** E. Szechenyi (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Société Française des Mécaniciens, Réunion sur Alimentation des Turbomachines - Difficultés et Remèdes, Paris, France, May 4, 5, 1982.) ONERA, TP* no. 1982-31, 1982. 11 p. In French.

Experimental methods and results of ONERA trials to determine ways to eliminate feed-induced flutter of axial compressor blades are described. A general equation for the flutter induced on a blade is defined, showing that two cases of instability exist; conditions when the aeroelastic force cancels the stiffness of the blades, and when the total damping is negative and amplitude of vibration increases to the rupture point. Operation of a wind tunnel with rectilinear blades at vibration frequencies between 0-500 Hz are reviewed, noting that flows between Mach 0.5 to Mach 1.0 have been examined. Hydraulic actuators initiate the vibratory movement of the pressurized air flow, and pressure measurements recorded the magnitude and characteristics of the turbulence. It has been demonstrated that in sub- and transonic regimes the angle of attack and stable vibration frequencies are dominant factors governing the onset of vibration. When no instabilities are present, conditions of an unstable feed flow are noted to be responsible for the appearance of flutter. M.S.K.

A82-42809 # **Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces (Equilibre aéroélastique d'un rotor d'hélicoptère en presence de forces aérodynamiques non linéaires).** J.-J. Costes (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(NATO, AGARD, Meeting on Prediction of Aerodynamic Loads on Rotorcraft, London, England, May 17-19, 1982.) ONERA, TP*, no. 1982-33, 1982. 22 p. 13 refs. In French.

A computer code for the aeroelastic coupling of a helicopter rotor, holding into account stall conditions around the retreating blade, is presented. Quasi-linear forms are developed for nonlinear lift functions, and the aerodynamics are based on the acceleration potential in a compressible fluid. Consideration is given to all wakes and the blades are modeled in terms of a lifting line 1/4 from the front of the blade. Modifications of the linear theory of aeroelastic coupling is guided by two-dimensional results on stalled profiles. The complete nonlinear system is transformed by means of the introduction of quasi-steady constraints in order to estimate power increases necessary to overcome losses due to flow separation. M.S.K.

A82-42810 # Corrections for wall effects in ONERA industrial wind tunnels (Améliorations des calculs des effets de parois dans les souffleries industrielles de l'ONERA). X. Vaucheret (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(NATO, AGARD, Meeting on Prediction of Aerodynamic Loads on Rotorcraft, London, England, May 17-19, 1982.) ONERA, TP* no. 1982-34, 1982. 13 p. 11 refs. In French.

Analytical methods for allowing for the effects of the walls on flows in transonic wind tunnels operated by ONERA are presented. The discussion is limited to the case of three-dimensional models in cylindrical wind channels. Attention is given to the numerical description of the model and the sting mount, to the use of a method of characteristics for the verification of the numerical models of the model-sting configurations and the models of wall porosity, and to correction coefficients for particular wind tunnel channels. A volumetric representation of ellipsoidal fuselages is discussed, including using a number of doublets equal to twice the thickness of the fuselage. Further consideration is given to the calculation of lift, wall porosity, nonzero lift characteristics, and corrections of the Mach number. M.S.K.

A82-42811 # An examination of helicopter blade profiles and tips (Etudes de profils et d'extrémités de pale d'hélicoptère). J. J. Thibert and J. J. Philippe (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(NATO, AGARD, Meeting on Prediction of Aerodynamic Loads on Rotorcraft, London, England, May 17-19, 1982.) ONERA, TP* no. 1982-35, 1982. 15 p. 28 refs. In French.

The results of long-term ONERA research into profiles and tips of composite material helicopter blades are summarized. Consideration is given to the use of symmetric NACA profiles on older helicopter designs and to the development of new profiles with numerically modeled internal and external sections. Trials with the OA2XX profile blades on scale model helicopters in the Modane wind tunnel have shown a nominal power augmentation of 9 percent. Flight tests with OA209 blades have, in comparison with the NACA 0012 blades, displayed isopower increases of 2 percent, an enlarged flight envelope such as 10 percent maximum speed or power increases, and more economic rotor performance at high speeds. Two dimensional modeling of the interior of the rotor has been shown to give way to three-dimensional modeling near the tip in order to maintain accuracy. Iso-Mach lines have been calculated from azimuths of 60 and 120 deg and with bending of 30 deg. Further studies to evaluate parabolically flexed tip configurations are indicated. M.S.K.

A82-42813 # The use of adaptive walls in plane flows (Utilisation de parois adaptables pour les essais en courant plan). J. P. Archambaud (ONERA, Centre d'Etudes et de Recherches de Toulouse, Toulouse, France) and J. P. Chevallier (ONERA, Division d'Aérodynamique Expérimentale, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(NATO, AGARD, Meeting on Wall Interference in Wind Tunnels, London, England, May 19, 20, 1982.) ONERA, TP* no. 1982-38, 1982. 15 p. 33 refs. In French.

Computational methods which take into account the effects induced in plane flows by the presence of adaptive walls in a wind tunnel are presented, along with test results from the ONERA T2 transonic wind tunnel. Modeling of the wall effects through the method of signatures is analytically described, with consideration given to the length of the adapted regions, fairings with up- and down-stream regions, residual effects, and reference conditions. Operation of the walls to induce varying flow conditions is outlined, and iterative procedures for quantifying the flow under the initial, changing, and new conditions are presented. The numerical techniques are shown to include factors such as the diminution of the flow in proportion to the distance from the adaptive wall sections, movement of the walls in 2 mm steps to examine camber, and fast convergence of the solution of adaptation to acceleration represented by a single gust. M.S.K.

A82-42817 # Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades. C. Armand, P. Combet, and J.-P. Drevet (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Institute of Electrical and Electronics Engineers, Congress on Instrumentation in Aerospace Simulation Facilities, 9th, University of Dayton, Dayton, OH, Sept. 20-Oct. 2, 1981.) ONERA, TP* no. 1981-93, 1981. 9 p. 5 refs.

The development of thermistors as a suitable replacement for hot-film transducers for boundary layer experiments in the ONERA Modane test center is described, and comparisons are made between performances of the thermistor and hot-film devices. The operation of both apparatus is described in terms of the power fluctuations necessary to maintain a constant temperature in an electrically heated element subject to ambient fluctuating flow. Operating parameters for boundary layer transducers are defined. Fabrication of a 0.2 sq mm, 10 microns thick, 200 ohms resistance (low temperature) and 250 ohms (high temperature), 11 mA heating element semiconductor thermistor for boundary layer studies is noted, including characteristics which form a Wheatstone bridge. The measurement voltage has been transmitted over 100 m without loss, and frequencies of pressure fluctuations have been detected up to 15 kHz. Wind tunnel tests with both types of transducers implanted on rotary wings have revealed conditions which are not quantifiable using models for fixed wing flowfields. M.S.K.

A82-42849 Taking the drag out of bombs. C. Epstein (NATO, Brussels, Belgium). *Flight International*, vol. 122, Aug. 21, 1982, p. 418-420.

Conformal carriage of weapons and stores offers significant advantages over external multiple ejector rack carriage, expanding the flight envelope of the F-4 (with twelve 500 pound bombs) from Mach 1.1 to 1.8, reducing overall drag 60% and extending mission radius nearly 50%. Conformal mounting of fuel tanks (fast packs) on the F-15C provides more than 230 n mi further low altitude dash, 100 n mi further radius at Mach 2, and from one and one-half to three hours extra on-station time at a 500 n mi radius. Radar cross-section and maneuverability are also improved. The General Dynamics F-16XL features semi-conformal weapons carriage, and comparable improvements of performance are expected. A.B.

A82-42865 # In-flight acoustic emission monitoring. I. G. Scott (Department of Defence, Aeronautical Research Laboratories, Melbourne, Australia). In: Symposium on Nondestructive Evaluation, 13th, San Antonio, TX, April 21-23, 1981, Proceedings. San Antonio, TX, Southwest Research Institute, 1982, p. 210-219. 8 refs.

The feasibility of the in-flight acoustic emission (AE) monitoring of fatigue cracks has been assessed by a flight test program employing a Royal Australian Air Force Macchi jet trainer aircraft. It is found that despite the hostile environment in which the equipment is operating, AE signals originating from a known spar fatigue crack have upon analysis yielded suggestive data on the relation between AE, flight regimes and crack growth parameters. Magnetic rubber replica inspection, EPROM flight data recording and flight profile data breakdowns have been employed in this research project. O.C.

A82-42887 # Laser pointing in a turbulent atmosphere. A. L. Pavel (USAF, Weapons Laboratory, Kirtland AFB, NM). In: Aero-optical phenomena. New York, American Institute of Aeronautics and Astronautics, 1982, p. 401-411. 10 refs.

The sources of jitter encountered in optical pointing from an airborne platform are surveyed. Aircraft always operate in some level of atmospheric turbulence and this turbulence induces motion which must be compensated for by an optical pointing system. Levels of atmospheric gust turbulence are related to the corresponding airframe jitter. This level of jitter will determine the capability required by the pointing system. Once the beam leaves the aircraft the final pointing accuracy becomes a function of atmospheric turbulence, which influences the index of refraction of the air through which the light must pass. Levels of atmospheric temperature turbulence are used to predict system jitter that could be expected. The combined effects of atmospheric gust and temperature turbulence constitute the budget of beam jitter that must be factored into laser pointing experiments. (Author)

A82-42893 † Antiwear properties of additives based on higher fatty acids (Protivoiznosnye svoistva prisadok na osnove vysshikh zhirnykh kislot). O. P. Lykov, T. P. Vishniakova, V. V. Sashevskii, and L. S. Zaitseva (Moskovskii Institut Neftekhimicheskoi i Gazovoi Promyshlennosti, Moscow, USSR). *Khimiia i Tekhnologiia Topliv i Masel*, no. 8, 1982, p. 16, 17. 5 refs. In Russian.

The antiwear characteristics of additives based on higher fatty acids isolated from C17-C20 fractions and residues of synthetic fatty acids production have been investigated experimentally using the additives with hydrofined jet fuel T-7. Of the additives investigated, isomonocarboxylic and unsaturated acids of C17-C20 fractions are found to have the highest antiwear characteristics when used in amounts of 0.002-0.007 mass %. V.L.

A82-42894 † Determination of antioxidant content in aviation oils using thin-layer chromatography (Opredelenie soderzhaniia antiokislitel'nykh prisadok v aviatsionnykh maslakh metodom TSKh). P. A. Mikheichev, A. V. Vilenkin, and I. M. Novikova (GOSNIIErat GA, USSR). *Khimiia i Tekhnologiia Topliv i Masel*, no. 8, 1982, p. 35-37. 6 refs. In Russian.

A method based on thin-layer gas chromatography is proposed for determining the amounts of antioxidants in fresh and used aviation oils. The accuracy of the method has been verified by determining the content (which was known to be 0.35% by mass) of dibutyl-n-cresol additive in oil. Analysis of the measurements has shown that the method is accurate to within 6.0%, which is sufficient for oil quality control purposes. V.L.

A82-42895 † Antioxidants for synthetic oils (Antiokislitel'nye prisadki k sinteticheskim maslam). Kh. N. Kulieva and V. S. Smolenkova (Akademiia Nauk Azerbaidzhanskoi SSR, Baku, Azerbaidzhan SSR). *Khimiia i Tekhnologiia Topliv i Masel*, no. 8, 1982, p. 40-42. 21 refs. In Russian.

Recent advances in the synthesis of antioxidants for synthetic lubrication oils used in modern jet engines are briefly reviewed. In particular, consideration is given to nitrogen-containing antioxidants (e.g., succinimide-type compounds, aromatic amines, and Schiff's bases), metal-containing antioxidants (e.g., complex compounds of group I or group VIII metals), and mixtures of two or three different antioxidants characterized by a synergic effect. V.L.

A82-42950 * # Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds. K. K. Yoshikawa (NASA, Ames Research Center, Moffett Field, CA). *American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, 9th, San Diego, CA, Aug. 9-11, 1982, Paper 82-1362.* 19 p. 17 refs.

The time-dependent, compressible, Reynolds-averaged, full Navier-Stokes equations are applied to solve an axisymmetric flow around a forward-facing stepbody (spikebody) at supersonic speeds and a stalling airfoil at transonic speeds. Important transient and unsteady phenomena, not yet well understood, are examined, and significant new findings of the present solution to the phenomena are discussed. The phenomena described in detail are as follows: The evolution of the shock wave pressure built up by the impact of the pressure waves, one from the trailing edge; the separation of the flow as influenced by the shock wave; the location of the reversed flow, the separation point, and the reattachment point; and the transient (or unsteady) phenomena of the flow pulsation, oscillation, and stalling of the body and airfoil wake flow. The numerical results show that the transient flow instability is caused by a supersonic jet induced in the separation bubble by the shock-bifurcation (lambda shock) mechanism between the separation shock and the reflected shock. Pulsation and stall phenomena are caused by a sudden increase in the leading-edge pressure due to the jet and the separation bubble interacting along the stagnation point flow. (Author)

A82-43091 Apache to provide night/bad weather capability. R. R. Ropelewski. *Aviation Week and Space Technology*, vol. 117, Sept. 13, 1982, p. 42, 43, 45 (4 ff.).

Test flights of the Hughes AH-64 Apache advanced attack helicopter, due for delivery to the Army in early 1984, displayed its capability for night and adverse weather antitank/operations. The aircraft's two 1,690 shp T700-GE-701 engines exceeded the Army's high/hot rate of climb requirements and provided a maximum 1,700-1,800 fpm rate of climb. Low altitude nap-of-the-earth flying is facilitated by the precision and quick response of the handling, as well as by the high instantaneous turn rate. Doppler navigation system, day/night vision systems, laser ranging/ designating/tracking and digital fire control computer are integrated to minimize the need for communications between the two cockpits, and to reduce the pilot workload. The AH-64 is armed with Hellfire missiles, and standard 2.75-inch rockets. A.B.

A82-43092 New nozzle design aimed at F-15, F-16 aircraft. *Aviation Week and Space Technology*, vol. 117, Sept. 13, 1982, p. 67, 71, 73.

The two-dimensional convergent/divergent nozzle consists of two convergent-/divergent flaps which vary thrust and exit area as well as control vectoring and reversing. Vectoring on the order of + or - 30 degrees is possible. Designed for short takeoff and landing, and for high Mach maneuvering, landing distances on dry runways are reduced from 3,000 to 1,000 feet, and from 10,000 to 1,200 feet on icy runways. The rectangular nozzle has lower cost and weight than circular nozzles with the same capacity. Ground demonstration tests produced a maximum 8,000 pound perpendicular thrust component and 6,200 pounds of reverse thrust. The nozzle could be employed in an F-15 or F-16, and several external contours for it are being considered. A.B.

A82-43111 # Construction and testing of an Omega navigation system for the balloon-borne X-ray experiment (Aufbau und Test eines Omega-Navigationssystems für das Ballon-Röntgenexperiment). E. Götz. Tübingen, Universität, Astronomisches Institut, Diplomarbeit, 1981. 109 p. 26 refs. In German.

Various systems are compared for their suitability for determining balloon position. The Omega navigation system is discussed, with emphasis on the propagation characteristics of VLF waves, which strongly influence the positional accuracy of the system. A concept for a Tübingen navigation system is presented that is suitable for position determination in the X-ray experiment. A software algorithm that permits the application of hyperbolic coordinates to geographic position is described along with a real-time program that would evaluate the data from the Omega receiver during balloon flight and convert them to geographical position using the algorithm. This calculation procedure is confirmed by a test and its attainable accuracy is found. The receiver electronics and its functional principle is discussed, as is the mode of data transfer to the computer. C.D.

A82-43184 The external balance system of the German- Dutch windtunnel DNW and its strain gage load cells. C. C. Groothoff (Nationaal Lucht- en Ruimtevaartlaboratorium, Emmeloord, Netherlands), D. Theiss, and P. Giesecke (Carl Schenck AG, Darmstadt, West Germany). In: Symposium on Force, Pressure, Displacement and Flow Sensors, Technische Hogeschool Twente, Enschede, Netherlands, May 13, 14, 1982, Proceedings. (A82-43176 21-35) Enschede, Netherlands, Technische Hogeschool Twente, 1981, p. 99-113.

The external six component balance system of the German-Dutch Windtunnel DNW is described. Although designed for a multitude of testing circumstances, the requirements on aircraft model testing were dominant. The applied aerodynamic loads (e.g. 65,000 N lift) and the dimensions of the models and wind tunnel size resulted in a large and heavy instrument. The balance is of the platform type, enabling a simple and stiff construction. The requirements regarding the allowable errors - order of magnitude 0.1% f.s for forces, 0.2% f.s for moments - posed high demands on the design of the balance and calibration equipment, but check loads showed that the requirements were met. (Author)

A82-43249 Meteorological aspects of North Atlantic flight tracks - The development of programs for minimum-time tracks. L. Bennett (Civil Aviation Authority, London, England). *Journal of Navigation*, vol. 35, Sept. 1982, p. 486-501.

The phase of a flight planning operation in which airline personnel calculate minimum time tracks for the purpose of advising oceanic control centers of their needs is described. before defining the Organised Track System. Results are based on 12- and 24-hour forecasts for a 250-mb level, and aircraft with a nominal constant speed of Mach 0.82. The graphical method customarily employed is that of finding the minimum time track, which involves drawing the envelopes of a large number of circles. This, however, is unsuitable for computer implementation. The problem may alternatively be defined in terms of a network, using an algorithm to obtain the shortest paths. O.C.

A82-43250 Meteorological aspects of North Atlantic flight tracks - Some interim results of the study. R. Monk (Civil Aviation Authority, London, England). *Journal of Navigation*, vol. 35, Sept. 1982, p. 502-513; Discussion p. 513-516.

A comparison is presented of minimum time North Atlantic flight tracks calculated for the weather conditions forecast and those analyzed after each of the flights between 12 city pairs. The differences show that the effect of forecast error is small, averaging 1.5 min of flying time for both 12- and 24-hour forecasts, and being 4 min or less in about 90% of the flights studied. The remaining 10% range from 4 min to a maximum of 21 min for a 24-hour forecast and 16 min for a 12-hour one. O.C.

A82-43261 * # Statistical analysis of piloted simulation of real time trajectory optimization algorithms. D. B. Price (NASA, Langley Research Center, Hampton, VA). *IEEE, AIAA, AIChE, ASME, ISA, and SME, American Control Conference, Arlington, VA, June 13-16, 1982, Paper.* 3 p.

A simulation of time-optimal intercept algorithms for on-board computation of control commands is described. The effects of three different display modes and two different computation modes on the pilots' ability to intercept a moving target in minimum time were tested. Both computation modes employed singular perturbation theory to help simplify the two-point boundary value problem associated with trajectory optimization. Target intercept time was affected by both the display and computation modes chosen, but the display mode chosen was the only significant influence on the miss distance. A.B.

A82-43264 * # Current perspectives on emergency spin-recovery systems. R. D. Whipple (NASA, Langley Research Center, Hampton, VA). *Society of Flight Test Engineers, Symposium on Flight Testing Technology - A State of the Art Review, New York, NY, Sept. 19-22, 1982, Paper.* 13 p. 23 refs.

The requirements generated by the loss-of-control problems of contemporary and future aircraft are discussed in connection with the development of rocket and parachute technology for spin-recovery systems used in current aircraft. Recovery rockets must be designed to provide the thrust (not impulse) levels required by the specific application, because insufficient thrust will not effect a recovery regardless of its duration. The need for long firing times and a restart capability make liquid rocket systems preferable. Alternatives to the current tail-mounted method of implementing parachute systems include: nose chutes, wing-tip parachutes, dual-bridle and rigid towline systems. Comparative test results for these and the conventional system are given along with the latest dynamic model test technique for spin-recovery rockets. A.B.

A82-43275 757 systems key to route flexibility. R. R. Ropelewski. *Aviation Week and Space Technology*, vol. 117, Aug. 30, 1982, p. 36-38, 43, 45, 46.

The Boeing 757 is a single-aisle narrow body commercial transport accommodating 186 passengers, with twin engines which each produce 37,000 pounds thrust, a maximum takeoff weight of 220,000 pounds, and a maximum range of 2,650 nautical miles. The operating procedures and cockpit layout of the 757 are almost identical to those of the 767, which will permit flight crews to obtain a common rating for both, and can reduce maintenance and support costs for airlines operating both aircraft. The avionics aboard include an integrated flight management computer, autopilot/flight director, thrust management system and color cathode ray tube displays. The maiden flight was on February 19, 1982, and certification is expected in December 1982 for commercial service the following year. A.B.

A82-43278 † Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft (Perspektivnaia mnogotselevaia radiofizicheskaia letaiushchaia laboratoriia na baze samoleta tipa IL-18). V. S. Abliazov, N. A. Armand, A. N. Beliunov, V. M. Berezanskii, L. F. Borodin, V. L. Bulatnikov, A. N. Vystavkin, A. A. Kalinkevich, A. A. Kirilin, and A. P. Kulakov. *(Vsesoiuznaia Konferentsiia po Problemam Issledovaniia Prirodnykh Resursov Zemli i Mirovogo Okeana Aviatsionno-Kosmicheskimi Sredstvami, Moscow, USSR, Nov. 1980.) Geodeziia i Aerofotos'emka*, no. 2, 1982, p. 11-18. In Russian.

The paper describes an airborne laboratory for performing radio-physical experiments relating to the remote sensing of earth resources and the monitoring of the environment in the microwave, infrared, and visual ranges. Consideration is given to the onboard automated data acquisition system, the radiometer system, and an algorithm for processing and classifying the radiometer data. A picture showing the arrangement of remote-sensing equipment and processing systems on the aircraft is presented along with block diagrams of the data-acquisition and radiometer systems. B.J.

A82-43311 A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel. L. Bernstein and G. T. Stott (Queen Mary College, London, England). *Aeronautical Quarterly*, vol. 33, Aug. 1982, p. 237-257. 19 refs.

An interferometric method is developed for following the trajectory of a weakly restrained model in a shock tunnel where the force levels are of order 10N for flow duration of about 1 ms. The system consists of two simple Michelson interferometers and a single He-Ne laser that provides two measurement and reference beams for following the motion of two points on the model. Interference fringes are produced at the detectors as the model moves, and the resulting frequency-modulated wave-trains are recorded. The data are analyzed by curve fitting to a parabola in order to find the accelerations of the measurement points, and the forces on the model are calculated based on the model's internal characteristics. A lift and pitching moment for a ridge-delta of aspect-ratio 1 is obtained by suitably aligning the beams. In addition, results of tests on two models of the same geometric size but with different inertias are presented. N.B.

A82-43326 # The testing of new technologies with the aid of the Alpha Jet aircraft (Erprobung neuer Technologien am Alpha Jet). M. Natter (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper.* 31 p. In German.

The Alpha Jet aircraft as weapon system of the 1980s and 1990s represents the most modern, operationally utilizable status of technology. The origin of the currently employed technologies goes back to the late 1960s. The present investigation is concerned with recent developments regarding the technologies which determine bomber aircraft design, taking into account the advantages that the new technologies will provide for future bomber aircraft. Technological changes of the 1970s are related to electronics and cybernetics, fluid mechanics and flight physics, and materials and methods of construction. The development, manufacture, and long-term testing of carbon-fiber reinforced plastics is considered, giving attention to the landing flap, rudder, elevator unit, and the wings of the Alpha Jet. The development and flight testing of a transonic wing is discussed, and a description is presented of the development and testing of a direct side force control system. G.R.

A82-43327 # Applied flight mechanics in the design and in flight tests (Angewandte Flugmechanik bei der Auslegung und Flugerprobung). H. Wünnenberg (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper.* 22 p. 5 refs. In German.

It is pointed out that flight mechanics played an important part in connection with the design and the development of the Alpha Jet aircraft. The main criteria involved in a selection of the optimal configuration were related to a satisfaction of the requirements of flight mechanics. The German aerospace company engaged in the Alpha Jet project has already proposed seven alternative configurations for a jet trainer in connection with a prestudy. Factors used in comparing these configurations were related to flight mechanics, system costs, safety, structure, problems of construction, equipment, and employment possibilities as a light weapons system. The degree with which the flight-mechanics requirements were satisfied was determined on the basis of 17 criteria. Attention is also given to the procedures used in the development phase of the aircraft and the test phase. G.R.

A82-43328 # Processes and procedural approaches in the aerodynamic design of the Alpha Jet aircraft (Verfahren und Vorgehensweise bei der aerodynamischen Auslegung des Alpha-Jet). D. Welte (Dornier GmbH, Friedrichshafen, West Germany). Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper. 18 p. In German.

The military aircraft Alpha Jet, which has been developed jointly by a French and a German aerospace company, is to be used as a training aircraft for novices and advanced students, and also as a combat aircraft to provide support to troops fighting on the ground. A description is presented of the approaches used to develop a design which will ensure the aerodynamic characteristics required by the aircraft to perform its missions. Attention is given to aspects of wing design, aids for obtaining satisfactory lift characteristics, engine inlets, jet effects, and a wind tunnel program. G.R.

A82-43330 # Aerodynamic computational procedures for subsonic and transonic aircraft (Aerodynamische Berechnungsverfahren für Unterschall- und Transschallflugzeuge). W. Schmidt. (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper.* 25 p. 22 refs. In German.

The improvement of the flight characteristics of modern aircraft has been accompanied by a considerable increase in the aircraft development costs. Current procedures in connection with the aerodynamic design are still characterized by wind-tunnel studies. The use of modern aerodynamic computational processes will make it possible to restrict cost-intensive wind tunnel tests in the future to tests related to the verification of configuration characteristics and the determination of maneuverability properties. The development of the Alpha Jet aircraft is used as an example to show the advances which have been made regarding the development of aerodynamic computational procedures since the period from 1969 to 1973. Attention is given to the aerodynamic sizing program, the predesign of the wing-fuselage combination, profile design for sonic and transonic conditions, the design of flap systems, the design of engine inlets, and the aerodynamic design of the tail assembly. G.R.

A82-43331 # Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness (Verfahren und Vorgehensweise bei der Dimensionierung der Tragstruktur und beim Nachweis der Lufttüchtigkeit). E. Hässler (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper.* 26 p. In German.

The airworthyness of an aircraft is related to the ability of the airframe of the aircraft to tolerate the stresses occurring in flight operations in a satisfactory manner. On the other hand, a strength of the airframe exceeding the requirements to a large degree is also undesirable in connection with a corresponding unnecessary increase in the weight of the aircraft. The present investigation is concerned with the approaches used to obtain an airframe with optimum design characteristics, taking into account the procedures employed in connection with the design of the Alpha Jet aircraft. Attention is given to details regarding the airworthyness requirements in the case of the Alpha Jet, the optimal dimensioning of the airframe, questions of load mechanics, the structural calculations, and approaches for ensuring appropriate quality. G.R.

A82-43332 # A survey regarding the German-French development program Alpha Jet (Überblick über das deutsch-französische Entwicklungsprogramm Alpha Jet). P. Kania (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper.* 27 p. In German.

The project Alpha Jet has its origin in the late 1960s, when in Germany and in France a need for a new jet trainer for the air force was recognized. Initial contacts between German and French aerospace companies in 1968 led to plans for the development of the Alpha Jet aircraft in a joint project by French and German companies. In response to the need of the 'Luftwaffe' for a combat aircraft providing close-air support, the development objectives for the Alpha Jet were extended to cover also requirements concerning an employment of the aircraft for combat missions. In September 1975, Belgium became the third partner in the Alpha Jet project. The last of four prototypes of the Alpha Jet performed its first flight on October 11, 1974. Attention is given to details concerning the implementation of the Alpha Jet program, organizational questions, aspects of the program schedule, financial considerations, and an outlook regarding future developments involving the Alpha Jet. G.R.

A82-43333 # Simulation in connection with the development of the Alpha Jet aircraft (Simulation bei der Entwicklung des Alpha Jet). H. Friedrich (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981. Paper.* 37 p. In German.

A survey is provided of simulation studies conducted by a German aerospace company as an aid in the development of the Alpha Jet military aircraft. The first simulations were unmanned simulations, involving six degrees-of-freedom calculations. The simulation, including preprogrammed control input data or simulated pilot behavior, was performed by a digital computer. At a later time, a cockpit mock-up was provided with control elements and instruments, and the resulting installation was connected with a digital computer. In this connection, an operational simulator was developed. This simulator is used for air/ground mission applications. Investigations involving manned simulations are also discussed. Manned simulations were almost exclusively performed in connection with the adaptation of the aircraft to modified and new missions. The simulator is principally employed for mission simulations and the study of new control concepts. G.R.

A82-43394 **Sensitivity analysis and optimization of aeroelastic stability.** A. P. Seiranian. *International Journal of Solids and Structures*, vol. 18, no. 9, 1982, p. 791-807. 42 refs.

An analysis of the sensitivity characteristics of aeroelastic stability with respect to changes of distributed and discrete parameters is presented using variational analysis. The optimization problem of aeroelastic stability of a slender wing in incompressible flow is formulated and the solution demonstrates that this problem possesses at least two extrema, but that one of them is only a local maximum. Sensitivity analysis of flutter systems is developed by deriving the gradients of flutter and divergence critical speeds, and obtaining the necessary optimality conditions. The solution technique is then described and numerical results are presented. The optimality conditions for the distribution of nonstructural mass along the wing span are established and the bang-bang optimal distributions are obtained. N.B.

A82-43400 # **Methodology in flight tests (Methodik bei der Flugerprobung).** U. von Meier (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft fur Luft- und Raumfahrt, Symposium uber angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper.* 19 p. In German.

Cost considerations in connection with the conduction of flight tests make it necessary to conduct performance and property measurements, individual system tests, and flutter studies during the same flight. Flight tests conducted with the Alpha Jet aircraft provide a good example for efficient bilateral flight testing procedures. Four prototypes were used in the flight tests. Attention is given to the assignment of the various test problems to the Alpha Jet prototypes, the flight program for the test flights, aspects of performance evaluation, the excitation of structural vibration and the evaluation of the vibrations for the flutter analysis, and a survey concerning the testing of the weapons of the aircraft. G.R.

A82-43402 **Mode scatterer design for fan noise suppression in two-dimensional ducts.** M. S. Tsai (Boeing Commercial Airplane Co., Seattle, WA). *Journal of Sound and Vibration*, vol. 83, Aug. 22, 1982, p. 501-512. 11 refs.

The favorable scattering associated with the transfer of the lower order modal energies to the higher ones can be induced only when (1) the lower frequency waves propagate in the inlet duct or in the no mean flow conditions, and (2) the first lining which the incident waves from the fan face meet is a nearly reactive one. The phases of the incident waves from the noise source will affect the performance of the scatterer, but not the selection of the optimized scatterer. For a given baseline lining, the reactance and the length of the scatterer are the coupling factors in the determination of an optimized scatterer. (Author)

A82-43425 **Northrop ECM - From B-1B to F-5E.** D. Richardson. *Flight International*, vol. 122, Sept. 4, 1982, p. 683, 684, 693.

Several electronic countermeasures systems are described. The B-1 RFS/ECM jamming transmitter system has been extended to cover Band 8, as well as 6 and 7; in-phase power stacking allows the output of individual jamming sources to be combined, and phased array antennas are employed. The ALQ-171 (V) conformal countermeasures system, designed for the F-5, has a minimal effect on aircraft performance, reducing the maximum Mach number less than 4 percent at 36,000 feet. Continuous-power amplitude-modulation noise, a constant-power AM pulse repeater, and a continuous wave repeater are employed singly or in combination, and are effective against multiple threats. Future developments include the Modularised Infrared Transmitting Set consisting of an infrared transmitter and electronic control unit which provides 180 degree countermeasures coverage. A.B.

A82-43468 **A field guide for scanner and photographic missions.** D. L. Hawley (EG & G, Inc., Multispectral Remote Sensing Dept., Las Vegas, NV). In: American Society of Photogrammetry and American Congress on Surveying and Mapping, Fall Technical Meeting, San Francisco, CA, September 9-11, 1981 and Honolulu, HI, September 14-16, 1981, ASP Technical Papers. Falls Church, VA, American Society of Photogrammetry, 1981, p. 513-530. 6 refs.

The guide comprises separate sections for planning, executing, and evaluating a multispectral scanner and/or photographic mission. The planning section addresses mission objectives, mission requirements, navigation, flight briefing, weather, communications, field/aircraft equipment, and logistics. The mission requirements deal with general flight parameters of sunrise, sunset, equation of time, solar altitude, solar azimuth, duration of daylight, duration of civil twilight, duration of astronomical twilight, flight line headings, flight altitude, flight line coverage, flight line interval, and number of flight lines. Among the scanner parameters discussed are the velocity/height ratio, scanner speed, and tape speed. Navigation techniques are described, together with aircraft considerations. C.R.

A82-43469 **Loran-C navigation as an aid to aerial photographic operations.** C. W. Dull (U.S. Department of Agriculture, Forest Service, Doraville, GA) and W. H. Clerke (U.S. Department of Agriculture, Forest Service, Atlanta, GA). In: American Society of Photogrammetry and American Congress on Surveying and Mapping, Fall Technical Meeting, San Francisco, CA, September 9-11, 1981 and Honolulu, HI, September 14-16, 1981, ASP Technical Papers. Falls Church, VA, American Society of Photogrammetry, 1981, p. 531-541. 13 refs.

The navigational accuracy obtained during a wide variety of operational aerial photographic missions utilizing a Loran-C TDL-424 navigator is evaluated. The navigational displays, steering, and data outputs are discussed, and the parallel track steering and preprogrammed flight pattern are shown. The navigational accuracy evaluation includes a parallel flightline evaluation for three missions, a comparison of an aerial photographic mission with and without Loran-C, evaluation of return flight accuracy for a predescribed flightline, and overflights of predetermined exposure stations. C.D.

A82-43571 # **Implicit model-following technique - Application to the design of longitudinal stability augmentation systems.** V. Mocanu (National Institute for Scientific and Technical Research, Bucharest, Rumania). *Revue Roumaine des Sciences Techniques, Série de Mécanique Appliquée*, vol. 26, Nov.-Dec. 1981, p. 845-853. 13 refs.

Implicit model-following and static decoupling techniques are applied to the design of a control and stability augmentation system for a control-configured, relaxed static stability version of the F-4 aircraft. Implicit model-following allows the computation of the optimal feedback law which minimizes differences between aircraft and model dynamics for the cases of distinct flying qualities. The static decoupling technique is used for the computation of a feedforward matrix which decouples the steady state system outputs. O.C.

A82-43577 **Technology for tomorrow's business aircraft.** M. Grangier. *Interavia*, vol. 37, Sept. 1982, p. 875, 876.

Improvements of business aircraft by the end of the decade are forecast, which pertain to their structure, aerodynamics, propulsion and avionics. The increased use of composite materials in place of metal should reduce the empty weight of aircraft about 20 percent, but problems with testing and residual strength after damage must be resolved. Aerodynamic changes may include the use of new wing shapes, canard foreplanes, and wings with relative thicknesses of more than 15 percent at the root, aspect ratios over 10, and a sweep of 35 percent or more. It is hoped that engine power output will be increased 30 percent over current units by increasing the bypass ratio or by modifying the fan blade shape. Improved energy efficiency is to be expected from all of these changes. A.B.

A82-43578 **Piston engines for general aviation - Is the revolution really under way.** M. Grangier. *Interavia*, vol. 37, Sept. 1982, p. 898-900.

The search for higher efficiency, lower fuel consumption engines for general aviation is prompting the consideration of alternative fuels and engine designs. The Thunder engine, based on a McLaren/Chevrolet 8 cylinder automobile engine, is being developed to produce 700 HP at 4,400 rpm with fuel consumption of 0.40 pounds/HP/ hour and to run on a variety of fuels. Liquified petroleum gas is an attractive alternative fuel because its cost is 40-60 percent less than aviation gasoline with less pollution and engine carbon deposits; conversion of conventional engines is relatively simple, and it does not alter the flying characteristics of an aircraft. Alcohol is a possible fuel, but it gives lower engine performance than gas and could call for altitude restrictions. Diesel power is being considered through a 2 stroke 4 cylinder star configuration diesel for NASA. Finally, weight and cooling present problems to be overcome, as well as the high pressure fuel injection system necessary. A.B.

A82-43579 **The cruise missile era dawns.** J. P. Geddes. *Interavia*, vol. 37, Sept. 1982, p. 919-923.

In December 1982, 192 cruise missiles will be deployed on 16 B-52's, and will be the first out of over 4,000. In addition to the ALCM, the Tomahawk SLCM will be produced in several versions for surface launch, submarine launch and ground launch, the last of which will become operational in mid-1984. All these versions employ common propulsion and internal guidance systems with Terrain Contour Matching, and have a cruise speed of 550 mi/h and a range of 1550 nmi. A fifth version, the Medium Range Air-to-Surface Missile, will become operational in late-1986. The size of the anticipated production is made possible by the missile's low cost (about $1 million), and is made necessary by its vulnerability, considering exposure to enemy counter-measures for some three hours before reaching target. Nuclear arming requires 24 flight events, and occurs only in the target area. Future developments center on enabling small engines to run at 3000 C for more power and range. A.B.

A82-43583 **What has hypersonics research led to - Some examples of progress and spin off /17th Handley Page Memorial Lecture/.** J. L. Stollery (Cranfield Institute of Technology, Cranfield, Beds., England). *Aerospace* (UK), vol. 9, Sept. 1982, p. 14, 15, 21-26. 23 refs.

Hypersonic flight poses considerable problems due to the high kinetic heating, the great power required, and the difficulties in maintaining structural integrity. Temperatures over 1000 K are encountered, and installed thrust must equal maximum takeoff weight. The retractable spike on the Trident Missile was one of the first applications of a technique which prevents the boundary layer from becoming a bow shockwave, and reduces kinetic heating. Because no wind tunnel duplicates all the aspects of hypersonic flight, the flights of the Space Shuttle provided the opportunity to evaluate theoretical predictions of the aerodynamic conditions at speeds from Mach 27 to 0.9. Spin-offs from hypersonic research include the intermittent shock tube and the gasdynamic laser as well as developments for power cells and magnetohydrodynamics. A proposed laser powered hypersonic aircraft is also discussed. A.B.

A82-43586 **Aeronautical research and development in Europe - Perspectives (La recherche et le développement aéronautiques en Europe - Perspectives).** J. C. Wimpenny (British Aerospace Public, Ltd., Co., Aircraft Group, Kingston-upon-Thames, Surrey, England). *(Journée des Pionniers Européens, 7th, Toulouse, France, May 6, 1982.) L'Aéronautique et l'Astronautique,* no. 94, 1982, p. 3-15. In French.

Processes of design-to-cost, construction, and use of aircraft up to the year 2000 are discussed, with attention given to the purposes, directions, and constraints on research and development. Factors influencing the commercial R&D activities are identified as competition and increases in the market, which should expand at least over the extent of the period covered. The demand for new services is driven by attempts to capture markets outside the country of origin, faster flights between locations, and the cost of operations. Raises in fuel costs create new markets for manufacturers to satisfy demands of commercial customers for greater flight economy. Collaborative efforts by different European companies in R&D activities are reviewed, along with specific program goals to lower manufacturing costs and extend the lifetime of the aircraft. M.S.K.

A82-43589 **Parietal jets. I (Les jets pariétaux. I).** L. Rosenthal (Centre de Documentation de l'Armement, Paris, France). *L'Aéronautique et l'Astronautique*, no. 94, 1982, p. 17-30. 25 refs. In French.

Analytical models are explored for the characteristics of jet flow over a wall in order to describe the performance features of parietal jets in varying applications. Attention is given to physically modeling the characteristics of the Coanda and Young effects, particularly in the case of a jet exhaust directed over an inclined flat plate. Experimental studies with free stream velocities equal to zero are reviewed, and numerical models for conditions where the freestream velocity is not equal to zero are noted to require either an integral or a finite difference method for solution of the separation point. Applications of the parietal jets in helicopter blades, STOL aircraft, engines, thrust reversers, and fluidics are mentioned. M.S.K.

A82-43603 † **Survey and design of airfields (Izyskaniia i proektirovanie aerodromov).** G. I. Glushkov, V. F. Babkov, L. I. Goretskii, and A. S. Smirnov. Moscow, Izdatel'stvo Transport, 1981. 616 p. 15 refs. In Russian.

The fundamentals of airfield and airport design are reviewed with reference to the current requirements and standards, including those of ICAO and State Standard of the USSR, and results of the latest research in this area. Topics discussed include airport layout, calculation of the airfield size, vertical planning of the airfield, drainage systems, design of airfield pavements, design of unpaved airfields, heliports, airfields for VTOL aircraft, and, finally, surveying and project development. V.L.

A82-43659 **NASA studies business aircraft avionics.** B. M. Elson. *Aviation Week and Space Technology*, vol. 116, Apr. 26, 1982, p. 119, 121, 125 (4 ff.).

NASA is evaluating an approach to digital avionics using as a testbed a two-engine Cessna 402B equipped with a demonstration advanced avionics system (DAAS). DAAS functions include autopilot/flight directing, navigation/flight planning, flight warning, and weight and balance computations, and examples of system capabilities are air traffic control Mode S message processing, built-in testing, and ground simulation. Built around eight bus-connected microprocessors, DAAS uses digital implementations of the algorithms used for defining the analog autopilot, and incorporates some KFC 300 features. Selector switch, bug selection, and wind velocity are also considered. Cost constraints impose the storage of 10 navigation aids and 10 waypoints, and the use of a small CRT, but some research is being done in flat panel technology and also the use of low-cost inertial sensors should compensate for these problems. R.K.R.

A82-43660 # **Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves (Theoretische und experimentelle Untersuchung einiger nichtlinearer Eigenschaften elektrohydraulischer Servoventile).** M. Rizk. Stuttgart, Universität, Fakultät für Luft- und Raumfahrttechnik, Dr.-Ing. Dissertation, 1981. 119 p. 29 refs. In German.

Electrohydraulic control methods are used in a number of applications, including those related to positioning operations performed in connection with the control of aircraft. These control methods are based on the employment of electrohydraulic servovalves. The characteristics of the servovalves have an essential effect on the system behavior. However, the information available concerning the nonlinearities with respect to these characteristics is in many respects insufficient. The present investigation is concerned with a theoretical and experimental study of all possible nonlinear characteristics of electrohydraulic servovalves, with the exception of hysteresis. An open loop control system was built for the conduction of the experiments. The effect of the bypass choke valve on the pressure sensitivity of the first hydraulic stage is calculated, while aspects of hydraulic stiffness in the second stage are experimentally studied. Attention is given to the effect of magnetic and hydraulic saturation on valve characteristics, the effect of manufacturing tolerances, and the effect of the supply pressure. G.R.

A82-43724 # **An examination of the dynamics of rotary machines (Contribution à l'étude dynamique des machines tournantes).** R. Henry. Lyon I, Université, Docteur d'Etat ès-Sciences Thesis, 1981. 167 p. 74 refs. In French.

Numerical models are developed and tested experimentally for accuracy in modeling static and dynamic behaviors of disk-blade systems in conditions of equal or unequal rigidity of the disks and blades. The static and dynamic analyses of thin blades in rotation are carried out through a finite element method, with the choice of elements, boundary values, and matrices being discussed. Attention is given to the calculation of frequencies and modes of repetitive circular systems, with mention made of potential and kinetic energy analyses of substructures using reduced matrices. A computer program, DISCO, is introduced and applied to a disk-blade lattice and an annular plate. The frequencies and modes of an industrial centrifugal compressor wheel are calculated and compared to data, and an accuracy of 5 percent is demonstrated to be possible at cost effective levels of computation. M.S.K.

A82-43742 **A fatigue crack growth theory based on strain energy density factor.** R. Badaliance (McDonnell Aircraft Co., St. Louis, MO). In: Absorbed specific energy and/or strain energy density criterion; Proceedings of the International Symposium, Budapest, Hungary, September 17-19, 1980. The Hague, Martinus Nijhoff Publishers, 1982, p. 329-345. 7 refs.

The strain energy density at the crack tip is used to characterize the fatigue crack growth behaviro of metallic materials. Having postulated that the rate of crack propagation is a function of the range of the strain energy density, this range is used to correlate subcritical growth data of certain aluminums, titaniums, and steels. A parameter which incorporates yield stress, true ultimate stress, and stress ratio is devised to account for stress ratio effects. A single crack growth curve for each material is developed by numerical procedures, and these constant amplitude curves are then used in conjunction with cycle-by-cycle integration schemes to predict spectrum fatigue lives of center cracks and elliptic surface flaws in plates subjected to fighter aircraft landing gear stress history. The results show good agreement with data from experimental tests. N.B.

A82-43753 # **An implicit finite-volume method for solving the Euler equations.** A. Lerat (Ecole Nationale Supérieure d'Arts et Métiers; Paris VI, Université, Paris, France), J. Sidès, and V. Daru (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(Conférence Internationale sur les Méthodes Numériques en Dynamique des Fluides, 8th, Aachen, West Germany, June 28-July 2, 1982.) ONERA, TP* no. 1982-59, 1982. 8 p. 10 refs.

Although the explicit methods which have been developed for the solution of steady or unsteady transonic flow Euler equations allow the prediction of supercritical flows around airfoils without restriction on shock wave strength and motion, they are computing time-intensive due to the limitation on the time step required for numerical stability. This limitation is removed through the application of the present, second-order and noniterative implicit method for the solution of Euler equations. An important feature of the present method is that the implicit terms are of the order of the truncation error, allowing simpler and easier treatment of boundary conditions. The method is expressed in the finite volume formulation and applied to both steady and unsteady transonic flows. The computing time reduction achieved while obtaining accurate results is noted. O.C.

A82-43755 # **Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor.** B. Sellier and J. Pigere (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(International Symposium on Applications of Laser-Doppler Anemometry to Fluid Mechanics, Lisbon, Portugal, July 5-7, 1982.) ONERA, TP* no. 1982-61, 1982. 12 p. 6 refs.

The equipment, instrumentation and results of a laser Doppler anemometry study of helicopter rotor wake airflow are described. Azimuthal and radial distributions of vertical induced velocities and tip vortex paths are determined for the cases of hovering and forward flight. Attention is given to the arrangement of the laser velocimeter system and the data acquisition system, which can operate in both a 'wake' and a 'histogram' mode. The former simultaneously obtains the two induced velocities and the angular position of the blade, while in the latter, velocities are measured for one given azimuthal blade location. O.C.

A82-43756 # Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter. J. Labbe, G. Janssens, and P. Avram (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(International Symposium on Applications of Laser-Doppler Anemometry to Fluid Mechanics, Lisbon, Portugal, July 5-7, 1982.) ONERA, TP* no. 1982-62, 1982. 10 p. 5 refs.

Laser velocimetry methods suitable for the measurement of turbomachine flow velocities must take into account the periodicity of rotation and minimize secondary effects caused by laser light reflection from shroud, hub and impeller surfaces. These difficulties are greatest in centrifugal compressors due to shape of the casing, blade geometry, and the complexity of flow geometry near the blade tips. A two-focus laser velocimeter is described whose mean values, measured outside the centrifugal compressor impeller studied, are in accordance with those determined in the same test section by classical pressure probe methods. O.C.

A82-43757 # Application of laser velocimetry to large industrial wind-tunnels. A. Boutier and M. Canu (ONERA, Châtillon-sous-Bagneux, Hauts-de-Seine, France). *(International Symposium on Applications of Laser-Doppler Anemometry to Fluid Mechanics, Lisbon, Portugal, July 5-7, 1982.) ONERA, TP* no. 1982-63, 1982. 11 p. Research supported by the Direction des Recherches, Etudes et Techniques.

Laser velocimetry has been recently applied in two large industrial transonic wind-tunnels at Modane. In S3 Modane, a blow-down facility, a velocity map has been obtained around a model, with a two-dimensional laser velocimeter using forward scattered light and two XYZ benches, one on each side of the test section: the whole velocimeter was monitored by a mini computer during the runs. At S2 Modane, preliminary experiments have shown that a laser velocimeter can be operated in a pressurized chamber and can provide good results, if some precautions indicated in the paper are taken. (Author)

A82-43792 Recent results in main beam nulling. R. N. Adams, W. G. Brodsky, L. L. Horowitz, and K. D. Senne (MIT, Lexington, MA). In: ICC '81; International Conference on Communications, Denver, CO, June 14-18, 1981, Conference Record. Volume 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 10.5.1-10.5.5. USAF-sponsored research.

The use of an adaptive, multibeam antenna, which nulls main-beam interferers while tracking and receiving the friendly signal, can significantly reduce the size of the link outage region which results when interferers pass through the main beam of a receiving antenna aboard an aircraft. A multibeam adaptive antenna system which responds to these technical requirements has been designed and partially fabricated. Details of the system design are reviewed, as are preliminary results of laboratory and antenna test range experiments. (Author)

A82-43821 The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing. E. M. Gross, T. Laufer (NOAA, National Weather Service, Silver Spring, MD), and T. R. Mitchell (Mitre Corp., Bedford, MA), and F. J. Steckbeck (FAA, Washington, DC). In: ICC '81; International Conference on Communications, Denver, CO, June 14-18, 1981, Conference Record. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 32.1.1-32.1.9. 19 refs.

A more effective procedure of making weather information available to the user would lead to a significant improvement in weather services. A description is presented of the evolution of the Pilot Self-Briefing program and the Aviation Route Forecast (ARF) development effort. These two program efforts have been integrated so that users can directly acquire weather information tailored by the computer to their specific interests. As presently constituted, the ARF concept is oriented toward aviation, but the basic hardware, software, and algorithms could be adapted to other forecasting applications. Attention is given to the background regarding the pilot self-briefing development, the ARF concept and development, the ARF output processing rationale, the ARF output organization, pilot self-briefing data reduction due to ARF, past ARF testing, future ARF testing, and the need for forecaster analysis support systems. G.R.

A82-43840 Electronic warfare system measure of effectiveness. A. B. Glenn (Mitre Corp., McLean, VA). In: ICC '81; International Conference on Communications, Denver, CO, June 14-18, 1981, Conference Record. Volume 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 36.6.1-36.6.5.

A methodology is proposed to determine the measure of effectiveness (MOE) of systems used in electronic warfare (EW). This MOE will use a combination of both qualitative and quantitative measures which are based on the EW system's test data, the threat environment, and the necessary mathematical analysis. The MOE which is quantitative gives a more accurate indication of the EW effectiveness than the commonly used qualitative measures of high-medium-low. A simple example is given to illustrate how the MOE of an anti-jam (AJ) Ground Control Intercept (GCI) communications system can be determined for a specific hypothetical scenario. (Author)

A82-43870 Combined amplitude-phase modulation for a VHF communication link. G. Benelli, G. Borghi, V. Cappellini, E. Del Re, and S. Gueli (Firenze, Università, Florence, Italy). In: ICC '81; International Conference on Communications, Denver, CO, June 14-18, 1981, Conference Record. Volume 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 56.6.1-56.6.6. 8 refs.

In this work a combined amplitude-phase modulation communication system is considered. Amplitude modulation is used to transmit a voice signal, phase modulation is used for data transmission. Such a scheme was studied as a possible realization of a data channel between aircraft and ground stations. The performance of the combined modulation system is evalcated through computer simulation in the two cases AM-PSK and AM-MSK. (Author)

A82-43883 A new class of routing protocols for a proposed computer network linking tactical radar sites. C. Warner (U.S. Naval Ocean Systems Center, San Diego, CA) and J. Spragins (Clemson University, Clemson, SC). In: ICC '81; International Conference on Communications, Denver, CO, June 14-18, 1981, Conference Record. Volume 4. New York, Institute of Electrical and Electronics Engineers, Inc., 1981, p. 73.6.1-73.6.10. 6 refs.

An advanced forward area tactical radar network, which has been studied for the Air Force Electronic Systems Division, can be viewed as a novel form of computer network, sharing many of the problems of more standard computer networks but with other unique problems resulting from the specialized nature of the application. This network will link together a number of short range tactical radars, each with associated data processing equipment, spaced at nominal distances of approximately 30 miles, and enable each radar site to have a complete file of tracks for all targets seen by any radar in the network. In addition, the communication network is expected to be used for transmission of a variety of other types of command and control messages. As part of the design of this network, a new class of distributed and adaptive routing protocols has been developed. The results of simulation studies of these routing algorithms are presented. (Author)

A82-44091 # Generation of boundary-conforming grids around wing-body configurations using transfinite interpolation. L. E. Eriksson (Flygtekniska Forsoksanstalten, Bromma, Sweden). *AIAA Journal*, vol. 20, Oct. 1982, p. 1313-1320.

A computational procedure for generating three-dimensional nonorthogonal surface-fitted mesh systems around wing-fuselage configurations is presented. The method is based on the concept of transfinite interpolation, which has been extended to handle very general mapping function specifications at the boundaries, thereby making it possible to generate single-block mappings with geometry data specified only at the outer boundaries of the computational domain. Since it is a direct algebraic mapping technique, the method is very inexpensive in terms of computer cost. Different types of possible mappings are compared with respect to resolution and economy of nodal points. A procedure for a novel type of mapping, designated type O-O, is described and several plots of generated grids demonstrate the capabilities of the method. The singular lines inherent in every three-dimensional mesh for this type of surface geometry aro also discussed. (Author)

A82-44092 # Damped Euler-equation method to compute transonic flow around wing-body combinations. A. Rizzi (Flygtekniska Forsoksanstalten, Bromma, Sweden). *AIAA Journal*, vol. 20, Oct. 1982, p. 1321-1328. 22 refs. Research sponsored by the Forsvarets Materielverk.

Inviscid transonic flows containing either strong shock waves or complex vortex structure call for the Euler equations as a realistic model. Presented here is a computational procedure for solving the Euler equations for transonic flow around a wing and fuselage upon an O-O mesh generated by transfinite interpolation. An explicit time-marching finite-volume procedure solves the flow equations and features a nonreflecting far field boundary condition, an internal mechanism for temporal damping, and use of the local time step, all of which improve the convergence of the computation. Converged after several hundred iterations, results computed on the CYBER 203 vector processor are compared with experimental data and potential-flow computations. The Euler-equation model is found to predict the existence of a tip vortex created by inviscid flow separation in the downstream region of the tip of the M6 wing where the radius of curvature approaches zero. (Author)

A82-44100 A method to determine runway capacity. M. Jelaska and T. Jovanovic (ZG-Prometni Institut, Ljubljana, Yugoslavia). *Airport Forum*, vol. 11, Aug. 1982, p. 42-46.

Two approaches to the calculation of runway capacity are presented, and are compared by application to a specific situation. The analytic model provides point-by-point estimates of the capacity for given percentages of landings out of the total number of operations, but the relationship between capacity, input flow and average delays per aircraft cannot be determined. The simulation model, employing the Monte Carlo method, takes into consideration the input flows into the system, so average aircraft delays can be estimated and the relationship of the capacity to the values of the parameters can be determined. This makes the simulation model more suitable for the analysis of airport operation. A block diagram of the simulation model is included.
A.B.

A82-44218 # **New approaches to fighter design.** *Dornier-Post* (English Edition), no. 3, 1982, p. 4-6.

The principles of the development of a cost-effective weapons system which could replace the Luftwaffe F-4 Phantom tactical combat aircraft are summarized. The first principle which Dornier has proposed is maximum fleet effectiveness, and the approach to this goal includes such considerations as determining the effects of aircraft, weapons, and equipment requirements on costs, evaluating the effects of requirements on combat effectiveness, and identifying cost-effective substitute performances. A second principle is that new technologies be developed which are based on cost-effectiveness criteria, rather than performance criteria. Criteria include the use of cost-effective carbon fiber materials, and plastic-formed and diffusion-bonded titanium components. The tailless all-wing aircraft is considered as an example of the integration of new technologies for new weapons systems capabilities. Operational analysis reveals that the dry thrust concept can match tactical fighters' combat performance, and, in some missions, offers a superiority of 50%.
R.K.R.

A82-44219 # **New technologies for future fighters.** *Dornier-Post* (English Edition), no. 3, 1982, p. 7-10.

Recent activities underway at Dornier in the fields of aerodynamics and flight mechanics are presented. The Alpha Jet is being used to test a transonic wing (TST), which, compared to the standard wing, has an 18% thicker profile, advanced wing/fuselage blending, and maneuver flaps comprised of leading-edge slats and trailing-edge flaps. Tests have shown an improvement in drag-rise and buffeting limits, and the thicker wing permits carrying additional fuel without external tanks. The maximum lift coefficient has been increased by approximately 20%, allowing higher stationary and unstationary load factors, thus improved maneuverability. In addition, direct side force control (DSFC) tests, aimed at accelerating aircraft alignment, have shown that the system is good in all three axes, the drag control mode is effective with decelerations of up to 0.75 g in horizontal flight, and well-controlled steep dives at constant speed are possible. A combination of the TST and DSFC programs will be tested on a modified Alpha Jet.
R.K.R.

A82-44220 # **Perspectives for the use of remotely piloted vehicles in military technology.** W. Klaar. *Dornier-Post* (English Edition), no. 3, 1982, p. 23-29.

An overview of remotely piloted vehicle (RPV) technology is presented in terms of crew replacement, design possibilities, and mission tasks. In air attack applications, one-way missile concepts are preferred, as they use airborne signal processing and need no remote pilot. Terrain contours have been used for en-route navigation, and more precise methods are being investigated. For mission planning, computer-based methods and systems must be used. In addition, unmanned carrier platforms and net recovery methods are being developed at Dornier. This recovery method reduces launch vehicle weight by 8-15%, and ensures well-controllable landing decelerations. Applications for unmanned systems include air target simulation, aerial reconnaissance, and electronic warfare tasks.
R.K.R.

A82-44221 # **Image processing in tactical flight guidance.** *Dornier-Post* (English Edition), no. 3, 1982, p. 32-38.

Work performed by Dornier in the field of image processing in tactical flight guidance is presented. Image-forming sensors scan the scene and store the energy potential to form a TV image, and sensors are being designed for the infrared range and the millimeter wave range. To remove errors and imperfections from the image, preprocessing methods such as a two-dimensional high pass filter, a histogram for contrast spreading, and inverse filtering methods are used. An object recognition process is explained which involves a comparison between stored images and recently scanned area images. Pattern and feature recognition can be achieved by two approaches. The first is a direct image comparison (image point brightness value), and the second consists of transforming two images into a single feature space for comparison. Images which represent these processes are included.
R.K.R.

A82-44222 # **Automated flight data processing.** K. Blumenwitz. *Dornier-Post* (English Edition), no. 3, 1982, p. 39-43.

The automated flight data processing (AFA) system for use in the Alpha Jet consists of six components which are (1) a digital computer with two disk drives, (2) an electronic cabinet with central voltage cutoff, (3) a single-color screen (38 cm x 28 cm), (4) a screen copier which supplies an A4 hardcopy of the screen display, (5) a printer with keyboard, and (6) an elevated and inclining map table. Stored meteorological data can be updated for a planned mission, and once they are verified, a low-level or a high-level mission, or any combination of the two, can begin. Due to time savings in low- and high-level flight planning, the pilot has more time to study the planned flight path and the available flight information. It is mentioned that the AFA has been designed such that it is adaptable to the requirements of other flying weapons systems.
R.K.R.

A82-44223 # **Interactive graphics design with CODEM.** L. Thieme. *Dornier-Post* (English Edition), no. 3, 1982, p. 49-52.

The Computer-Graphics Augmented Design and Manufacturing System (CODEM) is user-optimized and can be connected to other program systems. CODEM offers a time savings in making precise drawings, resulting in a cost savings and a shorter project cycle time. Aspects to consider when the system is introduced include user participation during preparations, computer configuration planning which avoids lengthy response times, and well planned file organization and data security. In addition, it is found that a six-hour work day for each designer is required, and such tasks as short discussions and consulting, calculations, and looking up of standard components can be performed at the display. In order to ensure uninterrupted and transparent data transfer in the design, development, and production of the aircraft, link-ups with other program systems are made via the defined interfaces of CODEM.
R.K.R.

A82-44224 # **The design of airfoil profiles with trailing edge loading in transonic flow (Conception de profils à charge arriere en écoulement transsonique).** E. Lavigne. *Toulouse, Conservatoire National des Arts et Métiers, Ingénieur en Aérodynamique Thesis, 1981. 112 p. In French. Research supported by the Service Technique des Programmes Aéronautiques.*

The results and techniques of a series of studies to define airfoil profiles with satisfactory characteristics in transonic flows are presented. An inverse numerical model for transonic flows past an airfoil is developed, along with techniques for a two-dimensional analysis of transonic flows coupled to a boundary layer. The results of trials performed in wind tunnels with perforated walls to diminish the intensity of reflected waves are presented, along with a description of the instrumentation, including 76 pressure sensors, photographic equipment, and carborundum bands to induce transition to separation. Results are presented for configurations producing higher maximum lift, augmented buffeting lift, and reducing drag. It is shown that increasing the trailing edge loading increases drag.
M.S.K.

A82-44231 # **Radionavigation for civil aviation (La radionavigation de l'aviation civile).** O. Carel (Direction Générale à l'Aviation Civile, Paris, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811760.* 17 p. In French.

Radionavigation systems involving beacons either on the ground or on satellites which transmit and receive signals from general aviation aircraft for fixing location and distance are reviewed. The systems are intended to allow flight in the shortest possible route, to aid in avoiding ground obstacles, to keep flight within controlled airspace and aid in avoiding air collisions, and to aid landing in safe and timely conditions. In France, ground based beacons comprise 180 radiocompasses, 30 VHF goniometers, 70 VOR installations, 80 ILS stations, 30 DME units, and the ILS successor, the MLS. Additionally, the Navstar global positioning system will eventually feature 18 satellites to give continuous worldwide coverage. The use of frequency synthesizers to allow high volume multiple access to DME units is noted, along with widespread use of the MLS to replace ILS beacons. Finally, the increasing radio noise from citizen band radios, television, and industry as a threat to VHF radionavigation systems' effectiveness is mentioned.
M.S.K.

A82-44232 # **The ILS in Category III operations (L'ILS dans les opérations de Catégorie III).** J. P. Dupont (Direction Générale à l'Aviation Civile, Service Technique de la Navigation Aérienne, Paris, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811761.* 19 p. In French.

The evolution of ground-based equipment for support of an inertial landing system (ILS) for the French national air routes is described, along with nominal functioning characteristics. The approach trajectory is defined by a track represented by a three degree angle from the ground which includes the point of touchdown. The ILS consists of two signals giving angular references within a limited volume. The signals register on the same display grid for the pilot, while the autopilot performs functions of maintaining center of gravity and aligning the aircraft in its approach, taking into account both lateral and longitudinal motions. Specific features of monitoring the radio beacons to assure accuracy are outlined, and attention is given to the certification process. All weather landing is made feasible by use of the ILS, even in conditions of extremely low ceiling.
M.S.K.

A82-44233 # The flight management computer (Calculateurs de gestion du vol). J. Grossin (Société Nationale Industrielle Aérospatiale, Direction des Etudes, Toulouse, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811762.* 23 p. In French.

Numerical models and their implementation into flight management computers to ensure maximum flight economies in the air transport industry are discussed. The FMC system comprises a data bank, a memory-filed flight plan, built-in programs for determining the position of the aircraft and optimizing the performance, a display system for alerting the pilot to autopilot actions or recommending actions, and a series of sensors to monitor the aircraft interior, the environment, and waypoints on the flight path. Optimization is shown to reside in minimizing both fuel consumption and the flight time. The flight is divided into three phases in the computer: ascent, cruise, and descent, with calculations proceeding through use of a singular perturbation algorithm. The necessity of the computer being able to receive and process data in-flight is stressed, and the implementation of bubble chips and magnetic disks is noted. M.S.K.

A82-44234 # Electronic aircraft stabilization (Stabilisation d'un avion par l'électronique). A. Chadeau (Ministère de la Defense, Service Technique des Télécommunications et des Equipements Aéronautiques, Paris, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811763.* 13 p. In French.

The performance, components, circuitry, and degree of totality of electronic autopilots are discussed. The systems are noted to alleviate the pilot work load in cruise flight and bad weather conditions as well as correcting instabilities which are beyond human capability and freeing the pilot for other tasks, such as managing armaments. Electronic autopilots have been shown to be capable of maintaining trim in pitch and roll, stabilizing the flight slope, course, altitude, speed, the course as determined by fixed radio beacons, landing an aircraft, and in controlling flare. A block diagram is furnished of an electrohydraulic servocontrol system, and the limits of on board computers to calculate responses to changing demands are discussed, along with safety procedures. Finally, programmed features for limiting and assessing the gravity and probability of malfunctions are outlined. M.S.K.

A82-44235 # Air-air anticollision systems (Systèmes d'anticollision air-air). A. Michel (Direction Générale à l'Aviation Civile, Service Technique de la Navigation Aérienne, Paris, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811764.* 47 p. In French.

The requirements for a successful air-air on-board anticollision system for aircraft are reviewed and test results to date on prototype equipment are discussed. The systems are noted to require the capability of detecting all possible collision dangers, must function at all times, offer clear avoidance paths, be compatible with air traffic control and other anticollision systems, function in controlled and uncontrolled airspace, have a low rate of false alarms, and be able to take into account multiple dangers in dense air traffic. Attention is given to BCAS (beacon collision avoidance system), a system equipped with a secondary radar set to detect the presence of other aircraft, measure the separation distance and altitude, discern those aircraft which pose a threat, and calculate an avoidance path. The safety maneuver can be done in coordination with the other aircraft's system if compatibility is present between the on-board systems. Block diagrams are furnished of a test system of the BCAS, along with an analysis of operational procedures. M.S.K.

A82-44236 # New image generators for the next generation of civil aircraft (Nouvelles visualisations pour la prochaine génération d'avions civils). M. Bernard and D. Giroux (Thomson-CSF, Division Equipements Avioniques, Malakoff, Hauts-de-Seine, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811767.* 21 p. In French.

The results of studies of problems, benefits, and applications, and design of CRT displays for private aircraft are discussed. Particular attention is given to avionics for the Airbus A 310 and the A 300-600 aircraft, and the possibilities of enhancing the reliability of pilot data displays while reducing the volume necessary for cockpit instrumentation. The CRTs will produce color images, and in being coupled to the central computer, will permit the pilots to call up a wide range of data on any screen with the mode of display adapted for each stage of a flight. The displays will follow the flight path and provide changing parameters during takeoff and during automatic adaptation during velocity changes to maintain efficient flight under changing mass due to fuel being consumed. M.S.K.

A82-44238 # New trends and concerns in the airliner radio equipment market (Nouvelles tendances et nouvelles préoccupations sur le marché des équipements radio avions de ligne). H. Medioni (Electronique Aérospatiale, Le Bourget, Seine-Saint-Denis, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811768.* 10 p. In French.

The types of new electronics for avionics communication and navigation displays which are currently available to airlines, and problems inherent in assuring that microprocessors installed on fleet aircraft are not made obsolescent in too short a time are discussed. Airline regulations in France which require the interchangeability of certain electronic equipment in order to assure, at least in this respect, the financial viability of making repairs to electronic equipment in a safe manner with a short down time are noted. One requirement for equipment such as multiplexers, multiemitters/multireceivers, and locators has been in operation at 1 Mbit/sec, while monoemitters in open switch position transmit at 12 kbit/sec. Problems which are expected to occur in flight-qualifying totally automated pilot systems, including landing systems, are explored. M.S.K.

A82-44239 # Satellite localization of aircraft accidents - The Sarsat program (La localisation par satellite des accidents d'avion - Le programme SARSAT). M. Leveque (Centre National d'Etudes Spatiales, Direction des Programmes et de la Planification, Paris, France). *Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur l'Electronique dans l'Aéronautique, Nice, France, Nov. 26, 27, 1981, Paper 811765.* 24 p. In French.

Features of the search and rescue satellite aided tracking (Sarsat) system, which will aid in locating air and seacraft in distress conditions, are outlined. The first Sarsat will be launched in 1982 and a globally operating system is envisioned by 1990. The program, a joint effort by the U.S. and Canada beginning in 1976, was joined by the French in 1977 for coordination with the Sargos program, and by the Soviet Union for the Cospas program. Doppler location by Sarsat will comprise beacons operating between 121.5-243 MHz for demonstration purposes, and then use beacons at 406 MHz in cooperation with the Sargos system. Repeaters are used if a distress signal in the 121.5-243 MHz band is received by an NOAA spacecraft equipped with SAR. The distress signal is stored on board and transmitted by downlink to a ground station when the satellite recrosses the continental U.S. or Canada. M.S.K.

A82-44244 # Pneumatic tire model for aircraft simulation. J. R. Kilner (Boeing Military Airplane Co., Seattle, WA). *Journal of Aircraft,* vol. 19, Oct. 1982, p. 851-857. 5 refs. Research supported by the Boeing Military Airplane Co.

The development of a tire model for the prediction of vertical and drag loads in response to large discrete surface obstacles shorter than the tire footprint length is presented. The tire is modeled as a toroidal membrane with the objective of characterizing the enveloping properties of the tire. An explicit set of equations is used to calculate the tire footprint in contact with a user specified surface profile, the tire volume, the pneumatic pressure, and the resultant vertical and drag loads at the wheel axle. Tire carcass and bottoming loads are also predicted. The model is designed to be computationally efficient for use with aircraft digital taxi simulations. Model predictions are compared with tire test data for low-speed fixed axle excursions over short rectangular bumps and dips. Excellent quantitative correlation is demonstrated. (Author)

A82-44245 # Transonic flutter and response analyses of two 3-degree-of-freedom airfoils. T. Y. Yang (Purdue University, West Lafayette, IN) and C. H. Chen. *Journal of Aircraft,* vol. 19, Oct. 1982, p. 875-884. 33 refs. Grant No. AF-AFOSR-78-3523.

Time-response and flutter analyses are presented for a conventional and a supercritical airfoil which are oscillating with plunge, pitch and aileron pitch degrees-of-freedom (DOFs) in small disturbance transonic flow, using the LTRAN2-NLR transonic code to calculate aerodynamic characteristics. The flutter speeds associated with the bending-torsion branch of aeroelastic parameters are plotted against Mach number for different parameter values, and the transonic dip phenomenon is demonstrated. The flutter modes are studied by plotting the flutter speed, amplitude ratio, and phase difference at various Mach numbers against the mass ratio for both a 2DOF and a 3DOF case. Time-response results are given for the conventional and supercritical airfoils at Mach 0.85 and 0.755, respectively. O.C.

A82-44248 * # Higher-order flow angle corrections for three-dimensional wind tunnel wall interference. M. H. Rizk (Flow Research Co., Kent, WA). *Journal of Aircraft,* vol. 19, Oct. 1982, p. 893-895. 5 refs. Contract No. NAS1-16262.

A second-order theory including camber effects in wind tunnel wall interference corrections is described. Changes in the geometrical configuration of the model tested are avoided by introducing the camber correction as an equivalent angle-of-attack correction. Tabular and graphic data are presented which indicate improved accuracy for second-order over first-order theory. O.C.

A82-44291 Improving aircarrier water survival. C. T. Lindemann, Jr. (Air Line Pilots Association International, Washington, DC). *SAFE Journal,* vol. 12, Fall 1982, p. 11-13.

Existing deficiencies in planning, preparation and equipment for aircraft water accident survival are reviewed and recommendations made. Many approved seat cushions are not adequate flotation devices for passengers, because the required level of buoyancy is lost after a few minutes of use, and because users have about one-half of their heads immersed, speeding hypothermia. Life vests designed for easy donning with improved buoyancy and hypothermia protection should be employed. Slide/rafts, like those already installed in wide-body aircraft, should be developed for narrow-body aircraft, and airports should develop emergency plans for water accidents. A.B.

A82-44293 **Problems with the use of percentages in the analysis of AAES data.** J. E. Vetter (U.S. Navy, Washington, DC). *SAFE Journal,* vol. 12, Fall 1982, p. 23-26, 28, 29.

Techniques for rectifying common problems with the statistical analysis of in-service usage data for aircrew automated escape systems are outlined and illustrated. The comparison of percentage data should be made with regard to the sample size and its variation. Percentage points can be plotted along with a bar representing the confidence level. Trend-line analysis should use the method of weighted least squares, when some points have a larger variance than others. Pie charts can make a decrease in one component appear as an increase in another unless sample size is included. Log-linear model analysis is recommended for the analysis of categorical data. A.B.

A82-44467 # **Mediating Mach's mechanics - Bombs away.** D. Spurgeon. *Science Dimension,* vol. 14, no. 4, 1982, p. 10, 12, 14.

The Canadian National Aeronautical Establishment's (NAE) approach to the problems posed when cargo is carried externally at the speed of sound is presented. At such speed flutter can occur, leading to the break-up of the vehicle. In addition, stores released at transonic speeds may rise after a short fall as the aircraft moves ahead, and eventually collide with the tail section. Wind tunnel experiments have been carried out using force-measuring devices to determine the results of simulated flying conditions. These results can be scaled up to approximate real conditions, and may reduce the number of flight tests needed, while increasing the safety of actual tests. By flying a loaded aircraft equipped with accelerometers in the wing tips, it is found that a precise velocity must not be exceeded in order to avoid flutter. Weight, type, and suspension of the stores carried can influence this velocity. Research on this problem has significant applications in the production of civilian aircraft. R.K.R.

A82-44468 **XV-15 program update.** T. Thomason (Bell Helicopter Textron, Tilt Rotor Aircraft Dept., Fort Worth, TX). *Vertiflite,* vol. 28, Sept.-Oct. 1982, p. 12-15.

After nearly 500 hours of total operating time, the operating characteristics of the Army/NASA XV-15 Tiltrotor aircraft are becoming clear. Level flight at 301 knots, and descent at 345 knots have been demonstrated, as well as operation at 24,500 feet and between -0.5 and +2.7 G's; more than 100 full conversions have been made from the helicopter to the airplane mode and back. In addition, the aeroelastic stability of the wing/pylon/rotor system, gust sensitivity and the effects of disk loading and tipspeed on downwash, noise and hover mode operations have been investigated, and do not limit the aircraft's capability, although further modifications are planned. The Joint Services Advanced Vertical Lift Aircraft Development Program has been initiated partly as a result of the demonstration of the Tiltrotor concept. A.B.

A82-44469 **It's too logical - It'll never work /Commercial applications of the JVX/.** J. F. Zugschwert. *Vertiflite,* vol. 28, Sept.-Oct. 1982, p. 24-27.

It is proposed that both military and commercial applications of V/STOL aircraft be developed by the Joint Services Advanced Vertical Lift Aircraft Fleet, the commercial models would be subject to, and suitable for wartime call-up. Such cross utilization would have the benefit of spreading the R & D and acquisition costs over a larger base, and of reducing the total operational flying hour cost by permitting a return on investment from the commercial aircraft. This proposal is also deemed appropriate for the Heavy Lift Helicopter and the Advancing Blade Concept aircraft. A.B.

A82-44470 **Helicopter commuters - An optimistic outlook.** L. K. Smith. *Vertiflite,* vol. 28, Sept.-Oct. 1982, p. 28-32.

Current operations of helicopter airline services in the United States are reviewed along with past attempts at providing such a service. Problems which plagued helicopter services in the past included: the high number of maintenance hours per flight hour, high seat mile costs, percentages of on-time departures, labor-managment problems, and the need for city center heliports. Technological advances have reduced maintenance time as well as reducing noise and vibration, and improving avionics and crashworthiness; it is expected that seat mile costs will also be made more competitive with those of fixed wing aircraft. The recent start of helicopter shuttle operations by major airlines for their first-class and business-class passengers has reinforced the conviction that there is a need for helicopter commuter services. A.B.

A82-44480 * # **Minimum fuel horizontal flight paths in the terminal area.** E. Kreindler and F. Neuman (NASA, Ames Research Center, Moffett Field, CA). *Journal of Guidance, Control, and Dynamics,* vol. 5, Sept.-Oct. 1982, p. 490-497. 16 refs.

A82-44481 # **Maximum likelihood failure detection of aircraft flight control sensors.** B. Friedland (Singer Co., Kearfott Div., Little Falls, NJ). *Journal of Guidance, Control, and Dynamics,* vol. 5, Sept.-Oct. 1982, p. 496-503. 11 refs.

A recently developed maximum likelihood failure detection algorithm, based on processing the residuals from an observer designed on the assumption of no failures, is applied to the problem of detecting and correcting gyro or accelerometer failures in the vertical axis of an aircraft flight control system. Design calculations are illustrated with a simplified dynamic model and the effectiveness of the failure detection method is demonstrated by simulation. (Author)

A82-44482 # **Minimum-time three-dimensional turn to a point of supersonic aircraft.** C.-F. Lin (Wisconsin, University, Madison, WI). *Journal of Guidance, Control, and Dynamics,* vol. 5, Sept.-Oct. 1982, p. 512-520. 13 refs.

The objective of this paper is to present real-time, on-line, minimum-time three-dimensional turn to a point of supersonic aircraft. The analytic aspect of the theory of optimal trajectories is emphasized. This includes the general properties of optimal trajectories consisting of the integrals of motion and the characteristic features in engine and aerodynamic controls. By using the integrals of motion the totality of the optimal trajectories can be obtained as a family of curves depending on a certain number of arbitrary constants. The optimal control is obtained by geometrical method through the domain of maneuverability. This makes explicit the switching characteristics of the optimal control, in particular when singular or chattering control is involved. The optimality of singular thrust control and the optimal junction of different subarcs are analyzed. The computation of the optimal trajectories is carried out using the aerodynamic and engine characteristics of a lightweight, high thrust-to-weight ratio supersonic fighter. By using normalized control variables, i.e., the thrust-to-weight ratio, the bank angle, and the load factor, results can be applied to any supersonic aircraft. (Author)

A82-44695 # **Design to life cycle cost capability of the PRICE models.** M. H. Burmeister (RCA, Cherry Hill, NJ). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-221.* 8 p.

PRICE is a family of three parametric cost predicting models, currently widely used in U.S. government and industrial circles. A number of European organizations also use the PRICE models. A case study, utilizing the PRICE Hardware and Life Cycle models, is presented here to illustrate the cost impact of maintainability considerations for Avionic equipment. The study depicts a trade-off analysis to assess the economic impact of designing equipment with two different technologies for changing deployment scenarios. This case study is not intended to provide a definitive answer on the level of technology to be employed in the design of avionics. Rather, the purpose of this analysis is to illustrate the flexibility and utility of parametric estimating models. Through the use of these parametric models, a practical method now exists to conduct multiple, rapid, design-to-life-cycle-cost trade-off analyses. (Author)

A82-44699 # **Consideration of an international private sector satellite search and rescue locating system.** C. M. Case (Boeing Aerospace Co., Seattle, WA). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-236.* 11 p. 24 refs.

This paper presents a rationale for the creation of a private sector organization to establish, finance, and operate an international satellite aided search and rescue locating system. The social and political impact of such a system on the global community is examined. Organizational structure, ownership, and control design issues are considered using Intelsat and Inmarsat as models. Questions of financial support including source and stability of income streams are addressed. Search and rescue requirements and satellite design trades are considered, and a conceptual network design is described. (Author)

STAR ENTRIES

N82-30283*# National Aeronautics and Space Administration, Washington, D. C.
NASA AERONAUTICS
David A. Anderson [1982] 30 p Original contains color illustrations
(NASA-EP-85; NAS 1.19:85) Avail: NTIS MF A01; SOD HC $2.50 as 033-000-00796-5 CSCL 01B

Aeronautical research programs are discussed in relation to research methods and the status of the programs. The energy efficient aircraft, STOL aircraft and general aviation aircraft are considered. Acrodynamic concepts, rotary wing aircrft, aircraft safety, noise reduction, and aircraft configurations are among the topics included. S.L.

N82-30287*# National Aeronautics and Space Administration, Washington, D. C.
AERODYNAMICS ON A TRANSPORT AIRCRAFT TYPE WING-BODY MODEL
V. Schmitt May 1982 30 p refs Transl. into ENGLISH of "Aerodynamique dun ensemble voilure-fuselage du type 'avion de transport" (France), no. ONERA-TP-1981-122, 1981 p 1-23 Presented at the 18th Colloq. on Appl. Aerodyn. of AAAF, Poiteriers, France, 18-20 Nov. 1981 Original document announced as A82-19738 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76878; NAS 1.15:76878) Avail: NTIS HC A03/MF A01 CSCL 01A

The DFLR-F4 wing-body combination is studied. The 1/38 model is formed by a 9.5 aspect ratio transonic wing and an Airbus A 310 fuselage. The F4 wing geometrical characteristics are described and the main experimental results obtained in the S2MA wind tunnel are discussed. Both wing-fuselage interferences and viscous effects, which are important on the wing due to a high rear loading, are investigated by performing 3D calculations. An attempt is made to find their limitations. S.L.

N82-30288*# Oklahoma State Univ., Stillwater. Dept. of Mechanical Engineering.
FLOW AND ACOUSTIC PROPERTIES OF LOW REYNOLDS NUMBER UNDEREXPANDED SUPERSONIC JETS Ph.D. Thesis
Tieh-Feng Hu 1977 146 p refs
(Contracts NAG1-159; NAG1-10)
(NASA-CR-169257; NAS 1.26:169257) Avail: NTIS HC A07/MF A01 CSCL 01A

Jet noise on underexpanded supersonic jets are studied with emphasis on determining the role played by large scale organized flow fluctuations in the flow and acoustic processes. The experimental conditions of the study were chosen as low Reynolds number (Re=8,000) Mach 1.4 and 2.1, and moderate Reynolds number (Re=68,000) Mach 1.6 underexpanded supersonic jets exhausting from convergent nozzles. At these chosen conditions, detailed experimental measurements were performed to improve the understanding of the flow and acoustic properties of underexpanded supersonic jets. S.L.

N82-30289*# Systems Technology, Inc., Hawthorne, Calif.
STABILITY AND CONTROL OF THE GOSSAMER HUMAN POWERED AIRCRAFT BY ANALYSIS AND FLIGHT TEST Final Report, Jan. 1980 - Dec. 1981
Henry R. Jex Jan. 1982 82 p refs Prepared for AeroVironment, Inc.
(Contract NAS4-2705)
(NASA-CR-163119; NAS 1.26:163119; STI-TR-2109-1; AV-R-82/520) Avail: NTIS HC A05/MF A01 CSCL 01A

A solar cell electric-powered aircraft was investigated in relation to performance, stability and control. The performance properties, such as lift to drag, power required, propeller efficiency, and trim speed effects were studied. The dynamic response properties to various control inputs to verify the computed stability and control characteristics were also investigated. S.L.

N82-30290*# National Aeronautics and Space Administration, Washington, D. C.
FLOW AND PRESSURE FIELD OF A MODEL PROPELLER
Rudolf Neubauer and Klous-Peter Anders Feb. 1982 12 p refs Transl. into ENGLISH of "Stromungs und Druckfeld eines Modellpropellers" West Germany, 1977 8 p Presented at the 10th Jahrestagung, West Berlin, 13-15 Sep. 1977 Original language document announced as A78-24451 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by DFVLR, Brunswick
(Contract NASw-3542)
(NASA-TM-76690; NAS 1.15:76690) Avail: NTIS HC A02/MF A01 CSCL 01A

To examine the problem of noise reduction of propeller aircraft, a disturbance free method is presented for visualization of pressure gradients and flows by means of a Schlieren configuration. The flow and pressure field of a model propeller was represented using a running film. Aspects of Schlieren and model technology are commented on. Author

N82-30291*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AEROPROPULSIVE CHARACTERISTICS OF MACH NUMBERS UP TO 2.2 OF AXISYMMETRIC AND NONAXISYMMETRIC NOZZLES INSTALLED ON AN F-18 MODEL
Francis J. Capone Aug. 1982 80 p refs
(NASA-TP-2044; L-15208; NAS 1.60:2044) Avail: NTIS HC A05/MF A01 CSCL 01A

An investigation to determine the aeropropulsive characteristics of nonaxisymmetric nozzles on an F-18 jet effects model was conducted in the Langley 16-foot transonic tunnel and the AEDC 16-foot supersonic wind tunnel. The performance of a two dimensional convergent-divergent nozzle, a single expension ramp nozzle, and a wedge nozzle was compared with that of the baseline axisymmetric nozzle. Test data were obtained at static conditions and at Mach numbers from 0.60 to 2.20 at an angle of attack of 0 deg. Nozzle pressure ratio was varied from jet-off to about 20. Author

N82-30293# Naval Surface Weapons Center, White Oak, Md.
EFFECTS OF CANOPY GEOMETRY AND CLOTH PERMEABILITY ON THE DRAG COEFFICIENT OF A CROSS PARACHUTE IN THE FULLY OPEN AND REEFED CONDITIONS FOR A W/A RATIO OF 0.3 Final Report, FY 1981
W. P. Ludtke 1 Feb. 1982 77 p
(AD-A115046; AD-F500030; NSWC/TR-81-441) Avail: NTIS HC A05/MF A01 CSCL 01/3

This report describes a series of wind-tunnel tests on the cross-type parachute to investigate the effects of cloth permeability, number of suspension lines, and suspension line length in the fully opened and reefed conditions. Forty-inch-diameter models with a canopy arm width-to-length ratio (W/L) of 0.3 were tested at various velocities from 50 fps to 293 fps in the fully inflated state. Results of these tests demonstrate that the parachute geometry and cloth permeability do have an effect on the drag capability of the cross parachute. Additional tests of reefed configurations for several reefing line lengths-to-canopy-diameter ratios from 0.6 to 1.6 at a constant velocity of 203 fps established the reefed characteristics of this parachute. The steady state forces in the reefing line were measured by use of strain gage links. Data are presented in tabular and graphical format. Photographs of representative canopy shapes are included for illustration. GRA

N82-30296# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Entwurfsaerodynamik.
WIND TUNNEL INVESTIGATIONS ON THIN SUPERCRITICAL AIRFOILS IN HIGH SUBSONIC FLOW
Horst Koerner and Wolfgang Puffert-Meissner Feb. 1982 63 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-774)
(DFVLR-FB-82-06; ESA-TT-774) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 19.30

Four thin airfoils (t/c = 0.05) were investigated experimentally. The aerodynamic efficiency of three supercritical airfoils is compared with that of a conventional one. The investigation was conducted in a transonic wind tunnel within a Mach number range of 0.6 to 0.95 and at Reynolds numbers 4 million to 6 million. Results show the superiority of supercritical airfoil design. This is explained, referring to overall aerodynamic coefficients, limits of efficiency, and in special cases to pressure distributions. Author (ESA)

N82-30297*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AIRCRAFT ICING RESEARCH AT NASA
J. J. Reinmann, R. J. Shaw, and W. A. Olsen, Jr. 1982 17 p refs Presented at the 1st Intern. Workshop on Atmospheric Icing of Struct., Hanover, N.H., 1-3 Jun. 1982
(NASA-TM-82919; E-1307; NAS 1.15:82919) Avail: NTIS HC A02/MF A01 CSCL 01C

Research activity is described for: ice protection systems, icing instrumentation, experimental methods, analytical modeling for the above, and in flight research. The renewed interest in aircraft icing has come about because of the new need for All-Weather Helicopters and General Aviation aircraft. Because of increased fuel costs, tomorrow's Commercial Transport aircraft will also require new types of ice protection systems and better estimates of the aeropenalties caused by ice on unprotected surfaces. The physics of aircraft icing is very similar to the icing that occurs on ground structures and structures at sea; all involve droplets that freeze on the surfaces because of the cold air. Therefore all icing research groups will benefit greatly by sharing their research information. Author

N82-30298*# Dayton Univ., Ohio. Research Inst.
AERODYNAMIC PENALTIES OF HEAVY RAIN ON A LANDING AIRCRAFT Final Report
Patrick A. Haines and James K. Luers Jul. 1982 72 p refs
(Grant NsG-6026)
(NASA-CR-156885; NAS 1.26:156885; UDR-TR-82-26) Avail: NTIS HC A04/MF A01 CSCL 01C

The aerodynamic penalties of very heavy rain on landing aircraft were investigated. Based on severity [illegible] frequency of occurrence, the rainfall rates of 100 mm/hr, 500 mm/hr, and 2000 mm/hr were designated, respectively, as heavy, severe, and incredible. The overall and local collection efficiencies of an aircraft encountering these rains were calculated. The analysis was based on raindrop trajectories in potential flow about an aircraft. All raindrops impinging on the aircraft are assumed to take on its speed. The momentum loss from the rain impact was later used in a landing simulation program. The local collection efficiency was used in estimating the aerodynamic roughness of an aircraft in heavy rain. The drag increase from this roughness was calculated. A number of landing simulations under a fixed stick assumption were done. Serious landing shortfalls were found for either momentum or drag penalties and especially large shortfalls for the combination of both. The latter shortfalls are comparable to those found for severe wind shear conditions. Author

N82-30299# Royal Aircraft Establishment, Farnborough (England). Radio and Navigation Dept.
FLIGHT TRIALS OF THE LITTON LTN-211 OMEGA NAVIGATION SYSTEM IN A WESSEX HELICOPTER
I. D. Birch Jan. 1981 20 p refs
(RAE-TM-RAD-NAV-147; BR78250) Avail: NTIS HC A02/MF A01

The Litton LTN-211 Omega Navigation System is currently in service in RAF transport and other aircraft. Installation and flight trials of the Omega equipment in a Wessex helicopter are described. Author

N82-30303*# National Aeronautics and Space Administration, Washington, D. C.
GROB AIRCRAFT CONSTRUCTION: THE G 110 FLIES
B. Malzbender Jun. 1982 15 p Transl. into ENGLISH from Aerokurier (West Germany), no. 3, 1982 p 262-264 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76893; NAS 1.15:76893) Avail: NTIS HC A02/MF A01 CSCL 01C

Description, specifications and test flight performance of the G 110 are provided. The G 110 completely incorporates modern GfK construction techniques which heretofore have been developed and perfected for the construction of sailplanes. The G 110 is a prototype of a GfK constructed motorized aircraft and shows much promise for the future of German aviation. Author

N82-30304# School of Aerospace Medicine, Brooks AFB, Tex.
HUMAN-FACTORS EVALUATION OF C-141 FUEL SAVINGS ADVISORY SYSTEM Final Report, Dec. 1979 - Feb. 1981
Layne P. Perelli Dec. 1981 33 p refs
(AF Proj. 7930)
(AD-A114931; SAM-TR-81-37) Avail: NTIS HC A03/MF A01 CSCL 01/3

The Air Force installed a Fuel Savings Advisory System (FSAS) in three C-141 aircraft and performed an operational test and evaluation. At the request of the USAF Airlift Center, observers from the USAF School of Aerospace Medicine evaluated human-engineering, workload, and fatigue aspects of FSAS during three long-duration missions. Pilot's subjective fatigue/workload reports, interviews with crewman, and human-engineering analyses indicated that the FSAS was satisfactory for use in MAC airlift operations. Human-engineering solutions are provided, also suggestions for future improvement of the FSAS. Author (GRA)

N82-30305# Naval Air Engineering Center, Lakehurst, N.J. Advanced Technology Office.
APPLICATION OF WEAR DEBRIS ANALYSIS TO AIRCRAFT HYDRAULIC SYSTEMS
P. V. Ciekurs and S. A. Ropar (Rockwell International Corp., Columbus, Ohio) 10 May 1982 23 p refs
(WF41461000)
(AD-A115060; NAEC-92-158) Avail: NTIS HC A02/MF A01 CSCL 13/7

This report documents an investigation into the feasibility of applying wear debris analysis methods as a maintenance tool for aircraft hydraulic systems. A breadboard was designed and operated, fluid samples were analyzed and trended. No relevant failures were experienced and limited conclusions reached. Recommendations are made for further investigations. Author (GRA)

N82-30306# Honeywell, Inc., Minneapolis, Minn. Avionics Div.
ASSESSMENT OF STEREOGRAPHICS FOR FIRE CONTROL AND NAVIGATION IN FIGHTER AIRCRAFT Final Report, 1 Aug. 1980 - 30 Nov. 1981
Jeffrey M. Setterholm, S. Joy Mountford, and Paul N. Turner Wright-Patterson AFB, Ohio AFWAL Mar. 1982 95 p
(Contract F33615-80-C-3602; AF Proj. 2403)
(AD-A115414; AVD-TAS-3D-81-002; AFWAL-TR-82-3003) Avail: NTIS HC A05/MF A01 CSCL 14/5

Integration of dual helmet-mounted displays, a helmet-attitude tracking device, a six-degree of freedom fighter aircraft digital simulation and dynamic stereo-pair computer graphics line drawings permitted overlaying 3-D (stereo) information on a pilot's view of the world. Display content for weapon delivery and 4-D navigation was investigated. A second display medium using a forward projection, TV, and PLZT goggles was incorporated to aid in the training process. This report documents what was learned in developing and evaluating the displays. Author (GRA)

N82-30307# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN AND IMPLEMENTATION OF USAF AVIONICS INTEGRATION SUPPORT FACILITIES M.S. Thesis
Jon G. Hanson Dec. 1981 337 p refs
(AD-A115537; AFIT/GCS/EE/81D-10) Avail: NTIS HC A15/MF A01 CSCL 01/3

The design and implementation of avionic software support facilities known as Avionic Integration Support Facilities (AISFs) are investigated. A complete set of AISF functional requirements is presented in Data Flow Diagram format. This method of presentation facilitated the hierarchical development of the functional requirements. From these functional requirements an implementation model for such a facility is developed. The modeling vehicle used is Softech's Structured Analysis and Design Technique (SADT). The SADT model depicts inputs, outputs, processes, controls, and the mechanisms required to implement the AISF. Author (GRA)

N82-30308# Naval Postgraduate School, Monterey, Calif.
A PRELIMINARY ANALYSIS OF TF34-100/400 JET ENGINE

REWORK DATA IN SUPPORT OF THE MRP SYSTEM IMPLEMENTATION AT NARF ALAMEDA M.S. Thesis
Ernest R. Slaybaugh Dec. 1981 83 p refs
(AD-A114452) Avail: NTIS HC A05/MF A01 CSCL 15/5

The Naval Air Rework Facility (NARF) located at Naval Air Station (NAS) Alameda is in the process of implementing a Material Requirements Planning (MRP) system which will incorporate an inventory model to help manage those repair parts which are not always replaced during component rework. This thesis focused on analyzing TF34-100/400 jet engine rework data as one phase of that implementation. In particular, probability of replacement values were generated for the repair parts from demand data and the rework schedule during 1980, and the engine's bill of materials. In addition, a parametric analysis was conducted to study the optimal relationship between the shortage and surplus costs of the proposed inventory model for the TF34 repair parts. The analyses highlighted the importance of determining the actual shortage costs resulting from a work stoppage and suggested some potentially useful forms for the surplus cost parameter. Author (GRA)

N82-30310# Lincoln Lab., Mass. Inst. of Tech., Lexington.
REMOTE SENSING OF TURBINE ENGINE GASES Final Report, 1 Oct. 1980 - 30 Sep. 1981
Dennis K. Killinger, Norman Menyuk, and Aram Mooradian 30 Sep. 1981 81 p refs
(Contract F19628-80-C-0002; AF Proj. 1900)
(AD-A115443; ESD-TR-82-014; AFESC/ESL-TR-82-016)
Avail: NTIS HC A05/MF A01 CSCL 20/5

This is the FY 81 final report on the program entitled 'Remote Sensing of Turbine Engine Gases'. The specific tasks which were conducted during FY 81 consisted of the following: (1) the feasibility demonstration of a dual-laser differential-absorption LIDAR(DIAL) system for the remote sensing of CO, NO, and C2H4, (2) the development of a data acquisition and processing system for the dual-laser DIAL system, (3) the laser remote sensing of CO and C2H4 in the exhaust of a stationary jet aircraft, and (4) the laser remote sensing of hydrazine, monomethylhydrazine (MMH), and unsymmetrical dimethylhydrazine (UDMH). GRA

N82-30312# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
THE LATERAL RESPONSE OF AN AIRSHIP TO TURBULENCE M.S. Thesis
John J. Wrobleski, Jr. Dec. 1981 151 p refs
(AD-A115197) Avail: NTIS HC A08/MF A01 CSCL 20/4

A method is derived for finding the linear response and loading transfer functions for the lateral aerodynamic case of airship flight through atmospheric turbulence. The functions obtained are in a form that can be applied to the various spectral analysis methods used to predict survivability currently employed by designers. A numerical example using the USS AKRON (ZR-4) is presented. The results show that peak motion response and loading occur when the encountered spectral component has a wavelength equal to the airship length, and that simple feedback of heading angle does not significantly decrease this peak. Author (GRA)

N82-30313# Hochschule der Bundeswehr, Munich. (West Germany). Fachbereich Luft-und Raumfahrttechnik.
OPTIMAL PERIODIC DOLPHIN GLIDING FLIGHT [OPTIMAL PERIODISCHER DELPHIN-SEGELFLUG]
E. D. Dickmanns Feb. 1982 48 p refs In GERMAN
Avail: NTIS HC A03/MF A01

Numerically calculated time optimal flight paths through vertical wind fields are discussed for different wind field types and airplane classes. For solution types 1 (prefers speed to altitude, globally optimal for small wind fields), the ratio of path oscillation wavelength to up-wind field wavelength was chosen as criterion for global optimization. The most favorable control sequence as wull as the most favorable periodic boundary values for the speed components are determined. Calculations on examples for three wind field families and three airplane types with the best reciprocal glide numbers 28, 41, and 55, show that the unstationary type 2 ths for aerodynamically highly sophisticated airplanes with large wing load (water ballast) are more meaningful than for conventional gliders with small wing load. Author (ESA)

N82-30314*# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
CONTROL SOFTWARE FOR TWO DIMENSIONAL AIRFOIL TESTS USING A SELF-STREAMLINING FLEXIBLE WALLED TRANSONIC TEST SECTION Semiannual Progress Report for period ending Feb. 1982
S. W. D Wolf and M. J. Goodyer Jul. 1982 80 p refs
(Grant NsG-7172)
(NASA-CR-165941; NAS 1.26:165941) Avail: NTIS HC A05/MF A01 CSCL 14B

Operation of the Transonic Self-Streamlining Wind Tunnel (TSWT) involved on-line data acquisition with automatic wall adjustment. A tunnel run consisted of streamlining the walls from known starting contours in iterative steps and acquiring model data. Each run performs what is described as a streamlining cycle. The associated software is presented. Author

N82-30316# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ANALYSIS AND PREPARATION OF A DIGITAL TERRAIN DATA BASE FOR FLIGHT SIMULATOR USE M.S. Thesis
Harry D. Ross Nov. 1981 68 p refs
(AD-A115547; AFIT/GEO/MA-81D-1) Avail: NTIS HC A04/MF A01 CSCL 09/6

The Air Force needs low-level, high speed flight simulators capable of producing correlated visual, radar, and infra-red display scenes. These scenes can be produced by computer generated imagery if a suitable data base is available. The purpose of this thesis is to develop a digital terrain data base suitable for use in a high speed, low-level flight simulator. A 164,000 square nautical mile data base was constructed from data supplied by the Defense Mapping Agency. This paper discussed the construction and organization of the data base, as well as the data retrieval algorithms. It was demonstrated that the data could be accessed fast enough to simulate Mach 1 flight. Author (GRA)

N82-30336*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH TEMPERATURE COMPOSITES. STATUS AND FUTURE DIRECTIONS
Robert A. Signorelli 1982 25 p refs Presented at the 4th Intern. Conf. on Composite Mater., Tokyo, 25-28 Oct. 1982
(NASA-TM-82929; E-1280; NAS 1.15:82929) Avail: NTIS HC A02/MF A01 CSCL 11D

A summary of research investigations of manufacturing methods, fabrication methods, and testing of high temperature composites for use in gas turbine engines is presented. Ceramic/ceramic, ceramic/metal, and metal/metal composites are considered. Directional solidification of superalloys and eutectic alloys, fiber reinforced metal and ceramic composites, ceramic fibers and whiskers, refractory coatings, metal fiber/metal composites, matrix metal selection, and the preparation of test specimens are discussed. J.D.

N82-30337*# National Aeronautics and Space Administration, Washington, D. C.
COMPOSITE MATERIALS: TOMORROW FOR THE DAY AFTER TOMORROW
Pierre Condom May 1982 21 p Transl. into ENGLISH from Aviation Mag. Intern. (France), no. 817, 1-14 Jan. 1982 p 34-39 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76709; NAS 1.15:76709) Avail: NTIS HC A02/MF A01 CSCL 11D

A description is given of the history of the use of composite materials in the aerospace industry. Research programs underway to obtain exact data on the behavior of composite materials over time are discussed. It is concluded that metal composites have not yet replaced metals, but that that this may be a future possibility. Author

N82-30340# Atlantic Research Corp., Alexandria, Va.
NOTEBOOK ON ELECTROMAGNETIC PROPERTIES OF COMPOSITE MATERIALS BELOW 1 GHz Final Technical Report
D. R. Pflug, J. A. Birken, R. A. Wallenberg, and D. T. Auckland Sep. 1981 154 p refs
(Contract N00019-80-C-0157)
(AD-A115132; NAVAIR-AIR-518-9) Avail: NTIS HC A08/MF A01 CSCL 11/4

This report is the seventh in a series of reports on the electromagnetic properties of composites materials. The report quantitatively delineates: the vast differences in electromagnetic behavior exhibited by the principle composite materials (Graphite/epoxy & Kelvar), how to predict these different properties based on the materials intrinsic electrical properties (conductivity, permeability and permittivity) and how the airframe shape influences electromagnetic coupling. The electromagnetic threats of lightning electromagnetic pulse (LEMP), nuclear Electromagnetic pulse (NEMP). Author (GRA)

N82-30356# Northeastern Univ., Boston, Mass. Electronics Research Lab.
CONTROL ELECTRONICS FOR AIR-BORNE QUADRUPOLE ION MASS SPECTROMETER Final Report, 15 Sep. 1978 - 14 Sep. 1981
J. Spencer Rochefort and Raimundas Sukys Oct. 1981 310 p refs
(Contract F19628-78-C-0218; AF Proj. 2310)
(AD-A115398; AFGL-TR-82-0056) Avail: NTIS HC A14/MF A01 CSCL 07/4

The work concerned in this report spans the three-year period commencing 15 September 1978 and deals with the development of electronic instrumentation for rocket and balloon-borne quadrupole ion mass spectrometers. Electronic packages containing circuits to control the quadrupole filters and data processing were developed for sounding rockets launched from Red Lake, Ontario, Canada during the 26 February 1979 Solar Eclipse; from the Poker Flat Research Range, Chatanika, Alaska during 1980 and 1981 Solar Proton Event Programs and also the 1981 Auroral E Program. A microprocessor-based control system was developed for a balloon-borne mass spectrometer. This latter system also provides a two-way communications link for ground control of the experiment and data transmission during the flight. Author (GRA)

N82-30378# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
TITANIUM SURFACE TREATMENTS FOR ADHESIVE BONDING Phase Report
S. R. Brown and G. J. Pilla 31 Mar. 1982 50 p refs
(WF61542001)
(AD-A114710; NADC-82032-60) Avail: NTIS HC A03/MF A01 CSCL 13/8

The aircraft industry prepares titanium surfaces for adhesive bonding using various types of abrasive, etchant, chemical, and anodize treatments. A study was made to determine pretreatment effects on adhesive bond durability of titanium under severe environmental conditions of temperature, humidity, and stress. Replicate sets of Ti-6Al-4V titanium specimens were provided to aircraft manufacturers who prepared the sets using eleven different pretreatment processes. The manufacturers also bonded the specimens with the same four adhesive systems. Wedge specimens, bounded from 0.150-inch thick Ti-6Al-4V titanium were tested in a 140 F, 100% relative humidity atmosphere for a period of eight weeks. Chromic, acid anodize, alkaline etch, chromate-fluoride and alkaline peroxide treatments resulted in substantially lower crack growth rates than phosphate-fluoride treatments. There was a slight difference in performance ranking of bonding pretreatments depending upon the adhesive system used. Author (GRA)

N82-30386# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
IMPROVED PENETRANT PROCESS EVALUATION CRITERIA Final Report, 1 Aug. 1980 - 31 Jul. 1981
J. S. Cargill and K. D. Smith Wright-Patterson AFB, Ohio AFWAL Oct. 1981 51 p refs
(Contract F33615-80-C-5060; AF Proj. 2418)
(AD-A115157; PWA-FR-15223) Avail: NTIS HC A04/MF A01 CSCL 11/6

The objective of this program is to investigate the significance of the improvements and modifications suggested in 'Methods Improvement of the Fluorescent Penetrant Inspection (FPI) Process.' The program is composed of three technical phases: (1) specimen preparation and baseline demonstration, (2) improved methods demonstration, and (3) statistical comparison of Phase I and Phase II. Author (GRA)

N82-30400*# Hughes Aircraft Co., Culver City, Calif.
STUDIES OF NEW PERFLUOROETHER ELASTOMERIC SEALANTS Final Contractor Report, 1 Oct. 1980 - 26 Sep. 1981
D. I. Basiulis and D. P. Salisbury Sep. 1981 105 p refs
(Contract NAS2-10334)
(NASA-CR-166377; NAS 1.26:166377; Rept-76-986; FR-81) Avail: NTIS HC A06/MF A01 CSCL 11A

Channel and filleting sealants were developed successfully from cyano and diamidoxime terminated perfluoro alkylene ether prepolymers. The prepolymers were polymerized, formulated and tested. The polymers and/or formulations therefrom were evaluated as to their physical, mechanical and chemical properties (i.e., specific gravity, hardness, nonvolatile content, corrosion resistance, stress corrosion, pressure rupture resistance, low temperature flexibility, gap sealing efficiency, tensile strength and elongation, dynamic mechanical behavior, compression set, fuel resistance, thermal properties and processability). Other applications of the formulated polymers and incorporation of the basic prepolymers into other polymeric systems were investigated. A cyano terminated perfluoro alkylene oxide triazine was formulated and partially evaluated. The channel sealant in its present formulation has excellent pressure rupture resistance and surpasses present MIL specifications before and after fuel and heat aging. S.L.

N82-30404# Naval Research Lab., Washington, D. C.
LIFE ENHANCEMENT OF NAVAL SYSTEMS THROUGH ADVANCED MATERIALS
A. I. Schindler and I. Wolock 12 May 1982 50 p refs
(AD-A114722; NRL-4807) Avail: NTIS HC A03/MF A01 CSCL 11/3

Recent progress in the development of advanced materials to extend the life of Naval systems is discussed. The developments include anti-corrosion and anti-fouling paints, improved lubricants, and more durable helicopter rotor blades, as well as a variety of materials processing techniques and improved uses of materials to reduce corrosion, wear and fatigue of systems components. Author (GRA)

N82-30414# Suntech, Inc., Marcus Hook, Pa.
THE PREPARATION AND CHARACTERIZATION OF MIXTURES OF POLYCYCLOPENTADIENES AS SOLID RAMJET FUELS Final Report, 17 Jun. 1980 - 30 Jun. 1981
A. Schneider, L. W. Hall, Jr., and E. J. Janoski 15 Apr. 1982 18 p refs
(Contract N00019-80-C-0277)
(AD-A115075) Avail: NTIS HC A02/MF A01 CSCL 07/3

Conditions for the thermal polymerization of cyclopentadiene to tetracyclopentadienes and higher molecular weight oligomers are given for both neat and solution polymerization modes. Density and volumetric heats of combustion are given for the mixtures of oligomers formed under different conditions. Compatibilities of oligomers with hydroxyl terminated polybutadiene (HTPB) are given. Author (GRA)

N82-30432*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
THE INTERACTION OF RADIO FREQUENCY ELECTROMAGNETIC FIELDS WITH ATMOSPHERIC WATER DROPLETS AND APPLICATIONS TO AIRCRAFT ICE PREVENTION Thesis
Robert John Hansman, Jr. Jun. 1982 193 p refs
(Grants NAG1-100; NGL-22-009-640)
(NASA-CR-169246; NAS 1.26:169246; FTL-R82-5) Avail: NTIS HC A09/MF A01 CSCL 20N

The feasibility of computerized simulation of the physics of advanced microwave anti-icing systems, which preheat impinging supercooled water droplets prior to impact, was investigated. Theoretical and experimental work performed to create a physically realistic simulation is described. The behavior of the absorption cross section for melting ice particles was measured by a resonant cavity technique and found to agree with theoretical predictions. Values of the dielectric parameters of supercooled water were measured by a similar technique at lambda = 2.82 cm down to -17 C. The hydrodynamic behavior of accelerated water droplets was studied photograhically in a wind tunnel. Droplets were found to initially deform as oblate spheroids and to eventually become unstable and break up in Bessel function modes for large values of acceleration or droplet size. This confirms the theory as to the maximum stable droplet size in the atmosphere. A computer code which predicts droplet trajectories in an arbitrary flow field was written and confirmed experimentally. The results were consolidated into a simulation to study the heating by electromagnetic fields of droplets impinging onto an object such as an airfoil. It was determined that there is sufficient time to heat droplets prior to impact for typical parameter values. Design curves for such a system are presented. J.D.

N82-30437# Analysis and Technology, Inc., North Stonington, Conn.

UTILIZATION OF AN/APS-94 SIDE-LOOKING AIRBORNE RADAR SYSTEMS IN SEARCH AND RESCUE Interim Report, Jan. 1978 - Apr. 1982

S. R. Osmer, L. Nash, G. L. Hover, and T. J. Mazour Apr. 1982 23 p refs

(Contract DTCG39-81-C-80287)

(AD-A114484; USCG-D-14-82; CGR/DC-3/82) Avail: NTIS HC A02/MF A01 CSCL 17/9

Since September 1978, side-looking airborne radar (SLAR) detection data have been gathered in conjunction with visual detection experiments conducted by the U.S.C.G. R&D Center. These are part of a series of experiments designed to improve search planning guidance contained in the National Search and Rescue Manual. HC-130 aircraft, equipped with either the Airborne Oil Surveillance system (AOSS) or SLAR/radar image processor (SLAR/RIP) configuration of the AN/APS-94C or D SLAR, conducted controlled searches for life rafts, small boats, and 41-to 95-foot Coast Guard vessels. Through the use of a microwave tracking system and SLAR data, the positions of searchers and targets were accurately reconstructed to facilitate the verification of detections on SLAR films or video tape. These data were used to evaluate the effects of environmental and controllable parameters on SLAR detection of the various target types. Of the 12 parameters investigated, target size/composition, search altitude, swell height, wind speed, and humidity/precipitation were found to have a significant influence on SLAR detection performance. Sweep widths for SLAR search and recommendations for SLAR utilization in SAR missions are included. In addition, recommendations for future SLAR evaluation are made. Author (GRA)

N82-30462# Ohio State Univ., Columbus. ElectroScience Lab.

NEAR FIELD ANALYSIS OF AIRBORNE ANTENNAS Final Report

W. D. Burnside and N. Wang Dec. 1981 33 p refs

(Contract N00019-80-C-0593)

(AD-A115074; ESL-713321-4) Avail: NTIS HC A03/MF A01 CSCL 09/5

The radiation pattern analysis of the prolate spheroid based on the efficient UTD and geodesic solutions developed at least partially under previous NASC contracts has been combined with the flat plate scattering analysis in order to simulate complex airborne structures. This includes the junction edge scattering which results at the union between the fuselage (prolate spheroid) and flat plate. This solution is being verified by comparisons with various airborne antenna configurations. In addition, the geodesics for an ellipsoid have been found using a perturbation theory similar to that used for the prolate spheroid. This new ellipsoid configuration will be used to represent the fuselage in future simulation analyses. Author (GRA)

N82-30463# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.

THE EFFECT OF RADOME SCATTERING ON ECM ANTENNA PATTERNS M.S. Thesis

Robert K. Schneider Dec. 1981 150 p refs

(AD-A115517; AFIT/GE/EE/81D-52) Avail: NTIS HC A07/MF A01 CSCL 17/9

The problem of scattering by thin cylindrical dielectric shells of large circular cross sections is approached by two methods: (1) an infinite series of eigenfunctions, and (2) the method of moments. Numerical results are presented for shell radii of 0.3 lambda, 3.0 lambda, and 30 lambda, the source being an electric line current near but external to the shell. Computer programs are presented which implement these two solutions. When the scattering structure does become large limitations on numerical results are encountered due to computer memory and speed limitations. Author (GRA)

N82-30525*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DATA ACQUISITION SYSTEM FOR NASA LARC IMPACT DYNAMICS RESEARCH FACILITY

Royce F. McCormick, Jack C. Spears, James W. Lynch, and Frank R. Batten Jun. 1982 13 p

(NASA-TM-84510) Avail: NTIS HC A02/MF A01 CSCL 14B

A data system is designed to permit the simultaneous recording of 90 data channels on one 28 track magnetic tape recorder using a constant bandwidth FM multiplexing technique. Dynamic signals from transducers located in the test aircraft are amplified and fed to voltage controlled oscillators where they are converted to discrete FM signals. The signals from each group of five VCO's are fed to a mixer/distribution amplifier where they are combined into one composite signal and recorded, using direct recording techniques, on one magnetic tape recorder track. Millivolt signals from the recorders reproduce heads are amplified to one volt and then electronically switched to an FM demultiplexing system where appropriate frequency discrimination and signal filtering recover the original analog information. S.L.

N82-30547# Naval Postgraduate School, Monterey, Calif.

FLOW CONTROL FOR A HIGH ENERGY LASER TURRET USING TRAPPED VORTICES M.S. Thesis

James Edward Burd Dec. 1981 101 p refs

(AD-A115263; NPS67-81-017) Avail: NTIS HC A06/MF A01 CSCL 20/5

The Department of Defense is concerned with the viability of an airborne high energy laser system. The laser is housed in a blunt turret atop a NKC-135 aircraft. Turbulence generated by flow separation around the turret causes optical distortion of the laser beam. Control of flow separation is needed to improve laser beam performance especially for aft-aimed turrets. One technique proposed for flow control is a fairing design which will stabilize shed vortices by suction. A two dimensional computer model was used to design a fairing compatible with present test equipment. Experimental research of this fairing design was conducted in wind tunnel tests. Although flow mapping demonstrated improved flow performance through the use of suction, total quiescent flow was never achieved. A more adequate three dimensional model is needed to design a fairing that will stabilize trapped vortices. GRA

N82-30556# Garrett Turbine Engine Co., Phoenix, Ariz.

GAS FOIL BEARING DEVELOPMENT PROGRAM Final Report, 1 Jul. 1979 - 28 Feb. 1981

Francis J. Suriano Wright-Patterson AFB, Ohio AFWAL Sep. 1981 135 p

(Contract F33615-79-C-2037; AF Proj. 3048)

(AD-A114692; Rept-31-4089; AFWAL-TR-81-2095) Avail: NTIS HC A07/MF A01 CSCL 13/9

This document presents the final technical report for the nineteen-month gas foil bearing development program. The 3.5-inch foil bearing design was analyzed using an elastohydrodynamic analysis program. Bearing configurations with 10 and 8 foils were identified as having the potential to exceed the performance of the 12-foil GTCP165 APU bearing. A total of six bearing configurations were tested, two ambient temperature configurations using Teflon-S coated foils with a chrome-plated journal, and four with high-temperature foil and journal coatings. The high-temperature bearings used foil coatings Kaman DES, Kaman DES + au, Co-20 Ni, and TiC, all of which were run with a Kaman SCA-coated journal. Program goals were met with both ambient-temperature bearing configurations and Kaman SCA versus Kaman DES and TiC high-temperature configurations. GRA

N82-30566*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

STRUCTURES AND DYNAMICS DIVISION RESEARCH AND TECHNOLOGY PLANS, FY 1982

Kay S. Bales Jun. 1982 56 p

(NASA-TM-84509; NAS 1.15:84509) Avail: NTIS HC A04/MF A01 CSCL 20K

Computational devices to improve efficiency for structural calculations are assessed. The potential of large arrays of microprocessors operating in parallel for finite element analysis is defined, and the impact of specialized computer hardware on static, dynamic, thermal analysis in the optimization of structural analysis and design calculations is determined. General aviation aircraft crashworthiness and occupant survivability is also considered. Mechanics technology required for design coefficient, fault tolerant advanced composite aircraft components subject to combined loads, impact, postbuckling effects and local discontinuities are developed. S.L.

N82-30606# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Office of Remote Sensing Technology Implementation.

PHOTOINTERPRETATION KEY FOR PINE REGENERATION ANALYSIS USING HIGH-ALTITUDE COLOR INFRARED PANORAMIC PHOTOGRAPHY Final Report

B. B. Eav, C. A. Clark, R. E. Kinkle, and J. C. Prill Aug. 1981 38 p refs
(Contract USDA/FS-53-3187-0-29)
(PB82-164450; LEMSCO-16379; NFAP-247) Avail: NTIS HC A03/MF A01 CSCL 02F

A photointerpretation key for analysis of pine regeneration was developed during the second of the three phases of a timber inventory project. The procedures used in developing the photointerpretation key are presented, and the resulting selective photointerpretation key with color illustrations (stereopairs) is presented This photointerpretation key represents a model application of high-altitude color infrared panoramic photography to timber inventory and should pave the way for more imaginative applications of optical bar technoloy to resource inventories. GRA

N82-30608# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Office of Remote Sensing Technology Implementation.

HIGH-ALTITUDE IMAGERY USER GUIDE

Richard E. Hinkle Aug. 1981 127 p refs
(Contract USDA/FS-53-3187-0-29)
(PB82-158353; LEMSCO-16312; NFAP-224) Avail: NTIS HC A07/MF A01 CSCL 02F

New and more efficient remote sensing methods to users in the field are presented. The high altitude aircraft and associated sensor systems are discussed. Applications in use, such as resource inventories, pest management, catastrophic damage assessment, resource management and planning are outlined. GRA

N82-30782# Scripps Institution of Oceanography, La Jolla, Calif. Visibility Lab.

AIRBORNE MEASUREMENTS OF EUROPEAN SKY AND TERRAIN RADIANCES Scientific Interim Report

Richard W. Johnson Aug. 1981 36 p refs
(Contract F19628-78-C-0200; AF Proj. 6210)
(AD-A114637; SIO-82-2; AFGL-TR-81-0275; SIR-19) Avail: NTIS HC A03/MF A01 CSCL 04/1

A data set which contains nearly 500 arrays representing measurements of sky and terrain radiance values from 47 different flights is described and illustrated. The measurements were made using radiometer systems mounted on a C-130 aircraft during a series of European flights associated with the NATO program OPAQUE. Radiance measurements throughout the 4 pi field surrounding the aircraft were made in four spectral bands having mean wavelengths of 478, 557, 664, and 765 nm. Spectral sets of measurements were made at each of several altitudes between the surface and approximately 6 km AGL. Evaluation of the data illustrates good orientation and radiometric accuracies, except for stray light influences as the radiometer field of view swept near and through the solar disc. Corrective procedures are outlined and their application is undergoing further refinement. These data are appropriate for use in the development of operationally useful predictive models. The radiance data in conjunction with their companion scattering coefficient data, are readily applicable to the determination of slant path contrast transmittances, atmospheric optical depths, aerosol directional scattering characteristics, flux divergences and their attendant determinations of turbid atmospheric single scattering albedos. GRA

N82-30800# Ohio Univ., Athens. Avionics Engineering Center.

EVALUATION OF THE FAA/MITRE WEATHER DATA DEVICE Final Report

Delmar G. Pullins Washington FAA Jan. 1982 59 p refs
(Contract DTFA01-81-C-10007)
(AD-A114645; OU/AEC/EER-51-1; DOT-FAA-RD-82-14) Avail: NTIS HC A04/MF A01 CSCL 04/2

A cockpit weather display unit was evaluated. Twenty subject pilots were flown using prerecorded weather information, and real time weather information from the Columbus weather radar. The airborne system consists of a VOR Receiver, a processor unit, a control module, and a hardcopy printer that provides the pilot with ground weather radar information in the cockpit upon demand. It is found that providing the pilot with a low cost, real time radar weather information source, will be a distinct factor in reducing unnecessary radio transmissions, controller workload, and will aid the pilot in decision making. The installation of such a unit in the cockpit would eliminate errors due to verbal communication of the weather picture, provide useful information, and directly attack the major problem of aviation thunderstorm avoidance. E.A.K.

N82-30804# National Oceanic and Atmospheric Administration, Norman, Okla. National Severe Storms Lab.

FIELD PROGRAM OPERATIONS: TURBULENCE AND GUST FRONT Final Report, Mar. 1980 - Dec. 1980

J. T. Lee and R. J. Doviak Washington FAA Nov. 1981 43 p
(Contract DTFA01-80-Y-10524)
(AD-A115447; DOT-FAA-RD-81-108) Avail: NTIS HC A03/MF A01 CSCL 04/2

Aircraft, rawinsonde network, mesoscale surface network, low-level wind shear alert system at Will Rogers World Airport, 444 m instrumented tower and satellite observations augmented a conventional weather radar and a new, dual Doppler weather radar system to obtain concurrent data on weather hazards to aircraft. Storm days and data acquired are detailed. An objective was to determine the characteristics and detectability of turbulence, wind shear and other aircraft operational weather hazards using indirect (radar) probes. The South Dakota School of Mines T-28 aircraft and the National Aeronautics and Space Administration's F-106 aircraft made thunderstorm penetrations during Doppler radar and lightning operations. Data obtained are discussed, and the analysis of a turbulence case and two gust front cases is presented. Author

N82-30806# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.

A SURVEY OF MELTING LAYER RESEARCH

Robert C. Schaller, Ian D. Cohen, Arnold A. Barnes, Jr., and Lawrence C. Gibbons 4 Jan. 1982 105 p refs
(AF Proj. 2310)
(AD-A115224; AFGL-TR-82-0007; AFGL-AFSG-438) Avail: NTIS HC A06/MF A01 CSCL 01/3

This report summarizes previous melting-layer research both within and outside AFGL and provides recommendations for future research in the melting layer. An extensive literature search provided a bibliography of previous research. This bibliography is included as an appendix. Several definitions of the top and bottom of the melting layer are presented and discussed. Aggregation and breakup appear to be the chief microphysical processes that determine the particle-size spectrum of snow and ice that enter the melting layer. Studies of the actual melting process and of the melting layer as seen by radar are presented. Microphysical and thermodynamic characteristics are discussed. Dynamic considerations are mentioned. Previously gathered aircraft data are reviewed, and recommendations are made for future aircraft and radar data-gathering efforts. Author (GRA)

N82-30820# National Oceanic and Atmospheric Administration, Boulder, Colo. Weather Modification Program Office.

EVALUATION OF A METEOROLOGICAL AIRBORNE PULSE DOPPLER RADAR

B. L. Trotter, R. G. Strauch, and C. L. Frush (National Center for Atmospheric Research) Jul. 1981 65 p
(PB82-156860; NOAA-TM-ERL-WMPO-45; NOAA-81103011) Avail: NTIS HC A04/MF A01 CSCL 04B

Doppler measurements installed in the aircraft which measure the radial velocities in light to heavy precipitation and in nonturbulent to turbulent meteorological situations was evaluated. The base line noise level in the system increased whenever video returns were present. The minimum detectable signal at the system output was approximately minus 100 dBm. It is shown that the system can be used in an airborne environment. Errors in velocity measurements will occur if the exact antenna spacial pointing angle is not known. The magnitude of error in the measurement is a function of the error in the known antenna position and the ground speed of the aircraft. GRA

N82-30838*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

PILOT/VEHICLE MODEL ANALYSIS OF VISUAL AND MOTION CUE REQUIREMENTS IN FLIGHT SIMULATION

R. Lancraft, G. Zacharias, and S. Baron *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 68-91 refs

Avail: NTIS HC A99/MF A01 CSCL 14B

The optimal control model for pilot/vehicle analysis is used to investigate the closed-loop consequences of the performance limitations associated with a computer generated image (CGI) visual system and a six degree-of-freedom motion simulator (VMS) in a helicopter hover task. The specific problem addressed was to determine the potential effects of CGI and VMS system characteristics on closed-loop hover performance and pilot workload, and to evaluate these effects in light of performance/workload levels we might expect to see in the actual flight situation. Author

N82-30840*# Systems Technology, Inc., Mountain View, Calif.

TRAINING AIRCRAFT DESIGN CONSIDERATIONS BASED ON THE SUCCESSIVE ORGANIZATION OF PERCEPTION IN MANUAL CONTROL

Robert K. Heffley, Warren F. Clement, and Samuel J. Craig (Vought Corp., Hawthorne, Calif.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 119-127 refs

Avail: NTIS HC A99/MF A01 CSCL 01C

Pilot skill development in the approach and landing task is very strongly tied to the aircraft closure rate and, therefore, pilot training for this task should be based on an appropriate progression closure rate. This, in turn, leads to a rational and explicit determination of design point approach speeds as well as other important aerodynamic features for training aircraft. One key is to recognize the significance of transitioning from a purely compensatory control loop technique to one involving a pursuit crossfeed between throttle and pitch attitude. Such transitioning requires significant skill development, yet reduces pilot workload while enhancing flight path and airspeed performance. The second key is to address the terminal flight path adjustment in terms of range-to-go. This establishes a bridge between the visual field and the combination of manual control technique and vehicle flight dynamics. A design summary plot is thus created in terms of: (1) performance (flight path bandwidth); (2) critical range-to-go (for terminal path correction); and (3) closure rate. Author

N82-30848# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

EFFECTS OF HIGHER ORDER CONTROL SYSTEMS ON AIRCRAFT APPROACH AND LANDING LONGITUDINAL HANDLING QUALITIES

Muhammad A. Pasha (Pakistan Air Force), John J. DAzo, and James T. Silverthorn *In* MIT Proc. of the 16th Conf. on Manual Control 1980 p 254-264 refs

Avail: NTIS HC A99/MF A01 CSCL 01C

A study of approach and landing longitudinal flying qualities, based on data generated by Calspan using a variable stability NT-33 aircraft combined with significant control system dynamics is presented. An optimum pilot lead time for pitch tracking, flight path angle tracking, and combined pitch and flight path angle tracking tasks is determined from a closed-loop simulation using integral squared error (ISE) as a performance measure. Pilot gain and lead time were varied in the closed-loop simulation of the pilot and aircraft to obtain the best performance for different control system configurations. The results lead to the selection of an optimum lead time using ISE as a performance criterion. Using this value of optimum lead time, a correlation is then found between pilot rating and performance with changes in the control system and in the aircraft dynamics. It is also shown that pilot rating is closely related to pilot workload which, in turn, is related to the amount of lead which the pilot must generate to obtain satisfactory response. The results also indicate that the pilot may use pitch angle tracking for the approach task and then adds flight path angle tracking for the flare and touchdown. Author

N82-30849*# Princeton Univ., N. J. Flight Research Lab.

PILOT OPINIONS OF SAMPLING EFFECTS IN LATERAL DIRECTIONAL CONTROL

Robert F. Stengel and George E. Miller *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 265-270 refs

(Contract N00014-78-C-0257)

Avail: NTIS HC A99/MF A01 CSCL 01C

Flight experiments with a microprocessor control system were conducted to determine the effects of variations in sampling parameters on several pilots' opinions of lateral-directional flying qualities. Princeton's Variable Response Research Aircraft, which is equipped with a microprocessor-based digital flight control system was the test vehicle. Two U.S. Navy pilots evaluated the effects of sampling rate, quantization, and pure time delay during tracking, approach, and landing. Aircraft carrier approach tasks were conducted using a Navy approach mirror. Acquisition and tracking of fixed objects on the ground provided additional information related to the Navy mission. Author

N82-30856*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

EVALUATION OF A TRAJECTORY COMMAND CONCEPT FOR MANUAL CONTROL OF CARRIER APPROACHES AND LANDINGS

Walter E. McNeill, G. Allan Smith, Jr., and Ronald M. Gerdes *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 370-392 refs

Avail: NTIS HC A99/MF A01 CSCL 01C

A trajectory control system concept for providing monual control of a conventional jet aircraft is described. The total aircraft flight control system (TAFCOS) utilizes an inverse model of the aerodynamic and propulsion characteristics and employs feedforward control to provide the required acceleration command. On-board digital computations which can easily be handled by a modern airborne computer are required. The system was studied in a piloted simulation of the carrier approach and landing task with primarily visual flight and guidance cues. The principal modes of vertical flight path control investigated were vertical velocity command and vertical acceleration command. The study included manual carrier approaches with and without moderate ship motion and associated air disturbances, and tests of the effects of discrete gusts. Manual control of flight path through this concept was shown to be feasible as an addition to an automatic control system and to have potential as an improved mode of control over conventional control for the carrier approach task. The concept also offers several advantages, among which are design flexibility, automatic compensation for external disturbances, and prevention of abusive pilot control. Author

N82-30857*# Systems Technology, Inc., Mountain View, Calif.

APPLICATION OF A PILOT CONTROL STRATEGY IDENTIFICATION TECHNIQUE TO A JOINT FAA/NASA GROUND BASED SIMULATION OF HEAD UP DISPLAYS FOR CTOL AIRCRAFT

Wayne F. Jewell *In* MIT Proc. of the 16th Ann Conf. on Manual Control 1980 p 395-409 refs

(Contracts NAS2-10385; DOT-FA77WAI-725; NASA-NMI-1052.151)

Avail: NTIS HC A99/MF A01 CSCL 01D

The development, evaluation, and application of a technique for measuring a pilot's control strategy is described. The nonintrusive pilot identification program (NIPIP) estimates the pilot's input-output describing function and combined pilot vehicle performance parameters such as crossover frequency and phase margin by using a time domain model of the pilot and a least squares identification algorithm. It functions in realtime and uses a 'sliding' time window to maintain freshness in the data; thus time varying characteristics in the pilot's control strategy can be measured. The application of NIPIP to a realtime ground based simulation of two competing concepts of head up displays (HUD) for use in conventional takeoff and landing aircraft. Differences in the pilot's control strategy used for the two HUDs and the head down display are quantified in terms of differences in the pilots' describing functions and combined pilot vehicle measurements. Conclusions based on the performance evaluation and application of NIPIP are presented and some recommendations on how NIPIP could be used in other manual control tasks are discussed. J.D.

N82-30859*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

DESIGN, SIMULATION AND EVALUATION OF ADVANCED DISPLAY CONCEPTS FOR THE F-16 CONTROL CONFIGURED VEHICLE

Robert W. Klein (Grumman Aerospace Corp., Bethpage, N.Y.)

and Walter M. Hollister *In its* Proc. of the 16th Ann. Conf. on Manual Control 1980 p 424-438 refs

(Grant AF-AFOSR-3260-78)
Avail: NTIS HC A99/MF A01 CSCL 01D

The F-16 control configured vehicle (CCV) flight test program, and current aircraft display research are reviewed and task oriented and compensatory displays to further enhance the capability of the F-16 CCV are suggested. The fixed base M.I.T. 707 simulator was modified to represent the F-16 CCV. An isometric sidearm control stick and two axis CCV thumb button were installed in the cockpit. The forward cockpit CRT was programmed to present an external scene (numbered runway, horizon) and the designed heads up display. The cockpit interior was modified to represent a fighter and the F-16 CCV dynamics and direct lift and side force modes were programmed. Compensatory displays were designed from man/machine considerations. Pilots evaluated the heads up display and compensatory displays during simulated descents in the presence of several levels of filtered, zero mean wind gusts. During a descent from 2500 feet to the runway, the pilots tracked a point on the runway utilizing the basic F-16, F-16 CCV, and F-16 CCV with advanced displays. Substantial tracking improvements resulted utilizing the CCV modes, and the displays were found to even further enhance the tracking ability of the F-16 CCV. J.D.

N82-30860*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SEPARATION MONITORING WITH FOUR TYPES OF PREDICTORS ON A COCKPIT DISPLAY OF TRAFFIC INFORMATION
Sharon Jago and Everett Palmer *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 439-447 refs

Avail: NTIS HC A99/MF A01 CSCL 01D

The concept of a cockpit display of traffic information (CDTI) includes the integration of air traffic, navigation, terrain and weather information in a single electronic display in the cockpit. Investigations designed to develop a clear and concise display format for use in later full mission simulator evaluation of the CDTI concept are described. The experiment required airline pilots to monitor a CDTI and make perceptual judgments concerning the future position of a single intruder aircraft in relationship to their own aircraft (ownship). The main experimental variable was the type of predictor used to display future position of each aircraft. Predictors were referenced to the ground or to ownship and they either included turn rate information or did not. Other variables were the aircraft's separation distance when the judgment was required and the type of encounter (straight or turning). Results indicate that under these experimental conditions fewer errors were made when the predictor included turn rate information. There was little difference in overall error rate for the curved ground referenced and the ownship referenced predictors. Author

N82-30953# Naval Training Equipment Center, Orlando, Fla. Computer Systems Lab.
COMPUTER ARCHITECTURE STUDY FOR VTXTS SIMULATORS Final Report, Mar. - Nov. 1981
Leonard D. Healy, Gerald A. Wyndle, and Bruce Baker (Servos and Simulation, Inc.) Apr. 1982 123 p refs
(AD-A115006; NAVTRAEQUIPC-IH-336) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report provides an evaluation of computer configurations that might be applied to VTXTS simulators. Computers ranging from the large, general purpose computer ordinarily used in data processing to the microcomputer which requires 40 separate units to implement a simulator complex are considered. Eleven computer configurations are evaluated with respect to availability, maintenance, expandability, risk and life cycle cost. The information is summarized in a table of advantages and disadvantages of the various configurations. Author (GRA)

N82-30954# Naval Training Equipment Center, Orlando, Fla. Computer Systems Lab.
DESIGN OF A MICROPROCESSOR-CONTROLLED LINKAGE FOR SIMULATOR APPLICATIONS Final Report, Oct. 1980 - Jun. 1981
Leonard D. Healy Apr. 1982 82 p
(AD-A115421; NAVTRAEQUIPC-IH-334) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report describes a method of linking a host computer to external devices and presents an implementation of such a system using multiple microcomputers. The technique used takes advantage of the statistical properties of simulator data to reduce the amount of data transferred, thereby insuring that those variables that change are updated with minimum delay. Implementation of linkage using multiple microcomputers provides a modular system easily tailored to various simulator applications. Author (GRA)

N82-30962*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCED RELIABILITY MODELING OF FAULT-TOLERANT COMPUTER-BASED SYSTEMS
Salvatore J. Bavuso May 1982 33 p refs
(NASA-TM-84501; NAS 1.15:84501) Avail: NTIS HC A03/MF A01 CSCL 09B

Two methodologies for the reliability assessment of fault tolerant digital computer based systems are discussed. The computer-aided reliability estimation 3 (CARE 3) and gate logic software simulation (GLOSS) are assessment technologies that were developed to mitigate a serious weakness in the design and evaluation process of ultrareliable digital systems. The weak link is based on the unavailability of a sufficiently powerful modeling technique for comparing the stochastic attributes of one system against others. Some of the more interesting attributes are reliability, system survival, safety, and mission success.

N82-31066*# Man-Acoustics and Noise, Inc., Seattle, Wash.
A STUDY OF GENERAL AVIATION COMMUNITY NOISE IMPACT AND ANNOYANCE Final Contractor Report, Sep. 1979 - Apr. 1982
J. E. Mabry Apr. 1982 45 p refs
(Contract NAS1-15896)
(NASA-CR-165945; NAS 1.26:165945; MAN-1045) Avail: NTIS HC A03/MF A01 CSCL 20A

The method involved the selection of three airports which were dominated by aircraft weighing 12,500 lbs or under and which were also undergoing a change relative to utilization. Also, there was interest in airports with different utilization levels so that effect of number of operations could be considered. In addition, there was a requirement to select airports with communities in the surrounding areas which were exposed to aircraft operations noise. Noise annoyance response data was obtained from available sources. These sources included environmental impact statements, interviews with airport managers, noise complaint information, community meetings concerned with projected changes in airport utilization, and social survey data. As a means of objectively assessing the noise impact due to aircraft operations, noise measurement and computer noise modeling determinations were obtained for each airport. Listening quality tape recordings were also obtained. Author

N82-31069*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NOISE TRANSMISSION LOSS OF AIRCRAFT PANELS USING ACOUSTIC INTENSITY METHODS
Michael C. McGary Aug. 1982 37 p refs
(NASA-TP-2046; L-15306; NAS 1.60:2046) Avail: NTIS HC A03/MF A01 CSCL 20A

The two-microphone, cross-spectral, acoustic intensity measurement technique was used to determine the acoustic transmission loss of three different aircraft panels. The study was conducted in the transmission loss apparatus in the Langley aircraft noise reduction laboratory. Author

N82-31070*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AIRPORT/COMMUNITY NOISE
David G. Stephens, comp. 1982 40 p Proceedings of a Workshop held at Hampton, Va., 25-26 Feb. 1982
(NASA-CP-2241; L-1545; NAS 1.55:2241) Avail: NTIS HC A03/MF A01 CSCL 13B

Airport noise and community planning for noise compatibility were discussed. For individual titles, see N82-31071 through N82-31074.

N82-31071*# Douglas Aircraft Co., Inc., Long Beach, Calif.
AIRPORT NOISE
Robert E. Pendley *In* NASA. Langley Research Center

Airport/Community Noise 1982 p 2-12

Avail: NTIS HC A03/MF A01 CSCL 13B

The problem of airport noise at several airports and air bases is detailed. Community reactions to the noise, steps taken to reduce jet engine noise, and the effect of airport use restrictions and curfews on air transportation are discussed. The adverse effect of changes in allowable operational noise on airport safety and altenative means for reducing noise pollution are considered. Community-airport relations and public relations are discussed. J.D.

N82-31072*# Georgia Inst. of Tech., Atlanta.
COMMUNITY NOISE
Clifford R. Bragdon *In* NASA. Langley Research Center Airport/Community Noise 1982 p 13-29

Avail: NTIS HC A03/MF A01 CSCL 13B

Airport and community land use planning as they relate to airport noise reduction are discussed. Legislation, community relations, and the physiological effect of airport noise are considered. Noise at the Logan, Los Angeles, and Minneapolis/St. Paul airports is discussed. J.D.

N82-31073*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUMMARY OF AIRPORT TECHNOLOGY NEEDS
Homer G. Morgan *In its* Airport/Community Noise 1982 p 30

Avail: NTIS HC A03/MF A01 CSCL 13B

The need for improvement in airport noise assessment methodology is summarized and specific investigations of the relationship between noise level and individual and community response outlined. J.D.

N82-31074*# Georgia Inst. of Tech., Atlanta.
SUMMARY OF COMMUNITY TECHNOLOGY NEEDS
Clifford R. Bragdon *In* NASA. Langley Research Center Airport/Community Noise 1982 p 31-33

Avail: NTIS HC A03/MF A01 CSCL 13B

Applications of the social sciences and engineering to solution of the problem of airport noise are summarized. Specific needs are outlined. J.D.

N82-31147*# National Aeronautics and Space Administration, Washington, D. C.
PRESENT CHALLENGES OF RESEARCH AND TECHNOLOGY POLITICS
Andreas V. Bulow May 1982 12 p Transl. into ENGLISH from DFVLR-Nachr. (West Germany), no. 35, Mar. 1982 p 3-5 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76720; NAS 1.15:76720) Avail: NTIS HC A02/MF A01 CSCL 05A

Research and technology in Germany are discussed. The rapid transfer of scientific knowledge and techniques from the laboratory to the manufacturing and industrial communities is indentified as a priority. It is recommended that the government give maximum support to the aviation and space flight industries. R.J.F.

N82-31153*# National Aeronautics and Space Administration, Washington, D. C.
EXTRACTS FROM PROBLEMS OF AIR LAW, A COLLECTION OF WORKS OF THE SECTION OF AIR LAW OF THE AVIAKHIM SOCIETY OF THE USSR AND AVIAKHIM RSFSR
P. I. Baranov, ed., V. A. Zarzar, ed., Ye. A. Korovin, ed., V. L. Lakhtin, ed., and A. V. Sabanina, ed. Jun. 1982 25 p Transl. into ENGLISH from the book "Voprosy Vozdushnogo Prava. Sbornik Trudov Sektsii Vozdushnogo Prava Soyuza Aviakhim SSSRi Aviakhim RSFSE" Moscow, Aviakhim Press, 1927 p 89-110 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76913; NAS 1.15:76913) Avail: NTIS HC A02/MF A01 CSCL 05D

The difficulties of developing a body of international law to govern air travel is discussed. A summary of literature and agreements is presented as well as a brief history. Air space over the poles and the legality of methods of claiming territory in the polar regions is discussed. R.J.F.

N82-31158*# Detroit Diesel Allison, Indianapolis, Ind.
CERAMIC APPLICATIONS IN TURBINE ENGINES Semiannual Report, 1 Jan. - 30 Jun. 1980
S. Michael Hudson, Michael A. Janovicz, and Franklin A. Rockwood Nov. 1980 177 p
(Contracts DEN3-17; EC-77-A-31-1040)
(NASA-CR-165197; NAS 1.26:165197; EDR-10383) Avail: NTIS HC A09/MF A01 CSCL 13F

The design and testing of gas turbine engines employing ceramic components is discussed. Thermal shock and vibration test results as well as spin tests of various engine components are discussed. R.J.F.

N82-31291# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
AERONAUTICAL SYSTEMS TECHNOLOGY NEEDS: ESCAPE, RESCUE AND SURVIVAL, TEST FACILITIES AND TEST EQUIPMENT AND TRAINING/SIMULATION EQUIPMENT Annual Report, CY 1982
Mark A. Moon Feb. 1982 88 p refs Supersedes ASD-TR-82-5001
(AD-A115435; ASD-TR-82-5001-Rev) Avail: NTIS HC A05/MF A01 CSCL 01/3

This report is a part of a compilation of formalized Technology Needs (TN) covering Equipment Subsystems as identified in the Aeronautical Systems Division. They are based on development/operational experience, systems studies and new concepts - all related to future system applications. Their presentation is to serve a threefold purpose; i.e., (1) guidance for technology program, (2) prove developmental potential, and (3) engineering data/requirements essential for technology use in systems. The identified needs delineate progress desired in performance, control, design flexibility, safety and cost. Author (GRA)

N82-31294*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NOISE AND ECONOMIC CHARACTERISTICS OF AN ADVANCED BLENDED SUPERSONIC TRANSPORT CONCEPT
John K. Molloy, William D. Grantham, and Milton J. Neubauer, Jr. Sep. 1982 32 p refs
(NASA-TP-2073; L-15297; NAS 1.60:2073) Avail: NTIS HC A03/MF A01 CSCL 01B

Noise and economic characteristics were obtained for an advanced supersonic transport concept that utilized wing body blending, a double bypass variable cycle engine, superplastically formed and diffusion bonded titanium in both the primary and secondary structures, and an alternative interior arrangement that provides increased seating capacity. The configuration has a cruise Mach number of 2.62, provisions for 290 passengers, a mission range of 8.19 Mm (4423 n.mi.), and an average operating cruise lift drag ratio of 9.23. Advanced operating procedures, which have the potential to reduce airport community noise, were explored by using a simulator. Traded jet noise levels of 105.7 and 103.4 EPNdB were obtained by using standard and advanced takeoff operational procedures, respectively. A new method for predicting lateral attenuation was utilized in obtaining these jet noise levels. Author

N82-31295*# United Technologies Research Center, East Hartford, Conn.
A DOUBLET LATTICE METHOD FOR THE DETERMINATION OF ROTOR INDUCED EMPENNAGE VIBRATION AIRLOADS. ANALYSIS DESCRIPTION AND PROGRAM DOCUMENTATION
Santu T. Gangwani Jun. 1982 68 p refs
(Contract NAS1-16058)
(NASA-CR-165893; NAS 1.26:165893; UTRC81-7) Avail: NTIS HC A05/MF A01 CSCL 01A

An efficient state-of-the-art method was developed to determine the unsteady vibratory airloads produced by the interaction of the main rotor wake with a helicopter empennage. This method was incorporated into a computer program, Rotor Induced Empennage Vibration Analysis (RIEVA). The program requires the main rotor wake position and the strength of the vortices locates near the empennage surfaces. A nonlinear lifting surface analysis is utilized to predict the aerodynamic loads on the empennage surfaces in the presence of these concentrated vortices. The analysis was formulated to include all pertinent effects such as suction of the interacting vortices and the shed vorticity behind the empennage surfaces. The analysis employs a time domain solution. The output of the program consists of chordwise and spanwise airload distributions on the empennage surfaces. The airload distributions are harmonically analyzed and formulated for input into the Coupled Rotor/Airframe Vibration Analysis. Author

N82-31296*# United Technologies Research Center, East Hartford, Conn.
A PRESCRIBED WAKE ROTOR INFLOW AND FLOW FIELD PREDICTION ANALYSIS, USER'S MANUAL AND TECHNICAL APPROACH
T. A. Egolf and A. J. Landgrebe Jun. 1982 79 p refs
(Contract NAS1-16058)
(NASA-CR-165894; NAS 1.26:165894; UTRC81-2) Avail: NTIS HC A05/MF A01 CSCL 01A

A user's manual is provided which includes the technical approach for the Prescribed Wake Rotor Inflow and Flow Field Prediction Analysis. The analysis is used to provide the rotor wake induced velocities at the rotor blades for use in blade airloads and response analyses and to provide induced velocities at arbitrary field points such as at a tail surface. This analysis calculates the distribution of rotor wake induced velocities based on a prescribed wake model. Section operating conditions are prescribed from blade motion and controls determined by a separate blade response analysis. The analysis represents each blade by a segmented lifting line, and the rotor wake by discrete segmented trailing vortex filaments. Blade loading and circulation distributions are calculated based on blade element strip theory including the local induced velocity predicted by the numerical integration of the Biot-Savart Law applied to the vortex wake model. Author

N82-31297*# Sikorsky Aircraft, Stratford, Conn.
USER'S MANUAL FOR THE AUTOMATED PANELING TECHNIQUE (APT) AND THE WING BODY AERODYNAMIC TECHNIQUE (WABAT) PROGRAMS Final Report
R. E. Studwell Jun. 1982 44 p refs
(Contract NAS1-16058)
(NASA-CR-165895; NAS 1.26:165895) Avail: NTIS HC A03/MF A01 CSCL 01A

User instructions for the Tektronix Graphics Package of the Automated Paneling Technique (APT) and the Wing and Body Aerodynamic Technique (WABAT) Programs are provided. Responses to plot package messages which the user must make to activate plot package operations and options are described. Modifications to the APT and WABAT input run streams, to affect the graphic interface, are also covered. Author

N82-31298*# United Technologies Research Center, East Hartford, Conn.
AEROELASTIC ANALYSIS FOR HELICOPTER ROTORS WITH BLADE APPENDED PENDULUM VIBRATION ABSORBERS. MATHEMATICAL DERIVATIONS AND PROGRAM USER'S MANUAL Final Report
Richard L. Bielawa Jun. 1982 109 p refs
(Contract NAS1-16058)
(NASA-CR-165896; NAS 1.26:165896; UTRC81-45) Avail: NTIS HC A06/MF A01 CSCL 01A

Mathematical development is presented for the expanded capabilities of the United Technologies Research Center (UTRC) G400 Rotor Aeroelastic Analysis. This expanded analysis, G400PA, simulates the dynamics of teetered rotors, blade pendulum vibration absorbers and the higher harmonic excitations resulting from prescribed vibratory hub motions and higher harmonic blade pitch control. Formulations are also presented for calculating the rotor impedance matrix appropriate to these higher harmonic blade excitations. This impedance matrix and the associated vibratory hub loads are intended as the rotor blade characteristics elements for use in the Simplified Coupled Rotor/Fuselage Vibration Analysis (SIMVIB). Sections are included presenting updates to the development of the original G400 theory, and material appropriate to the user of the G400PA computer program. This material includes: (1) a general description of the structuring of the G400PA FORTRAN coding, (2) a detailed description of the required input data and other useful information for successfully running the program, and (3) a detailed description of the output results. Author

N82-31299*# Sikorsky Aircraft, Stratford, Conn.
USER'S MANUAL FOR THE COUPLED ROTOR/AIRFRAME VIBRATION ANALYSIS GRAPHIC PACKAGE Final Report
R. E. Studwell Jun. 1982 27 p
(Contract NAS1-16058)
(NASA-CR-165897; NAS 1.26:165897) Avail: NTIS HC A03/MF A01 CSCL 01A

User instructions for a graphics package for coupled rotor/airframe vibration analysis are presented. Responses to plot package messages which the user must make to activate plot package operations and options are described. Installation instructions required to set up the program on the CDC system are included. The plot package overlay structure and subroutines which have to be modified for the CDC system are also described. Operating instructions for CDC applications are included. S.L.

N82-31300*# Flow Research, Inc., Kent, Wash.
SINGULARITY EMBEDDING METHOD IN POTENTIAL FLOW CALCULATIONS
Wen-Huei Jou and Hung Huynh Jun. 1982 28 p refs
(NASA Order A-77471B)
(NASA-CR-166387; NAS 1.26:166387) Avail: NTIS HC A03/MF A01 CSCL 01A

The so-called H-type mesh is used in a finite-element (or finite-volume) calculation of the potential flow past an airfoil. Due to coordinate singularity at the leading edge, a special singular trial function is used for the elements neighboring the leading edge. The results using the special singular elements are compared to those using the regular elements. It is found that the unreasonable pressure distribution obtained by the latter is removed by the embedding of the singular element. Suggestions to extend the present method to transonic cases are given. Author

N82-31301*# Grumman Aerospace Corp., Bethpage, N.Y.
AXISYMMETRIC AND NON-AXISYMMETRIC EXHAUST JET INDUCED EFFECTS ON A V/STOL VEHICLE DESIGN. PART 2: ANALYSIS OF RESULTS
W. C. Schnell Jan. 1982 202 p refs
(Contract NAS2-9887)
(NASA-CR-166365; NAS 1.26:166365) Avail: NTIS HC A10/MF A01 CSCL 01A

A wind tunnel investigation, employing a 1/8 scale model in an 11 foot transonic wind tunnel (Mach 0.4-1.4), was conducted to determine the jet effects of several exhaust nozzles on the aeropropulsive performance of a V/STOL fighter design. The force and pressure data show that significant differences in aeropropulsion performance can be expected by varying the exhaust nozzle type, jet area and deflection angle on an underwing nacelle installation. At unvectored conditions, the single expansion ramp nozzles show large performance gains relative to a circular nozzle installation. Additionally, a further drag reduction is realized when the nonaxisymmetric nozzle is vectored through a 10 degree deflection angle. The combined payoff of the vectored nonaxisymmetric nozzle over the baseline circular nozzle installation is equivalent to 25 percent of zero lift drag. R.J.F.

N82-31302*# Grumman Aerospace Corp., Bethpage, N.Y.
AXISYMMETRIC AND NON-AXISYMMETRIC EXHAUST JET INDUCED EFFECTS ON A V/STOL VEHICLE DESIGN. PART 3: EXPERIMENTAL TECHNIQUE
W. C. Schnell Jun. 1982 115 p refs
(Contract NAS2-9887)
(NASA-CR-166147; NAS 1.26:166147) Avail: NTIS HC A06/MF A01 CSCL 01A

The jet induced effects of several exhaust nozzle configurations (axisymmetric, and vectoring/modulating variants) on the aeropropulsive performance of a twin engine V/STOL fighter design was determined. A 1/8 scale model was tested in an 11 ft. transonic tunnel at static conditions and over a range of Mach Numbers from 0.4 to 1.4. The experimental aspects of the static and wind-on programs are discussed. Jet effects test techniques in general, flow through balance calibrations and tare force corrections, ASME nozzle thrust and mass flow calibrations, test problems and solutions are emphasized. S.L.

N82-31303*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SUPERCRITICAL MANEUVERING FIGHTER CONFIGURATION. WIND-TUNNEL INVESTIGATION AT MACH NUMBERS OF 0.60 TO 0.95

Michael J. Mann, Charles E. Mercer, and Richard L. Campbell Sep. 1982 69 p refs
(NASA-TM-84513; L-15399; NAS 1.15:84513) Avail: NTIS HC A04/MF A01 CSCL 01A

A wind tunnel investigation was conducted to study the application of supercritical technology to highly maneuverable combat aircraft. The configuration studied has a leading-edge sweep of 45 deg and an aspect ratio of 3.28. Two supercritical-wing shapes were tested at Mach numbers from 0.60 to 0.95 with angles of attack from -2 deg to 17 deg. On supercritical wing was designed to achieve a high level of transonic maneuver performance at a Mach number of 0.90; however, excessive flow separation developed on this wing at a Mach number of 0.85. A second supercritical wing was tested which had significantly reduced flow separation and improved drag characteristics at a Mach number of 0.85 and maintained the performance of the original wing at the higher Mach numbers. Leading-edge vortex generators did not improve the performance of the second wing; however, a sharp leading-edge flap produced sizable drag reductions at Mach numbers from 0.60 to 0.90. Author

N82-31304*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.

HYBRID STATE VECTOR METHODS FOR STRUCTURAL DYNAMIC AND AEROELASTIC BOUNDARY VALUE PROBLEMS

Larry Lee Lehman Washington NASA Aug. 1982 195 p refs
(Grant NGL-05-020-243)
(NASA-CR-3591; NAS 1.26:3591) Avail: NTIS HC A09/MF A01 CSCL 01A

A computational technique is developed that is suitable for performing preliminary design aeroelastic and structural dynamic analyses of large aspect ratio lifting surfaces. The method proves to be quite general and can be adapted to solving various two point boundary value problems. The solution method, which is applicable to both fixed and rotating wing configurations, is based upon a formulation of the structural equilibrium equations in terms of a hybrid state vector containing generalized force and displacement variables. A mixed variational formulation is presented that conveniently yields a useful form for these state vector differential equations. Solutions to these equations are obtained by employing an integrating matrix method. The application of an integrating matrix provides a discretization of the differential equations that only requires solutions of standard linear matrix systems. It is demonstrated that matrix partitioning can be used to reduce the order of the required solutions. Results are presented for several example problems in structural dynamics and aeroelasticity to verify the technique and to demonstrate its use. These problems examine various types of loading and boundary conditions and include aeroelastic analyses of lifting surfaces constructed from anisotropic composite materials. Author

N82-31305# Arizona Univ., Tucson. Engineering Experiment Station.

SURFACE GENERATION FOR AERODYNAMIC APPLICATIONS

H. Sobieczky (DFVLR, Goettingen, West Germany) Jun. 1981 22 p refs
(Contract N00014-76-C-0182)
(AD-A116283; TFD-81-03) Avail: NTIS HC A02/MF A01 CSCL 20/4

This paper describes an analytical procedure to obtain the geometry of wing-body combinations, missiles, rotors and propellers, to be used in computational algorithms as well as for automated tool manufacturing wind tunnel models for flow-field analysis, with emphasis on parametrical shape variations needed in aerodynamic design and optimization procedures. Analytical shape definition allows for arbitrary surface coordinates generation to be combined with three dimensional (flow space) grid generators. Present version of the code (E88-A) defines the wing along sections at constant span, with smooth deviations near the wing root section, which is projected onto the body surface. The body is defined by cross-section shapes based on superelliptic arcs, connecting analytic crown lines and planform projection curves. Wing sections are defined by an analytical blending between given root and central sections for the inner part of the wing, and the same between the central and tip section for the outer part of the wing. These three basic airfoils may be given as dense data from preceding two dimensional design or as relatively few spline supports for an interpolation technique of suitably stretched ordinates in order to density airfoil data. GRA

N82-31308# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

MATERIALS AND DESIGN CRITERIA FOR KEVLAR-29 RIBBON PARACHUTES Final Report, 1 Sep. - 1 Mar. 1980

William R. Pinnell Apr. 1982 287 p refs
(AF Proj. 2402)
(AD-A116357; AFWAL-TR-81-3138) Avail: NTIS HC A12/MF A01 CSCL 01/3

This report contains information and design criteria for application of Kevlar-29 (intermediate modulus para-aramid) textile materials to ribbon parachutes. Textile materials for this application are listed, their properties and limitations discussed, and methods for tensile testing presented. Twenty degree conical continuous ribbon parachute test items were designed and fabricated using Kevlar-29 textile materials entirely. The results of air drop and sled track testing at subsonic and transonic conditions are presented and design criteria based on these results are reported. The effects of reefing (two stages) on aerodynamic performance of the 15.3 ft nominal diameter parachutes is also reported. The report treats joining techniques for kevlar-29 parachute components and presents the results of tensile tests of joint samples. Design considerations and fabrication techniques related to application of Kevlar-29 materials are included. A comprehensive list of references useful to the parachute or decelerator system designer is provided. Author (GRA)

N82-31309# Sandia Labs., Albuquerque, N. Mex.

REDUCTION IN PARACHUTE DRAG DUE TO FOREBODY WAKE EFFECTS

Carl W. Peterson and Donald W. Joh[illegible] 1981 10 p refs
Presented at the 7th AIAA Aerodyn. Decelerator and Balloon Technol. Conf., San Diego, Calif., 21 Oct. 1981
(Contract DE-AC04-76DP-00789)
(DE81-030124; SAND-81-0510C) Avail: NTIS HC A02/MF A01

The reduction in parachute drag due to forebody wake effects was predicted. The drag of a 20 deg conical ribbon parachute was measured at several axial stations behind an ogive cylinder forebody with and without fins. The same parachute was tested in undisturbed flow (where wake effects were negligible) so that the effects of suspension line length on parachute drag could be separated from the drag losses caused by the turbulent wake. Total head pressure surveys were made across the forebody wake and integrated across the canopy skirt area to determine the effective dynamic pressure acting on the parachute. Experimental results confirmed the validity of the underlying physical model of the parachute/wake interaction: the ratio of parachute drag behind a forebody divided by wake-free parachute drag is equal to the ratio of effective dynamic pressure acting on the parachute divided by freestream dynamic pressure. DOE

N82-31311*# Virginia Univ., Charlottesville. Dept. of Mechanical Engineering.
IDENTIFICATION OF TERMS TO DEFINE UNCONSTRAINED AIR TRANSPORTATION DEMANDS Final Report, 26 Mar. 1980 - 31 Aug. 1981
Ira D. Jacobson and A. Robert Kuhlhau Apr. 1982 60 p refs
(Contract NAS1-14906)
(NASA-CR-165961; NAS 1.26:165961;
UVA/528194/MAE-CE82/101) Avail: NTIS HC A04/MF A01
CSCL 01C

The factors involved in the evaluation of unconstrained air transportation systems were carefully analyzed. By definition an unconstrained system is taken to be one in which the design can employ innovative and advanced concepts no longer limited by present environmental, social, political or regulatory settings. Four principal evaluation criteria are involved: (1) service utilization, based on the operating performance characteristics as viewed by potential patrons; (2) community impacts, reflecting decisions based on the perceived impacts of the system; (3) technological feasibility, estimating what is required to reduce the system to practice; and (4) financial feasibility, predicting the ability of the concepts to attract financial support. For each of these criteria, a set of terms or descriptors was identified, which should be used in the evaluation to render it complete. It is also demonstrated that these descriptors have the following properties: (a) their interpretation may be made by different groups of evaluators; (b) their interpretations and the way they are used may depend on the stage of development of the system in which they are used; (c) in formulating the problem, all descriptors should be addressed independent of the evaluation technique selected. Author

N82-31313# Federal Aviation Administration, Washington, D.C.
SUMMARY OF FEDERAL AVIATION ADMINISTRATION RESPONSE TO NATIONAL TRANSPORTATION SAFETY BOARD SAFETY RECOMMENDATIONS Quarterly Report, Jul. - Sep. 1981
R. E. Livingston and C. A. Carpenter Oct. 1981 320 p refs
(AD-A115485; DOT/FAA/ASF-81/5) Avail: NTIS
HC A14/MF A01 CSCL 05/4

This report contains NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as 'Closed' by the NTSB as a result of acceptable action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-81-36 through 38), but background material is included only for those recommendations which remain in an 'Open' status. Background information for those recommendations which have been closed is available in FAA Headquarters files. Author (GRA)

N82-31314# Federal Aviation Administration, Washington, D.C. Office of Aviation Safety.
SUMMARY OF FEDERAL AVIATION ADMINISTRATION RESPONSE TO NATIONAL TRANSPORTATION SAFETY BOARD SAFETY RECOMMENDATIONS Quarterly Report, Oct. - Dec. 1981
R. E. Livingston and C. A. Carpenter Jan. 1982 412 p refs
(AD-A115486; DOT/FAA/ASF-81/6) Avail: NTIS
HC A18/MF A01 CSCL 05/04

This report contains NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as 'Closed' by the NTSB as a result of acceptable action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-81-88 through 91), but background material is included only for those recommendations which remain in an 'Open' status. Background information for those recommendations which have been closed is available in FAA Headquarters files. Author (GRA)

N82-31315# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
FAA ACCEPTANCE TESTS ON THE NAVIGATION SYSTEM USING TIME GLOBAL POSITIONING SYSTEM Z SET RECEIVER Final Report, Jun. - Dec. 1979
Robert J. Esposito Jul. 1982 21 p refs
(FAA Proj. 049-330-110)
(DOT/FAA/RD-82/9) Avail: NTIS HC A02/MF A01

Acceptance tests on the Navigation System Using Time and Ranging (NAVSTAR) Global Positioning System (GPS) Z-set receiver are described. The Yuma laser tracking system computed a reference trajectory against which the GPS receiver solution was compared. Data from five flights, totaling over 6 hours, are presented with the objective of assessing Z-set capabilities to meet civil aviation requirements for nonprecision approaches. Author

N82-31318# Mitre Corp., McLean, Va. Metrek Div.
OPERATIONAL AND FUNCTIONAL REQUIREMENTS FOR THE NAVIGATION SYSTEM IN TERMINAL AREAS Final Report
Satish C. Mohleji Feb. 1982 63 p refs
(Contract DOTA01-82-C-10003)
(AD-A116127; MTR-82W13; FAA-RD-82-10) Avail: NTIS
HC A04/MF A01 CSCL 17/7

A comprehensive set of operational requirements relating the capabilities of the navigation system and its use in the ATC environment are developed in this paper by modifying the operational requirements for MLS established by the International Civil Aviation Organization. In order to establish the functional requirements, an interrelationship is established between the navigation system parameters, route geometry and ATC procedures considering system uncertainties. An impact of each ATC uncertainty (navigation, surveillance, communication delays, airspeeds and winds) is first examined individually by computing the time dispersions between the planned vs. the achieved aircraft performance. Then a total dispersion and control interaction is established by calculating the time variability due to speed adjustments permitted under ATC procedures, and by statistically combining the impact of the ATC uncertainties using a root sum square (RSS) approach. This technique is general enough to permit evaluation of functional requirements (accuracy, coverage and channel capacity) of any navigation system under varying ATC parameters, procedures and operational requirements. GRA

N82-31319# Mitre Corp., McLean, Va. Metrek Div.
ANALYSIS OF ACTIVE BCAS ALERT RATES AND PROTECTION BASED ON ACTUAL AIRCRAFT TRACKS Final Report
Lillian B. Zarrelli Feb. 1982 239 p refs
(Contract DTFA01-82-C-10003)
(AD-A116402; MTR-80W267; FAA-RD-82-33) Avail: NTIS
HC A11/MF A01 CSCL 17/7

This document describes an evaluation of the performance of the Active Beacon Collision Avoidance System (Active BCAS) using the Houston data base and simulated midair collision scenarios. The Houston data was extracted from ARTS III tapes and consisted of 65 hours of operation. This data was used to measure alert rates and assess desensitization techniques aimed at reducing the number of unnecessary alerts. The midair data base consisted of the reconstructed flight paths of 15 actual midair collisions. Measures of protection and tradeoffs were made based on the performance of the BCAS logic in resolving these simulated collision scenarios. Author (GRA)

N82-31321*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXPERIMENTAL INVESTIGATION OF ACTIVE LOADS CONTROL FOR AIRCRAFT LANDING GEAR
John R. McGehee and Robert C. Dreher Aug. 1982 72 p refs

(NASA-TP-2042; L-15224; NAS 1.60:2042) Avail: NTIS HC A04/MF A01 CSCL 01C

Aircraft dynamic loads and vibrations resulting from landing impact and from runway and taxiway unevenness are recognized as significant in causing fatigue damage, dynamic stress on the airframe, crew and passenger discomfort, and reduction of the pilot's ability to control the aircraft during ground operations. One potential method for improving operational characteistics of aircraft on the ground is the application of active control technology to the landing gears to reduce ground loads applied to the airframe. An experimental investigation was conducted which simulated the landing dynamics of a light airplane to determine the feasibility and potential of a series hydraulic active control main landing gear. The experiments involved a passive gear and an active control gear. Results of this investigation show that a series hydraulically controlled gear is feasible and that such a gear is very effective in reducing the loads transmitted by the gear to the airframe during ground operations. Author

N82-31322# Arizona Univ., Tucson. Engineering Experiment Station.
AN EFFECTIVE ALGORITHM FOR SHOCK-FREE WING DESIGN
K.-Y. Fung, A. Robert Seebass, L. J. Dickson, and C. F. Pearson Jun. 1981 31 p refs Presented at the 14th AIAA Fluid and Plasma Dyn. Conf., Palo Alto, Calif., 23-25 Jun. 1981
(Contract N00014-76-C-0182)
(AD-A116265; TFD-81-06) Avail: NTIS HC A03/MF A01 CSCL 20/4

This paper reviews the fictitious gas procedure of Sobieczky for finding shockfree airfoils and wings. Results for inviscid and viscous flows for airfoils and wings are described. The method is applied to a business jet planform resulting in a wing that should have good low speed characteristics as well as an M-infinity L/D that is near the maximum achievable for the wing lift and thickness choosen for the study. GRA

N82-31323# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex. Atmospheric Sciences Lab.
THE MANEUVERABLE ATMOSPHERIC PROBE (MAP), A REMOTELY PILOTED VEHICLE Final Report
Roberto Rubio, Claude L. Tate, Maynard L. Hill, Harold N. Ballard, Mike Izquierdo, and Carlos McDonald May 1982 56 p refs
(DA Proj. 1L1-62111-AH-71)
(AD-A116118; ERADCOM/ASL-TR-0110) Avail: NTIS HC A04/MF A01 CSCL 01/3

This report documents, in considerable detail, the physical and aerodynamic characteristics of the 10-hp, 36.5-kg, radio-controlled MAP aircraft, as well as the novel fluidic and electrostatic vertical stabilizer systems assisting in aircraft control. The atmospheric and aerodynamic sensor configurations, including the sensor data telemetry system, are described. Three distinct flight experiments were conducted with the instrumented MAP vehicle. During the first experiment, dust particulate samples, raging in size from 0.2 micrometer to 400 micrometer, were obtained by flying the RPV-mounted samplers through low altitude dust clouds generated by ground-based 105-mm artillery shell explosions. Data from this experiment are presented. The second experiment involved characterizing typical atmospheric conditions along a laser propagation range (path). Graphs of atmospheric temperature, pressure, RH, and derived air density, all as functions of RPV altitude, present data that are representative of those obtained from the second experiment. Measurement accuracies for temperature, pressure, and RH are respectively shown to be plus or minus 1 deg C, plus or minus 2 percent of the total pressure and plus or minus 4 percent of actual RH. The third experiment was conducted with the instrumented RPV being flown near a mountain peak whose altitude is 2440 millimeter relative to mean sea level (msl). Atmospheric electric field intensity and turbulence structure measurements as functions of RPV position relative to the mountain peak make up the third set of data presented in this report. GRA

N82-31324# Army Natick Research and Development Command, Mass.
SIMULATION OF THE INTERACTION BETWEEN AIRDROP PLATFORMS AND AIRCRAFT ROLLERS
Earl C. Steeves Apr. 1982 54 p
(DA Proj. 1L1-62210-D-283)
(AD-A116370; NATICK/TR-82/014) Avail: NTIS HC A04/MF A01 CSCL 01/2

All airdrop loads must be certified as not exceeding the maximum aircraft roller loads. This certification is presently accomplished by a series of tests which are numerous and complex. This report looks at the possibility of replacing this test procedure with a numerical simulation. Two simulations are examined; a straightforward deterministic structural simulation and a structural simulation that includes the imperfections in the system in a statistical manner. The imperfections in the system are large enough to make the deterministic structural model inadequate, and insufficient data are available to make an accurate statistical model of the imperfections. As a result, it was not possible to develop a complete model to carry out the roller load simulation, although only the imperfection model is needed for completion of the statistical simulation. The statistical model was used to demonstrate that the use of very flexible rollers would reduce the importance of the imperfections in the system. GRA

N82-31325# Naval Air Propulsion Test Center, Trenton, N.J. Propulsion Technology and Project Engineering Dept.
A METHOD FOR DESIGNING INLET DISTORTION SCREENS FOR AIRCRAFT GAS TURBINE ENGINE TESTS USING AN INTERACTIVE COMPUTER PROGRAM Final Report
Robert E. Anderson May 1982 35 p ref
(AD-A116584; NAPC-PE-66) Avail: NTIS HC A03/MF A01 CSCL 21/5

The design of inlet distortion screens used for testing aircraft gas turbine engines can be facilitated by using an interactive computer program. This report describes a computer program which has been developed by the Naval Air Propulsion Center to aid in the screen design process. The computer program can be used to establish the initial screen design and to develop modifications after the screen is tested. Author (GRA)

N82-31326*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
FUNCTIONAL DESIGN TO SUPPORT CDTI/DABS FLIGHT EXPERIMENTS Final Report
Tsuyoshi Goka Jul. 1982 170 p refs
(Contract NAS1-16802)
(NASA-CR-165947; NAS 1.26:165947) Avail: NTIS HC A08/MF A01 CSCL 01D

The objectives of this project are to: (1) provide a generalized functional design of CDTI avionics using the FAA developed DABS/ATARS ground system as the 'traffic sensor', (2) specify software modifications and/or additions to the existing DABS/ATARS ground system to support CDTI avionics, (3) assess the existing avionics of a NASA research aircraft in terms of CDTI applications, and (4) apply the generalized functional design to provide research flight experiment capability. DABS Data Link Formats are first specified for CDTI flight experiments. The set of CDTI/DABS Format specifications becomes a vehicle to coordinate the CDTI avionics and ground system designs, and hence, to develop overall system requirements. The report is the first iteration of a system design and development effort to support eventual CDTI flight test experiments. Author

N82-31327# Smiths Industries, Inc., Clearwater, Fla.
FINAL ENGINEERING REPORT FOR COMPUTER, WEAPON AIMING CP-1444/A Final Report
M. D. Caramichael 1 Jun. 1982 175 p refs
(Contract N00019-77-A-0350)
(AD-A115238; SI-0519) Avail: NTIS HC A08/MF A01 CSCL 19/5

The WAC performs the following general functions: (1) Signal conditioning of the aircraft attitude sensor data for use by the

Head-Up Display (HUD) system; (2) Air-to-air lead angle computation for the HUD air-to-air gunsight; (3) Air-to-ground weapon depression and across-wind aimpoint computation for the HUD air-to-ground Continuously Computed Impact Point (CCIP) weapon release cue; and (4) Breakway warning computation for terrain and weapon fragmentation avoidance for the HUD air-to-ground CCIP mode. GRA

N82-31329*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

DEVELOPMENT OF A SPINNING WAVE HEAT ENGINE Final Report

B. T. Zinn, E. A. Powell, and J. E. Hubbartt Aug. 1982 100 p refs

(Grant NAG3-96)

(NASA-CR-165611; NAS 1.26:165611) Avail: NTIS HC A05/MF A01 CSCL 21E

A theoretical analysis and an experimental investigation were conducted to assess the feasibility of developing a spinning wave heat engine. Such as engine would utilize a large amplitude traveling acoustic wave rotating around a cylindrical chamber, and it should not suffer from the inefficiency, noise, and intermittent thrust which characterizes pulse jet engines. The objective of this investigation was to determine whether an artificially driven large amplitude spinning transverse wave could induce a steady flow of air through the combustion chamber under cold flow conditions. In the theoretical analysis the Maslen and Moore perturbation technique was extended to study flat cylinders (pancake geometry) with completely open side walls and a central opening. In the parallel experimental study, a test moel was used to determine resonant frequencies and radial pressure distributions, as well as oscillatory and steady flow velocities at the inner and outer peripheries. The experimental frequency was nearly the same as the theoretical acoustic value for a model of the same outer diameter but without a central hole. Although the theoretical analysis did not predict a steady velocity component, simultaneous measurements of hotwire and microphone responses have shown that the spinning wave pumps a mean flow radially outward through the cavity. Author

N82-31330*# Drexel Univ., Philadelphia, Pa. Dept. of Mechanical Engineering and Mechanics.

SINGULAR PERTURBATION TECHNIQUES FOR REAL TIME AIRCRAFT TRAJECTORY OPTIMIZATION AND CONTROL Final Report, Feb. 1978 - Dec. 1981

Anthony J. Calise and Daniel D. Moerder NASA Washington Aug. 1982 111 p refs

(Grant NsG-1496)

(NASA-CR-3597; NAS 1.26:3597) Avail: NTIS HC A06/MF A01 CSCL 01C

The usefulness of singular perturbation methods for developing real time computer algorithms to control and optimize aircraft flight trajectories is examined. A minimum time intercept problem using F-8 aerodynamic and propulsion data is used as a baseline. This provides a framework within which issues relating to problem formulation, solution methodology and real time implementation are examined. Theoretical questions relating to separability of dynamics are addressed. With respect to implementation, situations leading to numerical singularities are identified, and procedures for dealing with them are outlined. Also, particular attention is given to identifying quantities that can be precomputed and stored, thus greatly reducing the on-board computational load. Numerical results are given to illustrate the minimum time algorithm, and the resulting flight paths. An estimate is given for execution time and storage requirements. Author

N82-31331# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.

DESIGN OF ADVANCED DIGITAL FLIGHT CONTROL SYSTEMS VIA COMMAND GENERATOR TRACKER (CGT) SYNTHESIS METHODS, VOLUME 1 M.S. Thesis

Richard M. Floyd Dec. 1981 226 p refs 2 Vol.

(AD-A115510; AFIT/GE/EE/81-20-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 01/2

This study develops a computer program for interactive execution to aid in the design of Command Generator Tracker control systems employing Proportional-plus-Integral inner-loop controllers and Kalman Filters for state estimation (CGT/PI/KF controllers). Design parameters are specified in the continuous-time domain and the computer program obtains the corresponding discrete-time parameters and determines a direct digital design for sampled-data implementation. Designs are based upon the Linear system mode, Quadratic cost, and Gaussian noise process (LQG) assumptions of optimal control theory. The report discusses the theoretical background and applications of optimal model-following designs which preceded the CGT theory. A development of the CGT/PI/KF controller theory is presented, and performance evaluation tools for the controller design are discussed. Following a brief description of the computer program developed, results of applying it to example aircraft-related controller design problems are presented and discussed. GRA

N82-31332# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.

DESIGN OF ADVANCED DIGITAL FLIGHT CONTROL SYSTEMS VIA COMMAND GENERATOR TRACKER (CGT) SYNTHESIS METHODS, VOLUME 2 M.S. Thesis

Richard M. Floyd Dec. 1981 246 p refs 2 Vol.

(AD-A115511; AFIT/GE/EE/81-20-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 01/2

CGTPIF is a controller design program which executes interactively. Three design paths are offered: (1) design of a Proportional-plus-Integral (PI) regulator via linear-quadratic (LQ) methodology; (2) design of a Command Generator Tracker, either open-loop (CGT) or closed-loop (CGT/PI); and (3) design of a Kalman filter (KF). These three designs are components of a final controller implemented as a Command Generator Tracker, with an inner-loop proportional-plus-integral regulator, and a Kalman filter for state estimation (CGT/PI/KF). For each design path there is a corresponding set of routines to evaluate the quality of the design achieved. The program is written in FORTRAN IV and consists of about 2500 lines of source code. In addition, numerous routines are employed from a library of matrix routines described in Reference 24. Author (GRA)

N82-31333# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany).

DESCRIPTION OF A SIMPLE MODEL TO DETERMINE LANDING GEAR FORCES DURING THE TAKEOFF OF AERODYNAMICALLY UNSTABLE AIRCRAFT [BESCHREIBUNG EINES EINFACHEN MODELLS ZUR ERMITTLUNG VON FAHRWERKSKRAEFTEN WAEHREND DES STARTVORGANGS EINES AERODYNAMISCHES INSTABILEN FLUGZEUGS]

M. Soelter 25 Nov. 1981 43 p refs In GERMAN

(EX-22B) Avail: NTIS HC A03/MF A01

A simple model to simulate the lateral motion during the takeoff of an aerodynamically unstable aircraft is presented. By neglecting the landing gear dynamics no additional solution of the corresponding differential equations was required. Landing gear forces were determined from the geometrical ratios of the aircraft to the ground reference line. This procedure is particularly efficient when no high frequency landing gear drive-as, e.g., during touchdown has to be taken into account. The objection free function of the control concept for an aircraft aerodynamically unstable in the lateral plane is shown. Author (ESA)

N82-31335# Goulding (Merrill K.) and Associates, Glendale, Calif.

STUDY OF THE DE-ICING PROPERTIES OF THE ASDE-3 ROTODOME Final Report, Sep. 1978 - Sep. 1980

Merrill K. Goulding Washington FAA Apr. 1982 132 p refs

(Grant DOT-TSC-15950)

(AD-A115445; DOT/FAA/RD-81/112; DOT-TSC-FAA-81-24; DTS-541) Avail: NTIS HC A07/MF A01 CSCL 01/5

A study was conducted of the thermal characteristics of the

ASDE-3 system's rotating radome (rotodome), a spheri-toroidal thin wall structure, approximately 18 feet in diameter and 6 feet in height. The purpose of the study was to determine the thermal transmissivities of the various regions of the design, discover 'hot spots,' determine the need for insulation, heater exhaust deflectors and other enhancements, and to make a prediction of the ability of its heaters to prevent system outages due to ice accretion on the rotodome. An analysis made using test data to predict the ability of the rotodome to resist icing conditions was very encouraging, demonstrating that convection becomes the dominant mode of heat loss during high wind conditions. A conservative analysis was made with winds applied at full velocity across all regions of the rotodome. The results indicate that the goal of de-icing the rotodome appears achievable using 30 kW of power. Although there are hot spots about the rotodome, the de-icing function using the hot air blower system is satisfactory. To reduce hot spots near the blower assembly, a deflector is recommended at the output of the blower. Author (GRA)

N82-31336# American Airlines, Inc., Ft. Worth, Tex.
WIDE-ANGLE, MULTIVIEWER, INFINITY DISPLAY SYSTEM Final Report
Ian Whyte and A. W. Zepf Jun. 1982 95 p refs
(Contract F33615-79-C-0002)
(AD-A116308; AFHRL-TR-81-27(1)) Avail: NTIS HC A05/MF A01 CSCL 05/9

This study examined the design specification for a wide angle infinity display system with minimal distortion, convergence, dipvergence, and collimation errors for use on wide body aircraft simulators. The report includes a recommended final design specification; a survey of potential fabrication technologies for projector, screen and large mirrors; an approach to fabrication of a large display system; and finally, assembly and alignment techniques of mirror segments for a large display. (Note: Dipvergence refers to vertical movement of eyes up and down as opposed to side to side.) GRA

N82-31338# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
CALIBRATION AND PERFORMANCE OF THE AEDC/VKF TUNNEL C, MACH NUMBER 4, AEROTHERMAL WIND TUNNEL Final Report, 15 May - 18 Dec. 1981
W. T. Strike, Jr. Jun. 1982 117 p refs
(AD-A116279; AEDC-TR-82-6) Avail: NTIS HC A06/MF A01 CSCL 14/2

The shakedown and calibrated characteristics of the new AEDC Mach Number 4 Aerothermal Wind Tunnel were experimentally identified at several test conditions. The nominal Mach number of the test core as defined by a 30-probe pitot pressure rake varied between nominally 3.95 and 4.0, depending on the test section Reynolds number and stilling chamber temperature. The overall variation in the stilling chamber pressure is nominally 15 to 180 psia, with temperatures from 250 to 1,210 F for an overall Reynolds number range of 0.2 to 8.1 million per foot and true temperature-pressure altitude simulation from 56,000 to 105,000 ft. Author (GRA)

N82-31448*# Douglas Aircraft Co., Inc., Long Beach, Calif.
KEVLAR/PMR-15 REDUCED DRAG DC-9 REVERSER STANG FAIRING
R. T. Kawai Aug. 1982 140 p refs
(Contract NAS3-21763)
(NASA-CR-165448; NAS 1.26:165448) Avail: NTIS HC A07/MF A01 CSCL 11D

A reduced drag fairing for the afterbody enclosing the thrust reverser actuators on the DC-9 has been developed with Kevlar-49/PMR-15 advanced composite material. The improved fairing reduces airplane drag 1% compared to the production baseline. Use of composites reduces weight 40% compared to an equivalent metal fairing. The Kevlar-49/PMR-15 advanced composite is an organic matrix material system that can be used at temperatures up to 500 F. Author

N82-31449*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENVIRONMENTAL AND HIGH-STRAIN RATE EFFECTS ON COMPOSITES FOR ENGINE APPLICATIONS
C. C. Chamis and G. T. Smith 1982 20 p refs Presented at the 23rd Struct. Dyn. and Mater. Conf., New Orleans, 10-12 May 1982; sponsored by AIAA, ASME, ASCE, and AHS Previously announced in IAA as A82-30118
(NASA-TM-82882; NAS 1.15:82882) Avail: NTIS HC A02/MF A01 CSCL 11D

The Lewis Research Center is conducting a series of programs intended to investigate and develop the application of composite materials to structural components for turbojet engines. A significant part of that effort is directed to establishing resistance, defect growth, and strain rate characteristics of composite materials over the wide range of environmental and load conditions found in commercial turbojet engine operations. Both analytical and experimental efforts are involved. Author

N82-31546*# Lockheed-California Co., Burbank.
ADDITIONAL EXPERIMENTS ON FLOWABILITY IMPROVEMENTS OF AVIATION FUELS AT LOW TEMPERATURES, VOLUME 2 Final Report
Francis J. Stockemer and Ronald L. Deane Aug. 1982 56 p refs
(Contract NAS3-21977)
(NASA-CR-167912; NAS 1.26:167912) Avail: NTIS HC A04/MF A01 CSCL 21D

An investigation was performed to study flow improver additives and scale-model fuel heating systems for use with aviation hydrocarbon fuel at low temperatures. Test were performed in a facility that simulated the heat transfer and temperature profiles anticipated in wing fuel tanks during flight of long-range commercial aircraft. The results are presented of experiments conducted in a test tank simulating a section of an outer wing integral fuel tank approximately full-scale in height, chilled through heat exchange panels bonded to the upper and lower horizontal surfaces. A separate system heated lubricating oil externally by a controllable electric heater, to transfer heat to fuel pumped from the test tank through an oil-to-fuel heat exchanger, and to recirculate the heated fuel back to the test tank. B.W.

N82-31548# Naval Postgraduate School, Monterey, Calif.
AN INVESTIGATION OF THE EFFECTS OF SMOKE SUPPRESSANT FUEL ADDITIVES ON ENGINE AND TEST CELL EXHAUST GAS OPACITIES Final Report, 1981
Donald W. Thornburg, Thomas R. Darnell, and David W. Netzer May 1982 116 p refs
(AD-A116171; NPS67-82-004) Avail: NTIS HC A06/MF A01 CSCL 21/4

Tests were conducted in a one-eighth scale turbojet test cell with a ramjet type combustor to investigate the effects of fuel additives on smoke reduction. Particle size and mass concentrations were determined at the engine and stack exhausts using three wavelength optical detector systems. Particulate samples were also collected at the engine exhaust and analyzed with a scanning electron microscope. Combustor temperature and fuel additives were found to significantly affect particulate mass concentrations emitted from the engine while particle size appeared to be unaffected. No significant changes in the particulate size or mass occurred from the engine exhaust to the stack exhaust. The optical determination of exhaust mean particulate size/mass concentration with three wavelength optical detector systems appears to be reasonably accurate technique for evaluating the effects of engine and test cell operating conditions and fuel composition changes on the emitted particulates. Author (GRA)

N82-31569# Southampton Univ. (England). Inst. of Sound and Vibration Research.
[ACTIVITIES OF THE INSTITUTE OF SOUND AND VIBRATION RESEARCH] Annual Report, Mar. 1982
1982 49 p refs

Avail: NTIS HC A03/MF A01

Research in fluid dynamics, acoustics, automotive engineering, audiology, noise and vibration effects (on human beings), and structural response to noise and vibration was carried out. Aircraft noise, acoustics of flow duct systems and enclosures, acoustic modeling, sound propagation, and acoustic measurement techniques were studied. Auditory and vestibular functions and electrophysiology were investigated. Author (ESA)

N82-31637*# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

REAL TIME ESTIMATION AND PREDICTION OF SHIP MOTIONS USING KALMAN FILTERING TECHNIQUES

Michael A. Triantafyllou, Marc Bodson, and Michael Athans Jul. 1982 142 p refs
(Grant NGL-22-009-124)
(NASA-CR-169284; NAS 1.26:169284; LIDS-R-1220) Avail: NTIS HC A07/MF A01 CSCL 20D

A landing scheme for landing V/STOL aircraft on rolling ships was sought using computerized simulations. The equations of motion as derived from hydrodynamics, their form and the physical mechanisms involved and the general form of the approximation are discussed. The modeling of the sea is discussed. The derivation of the state-space equations for the DD-963 destroyer is described. Kalman filter studies are presented and the influence of the various parameters is assessed. The effect of various modeling parameters on the rms error is assessed and simplifying conclusions are drawn. An upper bound for prediction time of about five seconds is established, with the exception of roll, which can be predicted up to ten seconds ahead. R.J.F.

N82-31639*# City Coll. Research Foundation, New York. Turbomachinery Lab.

EXPERIMENTAL STUDY OF TURBULENCE IN BLADE END WALL CORNER REGION

R. Raj Aug. 1982 110 p refs
(Grant NAG3-122)
(NASA-CR-169283; NAS 1.26:169283; RF-05438) Avail: NTIS HC A06/MF A01 CSCL 20D

Corner flows and wall pressure fluctuations, design and fabrication of the test model, preliminary results on boundary layer, flow visualization, turbulence intensity and spectra measurements are presented. The design consideration and fabrication report on the newly built wind tunnel to be used for subsequent continuation of the research effort is also presented. S.L.

N82-31645*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LAMINAR FLOW CONTROL, 1976 - 1982: A SELECTED ANNOTATED BIBLIOGRAPHY

Marie H. Tuttle and Dal V. Maddalon Aug. 1982 82 p
(NASA-TM-84496; L-15434; NAS 1.15:84496) Avail: NTIS HC A05/MF A01 CSCL 20D

Laminar Flow Control technology development has undergone tremendous progress in recent years as focused research efforts in materials, aerodynamics, systems, and structures have begun to pay off. A virtual explosion in the number of research papers published on this subject has occurred since interest was first stimulated by the 1976 introduction of NASA's Aircraft Energy Efficiency Laminar Flow Control Program. The purpose of this selected bibliography is to list available, unclassified laminar flow (both controlled and natural) research completed from about 1975 to mid 1982. Some earlier pertinent reports are included but listed separately in the Appendix. Reports listed herein emphasize aerodynamics and systems studies, but some structures work is also summarized. Aerodynamic work is mainly limited to the subsonic and transonic sped regimes. Because wind-tunnel flow qualities, such as free stream disturbance level, play such an important role in boundary-layer transition, much recent research has been done in this area and it is also included. Author

N82-31663*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DEVELOPMENT AND UTILIZATION OF A LASER VELOCIMETER SYSTEM FOR A LARGE TRANSONIC WIND TUNNEL

Robert J. Freedman and John P. Greissing Jun. 1982 17 p refs
(NASA-TM-82866; E-1264; NAS 1.15:82866) Avail: NTIS HC A02/MF A01 CSCL 14B

The need for measurements of the velocity flow field about spinner propeller nacelle configurations at Mach numbers to 0.8 was met by a specially developed laser velocimeter system. This system, which uses an argon ion laser and 4 beam 2 color optics, was required to operate in the hostile environment associated with the operation of a large transonic wind tunnel. To overcome the conditions present in locating the sensitive optics in close proximity to the wind tunnel, an isolation system was developed. The system protects the velocimeter from the high vibrations, elevated temperatures, destructive acoustic pressures and low atmospheric pressures attendant with the operation of the wind tunnel. The system was utilized to map the flow field in front of, behind and in between the rotating blades of an advanced swept blade propeller model at a Mach number of 0.8. The data collected by the system will be used to correlate and verify computer analyses of propeller nacelle flow fields and propeller performance. R.J.F.

N82-31694# AiResearch Mfg. Co., Torrance, Calif.

ELECTROMECHANICAL ACTUATION DEVELOPMENT PROGRAM (EADP). POWER CONTROL DEVELOPMENT Final Report, Jul. 1980 -Sep. 1981

Stephen Rowe, David Bailey, and Robert Belanus Wright-Patterson AFB, Ohio AFWAL Sep. 1981 146 p
(Contract F33615-80-C-3620; AF Proj. 2403)
(AD-A116126; AMC-81-18106; AFWAL-TR-81-3106) Avail: NTIS HC A07/MF A01 CSCL 20/3

Electromechanical actuation of primary flight control surfaces has been demonstrated by the development of an integrated rotary hingeline dual-redundant actuation unit. Improved system bandwidth was demonstrated after employing improved sensors and electronic controls. Author (GRA)

N82-31705 Politecnico di Milano (Italy). Dept. di Ingegneria Aerospaziale.

EXPERIMENTAL INVESTIGATION OF AEROELASTIC INSTABILITY OF OPEN FIELD THIN PROFILES [INDAGINE SPERIMENTALE SUL'INSTABILITA AEROELASTICA DI PROFILI SOTTILI APERTI]

G. Casarico (Soc. Anonima Elettrificazione SPA), S. DePonte, and P. Faggiano (Soc. Anonima Elettrificazione SPA) 1981 11 p In ITALIAN Presented at Coll. dei Tec. dell'Acciaio (CTA) Giornate Ital. della Costruzione in Acciaio, Palerma, Italy, Oct. 1981
Avail: Issuing Activity

The behavior of thin wall metal profiles under oscillating aerodynamic loads was investigated in a wind tunnel. The beams were held by elastic constraint, being able to move in all directions, while the air incidence angle was varied throughout the experiments. Three types of transient response characterized by one or two critical wind velocities and either flexional or torsional vibration, which are related to the profile characteristics and the wind incidence, are described. Author (ESA)

N82-31707*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

LARGE DISPLACEMENTS AND STABILITY ANALYSIS OF NONLINEAR PROPELLER STRUCTURES

Robert A. Aiello 1982 18 p refs Presented at the 10th NASTRAN User's Colloq., New Orleans, 13-14 May 1982
(NASA-TM-82850; NAS 1.15:82850) Avail: NTIS HC A02/MF A01 CSCL 20K

The use of linear rigid formats in COSMIC NASTRAN without DMAP procedures for the analysis of nonlinear propeller structures is described. Approaches for updating geometry and applying follower forces for incremental loading are demonstrated. Comparisons are made with COSMIC NASTRAN rigid formats and other independent finite element programs. Specifically, the comparisons include results from the four approaches for updating the geometry using RIGID FORMAT 1, RIGID FORMATS 4 and 13, MARC and MSC/NASTRAN. It is shown that 'user friendly' updating approaches (without DMAPS) can be used to predict the large displacements and instability of these nonlinear structures. These user friendly approaches can be easily implemented by the user and predict conservative results. Author

N82-31714# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
STRESS INTENSITY FACTORS FOR RADIAL CRACKS AT OUTER SURFACE OF A PARTIALLY AUTOFRETTAGED CYLINDER SUBJECTED TO INTERNAL PRESSURE Final Report
S. L. Pu May 1982 50 p refs
(DA Proj. 1L1-61102-AH-60)
(AD-A116396; ARLCB-TR-82003) Avail: NTIS HC A03/MF A01 CSCL 12/1

The functional stress intensity factor approach which combines the finite element, thermal simulation and weight function methods developed for the computation of stress intensity factors for multiple radial cracks at the inner surface of a partially autofrettaged cylinder is applied in this report to external cracks. Numerical results of stress intensity factors are obtained for a cylinder with outer diameter twice the inner diameter. A slight increase into the degree of autofrettage will increase stress intensity factors of inner cracks slightly but will decrease stress intensity factors of external cracks considerably. As in the inner crack case, the cylinder with two diametrically opposed external cracks is in general the weakest configuration and for more than two cracks, the stress intensity factor decreases as the number of external cracks increase. Author (GRA)

N82-31716# Riso National Lab., Roskilde (Denmark).
AERODYNAMIC FORCES ACTING ON THE BLADES OF STALL REGULATED PROPELLER TYPE WINDMILLS
F. Rasmussen Aug. 1981 37 p refs In DANISH
(DE82-901178; RISO-M-2316) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries; also available from Risoe Library, DK-4000, Roskilde, Denmark

Aerodynamic forces acting on the blades of stall regulated propeller type windmills are discussed. The expected dynamic behavior of the loads are outlined. Great dynamic loads under stall condition and skew wind (yaw or tilt) are shown by theoretical calculations from the blade element theory for one typical design. The forces on the three blades are calculated as well as the total forces from the rotor acting on the main shaft. Blade strut forces on a 10 m diameter, three blades Riisager windmill are measured. DOE

N82-31965*# Sikorsky Aircraft, Stratford, Conn.
COUPLED ROTOR/AIRFRAME VIBRATION ANALYSIS PROGRAM MANUAL MANUAL. VOLUME 1: USER'S AND PROGRAMMER'S INSTRUCTIONS Final Report
S. Cassarino and R. Sopher Jun. 1982 212 p refs Sponsored in part by ARMY 2 Vol.
(Contract NAS1-16058)
(NASA-CR-165891; NAS 1.26:165891) Avail: NTIS HC A10/MF A01 CSCL 09B

user instruction and software descriptions for the base program of the coupled rotor/airframe vibration analysis are provided. The functional capabilities and procedures for running the program are provided. Interfaces with external programs are discussed. The procedure of synthesizing a dynamic system and the various solution methods are described. Input data and output results are presented. Detailed information is provided on the program structure. Sample test case results for five representative dynamic configurations are provided and discussed. System response are plotted to demonstrate the plots capabilities available. Instructions to install and execute SIMVIR on the CDC computer system are provided. Author

N82-31966*# Sikorsky Aircraft, Stratford, Conn.
COUPLED ROTOR/AIRFRAME VIBRATION ANALYSIS PROGRAM MANUAL. VOLUME 2: SAMPLE INPUT AND OUTPUT LISTINGS Final Report
S. Cassarino and R. Sopher Jun. 1982 283 p refs Sponsored in part by ARMY 2 Vol.
(Contract NAS1-16058)
(NASA-CR-165892; NAS 1.26:165892) Avail: NTIS HC A12/MF A01 CSCL 09B

Sample input and output listings obtained with the base program (SIMVIB) of the coupled rotor/airframe vibration analysis and the external programs, G400/F389 and E927 are presented. Results for five of the base program test cases are shown. They represent different applications of the SIMVIB program to study the vibration characteristics of various dynamic configurations. Input and output listings obtained for one cycle of the G400/F389 coupled program are presented. Results from the rotor aeroelastic analysis E927 also appear. A brief description of the check cases is provided. A summary of the check cases for all the external programs interacting with the SIMVIB program is illustrated. Author

N82-31967*# Illinois Univ., Urbana-Champaign. Coordinated Science Lab.
MULTILEVEL SEMANTIC ANALYSIS AND PROBLEM-SOLVING IN THE FLIGHT DOMAIN Final Report, 11 Jul. 1981 - 10 Jul. 1982
R. T. Chien, D. C. Chen, W. P.-C. Ho, and Y. C. Pan Aug. 1982 111 p refs
(Contract NCC1-52)
(NASA-CR-169282; NAS 1.26:169282; T-117) Avail: NTIS HC A06/MF A01 CSCL 09B

A computer based cockpit system which is capable of assisting the pilot in such important tasks as monitoring, diagnosis, and trend analysis was developed. The system is properly organized and is endowed with a knowledge base so that it enhances the pilot's control over the aircraft while simultaneously reducing his workload. S.L.

N82-31974# Kaman Aerospace Corp., Bloomfield, Conn.
DYNAMIC SYSTEM COUPLING (DYSCO) PROGRAM. VOLUME 1: USER'S MANUAL Final Technical Report
A. Berman Fort Eustis, Va. Army Research and Technology Labs. Apr. 1982 40 p 2 Vol.
(Contract DAAK51-79-C-0046; DA Proj. 1L1-62209-AH-76)
(AD-A115003; R-1649-Vol-1; USAAVRADCOM-TR-81-D-42A-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

Dynamic System Coupling (DYSCO) is a computer program which allows an interactive user to couple arbitrary components and force algorithms into a model of a helicopter or other dynamic system. The equations of the system may then be solved by a choice of analytical methods. The components available are rigid blade rotor, elastic fuselage, rotor control system, and other structures representable by general linear second-order differential equations. The force methods available are linear rotor loads, tabular rotor aerodynamics with optional induced velocity map, fuselage flat plate drag, and sinusoidal shaker. The solution methods available are time history, linear constant coefficient eigenanalysis, and complex frequency response. The program has the capability of being expanded in its level of complexity by the addition of other technology modules. Author (GRA)

N82-31975# Kaman Aerospace Corp., Bloomfield, Conn.
DYNAMIC SYSTEM COUPLING (DYSCO) PROGRAM. VOLUME 2: THEORETICAL MANUAL Final Report
A. Berman Fort Eustis, Va. Army Research and Technology Labs. Apr. 1982 84 p 2 Vol.
(Contract DAAK51-79-C-0046; DA Proj. 1L1-62209-AH-76)
(AD-A115004; R-1649-Vol-2; USAAVRADCOM-TR-81-D-42B-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 09/2

Dynamic System Coupling (DYSCO) is a computer program which allows an interactive user to couple arbitrary components and force algorithms into a model of a helicopter or other dynamic system. The equations of the system may then be solved by a choice of analytical methods. The components available are rigid blade rotor, elastic fuselage, rotor control system, and other structures representable by general linear second-order differential equations. The force methods available are linear rotor loads, tabular rotor aerodynamics with optional induced velocity map, fuselage flat plate drag, and sinusoidal shaker. The solution methods available are time history, linear constant coefficient eigenanalysis, and complex frequency response. The program has the capability of being expanded in its level of complexity by the addition of other technology modules. Author (GRA)

N82-32080*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THE NOISE IMPACT OF PROPOSED RUNWAY ALTERNATIVES AT CRAIG AIRPORT

Richard DeLoach Jun. 1982 36 p refs
(NASA-TM-84503; NAS 1.15:84503) Avail: NTIS
HC A03/MF A01 CSCL 20A

Four proposed runway expansion alternatives at Craig Airport in Jacksonville, Florida have been assessed with respect to their forecasted noise impact in the year 2005. The assessment accounts for population distributions around the airport and human subjective response to noise, as well as the distribution of noise levels in the surrounding community (footprints). The impact analysis was performed using the Airport-noise Levels and Annoyance Model (ALAMO), an airport community response model recently developed at Langley Research Center. Author

N82-32081*# California Univ., Los Angeles.

AEROSOUND FROM CORNER FLOW AND FLAP FLOW

W. C. Meecham Jul. 1982 41 p refs Prepared in cooperation with Mechanics Development Co., Pacific Palisades, Calif.
(Contract NAS2-10590)
(NASA-CR-166396; NAS 1.26:166396) Avail: NTIS
HC A03/MF A01 CSCL 20A

Noise generation at the edge of a wing flap is analyzed. The phenomenon as a single vortex moving around a corner in an incompressible, potential flow is modelled. Vortex image retarding effects are proposed as an explanation for small Strouhal numbers. The model surface pressures, sound pressures (using Curle's theory), and Mach number dependencies agree with wind tunnel experiments. A double pressure peak is found in the model (credited to image action) which is qualitatively similar to measured sound correlations. Incompressible flow aerosound calculations are discussed. The effects of a series of vortices moving in the same idealized potential flow are also studied. The vortices are assumed to be statistically independent so their intensities can be added. The frequency of appearance of the vortices are determined from measurements. Diffraction effects caused by the presence of the wing near the dipole sound radiators on the flap surfaces are included. S.L.

N82-32082*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ROUGH ANALYSIS OF INSTALLATION EFFECTS ON TURBOPROP NOISE

Paul A. Durbin and John F. Groeneweg 1982 17 p refs Proposed for Presentation at the Acoust. Soc. of Am., Orlando, Fla., 8-12 Nov. 1982
(NASA-TM-82924; E-1316; NAS 1.15:82924) Avail: NTIS
HC A02/MF A01 CSCL 20A

A rough analysis of noise from a propeller operated at angle of attack, and in the nonuniform flow due to a line vortex approximating a wing flow field suggests installation can significantly affect turboprop noise levels. On one side of the propeller, where the blades approach the horizontal plane from above, decreases of noise occur; while on the other side noise increases. The noise reduction is due to negative interference of steady and unsteady sources. An angle of attack, or distance between propeller and vortex, exists for which noise is a minimum. Author

N82-32083# Federal Aviation Administration, Washington, D.C. Office of Environment and Energy.

HELICOPTER NOISE DEFINITION REPORT UH-60A, S-76, A-109, 206-L Final Report

J. Steven Newman, Edward J. Rickley (DOT, Cambridge, Mass.), and David W. Ford Dec. 1981 687 p
(AD-A116363; DOT/FAA/EE-81/16) Avail: NTIS
HC A99/MF A01 CSCL 20/1

This document presents noise data for the Sikorsky UH-60A Blackhawk, the Sikorsky S-76 Spirit, the Agusta A-109 and the Bell 206-L. The acoustical data are accompanied by phototheodolite tracking data, cockpit instrument panel photo data, and meteorological data acquired from radiosonde balloons. Acoustical metrics include both noise certification metrics (EPNL, PNLT, PNL) as well as community/airport noise assessment metrics (SEL, dBA). Noise data have been acquired systematically to identify variations in level with variations in helicopter airspeed and altitude. Data contained in this report provide essential information for development of helicopter noise exposure contours as well as further evaluation of ICAO helicopter noise certification standards. Accordingly, this information will be of interest to helicopter manufacturers, airport planning consultants, acoustical engineers and airport managers. This report serves as a noise definition document establishing baseline acoustical characteristics of the test helicopters. Author (GRA)

N82-32084# Federal Aviation Administration, Washington, D.C. Office of Environment and Energy.

A DESCRIPTION OF METHODOLOGIES USED IN ESTIMATION OF A A-WEIGHTED SOUND LEVELS FOR FAA ADVISORY CIRCULAR AC-36-3B

Jan. 1982 114 p refs
(AD-A116543; FAA-EE-82-1; DOT/FAA/AEE-82-1) Avail: NTIS
HC A06/MF A01 CSCL 20/1

This report provides a description of the assumptions, methodologies and techniques employed in arriving at estimated sound levels for many of the aircraft included in FAA Advisory Circular AC-36-3B. AC 36-3B was published to provide the public and the aviation community with comparative sound level information for aircraft currently in use. Detailed noise estimation data sheets are provided for 78 aircraft types. A table showing the difference between EPNL and dB(A) for selected jet aircraft is also provided. Author (GRA)

N82-32140# Federal Aviation Administration, Atlantic City, N.J. Technical Center.

FIBER OPTICS REMOTING OF TERMINAL RADAR AND BEACON SIGNALS Final Report, Jul. 1980 - May 1981

Robert G. Oliver May 1982 68 p refs
(FAA Proj. 021-241-860)
(AD-A116403; FAA-CT-81-71; FAA-RD-82-20) Avail: NTIS
HC A04/MF A01 CSCL 17/9

This report discusses the study phase of the terminal radar-beacon fiber optics remoting project. Fiber optics technology is discussed and applied to the remoting of airport surveillance radar (ASR) and air traffic control beacon interrogator (ATCBI) video and control signals. The requirements of this system are outlined and an engineering model, using multiplexed and nonmultiplexed video transmissions, is specified for installation at the Federal Aviation Administration (FAA) Technical Center. Tests to be conducted on this system are briefly outlined. Cost estimates are presented as well as suggested sources of supply fort the fiber optic components. The interface to the ASR and ATCBI systems is described. It is recommended that the system be built by the technical center. A schedule for completion of the remainder of the project is presented. Author (GRA)

N82-32186*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 1: PROPERTIES IN SI UNITS

Sanford Gordon Jul. 1982 397 p refs
(NASA-TP-1906; E-946; NAS 1.60:1906) Avail: NTIS
HC A17/MF A01 CSCL 20M

Thermodynamic and transport combustion properties were calculated for a wide range of conditions for the reaction of hydrocarbons with air. Three hydrogen-carbon atom ratios (H/C = 1.7, 2.0, 2.1) were selected to represent the range of aircraft fuels. For each of these H:C ratios, combustion properties were calculated for the following conditions: Equivalence ratio: 0, 0.25, 0.5, 0.75, 1.0, 1.25 Water - dry air mass ratio: 0, 0.03 Pressure, kPa: 1.01325, 10.1325, 101.325, 1013.25, 5066.25 (or in atm: 0.01, 0.1, 1, 10, 50) Temperature, K: every 10 degrees from 200 to 900 K; every 50 degrees from 900 to 3000 K Temperature, R: every 20 degrees from 360 to 1600 R; very 100 degrees from 1600 to 5400 R. The properties presented are composition, density, molecular weight, enthalpy, entropy, specific heat at constant pressure, volume derivatives, isentropic exponent, velocity of sound, viscosity, thermal conductivity, and Prandtl number. Property tables are based on composites that were calculated by assuming both: (1) chemical equilibrium (for both homogeneous and heterogeneous phases) and (2) constant compositions for all temperatures. Properties in SI units are presented in this report for the Kelvin temperature schedules. Author

N82-32187*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 2: COMPOSITIONS CORRESPONDING TO KELVIN TEMPERATURE SCHEDULES IN PART 1
Sanford Gordon Jul. 1982 281 p refs
(NASA-TP-1907; E-947; NAS 1.60:1907) Avail: NTIS HC A13/MF A01 CSCL 20M

The equilibrium compositions that correspond to the thermodynamic and transport combustion properties for a wide range of conditions for the reaction of hydrocarbons with air are presented. Initially 55 gaseous species and 3 coin condensed species were considered in the calculations. Only 17 of these 55 gaseous species had equilibrium mole fractions greater than 0.000005 for any of the conditions studied and therefore these were the only ones retained in the final tables. J.M.S.

N82-32188*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 3: PROPERTIES IN US CUSTOMARY UNITS
Sanford Gordon Jul. 1982 362 p refs
(NASA-TP-1908; E-948; NAS 1.60:1908) Avail: NTIS HC A16/MF A01 CSCL 20M

Thermodynamic and transport properties are presented for a wide range of conditions for the reaction of hydrocarbons with air. The values given are in U.S. customary units. J.M.S.

N82-32189*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 4: COMPOSITIONS CORRESPONDING TO RANKINE TEMPERATURE SCHEDULES IN PART 3
Sanford Gordon Jul. 1982 281 p refs
(NASA-TP-1909; E-949; NAS 1.60:1909) Avail: NTIS HC A13/MF A01 CSCL 20M

The equilibrium compositions corresponding to the thermodynamic and transport combustion properties for a wide range of conditions for the reaction of hydrocarbons with air are presented. The compositions presented correspond to Rankine temperature schedules. J.M.S.

N82-32300# Joint Publications Research Service, Arlington, Va.
AIRBUS A 310 WILL COMPETE WITH BOEING 767 FOR MARKET
Pierre Kerlouegan *In its* West Europe Rept.: Sci. and Technol., No. 99 (JPRS-80536) 9 Apr. 1982 44-47 Transl. into ENGLISH from Le Figaro (France), 17 Feb. 1982 p 9
Avail: NTIS HC A04

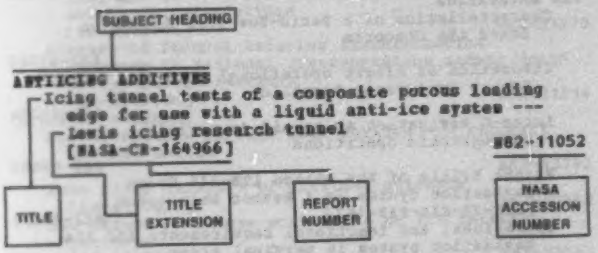
The European A-310 airbus is described, compared with the Boeing 767, and an analysis of its market presented. The A-310 is certified to fly with a crew of two. Projections for the larger A-320 are given. The basic configuration of the A-310 is presented. J.D.

SUBJECT INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 155)*

DECEMBER 1982

Typical Subject Index Listing


SUBJECT HEADING
ANTIICING ADDITIVES
Icing tunnel tests of a composite porous leading edge for use with a liquid anti-ice system --- Lewis icing research tunnel
[NASA-CR-164966]
N82-11052
TITLE
TITLE EXTENSION
REPORT NUMBER
NASA ACCESSION NUMBER

The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ACCIDENT INVESTIGATION
- Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations [AD-A115485] N82-31313
- Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations [AD-A115486] N82-31314

ACEE PROGRAM
- NASA aeronautics [NASA-SP-85] N82-30283

ACOUSTIC DUCTS
- Mode scatterer design for fan noise suppression in two-dimensional ducts A82-43402

ACOUSTIC EMISSION
- Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion A82-41914
- In-flight acoustic emission monitoring A82-42865

ACOUSTIC MEASUREMENT
- Helicopter noise definition report UH-60A, S-76, A-109, 206-L [AD-A116363] N82-32083

ACOUSTIC PROPERTIES
- Flow and acoustic properties of low Reynolds number underexpanded supersonic jets [NASA-CR-169257] N82-30288
- Helicopter noise definition report UH-60A, S-76, A-109, 206-L [AD-A116363] N82-32083

ACOUSTIC SCATTERING
- Mode scatterer design for fan noise suppression in two-dimensional ducts A82-43402

ACOUSTICS
- Activities of the Institute of Sound and Vibration Research N82-31569

ACTUATORS
- Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing [NASA-CR-165448] N82-31448
- Electromechanical Actuation Development Program (EADP). Power control development [AD-A116126] N82-31694

ADAPTIVE CONTROL
- The use of adaptive walls in plane flows [ONERA, TP NO. 1982-38] A82-42813

ADDITIVES
- Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2 [NASA-CR-167912] N82-31546
- An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities [AD-A116171] N82-31548

ADHESIVE BONDING
- Titanium surface treatments for adhesive bonding [AD-A114710] N82-30378

AERIAL PHOTOGRAPHY
- A field guide for scanner and photographic missions A82-43468
- Loran-C navigation as an aid to aerial photographic operations A82-43469
- Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography [PB82-164450] N82-30606

AERODYNAMIC CHARACTERISTICS
- Analysis of flight data in the frequency domain A82-41796
- Processes and procedural approaches in the aerodynamic design of the Alpha Jet aircraft A82-43328
- Aerodynamic computational procedures for subsonic and transonic aircraft A82-43330
- User's manual for the Automated Paneling Technique (APT) and the Wing Body Aerodynamic Technique (WABAT) programs [NASA-CR-165895] N82-31297
- Materials and design criteria for Kevlar-29 ribbon parachutes [AD-A116357] N82-31308
- Dynamic System Coupling (DYSCO) program. Volume 1: User's manual [AD-A115003] N82-31974

AERODYNAMIC COEFFICIENTS
- Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces [ONERA, TP NO. 1982-33] A82-42809
- Transonic flutter and response analyses of two 3-degree-of-freedom airfoils A82-44245

AERODYNAMIC CONFIGURATIONS
- NASA aeronautics [NASA-SP-85] N82-30283
- User's manual for the coupled rotor/airframe vibration analysis graphic package [NASA-CR-165897] N82-31299
- Surface generation for aerodynamic applications [AD-A116263] N82-31305

AERODYNAMIC FORCES
- Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces [ONERA, TP NO. 1982-33] A82-42809
- Mediating Mach's mechanics - Bombs away --- weapons delivery of fighter aircraft at transonic speed A82-44467

AERODYNAMIC INTERFERENCE
- The use of adaptive walls in plane flows [ONERA, TP NO. 1982-38] A82-42813
- Higher-order flow angle corrections for three-dimensional wind tunnel wall interference A82-44246
- Aerodynamics on a transport aircraft type wing-body model [NASA-TM-76878] N82-30287

AERODYNAMIC LOADS

The external balance system of the German-Dutch windtunnel DNW and its strain gage load cells A82-43184

Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness A82-43331

AERODYNAMIC NOISE

Mode scatterer design for fan noise suppression in two-dimensional ducts A82-43402

AERODYNAMIC STABILITY

Sensitivity analysis and optimization of aeroelastic stability A82-43394

Experimental investigation of aeroelastic instability of open field thin profiles --- metallic structures N82-31705

Large displacements and stability analysis of nonlinear propeller structures [NASA-TM-82850] N82-31707

AERODYNAMIC STALLING

Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces [ONERA, TP NO. 1982-33] A82-42809

Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds [AIAA PAPER 82-1362] A82-42950

AERODYNAMICS

Modern compressible flow with historical perspective --- Book A82-42552

Laminar flow control, 1976 - 1982: A selected annotated bibliography [NASA-TM-84496] N82-31645

AEROELASTICITY

Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces [ONERA, TP NO. 1982-33] A82-42809

Sensitivity analysis and optimization of aeroelastic stability A82-43394

Aeroelastic analysis for helicopter rotors with blade appended pendulum vibration absorbers. Mathematical derivations and program user's manual [NASA-CR-165896] N82-31298

Hybrid state vector methods for structural dynamic and aeroelastic boundary value problems [NASA-CR-3591] N82-31304

Experimental investigation of aeroelastic instability of open field thin profiles --- metallic structures N82-31705

AERONAUTICAL ENGINEERING

Turbulence modelling - Report of a Working Party A82-42547

Aeronautical systems technology needs: Escape, rescue and survival, test facilities and test equipment and training/simulation equipment [AD-A115435] N82-31291

AERONAUTICS

A history of aerostatics and aviation in Russia - In the period up to 1914 /2nd revised and enlarged edition/ --- Russian book A82-42066

AEROSPACE INDUSTRY

Composite materials: Tomorrow for the day after tomorrow [NASA-TM-76709] N82-30337

AEROTHERMODYNAMICS

Modern compressible flow with historical perspective --- Book A82-42552

Calibration and performance of the AEDC/VKF tunnel C, Mach number 4, aerothermal wind tunnel [AD-A116279] N82-31338

AH-64 HELICOPTER

Apache to provide night/bad weather capability A82-43091

AIR DEFENSE

Passive aircraft location A82-42791

AIR DROP OPERATIONS

Simulation of the interaction between airdrop platforms and aircraft rollers [AD-A116370] N82-31324

AIR FLOW

A miniature electro-optical air flow sensor A82-41854

Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor [ONERA, TP NO. 1982-61] A82-43755

Development of a spinning wave heat engine [NASA-CR-165611] N82-31328

AIR LAW

Extracts from Problems of Air Law, a collection of works of the Section of air law of the Aviakhim Society of the USSR and Aviakhim RSFSR [NASA-TM-76913] N82-31153

AIR NAVIGATION

Characteristics of a Paris-New York flight on board the Concorde A82-41700

Automation of flight operational control in the German Democratic Republic A82-42574

Loran-C navigation as an aid to aerial photographic operations A82-43469

Flight trials of the Litton LTN-211 Omega Navigation System in a Wessex helicopter [RAE-TM-RAD-NAV-147] N82-30299

Operational and functional requirements for the navigation system in terminal areas [AD-A116127] N82-31318

AIR TRAFFIC

Separation monitoring with four types of predictors on a cockpit display of traffic information N82-30860

AIR TRAFFIC CONTROL

Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations A82-42504

Automation of flight operational control in the German Democratic Republic A82-42574

Radionavigation for civil aviation [SEE PAPER 811760] A82-44231

Air-air anticollision systems [SEE PAPER 811764] A82-44235

A study of general aviation community noise impact and annoyance [NASA-CR-165945] N82-31066

Operational and functional requirements for the navigation system in terminal areas [AD-A116127] N82-31318

Functional design to support CDTI/DABS flight experiments [NASA-CR-165947] N82-31326

AIR TRANSPORTATION

Identification of terms to define unconstrained air transportation demands [NASA-CR-165961] N82-31311

AIRBORNE EQUIPMENT

Hover jam - US Army studies EW helicopter A82-41888

Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations A82-42504

Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft A82-43278

AIRBORNE/SPACEBORNE COMPUTERS

A floating-point/multiple-precision processor for airborne applications A82-41868

Integrated sensor system for flight test instrumentation A82-41869

New trends and concerns in the airliner radio equipment market [SEE PAPER 811768] A82-44238

Final engineering report for computer, weapon aiming CP-1444/A [AD-A115238] N82-31327

Multilevel semantic analysis and problem-solving in the flight domain [NASA-CR-169282] N82-31967

AIRCRAFT

High-altitude imagery user guide [PB82-158353] N82-30608

A survey of melting layer research
[AD-A115224] N82-30806

AIRCRAFT ACCIDENTS
Satellite localization of aircraft accidents - The Sarsat program
[SEE PAPER 011765] A82-44239
Improving aircarrier water survival
A82-44291
Aerodynamic penalties of heavy rain on a landing aircraft
[NASA-CR-156885] N82-30298
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A115485] N82-31313
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A115486] N82-31314

AIRCRAFT ANTENNAS
Recent results in main beam nulling --- aircraft antenna design
A82-43792
Near field analysis of airborne antennas
[AD-A115074] N82-30462
The effect of radome scattering on ECM antenna patterns
[AD-A115517] N82-30463

AIRCRAFT COMMUNICATION
New trends and concerns in the airliner radio equipment market
[SEE PAPER 011768] A82-44238

AIRCRAFT CONFIGURATIONS
A history of aerostatics and aviation in Russia - In the period up to 1914 /2nd revised and enlarged edition/ --- Russian book
A82-42066
Applied flight mechanics in the design and in flight tests
A82-43327

AIRCRAFT CONSTRUCTION MATERIALS
A supersonic V/STOL fighter design project
A82-42545
Aerospace applications of composites
A82-42675

AIRCRAFT CONTROL
Laser pointing in a turbulent atmosphere
A82-42887
The testing of new technologies with the aid of the Alpha Jet aircraft
A82-43326
Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves --- German thesis
A82-43660
Stability and control of the Gossamer human powered aircraft by analysis and flight test
[NASA-CR-163119] N82-30289
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities
N82-30848
Pilot opinions of sampling effects in lateral directional control
N82-30849
Evaluation of a trajectory command concept for manual control of carrier approaches and landings
N82-30856
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323
Singular perturbation techniques for real time aircraft trajectory optimization and control
[NASA-CR-3597] N82-31330
Multilevel semantic analysis and problem-solving in the flight domain
[NASA-CR-169282] N82-31967

AIRCRAFT DESIGN
Requirements and possible design choices for improving the operation of aircraft in the terminal control area
A82-41881
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton
A82-42035
A supersonic V/STOL fighter design project
A82-42545
The application of geometric programming to the structural design of aircraft wings
A82-42546
Design and analysis of advanced composite structures
A82-42670
Europe's best seller - Second-generation Airbus emerges
A82-42750
Taking the drag out of bombs
A82-42849
The testing of new technologies with the aid of the Alpha Jet aircraft
A82-43326
Applied flight mechanics in the design and in flight tests
A82-43327
Processes and procedural approaches in the aerodynamic design of the Alpha Jet aircraft
A82-43328
Aerodynamic computational procedures for subsonic and transonic aircraft
A82-43330
Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness
A82-43331
Simulation in connection with the development of the Alpha Jet aircraft
A82-43333
Methodology in flight tests
A82-43400
Implicit model-following technique - Application to the design of longitudinal stability augmentation systems
A82-43571
Technology for tomorrow's business aircraft
A82-43577
New approaches to fighter design
A82-44218
New technologies for future fighters
A82-44219
Interactive graphics design with CODEN
A82-44223
XV-15 program update
A82-44468
NASA aeronautics
[NASA-EP-85] N82-30283
Grob aircraft construction: The G 110 flies
[NASA-TM-76893] N82-30303
Structures and Dynamics Division research and technology plans, FY 1982
[NASA-TM-84509] N82-30566
Training aircraft design considerations based on the successive organization of perception in manual control
N82-30840
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 2: Analysis of results
[NASA-CR-166365] N82-31301

AIRCRAFT DETECTION
Passive aircraft location
A82-42791

AIRCRAFT ENGINES
The analysis of the thermal-mechanical stress conditions in axisymmetric rotating hot components of /aircraft/ gas turbines --- German thesis
A82-41606
Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion
A82-41914
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462
Determination of antioxidant content in aviation oils using thin-layer chromatography
A82-42894
Antioxidants for synthetic oils
A82-42895
Piston engines for general aviation - Is the revolution really under way
A82-43578
A method for designing inlet distortion screens for aircraft gas turbine engine tests using an interactive computer program
[AD-A116584] N82-31325

A description of methodologies used in estimation of a A-weighted sound levels for FAA Advisory circular AC-36-3B [AD-A116543] N82-32084

AIRCRAFT EQUIPMENT
- Aircraft radio communications equipment: Design and use --- Russian book A82-42067
- Repair-discard concepts in design A82-42178
- R/M/LCC effects of commercial off-the-shelf equipment A82-42181
- 757 systems key to route flexibility A82-43275
- Air-air anticollision systems [SEE PAPER 811764] A82-44235
- Evaluation of a meteorological airborne pulse Doppler radar [PB82-156860] N82-30820

AIRCRAFT FUEL SYSTEMS
- Studies of new perfluoroether elastomeric sealants --- for aircraft fuel tanks [NASA-CR-166377] N82-30400

AIRCRAFT FUELS
- Piston engines for general aviation - Is the revolution really under way A82-43578
- Human-factors evaluation of C-141 fuel savings advisory system [AD-A114931] N82-30304
- Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2 [NASA-CR-167912] N82-31546

AIRCRAFT GUIDANCE
- Image processing in tactical flight guidance A82-44221

AIRCRAFT HAZARDS
- Field program operations: Turbulence and gust front [AD-A115447] N82-30804
- Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations [AD-A115486] N82-31314

AIRCRAFT INDUSTRY
- Aircraft R&D in Europe - A perspective view A82-42544
- The sporty game --- on wide body commercial airliner business history A82-42572
- Aeronautical research and development in Europe - Perspectives A82-43588
- Titanium surface treatments for adhesive bonding [AD-A114710] N82-30378

AIRCRAFT INSTRUMENTS
- A miniature electro-optical air flow sensor A82-41854
- Integrated sensor system for flight test instrumentation A82-41869
- Maximum likelihood failure detection of aircraft flight control sensors A82-44481
- Aircraft icing research at NASA [NASA-TM-82919] N82-30297
- Separation monitoring with four types of predictors on a cockpit display of traffic information N82-30860

AIRCRAFT LANDING
- Requirements and possible design choices for improving the operation of aircraft in the terminal control area A82-41881
- The ILS in Category III operations --- ground-based support for French air routes [SEE PAPER 811761] A82-44232
- Aerodynamic penalties of heavy rain on a landing aircraft [NASA-CR-156885] N82-30298
- Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-30856
- Description of a simple model to determine landing gear forces during the takeoff of aerodynamically unstable aircraft [EX-22B] N82-31333

AIRCRAFT MAINTENANCE
- Repair-discard concepts in design A82-42178
- F-16 Centralized Data System /CDS/ A82-42206
- Fault isolation BITE for increased productivity A82-42210
- Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity A82-42217
- Application of wear debris analysis to aircraft hydraulic systems [AD-A115060] N82-30305

AIRCRAFT MANEUVERS
- Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations A82-42504

AIRCRAFT MODELS
- A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior --- German thesis A82-41687
- Implicit model-following technique - Application to the design of longitudinal stability augmentation systems A82-43571

AIRCRAFT NOISE
- NASA aeronautics [NASA-EP-85] N82-30283
- Flow and pressure field of a model propeller [NASA-TM-76690] N82-30290
- A study of general aviation community noise impact and annoyance [NASA-CR-165945] N82-31066
- Noise transmission loss of aircraft panels using acoustic intensity methods [NASA-TP-2046] N82-31069
- The noise impact of proposed runway alternatives at Craig Airport [NASA-TM-84503] N82-32080
- Aerosound from corner flow and flap flow [NASA-CR-166396] N82-32081
- Helicopter noise definition report UH-60A, S-76, A-109, 206-L [AD-A116363] N82-32083
- A description of methodologies used in estimation of a A-weighted sound levels for FAA Advisory circular AC-36-3B [AD-A116543] N82-32084

AIRCRAFT PARTS
- Grob aircraft construction: The G 110 flies [NASA-TM-76893] N82-30303
- Improved penetrant process evaluation criteria [AD-A115157] N82-30386

AIRCRAFT PERFORMANCE
- Europe's best seller - Second-generation Airbus emerges A82-42750
- Taking the drag out of bombs A82-42849
- 757 systems key to route flexibility A82-43275
- A survey regarding the German-French development program Alpha Jet A82-43332
- Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing [NASA-CR-165448] N82-31448

AIRCRAFT PRODUCTION
- Aircraft R&D in Europe - A perspective view A82-42544

AIRCRAFT RELIABILITY
- Models for controlling reliability in aviation --- Russian book A82-42055
- Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity A82-42217
- F/A-18 Hornet reliability challenge - Status report A82-42229
- In-flight acoustic emission monitoring A82-42865
- Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness A82-43331

AIRCRAFT SAFETY
NASA aeronautics
[NASA-EP-85] N82-30283
Aerodynamic penalties of heavy rain on a landing aircraft
[NASA-CR-156885] N82-30298
Data acquisition system for NASA LaRC impact dynamics research facility
[NASA-TM-84510] N82-30525
Summary of Federal Aviation Administration response to National Transportation Safety Board safety reccamendations
[AD-A115485] N82-31313
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A115486] N82-31314
Analysis of Active BCAS alert rates and protection based on actual aircraft tracks
[AD-A116402] N82-31319
Functional design to support CDTI/DABS flight experiments
[NASA-CR-165947] N82-31326
Multilevel semantic analysis and problem-solving in the flight domain
[NASA-CR-169282] N82-31967
AIRCRAFT SPIN
Current perspectives on emergency spin-recovery systems
A82-43264
AIRCRAFT STABILITY
Current perspectives on emergency spin-recovery systems
A82-43264
Implicit model-following technique - Application to the design of longitudinal stability augmentation systems
A82-43571
Electronic aircraft stabilization
[SEE PAPER 811763] A82-44234
XV-15 program update
A82-44468
Stability and control of the Gossamer human powered aircraft by analysis and flight test
[NASA-CR-163119] N82-30289
Description of a simple model to determine landing gear forces during the takeoff of aerodynamically unstable aircraft
[BX-22B] N82-31333
AIRCRAFT STRUCTURES
Aerospace applications of composites
A82-42675
Grob aircraft construction: The G 110 flies
[NASA-TM-76893] N82-30303
Flow control for a high energy laser turret using trapped vortices
[AD-A115263] N82-30547
Noise transmission loss of aircraft panels using acoustic intensity methods
[NASA-TP-2046] N82-31069
User's manual for the Automated Paneling Technique (APT) and the Wing Body Aerodynamic Technique (WABAT) programs
[NASA-CR-165895] N82-31297
AIRCRAFT TIRES
Pneumatic tire model for aircraft simulation
A82-44244
AIRCRAFT WAKES
Reduction in parachute drag due to forebody wake effects
[DE81-030124] N82-31309
AIRFIELD SURFACE MOVEMENTS
A method to determine runway capacity
A82-44100
AIRFOIL PROFILES
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
The design of airfoil profiles with trailing edge loading in transonic flow --- French thesis
A82-44224
Transonic flutter and response analyses of two 3-degree-of-freedom airfoils
A82-44245
AIRFOILS
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-39] A82-43753
Control software for two dimensional airfoil tests using a self-streamlining flexible walled transonic test section
[NASA-CR-165941] N82-30314
Surface generation for aerodynamic applications
[AD-A116263] N82-31305
An effective algorithm for shock-free wing design
[AD-A116265] N82-31322
AIRFRAMES
Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness
A82-43331
User's manual for the coupled rotor/airframe vibration analysis graphic package
[NASA-CR-165897] N82-31299
Coupled rotor/airframe vibration analysis program manual manual. Volume 1: User's and programmer's instructions
[NASA-CR-165891] N82-31965
Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
[NASA-CR-165892] N82-31966
AIRLINE OPERATIONS
Requirements and possible design choices for improving the operation of aircraft in the terminal control area
A82-41881
The sporty game --- on wide body commercial airliner business history
A82-42572
Helicopter commuters - An optimistic outlook
A82-44470
AIRPORT PLANNING
Survey and design of airfields --- Russian book
A82-43603
A method to determine runway capacity
A82-44100
Community noise
N82-31072
AIRPORTS
A study of general aviation community noise impact and annoyance
[NASA-CR-165945] N82-31066
Airport/Community Noise
[NASA-CP-2241] N82-31070
Airport noise
N82-31071
Summary of airport technology needs
N82-31073
Summary of community technology needs
N82-31074
Operational and functional requirements for the navigation system in terminal areas
[AD-A116127] N82-31318
Study of the de-icing properties of the ASDE-3 rotodome
[AD-A115445] N82-31335
The noise impact of proposed runway alternatives at Craig Airport
[NASA-TM-84503] N82-32080
AIRSHIPS
A history of aerostatics and aviation in Russia - In the period up to 1914 /2nd revised and enlarged edition/ --- Russian book
A82-42066
The lateral response of an airship to turbulence
[AD-A115197] N82-30312
AIRSPACE
Extracts from Problems of Air Law, a collection of works of the Section of air law of the Aviakhim Society of the USSR and Aviakhim RSFSR
[NASA-TM-76913] N82-31153
ALERTNESS
Analysis of Active BCAS alert rates and protection based on actual aircraft tracks
[AD-A116402] N82-31319
ALGORITHMS
Surface generation for aerodynamic applications
[AD-A116263] N82-31305
An effective algorithm for shock-free wing design
[AD-A116265] N82-31322
Functional design to support CDTI/DABS flight experiments
[NASA-CR-165947] N82-31326

ALPHA JET AIRCRAFT
The testing of new technologies with the aid of the Alpha Jet aircraft A82-43326
Applied flight mechanics in the design and in flight tests A82-43327
Processes and procedural approaches in the aerodynamic design of the Alpha Jet aircraft A82-43328
Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness A82-43331
A survey regarding the German-French development program Alpha Jet A82-43332
Simulation in connection with the development of the Alpha Jet aircraft A82-43333
Methodology in flight tests A82-43400
New technologies for future fighters A82-44219
Automated flight data processing A82-44222

AMPLITUDE MODULATION
Combined amplitude-phase modulation for a VHF communication link A82-43870

ANGLE OF ATTACK
Higher-order flow angle corrections for three-dimensional wind tunnel wall interference A82-44246
Rough analysis of installation effects on turboprop noise [NASA-TM-82924] N82-32082

ANISOTROPY
Hybrid state vector methods for structural dynamic and aeroelastic boundary value problems [NASA-CR-3591] N82-31304

ANTENNA DESIGN
Recent results in main beam nulling --- aircraft antenna design A82-43792

ANTENNA RADIATION PATTERNS
Recent results in main beam nulling --- aircraft antenna design A82-43792
Near field analysis of airborne antennas [AD-A115074] N82-30462
The effect of radome scattering on ECM antenna patterns [AD-A115517] N82-30463

ANTIFOULING
Life enhancement of Naval systems through advanced materials [AD-A114722] N82-30404

ANTIOXIDANTS
Determination of antioxidant content in aviation oils using thin-layer chromatography A82-42894
Antioxidants for synthetic oils A82-42895

APPROACH
Minimum fuel horizontal flight paths in the terminal area A82-44480

APPROACH CONTROL
FAA acceptance tests on the navigation system using time global positioning system Z set receiver [DOT/FAA/RD-82/9] N82-31315

ARCHITECTURE (COMPUTERS)
Computer architecture study for VTXTS simulators [AD-A115006] N82-30953
Design of a microprocessor-controlled linkage for simulator applications [AD-A115421] N82-30954

ATLANTIC OCEAN
Meteorological aspects of North Atlantic flight tracks - Some interim results of the study A82-43250

ATMOSPHERIC MOISTURE
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention [NASA-CR-169246] N82-30432

ATMOSPHERIC TEMPERATURE
Laser pointing in a turbulent atmosphere A82-42887

ATMOSPHERIC TURBULENCE
Laser pointing in a turbulent atmosphere A82-42887
Field program operations: Turbulence and gust front [AD-A115447] N82-30804
Evaluation of a meteorological airborne pulse Doppler radar [PB82-156860] N82-30820

ATTACK AIRCRAFT
Apache to provide night/bad weather capability A82-43091

AUTOMATED PILOT ADVISORY SYSTEM
The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing --- of meteorological information A82-43821

AUTOMATED RADAR TERMINAL SYSTEM
Automation of flight operational control in the German Democratic Republic A82-42574

AUTOMATIC FLIGHT CONTROL
Automation of flight operational control in the German Democratic Republic A82-42574
The flight management computer [SEE PAPER 811762] A82-44233
Pilot opinions of sampling effects in lateral directional control N82-30849

AUTOMATIC PILOTS
Simulated ILS using a laser tracker A82-41795
Electronic aircraft stabilization [SEE PAPER 811763] A82-44234

AUTOMATIC TEST EQUIPMENT
Analysis of built-in-test accuracy A82-42211
Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity A82-42217

AUTOMATION
Automation of flight operational control in the German Democratic Republic A82-42574

AVIONICS
Aircraft radio communications equipment: Design and use --- Russian book A82-42067
Fault isolation BITE for increased productivity A82-42210
757 systems key to route flexibility A82-43275
NASA studies business aircraft avionics A82-43659
Electronic aircraft stabilization [SEE PAPER 811763] A82-44234
New image generators for the next generation of civil aircraft [SEE PAPER 811767] A82-44236
New trends and concerns in the airliner radio equipment market [SEE PAPER 811768] A82-44238
Design to life cycle cost capability of the PRICE models [IAF PAPER 82-221] A82-44695
Design and implementation of USAF avionics integration support facilities [AD-A115537] N82-30307

AXISYMMETRIC BODIES
The analysis of the thermal-mechanical stress conditions in axisymmetric rotating hot components of /aircraft/ gas turbines --- German thesis A82-41686
Aeropropulsive characteristics of Mach numbers up to 2.2 of axisymmetric and nonaxisymmetric nozzles installed on an F-18 model [NASA-TP-2044] N82-30291

AXISYMMETRIC FLOW
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 2: Analysis of results [NASA-CR-166365] N82-31301

Axisymmetric and non-axisymmetric exhaust jet
induced effects on a V/STOL vehicle design.
Part 3: Experimental techniques
[NASA-CR-166147] N82-31302

B

BALLOON-BORNE INSTRUMENTS
Construction and testing of an Omega navigation
system for the balloon-borne X-ray experiment
--- German thesis
A82-43111
Control electronics for air-borne quadrupole ion
mass spectrometer
[AD-A115399] N82-30356
BEACON COLLISION AVOIDANCE SYSTEM
Analysis of Active BCAS alert rates and protection
based on actual aircraft tracks
[AD-A116402] N82-31319
BEAMS (RADIATION)
Recent results in main beam nulling --- aircraft
antenna design
A82-43792
BENDING MOMENTS
The lateral response of an airship to turbulence
[AD-A115197] N82-30312
BIBLIOGRAPHIES
Laminar flow control, 1976 - 1982: A selected
annotated bibliography
[NASA-TM-84496] N82-31645
BLADE TIPS
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
BLOWDOWN WIND TUNNELS
Adaptation and first cryogenic operation of T2
ONERA/CERT wind tunnel
A82-42531
Application of laser velocimetry to large
industrial wind-tunnels
[ONERA, TP NO. 1982-63] A82-43757
BLOWERS
Study of the de-icing properties of the ASDE-3
rotodome
[AD-A115445] N82-31335
BODY-WING CONFIGURATIONS
Generation of boundary-conforming grids around
wing-body configurations using transfinite
interpolation
A82-44091
Damped Euler-equation method to compute transonic
flow around wing-body combinations
A82-44092
Aerodynamics on a transport aircraft type
wing-body model
[NASA-TM-76878] N82-30287
BOEING 757 AIRCRAFT
757 systems key to route flexibility
A82-43275
BOEING 767 AIRCRAFT
Airbus A 310 will compete with Boeing 767 for market
N82-32300
BOMBER AIRCRAFT
The testing of new technologies with the aid of
the Alpha Jet aircraft
A82-43326
BONDING
Bonding procedure for Teflon seals
A82-42792
BOUNDARY ELEMENT METHOD
Generation of boundary-conforming grids around
wing-body configurations using transfinite
interpolation
A82-44091
BOUNDARY LAYER CONTROL
Laminar flow control, 1976 - 1982: A selected
annotated bibliography
[NASA-TM-84096] N82-31645
BOUNDARY LAYER FLOW
Turbulence modelling - Report of a Working Party
A82-42547
Boundary layer transducers /DCL/ developed for the
study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-93] A82-42817
BOUNDARY LAYER SEPARATION
Flow control for a high energy laser turret using
trapped vortices
[AD-A115263] N82-30547
BOUNDARY VALUE PROBLEMS
The analysis of the thermal-mechanical stress
conditions in axisymmetric rotating hot
components of /aircraft/ gas turbines --- German
thesis
A82-41686
Hybrid state vector methods for structural dynamic
and aeroelastic boundary value problems
[NASA-CR-3591] N82-31304
BUILDINGS
Repair and maintenance of buildings in civil
aviation --- Russian book
A82-42059
BUTADIENE
The preparation and characterization of mixtures
of polycyclopentadienes as solid ramjet fuels
[AD-A115075] N82-30414

C

C-141 AIRCRAFT
Human-factors evaluation of C-141 fuel savings
advisory system
[AD-A114931] N82-30304
Simulation of the interaction between airdrop
platforms and aircraft rollers
[AD-A116370] N82-31324
CARBON FIBER REINFORCED PLASTICS
A supersonic V/STOL fighter design project
A82-42545
CATHODE RAY TUBES
New image generators for the next generation of
civil aircraft
[SEE PAPER 011767] A82-44236
CENTRIFUGAL COMPRESSORS
Preliminary experiments on a centrifugal research
compressor using a laser -2- focus velocimeter
[ONERA, TP NO. 1982-62] A82-43756
CERAMIC COATINGS
High temperature composites. Status and future
directions
[NASA-TM-82929] N82-30336
CERAMICS
High temperature composites. Status and future
directions
[NASA-TM-82929] N82-30336
Ceramic applications in turbine engines
[NASA-CR-165197] N82-31150
CESSNA 402B AIRCRAFT
NASA studies business aircraft avionics
A82-43659
CHEMICAL COMPOSITION
Thermodynamic and transport combustion properties
of hydrocarbons with air. Part 2: Compositions
corresponding to Kelvin temperature schedules in
part 1
[NASA-TP-1907] N82-32187
Thermodynamic and transport combustion properties
of hydrocarbons with air. Part 4: Compositions
corresponding to Rankine temperature schedules
in part 3
[NASA-TP-1909] N82-32189
CHEMICAL MACHINING
Improved penetrant process evaluation criteria
[AD-A115157] N82-30386
CHROMIUM ALLOYS
Oxidation-resistant materials for hot-gas turbines
and jet engines
A82-41725
CIVIL AVIATION
Repair and maintenance of buildings in civil
aviation --- Russian book
A82-42059
Aircraft R&D in Europe - A perspective view
A82-42504
Automation of flight operational control in the
German Democratic Republic
A82-42574
Survey and design of airfields --- Russian book
A82-43603
Radionavigation for civil aviation
[SEE PAPER 011760] A82-44231
New image generators for the next generation of
civil aircraft
[SEE PAPER 011767] A82-44236
New trends and concerns in the airliner radio
equipment market
[SEE PAPER 011768] A82-44238

COCKPITS
NASA studies business aircraft avionics
A82-43659
Evaluation of the FAA/MITRE weather data device
[AD-A114686] N82-30800
Separation monitoring with four types of predictors on a cockpit display of traffic information
N82-30860
CODING
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2
[AD-A115511] N82-31332
COLLIMATORS
Wide-angle, multiviewer, infinity display system
[AD-A116308] N82-31336
COLLISION AVOIDANCE
Air-air anticollision systems
[SEE PAPER 811764] A82-44235
Functional design to support CDTI/DABS flight experiments
[NASA-CR-165947] N82-31326
COLOR INFRARED PHOTOGRAPHY
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606
COMBUSTION PHYSICS
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 1: Properties in SI units
[NASA-TP-1906] N82-32186
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 2: Compositions corresponding to Kelvin temperature schedules in part 1
[NASA-TP-1907] N82-32187
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 3: Properties in US customary units
[NASA-TP-1908] N82-32188
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 4: Compositions corresponding to Rankine temperature schedules in part 3
[NASA-TP-1909] N82-32189
COMMERCIAL AIRCRAFT
Fault isolation BITE for increased productivity
A82-42210
The sporty game --- on wide body commercial airliner business history
A82-42572
It's too logical - It'll never work /Commercial applications of the JVX/
A82-44469
Helicopter commuters - An optimistic outlook
A82-44470
COMMUNICATION CABLES
Fiber optics remoting of terminal radar and beacon signals
[AD-A116403] N82-32140
COMMUNICATION EQUIPMENT
Aircraft radio communications equipment: Design and use --- Russian book
A82-42067
COMMUNICATION NETWORKS
A new class of routing protocols for a proposed computer network linking tactical radar sites
A82-43893
COMMUNITIES
Summary of community technology needs
N82-31074
COMPENSATORS
Optimisation in multivariable design
A82-42565
COMPETITION
Identification of terms to define unconstrained air transportation demands
[NASA-CR-165561] N82-31311
COMPOSITE MATERIALS
Design and analysis of advanced composite structures
A82-42670
Aerospace applications of composites
A82-42675
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
Composite materials: Tomorrow for the day after tomorrow
[NASA-TM-76709] N82-30337
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340
Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing
[NASA-CR-165448] N82-31448
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449
COMPOSITE STRUCTURES
Design and analysis of advanced composite structures
A82-42670
COMPRESSIBLE FLOW
Modern compressible flow with historical perspective --- Book
A82-42552
COMPRESSOR BLADES
An experimental examination of compressor blade flutter
[ONERA, TP NO. 1982-31] A82-42808
COMPUTATIONAL FLUID DYNAMICS
Turbulence modelling - Report of a Working Party
A82-42547
Modern compressible flow with historical perspective --- Book
A82-42552
Corrections for wall effects in ONERA industrial wind tunnels
[ONERA, TP NO. 1982-34] A82-42810
The use of adaptive walls in plane flows
[ONERA, TP NO. 1982-38] A82-42813
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-59] A82-43753
Generation of boundary-conforming grids around wing-body configurations using transfinite interpolation
A82-44091
Damped Euler-equation method to compute transonic flow around wing-body combinations
A82-44092
The design of airfoil profiles with trailing edge loading in transonic flow --- French thesis
A82-44224
COMPUTER AIDED DESIGN
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462
The application of geometric programming to the structural design of aircraft wings
A82-42546
Optimisation in multivariable design
A82-42565
Aerodynamic computational procedures for subsonic and transonic aircraft
A82-43330
Simulation in connection with the development of the Alpha Jet aircraft
A82-43333
Interactive graphics design with CODEN
A82-44223
Structures and Dynamics Division research and technology plans, FY 1982
[NASA-TM-84509] N82-30566
Surface generation for aerodynamic applications
[AD-A116263] N82-31305
An effective algorithm for shock-free wing design
[AD-A116265] N82-31322
A method for designing inlet distortion screens for aircraft gas turbine engine tests using an interactive computer program
[AD-A116584] N82-31325
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1
[AD-A115510] N82-31331
COMPUTER GRAPHICS
Interactive graphics design with CODEN
A82-44223
Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
N82-30838
User's manual for the Automated Paneling Technique (APT) and the Wing Body Aerodynamic Technique (WABAT) programs
[NASA-CR-165895] N82-31297

COMPUTER NETWORKS
A new class of routing protocols for a proposed computer network linking tactical radar sites A82-43893
Design of a microprocessor-controlled linkage for simulator applications [AD-A115421] N82-30950
COMPUTER PROGRAMMING
Design and implementation of USAF avionics integration support facilities [AD-A115537] N82-30307
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2 [AD-A115511] N82-31332
COMPUTER PROGRAMS
Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity A82-42217
Construction and testing of an Omega navigation system for the balloon-borne X-ray experiment --- German thesis A82-43111
Interactive graphics design with CCDRM A82-44223
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1 [AD-A115510] N82-31331
Large displacements and stability analysis of nonlinear propeller structures [NASA-TM-82850] N82-31707
Dynamic System Coupling (DYSCO) program. Volume 1: User's manual [AD-A115003] N82-31974
Dynamic System Coupling (DYSCO) program. Volume 2: Theoretical manual [AD-A115004] N82-31975
COMPUTER SYSTEMS PERFORMANCE
Advanced reliability modeling of fault-tolerant computer-based systems [NASA-TM-84501] N82-30962
COMPUTER SYSTEMS SIMULATION
Advanced reliability modeling of fault-tolerant computer-based systems [NASA-TM-84501] N82-30962
COMPUTER TECHNIQUES
F-16 Centralized Data System /CDS/ A82-42206
Loran-C navigation as an aid to aerial photographic operations A82-43469
COMPUTERIZED SIMULATION
Turbulence modelling - Report of a Working Party A82-42547
A method to determine runway capacity A82-44100
Pneumatic tire model for aircraft simulation A82-44244
Assessment of stereographics for fire control and navigation in fighter aircraft [AD-A115414] N82-30306
Design and implementation of USAF avionics integration support facilities [AD-A115537] N82-30307
Real time estimation and prediction of ship motions using Kalman filtering techniques [NASA-CR-169284] N82-31637
CONCORDE AIRCRAFT
Characteristics of a Paris-New York flight on board the Concorde A82-41700
CONFERENCES
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AAS, SAE, and University of Dayton A82-42035
Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings A82-42176
CONIFERS
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography [PB82-164450] N82-30606
CONSTRUCTION MATERIALS
Experimental investigation of aeroelastic instability of open field thin profiles --- metallic structures N82-31705
CONTROL
Dynamic System Coupling (DYSCO) program. Volume 2: Theoretical manual [AD-A115004] N82-31975
CONTROL CONFIGURED VEHICLES
Requirements and possible design choices for improving the operation of aircraft in the terminal control area A82-41881
Implicit model-following technique - Application to the design of longitudinal stability augmentation systems A82-43571
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle N82-30859
CONTROL EQUIPMENT
Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves --- German thesis A82-43660
CONTROL ROCKETS
Current perspectives on emergency spin-recovery systems A82-43264
CONTROL SIMULATION
Statistical analysis of piloted simulation of real time trajectory optimization algorithms A82-43261
CONTROL SURFACES
Electromechanical Actuation Development Program (EADP). Power control development [AD-A116126] N82-31694
CONTROL THEORY
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1 [AD-A115510] N82-31331
CONTROLLABILITY
Requirements and possible design choices for improving the operation of aircraft in the terminal control area A82-41881
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-30848
CONTROLLERS
Programmable controller system for wind tunnel diversion vanes A82-41846
CONVERGENT-DIVERGENT NOZZLES
New nozzle design aimed at F-15, F-16 aircraft A82-43092
Aeropropulsive characteristics of Mach numbers up to 2.2 of axisymmetric and nonaxisymmetric nozzles installed on an F-18 model [NASA-TP-2044] N82-30291
COOLING
The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters A82-42474
CORNER FLOW
Experimental study of turbulence in blade end wall corner region [NASA-CR-169283] N82-31639
Aerosound from corner flow and flap flow [NASA-CR-166396] N82-32081
CORROSION PREVENTION
Life enhancement of Naval systems through advanced materials [AD-A114722] N82-30404
COST ESTIMATES
Design to life cycle cost capability of the PRICE models [IAF PAPER 82-221] A82-44695
COUPLING CIRCUITS
Dynamic System Coupling (DYSCO) program. Volume 1: User's manual [AD-A115003] N82-31974
Dynamic System Coupling (DYSCO) program. Volume 2: Theoretical manual [AD-A115004] N82-31975

CRACK PROPAGATION
In-flight acoustic emission monitoring
A82-42065
A fatigue crack growth theory based on strain energy density factor
A82-43762
Titanium surface treatments for adhesive bonding
[AD-A114710] N82-30378
Improved penetrant process evaluation criteria
[AD-A115157] N82-30386
Stress intensity factors for radial cracks at outer surface of a partially autofrettaged cylinder subjected to internal pressure
[AD-A116396] N82-31714
CRASHWORTHINESS
Structures and Dynamics Division research and technology plans, FY 1982
[NASA-TM-84509] N82-30566
CREW PROCEDURES (INFLIGHT)
Characteristics of a Paris-New York flight on board the Concorde
A82-41700
CRUISE MISSILES
The cruise missile era dawns
A82-43579
CRYOGENIC WIND TUNNELS
Adaptation and first cryogenic operation of T2 ONERA/CERT wind tunnel
A82-42531
CYCLIC COMPOUNDS
The preparation and characterization of mixtures of polycyclopentadienes as solid ramjet fuels
[AD-A115075] N82-30414
CYLINDRICAL BODIES
Stress intensity factors for radial cracks at outer surface of a partially autofrettaged cylinder subjected to internal pressure
[AD-A116396] N82-31714

D

DATA ACQUISITION
Economic analysis for data base management
A82-42208
Data acquisition system for NASA LaRC impact dynamics research facility
[NASA-TM-84510] N82-30525
DATA BASE MANAGEMENT SYSTEMS
Economic analysis for data base management
A82-42208
DATA BASES
Analysis and preparation of a digital terrain data base for flight simulator use
[AD-A115547] N82-30315
DATA LINKS
Design of a microprocessor-controlled linkage for simulator applications
[AD-A115421] N82-30954
DATA PROCESSING
Analysis of flight data in the frequency domain
A82-41796
DATA REDUCTION
Problems with the use of percentages in the analysis of AAES data --- Aircrew Automated Escape Systems
A82-44293
DATA SAMPLING
Pilot opinions of sampling effects in lateral directional control
N82-30849
DATA SYSTEMS
F-16 Centralized Data System /CDS/
A82-42206
DATA TRANSMISSION
Combined amplitude-phase modulation for a VHF communication link
A82-43870
A new class of routing protocols for a proposed computer network linking tactical radar sites
A82-43893
DC 9 AIRCRAFT
Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing
[NASA-CR-165448] N82-31448
DEBRIS
Application of wear debris analysis to aircraft hydraulic systems
[AD-A115060] N82-30305
DEFECTS
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449
DEFENSE PROGRAM
Economic analysis for data base management
A82-42208
DEGREES OF FREEDOM
Transonic flutter and response analyses of two 3-degree-of-freedom airfoils
A82-44245
DEICERS
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention
[NASA-CR-169246] N82-30432
DEICING
Aircraft icing research at NASA
[NASA-TM-82919] N82-30297
Study of the de-icing properties of the ASDE-3 rotodome
[AD-A115445] N82-31335
DESIGN ANALYSIS
Repair-discard concepts in design
A82-42178
Design and analysis of advanced composite structures
A82-42670
Applied flight mechanics in the design and in flight tests
A82-43327
Processes and procedural approaches in the aerodynamic design of the Alpha Jet aircraft
A82-43328
New approaches to fighter design
A82-44218
Design and implementation of USAF avionics integration support facilities
[AD-A115537] N82-30307
Functional design to support CDTI/DABS flight experiments
[NASA-CR-165947] N82-31326
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1
[AD-A115510] N82-31331
DESIGN TO COST
Design to life cycle cost capability of the PRICE models
[IAF PAPER 82-221] A82-44695
DETECTION
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
[AD-A114484] N82-30437
DIGITAL RADAR SYSTEMS
A new class of routing protocols for a proposed computer network linking tactical radar sites
A82-43893
DIGITAL SIMULATION
Simulation in connection with the development of the Alpha Jet aircraft
A82-43333
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2
[AD-A115511] N82-31332
DIGITAL SYSTEMS
NASA studies business aircraft avionics
A82-43659
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1
[AD-A115510] N82-31331
DIRECTIONAL CONTROL
Pilot opinions of sampling effects in lateral directional control
N82-30849
DISPLACEMENT
Large displacements and stability analysis of nonlinear propeller structures
[NASA-TM-82850] N82-31707
DISPLAY DEVICES
New image generators for the next generation of civil aircraft
[SEE PAPER 811767] A82-44236
Analysis and preparation of a digital terrain data base for flight simulator use
[AD-A115547] N82-30315
Evaluation of the FAA/MITRE weather data device
[AD-A114646] N82-30800

Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
N82-30838
Application of a pilot control strategy identification technique to a joint FAA/NASA ground based simulation of head up displays for CTOL aircraft
N82-30857
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle
N82-30859
Separation monitoring with four types of predictors on a cockpit display of traffic information
N82-30860
Functional design to support CDTI/DABS flight experiments
[NASA-CR-165947] N82-31326
Wide-angle, multiviewer, infinity display system
[AD-A116308] N82-31336

DITCHING (LANDING)
Improving aircarrier water survival
A82-44291

DRAG
Effects of canopy geometry and cloth permeability on the drag coefficient of a cross parachute in the fully open and reefed conditions for a W/L ratio of 0.3
[AD-A115046] N82-30293
Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing
[NASA-CR-165448] N82-31448

DRAG REDUCTION
Taking the drag out of bombs
A82-42849
Reduction in parachute drag due to forebody wake effects
[DE81-030124] N82-31309

DROPS (LIQUIDS)
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention
[NASA-CR-169246] N82-30432

DURABILITY
Titanium surface treatments for adhesive bonding
[AD-A114710] N82-30378

DYNAMIC LOADS
Experimental investigation of active loads control for aircraft landing gear
[NASA-TP-2042] N82-31321
Aerodynamic forces acting on the blades of stall regulated propeller type windmills
[DE82-901178] N82-31718

DYNAMIC MODELS
Pneumatic tire model for aircraft simulation
A82-44244

DYNAMIC STRUCTURAL ANALYSIS
An examination of the dynamics of rotary machines --- French thesis
A82-43728
Hybrid state vector methods for structural dynamic and aeroelastic boundary value problems
[NASA-CR-3591] N82-31304

E

ECONOMIC ANALYSIS
Economic analysis for data base management
A82-42208

ECONOMIC FACTORS
Aeronautical research and development in Europe - Perspectives
A82-43588
Noise and economic characteristics of an advanced blended supersonic transport concept
[NASA-TP-2073] N82-31294

ECONOMIC IMPACT
Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing
[NASA-CR-165448] N82-31448

EDUCATION
High-altitude imagery user guide
[PB82-158353] N82-30608

EJECTION INJURIES
Problems with the use of percentages in the analysis of AAES data --- Aircrew Automated Escape Systems
A82-44293

ELASTOMERS
Studies of new perfluoroether elastomeric sealants --- for aircraft fuel tanks
[NASA-CR-166377] N82-30400

ELECTRIC CONTROL
Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves --- German thesis
A82-43660

ELECTRICAL PROPERTIES
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340

ELECTRO-OPTICS
A miniature electro-optical air flow sensor
A82-41854

ELECTROMAGNETIC FIELDS
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention
[NASA-CR-169246] N82-30432

ELECTROMAGNETIC INTERACTIONS
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention
[NASA-CR-169246] N82-30432

ELECTROMAGNETIC PROPERTIES
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340

ELECTROMAGNETIC PULSES
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340

ELECTROMECHANICAL DEVICES
Electromechanical Actuation Development Program (EADP). Power control development
[AD-A116126] N82-31694

ELECTRONIC CONTROL
Electronic aircraft stabilization
[SAE PAPER 811763] A82-44234
Electromechanical Actuation Development Program (EADP). Power control development
[AD-A116126] N82-31694

ELECTRONIC COUNTERMEASURES
Northrop ECM - From B-1B to F-5E
A82-43425
The effect of radome scattering on ECM antenna patterns
[AD-A115517] N82-30463

ELECTRONIC WARFARE
Hover jam - US Army studies EW helicopter
A82-41888
Electronic warfare system measure of effectiveness
A82-43840

ELLIPSOIDS
Near field analysis of airborne antennas
[AD-A115074] N82-30462

EMBEDDING
Singularity embedding method in potential flow calculations
[NASA-CR-166387] N82-31300

ENERGY CONSERVATION
Minimum fuel horizontal flight paths in the terminal area
A82-44480

ENGINE DESIGN
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462
The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters
A82-42474
Piston engines for general aviation - Is the revolution really under way
A82-43578
Development of a spinning wave heat engine
[NASA-CR-165611] N82-31328

ENGINE NOISE
Airport/Community Noise
[NASA-CP-2241] N82-31070
Airport noise
N82-31071
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082

ENGINE PARTS
Structural strength of materials and parts of gas turbine engines --- Russian book
A82-42063
Improved penetrant process evaluation criteria
[AD-A115157] N82-30386
ENGINE TESTS
Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion
A82-41914
ENVIRONMENT EFFECTS
The noise impact of proposed runway alternatives at Craig Airport
[NASA-TM-84503] N82-32080
ESCAPE SYSTEMS
Problems with the use of percentages in the analysis of AAES data --- Aircrew Automated Escape Systems
A82-44293
ESTIMATES
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637
A description of methodologies used in estimation of a A-weighted sound levels for FAA Advisory circular AC-36-3B
[AD-A116543] N82-32084
ETHERS
Studies of new perfluoroether elastomeric sealants --- for aircraft fuel tanks
[NASA-CR-166377] N82-30400
EULER EQUATIONS OF MOTION
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-39] A82-43753
Damped Euler-equation method to compute transonic flow around wing-body combinations
A82-44092
EUROPEAN AIRBUS
Europe's best seller - Second-generation Airbus emerges
A82-42750
Airbus A 310 will compete with Boeing 767 for market
N82-32300
EUTECTIC COMPOSITES
High temperature composites. Status and future directions
[NASA-TM-82929] N82-30336
EXHAUST GASES
Remote sensing of turbine engine gases
[AD-A115443] N82-30310
An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities
[AD-A116171] N82-31548
EXHAUST NOZZLES
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 2: Analysis of results
[NASA-CR-166365] N82-31301
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 3: Experimental technique
[NASA-CR-166147] N82-31302
EXTERNAL STORES
Taking the drag out of bombs
A82-42849

F

F-4 AIRCRAFT
Implicit model-following technique - Application to the design of longitudinal stability augmentation systems
A82-43571
Aerodynamics on a transport aircraft type wing-body model
[NASA-TM-76878] N82-30287
F-15 AIRCRAFT
New nozzle design aimed at F-15, F-16 aircraft
A82-43092
F-16 AIRCRAFT
F-16 Centralized Data System /CDS/
A82-42206
New nozzle design aimed at F-15, F-16 aircraft
A82-43092
F-18 AIRCRAFT
F/A-18 Hornet reliability challenge - Status report
A82-42229
Aeropropulsive characteristics of Mach numbers up to 2.2 of axisymmetric and nonaxisymmetric nozzles installed on an F-18 model
[NASA-TP-2044] N82-30291
FABRICATION
Materials and design criteria for Kevlar-29 ribbon parachutes
[AD-A116357] N82-31308
FAIL-SAFE SYSTEMS
Analysis of built-in-test accuracy
A82-42211
FAILURE ANALYSIS
Maximum likelihood failure detection of aircraft flight control sensors
A82-44481
FAILURE MODES
F/A-18 Hornet reliability challenge - Status report
A82-42229
FAIRINGS
Flow control for a high energy laser turret using trapped vortices
[AD-A115263] N82-30547
FATIGUE (MATERIALS)
Improved penetrant process evaluation criteria
[AD-A115157] N82-30386
Stress intensity factors for radial cracks at outer surface of a partially autofrettaged cylinder subjected to internal pressure
[AD-A116396] N82-31714
FATIGUE LIFE
A fatigue crack growth theory based on strain energy density factor
A82-43742
FATIGUE TESTS
Structural strength of materials and parts of gas turbine engines --- Russian book
A82-42063
FATTY ACIDS
Antiwear properties of additives based on higher fatty acids --- for jet fuels
A82-42693
FAULT TOLERANCE
Advanced reliability modeling of fault-tolerant computer-based systems
[NASA-TM-84501] N82-30962
FAULT TREES
Fault isolation BITE for increased productivity
A82-42210
FEEDBACK CONTROL
Optimisation in multivariable design
A82-42565
FERROGRAPHY
Application of wear debris analysis to aircraft hydraulic systems
[AD-A115060] N82-30305
FIBER OPTICS
Fiber optics remoting of terminal radar and beacon signals
[AD-A116403] N82-32140
FIBER REINFORCED COMPOSITES
High temperature composites. Status and future directions
[NASA-TM-82929] N82-30336
FIGHTER AIRCRAFT
A supersonic V/STOL fighter design project
A82-42545
Taking the drag out of bombs
A82-42849
New approaches to fighter design
A82-44218
New technologies for future fighters
A82-44219
Mediating Mach's mechanics - Bombs away --- weapons delivery of fighter aircraft at transonic speed
A82-44467
Assessment of stereographics for fire control and navigation in fighter aircraft
[AD-A115414] N82-30306
Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95
[NASA-TM-84513] N82-31303
FINANCIAL MANAGEMENT
The sporty game --- on wide body commercial airliner business history
A82-42572

FINITE ELEMENT METHOD
  An examination of the dynamics of rotary machines --- French thesis A82-43724
  Large displacements and stability analysis of nonlinear propeller structures [NASA-TM-82850] N82-31707
  Stress intensity factors for radial cracks at outer surface of a partially autofrettaged cylinder subjected to internal pressure [AD-A116396] N82-31714
FINITE VOLUME METHOD
  An implicit finite-volume method for solving the euler equations [ONERA, TP NO. 1982-59] A82-43753
  Damped Euler-equation method to compute transonic flow around wing-body combinations A82-44092
FLIGHT CHARACTERISTICS
  Characteristics of a Paris-New York flight on board the Concorde A82-41700
FLIGHT CONDITIONS
  Meteorological aspects of North Atlantic flight tracks - Some interim results of the study A82-43250
  Aerodynamic penalties of heavy rain on a landing aircraft [NASA-CR-156865] N82-30298
FLIGHT CONTROL
  Statistical analysis of piloted simulation of real time trajectory optimization algorithms A82-43261
  Current perspectives on emergency spin-recovery systems A82-43264
  757 systems key to route flexibility A82-43275
  Image processing in tactical flight guidance A82-44221
  Maximum likelihood failure detection of aircraft flight control sensors A82-44401
  Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-30856
  Singular perturbation techniques for real time aircraft trajectory optimization and control [NASA-CR-3597] N82-31330
  Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1 [AD-A115510] N82-31331
  Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2 [AD-A115511] N82-31332
FLIGHT FATIGUE
  Human-factors evaluation of C-141 fuel savings advisory system [AD-A114931] N82-30304
FLIGHT MECHANICS
  Applied flight mechanics in the design and in flight tests A82-43327
FLIGHT OPERATIONS
  Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness A82-43331
FLIGHT OPTIMIZATION
  The flight management computer [SEE PAPER 811762] A82-44233
FLIGHT PATHS
  Meteorological aspects of North Atlantic flight tracks - The development of programs for minimum-time tracks A82-43249
  Meteorological aspects of North Atlantic flight tracks - Some interim results of the study A82-43250
  Loran-C navigation as an aid to aerial photographic operations A82-43469
  The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing --- of meteorological information A82-43821
  Automated flight data processing A82-44222
  Minimum fuel horizontal flight paths in the terminal area A82-44480
  Optimal periodic Dolphin gliding flight N82-30313
FLIGHT PLANS
  Meteorological aspects of North Atlantic flight tracks - The development of programs for minimum-time tracks A82-43249
  Meteorological aspects of North Atlantic flight tracks - Some interim results of the study A82-43250
FLIGHT SIMULATION
  Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle N82-30859
  Separation monitoring with four types of predictors on a cockpit display of traffic information N82-30860
FLIGHT SIMULATORS
  Analysis and preparation of a digital terrain data base for flight simulator use [AD-A115547] N82-30315
  Computer architecture study for VTXTS simulators [AD-A115006] N82-30953
  Wide-angle, multiviewer, infinity display system [AD-A116308] N82-31336
FLIGHT TEST INSTRUMENTS
  Integrated sensor system for flight test instrumentation A82-41869
FLIGHT TESTS
  Analysis of flight data in the frequency domain A82-41796
  Europe's best seller - Second-generation Airbus emerges A82-42750
  The testing of new technologies with the aid of the Alpha Jet aircraft A82-43326
  Applied flight mechanics in the design and in flight tests A82-43327
  Methodology in flight tests A82-43400
  New technologies for future fighters A82-44219
  XV-15 program update A82-44468
  Grob aircraft construction: The G 110 flies [NASA-TM-76893] N82-30303
FLIGHT TIME
  Meteorological aspects of North Atlantic flight tracks - The development of programs for minimum-time tracks A82-43249
FLOATING POINT ARITHMETIC
  A floating-point/multiple-precision processor for airborne applications A82-41068
FLOW CHARACTERISTICS
  Flow and acoustic properties of low Reynolds number underexpanded supersonic jets [NASA-CR-169257] N82-30288
FLOW DISTORTION
  A method for designing inlet distortion screens for aircraft gas turbine engine tests using an interactive computer program [AD-A116584] N82-31325
FLOW DISTRIBUTION
  Flow and pressure field of a model propeller [NASA-TM-76690] N82-30290
  A prescribed wake rotor inflow and flow field prediction analysis, user's manual and technical approach [NASA-CR-165894] N82-31296
  Surface generation for aerodynamic applications [AD-A116263] N82-31305
  Development and utilization of a laser velocimeter system for a large transonic wind tunnel [NASA-TM-82886] N82-31663

FLOW GEOMETRY
Optimal stream surfaces in supersonic three-dimensional flows A82-42722
Higher-order flow angle corrections for three-dimensional wind tunnel wall interference A82-44246
FLOW MEASUREMENT
Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades [ONERA, TP NO. 1981-93] A82-42817
Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor [ONERA, TP NO. 1982-61] A82-43755
Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter [ONERA, TP NO. 1982-62] A82-43756
Application of laser velocimetry to large industrial wind-tunnels [ONERA, TP NO. 1982-63] A82-43757
FLOW THEORY
Modern compressible flow with historical perspective --- Book A82-42552
FLOW VELOCITY
Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter [ONERA, TP NO. 1982-62] A82-43756
FLOWMETERS
A miniature electro-optical air flow sensor A82-41854
FLUORESCENCE
Improved penetrant process evaluation criteria [AD-A115157] N82-30386
FLUTTER ANALYSIS
An experimental examination of compressor blade flutter [ONERA, TP NO. 1982-31] A82-42808
Sensitivity analysis and optimization of aeroelastic stability A82-43394
Methodology in flight tests A82-43400
Transonic flutter and response analyses of two 3-degree-of-freedom airfoils A82-44245
FLYING PLATFORMS
Hover jam - US Army studies EW helicopter A82-41888
Perspectives for the use of remotely piloted vehicles in military technology A82-44220
FOIL BEARINGS
Gas foil bearing development program [AD-A114692] N82-30556
FOREBODIES
Reduction in parachute drag due to forebody wake effects [DE81-030124] N82-31309
FORTRAN
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2 [AD-A115511] N82-31332
FRACTURE MECHANICS
A fatigue crack growth theory based on strain energy density factor A82-43742
FREE FLIGHT TEST APPARATUS
A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel A82-43311
FREQUENCY RESPONSE
Optimisation in multivariable design A82-42565
FUEL CONSUMPTION
Minimum fuel horizontal flight paths in the terminal area A82-44480
Human-factors evaluation of C-141 fuel savings advisory system [AD-A114931] N82-30304
FUEL TANKS
Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2 [NASA-CR-167912] N82-31546
FUSELAGES
An optimum design of fuselage structure A82-42533
Generation of boundary-conforming grids around wing-body configurations using transfinite interpolation A82-44091

G

GAS BEARINGS
Gas foil bearing development program [AD-A114692] N82-30556
GAS TURBINE ENGINES
The analysis of the thermal-mechanical stress conditions in axisymmetric rotating hot components of /aircraft/ gas turbines --- German thesis A82-41686
Structural strength of materials and parts of gas turbine engines --- Russian book A82-42063
Ceramic applications in turbine engines [NASA-CR-165197] N82-31158
A method for designing inlet distortion screens for aircraft gas turbine engine tests using an interactive computer program [AD-A116584] N82-31325
GAS TURBINES
Oxidation-resistant materials for hot-gas turbines and jet engines A82-41725
GENERAL AVIATION AIRCRAFT
Analysis of flight data in the frequency domain A82-41796
Technology for tomorrow's business aircraft A82-43577
Piston engines for general aviation - Is the revolution really under way A82-43578
NASA studies business aircraft avionics A82-43659
Data acquisition system for NASA LaRC impact dynamics research facility [NASA-TM-84510] N82-30525
Structures and Dynamics Division research and technology plans, FY 1982 [NASA-TM-84509] N82-30566
GEODESIC LINES
Near field analysis of airborne antennas [AD-A115074] N82-30462
GEOSYNCLINES
A survey of melting layer research [AD-A115224] N82-30806
GLIDERS
Grob aircraft construction: The G 110 flies [NASA-TM-76893] N82-30303
Optimal periodic Dolphin gliding flight N82-30313
GLIDING
Optimal periodic Dolphin gliding flight N82-30313
GROUND SUPPORT EQUIPMENT
The ILS in Category III operations --- ground-based support for French air routes [SEE PAPER 811761] A82-44232
GROUND TRACKS
Meteorological aspects of North Atlantic flight tracks - The development of programs for minimum-time tracks A82-43249
Meteorological aspects of North Atlantic flight tracks - Some interim results of the study A82-43250
GUIDANCE (MOTION)
Image processing in tactical flight guidance A82-44221

H

HEAD-UP DISPLAYS
Final engineering report for computer, weapon aiming CP-1444/A [AD-A115238] N82-31327
HEAT RESISTANT ALLOYS
Oxidation-resistant materials for hot-gas turbines and jet engines A82-41725
High temperature composites. Status and future directions [NASA-TM-82929] N82-30336

HEATING EQUIPMENT
Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2
[NASA-CR-167912] N82-31546
HELICOPTER CONTROL
A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior --- German thesis
A82-41687
HELICOPTER DESIGN
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
Apache to provide night/bad weather capability
A82-43091
User's manual for the coupled rotor/airframe vibration analysis graphic package
[NASA-CR-165897] N82-31299
HELICOPTER ENGINES
The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters
A82-42474
Helicopter noise definition report UH-60A, S-76, A-109, 206-L
[AD-A116363] N82-32083
HELICOPTER PERFORMANCE
Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-93] A82-42817
Apache to provide night/bad weather capability
A82-43091
Helicopter commuters - An optimistic outlook
A82-44470
Coupled rotor/airframe vibration analysis program manual manual. Volume 1: User's and programmer's instructions
[NASA-CR-165891] N82-31965
Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
[NASA-CR-165892] N82-31966
HELICOPTER WAKES
Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor
[ONERA, TP NO. 1982-61] A82-43755
A prescribed wake rotor inflow and flow field prediction analysis, user's manual and technical approach
[NASA-CR-165894] N82-31296
HELICOPTERS
Flight trials of the Litton LTN-211 Omega Navigation System in a Wessex helicopter
[RAE-TM-RAD-NAV-147] N82-30299
Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
N82-30830
Dynamic System Coupling (DYSCO) program. Volume 2: Theoretical manual
[AD-A115004] N82-31975
Helicopter noise definition report UH-60A, S-76, A-109, 206-L
[AD-A116363] N82-32083
HELMET MOUNTED DISPLAYS
Assessment of stereographics for fire control and navigation in fighter aircraft
[AD-A115414] N82-30306
HIGH ALTITUDE
High-altitude imagery user guide
[PB82-158353] N82-30608
HIGH POWER LASERS
Flow control for a high energy laser turret using trapped vortices
[AD-A115263] N82-30547
HIGH TEMPERATURE GASES
Oxidation-resistant materials for hot-gas turbines and jet engines
A82-41725
Modern compressible flow with historical perspective --- Book
A82-42552
HISTORIES
Composite materials: Tomorrow for the day after tomorrow
[NASA-TM-76709] N82-30337
HORIZONTAL FLIGHT
Minimum fuel horizontal flight paths in the terminal area
A82-44480
HOVERING
A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior --- German thesis
A82-41687
HUMAN FACTORS ENGINEERING
Human-factors evaluation of C-141 fuel savings advisory system
[AD-A114931] N82-30304
HYDRAULIC CONTROL
Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves --- German thesis
A82-43660
Experimental investigation of active loads control for aircraft landing gear
[NASA-TP-2042] N82-31321
HYDRAULIC EQUIPMENT
Application of wear debris analysis to aircraft hydraulic systems
[AD-A115060] N82-30305
HYDROCARBON COMBUSTION
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 1: Properties in SI units
[NASA-TP-1906] N82-32186
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 2: Compositions corresponding to Kelvin temperature schedules in part 1
[NASA-TP-1907] N82-32187
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 3: Properties in US customary units
[NASA-TP-1908] N82-32188
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 4: Compositions corresponding to Rankine temperature schedules in part 3
[NASA-TP-1909] N82-32189
HYDROCARBON FUELS
Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2
[NASA-CR-167912] N82-31546
HYPERSONIC SPEED
What has hypersonics research led to - Some examples of progress and spin off /17th Handley Page Memorial Lecture/
A82-43583
HYPERSONICS
What has hypersonics research led to - Some examples of progress and spin off /17th Handley Page Memorial Lecture/
A82-43583

I

ICE FORMATION
Aircraft icing research at NASA
[NASA-TM-82919] N82-30297
Study of the de-icing properties of the ASDE-3 rotodome
[AD-A115445] N82-31335
ICE PREVENTION
Aircraft icing research at NASA
[NASA-TM-82919] N82-30297
A survey of melting layer research
[AD-A115224] N82-30806
ILYUSHIN AIRCRAFT
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278
IMAGE PROCESSING
Image processing in tactical flight guidance
A82-44221
Wide-angle, multiviewer, infinity display system
[AD-A116308] N82-31336
IMAGERY
Analysis and preparation of a digital terrain data base for flight simulator use
[AD-A115547] N82-30315
IMAGING TECHNIQUES
High-altitude imagery user guide
[PB82-158353] N82-30608
IMPACT RESISTANCE
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449

IN-FLIGHT MONITORING
In-flight acoustic emission monitoring
A82-42865

INCOMPRESSIBLE FLOW
Aerosound from corner flow and flap flow
[NASA-CR-166396] N82-32081

INFORMATION SYSTEMS
The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing --- of meteorological information
A82-43821

INPUT/OUTPUT ROUTINES
A floating-point/multiple-precision processor for airborne applications
A82-41868

INSPECTION
Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity
A82-42217

INSTALLING
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082

INSTRUMENT LANDING SYSTEMS
Simulated ILS using a laser tracker
A82-41795
The ILS in Category III operations --- ground-based support for French air routes
[SEE PAPER 811761] A82-44232

INTAKE SYSTEMS
A method for designing inlet distortion screens for aircraft gas turbine engine tests using an interactive computer program
[AD-A116584] N82-31325

INTERACTIVE CONTROL
Interactive graphics design with CODEM
A82-44223

INTERGRANULAR CORROSION
Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion
A82-41914

INTERNATIONAL COOPERATION
Consideration of an international private sector satellite search and rescue locating system
[IAF PAPER 82-236] A82-44699

INTERPOLATION
Generation of boundary-conforming grids around wing-body configurations using transfinite interpolation
A82-44091

INVENTORY CONTROLS
A preliminary analysis of TF34-100/400 jet engine rework data in support of the MEP system implementation at NARF Alameda
[AD-A114452] N82-30308

INVISCID FLOW
Damped Euler-equation method to compute transonic flow around wing-body combinations
A82-44092

J

JAMMING
Hover jam - US Army studies EW helicopter
A82-41888
Northrop ECM - From B-1B to F-5E
A82-43425

JET AIRCRAFT
In-flight acoustic emission monitoring
A82-42865

JET AIRCRAFT NOISE
Flow and acoustic properties of low Reynolds number underexpanded supersonic jets
[NASA-CR-169257] N82-30288
Airport/Community Noise
[NASA-CP-2241] N82-31070
Airport noise
N82-31071
Community noise
N82-31072
Summary of airport technology needs
N82-31073

JET ENGINE FUELS
Antiwear properties of additives based on higher fatty acids --- for jet fuels
A82-42893
An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities
[AD-A116171] N82-31548

JET ENGINES
Oxidation-resistant materials for hot-gas turbines and jet engines
A82-41725
A description of methodologies used in estimation of a A-weighted sound levels for FAA Advisory circular AC-36-3B
[AD-A116543] N82-32084

JET EXHAUST
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 3: Experimental technique
[NASA-CR-166147] N82-31302

JET FLOW
Parietal jets. I --- upper surface blowing
A82-43589

JOURNAL BEARINGS
Gas foil bearing development program
[AD-A114692] N82-30556

K

KALMAN FILTERS
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637

KEVLAR (TRADEMARK)
Materials and design criteria for Kevlar-29 ribbon parachutes
[AD-A116357] N82-31308
Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing
[NASA-CR-165448] N82-31448

L

LABORATORY EQUIPMENT
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

LAMINAR FLOW
Laminar flow control, 1976 - 1982: A selected annotated bibliography
[NASA-TM-84496] N82-31645

LAND USE
Community noise
N82-31072

LANDING GEAR
Experimental investigation of active loads control for aircraft landing gear
[NASA-TP-2042] N82-31321
Description of a simple model to determine landing gear forces during the takeoff of aerodynamically unstable aircraft
[EX-22B] N82-31333

LANDING SIMULATION
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle
N82-30859
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637

LASER APPLICATIONS
Simulated ILS using a laser tracker
A82-41795
Laser pointing in a turbulent atmosphere
A82-42887
Development and utilization of a laser velocimeter system for a large transonic wind tunnel
[NASA-TM-82886] N82-31663

LASER DOPPLER VELOCIMETERS
Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor
[ONERA, TP NO. 1982-61] A82-43755
Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter
[ONERA, TP NO. 1982-62] A82-43756
Application of laser velocimetry to large industrial wind-tunnels
[ONERA, TP NO. 1982-63] A82-43757

LASER INTERFEROMETRY
A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel
A82-43311

LATERAL STABILITY
  Description of a simple model to determine landing gear forces during the takeoff of aerodynamically unstable aircraft
  [EY-22B] N82-31333
LATTICES (MATHEMATICS)
  A doublet lattice method for the determination of rotor induced empennage vibration airloads. Analysis description and program documentation
  [NASA-CR-165893] N82-31295
LAW (JURISPRUDENCE)
  Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
  [AD-A115485] N82-31313
LAYERS
  A survey of melting layer research
  [AD-A115224] N82-30806
LIFE (DURABILITY)
  Life enhancement of Naval systems through advanced materials
  [AD-A114722] N82-30404
LIFE CYCLE COSTS
  Repair-discard concepts in design
  A82-42178
  R/M/LCC effects of commercial off-the-shelf equipment
  A82-42181
  Design to life cycle cost capability of the PRICE models
  [IAF PAPER 82-221] A82-44695
LIFE RAFTS
  Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
  [AD-A114480] N82-30437
LIFT DRAG RATIO
  An effective algorithm for shock-free wing design
  [AD-A116265] N82-31322
LIGHT (VISIBLE RADIATION)
  Airborne measurements of European sky and terrain radiances
  [AD-A114637] N82-30782
LIQUEFACTION
  A survey of melting layer research
  [AD-A115224] N82-30806
LISTS
  Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
  [NASA-CR-165892] N82-31966
LOADS (FORCES)
  Pneumatic tire model for aircraft simulation
  A82-44244
  The lateral response of an airship to turbulence
  [AD-A115197] N82-30312
  Simulation of the interaction between airdrop platforms and aircraft rollers
  [AD-A116370] N82-31324
LOGIC DESIGN
  Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2
  [AD-A115511] N82-31332
LOGISTICS
  Design and implementation of USAF avionics integration support facilities
  [AD-A115537] N82-30307
LONGITUDINAL STABILITY
  Implicit model-following technique - Application to the design of longitudinal stability augmentation systems
  A82-43571
LORAN C
  Long-range radio NAVAID signal reliability
  A82-41951
  Loran-C navigation as an aid to aerial photographic operations
  A82-43469
LOW TEMPERATURE
  Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2
  [NASA-CR-167912] N82-31546
LUBRICATING OILS
  Determination of antioxidant content in aviation oils using thin-layer chromatography
  A82-42894
  Antioxidants for synthetic oils
  A82-42895

M

MACH NUMBER
  Aeropropulsive characteristics of Mach numbers up to 2.2 of axisymmetric and nonaxisymmetric nozzles installed on an F-18 model
  [NASA-TP-2044] N82-30291
  Calibration and performance of the AEDC/VKF tunnel C, Mach number 4, aerothermal wind tunnel
  [AD-A115279] N82-31338
MAINTAINABILITY
  Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings
  A82-42176
  R/M/LCC effects of commercial off-the-shelf equipment
  A82-42181
  R & M characteristics of a Microwave Landing System
  A82-42216
MAINTENANCE
  Repair and maintenance of buildings in civil aviation --- Russian book
  A82-42059
MAN MACHINE SYSTEMS
  A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior --- German thesis
  A82-41687
  The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing --- of meteorological information
  A82-43821
  Assessment of stereographics for fire control and navigation in fighter aircraft
  [AD-A115414] N82-30306
  Application of a pilot control strategy identification technique to a joint FAA/NASA ground based simulation of head up displays for CTOL aircraft
  N82-30857
MAN POWERED AIRCRAFT
  Stability and control of the Gossamer human powered aircraft by analysis and flight test
  [NASA-CR-163119] N82-30289
MANAGEMENT PLANNING
  A preliminary analysis of TF34-100/400 jet engine rework data in support of the MRP system implementation at NARF Alameda
  [AD-A114452] N82-30308
MANEUVERABILITY
  Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95
  [NASA-TM-84513] N82-31303
MANUAL CONTROL
  Training aircraft design considerations based on the successive organization of perception in manual control
  N82-30840
  Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities
  N82-30848
  Evaluation of a trajectory command concept for manual control of carrier approaches and landings
  N82-30856
  Application of a pilot control strategy identification technique to a joint FAA/NASA ground based simulation of head up displays for CTOL aircraft
  N82-30857
  Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle
  N82-30859
MAPS
  Analysis and preparation of a digital terrain data base for flight simulator use
  [AD-A115547] N82-30315
MARKETING
  The sporty game --- on wide body commercial airliner business history
  A82-42572
  Airbus A 310 will compete with Boeing 767 for market
  N82-32300
MARKOV PROCESSES
  Analysis of built-in-test accuracy
  A82-42211

MASS SPECTROSCOPY
Control electronics for air-borne quadrupole ion mass spectrometer
[AD-A115399] N82-30356
MATHEMATICAL LOGIC
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2
[AD-A115511] N82-31332
MATHEMATICAL MODELS
Models for controlling reliability in aviation --- Russian book
A82-42055
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities
N82-30848
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1
[AD-A115510] N82-31331
MATHEMATICAL PROGRAMMING
The application of geometric programming to the structural design of aircraft wings
A82-42546
MAXIMUM LIKELIHOOD ESTIMATES
Maximum likelihood failure detection of aircraft flight control sensors
A82-44481
MEASUREMENT
Application of a pilot control strategy identification technique to a joint FAA/NASA ground based simulation of head up displays for CTOL aircraft
N82-30857
MEASURING INSTRUMENTS
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323
MECHANICAL PROPERTIES
Structural strength of materials and parts of gas turbine engines --- Russian book
A82-42063
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462
MELTING
A survey of melting layer research
[AD-A115224] N82-30806
METAL FATIGUE
A fatigue crack growth theory based on strain energy density factor
A82-43742
METAL MATRIX COMPOSITES
High temperature composites. Status and future directions
[NASA-TM-82929] N82-30336
METEOROLOGICAL PARAMETERS
Meteorological aspects of North Atlantic flight tracks - Some interim results of the study
A82-43250
A survey of melting layer research
[AD-A115224] N82-30806
Evaluation of a meteorological airborne pulse Doppler radar
[PB82-156860] N82-30820
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323
METEOROLOGICAL RADAR
Evaluation of the FAA/MITRE weather data device
[AD-A114646] N82-30800
Evaluation of a meteorological airborne pulse Doppler radar
[PB82-156860] N82-30820
METEOROLOGICAL SERVICES
The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing --- of meteorological information
A82-43821
MICROCOMPUTERS
A floating-point/multiple-precision processor for airborne applications
A82-41868
MICROPROCESSORS
Pilot opinions of sampling effects in lateral directional control
N82-30849
Design of a microprocessor-controlled linkage for simulator applications
[AD-A115421] N82-30954
MICROWAVE LANDING SYSTEMS
R & M characteristics of a Microwave Landing System
A82-42216
Operational and functional requirements for the navigation system in terminal areas
[AD-A116127] N82-31318
MIDAIR COLLISIONS
Air-air anticollision systems
[SEE PAPER 811764] A82-44235
MILITARY AIRCRAFT
Northrop ECM - From B-1B to F-5E
A82-43425
It's too logical - It'll never work /Commercial applications of the JVX/
A82-44469
MILITARY HELICOPTERS
Hover jam - US Army studies EW helicopter
A82-41888
MILITARY TECHNOLOGY
R/M/LCC effects of commercial off-the-shelf equipment
A82-42181
Northrop ECM - From B-1B to F-5E
A82-43425
Perspectives for the use of remotely piloted vehicles in military technology
A82-44220
MINIATURE ELECTRONIC EQUIPMENT
A miniature electro-optical air flow sensor
A82-41854
MIRRORS
Wide-angle, multiviewer, infinity display system
[AD-A116308] N82-31336
MISSILE DESIGN
The cruise missile era dawns
A82-43579
MISSILE LAUNCHERS
The cruise missile era dawns
A82-43579
MISSION PLANNING
A field guide for scanner and photographic missions
A82-43468
Automated flight data processing
A82-44222
MODULUS OF ELASTICITY
Stress intensity factors for radial cracks at outer surface of a partially autofrettaged cylinder subjected to internal pressure
[AD-A116396] N82-31714
MOMENTUM
Aerodynamic penalties of heavy rain on a landing aircraft
[NASA-CR-156885] N82-30298
MONITORS
R & M characteristics of a Microwave Landing System
A82-42216
Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity
A82-42217
Multilevel semantic analysis and problem-solving in the flight domain
[NASA-CR-169282] N82-31967
MONTE CARLO METHOD
A method to determine runway capacity
A82-44100
MTBF
Long-range radio NAVAID signal reliability
A82-41951
F/A-18 Hornet reliability challenge - Status report
A82-42229
MULTIENGINE VEHICLES
The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters
A82-42474
MULTIPLEXING
Data acquisition system for NASA LaRC impact dynamics research facility
[NASA-TM-84510] N82-30525
MULTISPECTRAL BAND SCANNERS
A field guide for scanner and photographic missions
A82-43468

N

NASTRAN
Large displacements and stability analysis of nonlinear propeller structures
[NASA-TM-82850] N82-31707
NAVIGATION
Assessment of stereographics for fire control and navigation in fighter aircraft
[AD-A115414] N82-30306
NAVSTAR SATELLITES
FAA acceptance tests on the navigation system using time global positioning system X set receiver
[DOT/FAA/RD-82/9] N82-31315
NAVY
Life enhancement of Naval systems through advanced materials
[AD-A114722] N82-30404
NEAR FIELDS
Near field analysis of airborne antennas
[AD-A115074] N82-30462
NETWORK CONTROL
A new class of routing protocols for a proposed computer network linking tactical radar sites
A82-43893
NIGHT FLIGHTS (AIRCRAFT)
Apache to provide night/bad weather capability
A82-43091
NOISE GENERATORS
Aerosound from corner flow and flap flow
[NASA-CR-166396] N82-32081
NOISE INTENSITY
Airport noise
N82-31071
NOISE MEASUREMENT
Summary of airport technology needs
N82-31073
NOISE POLLUTION
A study of general aviation community noise impact and annoyance
[NASA-CR-165945] N82-31066
Airport/Community Noise
[NASA-CP-2241] N82-31070
Community noise
N82-31072
Summary of airport technology needs
N82-31073
Summary of community technology needs
N82-31074
The noise impact of proposed runway alternatives at Craig Airport
[NASA-TM-84503] N82-32080
NOISE PREDICTION (AIRCRAFT)
Noise and economic characteristics of an advanced blended supersonic transport concept
[NASA-TP-2073] N82-31294
A description of methodologies used in estimation of a A-weighted sound levels for FAA advisory circular AC-36-3B
[AD-A116543] N82-32084
NOISE REDUCTION
Mode scatterer design for fan noise suppression in two-dimensional ducts
A82-43402
Airport/Community Noise
[NASA-CP-2241] N82-31070
Airport noise
N82-31071
Community noise
N82-31072
Summary of airport technology needs
N82-31073
Summary of community technology needs
N82-31074
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082
NONDESTRUCTIVE TESTS
Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion
A82-41918
In-flight acoustic emission monitoring
A82-42865
NONLINEAR SYSTEMS
Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves --- German thesis
A82-43660
NONUNIFORM FLOW
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082
NOZZLE DESIGN
Optimal stream surfaces in supersonic three-dimensional flows
A82-42722
New nozzle design aimed at F-15, F-16 aircraft
A82-43092
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 3: Experimental technique
[NASA-CR-166147] N82-31302
NOZZLE GEOMETRY
Aeropropulsive characteristics of Mach numbers up to 2.2 of axisymmetric and nonaxisymmetric nozzles installed on an F-18 model
[NASA-TP-2044] N82-30291
NUMERICAL CONTROL
Programmable controller system for wind tunnel diversion vanes
A82-41846
Automated flight data processing
A82-44222
The flight management computer
[SAE PAPER 811762] A82-44233
NUMERICAL FLOW VISUALIZATION
Turbulence modelling - Report of a Working Party
A82-42547

O

OIL ADDITIVES
Determination of antioxidant content in aviation oils using thin-layer chromatography
A82-42894
Antioxidants for synthetic oils
A82-42895
OMEGA NAVIGATION SYSTEM
Long-range radio NAVAID signal reliability
A82-41951
Construction and testing of an Omega navigation system for the balloon-borne X-ray experiment --- German thesis
A82-43111
Flight trials of the Litton LTN-211 Omega Navigation System in a Wessex helicopter
[RAE-TM-RAD-NAV-147] N82-30299
ONBOARD DATA PROCESSING
Statistical analysis of piloted simulation of real time trajectory optimization algorithms
A82-43261
Automated flight data processing
A82-44222
OPERATING COSTS
Aircraft R&D in Europe - A perspective view
A82-42504
OPTICAL RADAR
Remote sensing of turbine engine gases
[AD-A115443] N82-30310
OPTICAL TRACKING
Simulated ILS using a laser tracker
A82-41795
OPTIMAL CONTROL
Models for controlling reliability in aviation --- Russian book
A82-42055
OPTIMIZATION
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462
An optimum design of fuselage structure
A82-42533
The application of geometric programming to the structural design of aircraft wings
A82-42546
Optimisation in multivariable design
A82-42565
Sensitivity analysis and optimization of aeroelastic stability
A82-43394

ORDNANCE
Mediating Mach's mechanics - Bombs away --- weapons delivery of fighter aircraft at transonic speed
A82-44467
OUTPUT
Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
[NASA-CR-165892] N82-31966
OXIDATION RESISTANCE
Oxidation-resistant materials for hot-gas turbines and jet engines
A82-41725

P

PANEL METHOD (FLUID DYNAMICS)
User's manual for the Automated Paneling Technique (APT) and the Wing Body Aerodynamic Technique (WABAT) programs
[NASA-CR-165895] N82-31297
PANELS
Noise transmission loss of aircraft panels using acoustic intensity methods
[NASA-TP-2046] N82-31069
PARACHUTE FABRICS
Effects of canopy geometry and cloth permeability on the drag coefficient of a cross parachute in the fully open and reefed conditions for a W/A ratio of 0.3
[AD-A115046] N82-30293
PARACHUTES
Effects of canopy geometry and cloth permeability on the drag coefficient of a cross parachute in the fully open and reefed conditions for a W/A ratio of 0.3
[AD-A115046] N82-30293
PASSENGER AIRCRAFT
The sporty game --- on wide body commercial airliner business history
A82-42572
New image generators for the next generation of civil aircraft
[SEE PAPER 811767] A82-44236
Helicopter commuters - An optimistic outlook
A82-44470
PATTERN RECOGNITION
Image processing in tactical flight guidance
A82-44221
PERCEPTION
Training aircraft design considerations based on the successive organization of perception in manual control
N82-30840
PERFLUORO COMPOUNDS
Studies of new perfluoroether elastomeric sealants --- for aircraft fuel tanks
[NASA-CR-166377] N82-30400
PERFORMANCE
Application of a pilot control strategy identification technique to a joint FAA/NASA ground based simulation of head up displays for CTOL aircraft
N82-30857
PERFORMANCE PREDICTION
A survey regarding the German-French development program Alpha Jet
A82-43332
Electronic warfare system measure of effectiveness
A82-43840
Pneumatic tire model for aircraft simulation
A82-44244
PERFORMANCE TESTS
Analysis of built-in-test accuracy
A82-42211
Bonding procedure for Teflon seals
A82-42792
Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter
[ONERA, TP NO. 1982-62] A82-43756
Flight trials of the Litton LTN-211 Omega Navigation System in a Wessex helicopter
[RAE-TM-RAD-NAV-147] N82-30299
Ceramic applications in turbine engines
[NASA-CR-165197] N82-31158
PERTURBATION
Singular perturbation techniques for real time aircraft trajectory optimization and control
[NASA-CR-3597] N82-31330
PHASE MODULATION
Combined amplitude-phase modulation for a VHF communication link
A82-43870
PHOTOGRAPHY
High-altitude imagery user guide
[PB82-158353] N82-30608
PHOTOINTERPRETATION
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606
PILOT PERFORMANCE
A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior --- German thesis
A82-41687
Statistical analysis of piloted simulation of real time trajectory optimization algorithms
A82-43261
Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
N82-30838
Application of a pilot control strategy identification technique to a joint FAA/NASA ground based simulation of head up displays for CTOL aircraft
N82-30857
Separation monitoring with four types of predictors on a cockpit display of traffic information
N82-30860
PISTON ENGINES
Piston engines for general aviation - Is the revolution really under way
A82-43578
PNEUMATIC EQUIPMENT
Pneumatic tire model for aircraft simulation
A82-44244
POINTING CONTROL SYSTEMS
Laser pointing in a turbulent atmosphere
A82-42887
POLITICS
Present challenges of research and technology politics
[NASA-TM-76720] N82-31147
POLYAMIDE RESINS
Materials and design criteria for Kevlar-29 ribbon parachutes
[AD-A116357] N82-31308
POLYMERIZATION
The preparation and characterization of mixtures of polycyclopentadienes as solid ramjet fuels
[AD-A115075] N82-30414
POLYNOMIALS
Hybrid state vector methods for structural dynamic and aeroelastic boundary value problems
[NASA-CR-3591] N82-31304
POROUS WALLS
Corrections for wall effects in ONERA industrial wind tunnels
[ONERA, TP NO. 1982-34] A82-42810
POSITION (LOCATION)
Construction and testing of an Omega navigation system for the balloon-borne X-ray experiment --- German thesis
A82-43111
POTENTIAL FLOW
Singularity embedding method in potential flow calculations
[NASA-CR-166387] N82-31300
Aerosound from corner flow and flap flow
[NASA-CR-166396] N82-32081
POWER EFFICIENCY
The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters
A82-42474
PRECIPITATION (METEOROLOGY)
Evaluation of a meteorological airborne pulse Doppler radar
[PB82-156860] N82-30820
PREDICTION ANALYSIS TECHNIQUES
Design to life cycle cost capability of the PRICE models
[IAF PAPER 82-221] A82-44695

Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-30848
Large displacements and stability analysis of nonlinear propeller structures [NASA-TM-82850] N82-31707

PREPOLYMERS
Studies of new perfluoroether elastomeric sealants --- for aircraft fuel tanks [NASA-CR-166377] N82-30400

PRESSURE DISTRIBUTION
Flow and pressure field of a model propeller [NASA-TM-76690] N82-30290

PRESSURE GRADIENTS
Experimental study of turbulence in blade end wall corner region [NASA-CR-169283] N82-31639

PRODUCT DEVELOPMENT
A survey regarding the German-French development program Alpha Jet A82-43332

PROJECT PLANNING
A survey regarding the German-French development program Alpha Jet A82-43332

PROPELLANT ADDITIVES
Antiwear properties of additives based on higher fatty acids --- for jet fuels A82-42893

PROPELLERS
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton A82-42035
Flow and pressure field of a model propeller [NASA-TM-76690] N82-30290
Large displacements and stability analysis of nonlinear propeller structures [NASA-TM-82850] N82-31707
Rough analysis of installation effects on turboprop noise [NASA-TM-82924] N82-32082

PROPULSION SYSTEM PERFORMANCE
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton A82-42035

PROTECTORS
A method for designing inlet distortion screens for aircraft gas turbine engine tests using an interactive computer program [AD-A116584] N82-31325

PULSE DOPPLER RADAR
Evaluation of a meteorological airborne pulse Doppler radar [PB82-156860] N82-30820

Q

QUALITY CONTROL
Models for controlling reliability in aviation --- Russian book A82-42055

R

RADAR BEACONS
Fiber optics remoting of terminal radar and beacon signals [AD-A116403] N82-32140

RADAR MEASUREMENT
Remote sensing of turbine engine gases [AD-A115443] N82-30310

RADAR TRACKING
Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations A82-42504

RADAR TRANSMISSION
Hover jam - US Army studies EW helicopter A82-41808
A new class of routing protocols for a proposed computer network linking tactical radar sites A82-43893

RADIANCE
Airborne measurements of European sky and terrain radiances [AD-A114637] N82-30782

RADIO COMMUNICATION
Aircraft radio communications equipment: Design and use --- Russian book A82-42067

RADIO FREQUENCY HEATING
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention [NASA-CR-169246] N82-30432

RADIO NAVIGATION
Radionavigation for civil aviation [SEE PAPER 811760] A82-44231

RADIO PHYSICS
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft A82-43278

RADIO TRANSMISSION
Long-range radio NAVAID signal reliability A82-41951

RADOMES
The effect of radome scattering on ECM antenna patterns [AD-A115517] N82-30463
Study of the de-icing properties of the LSDE-3 rotodome [AD-A115445] N82-31335

RAIN
Aerodynamic penalties of heavy rain on a landing aircraft [NASA-CR-156885] N82-30298

RAMJET ENGINES
The preparation and characterization of mixtures of polycyclopentadienes as solid ramjet fuels [AD-A115075] N82-30414
An investigation of the affects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities [AD-A116171] N82-31548

REAL TIME OPERATION
Evaluation of the FAA/MITRE weather data device [AD-A114646] N82-30800
Singular perturbation techniques for real time aircraft trajectory optimization and control [NASA-CR-3597] N82-31330
Real time estimation and prediction of ship motions using Kalman filtering techniques [NASA-CR-169284] N82-31637

RECEIVERS
FAA acceptance tests on the navigation system using time global positioning system X set receiver [DOT/FAA/RD-82/9] N82-31315

RECONNAISSANCE AIRCRAFT
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue [AD-A114484] N82-30437

RECOVERY PARACHUTES
Current perspectives on emergency spin-recovery systems A82-43264

REGULATIONS
Identification of terms to define unconstrained air transportation demands [NASA-CR-165961] N82-31311

RELIABILITY ANALYSIS
Long-range radio NAVAID signal reliability A82-41951
R/M/LCC effects of commercial off-the-shelf equipment A82-42181
Analysis of built-in-test accuracy A82-42211
Advanced reliability modeling of fault-tolerant computer-based systems [NASA-TM-84501] N82-30962

RELIABILITY ENGINEERING
Models for controlling reliability in aviation --- Russian book A82-42055
Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings A82-42176
R & M characteristics of a Microwave Landing System A82-42214

F/A-18 Hornet reliability challenge - Status report
A82-42229

REMOTE SENSING
R & M characteristics of a Microwave Landing System
A82-42216
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278
A field guide for scanner and photographic missions
A82-43468
Remote sensing of turbine engine gases
[AD-A115443] N82-30310
High-altitude imagery user guide
[PB82-158353] N82-30608

REMOTELY PILOTED VEHICLES
A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior --- German thesis
A82-41687
Perspectives for the use of remotely piloted vehicles in military technology
A82-44220
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323

RESCUE OPERATIONS
Improving aircarrier water survival
A82-44291
Consideration of an international private sector satellite search and rescue locating system
[IAF PAPER 82-236] A82-44699

RESEARCH
Aircraft icing research at NASA
[NASA-TM-82919] N82-30297
Activities of the Institute of Sound and Vibration Research
N82-31569

RESEARCH AND DEVELOPMENT
Aircraft R&D in Europe - A perspective view
A82-42544
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
Aeronautical research and development in Europe - Perspectives
A82-43588
It's too logical - It'll never work /Commercial applications of the JVX/
A82-44469
Present challenges of research and technology politics
[NASA-TM-76720] N82-31147

RESEARCH MANAGEMENT
Present challenges of research and technology politics
[NASA-TM-76720] N82-31147
Electromechanical Actuation Development Program (EADP). Power control development
[AD-A116126] N82-31694

RESIDUAL STRESS
Stress intensity factors for radial cracks at outer surface of a partially autofrettaged cylinder subjected to internal pressure
[AD-A116396] N82-31714

REYNOLDS NUMBER
Flow and acoustic properties of low Reynolds number underexpanded supersonic jets
[NASA-CR-169257] N82-30288

RIBBON PARACHUTES
Materials and design criteria for Kevlar-29 ribbon parachutes
[AD-A116357] N82-31308
Reduction in parachute drag due to forebody wake effects
[DE81-030124] N82-31309

ROCKET-BORNE INSTRUMENTS
Control electronics for air-borne quadrupole ion mass spectrometer
[AD-A115399] N82-30356

ROLL
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637

ROLLERS
Simulation of the interaction between airdrop platforms and aircraft rollers
[AD-A116370] N82-31324

ROTARY WING AIRCRAFT
NASA aeronautics
[NASA-EP-85] N82-30283

ROTARY WINGS
The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters
A82-42474
Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces
[ONERA, TP NO. 1982-33] A82-42809
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
Boundary layer transducers /BCL/ developed for the study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-93] A82-42817
Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor
[ONERA, TP NO. 1982-61] A82-43755
Aeroelastic analysis for helicopter rotors with blade appended pendulum vibration absorbers. Mathematical derivations and program user's manual
[NASA-CR-165896] N82-31298
User's manual for the coupled rotor/airframe vibration analysis graphic package
[NASA-CR-165897] N82-31299

ROTATING BODIES
Study of the de-icing properties of the ASDE-3 rotodome
[AD-A115445] N82-31335

ROTATING DISKS
The analysis of the thermal-mechanical stress conditions in axisymmetric rotating hot components of /aircraft/ gas turbines --- German thesis
A82-41686

ROTOR AERODYNAMICS
Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces
[ONERA, TP NO. 1982-33] A82-42809
A doublet lattice method for the determination of rotor induced empennage vibration airloads. Analysis description and program documentation
[NASA-CR-165893] N82-31295
Coupled rotor/airframe vibration analysis program manual manual. Volume 1: User's and programmer's instructions
[NASA-CR-165891] N82-31965
Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
[NASA-CR-165892] N82-31966

ROTOR BLADES
Dynamic System Coupling (DYSCO) program. Volume 1: User's manual
[AD-A115003] N82-31974

ROTOR BLADES (TURBOMACHINERY)
A prescribed wake rotor inflow and flow field prediction analysis, user's manual and technical approach
[NASA-CR-165894] N82-31296

ROTORS
Aerodynamic forces acting on the blades of stall regulated propeller type windmills
[DE82-901178] N82-31718

ROUGHNESS
Aerodynamic penalties of heavy rain on a landing aircraft
[NASA-CR-156885] N82-30298

RUNWAYS
Survey and design of airfields --- Russian book
A82-43603
A method to determine runway capacity
A82-44100
The noise impact of proposed runway alternatives at Craig Airport
[NASA-TM-84503] N82-32080

S

SAFETY DEVICES
Improving aircarrier water survival
A82-44291

SARSAT
Satellite localization of aircraft accidents - The Sarsat program
[SEE PAPER 811765] A82-44239
Consideration of an international private sector satellite search and rescue locating system
[IAF PAPER 82-236] A82-44699

SATELLITE DESIGN
Consideration of an international private sector satellite search and rescue locating system
[IAF PAPER 82-236] A82-44699
SATELLITE NETWORKS
Consideration of an international private sector satellite search and rescue locating system
[IAF PAPER 82-236] A82-44699
SEA ROUGHNESS
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637
SEALERS
Studies of new perfluoroether elastomeric sealants --- for aircraft fuel tanks
[NASA-CR-166377] N82-30400
SEALS (STOPPERS)
Bonding procedure for Teflon seals
A82-42792
SEARCH RADAR
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
[AD-A114484] N82-30437
SEARCHING
Consideration of an international private sector satellite search and rescue locating system
[IAF PAPER 82-236] A82-44699
SECONDARY RADAR
Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations
A82-42504
SEPARATED FLOW
Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds
[AIAA PAPER 82-1362] A82-42950
SEQUENTIAL CONTROL
Programmable controller system for wind tunnel diversion vanes
A82-41846
SERVOCONTROL
Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves --- German thesis
A82-43660
SHIPS
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637
SHOCK TUNNELS
A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel
A82-43311
SIDE-LOOKING RADAR
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
[AD-A114484] N82-30437
SIGNAL PROCESSING
Passive aircraft location
A82-42791
Fiber optics remoting of terminal radar and beacon signals
[AD-A116403] N82-32140
SIGNAL TO NOISE RATIOS
Recent results in main beam nulling --- aircraft antenna design
A82-43792
SIGNAL TRANSMISSION
Fiber optics remoting of terminal radar and beacon signals
[AD-A116403] N82-32140
SINGULARITY (MATHEMATICS)
Singularity embedding method in potential flow calculations
[NASA-CR-166387] N82-31300
SITE SELECTION
Survey and design of airfields --- Russian book
A82-43603
SKY BRIGHTNESS
Airborne measurements of European sky and terrain radiances
[AD-A114637] N82-30782
SLENDER WINGS
Sensitivity analysis and optimization of aeroelastic stability
A82-43394
SMOKE ABATEMENT
An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities
[AD-A116171] N82-31548
SOLAR POWERED AIRCRAFT
Stability and control of the Gossamer human powered aircraft by analysis and flight test
[NASA-CR-163119] N82-30289
SOLID PROPELLANTS
The preparation and characterization of mixtures of polycyclopentadienes as solid ramjet fuels
[AD-A115075] N82-30414
SOUND TRANSMISSION
Noise transmission loss of aircraft panels using acoustic intensity methods
[NASA-TP-2046] N82-31069
SOUND WAVES
Development of a spinning wave heat engine
[NASA-CR-165611] N82-31328
SPACECRAFT CONSTRUCTION MATERIALS
Aerospace applications of composites
A82-42675
SPARE PARTS
A preliminary analysis of TF34-100/400 jet engine rework data in support of the MRP system implementation at NARF Alameda
[AD-A114452] N82-30308
SPECIFICATIONS
Grob aircraft construction: The G 110 flies
[NASA-TM-76893] N82-30303
Helicopter noise definition report UH-60A, S-76, A-109, 206-L
[AD-A116363] N82-32083
SPECTRUM ANALYSIS
The lateral response of an airship to turbulence
[AD-A115197] N82-30312
SPIKES (AERODYNAMIC CONFIGURATIONS)
Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds
[AIAA PAPER 82-1362] A82-42950
SPIN STABILIZATION
Current perspectives on emergency spin-recovery systems
A82-43268
STABILITY AUGMENTATION
Implicit model-following technique - Application to the design of longitudinal stability augmentation systems
A82-43571
STANDARDIZATION
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606
STANDARDS
Helicopter noise definition report UH-60A, S-76, A-109, 206-L
[AD-A116363] N82-32083
STATISTICAL ANALYSIS
Problems with the use of percentages in the analysis of AAES data --- Aircrew Automated Escape Systems
A82-44293
STEREOPHOTOGRAPHY
Assessment of stereographics for fire control and navigation in fighter aircraft
[AD-A115414] N82-30306
STORMS
Field program operations: Turbulence and gust front
[AD-A115447] N82-30804
STRAIN ENERGY METHODS
A fatigue crack growth theory based on strain energy density factor
A82-43742
STRAIN GAGE BALANCES
The external balance system of the German-Dutch windtunnel DNW and its strain gage load cells
A82-43184
STREAMLINING
Control software for two dimensional airfoil tests using a self-streamlining flexible walled transonic test section
[NASA-CR-165941] N82-30314

STRESS ANALYSIS
The analysis of the thermal-mechanical stress conditions in axisymmetric rotating hot components of /aircraft/ gas turbines --- German thesis
A82-41686
An optimum design of fuselage structure
A82-42533
Design and analysis of advanced composite structures
A82-42670
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449
STRESS RATIO
A fatigue crack growth theory based on strain energy density factor
A82-43742
STRUCTURAL ANALYSIS
An optimum design of fuselage structure
A82-42533
Design and analysis of advanced composite structures
A82-42670
Structures and Dynamics Division research and technology plans, FY 1982
[NASA-TM-84509] N82-30566
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449
STRUCTURAL DESIGN
An optimum design of fuselage structure
A82-42533
Design and analysis of advanced composite structures
A82-42670
STRUCTURAL DESIGN CRITERIA
Structural strength of materials and parts of gas turbine engines --- Russian book
A82-42063
The application of geometric programming to the structural design of aircraft wings
A82-42546
STRUCTURAL VIBRATION
Laser pointing in a turbulent atmosphere
A82-42887
An examination of the dynamics of rotary machines --- French thesis
A82-43724
User's manual for the coupled rotor/airframe vibration analysis graphic package
[NASA-CR-165897] N82-31299
SUBSONIC AIRCRAFT
Aerodynamic computational procedures for subsonic and transonic aircraft
A82-43330
SUBSONIC FLOW
Wind tunnel investigations on thin supercritical airfoils in high subsonic flow
[DFVLR-FB-82-06] N82-30296
SUBSONIC WIND TUNNELS
Programmable controller system for wind tunnel diversion vanes
A82-41846
SUPERCRITICAL FLOW
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-59] A82-43753
SUPERCRITICAL WINGS
Wind tunnel investigations on thin supercritical airfoils in high subsonic flow
[DFVLR-FB-82-06] N82-30296
Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95
[NASA-TM-84513] N82-31303
SUPERSONIC AIRCRAFT
A supersonic V/STOL fighter design project
A82-42545
Aerodynamic computational procedures for subsonic and transonic aircraft
A82-43330
Minimum-time three-dimensional turn to a point of supersonic aircraft
A82-44482
Noise and economic characteristics of an advanced blended supersonic transport concept
[NASA-TP-2073] N82-31294
SUPERSONIC FLOW
Optimal stream surfaces in supersonic three-dimensional flows
A82-42722
SUPERSONIC JET FLOW
Flow and acoustic properties of low Reynolds number underexpanded supersonic jets
[NASA-CR-169257] N82-30288
SUPERSONIC SPEEDS
Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds
[AIAA PAPER 82-1362] A82-42950
SUPERSONIC WIND TUNNELS
Calibration and performance of the AEDC/VKF tunnel C, Mach number 4, aerothermal wind tunnel
[AD-A116279] N82-31338
SURVEILLANCE RADAR
Fiber optics remoting of terminal radar and beacon signals
[AD-A116403] N82-32140
SURVIVAL EQUIPMENT
Improving aircarrier water survival
A82-44291
SYSTEM EFFECTIVENESS
Electronic warfare system measure of effectiveness
A82-43840
SYSTEM FAILURES
Maximum likelihood failure detection of aircraft flight control sensors
A82-44481
SYSTEMS ANALYSIS
Economic analysis for data base management
A82-42208
Analysis of built-in-test accuracy
A82-42211
SYSTEMS ENGINEERING
Aeronautical systems technology needs: Escape, rescue and survival, test facilities and test equipment and training/simulation equipment
[AD-A115435] N82-31291
Functional design to support CDTI/DABS flight experiments
[NASA-CR-165947] N82-31326
Wide-angle, multiviewer, infinity display system
[AD-A116308] N82-31336
SYSTEMS INTEGRATION
Integrated sensor system for flight test instrumentation
A82-41869

T

TAKEOFF
Description of a simple model to determine landing gear forces during the takeoff of aerodynamically unstable aircraft
[EX-22B] N82-31333
TARGET ACQUISITION
Statistical analysis of piloted simulation of real time trajectory optimization algorithms
A82-43261
TECHNOLOGICAL FORECASTING
Technology for tomorrow's business aircraft
A82-43577
New approaches to fighter design
A82-44218
New technologies for future fighters
A82-44219
The noise impact of proposed runway alternatives at Craig Airport
[NASA-TM-84503] N82-32080
TECHNOLOGIES
Present challenges of research and technology politics
[NASA-TM-76720] N82-31147
TECHNOLOGY ASSESSMENT
A history of aerostatics and aviation in Russia - In the period up to 1914 /2nd revised and enlarged edition/ --- Russian book
A82-42066
The testing of new technologies with the aid of the Alpha Jet aircraft
A82-43326
Composite materials: Tomorrow for the day after tomorrow
[NASA-TM-76709] N82-30337
Laminar flow control, 1976 - 1982: A selected annotated bibliography
[NASA-TM-84496] N82-31645

TECHNOLOGY TRANSFER
Present challenges of research and technology politics
[NASA-TM-76720] N82-31147
TECHNOLOGY UTILIZATION
Perspectives for the use of remotely piloted vehicles in military technology
A82-44220
Present challenges of research and technology politics
[NASA-TM-76720] N82-31147
TEFLON (TRADEMARK)
Bonding procedure for Teflon seals
A82-42792
TENSILE PROPERTIES
Materials and design criteria for Kevlar-29 ribbon parachutes
[AD-A116357] N82-31308
TERMINAL CONFIGURED VEHICLE PROGRAM
Requirements and possible design choices for improving the operation of aircraft in the terminal control area
A82-41881
TERMINAL FACILITIES
Repair and maintenance of buildings in civil aviation --- Russian book
A82-42059
Survey and design of airfields --- Russian book
A82-43603
TERMINOLOGY
Identification of terms to define unconstrained air transportation demands
[NASA-CR-165961] N82-31311
TERRAIN
Analysis and preparation of a digital terrain data base for flight simulator use
[AD-A115547] N82-30315
Airborne measurements of European sky and terrain radiances
[AD-A114637] N82-30782
TEST EQUIPMENT
Fault isolation BITE for increased productivity
A82-42210
THERMAL FATIGUE
Structural strength of materials and parts of gas turbine engines --- Russian book
A82-42063
THERMISTORS
Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-93] A82-42817
THERMODYNAMIC PROPERTIES
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 1: Properties in SI units
[NASA-TP-1906] N82-32186
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 2: Compositions corresponding to Kelvin temperature schedules in part 1
[NASA-TP-1907] N82-32187
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 3: Properties in US customary units
[NASA-TP-1908] N82-32188
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 4: Compositions corresponding to Rankine temperature schedules in part 3
[NASA-TP-1909] N82-32189
THIN AIRFOILS
Wind tunnel investigations on thin supercritical airfoils in high subsonic flow
[DFVLR-FB-82-06] N82-30296
THIN LAYER CHROMATOGRAPHY
Determination of antioxidant content in aviation oils using thin-layer chromatography
A82-42894
THIN WALLS
Experimental investigation of aeroelastic instability of open field thin profiles --- metallic structures
N82-31705
THREE DIMENSIONAL BOUNDARY LAYER
Generation of boundary-conforming grids around wing-body configurations using transfinite interpolation
A82-40051
THREE DIMENSIONAL FLOW
Optimal stream surfaces in supersonic three-dimensional flows
A82-42722
Higher-order flow angle corrections for three-dimensional wind tunnel wall interference
A82-44246
THRUST VECTOR CONTROL
New nozzle design aimed at F-15, F-16 aircraft
A82-43092
TILT ROTOR AIRCRAFT
XV-15 program update
A82-44468
TIME DISCRIMINATION
Passive aircraft location
A82-42791
TIME OPTIMAL CONTROL
Minimum-time three-dimensional turn to a point of supersonic aircraft
A82-44482
Optimal periodic Dolphin gliding flight
N82-30313
TITANIUM ALLOYS
Titanium surface treatments for adhesive bonding
[AD-A114710] N82-30378
TRACKING (POSITION)
Passive aircraft location
A82-42791
TRACKING FILTERS
Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations
A82-42504
TRAILING EDGES
The design of airfoil profiles with trailing edge loading in transonic flow --- French thesis
A82-44224
TRAINING AIRCRAFT
Training aircraft design considerations based on the successive organization of perception in manual control
N82-30840
TRAJECTORIES
Evaluation of a trajectory command concept for manual control of carrier approaches and landings
N82-30856
TRAJECTORY ANALYSIS
A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel
A82-43311
TRAJECTORY CONTROL
Singular perturbation techniques for real time aircraft trajectory optimization and control
[NASA-CR-3597] N82-31330
TRAJECTORY OPTIMIZATION
Statistical analysis of piloted simulation of real time trajectory optimization algorithms
A82-43261
Minimum-time three-dimensional turn to a point of supersonic aircraft
A82-44482
TRANSDUCERS
Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-93] A82-42817
TRANSFER FUNCTIONS
The lateral response of an airship to turbulence
[AD-A115197] N82-30312
TRANSMISSION EFFICIENCY
Combined amplitude-phase modulation for a VHF communication link
A82-43870
TRANSMISSION LOSS
Noise transmission loss of aircraft panels using acoustic intensity methods
[NASA-TP-2046] N82-31069
TRANSOCEANIC FLIGHT
Characteristics of a Paris-New York flight on board the Concorde
A82-41700
TRANSONIC FLIGHT
Mediating Mach's mechanics - Bombs away --- weapons delivery of fighter aircraft at transonic speed
A82-44467
Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95
[NASA-TM-84513] N82-31503

TRANSONIC FLOW
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-59] A82-43753
Damped Euler-equation method to compute transonic flow around wing-body combinations
A82-44092
The design of airfoil profiles with trailing edge loading in transonic flow --- French thesis
A82-44224

TRANSONIC FLUTTER
An experimental examination of compressor blade flutter
[ONERA, TP NO. 1982-31] A82-42808
Transonic flutter and response analyses of two 3-degree-of-freedom airfoils
A82-44245

TRANSONIC SPEED
Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds
[AIAA PAPER 82-1362] A82-42950

TRANSONIC WIND TUNNELS
Adaptation and first cryogenic operation of T2 ONERA/CERT wind tunnel
A82-42531
Bonding procedure for Teflon seals
A82-42792
Corrections for wall effects in ONERA industrial wind tunnels
[ONERA, TP NO. 1982-34] A82-42810
Application of laser velocimetry to large industrial wind-tunnels
[ONERA, TP NO. 1982-63] A82-43757
Wind tunnel investigations on thin supercritical airfoils in high subsonic flow
[DFVLR-FB-82-06] N82-30296
Control software for two dimensional airfoil tests using a self-streamlining flexible walled transonic test section
[NASA-CR-165941] N82-30314
Development and utilization of a laser velocimeter system for a large transonic wind tunnel
[NASA-TM-82886] N82-31663

TRANSPORT AIRCRAFT
Aircraft R&D in Europe - A perspective view
A82-42544
Aerodynamics on a transport aircraft type wing-body model
[NASA-TM-76878] N82-30287

TRANSPORT PROPERTIES
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 1: Properties in SI units
[NASA-TP-1906] N82-32186
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 2: Compositions corresponding to Kelvin temperature schedules in part 1
[NASA-TP-1907] N82-32187
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 3: Properties in US customary units
[NASA-TP-1908] N82-32188
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 4: Compositions corresponding to Rankine temperature schedules in part 3
[NASA-TP-1909] N82-32189

TRIBOLOGY
Application of wear debris analysis to aircraft hydraulic systems
[AD-A115060] N82-30305

TURBINE BLADES
Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion
A82-41914
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462

TURBINE ENGINES
Remote sensing of turbine engine gases
[AD-A115443] N82-30310

TURBINE WHEELS
An examination of the dynamics of rotary machines --- French thesis
A82-43724

TURBOCOMPRESSORS
An experimental examination of compressor blade flutter
[ONERA, TP NO. 1982-31] A82-42808

TURBOFAN ENGINES
A preliminary analysis of TF34-100/400 jet engine rework data in support of the MRP system implementation at NARF Alameda
[AD-A114452] N82-30308
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082

TURBOJET ENGINES
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449
An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities
[AD-A116171] N82-31548

TURBOMACHINE BLADES
An examination of the dynamics of rotary machines --- French thesis
A82-43724
Aerodynamic forces acting on the blades of stall regulated propeller type windmills
[DE82-901178] N82-31718

TURBOMACHINERY
An examination of the dynamics of rotary machines --- French thesis
A82-43724

TURBOPROP ENGINES
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082

TURBULENCE
The lateral response of an airship to turbulence
[AD-A115197] N82-30312

TURBULENT FLOW
Turbulence modelling - Report of a Working Party
A82-42547
Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds
[AIAA PAPER 82-1362] A82-42950
Experimental study of turbulence in blade end wall corner region
[NASA-CR-169283] N82-31639

TURNING FLIGHT
Minimum-time three-dimensional turn to a point of supersonic aircraft
A82-44482

TWO DIMENSIONAL FLOW
The use of adaptive walls in plane flows
[ONERA, TP NO. 1982-38] A82-42813

U

UPPER SURFACE BLOWING
Parietal jets. I --- upper surface blowing
A82-43589

USER MANUALS (COMPUTER PROGRAMS)
User's manual for the Automated Paneling Technique (APT) and the Wing Body Aerodynamic Technique (WABAT) programs
[NASA-CR-165895] N82-31297
Aeroelastic analysis for helicopter rotors with blade appended pendulum vibration absorbers. Mathematical derivations and program user's manual
[NASA-CR-165896] N82-31298
Coupled rotor/airframe vibration analysis program manual manual. Volume 1: User's and programmer's instructions
[NASA-CR-165891] N82-31965
Dynamic System Coupling (DYSCO) program. Volume 2: Theoretical manual
[AD-A115004] N82-31975

USER REQUIREMENTS
Identification of terms to define unconstrained air transportation demands
[NASA-CR-165961] N82-31311

V

V/STOL AIRCRAFT
A supersonic V/STOL fighter design project
A82-42545

It's too logical - It'll never work /Commercial applications of the JVX/
A82-44469

Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 2: Analysis of results
[NASA-CR-166365] N82-31301

Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 3: Experimental technique
[NASA-CR-166147] N82-31302

Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637

VELOCITY DISTRIBUTION

Development and utilization of a laser velocimeter system for a large transonic wind tunnel
[NASA-TM-82886] N82-31663

VELOCITY MEASUREMENT

Development and utilization of a laser velocimeter system for a large transonic wind tunnel
[NASA-TM-82886] N82-31663

VERY HIGH FREQUENCIES

Combined amplitude-phase modulation for a VHF communication link
A82-43870

VERY LOW FREQUENCIES

Long-range radio NAVAID signal reliability
A82-41951

VIBRATION

Aeroelastic analysis for helicopter rotors with blade appended pendulum vibration absorbers. Mathematical derivations and program user's manual
[NASA-CR-165896] N82-31298

Coupled rotor/airframe vibration analysis program manual manual. Volume 1: User's and programmer's instructions
[NASA-CR-165891] N82-31965

Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
[NASA-CR-165892] N82-31966

VIBRATION DAMPING

An experimental examination of compressor blade flutter
[ONERA, TP NO. 1982-31] A82-42808

VIBRATION EFFECTS

A doublet lattice method for the determination of rotor induced empennage vibration airloads. Analysis description and program documentation
[NASA-CR-165893] N82-31295

Activities of the Institute of Sound and Vibration Research
N82-31569

VIBRATION TESTS

An experimental examination of compressor blade flutter
[ONERA, TP NO. 1982-31] A82-42808

VIBRATORY LOADS

Experimental investigation of active loads control for aircraft landing gear
[NASA-TP-2042] N82-31321

VIDEO EQUIPMENT

Fiber optics remoting of terminal radar and beacon signals
[AD-A116403] N82-32140

VISCOUS FLOW

Aerodynamics on a transport aircraft type wing-body model
[NASA-TM-76878] N82-30287

VOICE COMMUNICATION

Combined amplitude-phase modulation for a VHF communication link
A82-43870

VORTICES

Aerosound from corner flow and flap flow
[NASA-CR-166396] N82-32081

W

WALL FLOW

Corrections for wall effects in ONERA industrial wind tunnels
[ONERA, TP NO. 1982-34] A82-42810

Higher-order flow angle corrections for three-dimensional wind tunnel wall interference
A82-44246

WALL PRESSURE

Experimental study of turbulence in blade and wall corner region
[NASA-CR-169283] N82-31639

WARNING SYSTEMS

Analysis of Active BCAS alert rates and protection based on actual aircraft tracks
[AD-A116402] N82-31319

WAVE PROPAGATION

Construction and testing of an Omega navigation system for the balloon-borne X-ray experiment --- German thesis
A82-43111

Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340

WAVE SCATTERING

The effect of radome scattering on ECM antenna patterns
[AD-A115517] N82-30463

WEAPON SYSTEMS

Taking the drag out of bombs
A82-42849

New approaches to fighter design
A82-44210

Final engineering report for computer, weapon aiming CP-1444/A
[AD-A115238] N82-31327

WEAPONS DELIVERY

Mediating Mach's mechanics - Bombs away --- weapons delivery of fighter aircraft at transonic speed
A82-44467

Final engineering report for computer, weapon aiming CP-1444/A
[AD-A115238] N82-31327

WEAR

Application of wear debris analysis to aircraft hydraulic systems
[AD-A115060] N82-30305

WEAR INHIBITORS

Antiwear properties of additives based on higher fatty acids --- for jet fuels
A82-42893

Life enhancement of Naval systems through advanced materials
[AD-A114722] N82-30404

WEATHER

Field program operations: Turbulence and gust front
[AD-A115447] N82-30804

WEATHER FORECASTING

The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing --- of meteorological information
A82-43821

Evaluation of the FAA/MITRE weather data device
[AD-A114646] N82-30800

WEIGHT INDICATORS

The external balance system of the German-Dutch windtunnel DNW and its strain gage load cells
A82-43184

WHISKER COMPOSITES

High temperature composites. Status and future directions
[NASA-TM-82929] N82-30336

WIND PRESSURE

Aerodynamic forces acting on the blades of stall regulated propeller type windmills
[DE82-901178] N82-31718

WIND TUNNEL APPARATUS

The external balance system of the German-Dutch windtunnel DNW and its strain gage load cells
A82-43184

A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel
A82-43311

Application of laser velocimetry to large industrial wind-tunnels
[ONERA, TP NO. 1982-63] A82-43757

WIND TUNNEL CALIBRATION

Calibration and performance of the AEDC/VKF tunnel C, Mach number 4, aerothermal wind tunnel
[AD-A116279] N82-31338

WIND TUNNEL TESTS

Programmable controller system for wind tunnel diversion vanes
A82-41846

The use of adaptive walls in plane flows
[ONERA, TP NO. 1982-38] A82-42813

Processes and procedural approaches in the aerodynamic design of the Alpha Jet aircraft A82-43328
The design of airfoil profiles with trailing edge loading in transonic flow --- French thesis A82-44224
Wind tunnel investigations on thin supercritical airfoils in high subsonic flow [DFVLR-FB-82-06] N82-30296
Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95 [NASA-TM-84513] N82-31303

WIND TUNNEL WALLS
Corrections for wall effects in ONERA industrial wind tunnels [ONERA, TP NO. 1982-34] A82-42810
The use of adaptive walls in plane flows [ONERA, TP NO. 1982-38] A82-42813
Higher-order flow angle corrections for three-dimensional wind tunnel wall interference A82-44246

WIND TURBINES
Aerodynamic forces acting on the blades of stall regulated propeller type windmills [DE82-901178] N82-31718

WIND VANES
Programmable controller system for wind tunnel diversion vanes A82-41846

WING FLAPS
Aerosound from corner flow and flap flow [NASA-CR-166396] N82-32081

WING LOADING
The design of airfoil profiles with trailing edge loading in transonic flow --- French thesis A82-44224

WING OSCILLATIONS
Sensitivity analysis and optimization of aeroelastic stability A82-43394
Transonic flutter and response analyses of two 3-degree-of-freedom airfoils A82-44245

WING TIP VORTICES
Damped Euler-equation method to compute transonic flow around wing-body combinations A82-44092

WINGS
The application of geometric programming to the structural design of aircraft wings A82-42546
An effective algorithm for shock-free wing design [AD-A116265] N82-31322

WORKLOADS (PSYCHOPHYSIOLOGY)
Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation N82-30838

X

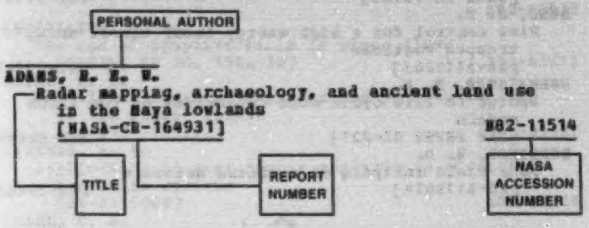
X RAY ASTRONOMY
Construction and testing of an Omega navigation system for the balloon-borne X-ray experiment --- German thesis A82-43111

XV-15 AIRCRAFT
XV-15 program update A82-44468

PERSONAL AUTHOR INDEX

AERONAUTICAL ENGINEERING / *A Continuing Bibliography (Suppl. 155)* DECEMBER 1982

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The accession number is located beneath and to the right of the title, e.g., N82-11514. Under any one author's name the accession numbers are arranged in sequence with the *IAA* accession numbers appearing first.

A

ABLIAZOV, V. S.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

ADAMS, R. M.
Recent results in main beam nulling
A82-43792

AIELLO, R. A.
Large displacements and stability analysis of nonlinear propeller structures
[NASA-TM-82850] N82-31707

ANDRES, K. P.
Flow and pressure field of a model propeller
[NASA-TM-76690] N82-30290

ANDERSON, D. A.
NASA aeronautics
[NASA-EP-85] N82-30203

ANDERSON, J. D., JR.
Modern compressible flow with historical perspective
A82-42552

ANDERSON, R. E.
A method for designing inlet distortion screens for aircraft gas turbine engine tests using an interactive computer program
[AD-A116584] N82-31325

ARCHAMBAUD, J. P.
The use of adaptive walls in plane flows
[ONERA, TP NO. 1982-38] A82-42813

ARMAND, C.
Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-33] A82-42817

ARMAND, N. A.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

ARNOLD, G. M.
F-16 Centralized Data System /CDS/
A82-42206

ATHANS, M.
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637

AUCKLAND, D. T.
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340

AVRAM, P.
Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter
[ONERA, TP NO. 1982-42] A82-43756

B

BABKOV, V. F.
Survey and design of airfields
A82-43603

BADALIANCE, R.
A fatigue crack growth theory based on strain energy density factor
A82-43742

BAILEY, D.
Electromechanical Actuation Development Program (EADP). Power control development
[AD-A116126] N82-31694

BAKER, D.
Computer architecture study for VTXTS simulators
[AD-A115006] N82-30953

BALASHOV, B. F.
Structural strength of materials and parts of gas turbine engines
A82-42063

BALES, K. S.
Structures and Dynamics Division research and technology plans, FY 1982
[NASA-TM-84509] N82-30566

BALLARD, H. N.
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323

BANDA, S. S.
Analysis of flight data in the frequency domain
A82-41796

BARANOV, P. I.
Extracts from Problems of Air Law, a collection of works of the Section of air law of the Aviakhim Society of the USSR and Aviakhim RSFSR
[NASA-TM-76913] N82-31153

BARNES, A. A., JR.
A survey of melting layer research
[AD-A115224] N82-30806

BARON, S.
Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
N82-30838

BARRINGER, S. R.
Bonding procedure for Teflon seals
A82-42792

BARTHOLOMEW, P.
The application of geometric programming to the structural design of aircraft wings
A82-42546

BASIULIS, D. I.
Studies of new perfluoroether elastomeric sealants
[NASA-CR-166377] N82-30400

BATTEN, F. R.
Data acquisition system for NASA LaRC impact dynamics research facility
[NASA-TM-84510] N82-30525

BAVUSO, S. J.
Advanced reliability modeling of fault-tolerant computer-based systems
[NASA-TM-84501] N82-30962

BELANUS, R.
Electromechanical Actuation Development Program (EADP). Power control development
[AD-A116126] N82-31694

BELCHER, W. R.
R & M characteristics of a Microwave Landing System
A82-42216

BELIUNOV, A. N.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

BENELLI, G.
Combined amplitude-phase modulation for a VHF communication link
A82-43870

BENNETT, L.
Meteorological aspects of North Atlantic flight tracks - The development of programs for minimum-time tracks
A82-43249

BEREZANSKII, V. M.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

BERLIN, IU. IA.
Repair and maintenance of buildings in civil aviation
A82-42059

BERMAN, A.
Dynamic System Coupling (DYSCO) program. Volume 1: User's manual
[AD-A115003] N82-31974
Dynamic System Coupling (DYSCO) program. Volume 2: Theoretical manual
[AD-A115004] N82-31975

BERNARD, M.
New image generators for the next generation of civil aircraft
[SEE PAPER 811767] A82-44236

BERNSTEIN, L.
A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel
A82-43311

BIELAWA, R. L.
Aeroelastic analysis for helicopter rotors with blade appended pendulum vibration absorbers. Mathematical derivations and program user's manual
[NASA-CR-165896] N82-31298

BIRCH, I. D.
Flight trials of the Litton LTN-211 Omega Navigation System in a Wessex helicopter
[RAE-TM-RAD-NAV-147] N82-30299

BIRGER, I. A.
Structural strength of materials and parts of gas turbine engines
A82-42063

BIRKEN, J. A.
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340

BLUMENWITZ, K.
Automated flight data processing
A82-44222

BODSON, M.
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637

BORGHI, G.
Combined amplitude-phase modulation for a VHF communication link
A82-43870

BORODIN, L. P.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

BOSSA, F.
Requirements and possible design choices for improving the operation of aircraft in the terminal control area
A82-41881

BOUTIER, A.
Application of laser velocimetry to large industrial wind-tunnels
[ONERA, TP NO. 1982-63] A82-43757

BOYLE, D.
Hover jam - US Army studies EW helicopter
A82-41888

BRAGDON, C. R.
Community noise
N82-31072
Summary of community technology needs
N82-31074

BRATCHIK, V. IA.
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462

BRODSKY, W. G.
Recent results in main beam nulling
A82-43792

BROWN, S. R.
Titanium surface treatments for adhesive bonding
[AD-A114710] N82-30378

BRYANT, G. F.
Optimisation in multivariable design
A82-42565

BULATNIKOV, V. L.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

BULON, A. V.
Present challenges of research and technology politics
[NASA-TM-76720] N82-31147

BURD, J. E.
Flow control for a high energy laser turret using trapped vortices
[AD-A115263] N82-30547

BURMEISTER, R. H.
Design to life cycle cost capability of the PRICE models
[IAF PAPER 82-221] A82-44695

BURNSIDE, W. D.
Near field analysis of airborne antennas
[AD-A115074] N82-30462

C

CALISE, A. J.
Singular perturbation techniques for real time aircraft trajectory optimization and control
[NASA-CR-3597] N82-31330

CAMPBELL, R. L.
Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95
[NASA-TM-84513] N82-31303

CANU, M.
Application of laser velocimetry to large industrial wind-tunnels
[ONERA, TP NO. 1982-63] A82-43757

CAPONE, F. J.
Aeropropulsive characteristics of Mach numbers up to 2.2 of axisymmetric and nonaxisymmetric nozzles installed on an F-18 model
[NASA-TP-2044] N82-30291

CAPPELLINI, V.
Combined amplitude-phase modulation for a VHF communication link
A82-43870

CARAMICHAEL, M. D.
Final engineering report for computer, weapon aiming CP-1444/A
[AD-A115238] N82-31327

CAREL, O.
Radionavigation for civil aviation
[SEE PAPER 811760] A82-44231

CARGILL, J. S.
Improved penetrant process evaluation criteria
[AD-A115157] N82-30386

CARPENTER, C. A.
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A115485] N82-31313
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A115486] N82-31314

CASARICO, G.
Experimental investigation of aeroelastic instability of open field thin profiles
N82-31705

CASE, C. M.
Consideration of an international private sector satellite search and rescue locating system
[IAF PAPER 82-236] A82-44699

CASSARINO, S.
Coupled rotor/airframe vibration analysis program manual manual. Volume 1: User's and programmer's instructions
[NASA-CR-165891] N82-31965
Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
[NASA-CR-165892] N82-31966

CHADEAU, A.
Electronic aircraft stabilization
[SEE PAPER 811763] A82-44234

CHAMIS, C. C.
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449
CHEN, C. H.
Transonic flutter and response analyses of two 3-degree-of-freedom airfoils
A82-44245
CHEN, D. C.
Multilevel semantic analysis and problem-solving in the flight domain
[NASA-CR-169282] N82-31967
CHEN, W.-P.
An optimum design of fuselage structure
A82-42533
CHEVALLIER, J. P.
The use of adaptive walls in plane flows
[ONERA, TP NO. 1982-38] A82-42813
CHIEN, R. T.
Multilevel semantic analysis and problem-solving in the flight domain
[NASA-CR-169282] N82-31967
CIEKURS, P. V.
Application of wear debris analysis to aircraft hydraulic systems
[AD-A115060] N82-30305
CLARK, C. A.
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606
CLEMENT, W. F.
Training aircraft design considerations based on the successive organization of perception in manual control
N82-30840
CLERKE, W. H.
Loran-C navigation as an aid to aerial photographic operations
A82-43469
COHEN, I. D.
A survey of melting layer research
[AD-A115224] N82-30806
COMBET, P.
Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-93] A82-42817
CONDOM, P.
Composite materials: tomorrow for the day after tomorrow
[NASA-TM-76709] N82-30337
COSTES, J.-J.
Aeroelastic equilibrium of a helicopter rotor in the presence of nonlinear aerodynamic forces
[ONERA, TP NO. 1982-33] A82-42809
CRAIG, S. J.
Training aircraft design considerations based on the successive organization of perception in manual control
N82-30840

D

DARNELL, T. R.
An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities
[AD-A116171] N82-31548
DARU, V.
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-39] A82-43753
DASTIN, S. J.
Aerospace applications of composites
A82-42675
DAZO, J. J.
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities
N82-30848
DEANE, R. L.
Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2
[NASA-CR-167912] N82-31546
DEL RE, E.
Combined amplitude-phase modulation for a VHF communication link
A82-43870
DELOACH, R.
The noise impact of proposed runway alternatives at Craig Airport
[NASA-TM-84503] N82-32080
DEMIANUSHKO, I. V.
Mathematical models of rotor strength and optimization in computer-aided design
A82-42062
DEPONTE, S.
Experimental investigation of aeroelastic instability of open field thin profiles
N82-31705
DICKMANNS, E. D.
Optimal periodic Dolphin gliding flight
N82-30313
DICKSON, L. J.
An effective algorithm for shock-free wing design
[AD-A116265] N82-31322
DING, H.-L.
An optimum design of fuselage structure
A82-42533
DOVIAK, R. J.
Field program operations: Turbulence and gust front
[AD-A115447] N82-30804
DREHER, R. C.
Experimental investigation of active loads control for aircraft landing gear
[NASA-TP-2042] N82-31321
DREVET, J.-P.
Boundary layer transducers /DCL/ developed for the study of the flow over helicopter rotor blades
[ONERA, TP NO. 1981-93] A82-42817
DULL, C. W.
Loran-C navigation as an aid to aerial photographic operations
A82-43469
DULNEV, R. A.
Structural strength of materials and parts of gas turbine engines
A82-42063
DUPONT, J. P.
The ILS in Category III operations
[SEE PAPER 811761] A82-44232
DURBIN, P. A.
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082
DUZ, P. D.
A history of aerostatics and aviation in Russia - In the period up to 1914 /2nd revised and enlarged edition/
A82-42066

E

EAV, B. B.
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606
EFREMENKOV, IU. V.
Aircraft radio communications equipment: Design and use
A82-42067
EGOLF, T. A.
A prescribed wake rotor inflow and flow field prediction analysis, user's manual and technical approach
[NASA-CR-165894] N82-31296
ELSON, B. M.
NASA studies business aircraft avionics
A82-43659
EPSTEIN, C.
Taking the drag out of bombs
A82-42849
ERIKSSON, L. E.
Generation of boundary-conforming grids around wing-body configurations using transfinite interpolation
A82-44091
ESPOSITO, R. J.
FAA acceptance tests on the navigation system using time global positioning system Z set receiver
[DOT/FAA/RD-82/9] N82-31315
EZELL, T. B., JR.
Bonding procedure for Teflon seals
A82-42792

F

FAGGIANO, P.
Experimental investigation of aeroelastic instability of open field thin profiles
N82-31705
FANG, N.
An optimum design of fuselage structure
A82-42533
FEIST, W. D.
Acoustic emission inspection of aircraft engine turbine blades for intergranular corrosion
A82-41914
FIELDING, J. P.
A supersonic V/STOL fighter design project
A82-42545
FLOYD, R. M.
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 1
[AD-A115510] N82-31331
Design of advanced digital flight control systems via Command Generator Tracker (CGT) synthesis methods, volume 2
[AD-A115511] N82-31332
FORD, D. W.
Helicopter noise definition report UH-60A, S-76, A-109, 206-L
[AD-A116363] N82-32083
FREEDMAN, R. J.
Development and utilization of a laser velocimeter system for a large transonic wind tunnel
[NASA-TM-82886] N82-31663
FRIEDLAND, B.
Maximum likelihood failure detection of aircraft flight control sensors
A82-44481
FRIEDRICH, H.
Simulation in connection with the development of the Alpha Jet aircraft
A82-43333
FRUSH, C. L.
Evaluation of a meteorological airborne pulse Doppler radar
[PB82-156860] N82-30820
FUNG, K. Y.
An effective algorithm for shock-free wing design
[AD-A116265] N82-31322

G

GANGWANI, S. T.
A doublet lattice method for the determination of rotor induced empennage vibration airloads. Analysis description and program documentation
[NASA-CR-165893] N82-31295
GEDDES, J. P.
The cruise missile era dawns
A82-43579
GERDES, R. M.
Evaluation of a trajectory command concept for manual control of carrier approaches and landings
N82-30856
GIBBONS, L. C.
A survey of melting layer research
[AD-A115224] N82-30806
GIESECKE, P.
The external balance system of the German-Dutch windtunnel DNW and its strain gage load cells
A82-43184
GIROUX, D.
New image generators for the next generation of civil aircraft
[SEE PAPER 811767] A82-44236
GLEASON, D.
Analysis of built-in-test accuracy
A82-42211
GLENN, A. B.
Electronic warfare system measure of effectiveness
A82-43840
GLUSHKOV, G. I.
Survey and design of airfields
A82-43603
GOETZ, E.
Construction and testing of an Omega navigation system for the balloon-borne X-ray experiment
A82-43111
GOKA, T.
Functional design to support CDTI/DABS flight experiments
[NASA-CR-165947] N82-31326
GOODYER, M. J.
Control software for two dimensional airfoil tests using a self-streamlining flexible walled transonic test section
[NASA-CR-165941] N82-30314
GORDON, S.
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 1: Properties in SI units
[NASA-TP-1906] N82-32186
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 2: Compositions corresponding to Kelvin temperature schedules in part 1
[NASA-TP-1907] N82-32187
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 3: Properties in US customary units
[NASA-TP-1908] N82-32188
Thermodynamic and transport combustion properties of hydrocarbons with air. Part 4: Compositions corresponding to Rankine temperature schedules in part 3
[NASA-TP-1909] N82-32189
GORETSKII, L. I.
Survey and design of airfields
A82-43603
GOULDING, M. K.
Study of the de-icing properties of the ASDE-3 rotodome
[AD-A115445] N82-31335
GRADY, W. T.
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton
A82-42035
GRANGIER, M.
Technology for tomorrow's business aircraft
A82-43577
Piston engines for general aviation - Is the revolution really under way
A82-43578
GRANTHAM, W. D.
Noise and economic characteristics of an advanced blended supersonic transport concept
[NASA-TP-2073] N82-31294
GREISSING, J. P.
Development and utilization of a laser velocimeter system for a large transonic wind tunnel
[NASA-TM-82886] N82-31663
GROENEWEG, J. F.
Rough analysis of installation effects on turboprop noise
[NASA-TM-82924] N82-32082
GROOTHOFF, C. C.
The external balance system of the German-Dutch windtunnel DNW and its strain gage load cells
A82-43184
GROSS, E. M.
The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing
A82-43821
GROSSIN, J.
The flight management computer
[SEE PAPER 811762] A82-44233
GUELI, S.
Combined amplitude-phase modulation for a VHF communication link
A82-43870

H

HADCOCK, R. N.
Design and analysis of advanced composite structures
A82-42670
HAESSLER, E.
Processes and procedural approaches used in the dimensioning of the supporting structure and the demonstration of the airworthiness
A82-43331
HAINES, A. B.
Turbulence modelling - Report of a Working Party
A82-42547

HAINES, P. A.
Aerodynamic penalties of heavy rain on a landing aircraft
[NASA-CR-156885] N82-30298
HALL, F. S.
Economic analysis for data base management
A82-42208
HALL, R. D.
Computer Monitored Inspection Program /CMIP/, a key to increased aircraft and personnel productivity
A82-42217
HALL, L. W., JR.
The preparation and characterization of mixtures of polycyclopentadienes as solid ramjet fuels
[AD-A115075] N82-30414
HANSMAN, R. J., JR.
The interaction of radio frequency electromagnetic fields with atmospheric water droplets and applications to aircraft ice prevention
[NASA-CR-169246] N82-30432
HANSON, J. G.
Design and implementation of USAF avionics integration support facilities
[AD-A115537] N82-30307
HAUFFE, K.
Oxidation-resistant materials for hot-gas turbines and jet engines
A82-41725
HAWLEY, D. L.
A field guide for scanner and photographic missions
A82-43468
HEALY, L. D.
Computer architecture study for VTXTS simulators
[AD-A115006] N82-30953
Design of a microprocessor-controlled linkage for simulator applications
[AD-A115421] N82-30954
HEFFLEY, R. K.
Training aircraft design considerations based on the successive organization of perception in manual control
N82-30840
HENRY, R.
An examination of the dynamics of rotary machines
A82-43724
HILL, M. L.
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323
HINKLE, R. E.
High-altitude imagery user guide
[PB82-158353] N82-30608
HO, W. P. C.
Multilevel semantic analysis and problem-solving in the flight domain
[NASA-CR-169282] N82-31967
HOLLISTER, W. M.
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle
N82-30859
HOROWITZ, L. L.
Recent results in main beam nulling
A82-43792
HOVER, G. L.
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
[AD-A114484] N82-30437
HU, T. F.
Flow and acoustic properties of low Reynolds number underexpanded supersonic jets
[NASA-CR-169257] N82-30288
HUBBARTT, J. E.
Development of a spinning wave heat engine
[NASA-CR-165611] N82-31328
HUDSON, S. M.
Ceramic applications in turbine engines
[NASA-CR-165197] N82-31158
HUNTER, J. R.
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton
A82-42035
HUYNH, H.
Singularity embedding method in potential flow calculations
[NASA-CR-166387] N82-31300

I

IZQUIERDO, M.
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323

J

JACOBSON, I. D.
Identification of terms to define unconstrained air transportation demands
[NASA-CR-165961] N82-31311
JAGO, S.
Separation monitoring with four types of predictors on a cockpit display of traffic information
N82-30860
JANOSKI, E. J.
The preparation and characterization of mixtures of polycyclopentadienes as solid ramjet fuels
[AD-A115075] N82-30414
JANOVICZ, M. A.
Ceramic applications in turbine engines
[NASA-CR-165197] N82-31158
JANSSENS, G.
Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter
[ONERA, TP NO. 1982-62] A82-43756
JELASKA, M.
A method to determine runway capacity
A82-44100
JEWELL, W. F.
Application of a pilot control strategy identification technique to a joint FAA/NASA ground based simulation of head up displays for CTCL aircraft
N82-30857
JEX, H. R.
Stability and control of the Gossamer human powered aircraft by analysis and flight test
[NASA-CR-163119] N82-30289
JOHNSON, D. G.
R/M/LCC effects of commercial off-the-shelf equipment
A82-42181
JOHNSON, D. W.
Reduction in parachute drag due to forebody wake effects
[DE81-030124] N82-31309
JOHNSON, R. W.
Airborne measurements of European sky and terrain radiances
[AD-A114637] N82-30782
JOU, W. H.
Singularity embedding method in potential flow calculations
[NASA-CR-166387] N82-31300
JOVANOVIC, T.
A method to determine runway capacity
A82-44100

K

KALINKEVICH, A. A.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278
KANIA, P.
A survey regarding the German-French development program Alpha Jet
A82-43332
KAWAI, R. T.
Kevlar/PMR-15 reduced drag DC-9 reverser stang fairing
[NASA-CR-165448] N82-31448
KEPPELER, D.
The analysis of the thermal-mechanical stress conditions in axisymmetric rotating hot components of /aircraft/ gas turbines
A82-41686
KERLOUEGAN, P.
Airbus A 310 will compete with Boeing 767 for market
N82-32300
KERSHNER, D. D.
A miniature electro-optical air flow sensor
A82-41854

KILLINGER, D. K.
Remote sensing of turbine engine gases
[AD-A115443] N82-30310

KILNER, J. R.
Pneumatic tire model for aircraft simulation
A82-44244

KING, R. F.
Programmable controller system for wind tunnel diversion vanes
A82-41846

KINKLE, R. E.
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606

KIRILIN, A. A.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

KLAAR, W.
Perspectives for the use of remotely piloted vehicles in military technology
A82-44220

KLEIN, R. W.
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle
N82-30859

KOERNER, H.
Wind tunnel investigations on thin supercritical airfoils in high subsonic flow
[DFVLR-FB-82-06] N82-30296

KOROVIN, Y. A.
Extracts from Problems of Air Law, a collection of works of the Section of air law of the Aviakhim Society of the USSR and Aviakhim RSFSR
[NASA-TM-76913] N82-31153

KOZLOV, L. A.
Structural strength of materials and parts of gas turbine engines
A82-42063

KREINDLER, E.
Minimum fuel horizontal flight paths in the terminal area
A82-44480

KUEHN, R. E.
R & M characteristics of a Microwave Landing System
A82-42216

KUHLTHAU, A. R.
Identification of terms to define unconstrained air transportation demands
[NASA-CR-165961] N82-31311

KULAKOV, A. F.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

KULIEVA, KH. M.
Antioxidants for synthetic oils
A82-42895

L

LABBE, J.
Preliminary experiments on a centrifugal research compressor using a laser -2- focus velocimeter
[ONERA, TP NO. 1982-62] A82-43756

LAKHTIN, V. L.
Extracts from Problems of Air Law, a collection of works of the Section of air law of the Aviakhim Society of the USSR and Aviakhim RSFSR
[NASA-TM-76913] N82-31153

LANCRAFT, R.
Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
N82-30838

LANDGREBE, A. J.
A prescribed wake rotor inflow and flow field prediction analysis, user's manual and technical approach
[NASA-CR-165894] N82-31296

LAUFER, T.
The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing
A82-43821

LAVIGNE, E.
The design of airfoil profiles with trailing edge loading in transonic flow
A82-44224

LEACH, E. J.
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton
A82-42035

LEE, J. T.
Field program operations: Turbulence and gust front
[AD-A115447] N82-30804

LEFAS, C. C.
Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations
A82-42504

LEHMAN, L. L.
Hybrid state vector methods for structural dynamic and aeroelastic boundary value problems
[NASA-CR-3591] N82-31304

LERAT, A.
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-59] A82-43753

LEVA, J. L.
Passive aircraft location
A82-42791

LEVEQUE, M.
Satellite localization of aircraft accidents - The Sarsat program
[SEE PAPER 811765] A82-44239

LEVIN, M. P.
Optimal stream surfaces in supersonic three-dimensional flows
A82-42722

LIN, C.-F.
Minimum-time three-dimensional turn to a point of supersonic aircraft
A82-44482

LINDEMANN, C. T., JR.
Improving aircarrier water survival
A82-44291

LINDENBAUM, B.
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton
A82-42035

LIVINGSTON, R. E.
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A115485] N82-31313
Summary of Federal Aviation Administration response to National Transportation Safety Board safety recommendations
[AD-A115486] N82-31314

LUBIN, G.
Aerospace applications of composites
A82-42675

LUDTKE, W. P.
Effects of canopy geometry and cloth permeability on the drag coefficient of a cross parachute in the fully open and reefed conditions for a W/A ratio of 0.3
[AD-A115046] N82-30293

LUERS, J. K.
Aerodynamic penalties of heavy rain on a landing aircraft
[NASA-CR-156885] N82-30298

LUSCZEK, J. J., JR.
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton
A82-42035

LYKOV, O. P.
Antiwear properties of additives based on higher fatty acids
A82-42893

LYNCH, J. W.
Data acquisition system for NASA LaRC impact dynamics research facility
[NASA-TM-84510] N82-30525

M

MABRY, J. E.
A study of general aviation community noise impact and annoyance
[NASA-CR-165945] N82-31066

MACDIARMID, P. R.
R/M/LCC effects of commercial off-the-shelf equipment
A82-42181

MADDALON, D. V.
Laminar flow control, 1976 - 1982: A selected annotated bibliography
[NASA-TM-84496] N82-31645

MALYSHKOV, A. M.
Repair and maintenance of buildings in civil aviation
A82-42059

MALZBENDER, B.
Grob aircraft construction: The G 110 flies
[NASA-TM-76893] N82-30303

MANN, M. J.
Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95
[NASA-TM-84513] N82-31303

MAZOUR, T. J.
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
[AD-A114484] N82-30437

MCCORMICK, R. F.
Data acquisition system for NASA LaRC impact dynamics research facility
[NASA-TM-84510] N82-30525

MCDONALD, C.
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116110] N82-31323

MCGARY, M. C.
Noise transmission loss of aircraft panels using acoustic intensity methods
[NASA-TP-2046] N82-31069

MCGEHEE, J. R.
Experimental investigation of active loads control for aircraft landing gear
[NASA-TP-2042] N82-31321

MCNEILL, W. E.
Evaluation of a trajectory command concept for manual control of carrier approaches and landings
N82-30856

MEDIONI, M.
New trends and concerns in the airliner radio equipment market
[SEE PAPER 811768] A82-44238

MEECHAM, W. C.
Aerosound from corner flow and flap flow
[NASA-CR-166396] N82-32081

MENYUK, N.
Remote sensing of turbine engine gases
[AD-A115443] N82-30310

MERCER, C. E.
Supercritical maneuvering fighter configuration. Wind-tunnel investigation at Mach numbers of 0.60 to 0.95
[NASA-TM-84513] N82-31303

MICHEL, A.
Air-air anticollision systems
[SEE PAPER 811764] A82-44235

MICHEL, R.
Adaptation and first cryogenic operation of T2 ONERA/CERT wind tunnel
A82-42531

MIGNOSI, A.
Adaptation and first cryogenic operation of T2 ONERA/CERT wind tunnel
A82-42531

MIKHEICHEV, P. A.
Determination of antioxidant content in aviation oils using thin-layer chromatography
A82-42894

MILLER, G. K.
Pilot opinions of sampling effects in lateral directional control
N82-30849

MITCHELL, T. R.
The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing
A82-43821

MOCANU, V.
Implicit model-following technique - Application to the design of longitudinal stability augmentation systems
A82-43571

MOERDER, D. D.
Singular perturbation techniques for real time aircraft trajectory optimization and control
[NASA-CR-3597] N82-31330

MOHLEJI, S. C.
Operational and functional requirements for the navigation system in terminal areas
[AD-A116127] N82-31310

MOLLOY, J. K.
Noise and economic characteristics of an advanced blended supersonic transport concept
[NASA-TP-2073] N82-31294

MOLONIN, V. P.
Models for controlling reliability in aviation
A82-42055

MONK, R.
Meteorological aspects of North Atlantic flight tracks - Some interim results of the study
A82-43250

MOON, R. A.
Aeronautical systems technology needs: Escape, rescue and survival, test facilities and test equipment and training/simulation equipment
[AD-A115435] N82-31291

MOORADIAN, A.
Remote sensing of turbine engine gases
[AD-A115443] N82-30310

MORGAN, H. G.
Summary of airport technology needs
N82-31073

MORINAGA, L. H.
Simulated ILS using a laser tracker
A82-41795

MOUNTFORD, S. J.
Assessment of stereographics for fire control and navigation in fighter aircraft
[AD-A115414] N82-30306

N

NASH, L.
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
[AD-A114484] N82-30437

NATTER, M.
The testing of new technologies with the aid of the Alpha Jet aircraft
A82-43326

NETZER, D. W.
An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities
[AD-A116171] N82-31540

NEUBAUER, M. J., JR.
Noise and economic characteristics of an advanced blended supersonic transport concept
[NASA-TP-2073] N82-31294

NEUBAUER, R.
Flow and pressure field of a model propeller
[NASA-TM-76690] N82-30290

NEUBURGER, A. L.
The Power Pair Locus - A preliminary design aid to select power ratings for multi-engined helicopters
A82-42474

NEUMAN, F.
Minimum fuel horizontal flight paths in the terminal area
A82-44480

NEWHOUSE, J.
The sporty game
A82-42572

NEWMAN, J. S.
Helicopter noise definition report UH-60A, S-76, A-109, 206-L
[AD-A116363] N82-32083

NOVIKOVA, I. M.
Determination of antioxidant content in aviation oils using thin-layer chromatography
A82-42894

O

OESTERLIN, W. H.
A restrained model helicopter, which is able to fly, for investigations regarding human multiparameter control behavior
A82-41687

OLIVER, R. G.
Fiber optics remoting of terminal radar and beacon signals
[AD-A116403] N82-32140
OLSEN, W. A., JR.
Aircraft icing research at NASA
[NASA-TM-82919] N82-30297
OSNER, S. R.
Utilization of AN/APS-94 side-looking airborne radar systems in search and rescue
[AD-A114484] N82-30437

P

PALMER, E.
Separation monitoring with four types of predictors on a cockpit display of traffic information
N82-30860
PAN, Y. C.
Multilevel semantic analysis and problem-solving in the flight domain
[NASA-CR-169282] N82-31967
PASHA, M. A.
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities
N82-30848
PAVEL, A. L.
Laser pointing in a turbulent atmosphere
A82-42887
PEARSON, C. F.
An effective algorithm for shock-free wing design
[AD-A116265] N82-31322
PENDLEY, R. E.
Airport noise
N82-31071
PERELLI, L. P.
Human-factors evaluation of C-141 fuel savings advisory system
[AD-A114931] N82-30304
PETERSON, C. W.
Reduction in parachute drag due to forebody wake effects
[DE81-030124] N82-31309
PETTINATO, A. D.
R/M/LCC effects of commercial off-the-shelf equipment
A82-42181
PETUKHOV, A. N.
Structural strength of materials and parts of gas turbine engines
A82-42063
PFLUG, D. R.
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340
PHILIPPE, J. J.
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
PIGERE, J.
Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor
[ONERA, TP NO. 1982-61] A82-43755
PILLA, G. J.
Titanium surface treatments for adhesive bonding
[AD-A114710] N82-30378
PINNELL, W. R.
Materials and design criteria for Kevlar-29 ribbon parachutes
[AD-A116357] N82-31308
PLEWS, L. D.
Integrated sensor system for flight test instrumentation
A82-41869
POWELL, E. A.
Development of a spinning wave heat engine
[NASA-CR-165611] N82-31328
PRICE, D. B.
Statistical analysis of piloted simulation of real time trajectory optimization algorithms
A82-43261
PRILL, J. C.
Photointerpretation key for pine regeneration analysis using high-altitude color infrared panoramic photography
[PB82-164450] N82-30606
PU, S. L.
Stress intensity factors for radial cracks at outer surface of a partially autofrettaged cylinder subjected to internal pressure
[AD-A116396] N82-31714
PUFFERT-MEISSNER, W.
Wind tunnel investigations on thin supercritical airfoils in high subsonic flow
[DFVLR-FB-82-06] N82-30296
PULLINS, D. G.
Evaluation of the FAA/MITRE weather data device
[AD-A114646] N82-30800

Q

QUAN, D. L.
1980 Conference on Propeller Propulsion, Dayton, OH, April 22-24, 1980, Proceedings. Conference sponsored by AIAA, AHS, SAE, and University of Dayton
A82-42035

R

RAJ, R.
Experimental study of turbulence in blade end wall corner region
[NASA-CR-169283] N82-31639
RASCHKE, W.
Automation of flight operational control in the German Democratic Republic
A82-42574
RASMUSSEN, F.
Aerodynamic forces acting on the blades of stall regulated propeller type windmills
[DE82-901178] N82-31718
REINMANN, J. J.
Aircraft icing research at NASA
[NASA-TM-82919] N82-30297
RICHARDSON, D.
Northrop ECM - From B-1B to F-5E
A82-43425
RICKETTS, M. P.
F/A-18 Hornet reliability challenge - Status report
A82-42229
RICKLEY, E. J.
Helicopter noise definition report UH-60A, S-76, A-109, 206-L
[AD-A116363] N82-32083
RIZK, M.
Theoretical and experimental investigation of some nonlinear characteristics of electrohydraulic servovalves
A82-43660
RIZK, M. H.
Higher-order flow angle corrections for three-dimensional wind tunnel wall interference
A82-44246
RIZZI, A.
Damped Euler-equation method to compute transonic flow around wing-body combinations
A82-44092
ROCHEFORT, J. S.
Control electronics for air-borne quadrupole ion mass spectrometer
[AD-A115399] N82-30356
ROCKWOOD, F. A.
Ceramic applications in turbine engines
[NASA-CR-165197] N82-31158
ROPAR, S. A.
Application of wear debris analysis to aircraft hydraulic systems
[AD-A115060] N82-30305
ROPELEWSKI, R. R.
Apache to provide night/bad weather capability
A82-43091
757 systems key to route flexibility
A82-43275
ROSENTHAL, L.
Parietal jets. I
A82-43589
ROSS, H. D.
Analysis and preparation of a digital terrain data base for flight simulator use
[AD-A115587] N82-30315
ROWE, S.
Electromechanical Actuation Development Program (EADP). Power control development
[AD-A116126] N82-31694

RUBIO, R.
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323

RUHNOW, W. B.
Long-range radio NAVAID signal reliability
A82-41951

S

SABAKINA, A. V.
Extracts from Problems of Air Law, a collection of works of the Section of air law of the Aviakhim Society of the USSR and Aviakhim RSFSR
[NASA-TM-76913] N82-31153

SALISBURY, D. P.
Studies of new perfluoroether elastomeric sealants
[NASA-CR-166377] N82-30400

SASHEVSKII, V. V.
Antiwear properties of additives based on higher fatty acids
A82-42893

SCHALLER, R. C.
A survey of melting layer research
[AD-A115224] N82-30806

SCHINDLER, A. I.
Life enhancement of Naval systems through advanced materials
[AD-A114722] N82-30404

SCHMIDT, W.
Aerodynamic computational procedures for subsonic and transonic aircraft
A82-43330

SCHMITT, V.
Aerodynamics on a transport aircraft type wing-body model
[NASA-TM-76878] N82-30287

SCHNEIDER, A.
The preparation and characterization of mixtures of polycyclopentadienes as solid ramjet fuels
[AD-A115075] N82-30414

SCHNEIDER, R. K.
The effect of radome scattering on ECM antenna patterns
[AD-A115517] N82-30463

SCHNELL, W. C.
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 2: Analysis of results
[NASA-CR-166365] N82-31301
Axisymmetric and non-axisymmetric exhaust jet induced effects on a V/STOL vehicle design. Part 3: Experimental technique
[NASA-CR-166147] N82-31302

SCOTT, I. G.
In-flight acoustic emission monitoring
A82-42865

SEEBASS, A. R.
An effective algorithm for shock-free wing design
[AD-A116265] N82-31322

SEGER, J. K.
Repair-discard concepts in design
A82-42178

SEIRANIAN, A. P.
Sensitivity analysis and optimization of aeroelastic stability
A82-43394

SELLIER, B.
Laser Doppler anemometry applied to the study of the airflow in the wake of an helicopter rotor
[ONERA, TP NO. 1982-61] A82-43755

SENNE, K. D.
Recent results in main beam nulling
A82-43792

SETTERHOLM, J. M.
Assessment of stereographics for fire control and navigation in fighter aircraft
[AD-A115414] N82-30306

SHAW, R. J.
Aircraft icing research at NASA
[NASA-TM-82919] N82-30297

SHVED, A. P.
Aircraft radio communications equipment: Design and use
A82-42067

SIDES, J.
An implicit finite-volume method for solving the euler equations
[ONERA, TP NO. 1982-59] A82-43753

SIGNORELLI, R. A.
High temperature composites. Status and future directions
[NASA-TM-82929] N82-30336

SILVERTHORN, J. T.
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities
N82-30848

SIZOVA, E. N.
Structural strength of materials and parts of gas turbine engines
A82-42063

SLAYBAUGH, R. R.
A preliminary analysis of TF34-100/400 jet engine rework data in support of the MRP system implementation at NARF Alameda
[AD-A114452] N82-30308

SMIRNOV, A. S.
Survey and design of airfields
A82-43603

SMITH, G. A., JR.
Evaluation of a trajectory command concept for manual control of carrier approaches and landings
N82-30856

SMITH, G. T.
Environmental and High-Strain Rate effects on composites for engine applications
[NASA-TM-82882] N82-31449

SMITH, K. D.
Improved penetrant process evaluation criteria
[AD-A115157] N82-30386

SMITH, L. Z.
Helicopter commuters - An optimistic outlook
A82-44470

SMOLENKOVA, V. S.
Antioxidants for synthetic oils
A82-42895

SNELL, M. B.
The application of geometric programming to the structural design of aircraft wings
A82-42546

SOBIECZKY, H.
Surface generation for aerodynamic applications
[AD-A116263] N82-31305

SORLTER, M.
Description of a simple model to determine landing gear forces during the takeoff of aerodynamically unstable aircraft
[RX-22B] N82-31333

SOPHER, R.
Coupled rotor/airframe vibration analysis program manual manual. Volume 1: User's and programmer's instructions
[NASA-CR-165891] N82-31965
Coupled rotor/airframe vibration analysis program manual. Volume 2: Sample input and output listings
[NASA-CR-165892] N82-31966

SPEARS, J. C.
Data acquisition system for NASA LaRC impact dynamics research facility
[NASA-TM-84510] N82-30525

SPRAGINS, J.
A new class of routing protocols for a proposed computer network linking tactical radar sites
A82-43893

SPURGEON, D.
Mediating Mach's mechanics - Bombs away
A82-44467

STACEY, A. B., JR.
Bonding procedure for Teflon seals
A82-42792

STANDER, C. E.
Fault isolation BITE for increased productivity
A82-42210

STECKBECK, F. J.
The aviation route forecast /ARF/ program - An interactive system for pilot self-briefing
A82-43821

STEEVES, E. C.
Simulation of the interaction between airdrop platforms and aircraft rollers
[AD-A116370] N82-31324

STENGEL, R. F.
Pilot opinions of sampling effects in lateral directional control
N82-30849

STEPHENS, D. G.
Airport/Community Noise
[NASA-CP-2241] N82-31070
STOCKEMER, F. J.
Additional experiments on flowability improvements of aviation fuels at low temperatures, volume 2
[NASA-CR-167912] N82-31546
STOLLERY, J. L.
What has hypersonics research led to - Some examples of progress and spin off /17th Handley Page Memorial Lecture/
A82-43583
STOTT, G. T.
A laser-interferometer method for determining the forces on a freely-flying model in a shock-tunnel
A82-43311
STRAUCH, R. G.
Evaluation of a meteorological airborne pulse Doppler radar
[PB82-156860] N82-30820
STRIKE, W. T., JR.
Calibration and performance of the AEDC/VKF tunnel C, Mach number 4, aerothermal wind tunnel
[AD-A116279] N82-31338
STUDWELL, R. E.
User's manual for the Automated Paneling Technique (APT) and the Wing Body Aerodynamic Technique (WABAT) programs
[NASA-CR-165895] N82-31297
User's manual for the coupled rotor/airframe vibration analysis graphic package
[NASA-CR-165897] N82-31299
SUKYS, R.
Control electronics for air-borne quadrupole ion mass spectrometer
[AD-A115399] N82-30356
SUN, X.-X.
An optimum design of fuselage structure
A82-42533
SURIANO, F. J.
Gas foil bearing development program
[AD-A114692] N82-30556
SZECHENYI, E.
An experimental examination of compressor blade flutter
[ONERA, TP NO. 1982-31] A82-42808

T

TATE, C. L.
The Maneuverable Atmospheric Probe (MAP), a remotely piloted vehicle
[AD-A116118] N82-31323
THEISS, D.
The external balance system of the German-Dutch windtunnel DNW and its strain gage load cells
A82-43184
THIBERT, J. J.
An examination of helicopter blade profiles and tips
[ONERA, TP NO. 1982-35] A82-42811
THIEME, L.
Interactive graphics design with CODEM
A82-44223
THOMAS, H. M.
Use of aircraft-derived data to assist in ATC tracking systems. I - Accuracy and theoretical considerations
A82-42504
THOMASON, T.
XV-15 program update
A82-44468
THORNBURG, D. W.
An investigation of the effects of smoke suppressant fuel additives on engine and test cell exhaust gas opacities
[AD-A116171] N82-31548
TIAGUN, P. P.
Aircraft radio communications equipment: Design and use
A82-42067
TRIANTAFYLLOU, M. A.
Real time estimation and prediction of ship motions using Kalman filtering techniques
[NASA-CR-169284] N82-31637
TROTTER, B. L.
Evaluation of a meteorological airborne pulse Doppler radar
[PB82-156860] N82-30820
TSAI, M. S.
Mode scatterer design for fan noise suppression in two-dimensional ducts
A82-43402
TURNER, P. E.
Assessment of stereographics for fire control and navigation in fighter aircraft
[AD-A115414] N82-30306
TUTTLE, M. H.
Laminar flow control, 1976 - 1982: A selected annotated bibliography
[NASA-TM-84496] N82-31645

V

VAUCHERET, X.
Corrections for wall effects in ONERA industrial wind tunnels
[ONERA, TP NO. 1982-34] A82-42810
VETTER, J. R.
Problems with the use of percentages in the analysis of AAES data
A82-44293
VICENS, F.
Characteristics of a Paris-New York flight on board the Concorde
A82-41700
VILENKIN, A. V.
Determination of antioxidant content in aviation oils using thin-layer chromatography
A82-42894
VISHNIAKOVA, T. P.
Antiwear properties of additives based on higher fatty acids
A82-42893
VON MEIER, U.
Methodology in flight tests
A82-43400
VYSTAVKIN, A. N.
Proposed multipurpose flying radio-physical laboratory using an IL-18 aircraft
A82-43278

W

WALLENBERG, R. A.
Notebook on electromagnetic properties of composite materials below 1 GHz
[AD-A115132] N82-30340
WANG, N.
Near field analysis of airborne antennas
[AD-A115074] N82-30462
WARNER, C.
A new class of routing protocols for a proposed computer network linking tactical radar sites
A82-43893
WELLS, W. R.
Analysis of flight data in the frequency domain
A82-41796
WELTE, D.
Processes and procedural approaches in the aerodynamic design of the Alpha Jet aircraft
A82-43328
WHIPPLE, R. D.
Current perspectives on emergency spin-recovery systems
A82-43264
WHYTE, I.
Wide-angle, multiviewer, infinity display system
[AD-A116308] N82-31336
WIMPENNY, J. C.
Aircraft R&D in Europe - A perspective view
A82-42544
Aeronautical research and development in Europe - Perspectives
A82-43588
WOLF, S. W. D.
Control software for two dimensional airfoil tests using a self-streamlining flexible walled transonic test section
[NASA-CR-165941] N82-30314
WOLOCK, I.
Life enhancement of Naval systems through advanced materials
[AD-A114722] N82-30404
WRIGHT, D. B., JR.
Bonding procedure for Teflon seals
A82-42792

WROPLESKI, J. J., JR.
The lateral response of an airship to turbulence
[AD-A115197] N82-30312
WUENNENBERG, H.
Applied flight mechanics in the design and in flight tests
A82-43327
WYNDLE, G. A.
Computer architecture study for VTXTS simulators
[AD-A115006] N82-30953

Y

YANG, T. Y.
Transonic flutter and response analyses of two 3-degree-of-freedom airfoils
A82-44245
YEE, R.
A floating-point/multiple-precision processor for airborne applications
A82-41868
YOSHIKAWA, K. K.
Transient phenomena of shock-induced turbulent separation for a spikebody and stalling airfoil at transonic and supersonic speeds
[AIAA PAPER 82-1362] A82-42950

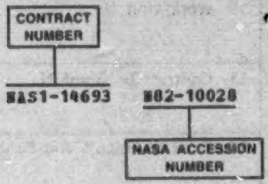
Z

ZACHARIAS, G.
Pilot/vehicle model analysis of visual and motion cue requirements in flight simulation
N82-30838
ZAITSEVA, L. S.
Antiwear properties of additives based on higher fatty acids
A82-42893
ZAKHAROVA, T. P.
Structural strength of materials and parts of gas turbine engines
A82-42063
ZARRELLI, L. B.
Analysis of Active BCAS alert rates and protection based on actual aircraft tracks
[AD-A116402] N82-31319
ZANZAR, V. A.
Extracts from Problems of Air Law, a collection of works of the Section of air law of the Aviakhim Society of the USSR and Aviakhim RSFSR
[NASA-TM-76913] N82-31153
ZEPF, A. W.
Wide-angle, multiviewer, infinity display system
[AD-A116308] N82-31336
ZHESTOVSKII, V. V.
Mathematical models of rotor strength and optimization in computer-aided design
A82-42462
ZINN, B. T.
Development of a spinning wave heat engine
[NASA-CR-165611] N82-31328
ZUGSCHWERT, J. F.
It's too logical - It'll never work /Commercial applications of the JVX/
A82-44469

CONTRACT NUMBER INDEX

AERONAUTICAL ENGINEERING/*A Continuing Bibliography (Suppl. 155)* DECEMBER 1982

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the *IAA* accession numbers appearing first. The accession number denotes the number by which the citation is identified in either the *IAA* or *STAR* section.

AF PROJ. 1900
N82-30310
AF PROJ. 2310
N82-30356
N82-30806
AF PROJ. 2402
N82-31308
AF PROJ. 2403
N82-30306
N82-31694
AF PROJ. 2418
N82-30386
AF PROJ. 3048
N82-30556
AF PROJ. 6210
N82-30782
AF PROJ. 7930
N82-30304
AF-AFOSR-79-3523
A82-44245
AF-AFOSR-3260-78
N82-30859
DA PROJ. 1L1-61102-AH-60
N82-31714
DA PROJ. 1L1-62111-AH-71
N82-31323
DA PROJ. 1L1-62209-AH-76
N82-31974
N82-31975
DA PROJ. 1L1-62210-D-283
N82-31324
DAAK51-79-C-0046
N82-31974
N82-31975
DE-AC04-76DP-00789
N82-31309
DEN3-17 N82-31158
DOT-FA77WAI-725
N82-30857
DOT-TSC-15950
N82-31335
DOTA01-82-C-10003
N82-31318
DTCG39-81-C-80287
N82-30437
DTFA01-80-Y-10524
N82-30804
DTFA01-81-C-10007
N82-30800
DTFA01-82-C-10003
N82-31319
EC-77-A-31-1040
N82-31158
FAA PROJ. 021-241-860
N82-32140
FAA PROJ. 049-330-110
N82-31315
F19628-78-C-0200
N82-30782
F19628-78-C-0218
N82-30356
F19628-80-C-0002
N82-30310
F33615-79-C-0002
N82-31336
F33615-79-C-2037
N82-30556
F33615-80-C-3602
N82-30306
F33615-80-C-3620
N82-31694
F33615-80-C-5060
N82-30386
NAG1-10 N82-30288
NAG1-100 N82-30432
NAG1-159 N82-30288
NAG3-96 N82-31328
NAG3-122 N82-31639
NASA ORDER A-77471B
N82-31300
NASA-NMI-1052.151
N82-30857
NASW-3541 N82-30287
N82-31153
NASW-3542 N82-30290
N82-30303
N82-30337
N82-31147
NAS1-14908 N82-31311
NAS1-15896 N82-31066
NAS1-16058 N82-31295
N82-31296
N82-31297
N82-31298
N82-31299
N82-31965
N82-31966
NAS1-16262 A82-44246
NAS1-16802 N82-31326
NAS2-9887 N82-31301
N82-31302
NAS2-10334 N82-30400
NAS2-10385 N82-30857
NAS2-10590 N82-32081
NAS3-21763 N82-31448
NAS3-21977 N82-31546
NAS4-2705 N82-30289
NCC1-52 N82-31967
NGL-05-020-243
N82-31304
NGL-22-009-124
N82-31637
NGL-22-009-640
N82-30432
NSG-1496 N82-31330
NSG-6026 N82-30298
NSG-7172 N82-30314
N00014-76-C-0182
N82-31305
N82-31322
N00014-78-C-0257
N82-30849
N00019-77-A-0350
N82-31327
N00019-80-C-0157
N82-30340
N00019-80-C-0277
N82-30414
N00019-80-C-0593
N82-30462
USDA/FS-53-3187-0-29
N82-30606
N82-30608
WF41461000 N82-30305
WF61542001 N82-30378
505-03-13-04 N82-31070
505-32-02 N82-32082
505-32-72 N82-32186
N82-32187
N82-32188
N82-32189
505-33-32 N82-30336
505-33-33-11 N82-30566
505-33-53-01 N82-31304
505-33-53-03 N82-31069
505-33-62 N82-31707
505-34-43-05 N82-30962
505-35-13-01 N82-32080
505-41-33-01 N82-30525
505-43-23-01 N82-30291
505-44-12 N82-30297
505-44-33-01 N82-31321
533-01-11 N82-30400
533-01-43-10 N82-31294
534-01-13-06 N82-31645
535-03-12 N82-31663

1. Report No.
NASA SP-7037(155)

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle
Aeronautical Engineering
A Continuing Bibliography (Supplement 155)

5. Report Date
December 1982

6. Performing Organization Code

7. Author(s)

8. Performing Organization Report No.

9. Performing Organization Name and Address
National Aeronautics and Space Administration
Washington, D.C. 20546

10. Work Unit No.

11. Contract or Grant No.

12. Sponsoring Agency Name and Address

13. Type of Report and Period Covered

14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 272 reports, articles and other documents introduced into the NASA scientific and technical information system in November 1982.

17. Key Words (Suggested by Author(s))
Aerodynamics
Aeronautical Engineering
Aeronautics
Bibliographies

18. Distribution Statement
Unclassified - Unlimited

19. Security Classif. (of this report)
Unclassified

20. Security Classif. (of this page)
Unclassified

21. No. of Pages
68

22. Price*
$5.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1982